Waun Maenllwyd Wind Energy Hub Limited

Waun Maenllwyd Wind Energy Hub

Information to Support a Scoping Opinion Request

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RSK GENERAL NOTES

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1 INTRODUCTION

1.1 Background

1.1.1 Waun Maenllwyd Wind Energy Hub Limited (hereafter, the 'Applicant') has commissioned RSK Environment Limited (hereafter, 'RSK') to prepare an Environmental Impact Assessment (EIA) Scoping Report to accompany a request for a Scoping Opinion from Planning and Environment Decisions Wales (PEDW) (prepared on behalf of Welsh Minister) for the proposed Waun Maenllwyd Wind Energy Hub (hereafter, the 'Proposed Development').

1.1.2 The Planning (Wales) Act 2015 and the Developments of National Significance (Wales) Regulations 2016 (as amended) and subsequent regulations, provide the statutory basis for a Development of National Significance (DNS). Any proposal to construct or operate an onshore wind development with a capacity over 10 mega-watts (MW) falls under the DNS system and requires Welsh Ministers' consent.

1.1.3 The Proposed Development will comprise the construction and operation of up to six (6) wind turbines, an electrical substation and control building, a battery storage compound, underground power cables, anemometer mast, site access tracks, habitat management, and, where necessary, off-site highway improvements. The Proposed Development will be classed as a DNS as the combined installed capacity of the power generating elements will be greater than 10MW.

1.1.4 The purpose of this EIA Scoping Report is to establish the scope of the Environmental Statement that will be prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (hereafter, the 'EIA Regulations'), and will accompany the Applicant's DNS application. In line with EIA Regulation requirements, the request for an EIA Scoping Opinion is made in relation to a DNS for the purposes of section 62D of the Town and Country Planning Act 1990.

1.2 Definition of an EIA

1.2.1 The term EIA describes a procedure that must be followed for certain types of project before it can be given 'consent'. The procedure is a means of drawing together, in a systematic way, an assessment of a project's likely significant environmental effects. This helps to ensure that the importance of the predicted effects and the scope for avoiding, preventing, reducing or, if possible, offsetting them are properly understood by the public and the authority granting consent (the 'determining authority') before it makes its decision.

1.3 Requirement for EIA

1.3.1 The EIA Regulations require that, before consent is granted for certain types of development, an EIA must be undertaken. The EIA Regulations set out the types of development which must be subject to an EIA (referred to as Schedule 1 development) and other developments, which may be subject to an EIA depending

on certain parameters and/or their potential to give rise to significant environmental effects (referred to as Schedule 2 development).

1.3.2 The Proposed Development does not fall under any of the types of development set out in Schedule 1 of the EIA Regulations. However, the Proposed Development is of a type and scale described in Schedule 2 of the EIA Regulations 2017, as follows:

"Energy industry

a) Industrial installations for the production of electricity, steam and hot water (projects not included in Schedule 1 to these Regulations);

(i) Installations for the harnessing of wind power for energy production (wind farms);"

1.3.3 For the purposes of the EIA Regulations, the Applicant considers the Proposed Development to be EIA development. Therefore, the Applicant is notifying PEDW (under Regulation 5(2)(a) of the EIA Regulations) of the intention to prepare and submit an Environmental Statement (ES) in support of the DNS application without prior request for a Screening Opinion.

1.4 Purpose of the report

1.4.1 In accordance with Regulation 33 of the EIA Regulations, a person who is minded to make an EIA application may ask PEDW to state in writing their opinion as to the scope and level of detail of the information to be provided in the ES. Therefore, this EIA Scoping Report has been prepared in accordance with Regulation 33(2) of the EIA Regulations and PEDW's 'Developments of National Significance: Procedural Guidance' (Appendix 3: EIA).

1.4.2 The purpose of this EIA Scoping Report is to ensure that the subsequent EIA is focused on the key impacts likely to give rise to significant environmental effects, and to obtain agreement on the EIA approach and scope. As well as identifying elements to be considered in the EIA, this EIA Scoping Report also identifies those elements that are not considered necessary to assess further. This approach is in line with the general aim to undertake proportionate EIA, as advocated by industry best practice.

1.4.3 Whilst this EIA Scoping Report seeks to establish the overall framework for the EIA in relation to the environmental factors and associated effects, the exact scope of the EIA will be influenced by the Scoping Opinion received, the on-going design evolution of the Proposed Development, and through on-going baseline data collection (e.g. field surveys etc.). In this regard, a list of 'scoping questions' is presented within **Chapter 6** of this EIA Scoping Report, the aim of which is to assist the determining authority and its consultees in forming the Scoping Opinion.

1.4.4 Where further evidence justifies a change to the scope of the EIA, this will be explained in the ES along with confirmation of whether the change has been agreed with relevant consultees.

1.4.5 Paragraph 3.14 and 3.15 of PEDW's 'Developments of National Significance: Procedural Guidance' (Appendix 3: EIA) sets out what should be provided within the EIA Scoping Report. This guidance document draws on Regulation 33(2) of the EIA

Regulations and any additional information which needs to be provided in the EIA Scoping Report. In accordance with the EIA Regulations and PEDW Guidance, **Table 1-1** sets out the information requirements and where this information can be found within this EIA Scoping Report.

Table 1-1: Information required to accompany a request for a Scoping Direction

Information Required	Location within EIA Scoping Report
EIA Regulations (Regulation 33(2))	
A plan sufficient to identify the land.	**Appendix A**
A brief description of the nature and purpose of the development, including its location and technical capacity.	**Chapter 2**
An explanation of the likely significant effects of the development on the environment.	**Chapter 6**
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.	**Chapter 1**
DNS Procedural Guidance (Appendix 3)	
An outline of the main alternatives considered and the reasons for selecting a preferred option.	**Chapter 3**
Results of desktop and baseline studies, where available.	**Chapters 5** and **6**
A record of consultation undertaken with relevant bodies (including any public engagement) to date.	**Chapters 5** and **6**
Referenced plans presented at an appropriate scale to convey clearly the information and all known aspects associated with the proposal.	**Appendix B**
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.	**Chapters 5** and **6**
Methods used or proposed to be used to assess impacts and the significance criteria framework used.	**Chapters 6**
Any mitigation proposed and the extent to which these are likely to reduce impacts.	**Chapter 4**
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).	**Chapter 4** and **7**

Information Required	Location within EIA Scoping Report
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.	**Chapter 2** and **6**
Key topics covered as part of applicants' scoping exercise.	**Chapter 4, 5** and **6**
An outline of the structure of the proposed ES.	**Appendix H**

1.4.6 In accordance with the EIA Regulations, the ES will be based on the Scoping Opinion received.

1.5 References

- Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (as amended). Available at: The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (legislation.gov.uk)
- Planning and Environment Decisions Wales. (June 2019). Development of National Significance Procedural Guidance: Appendix 3 – Environmental Impact Assessment. Available at: https://www.gov.wales/developments-national-significance-dns-procedural-guide

2 DESCRIPTION OF THE NATURE AND PURPOSE OF THE PROPOSED DEVELOPMENT

2.1 Introduction

2.1.1 This chapter provides a description of the Site (and surrounding area) and Proposed Development for the purposes of identifying and reporting the potential environmental impact and likely significant effects in this EIA Scoping Report. The description of the Proposed Development represents the current understanding of the design parameters. However, as part of an ongoing design process, the detail provided in this chapter will be further refined for the Draft Environmental Statement (ES) and Final ES.

2.1.2 The final built form and layout of the Proposed Development, as well as the installation/construction methods to be utilised will, eventually, be determined by the appointed contractor. However, all works will be required to be undertaken within the parameters assessed for the Proposed Development. With this in mind, the EIA will represent a 'worst-case', ensuring a robust assessment of the likely significant effects.

2.1.3 The design of the Proposed Development will take account of the following guidance:

- Design Commission for Wales (2023) Designing for Renewable Energy in Wales (Draft – currently under consultation)
- Scottish Natural Heritage (2017) Siting and Designing Wind Farms in the Landscape (Version 3)
- Ceredigion Local Development Plan (LDP1) - 2007 - 2022 Ceredigion County Council (2015) Renewable Energy Supplementary Planning Guidance.

2.2 The application site

2.2.1 **Appendix A** identifies the location of the Site. The Site boundary shown on **Appendix A** is the area (approximately 265 hectares (ha)) within which the Proposed Development would be located.

2.2.2 The design of the Proposed Development is not yet complete, and as such, details of any off-site requirements, such as for access of Abnormal Indivisible Loads (AIL) and other construction traffic, are yet to be confirmed. Where possible, all potential effects from expected development and construction activities have been considered within this EIA Scoping Report.

2.3 The site and surrounding area

2.3.1 The Site is located within the county of Ceredigion, approximately 11km north-east of Lampeter. The villages of Llanddewi Brefi and Llanfair Clydogau are located approximately 2.5km north-west and 5km south-west of the Site, respectively.

2.3.2 The Site is part of a larger, undulating landscape at the south-western edge of the Cambrian Mountains, with topography ranging from 390m to 473m Above Ordnance Datum (AOD). The Site is not located within any nationally or locally designated landscapes. The closest nationally designated landscape is the Bannau Brycheiniog National Park (formerly Brecon Beacons), located approximately 23km south-east of the Site.

2.3.3 The landcover at the Site is predominately commercial forestry, accompanied by a mixture of upland moorland and pasture. The commercial forestry areas comprise planted coniferous woodland and unimproved acidic grassland. The upland moorland comprises unimproved acid and marshy grassland, with lower areas supporting improved and semi-improved acidic grassland.

2.3.4 The Site is drained by various small watercourses, including Nant Esgair-goch, Nant Bryn-du and Nant Clywedog-uchaf, as well as various unnamed watercourses. These streams then drain into the larger Afon Teifi at Llanfair Clydogau.

2.3.5 There are no public rights of way crossing the Site. The Cambrian Way long distance footpath is approximately 5km to the northeast at its closest point. An unnamed minor road passes through the centre of the Site on a north-west to south-east bearing. The northern area of the Site encompasses some open access land, at Bancau Duon, whilst it also borders open access land along the south-eastern boundary.

2.3.6 There are a number of single turbine developments within Ceredigion, all of which have been built for domestic use. The closest commercial wind farm is the Llangwyryfon wind farm, approximately 12.5km south east of Aberystwyth, and comprises 11 turbines with 66m tip heights. It is located approximately 16km to the northwest of the Site.

2.4 Description of proposed development

Summary of key components

2.4.1 The main elements of the Proposed Development will comprise:

- Up to six (6) wind turbines and associated infrastructure, including; transformers, foundations, crane pads, and laydown/storage areas.
- An on-site electrical substation and control building.
- Battery storage compound.
- Underground power cables linking the wind turbines and on-site substation and control building.
- New site entrances and internal access tracks.
- Permanent anemometer masts for monitoring wind speeds and wind turbine performance.
- Borrow pit(s) where feasible.
- One or more temporary construction and storage compounds.
- Off-site works (where necessary) to facilitate the transport of AIL.

Wind turbines

2.4.2 Based on known environmental and technical constraints, the Site can accommodate up to 6 wind turbines; refer to **Appendix B** for an indicative turbine layout. The proposed turbines would be three bladed horizontal axis turbines. The turbine towers would be of tapered tubular steel construction, likely to be finished in a light grey semi-matt colour.

2.4.3 This EIA Scoping Report has been prepared based upon a maximum tip height for wind turbines of 230m, although the maximum turbine heights and turbine specifications in other respects will be considered further through the EIA process. The worst-case candidate turbine can differ across the EIA disciplines (for example noise, ornithology, transport etc.) therefore different candidate turbines may be specified in the ES where necessary to inform assessments of effects.

2.4.4 A transformer would be required for each wind turbine. Depending upon the type of turbine selected, the turbine's electrical transformers may be located within or adjacent to the turbines. For the purposes of this EIA Scoping Report, it has been assumed that the transformers will be external and located adjacent to each turbine within the hardstanding areas.

2.4.5 The wind turbines would be installed on foundations. The detailed design specification for each foundation will depend on the type of turbine procured and the specific ground conditions at the location of each wind turbine. A crane pad would be required for each turbine and would consist of an area of hardstanding adjacent to the turbine. The exact specification and position of the crane pad will depend on the turbine supplier's specifications, the crane selected for erection, and specific ground conditions. The EIA will be based on indicative maximum crane pad dimensions, together with an appropriate micro-siting allowance.

Aviation lighting

2.4.6 The UK statutory requirements for the lighting of en–route obstacles (i.e., those away from the vicinity of a licensed aerodrome) are set out in Article 222 of the Air Navigation Order 2016. This article requires medium intensity (2000 candela) steady red aviation warning lights to be mounted as close as possible to the top of all structures at or above 150m above ground level (AGL).

2.4.7 In terms of the requirement for lighting wind turbines in accordance with the Air Navigation Order 2016, the Civil Aviation Authority (CAA) considers the top of a wind turbine to be the maximum blade tip height. In terms of the positioning of aviation obstruction lighting on onshore wind turbine generators with a maximum height of 150m AGL or above, the CAA interprets 'as close as possible to the top of the obstacle' as the fitting of lights on the top of the supporting structure (the nacelle) rather than the blade tips.

2.4.8 The anticipated height of the wind turbines means there will be a statutory requirement for aviation obstacle lighting (AOL). Any required lighting scheme will be agreed with relevant consultees (including the CAA).

On-site electrical substation and control building

2.4.9 The proposed wind turbines would produce electricity at typically up to 1,000 Volts. The electricity would then be transformed to 33,000 Volts (33 kV) via a transformer located immediately adjacent to the tower of each turbine, depending on the final turbine model used. Cables from each turbine and transformer would be connected underground to a purpose-built electrical substation and control building, which would include switchgear and metering equipment.

2.4.10 The dimensions and the location of the electrical substation and control building are not yet finalised, but both would be sited within the Site boundary. The location of the substation would be influenced by factors such as the distance to the point of connection, access during the operation of the Proposed Development, and environmental constraints, all of which will be considered further throughout the iterative design process.

Access and vehicle movements

2.4.11 The size and/or weight of the turbine components and transformers require specialist vehicles to carry them to site – these are classed as Abnormal Indivisible Loads (AIL). It is anticipated that AIL vehicles carrying turbine components will travel to the Site from the Port of Swansea. The route from port to Site is likely to be via the M4 out of Swansea, joining the A48 and A40 before heading north to the Site from a junction at Pumsaint. The route will be formalised through the EIA process. The Applicant will agree the route to Site with relevant consultees and will ensure that it meets the requirements of appropriate guidelines (such as visibility, construction materials, surface water drainage, gradient and safety of other road users).

2.4.12 The Proposed Development will include a new network of on-site access tracks to enable construction and maintenance, once operational. This will include a main site access track running from the new access junction. These tracks are anticipated to have a maximum running width of approximately 6.5m (with additional widening at bends). The design of the new access tracks will follow the topography of the Site, avoiding steep gradients and environmental constraints (e.g., valuable areas of terrestrial habitat and peat), where possible and will look to make use of existing forestry tracks, in order to minimise the amount of new tracks needed, where feasible.

On-site cabling

2.4.13 It is anticipated that electric cabling connecting the wind turbines and the control building will be laid in underground trenches running alongside the access tracks. The dimensions of the trenches will vary depending on the number of ducts they contain and are assumed to be up to approximately 2m in width and up to approximately 1m in depth.

2.4.14 Open-cut trenching methods would be used for a majority of the cable routing.

Permanent anemometer mast

2.4.15 A permanent steel tower anemometer mast may be required to provide ongoing monitoring of the wind conditions after commissioning of the Proposed Development. The height of any anemometer mast would align with the chosen wind turbine model. Further detail on the location and size of any anemometer mast will be provided in the ES.

Temporary construction compounds and working areas

2.4.16 The construction works would require one or more temporary construction compounds. The main construction site office and compound would comprise: temporary cabins to be used for the site offices (including welfare facilities for site staff); parking for construction staff, visitors and construction vehicles; and security fencing around the compound.

2.4.17 The temporary construction compound will likely be located close to the Site access point (but within the Site boundary) so as to control all access on to the Site. A typical compound will be in the region of 120m x 50m to give flexibility for dedicated storage and parking areas, so improving site safety through vehicle/pedestrian segregation.

2.4.18 The construction disturbance associated with the temporary construction compound is expected to be minimal. Typically, surface soils will be stripped and stockpiled, and the surface then capped with geofabric and aggregate. Once construction is complete the stone is lifted, geofabric removed and the surface soils re-spread allowing the area to regenerate. Best practice soil handling techniques will be followed.

2.4.19 The major structural components of the turbines would be delivered directly to Site. Temporary lay-down areas would be provided for parking and unloading delivery vehicles and, in particular, AIL.

Stone and aggregate

2.4.20 The Proposed Development will require crushed stone to construct the new access tracks, turbine foundations, crane pads and laydown areas. Suitable stone would be sourced wherever possible from on-site borrow pits to minimise the need for Heavy Goods Vehicle (HGV) movements on the local highway network to transport the stone to site. If on-site borrow pits are not viable, or if additional stone is required, a local quarry will be used.

Construction phase

2.4.21 It is expected that the construction of the Proposed Development will be completed over a period of approximately 18–24 months and will consist of the following principal activities:

- Public road improvements and upgraded access junction.
- Construction of main site access track.
- Construction of temporary construction compound.
- Opening of one or more onsite borrow pits and extraction of stone (if viable).
- Construction of all other onsite access tracks.

- Design and construction of temporary and permanent drainage measures and cable trenches.
- Laying of electricity and communications cables in trenches.
- Construction of turbine foundations, crane hardstandings and laydown areas.
- Construction of electrical substation and control building.
- Construction and commissioning of the battery energy storage.
- Delivery, installation, testing and commissioning of wind turbines and any permanent meteorological mast and ancillary equipment.
- Installation of external turbine transformers and switchgear in enclosed kiosks (if not internal in the turbines).
- Site reinstatement and restoration.

Construction environmental management plan

2.4.22 An Outline Construction Environmental Management Plan (CEMP) will be submitted in support of the DNS application and will set out the key measures to be employed during construction to control and minimise the impacts on the environment. The details and implementation of the CEMP will be secured by a planning condition.

2.4.23 The purpose of a CEMP is:

- To ensure nuisance levels resulting from construction and operation activities are kept to a minimum.
- To comply with relevant regulatory requirements and environmental commitments.
- To ensure procedures are put into place to minimise environmental effects during construction.

Construction traffic management plan

2.4.24 A Construction Traffic Management Plan (CTMP) will be submitted in support of the DNS application which will propose measures to control the delivery of materials and staff onto the Site during the construction phase.

2.4.25 The principles of the CTMP will be available for comment as part of the statutory consultation process to ensure that the comments of local residents and stakeholders are taken into account in its development.

Operational phase

2.4.26 The Proposed Development is likely to be operational for a limited period of 40 years. Minor maintenance works are expected to occur throughout the operating life of the Proposed Development. It is assumed that routine inspections will be carried out and access will use the previously built construction roads.

Decommissioning phase

2.4.27 At the end of the operational period, the Proposed Development would be decommissioned. Any above ground infrastructure would be dismantled and removed in accordance with industry best practice at the time. The use of decommissioned materials would follow the waste hierarchy such that they would be reused where possible before recycling and disposal were considered.

2.4.28 At the time that decommissioning would take place, the regulatory framework, good industry practices and the future baseline could have altered. The Applicant would consider and implement a Decommissioning Environmental Management Plan (DEMP) taking account of good industry practice, its obligations to landowners under the relevant agreements and all relevant statutory requirements.

2.4.29 There may be potential to extend the life of the Proposed Development or replace the turbines and other electricity infrastructure, which would be subject to a new application.

Grid connection

2.4.30 Grid capacity for the Proposed Development has been secured via a new 33kV wood pole connection to Lampeter. The grid connection to the Proposed Development is still to be confirmed, subject to optioneering, consultation, survey, assessment and design by the DNO. Therefore, the grid connection will be subject to a separate consent application and will not form part of the DNS application.

2.5 Approach to addressing uncertainty

2.5.1 In order to define the Proposed Development and determine where detail is to be included at the DNS application stage and where it may be deferred until after consent is granted, the Applicant will identify the level of flexibility required (e.g., in relation to the size of the wind turbines or construction methods).

2.5.2 Many promoters of renewable energy projects seek to maximise flexibility in their consents, given the long lead in times to consent and subsequent engagement of EPC (engineering, procurement, and construction) contractors. It is typical for large infrastructure projects to contain the ability to alter the final design of a scheme by having “limits of deviation” or including for a “micro-siting allowance”.

2.5.3 In order to maintain flexibility in the design, it is the Applicant’s intention to use the ‘Rochdale Envelope’ approach within parameter ranges. The Rochdale Envelope is an acknowledged way of dealing with an application comprising EIA development, where details of a project have not been fully resolved by the time the application is submitted. The term is used to describe those elements of a scheme that have not yet been finalised, but yet can be accommodated within certain limits and parameters, allowing the likely significant effects of a project to be presented in the ES as a ‘worst case’. It also provides the opportunity to assess aspects of a development where the detailed design is to be developed by the Applicant and approved by the determining authority under a planning condition, subsequent to the planning consent being made.

2.5.4 Furthermore, such flexibility may be useful where a change in the design or capacity of the Proposed Development is anticipated, but not yet certain. Therefore, it may be possible that a particular element of the design will be subject to on-going technological advancements. It will be important that a lack of flexibility in the DNS application does not unduly hinder the Applicant's ability to consider and adopt such future technological advancements. This is of particular importance to maintaining flexibility due to the rapid pace of change in renewable energy technologies.

2.5.5 It is therefore necessary for the EIA to assess an 'envelope' within which the works will take place. To remain in accordance with the EIA Regulations, it will be essential that the parameters are defined to ensure that 'likely significant effects' are identified, rather than unrealistically amplified effects, which could be deemed unlikely. These parameters will be considered in detail by the technical authors in the ES to ensure the realistic 'worst case' effects of the Proposed Development are assessed for each potential receptor.

3 REASONABLE ALTERNATIVES CONSIDERED

3.1 Introduction and approach

3.1.1 Regulation 17(3)(d) of the EIA Regulations states that an ES should include:

'A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the applicant or appellant which are relevant to the Proposed Development and its specific characteristics and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.'

3.1.2 Although the Site is based in Wales, guidance from other parts of the UK can inform good practice when writing an ES. Section 9.3 of the Planning Inspectorate's Advice Note Seven states that a good ES is one that 'explains the reasonable alternatives considered and the reasons for the chosen option taking into account the effects of the Proposed Development on the environment'. The ES will therefore include a description of the reasonable alternatives that have been considered, including a clear narrative on the main reasons for selecting the chosen option, including a comparison of the environmental effects.

3.1.3 The reasonable alternatives assessment will focus on: the site selection process, design layouts/opportunities within the Site, the sizing and scale of infrastructure, and alternative technologies.

3.1.4 A 'no development' alternative would not deliver the additional electricity generation capacity associated with the Proposed Development and will therefore not be considered.

3.1.5 The consideration of alternatives and design evolution will be undertaken with the aim of avoiding and/or reducing adverse environmental effects, maintaining operational efficiency and cost-effective design solutions, and with consideration of other relevant matters such as available land and planning policy.

3.2 Alternatives studied to date

Introduction

3.2.1 The Applicant has a well-established process for selecting sites and identifying land for wind farm development. The overall approach to wind farm site selection is to identify areas of land where the siting of a wind farm would result in minimal environmental effects, be free from overriding technical constraints, and be economically viable. This initial site identification exercise involves:

- Geographical Information System (GIS) constraints analysis.
- A review of suitable site access points and related transportation issues.
- Analysis of site wind resource.

- Assessment of potential nearby grid capacity.
- Review of local planning policy and history.
- Landowner interest.
- Economic viability analysis.

Planning policy framework considerations

3.2.2 The Proposed Development relates to the generation of electricity from renewable energy sources and will be a response to the national energy policy and planning objectives. The Environment (Wales) Act 2016 sets a target to reduce greenhouse gas emissions in Wales by 100% by 2050. Furthermore, the Welsh Government has declared a climate emergency and in March 2021 the Senedd Cymru approved a net zero target for 2050. Renewable energy is a key component to achieving greenhouse gas emission reduction and at the time of writing the Welsh Government is consulting on using renewable energy to meet 100% of its electricity needs by 2035.

3.2.3 Future Wales: The National Plan 2040 provides a framework for planning change and development and has development plan status. Policy 17 on renewable and low carbon energy and associated infrastructure and Policy 18 on renewable and low carbon energy developments of national significance, provide the strategic spatial and detailed criteria-based policies for renewable and low carbon energy developments.

3.2.4 Planning Policy Wales details the land use planning policies of the Welsh Government, with the objective to ensure the delivery of sustainable development. Planning Policy Wales identifies that low carbon electricity must become the main source of energy in Wales. Planning Policy Wales also recognises that wind energy forms a key part of meeting renewable energy production due to Wales's considerable wind resource.

3.2.5 Policy 17 identifies ten 'Pre-Assessed Areas for Wind Energy'. There is a presumption in favour of large-scale wind energy development in these areas, subject to the criteria in Policy 18. The Proposed Development is mostly within Pre-Assessed Area for Wind Energy 06. However, the National Plan also notes that "*Outside of these areas a positive policy framework still exists, subject to policy 18*".

GIS constraints analysis

3.2.6 The GIS constraints analysis involves identifying and mapping environmental, technical, and engineering constraints to wind farm development. Constraints that were considered as part of the site selection and early design development exercise for the Proposed Development included:

- Watercourses: A 50m buffer applied to all watercourses.
- Highways: A suitable tip-height buffer was applied to any highways.
- Communications links: Consultation with relevant telecommunication link providers identified a relevant buffer which is applied to ensure the safe operation of the telecommunication link.
- Residential properties: 800m buffer from all residential properties.

- Topography: Steep areas of slope are avoided where possible.
- Peat: Areas of peat at depth of over 30cm should be avoided where possible
- Electricity overhead lines and cables: Buffer of 1.1x turbine tip height.

3.2.7 The predicted wind resource in any given location is an important consideration in identifying potentially suitable wind farm sites. The electricity that can be generated by a wind farm is directly linked to wind speed. Wind speed generally increases with height above ground level. The amount of electricity generated increases disproportionately with increases in wind speed, this in turn affects the carbon emission savings and the commercial viability of a site.

3.2.8 A temporary 90m tall meteorological mast has already been erected at the Site in order to measure wind speeds. The mast was granted full planning permission in late 2022 and will be at the Site for up to three years.

Suitable access considerations

3.2.9 Given the size and scale of AIL associated with wind farm development, a site must demonstrate that it is accessible for construction traffic. The Applicant has conducted a Route Survey Report to help inform the likely issues associated with the Proposed Development with regards to off-site transport and access for AIL traffic. The report identified the key issues associated with AIL deliveries and notes any requirement for remedial works, either in the form of physical works or as traffic management interventions, that will be required to accommodate the predicted loads.

3.3 References

- Planning Inspectorate. (June 2020). PINS Advice Note 7: Environmental Impact Assessment: Process, Preliminary Environment Information and Environmental Statements. Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/
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4 APPROACH TO EIA

4.1 Introduction

4.1.1 This chapter sets out the overall approach that will be taken to the EIA for the Proposed Development. The ES will contain the information specified in Regulation 17 and Schedule 4 of the EIA Regulations. The approach to the assessment has been informed by current best practice guidance.

4.1.2 An overview of the guidance and methodology adopted for each environmental factor is provided within the respective environmental factor chapters of this EIA Scoping Report.

4.1.3 The environmental factors listed under Regulation 4(2) and Schedule 4 (Paragraph 4) of the EIA Regulations are presented below:

- Air quality
- Biodiversity
- Climate
- Cultural Heritage
- Population
- Human health
- Land and soil (factors combined for the purposes of reporting)
- Landscape and visual
- Material assets
- Water

4.1.4 It should be noted that although not listed as specific environmental 'factors' under Regulation 4(2) and Schedule 4 (Paragraph 4) of the EIA Regulations 2017, the following are also considered within this EIA Scoping Report:

- Aviation
- Forestry
- Heat and radiation
- Major accidents and disasters
- Noise and vibration
- Shadow flicker
- Telecommunication and utilities
- Traffic and transport.

4.1.5 The proposed structure of the Environmental Statement is set out in **Appendix H**.

4.2 Consultation

4.2.1 Consultation alongside the EIA process is critical to the development of a comprehensive and proportionate ES. The views of statutory and non-statutory consultees are important to ensure that the EIA from the outset focuses on specific issues where significant environmental effects are likely, and where further investigation is required.

4.2.2 The consultation, as an ongoing process, enables embedded and additional mitigation measures to be incorporated into the Proposed Development to limit adverse environmental effects and optimise environmental benefits. Early and ongoing engagement with consultees will be important to influence the design process of the Proposed Development by seeking an appropriate level of feedback from consultees, to ensure that comments are considered in the evolving design.

4.2.3 As part of the EIA process, consultation will be undertaken with a range of statutory and non-statutory consultees. It is anticipated at this stage that consultees will include (but are not limited to):

- Ceredigion County Council.
- Carmarthenshire County Council
- Llanddewi Brefi Community Council.
- Llanfair Clydogau Community Council.
- Welsh Government.
- Natural Resources Wales (NRW).
- Cadw.
- North and Mid-Wales Trunk Road Agency.
- Public Health Wales.
- RSPB.
- Bannau Brycheiniog National Park Authority (formerly Brecon Beacons)

4.2.4 The purpose of this consultation will be to brief consultees on the Proposed Development, seek feedback on the approach to assessment, and obtain baseline data. A summary of consultation will be included within the ES and technical consultation will be summarised within the individual technical chapters.

4.2.5 The Applicant intends to carry out community consultation, with public exhibitions and circulars. The outcome of the consultation process will be compiled into a Pre-Application Consultation Report to accompany the DNS application, detailing the consultation undertaken and any changes made to the Proposed Development as a result.

4.3 General difficulties and uncertainties

4.3.1 Factor-specific difficulties and uncertainties are set out in **Chapter 6** of this EIA Scoping Report. The following key general difficulties and uncertainties apply to a number of factors:

- The period of validity for each set of baseline data collected will be set out in the ES and, where appropriate, the requirement for any repeat surveys will be specified, such as for species data.
- It may be necessary to collect data on Site. Where it is not possible to access private land, data will be collected from publicly accessible land only.
- The COVID-19 pandemic has affected the everyday lives of the UK population in terms of travel, working arrangements and behaviour. Legal restrictions have been put in place by the UK Government and Welsh Government which, as a result, have impacted on normal baseline levels (e.g., typical traffic flows). The approach to data collection considering any COVID-19 restrictions will be confirmed and set out in the ES.

4.4 Defining the study area

4.4.1 Study areas have been defined individually for each environmental factor, taking into account the geographic scope of the potential impacts relevant to that factor and the information required to assess those impacts. The proposed study areas are described within **Chapter 6** of this EIA Scoping Report.

4.5 Establishing baseline conditions

4.5.1 Likely significant environmental effects of the Proposed Development will be described in the ES in relation to the extent of changes to the existing baseline environment as a result of the construction, operation and (where considered appropriate), the decommissioning of the Proposed Development. The baseline environment will comprise the existing environmental characteristics and conditions, based upon desk-top studies, field surveys undertaken and information available at the time of the assessment.

4.5.2 Baseline conditions will be established by:

- Site visits and surveys
- Desk based studies and
- Modelling.

4.5.3 The baseline conditions for each environmental factor, as they are currently known, are set out within **Chapter 6** of this EIA Scoping Report.

4.5.4 The baseline conditions used in the ES will vary depending on the timing of surveys or the date at which data sources have been produced/assessed. It is anticipated that information required to inform the baseline environment for the assessments will be based on data obtained or surveys completed between 2020 and 2023. Where appropriate, existing baseline data collected prior to this may be used to inform the assessment if it is deemed to remain relevant.

4.5.5 Data obtained from third party sources may be older, but the origin of all third-party data will be clearly outlined, alongside any limitations and assumptions.

4.5.6 Baseline data which is deemed to be confidential in nature, such as that relating to protected species, will be provided in separate confidential appendices to the ES, due to the sensitivity of such species records.

4.6 Establishing future baseline conditions

4.6.1 Schedule 4(3) of the EIA Regulations 2017 requires consideration of the likely evolution of the current state of the environment (baseline scenario) in the absence of the Proposed Development, as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge (the 'future baseline').

4.6.2 Whilst there are considerable limitations to the predictions that can be made about natural baseline conditions at a future point in time, reasonable effort will be made to characterise the future baseline in the absence of the Proposed Development in each factor assessment. In addition, some assessments require projections to account for future change, such as traffic growth within the assessment of likely significant effects associated with the Proposed Development.

4.7 Approach to mitigation

4.7.1 Mitigation can be relied on to reduce any potential significant effects from the Proposed Development. The sequential steps of the mitigation hierarchy are as follows:

- Avoidance: Measures taken to avoid creating impacts from the outset.
- Minimisation: Measures taken to reduce the duration, intensity and extent of the impact if they cannot be avoided.
- Restoration: Measures taken to improve ecosystems following exposure to unavoidable impacts.
- Offset: Measures taken to compensate for any residual impacts.

4.7.2 The Institute of Environmental Management and Assessment's (IEMA) 'Environmental Impact Assessment Guide to Shaping Quality Development' refers to three distinct forms of mitigation:

- Primary: An intrinsic part of the project design
- Secondary: Typically described within the environmental factor chapters of the ES, but often are secured through planning conditions and/or management plans.
- Tertiary: Required regardless of any EIA, as it is imposed, for example, as a result of legislative requirements and/or standard sectoral practices.

4.7.3 For the purposes of this EIA Scoping Report, the Draft ES and the Final ES, embedded 'primary' mitigation measures will form part of the Proposed Development for which development consent is sought. **Table 4-1** describes the currently known embedded (primary) environmental mitigation measures that are considered to be an inherent part of the Proposed Development i.e., the project design principles adopted to avoid or prevent adverse environmental effects, based on the design of the

Proposed Development to date. It should be noted that these will likely evolve over the course of the design evolution, up to submission of the DNS application.

4.7.4 These embedded (primary) environmental mitigation measures should not be confused with additional (secondary and tertiary) mitigation measures proposed in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment, which are described under the 'Additional (Secondary and Tertiary) Mitigation Measures' section within each environmental factor assessment chapter (see **Chapter 6**).

Table 4-1: Embedded (primary) environmental mitigation measures

Environmental Factor to which the Embedded Environmental Mitigation Measure Relates	Embedded Environmental Mitigation Measure and Associated Benefit
Land, soils and water Landscape and visual Noise Shadow flicker	**Locating turbines to avoid sensitive environmental receptors** The indicative turbine layout presented in **Appendix B** has considered/avoided the following features: • Watercourses, with 50m buffer implemented. • Located wind turbines at least 800m from residential properties. • Avoid all areas of peat with a depth of over 30cm
Telecommunications and utilities	**Locating turbines to avoid existing infrastructure, engineering constraints and land use features** The indicative turbine layout presented in **Appendix B** has considered/avoided the following features: • 200m buffer applied to the Airwaves communication link running through the Site as agreed with Airwaves.
Aviation Landscape and visual	**Avoidance of potential impacts on aviation and radar receptors** The following measures will form part of the Proposed Development to avoid potential impacts on aviation and radar receptors: • All structures of more than 91.4m in height will be charted on aeronautical charts and reported to the Defence Geographic Centre, which maintains the UK's database of tall structures (Digital Vertical Obstruction File) at least ten weeks prior to construction.

Environmental Factor to which the Embedded Environmental Mitigation Measure Relates	Embedded Environmental Mitigation Measure and Associated Benefit
	• Any temporary obstacles associated with wind farms which are of more than 91.4m in height are to be alerted to aircrews by means of the Notice to Airmen (NOTAM) system. • Approval and implementation of a Lighting Management Plan, which will set out specific requirements in terms of aviation lighting to be installed on the wind turbines, as required under CAA (2016). CAP 393, Air Navigation: The Order and the Regulations (2016).
Terrestrial ecology	**Avoidance of potential impacts on bats** A minimum 50m buffer (from blade tip) will be applied to nearest woodland (or other key bat habitat features) in so far as possible having regard to other ecological and non-ecological constraints. **Avoidance of potential impacts on bats** A programme of turbine 'feathering' i.e. reduced rotation speed while idling (not generating) will be implemented for all turbine locations and will be applied using the candidate turbines SCADA data system. **Avoidance of potential impacts on protected terrestrial mammals** Minimum infrastructure and construction work buffers will be applied to any identified breeding and/or resting sites of the following species in accordance with industry standard guidance, in so far as possible having regard to other ecological and non-ecological constraints: • Red squirrel; • Pine marten; • Badger; • Otter; • Water vole. A CEMP will be implemented during the construction phase of the Proposed Development. The CEMP will include provision for good practice construction measures, pollution prevention controls, pre-

Environmental Factor to which the Embedded Environmental Mitigation Measure Relates	Embedded Environmental Mitigation Measure and Associated Benefit
	commencement surveys and Species Protection Plans. **Avoidance of potential impacts on fish and freshwater pearl mussel** A 50m buffer implemented around watercourses, and avoidance/minimisation of watercourse crossings. Sensitive design of unavoidable watercourse crossings (to allow free passage of wildlife). Implementation of a CEMP during the construction phase of the Proposed Development. The CEMP will include provision for good practice construction measures, pollution prevention controls and monitoring to be implemented in line with current industry standard guidance. **Avoidance of potential impacts upon great crested newt** Suitable waterbodies will be buffered (by 250m), in so far as is possible. Implementation of a CEMP during the construction phase of the Proposed Development. The CEMP will include provision for good practice construction measures, pollution prevention controls, pre-commencement surveys and Species Protection Plans.

4.8 Assessment of likely significant effects

4.8.1 The ES will report on the likely significant environmental effects for the site preparation, earthworks and construction (hereafter referred to as 'construction'), operational (i.e., once completed and open to use), and decommissioning (i.e., once the Proposed Development has reached its end of life) phases of the Proposed Development (where considered appropriate).

4.8.2 The design of the Proposed Development will continue to be progressed and there will be a need to continue refining the design up to the detailed design stage, requiring a certain level of flexibility to be maintained (e.g., micro-siting of wind turbines and other infrastructure). However, the assessment will be based on a cautious 'worst case' approach and the level of information provided will ensure that likely significant effects are identified.

4.8.3 The following criteria will be taken into account when determining significance:

- Likelihood of occurrence.
- Adherence of the Proposed Development to legislation, planning policy, international, national, and local standards.
- The receptors/resources (natural and human) which would be affected and the pathways for such effects.
- The geographic importance, sensitivity or value of receptors/resources.
- The duration (short-term, medium-term or long-term); permanence (permanent or temporary) and changes in significance (increase or decrease).
- Reversibility - e.g., is the change reversible or irreversible, permanent or temporary.
- Environmental and health standards (e.g., local air quality standards) being threatened.
- Inter-relationships between effects (both cumulatively and in terms of potential effect interactions).
- The outputs of stakeholder and public engagement.
- Feasibility and mechanisms for delivering mitigating measures, e.g. Is there evidence of the ability to legally deliver the environmental assumptions which are the basis for the assessment?

4.8.4 The method for assessing significance of effects varies between environmental factors but, in principle, will be based on the environmental sensitivity (or value/importance) of a receptor/resource and the magnitude of change from the baseline conditions. The approach to assessing the significance of effects for each individual factor is outlined within **Chapter 6** and **Appendix G** of this EIA Scoping Report.

4.8.5 A summary of effect tables that summarise the likely significant effects associated with each of the environmental factors will be provided in the ES at the end of each factor assessment chapter. These tables will outline sensitive receptors, additional mitigation measures and residual effects. A distinction will be made between direct, indirect, secondary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects. Cumulative effects will be considered as a single coordinated assessment.

4.9 Opportunities for enhancing the environment

4.9.1 Where possible, there will be a commitment to identifying opportunities for enhancement within the relevant environmental factor assessments. Enhancement is defined as '*a measure that is over and above what is required to mitigate the adverse effects of a project*' (Ministry of Housing, Communities and Local Government, 2021). Therefore, any identified enhancement measures will not be taken into account when determining the significance of effects.

4.9.2 Enhancement measures will be assessed in accordance with steps set out in Planning Policy Wales.

4.10 References

- Institute of Environmental Management and Assessment (IEMA). (2015). Environmental Impact Assessment Guide to Shaping Quality Development.
- Welsh Government. (2021). *Planning Policy Wales*. [Online]. Available at: https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf

5 ENVIRONMENTAL FACTORS PROPOSED TO BE SCOPED OUT

5.1 Air quality

5.1.1 Human activities and natural processes release chemicals into the atmosphere and can result in air pollution. Once in the atmosphere, the chemicals are subjected to various atmospheric processes that control their transport and can alter their chemical and physical form. The eventual environmental impact of chemicals released to the atmosphere is therefore greatly influenced by these processes. The impacts of air pollution can range from poor air quality in the close vicinity of a source, to the disruption of natural chemical cycles and physical processes that occur on a global scale.

5.1.2 Given the nature of the Proposed Development, any potential impacts on air quality are only likely to occur during the construction and decommissioning phases. It is anticipated that any emissions, associated with site activities and off-site traffic during the construction phase, would be minimal. Localised dust and traffic emissions would be controlled by the adoption of construction best practices, with all relevant procedures to be documented in the Outline CEMP that will be submitted in support the DNS application.

5.1.3 Section 83 of the Environment Act 1995 requires local planning authorities to designate an air quality management area (AQMA) when a national air quality objective is not being achieved, or is not likely to be achieved. There are no AQMAs within 2km of the site boundary, although there is one along the proposed off-site access route for any AIL deliveries. This is the Llandeilo AQMA, along a section of the A483 that passes through Llandeilo.

5.1.4 No significant air quality impacts are predicted, so air quality is therefore proposed to be scoped out of further assessment in the ES.

5.2 Aviation

5.2.1 Wind developments have the potential to affect aviation interests, either by presenting a physical obstruction or collision risk to aircraft, or by interfering with the operation of navigational equipment. Early feasibility work completed at the Site included an initial assessment of the potential aviation effects. The following considerations were identified:

- The Proposed Development is located in an area that is remote from significant aviation facilities. It is under Class G unregulated airspace and within the lateral confines of Danger Area D202 which is activated only when required and has a base level of Flight Level 100 (approximately 10,000ft AMSL). It is used for Unmanned Aerial Vehicle (UAV) trials controlled from MOD Aberporth or Parc Aberporth.
- The Site is located approximately 63km to the east of Aberporth West Wales Airport

- All turbines considered are located within an MOD Tactical Low Flying Area designated as LFA7 (T) or TTA7.

5.2.2 Further consultation with relevant stakeholders, including NATS and the MoD, will be undertaken as the design of the Proposed Development develops. Any relevant restrictions on the design of the Proposed Development (turbine heights, micro-siting etc.), and any required mitigation, such as aviation lighting, will be referenced within the ES as part of the description of the Proposed Development.

5.2.3 Where a requirement for aviation warning lights is specified by consultees, this will be assessed in the Landscape and Visual Impact Assessment (refer to **Section 6.1**).

5.2.4 A standalone technical report, based upon the guidance in CAA Publication CAP 764 Policy and Guidelines on Wind Turbines Version 6 (2016) (CAA (2016) CAA Policy and Guidelines on Wind Turbines. CAP 764), will be prepared by Wind Power Aviation Consultants (WPAC) and submitted in support of the DNS application to present an analysis of the aviation issues pertinent to the Proposed Development. This will be undertaken outside of the EIA process. The report will consider effects to:

- MOD ATC Radar (RAF Shawbury)
- MOD Low Flying
- NERL Radar Issues
- Aviation Lighting.

5.3 Forestry

5.3.1 Much of the Site comprises commercial forestry, so a Forestry Assessment will be undertaken, to be submitted as a standalone report in support of the DNS application.

5.3.2 Forests are dynamic and constantly changing through landowner activities and natural events. The changes to the forest structure resulting from the incorporation of the Proposed Development will be assessed. This will include the changes to, for example, the woodland composition and felling programmes.

5.3.3 The description of the forestry baseline will include total area, species composition, age class structure, yield class, other relevant crop information, baseline felling and restocking plans, as available. The baseline will be prepared from existing records, site surveys and aerial photography.

5.3.4 Consultation with relevant interested parties, including NRW, will be undertaken in order to ensure views of relevant stakeholders are taken into account within the assessment and to ensure any proposed changes are appropriate.

5.3.5 The effects of the changes to forest design as a result of the Proposed Development will be considered within the relevant chapters of the ES. Opportunities for compensatory planting and/or habitat improvement will be outlined.

5.3.6 Potential impacts on forestry assets will be minimised where practicable during the design of the Proposed Development. Additionally, none of the activities to be

undertaken during construction, operation or decommissioning of the Proposed Development are expected to have a significant effect on forestry. Therefore, the above assessment will be undertaken outside of the EIA and forestry is proposed to be scoped out of further assessment in the ES.

5.4 Heat and radiation

5.4.1 The requirement to consider heat and radiation in UK EIA practice was introduced via the EIA Regulations 2017. Schedule 4(5)(c) of the EIA Regulations 2017 requires that an ES includes: *'A description of the likely significant effects of the development on the environment resulting from, inter alia:*

(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste.'

5.4.2 Due to the scale and nature of the Proposed Development, it is not anticipated that there will be any significant sources of heat or radiation during construction, operation, or decommissioning. The consideration of heat and radiation emissions has therefore been scoped out of further assessment and has not been considered further in this EIA Scoping Report.

5.5 Major accidents and disasters

5.5.1 The construction, operation and decommissioning of the Proposed Development will be managed within the requirements of a number of health and safety related regulations, including the Construction (Design and Management) Regulations 2015 and the Health and Safety at Work Act 1974.

5.5.2 The Site is not located in an area with a history of natural disasters, such as extreme weather events.

5.5.3 As described within **Section 6.4**, there may be a requirement to consider the risk of peat slide if deep peat (i.e. areas of peat greater than 30cm) cannot be avoided. In such a case, a Peat Slide Risk Assessment will be prepared in support of the DNS application.

5.5.4 A description of relevant safety features of the Proposed Development will be included in the ES within the description of the Proposed Development. As described in **Chapter 2** above, the Applicant is considering energy storage facilities as part of the Proposed Development. If energy storage facilities are included, the Applicant will consider the requirement for a Battery Safety Management Plan as part of the DNS application. In addition, the design will take into account the potential for adverse effects of climate change which could manifest during the design life of the wind farm (such as stormier weather, increased risk of floods etc.).

5.5.5 It is not therefore considered necessary to include a separate assessment of major accidents and/or disasters within the ES and major accidents and disasters is scoped out.

5.6 Material assets and waste

5.6.1 Material assets can be defined as "*substances used in each lifecycle stage of a development, with particular focus on the construction, operation and maintenance, and decommissioning or 'end of first life' (deconstruction, demounting, demolition and disposal) phases*" (IEMA, 2020). Material assets can include 'material' (i.e. physical resources that are used across the lifecycle of a development) and 'excavated arisings' (i.e. soil, rock, or similar resource generated by excavations).

5.6.2 Waste is defined as '*any substance or object which the holder discards or intends or is required to discard'* (IEMA, 2020). The Waste Framework Directive definition includes any substance or object that is discarded for disposal or that has not been subject to acceptable recovery (including reuse and recycling).

5.6.3 The main impacts (changes) and effects (consequences) of materials consumption and waste disposal relevant to the Proposed Development are presented in **Table 5-1**.

Table 5-1: Impacts and effects of material consumption and waste disposal relevant to the Proposed Development

Matter	Direct Impacts	Adverse Effects	Applicable Development Phase
Materials	Consumption of resources	Depletion of resources, resulting in the temporary or permanent degradation of the natural environment.	Construction and decommissioning
Waste	Generation and disposal of waste	Reduction in landfill capacity. Unsustainable use or loss of resources to landfill that results in the temporary or permanent degradation of the natural environment.	Construction and decommissioning

5.6.4 The indirect impacts associated with materials consumption and waste disposal (e.g. release of greenhouse gas emissions, water consumption, amenity impacts, ecological impacts, etc) will be assessed elsewhere within the EIA. Similarly, the indirect impacts of any off-site waste management facilities and material production facilities are expected to be assessed (and where necessary, mitigated) under the planning and permitting regime for those sites and thus do not form part of an EIA for a development that uses such facilities for material supply or waste management.

5.6.5 A description of the potential streams and volumes of construction materials and waste disposal will be described within the ES in the description of the Proposed Development. In addition, the Outline CEMP will set out how construction materials and waste will be managed on-site, and opportunities to recycle waste will be explored. Where possible, development-specific commitments for sustainable resource management will be presented within the ES.

5.6.6 As part of any detailed CEMP, there would be a requirement to develop and implement a Site Waste Management Plan (SWMP) and Materials Management Plan (MMP) in advance of the construction works.

5.6.7 It is also not intended to remove significant quantities of excavated arisings from the Site during construction (there are currently no demolition works proposed, for example). There may, however, be a need to remove some soils from the Site for treatment or disposal, if found to be contaminated, and it is not practical to treat this on-Site. However, where possible, soil arisings will be balanced through a cut and fill exercise to retain volumes on Site.

5.6.8 There will be relatively little waste produced during the operational phase and the requirement for material assets will be limited to maintenance and replacement parts, as required.

5.6.9 During decommissioning, the removal of any material assets and waste will be recycled or disposed of in accordance with good practice and market conditions at that time. If items can be recycled, this will be the first-choice option.

5.6.10 Taking the above into account, it is proposed to scope out material assets and waste from further assessment in the ES.

5.7 Population and human health

Socio-economics

5.7.1 It has been relatively common practice in the past for potential socio-economic effects of renewable energy parks to be considered within the EIA process and reported on in the ES. However, the conclusion of these assessments is often that any such effects identified fall below the threshold of being significant.

5.7.2 In the interests of focussing the ES on likely significant effects, it is therefore proposed to scope out all socio-economic effects from the ES. However, there is still an expectation at a national and local level for planning decisions to consider the social and economic aspects. Therefore, a Socio-economics Statement will be submitted in support of the DNS application to describe how the Proposed Development's socio-economic impacts are expected to benefit the local and wider community.

5.7.3 Whilst it is widely accepted that socio-economic benefits are not material considerations under the land-use planning system, decision-making authorities such as the Welsh Ministers and local planning authorities are required to take these into account as part of their mandate to ensure sustainability and well-being.

Land Use and Public Access

5.7.4 As described in **Chapter 2** above, the landcover of the Site is predominantly commercial forestry and unimproved grassland and moorland. No public rights of way cross the Site, although the Cambrian Way long distance footpath is approximately 5km to the north east at its closest point.

5.7.5 A section of the northern area of the Site encompasses some open access land, at Bancau Duon, whilst there is also open access land bordering the south-eastern boundary.

5.7.6 The Proposed Development has the potential to give rise to visual effects on users of the nearby Cambrian Way public right of way and common land. Such visual effects will be considered within the Landscape and Visual Impact Assessment (refer to **Section 6.1** below).

Human Health

5.7.7 It is not considered necessary to include a standalone human health chapter within the ES. Potential effects of the Proposed Development with respect to human health will instead be considered via other relevant assessments, including noise and vibration and traffic and transport.

5.7.8 As described above in relation to major accidents and disasters, relevant safety considerations informing the design of the Proposed Development will be described within the ES in the description of the Proposed Development.

5.8 Shadow flicker

5.8.1 Rotating wind turbine blades can cause brightness levels to vary periodically at locations where they obstruct the sun's rays. This can result in a nuisance when the shadow is cast over the windows of residential properties. This intermittent shadow is described by the term 'shadow flicker'. Shadow flicker can be a cause of annoyance at residences near onshore wind turbines if it occurs for a significant period of time during the year; however, no significant negative health effects are understood to be associated with this phenomenon (Front Public Health, 2014).

5.8.2 The likelihood and duration of shadow flicker depends upon:

- The orientation of a residential property's windows relative to the proposed wind turbines – in the UK, only residential properties within 130 degrees either side of north, relative to the proposed wind turbines, can be affected, as wind turbines do not cast long shadows on the southern side.
- Distance from the proposed wind turbines – the further the observer is from the proposed wind turbine, the less pronounced the effect would be.
- The proposed wind turbine height and rotor diameter.
- The time of year and time of day.
- Weather conditions.

5.8.3 Once the design of the Proposed Development has taken account of all known environmental and technical constraints (including the proximity of the proposed wind turbines to residential properties), a technical assessment of the potential for shadow flicker will be undertaken, with reference to the above criteria, focussing on the operational effects of the Proposed Development.

5.8.4 The technical assessment will determine whether there will be any shadow flicker effects on properties which lie within ten rotor diameters and 130° either side of north

from each of the proposed turbines. Effects will be quantified using a computer model and mitigation, if required, will be implemented.

5.8.5 There is no formal limit on the amount of shadow flicker that is considered acceptable within the UK. A typical limit, which has been utilised in Northern Ireland, Germany and Belgium, is 30 hours per year with a maximum of 30 minutes per day. If shadow flicker effects are predicted beyond this limit, mitigation may be required to eradicate the occurrence of shadow flicker.

5.8.6 In the event that it is not possible to completely remove shadow flicker effects on residential properties, the Proposed Development will include mitigation measures to reduce any effects to the limits specified above.

5.8.7 Mitigation could include a shutdown scheme which defines the times between which a wind turbine should be shut down to eliminate (or reduce to acceptable limits) shadow flicker effects on each receptor, assuming clear sunny skies. The term 'shutdown' means that the rotating blade is completely still and does not move for the period of time specified.

5.8.8 The potential impacts relating to shadow flicker will be assessed in a stand-alone report outside of the EIA process, which will be submitted in support of the DNS application. Furthermore, any potentially significant shadow flicker effects will be mitigated through the measures described above. Therefore, it is proposed to scope shadow flicker out of further assessment in the ES.

5.9 Telecommunications

5.9.1 Wind turbines have the potential to cause interference to telecommunication systems, including terrestrial fixed microwave links, terrestrial radio telemetry links, and television broadcasts.

5.9.2 With respect to terrestrial television services, any impacts can be mitigated through the simple repositioning/reorientation of antenna or the installation of alternative satellite or cable infrastructure. Given the above, it is considered that effects upon television signals do not require further consideration as part of the EIA.

5.9.3 A feasibility assessment of terrestrial fixed microwave links and terrestrial radio telemetry links has been completed for the Site. The assessment identified that due to an Airwave Solutions communication link passing through the Site, a buffer of 200m will be applied to the link. The other operators contacted (BT, Arqiva, Atkins, JRC, Vodaphone and Ericsson) confirmed that there are no communication links in the vicinity of the Site that would require any form of mitigation. Any responses received from Ofcom and Welsh Water will be checked and appropriate mitigation measures implemented if necessary.

5.9.4 Notwithstanding this, consultation with relevant link operators will continue until the design of the Proposed Development has been fixed. If no objection is received, it is proposed that the ES will simply describe any restrictions which have arisen as part of the design process. If objections are received, the process for mitigation is to engage with the stakeholder managing the link to discuss a mitigation strategy. This

process can be undertaken outside of the EIA process and therefore it is proposed to scope out telecommunications from further assessment within the ES.

5.10 References

- CAP 764 – CAA Policy and Guidelines on Wind Turbines (Version 6), Civil Aviation authority. [February 2016].
- Draft National Policy Statement for Renewable Energy Infrastructure (EN3), Department for Business, Energy and Industrial Strategy, September 2021. Available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015236/en-3-draft-for-consultation.pdf
- Guide to: Materials and Waste in Environmental Impact Assessment – Guidance for a proportionate approach. Institute of Environmental Management and Assessment (IEMA). [2020].
- Wind Turbines and Human Health. Front Public Health [2014]. Available online: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4063257/
- DCLG. Planning Practice Guidance for Renewable and Low Carbon Energy [2013]. Available online: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/225689/Planning_Practice_Guidance_for_Renewable_and_Low_Carbon_Energy.pdf

6 ENVIRONMENTAL FACTORS PROPOSED TO BE SCOPED IN

6.1 Landscape and visual

6.1.1 Consultation

No consultation to inform the landscape and visual assessment has been undertaken to date. However, dependent on the response to this EIA Scoping Report, consultation will be undertaken with NRW, Ceredigion County Council, and Carmarthenshire County Council to agree the list of representative viewpoints.

6.1.2 Study area

An initial study area of 35km from the proposed turbines within the Site is proposed to assess the relationship between the Proposed Development and the wider area in terms of potential significant effects on landscape character and visual amenity, in line with NatureScot guidance Visual Representation of Wind Farms: Version 2.2 (2017) and GN046 which advises a search area of up to 35km.

For the purpose of identifying, mapping and assessing the likely significant effects of the Proposed Development on the landscape of the Site and its immediate surroundings, a 'detailed study area' from the outer turbines will be defined. This detailed study area will be informed through on-going assessment work, but is proposed at this stage to include areas of potential visibility up to 20km from the outermost wind turbines.

The proposed study area for night-time effects is 15km from the turbines. The study area for the Residential Visual Amenity Assessment will be 2km from the proposed turbines.

The Site access corridor is not anticipated to give rise to any potentially significant landscape and visual effects, but relevant localised impacts will be identified within the assessment.

6.1.3 Data sources to inform the EIA baseline characterisation

The following references are of relevance to this EIA Scoping Report and/or the LVIA:

- Natural Resources Wales (2014) National Landscape Character.
- Natural Resources Wales LANDMAP.
- Ceredigion County Council (2014) Special Landscape Areas Supplementary Planning Guidance.
- Natural Resources Wales mapping: CRoW Open Access, Heritage Coasts, National Parks.
- Welsh Historic Environment Service (Cadw) mapping: Registered Historic Landscapes, Registered Historic Parks and Gardens.
- Ordnance Survey mapping datasets and products: 1:250,000 raster, 1:50,000 raster, Open Map Local, Terrain 50.
- Sustrans mapping: National Cycle Network.

6.1.4 Surveys to inform the EIA baseline characterisation

The site visit, informed by the Zone of Theoretical Visibility (ZTV), in addition to desk-based studies has enabled the identification of a proposed selection of viewpoints for the LVIA. The proposed viewpoints are listed below and shown on **Figures 6.1 to 6.4** in **Appendix D**.

Following scoping and agreement with consultees regarding the final selection of viewpoints, further surveys will be undertaken within the detailed study area (20km from the outermost wind turbines) and at any locations in the wider search area where significant landscape and visual effects may occur. Viewpoint photography will be undertaken to record the baseline landscape and views towards the Site. A 360 degree sweep of photography will be taken at each viewpoint location.

VP	Location	Indicative OS Grid Reference		Distance and direction (from nearest turbine)	Receptors
1	Bridleway 48/20	266811 E	254410 N	2.1km North-west	Residents, public right of way users, road users
2	Cistercian Way, Llanddewi Brefi	266298 E	255605 N	3.4km North-west	Settlement, public right of way/Cistercian Way users
3	Nantyrast	270763 E	248252 N	4.2km South-east	Settlement, road users
4	Public right of way (intersection of 48/28 and 48/29	273982 E	252852 N	4.7km East	Public rights of way users
5	Coed-y-Gof/public footpath 48/12	263969 E	254981 N	4.8km West-north-west	Settlement, public rights of way users, road users
6	Capel Mair/Llanfair Clydogau	262201 E	251426 N	5.8km West	Settlement, cyclists (NCR 82), road users
7	Cistercian Way, Olmarch	262452 E	255055 N	6.2km West-north-west	Settlement, Cistercian Way users, road users
8	Stags Head	264081 E	258983 N	7.4km North-west	Settlement, caravan park, road users
9	Tregaron	267893 E	260166 N	7.4km North	Settlement, road users
10	Public Footpath 54/5, Llangybi	260074 E	252786 N	7.9km West	Settlement, public rights of way users
11	Cwmann	258671 E	247245 N	10.5km South-west	Settlement

12	Lampeter	256877 E	248131 N	11.8km West-south-west	Settlement, road users
13	Coast to Coast route	280703 E	249419 N	11.8km East-south-east	Coast to Coast users, road users
14	Banc Gwyn	274221 E	266939 N	15.1km North-north-east	Recreational – walkers (Borth to Devil's Bridge to Pontrhydfendigaid Trail)
15	Hafod Ithel	261060 E	267790 N	16.6km North-north-west	Recreational – walkers in Open Access Land and using local public rights of way (also selected for cumulative views)
16	Bannau Brycheiniog National Park	279108 E	228970 N	25.5km South-east	Users of Open Access Land on or close to the Cistercian Way

6.1.5 Baseline conditions

In general, the Site occupies a forested area within an upland landscape of largely open moorland and pasture with some forestry, 2.5km south-east of Llanddewi Brefi and 5km north-east of Llanfair Clydogau. It is located at the western edge of the Cambrian Mountains.

The wider landscape is characterised by small to large scale undulating hills and pasture with some blocks of commercial forestry within and to the east and south of the Site. To the north and east there are rolling plateau uplands with large areas of forestry and deep valleys that take a generally east-west alignment as they transition from upland to lowland valleys. The main transport routes and settlements are found in the Teifi river valley to the east and north of the Site, where deciduous woodlands, coniferous plantations and hedgerow boundaries create a complex rural landscape.

To the west and south, settlement is largely absent or sparsely distributed and confined to individual or small groups dwellings and farmsteads. The main settlements in the wider area are Tregaron (north-west) and Lampeter (south-west), with other smaller settlements such as Llanddewi Brefi and Llangybi occupying positions on the main roads through the Teifi river valley (the A485 and B4343).

The inclusion of the Site in Pre-Assessed Area 6 indicates in principle that a large-scale wind energy development can be accommodated in the landscape of this area subject to a detailed assessment of effects arising from development. Future Wales Policy 17 states 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 (including repowering) in these areas, subject to the criteria in policy 18.*" In relation to landscape and visual impact of schemes within pre-assessed areas Policy 18 advises that development will be permitted providing "*there are no unacceptable adverse visual impacts on nearby communities and individual dwellings*". Policy 18 also indicates that "*The cumulative impacts of existing and consented renewable energy schemes should also be considered*".

Taking this into account, a proportionate assessment approach will be taken to the LVIA – focussing on significant landscape effects and primarily on visual effects, taking account of cumulative development, which includes Llangwyryfon wind farm.

In pre-assessed areas, effects on landscape character are generally considered acceptable, indicating that while effects may be significant such effects may also be considered acceptable by the determining authority. However, an obligation remains under the EIA Regulations to report effects which are likely to be significant. In this policy context, a proportionate scope of assessment is proposed below - focussing on those effects on landscape character and designations which are likely to be significant but also defining the geographical extent of significant effects through an evaluation of effects that are not significant.

Landscape character context

The Site coincides with National Landscape Character Area (NLCA) 21: Cambrian Mountains. NLCA 21 is described as an *'extensive upland plateau, being an inland spine that divides western and eastern river catchments and forms one of the most extensive and tranquil areas of Southern Britain… the abundance in some areas of reservoirs, forestry and wind farms, together with the legacy land cover from extensive plateau sheep rearing, reminds us of the significant effects of human activity on the overall character of the area."*

Whilst forestry is a key influence in the area to the east of the Site, the woodland that is widely distributed to the west tends to form much smaller areas with the exception of plantations close to the uplands of Mynydd Bach. Wind farm development within the proposed 20km study area is not a key influence, and apart from Llangwyryfon wind farm approximately 16km to the north-north-west, there is a scattering of one or two turbine developments, largely associated with farms, to the west and north of the Site.

Visual amenity

The Site is in a relatively sparsely settled area of open moorland and forested upland on the slopes of Bryn Brawd, the highest hill in the locality. Effects on the adjacent valleys and uplands are a key consideration.

The area within 5km of the Site includes only one settlement of note, Llanddewi Brefi approximately 2.5km to the north-west. Dispersed farms and individual dwellings occur occasionally, mainly within the valley and tributary valleys of the Teifi river. The small town of Tregaron is located approximately 5.6km to the north of the Site, and the villages of Stags Head (to the north-east) and Llangybi (to the west) are approximately 7.3km and 7km from the Site respectively.

Roads are mainly limited to the lower valley floors to the west of the Site. The main road running within approximately 5km of the Site is the B4343, which connects directly to the A485 at Tregaron, approximately 6km north of the Site. The B4343 also has an indirect connection to the A road via a minor road at Llanddewi Brefi to the north-east. Llanddewi Brefi is also at the centre of a network of local roads to the west of the Site, which also includes the track that leads to and passes through the Site.

Both the Cistercian Way long distance route and National Cycle Route 82 pass to the north-west within 5km of the Site, converging and immediately diverging at Llanddewi Brefi.

A review of the Ceredigion County Council interactive Rights of Way map and OS mapping shows that there are numerous public rights of way between the south-west and north of the Site, with the closest being located approximately 2.6km from the Site. A few public rights of way are located to the east of the Site, beyond large areas of plantation forestry. Of those within 5km of the Site, the closest is located approximately 3.3km from the closest turbine. Of the other long-distance routes (walking and NCRS) within the detailed 20km study area, the Coast to Coast is the most proximate to the Site, located approximately 9.4km at its closest point.

In addition, large areas of Open Access Land lie within the 5km of the Site and beyond. The closest of these abuts the Site's south-eastern section of boundary.

Landscape designations

The Bannau Brycheiniog National Park (formerly Brecon Beacons) is the nearest nationally designated landscape and is located approximately 19km south-east of the Site. As illustrated in **Figure 6.3** in **Appendix D**, there would be pockets of visibility from this designated landscape.

Special Landscape Areas (SLA) 7 Teifi Valley and 13 Southern Uplands are located to the west and north and east and south of the Site respectively. SLA 13 abuts the Site's southern boundary, while SLA 7 is located at its closest point approximately 0.5km to the north of the Site. Other SLAs within 20km of the Site are SLAs 8 Aeron Valley, 9 Wyre Valley and 12 Northern Uplands.

Landscapes designated for their heritage interest within 20km of the Site include four Landscapes of Historic Interest and several Registered Historic Parks and Gardens including Derry Ormond, located 8km to the west of the Site.

6.1.6 Additional (secondary and tertiary) mitigation

The primary form of mitigation for landscape and visual effects is through iterative design of the layout of the turbines and infrastructure. Design development will be set out in detail in the design strategy that will form part of the ES.

Opportunities for additional second and tertiary mitigation measures within the Site boundary are likely to be limited.

6.1.7 Description of likely significant effects

In line with national policy, as discussed in **Section 6.1.5** above, it is proposed that the scope of assessment focuses only on those effects likely to be significant.

Figure 6.3 in **Appendix D** shows the proposed turbine locations, the character areas and the ZTV.

It is judged that significant direct effects may arise on the host character area NLCA 21: Cambrian Mountains.

It is judged that limited significant effects may arise on character area NLCA 25: Bro Ceredigion, an upland area of lesser height that the host character area and of similar but not identical character. They are separated by NLCA 40: Teifi Valley, at a distance ranging from approximately 2km to 5km. Any significant effects would be localised and based on proximity to the host area. Effects would diminish rapidly with increasing distance from the Site.

It is also judged that some limited significant effects may arise on the neighbouring character area NCLA 40: Teifi Valley. The ZTV shows that visibility of the Proposed Development would be limited or absent at the edges of both NLCAs. Within NLCA 40: Teifi Valley, it is the rising ground transitioning to area NLCA 25: Bro Ceredigion, where views are wide and open, that would experience notable indirect effects.

In both cases, these effects are likely to be localised.

Bannau Brycheiniog National Park is 19km to the south and there is limited potential for significant effects on its special qualities.

6.1.8 Receptors/elements to be scoped into further assessment

Taking account of the findings of the work undertaken to date whilst still adopting a precautionary approach at this preliminary stage, the receptors that will be assessed in the EIA are described below.

Receptor/Element	Phase	Justification
NLCA 21: Cambrian Mountains	Construction and operation	Potential for significant effects on landscape character
NLCA 25: Bro Ceredigion	Construction and operation	Potential for significant effects on landscape character
NLCA 40: Teifi Valley	Construction and operation	Potential for significant effects on landscape character
Bannau Brycheiniog National Park	Construction and operation	Potential for significant effects on special qualities of designated area
Special Landscape Area 7 Teifi Valley	Construction and operation	Potential for significant effects on special qualities of designated area
Special Landscape Area 13 Southern Uplands	Construction and operation	Potential for significant effects on special qualities of designated area
LCA 19: Carno Valley	Construction and operation	Potential for significant effects on landscape character
Local residents (including local farmsteads and residential properties) within 2km	Construction and operation	Potential for significant effects on visual amenity of local residents primarily during operation. Not all receptors in this area are likely to experience significant visual effects.
Residents of settlements Llanddewi Brefi, Llanfair Clydogau, Llangybi, Stags Head, Tregaron and others within 10km	Construction and operation	Potential for significant effects on visual amenity of people in settlements primarily during operation. Not all receptors in this area are likely to experience significant visual effects.
Local road users within 10km of the proposed turbines	Construction and operation	Potential for significant effects on visual amenity of road users in the surrounding area primarily during operation. Not all receptors in this area are likely to experience significant visual effects.
Users of recreational resources (e.g. walkers and cyclists using the long distance /national routes of NCR 82, Cistercian Way, Coast to Coast and	Construction and operation	Potential for significant effects on visual amenity of users of recreational resources in the surrounding landscape primarily during operation.

Heart of Wales; and users of public rights of way and open access land within 10km of the proposed turbines)		Not all receptors in this area are likely to experience significant visual effects.

6.1.9 Receptors/elements to be scoped out of further assessment

On the basis of the work undertaken to date, the national policy context, the professional judgement of the assessment team and experience from similar projects and consultation responses, it is proposed that the following receptors can be scoped out (within the proposed detailed 20km study area).

Receptor/Element	Phase	Justification
NCLA 23: Banwy Valley	Construction and operation	As illustrated in **Figure 6.4** in **Appendix D**, there would be limited visibility of the Site from this character area, or the turbines would not notably add to effects arising from the existing and consented wind farms.
NCLA 24: Trannon	Construction and operation	As illustrated in **Figure 6.4** in **Appendix D**, whilst there would be some visibility of the Site from this character area, the proposed turbines would not notably add to effects arising from the existing and consented wind farms.
NCLA 27: The Vales of Irfon and Ithon	Construction and operation	As illustrated in **Figure 6.4** in **Appendix D**, there would be limited visibility of the Site from this character area, or the turbines would not notably add to effects arising from the existing and consented wind farms.
NCLA 28: Epynt Plateau and Valleys	Construction and operation	As illustrated in **Figure 6.4** in **Appendix D**, there would be limited visibility of the Site from this character area, or the turbines would not notably add to effects arising from the existing and consented wind farms.
NCLA 33: Gwendraeth Vales	Construction and operation	As illustrated in **Figure 6.4** in **Appendix D**, there would be limited visibility of the Site from this character area, or the turbines would not notably add to effects

		arising from the existing and consented wind farms.
NCLA 41: Tywi Valley	Construction and operation	As illustrated in **Figure 6.4** in **Appendix D**, there would be limited visibility of the Site from this character area, or the turbines would not notably add to effects arising from the existing and consented wind farms.
NCLA 42: Pembroke and Carmarthen Foothills	Construction and operation	As illustrated in **Figure 6.4** in **Appendix D**, there would be limited visibility of the Site from this character area, or the turbines would not notably add to effects arising from the existing and consented wind farms.
Special Landscape Areas beyond 10km from the Site	Construction and operation	Where there is limited theoretical visibility from SLA, these will be scoped out.
National Cycle Routes 43, 70, 81 and 820	Construction and operation	As illustrated in **Figure 6.3** in **Appendix D**, there would be limited or no visibility the from these routes.
All receptors	Decommissioning	Any effects experienced during decommissioning are not expected to be worse than those experienced during the construction phase. Therefore, effects during the decommissioning phase will not be considered to avoid potential repetition of assessment.
Cumulative – small developments	Construction and operation	Turbines below 50m will only be considered within a 5km radius of the Proposed Development and are scoped out of further assessment beyond this distance.

6.1.10 Opportunities for enhancing the environment

There may be opportunities to contribute to habitat enhancement design. Further detail will be provided in the Draft ES and/or Final ES as the design of the Proposed Development progresses.

6.1.11 Proposed assessment methodology

The LVIA will inform modifications and refinements to the layout design and will be undertaken following the approach set out in Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3).

Landscape character assessment

Given that there is no local landscape character assessment to which reference can be made, it is proposed that the National Landscape Character Areas (NRW) character areas are included within the LVIA, supplemented with information from survey observations.

Value and sensitivity judgements will be informed by LANDMAP and Technical Guidance Note 02/21 Assessing landscape value outside national designations (Landscape Institute, 2021).

In line with national policy, as discussed in **Section 6.1.5** above, it is proposed that the scope of assessment focuses only on those effects likely to be significant. Clear and transparent justification will be provided for those receptors scoped out i.e. non-significant effects.

LANDMAP

The LANDMAP findings for the areas identified for assessment above will be used to inform considerations of sensitivity. The filtering approach recommended by Guidance Note 046 Using LANDMAP in LVIA (NRW, 2021) will be applied to areas within the pre-assessed area using LANDMAP data.

Visual assessment

The assessment will be a receptor group-based assessment. The assessment will include potential effects on settlement areas and routes, including roads, railway lines, walking and cycle routes within the detailed 20km study area where potential visibility is indicated by the ZTV (see **Figures 6.1 to 6.4** in **Appendix D**). The assessment will focus on those receptors where there may be the potential for significant effects, which is likely to be those within the detailed 20km study area, though outlying receptors may be selected due to their importance.

Viewpoints

The list of viewpoint locations is shown in the table in section 'Surveys to inform the EIA baseline characterisation' and illustrated on **Figures 6.1 to 6.4** in **Appendix D**.

Some viewpoints, particularly those beyond 20km, may be illustrated with wireframes only. Grid references are indicative at this stage; viewpoints will be subject to field survey verification and may be moved slightly to obtain a clearer or more representative view, whilst remaining as close as possible to the receptor group and location proposed in the viewpoint table.

Visualisations

The assessment will be supported by a series of photomontages and wireframes from agreed viewpoint locations. Visualisations from each viewpoint will be prepared in accordance with NatureScot (formerly SNH) guidance Visual Representation of Windfarms: Version 2.2 (2017) and Technical Guidance Note 6/19 Visual Representation of Development Proposals (Landscape Institute, 2019).

Photomontages will be prepared for viewpoints mainly within a 20km radius or further if it is necessary to include a notable recognised viewpoint. Ancillary elements such as tracks, sub-station, battery energy storage and control buildings will only be shown from close viewpoints where these will be discernible and have a bearing on the assessment of effects. From more distant viewpoints, ancillary elements would likely only be visible as minor elements.

Cumulative assessment

The assessment will consider other wind farms within the detailed 20km study area in line with NatureScot guidance Assessing the Cumulative Impact of Onshore Wind Energy Developments (2021).

An initial cumulative search will be undertaken for a 35km study area and all other wind farm developments identified. Turbines under 50m in height will only be included where they lie within 5km of the proposed turbines. The proposed scope of the cumulative assessment will focus on where there may be likely significant effects which may influence the outcome of the consenting process. It is therefore likely that the cumulative assessment will focus on developments within 20km of the Proposed Development.

Operational and consented Sites will form part of the baseline and future baseline respectively for the assessment.

Night-time assessment

Turbines of 150m or greater tip height would require visible aviation lighting. The Lighting Strategy will form the basis of the assessment and visual material presented. An assessment of night-time impacts on landscape and visual receptors will be carried out and included in the LVIA.

The proposed study area for night-time effects is 15km from the turbines. The assessment will be supported by a ZTV study illustrating the extent of visibility of the lights and the number of lights visible. The consideration of night-time effects on landscape receptors will be informed by in the field assessment and satellite mapping of existing light levels and the character and special qualities of the landscape receptors at night. Visualisations will consist of wireline diagrams indicating the number of lights likely to be visible and by photomontages from receptor groups most likely to be affected. These are areas where people are likely to be during hours of darkness (typically around settlements) and nearby Dark Sky Parks or Dark Sky Discovery Sites. There are three Dark Sky Discovery Sites (according to) located within 15km of the Site: Dolgoch Hostel, Llyn Brianne Car Park and Tyncornel Hostel, all of which are located to the east of the Site. The ZTV indicates that there would be no views of the Proposed Development from these locations. The closest Dark Sky Discovery Site within the Bannau Brycheiniog National Park is the Trecastle Usk Reservoir Car Park, 27km to the south-east of the Site. Here too, the ZTV indicates that there would be no visibility of the Proposed Development.

Within the 15km study area, key night receptors include the settlements identified in **Section 6.1.5** above.

Wireline diagrams will be prepared from selected viewpoints likely to be visited at night, within 15km of the turbines and included in the LVIA.

Previous work has established that night photomontages are of limited value in representing effects due to the difficulties of fully representing the brightness of lights on paper/screen. Up to three will be provided representing the most affected receptors in a range of distances and directions. These will be confirmed with consultees once initial assessment work has been completed.

Residential visual amenity assessment

A separate assessment of the effects on residential visual amenity will be undertaken as a standalone appendix/document. This will be undertaken in line with Landscape Institute Technical Guidance Note 2/19: Residential Visual Amenity Assessment (RVAA).

The study area for the RVAA will be 2km from the proposed turbines.

6.1.12 Difficulties and uncertainties

No difficulties or uncertainties regarding the landscape and visual assessment have been identified at this stage.

6.1.13 References

- Ceredigion Local Development Plan 2007-2022 Volumes 1 (Strategy and policies) and 2B (Proposals Map).
- Ceredigion Local Development Plan 2007-2022 Supplementary Planning Guidance Renewable Energy.
- Ceredigion Local Development Plan 2007-2022 Supplementary Planning Guidance Special Landscape Areas.
- Ceredigion Rights of Way Map available at: https://www.ceredigion.gov.uk/resident/coast-countryside/public-rights-of-way/the-definitive-map-public-right-of-way-registers/rights-of-way-map/ (Accessed 20 April 2023).
- Landscape Institute and Institute of Environmental Management & Assessment (2013), Guidelines for Landscape and Visual Impact Assessment, Third Edition.
- Natural Resources Wales (2023) LANDMAP. Available at: https://smnr-nrw.hub.arcgis.com/ (Accessed 20 April 2023).
- Natural Resources Wales (2013) Using LANDMAP in Landscape and Visual Impact Assessments GN46. Available at: https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/evidence-to-inform-development-planning/using-landmap-in-landscape-and-visual-impact-assessments-gn46/?lang=en (Accessed 20 April 2023).
- Scottish Natural Heritage (2017) Visual Representation of Wind Farms (Version 2.2)

6.1.14 Scoping questions

- Do you agree with the proposed consultees? Are there any other relevant parties who should be included within the post-scoping consultation process for the LVIA?
- Do you consider the size of the detailed 20km radius study area to be appropriate?
- Do you agree that the data sources listed to inform the EIA baseline characterisation are appropriate?
- Do you agree that the surveys proposed to inform the EIA baseline characterisation are appropriate?
- Is the proposed scope for the assessment of effects on landscape character considered to be proportionate and adequate to consider all potentially significant effects?
- Is the proposed scope for the assessment of effects on designated landscapes considered proportionate and adequate to consider all potentially significant effects?
- Do you consider that the proposed viewpoints are appropriate to inform the visual assessment, and that the suggested presentation of visualisations is proportionate? If not, please identify any alternative locations which you consider sensitive and requiring assessment.
- Is the approach to inclusion of schemes within the cumulative assessment appropriate?
- Is the scope of the assessment of effects on residential visual amenity appropriate?
- Is the scope of the night-time impact assessment proportionate and adequate to consider likely significant effects?
- Do you have any suggestions (taking account of the ZTV study shown in **Figures 6.1 to 6.4** in **Appendix D**) for night-time viewpoints that merit photomontages? These should

be publicly accessible locations at which people may be present during hours of darkness, and sensitive to changes in the lighting environment.

- Do you have any specific concerns regarding potential landscape and visual impacts that are not covered by the proposed scope of assessment?
- Do you agree with the proposed receptor-group specific assessment approach?

6.2 Terrestrial ecology

6.2.1 Consultation

Consultation with Mid Wales Red Squirrel Partnership (MWRSP) was undertaken in September 2022, during which data on the presence of Important Link Regions for red squirrels within and adjacent to the Site was obtained. A review of publicly available records on the MWRSP Red Squirrel Sightings Map was also undertaken.

No other consultation has been undertaken to date with regards to the availability of existing ecological information, the scope of baseline studies and initial concerns relating to the Proposed Development and impacts upon ecological interests.

Consultation with the following organisations will be undertaken to identify existing ecological information and which will be used refine the scope of baseline studies and assessment:

- NRW;
- Vincent Wildlife Trust;
- West Wales Biodiversity Information Centre; and,
- South and West Wales Wildlife Trust.

Further consultation with Mid Wales Red Squirrel Partnership, as necessary.

6.2.2 Study area

Study areas for existing ecological baseline information will be adopted as follows:

- Statutory designated sites for nature conservation with cited ecological qualifying features, including Special Areas of Conservation (SACs), Candidate SACs (cSACs), Sites of Special Scientific Interest (SSSIs), Ramsar sites, within 5km, extended to 10km for European sites (i.e. SACs, cSACs and Ramsar sites) with qualifying bat features;
- Non-statutory designated sites for nature conservation with cited ecological qualifying interests e.g. Wildlife Sites, Sites of Interest for Nature Conservation (SINC) and/or Local Wildlife Sites within 2km; and,
- Existing records of protected and notable faunal species and habitats, including those listed as UKBAP Priority Habitats or Species and/or as habitats or species of principal importance in Wales i.e. listed on Section 7 of the Environmental (Wales) Act 2017, within 2km of the Site, extended to 10km for bat species records.

Survey areas for baseline ecological surveys will be adopted as follows, and where appropriate have been established with reference to current industry standard guidance, in the absence of Welsh-specific guidance:

- Habitats and vegetation surveys: Site + 250m (where access allows), to aid in the identification of potential groundwater dependent terrestrial ecosystems (GWDTEs) for further hydrological assessment (see **Section 6.7** below);

- Protected terrestrial mammal surveys: Site + 250m (where access allows) with reference to species-specific methodologies outlined in current NatureScot guidance (2022) on surveys to inform developments which may impact upon species listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), including for badger[1], pine marten[2], otter[3] and water vole[4];
- Bat activity surveys: Site. Static detectors deployed as close as possible to proposed turbine locations and/or area of turbine interest and following Joint Agency guidance (NatureScot, 2021);
- Bat roost potential survey: Site + 200m + blade length (where access allows) for assessment of bat roost potential and following Joint Agency (NatureScot, 2021) and Bat Conservation Trust (BCT) guidance (Collins, 2016); and,
- Great crested newt survey: Site + 250m (where access allows) for presence/absence surveys using environmental DNA sampling in accordance with Defra guidance (Biggs *et al*., 2014).

Where required, study areas will be updated to account for any changes to the design of the Proposed Development and ensure baseline ecological information is collected in accordance with current industry guidance.

6.2.3 Data sources to inform the EIA baseline characterisation

Key sources of existing ecological information will include those provided by, but not limited to:

- NRW;
- MAGIC[5];
- West Wales Biodiversity Information Centre;
- Vincent Wildlife Trust;
- South and West Wales Wildlife Trust; and,
- Mid Wales Red Squirrel Partnership.

Additional relevant peer reviewed literature, guidance and other publications will also be reviewed and referenced where appropriate within the assessment.

Publicly available documentation for the nearest wind farm proposal, where this is available at the time of assessment, will also be reviewed.

6.2.4 Surveys to inform the EIA baseline characterisation

In the absence of specific guidance published for Wales, it is acknowledged within current industry standard advice (NatureScot, 2020) that there are some species that, with standard mitigation, are unlikely to experience significant environmental effects during construction/operation of onshore wind farms (e.g. moths and other invertebrates, reptiles, and amphibians). In accordance with the principles of proportionate EIA, such species will not require surveys to inform the EIA, but instead mitigation can be applied to minimise potential effects and avoid committing offences under relevant wildlife legislation. Further justification on the scoping out of species from the requirement for baseline studies and detailed assessment is presented in **Section 6.2.9** below.

[1] https://www.nature.scot/doc/standing-advice-planning-consultations-badgers

[2] https://www.nature.scot/doc/standing-advice-planning-consultations-pine-martens

[3] https://www.nature.scot/doc/standing-advice-planning-consultations-otters

[4] https://www.nature.scot/doc/standing-advice-planning-consultations-water-voles

[5] https://magic.defra.gov.uk/MagicMap.aspx

Where changes to the Proposed Development occur over the course of EIA, study areas will be reviewed, and surveys updated where necessary to ensure sufficient information is obtained to inform scheme design and enable a robust impact assessment to be undertaken.

Surveys undertaken in 2022

Methods for the ecological field surveys undertaken in 2022 are summarised below. Full details of all survey methods will be provided in the ES.

Phase 1 habitat survey

A Phase 1 habitat survey was undertaken in the Autumn of 2022. The methodology followed the UK industry standard Joint Nature Conservation Committee (JNCC) Phase 1 Habitat Methodology (JNCC, 2010) and was extended to include the recording of signs indicative of the presence or potential presence of protected and notable terrestrial mammals, amphibians and reptiles in accordance with good practice guidance (CIEEM, 2017).

National Vegetation Classification (NVC) survey

An NVC survey was undertaken in the Autumn of 2022, following the Phase 1 habitat survey, to further identify vegetation communities of notable importance, including potential habitats listed on Annex 1 of the Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (i.e., Habitats Directive) and/or as UKBAP Priority Habitats and/or as habitats of principal importance in Wales i.e. listed on Section 7 of the Environmental (Wales) Act 2017, and habitats with potential groundwater dependence to inform further hydrological assessment (see **Section 6.7** below). The survey methodology followed UK industry standard JNCC guidance (Rodwell, 2006[6]).

Surveys to be undertaken in 2023

The following baseline ecological field surveys will be undertaken in 2023.

Protected terrestrial mammal surveys

On the basis of habitat suitability, and the potential for species presence, targeted searches for otter, pine marten, water vole and badger will be undertaken, following species-specific walkover methodologies detailed within NatureScot guidance (2022).

Bat activity surveys

Bat activity surveys will follow current UK industry standard Joint Agency guidance (2021). The methodology will employ ground-level static surveys and capture 10 suitable monitoring nights in each of spring (April-May), summer (June-mid-August) and autumn (mid-August-October). Monitoring will be focused in those parts of the Site where turbines are most likely to be located, with detectors placed at all turbine locations (if known), and where possible, include sampling of bat activity within open areas to provide an indication of how bats may adapt to and use new habitats created through turbine construction (i.e. woodland clearance).

Bat roost surveys

A ground level daytime inspection of features that could support maternity roosts and significant hibernation and/or swarming sites within the study area will be undertaken to inform the potential requirement for targeted presence/absence surveys. Where such features are identified, presence/absence surveys would be undertaken to establish the presence or absence of roosts and, if bats are present, the species and numbers (or estimated numbers) using methodologies and effort detailed in current industry standard Joint Agency (NatureScot, 2021) and BCT guidance (Collins, 2016).

Great crested newt surveys

eDNA sampling to detect the presence/absence of great crested newts within suitable waterbodies will be undertaken in accordance with current industry standard Defra guidance (Biggs, 2014). Samples will be undertaken between 15 April and 30 of June, by a suitably licenced

[6] Rodwell, J. S. (2006). National Vegetation Community Users' Handbook. JNCC, Peterborough.

ecologist. A Habitat Suitability Index (HSI) assessment of all suitable waterbodies identified will also be undertaken, following industry standard guidance (Oldham *et al*., 2000).

Access track route ecological walkover

An additional ecological walkover survey will be undertaken of the access route + 100m buffer. The methodology will follow UK industry standard JNCC Phase 1 Habitat Methodology (JNCC, 2010) and will be extended to include the recording of signs indicative of the presence or potential presence of protected and notable terrestrial mammals, amphibians and reptiles in accordance with good practice guidance (CIEEM, 2017).

6.2.5 Baseline conditions

Baseline ecological studies are currently ongoing (refer to **Section 6.2.4** above). Full details of baseline survey and desk study methodologies and results will be presented within the ES, associated technical appendices and figures. Information relating to the presence and/or potential presence of the breeding and/or resting places of protected species and/or information received from third parties and marked as restricted, will be presented within a Confidential Volume of the ES, made available to NRW and the Welsh Government on request and subject to data sharing agreements where applicable.

Designated sites for nature conservation

Afon Teifi SSSI – (c. 300m north of the Site) designated for its range of river plant communities (including those characterised by water crowfoot), associated riverside habitats (including marshy grassland, swamp, saltmarsh and broad-leaved woodland, nutrient-poor, mildly acidic upland lakes (the Teifi Pools)), fish (including Atlantic salmon, bullhead, and three species of lamprey), otter, range of unusual flowering plants (including floating water plantain, northern yellow-cress and multi-fruited river moss), rare and scarce insects and other invertebrates (including club-tailed dragonfly and freshwater pearl mussel), breeding river and wetland birds, and bottle-nosed dolphins. Ten tributaries; the Cych, Clettwr, Grannell, Ceri, Dulas, Piliau, Groes, Tyweli, Cerdin and Brefi, are also included in the designation;

Afon Teifi/River Teifi SAC – (c. 300m north of the Site) designated for its bullhead, river lamprey, brook lamprey, floating water plantain, otter, Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*, sea lamprey, Atlantic salmon and watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation.

Figyn Blaen-Brefi SSSI – (c. 2.1km north east of the Site) designated for its blanket mire features.

Cwm Doethie - Mynydd Mallaen SSSI (c. 4km south of the Site) – designated for its semi-natural broad-leaved woodland, species rich neutral grassland, dry heathland, blanket bog, cliff ledge plants, upland birds (including red kite, merlin, red grouse, ring ouzel, pied flycatcher, redstart and wood warbler), assemblage of rare mosses, liverworts and lichens.

Cwm Doethie - Mynydd Mallaen SAC (c. 4km south of the Site) – designated for its European dry heaths and Old sessile oak woods with *Ilex* and Blechnum in the British Isles.

Rhosydd Bryn-maen SSSI (c. 4.5km west of the Site) – designated for its species-rich neutral grassland, unimproved acid grassland, marshy grassland, marsh fritillary butterfly, lilljeborg's whorl snail and oxbow diving beetle.

Glanrhocca SSSI (c. 4.6km west of the Site) – designated for its species-rich neutral grassland, purple moor-grass meadows on calcareous, peaty or clayey-silt-laden soils, marsh fritillary butterfly and mixture of habitats, including dry acid grassland acidic marshy grassland.

Allt Rhyd Y Groes NNR – (c.4.7km east of the Site) noted for its oak woodlands, heathland grassland and bog habitats, which support rare and special wildlife species including birds.

There are no additional European sites identified within 10km of the Site, with bat qualifying features.

Non-statutory designated sites within proximity to the Site will be identified through existing data sources, and details provided in the ES.

Habitats and vegetation

The Site predominantly comprises compartments of planted coniferous woodland (A.1.2.2) typically of low ecological value and not comprising protected or notable habitats. Small areas of semi-natural broad-leaved woodland (A1.1.1) were recorded outwith the Site boundary to the north and south, together with very small, isolated areas of dense scrub (A2.1) within the southern extent of the Site.

Areas of potentially higher ecological value comprising grassland, marsh and mire habitats (including B1.1, B1.2, B2.1, B5, E1.7, E1.8, E2.1 and E3.1) also occur, primarily to the peripheries of the Site and study area, with small areas of heathland habitats also recorded within the study area (including D1.1, D2, D5 and D6). These areas have been subject to targeted NVC survey and which has classified a range of heath, mire, mesotrophic and calcifugous grassland communities.

Protected terrestrial mammals

No signs indicative of the presence or potential presence of protected and notable terrestrial mammals were recorded during the Phase 1 habitat survey in 2022; however, a number of habitat features with the potential to support badger, otter and water vole were identified.

Pine martens remain a rare species in Wales however, the potential for presence has been considered with reference to the translocation population reinforcement project undertaken by the Vincent Wildlife Trust between 2015-2017 in mid-Wales.

The presence of red squirrels in proximity to the Site, including within connected woodlands, is identified in a review of Mid Wales Red Squirrels sightings (2023). This includes verified, reported and trail camera records from as recently as 2019. The species presence, including the presence of dreys within woodland habitats of the Site, can be confidently assumed and population densities assigned where relevant with reference to Annex II 'Squirrel population density in different UK woodland types' of Forestry Commission guidance (Forestry Commission 2023), in the absence of comparable industry standard guidance for Wales.

The presence of dormice in proximity to the Site is considered highly unlikely and with reference to the fourth UK Habitats Directive Report (JNCC, 2019)[7], the species is considered rare, with restricted populations in Wales. Habitats within the Site, predominantly comprising commercially managed coniferous plantation woodland, can be also assessed as providing unfavourable features for the species with reference to Welsh guidance on woodland management for the species (NRW, 2010)[8]. Areas potentially of higher value habitat, including broad-leaved woodland and scrub within the Site are present, but are isolated and very small, being highly unlikely to support dormice.

With reference to the fourth UK habitats Directive Report (JNCC, 2019)[9], the Site falls within the range of the following bat species:

- Lesser horseshoe bat
- Greater horseshoe bat
- Common pipistrelle
- Noctule
- Soprano pipistrelle

[7] https://jncc.gov.uk/jncc-assets/Art17/S1341-WA-Habitats-Directive-Art17-2019.pdf

[8] https://cdn.cyfoethnaturiol.cymru/media/683856/dormouseguidancewalessept2010v2.pdf

[9] https://jncc.gov.uk/our-work/article-17-habitats-directive-report-2019-species/

- Leisler's bat
- Whiskered bat
- Serotine
- Brown long-eared
- Natterer's bat
- Brandt's bat
- Nathusius pipistrelle.

6.2.6 Additional (secondary and tertiary) mitigation

The requirement for any additional (secondary or tertiary) mitigation measures in relation to ecological features will be identified over the course of baseline studies to ensure legislative compliance with regards the protection afforded to these species under the Conservation (Natural Habitats, &c.) Regulations 1994 (the Habitats Regulations) (as amended) and the Wildlife and Countryside Act 1981 (as amended), as relevant.

6.2.7 Description of likely significant effects

There is potential for significant effects to occur upon the following important ecological features as a result of the construction, operation and decommissioning of the Proposed Development:

- Statutory designated sites: including direct and indirect impacts during the construction phase of the Proposed Development to qualifying features of such sites within 2km of the Site during the construction and decommissioning phases of the Proposed Development, where potential impact pathways are identified;
- Non-statutory designated sites: including direct and indirect impacts to qualifying features of such sites within 2km of the Site during the construction and decommissioning phases of the Proposed Development, where potential impact pathways are identified;
- Habitats and vegetation: including direct (i.e. derived from land-take from all infrastructure) and indirect effects (i.e. changes caused by effects to supporting systems such as groundwater or overland flow) upon examples of Annex 1 habitats, UKBAP Priority Habitats and/or as habitats of principal importance in Wales i.e. listed on Section 7 of the Environmental (Wales) Act 2017 and/or habitat types with the potential to represent Groundwater Dependent Terrestrial Ecosystems (GWDTEs) during the construction and decommissioning phases of the Proposed Development; and
- Bats: including direct (e.g. loss of life; loss/severance of habitats, and general disturbance) and indirect effects (e.g. loss/changes of/to foraging/commuting resources; population fragmentation) during the construction, operation and decommissioning phases of the Proposed Development.

Effects in relation to the decommissioning phase of the Proposed Development are considered to be of the same nature as construction phase effects. Decommissioning phase effects will therefore not be discussed in detail within the assessment, but will be assessed as being of the same or of similar magnitude to construction phase effects.

Sources of impacts will be considered throughout the design process for the Proposed Development, and where possible will either be avoided through scheme design or will be prevented/minimised by standard good practice measures (see **Section 6.2.10** below).

Potential effects upon peat, geology, soils and hydrology (including GWDTEs) are considered separately (refer to **Section 6.7** below).

6.2.8 Receptors/elements to be scoped into further assessment

Where on review of baseline information and considering potential pathways for effect, it is identified that ecological features listed below are unlikely to be so important in the context of the Proposed Development as to warrant a detailed assessment or where they are unlikely to be significantly affected by either the construction, operation or decommissioning of the Proposed Development, it is proposed that these will be 'scoped out' of further assessment in the ES. Mitigation measures for such features may, however, still be appropriate, to reduce and/or avoid any potentially adverse effects, or to ensure legislative compliance.

Receptor/Element	Phase	Justification
Afon Teifi/River Teifi SAC/SSSI	Construction and decommissioning	Where the potential for hydrological connectivity is identified, the construction and decommissioning of the Proposed Development has the potential to impact upon the qualifying interests of the Afon Teifi/River Teifi SAC/SSSI.
Non-statutory designated sites	Construction, operation and decommissioning	Scoped in on a precautionary basis as information on non-statutory designated sites within proximity to the Site has not yet been obtained.
Annex 1 habitats	Construction, operation and decommissioning	The construction (and/or decommissioning) of the Proposed Development will result in the loss and/or deterioration of baseline habitats. No additional (cumulative) habitat losses would be expected to occur during the operational phase however, habitats losses resulting in the construction phase, would be expected to be of longer term (or permanent) duration within the operational phase in the absence of habitat recreation.
UKBAP Priority Habitats		
Habitats of principal importance in Wales i.e. listed on Section 7 of the Environmental (Wales) Act 2017		
Habitat types with the potential to represent GWDTE and which are considered important in maintaining and enhancing biodiversity in a Welsh context		
Bats	Construction and decommissioning	The construction (and/or decommissioning) of the Proposed Development will result in the loss and/or fragmentation of bat habitat features, which may potentially significantly impact upon bat foraging and commuting corridors and availability of tree roosts (where identified).

Bats	Operation	The operation of the Proposed Development may result in the death or injury of bat species as a result of interaction with turbine blades, which may potentially significantly impact upon the populations of bat species.

6.2.9 Receptors/elements to be scoped out of further assessment

Industry standard Charted Institute for Ecological and Environmental Management (CIEEM) guidelines (CIEEM, 2018) stipulate that it is not necessary to carry out a detailed assessment of impacts upon ecological features that are sufficiently widespread, unthreatened and/or resilient to impacts of a development proposal. Industry standard NatureScot guidance (NatureScot, 2020) similarly advises that there are some species (e.g. moths, invertebrates and amphibians), which with standard mitigation measures, are unlikely to experience a significant environmental effect as a result of the construction and/or operation of onshore wind farms. This includes species that do not require surveys to inform an assessment of a development, but may require appropriate mitigation to ensure legislative compliance.

Receptor/Element	Phase	Justification
Figyn Blaen-Brefi SSSI	Construction, operation and decommissioning	Absence of potential impact pathways by virtue of spatial separation (these designated sites are located greater than 2km from the Site), absence of hydrological connectivity and/or sedentary nature of qualifying interests within designation boundaries. Although significant effects on these designated sites are considered unlikely, a Report to inform a Habitats Regulations Assessment will be submitted in support of the DNS application, which will provide relevant information for the Competent Authority to enable a Habitats Regulations Assessment in relation to the Cwm Doethie - Mynydd Mallaen and Afon Teifi/River Teifi SACs.
Cwm Doethie - Mynydd Mallaen SSSI Cwm Doethie - Mynydd Mallaen SAC		
Rhosydd Bryn-maen SSSI		
Glanrhocca SSSI		
Allt Rhyd Y Groes NNR		
Common and widespread habitats of low sensitivity and/or conservation interest within the Site	Construction, operation and decommissioning	The construction (and/or decommissioning) of the Proposed Development may result in the loss and/or deterioration of commoner and widespread baseline habitats, which are of low ecological value, including coniferous plantation woodland. An Outline CEMP will be submitted in support of the DNS application, which will include measures to ensure defined working areas and minimise overall habitat losses. A Habitat Management Plan will be submitted in support of the DNS application, which will include measures to maintain and enhance baseline habitats for biodiversity, to

		result in overall positive effects for local wildlife.
Red squirrel	Construction, operation and decommissioning	The presence of red squirrels within the Site, including the presence of dreys, can be reasonably assumed for the purposes of assessment. The design of the Proposed Development will seek to avoid or minimise the felling of trees and ground works within forest habitats and maintain habitat corridors (see **Table 4-1** in **Chapter 4** above). An Outline Species Protection Plan would be submitted in support of the DNS application, which will include for the undertaking of pre-construction surveys to identify red squirrel dreys in proximity to working areas and measures required to minimise impacts upon red squirrels and ensure legislative compliance.
Pine marten	Construction, operation and decommissioning	The design of the Proposed Development will seek to avoid or minimise the felling of trees and ground works within forest habitats and maintain habitat corridors (see **Table 4-1** in **Chapter 4** above). The design of the Proposed Development will also adopt infrastructure and construction work buffers around any pine marten dens identified during baseline and/or pre-construction surveys (30m from non-breeding dens, and 100m from known or suspected breeding dens), in so far as is possible. If species presence is identified or there is potential for the species to establish prior to the commencement of construction works, an Outline Species Protection Plan would be submitted in support of the DNS application, which will include for the undertaking of pre-construction surveys and measures required to minimise impacts upon pine marten and ensure legislative compliance.
Badger	Construction, operation and decommissioning	The design of the Proposed Development will adopt infrastructure and construction work buffers around any badger sets identified during baseline and/or pre-construction surveys (30m from sett entrances and 100m for pile driving or blasting works), in so far as is possible. If species presence is identified or there is potential for the species to establish prior to the commencement of construction works, an Outline Species Protection Plan would be

		submitted in support of the DNS application, which will include for the undertaking of pre-construction surveys and measures required to minimise impacts upon badgers and ensure legislative compliance.
Otter	Construction, operation and decommissioning	The design of the Proposed Development will adopt 50m infrastructure buffers from watercourses and avoid or where otherwise minimise the requirement for watercourse crossings. Watercourse crossings, where required, will be of a wildlife sensitive design (e.g. clear span bridges or bottomless culverts). Infrastructure and construction work buffers will be applied around any otter holts or shelters (200m from breeding holts and 30-100m from non-breeding holts and shelters). If species presence is identified or there is potential for the species to establish prior to the commencement of construction works, an Outline Species Protection Plan would be submitted in support of the DNS application, which would include for the undertaking of pre-construction surveys and measures required to minimise impacts upon otters and ensure legislative compliance.
Dormice	Construction, operation and decommissioning	The presence of dormice at and/or in proximity to the Site is considered highly unlikely due to the species restricted range in Wales and absence of optimal habitats within the Site. The design of the Proposed Development will also seek to avoid loss and/or impacts to potential dormice habitats (albeit this is very limited and unconnected). Where this cannot be avoided and/or there is potential for the species to establish prior to the commencement of construction works, an Outline Species Protection Plan would be submitted in support of the DNS application, which will include for pre-construction surveys and measures required and with reference to current guidance on Woodland Management in the presence of dormouse[10], to minimise impacts upon dormice and ensure legislative compliance.
Water vole	Construction, operation and decommissioning	The design of the Proposed Development will adopt 50m infrastructure buffers from watercourses and avoid or where otherwise

[10] Available at: https://cdn.cyfoethnaturiol.cymru/media/683856/dormouseguidancewalessept2010v2.pdf

		minimise the requirement for watercourse crossings. Watercourse crossings where required will be of a wildlife sensitive design (e.g. clear span bridges or bottomless culverts). Infrastructure and construction work buffers will be applied around any water vole habitat and active water vole burrows (10m exclusion zones). If species presence is identified or there is potential for the species to establish prior to the commencement of construction works, an Outline Species Protection Plan would be submitted in support of the DNS application, which will include for the undertaking of pre-construction surveys and measures required to minimise impacts upon water vole and ensure legislative compliance.
Fish and freshwater pearl mussel (excluding as qualifying features of the Afon Teifi/River Teifi SAC/SSSI)	Construction, operation and decommissioning	The design of the Proposed Development will adopt 50m infrastructure buffers from watercourses and avoid or where otherwise minimise the requirement for watercourse crossings. An Outline CEMP will be submitted in support of the DNS application, which will include for industry standard good practice construction measures to safeguard the aquatic environment. Watercourse crossings where required will be of a wildlife sensitive design (e.g. clear span bridges or bottomless culverts). An Outline Species Protection Plan would be submitted in support of the DNS application, which will include for pre-construction surveys and water quality monitoring and ensure legislative compliance.
Invertebrates, amphibians and reptiles (with the exception of great crested newts)	Construction, operation and decommissioning	The potential for significant effects upon these species is not considered likely. An Outline CEMP will be submitted in support of the DNS application, which will include for industry standard good practice construction measures to safeguard the terrestrial and aquatic environment, which would include reasonable avoidance measures to protect individual animals from harm.

6.2.10 Opportunities for enhancing the environment

Suitable principles for ecological enhancement, to be delivered as part of the Proposed Development, will be outlined within the ES. Principles will include measures to maintain and enhance biodiversity, promote ecological resilience and will be underpinned by Planning Policy Wales, adopted guidance in the Biodiversity supplementary planning guidance and TAN 5 (2009)

and in the Welsh Government letter of 23/10/19 to all Chief Planning Officers and ensure that Ceredigion County Council, Llanddewi Brefi Community Council and Llanfair Clydogau Community Council can discharge their biodiversity duties under the Environment (Wales) Act 2016.

The appropriateness and feasibility of principles will be discussed with NRW, Ceredigion County Council, Llanddewi Brefi Community Council and Llanfair Clydogau Community Council and other relevant consultees over the course of the EIA, with a view to prescriptive enhancement measures being detailed post-consent, within a Habitat Management Plan (or similar) for the Proposed Development.

The Habitat Management Plan will be finalised in consultation with NRW, Ceredigion County Council, Llanddewi Brefi Community Council and Llanfair Clydogau Community Council and other relevant consultees on the basis of an Outline Habitat Management Plan (or similar) which will be submitted in support of the DNS application.

6.2.11 Proposed assessment methodology

The assessment will be undertaken in accordance with current Chartered Institute of Ecological and Environmental Management (CIEEM) guidelines (2018).

Significance criteria to be applied are presented in **Appendix G**.

In accordance with Joint Agency guidance (2021) and subject to its availability, the Ecobat tool will be used to provide a relative measure of bat activity for the Site, and inform an overall risk assessment of the potential risk to high collision risk bat species. As the Ecobat tool is currently offline for repair and maintenance, with an unknown timescales for its renewed availability, should the tool not be available for use in the assessment of the Proposed Development, the Bat Activity Index will be used to provide bat activity levels used in the overall risk assessment.

6.2.12 Difficulties and uncertainties

At this stage, not all baseline ecological surveys and desk studies have been completed. The requirement for habitat loss and watercourse crossings within the Site is also not yet understood.

6.2.13 References

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- NatureScot (2022) Standing advice for planning consultations – otters https://www.nature.scot/doc/standing-advice-planning-consultations-otters
- NatureScot (2022) Standing advice for planning consultations – water voles https://www.nature.scot/doc/standing-advice-planning-consultations-water-voles
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- https://magic.defra.gov.uk/magicmap.aspx

6.2.14 Scoping questions

- Do you agree with the proposed list of consultees?
- In the absence of guidance published by NRW, do consultees consider the most appropriate industry standard guidance has been adopted and referred to?

- Do consultees consider the identification of qualifying features of listed statutory designated sites is correct?
- Do consultees consider any additional pieces of legislation, policy or guidance need to be referred to as part of the ecological assessment?
- Do consultees agree that the range of surveys carried out to date and/or proposed is sufficient and appropriate to inform the design and assessment of the Proposed Development?
- Are the baseline survey methods followed and study areas used appropriate to the nature and location of the Proposed Development?
- Do you agree that the data sources listed to inform the EIA baseline characterisation are appropriate?
- Are there any other relevant key sources of information that should be contacted or reviewed with respect to baseline ecological information gathering and assessment?
- Are any receptors/assets/resources not identified that it is appropriate to include in the EIA?
- Do you agree that additional (secondary and tertiary) mitigation measures can be identified and proposed on the basis of the conclusions of the assessment, and agreed by way of a suitably worded planning condition?
- Do consultees agree with the approach to assessment of bats, including the approach specified in the absence of the Ecobat tool being available? Where possible, consultees are invited to expand on how classifications of bat activity levels e.g. high, moderate, low should be assigned.
- Do you agree that the receptors/matters that are proposed to be scoped in and out of further assessment are proportionate?
- Specifically do consultees agree that, with the exception of the Afon Teifi/River Teifi SAC/SSSI, and in the current absence of additional information, potentially significant effects upon statutory designated sites for nature conservation (with ecological features of interest), including those >2km from the Site can be precluded?

6.3 Ornithology

6.3.1 Consultation

Initial consultation has been undertaken with NRW in relation to the scope of baseline ornithological studies. Consultation with the West Wales Biodiversity Information Centre has also been undertaken, to obtain existing ornithological information in proximity to the Site.

Vantage point locations and viewsheds

Consultation with NRW was undertaken in February 2021 to outline the proposed scope and approach to baseline ornithological surveys and seek advice from NRW on its adequacy to inform the design and assessment of a potential wind farm development within the Site.

In response, subsequent to clarifications on viewshed visibility and approach to undertaking Vantage Point (VP) surveys, the approach to baseline surveys was confirmed as appropriate by NRW in April 2021.

Amended survey schedule

NRW was subsequently approached to confirm whether survey efforts on site could be delayed for a year in accordance with NatureScot guidance (SNH, 2017), which states that data should

be “reliable and not too dated” and “collected within the last 5 years or within 3 years if the populations of key species are known to be changing rapidly”.

The amended schedule for an additional second year of ornithological surveys was agreed with NRW in July 2021.

This will result in the following baseline ornithological survey data:

- One year of complete ornithology data from September 2020 to August 2021
- One fallow year September 2021 to August 2022
- One year of complete ornithology data from September 2022 to August 2023.

6.3.2 Study area

In the absence of specific guidance published by NRW for Wales, study areas used for baseline ornithology surveys have been identified in accordance with industry standard NatureScot guidance (SNH, 2017) and have been agreed through consultation with NRW (refer to **Section 6.3.1** above).

Study areas for existing ornithological baseline information will be adopted as follows:

- Special Protection Areas (SPAs) – within 10km of the proposed Site boundary (20km for sites designated for geese);
- Ramsar sites (Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat) – within 10km of the proposed Site boundary;
- Sites of Special Scientific Interest (SSSIs) – within 5km of the proposed Site boundary;
- Important Bird Areas (IBAs) – within 5km of the proposed Site boundary;
- Locally designated sites such as Wildlife Sites, Sites of Important Nature Conservation (SINCs) and/or Local Wildlife Sites – within 5km of the proposed Site boundary;
- Local and National Nature Reserves (LNR and NNR) (including RSPB and Wildlife Trust Reserves) – within 5km of the proposed Site boundary;
- Existing ornithological records (from West Wales Biodiversity Information Centre) for all relevant records within the last five years:
    - Data from within 20km of the proposed Site boundary for goose species
    - Data from within 10km from the proposed Site boundary for raptor species.

Study areas for baseline ornithological surveys have been adopted as follows, where access permissions allow:

- Site + 500m for breeding bird surveys;
- Site + 2km for breeding raptor surveys;
- Site + 500m for breeding nightjar surveys; and
- Site + 500m for Vantage Point (VP) flight activity surveys.

6.3.3 Data sources to inform the EIA baseline characterisation

Key sources of existing ornithological information will include:

- NRW (including “Protected areas of land and sea” search engine”);
- MAGIC;
- RSPB; and,
- West Wales Biodiversity Information Centre.

6.3.4 Surveys to inform the EIA baseline characterisation

The following baseline ornithological surveys have been and/or will be undertaken following agreement with NRW:

- Breeding bird surveys (April to July 2021 and 2023) following amended Brown and Shepherd methodology (1993);
- Breeding raptor surveys (March to July 2021 and 2023) for Schedule 1 and Annex 1 raptor species, following species-specific methodologies in Hardey *et al*. (2013);
- Nightjar surveys (June to July 2021 and 2023) following species-specific guidance in Gilbert *et al*. (1998); and,
- Vantage Point (VP) surveys (September 2020 to August 2021 and September 2022 to August 2023), utilising three VP locations, with a minimum of 36 hours per VP per breeding and non-breeding season and adopting a series of flight height bands to allow for flexibility in choice of turbine specifications.

6.3.5 Baseline conditions

Baseline ornithological studies are currently ongoing. Full details of baseline survey and desk study methodologies and results will be presented within the ES, associated technical appendices and figures. Information relating to the locations or potential locations of sensitive breeding bird species and/or information received from third parties and marked as restricted, will be presented within a Confidential Volume of the ES, made available to NRW and the Welsh Government on request and subject to data sharing agreements where applicable.

Designated sites for nature conservation

Three statutory designated sites with ornithological features of interest are located within 10km of the Site:

- Cwm Doethie - Mynydd Mallaen SSSI (c. 4km south of the Site) – noted for its upland birds including red kite, merlin, red grouse, ring ouzel, pied flycatcher, redstart and wood warbler;
- Elenydd-Mallaen SPA (c. 3.3km east of the Site) – designated for its breeding red kite, merlin and peregrine interests; and,
- Cors Caron SSSI/NNR/Ramsar site (c. 7.4km north of the Site) – noted for its breeding and wintering bird interests, including lapwing, curlew, snipe, cuckoo, reed bunting, grasshopper warbler, and sedge warbler, together with whooper swan cited as noteworthy (but not qualifying) fauna within the Ramsar site citation.

There are no additional European sites identified within 20km of the Site, with migratory goose qualifying interests.

Non-statutory designated sites within proximity to the Site will be identified through existing data sources, and details provided in the ES.

Existing ornithological records

The information request response received from West Wales Biodiversity Information Centre identified records of the following species groups:

- Raptors: Records were obtained for 10 protected raptor species from within c. 10km of the Site boundary, including numerous records for hen harrier, peregrine and red kite as well as limited records of seven other species.
- Gulls: Records of black-headed gull, herring gull and lesser black-backed gull species were identified from within c. 5km of the Site boundary.

- Waders: Records of three wader species were identified from within c. 5km of the Site boundary including common sandpiper, snipe and woodcock, with the most common recorded being woodcock.
- Waterfowl: The desk study data included records for two protected species of waterfowl, pink-footed goose and whooper swan, from within c. 20km of the Site boundary.

VP surveys

Non-breeding season 2020/21 VP surveys recorded flight activity of a total of three target species, with red kite the most frequently recorded species:

- Red kite (18 flights);
- Goshawk (1 flight); and,
- Peregrine (1 flight).

Breeding season 2021 VP surveys recorded flight activity of a total of five target species, with red kite the most frequently recorded species:

- Goshawk (2 flights);
- Kestrel (4 flights)
- Red kite (31 flights);
- Herring gull (1 flight); and,
- Lesser black-backed gull (2 flight).

A second year of VP surveys is currently ongoing and will be completed in August 2023. Full details will be presented within the ES.

Note: the above flight activity does not necessarily infer the potential for annual collision risks, as some flight activity may not be at collision risk, subject to final turbine locations and specifications.

Breeding bird surveys

The breeding bird surveys undertaken in 2021 did not identify any signs of breeding or nest locations within the Site and 500m of its boundary for any of the target wader species. The habitat within the Site boundary and Site buffer is sub-optimal for breeding waders, with the agricultural land being heavily grazed resulting in very little suitable breeding habitat.

The passerine species considered breeding within the open habitats within the survey area included skylark, meadow pipit, wheatear, pied wagtail, wren and stonechat.

A second year of surveys is currently ongoing and will be completed in July 2023. Full details will be presented within the ES.

Breeding raptor surveys

Breeding raptor surveys in 2021 recorded observations of the following species, although no confirmed breeding efforts were identified within the survey area:

- Goshawk;
- Kestrel;
- Red kite; and,
- Short-eared owl.

The nature of the habitat with the Site boundary provides only sub-optimal suitability for Schedule 1/Annex 1 raptors; much of the conifer plantation is either clearfell and/or young forestry aged between 1 and 12 years old and the agricultural land is heavily grazed.

A second year of surveys is currently ongoing, and will be completed in July 2023. Full details will be presented within the ES.

Nightjar survey

Nightjar surveys in 2021 recorded up to eight potentially breeding males within the survey area. Much of the forestry within the Site and 500m buffer is young forestry age between 1 and 12 years old providing optimal breeding habitat for nightjar.

A second year of surveys is currently ongoing and will be completed in July 2023. Full details will be presented within the ES.

6.3.6 Additional (secondary and tertiary) mitigation

The requirement for any additional (secondary or tertiary) mitigation measures in relation to ornithological features will be further identified following the completion of ornithological surveys. This may include the adoption of disturbance buffer zones around the confirmed breeding sites of Schedule 1 breeding species where these are identified, with reference to current industry standard guidance (NatureScot, 2022).

6.3.7 Description of likely significant effects

The assessment will consider the potential for the following main impacts upon important ornithological features:

- Collision mortality risk; and,
- Disturbance/displacement.

Such effects will be assessed for the construction, operational and decommissioning stages of the Proposed Development, and in-combination with other relevant developments.

The assessment will be restricted to consideration of the potential for significant effects upon designated sites for nature conservation and ornithological features which are considered 'important' on the basis of relevant guidance and professional judgement.

Construction

The construction of the Proposed Development may result from disturbance to and loss of nest sites, eggs and/or dependent young. Effects are likely to be greatest during the breeding season (generally between March and August, depending upon the species), but are considerably variable between sites and species.

Overall, construction disturbance is considered temporary and will occur only when construction activities are taking place. Furthermore, construction is not expected to take place over the entire Site, but within defined working areas, phased over small areas.

Embedded (primary) mitigation will enable legislative compliance with regards to the protection of all wild birds, including those afforded special protection against disturbance under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).

Operation

The operation of turbines and maintenance activities has the potential to cause disturbance/displacement of bird species over the course of the Proposed Development's operational lifetime.

The potential extent of displacement will be highly variable between species and species-group and therefore a species-specific assessment will take place on the basis of the results of baseline studies.

The risk of avian mortality resulting from the collision of birds with the turbine blades (or additional wind farm infrastructure) is also acknowledged to be higher for some species due to their biometrics and flight behaviour. The likelihood of collision is also likely to be influenced by the habitats present within the Site and the surrounding environment.

Where required, a detailed assessment of collision mortality risk will be provided following the NatureScot Collision Risk Model (CRM) or Band Model in accordance with industry standard NatureScot guidance (Band et al., 2007; SNH, 2000).

The potential for individual turbines to result in significant collision mortality risks at a species regional population level will be considered throughout the design process for the Proposed Development, and where possible will be avoided through sensitive design and/or minimised via good practice embedded (primary) mitigation measures to be included in the Proposed Development from the outset.

Designated Sites for Nature Conservation

The potential for effects upon ornithological qualifying interests of a statutorily designated site for nature conservation will be considered on the basis of documented foraging distances within current industry NatureScot guidance (SNH, 2016).

As such, the potential impacts on ornithological interests of the following designations will be considered:

Elenydd – Mallaen SPA - located within the core breeding foraging range of red kite (4km) and for merlin (5km), but not for peregrine (2km) as specified within current industry guidance for establishing potential connectivity (SNH, 2016). The Site is also located within 10km of the SPA, the distance to which red kites are known to forage from their roosting locations during the non-breeding season, within some parts of its range. Flight activity of red kite and peregrine has been recorded and which, subject to final turbine locations and specifications, may be identified as being “at collision risk” to the Proposed Development. No flight activity of merlin was recorded during 2020-21 baseline surveys. The core breeding foraging range specified within current industry guidance is considered appropriate for establishing the potential for connectivity with breeding birds in this instance, given the likely availability of foraging habitat for all three qualifying interests between the SPA and the Site.

Cwm Doethie - Mynydd Mallaen SSSI - located within the core breeding foraging range of red kite (4km) and for merlin (5km), as specified within current industry guidance for establishing potential European site connectivity (SNH, 2016). Flight activity of red kite has been recorded during the breeding season and which, subject to final turbine locations and specifications, may be identified as being “at collision risk” to the Proposed Development. No flight activity of merlin was recorded during 2020-21 baseline surveys.

The potential for impacts upon any additional statutory and non-statutory designated sites is considered unlikely, but will be reviewed over the course of the EIA on the basis of consultation responses received.

Species

Based on the results of baseline ornithological surveys and consultations to date, the assessment will consider the potential for significant effects upon the following species:

- Red kite (including as a qualifying feature of the Elenydd – Mallaen SPA, Cwm Doethie - Mynydd Mallaen SSSI and wider countryside);
- Kestrel; and,
- Nightjar.

The potential for significant effects as a result of collision mortality (operational phase) and/or disturbance/displacement (construction, operational and decommissioning phases) for the above listed species will be assessed.

6.3.8 Receptors/elements to be scoped into further assessment

The scoping in of additional ornithological species, over and above those listed below, will be reviewed following the completion of the second year of ornithological features in August 2023, and where activity levels justify it.

Receptor/Element	Phase	Justification
Cwm Doethie - Mynydd Mallaen SSSI (red kite)	Operation	Levels of flight activity with the potential for collision mortality risk to red kite, comprising a qualifying feature with the potential for connectivity on the basis of core breeding foraging range (4km).
Elenydd – Mallaen SPA (red kite)	Operation	Levels of flight activity with the potential for collision mortality risk to red kite, comprising a qualifying feature with the potential for connectivity on the basis of core breeding foraging range (4km) and wintering foraging range (10km).
Red kite	Construction, operation and decommissioning	Levels of flight activity with the potential for collision mortality risks. Potential for the species to establish breeding sites in proximity to construction works.
Goshawk	Construction, operation and decommissioning	Levels of flight activity with the potential for collision mortality risks. Potential for the species to establish breeding sites in proximity to construction works.
Kestrel	Construction, operation and decommissioning	Levels of flight activity with the potential for collision mortality risks. Potential for the species to establish breeding sites in proximity to construction works.
Nightjar	Construction, operation and decommissioning	Species of conservation interests confirmed as breeding within the Site, with the potential for habitat loss and disturbance.

6.3.9 Receptors/elements to be scoped out of further assessment

Industry standard CIEEM guidelines (2018) stipulate that it is not necessary to carry out a detailed assessment of impacts upon ornithological features that are sufficiently widespread, unthreatened and/or resilient to impacts of a development proposal. Industry standard NatureScot guidance (2017 and 2020) similarly advises that there are some species, which with standard mitigation measures, are unlikely to experience a significant environmental effect as a result of the construction and/or operation of onshore wind farms. This includes species that do not require surveys to inform the EIA but may require appropriate mitigation to ensure legislative compliance, such as breeding passerine species.

The scoping out of additional ornithological species, over and above those listed below, will be reviewed following the completion of the second year of ornithological features in August 2023, and where activity levels justify it.

Receptor/Element	Phase	Justification
Cwm Doethie - Mynydd Mallaen SSSI (all ornithological features)	Construction and decommissioning	The Site is located sufficiently distant from the Cwm Doethie - Mynydd Mallaen SSSI to preclude the potential for direct and indirect effects due to direct habitat loss and/or disturbance/displacement within the designation. The Site is also located beyond the potential alternative nest range for red kite (1km) and merlin (500m-1.5km) specified in current industry standard guidance (SNH, 2016).
Cwm Doethie - Mynydd Mallaen SSSI (merlin)	Operation	The Site is located within the core foraging range for merlin, but no flight activity of merlin has been recorded to date. Therefore, operational collision mortality risks to this species, including as a qualifying interest of the Cwm Doethie - Mynydd Mallaen SSSI, is currently precluded. The potential for collision mortality risks to merlin will, however, be reviewed following the completion of baseline surveys.
Elenydd – Mallaen SPA (all ornithological features)	Construction and decommissioning	The Site is located sufficiently distant from Elenydd – Mallaen SPA to preclude the potential for direct and indirect effects due to direct habitat loss and/or disturbance within the designation. The Site is also located beyond the alternative potential nest range for red kite (1km) and merlin (500m-1.5km) specified in current industry standard guidance (SNH, 2016). The Site is located within the distance of potential alternative nest sites for peregrine (3-6.5km) specified in current industry standard guidance (SNH, 2016); however, no breeding evidence to date or suitable nesting features for the species have been identified within 2km of the Site.
Elenydd – Mallaen SPA (merlin and peregrine)	Operation	No flight activity of merlin has been recorded to date and therefore operational collision mortality risks to this species, including as a qualifying interest of the Elenydd – Mallaen SPA, is currently precluded. The potential for collision mortality risks to merlin will, however, be reviewed following the completion of baseline surveys. Flight activity of peregrine has been recorded; however, the Site is located beyond the core foraging range for peregrine (2km) specified in current industry standard guidance (SNH, 2016). As such, the likelihood of activity observed during surveys, can reasonably be precluded as originating from the SPA.

Cors Caron NNR/Ramsar site/SSSI	Construction, operation and decommissioning	The Cors Caron NNR/Ramsar site/SSSI is notified for its overwintering whooper swan interests and is sufficiently distant from the Site to preclude the potential for direct effects and is located beyond the core foraging range of non-breeding whooper swans (SNH, 2016). Baseline ornithological surveys to date have recorded very low levels of activity of this species and the Site provides no suitable foraging or roosting opportunities. Potentially significant effects upon this species as a result of disturbance/displacement during construction, operation and decommissioning and collision mortality risks during operation, including as a qualifying interest of the Cors Caron NNR/Ramsar site/SSSI, can therefore be reasonably precluded.
All other Schedule 1/Annex 1 raptors	Construction, operation and decommissioning	The Site provides suboptimal opportunities for breeding establishment and low levels of flight activity have been recorded during surveys to date. The Proposed Development is therefore unlikely to result in potentially significant disturbance/displacement effects to these species. However, an estimation of collision mortality risks will be undertaken for any of these species that meet the criteria of greater than three “at collision risk” flights and to identify the potential for significant collision risks for such species at an appropriate population level.
All waterfowl	Construction, operation and decommissioning	The Site provides suboptimal opportunities for breeding and/or foraging and low levels of flight activity have been recorded during surveys to date. The Proposed Development is therefore unlikely to result in potentially significant disturbance/displacement effects to these species. However, an estimation of collision mortality risks will be undertaken for any of these species that meet the criteria of greater than three “at collision risk” flights and to identify the potential for significant collision risks for such species at an appropriate population level.
All waders	Construction, operation and decommissioning	Site provides suboptimal opportunities for breeding and/or foraging and low levels of flight activity recorded. The Proposed Development is therefore unlikely to result in potentially significant disturbance/displacement effects to these species. However, an estimation of collision mortality risks will be undertaken for any of these species that meet the criteria of greater than three “at collision risk” flights and to identify the potential for significant

		collision risks for such species at an appropriate population level.
All passerines	Construction, operation and decommissioning	In accordance with current industry guidance (SNH, 2017), such species are established as not being significantly affected by onshore wind farm developments.

6.3.10 Opportunities for enhancing the environment

Suitable principles for ornithological enhancement, to be delivered as part of the Proposed Development, will be outlined within the ES. Principles will include measures to maintain and enhance biodiversity, promote ecological resilience and will be underpinned by Planning Policy Wales, adopted guidance in the Biodiversity supplementary planning guidance and TAN 5 (2009) and in the Welsh Government letter of 23/10/19 to all Chief Planning Officers and ensure that Ceredigion County Council can discharge its biodiversity duty under the Environment (Wales) Act 2016.

The appropriateness and feasibility of principles will be discussed with NRW, Ceredigion County Council and other relevant consultees over the course of the EIA, with a view to prescriptive enhancement measures being detailed post-consent, within a Habitat Management Plan (or similar) for the Proposed Development.

The Habitat Management Plan will be finalised in consultation with NRW, Ceredigion County Council and other relevant consultees on the basis of an Outline Habitat Management Plan (or similar) which will be submitted in support of the DNS application.

6.3.11 Proposed assessment methodology

The assessment will be undertaken in accordance with current Chartered Institute of Ecological and Environmental Management (CIEEM) guidelines (2018).

Significance criteria to be applied are presented in **Appendix G**.

6.3.12 Difficulties and uncertainties

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

- Where access was compromised due to restrictions, breeding bird surveys were undertaken from the nearest accessible location to ensure surveys were undertaken effectively. Therefore, the data can be regarded as providing a reliable and realistic depiction of baseline conditions.

6.3.13 References

- Band, W., Madders, M. & Whitfield, D.P. (2007). Developing field and analytical methods to assess avian collision risk at wind farms. In: de Lucas, M., Janss, G.F.E. & Ferrer, M. (Eds.) Birds and Wind Farms: Risk Assessment and Mitigation, pp 259-275. Quercus, Madrid.
- Brown, A.F. & Shepherd, K.B. (1993). A method for censusing upland breeding waders. Bird Study, 40, pp. 189-195.

- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.
- Gilbert, G., Gibbons, D.W. & Evans, J. (1998). Bird monitoring methods. A manual of techniques for key UK species. RSPB, Sandy, Bedfordshire.
- Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). Raptors: a field guide to survey and monitoring. Third Edition. The Stationary Office, Edinburgh.
- NatureScot (2022) Disturbance Distances in Selected Scottish Bird Species. NatureScot, Guidance.
- SNH (2000) Windfarms and Birds - Calculating a theoretical collision risk assuming no avoiding action. SNH Guidance Note.
- SNH (2016). Assessing connectivity with Special Protection Areas (SPAs). Guidance. Version 3 – June 2016.
- SNH (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage (SNH), Inverness.

6.3.14 Scoping questions

- Do you agree with the proposed list of consultees?
- In the absence of guidance published by NRW, do consultees consider the most appropriate industry standard guidance has been adopted and referred to?
- Do consultees consider the identification of qualifying features of listed statutory designated sites is correct?
- Do consultees consider any additional pieces of legislation, policy or guidance need to be referred to as part of the ecological assessment?
- Do consultees agree that the range of surveys carried out to date and/or proposed is sufficient and appropriate to inform the design and assessment of the Proposed Development?
- Are the baseline survey methods followed and study areas used appropriate to the nature and location of the Proposed Development?
- With reference to current NatureScot guidance (2017), would consultees agree that, on the basis of the DNS application being made in or prior to Q4 2028, baseline ornithological surveys concluding in August 2023 would remain sufficiently contemporary to inform the design and assessment of the Proposed Development?
- Do you agree that the data sources listed to inform the EIA baseline characterisation are appropriate?
- Do you agree that all potential impacts on ornithological receptors have been identified?
- Do you agree with the ornithological receptors that are proposed to be scoped in (and out) of the EIA, given the available evidence gathered to date?
- Are any receptors/assets/resources not identified that it is appropriate to include in the EIA?
- Specifically, do consultees agree with the use of core foraging ranges in this instance, for the establishment of potential connectivity between the Site and identified statutory designated sites?
- Specifically, do consultees agree that, with the exception of potential effects upon red kite as a qualifying feature of the Elenydd – Mallaen SPA, and in the current absence

of additional information, potentially significant effects upon statutory designated sites for nature conservation (with ecological features of interest), can be precluded?

- Do you agree with the proposed assessment approach?
- Can NRW (or additional consultees) provide any up-to-date population numbers of qualifying species for the mentioned designated sites and outline the relevant sources of information from which county, regional and national species populations should be taken, to inform assessment?

6.4 Traffic and transport

6.4.1 Consultation

Consultation on the detail of the transport and access elements will be undertaken with the following:

- Carmarthenshire County Council (as local roads authority);
- Welsh Government (as trunk roads authority); and
- Road and structure operators along the AIL access route.

6.4.2 Study area

The Proposed Development will be accessed from a combination of the public road network using an upgraded access junction on the A482 at Pumsaint. Loads will then proceed to the proposed turbine locations using a combination of existing, upgraded and new access tracks.

Access to the A482 for construction traffic will be from the north or south of Pumsaint. Sources for quarry materials and concrete are predominantly from the south and west, with access via the A40 and A483. As these traffic movements will create the highest levels of trip generation, they help define the study area.

Locally sourced material will be used where feasible and traffic will avoid impacting on local communities as far is possible.

Two AIL access routes are under consideration, with all AIL access being taken from the A48 and A40 at Carmarthen. A detailed Route Survey Report will support the DNS application and will identify the necessary access improvements that will be required to enable loads to access the Site from the A40 corridor. The two access options from the A40 are as follows:

- Option 1: Access via the A482 from Llanwrda; and
- Option 2: Access via the B4302 and A482 via Llandeilo, Talley and Crugybar.

A finalised route will be determined and advised upon completion of the AIL route survey.

The proposed study area is therefore either:

For Option 1:

- A482 between Pumsaint and Llanwrda;
- A40 between Llanwrda and the A48 at Carmarthen;

For Option 2:

- A40 between Llandeilo and the A48 at Carmarthen
- B4302 between Llandeilo and its junction with the A482.
- A482 between Pumsaint and the B4302-A482 junction

An Electronic Service Delivery for Abnormal Loads (ESDAL) weight review for structures on the proposed access routes from Port of Swansea to the Site will be undertaken.

6.4.3 Data sources to inform the EIA baseline characterisation

Baseline traffic count data will be obtained from a new Automatic Traffic Count (ATC) survey located at the following locations:

- A482 at the site access junction;
- A40 in Llandovery;
- A483 in Llandovery; and
- B4302 in Talley

These represent the communities that are likely to be most affected by traffic flows during the construction phase.

Further traffic data for the local road network will be obtained from UK Government Department for Transport (DfT) traffic count data. Data from the following sites will be obtained:

- DfT Count site 40592, A482 South of Cwmann;
- DfT Count site 20515, A40 West of Llanwrda;
- DfT Count site 20516, A40 east of Llanegwad; and
- DfT Count site 70086, A40 north of Pensarn Roundabout.

National Road Traffic Forecast (NRTF) Low Traffic Growth assumptions will be used to provide a common future year baseline to coincide with the expected construction traffic peak.

Data relating to public rights of way will be obtained from Carmarthenshire County Council's online resource (https://prow-carms.esdm.co.uk/standardmap.aspx) with additional active travel data sourced from Sustrans for the National Cycle Route network.

Traffic accident data will be obtained from Crashmap UK for the study network to inform the accident review for the immediate road study area. Three years' worth of data will be collated for roads within the study area.

6.4.4 Surveys to inform the EIA baseline characterisation

As stated in **Section 6.4.3** above, new traffic surveys will be undertaken by ATC and will be deployed for one week during a neutral month. Data collected will include traffic volume, vehicle classes and speed data.

6.4.5 Baseline conditions

A full description of the baseline traffic conditions and network condition will be detailed within the ES.

6.4.6 Additional (secondary and tertiary) mitigation

Standard mitigation measures that are likely to be embedded in the assessment are:

- Production of a Construction Traffic Management Plan;
- The design of suitable access arrangements with full consideration given to the road safety of all road users;
- A Staff Sustainable Access Plan; and

- A Framework Abnormal Load Transport Management Plan.

Additional mitigation will be included should the assessment reveal effects that are significant following the application of standard mitigation measures.

All mitigation measures will only be relevant to the construction phase of the Proposed Development.

6.4.7 Description of likely significant effects

The assessment will consider the effects on transport link users and residents within the study area, focussing on the following:

- Severance;
- Driver delay;
- Pedestrian delay:
- Pedestrian amenity;
- Fear and intimidation; and
- Accidents and safety.

6.4.8 Receptors/elements to be scoped into further assessment

Receptor/Element	Phase	Justification
Users of the A40, A482, A483 and B402	Construction	Potential for significant traffic flows during construction phase.
Residents living along the A40, A482, A483 and B402	Construction	Potential for significant traffic flows during construction phase.
Residents of Llandovery, Cwmann and Talley	Construction	Potential for significant traffic flows during construction phase.

6.4.9 Receptors/elements to be scoped out of further assessment

Receptor/Element	Phase	Justification
All receptors	Operation	Once operational, it is envisaged that the level of traffic associated with the Proposed Development will be minimal. Regular monthly or weekly visits would be made for maintenance checks. The vehicles used for these visits are likely to be 4x4 vehicles and there may also be the occasional need for an HGV to access the Proposed Development for specific maintenance and/or repairs. It is considered that the effects of operational traffic would be negligible and therefore no

		detailed assessment of the operational phase of the Proposed Development is proposed.
All receptors	Decommissioning	The traffic generation levels associated with the decommissioning phase will be less than those associated with the construction phase as some elements such as access roads will be left in place on the Site. As such, the construction phase is considered the worst-case assessment to review the impact on the study area. An assessment of the decommissioning phase will therefore not be undertaken, although a commitment to reviewing the impact of this phase will be made immediately prior to decommissioning works proceeding.

6.4.10 Opportunities for enhancing the environment

No opportunities for enhancement in a traffic and transport context have been identified at this stage.

6.4.11 Proposed assessment methodology

The Guidelines for the Environmental Assessment of Road Traffic (IEA, 1993) sets out a methodology for assessing potentially significant environmental effects. In accordance with this guidance, the scope of assessment will focus on:

- Potential impacts (of changes in traffic flows) on local roads and the users of those roads; and
- Potential impacts (of changes in traffic flows) on land uses and environmental resources fronting these roads, including the relevant occupiers and users.

The following rules taken from the guidance will be used as a screening process to define the scale and extent of the assessment:

- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
- Rule 2: Include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

Increases below these thresholds are generally considered to be insignificant, given that daily variations in background traffic flow may fluctuate by this amount. Changes in traffic flow below this level predicted as a consequence of the Proposed Development will therefore be assumed to result in no discernible environmental impact and as such, no further consideration will be given to the associated environment effects.

The estimated traffic generation of the Proposed Development will be compared with baseline traffic flows, obtained from existing traffic survey data, in order to determine the percentage increase in traffic.

Potentially significant environmental effects will then be assessed where the thresholds are exceeded. Suitable mitigation measures will be proposed, where appropriate.

It is not anticipated that a formal Transport Assessment will be required as these are not generally considered necessary for temporary construction works. A reduced scope Transport Assessment is therefore proposed and will be submitted in support of the DNS application.

Each turbine is likely to require between 11 and 14 AIL to deliver the components to Site. The components will be delivered on extendable trailers which will then be retracted to the size of a standard HGV for the return journey. Detailed swept path analyses will therefore be undertaken for the main constraint points on the route from the port of entry through to the Site access junction to demonstrate that the turbine components can be delivered to Site and to identify any temporary road works which may be necessary. A Route Survey Report and Transport Management Plan describing the route and the proposed operational management of the deliveries will be submitted in support of the DNS application.

Committed development traffic, i.e. those from nearby proposals with planning consent, will be included in baseline traffic flows, where traffic data for these schemes is considered significant and is publicly available.

Significance criteria to be applied are presented in **Appendix G**.

6.4.12 Difficulties and uncertainties

No difficulties or uncertainties regarding the traffic and transport assessment have been identified at this stage.

6.4.13 References

- Institute of Environmental Assessment (1993) The Guidelines for the Environmental Assessment for Road Traffic

6.4.14 Scoping questions

- Is the proposed methodology considered acceptable?
- Are the methods proposed for obtaining traffic flow data acceptable?
- Is the use of Low National Road Traffic Forecasts (NRTF) acceptable for the whole of the study?
- What cumulative traffic flows from committed development should be included in the assessment?

6.5 Cultural heritage

6.5.1 Consultation

It is envisaged that consultation would be necessary with Cadw, Dyfed Archaeological Trust, and Ceredigion's and Carmarthenshire's Conservation Officers to agree the general approach and potential representative viewpoints for significant assets that the consultees would wish to ensure have been individually assessed.

6.5.2 Study area

The study area comprises two spatial levels. Firstly, an 'Immediate Study Area', comprising the Site as defined by the application boundary, for which the potential for direct physical impacts from groundworks would be assessed and constraint mapping provided as part of design iteration, to avoid impacts on known historic assets. This has been supported by a search of known assets within a 2km zone around the Site boundary which has helped predict the

probability for potential unknown historic assets to lie within the Site boundary (**Figure 1** in **Appendix E**).

Secondly, a 'Wider Study Area' has been defined comprising a zone in which indirect visual impacts from the turbines might affect designated historic assets susceptible to significant change and therefore those should be assessed. For those designated historic assets which show a potential significant change to their setting in both Immediate and Wider Study Areas by proximity or through intervisibility, further analysis will be undertaken to assess the level of impact. **Figure 2** in **Appendix E** shows all designated historic assets within 5km. It is considered that listed buildings and conservation areas within 2km are sufficiently close that they might be affected, whereas scheduled monuments up to 5km might be affected and should be assessed.

6.5.3 Data sources to inform the EIA baseline characterisation

This EIA Scoping Report has been informed by data purchased (DAT enquiry number 1395) for a 2km search area, supplemented by National Monuments Record (NMR) information from the Royal Commission on the Ancient and Historical Monuments of Wales for assets within the Site boundary. Designation data has been downloaded from Cadw via the Welsh Government geo-portal website "DataMapWales" for a 5km search area. A previous desk study has also been reviewed, Headland Archaeology (September 2022) *Waun Maenllwydd Mountain Road MetMast: Archaeological Desk-Based Assessment*, as well as a watching brief report on the erection of the Metmast, Hampton Heritage (January 2023*) Waun Maenllwyd, Ceredigion: Archaeological Watching Brief Report.*

A historic mapping regression exercise would be undertaken to record the Site's historic development from Tithe map to later 20th century Ordnance Survey mapping. LiDAR data is not available for this Site so this valuable remote sensing tool will not be applied during the assessment. Instead, satellite imagery and internet digitally available aerial photographs will be sourced and examined.

6.5.4 Surveys to inform the EIA baseline characterisation

A site walkover survey will be conducted to help identify previously unidentified historic assets within the Site boundary, and to study the designated assets within their setting so that their heritage significance can be fully appreciated, and so that an appropriate level of assessment of potential impact can be made.

6.5.5 Baseline conditions

The general character of the area is an undulating landscape of upland rough grazing with conifer plantations, sloping generally from 450m AOD in the south-west to c. 400m AOD in the north-east. As a moorland location, some peat deposits have been identified, and the conditions are typical for the finding of two specific types of archaeological remain: prehistoric funerary and ceremonial sites, and medieval/post-medieval dispersed farmsteads. The introduction of modern commercial forestry into this landscape severely limits the visibility of archaeological remains, so that modern investigation and identification of previously unknown remains would be restricted to open land outside the plantation areas.

In contrast to the Site and its immediate surroundings, the more populated zones in prehistoric and historic times are likely to be found within the river valleys due to the proximity of water sources, the better land quality, and the easier communications provided by the valleys.

There are 30 Bronze Age assets within the 2km HER search area, and 37 probable medieval ones, as well as two of other prehistoric date, one unknown date, and 93 post-medieval and

modern records. **Figure 1** in **Appendix E** shows the distribution of these assets, colour-coded by period, and with PRN identifier. Within the Site, three additional entries have been identified through enquiry of the Royal Commission on the Ancient and Historical Monuments of Wales NMR data.

The distribution of assets from the two main periods of interest are markedly different, with the Bronze Age sites aligned along the ridges to the south of the Site, or clustered close to the north-west of it, with three inside the Site boundary and an outlier at Bryn Garreg-lwyd further east, whereas the medieval settlement and farming evidence is concentrated on the margins of the 2km search area, especially in the north beyond the Afon Breifi. Three medieval assets lie within the Site, however, in the vicinity of the met mast. All of these, and the three NMR records within the Site to the north-east, are within areas without conifer plantation, reinforcing the selectivity of the data which has been influenced by what the forestry may be masking.

Designated historic assets are shown in **Figure 2** in **Appendix E** which includes a 5km search area from the turbines. There are 14 listed buildings and one conservation area, Llanddewi Brefi. Apart from two listed buildings in the south, all the rest are located within, or in close proximity to, Llanddewi Brefi, and all lie more than 3km from the nearest turbine.

There are 14 scheduled monuments within the 5km search area, nine of which are prehistoric, one early medieval (comprising four inscribed stones), three medieval longhouses, and one monument comprised of two post-medieval longhouses. The closest scheduled monument is Crug Round Cairn c.1.2km west of the T5. All other scheduled monuments are between 2 – 5km from the turbines, with three to the south-west, six to the south-east and east, and the rest to the north with a concentration on Bryn Rhudd. Apart from the early medieval inscribed stones which are found within the church at Llanddewi Brefi, the other medieval and post-medieval assets are to the east and north-east of the Site.

6.5.6 Additional (secondary and tertiary) mitigation

Construction

Specific measures to avoid harmful direct impacts would include fencing off and marking out known historic assets so that machinery does not unintentionally damage them, and design of an appropriate programme of archaeological investigation and monitoring of all groundworks within the Site. This phase of work would be followed by analysis, report production and dissemination of the results, including deposition of a site archive with the Ceredigion Museum Service. This phase of work would be secured via an appropriate planning condition on permission.

Operation

There are no additional mitigation measures that can be taken for potential operational impacts once the turbine array has been finalised.

6.5.7 Description of likely significant effects

Construction

All groundwork activities have the potential to directly impact (physically) on historic assets. Felling, access tracks, borrow pits, trenching, crane pads, turbine bases, substation and compounds are all types of activity that might result in damage to known and previously unknown buried or upstanding historic assets. The groundworks might disturb archaeological remains, or in the worst case, destroy them in their entirety. The heritage value of each specific asset would determine how significant the effect is likely to be.

Operation

The principal potential impact from operation is visual change to the heritage significance of an asset due to development within its setting and the introduction of tall structures into a rural upland landscape. This would be an indirect impact, and it is possible other factors such as noise and shadow flicker would also affect the baseline conditions for experiencing the monuments in their setting. Scheduled monuments include assets which were designed to look out over, and be seen, from a long distance, and to be seen against the skyline, and therefore the change to the existing baseline by introducing tall moving structures needs to be assessed. Proximity and therefore scale of turbines in relation to the asset and its surroundings would form an important part of this assessment, but crucially important is to understand how the scheduled monument is likely to have been designed and functioned in relation to its setting and other monuments within that landscape. If turbine locations interrupt or distract from key vistas and intervisibility between related monuments, this is likely to result in a significant effect.

It is considered that any direct (physical) impacts on historic assets will have already occurred during construction. Furthermore, any impacts on setting would be negated through the removal of the turbines and associated infrastructure.

6.5.8 Receptors/elements to be scoped into further assessment

The following receptors/elements are proposed to be scoped into further assessment at this stage. However, as evident in the text below, it is considered that with further assessment, some of the receptors outlined below may be scoped out of further assessment. Where this is considered to be the case, this will be clearly stated and justified in the ES.

Receptor/Element	Phase	Justification
5148 Y Garn; Banciau Duon	Construction	Round barrow; lies within the Site boundary and so may be directly impacted by groundworks.
9020 Cnwch Mawr	Construction	Round barrow; lies within the Site boundary and so may be directly impacted by groundworks.
9585 Cerig y Bela	Construction	Long hut (same as 13182, duplicate entry?); lies within the Site boundary and so may be directly impacted by groundworks.
9586 Cors y Garn	Construction	Long hut; lies within the Site boundary and so may be directly impacted by groundworks.
11583 Nant Rhysgog	Construction	Cottage; lies within the Site boundary and so may be directly impacted by groundworks.
13182 Cerig y Bela	Construction	Long hut (same as 9585, duplicate entry?); lies within the Site boundary and so may be directly impacted by groundworks.
529574 Bancau Duon, Hollow for feeder, and trackway	Construction	Hollow for sheep feeder next to trackway; lies within the Site boundary and so may be directly impacted by groundworks.

529575 Bancau Duon, lead mining trial level	Construction	Mining remains; lies within the Site boundary and so may be directly impacted by groundworks.
529576 Bancau Duon, Trackway I	Construction	Mining remains; lies within the Site boundary and so may be directly impacted by groundworks.
CD137 Cairns and Ringworks south of Bryn Rhudd	Operation	Important group of prehistoric ritual monuments at 2 - 3km distance from turbines, facing the site on the north side of the Afon Brefi; ZTV suggesting up to 6 turbines visible, potential indirect impact due to importance for far distant views.
CD169 Carn Fawr Round Cairn	Operation	Prehistoric monument located on hilltop, at 2km distance from turbines; ZTV suggesting up to 6 turbines visible, potential indirect impact due to importance for far distant views.
CD185 Blaen Brefi Longhouses	Operation	Northern longhouse - ZTV suggests up to 6 turbines visible, potential indirect impact although at 3.5km distance this type of site is unlikely to include far distant views as of importance for its heritage significance.
CD199 Cyrnau Long Hut	Operation	ZTV suggesting up to 6 turbines visible, potential indirect impact, although at 4km distance from turbines, this type of site is unlikely to include far distant views as of importance for its heritage significance.
CD233 Crug Round Cairn	Operation	Prehistoric burial monument in prominent hilltop location, proximity to turbines at 1.5km and ZTV suggesting up to 6 turbines visible, potential indirect impact due to importance for far distant views.
CD240 Penrhiwllwydog Round Cairn	Operation	Prehistoric monument in prominent hilltop location, ZTV suggesting up to 6 turbines visible, potential indirect impact although at 4.5km distance from turbines this may not be significant.
CD363 Craig Twrch Round Cairn	Operation	Prehistoric ritual monument on hillside location at 3.5km from turbines, ZTV suggesting up to 6 turbines visible, potential indirect impact due to importance for far distant views.
CD364 Carn Nant-yr-ast round cairn	Operation	Prehistoric ritual monument in hilltop location at 4km from turbines, ZTV suggesting up to 6 turbines visible, potential indirect impact due to importance for far distant views.
CD365 Bryn Bedd Round Barrow	Operation	Prehistoric burial monument in hilltop location, ZTV suggesting up to 6 turbines visible, potential indirect impact although almost 5km distance from turbines suggests this may not be significant.

6.5.9 Receptors/elements to be scoped out of further assessment		
Receptor/Element	**Phase**	**Justification**
CD047 Four Inscribed Stones in Church	Operation	Inside church, remote from turbines or Site activity.
CD115 Moelfryn Round Cairn	Operation	ZTV shows no intervisibility with turbines, located on west-facing hillside c.3km south-west of nearest turbine.
CD200 Cors Blaen Cothi Deserted Rural Settlement	Operation	ZTV shows no intervisibility with turbines and as a rural medieval settlement long distance views would not be a factor in heritage significance.
CD210 Round Cairns c. 400m SE of Lan Fawr	Operation	ZTV shows no intervisibility with turbines, located on south-facing hillside c.2km south of nearest turbine.
10714 Telephone Call-box W of Foelallt Arms	Operation	ZTV shows no intervisibility, part of village asset group at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
15652 No 1 Penuwch Street	Operation	ZTV shows no intervisibility, part of village asset group at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
16267 Ty-Newydd, Saron	Operation	ZTV shows no intervisibility, along valley to south of the Site at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
16268 Ty'n-Y-Corn, Saron	Operation	ZTV shows no intervisibility, along valley to south of the Site at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
18942 Capel Bethesda	Operation	ZTV shows no intervisibility, part of village asset group at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
18944 W Range of outbuildings at Nant-y-Dderwen	Operation	ZTV shows no intervisibility, part of village asset group at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
18945 N and E ranges of	Operation	ZTV shows no intervisibility, part of village asset group at a distance beyond what would be perceptible as any

outbuildings at Nant-y-Dderwen		significant visual change caused by the Proposed Development.
18946 Neuadd	Operation	ZTV shows no intervisibility, part of farm asset group at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
18947 Barn to W of Neuadd	Operation	ZTV shows no intervisibility, part of farm asset group at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
18949 Enclosure walls, steps and memorial plaque to Quaker Burial Ground at Werndriw	Operation	ZTV shows no intervisibility, west of village asset group but focussed on the community and its cultural history, at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
18951 No 2 Penuwch Street	Operation	ZTV shows no intervisibility, part of village asset group at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
18952 No 3 Penuwch Street	Operation	ZTV shows no intervisibility, part of village asset group at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
9920 Church of Saint David	Operation	ZTV shows no intervisibility, part of village asset group at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
9921 Pont Gogoyan	Operation	ZTV shows no intervisibility, bridge focused on roads crossing the river, and at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.
Llanddewi Brefi Conservation Area	Operation	ZTV shows no intervisibility, part of village asset group at a distance beyond what would be perceptible as any significant visual change caused by the Proposed Development.

6.5.10 Opportunities for enhancing the environment

There are no specific enhancement opportunities for the historic environment. However, the existing baseline includes modern elements that have degraded the previous character of the upland environment, such as conifer plantation, which do not help with understanding and appreciating the heritage significance of the monuments in their original open upland setting. Although the Proposed Development would introduce alien tall structures into this landscape,

it would also remove some elements of modern commercial farming which has detracted from the historic environment. This would be via felling some of the conifer plantations, allowing a gradual return to the more open vistas and moorland feel that the prehistoric ritual monuments would have originally experienced. Opportunities for better explanation and access for the public to the historic environment would be explored.

6.5.11 Proposed assessment methodology

Key guidance and assessment tools

Cadw's *Conservation Principles* (2011: page 18) states in Managing Change to an Historic Asset: "*Changes to historic assets are inevitable ….. To ensure the long-term future of historic assets, change needs to be managed to ensure that their significance is not diminished as a consequence*" and paragraph 47 "*When considering the severity of potential impacts upon an historic asset, there should always be proportionality and reasonableness*". The heritage assessment will use these key aims of the guidance to ensure the results of the study are focused on a proportionate response to potential impacts on heritage significance from the degree of change that might result from the Proposed Development.

The Proposed Development would result in change to the existing baseline, and change would be considered as impacts according to the degree of change caused to heritage significance. The assessment will identify impacts and effects as direct or indirect, adverse or beneficial, and short-term, long-term or permanent. Direct impacts are those which physically alter an asset and therefore its heritage significance; indirect impacts are those which affect the heritage significance of an asset by causing change within its setting.

As appropriate the baseline survey and impact assessment will be guided by the Chartered Institute for Archaeologists' *Standard and Guidance for Historic Environment Desk-Based Assessment* (2020).

To assess the degree of potential change to the landscape and the potential impact on the setting of assets, a ZTV will be applied to filter out assets which would not experience intervisibility with the turbines, supplemented by a field visit for those designated assets that have the potential to be affected. The ZTV would use the hubs and full rotor blade length as the criteria for this ZTV filtering exercise, as blade-tip ZTVs can be very misleading once vegetation and structures are introduced which effectively screen out the theoretical visual change to a bare earth model.

Key aspects of a wind farm that might affect the historic environment, such as visual dominance, scale, intervisibility, vista and sight-lines, movement, sound or light effects, and unaltered setting, would form part of the criteria for assessment. More detailed guidance has also been issued by Cadw, including the *Setting of Historic Assets in Wales* (May 2017) and *Heritage Impact Assessment in Wales* (May 2017). These promote a staged approach to assessing assets, their historic significance and the potential impacts from development. The assessment would also address issues such as permanence or reversibility, construction, operation and decommissioning, temporary or long-term effects.

Cadw's guidance *Managing: Setting of Historic Assets in Wales* will be followed which includes a four-stage process in assessment of impacts:

- Stage 1: Identify the historic assets within the study area, and those that might be affected by the Proposed Development;
- Stage 2: Define and analyse the setting;
- Stage 3: Evaluate the potential impact of change or development; and
- Stage 4: Consider options to mitigate the impact of a proposed change or development.

This guidance is sufficiently detailed for a clear distinction to be made between the aims of the assessment, which is to establish heritage significance, how setting contributes to that heritage significance, and how this might be altered by a development, as opposed to merely stating that all development would result in change to the surroundings of a heritage asset. In summary, this approach is required because of the simple fact that a new development that might be visible from a heritage asset is not in itself an adverse impact. The guidance is designed to manage change and allow sustainable development which does not substantially harm the historic environment, and the staged assessment process allows a balanced view to be established as to what is of importance for understanding a historic asset in its setting.

Significance criteria to be applied are presented in **Appendix G**.

6.5.12 Difficulties and uncertainties

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

- This EIA Scoping Report is based on known data for the historic environment, but much of the Site includes conifer plantation which may have masked historic assets for many years. It is therefore possible that upstanding monuments might lie unidentified within the forestry, and also there is always the potential for previously unknown buried archaeological sites to be found as part of groundworks.
- Although the potential probability for unknown archaeological remains of specific period and/or type would be assessed based on examination of the HER data for an area of c.2km around the Site boundary, there would remain a high level of uncertainty over whether groundworks might disturb unknown remains. It is therefore essential that a mitigation strategy is adopted which includes archaeological investigation prior to, or during, any construction work which includes ground disturbance.
- The amount of land in which good visibility for a site walkover survey can be conducted is greatly constrained by the presence of large scale, established commercial forestry within the Site. Effective survey of the ground may therefore have to wait until felling occurs as part of construction activity.

6.5.13 References

- Cadw (March 2011) Conservation Principles for the Sustainable Management of the Historic Environment in Wales Welsh Government
- Cadw (May 2017) Managing: Heritage Impact Assessment in Wales Welsh Government
- Cadw (May 2017) Managing: The Setting of Historic Assets in Wales Welsh Government
- CIfA (2020) Standard and Guidance for Historic Environment Desk-Based Assessment

6.5.14 Scoping questions

- Do you agree with the proposed list of consultees?
- Do you agree with the proposed Immediate and Wider Study Areas?
- Do you agree that the data sources that have been used to inform Scoping and the EIA baseline characterisation are appropriate?

- Do you agree that the survey proposed to inform the EIA baseline characterisation is appropriate once conifers have been felled and removed from areas likely to be disturbed by groundworks?
- Do you agree with the proposed mitigation measures and is this mitigation appropriate?
- Do you agree with the receptors/matters that are proposed to be scoped in and out of further assessment?

6.6 Noise and vibration

6.6.1 Consultation

No formal consultation has been undertaken with regards to noise and vibration at this stage. A formal consultation will be undertaken with Ceredigion County Council prior to the commencement of the survey work.

6.6.2 Study area

The study area will include the nearest noise sensitive receptors considered to be representative of residential dwellings in the immediate vicinity that may be subject to the effects of noise from construction and/or operation of the Proposed Development, selected based on the results of (initial) predictive noise modelling, relevant noise criteria and professional judgement. However, the 'study area' for the wind turbine component should, as a minimum, be the area within which noise levels from the proposed, consented and existing wind turbines may exceed 35 dB L_{A90} at up to 10 m/s wind speed (i.e. any area which as a direct component of the proposed wind farm, or as a cumulative result of the operation of the proposal and other neighbouring wind farms will exceed 35 dB(A)).

6.6.3 Data sources to inform the EIA baseline characterisation

The following data sources will inform the EIA baseline characterisation:

- Any available baseline noise survey studies previously undertaken in the area. The relevance, recency and use of previous studies will be considered in consultation with Ceredigion County Council Environmental Health Department;
- Any available third-party noise impact assessment(s). The relevance, recency and use of third-party studies will be considered in consultation with Ceredigion County Council Environmental Health Department;
- Aerial imagery and online geographic information systems;
- On-site photography taken on site walkover(s).

6.6.4 Surveys to inform the EIA baseline characterisation

Representative baseline noise survey locations for assessment of the wind turbine element will be selected by identifying those residential dwellings which may exceed 35 dB LA90 at up to 10 m/s wind speed in noise level from the proposed, consented and existing wind turbines (i.e. on its own or cumulatively). A noise contour plot of the Site will be prepared based on data taken from the candidate turbine at 10 m/s wind speed. Noise levels from existing operational wind farms near to the Proposed Development and any nearby consented wind farms will be added to this to give an understanding of the predicted noise levels on and near to the Proposed

Development for receptors. An assessment will be undertaken on any dwellings that are subsequently predicted to be affected by emissions from either the Proposed Development or cumulative effects in combination with nearby developments.

The locations selected as representative baseline noise survey locations will also be subject to consultation and agreement with Ceredigion County Council's Environmental Health Department.

In addition, the locations and assessment approach agreed with Ceredigion County Council's will, for the purposes of setting appropriate noise limits due to the presence of other wind farms in the area, be selected such that the contribution to background noise levels from existing wind turbines will be discounted when determining background noise levels.

Wind data, including wind speed and direction, will be obtained to inform the baseline noise survey, at a location representative of the Site.

6.6.5 Baseline conditions

The Site is located in an area of low population density with the nearest noise-sensitive receptors (residential dwellings) located mainly north-west of the Site in the village of Llanddewi-Brefi, and hamlet of Petre-rhew. There are a number of isolated dwellings spread around the remainder of the Site boundary.

The background noise environment is likely characterised by noise sources such as wind-swept vegetation, birdsong, watercourses, farm animals and traffic from local roads, which vary in influence according to weather conditions and time of day.

The closest operational wind farm sites in the local area are limited and therefore their influence on baseline conditions will be small.

6.6.6 Additional (secondary and tertiary) mitigation

Noise on construction sites is controlled by 'best practical means' to minimise noise from construction activities and, if required, the introduction of additional (secondary and tertiary) mitigation, such as temporary noise barriers, during certain activities to reduce noise levels further will be considered.

6.6.7 Description of likely significant effects

The following has the potential to result in significant effects:

- Noise associated with the operation of the wind turbine element (including cumulative noise due to operation of neighbouring wind farms)

Operation of the battery energy storage. The following are not considered likely to result in a potential significant effect:

- Noise and vibration from the construction activities and associated construction traffic;
- Vibration resulting from the operation of the Proposed Development - levels of vibration will typically be imperceptible over the distance ranges between the wind turbines and the nearest residential dwelling;
- Infrasound and low frequency noise resulting from the operation of the wind turbine element – a 2010 study performed on behalf of the UK Government on 'Wind Turbines and Human Health' found no evidence for health effects from infrasound or low frequency noise stemming from wind turbines.

At this stage, the details around the specific hub height, and candidate turbine are yet to be finalised. However, an initial noise contour plot has been prepared for an indicative scenario,

assuming 6no. Vesta V150 turbines at 155m hub height). Through the development of an initial noise contour plot (see **Figure 1** in **Appendix F**), the 35 dB(A) noise contour is seen to include a number of potential sensitive receptors and as such a detailed assessment of noise impacts, inclusive of baseline noise monitoring, will be undertaken.

6.6.8 Receptors/elements to be scoped into further assessment

Receptor/Element	Phase	Justification
Human receptors affected by noise	Operation	During their operation, wind farms have the potential to create noise effects through both aerodynamic noise and mechanical noise. Aerodynamic noise would be caused by the interaction of the turbine blades with the air. Mechanically generated noise would be caused by the operation of internal components, such as the gearbox and generator, which are housed within the nacelle of the turbine. However, the level of mechanical noise radiated from current technology wind turbines is generally engineered to a low level. The assessment of operational noise will also include the cumulative effects of other turbines in the area.

6.6.9 Receptors/elements to be scoped out of further assessment

Receptor/Element	Phase	Justification
Noise and vibration associated with construction and decommissioning activities – Wind Turbine Erection	Construction and decommissioning	Construction activities (wind turbine erection) are likely to be relatively distant from the nearest sensitive receptors (500m+). Therefore, noise and vibration effects during the construction and decommissioning of the turbine erection are unlikely to be significant, provided that works are undertaken during standard working hours only and that good practice construction measures/Best Practical Means (BPM) are implemented.
Vibration associated with access road construction	Construction	Vibration associated with access road construction is likely to be minimal, and emission levels at receptors below levels of perception.
Noise and vibration associated with construction traffic	Construction	Construction vehicle movements are likely to be low and transient, and therefore unlikely to have an impact on existing noise sensitive receptors.
Vibration from Proposed Development	Operation	It is considered that vibration resulting from the operation of the wind turbines will be imperceptible at the existing separation distances between the turbines and the nearest sensitive receptors.

Vibration and air overpressure from borrow pits	Construction	Blasting may potentially be used on onsite borrow pits; however, this is considered unlikely. Where blasting is required onsite, it will be small charges and assessed as part of a blast management plan, prepared by the appointed Principal Contractor.

6.6.10 Opportunities for enhancing the environment

No opportunities to enhance the environment from a noise and vibration perspective are envisaged at present.

6.6.11 Proposed assessment methodology

The following relevant standards, guidance and industry best practice will inform the noise and vibration assessment:

- BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'
- Calculation of Road Traffic Noise Memorandum (CRTN)
- Design Manual for Roads and Bridges (DMRB), LA 111 'Noise and Vibration'
- ETSU-R-97 'The Assessment and Rating of Noise from Wind Farms'
- Institute of Acoustics 'Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'
- ISO 9613-2:1996 - Acoustics. Attenuation of sound during propagation outdoors. Part 2: General method of calculation
- Welsh Government Technical Advice Note (TAN) 1/1997 'Noise'

Operation

Current best practice calls for the control of wind turbine noise by the application of noise limits at the nearest noise sensitive properties. It is considered that absolute noise levels applied at all wind speeds are not suited to wind turbine developments and therefore best practice is to adopt noise limits relative to background noise levels in the vicinity of the noise sensitive locations. Therefore, one critical aspect of the noise assessment of wind energy proposals relates to the identification of baseline noise levels through on-site noise surveys.

On the assumption that some receptors will be within the 35 dB(A) noise contour for sole or cumulative impact, the following will apply. Continuous baseline noise monitoring will be carried out at representative noise sensitive locations for a suitable period and should capture a representative sample of wind speeds in the area (i.e. cut in speeds to wind speed of rated sound power of the proposed turbine). Background noise measurements (i.e. $L_{A90,10min}$) will be carried out in light of guidance contained within the Institute of Acoustics (IoA) document 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' and related to wind speed measurements that are collated at the site of the wind turbines of the Proposed Development. Regression analysis will then be applied to this data set to derive background noise levels at various wind speeds, and from this, the appropriate day and night time noise criterion curves will be established.

In the case of wind farms that may have significant cumulative effects, further analysis methods are applied in deriving background noise levels free of influence from other wind farm developments (both existing and consented). The most common methods are directional filtering (excluding data known to be influenced by cumulative developments under certain wind

directions) and subtraction (subtracting a prediction of the noise contribution from cumulative developments from measured background noise levels).

Noise emissions associated with the wind turbines are predicted in accordance with ISO 9613: Acoustics – Attenuation of sound outdoors, Part 2: General method of calculation (1996) and again considering guidance contained within IoA document 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'. This is a noise prediction standard that considers noise attenuation offered, amongst others, by distance, ground absorption, directivity and atmospheric absorption. Noise predictions and contours are typically prepared for various wind speeds and the predicted levels are compared against the relevant noise criterion curve to demonstrate compliance with the IOA Guidelines.

An operational phase assessment of the other noise emitting infrastructure associated with the Proposed Development (substation transformers, solar photovoltaic-system inverter(s) and battery storage cooling fan system) will be undertaken to the requirements of BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'. Noise predictions of the proposed infrastructure will be derived from computer noise modelling or spreadsheet calculations as appropriate and will be compared with the measured prevailing background sound level (L_{A90}) at the nearest or most exposed receptors to determine the magnitude of impacts and significance of effects.

6.6.12 Difficulties and uncertainties

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

- The study area for the noise assessment has yet to be established as initial modelling is yet to be performed. Upon selection of candidate turbine model, the uncertainties around study area will be resolved.
- Consideration of cumulative noise impacts may require the determination of partial noise limits which may be difficult to obtain unless the amenity noise limit is precisely determined. The approach to the influence of cumulative noise on baseline noise measurements will be agreed with Ceredigion County Council's Environmental Health Department.

6.6.13 References

- British Standards Institute, 2014. BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites: Noise. British Standards Institute
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- National Highways/Welsh Government, 2019. Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration

6.6.14 Scoping questions

- Do you agree with the proposed approach to the noise assessment i.e. the use of prescribed methodology in ETSU and GPG? Are there additional elements to be included for consideration?
- Do you agree with the elements of the assessment proposed to be scoped out?

6.7 Land, soil and water

6.7.1 Consultation

No formal consultation has been undertaken with regards to land, soil and water at this stage. However, consultations will be carried out with the following stakeholders and organisations:

- NRW in relation to peat soils, forestry and hydrology;
- Ceredigion County Council ecologists in relation to peatland habitats;
- The forest agent/landowner in relation to felling plans and compatibility of any peatland restoration measures; and
- Ceredigion County Council for private water supply records.

6.7.2 Study area

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

6.7.3 Data sources to inform the EIA baseline characterisation

- Topographical information at the Site, as provided by OS contour mapping.
- 1:25,000 and 1:50,000 scale OS mapping to identify watercourses within the Site.
- Solid and superficial geology information provided by British Geological Survey (BGS) mapping.
- NRW online flood maps.
- Water quality information at and near the Site set out in NRW river basin management plans and NRW water watch Wales map gallery.
- Hydrogeology information given by BGS data accessed via Defra Magic Maps.

- Designated nature and conservation sites identified using information from NRW's mapping database.
- Soil information provided by the Cranfield University Soilscapes mapping.
- The potential for peat being present across the Site has been identified using the Peatlands of Wales Carbon Stock DataMap. Peat depth data have been assessed using a Phase 1 Peat Survey undertaken in February and March 2023.
- Consultation with NRW and neighbouring residents within the Afon Teifi, Afon Brefi and Pysgotwr Fawr catchments will be undertaken to obtain relevant flood, water supply and further peat information, including any licenced abstractions and private water supplies.
- Groundwater terrestrial ecosystems (GWDTEs) will be identified based on habitat mapping and ecological surveys and reviewed by the hydrologists in the field.

6.7.4 Surveys to inform the EIA baseline characterisation

Peat probing has been completed to obtain an initial understanding of the peat depth and distribution on Site. Phase 1 probing was undertaken over the Site in February and March 2023. The 100m grid comprised 119 probe locations. Probes indicated depths of up to 2.9m, with 61% of probes in organic soils (<0.3m), 10% in peat of 0.3-0.5m, 14% in 0.5-1.0m, 9% in 1.0-1.5m, 3% in 1.5-2.0m, and <3% in peat >2.0m.

Further high-density peat depth surveys will be undertaken within the Site in accordance with the relevant guidance (Guidance on Developments on Peatland: Peatland Survey (2017) across the footprint of proposed infrastructure and a micro-siting allowance to inform micro-siting of the layout to seek avoidance of deep peat where possible.

A walkover hydrological survey of the Site will be carried out to identify the existing baseline conditions, including identifying and documenting watercourse crossings (proposed and existing), identification of other water features such as wetlands and springs, undertaking an overview assessment of areas identified as floodplain within the NRW Flood Maps and providing a general overview of landscape and land cover of importance to hydrology and soils including geomorphology.

Private water supply visits will also be undertaken, if required, following consultation with the private water supply owners to verify the source location.

6.7.5 Baseline conditions

Geology, hydrogeology and soils

The bedrock in the area is a sequence of Silurian sedimentary rocks of the Cwmystwyth Grits Group. The Rhuddnant Grits Formation is within this Group and comprises thinly interbedded tubidite sandstones and mudstones with abundant thicker beds of argillaceous coarse sandstone. The formation covers the majority of the Site and is relatively impermeable.

The BGS Hydrogeology (1:625,000 scale) map shows the bedrock within the Site to be a low productivity aquifer, of highly indurated argillaceous rocks with limited groundwater. Aquifer Designation Wales describes the area as a Secondary B aquifer, comprising predominantly lower permeability strata that may have the ability to store and yield limited amounts of groundwater through localised fissures and weathered zones.

There is one geological fault that transects the Site from north-east to south-west and aligns with an existing watercourse.

The superficial deposits within the Site are recorded on the BGS maps to comprise glacial till with minor areas of alluvium along watercourses and significant areas where there are no recorded deposits, meaning bedrock could be exposed or near to the surface.

In keeping with the widespread forest cover, the Peatlands of Wales Carbon Stock DataMap mapping indicates that the majority of the Site is free of peat, although this is likely due to lack of information due to the forestry cover. Peat is also present adjacent to the Site to the south near the summit of Bryn Brawd.

Soil mapping shows that the majority of the Site is underlain by very acid loamy upland soils with a wet and peaty surface. Smaller areas of the north and south-west of the Site are underlaid by blanket bog peat soils.

There are some abandoned mine shafts located to the north of the Site boundary. BGS records online show a borehole without any records in this location associated with the Rhysgog Mine.

Surface hydrology, site drainage and flooding

The majority of the Site is located within the Afon Teifi catchment. The northern part of the Site drains to Afon Brefi via Nant Rhysgog, which joins the Afon Teifi at Pont Gogoyan. The southern and western parts of the Site drain via Nant Clywedog-uchaf and Nant Clywedog-ganol to Nant Clywedog-isaf, which discharges to the Afon Teifi at Llanfair Clydogau. Afon Teifi discharges to the sea at Cardigan, 46km to the west. A small area in the south-east of the Site drains via Nant y Garn to Afon Pysgotwr Pawr, and then to Afon Tywi. Afon Tywi discharges to the sea at Llansteffan, 52km to the southwest of the Site.

The NRW Flood Risk Assessment Wales Map indicates some flooding within the Site, particularly along the tributaries of Nant Clywedog-uchaf in the south and south-west of the Site, and flooding of tributaries of Nant Rhysgog in the north of the Site. Other watercourses within the Site have a flood risk very tightly constrained by their narrower river valleys.

Land use and designated sites

The Site essentially straddles a broad ridge between the summits of Bigwrn Fach (463m AOD) to the north-west and Bryn Brawd (484m AOD) to the south- east, with a spur to Garn (473m AOD) in the north-east. The area comprises undulating hills and valleys with generally moderate to shallow slopes within the Site boundary.

The land use of the Site is dominated by commercial forest, with some open moorland to the north. Surface run-off within the forested areas has likely been modified through uptake and forestry drainage.

The Afon Teifi watercourse is a Site of Special Scientific Interest (SSSI), located approximately 300m north of the Site, notified for both its geological and biological importance.

Figyn Blaen-Brefi SSSI is located approximately 2.3 km north-east of the Site and designated for its wildlife.

Allt Rhyd y Groes National Nature Reserve, part of the Cwm Doethie – Mynydd Mallaen SSSI and Special Area of Conservation (SAC), is located approximately 3.9km south-east of the Site. Cwm Doethie – Mynydd Mallaen is designated an SAC for old sessile oak wood with Ilex and Blechnum, as well as European dry heaths, and designated a SSSI for biological reasons.

Water quality and water use

The Afon Brefi catchment, which drains the northern part of the Site, is currently of good overall status, as identified by the River Basin Management Plans (RBMP) 2018.

The Afon Teifi catchment, which drains the south and west of the Site, has moderate overall status.

The Pysgotwr Fawr catchment, which drains the south-eastern section of the Site, has poor overall status.

There are no known public water supply boreholes within the vicinity of the Site. There are Welsh Water Drinking Water Protected Areas approximately 2.6km north-east of the Site and 6.6km south-east of the Site, but neither are hydrologically connected to the Site.

There are some properties that may be reliant on private water supplies, and an initial private water supply investigation yielded 24 properties from which confirmation of their water source and use will be required.

6.7.6 Additional (secondary and tertiary) mitigation

Construction

- Surface water and sediment management;
- Peat management, restoration and peat handling;
- Peat slide risk factors and management.

Operation

- Ongoing monitoring of water quality, drainage infrastructure and track status;
- Sediment management during maintenance;
- Pollution prevention.

6.7.7 Description of likely significant effects

Potential effects on hydrology, hydrogeology and soils will be assessed as part of the EIA process. This will include the identification of both generic effects of construction (e.g. sediment release, pollution, fuel spills etc.), disturbance of soils and peat and effects on specific locations, such as sensitive habitats (i.e. GWDTEs, private water supplies, water features, etc) which are sensitive to pollution risk and/or disturbance from required engineering works.

Potentially significant effects are considered more likely to occur during the construction phase. The Applicant is committed to implementing good practice construction methods to complement the high standards expected by NRW.

6.7.8 Receptors/elements to be scoped into further assessment

Receptor/Element	Phase	Justification
Afon Teifi SSSI	Construction and decommissioning	Where the potential for hydrological connectivity is identified, the construction and decommissioning of the Proposed Development has the potential to impact upon the qualifying interests of the Afon Teifi/River Teifi SAC/SSSI.
Surface water (where it supports a private water supply)	Construction, operation and decommissioning	Where the potential for hydrological connectivity is identified, the infrastructure of the Proposed Development has the potential to impact on private water supplies through alteration of water flow or quality on a permanent basis.
Shallow groundwater (where it supports a groundwater dependent terrestrial ecosystem)	Construction, operation and decommissioning	Where the potential for hydrogeological connectivity is identified, the infrastructure of the Proposed Development has the potential to impact on groundwater dependent terrestrial ecosystems through

		the alteration of groundwater flow or a change in groundwater quality on a permanent basis.
Peat, peat soil and peatland	Construction, operation and decommissioning	Peat is present on Site and therefore unless the layout of the Proposed Development can completely avoid peat, there will be the potential for effects on peat. These will include direct removal; erosion due to the infrastructure potentially changing the hydrological environment; dewatering of peat due to excavations or pumping; and an increase in the peat slide risk.

6.7.9 Receptors/elements to be scoped out of further assessment

Receptor/Element	Phase	Justification
Afon Teifi SSSI	Operation	The distance to the qualifying interests of the Afon Teifi SSSI are sufficient that any significant effect from the operation of the Proposed Development is unlikely.
All other surface waterbodies	Construction, operation and decommissioning	Assuming that best practice is followed, including the siting of all infrastructure over 50m from all 1:25,000 Ordnance Survey mapped water features, and the provision, and adherence to, a detailed and approved CEMP (an 'Outline' of which will be submitted in support of the DNS application), it is considered that effects on all other surface waterbodies, aside from the Afon Teifi SSSI and those supporting private water supplies (see **Section 6.7.8** above), can be scoped out.
Deep groundwater	Construction, operation and decommissioning	The underlying bedrock is low permeability and does not support abstractions.
Flood risk	Construction, operation and decommissioning	All infrastructure, with the exception of any watercourse crossing, will be located outside of any flood zones and drainage will be managed according to sustainable drainage systems (SuDS) to avoid any increase in flooding due to infrastructure. Any watercourse crossing will be constructed to 1:200 year flow plus climate change.

6.7.10 Opportunities for enhancing the environment

An enhanced Peat Management Plan will be submitted in support of the DNS application incorporating forest-to-bog restoration which would involve restoring bat exclusion areas through ground smoothing or bunding (using excavated peat), extension of felling to remove non windfirm trees adjacent to the bat exclusion areas to expand the open area, and where possible felling lower yield class forest in areas of deep peat where the understorey habitats indicate good potential for bog recovery. Much of this would be dependent on peat depth and habitat condition and would involve collaboration with the Ecology team and the Forestry consultant.

6.7.11 Proposed assessment methodology

The findings of the baseline assessment (refer to **Section 6.7.3**) and survey work (refer to **Section 6.7.4**) will contribute to environmental constraints mapping and will provide input and feedback into design iterations and subsequent environmental assessment.

There are industry-established mitigation measures that will be employed in the design of the Proposed Development and the methodologies used for the construction and operation to minimise, or mitigate for, impacts on peat and the geological environment.

The infrastructure will be designed to avoid peat where possible as defined by the detailed probing and coring across the infrastructure footprint. Where peat is unable to be avoided, floating tracks will be used and if necessary, other appropriate engineering solutions.

An outline Peat Management Plan will be developed and submitted in support of the DNS application to present the total peat volumes that will be excavated, the methodologies for extraction and management to minimise impact on peat, and the strategy for storage and restoration or reuse. Peat restoration strategies will be in accordance with guidance including: 'Assessing the impact of windfarm developments on peatlands in Wales' (CCW, 2010); 'Good practice during windfarm construction' (Scottish Renewables, SNH, SEPA & Forestry Commission Scotland, 4th Edition 2019); 'Good practice guidance on peat excavation and reuse' (Scottish Renewables and SEPA, 2012) and 'Regulatory Position Statement – Developments on peat' (SEPA, 2010) with any additional requirements specified by NRW addressed as part of the assessment. Peat restoration will focus on areas where peat has been removed, eroded or degraded for restoration.

Any peat landslide risk may require additional mitigation measures to be employed, such as installation of catch-fences as a precaution against runout into sensitive watercourses and the preparation of a geotechnical risk register providing explicit mitigation measures tailored to location with elevated risk.

With respect to peat, mitigation of impacts through sensitive layout design will provide the best opportunity to limit the potential for significant effects. This is applicable both to minimising peat excavation and ensuring that undue risks associated with peat instability are avoided. Findings from the geomorphological assessment of peat will be compared with those from ecological surveys to enable a holistic assessment of peatland condition across the Site and avoidance of the highest quality habitats.

Significance criteria to be applied are presented in **Appendix G**.

6.7.12 Difficulties and uncertainties

Coring at the Site has identified the presence of a silty clay layer that is indistinguishable from peat when probing. This may lead to an overestimation in the peat depths that are actually present on Site.

6.7.13 References

- Assessing the impact of windfarm developments on peatlands in Wales (CCW, 2010)
- Good practice during windfarm construction (Scottish Renewables, SNH, SEPA & Forestry Commission Scotland, 4th Edition 2019)
- Good practice guidance on peat excavation and reuse (Scottish Renewables and SEPA, 2012)
- Peat Landslide Hazard and Risk Assessments: Good practice Guide for Proposed Electricity Generation Developments (Scottish Government, Second Edition, 2017);
- Peatland Survey. Guidance on Developments on Peatland. Scottish Government, Scottish Natural Heritage (SEPA, 2017);
- A Strategic Assessment of the Afforested Peat Resource in Wales (Forestry Commission 2012)
- Control of water pollution from constructions sites. Guidance for consultants and contractors C532 (CIRIA, 2001)
- Environmental good practice on site C650 2nd Edition (CIRIA, 2005)
- Control of water pollution from linear construction projects: technical guidance C648 (CIRIA, 2006)
- The Private Water Supplies (Wales) Regulations 2017
- Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Land Use Planning System Guidance Note 31 (LUPS-GU31), version 3 (SEPA, 2017)
- BGS superficial and bedrock geology: BGS Geology Viewer (BETA)
- Flood risk: Geocortex Viewer for HTML5 (https://cyfoethnaturiolcymru.gov.uk/flooding/check-your-flood-risk-on-a-map-flood-risk-assessment-wales-map/?lang=cy)
- Water quality: Water Watch Wales (naturalresourceswales.gov.uk), Cycle 3, Layer: River Waterbodies Cycle 3 2021.
- Drinking water protected areas: As above, layer: Drinking Water Protected Area River Catchments 2021
- Hydrogeology: GeoIndex - British Geological Survey (https://www.bgs.ac.uk/) Layer: Hydrogeology 1:625,000 scale
- Aquifer designation: As above, layer: Aquifer properties
- Boreholes: As above, layer: Borehole Records
- Designated sites: New map | DataMapWales (https://datamap.gov.wales/) Layer: SAC, SPA, SSI, GCR
- Soil information: Soilscapes soil types viewer - Cranfield Environment Centre. Cranfield University
- Peatland info: New map | DataMapWales (https://datamap.gov.wales/)

6.7.14 Scoping questions

- Coring on Site has demonstrated the presence of both an upper layer of forestry brash and needles and an underlying layer of silty clay that result in overestimation of the peat

from probing. Will methods to define the actual peat depth be acceptable to be applied over appropriate areas of the Site?

- Will it be considered acceptable for any peat to be excavated and reused on Site to improve the currently degraded peat habitats?
- Does NRW have any information that may assist in the assessment, such as private water supplies database?

6.8 Climate

6.8.1 Consultation

No consultation to inform the climate assessment has been undertaken to date and no specific consultation in relation to climate change is envisaged, over and above the consideration of comments received to this EIA Scoping Report.

6.8.2 Study area

Scope 1 greenhouse gas (GHG) emissions will include those emitted directly from all facilities and infrastructure as part of the Proposed Development, and likely within the Site boundary. Scope 2 and any relevant Scope 3 emissions are indirect emissions and thus may occur outside the proposed Site boundary. These will be estimated based upon project-specific data that may relate to activities outside the Site boundary (e.g., water provision and wastewater treatment outside of the Site boundary).

The receptor to GHG emissions is the global climate, and so when assessing the impact and significance of GHG emissions, the national (Climate Change Act 2008 and associated Carbon Budgets) and global context (Paris Agreement) is considered.

6.8.3 Data sources to inform the EIA baseline characterisation

The GHG baseline characterisation will be conducted using a desk-based assessment of operation data provided by the Applicant to determine current, and proposed future, emissions sources. It will be undertaken in accordance with the IEMA Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022), having consideration also for PAS 2080:2016 Carbon Management in Infrastructure and Royal Institution of Chartered Surveyors (RICS) Whole life carbon assessment for the built environment (2017). Standard emission factors will be applied, sourced from reputable agencies, such as Defra UK Government GHG Conversion Factors for Company Reporting (2022).

The national GHG baseline data will be obtained from the UK government (BEIS, 2022).

Flood risk within the Site has been derived for this EIA Scoping Report using Natural Resource Wales Flood Risk Assessment Map (2023), which ranks an area's flood risk probability from different sources on a scale of low, medium, and high.

6.8.4 Surveys to inform the EIA baseline characterisation

No surveys have been undertaken to date and none are proposed to inform the climate assessment.

6.8.5 Baseline conditions

The baseline conditions describe the conditions of a business-as-usual scenario whereby the Proposed Development is not undertaken. The baseline comprises existing carbon stock and sources of GHG emissions within the Site boundary of the existing activities on-site.

The Site is located approximately 3km east of Llanddewi-Brefi, north of Ceredigion/Carmarthenshire border, and is predominantly located in commercially managed forests. Half of the Site is within Pre-Assessed Area 6, as defined by the Welsh Government (2021) in 'Future Wales: the National Plan 2040'. This is described as *"The wooded valleys and the upland heathlands of the Black Mountains [which] support multiple ecosystem services, including carbon sequestration and storage to help mitigate climate change, water quality enhancements and the habitats help prevent flooding."* Based on this classification, it is highly likely that the Site presently sequesters carbon. No significant GHG emissions are expected to occur from the Site.

With regards to the national baseline, the UK Government set out a legally binding framework to cut GHG emissions by at least 80% by 2050 in the Climate Change Act (2008); this was amended by the Climate Change Act 2008 (2050 Target Amendment) Order 2019, changing the 80% reduction to a 100% reduction, or net zero, by 2050.

The total UK GHG emissions for 2021 was 505 million tCO_2e, up by 6% from the year before. Overall however, the trend of total UK GHG emissions shows a decreasing trajectory from 1990 to 2020. Emissions relating to 'Electricity, gas, steam and air conditioning supply' specifically show a significant reduction trend over the past decade, halving from 176 million tCO_2e in 2010 to 81 million tCO_2e in 2020 (BEIS, 2022).

6.8.6 Additional (secondary and tertiary) mitigation

Construction

GHG emissions are inevitable during the construction phase. A CEMP (an 'Outline' of which will be submitted in support of the DNS application) would be implemented to identify good working practices in line with appropriate standards, including low carbon practices. Some mitigation measures that are anticipated to be taken account are:

- Ensure minimum peat disturbance and forestry felling are considered during the design stage, whilst remaining cognisant of optimal design for wind energy generation.
- Embed carbon reduction practices as a core principle for the design team. Where reduction ideas are suggested, they should be recorded and potential impact quantified. Earlier engagement with carbon reduction allows for the greatest returns.
- Where technical specifications allow, maximise the recycled content of construction materials such as concrete and steel.
- Maximise the specification of materials with an environmental product declaration with the aim of reducing embodied carbon emissions.
- Incentivise use of local suppliers with a view to shorten project supply chains and environmental footprint.
- Onsite mobile and non-mobile plant should conform to the latest emissions standards, with mobile vehicles conforming to EURO 6 standards as a minimum. All plant should investigate the option of using HVO fuels or electric versions where possible.
- Encourage main contractors to report on energy data, water usage and waste disposal and their GHG emissions as part of the CEMP.

Operation

The operation of the Proposed Development is anticipated to have a positive effect on the climate. Nonetheless, there is scope to further improve the Site in terms of ecological enhancements and habitat creation, which can have a positive effect in terms of carbon sequestration. These will be documented in a Habitat Management Plan, to be submitted in support of the DNS application.

Decommissioning

The decommissioning process is likely to result in GHG emissions, particularly from the removal or renewal of turbines. Additional mitigation can be employed that aligns with the hierarchy for managing project-related emissions (avoid, reduce, substitute and compensate). These will be detailed within the ES.

6.8.7 Description of likely significant effects

Construction

GHG emissions will be inevitable during the construction phase given the scale of the Proposed Development and the methods available for it to be carried out (through the use of heavy machinery). Main emissions sources are likely to be through fuel consumption and the embodied emissions of materials. While mitigation measures are likely to be implemented to limit these emissions, they will still be significant based on current available information.

It is not expected that the emissions from construction will compromise the ability of the UK to meet its carbon reduction targets. However, in view of the cumulative contribution of all emissions towards climate change, and the fact that the global climate is highly sensitive to fluctuations in GHG emissions, the emissions associated with the construction of the Proposed Development have the potential to have a significant negative effect upon the climate.

Operation

The operation of the Proposed Development is unlikely to contribute a significant amount of GHG emissions and can be viewed as achieving emissions savings by reducing the consumption of fossil fuel generated mains electricity.

Decommissioning

GHG emissions will be inevitable during the decommissioning phase, again due to the necessary use of heavy machinery. As is the case with construction, the receptor is not confined to the immediate vicinity of the Site. Instead, it is the global atmosphere. As such, the receptor is highly sensitive, in view of the cumulative contribution of all emissions towards climate change. With this in mind, the emissions associated with the decommissioning of the Proposed Development are likely to have a significant negative effect upon the climate.

Cumulative effects

GHG emissions are inherently cumulative, as all emissions have the same per-unit impact on the same ultimate receptor. The impact is climate change, or global warming, caused by the radiative forcing effects of GHGs in the atmosphere, and the affected receptor is the global climate and all the ecosystems and biomes that depend on it.

The Proposed Development will achieve emissions savings by reducing the consumption of fossil fuel generated mains electricity. These savings will outweigh the necessary GHG emissions resulting from manufacturing, constructing, and decommissioning the Proposed Development. Once emissions from these sources are offset by the Proposed Development, then each subsequent unit of wind generated electricity would displace a unit of conventionally generated electricity, thereby contributing to the overall reduction in emissions into the atmosphere.

6.8.8 Receptors/elements to be scoped into further assessment		
Receptor/Element	**Phase**	**Justification**
GHG emissions	Construction	Embodied carbon of wind turbines and any ancillary developments can potentially be significant. It is important to include construction-related emissions when considering the overall lifecycle emissions of the Proposed Development, to determine an accurate 'carbon-payback' time of the Proposed Development.
GHG emissions	Operation	Aligned with IEMA guidance, a project that causes GHG emissions to be avoided has a beneficial effect that is significant.
GHG emissions	Decommissioning	The decommissioning process is likely to result in GHG emissions, particularly from the removal or renewal of turbines. It is important to include all emissions when considering the overall lifecycle emissions of the Proposed Development, to determine an accurate 'carbon-payback' time of the Proposed Development.
6.8.9 Receptors/elements to be scoped out of further assessment		
Receptor/Element	**Phase**	**Justification**
Climate change risk	Construction, operation and decommissioning	UKCP18 projections suggest that climate change will lead to hotter drier summers, warmer wetter winters, increased likelihood of extreme weather events (e.g., heat waves, high rainfall events) and sea-level rise. Due to the embedded resilience of wind turbines to high heat and wind speeds, and the distance of the Site from coastline, these factors are not expected to significantly impact on the construction, operation, or decommissioning of the Proposed Development. Flooding is not expected to have any significant impact on the Proposed Development, due both to the embedded resilience of wind turbines and the lack of recorded historical flooding within the Site boundary.
6.8.10 Opportunities for enhancing the environment		
The Proposed Development is expected to have a net beneficial impact on the climate, in that it will reduce GHG emissions associated with electricity consumption on a national scale. Opportunities exist to further increase the environmental benefit of the Proposed Development by ensuring that emissions associated with the construction and decommissioning process are kept to a minimum. This can be ensured by the adoption of various mitigation measures as detailed in **Section 6.8.6** above.		

6.8.11 Proposed assessment methodology

The assessment of the effects of GHG emissions arising from the Proposed Development will be carried out in accordance with:

- The Scottish Government's carbon calculator tool (based upon Nayak et al., 2010 and Smith et al., 2011);
- The Institute of Environmental Management and Assessment Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022 edition);
- PAS 2080:2016 Carbon Management in Infrastructure; and
- Royal Institute of Chartered Surveys (RICS) Whole life carbon assessment for the built environment (2017).

The assessment will quantify applicable Kyoto Protocol GHGs as measured in tonnes of carbon dioxide equivalence (tCO_2e), where equivalence means having the same warming effect as CO_2 over 100 years.

The Scottish Government's carbon calculator tool is considered the best available method to assess GHG emissions from wind farms within the UK. The tool provides for the calculation of CO_2 emissions savings against:

- Carbon loss due to turbine manufacture, construction, operation, and decommissioning;
- Loss due to backup power generation;
- Loss of carbon from the soil;
- Loss associated with runoff of dissolved and particulate organic carbon;
- Loss due to felling of forestry (if applicable); and
- CO_2 gain associated with habitat improvements at site.

In doing this, the tool provides for a determination of the net carbon impact of the Proposed Development and its subsequent carbon payback period.

Where possible, site-specific data will be used and input to the tool. Where this data is not available, default values, as set out in associated guidance, will be used. Where required, input from relevant hydrology, ecology and peatland specialists will be used. A record of all data used, and for what purpose, will be maintained throughout the assessment, and included within the ES. At present (April 2023), the latest version of the carbon calculator tool is V1.7.0.

6.8.12 Difficulties and uncertainties

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

- The accuracy of a GHG assessment depends on the quality of the data provided. Primary data should always be used where available. Where it is not possible to collect this data, in view of the fact that this assessment represents a forecast of emissions and some information may not yet be known, secondary data (such as estimates, extrapolations, benchmarks and proxy data such as distance travelled) will be used. Assessments such as this, based largely on secondary data, should only be viewed as an estimate of GHG emissions impact, and actual emissions may vary significantly.

6.8.13 References

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- Defra and BEIS (2022) UK Government GHG Conversion Factors for Company Reporting
- IEMA (2022) Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance
- Natural Resource Wales (2023) Flood Risk Assessment Wales Map. https://naturalresources.wales/flooding/check-your-flood-risk-on-a-map-flood-risk-assessment-wales-map?lang=en
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- The Greenhouse Gas Protocol (2004) Corporate Accounting and Reporting Standard
- The Greenhouse Gas (GHG) Protocol, A Corporate Accounting and Reporting Standard (Revised Edition) https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf (Accessed April 2023)
- Welsh Government (2021) Future Wales: The National Plan 2040

6.8.14 Scoping questions

- Do you agree that the data sources listed 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?
- Do you agree with the proposed additional (secondary and tertiary) mitigation measures and is this mitigation appropriate?
- Do you agree with the receptors/elements that are proposed to be scoped in and out of further assessment?

7 CUMULATIVE EFFECTS

7.1 Proposed assessment methodology

7.1.1 Paragraph (5)(e) of Schedule 4 of the EIA Regulations 2017 states that the Environmental Statement should include "*a description of the likely significant effects of the development on the environment resulting from… the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources*".

7.1.2 Regulation 4(2) states that the EIA must "*identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors [...] population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and the landscape*". Regulation 4(2)(e) refers to the need to assess the interaction between those factors.

7.1.3 There is no widely accepted methodology or best practice for assessing cumulative effects, although various guidance documents exist. However, relevant guidance has been considered, including from the Institute of Environmental Management and Assessment (IEMA). The proposed assessment methodology also reflects that set out in the Planning Inspectorate's Advice Note Seventeen: Cumulative Effects Assessment which, although it is written for projects in England, is used in this context as best practice guidance to aid in assessing cumulative effects.

7.1.4 The following approach will be adopted for the assessment of cumulative effects, based on previous experience, the types of receptors being assessed, the nature of the Proposed Development, the other developments under consideration and the information available to inform the assessment.

7.1.5 The following types of cumulative effects will be considered in accordance with the EIA Regulations 2017 and best practice guidance:

- Intra-project combined effects – the interaction and combination of different environmental residual (post-additional mitigation) effects from within the Proposed Development affecting a receptor; and
- Inter-project cumulative effects – the combined residual (post-mitigation) effects of the Proposed Development and other projects on a single receptor/resource, considering the deviation from the baseline conditions at common sensitive receptors/resources as a result of changes brought about as a result of the Proposed Development in combination with one or more other approved (committed) developments.

Intra-project combined effects

7.1.6 The approach to the assessment of interactions of environmental effects will consider the changes in baseline conditions at common sensitive receptors (i.e. those

receptors that have been identified as experiencing likely significant effects by more than one environmental factor) due to the Proposed Development.

7.1.7 The assessment will be based upon residual (post-additional mitigation) effects of '**slight/minor**' or greater significance only. The study area for the assessment will be informed by the study areas for the individual factor assessments.

7.1.8 The assessment of the intra-project combined effects will be undertaken using a two-stage approach:

Stage 1 - Screening

7.1.9 Screening will be undertaken to determine whether a sensitive receptor is exposed to more than one type of residual (post-additional mitigation) effect during the construction, decommissioning, and/or operational phases of the Proposed Development. Those common sensitive receptors exposed to two or more types of residual (post-additional mitigation) effects, with significance of '**slight/minor**' or greater, will be taken forward to Stage 2 of the assessment.

7.1.10 If there is only one type of effect on a sensitive receptor (i.e. only one technical chapter has identified effects on that sensitive receptor), then it will be considered that there are no potential intra-project combined effects and the sensitive receptor will not be taken forward to Stage 2 of the assessment.

Stage 2 – Assessment of intra-project combined effects

7.1.11 A quantitative assessment of the overall significance of the cumulative effects on common sensitive receptors identified at Stage 1 will be undertaken based on technical information provided in the technical chapters and supporting appendices as well as professional judgement. Given that the types of effects may be very different in some cases, a quantitative assessment may not be possible, and it may be necessary to apply professional judgement in determining the significance of each individual effect.

7.1.12 The evaluation at the receptor level will consider: the magnitude of change at the common receptor; previously identified sensitivity; duration and reversibility of interaction. The focus will be on determining a change in the level of effect likely to be experienced and whether this is significant or not.

Inter-project cumulative effects

7.1.13 The approach to the assessment of inter-project effects will consider the deviation from the baseline conditions at common sensitive receptors as a result of changes brought about as a result of the Proposed Development in combination with one or more other approved (committed) developments.

7.1.14 The assessment of the inter-project effects will be based upon the residual (post-additional mitigation) effects that have been identified in the various factor assessments for the Proposed Development, as well as available environmental information for the approved (committed) developments.

7.1.15 In accordance with Advice Note Seventeen, two clear stages will be taken in identifying the list of approved (committed) developments which will be included within the inter-project cumulative effects assessment:

- **Stage 1**: Establish a long list of approved (committed) developments based on appropriate spatial and temporal limits.
- **Stage 2**: Apply a clear rationale to establish a short list of approved (committed) developments which, in combination with the Proposed Development, have the potential to result in a significant cumulative effect for inclusion within the assessment.

Stage 1: Long list methodology

7.1.16 The following criteria will be used to establish the 'long list' of approved (committed) developments, as at the time of submitting the planning application for the Proposed Development:

- Schemes that are under construction but that will not be completed prior to the Proposed Development commencing (N.B. consideration will be afforded on a case by case basis to whether schemes that are under construction form part of the existing baseline or not, to avoid double counting);
- Schemes with planning permission within the last five years[11], but not yet implemented;
- Submitted applications but not yet determined;
- Refusals subject to appeal procedures not yet determined; and
- EIA development not yet submitted but subject of EIA scoping request.

7.1.17 Development projects that are at EIA screening stage at the time of submitting the planning application for the Proposed Development will not be considered, as they are not considered 'approved'.

7.1.18 Where an approved (committed) development meets one of the criteria presented in paragraph 7.1.16, it will be taken forward for further consideration against the following spatial (and where appropriate, scale) limits in order to develop a refined list of approved (committed) development:

- NSIP or DNS developments[12]: Must lie within the Zone of Influence (ZoI) of the Proposed Development.
- Onshore wind developments (not classed as a DNS) (where the wind turbines are greater than 50m to tip height and more than one wind turbine proposed): Must lie within the 20km of the Proposed Development.
- Other energy infrastructure developments must lie within 10km of the Proposed Development.

[11] A five-year period is considered a reasonable time period to capture all approved developments that still have the potential to be built. Developments with planning permission older than five years will likely have been built or will not likely be built at all.

[12] As defined by the Planning Act 2008 (as amended) and the Planning (Wales) Act 2015 and the Developments of National Significance (Wales) Regulations 2016 (as amended).

- Employment developments: Must lie within 10km of the Proposed Development.
- Residential developments: Must comprise 10+ dwellings and lie within 10km of the Proposed Development.
- Minerals and waste applications: Must lie within 10km of the Proposed Development.
- Transport infrastructure developments[13]: Must lie within 10km of the Proposed Development

7.1.19 The ZoI is defined here as the study area for each environmental factor considered in the EIA for the Proposed Development. The environmental factor-specific study areas, and appropriate justifications for these study areas, will be provided in the Environmental Statement. The search area for forming the long list of approved (committed) developments will be based on the greatest ZoI in terms of distance.

7.1.20 A planning application search will be conducted to identify approved (committed) developments using relevant planning portals. However, it is recognised that Ceredigion County Council as the local planning authority may be aware of additional proposals not yet fully in the public domain and hence comment is sought on any further developments that should, in the authority's opinion, be included in the cumulative effects assessment process.

7.1.21 Only if the approved (committed) developments meet the Stage 1 criteria will they then been taken forward to Stage 2.

Stage 2: Short list methodology

7.1.22 Following the formation of the long list, the eligible approved (committed) developments identified require further assessment (Stage 2) to establish a short list of approved (committed) developments which, in combination with the Proposed Development, have the potential to result in significant cumulative effects.

7.1.23 The criteria used to determine whether to include or exclude an approved (committed) development on the short list will reflect the process established by Advice Note Seventeen and have regard to relevant policy and guidance documents and consultation with the appropriate statutory consultation bodies (particularly the local planning authority).

7.1.24 Advice Note Seventeen states that the criteria should address the following:

- *"**Temporal scope:** The applicant may wish to consider the relative construction, operation and decommissioning programmes of the 'other existing development and/or approved development' identified in the ZOI together with the* [project] *programme, to establish whether there is overlap and any potential for interaction.*

[13] Trunk roads only, as smaller transport infrastructure proposals would not likely have a significant cumulative effect.

- ***Scale and nature of development:*** *The applicant may wish to consider whether the scale and nature of the 'other existing development and/or approved development' identified in the ZOI are likely to interact with the proposed* [project]*. Statutory definitions of major development and EIA screening thresholds may be of assistance when considering issues of scale.*
- ***Other factors:*** *The applicant should consider whether there are any other factors, such as the nature and/or capacity of the receiving environment that would make a significant cumulative effect with 'other existing development and/or approved development' more or less likely and may consider utilising a source-pathway-receptor approach to inform the assessment.*
- ***Documentation:*** *The CEA shortlisting process may be documented using Matrix 1 (Appendix 1). The reasons for excluding any development from further consideration should be clearly recorded. This will provide decision makers, consultation bodies and members of the public with a clear record of 'other existing development and/or approved development' considered and the applicant's decision making process with respect to the need for further assessment."*

7.1.25 Advice Note Seventeen suggests that professional judgement may also be used to supplement the threshold criteria and in order to avoid excluding 'other existing development and/or approved development' that is:

- "*Below the threshold criteria limits but has characteristics likely to give rise to a significant effect; or*
- *Below the threshold criteria limits but could give rise to a cumulative effect by virtue of its proximity to the proposed* [project]."

7.1.26 Taking the above into consideration, the approved (committed) developments on the long list will be reviewed against the following criteria to form the short list of approved (committed) developments, as at the time of submitting the planning application for the Proposed Development:

- **Criteria 1:** The approved (committed) development has a construction, operational and/or demolition phase that is concurrent with the Proposed Development.
- **Criteria 2:** The approved (committed) development and the Proposed Development share common sensitive receptors/resources which are assessed and described in the supporting environmental documentation, and have the potential to be significantly affected by the combination of the approved (committed) development and the Proposed Development.
- **Criteria 3:** The approved (committed) development has sufficient environmental assessment information freely and publicly available to inform the inter-project cumulative effects assessment. The assessment of each approved (committed) development on the short list will be proportionate to the environmental assessment information available (N.B: An attempt will not be made to assess the potential environmental effects of any other development to inform the inter-project cumulative effects assessment. If

there is an approved (committed) development that it is known will be progressed but has insufficient environmental assessment information, it still may be prudent to consider it in the inter-project cumulative effects assessment. This might take the form of listing the project and why it hasn't been considered in detail, or the potential cumulative effect could be discussed at a high level (qualitatively) using professional judgement).

7.1.27 Where an approved development meets all of the above criteria, it will be taken forward for further consideration in the assessment.

7.2 Determining significant cumulative effects

7.2.1 There is no formal guidance on the criteria for determining significance of cumulative effects. The following principles will be considered when assessing the significance of cumulative effects in relation to both intra-project and inter-project cumulative effects:

- Is there an intra-project and/or inter-project effect on any receptors/resources;
- The nature of the receptors/resources affected;
- How the impacts identified combine to affect the condition of the receptor/resource;
- The probabilities of the impacts occurring in relation to each other in such as way so as to produce a cumulative effect, considering the extent and duration of the impact change;
- The ability of the receptor/resource to absorb further impacts; and
- Is the level of effect different to that considered at the project level and is the in-combination effect significant or not.

7.3 Difficulties and uncertainties

7.3.1 The assessment of inter-project cumulative effects will be limited to publicly available information obtained from the relevant planning applications on the Ceredigion County Council planning portal. For some of the identified approved developments, relevant information for this assessment may not be available. Where this is the case, the inter-project cumulative effects assessment will be based upon assumptions and professional judgement, and some statements made would rely on the review of mitigation measures proposed as part of the approved (committed) developments rather than the Proposed Development.

7.4 References

- Institute of Environmental Management and Assessment (IEMA). (2011). Special Report on 'The State of Environmental Impact Assessment in the UK'. Available at: https://s3.eu-west-2.amazonaws.com/iema.net/documents/knowledge/policy/impact-assessment/2011-State-of-EIA-IEMA.pdf

- Planning Inspectorate. (August 2019). Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects. Available at : https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/