Llanbrynmair Wind Farm

Scoping Report

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1 Introduction

1.1 Background and Context

1.1.1 RES ('The Applicant') is preparing an application for the Llanbrynmair Wind Farm ('Proposed Development'), located between the villages of Llanbrynmair and Llanerfyl in Powys, Wales. The site area is in the uplands north-east of Llanbrynmair village, see **Figure 1.1** Site Location and Context Plan. This report accompanies a request for an Environmental Impact Assessment (EIA) Scoping Direction from Planning and Environment Decisions Wales (PEDW) in accordance with Regulation 33 of the Town and Country Planning (EIA) (Wales) Regulations 2017 (the "EIA Regulations") with respect to the Proposed Development.

1.1.2 As the scheme comprises an electricity generating station with an installed generating capacity of between 10 and 350 MW, it falls within the definition of a 'Development of National Significance' (DNS) under section 4(1) of the Developments of National Significance (Specified Criteria and Prescribed Secondary Consents) (Wales) Regulations 2016 (as amended), for the purposes of s62(D) of the Town and Country Planning Act 1990, as amended by s19 of the Planning (Wales) Act 2015.

1.1.3 In accordance with the EIA Regulations, a person who is minded to make an application for planning permission for a potential DNS may ask the Welsh Ministers to state in writing the scope and level of detail of the information to be provided in the Environmental Statement (ES) (a "Scoping Direction").

1.1.4 Regulation 33 (2) of the EIA Regulations states that a scoping request must be accompanied by:

(2) A request under paragraph (1) must include-

(a) a plan sufficient to identify the land;

(b) a brief description of the nature and purpose of the development including its location and technical capacity;

(c) its likely significant effects on the environment;

(d) a statement that the request is made in relation to a development of national significance for the purposes of section 62D of the 1990 Act; and

(e) such other information or representations as the person making the request may wish to provide or make.

1.1.5 In addition to the above, Appendix 3 of the PEDW Developments of National Significance: Procedural Guidance sets out that a Scoping Report should include the following information:

- An outline of the main alternatives considered and the reasons for selecting a preferred option;
- Results of desktop and baseline studies where available;
- A record of consultation undertaken with relevant bodies (including any public engagement) to date;
- Referenced plans presented at an appropriate scale to convey clearly the information and all known aspects associated with the proposal;
- Guidance and best practice to be relied upon, and whether this has been agreed with the relevant bodies (for example the statutory nature conservation bodies or local authorities) together with copies of correspondence to support these agreements;
- Methods used or proposed to be used to assess impacts and the significance criteria framework used;
- Any mitigation proposed and the extent to which these are likely to reduce impacts;
- Where impacts from consequential or cumulative development have been identified, how applicants intend to assess these impacts in the ES (for example, a high level assessment of the grid connection where this does not form part of the Proposed Development for a power station);
- An indication of any European designated nature conservation sites that are likely to be significantly affected by the proposed development and the nature of the likely significant impacts on these sites; and
- Key topics covered as part of applicants' scoping exercise; and
- An outline of the structure of the proposed ES.

1.1.6 In accordance with the requirements of Regulation 33, this request for a Scoping Direction is made in relation to a DNS for the purposes of section 62D of the Town and Country Planning Act 1990.

1.2 Application History

1.2.1 A planning application was first submitted to the Department of Energy and Climate Change (DECC) in 2009 and received an objection from Powys County Council in September 2012. A Public Inquiry followed which was joined with applications for four other wind farm projects including adjacent Carnedd Wen wind farm being developed by RWE. The Public Inquiry was held between 6 June 2013 and 30 May 2014 in Welshpool, Powys. The Planning Inspector passed the report to the Secretary of State in early December 2014. In early March 2015, DECC announced the Mid Wales Public Inquiry decision would not be made until early in the next Parliament.

1.2.2 On 7 September 2015, the Secretary of State refused planning permission for Llanbrynmair Wind Farm and Carnedd Wen wind farm, against the advice of the Planning Inspector. Following a judicial review challenge to the decision by RES and RWE, the Secretary of state was required to redetermine both Llanbrynmair and Carnedd Wen applications.

1.2.3 The Section 36 decision letter for Llanbrynmair states on this matter that: "Given the sites are adjacent to each other in a large area of upland plateau near Talerddig, Foel/Llangadfan and the Nant yr Eira Valley, and the Inspector has considered both proposals together in his Report, the Secretary of State decided therefore that the redetermination of the applications and required update to the environmental information should be undertaken together and as an in-combination Habitats Regulation Assessment" (paragraph 2.6).

1.2.4 Llanbrynmair Wind Farm was finally granted Section 36 consent under the terms of the Electricity Act 1989 (the 'Electricity Act') on 17th December 2021 in relation to a generating station of up to 90 MW maximum installed capacity.

1.3 Need for Development

1.3.1 The science behind climate change is well established and points strongly towards a need to reduce our reliance on fossil fuels in order to avoid negative economic, environmental and social effects. International and European commitments to reducing CO_2 and tackling climate change have been made by all major economies. In response to these issues the UK has made significant, legally binding commitments to increase the use of renewable energy.

1.3.2 There is a strong planning policy direction that much more has to be done through the planning system to meet the greatly enhanced level of renewable energy development that is now required. The Environment (Wales) Act 2016 sets a target to reduce greenhouse gas emissions in Wales by 80% by 2050 and in 2017, the Welsh Government announced a target of meeting 70% of Wales' electricity consumption from renewable electricity sources by 2030 (Welsh Government, 2017). Since declaring a climate emergency in 2019 and responding to advice from the Climate Change Committee, the Welsh Government has set out the target for Wales to be net zero by 2050. The Proposed Development relates directly to both the need and of those commitments.

1.4 The Applicant

1.4.1 RES is the world's largest independent renewable energy company active in onshore and offshore wind, solar, energy storage and transmission and distribution. At the forefront of the industry for more than 41 years, RES has delivered more than 23GW of renewable energy projects across the globe and supports an operational asset portfolio exceeding 10GW worldwide for a large client base. Understanding the unique needs of corporate clients, RES has secured >1.5GW of power purchase agreements (PPAs) enabling access to energy at the lowest cost. RES employs more than 4,500 people and is active in 21 countries.

1.4.2 From its Cardiff office, RES has been developing, constructing and operating wind farms in Wales since the early 1990s. RES has developed and/or built 7 wind farms in Wales with a total generation capacity of 146.55 MW, and currently manages assets totalling 69.4 MW of capacity in Wales.

2 Environmental Impact Assessment

2.1 Environmental Impact Assessment

2.1.1 The EIA Regulations require that before consent is granted for certain types of development, an EIA must be undertaken. The Regulations set out the types of development which must always be subject to an EIA (Schedule 1 development) and other developments which may require EIA if they are above certain thresholds and are likely to give rise to significant environmental impacts (Schedule 2 development).

2.1.2 The Proposed Development falls within Schedule 2 of the EIA Regulations and has the potential to have some significant environmental effects. Therefore, it is the opinion of The Applicant that the Proposed Development qualifies as "EIA Development" and therefore The Applicant will submit an Environmental Statement (ES), in support of a planning application to the Welsh Ministers.

2.1.3 EIA is an iterative process which identifies the potential environmental effects that in turn inform the eventual design of the Proposed Development. It seeks to avoid, reduce, offset and minimise any adverse environmental effects through mitigation. It takes into account the effects arising during the construction, operation and decommissioning phases. Consultation is an important part of the EIA process and assists in the identification of potential effects and mitigation measures.

2.2 Purpose of EIA Scoping

2.2.1 The purpose of EIA Scoping is to consider the scope and level of detail of the information to be provided in the ES and to focus the EIA process on the likely significant environmental effects of a proposal.

2.2.2 The EIA Regulations provides for potential applicants to ask Welsh Ministers to state in writing the information that should be provided within the ES. The 'Scoping Direction' is to be offered following discussion with the consultation bodies.

2.2.3 The Applicant recognises the value of the scoping approach, and the purpose of this report is to ensure that relevant issues are identified and to confirm that the assessment process described will meet legislative requirements.

2.2.4 This Scoping Report:

- describes the existing site and its context;
- establishes the format of the ES;

- provides baseline information; and
- describes key issues and the proposed assessment methodologies for various technical assessments to be covered in the ES.

2.2.5 Key questions are included throughout the Scoping Report to help structure the feedback from Ministers and consultees and ensure realisation of the maximum value of the scoping process for all parties.

2.2.6 This Scoping Report will be submitted to PEDW, who will seek opinions from a range of statutory and non-statutory consultees. Where requested, the report can be made available to other interested parties.

2.3 EIA Process and Methodology

Introduction

2.3.1 Environmental Impact Assessment (EIA) is a process, which identifies the potential environmental effects of a development and then seeks to avoid, reduce or offset any adverse effects through mitigation measures. Its key characteristics are that it is:

- Systematic – comprising a sequence of tasks defined both by regulation and by good practice, leading to the use of the information that is gathered to inform decision-making as to whether or not the proposed development should be allowed to proceed;
- Analytical - requiring the application of specialist skills from the environmental sciences;
- Impartial – its aim being to inform the decision maker rather than to promote the project;
- Consultative – with provision being made for obtaining feedback from interested parties including local authorities and statutory agencies;
- Iterative - allowing opportunities for environmental concerns to be addressed during the planning and design of a project; and
- Interactive, whereby the proposals for the key stages of the development are progressively refined in response to environmental as well as technical considerations with a view to minimising the scheme's potential adverse environmental effects and maximising environmental benefits.

2.3.2 The EIA process is an iterative one, but the process can be broken down into the following stages; consultation and scoping; assessment approach and

methodology; baseline studies to establish the existing environmental conditions at the site; identification of potential environmental effects; mitigation to avoid or reduce the effects through iterative design process; assessment of residual effects and preparation of the ES.

Consultation and Scoping

2.3.3 As discussed in section 2.2 above, the purpose of EIA Scoping is to consider the scope and level of detail of the information to be provided in the ES and to focus the EIA process on the likely significant environmental effects of a proposal. In addition, the scoping process seeks opinions from a range of statutory and non-statutory consultees which provides helpful feedback and guidance which informs the EIA process and outputs of the ES.

Assessment Approach and Methodology

2.3.4 The assessment approach and methodology identifies the study area assessed and explains why this area is appropriate. It also identifies the criteria for assessing and describing significance, whilst confirming what assessments have been carried out and when. The methodology will provide detailed information of any consultation undertaken both pre and post Scoping. It will also include a section on relevant policy and guidance.

Baseline Conditions Studies

2.3.5 Information relating to the existing environmental conditions will be collected. This may include one or all of the following: desk based assessment, information from consultees, public records and other archive sources. Where site surveys are undertaken the methods of data collection discussed and agreed with the relevant consultees will be provided. Individual data sources will be described in each chapter of the ES.

Identification, Description and Evaluation of Likely Significant Environmental Effects

2.3.6 This section of the EIA process recognises the effects which are likely. The stated methodology is applied to the scheme design and covers the construction, operation and decommissioning of the Proposed Development. The site receptors are identified at this stage in the process, including human receptors and environmental resources such as flora, fauna, the water environment and cultural heritage.

2.3.7 Conclusions about significance are derived with reference to available information about the project description and the site receptors, and to predictions about the impacts which the development proposed would have assuming it is consented, on identified receptors.

2.3.8 In each of the environmental topic chapters, professional judgement is used in combination with relevant guidance to assess the interaction of the receptor's sensitivity (this may be defined in terms of importance, value, rarity, quality) against the predicted magnitude of change to identify a level of effect.

2.3.9 In general terms, and in order to assist consistent interpretation of the final results of the EIA, receptor sensitivity, magnitude of change and level of effect for each environmental topic are categorised. The type of categorisation may be moderated by the individual professional that undertakes the assessment in accordance with relevant guidance documents, judgement and experience. In particular, the divisions between categories of receptor sensitivity, magnitude of change, and level of effect should not be interpreted as definitive.

2.3.10 When determining significance this reflects the relationship between two factors; the magnitude or severity of an effect (i.e. the actual change taking place to the environment); and the sensitivity, importance or value of the resource or receptor. The significance of an environmental effect is determined by the interaction of magnitude and sensitivity, whereby the effects can be positive or negative (beneficial or adverse). Magnitude, sensitivity and significance criteria are provided as a guide for specialists to categorise the significance of effects. Where discipline specific methodology is applied that differs from the generic criteria and will be explained within the given chapter under the Assessment Approach & Methodology section.

Mitigation

2.3.11 Mitigation identifies any measures required to prevent, reduce or compensate for significant adverse impacts, or enhance positive effects. It also takes into account the likelihood of the success of the mitigation measures proposed. Where effects cannot be avoided, individual chapters outline appropriate mitigation to reduce these effects or recommend compensatory measures.

Residual Effects

2.3.12 Each chapter of the ES will include a description and evaluation of the residual effects of the development proposed, i.e. those effects which are considered to be significant in terms of the EIA Regulations following the implementation of mitigation measures.

2.4 The Environmental Statement

2.4.1 The ES systematically sets out the assessment methodology, baseline conditions, key impacts and potential mitigation and enhancement measures that have been assessed by consultants of the respective disciplines to address the likely significant effects identified as required by the Town and Country Planning (EIA) (Wales) Regulations 2017.

2.4.2 The ES reports the findings of the assessment of the likely significant environmental effects of the scheme. Although each assessment applies a specific series of matrices and decision-making tools to assist the assessor in determining the significance of predicted effects identified in the ES, the same general approach of information gathering and assessment is undertaken throughout the EIA process.

2.4.3 The ES includes information, as detailed in Schedule 4 of the Town and Country Planning (EIA) (Wales) Regulations 2017, as reasonably required, to assess the environmental effects of the development. The ES provides data to identify and assess any environmental effects of likely significance in relation to the Proposed Development and provides a description of the measures envisaged in order to avoid, reduce or remedy, if possible, significant adverse effects.

2.4.4 The structure of the ES will follow the requirements of the Town and Country Planning (EIA) (Wales) Regulations 2017 and other relevant good practice guidance. Essentially, the ES will comprise the following volumes:

- Volume 1 – Non-Technical Summary;
- Volume 2 – Main Text;
- Volume 3 – Figures
- Volume 4 – Technical Appendices; and
- Volume 5 – Confidential Annex (if required).

2.4.5 Volume 2 will comprise of the following chapters:

- Chapter 1 – Introduction;
- Chapter 2 – Approach to EIA / Assessment Methodology;
- Chapter 3 – Application Site and Proposed Development;
- Chapter 4 – Design Evolution, Alternatives and Planning Policy;
- Chapter 5 – Landscape and Visual Impact Assessment;
- Chapter 6 – Cultural Heritage Assessment;
- Chapter 7 – Ecology Assessment;
- Chapter 8 – Ornithology Assessment;
- Chapter 9 – Geology, Hydrology and Hydrogeology Assessment;

- Chapter 10 – Peat Assessment
- Chapter 11 - Traffic and Transport Assessment;
- Chapter 12 – Acoustic Assessment;
- Chapter 13 – Socio Economic Assessment;
- Chapter 14 – Aviation and Other Issues;
- Chapter 15 – Shadow Flicker;
- Chapter 16 - Schedule of Environmental Mitigation; and
- Chapter 17 – Summary and Conclusions

2.4.6 Each technical chapter (5-17) will include, as a minimum, the following sections:

- Introduction
- Legislation, Policy and Guidance
- Consultation
- Method of Assessment
- Baseline
- Assessment of Potential Effects
- Mitigation
- Assessment of Residual Effects
- Assessment of Cumulative Effects
- Summary
- References

2.5 ES Format

2.5.1 When the EIA process has been completed and the ES prepared it will be made available online, on USB flash drive and hard copy which will be publicly available although, in the interest of sustainability, encouragement of the online format is preferred.

3 The Proposed Development

3.1 Introduction

3.1.1 This section describes the Proposed Development and provides information on its location, physical characteristics, proposed components and design. The wind turbine and infrastructure layout will be subject to an iterative design process as part of the EIA.

3.1.2 The Proposed Development is located on land within Powys, Wales. The area is in the uplands located approximately 6 kilometres (km) to the north-east of Llanbrynmair village and is located between the villages of Llanbrynmair and Llanerfyl between the A458 and A470. The Site is primarily comprised of undulating hilly ground and generally slopes towards the south-east to the Afon Gam watercourse. The site contains some commercial forestry in the west but is mostly comprised of open moorland and farmland.

3.1.3 The nearest settlements to the Proposed Development are: Llanbrynmair ca.2.7 km to the southwest; Dolfach ca.2.7 km to the south; Foel ca.3.2 km to the northeast; Talerddig ca.3.7 km to the south; LLangadfan ca.4.7 km to the northeast.

3.1.4 The principal components of the Proposed Development are expected to include:

- up to 15 three-bladed horizontal axis wind turbines of up to 230m tip height. The wind turbines would be nominally rated at 7.2 MW;
- at each wind turbine, associated low to medium voltage transformers and related switchgear;
- wind turbine foundations;
- hardstand areas for erection cranes at each wind turbine location;
- a network of on-site tracks including an access track and site entrance from the public road network;
- borrow pits (dependent on availability of stone within the site);
- a substation compound containing electrical infrastructure, control building, welfare facilities and a communications mast;
- a network of buried electrical and communication cables; and
- temporary construction compounds.

3.2 Site Description

3.2.1 The Proposed Development site is primarily comprised of undulating hilly ground and generally slopes towards the south-east to the Afon Gam

watercourse. The site contains some commercial forestry in the west but is mostly comprised of open moorland and farmland. It is located approximately 6 kilometres (km) to the north-east of Llanbrynmair village, Powys, as shown on the Site Location and Context Plan - **Figure 1.1**. The site is centred on Ordnance Survey grid ref SH 954065 06541 (E 295493, N 306541) and covers an area of approximately 1646 hectares (16.46 km^2).

3.2.2 The site is predominantly a mosaic of blanket bog, heath and grassland (including improved and semi-improved pasture and acid grassland), with smaller compartments of commercial plantation (covering approximately 15 % of the area).

3.2.3 The topography of the Site is predominantly gently rolling, but steep-sided valleys and ridges are present to the west and north and occur locally within the Site boundary. Minor watercourses are frequent, and mainly discharge to the Nant Carfan to the west and the Nant yr Eira which flows north-west across the Site to join the Afon Banwy. There are two large still freshwater bodies to the north-west of the Site (within the Carnedd Wen Wind Farm site), Llyn Gwyddior and Llyn Coch-hwyad.

3.2.4 Apart from two designated historic assets within the site itself but in close proximity to the site boundary, there are no statutory environmental designations within the site boundary. The assets include the Scheduled Monument of a Bronze Age cairn in the south-western part of the Site and the Grade II Listed Building of Abercannon near the eastern boundary of the northern part of the Site. Registered Historic Parks & Gardens are located more than 15 km from the Site with the closest at Gregynog, to the southeast.

3.2.5 The site is not located within a nationally or locally designated landscape. Eryri / Snowdonia National Park is located ca. 4.2 km to the northwest of the site. The closest Special Landscape Areas (SLA) (areas of high landscape importance) is Corris SLA approximately 15 km northwest of the Site.

3.2.6 One Special Area for Conservation (SAC), the Berwyn and South Clwyd Mountains SAC, the Berwyn Special Protection Area (SPA) and six SSSIs are present within 5 km of the Site. SSSIs within 2 km of the Site are Corsydd Llanbrynmair (Llanbrynmair Moors) SSSI approximately 300m to the north-west of the Site at its closest point comprising several small areas of remnant blanket bog and Gweunydd Dolwen SSSI located approximately 230m east of the Site at its closest point notified for its acid and neutral dry grassland.

3.2.7 The Site is underlain by bedrock of Silurian age, from the Llandovery and Wenlock Epochs. No areas of mineral extraction are identified and there are no records of active mining or quarrying within the Site; however, there is a disused quarry present within the Site itself. The main groundwater bodies associated with the Site are Wenlock Rocks and Llandovery Rocks, both considered to be low productivity aquifers.

3.2.8 The Unified Peat Map of Wales (Evans *et al.*, 2020) shows six areas of peat within the Site ranging in area from 1.5 to 10 hectares.

3.2.9 Flood risk is indicated to be medium to high for rivers and minor watercourses within the Site. Areas of flood risk are mostly confined to main watercourse channels, with some localised flood risk areas extending outside of the watercourse channels, however, for most of the Site, flood risk is negligible.

3.2.10 Two footpaths bisect the site, one in the centre of the site known as Glyndwr Way and another further in the south.

3.2.11 See **Figure 3.1** Environmental Constraints Plan for features described above.

3.3 Site Design

3.3.1 The Proposed Development has been informed by an iterative process of design, engineering analysis and examining site suitability issues, commencing with a preliminary constraints analysis exercise taking into account topographical considerations, proximity to local designations and a robust analysis of environmental considerations. Initially the scheme commenced as a 21 turbine layout which reduced to 15 turbines following the findings of the preliminary ecological habitat surveys and updated peat mapping.

3.3.2 An interim peat survey of greater resolution than the standard 100m is planned to be carried out but of a low enough resolution to provide a larger survey area to be feasible and with final Phase 2 peat survey probing scheduled near design freeze. See **Figure 3.2** Llanbrynmair Turbine Layout Plan. Further survey work not only includes peat assessment but also further guidance following on from forthcoming ecological surveys and any relevant constraints as a result of this work.

3.3.3 Located immediately adjacent to the northern boundary of the Site is the proposed Carnedd Wen (CW) wind farm. The location and proximity of the two projects creates unique circumstances which is considered should

underpin the design approach in order to maximise the combined installed capacity that can be generated by the two projects and also which can minimise the environmental effects arising to an acceptable level. It is therefore considered to be in the interest of both RWE and The Applicant to continue to work with each other to facilitate the development of two compatible projects such that each development can essentially be seen as an 'extension' to the other, with the aim of achieving a consistent and aligned EIA approach including the assessment of cumulative effects. **Figure 3.3** illustrates the layout of both Llanbrynmair and Carnedd Wen Wind Turbine Layout Plans.

3.4 Cumulative Development

3.4.1 Within EIA, cumulative effects are generally considered to arise from the combination of effects from the Proposed Development and from other proposed or permitted schemes in the vicinity, acting together to generate elevated levels of effects. Examples of these kinds of effects could include traffic generated from developments affecting the surrounding road network; air quality effects from developments; and discharges to the water environment The ES will consider the potential for likely significant effects on the environment resulting from committed developments in the area.

3.4.2 As set out within Welsh Office Circular 11/99 'Environmental Impact Assessment' paragraph 46:

"Local planning authorities should always have regard to the possible cumulative effects with any existing or approved development"

3.4.3 Furthermore, Policy 18 of Future Wales requires proposals for renewable and low carbon energy projects to consider the cumulative impacts of existing and consented renewable energy schemes.

3.4.4 Cumulative sites within 30km of the Proposed Development as listed in Table 3.1 and illustrated on **Figure 3.4** (Other Wind Energy Developments) will be considered for operational, under construction, consented, and proposed (for those which there is a valid planning application) wind farms. Carnedd Wen (CW) wind farm is in close proximity to Llanbrynmair wind farm, located immediately adjacent to the north, therefore, in addition to being considered as a cumulative site its layout will be considered with the design of Llanbrynmair site design process in order to arrive at mutually acceptable developments where possible.

3.4.5 The approach to how cumulative effects will be considered for each discipline is outlined within each individual topic section below and the

detailed methodology will be set out within the relevant chapter of the ES as methodologies may differ slightly from topic to topic. For example, as stated in the landscape section below (Section 5) the Landscape and Visual Impact Assessment chapter of the ES will consider the potential for any cumulative effects to arise within 30km of the site, but other disciplines may not have a need to consider committed developments this far from the Proposed Development.

3.4.6 As the cumulative baseline is constantly evolving and the relevant cumulative schemes will vary by topic, the schedule of cumulative sites to be included in the assessment will be finalised following consultation with relevant consultees, in particular Powys County Council (PCC).

Table 3.1 Cumulative sites within 30km

Wind Farm	Status	Approx distance /direction from Llanbrynmair	Turbines Nos/Blade Tip Height metres (BTH)
Banc Du	Scoping	21km south	7 turbines / 200m BTH
Bryn Blaen	Operational	21km south	6 turbines / 100m BTH
Bryn Titli	Operational	27km	22 turbines /48.5m BTH
Bryngydfa	Scoping	29km	12 turbines /126.5m BTH
Carnedd Wen	Scoping	<1km northwest	26 turbines / 200m BTH
Carno I	Operational	6km south	56 turbines / 53.5m BTH
Carno II	Operational	6km south	12 turbines / 80m BTH
Carno III	Consented	8km south	13 turbines / 149.9m BTH
Cefn Croes	Operational	25km southwest	39 turbines / 100m BTH
Cemmaes 2	Operational	5km west	18 turbines / 66m BTH
Esgair Cwmowen	In Planning	7km southeast	18 turbines / 125m BTH
Esgair Galed	Scoping	12km southwest	26 turbines / 220m BTH
Garn Fach	Scoping	22km southeast	17 turbines / 149.9m BTH
Garreg Lwyd Hill	Operational	29km southeast	17 turbines / 126m BTH
Llandinam	Operational	20km	103 turbines / 44m BTH
Llandinam Repowering	Consented	22km southeast	39 turbines / 121.2m BTH
Lluest y Gwynt	Scoping	22km southwest	24 turbines / 180m BTH
Mynydd Clogau	Operational	9km southeast	17 turbines / 66m BTH
Mynydd Gorddu	Operational	29km	19 turbines / 54m BTH
Mynydd Lluest y Graig	Scoping	2km east	34 turbines/ 200m BTH
Rheidol	Operational	30km	8 turbines / >80m BTH

Rhiwlas	Scoping	24km south	15 turbines / 200m BTH
Tirgwynt	Operational	5km southeast	12 turbines / 116m BTH

3.4.7 Assessments will be quantitative where possible, and qualitative where not, based on professional judgement and reasonable assumptions. As part of the Scoping consultation, confirmation is also sought from PEDW on the Proposed Developments to be considered in the cumulative assessment.

3.5 Electrical Layout and Grid Connection

3.5.1 Wind turbines will be electrically connected to each other via inter-array cable circuits. A substation, which would house transformer(s) and associated switchgear, would convert the electricity generated by the wind turbines onto an appropriate voltage for onward transmission onto the National Grid.

3.6 Construction Phase

3.6.1 It is anticipated that the construction phase of the Proposed Development would be completed over a period of approximately 13 months.

3.6.2 Temporary compound(s) would be required during construction. The temporary compound(s) would include site cabins and welfare facilities for construction workers and could also be used as a laydown area for the delivery of some materials.

3.6.3 Stone required to construct any new access tracks could potentially be obtained from on-site borrow pits. The exact location of borrow pits would be dependent upon site surveys, availability of suitable material and proximity to where it is required. Should a suitable borrow pit search area not be identified within the site, The Applicant will need to make provision for the import of aggregate from a suitable off-site source.

3.6.4 All statutory legislation and other best practice guidance would be fully complied with during construction.

3.6.5 Construction mitigation and environmental protection measures would be implemented via a Construction Environmental Management Plan (CEMP).

3.7 Operational Phase

3.7.1 The assessments undertaken to inform the EIA will consider the operational phase of the Proposed Development in perpetuity.

3.7.2 Routine operational and maintenance work would be carried out as necessary.

3.8 Decommissioning Phase

3.8.1 When decommissioning is required, it is considered that the impacts would be less than the impacts experienced during the construction phase.

4 Planning Policy Context

4.1 Introduction

4.1.1 The application will be submitted under the Town and Country Planning Act 1990 as a development of national significance (DNS) and accompanied by a Planning Statement in support of the Proposed Development. The Planning Statement will consider the Proposed Development against identified planning and other policy objectives, concluding with substantiated comments about the extent to which the Proposed Development complies with the aims and objectives of identified plans and policies.

4.1.2 For clarity, the Planning Statement will draw upon the residual effects, post mitigation, of the Proposed Development identified in the various technical chapters of the ES, in discussing the extent to which it complies with the aims and objectives of identified planning, energy and other relevant policy objectives. The planning and energy related documents that will be considered by The Applicant are set out below.

4.2 National Planning Policy

Future Wales: The National Plan 2040

4.2.1 Future Wales: The National Plan 2040 (Future Wales) is the National Development Framework for Wales and sets out the overall context for development planning across the country to 2040. Future Wales was introduced in February 2021 and seeks to provide a strategy for addressing key national priorities through the planning system, inclusive of decarbonisation. It is the primary document in the development plan and is a material consideration in the determination of DNS applications.

4.2.2 Future Wales sets out that Wales can become a world leader in renewable energy technologies, with its wind resources highlighted as well as support for large scale projects and commitment to ensuring that the planning system provides a strong lead for renewable energy development.

4.2.3 Decarbonisation is a key aim of the document, which sets a number of target outcomes including the planning system helping Wales lead the way in promoting and delivering a sustainable decarbonised society. Two of the 'seven key questions' that will form the 'First Review' of the document in determining it's success are 'Has Future Wales supported decarbonisation', and 'Has Future Wales supported the delivery of renewable energy.'

4.2.4 Of particular note are Policy 17 (Renewable and Low Carbon Energy and Associated Infrastructure) and Policy 18 (Renewable and Low Carbon Energy Developments of National Significance). Policy 17 strongly supports the principle of developing renewable and low carbon energy from all technologies, stating that decision makers must give significant weight to the need to meet Wales' international commitments and targets. It also confirms that in Pre-Assessed Areas for Wind Energy the Welsh Government has already modelled the likely impact on the landscape and has found them to be capable of accommodating development in an acceptable way. There is a presumption in favour of large-scale wind energy development in these areas, subject to the criteria in Policy 18.

4.2.5 Policy 18 sets a number of criteria for assessing such proposals, including no unacceptable adverse impacts on the surrounding landscape outside the pre-assessed areas (particularly on the setting of National Parks and AONBs), no adverse impacts on heritage assets, the proposal including biodiversity enhancement measures, no adverse impacts on the transport network and ensuring that cumulative impacts are considered.

4.2.6 The supportive text to the policies sets out in detail how the policies will support such development. The Planning Statement will provide further detail as to how this support is relevant to the determination of the proposed development.

Planning Policy Wales

4.2.7 Planning Policy Wales (PPW) was republished in February 2024 (Edition 12) and outlines the current land use planning policy for Wales, providing the policy framework for the effective preparation of local planning authorities' development plans. The PPW is supplemented by a series of topic based Technical Advice Notes and is designed to ensure the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales. Alongside Future Wales, the PPW outlines the way in which the planning system can support this delivery through Strategic and Local Development Plans.

4.2.8 PPW confirms that planning applications for onshore generating projects in Wales which have an installed generation capacity of between 10 MW and 350 MW are made directly to the Welsh Government under the Developments of National Significance (DNS) process and considered under policies in Future Wales.

Green Infrastructure Statement

4.2.9 Planning Polic Wales (Edition 12) places a stronger emphasis on taking a proactive approach to green infrastructure, covering cross boundary considerations, identifying key outputs of green infrastructure assessments, the submission of proportionate Green Infrastructure Statements with planning applications and signposting building with nature standards. There is a requirement to submit Green Infrastructure Statements with all planning applications.

Technical Advice Notes

4.2.10 Alongside the PPW, the Welsh Government provides technical advice on specific land use planning matters through a series of Technical Advice Notes (TANs). A number of TANs are potentially relevant to the Proposed Development and these may be briefly discussed in the Planning Statement, with more detailed commentary reserved for the relevant technical chapters of the ES. At this stage, it is envisaged that the following TANs may be of relevance:

- Technical advice note (TAN) 5: Nature conservation and Planning (2009)
- Technical advice note (TAN) 11: Noise (1997)
- Technical advice note (TAN) 12: Design (2016)
- Technical advice note (TAN) 15: Development and Flood Risk (2023)
- Technical advice note (TAN) 18: Transport (2007)
- Technical advice note (TAN) 24: The Historic Environment (2017)

4.3 Strategic and Local Planning Policy

Energy Policy

4.3.1 According to the United Nations Intergovernmental Panel on Climate Change's fifth assessment report, fossil fuel power generation should be phased out 'almost entirely' by the end of the century to limit global warming to 2 degrees Celsius (°C) above pre-industrial levels. The report

states that low carbon electricity supply will have to increase from 30% currently to more than 80% by 2050.

4.3.2 Most of the energy policy documents of relevance to the Proposed Development are concerned with reducing the amount of greenhouse gases (GHG) that are emitted as a result of energy production and a related objective of increasing the proportion of energy derived from renewable sources. The Planning Statement will identify and discuss the key aims and objectives of the most pertinent energy policy documents to the Proposed Development, as at the time of ES preparation. The discussion will include relevant European, United Kingdom (UK) and Welsh energy related legislation and policy. It is anticipated that the commentary on energy policy will identify and discuss the following publications:

- The Paris Agreement (2015) - The Paris Agreement within the United Nations Framework Convention on Climate Change sets out a global action plan towards climate neutrality with the aims of stopping the increase in global average temperature to well below 2ºC above pre-industrial levels, and to pursue efforts to limit global warming to 1.5ºC. The Paris Agreement introduced Nationally Determined Contributions (NDS's) – national climate plans that include commitments to increasing renewable energy provision.
- The Climate Change Act 2008 - (the 2008 Act) provides a system of carbon budgeting. Under the 2008 Act, the UK committed to a net reduction in greenhouse gas (GHG) emissions by 2050 of 80% against the 1990 baseline. The Government amended the Climate Change Act in 2019 by introducing a target for at least a 100% reduction of greenhouse gas emissions (compared to 1990 levels) in the UK by 2050. This is the well-known commitment to 'net zero', requiring a major shift to greater renewable energy generation.
- National Infrastructure Strategy – Fairer, Faster and Greener (November 2020) - The Strategy sets out the UK Government's plans to deliver on its ambition, being to: "deliver an infrastructure revolution: a radical improvement in the quality of the UK's infrastructure to help level up the country, strengthen the Union, and put the UK on the path to net zero emissions by 2050".
- The UK Energy White Paper (December 2020) - The UK Government Energy White Paper 'Powering our Net Zero Future' (December 2020) aims to address the transformation of the UK's energy system towards the 2050 target for net zero emissions. The White Paper recognises the progress made to increase deployment of renewables

and sees the expansion of renewable technologies as a key contributor to achieving an affordable clean electricity system by 2050. It states that "Onshore wind and solar will be key building blocks of the future generation mix…We will need sustained growth in the capacity of these sectors in the next decade to ensure we are on a pathway that allows us to meet net zero emissions in all demand scenarios."

- The Carbon Budget Order (June 2021) ensures that Britain will remain on track to end its contribution to climate change whilst remaining consistent with the Paris agreement temperature goal. The Climate Change Committee have advised that the rapid roll out of renewable energy generation will form a key role in achieving this carbon budget.
- The UK Net Zero Strategy (October 2021) - This sets out policies and proposals for keeping the UK on track in relation to carbon budgets and the UK's nationally determined contribution (NDC)8 and establishes the long-term pathway to net zero by 2050. The Strategy confirms that the fundamental approach of the Energy White Paper remains unchanged. A low-cost net zero consistent electricity system is most likely to be composed predominantly of wind and solar generation. The Strategy affirms that the UK needs to continue to drive rapid deployment of renewables so that it can reach substantially greater capacity beyond 2030.
- The British Energy Security Strategy (April 2022) – The strategy focuses on energy supply and states that in the future nuclear will have an expanded role and that renewables have an important role.
- Powering up Britain (March 2023) - On 30 March 2023 the UK Government (Department for Energy Security and Net Zero) published 'Power Up Britain' which comprises a series of documents including an Energy Security Plan and Net Zero Growth Plan. The documents explain how the country will 'diversify, decarbonise and domesticate energy production by investing in renewables and nuclear, to power Britain from Britain.'
- The Environment (Wales) Act 2016 – This set in place an obligation on the Welsh Government to reduce greenhouse gas emissions by 80% against 1990 levels by 2050.
- Climate Emergency declared in Wales (2019)- The Welsh Government has committed to achieving a carbon neutral public sector by 2030

- Net Zero Wales, Carbon Budget 2 (2021) - The plan states that the Net Zero Wales Plan represents a new phase in the country's decarbonisation journey with a new legally binding Net Zero target. It focuses on Wales's Second Carbon Budget (2021-2025) but looks ahead to Carbon Budget 3 and Wales's 2030 target as well as Net Zero by 2050.
- 100% Renewable Electricity Generation Target – 2035 - On 14 July 2023, the Welsh Minister for Climate Change, Julie James MS, published a summary response to a consultation on Wales's renewable energy targets. In the response to the Minister stated that the Senedd will be adopting the target for Wales to meet the equivalent of 100% of our annual electricity consumption from renewable sources by 2035, and to continue to keep pace with consumption thereafter.

4.3.3 The Proposed Development is located within the administrative area of Powys County Council. The Powys Local Development Plan (LDP) (2011-2026) was adopted by Powys County Council on the 17th of April 2018.

4.3.4 The principal policy of relevance to the proposed development is Policy RE1 (Renewable Energy). This permits proposals for wind energy greater than 25MW within or close to the Strategic Search Areas[1], subject to criteria 3 to 5. These criteria expect proposals to comply with all other relevant policies in the LDP, require satisfactory mitigation to be in place to reduce the impact of the proposal and its associated infrastructure, and where necessary, seek compensatory benefits in accordance with Policy DM1.

4.3.5 The site as a whole appears to be mainly undesignated countryside as per the Council's Policies Map, aside from some sporadic Sand and Gravel Safeguarding Areas. The relevant policies within the LDP which have informed the proposed assessment scope therefore include:

- SP7 – Safeguarding of Strategic Resources and Assets
- DM1 – Planning Obligations
- DM2 – The Natural Environment
- DM4 – Landscape
- DM7 – Dark Skies and External Lighting
- DM8 – Minerals Safeguarding

[1] Now revoked and replaced with the Pre-Assessed Areas within Future Wales

4.3.6 DM10 – Contaminated and Unstable Land

4.3.7 DM14 – Air Quality Management

- DM15 – Waste Within Developments
- E6 – Farm Diversification
- T1 – Travel, Traffic and Transport Infrastructure
- RE1 – Renewable Energy

4.3.8 M3 – Borrow Pits

- M5 – Restoration and Aftercare

5 Landscape and Visual

5.1 Introduction

5.1.1 It is acknowledged from the outset that, in common with almost all commercial wind energy developments that some significant landscape and visual effects would occur as a result of the Proposed Development.

5.1.2 A key principle of the European Landscape Convention is that all landscapes matter and should be managed appropriately. It is also acknowledged that landscapes provide the surroundings for people's daily lives and often contribute positively to the quality of life and economic performance of an area.

5.1.3 Therefore, it is proposed that a Landscape and Visual Impact Assessment (LVIA) is undertaken as part of the EIA and an LVIA Chapter be included in the Environmental Statement (ES). The LVIA will be undertaken by a team of Landscape Architects, including a Chartered Member of the Landscape Institute, who are experienced in the assessment of large scale, onshore wind energy projects and are fully familiar with the landscape in the vicinity of the site.

5.1.4 It is proposed that the LVIA will consider the potential effects of the Proposed Development upon:

- Individual landscape features and elements;
- Landscape character; and
- Visual amenity and the people who view the landscape.

The Site

5.1.5 The Proposed Development site is primarily comprised of undulating hilly ground and generally slopes towards the south-east to the Afon Gam watercourse. The site contains some commercial forestry in the west but is mostly comprised of open moorland and farmland.

5.1.6 The nearest settlements to the proposed turbines are: Llanbrynmair ca.2.7 km to the southwest; Dolfach ca.2.7 km to the south; Foel ca.3.2 km to the northeast; Talerddig ca.3.7 km to the south; LLangadfan ca.4.7 km to the northeast.

5.1.7 The nearest main transport routes include: the A470 ca.1.4 km to the southwest of the site; the A458 ca.2.7 km to the north; and the course of the Cambrian Line railway lying ca.1.2 km to the southwest of the site, with its closest station at Caersws ca.14 km to the southeast.

5.2 Legislation, Policy and Guidance

5.2.1 The LVIA will be prepared in accordance with the principles of best practice, as outlined in published guidance documents, notably the third edition of the Guidelines for Landscape and Visual Assessment (GLVIA3).

"This edition concentrates on principles and processes. It does not provide a detailed or formulaic 'recipe' that can be followed in every situation – it remains the responsibility of the professional to ensure that the approach and methodology adopted are appropriate to the task in hand."

5.2.2 The approach has therefore been developed specifically for this assessment to ensure that the methodology is fit for purpose. Consideration has also been given to the following documents:

- Future Wales: The National Plan 2040 (2021);
- Siting and Designing Windfarms in the Landscape (Scottish Natural Heritage (SNH), 2017);
- Visual Representation of Wind Farms Guidance, Version 2.2, Scottish Natural Heritage (2017);
- Landscape Institute (2019) Technical Guidance Note 02/19, Residential Visual Amenity Assessment.

5.2.3 Full details of the methodology will be provided within the LVIA chapter of the ES.

5.3 Proposed Scope of Assessment

5.3.1 It is proposed that the main objectives of the LVIA will be as follows:

- To identify, evaluate and describe the current landscape character of the site, its surroundings and any notable individual or groups of landscape features within the site;
- To determine the sensitivity of the landscape to the type of development proposed;
- To identify potential visual receptors (i.e. people that would be able to see the proposed development) and evaluate their sensitivity to the type of changes proposed;
- To identify and describe any impacts of the proposed development in so far as they affect the landscape and/or views of it and evaluate the magnitude of change due to these impacts;
- To identify and describe any mitigation measures (including mitigation which is inherent in the design and layout of the development) that have been adopted to avoid, reduce and compensate for landscape and visual effects;
- To identify and assess any cumulative landscape and visual effects;
- To evaluate the level of residual landscape and visual effects; and
- To make a professional judgement about which effects, if any, are significant.

Distinction between Landscape and Visual Effects

5.3.2 In accordance with the published guidance, landscape and visual effects will be assessed separately, although the procedure for assessing each of these is closely linked. A clear distinction has been drawn between landscape and visual effects as described below:

- Landscape effects relate to the effects of the Proposed Development on physical and perceptual characteristics of the landscape and its resulting character and quality; and
- Visual effects relate to the effects on specific views experienced by visual receptors and on visual amenity more generally.

Study area

5.3.3 The majority of the site and all of the proposed turbines lie within a 'Pre-assessed Area for Wind Energy' identified within Policy 17 of Future Wales, where there is a presumption in favour of development, subject to the criteria of Policy 18.

5.3.4 In order to assist with defining the study area, a digital Zone of Theoretical Visibility (ZTV) model has been produced as a starting point to illustrate the geographical area within which views of the proposed development on the site are theoretically possible. This was based on a 'bare-earth' scenario, whereby the screening effect of existing vegetation or built features in the landscape are not taken into account. The ZTV was modelled to blade tip height using the currently proposed blade tip height of 230 m, and turbine hub height of 149 m, and is presented at **Figures 5.2,** and **5.3.**

5.3.5 With reference to 'Using LANDMAP in Landscape and Visual Impact Assessment GN46'[2], based on the preliminary blade tip height, a study area of 28 km is proposed.

5.3.6 The cumulative effect of the Proposed Development in association with other wind energy developments will also be considered. It is proposed that a slightly larger 30 km radius study area will be adopted to consider cumulative effects, which is considered to represent a proportionate extent of the study area and the limit within which any potential significant cumulative effects could occur.

5.4 Baseline Conditions

5.4.1 Initial studies have been undertaken to identify the potential landscape and visual receptors to be considered within the LVIA and the viewpoint locations to inform the assessment (15 proposed viewpoints are set out in **Table 5.1**). This is based on the initial ZTVs (**Figure 5.2 and Figure 5.3**) and knowledge of the area surrounding the site.

5.4.2 The key receptors are outlined in turn below. For the final LVIA, detailed baseline information on the landscape and visual resource will be gathered through a combination of desk studies, consultation and field survey.

Landscape Character

5.4.3 Regarding Landscape Character, the most up to date and relevant landscape character assessment covering the study area is the 2014 National Landscape Character Areas (NLCA) published by Natural Resources Wales. The site falls within the northern extents of NLCA 21: Cambrian Mountains[3] (**Figure 5.1**), as identified by the published document. Its key characteristics are described as:

[2] Natural Resources Wales. 2023. 'Using LANDMAP in Landscape and Visual Impact Assessments GN46'. Last updated: 11 March 2024

[3] Natural Resources Wales. 2014. National Landscape Character NCLA21 Cambrian Mountains.

- “Upland plateau - A band of resistant Silurian grits forming a vast upland, rolling, windswept plateau of moorland hills and incised valleys at the heart of Wales.
- Deep valleys and glacial features - Glaciation gouged deeply dissected U-shaped valleys into the plateau, as well as corries (cymoedd), lakes and moraines. Open moorland and forestry - Thin soils support extensive tracts of sheep grazed grassy moorland – the smooth slopes are interspersed with bracken scrub, wind blown oaks and angular blocks of coniferous forestry.
- Peat bogs, pools - Upland peat deposits give rise to large areas of blanket bog and pools of open water.
- Hedgerow enclosed pastures - Deep valleys on the edges of the moorland, with their distinctive pattern of hedgerow enclosures, lush pastures for stock grazing, and woodland.
- Major reservoirs – notably Nant-y-Moch, Llyn Clywedog, Craig Goch, Penygarreg, Garreg-ddu, Claerwen and Llyn Brianne are features of the valleys, contributing to the landscape’s man-made features.
- Mineral exploitation - Metal ores have been exploited from the prehistoric period with evidence for Bronze Age copper working at Copa Hill, however, most activity relates to extensive lead and silver mining which occurred principally during the 19th and 20th centuries.
- Lack of settlement - Settlement is largely absent, being confined to the lower hillsides and valleys, however, a large number of deserted settlements indicate that settlement was once more widespread than today.
- Natural features - Screes and cliffs, gritstone outcrops, stony summits, bracken scrub and wind blown oaks provide texture in the landscape.
- Panoramic views - from high summits over the moorlands and adjacent lowlands are a feature of the hills.
- Tranquil - The mountains engender a sense of remoteness because of their dark nighttime skies, low population density, relative inaccessibility, the impression of naturalness they impart and the relative lack of visible, built influences.
- Archaeology - The mountains contain a significant scattering of prehistoric monuments, including round barrows, cairns, stone

circles and standing stones, Iron Age hillforts and settlements. The fort at Cae Gaer indicates a Roman presence, while the Cistercian abbey of Strata Florida was established on the west side of the mountains in the late 12th century. Its granges covered much of this area as well as part of lowland Ceredigion."

5.4.4 Other NLCAs within 15 km of the Site are listed by distance from the site as follows:

- '17 Bryniau a Dyffrynnoedd Trefaldwyn / Montgomeryshire Hills and Vales' (ca. 2 km east)
- '16 Y Berwyn / Berwyn' (ca. 3 km north)
- '06 Eryri (Snowdonia)' (ca. 4 km northwest)
- '19 Dyffryn Hafren / Severn Valley' (ca. 11 km south)
- '22 Glannau Aberdyfi / Aberdovey Coast' (ca. 15 km southwest)

5.4.5 National Character Areas will be assessed in detail where the potential for significant indirect effects occurs which is likely to be a function of ZTV coverage, distance from the proposal and field assessment.

5.4.6 The LVIA will also include an assessment of the sensitivity of landscape character, based on the Landmap Aspect Areas in accordance with the NRW Landmap GN46[4] in order to identify potentially significant effects.

Landscape Designations

5.4.7 Landscape designations are illustrated on **Figure 5.1**. The site is not located within a nationally or locally designated landscape.

5.4.8 Eryri / Snowdonia National Park is located ca. 4.2 km to the northwest of the site.

5.4.9 Special Landscape Areas (SLA) are a non-statutory designation applied by local planning authorities in Wales to define areas of high landscape importance within their administrative boundary. The closest is Corris SLA that is circa 15 km northwest of the Site.

5.4.10 Registered Historic Parks & Gardens are located more than 15 km from the Site with the closest at Gregynog, to the southeast.

Visual Receptors

[4] Natural Resources Wales. 2023. 'Using LANDMAP in Landscape and Visual Impact Assessments GN46'. Last updated: March 2023

5.4.11 A detailed consideration of the potential for effects to the visual amenity of receptors in the landscape surrounding the site will be set out in the LVIA. This visual assessment will be informed by a selection of representative assessment viewpoints which are listed in **Table 5.1**.

5.4.12 The LVIA will focus on the potential effects of the Proposed Development on different visual receptors comprising settlements, footpath users, recognised tourist routes, long distance walking routes, cycle routes, centres for tourism and rail routes.

Residential Visual Amenity

5.4.13 A number of residential properties are located within the vicinity of the proposed development. It is proposed that a Residential Visual Amenity Assessment (RVAA) will be undertaken as part of the LVIA. This will consider the visual effects on those properties within 1.5 km to 2 km of the proposed development and identify any properties where residents could experience adverse visual effects to the degree that the Residential Visual Amenity Threshold (RVAT) would be breached. The findings will be presented in a separate Technical Appendix to the LVIA chapter.

Proposed Viewpoints

5.4.14 It is proposed that the 15 locations set out in Table 5.1 and shown on Figure 5.2 and Figure 5.3 are included as assessment viewpoints in the LVIA. The viewpoints represent visual receptors and landscape designations at a range of distances and directions from the site.

Table 5.1 Proposed LVIA Viewpoints

Viewpoint	Distance and Direction from nearest turbine	OS Grid Reference	Reason for selection
Viewpoint 1- Glyndwr's Way long distance footpath south of Dolwen	1.32 km, southeast	297478 307449	Shared viewpoint with Carnedd Wen Wind Farm (Viewpoint 6) and agreed with consultees
Viewpoint 2- Glyndwr's Way long distance footpath Esgair Fraith	1.32 km, southwest	291402 303381	Shared viewpoint with Carnedd Wen Wind Farm (Viewpoint 3) and agreed with consultees
Viewpoint 3- B4518, South of Llanbrynmair	3.23 km, southwest	289638 302443	Shared viewpoint with Carnedd Wen Wind Farm (Viewpoint 2) and agreed with consultees
Viewpoint 4- Glyndwr's Way long	3.74 km, west	288424 304972	Direct view from elevated land on promoted recreational

Viewpoint	Distance and Direction from nearest turbine	OS Grid Reference	Reason for selection
distance footpath northwest of Llanbrynmair			route. Viewpoint further east at Moel Eiddew (Carnedd Wen Wind Farrm Viewpoint 1) rejected as a shared viewpoint as it lies close to an operational windfarm and is not on the promoted footpath route
Viewpoint 5- Minor road north of Foel	3.87 km, northeast	299071 311658	Shared viewpoint with Carnedd Wen Wind Farm (Viewpoint 17) and agreed with consultees
Viewpoint 6- A470 near Talerdigg	4.00 km, south	293373 299905	Direct view from open section of main road route on the approach to a settlement.
Viewpoint 7- Cerrig Cwn open access land	5.29 km, north	292444 314457	Shared viewpoint with Carnedd Wen Wind Farm (Viewpoint 5) and agreed with consultees
Viewpoint 8- Llyn Y Grinwydden bridleway	5.67 km, east	302240 307110	Shared viewpoint with Carnedd Wen Wind Farm (Viewpoint 16) and agreed with consultees
Viewpoint 9- Cambrian Way long distance footpath at Llechwedd Mawr	6.51 km, west	287517 310077	Elevated view from promoted recreational route.
Viewpoint 10- Allt Dolanog Fort in open access land	10.76 km, east	306403 313330	A Scheduled Monument, iron age hillfort close to the village of Dolanog with several public rights of way and long distance footpath routes nearby
Viewpoint 11- Cambrian Way long distance footpath at Maesglase	12.61 km, northwest	282605 314834	Overlooking waterfalls of Craig Maesglase. By contrast Carnedd Wen Wind Farm viewpoint 13 is not located on the long distance footpath route and is unlikely to have views over the waterfalls.
Viewpoint 12- Glyndwr's Way long distance footpath, Penycrocbren	12.72 km, southwest	285691 293515	Located on a long distance promoted footpath within the Clwedog Valley Historic Landscape Area
Viewpoint 13- Pererindod Melangell long distance footpath	13.57 km, north	302778 320716	Selected as located on high ground overlooking Lake Vyrnwy from a promoted recreational route.
Viewpoint 14- Bwlch y Groes promoted viewpoint	13.90 km, north	291256 323024	Shared viewpoint with Carnedd Wen Wind Farm (Viewpoint 8) and agreed with consultees

Viewpoint	Distance and Direction from nearest turbine	OS Grid Reference	Reason for selection
Viewpoint 15- Cadair Idris summit on Cambrian long distance way footpath	22.70 km, west	271108 313042	Shared viewpoint with Carnedd Wen Wind Farm (Viewpoint 18) and agreed with consultees

5.4.15 Each of the representative viewpoints will be visited to evaluate the sensitivity of views. In addition, the study area will also be visited to consider visibility of the proposed development as receptors move through the landscape.

5.4.16 The viewpoints will be used as the basis for determining the effects on visual receptors within the study area. The sensitivity of different receptor groups will be set out in the LVIA methodology.

5.4.17 The level of effect experienced by different visual receptors will be determined by considering the sensitivity of the receptors with the magnitude of change resulting from the introduction of the proposed development.

Visualisations

5.4.18 Each viewpoint will be illustrated with visualisations prepared in line with SNH Visual Representation of Wind Farms Version 2.2.

Night-time Lighting Assessment

5.4.19 Under Civil Aviation Authority (CAA) Regulations[5] structures over 150m in height are required to be lit with visible aviation lighting.

5.4.20 In accordance with NatureScot guidance[6] the LVIA will assess the additional visual effects of the aviation lighting in the main body of the LVIA chapter. The additional change introduced by the aviation lighting sill forms a component of the magnitude of change.

5.4.21 The assessment of the visible aviation lighting will be informed by a ZTV of the lit turbines, a turbine lighting intensity ZTV and night-time visualisations from a selection of viewpoints, illustrating the proposed lighting effects.

5.4.22 In line with NatureScot Visualisation Guidance, the viewpoints selected represent locations from where people are most likely to experience the

[5] Civil Aviation Authority. 2017. DAP Policy 124: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level. Last updated June 2017.

[6] NatureScot. 2017. Siting and Designing Wind Farms in the Landscape, Version 3a. Last updated August 2017.

wind farm at night. Eryri National Park is an International Dark Sky Reserve and the Dark Sky Reserve 'Core Zone 3' is located approximately 13 km to the northwest of the closest turbine[7].

5.4.23 It is proposed that the following night-time visualisations will be produced:

- Viewpoint 3 - B4518, South of Llanbrynmair
- Viewpoint 5 - Minor road north of Foel
- Viewpoint 14 - Bwlch y Groes promoted viewpoint in Eryri National Park

5.4.24 The viewpoints will be used to inform consideration of the potential visual effects on key visual receptors in nearby residential properties, settlements and users of the road network.

5.5 Potential Mitigation

5.5.1 Mitigation measures may include:

- avoidance of effects;
- reduction in magnitude of effects; and
- compensation for effects (which may include enhancements to offset any adverse effects).

5.5.2 The primary mitigation adopted in relation to landscape and visual matters is likely to be embedded within the design of the Proposed Development and will comprise the consideration given to avoiding and minimising landscape and visual effects during the evolution of the Proposed Development layout. This is sometimes referred to as 'mitigation by design'.

5.6 Potential Landscape and Visual Effects

5.6.1 The LVIA will consider the potential effects of the Proposed Development upon:

- Individual landscape features and elements;
- Landscape character;
- Visual amenity and the people who view the landscape; and
- Landscape designations as appropriate.

[7] Snowdonia National Park Authority, Supplementary Planning Guidance obtrusive lighting (Light Pollution) (2016).

5.6.2 Effects during the construction and decommissioning phases are considered to be temporary and would have a short duration. Effects associated with the operational phase of the proposed development are considered to be long term effects.

5.6.3 Following the judgement of the sensitivity of the landscape or visual receptor, the LVIA will provide a judgement as to the magnitude of change and the level of the effect experienced by each receptor, along with a statement to clarify whether the effect resulting from the Proposed Development is significant or not.

Matters Scoped out of the Assessment

5.6.4 In order that the assessment remains proportionate and focuses on the key matters that have the potential to bring about significant effects, it is proposed that the following matters are scoped out of the assessment:

- **Effects on receptors located outside of the ZTV** - The Proposed Development would not result in any effects where there is no predicted visibility;
- **Effects during decommissioning** - Effects during decommissioning would be very similar in nature to those experienced during the construction phase, except in reverse;
- **Effects on settlements beyond 15 km** - Due to the distance from the Proposed Development and the limited theoretical visibility there is no potential for receptors to experience significant visual effects;
- **Effects on public rights of way beyond 15 km** - Due to the distance from the Proposed Development and the limited theoretical visibility there is no potential for receptors to experience significant visual effects;
- **Effects on Registered Historic Landscapes (RHLs)**– Although it is acknowledged that there would be potential for some distant views from several RHLs over 10 km from the proposals, the Cultural Heritage scoping chapter has evaluated the potential for significant heritage effects and proposes to scope out all RHLs including the Clywedog Valley RHL;
- **Effects on the Corris Special Landscape Area (SLA)** – Although it is acknowledged that there would be potential for some distant views from parts of the Corris SLA over 15 km from the proposals, given the separation distance, any effects would be limited and would not be

of such a scale so as to undermine the special qualities of the designation.

5.7 Cumulative Assessment

5.7.1 The LVIA will also consider the potential for any cumulative effects to arise within 30 km of the site. This will include operational, under construction, consented, and proposed (for those which there is a valid planning application) wind farms as set out in **Table 5.2** (and illustrated on **Figure 3.4)**, and the planning status confirmed with the local planning authorities.

5.7.2 The methodology will follow guidance provided by SNH for assessing cumulative effects. The assessment will be supported by cumulative ZTVs.

5.7.3 In order that the cumulative assessment remains focussed on other developments that have the greatest potential to give rise to significant cumulative effects it is necessary at the outset to decide which developments need to be considered in detail, as to consider all developments within 30 km of the proposed development would detract attention from the key issues relating to the application. In this landscape and visual context it is considered appropriate and proportionate to scope out all turbines under 50 m, and any turbines between 50 m and 80 m which are located over 15 km distance from the Site (as highlighted in grey in **Table 5.2** below).

Table 5.2 Cumulative Sites within 30 km

Wind Farm	Status	Approx distance /direction from Llanbrynmair	Turbines Nos/Blade Tip Height metres (BTH)
Banc Du	Scoping	21 km south	7 turbines / 200 m BTH
Bryn Blaen	Operational	21 km south	6 turbines / 100 m BTH
Bryn Titli	Operational	27 km	22 turbines /48.5 m BTH*
Bryngydfa	Scoping	29 km	12 turbines /126.5 m BTH
Carnedd Wen	Scoping	<1 km northwest	26 turbines / 200 m BTH
Carno I	Operational	6 km south	56 turbines / 53.5 m BTH
Carno II	Operational	6 km south	12 turbines / 80 m BTH
Carno III	Consented	8 km south	13 turbines / 149.9 m BTH
Cefn Croes	Operational	25 km southwest	39 turbines / 100 m BTH
Cemmaes 2	Operational	5 km west	18 turbines / 66 m BTH
Esgair Cwmowen	In Planning	7 km southeast	18 turbines / 125 m BTH
Esgair Galed	Scoping	12 km southwest	26 turbines / 220 m BTH
Garn Fach	Scoping	22 km southeast	17 turbines / 149.9 m BTH
Garreg Lwyd Hill	Operational	29 km southeast	17 turbines / 126 m BTH
Llandinam	Operational	20 km	103 turbines / 44 m BTH*
Llandinam Repowering	Consented	22 km southeast	39 turbines / 121.2 m BTH
Lluest y Gwynt	Scoping	22 km southwest	24 turbines / 180 m BTH
Mynydd Clogau	Operational	9 km southeast	17 turbines / 66 m BTH
Mynydd Gorddu	Operational	29 km	19 turbines / 54 m BTH*
Mynydd Lluest y Graig	Scoping	2 km east	34 turbines/ 200 m BTH
Rheidol	Operational	30 km	8 turbines / >80 m BTH*
Rhiwlas	Scoping	24 km south	15 turbines / 200 m BTH
Tirgwynt	Operational	5 km southeast	12 turbines / 116 m BTH

*Turbines between 50-80 m tall located over 15 km distant from the Llanbrynmair site scoped out of the detailed cumulative assessment

5.8 Questions

5.8.1 The following are considered to be the key issues which require consideration by the consultees:

- Are there any comments on the proposed study areas?
- Are there any comments on the proposed list of viewpoint locations in **Table 5.1**?

- Are there any further wind farm sites, to those listed in **Table 5.2**, to consider as part of the cumulative assessment?
- Do you agree that matters proposed to be scoped out of the assessment?
- Do you agree that the proposed scope of assessment is appropriate?

6 Cultural Heritage and Archaeology

6.1 Introduction

6.1.1 This Scoping Report Chapter outlines the approach to be taken to the assessment of potentially significant effects to archaeological and cultural heritage receptors of the Proposed Development.

6.1.2 The baseline presented below has been informed by an initial review of currently available information, namely Cadw, National Monument Record of Wales (NMRW), and Clwyd-Powys Archaeological Trust Historic Environment Record (HER) data.

6.1.3 The scoping of heritage setting assessment has been undertaken by reviewing Cadw, NMRW and HER data against the Zone of Theoretical Visibility model prepared for Landscape and Visual (see section 5 above).

6.1.4 It is anticipated that the forthcoming Environmental Statement Chapter will be supported by the following technical appendices:

- Heritage Desk-Based Assessment (for the entire redline area);
- Geophysical Survey Report (presenting survey data for a 1ha square around each turbine base).

6.2 Legislation, Policy and Guidance

Legislation

6.2.1 Scheduled Monuments are protected by the provisions of the Ancient Monuments and Archaeological Areas Act 1979 which relates to nationally important archaeological sites.[8] Whilst works to Scheduled Monuments are subject to a high level of protection, it is important to note that there is no duty within the 1979 Act to have regard to the desirability of preservation of the setting of a Scheduled Monument.

8 UK Public General Acts, Ancient Monuments and Archaeological Areas Act 1979.

6.2.2 Legislation relating to the built historic environment is primarily set out within the Planning (Listed Buildings and Conservation Areas) Act 1990, which provides statutory protection for Listed Buildings and their settings and Conservation Areas.[9]

6.2.3 The Historic Environment (Wales) Act 2016 made a number of important amendments to the 1979 and 1990 Acts to address the needs of the Welsh historic environment. It also introduced several stand-alone provisions for Wales, including the compilation of: a register of historic parks and gardens, a list of historic place names in Wales, and a historic environment record for each local authority area in Wales.

National Planning Policy

6.2.4 National policy is set out within the Welsh Government's 'Future Wales: The National Plan 2040' (FW) and 'Planning Policy Wales, Edition 12' (PPW12).

Future Wales: The National Plan 2040 (2021)

6.2.5 Policy 17 of Future Wales provides a presumption in favour of renewable energy development subject to the criteria in Policy 18 which includes: *"6. there are no unacceptable adverse impacts on statutorily protected built heritage assets"*.

Planning Policy Wales, Edition 12 (February 2024)

6.2.6 PPW12 Chapter 6 deals with the historic environment and its contribution to the Welsh Government's seven well-being goals for a sustainable Wales. PPW12 emphasises that the positive management of change in the historic environment is based on a full understanding of the nature and significance of historic assets and the recognition of the benefits that they can deliver in a vibrant culture and economy.

6.2.7 Paragraph 6.1.5 of PPW12 provides that:

"The planning system must take into account the Welsh Government's objectives to protect, conserve, promote and enhance the historic environment as a resource for the general well-being... Conservation Principles highlights the need to base decisions on an understanding of the impact a proposal may have on the significance of an historic asset."

6.2.8 Paragraph 6.1.6 sets out the Welsh Government's specific objectives for the historic environment as follows:

9 UK Public General Acts, Planning (Listed Buildings and Conservation Areas) Act 1990.

- Protect the Outstanding Universal Value of the World Heritage Sites;
- Conserve archaeological remains, both for their own sake and for their role in education, leisure and the economy;
- Safeguard the character of historic buildings and manage change so that their special architectural and historic interest is preserved;
- Preserve or enhance the character or appearance of Conservation Areas, while at the same time helping them remain vibrant and prosperous;
- Preserve the special interest of sites on the register of historic parks and gardens; and
- Protect areas on the register of historic landscapes in Wales.

6.2.9 In relation to the setting of Listed Buildings, paragraph 6.1.10 provides that:

"There should be a general presumption in favour of the preservation or enhancement of a listed building and its setting, which might extend beyond its curtilage. For any development proposal affecting a listed building or its setting, the primary material consideration is the statutory requirement to have special regard to the desirability of preserving the building, its setting or any features of special architectural or historic interest which it possesses."

6.2.10 In relation to Conservation Areas, Paragraph 6.1.14 provides that:

"There should be a general presumption in favour of the preservation or enhancement of the character or appearance of conservation areas or their settings. Positive management of conservation areas is necessary if their character or appearance are to be preserved or enhanced and their heritage value is to be fully realised."

6.2.11 In relation to Historic Parks & Gardens, Paragraphs 6.1.18 and 6.1.19 provide that:

"Planning authorities should value, protect, conserve and enhance the special interest of parks and gardens and their settings included on the register of historic parks and gardens in Wales. The register should be taken into account in planning authority decision making.

The effect of a proposed development on a registered park or garden, or its setting, is a material consideration in the determination of planning applications."

6.2.12 In relation to archaeological remains, paragraphs 6.1.23–6.1.25 provide as follows:

"The conservation of archaeological remains and their settings is a material consideration in determining planning applications, whether those remains are a scheduled monument or not.

Where nationally important archaeological remains are likely to be affected by proposed development, there should be a presumption in favour of their physical protection in situ. It will only be in exceptional circumstances that planning permission will be granted if development would result in direct adverse impact on a scheduled monument (or an archaeological site shown to be of national importance) or has a demonstrably and unacceptably damaging effect upon its setting.

In cases involving less significant archaeological remains, planning authorities will need to weigh the relative importance of the archaeological remains and their settings against other factors, including the need for the proposed development."

Technical Advice Note 24

6.2.13 'Technical Advice Note 24: The Historic Environment' (TAN24) provides a detailed supplement to PPW12, and as such is consistent with those national policies. It contains detailed guidance on how the planning system considers the historic environment during development plan preparation and decision making on planning and listed building consent applications. It replaces Welsh Office Circulars 60/96, 61/96, and 1/98.

Local Planning Policy

6.2.14 Powys County Council is currently in the initial stages of preparing its new Replacement Local Development Plan, which will cover all of Powys excluding the Bannau Brycheiniog National Park.

6.2.15 In the meantime, however, the adopted Powys Local Development Plan 2011-2026 applies.

6.2.16 Policy SP7 'Safeguarding of Strategic Resources and Assets' states:

"To safeguard strategic resources and assets in the County, development proposals must not have an unacceptable adverse impact on the resource or asset and its operation.

The following have been identified as strategic resources and assets in Powys:

1. Land designated at international, European and/or national level for environmental protection.

2. Historic environment designations, including:

i. Registered Historic Landscapes.

ii. Registered Historic Parks and Gardens.

iii. Scheduled Ancient Monuments and other archaeological remains.

iv. Listed Buildings and their curtilages.

v. Conservation Areas. AND the setting of designations i.-v.

3. Recreational Assets, including:

i. National Trails.

ii. Public Rights of Way Network.

iii. Recreational Trails.

iv. National Cycle Network.

4. The valued characteristics and qualities of the landscape throughout Powys.

5. Sennybridge (Ministry of Defence) Training Area.

6. Mineral Resource Areas.

7. Proposed Strategic Infrastructure Routes (if and when identified)."

6.2.17 Policy RE1 'Renewable Energy' states:

"Proposals for renewable and low carbon energy development will be permitted subject to the following criteria:

1. Within or close to the Strategic Search Areas (SSAs), proposals for wind energy greater than 25MW will be permitted subject to criteria 3 to 5; all other proposals for renewable and low carbon energy will only be permitted where they can demonstrate they would not prejudice the purpose of the SSA.

2. Within the Local Search Areas (LSAs), proposals for solar PV between 5 – 50MW will be permitted subject to criteria 3 to 5; all other proposals for renewable and low carbon energy will only be permitted where they can demonstrate they would not prejudice the purpose of the LSA.

3. Proposals for all types of renewable and low carbon energy development and associated infrastructure either on their own, cumulatively or in combination with existing, approved or proposed development, shall comply with all other relevant policies in the LDP.

4. Satisfactory mitigation shall be in place to reduce the impact of the proposal and its associated infrastructure. Proposals shall make provision for the restoration and after-care of the land for its beneficial re-use.

5. Where necessary, additional compensatory benefits will be sought by agreement with applicants in accordance with Policy DM1 - Planning Obligations."

6.2.18 The adopted LDP also includes the following Supplementary Planning Guidance documents:

- Renewable Energy (2019);
- Conservation Areas (2020);
- Archaeology (2021); and
- Historic Environment (2021).

Guidance

Assessment of Significance

6.2.19 TAN24 defines heritage significance as: "the sum of the cultural and natural heritage values of a place, often set out in a statement of significance."

6.2.20 Cadw's 'Conservation Principles for the sustainable management of the historic environment in Wales' (2011) defines significance as deriving from a combination of any, some or all of the following four component values:

- Evidential value: deriving from the potential of a place to yield evidence about past human activity;
- Historic value: deriving from the ways in which past people, events and aspects of life can be connected through a place to the present;
- Aesthetic value: deriving from the ways in which people draw sensory and intellectual stimulation from a place; and
- Communal value: deriving from the meaning of a place for the people who relate to it, or for whom it figures in their collective experience or memory.

6.2.21 This approach allows for a detailed and justifiable determination of significance and the values from which that significance derives.

6.2.22 In accordance with the levels of significance articulated in TAN24 and PPW12, the following terminology will be used in the ES Chapter:

- Designated historic assets: Scheduled Monuments, Listed Buildings (Grade I, II* and II), Registered Parks and Gardens (Grade I, II* and

II), Registered Historic Landscapes ('Outstanding' or 'Special'), World Heritage Sites, and Conservation Areas;

- Non-designated nationally important archaeological remains: Archaeological remains that are not designated but are still considered to be of a level of significance commensurate with that of a Scheduled Monument; and
- Non-designated historic assets: Assets of less than national importance, including any of special local interest.

Contribution made by Setting to Significance

6.2.23 Setting is defined in TAN24 as: "the surroundings in which [a historic asset] is understood, experienced, and appreciated embracing past and present relationships to the surrounding landscape. Its extent is not fixed and may change as the asset and its surrounding evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect [the] ability to appreciate that significance or may be neutral."

6.2.24 Setting can contribute to, detract from, or have a neutral effect upon the heritage significance of an asset. In addition, whilst a physical or visual connection between a historic asset and its setting will often exist, it is not essential or determinative.

6.2.25 TAN24 states that "setting is not a historic asset in its own right but has value derived from how different elements may contribute to the significance of a historic asset." As such, any impacts will be described within the ES Chapter in terms of how they affect the significance of a historic asset, and any heritage values that contribute to that significance, through changes to setting.

6.2.26 Settings assessment will be undertaken in accordance with the industry-standard methodology provided by Cadw's 'Setting of Historic Assets in Wales' (2017). This guidance promotes a 'stepped' (iterative) approach, as follows:

- Stage 1 - assess which assets would be affected and identify their setting;
- Stage 2 - define and analyse the settings to understand how they contribute to the significance of the historic assets and, in particular, the ways in which the assets are understood, appreciated and experienced[10];

10 The guidance includes a (non-exhaustive) check-list of elements that may contribute to a historic asset through setting including: functional and physical relationships, topographic features, physical surroundings, original layout, buried or archaeological elements, views to/from/across, formal or planned vistas, prominence, views

- Stage 3 - assess the effects of the Proposed Development, whether beneficial or harmful, on that significance or on the ability to appreciate it; and
- Stage 4 - consider options to mitigate or improve the potential impact of a proposed change or development on that significance.

6.2.27 The following resources will be used to inform Stage 1:

- The relevant Cadw Scheduling and Listing descriptions;
- A Zone of Theoretical Visibility model;
- Elevation and contour mapping;
- Modern and historic mapping; and
- Modern and historic aerial imagery.

Assessment of Harm and Benefit

6.2.28 The overriding provision within PPW12 in relation to harm to designated assets (and non-designated assets of equivalent significance) is that there should be a presumption in favour of:

- The physical preservation in situ of Scheduled archaeological remains;
- The preservation and enhancement of Listed Buildings and their settings, and ensuring consistency with the statutory requirement under Section 66(1) of the 1990 Planning Act; and
- The preservation or enhancement of the character or appearance of Conservation Areas or their settings.

6.2.29 PPW12 also provides that any development effects upon the following are material considerations in the determination of planning applications:

- Registered Parks or Gardens, or their setting; and
- Non-designated archaeological remains, with the relative importance of the archaeological remains and their settings to be weighed against other factors, including the need for the proposed development.

6.2.30 Where harm to the significance of a historic asset is identified, the nature and scale of that harm will be discussed, and professional judgment used to determine the acceptability of that level of harm within the context of the above policy provisions.

6.2.31 The following terminology and approach will be used in the ES Chapter:

associated with aesthetic / functional / ceremonial purposes, historical / artistic / literary / place name / cultural / scenic associations, noise, smell, tranquillity / remoteness / wildness.

- Harm to Designated Historic Assets (or to non-designated assets of equivalent significance): The designated asset's significance would be reduced. An attempt will be made to qualify more precisely the nature and level of harm, with reference to PPW12, TAN24 and the heritage values defined by 'Conservation Principles'; all determinations will be fully qualified.
- Harm to Non-Designated Historic Assets: The non-designated asset's significance would be reduced. Professional judgment will be used to define the anticipated level of harm to the significance of non-designated historic assets; all determinations will be fully qualified.
- No Harm: The asset's significance would be preserved.
- Heritage Benefit: The asset's significance would be enhanced. This would weigh in favour of the Proposed Development in the planning balance. It would be a desirable outcome, consistent with all key policy objectives and industry guidance provisions.

6.3 Proposed Scope of Assessment

6.3.1 The Heritage Desk-Based Assessment will consider the known and potential above and below ground archaeological resource of the Site as well as the significance and setting of designated historic assets deemed potentially sensitive to change as arising from the Proposed Development.

6.3.2 The Geophysical Survey Report (to be prepared by a specialist subcontractor) will present data only for a 1ha square around each turbine base.

6.3.3 The ES Chapter will consider the following in respect of each identified historic environment receptor (asset):

- The asset's significance;
- The anticipated level of harm to that significance (comparable to 'magnitude'); and
- Whether that level of harm would comprise a significant effect.

6.3.4 Determination of each of the above will be undertaken in accordance with a robust methodology, formulated within the context of recent case law, the relevant statute and policy provisions, and professional guidance as set out in the previous section (6.2).

6.3.5 The Heritage Desk-Based Assessment and ES Chapter will be informed by the Chartered Institute for Archaeologists' 'Standard and Guidance for Historic

Environment Desk-Based Assessment' (2014) and Cadw's 'Heritage Impact Assessment in Wales' (2017).

Consultation

6.3.6 No consultation has yet been undertaken. It is intended that the scope and methodology of the Heritage Desk-Based Assessment and the Geophysical Survey will be agreed with the relevant Advisor at Cadw (regarding designated historic assets), the Conservation Officer at Powys County Council (regarding built historic assets), and the Planning Officer at the Clwyd-Powys Archaeological Trust (regarding archaeology) as appropriate.

Methodology

Study Area

6.3.7 The Heritage Desk-Based Assessment will identify all designated historic assets within a minimum 10km-radius study area measured from the Site redline boundary, and all non-designated historic assets within a 3km-radius study area measured from the Site redline boundary. Other sources of information, such as historic maps and aerial photographs (see below), are likely to be focussed on the Site and outlying land within a 1km-radius.

6.3.8 The Zone of Theoretical Visibility (ZTV) and Screened Zone of Theoretical Visibility (SZTV: where existing vegetation and built form is taken into account within the modelling) prepared as part of the Landscape and Visual Impact Assessment will be used as a tool of assessment. The ZTV will be utilised to 'sieve' out assets which have no theoretical visibility of the Proposed Development.

6.3.9 It is understood, though, that 'setting' is not a purely visual concept, and therefore assets that fall outside of the ZTV will also be assessed to ensure they do not have an historic associative functional relationship with the Site which could be impacted by the Proposed Development despite having no theoretical visibility.

6.3.10 Assets beyond the proposed 10km study area for designated historic assets will be considered with reference to the SZTV. Any assets which may have the potential to experience effects arising from the Proposed Development will be considered within the assessment.

Desk Study

6.3.11 The following data sources will inform the Heritage Desk-Based Assessment:

- Cadw for information regarding designated historic assets;

- The National Monuments Record of Wales (NMRW) for information relating to previous archaeological investigations and recorded historic assets;
- The Clwyd-Powys Archaeological Trust Historic Environment Record (HER) for information relating to previous archaeological investigations and recorded historic assets;
- Previous published and grey literature reports relating to any archaeological investigations previously undertaken;
- Historic maps and other relevant documentary sources held by Powys Archives and available through The Genealogist, National Library of Wales, and Promap websites;
- The Central Register of Aerial Photographs for Wales, available online through the Welsh Government's Aerial Photography Unit website; and
- Online resources, including geological data from the British Geological Survey, soil data from the Cranfield Soil and Agrifood Institute, and recent satellite imagery available on Google Earth.

6.3.12 In addition, a walkover survey (comprising a visual inspection only) will be undertaken of the Site. Designated historic assets deemed potentially sensitive to the Proposed Development will be inspected from the Site and accessible public rights of way for the purposes of setting assessment.

Additional Surveys

6.3.13 The baseline conditions and assessment methodology presented in this Scoping Report are based on the limited research undertaken to date: only Cadw, NMRW and HER data have been reviewed.

6.3.14 The baseline that will be presented in the ES will summarise the findings of the Heritage Desk-Based Assessment (as informed by all of the data sources listed above, a Site walkover survey, and inspections of designated historic assets) and the findings of any additional, follow-on archaeological surveys and fieldwork that may be requested by statutory heritage consultees.

6.3.15 The Geophysical Survey of the turbine pads (see 6.3.2) will be undertaken in line with guidance set out by the Chartered Institute for Archaeologists (2020) and the European Archaeology Council (2016). A Written Scheme of Investigation detailing the scope and methodology of the survey will be prepared and submitted to the Clwyd-Powys Archaeological Trust for approval prior to commencement.

Assessment of Likely Significant Effects

Effects During Construction

6.3.16 Construction of the Proposed Development will include: ground clearance and preparation, creating temporary compounds, laying access tracks, excavation of borrow pits, excavation of foundations for wind turbines and pads for the substation, inverters and transformers, establishing crane pads, excavating cable trenches, erecting security fencing, and excavating drainage swales.

6.3.17 These activities could require the demolition or removal of upstanding historic structures and earthworks and/or result in the truncation and/or destruction of buried archaeological remains within the Site. These would be direct (physical) development effects. Increased traffic movements and noise could also adversely affect the setting of historic assets. These would be indirect (non-physical) development effects.

Effects During Operation

6.3.18 Indirect (non-physical) development effects caused by change to the setting of historic assets have the potential to arise from the operation of the Proposed Development.

Effects During Decommissioning

6.3.19 Decommissioning of the Proposed Development will include: creating temporary compounds, dismantling wind turbines, re-excavating cable trenches to remove cabling, removing fencing, and transporting all infrastructure including inverters and transformers off-site.

6.3.20 These activities have the potential to truncate buried archaeological remains within the Site. These would be direct (physical) development effects. Increased traffic movements and noise could also adversely affect the setting of historic assets. These would be indirect (non-physical) development effects.

Assessment of Significance of Effect

6.3.21 In determining whether any identified harm to heritage significance would translate into a significant effect. The determination of the significance of effects have been based upon professional judgement, which is presented qualitatively and with full justification.

6.3.22 Ultimately, a statement of whether any identified harm does or does not represent a significant effect is provided in respect of each cultural heritage receptor using the following terminology: ‘Significant’ or ‘Not Significant’.

6.4 Baseline Conditions

Site Description and Context

6.4.1 The Site encompasses approximately 1,604 hectares of land, *c.*1.7km north-west of Llanbrynmair at its closest point and *c.*1.8km north-west of Llanbrynmair at its furthest point. A total of 15 wind turbines are proposed within the Site: 8 in the north (with 5 located within existing plantations), 3 in the centre, 4 in the south.

Baseline Survey Information

Assets Recorded Within the Site

6.4.2 Two designated historic assets are mapped within the Site by Cadw (**Figure 6.1**):

- The Scheduled Monument of a Bronze Age cairn, in the south-western part of the Site, *c.*585m north-west of the nearest proposed wind turbine (MG314); and
- The Grade II Listed Building of Abercannon, near the eastern boundary of the northern part of the Site (16834).

6.4.3 A total of 73 'monuments', most of which may be considered non-designated historic assets, are mapped within the Site by the HER (**Figure 6.2**). None coincide with any of the currently proposed wind turbine locations.

6.4.4 Of the 73 monuments, 6 are dated to the Bronze Age; 5 to the Medieval or Medieval/Post Medieval period; 57 to the Post Medieval period; and 5 to the Modern period.

6.4.5 The Bronze Age monuments comprise:

- The aforementioned Scheduled cairn, said to be in good condition in 2002, in the south-western part of the Site (719);
- Two cairns, one reported as damaged and the other as eroded in 1998, in the southern part of the Site (720, 4288);
- A possible cairn that could in fact be a post-medieval clearance cairn, in the southern part of the Site (54500);
- A cairn, said to be in good condition in 2014, in the central part of the Site (168990); and
- A cairn, in the north-west central part of the Site (168992).

6.4.6 The Medieval or Medieval/Post Medieval monuments comprise:

- A possible section of the 1km-long earthwork called 'Black Dyke' or 'Abbot's Dyke', associated with lands belonging to Strata Marcella Abbey near Welshpool, in the southern tip of the Site (17926);
- Another possible section of Abbot's Dyke, and the possible location of a monastic grange, at Dolwen at the north-eastern boundary of the Site (132003);
- Two ruinous stone buildings that might be the remains of a longhut and/or sheepfold, in the north-western part of the Site (72504, 72503); and
- An earthwork bank interpreted as a possible boundary or alternatively a drainage feature, in the far northern part of the Site (169128).

6.4.7 The remaining Post-medieval and Modern monuments within the Site comprise extant, damaged, and destroyed buildings (farmhouses, farm buildings, barns, sheep folds) and the earthwork remains of agricultural and industrial activity (boundary banks, clearance cairns, peat workings, ponds, quarries). The overwhelming majority of these monuments are clustered along Afon Cannon and the parallel track in the northern part of the Site, and to the north of the unnamed watercourse that flows east to Neinthirion in the centre of the Site.

Assets Recorded Beyond the Site

6.4.8 Designated historic assets within and beyond a 10km radius of the Site are illustrated on **Figure 6.1** and include:

- 54 Scheduled Monuments;
- 174 Listed Buildings;
- 4 Conservation Areas; and
- The far northern edge of the Clywedog Valley Registered Historic Landscape.

6.4.9 There are no World Heritage Sites or Registered Historic Parks and Gardens within a 10km radius of the Site.

Implications of Climate Change

6.4.10 The UKCP18 projections show a general trend towards warmer, wetter winters and drier, hotter summers. Extreme events are also likely to increase in duration and frequency. Increased severity of rainfall and flooding may cause or exacerbate the erosion of above-ground historic assets, and the topsoil and subsoil overlying (and protecting) below-ground historic assets. Changes in temperature and rainfall patterns may also alter

groundwater regimes, specifically, moisture levels and/or chemical composition of buried soils, which may affect the preservation of archaeological and palaeoenvironmental remains contained therein.

Scoping Criteria

Receptors Scoped In to ES

6.4.11 With reference to Figures 6.1, 6.2 and 6.3, and Tables 6.1 and 6.2: the following receptors within the Site and a 10km radius of the Site are to be scoped into the assessment of direct (physical) and/or indirect (non-physical) effects, as it is considered that there is the potential for such effects to be significant (see 6.3.16–6.3.22):

- Scheduled Monument MG314 within the south-western part of the Site (construction, operation, decommissioning);
- Listed Building 16834 at the eastern boundary of the northern part of the Site (construction, operational, decommissioning);
- All extant non-designated historic assets within the Site that coincide with Proposed Development infrastructure (construction, decommissioning);
- All Scheduled Monuments with theoretical visibility of the Proposed Development, which could also disrupt intervisibility of assets (operation); and
- Selected Listed Buildings with theoretical visibility of the Proposed Development, and/or possible co-visibility of the Proposed Development in views towards them, and/or a possible historical association of landholding with parts of the Site (operation).

Table 6.1: Scoped-In Scheduled Monuments

SAM Number	Name	Easting	Northing
ME217	Ffridd Braich Llwyd Bronze Age Ritual Complex	291241	313732
MG052	Caer Noddfa	296245	296571
MG065	Domen Fawr Castle Mound Tafolwern	289103	302636
MG066	Ceffig Caerau Stone Circle	290283	300503
MG068	Lled Croen-yr-Ych Stone Circle	290403	300562
MG070	Gardden Camp & Barrows	303355	308614
MG072	Llysun Motte and Bailey	303150	310076
MG074	Gogerddan Camp	299310	312054
MG075	Maes Llymystyn Camp	296984	311463
MG134	Mynydd Dyfnant Stone Alignment	298518	315758
MG146	Cross-Incised Stone (Now in Carno Church)	295729	297295
MG147	Rhos-Dyrnog Standing Stone	282773	300577
MG149	Moel Ddolwen Camp	298895	307850
MG164	Pencad Cymru Cairn	298935	309330
MG180	Ring Cairn 540m SW of Llyn y Tarw	301372	296999
MG205	Castell Carno	294912	296098
MG209	Yr Allor Cairn	289848	300405
MG218	Root Store at Bon-y-Maen 800m NW of Blaen y Cwm	297859	303253
MG250	Soldiers' Graves Pillow Mounds	302484	316609
MG265	Ffridd yr Ystrad Cairns	291857	299017
MG268	Boncyn y Llwyn round cairn	297364	310822
MG269	Tryfel Cairns and Stone Setting	296999	316117
MG270	Llechwedd Du Round Cairn	296763	316259
MG276	Lluest Uchaf Cairns and Stone Row	300049	298329
MG277	Craig y Llyn Mawr Round Cairn	299970	298180
MG278	Nant Cwm Gerwyn Cairns	299587	298711
MG279	Blaen y Cwm Ring Cairn	298191	298687
MG291	Carreg Lwyd Ritual Complex	291926	295742
MG292	Twr Gwyn Mawr Round Cairn	291816	295936
MG293	Blaen y Cwm Round Cairns	292105	296036
MG294	Esgair Draenllwyn Round Cairn I	292644	294424
MG295	Esgair Draenllwyn Round Cairn II	292964	294818
MG296	Bryn yr Aran Stone Setting	293499	295635
MG297	Esgair Draenllwyn Stone Setting	293023	295053
MG304	Bryn yr Aran Ring Cairn and Ritual Platform	293228	295790
MG311	Moelfre round barrow	284805	298358

MG312	Moel Eiddew platform cairn	286539	305118
MG313	Mynydd Lluest Fach barrow cemetery	289890	308136
MG314	Ffridd Cwm y Ffynnon round barrow	291826	304977
MG325	Bryn Du hut circle	301935	297947
MG327	Mynydd y Gribin kerb cairn	301786	302249
MG331	Bryn y Gadair round cairn	296281	294115
MG332	Fron Goch hillfort	282223	301369
MG338	Round Hut 700m NNE of Garreg Hir	299708	298181
MG339	Round Hut 400m NE of Garreg Hir	299770	297840

Table 6.2: Scoped-In Listed Buildings

Record Number	Name	Grade	Easting	Northing
7605	Church of St Mary	II*	288412	300782
7632	Church of St Cadfan	II	301108	310334
17936	Church of St. Erfyl	II	303408	309775
17942	Abercannon	II	296280	306933
18132	Cwm-carnedd-uchaf	II	291580	302870
18137	Plas rhiw-saeson	II	290109	305138
80796	Parish Church of St Tydecho, Foel	II	298552	311892
84408	Cwm Pen Llydan	II	292916	306360

Receptors Scoped Out of ES

6.4.12 With reference to Figures 6.1 and 6.3: the following receptors within a 10km radius of the Site are to be scoped out of the assessment of direct (physical) and/or indirect (non-physical) effects, as it is considered that there is no potential for significant effects (see 6.3.16-6.3.22):

- All non-designated historic assets outside the Site;
- All Scheduled Monuments lacking theoretical visibility of the Proposed Development;
- Listed Buildings with theoretical visibility of the Proposed Development only in non-designed views, and/or with no co-visibility of the Proposed Development in views towards them, and/or with no known historical or functional association with the Site;
- All Listed Buildings lacking theoretical visibility of the Proposed Development;
- All Conservation Areas; and
- Clywedog Valley Registered Historic Landscape.

6.4.13 Not allowing for exceptions, designated historic assets lying beyond a 10km radius of the Site will also be scoped out of the assessment of direct (physical) and/or indirect (non-physical) effects

6.5 Potential Mitigation

Mitigation by Design

6.5.1 The entire redline boundary area will be subject to Heritage Desk-Based Assessment and a 1ha square around each turbine base will be subject to Geophysical Survey. This data, combined with the customary 50m tolerance on the specified grid coordinate of a wind turbine, will allow for micro-siting of the turbine to avoid any significant archaeological remains that may be revealed during the construction phase.

Additional Mitigation

6.5.2 Additional mitigation measures that are anticipated to be taken into account within the ES include the undertaking of archaeological fieldwork to provide further information regarding the survival, buried depth (as applicable), character, date, function and significance of historic assets and to preserve by record any assets for which primary mitigation is not possible.

Enhancement

6.5.3 Opportunities for enhancement in relation to cultural heritage include:

- Assessing the survival and condition of historic assets, which may allow for suitable management strategies to be identified and implemented by heritage bodies and/or landowners in the future; and
- Disseminating information regarding known and previously-unknown historic assets to members of the public by way of enhanced Historic Environment Records, release of publications, community/outreach activities and/or on-site interpretation boards as appropriate.

6.6 Cumulative Effects

6.6.1 The cumulative effect on historic assets of the Proposed Development in combination with other schemes (including Carnedd Wen) will be assessed within the ES Chapter.

6.7 Questions

- Do you agree with the proposed study areas?
- Do you agree that the data sources listed to inform the EIA baseline characterisation are appropriate?
- Are any receptors not identified that you would like to see included in the EIA?
- Do you agree with the receptors that are proposed to be scoped in and out of the EIA?

7 Ecology

7.1 Introduction

7.1.1 This section of the Scoping Report sets out the proposed approach to the assessment of construction, operational and decommissioning effects of the Proposed Development on ecological features. Ornithological effects are considered in **Section 8**.

7.2 Legislation, Policy and Guidance

7.2.1 This section presents a summary of the legislation, policy and guidance that will inform the approach to the design and assessment of the Proposed Development.

7.2.2 Particular consideration has been given to habitats and species listed under Annexes 1 and 2 of the Habitats Directive (92/43/EEC), Schedules 5, 8 and 9 of the Wildlife and Countryside Act 1981 (as amended) and Section 7 of the Environment Wales Act (2016) in deriving the detailed approach to the work.

7.2.3 Consideration has been given to national and local policy, to include Planning Policy Wales (PPW) 12, Technical Advice Note (TAN) 5 Nature Conservation and Planning, Future Wales (The National Plan 2040) and the Powys County Council Local Development Plan (LDP) in informing the proposed assessment scope.

7.2.4 The approach to the collection of ecological data is based on industry standard guidance wherever this is available and applicable to the Site. For example, Phase 1 habitat survey has been completed in accordance with the approach outlined by the Joint Nature Conservation Committee (JNCC, 2010), bat survey and dormouse survey has followed NatureScot *et al.*, 2021 and Bright *et al.*, 2006 respectively, and otter and water vole survey will be based on approaches outlined by Chanin (2003) and Dean *et al.* (2016).

7.2.5 The approach to the ecological impact assessment will be based on Chartered Institute for Ecology and Environmental Management (CIEEM) guidance (2018).

7.3 Proposed Scope of Assessment

Methodology

Study area

7.3.1 The study area for the desk study extends to 2 km beyond the Site boundary for most ecological features[11], but to 10 km for bats (and sites designated for their bat populations).

7.3.2 Ecological survey work has been largely focused within the Site. However, for some species, such as water vole and otter, it is proposed to survey potentially suitable habitats within a reasonable search distance[12] around turbines and other infrastructure following a design freeze.

Desk Study

7.3.3 An initial desk study was completed in January 2022. This included a review of aerial imagery, ordnance survey maps and the UK Government's 'Magic'

[11] Species and designated sites.
[12] 200 m is proposed.

website[13] to broadly assess habitat types and connectivity, and a review of species and non-statutory site data from the Biodiversity Information Service (BIS) for Powys for a search area extending to 2 km around the Site (however, this area has been extended to 10 km for bats). This has helped inform the approach to survey work. The BIS data search desk study will be updated prior to submission of the planning application.

7.3.4 The most relevant ecological information for the Site is a report compiled by BSG Ecology (2018). This report contains a review of data collected to inform the initial Llanbrynmair Wind Farm planning application (in 2008) and updated detailed bat and great crested newt survey in 2016 - 2017, which were collected to inform determination of the application by the Department of Business, Energy and Industrial Strategy. The report also includes a summary of data for RWE Renewables' adjacent Carnedd Wen Wind Farm site (an equally long-running development proposal).

Surveys

7.3.5 The proposed scope and specification of ecological surveys is provided below.

Phase 1 Habitat Survey

7.3.6 As a result of the gradual evolution of the developable area, different parts of the site were subject to Phase 1 Habitat survey over two distinct periods. The two areas (illustrated on **Ecology Figure 7.5**) have been defined as Area A and Area B for clarity within the text that follows:

- Area A: areas covering a perimeter of 250 m around indicative turbine locations on an early site layout and other unconstrained areas (survey completed in July 2022);
- Area B: areas within the updated Developable Area[14] which were not surveyed in 2022 (survey completed in October 2023).

7.3.7 A more detailed survey than is typical of a phase 1 habitat survey was completed in Area A, with habitats categorised in terms of their National Vegetation Classification (NVC) categories in the field (based on the experience of surveyors) and subsequently checked against community types identified by Rodwell (1998). This allows priority habitats to be identified. Area B (6.6 km^2) was subject to a high-level Phase 1 habitat survey only (in accordance with industry standard (JNCC, 2010) survey

[13] MAGIC (defra.gov.uk)
[14] Provided by RES on 15/09/2023.

guidance), given that it was completed outside of the growing season and some species may not have been apparent.

7.3.8 The Phase 1 habitat survey for the Site was updated in July 2024 following issue of an updated turbine layout and will be updated further once a design chill has been reached. The survey area will be refined to areas within 250 m of turbine locations and other infrastructure as appropriate (SEPA Guidance Note 31). Those areas that have been surveyed in more detail previously (Area A) will be checked to confirm that the habitats described have not changed (in character or condition). Those areas that have only been subject to phase 1 survey (Area B) will require further detailed survey at the optimum time of year to allow data on NVC communities to be collected.

Bat Survey

7.3.9 Bat activity has been characterised using static acoustic bat detectors in accordance with industry standard guidance (NatureScot *et al*. 2021). This involved the seasonal deployment of 14 static acoustic detectors at potential turbine locations (based on the working turbine layout of 21 turbines at the time) for a minimum of 10 nights during spring, summer and autumn 2023. Song Meter 4 and Song Meter Mini full spectrum detectors were used. A weather station was deployed for the duration of the survey work, to collect site-specific meteorological data.

7.3.10 The locations of bat detectors are illustrated on **Ecology Figure 7.1**.

7.3.11 Bat roost surveys of trees and buildings within a 250 m perimeter area around proposed turbines will be completed in 2025. The aim of the survey will be to identify potential for roosting bats. Further climbed tree surveys and / or emergence / re-entry surveys will then be completed as required.

Great Crested Newt (GCN) Survey

7.3.12 A total of sixteen ponds were identified within and adjacent to the Site and the proposed access route, through a combination of review of historical pond locations and additional ponds identified during the Phase 1 survey in 2022. An environmental DNA (eDNA) survey was completed of nine ponds in April 2023 to gain presence / absence data on great crested newt (GCN). Six ponds were dry at the time of survey and one pond (Pond 4) could not be sampled due to safety concerns regarding access. Following discussion with Natural Resources Wales (NRW), it was agreed that in addition to eDNA sampling, some complementary additional survey techniques would be employed before GCN were presumed absent. As such, ponds were subject

to one or more torching, egg search and terrestrial search surveys depending on their suitability to support GCN[15]. The surveys were completed in 2023. Pond 10 returned a positive eDNA result during previous surveys in 2016 but a negative result in 2023; as a precaution it was subject to four presence / absence survey visits using a range of conventional survey techniques (such as bottle trapping and egg searching).

7.3.13 Pond locations are illustrated on **Ecology Figure 7.2**.

Dormouse Survey

7.3.14 Dormouse survey commenced in November 2022, with survey visits completed in June, August and October 2023. Areas of the Site with good connection to belts of off-site semi-natural valley woodland were targeted for sampling in addition to indicative turbine locations and track edges. A combination of nest boxes and nest tubes were deployed to sample different habitat types.

7.3.15 The locations of next boxes and nest tubes are illustrated on **Ecology Figures 7.3A – 7.3C**.

Otter and Water Vole Survey

7.3.16 Surveys for otter and water vole will take in suitable habitats within a perimeter of 200 m around wind farm infrastructure. Survey methods for otter will be based on those recommended in Chanin (2003). Streams (channels and banks) will be systematically surveyed for signs of otter such as droppings ('spraints'), runs and footprints. Particular attention will be given to suitable sprainting areas such as large, flat rocks and areas where otters are likely to enter and leave streams via runs and slides. Water vole surveys will be completed concurrently. Industry standard guidance (Dean *et al.*, 2016) recommends two survey visits for water vole in two different seasons (one spring / early summer and one late summer / autumn). Work will commence once the Proposed Development has reached a design chill.

Adder Habitat Suitability Survey

7.3.17 Due to the likelihood that adder will become fully protected if / when the Quinquennial Review of the Wildlife and Countryside Act 1981 is implemented, a habitat suitability survey for this species was completed in October 2022. The work was completed by a national expert and informed

[15] The survey effort for each pond was based on a combination of factors, including Habitat Suitability Index (HSI) scores, pond location and formation (e.g. some ponds were formed in track-side borrow pits), previous survey data and early consultation discussions with Natural Resources Wales.

by the extended Phase 1 habitat survey. This data will be ground-truthed during the update of the habitat survey.

Assessment of Likely Significant Effects

7.3.18 The assessment will be completed in accordance with CIEEM guidance and will involve:

- Determining important ecological features that require detailed impact assessment through evaluation of desk study and field survey data through:
  - defining the ecological zone of influence of the development.
  - consideration of the importance of ecological features within a defined geographical context (e.g. whether populations are important at the national, regional, county or local levels).
- Characterising and quantifying effects and assessing their significance through:
  - consideration of whether effects are: beneficial, adverse or neutral; their extent, magnitude, duration, reversibility, timing and frequency; and whether there is potential for their significance to be increased cumulatively as a result of other plans or projects.
  - determining the significance of both beneficial and adverse effects. This will be completed in relation to the conservation status of each species at the geographical level at which it has been valued.

7.3.19 The potential of the Proposed Development to affect the Favourable Conservation Status (FCS) of species will be considered, taking account of available data on their Current Conservation Status (CCS) at the national and local level.

7.3.20 The value of any feature that will be significantly affected will then be used to draw conclusions as to what the implications of development are in legislative terms and any additional measures needed to ensure policy compliance (CIEEM, 2018).

Consultation

7.3.21 Consultation on the approach to ecological work to inform the assessment was undertaken with NRW in January 2022. The minutes of the meeting are found in **Ecology Appendix 7.1a and Appendix 7.1b**.

7.3.22 Most of the scope of work was agreed with NRW at the meeting in January.

7.3.23 Consultation with the Powys County Council (PCC) ecologist over the scope of ornithological and ecological work was undertaken in June 2022. The minutes of the meeting are found in **Ecology Appendix 7.2**.

7.3.24 The scope of work was largely agreed with the PCC ecologist at the meeting in June. It was accepted that some tube deployment might be useful in more effectively sampling scrubby areas / those with young woody growth (including bramble scrub) during dormouse surveys. NRW had recommended the use of boxes as opposed to tubes. As result, a combination of boxes and tubes were used during the survey.

Scoping Criteria

Construction

7.3.25 Corsydd Llanbrynmair Site of Special Scientific Interest (SSSI) (**Ecology Figure 7.4**) is within 300 m of the Site and comprises remnant areas of blanket bog. High-level Phase 1 survey data indicates a range of other priority habitats including wet and dry heath and marshy grassland are present within the Site.

7.3.26 Design phase mitigation will aim to ensure that there are no significant effects on the hydrology of the SSSI[16] and priority habitats within the Site. There is the potential for significant effects on the condition of the SSSI and on priority habitats within the wider Site through physical damage by construction traffic and pollution. Construction phase pollution and / or sediment mobilisation could also potentially affect offsite watercourses. However, good practice prevention and control measures in relation to pollution prevention and soil compaction will be embedded into the Site design and delivered through a Construction Environmental Management Plan (CEMP). These measures will be described in detail within the ES but considered prior to the assessment of the likely effects of the Proposed Development. If likely significant effects are identified then further specific mitigation measures will be detailed prior to determining the likely significance of residual effects.

[16] The potential for hydrological change is likely to be localised due to the damage to the hydrological regime of the Site.

7.3.27 In general it is likely that effects on habitats will be very localised due to the disruption that has resulted to habitat function through long-term afforestation in some areas, and the significant fragmentation of peatland habitat across the Development site.

7.3.28 The potential for significant effects on protected species will depend on the outcome of ongoing survey work. Otter were recorded using the large pools within the adjacent Carnedd Wen Wind Farm Site during bird survey work in 2016/17 and could potentially be disturbed or displaced by construction work if they also use the watercourses on Site. There is also potential for killing and injury and the loss of places of shelter for a range of other species including otter, water vole, bats and reptiles (including adder) and amphibians.

Operation

7.3.29 The main potentially significant operational phase effect is bat fatality resulting from collision with turbine blades. The assessment will be undertaken with reference to NatureScot *et al.* (2021) which categorises bat species in terms of their collision risk and relative abundance to give an overall population vulnerability level for the species.[17] At the current time, the EcoBat tool (used for standardised interpretation of bat activity data) is not being maintained and has not been available for use since 2022. For this reason, it will not be used to inform the interpretation of bat activity data for this Site. A categorisation of bat activity will instead be derived through comparison with bat activity data collected by BSG Ecology at 106 other sites[18] across Wales, England, Scotland and Ireland.

7.3.30 Bat survey work demonstrated that a minimum of eight species of bat occurred at the Site. The most frequently recorded were common and soprano pipistrelle, which are likely to roost around farms and in residential buildings in the wider area. Noctule occurred infrequently (in comparison with activity levels at many other Welsh wind farms); activity was consistent across the survey season. Of the other large bats, Leisler's bat was recorded very infrequently, and no confirmed serotine passes were recorded. There were also three records of Nathusius' pipistrelle. The results were largely consistent with previous bat survey work completed at the Site.

[17] This is based on evidence from the National Bats and Wind Turbines study (Mathews, F., Richardson, S., Lintott, P. & Hosken, D. (2016). *Understanding the risk to European Protected Species (bats) at onshore wind turbine sites to inform risk management*. University of Exeter report to Defra.) and Eurobats data.

[18] These include proposed and operational wind farm sites, proposed energy production sites, proposed residential and infrastructure developments, mineral extraction sites, and other non-development lowland, wetland and island sites.

7.3.31 The assessment of operational effects on bats will be further informed by roost survey work in 2025. However, it is likely that effects on noctule and the commoner pipistrelles will be the focus of the assessment.

7.3.32 Effects on habitats and protected species other than bats during operation are likely to be neutral.

Decommissioning

7.3.33 The effects of decommissioning have the potential to be similar to those during the construction phase but are likely to occur over a shorter time period.

7.3.34 There is the potential for damage to semi-natural habitats and killing and injury, disturbance and displacement of protected and priority species using the Site at the time of decommissioning.

7.3.35 It is reasonable to expect that there will be changes in legislation concerning habitats and protected species over the operational life of the Proposed Development. These may be driven by climatic change, government policy concerning land management, increased effectiveness / policing of species protection, ecological research, the spread of reintroduced and non-native species and other factors.

7.3.36 Predictions of potentially significant effects are therefore not possible, with any confidence, over the operational life of the Proposed Development. It follows that effects on protected and priority habitats and species would be best addressed through a decommissioning phase Environmental Management Plan.

Effects Scoped Out

7.3.37 It is likely that effects on all designated sites other than Corsydd Llanbrynmair SSSI can be scoped out of detailed consideration in the ecological impact assessment.

7.3.38 Detailed consideration of dormouse and great crested newt in the ecological impact assessment can be scoped out given that these species were not recorded during surveys in 2023.

7.3.39 The potential to scope out detailed consideration of effects on other species such as water vole will depend on the scope and results of forthcoming survey work.

7.3.40 Legislative compliance with regard to other protected and / or priority species, such as reintroduced pine marten populations, hedgehog and badger should be possible to address through construction phase controls

and are unlikely to require detailed consideration in the ecological impact assessment. Of these species, badger has been recorded in the area; small-scale activity has been noted around the periphery of the Site during previous survey work. One pine marten sighting was also recorded in the Carnedd Wen Wind Farm site forestry in April 2023. It was agreed with Natural Resources Wales during an email exchange in May 2024 that survey for pine marten would not be required within the adjacent Carnedd Wen Wind Farm site forestry, but assessment provisions should include pine marten and precautionary provisions such as pre-commencement surveys should be included in any future CEMP.

7.4 Baseline Conditions

Site Description and Context

7.4.1 The Site is upland in nature and is characterised by a mixture of commercial coniferous plantation and open moorland / grassland. Habitat survey and mapping indicates that the area is predominantly a mosaic of blanket bog, heath and grassland (including improved and semi-improved pasture and acid grassland), with smaller compartments of commercial plantation (covering approximately 15 % of the area).

7.4.2 The topography of the Site is predominantly gently rolling, but steep-sided valleys and ridges are present to the west and north, and occur locally within the Site boundary. Minor watercourses are frequent, and mainly discharge to the Nant Carfan to the west and the Nant yr Eira which flows north-west across the Site to join the Afon Banwy.

7.4.3 There are two large still freshwater bodies to the north-west of the Site (within the Carnedd Wen Wind Farm site), Llyn Gwyddior and Llyn Coch-hwyad; these are approximately 550 m by 350 m and 520 m by 270 m respectively at their greatest extent.

7.4.4 Land use in the wider area includes extensive open moorland (particularly to the north and west), scattered plantation, and semi-natural valley woodland and pasture farmland in the valleys. Farm buildings are a feature of the farmland within the Site.

7.4.5 One Special Area for Conservation (SAC), the Berwyn and South Clwyd Mountains SAC, the Berwyn Special Protection Area (SPA) and six SSSIs are present within 5 km of the Site. The locations of these designated areas in relation to the Site are shown on **Ecology Figure 7.4**.

7.4.6 The Berwyn and South Clwyd Mountains SAC is approximately 4.4 km to the north of the Site[19] at its closest point. The SAC was designated for its blanket bog, European dry heath, semi-natural dry grassland and scrubland facies, transition mires and quaking bogs, calcareous and calcshist screes of the montane and alpine levels, and calcareous rocky slopes with chasmophytic vegetation.

7.4.7 SSSIs within 2 km of the Site are as follows:

- Corsydd Llanbrynmair (Llanbrynmair Moors) SSSI, is within the adjacent Carnedd Wen Wind Farm site, approximately 300 m to the north-west of the Site at its closest point. It is a composite site comprising several small areas of remnant blanket bog.
- Gweunydd Dolwen SSSI is located approximately 230 m east of the Site at its closest point and is notified for its acid and neutral dry grassland.

Baseline Survey Information

7.4.8 Previous survey data (and survey from 2022 to date) is summarised as follows:

- Potential priority habitats[20] identified during the Phase 1 habitat survey of the developable area were upland heathland, marshy grassland, blanket bog, upland flushes, fens and swamps, ponds, hedgerows and semi-natural broadleaved woodland. Potential priority habitats are illustrated on **Ecology Figure 7.5**.
- Further detailed habitat survey was undertaken within 250 m of proposed turbine locations[21] during July 2024 to confirm whether these correspond to priority habitats and to collect information on their condition. This data is currently being collated and reviewed. Further survey will be required once a design chill has been reached for those areas which have not yet been subject to detailed survey.
- Automated detector surveys identified a minimum of eight bat species using the Site in 2023. Species diversity is typical of the surrounding area (based on the results of the desk study and previous survey data). These species were: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, (one or more) Myotis species, long-eared bat species, noctule, Leisler's bat and lesser horseshoe bat. The data indicates that bat activity is higher with proximity to edge features

[19] Located to the north of the A458, within 46 m of the adjacent Carnedd Wen Wind Farm Site.
[20] Those listed under Section 7 of the Environment Wales Act (2016) or under Annex 1 of the Habitats Directive (The Conservation of Habitats, Flora and Fauna, 92/43/EEC).
[21] Based on the two working turbine layouts at the time (PWALbm050 and PWALbm055).

where multiple habitat boundaries meet, and areas in proximity to habitat features such as waterbodies, where prey availability is likely to be greater. These habitats and topographical features are spread throughout the Site and not focussed in any one area. The Site is considered to be of low value to foraging and commuting bats; levels and timing of activity do not suggest that any species are reliant on the Site as a primary foraging or commuting resource. Habitats adjacent to the Site (such as those within the local statutory designated sites) are considered likely to be of higher value to foraging bats. The total bat activity recorded at each detector location is illustrated on **Ecology Figure 7.6**. The value of the Site as a roosting resource will be determined following roost surveys in 2025. Roost survey methods will be in accordance with Bat Conservation Trust guidance (Collins, 2023).

- During previous surveys in 2016, 11 suitable ponds located within 250 m of the proposed turbine locations at Carnedd Wen Wind Farm and Llanbrynmair Wind Farm were tested for presence / absence of great crested newt using the environmental DNA (eDNA) method. A positive eDNA result was returned for Pond 10; this pond is approximately 213 m^2 in size and is situated on a linear watercourse in grassland habitat within the Llanbrynmair Wind Farm site boundary. The nearest pond is Pond 11 and it is situated approximately 1.8 km to the south-west. The majority of the ten ponds that tested negative for the presence of GCN DNA are small track-side borrow pits located in commercial coniferous plantation habitat and are at least 2 km from Pond 10. Nine ponds were sampled for eDNA across the Llanbrynmair and Carnedd Wen Wind Farm Sites in 2023. The eDNA survey in 2023 returned negative results for all ponds surveyed at Llanbrynmair Wind Farm. One pond associated with Carnedd Wen Wind Farm (Pond 2) returned a likely false positive result[22]. No GCN were recorded during supplementary presence / absence surveys of any of the ponds.
- The site is considered to be suboptimal for dormouse given its limited potential to provide adequate nesting sites, food resources and cover. No evidence of dormouse was recorded during the survey work between 2022 to 2023.

[22] The pond was very shallow at the time of survey with very little submerged vegetation. Only one of the six sample replicates returned a positive result. The pond is isolated from other more suitable ponds by over 1.2 km, and no evidence of GCN was recorded during subsequent torching surveys, egg searches or terrestrial searches.

- No evidence of adder presence (adders basking, dispersing, sloughed skins etc) was observed during the adder habitat suitability survey in October 2022. Steep slopes with structural vegetation within the Site and the stream valley slopes around Cannon Farm were considered to be suitable habitats for adder.

7.5 Potential Mitigation

7.5.1 The Step-Wise Approach, which involves avoiding, minimising, mitigating and where necessary compensating for ecological effects will be adopted.

Mitigation by Design

7.5.2 Design phase measures will include:

- Avoidance of any Development infrastructure in areas likely to affect the hydrology of the Corsydd Llanbrynmair SSSI.
- A stand-off (likely to be 60 m) from all watercourses to reduce the potential for effects on riverine mammals, fish and invertebrates associated with freshwater habitats.
- Avoidance of known areas of deep peat, remnant blanket bog and localised areas of high quality semi-natural habitat (if present) for turbine placement.

Additional Mitigation

7.5.3 Construction phase mitigation will principally be delivered through input to the Construction Environmental Management Plan (CEMP). Ecological objectives of the CEMP will include:

- Appointment of an ecologist tasked with ensuring compliance with all relevant regulatory and other requirements, method statements and plans, and reporting to the principal contractor and statutory consultees concerning ecological issues.
- Identification of the scope and timing of pre-construction ecological survey work (to be informed by existing data and reconnaissance), and how this will potentially inform the approach to construction work.
- Ecological input to method statements for all components of the work. This should set out to demonstrate how the potential for offences, pollution events and mobilisation of sediment will be avoided.
- The appointment of an appropriately qualified and experienced ecologist to act as an ecological clerk of works for the project.

- The identification of appropriate ecological awareness training for site staff and contractors in respect of the presence of protected and sensitive species and the importance of species-specific mitigation measures.

7.5.4 The requirement for operational phase mitigation will be informed by further statistical analysis of the correlation between weather conditions and bat use of the Site. If required, measures could include feathering of turbines at idle and adjustment of cut-in speeds to minimise potential for killing and injury.

Enhancement

7.5.5 In conjunction with the ecological assessment, a policy-compliant biodiversity enhancement plan will be produced and will form part of the Habitat Management Plan (HMP) for the Site. The HMP will aim to deliver a net benefit for biodiversity in line with the DECCA Framework (Planning Policy Wales (PPW) 12). The HMP will be implemented over the operational life of the Proposed Development and may include monitoring requirements.

7.6 Cumulative Effects

7.6.1 Consideration and assessment of cumulative effects with other developments, in particular wind farm sites, within the vicinity of the Proposed Development will be undertaken as part of the EIA.

7.6.2 The most relevant of these other developments is likely to be the proposed Carnedd Wen Wind Farm adjacent to the Site. However, other proposals will need to be considered as part of the work.

7.6.3 Previous survey data suggest that the effects of the wind farm on protected species and habitats are likely to be relatively localised, but that the cumulative assessment for bats might reasonably cover all wind farms (and other developments with the potential to impact on bats) within 10 km of the Proposed Development (in accordance with NatureScot (2021) guidance).

7.7 Questions

7.7.1 Are consultees content with the proposed approach to the ecological desk study and site survey work?

7.7.2 Corsydd Llanbrynmair SSSI will be considered in the ES. Do consultees agree that detailed consideration of effects on other designated sites can be scoped out?

7.7.3 Can consultees identify any key development projects for consideration within the scope of the cumulative assessment?

8 Ornithology

8.1 Introduction

8.1.1 This section of the Scoping Report sets out the proposed approach to the assessment of construction, operational and decommissioning effects of the Proposed Development on ornithological features.

8.1.2 Ecological effects are considered in **Section 7**.

8.2 Legislation, Policy and Guidance

8.2.1 The approach to ornithological survey has been based on Scottish Natural Heritage[23] (SNH, 2017) guidance for bird survey at onshore wind farms, which represents industry standard guidance for the UK.

8.2.2 Particular consideration has been given to those species listed under Annex 1 of the Birds Directive (2009/47/EC), Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and Section 7 of the Environment Wales Act (2016) in deriving the detailed approach to the work.

8.2.3 Consideration has been given to national and local policy, to include Planning Policy Wales (PPW) 12, Technical Advice Note (TAN) 5 Nature Conservation and Planning, Future Wales (The National Plan 2040) and the Powys Council Local Development Plan (LDP) in informing the proposed assessment scope.

8.2.4 The approach to the ornithological impact assessment will be based on Chartered Institute for Ecology and Environmental Management (CIEEM) guidance (2018) and informed by Collision Risk Modelling using the Band Model derived by SNH.

8.3 Proposed Scope of Assessment

Methodology

Study Area

[23] Now NatureScot

8.3.1 The study area varies according to species group and survey method in accordance with industry standard (SNH, 2017) guidance. Further commentary on the spatial extent of survey work is provided in the section on field surveys.

8.3.2 Following early consultation with Natural Resources Wales (NRW), the spatial extent of the study area was amended to include the collection of considerable desk study data for the Berwyn Special Protection Area (SPA) to the north alongside survey to investigate whether there was evidence that SPA birds regularly moved between the Berwyn SPA and the Site.

Desk Study

8.3.3 The initial desk study was completed in January 2022. This included a review of aerial imagery and maps to broadly assess habitat types and connectivity, and a review of species and non-statutory site data from the Biodiversity Information Service (BIS) for Powys. This helped inform the approach to survey work. The BIS data search will be updated prior to submission of the planning application.

8.3.4 The most relevant contextual ornithological information for the Site is a detailed ornithological report compiled by BSG Ecology (2017) in which all survey data collected to inform the initial Llanbrynmair Wind Farm planning application (in 2008), an updated ornithological assessment (in 2012) and determination by the Department of Business, Energy and Industrial Strategy (involving a full ornithological survey update in 2016 and 2017) was summarised. The report also includes a summary of data for the adjacent Carnedd Wen Wind Farm site (an equally long-running development proposal).

8.3.5 A second data set that has provided important context for the assessment is that held in part by a raptor worker and in part by RSPB Cymru for breeding raptors in the Berwyn SPA. These data sets have previously been secured for ten breeding seasons between 2012 and 2021 inclusive. They include details of nest sites and productivity of raptors. Data for 2022 – 2024 will be requested prior to submission of the planning application.

Surveys

8.3.6 Extensive wintering and breeding bird survey work recommenced at the Site in October 2021. This largely represents an update of work completed in 2016/17, when the scope was very similar. Smaller-scale work was completed in 2012 (breeding hen harrier and black grouse survey only), and extensive survey work was undertaken between 2005 and 2008 inclusive to

inform the original planning application. Considerable complementary data also exists for the adjacent Carnedd Wen Wind Farm.

8.3.7 The following field surveys were completed between October 2021 and November 2023:

- Vantage point (VP) surveys from 14 locations within and overlooking the Site and adjacent areas (2021 – 2022). Focal species included all Annex 1 and Schedule 1 raptors, kestrel, owls, all grouse, waders and wildfowl[24] species. **Ornithology Figure 8.1** indicates VP locations and viewsheds.
    - Winter VP work commenced in October 2021, with at least 36 hours of survey data collected from each location between October 2021 and March 2022 inclusive.
    - Regular counts of waterfowl using the two large waterbodies close to the Site were completed in conjunction with the winter VP work.
    - Breeding season VP work was completed from the same locations as the winter work. At least 36 hours of data was collected from each VP between April and July 2022. Further data was collected from each VP in August and September (the same monthly effort was applied as during the breeding season), principally to gain supplementary information on dispersing birds that may form part of the breeding population of the adjacent Berwyn SPA.
- Breeding raptor surveys. These were completed under licence in accordance with the methods set out by Hardey *et al.* (2013) and included walkover surveys and ad hoc watches from vantage points. Thirty days of work were completed during 2022. The scope of raptor work included the following:
    - Late winter / early spring surveys to detect territorial activity in goshawk. These have involved surveys from standard and supplementary VP locations within the Site and areas of forestry extending to over 1 km from it in periods of good, settled weather.

[24] The latter excludes non-native and re-established goose species.

- Surveys of the Site and a perimeter area extending to 1-2 km around it for woodland, ground and cliff-nesting raptors.[25]
- An extension of the spatial extent of the raptor survey to take in those areas of the Berwyn SPA which desk study and local stakeholder liaison has established are not routinely surveyed for ground-nesting raptors.

- Breeding wader surveys. Surveys of open moorland to the east and south-east of the Site were completed in accordance with industry standard guidance (SNH, 2017). These involved four survey visits between April to July 2022 inclusive. The survey area extended beyond the approximate maximum distance at which wader displacement has been recorded.
- Black grouse surveys. Surveys have been completed in accordance with the methods set out in Gilbert *et al.* (1998). These were informed by desk study and reconnaissance and were focussed on areas of plantation edge and open land within 1.5 km of the Site that have historically supported the species. Surveys were completed between April and May 2022 inclusive. The black grouse survey transect route can be found on **Ornithology Figure 8.2**.
- Nightjar surveys. Following review of forest plans and reconnaissance to establish areas of permanently open habitat, clearfell and recently re-stocked plantation (up to canopy closure), surveys were completed to determine presence of territorial nightjar within the Site boundary and adjacent suitable habitat. Survey involved driven transects with stopping points. Survey timing followed Gilbert *et al.* (1998). Ten nights of work were completed over the course of June and July 2022. The surveys were repeated in June and July 2023.
- Barn owl. There is potential for disturbance to barn owl in agricultural buildings as a result of the Proposed Development. There is one minor road into the Site from the south (a route that was consented for haulage in relation to the previous wind farm application) that will experience additional traffic if it is used. If this is the case, a complex of buildings at Ordnance Survey Grid Reference SH 94400 04260 (within the Site), and further buildings directly adjacent to the road at SH 94678 03978 (Ffridd Fawr), at SH 94371 02236, SH 93693 01395 and SH 93166 00963 (Pant Glas) will be subject to more regular lorry noise

[25] SNH (2017) guidance is that for some species such as red kite, peregrine and hen harrier a 2 km perimeter search area is implemented, while for others such as goshawk and hobby a 1 km search area is appropriate.

during construction. These buildings were inspected in August 2022 for their potential to support breeding barn owl. The complex of buildings within the Site were subject to internal inspections whilst any off-Site buildings were inspected externally only. The inspections were completed under a Schedule 1 licence.

- Targeted red kite and hen harrier survey. Targeted VP survey effort for red kite and hen harrier (to supplement the first year of ornithological survey work) was completed between December 2022 and November 2023 inclusive. As the aim of the work was to determine whether the site provided functional linkage to the Berwyn SPA, for which these species represent qualifying interest features (and not to input to a collision risk model), the method was varied slightly from standard VP work. Only hen harrier and red kite were treated as target species with all other species activity recorded in the activity summary at five minute intervals. The duration of watches and method of recording flight lines otherwise remained consistent with the SNH VP methods. Surveyors were positioned at two VP locations to the north of the Carnedd Wen Wind Farm Site. The VPs were located approximately 2.75 km apart on Foel Dugoed (SH 89825 12783) and Craig Ddu (SH 92251 13905), both of which provide coverage of the area between the Berwyn SPA and the site. Six hours of data collection from both VP locations was undertaken monthly for a full calendar year. The VP locations and indicative viewsheds are provided in **Ornithology Figure 8.3**.

Assessment of Likely Significant Effects

8.3.8 The assessment will be completed in accordance with CIEEM guidance and will involve:

- Determining important ornithological features that require detailed impact assessment through evaluation of desk study and field survey data through:
    - defining the ornithological zone of influence of the development.
    - consideration of the importance of ornithological features within a defined geographical context (e.g. whether populations are important at the national, regional, county or local levels).
- Characterising and quantifying effects and assessing their significance through:

- considering whether effects are: beneficial, adverse or neutral; their extent, magnitude, duration, reversibility, timing and frequency; and whether there is potential for their significance to be increased cumulatively as a result of other plans or projects.
- determining the significance of both beneficial and adverse effects. This will be completed in relation to the conservation status of each species at the geographical level at which it has been valued.

8.3.9 The process will be informed by Collision Risk Analysis. This will involve extrapolation of flight-data obtained during VP surveys, to calculate the number of flights likely to occur through the rotor swept area when the Proposed Development becomes operational. Following the application of avoidance rates, predicted fatalities per year and over the life of the wind farm (by each focal species) will be determined.

8.3.10 The value of any feature that will be significantly affected will then be used to draw conclusions as to what the implications of development are in legislative terms and whether it is likely to be policy compliant (CIEEM, 2018).

Consultation

8.3.11 Consultation on the approach to ornithological work to inform the assessment was undertaken with NRW in January 2022. The minutes of the meeting are in **Appendix 7.1a and Appendix 7.1b**.

8.3.12 The majority of the scope of work was agreed with NRW. Discussion over potential effects on raptors breeding within the Berwyn SPA and using the Site led to an adaption to the previous approach to raptor survey to include part of the SPA. The approach was agreed with NRW.

8.3.13 A second meeting was held with NRW in November 2022, to discuss the results of the ornithology survey completed between October 2021 and September 2022, and the matter of functional linkage between the Site and the Berwyn SPA. The agreed minutes of the meeting are provided in **Ornithology Appendix 8.1**.

8.3.14 During the meeting in November 2022, NRW expressed the preliminary view that for all species other than red kite the data collection had established there was no clear evidence of functional linkage between the Site and the

Berwyn SPA, and that survey work for the majority of species could cease given the results of the first year of data collection. For red kite, it was considered that some further data collection would be useful to ensure that the evidence base was in place to support this conclusion.

8.3.15 To address this point, BSG Ecology identified and secured access to two vantage point (VP) locations to the north of the Carnedd Wen Wind Farm Site, both of which provided excellent views over the area between the Berwyn SPA and the northern boundary of Carnedd Wen Wind Farm. BSG Ecology proposed to undertake six hours of data collection from these locations monthly for a full calendar year to address the question. The scope of survey work was outlined in a letter to NRW on 16 December 2022.

8.3.16 The response from NRW (dated 16 February 2023) stated that NRW were "*content with the proposal for additional VP survey effort as outlined in the letter of 16th December 2022*" but advised that hen harrier flights were also recorded at the proposed VP locations to provide further information with regard to the dependence of wintering / non-breeding adults on the Site. Hen harrier were therefore included as a target species during the work.

8.3.17 Consultation with the Powys County Council (PCC) ecologist over the scope of ornithological and ecological was undertaken in June 2022. The minutes of the meeting are provided in **Ecology Appendix 7.2**. The PCC ecologist did not raise any concerns over the scope of ornithological survey work.

Scoping Criteria

Construction

8.3.18 There is potential for significant effects resulting from displacement of breeding birds to occur during construction works. Destruction of the active nests of breeding birds may also occur during felling completed as part of Site preparation.

8.3.19 Breeding birds potentially affected by these works include Schedule 1 species (goshawk, crossbill and firecrest) recorded holding territory in the plantation during ongoing or previous survey work. Disturbance to breeding barn owl may be a consideration during construction depending on the location of the access route.

8.3.20 Despite a nationally important black grouse population being present in the 2000s, both wind farm-related survey and RSPB data indicate the species is likely to have become locally extinct. No black grouse were recorded during surveys in 2022. Breeding curlew also occurred commonly in grassland

habitats around the Nant-yr-Eira until 2010, since which time the population has significantly declined with no evidence of breeding recorded during surveys in 2022.

8.3.21 Forest operations have resulted in the creation of open clearfell and recently restocked areas of plantation that provide better breeding opportunities for nightjar than were previously present. Two churring nightjar were recorded [redacted] during the June surveys in 2022 and three churring nightjar in the same area in June and July 2023. There is potential for further colonisation due to other potentially suitable habitat on and adjacent to the Site.

Operation

8.3.22 The main potentially significant effect during operation will be collision of breeding raptors with turbines. This has the potential to affect both forest-nesting species and those breeding within the wider landscape and using the airspace above the Site when commuting or foraging.

8.3.23 The survey data suggest that the most commonly-recorded focal raptor species was red kite. Red kite were recorded commuting and foraging over the Site regularly. Of the other species for which the Berwyn SPA was classified, hen harrier was the most regularly recorded, albeit most flight activity was below collision risk height. Despite the presence of eyries in the area, flight activity over the Site by peregrine was typically low, suggesting birds forage elsewhere. Merlin were recorded very occasionally during previous survey work, with most records outside the breeding season. This reflects the fact that desk study data indicates no known recent breeding territory of the species within a typical ranging distance of the Site.

8.3.24 Flight activity in other raptors and owls has been very limited during all work completed post 2010.

8.3.25 Other species at potential risk of collision include whooper swan, small numbers of which were recorded using the larger pools within the adjacent Carnedd Wen Wind Farm site boundary (predominantly) during late autumn and early winter for roosting and foraging, and golden plover; flocks made occasional flights over the Site outside the breeding season.

8.3.26 Significant effects may also arise from operational phase displacement of breeding forest-nesting raptors from areas of plantation close to operational turbines.

8.3.27 The potential for collision and operational displacement of other species, such as black grouse, waders and nightjar during operation is considered minimal. This is based on survey data and, in the case of nightjar, understanding of the results of monitoring at various Welsh wind farms.[26]

Decommissioning

8.3.28 The effects of decommissioning have the potential to be similar to those during the construction phase but are likely to occur over a shorter time period.

8.3.29 Species most likely to be disturbed and displaced from the Site during decommissioning are those that breed, roost or forage within it at that time.

8.3.30 It is reasonable to expect that there will be changes in legislation concerning protected species, as well as changes in local populations and distribution over the operational life of the Proposed Development. These may be driven by climatic change, landscape-scale land management, increased effectiveness / policing of protection, changes in the attitude of land managers to birds, the spread of reintroduced populations, changes on the wintering and staging grounds of migrant species and other factors.

8.3.31 Predictions are not therefore possible, with any confidence, over the operational life of the Proposed Development. It follows that effects on birds would be best addressed through a decommissioning phase Environmental Management Plan.

Effects Scoped Out

8.3.32 Construction and operational phase effects on black grouse can be scoped out of the assessment. No black grouse were recorded during the survey work in 2022 and it is accepted by NRW that the local population is likely to have become extinct (see **Ornithology Appendix 8.1**).

8.3.33 Other potential issues, such as disturbance and / or displacement of breeding short-eared owl, merlin and waders can be scoped out of detailed assessment given that these species were not recorded at the Site during the survey work in 2021/2022.

8.4 Baseline Conditions

Site Description and Context

[26] Work completed at sites including Pen y Cymoedd, Brechfa Forest West and Clocaenog Wind Farms has established that birds will hold territory very close to wind turbines. Construction phase disturbance effects have not been observed to extend beyond 200 m (Dr Mike Shewring pers comm).

8.4.1 The Site is upland in nature and is characterised by a mixture of commercial coniferous plantation and open moorland / grassland. Habitat survey and mapping indicates that the area is predominantly a mosaic of blanket bog, heath and grassland (including improved and semi-improved pasture and acid grassland), with smaller compartments of commercial plantation (covering approximately 15 % of the area).

8.4.2 The topography of the Site is predominantly gently rolling, but steep-sided valleys and ridges are present to the west and north and occur locally within the Site boundary. Minor watercourses are frequent, and mainly discharge to the Nant Carfan to the west and the Nant yr Eira which flows north-west across the Site to join the Afon Banwy.

8.4.3 There are two large still freshwater bodies to the north-west of the Site (within the Carnedd Wen Wind Farm site), Llyn Gwyddior and Llyn Coch-hwyad; these are approximately 550 m by 350 m and 520 m by 270 m respectively at their greatest extent.

8.4.4 Land use in the wider area includes extensive open moorland (particularly to the north and west), scattered plantation, and semi-natural valley woodland and pasture farmland in the valleys. Buildings are a feature of the farmland within the Site.

8.4.5 The Berwyn[27] SPA lies approximately 4.4 km to the north of the Site. It was classified for its breeding populations of hen harrier, merlin, peregrine and red kite. Berwyn is also notified a Site of Special Scientific Interest (SSSI) for its breeding bird community (which in addition to raptors includes short-eared owl, golden plover and red grouse), upland habitats and for the population of Welsh clearwing (a moth) it supports.

8.4.6 Other statutory designated sites within the Site and in the local area were not designated for their bird interest and are referred to in the ecology section.

8.4.7 The positions of designated areas in proximity to the Site are shown on **Ecology Figure 7.4.**

Baseline Survey Information

8.4.8 Survey data is summarised as follows:

- Focal raptors: red kite, kestrel, goshawk, hen harrier, peregrine, merlin, hobby marsh harrier and osprey occur. The most commonly recorded focal raptor species during vantage point work is red kite,

[27] Berwyn is also designated as an Special Area for Conservation (SAC) for its botanical interest.

with less frequent hen harrier, kestrel and goshawk activity (the former two species predominantly over moorland / open ground within the Site), infrequent flights of peregrine, and occasional flights by osprey and hobby. Some of the more commonly recorded raptors breed in the local area. There is also potential for barn owl to breed in buildings within and adjacent to the Site. A range of other species have bred historically (pre-canopy closure), including hen harrier and merlin, but there has been no evidence of this in recent years.

- Of the SPA species, red kite was the most frequently recorded during all of the survey periods. The majority of red kite activity was attributed to commuting and foraging flights, although two probable (off-Site) territories were noted during the breeding raptor surveys. There was no evidence to suggest that the Site acts as functionally linked land for breeding or wintering red kite from the Berwyn SPA. Hen harrier was recorded infrequently, with no records of the species during the breeding raptor surveys. There was no evidence that hen harrier used the Site or nearby areas for breeding in 2022. There was no evidence to suggest that the Site acts as functionally linked land for breeding, foraging or wintering hen harrier from the Berwyn SPA. One merlin flight was recorded over the Carnedd Wen Wind Farm site during the winter work. No evidence of breeding was recorded in the species. Two occupied peregrine nest sites were identified during the surveys. Two further nest sites that were checked were unoccupied although one showed evidence of recent use. Despite confirmed local breeding, peregrine flights were recorded infrequently during the breeding season VP work, suggesting that peregrine do not commute over or use the Site for foraging with regularity.
- Wintering waterfowl occur on Llyn Gwyddior and Llyn Coch-hwyad: small numbers of whooper swan, tufted duck, little grebe, mallard, lesser black-backed gull and great black-backed gull occur.
- Waders: golden plover and snipe are present in local farmland and occasionally fly over the Proposed Development site. Curlew were commonly recorded around Nant yr Eira (to the east of the Site) up until 2010, since which time the population has significantly declined. Survey in 2016 recorded curlew activity around Nant yr Eira, albeit there was no clear evidence of breeding. Some curlew activity was recorded in this general area during wader surveys in 2022, however no evidence of breeding was recorded.
- Black grouse: the species was present during the 2000's in nationally important numbers (based on lek counts) around Cannon Farm and in

the vicinity of Llyn Coch-hwyad prior to canopy closure. Previous survey indicates significant decline and likely extinction on site by 2013. Work completed in 2016 recorded a calling male offsite to the west, but no other signs of black grouse presence. No black grouse were recorded during surveys in 2022.

- Nightjar: surveys for nightjar were completed in 2005, 2006 and 2016 – all returned negative results. Recent forest operations have resulted in the creation of open clearfell and pre-thicket areas of plantation that provide better breeding opportunities for the species than were present previously. Survey in 2022 and 2023 recorded two and four territories, respectively, in [redacted] (within the Carnedd Wen Wind Farm site). Nightjar territories are illustrated on **Ornithology Figure 8.4A** and **Ornithology Figure 8.4B**.

8.5 Potential Mitigation

Mitigation

8.5.1 Construction phase mitigation will principally be delivered through input to the Construction Environmental Management Plan (CEMP). Ornithological objectives of the CEMP will include:

- Appointment of an ecologist tasked with ensuring compliance with all relevant regulatory and other requirements, method statements and plans, and reporting to the principal contractor and statutory consultees concerning ornithological issues.
- Identification of the scope and timing of pre-construction ornithological survey work (to be informed by existing data and reconnaissance), and how this will potentially inform the approach to construction work.
- Ornithological input to method statements for all components of the work. This should set out to demonstrate how the potential for offences will be avoided.
- The appointment of an appropriately qualified and experienced ecologist to act as an ecological clerk of works for the project.
- The identification of appropriate ecological awareness training for site staff and contractors in respect of the presence of protected and sensitive bird species and the importance of species-specific mitigation measures.

Enhancement

8.5.2 In conjunction with the ecological assessment, a policy-compliant biodiversity enhancement plan will be produced and will form part of the Habitat Management Plan (HMP) for the Site. The HMP will aim to deliver a net benefit for biodiversity in line with the DECCA Framework (Planning Policy Wales (PPW) 12). The HMP will be implemented over the operational life of the Proposed Development and may include monitoring requirements.

8.6 Cumulative Effects

8.6.1 Consideration and assessment of cumulative effects with other developments, in particular wind farm sites, within the vicinity of the proposed Development will be undertaken as part of the EIA.

8.6.2 The most relevant of these other developments is likely to be the Carnedd Wen Wind Farm adjacent to the Site. However, other proposals, particularly those with the potential to effect Berwyn SPA bird populations will need to be considered as part of the work.

8.6.3 The scope of the assessment of cumulative effects on species forming the cited interest of the Berwyn SPA will need to be agreed with NRW; the work will take into account all proposed wind farms and any other relevant plans or projects within the ranging distance of species breeding within or close to the SPA (and important to sustaining SPA populations), while the scope of assessment for bird species associated with the wider landscape will be more limited (and proportionate to the scale of effects predicted as a result of the scheme).

8.6.4 Consultation with NRW and PCC will be undertaken to discuss and agree the scope of the cumulative assessment.

8.7 Questions

8.7.1 Are consultees content with the proposed approach to the ornithological desk study and site survey work?

8.7.2 Can consultees identify any key development projects for consideration within the scope of the cumulative assessment?

9 Geology, Hydrology and Hydrogeology

9.1 Introduction

9.1.1 This section of the Scoping Report sets out a summarised baseline for the project in relation to geology, hydrology and hydrogeology. The baseline describes land uses within and around the Application Site, and resources and receptors within the Application Site. The resources and receptors within the Application Site relevant to this chapter will include geology, hydrogeology, groundwater-dependent terrestrial ecosystems (GWDTE), designated sites, hydrology, private water supplies (PWS), water resources and areas affected by flood risk.

9.1.2 This is followed by the identification of key potentially significant effects that may arise should the development be given consent, and potential mitigation that would be applied. Receptors that are proposed for scoping in and out are described, with a justification for this decision.

9.2 Legislation, Policy and Guidance

9.2.1 The proposed assessment method involves a combination of desk-based data gathering, site visits and site-specific data collection followed by data analysis to determine the potential significance of effects.

9.2.2 Key legislation and regulations are listed below.

National Planning Policy

- Environment Act 1995;
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (SI2003/3242);
- Planning Policy Wales, 2021;
- Future Wales: The National Plan 2040;
- Planning (Wales) Act 2015;
- Flood and Water Management Act 2010;
- The Flood Risk Regulations 2009;
- Private Water Supplies (Wales) Regulations 2017;
- Environmental Permitting (England and Wales) Regulations 2010 (SI 2010/675); and
- Pollution Prevention & Control (England & Wales) Regulations 2000.

Local Planning Policy

- Powys Local Development Plan 2011-2026 (policy DM13)

Powys Local Development Plan (2011 to 2026) Supplementary Planning Guidance Biodiversity and Geodiversity

- Powys Local Development Plan (2011-2026) Supplementary Planning Guidance Renewable Energy Guidance
- Planning: Guidance on Environmental Effect Assessments (Circular 11/99);
- Technical Advice Note (TAN) 15: Development and Flood Risk (2004);
- Environment Agency Guidance to Protect Groundwater and Prevent Groundwater Pollution 2017 adopted by NRW.

9.3 Proposed Scope of Assessment

Methodology

Study area

9.3.1 The area assessed will include the Application Site plus a buffer zone of 2 km around the Site. For hydrological receptors, effects downstream up to 5 km from the Application Site will also be considered, as effects such as pollution can be transmitted downstream for distances greater than 2 km.

Desk study

9.3.2 The assessment will involve a desk study, to gather available data concerning the existing geological, hydrogeological and hydrological conditions in and around the Application Site. Datasets anticipated to be used include:

- Geological maps, including both bedrock and superficial geology;
- Hydrogeological maps, including productivity and groundwater vulnerability;
- Soils mapping;
- High-resolution aerial or satellite imagery of the project area and its immediate surroundings;
- Natural Resources Wales' water quality and flood risk data for the study area;
- Vegetation mapping as available for the Site;
- Borehole records, where available. These will be sourced from records held by the British Geological Survey (BGS) and other sources as available;
- Local authority private water supply (PWS) records;

- Any available utilities investigations and details of public water supplies and assets;
- Previous assessments carried out in relation to neighbouring wind farm projects and previous studies undertaken within the study area; and
- Data gathered from site visits, including peat depth and condition surveys and any material arising from future surveys that may be relevant.

Surveys

9.3.3 A hydrological walkover survey will be required to establish a greater understanding of the hydrological receptors found on site. This allows a fuller understanding of the hydrology and drainage pathways to be gained in advance of the assessment, and to be used to inform the impact assessment process.

9.3.4 A GWDTE survey will be required to establish whether there are any areas of potentially groundwater-dependent wetland habitats within the Site. This will require identification of potential GWDTE from available habitat mapping, followed by a survey to inspect the hydrological and hydrogeological setting of the habitats within the Application Site to determine the likely sources of water supporting the habitats.

Assessment of Likely Significant Effects

9.3.5 Assessment of effects is undertaken by assigning a sensitivity to receptors, and magnitude and likelihood criteria to the identified effects. These are then combined using a matrix to assign a level of significance. The sensitivity criteria used are provided in Table 9.1

Table 9.1: Receptor value and sensitivity

Value	Description
Very High	The receptor has very limited ability to absorb change without fundamentally altering its present character, is of very high environmental value and/or is of international importance, for example Special Areas of Conservation, Ramsar sites
High	The receptor has limited ability to absorb change without significantly altering its present character, is of high environmental value and/or is of national importance, for example National Nature Reserves, Sites of Special Scientific Interest
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has moderate environmental value and/or is of regional importance, for example Geological Conservation Review sites

Value	Description
Low	The receptor is tolerant of change without detriment to its present character, is of low environmental value and/or of local importance, for example Local Nature Reserves, Local Geodiversity Sites

9.3.6 The magnitude criteria used are provided in Table 9.2.

Table 9.3: Effect magnitude criteria

Magnitude	Summary
Substantial	Substantial changes, over a significant area, to key characteristics or to the geological/hydrogeological/hydrological/peat classification or status for more than 2 years
Moderate	Noticeable but not substantial changes for more than 2 years or substantial changes for more than 6 months but less than 2 years, over a substantial area, to key characteristics or to the geological/ hydrogeological/hydrological/peat classification or status
Slight	Noticeable changes for less than 2 years, substantial changes for less than 6 months, or barely discernible changes for any length of time
Negligible or no change	Any change would be negligible, unnoticeable or there are no predicted changes

9.3.7 The likelihood of an effect occurring is evaluated to three levels: **unlikely, possible,** or **likely**. The determination of likelihood is based on professional judgement and past experience of similar developments.

9.3.8 The sensitivity, magnitude and likelihood criteria are combined using the matrix provided in Table 9.3. Effects assessed as major or moderate are deemed to be significant in EIA terms; those assessed as minor or negligible are deemed to be not significant.

Table 9.4: Effects significance matrix

Sensitivity	Magnitude	Likelihood	Significance
Very High	Substantial	Likely	**Major**
		Possible	**Major**
		Unlikely	**Moderate**
	Moderate	Likely	**Major**
		Possible	**Moderate**
		Unlikely	**Moderate**
	Slight	Likely	**Moderate**
		Possible	Minor
		Unlikely	Minor

Sensitivity	Magnitude	Likelihood	Significance
	Negligible/no change	Likely	Minor
		Possible	Negligible
		Unlikely	Negligible
High	Substantial	Likely	**Major**
		Possible	**Major**
		Unlikely	**Moderate**
	Moderate	Likely	**Moderate**
		Possible	**Moderate**
		Unlikely	Minor
	Slight	Likely	Minor
		Possible	Minor
		Unlikely	Minor
	Negligible/no change	Likely	Minor
		Possible	Negligible
		Unlikely	Negligible
Moderate	Substantial	Likely	**Major**
		Possible	**Moderate**
		Unlikely	Minor
	Moderate	Likely	**Moderate**
		Possible	Minor
		Unlikely	Minor
	Slight	Likely	Minor
		Possible	Minor
		Unlikely	Negligible
	Negligible/no change	Likely	Negligible
		Possible	Negligible
		Unlikely	Negligible
Low	Substantial	Likely	**Moderate**
		Possible	Minor
		Unlikely	Negligible
	Moderate	Likely	Minor
		Possible	Minor
		Unlikely	Minor
	Slight	Likely	Minor
		Possible	Negligible
		Unlikely	Negligible
	Negligible/no change	Likely	Negligible

Sensitivity	Magnitude	Likelihood	Significance
		Possible	Negligible
		Unlikely	Negligible

Effects during construction

9.3.9 Effects can arise from the following activities taking place during construction:

- Excavations for tracks, turbines, hardstandings, borrow pits, substation, cable trenches and drainage;
- Sediment management including handling and storage of excavated materials;
- Surface water and drainage management including use, location and sizing of sustainable drainage infrastructure;
- Storage and handling of polluting materials including fuel, oils, concrete batching and wastewater from welfare facilities.

9.3.10 There is potential for significant effects on the following receptors:

- Surface water;
- Groundwater;
- Water resources including public and private water supplies;
- Infrastructure at risk of flooding.

Effects during operation

9.3.11 Effects can arise from the following activities taking place during operation:

- Sediment management from unsealed hardstandings and bare ground;
- Maintenance of drainage infrastructure;
- Storage and handling of polluting materials including fuel, oils, lubricants and wastewater from welfare facilities.

9.3.12 The potential for significant effects is considerably reduced during operation. There is some potential for significant effects on the following receptors:

- Surface water;
- Groundwater;
- Water resources including public and private water supplies;
- Infrastructure at risk of flooding.

Effects during decommissioning

9.3.13 Effects can arise from the following activities taking place during decommissioning:

- Removal of tracks, turbine foundations, hardstanding areas, substation and underground cables;
- Sediment management including handling and storage of excavated materials;
- Removal and reinstatement of surface water and drainage infrastructure;
- Storage and handling of polluting materials including fuel, oils and wastewater from welfare facilities.

9.3.14 The potential for significant effects during decommissioning is similar to the construction phase. There is potential for significant effects on the following receptors:

- Surface water;
- Groundwater;
- Water resources including public and private water supplies;
- Infrastructure at risk of flooding.

Consultation

9.3.15 Consultation will be undertaken with key statutory consultees and stakeholders. These are expected to include, but are not limited to, the following:

- Natural Resources Wales;
- Powys County Council;
- Hafren Dyfrdwy;
- Local landowners and residents.

Scoping criteria

9.3.16 Matters considered likely to require assessment for construction, operation and decommissioning are:

- Physical changes to overland drainage and surface water flows;
- Particulates and suspended solids;
- Water contamination from fuels, oils, lubricants, concrete batching or wastewater;
- Changes in or contamination of water supply to vulnerable receptors (water resources, PWS, GWDTE, designated sites);
- Increased flood risk; and
- Modification to groundwater flow paths.

Table 9.4: Matters to be Scoped In

Matter	Phase	Justification
Physical changes to overland drainage and surface water flows	Construction, Decommissioning	Changes to surface water flow paths and drainage can have a considerable effect on environmental receptors including surface watercourses and waterbodies, habitats and freshwater ecology. Appropriate consideration is required to ensure that this is properly addressed in the design and assessment process.
Particulates and suspended solids	Construction, Operation, Decommissioning	Excavations and groundworks all release sediment. Sediment pollution of watercourses is a considerable problem associated with infrastructure developments. Although reduced during operation, sediment derived from hardstandings and tracks needs to be appropriately considered.
Water contamination from fuels, oils, lubricants, concrete batching and wastewater	Construction, Operation, Decommissioning	Potentially polluting materials and wastewater will be present and in use within the site through all stages of work. Appropriate consideration is required to inform their storage, handling and disposal at all stages.
Changes in or contamination of water supply to vulnerable receptors	Construction, Decommissioning	Specific consideration of receptors where water supply is critical to their status and value. This makes use of changes in drainage and flow paths as well as pollution and sediment release where relevant.
Increased flood risk	Construction, Operation, Decommissioning	Although flood risk within the site is mainly low, there is potential to increase flood risk to areas downstream of the site. Appropriate consideration is required to ensure that this is properly considered in design and assessment.
Modification to groundwater flow paths	Construction, Decommissioning	Excavations for tracks and hardstandings will affect shallow groundwater flow paths. Excavations for turbine foundations and borrow pits will affect deeper groundwater flow paths. Linear excavations such as tracks and cable trenches can provide preferential flow paths for groundwater. These require appropriate consideration in design and assessment.

9.3.17 Matters considered to be scoped out are:

- Physical changes to overland drainage and surface water flows – operational phase;
- Changes in or contamination of water supply to vulnerable receptors (water resources, PWS, GWDTE, designated sites) – operational phase;

- Modification to groundwater flow paths – operational phase; and
- Mineral resources – all phases.

Table 9.5: Matters to be Scoped Out

Matter	Phase	Justification
Physical changes to overland drainage and surface water flows	Operation	No additional changes are anticipated to be introduced during operation
Changes in or contamination of water supply to vulnerable receptors	Operation	No additional changes are anticipated to be introduced during operation
Modification to groundwater flow paths	Operation	No additional changes are anticipated to be introduced during operation
Mineral mining	Construction, Operation, Decommissioning	No important mineral resources are present in the Application Site

9.4 Baseline Conditions

Description of Site and Context

9.4.1 Within the Application Site, small areas towards the north are Countryside and Rights of Way (CRoW) Open Access land. There are areas of agricultural land and associated dwelling houses and farms. Moderate sized areas of forestry are present within the Site, with forestry located outside the Site boundary towards the west and north-west. Most of the land surrounding the Site is used for agriculture or forestry purposes.

Baseline Survey Information

Geology

9.4.2 The Site is underlain by bedrock of Silurian age, from the Llandovery and Wenlock Epochs, and consists of three named formations mainly consisting of interbedded mudstone, siltstone, sandstone and conglomerate (BGS 2024).

9.4.3 Superficial geology consists primarily of diamicton till, with pockets of peat to the south of the Site. Along the east of the Site, along the Afon Gam, are alluvial and river terrace deposits of sand and gravel (BGS 2024).

9.4.4 No areas of mineral extraction are identified and there are no records of active mining or quarrying within the Site; however, there is a disused quarry present within the Site (BGS 2024).

Hydrogeology

9.4.5 The main groundwater bodies associated with the Site are Wenlock Rocks (undifferentiated) and Llandovery Rocks (undifferentiated). They are both considered to be low productivity aquifers with flows predominantly through fractures and other discontinuities, with geology consisting of highly indurated (hardened), largely fine-grained rocks with limited groundwater (BGS 2024).

Groundwater-dependent terrestrial ecosystems

9.4.6 Groundwater-dependent terrestrial ecosystems (GWDTE) are areas of wetland or marshy ground that are dependent on groundwater to maintain their function as a wetland or marsh area. Initial vegetation surveys of the area have identified potential GWDTE within the Site. Further assessment will be undertaken once additional vegetation mapping is available.

Designated sites

9.4.7 Natural Resources Wales (2024) indicates that there are seven designated sites within 5 km of the Site that have been designated for reasons associated with geology, hydrogeology or hydrology. All seven sites have been designated as Sites of Special Scientific Interest (SSSI), and one is also Special Area of Conservation (SAC). A risk screening would be undertaken to determine if there is any linkage between the Proposed Development and these designated sites. The sites and distance from the Application Site are:

- Gweunydd Dolwen (SSSI) – 0.3 km
- Corsydd Llanbrynmair (Llanbrynmair Moors) (SSSI) – 0.3 km
- Gweunydd Llechwedd-newydd (SSSI) - 2.7 km
- Bryn Coch (SSSI) – 3.4 km
- Gwaun Llan (Llan Pastures) (SSSI) – 3.9 km
- Berwyn (SSSI, SPA, SAC) – 4.4 km
- Gweunydd Pen-y-Coed (SSSI) – 4.8 km

Hydrology

9.4.8 The Site lies entirely within catchment of the Afon Gam. It has an overall status of “good” (DataMapWales, 2024).

Private water supplies

9.4.9 Powys County Council requires the PWS register to be purchased. While efforts will be made to obtain the PWS register later in the project, it is important to note that PWS within 5 km of the application boundary will be assessed. A PWS risk screening would be undertaken to determine if any of the identified supply sources would be at risk from development in this area

and further site-specific assessment undertaken if any PWS are identified as potentially at risk from the Proposed Development.

Water resources

9.4.10 The majority of the Site is within the Severn Uplands - Lower Palaeozoic Groundwater Drinking Protected Area (DWPA), which has a status of 'not at risk'. Small sections of the Site to the south and west are within the Meirionnydd DWPA, which is also 'not at risk' (Rivers Trust, 2021).

9.4.11 There are no lake or river catchment DWPAs that have hydrological connectivity to the study area (NRW, 2024).

Flood risk

9.4.12 Flood risk is indicated to be medium to high for rivers and minor watercourses within the Site. Areas of flood risk are mostly confined to main watercourse channels, with some localised flood risk areas extending outside of the watercourse channels (NRW, 2024). For most of the Site, flood risk is negligible.

9.4.13 Areas with high flood risk outside the river channels can be found in the south of the Site along the Afon Gam. This continues further upstream of the Afon Gam, particularly along the western boundary of the Site where several tributaries converge into the Afon Gam (NRW, 2024).

9.4.14 Downstream from the site, the Afon Gam flows into the River Banwy. This river has a high flood risk extending out of the watercourse channel. There is a low to medium flood risk which extends out to a greater extent, posing a risk of flooding to residential areas (NRW, 2024).

Implications of Climate Change

9.4.15 Climate change is increasing the intensity and frequency of storms and periods of rainfall, which is likely to change flood risk throughout the Site. The Proposed Development infrastructure would need to be designed to withstand storm events of a 1-in-200 year return period plus a climate change increase of at least 20%. Drainage and surface water infrastructure should be able to manage the expected changes in rainfall intensity and storm duration.

9.4.16 GWDTE are vulnerable to the increasing average global temperatures caused by climate change. Prolonged periods of excessive heat and drought is likely to reduce water availability to GWDTE, potentially harming the species located within these habitats. Over time, this could decrease the size and prevalence of GWDTE within the site. It is therefore important that

infrastructure does not negatively affect them in a way that might exacerbate their pre-existing susceptibility to damage from climate change.

9.5 Potential Mitigation

Mitigation by Design

Construction

9.5.1 Many construction effects are best managed through good design, by avoiding sensitive receptors as far as possible. This would include:

- Minimising watercourse crossings;
- Careful design of watercourse crossing structures;
- Avoiding sensitive wetland habitats;
- Careful design of sustainable drainage to mimic natural drainage patterns as far as possible;
- Design using appropriate buffer around watercourses and waterbodies;
- Location of construction compounds with sufficient set-back from watercourses.

9.5.2 Implementation of good design can help to avoid potential significant effects relating to geological, hydrogeological and hydrological receptors.

Operation

9.5.3 There are no specific measures for mitigation by design during the operational phase of the Proposed Development.

Decommissioning

9.5.4 There are no specific measures for mitigation by design during the decommissioning phase of the Proposed Development.

Additional Mitigation

9.5.5 Additional mitigation anticipated to be required includes:

- Management of surface water using temporary measures during construction;
- Management of suspended sediment using temporary measures during construction;
- Careful storage and handling of polluting materials including wastewater at all stages;
- Monitoring of surface water and groundwater at all stages;

- Ongoing monitoring and maintenance of infrastructure throughout operation;
- Careful reinstatement of track and hardstanding margins and of all temporary infrastructure following completion of construction works.

9.5.6 It is likely that additional mitigation will be identified during the assessment process.

Enhancement

9.5.7 There are likely to be opportunities for enhancement associated with potential GWDTE, through habitat management including scrub clearance. Suitable enhancement opportunities would be identified during surveys for the Proposed Development.

Difficulties and Uncertainties

9.5.8 To ensure transparency within the EIA process, the following difficulties and uncertainties have been identified:

- Weather conditions during site surveys can affect the geographical coverage and quality of data collected. For example, under some circumstances weather conditions can make it too dangerous to access certain areas; preceding weather conditions can influence the appearance of watercourses and ground conditions – e.g. very wet weather may lead to over-estimation of ground wetness or watercourse size. Use of professional judgement and field experience can help to mitigate this; also scheduling site visits outside the main winter period (November to February) reduces the risk of dangerous weather conditions.
- PWS data relies on information held by Powys County Council. This has been supplied by property owners and may be incomplete. Property owners/tenants may not be aware of all details of their own supplies. Attempts will be made to verify supply details. Where this is not possible, a worst-case scenario will be assessed, and contingency mitigation measures provided.

9.6 Cumulative Effects

9.6.1 Cumulative effects relating to the Proposed Development and potential interactions with other significant developments in the area will be assessed. A list of developments within the planning system have been identified in section 3.4 and any further sites will be identified as part of

the assessment process and these will all be screened for potential cumulative effects with the Proposed Development on geological, hydrogeological and hydrological receptors.

9.6.2 For hydrology, cumulative effects are possible for developments within the same hydrological catchment areas and also where the main catchments drain into the same receiving watercourse or waterbody downstream. Cumulative effects will be considered to a distance of 15 km downstream of the Site boundary.

9.6.3 For hydrogeology, the potential for cumulative effects depends on the groundwater catchment and type of groundwater flow. In this area, as groundwater is mainly limited to shallow depths and groundwater catchments are likely to be the same as surface water catchments. Cumulative effects will also be considered to a distance of 15 km from the Site boundary.

9.6.4 Geological effects are confined to direct impacts as effects do not travel. There are unlikely to be any cumulative geological effects that require consideration.

9.6.5 Several of the wind turbines for the proposed Carnedd Wen and Mynydd Lluest y Graig wind farms are within the Afon Gam catchment, the same hydrological catchment as Llanbrynmair. Groundwater catchments are likely to be the same as surface water catchments, so the potential for cumulative effects can be considered similar. An up-to-date list of nearby developments will be requested as part of the impact assessment process and cumulative effects will be fully considered within the ES chapter.

9.7 Questions

- Are there any other key stakeholders or stakeholder organisations that should be consulted?
- Are there any additional data sources or guidance documents that should be considered?
- Do you agree that the surveys proposed to inform the EIA baseline characterisation are appropriate?
- Are any receptors/assets/resources not identified that you would like to see included in the EIA?
- Are there any known flooding concerns downstream that could be affected by the Proposed Development?

10 Peat

10.1 Introduction

10.1.1 This section sets out a summarised baseline for the Proposed Development in relation to peat. The baseline conditions describe the peat, peaty soils and peatland within the Application Site.

10.1.2 This is followed by identification of key potentially significant effects that may arise should the Proposed Development be given consent, and potential mitigation that would be applied. Receptors that are proposed for scoping in and out are described, with a justification for this decision.

10.2 Legislation, Policy and Guidance

10.2.1 The proposed assessment method involves a combination of desk-based data gathering, site visits and site-specific data collection followed by data analysis to determine the potential significance of effects.

10.2.2 Key legislation and regulations are listed below.

National Planning Policy

- Environment Act 1995;
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (SI2003/3242);
- Planning Policy Wales, 2021;
- Future Wales: The National Plan 2040;
- Planning (Wales) Act 2015;
- Flood and Water Management Act 2010;
- The Flood Risk Regulations 2009;
- Private Water Supplies (Wales) Regulations 2017;
- Environmental Permitting (England and Wales) Regulations 2010 (SI 2010/675); and
- Pollution Prevention & Control (England & Wales) Regulations 2000.

Local Planning Policy

- Powys Local Development Plan 2011-2026 (policy DM13)
    - Powys Local Development Plan (2011 to 2026) Supplementary Planning Guidance Biodiversity and Geodiversity
    - Powys Local Development Plan (2011-2026) Supplementary Planning Guidance Renewable Energy

Guidance

- Planning: Guidance on Environmental Impact Assessments (Circular 11/99).

10.3 Proposed Scope of Assessment

Methodology

Study area

10.3.1 The study area would include the whole of the Application Site with a small buffer of up to 500 m for the desk study. Peat surveys would be focused within the Application Site, with the Phase 2 peat survey targeting areas proposed for infrastructure.

Desk study

10.3.2 The assessment will involve a desk study, to gather available data concerning the existing environment relating to peat, peaty soils and peatland within the Application Site. Some consideration will also be given to climate data as this is particularly relevant to peat development.

Surveys

10.3.3 Surveys to identify the extent and depth range of peat and soils will be required. Peat surveys will be undertaken in two phases.

10.3.4 Phase 1 surveys cover the Proposed Development area and sample peat depths on a 100 m grid. This information is used to develop a site-wide peat depth map and to inform the initial infrastructure design.

10.3.5 Phase 2 surveys focus on areas proposed for infrastructure. Surveys on proposed tracks involve data collection every 50 m down track centrelines plus 10-25 m offsets to either side. For existing tracks to be upgraded, offset probing to either side at 50 m intervals is undertaken. For turbines, crane hardstandings and other infrastructure within the Application Site, probing is usually undertaken on a grid of 10-25 m across the proposed infrastructure footprint and a buffer zone around the margins to allow for micrositing.

10.3.6 Peat condition information will be gathered as part of the peat depth surveys. All survey results will be combined to provide necessary input data for assessment of peat landslide risk and calculation of peat volumes requiring to be excavated for the Proposed Development.

Assessment of Likely Significant Effects

10.3.7 Assessment of effects is undertaken by assigning a sensitivity to receptors, and magnitude and likelihood criteria to the identified effects. These are

then combined using a matrix to assign a level of significance. The sensitivity criteria used are provided in Table 10.1.

Table 10.1: Receptor value and sensitivity

Value	Description
Very High	The receptor has very limited ability to absorb change without fundamentally altering its present character, is of very high environmental value and/or is of international importance, for example Special Areas of Conservation, Ramsar sites
High	The receptor has limited ability to absorb change without significantly altering its present character, is of high environmental value and/or is of national importance, for example National Nature Reserves, Sites of Special Scientific Interest
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has moderate environmental value and/or is of regional importance, for example Geological Conservation Review sites
Low	The receptor is tolerant of change without detriment to its present character, is of low environmental value and/or of local importance, for example Local Nature Reserves, Local Geodiversity Sites

10.3.8 The magnitude criteria used are provided in Table 10.2.

Table 10.2: Effect magnitude criteria

Magnitude	Summary
Substantial	Substantial changes, over a significant area, to key characteristics or to the geological/hydrogeological/hydrological/peat classification or status for more than 2 years
Moderate	Noticeable but not substantial changes for more than 2 years or substantial changes for more than 6 months but less than 2 years, over a substantial area, to key characteristics or to the geological/ hydrogeological/hydrological/peat classification or status
Slight	Noticeable changes for less than 2 years, substantial changes for less than 6 months, or barely discernible changes for any length of time
Negligible or no change	Any change would be negligible, unnoticeable or there are no predicted changes

10.3.9 The likelihood of an effect occurring is evaluated to three levels: **unlikely, possible,** or **likely**. The determination of likelihood is based on professional judgement and past experience of similar developments.

10.3.10 The sensitivity, magnitude and likelihood criteria are combined using the matrix provided in Table 10.3. Effects assessed as major or moderate are deemed to be significant in EIA terms; those assessed as minor or negligible are deemed to be not significant.

Table 10.3: Effects significance matrix

Sensitivity	Magnitude	Likelihood	Significance
Very High	Substantial	Likely	Major
		Possible	Major
		Unlikely	Moderate
	Moderate	Likely	Major
		Possible	Moderate
		Unlikely	Moderate
	Slight	Likely	Moderate
		Possible	Minor
		Unlikely	Minor
	Negligible/no change	Likely	Minor
		Possible	Negligible
		Unlikely	Negligible
High	Substantial	Likely	Major
		Possible	Major
		Unlikely	Moderate
	Moderate	Likely	Moderate
		Possible	Moderate
		Unlikely	Minor
	Slight	Likely	Minor
		Possible	Minor
		Unlikely	Minor
	Negligible/no change	Likely	Minor
		Possible	Negligible
		Unlikely	Negligible
Moderate	Substantial	Likely	Major
		Possible	Moderate
		Unlikely	Minor
	Moderate	Likely	Moderate
		Possible	Minor
		Unlikely	Minor
	Slight	Likely	Minor
		Possible	Minor
		Unlikely	Negligible
	Negligible/no change	Likely	Negligible
		Possible	Negligible
		Unlikely	Negligible

Sensitivity	Magnitude	Likelihood	Significance
Low	Substantial	Likely	Moderate
		Possible	Minor
		Unlikely	Negligible
	Moderate	Likely	Minor
		Possible	Minor
		Unlikely	Minor
	Slight	Likely	Minor
		Possible	Negligible
		Unlikely	Negligible
	Negligible/no change	Likely	Negligible
		Possible	Negligible
		Unlikely	Negligible

Effects during construction

10.3.11 Effects can arise from the following activities taking place during construction:

- Peat and soil stripping for construction works;
- Peat and soil compaction;
- Peat and soil storage;
- Peat and soil reinstatement.

10.3.12 There is potential for significant effects on peat receptors.

Effects during operation

10.3.13 There are no likely significant effects on peat during operation.

Effects during decommissioning

10.3.14 There are no likely significant effects on peat during decommissioning.

Consultation

10.3.15 Consultation will be undertaken with key statutory consultees and stakeholders. These are expected to include, but are not limited to, the following:

- Natural Resources Wales;
- The Soil Policy Unit of the Welsh Government's Department of Climate Change;
- Local landowners.

Scoping criteria

10.3.16 Matters considered likely to require assessment for construction are:

- Loss of structure from excavation and stockpiling;
- Soil and peat compaction;
- Soil and peat contamination.

Table 10.4 Matters Scoped In

Matter	Phase	Justification
Loss of structure from excavation and stockpiling	Construction	Initial survey data confirm that peat is present, and it is likely that some peat will require excavation as part of the Proposed Development. Peat is very sensitive to excavation, storage and transport and internal structure is important to reinstatement of peat and peaty soils.
Soil and peat compaction	Construction	Plant and vehicle movements across areas of unstripped ground will act to compact peat and peaty soils. Stockpiling can also compile peat and soil materials.
Soil and peat contamination	Construction	Potentially polluting materials and wastewater will be present and in use within the site through all stages of work. Appropriate consideration is required to inform their storage, handling and disposals.

10.3.17 Matters considered to be scoped out are:

- Loss of structure from excavation and stockpiling – operation and decommissioning;
- Soil and peat compaction – operation and decommissioning;
- Soil and peat contamination – operation and decommissioning.

Table 10.5 Matters Scoped Out

Matter	Phase	Justification
Loss of structure from excavation and stockpiling	Operation, Decommissioning	No works in areas of peat, peaty soil or peatland are anticipated during operation or decommissioning
Soil and peat compaction	Operation, Decommissioning	No works in areas of peat, peaty soil or peatland are anticipated during operation or decommissioning
Soil and peat contamination	Operation, Decommissioning	No works in areas of peat, peaty soil or peatland are anticipated during operation or decommissioning

10.4 Baseline Conditions

Site Description and Context

10.4.1 The Application Site consists mainly of upland open ground and forestry plantations with some agricultural land used mainly as grazing and pasture on lower slopes. Open upland areas include rough grazing, grassland and some apparent boggy areas.

Baseline Survey Information

Peat and soils

10.4.2 The Unified Peat Map of Wales (Evans *et al.*, 2020) shows six areas of peat within the Site ranging in area from 1.5 to 10 hectares (ha).

10.4.3 The Peatlands of Wales Maps (DataMapWales, 2024) show extensive coverage of peatland in all but the eastern part of the Site towards Dolwen. This coverage is mapped in 50 m cells, each assigned a 'peatland evidence score' of 1 to 10, which defines the level of confidence in the presence of peat in any given grid cell where 1 is low confidence and 10 is high confidence. Most cells within the Application Site that have an evidence score are 2 or 3, with a few limited areas showing 4/10.

10.4.4 Considering all Site soils, the following soil types are mapped as present within the Site (LandIS, 2024):

- Blanket bog peat soils in the north-west and centre;
- Slowly permeable seasonally wet acid loamy and clayey soils in the south-east;
- Very acid loamy upland soils with a wet peaty surface in the south-west;
- Slowly permeable wet very acid upland soils with a peaty surface across most areas of the Site.

Designated sites

10.4.5 Natural Resources Wales (2024) indicates that there is one designated site within 5 km of the Site that has been designated for reasons associated with peat. The site is designated as a Site of Special Scientific Interest (SSSI). A risk screening would be undertaken to determine if there is any linkage between the Proposed Development and this designated site. The site is:

- Corsydd Llanbrynmair (Llanbrynmair Moors) (SSSI) – 0.3 km

Implications of Climate Change

10.4.6 Climate change is increasing the intensity and frequency of storms and periods of rainfall, and also leading to longer hot and dry periods. Both changes have an influence on peat, peaty soils and peatland habitats. Dry periods are likely to lead to drying of surface peat which can lead to cracking within peat and soil units, and may also influence the health of peatland habitats.

10.4.7 High intensity rainfall following periods of dry weather and cracking can increase the potential for peat landslide, as the water can lead to higher pore pressures and acts to lubricate natural breaks within the peat and soil bodies.

10.4.8 Long-term reductions in rainfall and periods of wetness may lead to loss of peat and peatland vegetation if conditions are no longer suitable for peat formation.

10.5 Potential Mitigation

Mitigation by Design

Construction

10.5.1 The most effective mitigation for peat, peaty soils and peatland is avoidance through careful design. It is important to follow the Step-Wise Approach when designing for peat, where the two first steps – Avoid and Minimise – need to be the first considerations.

10.5.2 Design evolution will be influenced by peat depth data collected for the Site. Infrastructure will be targeted in areas where peat depth mapping indicates there is no peat present. Incursion into areas of peat will be minimised as far as possible.

Operation

10.5.3 There are no specific measures for mitigation by design during the operational phase of the Proposed Development.

Decommissioning

10.5.4 There are no specific measures for mitigation by design during the decommissioning phase of the Proposed Development.

Additional Mitigation

10.5.5 For areas where peat cannot be completely avoided, the following mitigation is anticipated to be required:

- Peat excavation, handling and storage will be undertaken making use of the most recent best practice guidance;
- Peat will be stored for as short a time as possible, in stockpiles no more than 1 m in height;
- Stored peat will be protected from drying out by use of a protective cover. Damping sprays may be needed in very dry conditions;
- Excavated peat will be reused in site reinstatement where possible.

Enhancement

10.5.6 There are potential opportunities for peatland restoration to be undertaken within the Application Site and immediate areas. This would be targeted at areas with best potential for recovery. Restoration work may involve blocking of drainage ditches or erosion channels, restricting grazing and/or use of mulches to encourage regrowth of vegetation if areas of bare peat are encountered.

10.5.7 Peatland restoration opportunities will be discussed with the Ecology consultants to ensure that the best options are proposed.

10.6 Cumulative Effects

10.6.1 Although effects on peat, peaty soils and peatland are typically restricted to direct effects and localised drying, there is a need to consider peat as an important resource within Wales. Therefore cumulative effects will need to be considered on the peat and peatland in the area. A list of developments within the planning system have been identified in section 3.4 and any further sites will be identified as part of the assessment process and these will all be screened for potential cumulative effects with the Proposed Development on peat, peaty soils and peatland.

10.6.2 The assessment will consider potential cumulative effects for developments up to 5 km from the Site boundary.

10.7 Questions

- Are there any other key stakeholders or stakeholder organisations that should be consulted?
- Are consultees aware of any peatland restoration that has taken place at this Site or in nearby areas?
- Are consultees aware of any areas nearby where peatland restoration would be beneficial?

11 Traffic and Transport

11.1 Introduction

11.1.1 The Traffic and Transport chapter of the EIA will be prepared with reference to the Institute of Environmental Assessment (IEMA) Guidelines '*Environmental Assessment of Traffic and Movement*' (2023) as appropriate.

11.1.2 This section of the Scoping Report sets out the proposed methodology for the assessment of the Scheme against transportation matters. In particular, the methodology would consider the potential effects of the Proposed Development on the local and strategic highway network during the construction and operational phases.

11.2 Legislation, Policy and Guidance

11.2.1 The transport effects of the Proposed Development will be considered with reference to local and national policy and guidance contained in the following documents as appropriate:

- Planning Policy Wales document (PPW, 2024).
- 'Future Wales: the national plan 2040' (2021).
- The Overarching National Policy Statement for Energy (EN-1 chapter 15.14 *'Traffic and Transport'*, 2024).
- National Policy Statement for Renewable Energy Infrastructure (EN-3, chapter 2.10 'Solar Photovoltaic Generation', 2023).
- IEMA Guidelines for the Environmental Assessment of Traffic and Movement (2023).
- The Design Manual for Roads and Bridges (DMRB).
- 'Llywybr Newydd: the Wales transport strategy' (2021).
- Technical advice note (TAN) 18: 'Transport', Planning Policy Wales (2007).
- The Powys Local Development Plan (2011-2026), Powys County Council (2018); and
- The Powys Replacement Local Development (2022-2037) 'Integrated Planning and Transport Strategy Background Paper', Powys County Council (2023).

11.2.2 The strategic Traffic Management Plan (sTMP) prepared by RenewableUK Cymru and approved by Welsh Government, which was published in 2021 to provide a strategy for and address the cumulative effects of wind farm development in Mid Wales, will also be referred to within the ES chapter as appropriate.

11.3 Proposed Scope of Assessment

Study Area

11.3.1 The assessment will provide detailed consideration of each of the links to be used by traffic during the construction, operational and decommissioning phases between the site and the trunk road network.

11.3.2 It is noted that there are seven Public Rights of Way (PRoW) routes which cross or abut the site, of which one route (the 219/39/4 Bridleway), comprises part of the Glyndwr's Way National Trail.

Methodology

11.3.3 The Traffic and Transport chapter would provide an assessment of the predicted impact on the local highway network by using pre-defined significance criteria set out within the IEMA Guidelines. Those criteria will be based on the net change in journeys as a result of construction and operational traffic values and any mitigation to be delivered as part of the proposals.

11.3.4 IEMA rules will be applied to define the threshold effects of development traffic which will inform the scale and extent of the Traffic and Transport chapter work. On this basis, links where the traffic flows are expected to increase by more than 30% as a result of the scheme will be considered. Links in proximity to sensitive receptors, where traffic flows are expected to increase by more than 10% as a result of the scheme will also be considered.

11.3.5 Where the predicted increase in traffic and HGV flow is lower than these thresholds, the significance of the effects can be considered to be low or not significant and it is considered that detailed assessment is not required.

11.3.6 A future year of 2029 is proposed for the consideration of temporary construction traffic on the basis that this will represent the period of peak construction.

11.3.7 A future year of 2031 is proposed for the consideration of operational traffic, on the basis that all construction activities at the site will be complete following the conclusion of the 19-month construction period.

TEMPro growth rates will be determined through dialogue with PCC in due course.

Assessment of Likely Significant Effects

11.3.8 Assessment of effects is undertaken by assigning a sensitivity to receptors, and magnitude and likelihood criteria to the identified effects. These are then combined using a matrix to assign a level of significance.

11.3.9 The significance criteria would establish the magnitude of any beneficial or adverse effects the Proposed Development will have on the transport network. There are four levels of impact magnitude that will be considered which are negligible, low, medium, and high.

11.3.10 Definitions of magnitude have been derived based on the IEMA guidelines and are shown in Table 11.1.

Table 11.1 – Criteria for Magnitude of Impact

Impact	Magnitude of Impact / Threshold			
	Negligible	**Low**	**Medium**	**High**
Traffic Flow	Change in peak or 24 hr traffic within study area by less than 5%	Change in peak or 24 hr traffic within study area between 5% and 15%	Change in peak or 24 hr traffic within study area between 15% and 30%	Change in peak or 24 hr traffic within study area by 30% or more
Accidents and Safety	Number of predicted personal injury collisions (PICs) does not exceed the number of observed PICs.		The number of observed PICs will be compared against the predicted number of PICs that could be expected over the time period of the observed data (e.g., 3 years) in accordance with the COBA Manual (DMRB Volume 13, Section 1, Chapter 4). The calculations will be based on variables including: observed AADT traffic flow, road speed, length of road section and type of road. This analysis will be interpreted with professional judgement and used to inform and determine the impact on Accidents and Safety.	
Severance	Change in peak or 24 hr traffic within study area by less than 30%	Change in peak or 24 hr traffic within study area of 30%-60%	Change in peak or 24 hr traffic within study area of 60% - 90%	Change in peak or 24 hr traffic within study area by 90% or more
Non-motorised user Delay	The guidance recommends that professional judgement is used to determine the impact on Pedestrian Delay, considering local factors such as pedestrian activity, visibility, and the physical conditions of the site.			

Impact	Magnitude of Impact / Threshold			
	Negligible	Low	Medium	High
Driver and Passenger Delay	Change in peak or 24 hr traffic within study area by less than 5%	Change in peak or 24 hr traffic within study area between 5% and 15%	Change in peak or 24 hr traffic within study area between 15% and 30%	Change in peak or 24 hr traffic within study area by 30% or more
Non-motorised user Amenity	Pedestrian Amenity is impacted by traffic flow, composition and width of pavement and is related to fear and intimidation thresholds. As suggested by national guidance a threshold of where traffic or HGV flows have halved or doubled will be used to indicate whether there is a significant effect.			
Fear / Intimidation	No change.	One step change in level, with <400 vehicle increase in average 18hr two-way vehicle flow and/or <500 Heavy Vehicle increase in total 18hr flow	One step change in level, with >400 vehicle increase in average 18hr two-way vehicle flow and/or >500 Heavy Vehicle increase in total 18hr flow	Two step changes in level

11.3.11 The impact magnitudes can have either a beneficial or adverse impact.

Receptor Sensitivity

11.3.12 Sensitive receptors will be identified using the principles set out in the IEMA guidelines (paragraph 1.30) for the categories of effect assessed in this chapter. Any sensitive receptors will be agreed with the Highway Authority in due course.

11.3.13 The criteria proposed for assessing the sensitivity of a receptor are set out in Table 11.2.

Table 11.2 – Criteria for Sensitivity of Receptor

Receptor Sensitivity	Receptor Type
High	Receptors of greatest sensitivity to traffic flows, such as schools, playgrounds, accident blackspots, retirement homes, areas with no footways with high pedestrian footfall.
Medium	Traffic flow sensitive receptors, such as congested junctions, hospitals, shopping areas with active frontages, narrow footways, parks, and recreational areas.
Low	Receptors with some sensitivity to traffic flow, such as conservation areas, listed buildings, tourist attractions, and residential areas.

Negligible	Receptors with low sensitivity to traffic flows, and those distant from affected roads.

Significance of Effect

11.3.14 The Significance of Effect will be determined by combining the predicted magnitude of impact with the assigned sensitivity of the receptor. The Significance of Effect is set out in Table 11.3.

11.3.15 The significance thresholds can be categorised as beneficial (positive, i.e., reduction in traffic flows), negligible (no real impact) or adverse (negative i.e., increase in traffic flows). For the purpose of this chapter, major and moderate significance of effects are considered 'significant', as indicated by the shading in the table below.

Table 11.3 – Significance Matrix

Magnitude of Change	**Sensitivity of Receptor**				
		High	**Medium**	**Low**	**Negligible**
	High	**Major**	**Major**	**Moderate**	**Negligible**
	Medium	**Major**	**Moderate**	**Minor to Moderate**	**Negligible**
	Low	**Moderate**	**Minor to Moderate**	**Minor**	**Negligible**
	Negligible	**Negligible**	**Negligible**	**Negligible**	**Negligible**

11.3.16 Significance thresholds can also be categorised as temporary or permanent and can have an effect for the short, medium, or long term. The relevant definitions in terms of the longevity of the effect are set out below:

- A short-term effect – an effect that will be experienced for 0-5 years.
- A medium-term effect – an effect that will be experienced for 5-15 years; and
- A long-term effect – an effect that will be experienced for 15 years onwards.

Scoping Criteria

11.3.17 In summary and with reference to the IEMA Guidelines, the Traffic and Transport chapter of the ES will consider the forecast effects of the

Proposed Development on the following throughout both the construction, operational, and decommissioning phases of the scheme:

- Severance.
- Driver Delay.
- Road safety; and
- Hazardous loads/ large loads.

11.3.18 Given that there are anticipated to be limited pedestrians within the vicinity of the site, it is not considered necessary to consider the effects of the scheme on the following, as these are therefore proposed to be scoped out of the assessment:

- Pedestrian delay.
- Non-motorised user amenity; and
- Fear / intimidation.

11.3.19 It is considered that in the context of the application, the impact and effects of hazardous / large loads will receive the most focus within the ES chapter. With reference to the RenewableUK Cymru sTMP (2012),the ES chapter will include a review of the appropriate abnormal indivisible load (AIL) route and carry out swept path analysis on the network as appropriate.

Consultation

11.3.20 Liaison with the appropriate highway authorities, including Powys County Council (PCC) and Traffic Wales, will take place in due course.

11.4 Baseline Conditions

Site Description and Context

11.4.1 The Proposed Development site is located approximately six kilometres to the northeast of Llanbrynmair, Powys, and covers an area of approximately 1,646 hectares.

11.4.2 The nearest classified road to the site is Pandy Road, which connects between the villages of Llanbrynmair and Pandy to the southwest and continues north through Dol Fawr. This provides access to the North and Mid Wales Trunk Road Agent (NMWTRA) strategic road network at the A458 to the north and the A470 to the south, both of which form part of the approved construction traffic route as outlined in the RenewableUK sTMP. There are also a number of unclassified rural lanes and private access tracks serving existing farm and forestry land within the site boundary.

Baseline Survey Information

11.4.3 The baseline conditions along the proposed construction route will be reviewed with reference to recorded traffic data and the RenewableUK sTMP document.

11.4.4 At this stage, it is proposed that Annual Average Daily Traffic (AADT) will be assessed on the roads between the site and the trunk road network. A combination of Department for Transport (DfT) traffic counts and Automatic Traffic Count (ATC) surveys will be used to provide baseline flows at each link. The proposed link locations will be determined as the scheme progresses and the access strategy for each of the proposed turbines is established, in consultation with the highway authority as appropriate.

11.5 Potential Mitigation

11.5.1 With regards to the completed and operational Proposed Development, many mitigation measures are embedded into the design of the scheme. If likely significant effects are determined even with such embedded mitigation, where possible, mitigation measures will be proposed so that residual effects are not significant.

11.5.2 The majority of the measures that are likely to be proposed if required will be reflective of the strategy established in the RenewableUK Cymru sTMP (2012) document, such as controls relating to delivery timings and the size of delivery convoys to the site. Further controls and mitigation measures such as off-site works will be considered as the scheme progresses and included within the ES Chapter.

11.5.3 The proposals will also be supported by a Transport Statement (TS) and Construction Traffic Management Plan (CTMP). The TS will summarise the proposed access points and traffic movements expected once the site is operational. The CTMP will summarise the traffic movements anticipated throughout the construction period of the Scheme and the associated mitigation measures to be agreed with the highway authority. A scope for the TS and CTMP will be agreed with the highway authority in due course.

11.6 Cumulative Effects

11.6.1 Consideration will be given to the cumulative effects of the transport impact associated with the Proposed Development. This will include for the traffic generated from committed developments on any links that may be shared with the Proposed Development and where construction phases may overlap. The relevant links will be agreed with the local highway authority.

11.7 Questions

- Do you agree with the proposed study area?
- Do you agree with the proposed assessment methodology?
- Do you agree that the RenewableUK Cymru strategic Transport Management Plan for Mid Wales Wind Farms (2012) remains an appropriate reference for the preferred traffic and transport approach to wind farm development at the site?
- Do you agree with the effects that are proposed to be scoped in and out of the EIA?

12 Acoustic

12.1 Introduction

12.1.1 An assessment of potential effects of the Proposed Development with respect to sound and vibration will be undertaken. This will include a full assessment of operational phase (permanent) effects and a discussion of potential construction and decommissioning effects (temporary). An assessment of any potential cumulative operational and construction effects will also be provided.

12.2 Legislation, Policy and Guidance

12.2.1 Operational sound shall be assessed in accordance with ETSU-R-97, 'The Assessment and Rating of Noise from Wind Farms', and the Good Practice Guide (GPG) to its application issued by the Institute of Acoustics in 2013.

12.2.2 A discussion of the potential effects resulting from the construction of the proposals, in terms of any potential sound and vibration generated, will be provided with reference to BS 5228 Parts 1 & 2.

12.2.3 These documents are consistent with that referenced within current planning policy for Wales (i.e. Planning Policy Wales and Technical Advice Note 11: Noise).

12.3 Proposed Scope of Assessment

12.3.1 The operational assessment will follow the guidance contained within ETSU-R-97 and the GPG as discussed above and as referenced by current planning policy in Wales. This will incorporate the use of background sound information collected in support of previous wind farm planning applications

in the area (see the **Baseline Conditions** section); the use of common receptor locations as representative of those located closest to the proposed development(s) which are to be agreed between RES and a developer of the neighbouring Carnedd Wen wind farm development; a means of 'apportioning' the relevant sound limits between respective development for the purposes of generating relevant planning condition limits for each site; and the agreement of typical turbine sound power levels to be used at the two sites to be considered, amongst various other matters.

12.3.2 An assessment of the potential effects of sound from operation of the wind farm(s) at specific frequencies, e.g. low frequency sound, or the potential effects of other sound and vibration characteristics due to operation, such as amplitude modulation and vibration will not be undertaken as these aspects are not required to be assessed under current planning guidelines either due to their very limited expected impacts and ongoing or incomplete research into certain matters. However, a generalised discussion of these topics, in relation to current guidance and research will be provided.

12.3.3 The construction of turbines, ancillary electrical equipment, compounds and the corresponding access tracks typically occurs at very large distances from neighbouring residences. The resultant noise and vibration, which would be temporary in nature, is only very rarely cause for concern in terms of the potential for disturbing the inhabitants of neighbouring residences. Whilst the noise associated with the construction of these aspects may well be audible to people residing in the area, the levels would be below established noise limits and planning requirements in this respect. Nevertheless, typical mitigation measures, including the use of 'best practicable means' will be incorporated into the construction practices for the proposed wind farm with a view to reducing noise levels where possible and practical. As a result, this aspect will only be discussed in generalised terms with reference to standard noise limiting requirements; typical working practices; hours of work, and standard mitigation measures in this respect. A detailed assessment will not be undertaken.

12.4 Baseline Conditions

12.4.1 The existing character of sound at properties neighbouring the proposals is typical of a rural environment and consists of wind generated sound, along with water running through local streams, sound from traffic, farm machinery, birds and the occasional overhead aircraft

12.4.2 Extensive background sound surveys were undertaken as part of previous wind farm planning applications in the area in 2006, all in accordance with ETSU-R-97 and the GPG discussed above and agreed with relevant consultees at the time. There's no indication that the background noise environment would have changed significantly since the measurements were made and the results, which will be corrected to take into account the new dimensions of the turbines to be installed at the site, will be used to form the basis of the operational assessment and to inform applicable limits relating to construction sound.

12.5 Potential Mitigation

12.5.1 The potential effects of sound, due to operation of the wind farm, will be considered as part of the design process via the application of nominal buffers to neighbouring residences within which turbines will not be placed. The baseline/background sound levels will also inform the design of the site, with greater separation distances potentially being required for residences with relatively low background sound levels and similar corresponding acoustic limits. Furthermore, the turbines will be operated in reduced sound modes, if this is necessary to meet the sound limits derived in accordance with ETSU-R-97.

12.5.2 Standard good practice measures to reduce acoustic impact during construction and decommissioning of the site will be implemented in line with the 'best practicable means' defined by the Control of Pollution Act 1974. If additional mitigation measures are required, this will include a reduction in construction activities or traffic during certain periods, the use of less impactful equipment and restriction of construction timings, where considered appropriate.

12.6 Cumulative

12.6.1 An assessment of the operational sound levels associated with the combined impact of the Proposed Development and the neighbouring Carnedd Wen wind farm development will also be provided. As discussed within the **Baseline Conditions** section, this will involve some collaboration with the developers of the neighbouring site, such as the use of common receptor locations; agreement as to the background noise levels and corresponding limits used for the assessments; a means of 'apportioning' the relevant sound limits between respective development for the purposes of generating relevant planning condition limits for the sites; and the

agreement of typical turbine sound power levels to be used, amongst various other matters.

12.6.2 Noise due to the construction and decommissioning of other neighbouring development is unlikely to be present at the same time as that resulting from the Proposed Development. However, if construction and decommissioning activities are undertaken concurrently this would generally amount to an increase in the frequency of traffic (including HGVs) entering the various sites and passing local residences as a result; and, a slight increase in the overall construction noise levels when building out the infrastructure at each site. A detailed assessment will not be undertaken on the basis that all normal controls and best practice is followed in terms of construction techniques and that typical limiting requirements would be met as a result.

12.7 Questions

12.7.1 Do the consultees agree with the use of background sound data collected in support of previous wind farm planning applications in the area?

12.7.2 Do the consultees agree with the proposed assessment methodology?

13 Socio-economic

13.1 Introduction

13.1.1 The Socio-economics chapter of the ES will provide an assessment of the likely significant socio-economic effects generated by the Proposed Development. This will include the identification and assessment of likely effects during the construction phase, during the operational phase and the decommissioning phase. It will also consider cumulative effects.

13.2 Legislation, Policy and Guidance

13.2.1 A review of national and local policy will be undertaken. This will include the following:

- Planning Policy Wales[28] (PPW) published in February 2024, sets out the land use planning policies of the Welsh Government. The primary objective of the PPW is to ensure that the planning system contributes towards the delivery of sustainable development and

[28] Planning Policy Wales: Welsh Government, February 2024.

improves the social, economic, environmental and cultural well-being of Wales.

- Future Wales: The National Plan 2040[29] published in February 2021 is Wales' national development framework and sets the direction for development in Wales to 2040. It has a strategy for addressing key national priorities through the planning system, including sustaining and developing a vibrant economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of communities.
- The Overarching National Policy Statement for Energy (EN-1)[30] was published in November 2023 by the Department for Energy Security and Net Zero. It states that where an energy project is likely to have socio-economic impacts at local or regional levels, the applicant should undertake and include in their application an assessment of these impacts as part of the Environmental Statement.
- The All Wales Plan 2021-2025[31], which outlines how all of Wales will work together to achieve net zero. The Plan sets out pledges that Wales make to target seven areas where action is needed.
- The Review of Wales' Renewable Energy Targets[32], Summary of Consultation Responses published in July 2024 provides a summary of the Welsh Government's consultation on its proposals for revised renewable energy targets for Wales.
- In March 2022, the Welsh Government published Stronger, Fairer, Greener Wales: A Plan for Employability and Skills[33]. The aim of the Plan is to set out how the Welsh Government is committed to ensuring
- all individuals in Wales have a high quality education, access to jobs and to ensure Wales is a place where businesses can thrive.
- The Powys Local Development Plan[34] was adopted in April 2018 and sets out the Council's policies for the development and use of land in Powys up to 2026. It identifies a vision and objectives based on an understanding of the characteristics, issues and needs of the county and its communities. LDP Objective 5 to support the

[29] Future Wales, The National Plan 2040: Welsh Government, February 2021.
[30] Overarching National Policy Statement for Energy (EN-1): Department for Energy Security and Net Zero, November 2023.
[31] All Wales Plan 2021-25 Working Together to Reach Net Zero: Welsh Government, October 2021.
[32] Review of Wales' Renewable Energy Targets, Summary of Responses: Welsh Government, July 2024.
[33] Stronger, fairer, greener Wales: A plan for employability and skills: Welsh Government, March 2022.
[34] Powys Local Development Plan: Powys Council, April 2018.

conservation of energy and water and to generate energy from appropriately located renewable resources where acceptable in terms of the economic, social, environmental and cumulative impacts.

13.3 Proposed Scope of Assessment

13.3.1 There is no overarching Government guidance that sets out the preferred methodology for assessing the likely socio-economic effects of development proposals. Accordingly, the approach adopted for the assessment will be based on professional experience and best practice, and in consideration of the policy requirements/tests set out within the PPW and the Local Development Plan.

13.3.2 The first step in the assessment will be to identify the sensitivity of the receptors. In socio-economic assessments, receptors are not sensitive to changing environmental conditions in the same way as many environmental receptors are. To address this, the assessment will draw on a combination of measurable indicators (jobs, population, etc.) and a consideration of the importance of the receptor in policy terms to gauge the receptor's sensitivity. The sensitivity criteria proposed to be used in the Socio-Economics ES chapter are presented in Table 13.1.

13.3.3 The magnitude of change upon each receptor will then be determined by considering the predicted deviation from baseline conditions, both before and, if required, after mitigation. The magnitude of effect criteria proposed to be used in the Socio-Economics ES chapter are presented in Table 13.2.

13.3.4 Wherever possible the magnitude of change will be quantified. Where this is not possible, for example, for a number of the social related factors, consideration of magnitude of change will be on a qualitative basis and justified through baseline research, review of relevant policy, and consultation undertaken.

13.3.5 There are no industry standard significance criteria for the assessment of socio-economic effects. The assessment is quantitative where possible. In circumstances where this is not possible, the assessment is qualitative in nature and is based on professional judgement. The significance of effect is identified by combining the sensitivity of the receptor against the magnitude of impact using the matrix in Table 13.3.

Table 13.1: Criteria for Sensitivity of Receptor

Sensitivity	Evidence for sensitivity assessment
High	Evidence of direct and significant socio-economic challenges relating to receptor. Accorded a high priority in local, regional or national economic regeneration policy.
Medium	Some evidence of socio-economic challenges linked to receptor, which may be indirect. Change relating to receptor has medium priority in local, regional and national economic and regeneration policy.
Low	Little evidence of socio-economic challenges relating to receptor. Receptor is accorded a low priority in local, regional and national economic and regeneration policy.
Negligible	No socio-economic issues relating to receptor. Receptor is not considered a priority in local, regional and national economic development and regeneration policy.

Table 13.2: Criteria for Magnitude of Effect

Magnitude of impact	Description / criteria
High	Proposed Development would cause a large change to existing socio-economic conditions in terms of absolute and/or percentage change.
Medium	Proposed Development would cause a moderate change to existing socio-economic conditions in terms of absolute and/or percentage change.
Low	Proposed Development would cause a minor change to existing socio-economic conditions in terms of absolute and/or percentage change.
Negligible	No discernible change in baseline socio-economic conditions.

Table 13.3: Significance of Effect

Magnitude of change	Sensitivity of receptor				
		High	Medium	Low	Negligible
	High	Major	Major	Moderate	Negligible
	Medium	Major	Moderate	Minor to Moderate	Negligible
	Low	Moderate	Minor to Moderate	Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

13.3.6 Within a 15km buffer of the Site, there are seven lower super output areas (LSOA) and eight wards. This includes Powys 004B LSOA and Llanbrynmair ward, which the Site is located in. This 15km radius (see Plate 13.1) makes up the Primary Impact Zone for the socio-economic assessment, as shown in Table 13.4. A secondary impact zone will also be assessed, which will cover Powys local authority.

Plate 13.1: Map of a 15km buffer of the Site.

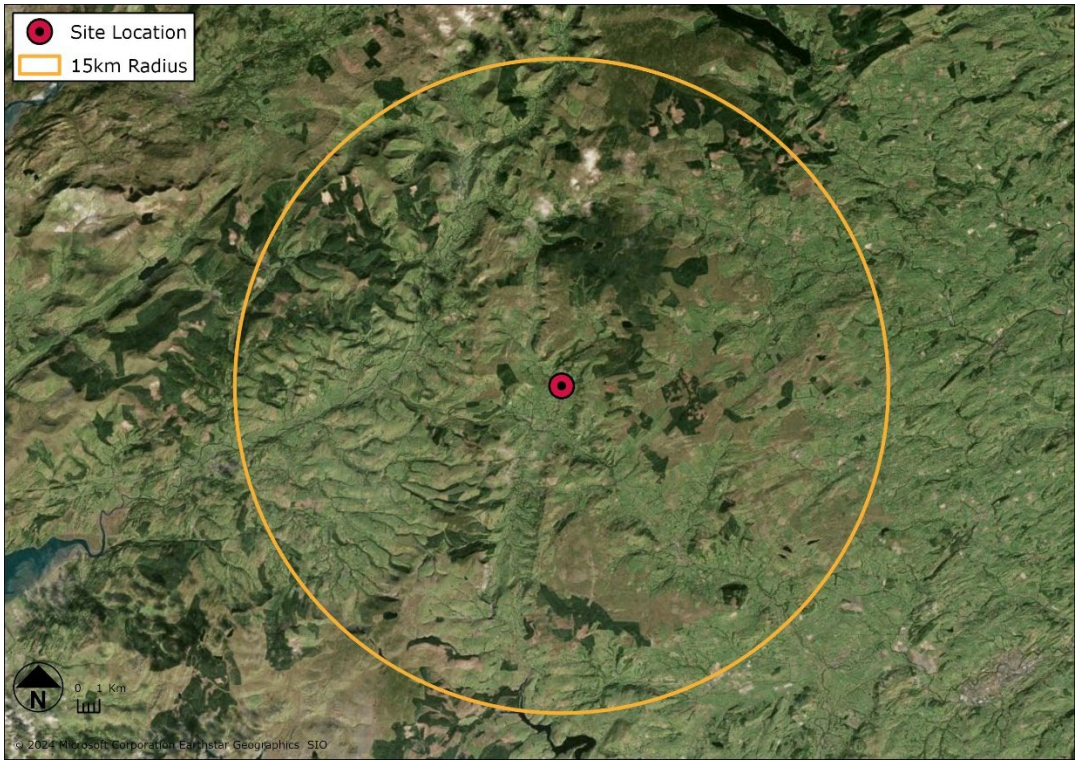

Table 13.4: Study area for the socio-economic assessment

Spatial scale	Title	Justification for inclusion
Primary Impact Zone	Wards located within a 15km buffer	The listed areas all lie within a 15km buffer of the Site, and some impacts may affect this wider scale.
Secondary Impact Zone	Powys Local Authority	The Site is located within the Powys local authority and most impacts are expected to be retained within the local authority.
Comparator Areas		

Spatial scale	Title	Justification for inclusion
National	Wales	Looking at the national scale enables analysis to compare the primary and secondary impact zones to the rest of the country in order to further understand the local context.

Likely Significant Effects

13.3.7 During construction, it is anticipated that the Proposed Development will generate the following socio-economic effects:

- Employment – direct, indirect and induced jobs based in the local and wider impact areas.
- Economic output – measured in gross value added (GVA, generated by the employment supported during the construction phase).
- Accommodation – potential impacts on available accommodation as a result of construction workers required during the construction phase.
- Potential disruption to residents and businesses, as well as the tourism industry.

13.3.8 Once completed and fully operational, it is anticipated that the socio-economic effects associated with the Proposed Development will include the following:

- Employment – direct, indirect and induced jobs based in the local and wider impact areas.
- Economic Output – measured in gross value added (GVA, generated by the employment supported once operational).
- Business rates revenue – measured in terms of the potential business rates generated.
- Tourism – the potential impact on tourism.

13.3.9 During decommissioning, it is anticipated that the Proposed Development will generate the following socio-economic effects:

- Employment – direct, indirect and induced jobs based in the local and wider impact areas.
- Economic output – measured in gross value added (GVA, generated by the employment supported during the decommissioning phase).

- Accommodation – potential impacts on available accommodation as a result of workers required during the decommissioning phase.
- Potential disruption to residents and businesses, as well as the tourism industry.

13.4 Baseline Conditions

13.4.1 Population

- **Population**: Between 2013 and 2023 the total population of Powys grew by 1.3% (1,700). This compares to population growth of 3% for Wales as a whole. During this time period, the only age group to experience an increase in Powys was the 65+ cohort which increased by 17.1%, a higher increase than Wales at 13.9%. In Powys the age group 0-15 decreased by 6.4% and ages 16-64 decreased by 3.2%. In Wales as a whole, those aged 0-15 decreased by 0.9%, whilst those aged 16-64 increased by 0.8%. As of 2022, the population of the Primary Impact Zone was 13,982. Table 13.5 details the 2023 wards that fall wholly or partly within a 15km Buffer of the Site. Ward data for 2023 are not available at the time of writing (July 2024).

Table 13.5: 2023 Wards within a 15km Buffer of the Site

Ward Code	Ward Name	LPA
W05001118	Banwy, Llanfihangel and Llanwddyn	Powys
W05001124	Caersws	Powys
W05001131	Glantwymyn	Powys
W05001140	Llanbrynmair	Powys
W05001147	Llanfair Caereinion and Llanerfyl	Powys
W05001167	Rhiwcynon	Powys
W05001521	Corris a Mawddwy	Gwynedd

Source: ONS

- **Employment**: Based on data from the Office for National Statistics, as of 2022, there were 59,000 jobs in Powys. This was a fall of 9.2% (6,000) since 2015. This compares to an increase of 1.7% (23,000) in Wales which had 1.3 million jobs in 2022. The Primary Impact Zone experienced no employment change between 2015 and 2022, remaining at 3,500 jobs. Table 13.6 details the 2019 wards that fall wholly or partly within a 15km buffer of the Site. Employment data

are only available for 2019 ward boundaries which are different to 2023 ward boundaries.

Table 13.6: 2019 Wards within a 15km Buffer of the Site

Ward Code	Ward Name	LPA
W05000056	Corris/Mawddwy	Gwynedd
W05000285	Banwy	Powys
W05000288	Blaen Hafren	Powys
W05000292	Caersws	Powys
W05000300	Glantwymyn	Powys
W05000309	Llanbrynmair	Powys
W05000317	Llanfair Caereinion	Powys
W05000343	Rhiwcynon	Powys
W05000324	Llanidloes	Powys

Source: ONS

- **Unemployment**: As of June 2024, the claimant count in Powys was 2.7%, which has decreased from 3.5% in June 2021. The latest rate was below the corresponding figures for Wales which fell from 5% in June 2021 to 3.4% in June 2024.
- **Economic Output**: Between 2012 and 2022, the gross value added (GVA) in Powys grew by 35.4% (£666million) to reach £2.6billion. This was slightly below the 39.4% growth in GVA that was seen in Wales.
- **Deprivation**: The Proposed Development is located in LSOA Powys 004B. Based on data from the Welsh Index of Multiple Deprivation, Powys 004B has an overall rank of 882 putting it in the top 50% least deprived LSOAs in Wales (out of 1,909, rank 1 is most deprived and 1,909 is least). Powys 004B has its' lowest rank in community safety with an overall rank of 1,792, putting it in the top 10% most deprived LSOAs for this domain. It has its highest rank in access to services with a rank of 8, putting it in the top 10% least deprived LSOAs for this domain.
- **Fuel Poverty (Powys/ Wales)**: The latest fuel poverty information down to a local authority in Wales is for 2018, whereby an estimated 10,000 people (17%) in Powys lived in fuel poverty compared to 155,000 (12%) in Wales[35]. Latest data from Wales shows that as of 2021, 14% of households in Wales were in fuel poverty[36].

[35] https://commonslibrary.parliament.uk/local-area-data-fuel-poverty/.
[36] Fuel poverty in Wales: interactive dashboard | GOV.WALES.

- **Accommodation**: Due to the nature of the location of the Site, it would not be suitable for the majority of workers to commute during the construction, therefore workers will likely stay in nearby accommodation. There are a total of 38,134 bedspaces in Powys, with 6,038 serviced, 5,259 self-catering, 24,698 caravan/camping, 1,911 hostel and 228 alternative[37].

13.5 Potential Mitigation

13.5.1 The potential mitigation required as a result of the scheme will be dependant on a more detailed outcome of the socio-economic analysis, based on work undertaken by similar large scale renewable energy schemes. Potential mitigation could include:

- Accommodation strategy
- Health impact assessment
- Equality impact assessment
- Construction Environmental Management Plan
- Employment & skills plan

13.6 Cumulative Impacts

13.6.1 Cumulative effects relating to the Proposed Development and potential interactions with other significant developments in the area will be assessed from a socio-economic perspective. It is proposed that this includes the proposed wind farm at Carnedd Wen.

13.7 Questions

13.7.1 From a socio-economic perspective are there any other schemes that should be considered for cumulative impacts?

13.7.2 It is likely that questions will arise during the consultation process. However, in the first instance it would be helpful if the Council can confirm they are happy with the Proposed Impact Zones outlined in this chapter.

13.7.3 It would also be helpful to confirm, of the potential mitigation measures outlined in paragraph 13.5, are there any that the Council would definitely expect to see produced for a scheme of this nature.

[37] Llwodraeth Cymru Welsh Government, Summary of Wales bedstock data: situation as at June 2023. August 2022. Available at: Summary of Wales bedstock data: situation as at June 2022 | GOV.WALES.

14 Aviation & Other Issues

14.1 Introduction

14.1.1 The Aviation and Other Issues chapter of the ES will include a description of military and civilian aeronautical and radar issues relating to the Proposed Development.

14.1.2 Radar systems can be susceptible to interference from wind turbines as the blade movement can cause intermittent detection by radars within their operating range. This is particularly relevant where there is a radar line of sight between the radar and the wind turbines. Due to their height, wind turbines can also impact airports and airfields if they protrude into the safeguarding areas above and around them.

14.2 Legislation, Policy and Guidance

14.2.1 The primary guidance in relation to the assessment of wind turbines on aviation in the UK is the Civil Aviation Authority (CAA) Publication (CAP) 764, Policy and Guidelines on Wind turbines (CAA, 2016).

14.2.2 The primary aviation lighting guidance for turbines at 150 metres tip height, or more, is the Air Navigation Order (ANO) 2016, Chapter 2, Lights and Lighting.

14.3 Consultation / Proposed Scope of Assessment

14.3.1 Consultation has been initiated with the Defence Infrastructure Organisation (DIO) who indicated in January 2024 that, based on the pre-application proforma, the Ministry of Defence (MOD) had concerns about the potential impact on the Air Traffic Control (ATC) radar at RAF Shawbury, some 61.30 km from the Proposed Development. The MOD is also likely to request a lighting condition to address the impact on low flying areas, and charting conditions. Further liaison will be undertaken with the MOD and other aviation stakeholders, up to the point that the locations of the wind turbines have been finalised. The ES will present the findings of these consultations and all responses received, as well as any predicted impacts on aviation, and mitigation required.

14.4 Baseline Conditions

14.4.1 There are few aviation interests in the area that could potentially be affected by the Proposed Development. Initial assessments indicate that the

development might impact the NATS en route radar at Clee Hill, which is 70.5 km from the Proposed Development. Also, analysis using the latest layout design indicates only one turbine would be visible to the MOD ATC radar at RAF Shawbury. The Proposed Development is within an area of low priority for military low flying operations, as shown in the blue hatched area in Plate 14.1. Consultation will be undertaken as necessary with civil and military aviation stakeholders to agree if any mitigation measures are necessary.

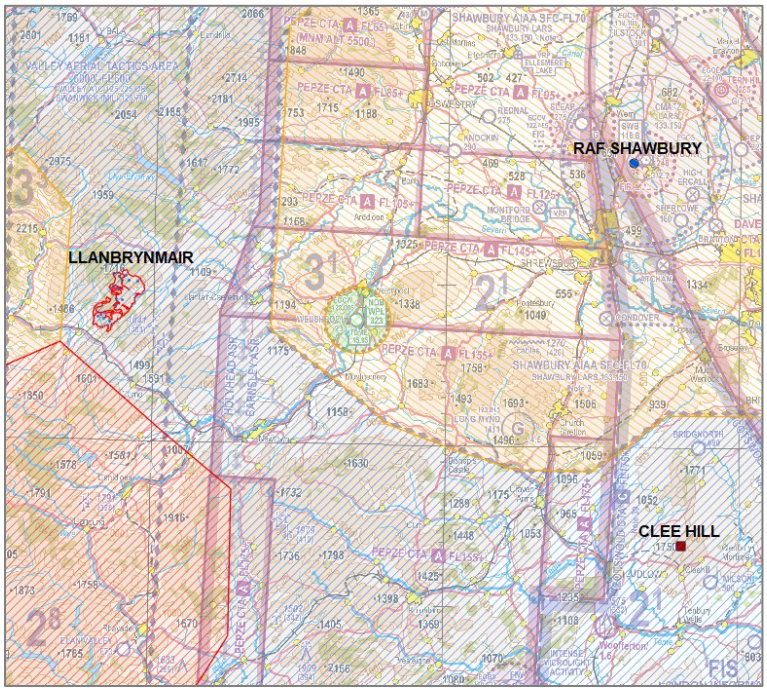

Plate 14.1: Potential aviation impacts, receptor locations (reproduced under licence from NATS (Services) Ltd © Copyright 2024 NATS (Services) Ltd. All rights reserved)

14.5 Potential Mitigation

14.5.1 The radar at Clee Hill does not currently have wind farm tolerance but, NATS En Route Limited (NERL) has procured a new radar that is expected to have the capacity to manage the impact of wind farms. This will be agreed through consultation with the NATS.

14.5.2 The impact on the MOD ATC Radar at RAF Shawbury is expected to be manageable, with only one turbine marginally visible. However, should mitigation be required, it is anticipated that either wind farm filter can be applied to the military STAR NG radar, or an infill solution would be appropriate. This will be agreed through consultation with the MOD.

14.5.3 The UK Air Navigation Order (ANO) 2016, Article 222, sets out the statutory requirement for the lighting on en-route obstacles, which applies to structures of 150 m or more above ground level. A visible lighting scheme

will be agreed with the Civil Aviation Authority (CAA). The MOD is likely to request an infrared lighting scheme for low flying military aircraft in the area and this will be agreed through consultation with the MOD.

14.6 Questions

14.6.1 Do consultees agree with the approach to aviation and radar interests proposed?

15 Shadow Flicker

15.1 Introduction

15.1.1 An assessment will be undertaken of the likely effects of the Proposed Development on shadow flicker.

15.2 Legislation, Policy and Guidance

15.2.1 There is no guidance on shadow flicker in Welsh planning policy, however, the Update to Shadow Flicker Evidence Base (2011) 11 published by the Department for Energy and Climate Change (DECC) (now part of the Department for Business, Energy and Industrial Strategy) states that assessing shadow flicker effects within ten times the rotor diameter of a wind turbine has been widely accepted across different European countries, and is deemed to be an appropriate area. The study area will therefore encompass all of the properties located within ten times the maximum rotor diameter, in this case, 1620m.

15.3 Proposed Scope of Assessment

15.3.1 For an accurate assessment of shadow flicker, complex modelling is required taking into account the turbine's dimensions and the movement of the sun throughout the year. Data will be input into the modelling as follows:

- The locations of properties within ten rotor diameters of each proposed wind turbine;
- The locations and dimensions of the proposed turbines;
- The local topography (Ordnance Survey Digital Terrain Model); and
- The estimated dimensions of windows.

15.3.2 The modelling calculates the position of the sun throughout the day in accordance with the curvature of the earth, the time of year and the Site's position. The software calculates the occurrences of shadow flicker at each

identified receptor. Analysis will be conducted to represent a worst case scenario, namely:

- The sun is shining all day, from sunrise to sunset.
- The rotor plane is always perpendicular to the line from the wind turbine to the sun.
- There are no obscuring features such as trees and vegetation.
- The analysis looks at shadow casting over the building from all directions rather than over vertical orientated windows only; and
- The wind turbine is always operating.

15.4 Baseline Conditions

15.4.1 Shadow flicker is an effect that can occur within buildings situated in relatively close proximity to wind turbines when the shadow from rotating blades passes over a window opening. Shadow flicker intensity is defined as the difference or variation in brightness at a given location in the presence and absence of a shadow. Shadow flicker can be a nuisance to nearby human receptors, and its effects therefore must be considered during the design of the Proposed Development. It only occurs when the turbine is in operation (i.e. sufficient wind speed is present), the sun is low in the sky (dawn, dusk, winter days), there is limited cloud cover, and the turbine lies between the direction of the sun and the building in question.

15.5 Potential Mitigation

15.5.1 Mitigation measures can be incorporated into the operation of the Wind Farm to reduce the instance of shadow flicker. Mitigation measures include planting tree belts between the affected dwelling and the responsible turbine(s) and shutting down individual turbines during periods when shadow flicker could theoretically occur.

16 Topics Scoped Out

16.1 EMI

16.1.1 Wind farm developments have the potential to interfere with electromagnetic signals passing above ground. Consultation will be carried out with OFCOM, television, telecommunication, and other utility providers to clarify that there are no links crossing the Site that will be impacted by the Proposed Development. The turbine layout will be designed to avoid

direct impact on any identified links, and where this has been a consideration, it will be identified as part of the design evolution of the scheme within the ES. On the basis that a technical mitigation solution can be implemented and that likely significant telecommunications effects are not anticipated, a specific chapter on this topic has been scoped out of the ES.

16.2 Television and Telecommunications

16.2.1 Effects on television and telecommunications have been scoped out of detailed assessment and will not form a chapter of the ES. Since Great Britain has transitioned from analogue to digital transmitters, interference to television and radio signals have ceased to be an issue for most sites.

17 Summary & Conclusions & Non-Technical Summary (NTS)

17.1 Introduction

17.1.1 A summary chapter will be included at the end of the ES, providing a synopsis of the findings of the EIA.

17.2 Non-Technical Summary (NTS)

17.2.1 A Non-Technical Summary (NTS) of the findings will also be prepared, as required by the EIA regulations.

17.2.2 The NTS will detail the main components of the Proposed Development and summarise the main findings of the environmental studies carried out to construct and operate the Proposed Development. The NTS is designed to be an easily readable document to communicate the main elements of the EIA to any interested party, without the need for the reader to have specialist background knowledge. It will also contain plans and mapping that illustrate the extent and geographical location of the Proposed Development.