

Intended for  
**Galileo Green Energy**

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Project Number  
**1620015888**

# **BRYN CADWGAN ENERGY PARK ENVIRONMENTAL IMPACT ASSESSMENT SCOPING REPORT**

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# 1. INTRODUCTION

## 1.1 Background

- 1.1.1 This Scoping Report is provided in support of a request to the Planning and Environment Decisions Wales (PEDW) (on behalf of Welsh Ministers) for a Scoping Direction in accordance with Regulation 33(2) of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 as amended (hereafter, the 'EIA Regulations').
- 1.1.2 Galileo ('the Applicant') is seeking to construct and operate the Bryn Cadwgan Energy Park ('the Proposed Development') on land ('the Site') between the towns of Lampeter to the west and Llanwrtyd Wells to the east. The Site is located across the administrative boundaries of Carmarthenshire County Council (CC) and Ceredigion CC. The location of the Site is presented on **Figure 1.1**.
- 1.1.3 The Scoping layout for the Proposed Development is presented on **Figure 1.2**. This currently comprises up to 25 wind turbines with a maximum tip height of up to 230 m and with a generation capacity of >10 Megawatts (MW). Solar photovoltaic (PV) panels and a Battery Energy Storage System (BESS) will also form part of the Proposed Development. The layout should be considered preliminary as it will evolve in response to Site survey information to be gathered in relation to environmental and technical constraints, stakeholder feedback to this Scoping Report and other consultations and responses gathered through public engagement.
- 1.1.4 As the turbine number and locations become fixed, a layout for ancillary infrastructure will also be developed. Ancillary infrastructure will include turbine foundations and crane hardstanding at the base of each turbine, an on-site control building and substation compound, new access tracks, underground cables, an anemometer mast, and temporary construction compound(s) and laydown area(s).
- 1.1.5 This Scoping Report has been prepared by competent Environmental Impact Assessment ('EIA') experts at Ramboll UK Ltd, with a select team of technical specialists providing inputs covering all the relevant environmental disciplines, as set out in **Table 1.1**.

<b>Table 1.1: EIA Team</b>	
<b>Discipline</b>	<b>Organisation</b>
Lead EIA Consultant	Ramboll
Landscape and Visual Amenity	Abseline Landscape Planning
Cultural Heritage	AOC Archaeology
Ecology and Ornithology	BSG Ecology
Hydrology, Hydrogeology, Geology and Peat	Ramboll
Transport and Access	Vectos (SLR)
Noise and Vibration	TNEI
Economics	Ramboll
Shadow Flicker	Ramboll
Telecommunications and Aviation	Aviatica
Forestry	Neil Mackay
Carbon	Ramboll
Glint and Glare	Ramboll

## 1.2 Consenting Regime

- 1.2.1 The statutory framework for Development of National Significance (DNS) in Wales is provided by the Planning (Wales) Act 2015 and the Developments of National Significance (Wales) Regulations 2016 (as amended). The Planning (Wales) Act 2015 amended the Town and Country Planning Act 1990. Under the Developments of National Significance (Specified Criteria and Prescribed Secondary Consents) (Wales) Regulations 2016, any proposal to construct an electricity generating station (other than an onshore wind generating station) with a generating capacity of between 10 MW and 350 MW, or to construct an onshore wind generation station with a generating capacity of 10 MW or above, falls within the DNS system and requires an application for planning permission to be made to the Welsh Ministers. It is anticipated that the Proposed Development would have an installed capacity of greater than 10 MW and less than 350 MW and is therefore considered to be a DNS.
- 1.2.2 Part of the Site and proposed access route are common land (commons with deeds for access). Should infrastructure be located on these areas of land in the final layout, the DNS application will be accompanied by a secondary consent for applications to deregister and exchange common land and consent to carry out works on common land (Sections 16 and 38 of the Commons Act 2006).
- 1.2.3 The Proposed Development does not fall under any of the types of development set out in Schedule 1 of the EIA Regulations. It does however fall under Schedule 2 of the EIA Regulations Under Part 3 "Energy Industry":

Description of Development	Applicable Threshold Criteria	Threshold/Criteria Exceeded/Met for Proposed Development? (Y/N)
<i>(a) Industrial installations for the production of electricity, steam and hot water (projects not included in Schedule 1 to these Regulations);</i>	<i>The area of the development exceeds 0.5 hectares</i>	Y
<i>(i) Installations for the harnessing of wind power for energy production (wind farms)</i>	<i>(i) The development involves the installation of more than 2 turbines; or (ii) the hub height of any turbine or height of any other structure exceeds 15 metres.</i>	Y

- 1.2.4 On the basis of the above, and in accordance with the EIA Regulations, the Proposed Development is defined as EIA development. As such, an EIA will be required and an Environment Statement ('ES') will be submitted with the DNS application. The Applicant has elected to submit an ES in respect of the Proposed Development, rather than request a formal Screening Direction.
- 1.2.5 The ES will be prepared in accordance with the EIA Regulations.

### 1.3 Purpose of this Scoping Report

1.3.1 EIA is a formal process by which the effects of certain types of development projects on the environment are identified, assessed and reported upon, and mitigation identified, in order for the environmental effects to be taken into account by the relevant authority when considering whether to grant planning permission.

1.3.2 The EIA Regulations make provision for obtaining a Scoping Direction from Welsh Ministers regarding the scope and level of detail of the information to be provided within the ES. This report therefore supports a request by the Applicant for a Scoping Direction from PEDW, on behalf of the Welsh Ministers, in relation to a DNS. This report contains the necessary information required under Regulation 33(2) of the EIA Regulations, that being:

- a plan sufficient to identify the land on which the development would be carried out;
- a brief description of the nature and purpose of the development including its location and technical capacity;
- its likely significant effects on the environment;
- a statement that the request is made in relation to a development of national significance for the purposes of section 62D of the Town and Country Planning Act 1990.; and
- such other information or representations as the person making the request may wish to provide or make.

1.3.3 This Scoping Report has been drafted to provide the above information. It also includes additional information in response to PEDW's guidance on EIA for DNS,<sup>1</sup> as set out in **Table 1.2**.

<b>Table 1.2: Scoping Requirements under Appendix 3 of DNS Procedural Guidance</b>	
<b>Information Required</b>	<b>How is this addressed at Scoping stage?</b>
An outline of the main alternatives considered and the reasons for selecting a preferred option.	<b>Section 3.4</b> describes the approach to assessing alternatives. The main alternatives considered will be set out in the ES.
A record of consultation undertaken with relevant bodies (including any public engagement) to date.	Record of public consultation undertaken being prepared separately. NRW have been contacted but a response has not been received at the time of writing.
Referenced plans presented at an appropriate scale to convey clearly the information and all known aspects associated with the proposal.	Accompanying Figures.
Results of desktop and baseline studies where available.	<b>Chapters 4-13.</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.	

<sup>1</sup> Planning Inspectorate Wales, 'Development of National Significance - Procedural Guidance' (Version 2, October 2019), Appendix 3: Environmental Impact Assessment, paras 3.14-3.15

<b>Table 1.2: Scoping Requirements under Appendix 3 of DNS Procedural Guidance</b>	
Methods used or proposed to be used to assess impacts and the significance criteria framework used.	
Any mitigation proposed and the extent to which these are likely to reduce impacts.	
The elements of the proposed development likely to have a significant environmental effect. Where uncertainty remains, the applicant should provide as much detail as possible or assume the worst case.	
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).	Approach to the cumulative assessment is set out <b>Section 3.7.</b>
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.	<b>Chapter 6</b> and <b>Chapter 7.</b>
Key topics covered as part of applicants' scoping exercise.	<b>Section 3.1.</b>
An outline of the structure of the proposed ES.	<b>Chapter 15.</b>

1.3.4 The specific objectives of this Scoping Report are to:

- seek agreement on the likely significant effects associated with the Proposed Development, and confirm that all likely significant effects have been correctly included in the proposed scope of the EIA ('scoped in');
- seek agreement on where non-significant effects have been excluded from further assessment ('scoped out'); and
- invite comment on the proposed approach to baseline data collection, prediction of environmental effects and the assessment of significance.

1.3.5 All responses to this Scoping Report will be collated and presented as a Technical Appendix to the ES, as a record of the results of the scoping exercise. In accordance with the EIA Regulations, the scope of the ES will be based on the Scoping Direction received. 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 Direction received, the on-going design evolution of the Proposed Development, and through on-going baseline data collection (e.g. field surveys etc.). 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 The Applicant**

1.4.1 The Applicant exists to create, develop, finance, build, own and operate renewable energy projects in multiple European countries. Galileo was founded in 2020 and is backed by four long-term institutional investors:

- Infratil Limited, a New Zealand-based infrastructure investment company;
- the Australian Government Commonwealth Superannuation Corporation, an Australian based pension fund;
- the New Zealand Superannuation Fund, a New Zealand based pension fund; and

- the Morrison & Co Growth Infrastructure Fund, a vehicle managed by HRL Morrison & Co. Corr.

1.4.2 Collectively these investors hold ambitions to make a meaningful contribution to the renewable energy transition.

1.4.3 Galileo is managed by a team of experienced professionals who have decades of experience over multiple energy markets with a focus on Wales and Scotland. The UK business is a key focus, with offices in Cardiff and Edinburgh with a team capability in the critical disciplines of legal and land sector, consenting with Chartered Planners, environmental assessment, community engagement, and construction management.

1.4.4 It is expected that the planning application will be submitted by a Special Purpose Vehicle (SPV), Galileo 06, which is a wholly owned subsidiary of Galileo.

## 1.5 Structure of this Scoping Report

1.5.1 The remainder of this Scoping Report is structured as follows:

- **Chapter 2** provides a brief description of the nature and purpose of the Proposed Development, typical construction activities and decommissioning proposals;
- **Chapter 3** describes the general approach to the EIA;
- **Chapters 4 to 13** describe the potential significant environmental effects and the proposed methods for further data collection and the evaluation of effects;
- **Chapter 14** describes the impacts that are considered unlikely to give rise to significant effects and therefore are to be excluded from the EIA, providing a rationale in each case; and
- **Chapter 15** provides a summary of the proposed structure of the ES.

## 2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

### 2.1 Introduction

- 2.1.1 The description of the Proposed Development represents the current understanding of the design parameters, however the design process is ongoing and is an iterative process that takes into account environmental constraints and analysis as further information and data becomes available.
- 2.1.2 The final built form, as well as the installation/construction methods used for the Proposed Development will ultimately be determined by the appointed contractor. However, all works will be required to be undertaken within the parameters assessed within the ES. With this in mind, the EIA will represent a 'reasonable worst-case' scenario for the Proposed Development, ensuring a robust assessment of the likely significant effects.

### 2.2 Policy Considerations

#### *Policy Framework Considerations*

- 2.2.1 The ES will describe, in summary, the renewable energy policy framework and response to the national energy policy and planning objectives at international, European, and domestic levels.
- 2.2.2 The Proposed Development relates to the generation of energy from renewable sources and comes as a direct response to national planning and energy policy objectives. The clear objectives of the Welsh and UK Governments will be summarised in the ES, in relation to encouraging increased deployment and application of renewable energy technologies, consistent with sustainable development policy principles and national and international obligations on climate change.
- 2.2.3 The Welsh Government declared a climate emergency in April 2019 and the Environment (Wales) Act 2016 (Amendment of 2050 Emissions Target) Regulations 2021 sets a target to reduce greenhouse gas emissions in Wales by 100% by 2050. Renewable energy generation is a key component to achieving greenhouse gas emission reduction targets. In July 2023, the Welsh Government adopted a target of meeting 100% of Wales's electricity consumption from renewable electricity sources by 2035<sup>2</sup>. The Proposed Development would make a material contribution to renewable energy generation and the attainment of greenhouse gas reduction targets at both the Wales and UK levels, and the quantification of this contribution will be described in the ES.

#### *National Planning Policy and Guidance*

- 2.2.4 The ES will provide reference to key relevant national planning policy and guidance documents including Future Wales: The National Plan 2040 and Planning Policy Wales (PPW).

#### Future Wales: The National Plan 2040

- 2.2.5 Future Wales: The National Plan 2040 (2021)<sup>3</sup> is the National Development Framework for Wales, which sets out to provide a clear, long term spatial direction for Government policy, action, and investment in Wales. This is inclusive of national priorities such as decarbonisation and renewable energy, evident in the following statement from the plan:

*"Wales can become a world leader in renewable energy technologies. Our wind and tidal resources, our potential for solar generation, our support for both large and community scaled*

<sup>2</sup> Welsh Government, 2023. Written Statement: Publication of Summary of Responses to the Consultation on Wales' Renewable Energy Targets. July 2023.

<sup>3</sup> Welsh Government, 2021. Future Wales: The National Plan 2040

*projects and our commitment to ensuring the planning system provides a strong lead for renewable energy development, mean we are well placed to support the renewable sector, attract new investment, and reduce carbon emissions."*

- 2.2.6 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. Policy 17 identifies 10 'Pre-Assessed Areas for Wind Energy'. There is a presumption in favour of large-scale wind energy development in these areas, however a positive policy framework still exists for development outside of these areas, subject to the criteria in Policy 18. Policy 18 sets out a number of criteria that renewable energy proposals qualifying as DNS will be subject to when considering whether or not permission should be granted. This includes Criterion 1: *"Outside of the pre-assessed areas for wind developments and everywhere for all other technologies, the proposal does not have an unacceptable adverse impact on the surrounding landscape"*.

#### Planning Policy Wales (PPW)

- 2.2.7 PPW, republished in February 2021 (Edition 11), comprises the planning policy framework for Wales, whereas Future Wales provides a spatial framework, and sets the direction for development through strategic priorities and policies. PPW is supported by topic based Technical Advice Notes (TAN). PPW aims to ensure the planning system supports the delivery of sustainable development and improves social, economic, environmental, and cultural wellbeing in Wales. Paragraph 5.9.1 of PPW refers to renewable energy and low carbon energy and states:

*"Local authorities should facilitate all forms of renewable and low carbon energy development and should seek cross-department co-operation to achieve this. In doing so, planning authorities should seek to ensure their area's full potential for renewable and low carbon energy generation is maximised and renewable energy targets are achieved. Planning authorities should seek to maximise the potential of renewable energy by linking the development plan with other local authority strategies, including Local Well-being plans and Economic/Regeneration strategies."*

- 2.2.8 PPW11 notes that energy demand is expected to grow due to the growing electrification of transport and heat, and that significant investment will be needed in energy generation, transmission and distribution infrastructure. It also recognises that wind energy forms a key part of meeting renewable energy production due to Wales' considerable wind resource.
- 2.2.9 On the 18th October 2023, the Welsh Government issued an update to PPW, specifically in relation to Chapter 6 – Distinctive and Natural Places. The updates are focused on: taking a proactive approach to green infrastructure, securing net benefit for biodiversity (through the application of the Step-Wise Approach), a strengthened approach to the protection of Sites of Special Scientific Interest (SSSI), and the promotion of new tree planting as part of any proposed development.
- 2.2.10 The Proposed Development will be designed in line with the Step-Wise Approach outlined in Planning Policy Wales (PPW). A Green Infrastructure Statement will be prepared in support of the DNS Application to demonstrate the approach to firstly, protecting the natural environment, and secondly, delivering positive enhancement measures at the Site.

#### Well-being and Future Generations (Wales) Act 2015

- 2.2.11 The aim of the 2015 Act is to improve the social, economic, environmental and cultural well-being of Wales, making the public bodies listed in the Act (including the Welsh Ministers): think

more about the long-term, work better with people, communities and each other, look to prevent problems, and take a more joined-up approach.

2.2.12 The Act enshrines these goals in law, ensuring that all public bodies work towards achieving all of them. As part of delivering the Proposed Development, the Applicant is committed to delivering positive social benefits in line with the Act, as well as sustainable use of natural resources, decarbonisation and supporting a sustainable economy.

2.2.13 The Act puts in place seven well-being goals:

- A prosperous Wales.
- A resilient Wales.
- A healthier Wales.
- A more equal Wales.
- A Wales of cohesive communities.
- A Wales of vibrant culture and thriving Welsh Language.
- A globally responsible Wales.

#### Local Development Plan

2.2.14 The Proposed Development is located within the administrative areas of Carmarthenshire CC and Ceredigion CC.

2.2.15 Carmarthenshire CC is currently drafting their Local Development Plan (LDP) to 2033<sup>4</sup>, with a consultation on the preferred strategy having closed in April 2023. The production of the Revised LDP has however now been delayed. Until the new LDP comes into effect, the Future Wales: The National Plan 2040, together with the 2006 (updated 2014) LDP<sup>5</sup> comprise the statutory development plans relevant for the Proposed Development, with the Future Wales Plan taking precedence over the Local Plan. Of relevance, Policy RE1: Large Scale Wind Power of the 2014 LDP specifically relates to large scale wind farms of 25 MW and over and outlines the criteria that should be met when seeking permission for such a development.

2.2.16 The second Deposit LDP outlines a target for additional installed capacity of wind projects of almost 600 MW and 1.4 Megawatt hours (MWh) of additional energy generated by 2033. It also identifies Local Search Areas for use in solar power projects, where any solar project takes priority over simultaneously competing interests. One such Search Area extends across the southern part of the Site. These areas are considered to be the least constrained areas within the Authority in order to deliver solar energy.

2.2.17 Ceredigion CC adopted its LDP in 2013<sup>6</sup> and is for the period up to 2022. Of particular relevance are Policy LU 25: Renewable Energy Generation and LU26: Large and Medium Sized Wind Farms. Work to replace the LDP was put on hold in 2020 and has been paused for an unspecified length of time. Although the current LDP plan period ends in 2022, it will continue to be the Development Plan for Ceredigion until a Replacement Plan is adopted.

2.2.18 The local planning policy context relevant to the Site and Proposed Development will be taken into account in the iterative design process and technical assessments, where relevant.

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<sup>4</sup> Carmarthenshire County Council, 2023. Local Development Plan 2018-2033.

<sup>5</sup> Carmarthenshire County Council, 2014. Carmarthenshire Local Development Plan (2007-2021

<sup>6</sup> Ceredigion County Council, 2013. The Current Ceredigion Local Development Plan (LDP1) – 2007-2022 (Adopted 2013).

- 2.2.19 In addition to the ES, a Planning Statement will be provided with the DNS application, which will contain an assessment of the Proposed Development against the relevant policy documents.

## 2.3 Site Description and Context

- 2.3.1 The Site (defined by the red line boundary on **Figure 1.1**) is located in the southwest of Cambrian Mountain Range, north of the A482 and west of the A483. The Site occupies approximately 1276 hectares (ha), approximately 11 km to the east of Lampeter and 10 km to the west of Llanwrtyd Wells.
- 2.3.2 The design of the Proposed Development is ongoing and as such, details of any works required off-site, 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.
- 2.3.3 The land is of relatively steep and undulating terrain, with portions of the Site compromising ground with a slope  $>10^\circ$ . In a wider context, the Site is located within steep rounded hills between the valley of Afon Teifi and the valley of Afon Cothi. Ground levels across the Site range from 423 m Above Ordnance Datum (AOD) at the highest point in the north of the Site to approximately 250-270 m where the Afon Cothi bisects the central / south-western part of the Site. There are further points above or approaching 400 m AOD in the southwest and northeast of the Site.
- 2.3.4 The north-eastern part of the Site comprises a commercial forest, which is registered as part of the National Inventory of Woodland and Trees. The majority of the remaining part of the Site is a mix of privately owned upland moorland and grazing farmland. The Welsh Government's Predictive Agricultural Land Classification (ALC) Map<sup>7</sup> indicates the land is classified as grade 4 (poor quality agricultural land) and is therefore not considered Best and Most Versatile (BMV) agricultural land.
- 2.3.5 There are two residential properties within the Site, Nant-yr-Ast and Garthynty. Several scattered properties are located around the Site boundary, particularly to the south along the unclassified road from Pumsaint to Rhandirmwyn.
- 2.3.6 A public access road to Garthynty and Nant-yr-Ast bisects the Site in the centre and is also designated as a Public Right of Way (PRoW). There is also an extensive network of forestry tracks within the forest, one of which is designated as a Byway Open to All Traffic (BOAT). There is a further public road located within the south-western extremity of the Site which provides access to residential properties and a farm.
- 2.3.7 The Site is not located within a national or regional statutory designated landscape. The Bannau Brycheiniog (Brecon Beacons) National Park is located approximately 13 km to the southeast at its closest point.
- 2.3.8 The environmental context of the Site and surrounding area is described in the respective technical sections of this Scoping Report. With regard to surrounding wind farm development, there are a number of one and two turbine developments within Ceredigion and Carmarthenshire, all of which have been built for domestic use. There are no existing commercial solar or wind farms within 20 km of the Site.

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<sup>7</sup> DataMapWales (2019) *Predictive Agricultural Land Classification (ALC) Map* [online] Available: [2https://datamap.gov.wales/layers/inspire-wg:wg\\_predictive\\_alc2](https://datamap.gov.wales/layers/inspire-wg:wg_predictive_alc2) [date accessed: 25/10/2023] Welsh Government

## 2.4 The Proposed Development

### *Overview*

2.4.1 The Applicant proposes to develop an Energy Park comprising of the following:

- up to 25 wind turbines, each with a maximum tip height of up to 230 m, with accompanying external transformers, turbine foundations, crane hardstandings and laydown/storage areas;
- ground mounted solar photovoltaic (PV) generating station. The generating station will include solar PV modules and mounting structures;
- Balance of Solar System (BoSS) which comprises inverters, transformers and switchgear;
- a Project Substation compound, which will include; substation, switching and control equipment, office / control / welfare buildings, storage areas, and provisions for vehicular parking and material laydown;
- Battery Energy Storage System (BESS) compound and associated inverters, transformers, switchgear and ancillary equipment and their containers, enclosures, monitoring systems, air conditioning, electrical cables and fire safety infrastructure;
- permanent anemometer mast for monitoring wind speed and wind turbine performance;
- works to facilitate vehicular access to the Site and on-site access tracks, with watercourse crossings (if/where required) and where necessary, off-site works to facilitate the delivery of abnormal loads (e.g. construction of over-run areas and temporary modifications to street furniture etc).
- one or more temporary construction and storage compounds;
- borrow pit(s) to source stone and aggregate required for construction proposes;
- landscaping, habitat management, biodiversity enhancement and amenity improvements; and
- ancillary infrastructure works including; underground cables, boundary treatments, security equipment, lighting, landscaping, access tracks, earthworks, surface water management, and any other works identified as necessary to enable the development.

2.4.2 The connection of the substation to the grid would be the subject of a separate consent application and will not form part of the DNS application.

### *Wind Turbines*

2.4.3 A scoping turbine layout is presented in **Figure 1.2**, with turbine co-ordinates set out in **Table 2.1**. The proposed turbines would be three bladed horizontal axis turbines with tapered tubular steel towers, likely to be finished in a light grey semi-matt colour. EIA scoping is based upon a maximum tip height for turbines of up to 230 m, although the hub heights and turbine specifications in other respects will be considered further through the EIA process. The wind turbines would be installed on foundations, the detailed design of which will depend on the type of turbine procured and the specific ground conditions. 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 Scoping Report, it has been assumed that the transformers will be external and located adjacent to each turbine within the hardstanding areas. A crane pad would also 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.

- 2.4.4 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 and ensure that a reasonable worst case is presented.
- 2.4.5 A micro-siting allowance of 50 m for the turbines and other infrastructure will be applied to anticipate possible unfavourable site conditions or other construction constraints. These allowances will be clearly defined within the ES and assessed as appropriate.
- 2.4.6 The anticipated height of the wind turbines means there will be a statutory requirement for aviation lighting in accordance with Article 222 of the Air Navigation Order 2016. Any aviation lighting scheme will be agreed with the Civil Aviation Authority (CAA), MOD and other relevant consultees.

<b>Table 2.1: Scoping Turbine Layout Coordinates</b>		
<b>Turbine</b>	<b>X-Coordinates</b>	<b>Y-Coordinates</b>
1	270537	249911
2	270262	249258
3	269705	248645
4	270503	248718
5	271168	248691
6	269860	248095
7	270271	247767
8	270587	247239
9	270697	246721
10	271067	246403
11	271956	246937
12	271646	248016
13	272256	247872
14	272584	247437
15	272448	248793
16	272884	248529
17	273208	249196
18	273536	249866
19	273730	249059
20	274407	249437
21	273973	248545
22	274685	248905
23	274360	248240
24	275025	248355
25	275425	248040

### *Solar PV Array*

- 2.4.7 The location and design of the solar PV array is under consideration as the design work progresses. Solar PV modules are made up of individual solar cells. They are typically 2m long and up to 1 m wide and consist of a series of photovoltaic cells beneath a layer of toughened glass. The solar PV modules are fixed to a mounting structure in groups known as 'strings'. It is expected that solar PV modules would be mounted on a metal framework, supported by piles or screws up to a depth of approximately 1.5 to 2 m, subject to ground conditions. In sensitive areas of archaeology, concrete 'feet' may be used instead of piles. The individual solar PV modules are likely to consist of dark blue, and/or dark grey and / or black, PV cells. The mounting structure carrying the solar PV modules will be designed to face southwards on a single-axis tracker or on a tracking platform. The solar PV modules would be angled at a slope of 10 to 30 degrees from horizontal to optimise daylight absorption. Once attached to the mounting structure, the minimum height of the lowest part of the solar PV modules will be approximately 60 cm above ground level (AGL) and the maximum height of the solar PV modules will be approximately 4 m AGL. The height for each solar PV module can be influenced by several design factors including; local topography, visual receptors, land use practices, and the solar PV module type and configuration.
- 2.4.8 The Balance of Solar System (BoSS) refers to the components and equipment that convert the direct current (DC) electricity from the solar PV modules into alternating current (AC). This includes transformers, inverters, switch gear and electrical cabling in trenches between the modules and associated infrastructure. Lighting is not required within the solar PV array, although security lighting may be necessary, which, if required, will be developed and presented in more detail in the ES.

### *Project Substation*

- 2.4.9 The Proposed Development will require an on-site substation compound, which will house the transformers, control room, switch gear and metering equipment necessary to facilitate connection of the wind turbines and solar PV array to the proposed cable connection and ultimately to the national grid.
- 2.4.10 The compound will include a control building which will include office space, material storage and welfare facilities, as well as operational monitoring and maintenance equipment. The location 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.

### *Battery Energy Storage System (BESS)*

- 2.4.11 BESS will be included in the Application if it is deemed a viable option at the Site, following the completion of further technical studies. BESS is designed to provide peak generation and grid balancing services to the electricity grid. It will primarily allow excess electricity generated from the solar PV array to be stored in batteries and exported to the grid when required. As a secondary function it may also allow excess energy from the grid to be imported to batteries when energy available to the grid exceeds demand. The BESS will provide flexibility and grid reliability.
- 2.4.12 The BESS typically comprises a number of shipping container units, although they could be either individual enclosures or housed within a large building, that are usually single stacked.
- 2.4.13 The BESS will require heating, ventilation and cooling systems to ensure the efficiency of the technology. These features are integrated into the units they are housed in. The BESS will comprise DC/AC converters to control the charge of the batteries from the wind turbines and solar PV array output and/or AC/DC inverters to control the charge of the batteries when drawing energy from the grid.

- 2.4.14 The BESS will require its own control room, which would be of similar dimensions to the containers mentioned above.
- 2.4.15 There are different design options for the batteries that will be explored through the design process.
- 2.4.16 Down lighting will be provided within the BESS to be used only in the event of it being required for maintenance and security purposes.
- 2.4.17 It is anticipated that the BESS and its associated control room would be co-located within or next to the substation compound.

#### *Site Access*

- 2.4.18 A detailed access review is currently underway to confirm the access route into the Site from Pumsaint in the southwest. The Site access point has yet to be confirmed and will depend on a number of factors including environmental and ground constraints. The access point and route will facilitate abnormal loads associated with turbine deliveries as well as access for construction materials and operational traffic.
- 2.4.19 At this stage, it is anticipated that abnormal load vehicles carrying turbine components will travel to the Site from the most suitable Port of Entry (PoE) at Swansea. AIL access would be from Swansea to Carmarthen (M4 and A48) and on to Llandeilo (A40). From, Llandeilo, two access routes are under consideration which split just to the north of Llandeilo and re-join at the intersection of the B4302 and the A482, approximately 1.5 miles south of Pumsaint:
- Option 1 – A40 (to Llanwrda), A482 to Pumsaint; and
  - Option 2 – B4302 via Maerdy and Talley, then A482 to Pumsaint.
- 2.4.20 Outside of the above options, the majority of the proposed route from Swansea shares the same road network, comprising the A483 and M4 to Carmarthen, and the A40 to Llandeilo.
- 2.4.21 It is anticipated that off-site highway works will be required where upgrades to the road network are required to facilitate delivery of abnormal loads. These would be consented via a mixture of s278 works where works are confined to the highway boundary, and conventional planning applications where works on private land are anticipated. The latter may be included within the DNS application or addressed separately, which will be determined at a later date. Off-site highway works will be developed as part of the EIA and assessed in the ES.
- 2.4.22 At Pumsaint, it is anticipated that access to the Site will be via existing forestry and agricultural tracks that will require upgrade and newly constructed tracks. A new Site access junction would be created.
- 2.4.23 Within the Site itself, the Proposed Development will be served by a network of both new and upgraded on-site access tracks to enable construction and maintenance, once operational. Existing access tracks will be re-used where possible and any new access tracks will seek to minimise impacts on soils and peat. This will include a main Site access track running from the new Site access junction. The tracks are anticipated to have a typical surface width of approximately 5 m with additional widening at bends (depending on the turbine supplier's specifications) to facilitate the safe passage of Abnormal Indivisible Loads (AIL). The layout of the access tracks will be determined based on the final turbine layout, topography and environmental constraints on-site, and will seek to utilise existing forestry tracks where possible.

#### *Permanent Anemometer Mast*

- 2.4.24 A permanent steel tower anemometer I mast may be required to provide ongoing monitoring of the wind conditions after commissioning of the Proposed Development. The height of any met

mast would align with the chosen wind turbine model. Further detail on the location and height of any mast will be provided in the ES.

#### *Cabling and Associated Infrastructure*

- 2.4.25 Cables from each turbine and transformer, the solar PV array and BESS would be connected underground to the on-site substation.
- 2.4.26 It is anticipated that electric cabling would be laid in trenches where possible, running alongside the access tracks, the layout of which would be determined by the final Proposed Development layout and informed by consideration of relevant environmental receptors and effects, such as on-site ecology and ground conditions. The dimensions of the trenches will vary depending on the number of ducts they contain but would typically be up to approximately 3 m in width and up to approximately 2 m in depth, dependent on ground conditions.

#### *Security and Fencing*

- 2.4.27 Fencing would be installed around the solar PV array and substation/BESS compound for security purposes. This would likely comprise a deer type wire mesh and wooden post fencing with a maximum height of 2.5 m around the solar PV array, and palisade fencing up to 3 m high around the substation/BESS compound. CCTV cameras on poles would be installed around the perimeter of the solar farm, BESS and compound.

#### *Construction*

- 2.4.28 Typical construction activities and work methods will be set out in the ES. The report will contain details of appropriate environmental management measures, including pollution prevention measures, waste minimisation and management, and traffic generation and construction phasing. These measures will be in line with best practice and relevant guidance from National Resources Wales (NRW).
- 2.4.29 The construction works would require one or more temporary construction compounds. The main construction Site office and compound would likely be located near to the main Site access to control all access on to the Site. The compound(s) 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. Temporary lay-down areas would be provided for parking and unloading delivery vehicles and, in particular, AIL.
- 2.4.30 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 final full CEMP will be secured by a planning condition.
- 2.4.31 A Construction Traffic Management Plan (CTMP) and AIL management plan will also be submitted to manage traffic associated with construction and propose measures to reduce the potential impacts associated with construction traffic, with these to be secured by planning condition.

#### *Tree Felling and Replanting*

- 2.4.32 It would be necessary for areas of forestry to be removed to allow the various elements of the Proposed Development to be constructed. Potential impacts on forestry assets would be minimised where practicable during the design of the Proposed Development. The ES and accompanying technical appendices will describe the extent of tree felling, restocking and

compensatory replanting that could be required. This will include provision of drawings to show how the Proposed Development would interact with the existing forest plans for the area. This is detailed further in Section 14.2. All forestry works would be in accordance with the UK Forestry Standard<sup>8</sup>.

#### *Borrow Pits*

- 2.4.33 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 to import rocks into the Site. Should sufficient stone not be available on-site, a local quarry will be used, if possible, to minimise HGV traffic.
- 2.4.34 The potential for use of borrow pits will be determined as early as possible in the EIA process. Site selection will be based on access, geological suitability and on the avoidance of environmental constraints such as ecology, peat, forestry, watercourses and heritage assets.
- 2.4.35 Consultation will be undertaken on the potential use of borrow pits with the relevant Welsh Government department to determine the appropriate consenting/approval route, should the need for additional consenting be required outside of or supplementary to the DNS process.

#### *Operation and Maintenance*

- 2.4.36 The normal operating life of an Energy Park comprising wind turbines and solar PV array would be up to 50 years. The Proposed Development would be expected to be visited regularly (up to four times a month) by a small maintenance crew. There would also be a requirement for maintenance of the access tracks and substation. Periodically there would be a need for larger scale maintenance for the replacement of turbine equipment.

#### *Decommissioning*

- 2.4.37 Following the period of operation, the Proposed Development would be decommissioned. Any above ground infrastructure would likely 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. There may be potential to extend the life of the Proposed Development or replace the turbines and other infrastructure, which would be subject to a new application.
- 2.4.38 Decommissioning would be controlled in a similar way to construction, and for most environmental effects, would be of a similar or lower magnitude.
- 2.4.39 Decommissioning will be assessed as an integral part of the ES.

#### *Biodiversity Enhancement and Resilience of Ecosystems*

- 2.4.40 Opportunities for enhancing biodiversity in line with the requirements of the Environment (Wales) Act 2016 and the associated Nature Recovery Action Plan<sup>9</sup>. This may include on-site enhancement and off-site offsetting as appropriate. Biodiversity and the resilience of ecosystems will be assessed as part of the ES.

#### *Grid Connection*

- 2.4.41 The grid connection will be subject to a separate consent application and will not form part of the DNS application.

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<sup>8</sup> Forestry Commission, 2021. The UK Forestry Standard

<sup>9</sup> Welsh Government (2020) Nature Recovery Action Plan for Wales 2020-2021 [online] Available: <https://www.gov.wales/sites/default/files/publications/2020-10/nature-recovery-action-plan-wales-2020-2021.pdf> [date accessed: 13/11/2023]

- 2.4.42 The Applicant has secured a grid connection into a new substation at Ferryside, approximately 50 km south of the Site. Connection from the on-site substation to the wider electricity network is likely to be at 132 kilovolts (kV) and comprise either underground cables, overhead line, or a combination of the two. The connection from the on-site substation to the national grid would be made by the Distribution Network Operator and would be subject to a separate consent application and will not form part of the DNS application.
- 2.4.43 The ES will include a high-level account of the main environmental constraints within the grid connection corridor to confirm that a grid connection is likely to be possible without unacceptable environmental impacts but will not provide an assessment of the likely significant effects of the grid connection.

## **2.5 Design Optimization**

- 2.5.1 The Proposed Development design process will seek to establish a layout and turbine typology which takes account of visibility from the surrounding environment and the key environmental constraints on-site and in the surrounding area.
- 2.5.2 Following completion of the main baseline landscape and visual assessment, design objectives will be developed and used to evaluate a series of layout options. These layouts will be examined from key design viewpoints to assess and optimise the number, size and layout of the proposed wind turbines and the location of the Solar PV array and other infrastructure in relation to the landform of the Site and surrounds. The design iteration process will take account of other environmental and technical factors to establish the final layout for the Proposed Development.
- 2.5.3 At the time of writing, this Scoping Report utilises and assesses a proposed turbine layout that was developed prior to the completion of 2023 survey data, including the peat surveys and ecology surveys, the results of which have been made available towards the end of the scoping assessment and have therefore been included in the report. The turbine layout will be further refined throughout the EIA process, including in response to emerging information on peat depths on Site.

## 3. APPROACH TO THE EIA

### 3.1 Summary Scope of the EIA

- 3.1.1 The ES will set out on the likely significant effects, including, where applicable, direct, indirect, cumulative, short, medium and long-term, permanent and temporary, beneficial and adverse effects.
- 3.1.2 The EIA Regulations require consideration of the potential likely direct and indirect significant effects on the following factors (including their interaction):
- Population and human health;
  - Biodiversity, and in particular species and habitats protected under Council Directive 92/43/EEC on the conservation of natural habits and wild flora and Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds;
  - Land, soil, water, air and climate; and
  - Material assets, cultural heritage and the landscape.
- 3.1.3 **Chapters 4 - 14** of this Scoping Report provide a review of the proposed technical issues to be considered a part of the EIA, and justification for scoping out those not considered to be significant.
- 3.1.4 Potential significant environmental affects have been identified for the following topics, which have therefore been 'scoped in' for assessment within specific chapters within the ES (see **Chapter 4 - 13** of this Scoping Report):
- Landscape and visual amenity;
  - Cultural heritage;
  - Ecology;
  - Ornithology;
  - Hydrology, hydrogeology, geology and peat;
  - Transport and Access;
  - Noise;
  - Aviation;
  - Telecommunications;
  - Shadow flicker; and
  - Cumulative Effects.
- 3.1.5 For the following topics, no significant environmental effects are considered likely, but it is deemed necessary to provide factual reports to be appended to the ES to provide sufficient environmental information (see **Chapter 14** of this Scoping Report):
- Forestry (Forestry Impact Assessment);
  - Socio-economic impacts (Economic Benefit Statement);
  - Climate – Carbon Emissions Report to be appended to ES, and climate risks to be assessed as part of scoped in chapters; and
  - Glint and Glare – standalone Glint and Glare Assessment to inform scoped in technical chapters such as landscape and visual.
- 3.1.6 The above listed factual reports will be referenced in the ES and used to support assessment chapters where relevant.

3.1.7 No significant effects are considered likely in respect to the following technical disciplines and accordingly these would be scoped out of the EIA and not considered as part of the ES (see **Chapter 14** of this Scoping Report):

- Air quality;
- Climate;
- Population and human health;
- Risk of major accidents and/or disasters;
- Heat and radiation; and
- Materials and waste.

## 3.2 Consultation

3.2.1 The Applicant will carry out formal community consultation in line with 'The Developments of National Significance (Procedure) (Wales) Order 2016' and part 8 therein, 'publicity before applying for planning permission', which will comprise the consultation noted in the legislation as well as public exhibitions and circulars. As required, the outcome of this consultation will be compiled into a Pre-Application Consultation (PAC) Report, which will accompany the DNS application. The PAC Report will detail the consultation undertaken, how the applicant has satisfied the requirements in the noted legislation, and any changes made to the Proposed Development as a result of the consultation.

3.2.2 Consultation throughout 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.

3.2.3 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.

3.2.4 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):

- Carmarthenshire CC
- Ceredigion CC;
- Community Councils (Cilycwm Community Council, Cynwyl Gaeo Community Council and Llanddewi Brefi Community Council);
- Welsh Government (PEDW);
- Natural Resources Wales (NRW);
- Cadw;
- Dyfed Archaeological Trust;
- South Wales Trunk Road Agency (SWTRA) and North and Mid Wales Trunk Road Agency (NMWTRA);
- Civil Aviation Authority (CAA) / National Air Traffic Service (NATS);
- Ministry of Defence (MOD)
- Public Health Wales;

- Royal Society for the Protection of Wales (RSPB); and
- Bannau Brycheiniog National Park Authority (formerly Brecon Beacons).

### 3.3 Establishing the Baseline

- 3.3.1 The EIA will predict the likely scale of change in environmental conditions as a result of the Proposed Development. The assessment of the scale and significance of a predicted change will be undertaken against a reference condition, known as the baseline. In most cases, the baseline represents the environmental condition of the Site and the surrounding study area at the time of the assessment, although it may also include a projected environmental condition at some point in the future, referred to as the future baseline.
- 3.3.2 Consideration will be given, as appropriate (and subject to programmed implementation), to existing and future Site conditions:
- as existing, identified during Site surveys, desk-based data collection and/or modelling (Existing Baseline);
  - at the time the Proposed Development is completed, established by means of desk-based prediction, calculation and/or modelling (Future Baseline); and
  - in combination with other existing and/or approved development in the cumulative study area, established by means of desk-based prediction, calculation and/or modelling (Cumulative Future Baseline).
- 3.3.3 Baseline data gathering has already commenced for a number of environmental topics and will continue via a combination of consultation with stakeholders, field survey work and desk-based research, as detailed within **Chapters 4 - 13**. Where available, baseline information from desk-based research and completed survey work has been included in this Scoping Report.

### 3.4 Alternatives

- 3.4.1 The EIA Regulations require that the ES provides an outline of the reasonable alternatives to the Proposed Development considered by the Applicant and the reasons for the selection of the preferred option.
- 3.4.2 It is anticipated that the design and layout of the Proposed Development will evolve from the Scoping Turbine Layout presented in this Scoping Report, in response to further environmental survey work and statutory and non-statutory consultation. The alternatives considered in the course of the design process, such as site location, land uses, layouts and design evolution, will be presented in the ES. The environmental factors that informed each of the options will be presented as relevant.

### 3.5 Approach to Mitigation

- 3.5.1 Paragraph 7 of Schedule 4 of the EIA Regulations notes that the ES should include: "*A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases*".
- 3.5.2 For the purposes of this Scoping Report and the ES, mitigation measures that are embedded into the design will form part of the Proposed Development for which planning permission is sought. Such measures will be described within the ES but taken into account prior to assessment of the likely effects of the Proposed Development, on the basis that they would form an integral part of any consented design.

- 3.5.3 In addition, standard best practice and the employment of mitigation in accordance with current regulations, during the construction and operation of the Proposed Development, should also be considered as an integral part of the design/construction process. For example, the use of good practice measures in relation to pollution prevention and dust management. These would therefore also be taken into account prior to the assessment of likely effects. Such measures would be outlined within the outline CEMP to be submitted with the ES.
- 3.5.4 Additional mitigation measures that may be necessary to avoid, prevent or reduce and, if possible, offset potentially significant adverse effects, will then be considered prior undertaking an evaluation of the likely significance of the residual effects.
- 3.5.5 As further detailed in **Chapter 14**, it is proposed to scope out certain potential impacts from the ES on the basis that these will be avoided by standard good practice measures and design.

### **3.6 Assessment of Effects**

- 3.6.1 The EIA will employ a range of tools and approaches aimed at predicting the likely nature and extent of environmental effects. Some technical assessments will rely on mathematical models which provide a numerical estimate of the size of an environmental change or impact, such as the levels of noise likely to arise from operational wind turbines. Other technical assessments will rely on map-based techniques to plot the extent of land use change or habitat loss or use illustrative methods to communicate how the Proposed Development might appear from a particular viewpoint.
- 3.6.2 The predictions in the EIA will indicate the nature and scale of the Proposed Development's likely effects, to enable informed planning decisions about the likely environmental outcomes of the Proposed Development; however, these predictions may be subject to a degree of uncertainty. As such, the tools employed, and the assumptions made in each case will be developed accordingly and set out clearly.
- 3.6.3 Methods of prediction to be applied within the EIA will be either quantitative or qualitative or, in certain instances, both. Quantitative methods predict measurable changes because of the Proposed Development and rely on accurately measuring baseline conditions of the Site to make accurate predictions. Qualitative assessment techniques will rely on professional judgment and are exercised within a structured framework to ensure consistency of conclusions drawn. Clear distinctions will be made between matters of fact, judgement and opinions with all sources identified. Assumptions, degrees of confidence and areas of uncertainty will be clearly stated.
- 3.6.4 The significance of effect is usually a function of the sensitivity (vulnerability/value/importance) of the resource affected (receptor) and the magnitude of the potential impact.
- 3.6.5 The value or importance of a receptor could be a function of designation, whereas the vulnerability could be a function of carrying capacity and/or ability to respond to change. Receptor sensitivity will be defined based on a rating of high, medium or low.
- 3.6.6 The magnitude of impact of impact refers to the degree of change and will be defined based on a rating of high, medium and low/small (or unknown where relevant).
- 3.6.7 In assessing the magnitude of the impact, the scale and significance of resulting effects, regard will be had to the following:
- The likelihood of the impact/effect occurring, based on a scale of certain, likely or unlikely;
  - The duration of the impact/effect, based on a scale of long, medium and short term (temporary);

- The geographical extent of the impacts/effect at local, borough, regional, national and international levels; and
- The reversibility of the impact/effect, being either reversible or irreversible.

3.6.8 Scale of effects will be determined by means of published guidance, matrices and/or application of professional judgement and defined based on a rating of major, moderate, minor, negligible.

3.6.9 Where published industry guidance and terminology do not exist and to provide a consistent approach to the presentation of likely effects, the following terminology will be used throughout the ES:

Nature/Type of Effects -

- Adverse: detrimental or negative effect to an environmental resource or receptor;
- Neutral: effect that on balance, is both beneficial and adverse to an environmental resource or receptor; and
- Beneficial: advantageous or positive effect to an environmental resource or receptor.

Scale of Effects -

- Negligible: effects which are beneath levels of perception;
- Minor: slight, very short or highly localised effects;
- Moderate: limited effects (by magnitude, duration, reversibility, value and sensitivity of receptor) which may be considered significant; and
- Major: considerable effect (by magnitude, duration, reversibility, value and sensitivity of receptor, which may be more than of a local significance or lead to a breach of a recognised environmental threshold, policy, legislation or standard).

3.6.10 Residual effects will be defined as either 'significant' or 'not significant'. Significant effects would be considered material to the planning decision making process. Based on the above, residual effects of moderate and major scale may be considered significant, but would be dependent on the relevant technical assessment, as well as the existence of published assessment guidance.

3.6.11 Where published assessment guidance is not definitive in respect of categorising/determining significant environmental effects, or where no published guidance is available, professional judgement will be applied, considering the duration, extent and context of the effect, to determine significant effects.

3.6.12 Effects will also be described as being either direct or indirect, short-term, medium term or long term, and permanent or temporary.

3.6.13 Where there are any deviations to the terminology set out above (e.g. due to published industry guidance or professional judgement), this will be clearly identified and explained within the relevant technical assessment of the ES.

### **3.7 Cumulative Effects**

3.7.1 The EIA Regulations require that, in assessing the effects of a particular development proposal, consideration is also given to the cumulative effects which might arise from the proposal in conjunction with other existing and/or approved development proposals in the vicinity. The following two types of cumulative effects will be considered within the EIA:

- Intra-Project: The effects of different types of impact from the Proposed Development on receptors at or surrounding the Site. Potential impact interactions include the combined effects of noise and visual impacts on a sensitive receptor; and
- Inter-Project: The effects which are the combined effects generated from the Proposed

Development with other existing and/or approved developments in the vicinity, most notably other wind farm and large-scale solar development.

- 3.7.2 The assessment of inter-project cumulative effects will take into account guidance set out in the Planning Inspectorate's Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects<sup>10</sup> which, although produced for Nationally Significant Infrastructure Projects, is used widely across the UK as best practice guidance for assessing cumulative effects.
- 3.7.3 A planning application search will be conducted in the first instance using relevant planning portals to identify proposed and approved but not yet operational developments that meet the following criteria:
- Wind developments (or other vertical structures) within 35 km of the Site (based on NRW LANDMAP Guidance Note 46)<sup>11</sup>, where turbines are greater than 50 m to tip height and more than one wind turbine is proposed;
  - Any DNS or other major infrastructure schemes within 10 km which have undertaken their statutory consultation or have been submitted to the relevant authorities but not yet determined (subject to a cut-off point to allow assessments to be undertaken), have been consented, or are under construction at the time of assessment; and
  - Any DNS or other major infrastructure schemes within 10 km which are subject to an EIA Scoping Direction Request (subject to a cut-off point to allow assessments to be undertaken).
- 3.7.4 Schemes that are at the EIA Screening stage and not yet subject to an EIA Scoping Direction Request will not be considered in the cumulative assessment.
- 3.7.5 Once a list of schemes has been established based on the above criteria, this will be refined based on the following criteria:
- The cumulative development has a construction and/or operational phase has the potential to coincide with the Proposed Development;
  - The cumulative development shares 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; and
  - The cumulative development has sufficient environmental assessment information freely and publicly available to inform a cumulative effects assessment.
- 3.7.6 Any cumulative developments that are expected to be completed and operational prior to construction of the Proposed Development will be considered as part of the baseline underpinning the assessment.
- 3.7.7 Any developments identified as having been refused planning permission will not be considered as cumulative developments.
- 3.7.8 It should be noted that the list of schemes identified as having the potential to give rise to significant cumulative effects may differ between environmental topics. Not all of the cumulative developments would necessarily have a cumulative effect in respect of any

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<sup>10</sup> Planning Inspectorate, 2019. Advice Note 17: Cumulative effects assessment relevant to nationally significant infrastructure projects.

<sup>11</sup> GN46 recommends a search area equivalent to x150 the maximum height of a structure. Based on a 230m maximum tip height, the search area for cumulative visual effects should therefore extend to 35km (rounded to the nearest km) from the Site.

particular environmental topic and therefore each technical assessment will provide a full justification for the list of schemes considered in their respective assessments.

3.7.9 As the cumulative baseline is constantly evolving, the schedule of cumulative schemes to be included in the assessment will be finalised following consultation with the relevant consultees.

3.7.10 Cumulative effects will be assessed and reported on as a section within each technical chapter of the ES. The same approach is taken for the technical chapters within this Scoping Report.

## 4. LANDSCAPE AND VISUAL AMENITY

### 4.1 Introduction

- 4.1.1 This Chapter has been prepared by Abseline Landscape Planning. The Landscape and Visual Impact Assessment (LVIA) will consider direct and indirect effects on landscape resources, landscape character and designated landscapes. It will examine the nature and extent of effects on existing views and visual amenity. The effects of the Proposed Development will be assessed during the construction, operational and decommissioning phases. The LVIA will also consider cumulative effects i.e. the incremental effects of the Proposed Development in combination with other cumulative developments.
- 4.1.2 The LVIA will inform the final layout design and will be undertaken following the approach set out in Guidelines for Landscape and Visual Impact Assessment (3rd Ed.) (GLVIA3)<sup>12</sup>. The assessment will also draw upon LANDMAP studies; Guidance Note 046<sup>13</sup>; local landscape character information from local authorities within the study area and NRW; local policy, guidance and baseline technical studies, and current good practice guidance as set out in **Section 4.4**.

### 4.2 Existing Baseline

#### *Site Location and Context*

- 4.2.1 The Site and its location are described in detail in **Chapter 2**. In summary, it encompasses an area of commercial forestry, hill grazing and moorland pasture straddling the border between Ceredigion and Carmarthenshire within the Cambrian Mountains, around 11 km east of Lampeter. The Site is situated within hills that sit immediately north of the upper Cothi and Tywi valleys with the surrounding landscape comprising a mix of open uplands and extensive areas of commercial forest with some scattered settlement and enclosed farmland found within the bottoms of the incised valleys.
- 4.2.2 Wind energy development in the surrounding area is currently limited to occasional small turbines associated with agriculture. The nearest existing larger scale wind energy developments are a cluster of wind farms at Brechfa Forest, around 25 km southwest, and Llangwryfyon wind farm, located around 20 km to the northwest of the Site.

#### *Landscape Context*

- 4.2.3 The Site lies within National Landscape Character Area (NLCA) 21: Cambrian Mountains. This is broadly described within the NLCA profile<sup>14</sup> as an extensive upland plateau with open moorland and commercial forestry covering much of the area while improved pasture features around the margins and in deeper valleys. Several major reservoirs and a number of major rivers emerge from the area, including the Afon Twyi with its source the confluence of a number of smaller watercourses located just to the southeast of the Site. The profile notes NLCA 21 as being windswept, remote and sparsely populated with few settlements, although the abundance of reservoirs, forestry, wind farms and the legacy land cover of extensive upland sheep rearing are a reminder of the extensive human influence on the landscape.
- 4.2.4 There is extensive commercial forestry within the Site and surrounding area and the Llyn Brianne Reservoir is located around 2.5 km to the northeast.

<sup>12</sup> Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3). Landscape Institute and Institute of Environmental Management and Assessment (2013).

<sup>13</sup> Guidance Note 046 Using LANDMAP in Landscape and Visual Impact Assessments (LVIA). Natural Resources Wales (2021).

<sup>14</sup> NLCA21: Cambrian Mountains. Natural Resources Wales (2014). Available at: <https://cdn.cyfoethnaturiol.cymru/media/682591/nlca21-cambrian-mountains-description.pdf?mode=pad&rnd=13155058624000000> [Accessed on: 05/07/2023].

4.2.5 The Site is not located within any nationally or internationally designated landscape although it falls within the locally designated North Eastern Uplands Special Landscape Area (SLA) (Carmarthenshire) and the North Ceredigion Uplands SLA (Ceredigion) and there are a number of other SLAs in the surrounding area, as illustrated on **Figure 4.2** and **Figure 4.3**. The nearest nationally designated landscape is the Bannau Brycheiniog National Park, located approximately 13 km south of the Site at its closest point.

#### *Visual Amenity*

4.2.6 The Site and surrounding area are relatively remote with limited road access and sparse settlement, particularly extending across the Cambrian Mountains to the north and northeast. Roads and dispersed settlement tend to be confined to the bottom of incised valleys, including the upper Cothi and Tywi valleys which are located immediately south of the Site. There are a number of rural properties and farms in the immediate vicinity of the Site with further dispersed settlement and hamlets along valley bottoms within 5 km. The nearest larger villages or towns include Llandewi Brefi (6.5 km northwest), Tregaron (9.5 km north), Lampeter (11 km west), Llanwrtyd Wells (12 km east) and Llandovery (12 km south).

4.2.7 As noted above, there is a sparse network of local roads within 5 km of the Site which tend to follow valley bottoms and often terminate in dead ends, leading only to remote rural properties and farms. The nearest main road is the A482, located around 7 km to the southeast, which runs broadly northwest-southeast between Lampeter and the A40 south of Llandovery. Larger road networks and more frequent and extensive areas of settlement are focussed around the Teifi valley to the northwest and the Tywi valley and A483 corridor to the southeast of the Site.

4.2.8 Open moorland areas within the Site and across the surrounding hills include extensive areas of open access land and a network of PRoW, including two footpaths and a byway that pass broadly north-south through the Site. The network of PRoW is relatively limited to the north of the Site and more extensive across the hills and valleys to the south. The long-distance Cambrian Way passes directly east of the Site, following the base of the Tywi valley to the south and a series of minor upland valleys to the north. The only other long distance recreational routes in the area are the Heart of Wales Line which runs through Llanwrtyd Wells and Llandovery, passing around 7.5 km southeast of the Site at its closest point and part of National Cycle Network (NCN) Route 82 which follows the Teifi valley to the northwest, passing approximately 7 km at its closest point.

4.2.9 More generally, the area surrounding the Site is a popular visitor location with people undertaking a range of recreational pursuits. Local roads, particularly in the more remote areas to the northeast and around Llyn Brienne are popular with cyclists, motorcyclists and drivers seeking scenic road routes and there are a number of scenic viewpoints marked on Ordnance Survey (OS) mapping.

### **4.3 Design Considerations**

4.3.1 LVIA is an iterative process which will inform refinements to the design prior to submission. Landscape and visual mitigation will be embedded in the design of the Proposed Development, including the number, positioning and scale of the turbines and aviation lights, the positioning and scale of the solar PV arrays and other supporting infrastructure such as substation, battery storage and tracks.

4.3.2 At this early stage, the scoping layout has been informed by outline environmental parameters. In respect of landscape and visual matters this includes the scale of proposed turbines in relation to the surrounding landform and landcover pattern, and preliminary offsets from nearby residential properties.

## 4.4 Assessment Scope and Methodology

### *Scope of the Assessment*

4.4.1 The following potentially significant landscape and visual effects are likely to result from the Proposed Development although these may be reduced through the design process.

- effects on 'host' landscape character of NLCA 21: Cambrian Mountains;
- effects on surrounding landscape character and designated landscapes at a local and national level, including the North Eastern Uplands SLA, North Ceredigion Uplands SLA and the Bannau Brycheiniog National Park;
- effects on views from residential properties within 2 km of the proposed turbines, which will be subject to Residential Visual Amenity Assessment (RVAA);
- visual effects on the views from transport routes including the A482 and from recreational routes including the Cambrian Way and network of PRowS;
- visual effects on recreational and tourist / visitor attractions including a number of scenic viewpoints; and
- visual effects on night-time views from the surrounding visual receptors.

### *Legislation and Guidance*

4.4.2 The LVIA will be undertaken in accordance with the Guidelines for Landscape and Visual Impact Assessment (GLVIA3), Third Edition (Landscape Institute and IEMA, 2013).

4.4.3 National and local policy relevant to this assessment includes:

- Future Wales, The National Plan 2040, including:
  - Policy 18 – Renewable and Low Carbon Energy Developments of National Significance.
- PPW (Edition 11), including:
  - Section 6.3 – Landscape.
- Carmarthenshire Local Development Plan 2006 – 2021, including:
  - SP14 Protection and Enhancement of the Natural Environment;
  - Policy EQ6 Special Landscape Areas;
  - Policy RE1 Large Scale Wind Power; and
  - Policy RE3 Non-wind Renewable Energy Installations.
- Ceredigion Local Development Plan 2007 – 2022, including:
  - Policy LU26: Large and Medium Sized Wind Farms;
  - Policy DM10: Design and Landscaping;
  - Policy DM17: General Landscape;
  - Policy DM18: Special Landscape Areas (SLAs); and,
  - Policy DM20: Protection of Trees, Hedgerows and Woodlands.

4.4.4 In Carmarthenshire, the Local Development Plan (LDP) 2006 – 2021 remains in place although emerging local policy is contained within the Second Deposit Revised Local Development Plan 2018 – 2033. Once adopted the Revised LDP will replace policy contained within the current LDP; a Revised Delivery Agreement (August 2022) suggests an indicative adoption date of October – November 2024, subject to examination by the Welsh Government. Relevant emerging policies include:

- PSD4: Green and Blue Infrastructure – Trees, Woodlands and Hedgerows;
- SP 14: Maintaining and Enhancing the Natural Environment;
- NE1: Regional and Local Designations;

- BHE2: Landscape Character;
- CCH2: Renewable Energy Outside Pre-Assessed Areas and Local Search Areas; and
- CCH7: Climate Change – Forest, Woodland, and Tree Planting.

4.4.5 In addition to the above policy documents, the following local guidance documents are also relevant to this assessment:

- Carmarthenshire Wind and Solar Energy Supplementary Planning Guidance;
- Ceredigion Renewable Energy Supplementary Planning Guidance (2015); and
- Ceredigion Special Landscape Areas Supplementary Planning Guidance (2014).

4.4.6 In addition to GLVIA3, the approach to the assessment will be informed by the following key documents (in addition to other relevant guidance):

- Guidance Note 046 Using LANDMAP in Landscape and Visual Impact Assessments (LVIA). NRW (2021);
- Visual Representation of Wind Farms (Version 2.2). NatureScot (2017);
- TGN 06/19 Visual Representation of Development Proposals. Landscape Institute (2019);
- Assessing the Cumulative Impacts of Onshore Wind Energy Developments. NatureScot (2021);
- Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, PINS (2019);
- TGN 02/19 Residential Visual Amenity Assessment (RVAA). Landscape Institute (2019);
- Designing for Renewable Energy in Wales (Consultation Draft). Design Commission for Wales (2023);
- Carmarthenshire Wind Turbine Development Landscape Sensitivity and Capacity Study;
- Carmarthenshire Solar PV Development Landscape Sensitivity and Capacity Study;
- Pembrokeshire and Carmarthenshire: Cumulative Impact of Wind Turbines on Landscape and Visual Amenity guidance. White Consultants (2013);
- Local Landscape Character Assessment for the Powys Local Development Plan Area. LUC (2022);
- Brecon Beacons National Park Landscape Character Assessment. Fiona Fyfe Associates (2012); and
- Brecon Beacons National Park Management Plan 2010-2015.

#### *Zone of Theoretical Visibility*

4.4.7 In line with Guidance Note 046, Zone of Theoretical Visibility (ZTV) studies have been prepared covering a 35 km search area based on the initial wind turbine scoping layout and are presented on **Figure 4.1 – 4.3**. These illustrate that potential visibility of the proposed wind turbines within the search area occurs across three clear bands oriented broadly southwest to northeast.

4.4.8 The central band, encompassing the Site, extends along the southwestern tip of the Cambrian Mountains from around 15 km northeast of the Site to around 30 km to the southwest and generally no more than around 10 km across, following the more elevated hills. Potential visibility is intermittent across this area, frequently broken up by extensive areas of forestry, incised valleys and undulating hills with potential visibility frequently confined to open hilltops and other elevated locations.

4.4.9 To the northwest, the Teifi valley provides a notable break in visibility with the next band being more intermittent, often limited to blade tips only, and following the band of low hills that sit

parallel between the Teifi valley and the coast. To the southeast, the Tywi valley and that related to smaller watercourses northeast of Llandovery provide another notable break in potential visibility. Beyond this, another band extends along the north western side of Mynydd Epynt, the Black Mountains and the northwest edge of the National Park.

- 4.4.10 Beyond these three fairly distinct bands, potential visibility across the wider area is limited and very intermittent, confined to occasional hilltops and open, elevated areas of farmland. **Figure 4.3** also illustrates that potential visibility of turbine hubs is markedly less than that of the blade tips, particularly to the east and northwest.

#### *Study Area*

- 4.4.11 Based on the extent of the preliminary ZTVs covering the 35 km search area and preliminary fieldwork, which has identified that visibility is much more limited than illustrated by ZTVs due to extensive roadside hedgerows and other localised vegetation, not modelled within ZTVs, providing notable screening, it is proposed that a 20 km detailed study area is sufficient to identify all potentially significant landscape and visual effects. Beyond this, potential visibility is generally limited to areas of open farmland with limited public access or more remote areas of open upland, often with a smaller number of turbines potentially visible.
- 4.4.12 It is noted that some of the areas of visibility beyond 20 km coincide with the National Park and short sections of main road routes and, while significant effects are not anticipated at such distances, a number of viewpoints have been included beyond 20 km (see **Table 4.1**) in order to illustrate key views and potential effects in these areas.
- 4.4.13 Within the detailed study area, effects on all landscape and visual receptors with theoretical visibility of the Proposed Development will be considered.

#### *Landscape Effects*

- 4.4.14 The detailed study area comprises three local authority areas along with the National Park, each with different baseline assessments of landscape character. Locally defined landscape character types/areas will form the basis of the assessment of effects on landscape character as follows:
- Carmarthenshire – the assessment will consider effects on landscape units as defined within the Carmarthenshire Wind Energy Landscape Sensitivity and Capacity Study<sup>15</sup>;
  - Ceredigion – no baseline studies which define local landscape character have been produced for Ceredigion. Local character types/areas will be defined based on LANDMAP data and advice provided within Guidance Note 046 and will be used as the basis of assessment in this area;
  - Powys – the assessment will consider effects on landscape character areas as identified within the 2022 Local Landscape Character Assessment for the Powys Local Development Plan Area<sup>16</sup>; and
  - Bannau Brycheiniog National Park - the assessment will consider effects on landscape character areas as identified within the 2012 Brecon Beacons National Park Landscape Character Assessment<sup>17</sup>.
- 4.4.15 Effects will be assessed on landscape character types/areas/units, as set out above, which are within the detailed study area and would have theoretical visibility of the Proposed

<sup>15</sup> Carmarthenshire Wind Turbine Development Landscape Sensitivity and Capacity Study. Anthony Jellard Associates.

<sup>16</sup> Local Landscape Character Assessment for the Powys Local Development Plan Area Landscape Character Assessment Report. Final report prepared by LUC for Powys County Council (2022).

<sup>17</sup> Brecon Beacons National Park Landscape Character Assessment. Prepared By Fiona Fyfe Associates with Countryside, Alison Farmer Associates and Julie Martin Associates (2012).

Development. LANDMAP is a complete all-Wales GIS based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data set. A LANDMAP analysis, based on advice set out in Guidance Note 046, will be undertaken and will inform the assessment of effects on landscape character.

4.4.16 Effects on designated landscapes will be assessed based on the purposes of designation identified by policy for the SLAs; and for the National Park, on the documented Special Qualities set out in the National Park management plan<sup>18</sup>.

4.4.17 The presence of registered parks and gardens, registered historic landscapes, heritage coasts and conservations areas will, for the purpose of LVIA, be considered as indicators of landscape value, and as visual receptors if they are accessible to the public. Effects on the historic significance of such assets or areas will be considered within the cultural heritage assessment.

#### *Visual Effects*

4.4.18 The assessment of visual effects will focus on public amenity and will consider the effects on the views people see when in settlements; using roads and recreational routes; at tourist and recreational destinations and from near, but not within, their private homes and gardens. All visual receptors with theoretical visibility of the Proposed Development within the detailed study area will be considered within the LVIA.

#### *Viewpoints*

4.4.19 Viewpoint analysis is used to inform the LVIA from selected viewpoints within the Study Area. The purpose of this is to assess both the scale of visual impact for receptors and to help guide the assessment of the overall effect on visual amenity and landscape character. Viewpoints have been selected to represent views from a range of distances, directions and receptor types (landscape character, visual receptors, specific viewpoints known for their valued views, and designated landscapes). Proposed viewpoint locations are set out in **Table 4.1**.

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<sup>18</sup> Brecon Beacons National Park Management Plan 2010-2015. Brecon Beacons National Park Authority (2010).

<b>Table 4.1: Proposed Viewpoints</b>				
<b>VP</b>	<b>Location</b>	<b>X, Y</b>	<b>Distance/ Direction from Site</b>	<b>Reason for inclusion</b>
1	Cambrian Way	274134, 254947	5.1 km, N	Recreational users of long distance path, SLA
2	Cefn Cnwcheithinog	275720, 249670	1.3 km, NE	Recreational visitors, SLA
3	Road near Troed Rhiw Ruddwen	277081, 247743	1.7 km, E	Dispersed settlement, recreational users of long distance path, SLA
4	Rhandirmwyn	277870, 243600	5.0 km, SE	Settlement, recreational visitors, SLA
5	Mynydd Mallaen	273504, 244646	2.8 km, SE	Recreational visitors, SLA
6	Local road near Glan-meddyg	268014, 242681	4.8 km, SW	Dispersed settlement, local road users, SLA
7	Road near Bwlchgwynt	268281, 245179	2.9 km, SW	Dispersed settlement, local road users, SLA
8	Sarn Helen	264506, 247491	5.3 km, W	Dispersed settlement, local road users, SLA
9	Carn Fawr	266880, 250254	3.3 km, NW	Recreational visitors, SLA
10	Esgair Gelli	277433, 257456	8.5 km, N	Recreational visitors, local road users, SLA
11	Llyn Brienne Reservoir Viewpoint	281118, 250100	6.1 km, E	Promoted viewpoint (marked on OS mapping)
12	A4069 Llandovery	275951, 233241	14.0 km, S	Settlement, main road users, SLA
13	Cambrian Way, Sarnau	278432, 228702	19.2 km, S	National Park visitors, recreational users of long distance path
14	Mountain Road Viewpoint	273068, 219237	27.2 km, S	National Park visitors, promoted viewpoint (marked on OS mapping), main road users
15	Heart of Wales Line Trail	268197, 222097	24.5 km, S	National Park visitors, recreational users of long distance path
16	A475 near Llanwenog	248691, 246133	21.2 km, W	Dispersed settlement, main road users
17	Local Road near Lampeter	254808, 250051	15.0 km, W	Dispersed settlement, local road users
18	Penuwch	259771, 262898	16.9 km, NW	Settlement, local road users

- 4.4.20 Grid references are indicative at this stage and viewpoints will be subject to on-site 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 **Table 4.1**.
- 4.4.21 The assessment will be supported by a series of photomontages and wireframes from viewpoint locations. Visualisations from each viewpoint will be prepared in accordance with Scottish Natural Heritage (SNH, now NatureScot) guidance Visual Representation of Windfarms: Version 2.2<sup>19</sup> and Landscape Institute TGN 06/19 Visual Representation of Development Proposals<sup>20</sup>.
- 4.4.22 A Residential Visual Amenity Assessment (RVAA) for all dwellings within 2 km of the proposed wind turbine locations will be carried out in accordance with guidance set out in TGN 02/19 Residential Visual Amenity Assessment (RVAA)<sup>21</sup>. The assessment will be accompanied by illustrative material such as ZTV studies, wirelines and/or photomontages where appropriate.

#### *Night-time Effects*

- 4.4.23 The assessment of night-time effects is an emerging area, but at present, turbines of 150 m or greater tip height, require visible aviation lighting. The standard requirement is for 2000 candela (cd) lights affixed to the nacelle and 32 candela lights fitted halfway up the towers of all turbines of 150 m or greater tip height. However, it is anticipated that a reduced lighting scheme (not all turbines lit) will be agreed with the Civil Aviation Authority (CAA) prior to submission and that further mitigation, including a reduced intensity of lights (from 2000 cd to 200 cd) in clear visibility conditions, would be incorporated. Other forms of mitigation will also be investigated during the design process. The LVIA will consider the effects of the lighting scheme agreed with the CAA. If no agreement on a reduced scheme be reached by the time of the application submission, then the assessment will be based on standard lighting requirements.
- 4.4.24 There is a distinction between light pollution or nuisance and the effect of lighting on the character and amenity of the landscape at night. The LVIA will not provide a technical lighting assessment but will focus on the night-time effects resulting from the introduction of new artificial lighting. It will consider night-time impacts on landscape and visual receptors within the detailed study area and the agreed lighting scheme will form the basis of the assessment and visual material presented. The assessment will focus on those receptors that may experience notable effects as a result of the proposed lighting. For example, designated landscapes where darkness or the absence of human influence are noted qualities and those locations where people are likely to be and would experience the sky at night, such as promoted star gazing locations.
- 4.4.25 The assessment will be informed by ZTVs showing the number of lights potentially visible, satellite mapping showing the existing light levels within the study area and the position of lights will be indicated on wirelines for all viewpoints included in the assessment.
- 4.4.26 Previous work has established that night-time photomontages are of limited value in representing effects due to the difficulties of fully representing the brightness of lights on paper / screen. There is currently no guidance on this for developments in Wales although these limitations are recognised by current Scottish guidance<sup>22</sup>. This suggests inclusion of 2-3 night-time photomontages, selected for sensitivity or regular use at night, is proportionate and

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<sup>19</sup> Visual Representation of Wind Farms (Version 2.2). Scottish Natural Heritage (2017).

<sup>20</sup> Technical Guidance Note 06/19: Visual Representation of Development Proposals. Landscape Institute (2019).

<sup>21</sup> Technical Guidance Note 02/19: Residential Visual Amenity Assessment (RVAA). Landscape Institute (2019).

<sup>22</sup> General Pre-application and Scoping Advice for Onshore Wind Farms. NatureScot (August 2022). Available at:

<https://www.nature.scot/doc/general-pre-application-and-scoping-advice-onshore-wind-farms> [Accessed on: 05/07/2023].

sufficient to illustrate the assessment. These will be confirmed with consultees once initial assessment work has been completed and an outline lighting scheme has been determined.

#### *Cumulative Landscape and Visual Assessment*

- 4.4.27 A cumulative assessment will be undertaken to identify the additional impacts arising from the Proposed Development when considered together with other cumulative development in the area. This assessment will be based on PINS Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (Version 2, 2019), NatureScot's Assessing the Cumulative Impact of Onshore Wind Energy Developments<sup>23</sup>, (2021) and Pembrokeshire and Carmarthenshire: Cumulative Impact of Wind Turbines on Landscape and Visual Amenity guidance<sup>24</sup>.
- 4.4.28 Operational and consented schemes will be included in the assessment baseline and future baseline, and schemes in planning will be considered in the assessment of potential cumulative effects. Schemes at the pre-application stage (Tier 3 and 4) will not be considered in detail unless there is a particular reason to do so and sufficient information is publicly available to inform an assessment. As set out in **Section 4.2**, there is little existing wind energy development in the vicinity of the Site and existing wind farms are not a particularly notable feature within the 20 km detailed study area.
- 4.4.29 Proposed cumulative schemes within the detailed study area will be considered within the cumulative assessment, given the relatively limited potential visibility of the Proposed Development beyond this and the limited wind farm or other large scale development activity in the area, it is not considered likely that significant cumulative effects would arise with other schemes beyond the 20 km detailed study area. Single turbines and clusters of under 50 m in height will not be considered, or modelled in visualisations, unless within 5 km of the Proposed Development as beyond this area it is not considered that significant effects are likely to arise.

#### *Consultation*

- 4.4.30 This Scoping Report forms the initial consultation with respect to scope of the LVIA. Further consultation will be undertaken with Carmarthenshire CC, Ceredigion CC, Powys CC, Bannau Brycheiniog National Park Authority and NRW in order to confirm the scope of the LVIA, as set out in the preceding sections.

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<sup>23</sup> Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments. NatureScot (March 2021). Available at: <https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments> [Accessed on

<sup>24</sup> Pembrokeshire and Carmarthenshire: Cumulative Impact of Wind Turbines on Landscape and Visual Amenity guidance – Final Report for Carmarthenshire County Council, Pembrokeshire Coast National Park Authority, Pembrokeshire County Council. White Consultants (2013).

## 4.5 Summary Questions

1. Do consultees agree that a 20 km detailed study area for the LVIA is appropriate?
2. Do consultees consider that the proposed viewpoint locations are appropriate to inform the LVIA?
3. Do consultees consider that the proposed scope of the LVIA as set out in this chapter is proportionate and adequate to identify all potentially significant effects?
4. Do consultees have any specific concerns regarding potential landscape and visual impacts that they feel would not be covered by the proposed scope of assessment?
5. Do consultees agree that the proposed study area and parameters for cumulative assessment are appropriate?
6. Do consultees agree that a 2 km study area is appropriate for the RVAA?

## 5. CULTURAL HERITAGE

### 5.1 Introduction

5.1.1 This Chapter has been prepared by AOC Archaeology Group and outlines the baseline archaeological and cultural heritage conditions within the Site and study area and the methodology that will be utilised for the identification and assessment of direct and settings effects on heritage assets within the ES. This Chapter also considers the potential for significant effects on heritage assets arising from the Proposed Development and highlights instances where mitigation measures may be required.

### 5.2 Existing Baseline

5.2.1 This baseline has been informed by data obtained from Cadw, Dyfed Archaeological Trust Historic Environment Record (HER), LANDMAP, and a review of various historic mapping for Wales held and published online by the National Library of Scotland (NLS)<sup>25</sup>.

5.2.2 Each asset identified in the existing historic baseline has been assigned an Asset Number unique to this Scoping Report, and the Gazetteer of Heritage Assets and Events (**Appendix 5.1**) includes information regarding the type, period, grid reference, reference number, protective designation, and other descriptive information, as derived from the consulted sources.

5.2.3 LANDMAP Historic Landscape Character Area data records the Site and study area as being within various Historic Landscape areas comprised of woodland and upland marginal land containing prehistoric funerary and ritual sites, Roman leats and aqueducts associated with gold mines, medieval/post-medieval deserted settlements, and post-medieval agricultural features.

5.2.4 There are three Scheduled Monuments and one Historic Landscape within the Site (**Figure 5.1**):

- The Dolaucothi Roman Aqueduct Scheduled Monument (Asset 47), the remains of a Roman water channel believed to have been built in conjunction with the Roman exploitation of gold mines at Dolaucothi;
- The Pen-y-Raglan-Wynt Cairns and Stone Circle Scheduled Monument (Asset 49), the remains of a Bronze Age ring cairn, round barrow, stone row, and stone circle;
- The Garn Fawr Cairn Groups Scheduled Monument (Asset 58), the remains of two groups of well-preserved cairns which probably date to the Bronze Age; and
- The Dolaucothi Historic Landscape (Asset 118), an area considered important due to its relict evidence for Roman and later gold-mining.

5.2.5 The Dyfed Archaeological Trust HER shows 63 non-designated assets and nine records of previous archaeological events within the Site (**Figure 5.1**).

5.2.6 Additional heritage assets identified within the study area (**Figures 5.1** and **5.2**) include:

- 190 designated and non-designated assets within the 1 km study area, which include:
  - Eight Scheduled Monuments;
  - One Historic Landscape;
  - Two Grade II Listed Buildings;
  - 175 non-designated assets; and
  - Four previous archaeological events.

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<sup>25</sup> National Library of Scotland (2023) Ordnance Survey Maps - Six-inch England and Wales, 1842-1952 [online] Available: <https://maps.nls.uk/os/6inch-england-and-wales/> [date accessed: 26/10/2023]

- A further 71 designated assets within the 5 km study area, which include:
  - 36 Scheduled Monuments;
  - One Grade II Registered Park and Garden;
  - One Grade II\* Listed Building; and
  - 33 Grade II Listed Buildings.
- A further 48 designated assets of national importance within the 10 km study area, which include:
  - 36 Scheduled Monuments;
  - One Historic Landscape;
  - One Grade I Listed Building; and
  - 10 Grade II\* Listed Buildings.

5.2.7 Review of the Tithe Apportionment maps from 1843 established that ownership of the Site was mainly divided among landowners who lived on surrounding lower ground in the mid-19th century, particularly along the river valleys.

5.2.8 The OS maps published between 1887 and 1888 record the Site in its entirety. There is very little change to the field boundaries as recorded by the Tithe maps of 1843. The OS map depicts areas of moorland, with areas of improved ground centred on the dispersed farmsteads within and around the Site.

### **5.3 Design Considerations**

5.3.1 The existing design has sited turbines to avoid direct impacts on known designated and non-designated assets within the Site.

5.3.2 The existing design also avoids the placing of any infrastructure within the recorded boundary of the Dolaucothi Historic Landscape (Asset 118).

5.3.3 Further consideration will need to be given to the number and location of turbines which have the potential to impact upon the setting of heritage assets within the 10 km study area. This has particular relevance to the impact on the setting of the prehistoric burial monuments located in prominent positions on high ground within the Site and the surrounding landscape. There are a number of Bronze Age burial cairns located on hilltops within the immediate vicinity of the Site and as part of the wider landscape which have intervisibility with each other and whose understanding and appreciation relies on that intervisibility, therefore the placing of turbines within these views has the potential to impact on their settings.

5.3.4 The designated prehistoric assets within the Site (Assets 49 and 58) are currently shielded from view due to the surrounding forestry but consideration will also need to be given to potential impacts on the setting of these assets as a result of forestry felling management.

5.3.5 Access to the Site would be from Pumsaint, which is the site of the Pumsaint Roman Fort Scheduled Monument (Asset 52) and the Dolaucothi Registered Park and Garden (Asset 115) and falls within the Dolaucothi Historic Landscape (Asset 118). Any works to widen or enhance any roads or tracks in or around the Scheduled Monument would likely require Scheduled Monument Consent. Any works within the Dolaucothi Historic Landscape would also require ASIDOHL 2 assessment to be completed to assess any direct impact on the Historic Landscape, the level of which would need to be determined in discussions to be held with Cadw once further information is available regarding the extent of the works.

5.3.6 It is also noted that the existing design includes the potential for ground-mounted solar panels and associated infrastructure, including a Battery Energy Storage Site (BESS). Further

assessment may be required to assess the potential direct and/or indirect impacts to any heritage assets once the location and extent of the solar panel scheme is confirmed.

## 5.4 Assessment Scope and Methodology

### *Legislation and Guidance*

- 5.4.1 The statutory framework for heritage in Wales is outlined in the Ancient Monuments and Archaeological Areas Act 1979, Planning (Listed Buildings and Conservation Areas) Act 1990, and the Historic Environment (Wales) Act 2016.
- 5.4.2 The implications of these Acts with regard to government planning policy are described within:
- Planning Policy Wales (PPW) (2018, updated 2021) – Chapter 6: Distinctive and Natural Places – The Historic Environment; and
  - TAN 24: The Historic Environment (2017)<sup>26</sup>.
- 5.4.3 Local planning policy is contained within:
- The Carmarthenshire LDP (2006-2021) adopted in 2014 including:
    - Policy RE1: Large Scale Wind Power
    - Policy EQ1: Protection of Buildings, Landscapes and Features of Historic Importance; and
    - Supplementary Planning Guidance: Archaeology and Development (Adopted August 2018).
  - The Ceredigion LDP (2007-2022) adopted in 2013 including:
    - Policy LU26: Large and Medium Sized Wind Farms;
    - Policy DM07: Conservation Areas; and
    - Policy DM19: Historic and Cultural Landscape.
- 5.4.4 A revised LDP for Carmarthenshire is currently being prepared, the current draft of which includes Strategic Policy SP15: Protection and Enhancement of the Built and Historic Environment.
- 5.4.5 The following guidance documents will be consulted during the assessment to assist in the determination of potential effects on cultural heritage assets:
- Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process Revised 2nd Edition (Cadw, 2007<sup>27</sup>);
  - Conservation Principles for the sustainable management of the historic environment in Wales (Cadw, 2011<sup>28</sup>);
  - Historic Environment Records in Wales: Compilation and Use (Cadw, 2017<sup>29</sup>);
  - Managing Change to Listed Buildings in Wales (Cadw 2017<sup>30</sup>);
  - Managing Change to Registered Parks and Gardens in Wales (Cadw, 2017<sup>31</sup>);
  - Managing Conservation Areas in Wales (Cadw, 2017<sup>32</sup>);

<sup>26</sup> Welsh Government, 2017. Technical Advice Note 24: The Historic Environment.

<sup>27</sup> Cadw, 2007. Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process.

<sup>28</sup> Cadw, 2011. Conservation Principles for the sustainable management of the historic environment in Wales.

<sup>29</sup> Cadw, 2017a. Historic Environment Records in Wales: Compilation and Use.

<sup>30</sup> Cadw, 2017b. Managing Change to Listed Buildings in Wales.

<sup>31</sup> Cadw, 2017c. Managing Change to Registered Parks and Gardens in Wales.

<sup>32</sup> Cadw, 2017d. Managing Historic Character in Wales.

- Managing Historic Character in Wales (Cadw, 2017<sup>33</sup>);
- Setting of Historic Assets in Wales (Cadw, 2017<sup>34</sup>);
- Managing Scheduled Monuments in Wales (Cadw, 2018<sup>35</sup>);
- Understanding Listing in Wales (Cadw, 2018<sup>36</sup>); and
- Understanding Scheduling in Wales (Cadw, 2019<sup>37</sup>).

#### *Scope of the Assessment*

- 5.4.6 Based on baseline conditions, it is proposed that the following potentially significant effects will be assessed:
- Indirect impacts on designated assets with theoretical visibility within the 10 km study area (as identified using the Zone of Theoretical Visibility (ZTV)) or with identified sensitivity to setting change at greater distances;
  - Indirect impacts on non-designated assets with theoretical visibility within the 1 km study area identified as being of high sensitivity to setting change;
  - Direct impacts on designated and non-designated assets within the Site;
  - Indirect impacts on all designated assets within the Site and selected non-designated assets with theoretical visibility within the Site that have been identified as having high sensitivity to setting change; and
  - Cumulative effects.
- 5.4.7 Direct impacts on cultural heritage assets located outside of the Site will be scoped out of the assessment.
- 5.4.8 Impacts on the settings of non-designated cultural heritage assets and features beyond the 1 km study area will be scoped out of the assessment as these assets are generally considered less sensitive to changes in their settings and are judged to be unlikely to be subject to significant settings effects.
- 5.4.9 Impacts on the settings of heritage assets located outside of the ZTV will be scoped out as these assets are unlikely to be adversely impacted by the Proposed Development. However, where appropriate, consideration will be given to the potential for views of assets which include the Proposed Development, even where the asset itself lies outside of the ZTV.
- 5.4.10 Impacts on the settings of heritage assets beyond the 10 km study area will be scoped out, as most assets beyond this distance will be too far distant to have their settings significantly adversely affected by the Proposed Development.
- 5.4.11 A detailed assessment of the cultural heritage effects of decommissioning the Proposed Development will be scoped out of the EIA because:
- the future baseline conditions (environmental and other developments) cannot be predicted accurately at this stage;
  - the detailed proposals for decommissioning are not known at this stage;
  - the best practice decommissioning guidance methods will likely change during the lifetime of the Proposed Development; and
  - Decommissioning impacts are likely to be similar or less than construction impacts.

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<sup>33</sup> Cadw, 2017e. Setting of Historic Assets in Wales.

<sup>34</sup> Cadw, 2017. Cadw, 2017. Heritage Impact Assessment in Wales.

<sup>35</sup> Cadw, 2018a. Managing Scheduled Monuments in Wales.

<sup>36</sup> Cadw, 2018. Understanding Listing in Wales.

<sup>37</sup> Cadw, 2019. Understanding Scheduling in Wales.

### *Study Area*

5.4.12 Three study areas will be used in the baseline data gathering:

- 1 km study area - identifying all previously recorded designated and non-designated heritage assets and previous archaeological investigations (events) to allow for assessment of the potential for direct effect on known heritage assets and to assess the potential for hitherto unknown buried assets to survive on-site and thus potentially be impacted upon. This will also be used to identify non-designated assets in close proximity to the Proposed Development where impacts upon their setting might be a consideration;
- 5 km study area - identifying all designated heritage assets including World Heritage Sites, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Registered Battlefields and Conservation Areas to allow for the assessment of potential effects on their settings; and
- 10 km study area - identifying all designated heritage assets of national importance including World Heritage Sites, Scheduled Monuments, Grade I and II\* Listed Buildings, Grade I and II\* Registered Parks and Gardens and Registered Battlefields to allow for the assessment of potential effects on their settings.

### *Baseline Characterisation*

5.4.13 The historic environment baseline will be established with reference to the following data sources:

- Cadw and Historic Wales for:
  - designated asset data.
- The Dyfed Archaeological Trust for Historic Environment Record (HER) data, which includes;
  - non-designated asset data;
  - records of previous archaeological investigations (Events);
  - Historic Landscape Characterisation (HLC); and
  - the location of Ancient Woodland.
- Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) via Coflein for:
  - online accessible historic aerial photographs and reference aerial photographs available for copying.
- British Geological Survey (BGS)<sup>38</sup> for:
  - bedrock and superficial deposit data and historic boreholes information.
- Natural Resources Wales for:
  - pseudocolour combined hillshade image of Digital Surface Model (DSM) derived from 1m composite LiDAR data collected over the 2020-22 winter seasons.
- LANDMAP<sup>39</sup> for:
  - historic landscape characterisation; and
  - modern landscape information.

5.4.14 The assessment will also be informed by a detailed map regression and archival research. The following repositories and online collections will be consulted:

- The Carmarthenshire CC Archives and the Ceredigion Archive Record Office for:

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<sup>38</sup> British Geological Survey (BGS), 2023. Geology of Britain Viewer.

<sup>39</sup> LANDMAP. 2023. Data Map Wales.

- Archival records associated with the Site; and
- Historical maps depicting the Site.
- The National Library of Scotland for:
  - OS mapping depicting the Site; and
  - Pre-OS survey historical mapping depicting the Site.
- National Library of Wales for:
  - Documentary, pictorial and cartographic sources for the Site.
- The Genealogist Website<sup>40</sup> and Welsh Title Maps Online for:
  - Tithe maps and apportionments for the Site.
- Portable Antiquities Scheme for:
  - Details of finds within the study areas.
- Welsh Government Air Photos Online
  - For online accessible historic aerial photography of the Site.
- Cambridge Air Photo's
  - For online accessible historic aerial photography of the Site.

5.4.15 Any relevant published works, such as previous archaeological reports and assessments, will also be considered.

5.4.16 Following the completion of desk-based research and data gathering, an archaeological walkover survey of the Site will be undertaken with the aim of identifying any previously unknown remains and establishing the survival, extent, significance, and relationship of all known heritage assets within the Site. Weather, ground cover and any other conditions affecting the visibility during the survey will also be recorded. All heritage assets encountered will be recorded and photographed.

5.4.17 The walkover survey will also identify areas within the Site that may require further archaeological works in advance of any future development.

5.4.18 Designated heritage assets within the 10 km study area that have been identified as particularly sensitive to change in the wider landscape, or those with key views in the direction of the Proposed Development, will be visited as part of the field survey, insofar as they are publicly accessible, to establish their current settings and how this contributes to their significance.

5.4.19 The Carmarthenshire CC Archives and the Ceredigion CC Record Offices will be visited in order to view and record any relevant archival records and historic maps associated with the Site.

5.4.20 Visualisations, through wireframes, will be provided to support the assessment of effects to suitably identified assets; the need for photomontage visualisations, and appropriate viewpoints, will be agreed with relevant consultees.

### *Consultation*

5.4.21 This Scoping Report forms the start of the consultation process. It is proposed to consult with:

- The Conservation Officers of Ceredigion CC and Carmarthenshire CC;
- Dyfed Archaeological Trust, who advise Ceredigion CC and Carmarthenshire CC on archaeological matters; and
- Cadw, the Welsh Government's historic environment service.

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<sup>40</sup> The Genealogist, 2023. Tithe Apportionments, 1836-1929.

5.4.22 Following receipt of the Scoping Direction, detailed follow-up consultation will be undertaken with relevant consultees to further agree the scope of the assessment, as required.

#### *Method of Assessment*

5.4.23 The process for the assessment of potential effects to cultural heritage assets will begin by appropriately identifying the heritage assets that may be affected, based on the baseline data indicated above.

5.4.24 Consideration of archaeological potential will be informed by the number, density, and distribution of known heritage assets of a specific period and/or type within the study area.

5.4.25 The proximity of such assets to the Proposed Development and/or the similarities/dissimilarities in topographical location between the Proposed Development and the location of known assets will also be a factor in determining potential.

5.4.26 Previous land use will also be a consideration in assessing potential, as later disturbance may have removed or damaged earlier buried archaeological remains and therefore may have reduced the potential for archaeological remains to survive within the Site. Consideration will also be given to evidence from landform change in the study area and the possibility that natural deposits such as colluvium or alluvium may have buried archaeological remains.

5.4.27 The potential for surviving archaeological evidence of past activity within the Site will be expressed in the assessment as ranging between the scales of:

- High – The available evidence suggests a high likelihood for past activity within the Site and a strong potential for archaeological evidence to survive intact or reasonably intact;
- Medium – The available evidence suggests a reasonable likelihood for past activity within the Site and consequently there is a potential that archaeological evidence could survive;
- Low – The available evidence suggests archaeological evidence of activity is unlikely to survive within the Site, although some minor land-use may have occurred; and
- Uncertain - Insufficient information to assess.

5.4.28 Buried archaeological evidence is, by its very nature, an unknown quantity which can never be 100% identified during a desk-based assessment. The assessed potential will be based on available evidence, however, consultation will undertaken regarding any requirement for further archaeological evaluation following the desk based assessment.

5.4.29 Where known heritage assets are identified, the importance of such assets will be determined by reference to existing designations where available (see **Table 5.1**). For assets where no designation has been assigned, an informed assessment will be made of the likely historic, artistic, or archaeological importance of that resource based on professional knowledge and judgement. Adjustments to the classification are occasionally made, where appropriate; for some types of finds or assets where there is no consistent value, and the importance may vary. Levels of importance for any such areas are generally assigned on an individual basis, based on professional judgement and advice.

<b>Table 5.1: Defining the Importance of Heritage Assets</b>	
<b>Level of Importance</b>	<b>Definition</b>
Very High	Assets of very high importance and rarity and those considered to be important at an international level, including World Heritage Sites and other designated or non-designated heritage assets with demonstrable Outstanding Universal Value.
High	Assets of high importance and rarity and those considered to be important at a national level, including Scheduled Monuments (or non-designated assets of schedulable quality and importance), Grade I and II* Listed Buildings, Grade I and II* Registered Parks and Gardens, Registered Battlefields, and Registered historic landscapes. Well preserved historic landscapes, whether inscribed or not, with exceptional coherence, time depth, or other critical factor(s), can also be included.
Medium	Assets of medium importance and rarity and those considered to be important at a regional level. Designated or non-designated assets including Grade II Listed Buildings and Conservation Areas; well preserved structures or buildings of historical significance, historic landscapes or assets of a reasonably defined extent and significance, or reasonable evidence of occupation / settlement, ritual, industrial activity etc.
Low	Assets of low importance and rarity and those considered to be important at a local level. Locally listed buildings or non-designated assets with some evidence of human activity which have the potential to contribute to local research objectives, structures, or buildings of potential historical merit.
Negligible	Assets of very low importance which are common. Heritage assets with very little or no surviving archaeological interest or buildings and landscapes of no historical significance.
Unknown	Insufficient information exists to assess the importance of a feature (e.g., unidentified features on aerial photographs).

5.4.30 PPW includes the setting of the heritage asset with its physical remains, and both PPW and TAN 24 (2017) note that the setting of a heritage asset is as important as the physical remains. Setting is noted as extending beyond property boundaries and intangible as well as physical factors can be important to the understanding of a historic asset (Cadw, 2017<sup>41</sup>). While PPW does not differentiate between the importance of the asset itself and the importance of the asset's setting, Cadw guidance states that the settings of heritage assets is not fixed and changes.

5.4.31 The importance of an asset is not the same as its sensitivity to changes to its setting. Elements of setting may make a positive, neutral, or negative contribution to the significance of an asset (Cadw, 2017). Thus, in determining the nature and level of effects upon assets and their settings by the Proposed Development, the contribution that setting makes to an asset's significance and thus its sensitivity to changes to setting will be considered.

5.4.32 This approach recognises that setting is key to the understanding and appreciation of some, but by no means all, assets. Indeed, assets of High or Very High importance do not necessarily have high sensitivity to changes to their settings (e.g. do not necessarily have a high relative sensitivity). An asset's relative sensitivity to alterations to its setting refers to its capacity to retain its ability to contribute to our understanding and appreciation of the past in the face of changes to its setting. The ability of an asset's setting to contribute to an understanding,

<sup>41</sup> Cadw, 2017. Heritage Impact Assessment in Wales.

appreciation and experience of it and its significance also has a bearing on the sensitivity of that asset to changes to its setting. While heritage assets of High or Very High importance are likely to be sensitive to direct effects, not all will have a similar sensitivity to effects on their setting; this would be true where setting does not appreciably contribute to their significance. Assets with Very High or High relative sensitivity to settings effects may be vulnerable to any changes that affect their settings, and even slight changes may erode their key characteristics or the ability of their settings to contribute to the understanding, appreciation, and experience of them. Assets whose relative sensitivity to changes to their setting is lower may be able to accommodate greater changes to their settings without having key characteristics eroded.

- 5.4.33 The criteria that will be used for establishing an asset's relative sensitivity to changes to its setting is detailed in **Table 5.2**. This table has been developed based on AOC's professional judgement and experience in assessing setting effects. It has been developed with reference to the policy and guidance noted above including PPW, TAN 24, the Xi'an Declaration (ICOMOS 2005), and Cadw's Conservation Principles (2011) and guidance on the setting of heritage assets (Cadw, 2017f).

<b>Table 5.2: Criteria for Establishing Relative Sensitivity of a Heritage Asset to Changes to its Setting</b>	
<b>Level of Importance</b>	<b>Definition</b>
Very High	An asset, the setting of which, is critical to an understanding, appreciation, and experience of it should be thought of as having Very High Sensitivity to changes to its setting. This is particularly relevant for assets whose settings, or elements thereof, make an essential direct contribution to their cultural significance.
High	An asset, the setting, of which, makes a major contribution to an understanding, appreciation, and experience of it should be thought of as having High Sensitivity to changes to its setting. This is particularly relevant for assets whose settings, or elements thereof, contribute directly to their cultural significance.
Medium	An asset, the setting of which, makes a moderate contribution to an understanding, appreciation, and experience of it should be thought of as having Medium Sensitivity to changes to its setting. This could be an asset for which setting makes a contribution to significance but whereby its value is derived mainly from its other characteristics.
Low	An asset, the setting of which, makes some contribution to an understanding, appreciation, and experience of it should generally be thought of as having Low Sensitivity to changes to its setting. This may be an asset whose significance is predominantly derived from its other characteristics.
Negligible	An asset whose setting makes minimal contribution to an understanding, appreciation, and experience of it should generally be thought of as having Negligible Sensitivity to changes to its setting.

- 5.4.34 The determination of a heritage asset's relative sensitivity to changes to its setting is first and foremost reliant upon the determination of its setting and the key characteristics of setting which contribute to its cultural significance and an understanding and appreciation of that cultural significance. This aligns with Stage 2 of the Cadw guidance on setting. The criteria set out in **Table 5.2** are intended as a guide. Assessment of individual heritage assets will be informed by knowledge of the asset itself; of the asset type if applicable and by site visits to establish the current setting of the assets. This will allow for the use of professional judgement and each asset will be assessed on an individual basis.

- 5.4.35 The likely magnitude of the impact of the Proposed Development will be determined by identifying the level of change from the Proposed Development upon the 'baseline' conditions and the heritage resource identified in the assessment. This effect can be either adverse (negative), beneficial (positive) or neutral (see **Table 5.3**).

<b>Table 5.3: Criteria for Determining Magnitude of Impact</b>	
<b>Magnitude</b>	<b>Definition</b>
<b>Adverse</b>	
High	Substantial loss of information content resulting from total or large-scale removal of deposits from an asset; Major alteration of an asset's baseline setting, which materially compromises the ability to understand, appreciate and experience the contribution that setting makes to the significance of the asset and erodes the key characteristics of the setting.
Medium	Loss of information content resulting from material alteration of the baseline conditions by removal of part of an asset; Alteration of an asset's baseline setting that effects the ability to understand, appreciate and experience the contribution that setting makes to the significance of the asset to a degree but whereby the cultural significance of the monument in its current setting remains legible. The key characteristics of the setting are not eroded.
Low	Detectable impacts leading to minor loss of information content; Alterations to the asset's baseline setting, which do not affect the observer's ability to understand, appreciate and experience the contribution that setting makes to the asset's overall significance.
Negligible	Loss of a small percentage of the area of an asset's peripheral deposits; A reversible alteration to the fabric of the asset; A marginal alteration to the asset's baseline setting.
<b>Neutral</b>	
Neutral	A change to the asset or its setting which does not result in harm or benefit. This may occur where there is a perceptible change, but that change does not diminish or enhance the significance of the asset or the ability to appreciate its significance.
<b>Beneficial</b>	
Negligible	Barely distinguishable beneficial change from baseline conditions, where there would be very little appreciable impact on a known asset and little long-term effect on the significance of the asset.
Low	Minimal enhancement to an asset or its setting, such as removal of minor inappropriate features, limited improvements to setting or reduction in severance; slight changes in noise or sound quality; minor changes to use; resulting in a small improvement which would lead to enhancement of the ability to appreciate the significance of an asset.
Medium	Changes to key to an asset or its setting resulting in material enhancements which allow for greater appreciation of the asset and/or its setting. For example, removal of an inappropriate later addition allowing for the assets significance to be reveal; removal of an inappropriate feature in an asset's setting allowing the contribution of setting to the assets significance to be better understood or substantial reductions in noise or disturbance such that the significance of known asset would be enhanced.

<b>Table 5.3: Criteria for Determining Magnitude of Impact</b>	
<b>Magnitude</b>	<b>Definition</b>
High	Substantial positive changes to an asset and key elements of its setting which would greatly enhance its significance and the ability to appreciate that significance; this might result from the removal of adverse or considerably distracting features from the setting of an asset; significant decrease in noise or changes in sound quality; changes to use or access.

5.4.36 The predicted level of effect on each heritage asset will be determined by considering the asset’s importance and/or relative sensitivity in conjunction with the predicted magnitude of the impact. The method of deriving the level of effect is provided in **Table 5.4**.

<b>Table 5.4: Level of Effect based on Inter-Relationship between the Importance and/or Sensitivity of a Heritage Asset and/or its setting and the Magnitude of Impact</b>					
<b>Magnitude of Impact</b>	<b>Importance and/or Sensitivity</b>				
	<b>Negligible</b>	<b>Low</b>	<b>Medium</b>	<b>High</b>	<b>Very High</b>
<b>High</b>	Minor	Moderate	Moderate	Major	Major
<b>Medium</b>	Negligible/Neutral	Minor	Moderate	Moderate	Major
<b>Low</b>	Negligible/Neutral	Negligible/Neutral	Minor	Minor	Moderate
<b>Negligible</b>	Negligible/Neutral	Negligible/Neutral	Negligible/Neutral	Minor	Minor

5.4.37 The level of effect is judged to be the interaction of the asset’s importance and/or relative sensitivity (**Table 5.1** and/or **Table 5.2**) and the magnitude of the impact (**Table 5.3**). In order to provide a level of consistency, the assessment of importance and relative sensitivity, the magnitude of impact and the assessment of level of effect will be guided by pre-defined criteria. However, a qualitative descriptive narrative will also be provided for each asset to summarise and explain each of the professional value judgements that have been made.

5.4.38 Using professional judgment and with reference to the Guidelines for Environmental Impact Assessment (as updated) (IEMA 2017), the assessment will consider moderate and greater effects to be significant, while minor and lesser effects will be considered not significant.

5.4.39 The assessment of the potential impact of the Proposed Development on the three Historic Landscapes within the 10km study area will be done using a staged process provided by Cadw for the Assessment of the Significance of the Impact of Development on Historic Landscape areas on the Register (ASIDOHL 2).

5.4.40 The stages of the ASIDOHL 2 are described in the Technical Annex of Cadw’s guidance as:

- STAGE 1: Compilation of an introduction of essential, contextual information.
- STAGE 2: Description and quantification of the direct, physical impacts of development on the Historic Character Area(s) affected.
- STAGE 3: Description and quantification of the indirect impacts of development on the Historic Character Area(s) affected.
- STAGE 4: Evaluation of the relative importance of the Historic Character Area(s) (or part(s) thereof) directly and/or indirectly affected by development in relation to:
  - (a) the whole of the Historic Character Area(s) concerned, and/or

- (b) the whole of the historic landscape area on the Register, followed by
- (c) an evaluation of the relative importance of the Historic Character Area(s) concerned in the national context, and a determination of the average overall value of all the Historic Character Areas (or parts thereof) affected.
- STAGE 5: Assessment of the overall significance of impact of development, and the effects that altering the Historic Character Area(s) concerned has on the whole of the historic landscape area on the Register.

5.4.41 The Dolaucothi Historic Landscape (Asset 118) is the only Historic Landscape that falls within the Site. The current design excludes any development within this Historic Landscape and therefore there will be no direct impacts on this Historic Landscape within the Site. However, any works associated with enhancement or widening of access tracks along the proposed access route/s, which also passes through the Historic Landscape, would require Stage 2 of the ASIDOHL 2 assessment to be completed to assess any direct impacts.

#### *Cumulative Effects*

- 5.4.42 The assessment of cumulative effects on heritage assets will be based upon consideration of the effects of the Proposed Development on the settings of heritages assets, in addition to the likely effects of other cumulative schemes.
- 5.4.43 Cumulative effects will be considered for designated assets identified within the 5 km and 10 km study areas. Only those assets which are judged to have the potential to be subject to significant cumulative effects will be included in the detailed cumulative assessment.
- 5.4.44 In determining the degree to which a cumulative effect may occur as a result of the addition of the proposed development into the cumulative baseline a number of factors will be taken into consideration including:
- the distance between the schemes;
  - the interrelationship between their ZTV;
  - the overall character of the asset and its sensitivity to large scale development such as wind farms;
  - the siting, scale and design of the cumulative schemes themselves;
  - the way in which the asset is experienced;
  - the placing of the cumulative scheme(s) in relation to both the individual proposal being assessed and the heritage asset under consideration; and
  - the contribution of the cumulative baseline schemes to the significance of the effect, excluding the individual proposal being assessed, upon the setting of the heritage asset under consideration.
- 5.4.45 Cumulative wirelines from those assets most likely to experience significant cumulative impacts on their settings will be provided, if appropriate.
- 5.4.46 The schemes to be included in the cumulative impact assessment will be identified in accordance with the methodology set out in section 3, and through consultation with Conservation Officers at Carmarthenshire and Ceredigion County Councils, Cadw and Dyfed Archaeological Trust.

## 5.5 Summary Questions

1. Are there any additional sources of baseline information which should be referred to, to inform the appraisal of effects on cultural heritage?
2. Are the proposals to scope out certain elements of cultural heritage from detailed assessment appropriate?
3. Is the proposed methodology clear and appropriate?
4. Are there any assets beyond the proposed study areas that consultees would like to see scoped into the assessment?
5. Are there any visualisations that the consultees would like to see as part of the assessment?
6. An ASIDOHL 2 assessment will be produced relation to the impact on the Registered Historic Landscape in the Site. No direct impacts on the Registered Historic Landscape are currently proposed and therefore 'Stage 2' of the assessment process will be excluded. Are consultees in agreement that 'Stage 2' can be excluded from the ASIDOHL 2 assessment?

## 6. ECOLOGY

### 6.1 Introduction

6.1.1 This Chapter has been prepared by BSG Ecology. This Chapter sets out the proposed approach to assessing potential ecological effects associated with the Proposed Development. Effects on birds are excluded from this Chapter and considered within **Chapter 7**.

### 6.2 Existing Baseline

6.2.1 Ecological surveys at the Site are ongoing. Desk study and ecological survey work to date has comprised of the following:

- an extended Phase 1 habitat survey of the Site;
- desk-based review of statutory designated sites in relation to the Site;
- review of Ordnance Survey maps and aerial photographs to understand the degree of connectivity of the Site with statutory designated sites;
- a review of non-statutory designated sites and records of protected and priority species within 2 km of the Site and for bats within 10 km of the Site (in line with NatureScot, *et al.*, 2021<sup>42</sup> guidance) obtained from the West Wales Biodiversity Information Centre (WWBIC);
- a review of data relating to red squirrel *Sciurus vulgaris* and pine marten *Martes* within the Site provided by the forest manager at Bryn Arau Duon;
- deployment of bat detectors at indicative turbine locations and camera traps in some of the mature plantation habitats; and
- a survey of all watercourses within the Site for evidence of otter *Lutra lutra* and water vole *Arvicola amphibius*.

6.2.2 The following comprises a summary of the main ecological findings to date.

#### *Designated Sites*

6.2.3 The Cwm Doethie-Mynydd Mallaen Special Area of Conservation (SAC), designated for its oak woodland and heathland habitats, is situated immediately adjacent to the Site to the north and east. Parts of the SAC extend within the site boundary in discrete areas. A Site of Special Scientific Interest (SSSI) with the same name as the SAC is also located adjacent to the site with small areas partially within the Site, and extends further north beyond the SAC boundary. The reasons for notification of the SSSI are not precisely defined in the citation, but appear to reflect local SAC (and Special Protection Area – see **Chapter 7**) interest. A further SAC (and SSSI), the Afon Teifi, lies approximately 4 km to the northwest of the Site at its closest point; it is designated for its riparian habitats, fish and otter populations. A review of Ordnance Survey maps and aerial imagery indicates that the Site is not within the hydrological catchment of this SSSI. The Afon Tywi SSSI, although hydrologically connected to the Site, is located more than 10 km downstream of the Site.

6.2.4 Additional SSSIs beyond 2 km of the Site (but within 10 km) are notified for their invertebrate populations, habitats or geology, and unlikely to be impacted by the Proposed Development due to their distance from the Site and absence of hydrological linkage (or any other impact pathways). These are: Caeau Caradog, Dolaucothi Gold Mines, Cors Farlais, Figyn Blaen-Brefi, Mwyngloddfa Nantymwyn, Cae Blaen-dyffryn, Glanrhocca. Rhosydd Bryn-maen, Rhos Dolau-Bran, Vicarage Meadows, Llwynderw, and Gwaun Ystrad Caron.

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<sup>42</sup> NatureScot, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust. (2021). Bats and onshore wind turbines: survey, assessment and mitigation. SNH, Inverness. Available at [www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation](http://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation) [Ddate accessed: 28/11/2023].

- 6.2.5 The positions of the designated sites in relation to the Site are shown on **Figure 6.1**.
- 6.2.6 WWBIC data indicate that the Site is not subject to non-statutory designation. The Alt Rhyd y Groes National Nature Reserve (which supports sessile oak *Quercus petraea* woodland, grassland and heathland habitats), the Nant Melyn Wildlife Trust Reserve (supporting deciduous woodland and rough pasture) and Gwenffrwd-Dinas RSPB Reserve (supporting oak and wet alder *Alnus glutinosa* woodlands and scrubland) are adjacent to (but beyond) the Site boundary. The Gwenffrwd-Dinas RSPB reserve is located fully within the boundary of the larger Doethie-Mynydd Mallaen SAC.

#### Habitats

- 6.2.7 The predominant habitats within the Site are coniferous plantation, unenclosed upland moorland and enclosed improved and semi-improved pasture. The plantation dominates the eastern part of the Site. Unenclosed upland with rougher grazing and patches of marshy ground occurs around the western and northern edges of the Site, and enclosed, improved pasture in the southern and south-western parts of the Site. Shallow stream valleys are frequent across the unenclosed pasture, with the Afon Cothi flowing south through the enclosed pasture around Nant yr Ast Farm. Three areas of commercial coniferous plantation fall at least partially within the Site. By far the most extensive of these is at Pen-y-raglan-wynt, approximately 500 ha of which lies within the Site.
- 6.2.8 Habitats beyond the Site are dominated by rolling upland pasture and rough grazing with frequent areas of commercial plantation. Watercourses such as the Nant Melyn (to the south-east) and the Afon Pysgotwr Fawr (to the north) flow through very steep-sided valleys with sections of cliff and scree. The steeper slopes have localised bracken and gorse cover. Ancient semi-natural broadleaved woodland is present in both valleys beyond the Site.
- 6.2.9 The habitats present within the Site are shown on **Figure 6.2**<sup>43</sup>.

#### Bats

- 6.2.10 The desk study returned 11 bat records of three different species, three of which were of bat roosts. Ten of the records were within 2 km of the Site, including records of four individuals of *Myotis* sp. and six individuals of *Pipistrellus* sp. bats (unidentified to species level). [REDACTED]
- 6.2.11 Analysis of the bat survey data suggests an overall bat activity of approximately nine passes per hour across all detectors and seasons. Common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus* are the most commonly occurring species (recorded at a rate of approximately 3 passes per hour), with greatest activity levels at detectors near plantation edge habitat (such as at Detector 14; see **Figure 6.3**). Noctule *Nyctalus noctua* (a species of high collision risk as described in NatureScot *et al.*, 2021 guidance) was recorded at a rate of approximately 0.3 passes per hour. Leisler's bat *Nyctalus leisleri* and serotine *Eptesicus serotinus* were each recorded at a rate of < 0.1 passes per hour, and five passes of greater horseshoe bat (four in autumn and one in summer) were also recorded. Passes by all other species (all of which are considered to be at low risk of collision by NatureScot *et al.*, 2021) were recorded at very low-level.

<sup>43</sup> The extent of the Phase 1 Habitat survey was limited to 250 m (where access allowed) around an initial turbine layout (see Section 6.4 for survey methods).

- 6.2.12 Occasional passes by common pipistrelle, soprano pipistrelle and noctule were recorded within 20 minutes of sunset and sunrise<sup>44</sup> indicating the possible presence of bat roosts within or near to the Site.

*Otter and Water Vole*

- 6.2.13 WWBIC returned 21 records of otter within 2 km of the Site, five records of which were actual sightings of individuals and the remaining 16 records were of spraints found along rivers and streams. Records are associated with rivers surrounding the Site, including the Afon Pysgotwr Fach to the north and east, and the Afon Cothi to the south and west of the Site. A bird surveyor (undertaking survey work for the Proposed Development) recorded a deceased otter within the Site near Nant yr Ast Farm in 2022.
- 6.2.14 No water vole records were held by WWBIC within 2 km of Site; however, a record of water vole was provided beyond the study area (at approximately 2.5 km to the northwest of the Site) in Llanddewi Brefi.
- 6.2.15 Several minor watercourses are present within the Site. Those in the northern part of the Site discharge direct to the River Towy to the east, or the Afon Pygotwr Fach to the north (one of the main feeder watercourses in this part of the Towy catchment), while streams within the western part of the Site form part of the headwaters of the Afon Cothi. All of these streams could support otter and / or water vole, and the latter could also occur in areas of wet / swampy ground.
- 6.2.16 The survey completed at the Site in autumn 2023 recorded an otter spraint within the plantation in the eastern part of the Site. Evidence of water vole (a combination of droppings, feeding remains, and burrows) were recorded on streams within the plantation, and most of the tributaries of the Afon Cothi that are within the Site boundary.

*Red Squirrel and Pine Marten*

- 6.2.17 Protected species records provided by WWBIC included 60 records of red squirrel, of which 53 are located within the afforested part of the Site. A draft report from 2013 indicates that 10 red squirrels were captured in the plantation within the Site as part of a population study (McPherson, 2013)<sup>45</sup>. The same study recorded pine marten in squirrel traps, and this species has been reported visiting a garden close to the Site boundary by a local resident. Information provided by the Forest Manager at Bryn Arau Duon suggest that red squirrel and pine marten were also regularly recorded on trail-cameras within the Site as recently as 2020.
- 6.2.18 No evidence of either species has been recorded on trail-cameras deployed at the Site in summer 2023 (see **Section 6.4** for survey methods). However, data collection is on-going.

*Other Protected Species*

- 6.2.19 No records of dormouse *Muscardinus avellanarius* were returned from the desk study. It has also been established that in over 30 years of nest-box monitoring<sup>46</sup> in RSPB's Gwernffrwd Dinas reserve (directly east of the Site boundary at OSGR SN 779 466) and linked deciduous valley woodland with a good hazel component, there has been no evidence of dormouse

<sup>44</sup> These early emerging species typically emerge within 20 minutes of sunset (Andrews, H. & Pearson, L. (2017). A review of empirical data in respect of emergence and return times reported for the UK's 17 native bat species. Andrews Ecology, Somerset. Available at [battreehabitatkey.co.uk/wp-content/uploads/2017/06/AEcol-REVIEW-OF-EMERGENCE-AND-RETURN-EMPIRICAL-DATA-2017-Ver.-4.pdf](http://battreehabitatkey.co.uk/wp-content/uploads/2017/06/AEcol-REVIEW-OF-EMERGENCE-AND-RETURN-EMPIRICAL-DATA-2017-Ver.-4.pdf) [Accessed 28/11/2023])

<sup>45</sup> McPherson, J. (2013). A trapping study of red squirrel in Bryn Arau. Mammals in a Sustainable Environment (Draft) Report.

<sup>46</sup> The monitoring work has targeted pied flycatcher. However, dormouse, if present, will also occupy bird boxes which (equally to 'dormouse boxes') resemble natural tree holes.

presence recorded (Trevor Fletcher, Fledgmore Ringing and Nest Recording Group / licensed dormouse surveyor, pers comm). The study involves checks of over 600 nest boxes on several occasions each year. The reserve comprises better dormouse habitat than present on-site, and accordingly it is assumed that dormice are unlikely to be present on Site. Whilst dormouse have been recorded in conifer plantation habitat at Clocaenog Forest (SKM Enviro, 2012<sup>47</sup>; approximately 100 km north of the Site) the records (and subsequent monitoring areas) were associated with an extensive broadleaved scrub component (which is very limited within the Site and confined to steep valley slopes)<sup>48</sup>.

- 6.2.20 WWBRC did not hold any records of great crested newt records within 2 km of Site. However, a review of the data held by the National Biodiversity Network identified a great crested newt *Triturus cristatus* record dated March 2015, located approximately 4 km to the southwest of the Site at Bwlch-y-gwynt.
- 6.2.21 Six records of reptiles within 2 km of the Site were identified by the desk study. This includes records of slow worm *Anguis fragilis*, adder, grass snake *Natrix helvetica*, and common lizard *Zootoca vivipara* from the gorge of Gwenffrwd (approximately 1.5 km southeast of the Site).
- 6.2.22 The Phase 1 habitat survey of the Site recorded mosaic of habitats that are likely to support common species of reptile including slow worm, common lizard, and adder, particularly where vegetation or ground is less homogeneous in structure, for example along track edges and heathland habitats. Further habitat suitability survey is scheduled for completion in spring 2024.
- 6.2.23 There are six records of badger *Meles* within 2 km of the Site. Most of these records are attributed to the various areas of woodland surrounding the Site to the east that are within or adjacent to Gwenffrwd-Dinas RSPB Reserve. No evidence of badger has been recorded during any of the ecological survey visits to the Site to date.

### 6.3 Design Considerations

- 6.3.1 The developing design is being informed by the outcome of ecological survey work at the Site, and take a step-wise approach to mitigation and in securing biodiversity net-benefit (as required by Chapter 6 of PPW). The design will incorporate stand offs from land within the Cwm Doethie-Mynydd Mallaen SAC and SSSI<sup>49</sup>, potential bat roosting habitat (woodland edge and trees with bat potential both within the plantation and elsewhere on-site), and watercourses. This will reduce the potential for collision and disturbance of bats emerging / re-entering roosts and potential siltation and pollution events to freshwater habitats and disturbance of the species that use them.
- 6.3.2 Watercourse crossings, where required to facilitate the construction of access tracks, will be designed in such a way as to minimise impacts to and maintain habitat connectivity along the watercourse.
- 6.3.3 It is anticipated that design measures to avoid or minimise impacts on the following will also be implemented as they are identified:
- any areas of deep peat and associated priority habitats;
  - groundwater dependent terrestrial ecosystems (GWDTes);

<sup>47</sup> SKM Enviro (2012) Clocaenog Forest Wind Farm Environmental Statement. Chapter 10: Ornithology. RWE Npower Renewables Ltd.

<sup>48</sup> Survey work at Alwen Forest (within 4 km of Clocaenog Forest) by BSG Ecology in 2020 and 2022 did not record any evidence of dormouse. This is likely to be because of the smaller broadleaved component at Alwen and resultant poor foraging opportunities.

<sup>49</sup> The 2023 amendments to Chapter 6 of PPW 11 has strengthened the policy protection of SSSIs.

- other priority habitats in Wales; and
- places of shelter used by protected species (such as otter holts or badger setts).

6.3.4 Construction phase measures to minimise impacts on habitats, protected and priority species will also be detailed in the outline CEMP.

6.3.5 Habitat loss as a result of the Proposed Development will be compensated. This may include, but is not limited to, restoration of native habitats within the Site that are currently of limited ecological value, compensatory planting and consultation with local and/or regional stakeholders on land use and appropriate management for biodiversity. Any compensation or enhancement will include measures to benefit (and complement existing management plans of) designated sites within and adjacent to the Site boundary. An outline Habitat Management Plan (HMP) will be developed to set out the scope of mitigation and habitat and biodiversity enhancement proposals, and demonstrate how net benefits to biodiversity and ecosystem resilience will be achieved by the Proposed Development. This will include a clear demonstration of how the project addresses the individual components of the DECCA (Diversity, Extent, Condition, Connectivity and Aspects of ecosystem resilience) Framework.

## 6.4 Assessment Scope and Methodology

### *Legislation and Guidance*

- 6.4.1 The approach to the collection of baseline ecological data will be based on industry standard guidance wherever this is available and applicable to the Site. For example: the Phase 1 habitat survey will be undertaken in accordance with the JNCC Handbook (2010)<sup>50</sup> guidelines and all habitats attributed to National Vegetation Classification community types; the otter survey will follow Chanin (2003)<sup>51</sup>; and the bat survey has been designed to take account of wind farm specific guidance (NatureScot *et al.*, 2021)
- 6.4.2 Particular consideration has been given to habitats and species listed under Annexes 1 and 2 of the Habitats Directive (92/43/EEC) (as transposed by the Conservation of Habitats and Species Regulations 2017 (as amended)), Schedules 5, 8 and 9 of the Wildlife and Countryside Act 1981 (as amended) ('1981 Act') and Section 7 of the Environment (Wales) Act 2016 in deriving the detailed approach to the work.
- 6.4.3 The assessment will consider relevant national planning policy (including Planning Policy Wales (PPW; currently at edition 11), Future Wales: The National Plan 2040, and Technical Advice Note (TAN) 5 Nature Conservation and Planning) and local policy and planning guidance documents of Carmarthenshire and Ceredigion CCs.
- 6.4.4 Of relevance are amendments of Chapter 6 of PPW (updated in October 2023). These amendments have been made with the aim of ensuring the planning system in Wales meets the challenges set out in the Global Biodiversity Framework<sup>52</sup>, the Biodiversity Deep Dive recommendations developed in response to this (Welsh Government, 2022), and the Duty, under Section 6 of the Environment (Wales) Act 2016, to maintain and enhance biodiversity and ecosystem resilience in Wales.
- 6.4.5 Key principles of this update to PPW will be considered and referenced in the assessment.

<sup>50</sup> JNCC (2010). Handbook for Phase 1 habitat survey. A technique for environmental audit. Joint Nature Conservancy Council. Peterborough. Available at [hub.jncc.gov.uk/assets/9578d07b-e018-4c66-9c1b-47110f14df2a](http://hub.jncc.gov.uk/assets/9578d07b-e018-4c66-9c1b-47110f14df2a) [Accessed 28/11/2023].

<sup>51</sup> Chanin, P. (2003). Monitoring the otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No 10. Peterborough, English Nature. Available at [publications.naturalengland.org.uk/publication/78009](http://publications.naturalengland.org.uk/publication/78009) [Accessed 28/11/2023]

<sup>52</sup> Kunming-Montreal Global Biodiversity Framework. Available at [www.cbd.int/gbf/](http://www.cbd.int/gbf/) [Accessed 29/11/2023]

- 6.4.6 The approach to ecological impact assessment will be based on Chartered Institute of Ecology and Environmental Management (CIEEM) guidance<sup>53</sup>.

*Scope of the Assessment*

- 6.4.7 Potentially significant effects associated with the construction and operation of the Proposed Development include:

- Direct and indirect habitat loss;
- Disturbance to / loss of breeding sites, resting places, etc;
- Direct / indirect loss of foraging resource;
- Displacement / disruption to movement of protected fauna within / through the Site;
- Changes to habitats through environmental impacts, i.e. pollution and sedimentation of watercourses, etc; and
- Changes to habitat composition through land-use change, increased human presence, etc.

- 6.4.8 Impacts on the following ecological features will be scoped into the assessment as there is potential for significant direct and/or indirect effects to occur on these receptors during both construction and operation:

- Designated sites<sup>54</sup>;
  - Cwm Doethie-Mynydd Mallaen Special Area of Conservation (SAC) and SSSI; and
  - River Teifi SAC and SSSI (potentially limiting consideration of SAC and SSSI features to otter if hydrological, sedimentation and pollution impacts can be avoided through primary (designed-in) and tertiary mitigation).
  - The Alt Rhyd y Groes National Nature Reserve, Nant Melyn Wildlife Trust Reserve and Gwenffrwd-Dinas RSPB Reserve (unless hydrological, sedimentation and pollution impacts can be avoided).
- Priority habitats<sup>55</sup>; and
- Protected Species:
  - Bats (high and medium risk species in accordance with NatureScot *et al.*, 2021 guidance). The assessment will include collision fatality;
  - Otter;
  - Water vole;
  - Red squirrel;
  - Pine marten;
  - Reptiles; and
  - Badgers (with regard to legislative compliance only);

- 6.4.9 Ecological features that will be scoped out of the assessment, on the basis that significant effects are considered unlikely to occur are:

- Designated sites:

<sup>53</sup> CIEEM. (2018). Guidelines for ecological impact assessment in the UK and Ireland: terrestrial, freshwater and coastal. Second edition. Chartered Institute of Ecology and Environmental Management, Winchester. Available at [cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.2-April-22-Compressed.pdf](https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.2-April-22-Compressed.pdf) [Accessed 28/11/2023]

<sup>54</sup> Impacts on European designated sites will be subject to a separate Habitats Regulations Assessment (HRA) which will be included as a Technical Appendix to the ES.

<sup>55</sup> Those listed under Section 7 of the Environment (Wales) Act 2016 and / or on Annex 1 of the Habitats Directive.

- SSSIs and other non-statutory designations with no hydrological connectivity in excess of 2 km from the Site. The nearer of these are notified for their raised bog and grassland habitats. Impacts on these SSSIs are extremely unlikely to occur. The Afon Tywi SSSI is located more than 10 km downstream of the Site making significant effects very unlikely.
- Habitats:
  - Improved and semi-improved pasture, and potentially areas of species-poor rush-dominated marshy grassland.
- Protected Species:
  - Bat species that were not recorded, or recorded very rarely over the Site (such as horseshoe bats), which are considered at low risk of collision and for which there is no evidence of local roosting.
  - Hazel dormouse. Scrub and deciduous woodland will not be impacted by the Proposed Development. Some areas of commercial coniferous woodland will be affected by the Proposed Development, but comprise very limited habitat for the species.
  - Great crested newt. On the understanding that the species is not regularly recorded in Carmarthenshire and Ceredigion, has not been recorded within 2 km of the Site, and due to a lack of suitable habitat on Site.

6.4.10 Potential impacts on peat and hydrological receptors, including GWDTEs, will be addressed as part of the Hydrology, Hydrogeology, Geology and Peat chapter of the ES, as discussed in **Chapter 10**.

#### *Study Area*

6.4.11 The Study Area for habitat survey and assessment will extend to 250 m around turbines and up to 150 m around other proposed infrastructure. This approach reflects Scottish Environmental Protection Agency (SEPA) (2017) guidance<sup>56</sup>, which recommends a 250 m perimeter survey area around all excavations of 1 m or more depth in order to identify potential Ground Water Dependant Terrestrial Ecosystems (GWDTEs) based on their botanical characteristics<sup>57</sup>. For protected species, the area surveyed will include all suitable habitats within the Site, with the assessment informed by desk study data extending to 2 km from it. For bats (a highly mobile species group) desk study records from up to 10 km from the Site will be considered.

#### *Baseline Characterisation*

##### *Habitat Survey (Phase 1 and National Vegetation Classification)*

- 6.4.12 A Phase 1 Habitat Survey of the Site was completed in accordance with industry standard guidance (JNCC, 2010). The survey extended to 250 m (where access allowed) around an initial turbine layout (reflecting SEPA (2017) guidance for GWDTEs). The extent of the survey undertaken in 2023 is shown on **Figure 6.2**.
- 6.4.13 During the Phase 1 Survey, plant communities were be assigned to broad NVC categories in the field based on the experience of the surveyor.
- 6.4.14 The survey also considered the potential of the Site to support protected species, and to inform the scope and detail of wider ecological survey work required to inform the assessment of the Proposed Development. This included consideration of:

<sup>56</sup> This guidance is relevant for assessments of GWDTEs in Wales.

<sup>57</sup> Groundwater dependency is then confirmed by a hydrologist.

- The bat roost potential of trees and any buildings within ~ 250 m<sup>58</sup> of proposed turbine locations (to inform the risk of collision and supplement the static bat detector data). Trees were broadly assigned to two classes; those with moderate or high bat roost potential and those with low or negligible potential. A more detailed assessment will be needed of some trees once the design has been further developed.
- The presence of pine marten, such as dens, prey remains and faeces. Forest rides, firebreaks and natural openings in the forest were identified as suitable locations for further trail-camera based survey.
- The presence of red squirrel and badger signs were searched for, and an assessment of habitat quality for hazel dormouse was made.

6.4.15 The survey will be extended in spring/summer 2024 as the design progresses to ensure that all land within 250 m of final turbine locations, and up to 150 m around other proposed infrastructure (including solar PV panels) is surveyed. This will include quadrat survey methods within habitats of higher value (such as bog or other peatland habitats) with the aim to provide further information on NVC plant communities and habitat condition.

#### *Bat Survey and Data Analysis*

6.4.16 A total of 15 bat detectors were deployed at potential turbine locations for 10 nights in each of spring, summer and autumn 2023. Full spectrum detectors were used, and complementary weather data was collected (using a weather station installed within the Site). The locations of bat detectors are shown on **Figure 6.3**.

6.4.17 Bat call data has been analysed by Wildlife Acoustics Kaleidoscope Pro auto-identification software, and will be manually checked to confirm species ahead of the assessment. A total of 450 nights of bat data has been collected during the work. Analysed data will be presented as bat passes per detector-hour for the assessment, and relative activity will be obtained from the Mammal Society's EcoBat tool (if available)<sup>59</sup> or through comparison with data at other sites held by BSG Ecology. Bat activity will also be compared to collected weather data to determine whether any significant correlation between the data sets exist.

#### *Otter and Water Vole Survey*

6.4.18 Survey work commenced in autumn 2023, and included a walkover of all watercourses within the Site to search for signs of otter and water vole. The watercourses surveyed are shown on **Figure 6.3**. A second visit (in accordance with guidance on water vole survey by Dean *et al.*, 2016<sup>60</sup>) will be completed in spring 2024 when a design chill has been reached, and will focus on watercourse sections within 200 m of proposed infrastructure.

#### *Pine Marten and Red Squirrel Survey*

6.4.19 Anecdotal evidence from early informal discussions with the local Wildlife Trusts suggested that land on Site is actively managed and monitored for red squirrel and pine marten. Therefore, camera traps were deployed during the summer and autumn of 2023 in the plantation in the eastern part of the Site. These have been positioned to overlook forest tracks, particularly where these provide an effective break in the canopy or mark the boundary between coupes of different ages. The locations of camera traps are shown on **Figure 6.3**.

<sup>58</sup> Section 5.1 of NatureScot *et al.* (2021) states "Key features that could support maternity roosts and significant hibernation and/or swarming sites (both of which may attract bats from numerous colonies from a large catchment) within 200m plus rotor radius of the boundary of the proposed development should be subject to further investigation."

<sup>59</sup> The EcoBat tool has been unavailable for use since late 2022, and there is no indication of when it may be accessible in the future.

<sup>60</sup> Dean, M., Strachan, R., Gow, D & Andrews, R. (2016). The water vole mitigation handbook (the Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

- 6.4.20 The aim has been to collect data whilst the extent of desk-based information is fully established.

*Adder (habitat suitability) Survey*

- 6.4.21 The Quinquennial Review of Schedules 5 and 8 of the WCA recommended that *adder Vipera berus* is afforded full protection (it is currently subject to protection from killing and injury only). If this regrade is implemented, it is likely that activities that impact on adder (and their resting places) will need to follow a licencing process similar to other fully protected species. It is unclear if this recommended change to protection will be adopted or when this might occur.
- 6.4.22 Some areas of moorland habitat, open plantation and woodland edge within and around the Site are likely to have potential to support adder, and have been broadly identified during the Phase 1 survey. Rather than a full presence / absence survey, a national expert will complete a walkover habitat assessment in spring 2024 to assess suitability and quality in greater detail and identify potential mitigation and enhancement opportunities.

*Consultation*

- 6.4.23 Consultation with NRW through their discretionary planning advice service (DPAS) has been requested<sup>61</sup>. Consultation will also be sought with the local planning authority ecologists. It is proposed that discussions will cover:
- A review of the adequacy of the desk study and field survey proposed / completed.
  - The main issues in terms of ecological impact assessment (under the EIA Regulations) and the parallel Habitats Regulations Assessment process.
  - How impacts can be most effectively mitigated through design and other measures.
  - How the Proposed Development might deliver biodiversity net benefit in line with Planning Policy Wales.
- 6.4.24 The Vincent Wildlife Trust and Mid Wales Red Squirrel Partnership will also be approached for data on pine marten and red squirrel within the Site and local area.

*Method of Assessment*

- 6.4.25 The approach to ecological impact assessment will be based on CIEEM guidance. Although this is recognised as the industry standard for ecological assessment, the guidance is not prescriptive and does not recommend the use of matrices; rather, it aims to “*provide guidance to practitioners for refining their own methodologies*”.
- 6.4.26 CIEEM recommended assessment involves:
- Identification of important ecological features in relation to a Site.
  - Establishing a Zone of Influence (ZoI) based on desk study, field survey, consultation, an assessment of the sensitivity of ecological features, consideration of the outline design and liaison with other technical disciplines.
  - Assessing the importance of the features within a geographical context.
  - Identifying the nature of any potential effects.
  - Assessing the significance of effects with reference to the integrity of sites or ecosystems and / or the conservation status of habitats or species. This will include assessing the risk to bats and the vulnerability of populations to the effects of wind farms through the application of the 2021 SNH guidance.

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<sup>61</sup> Initial requests for DPAS meetings were made on 16 July, 14 September 2023 and 3 December 2023. However, NRW has responded to indicate a lack of capacity to engage. Further requests for consultation will be submitted throughout the EIA and NRW will have the opportunity to comment on this Scoping Report

- Applying mitigation to avoid or reduce the significance of effects.
- Assessment of residual effects.

6.4.27 Characterising and quantifying effects and assessing their significance will be completed through:

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

6.4.28 For the purposes of ecology assessment, apart from in exceptional circumstances, a significant effect is only considered to be possible where the feature in question is considered to be of regional/county, national or international importance. That is not to say that impacts from the Proposed Development could not result in effects on features of district or local importance, simply that those effects would not be considered significant in the assessment.

6.4.29 For the assessment of impacts to peatland habitats, information from the Hydrology, Hydrogeology, Geology and Peat Chapter will be utilised where applicable.

#### *Cumulative Effects*

6.4.30 The cumulative assessment considers guidance published by PEDW (Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects<sup>62</sup>). Cumulative effects are most likely to result with regard to those receptors for which a significant residual effect is predicted as a result of the Proposed Development. Effects are likely to arise if the extent or condition (habitats) or core range of those receptors (species) are also likely to be affected by other planned, consented or built development. It is also possible that non-significant effects on ecological features from multiple projects may result in a significant cumulative effect.

6.4.31 Cumulative effects may therefore be:

- Cumulative 'zone of influence' effects whereby two or more developments affect the same specific feature.
- Cumulative effects on the total resource (or population) of an ecological feature in a region due to two or more developments (e.g. two developments affecting the same feature reducing its overall extent or number).

6.4.32 For the Proposed Development a 10 km ZoI is likely to be appropriate as this will cover the core sustenance zones of mobile species using the Site and the likely maximum extent of any potential impacts on features remote from it that might result from construction or operation.

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<sup>62</sup> Available at [infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/](https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/) [Accessed 28/11/2023]

## 6.5 Summary Questions

1. Are NRW satisfied that the scope of ecological survey and desk study is appropriate?
2. Do NRW have ecological concerns with regard to the Proposed Development, and if so could they outline what they see the principal ecological issues as being?
3. Are there any other receptors not identified that consultees consider appropriate to include in the EIA?
4. Is NRW aware of verified records of great crested newt in Carmarthenshire or Ceredigion? What would be the advice if we were to find pools with a good Habitat Suitability Index score during the Phase 1 survey?
5. Do consultees agree that the receptors/matters that are proposed to be scoped in and out of further assessment are proportionate?
6. We are looking to deliver our Biodiversity Net Benefit solution on-site. What would NRW be looking for in an on-site solution?

## 7. ORNITHOLOGY

### 7.1 Introduction

7.1.1 This Chapter has been prepared by BSG Ecology. This Chapter sets out the proposed approach to assessing potential ornithological effects associated with the Proposed Development.

### 7.2 Existing Baseline

7.2.1 The ornithological desk study and survey work commenced in April 2022. The desk study has involved:

- desk-based review of statutory designated sites in relation to the Site;
- review of Ordnance Survey maps and aerial photographs to understand the distribution of habitats within the local landscape; and
- requests to WWBIC and RSPB Cymru for information on protected and priority bird species within 2 km of the Site.

7.2.2 One full year and one 'breeding season'<sup>63</sup> of data collection has been completed, and a second winter season of survey work is underway (which commenced in September 2023). Survey work to inform the assessment is being carried out in accordance with industry standard SNH<sup>64</sup> (2017) guidance<sup>65</sup> supplemented by guidance for raptor survey produced by Hardey *et al.* (2013)<sup>66</sup> and guidance for nightjar *Caprimulgus europaeus* survey in Gilbert *et al* (1998)<sup>67</sup>.

7.2.3 The results from the first complete year (2022-2023) of bird surveys and the second (2023) breeding bird survey are provided in **Appendix 7.1**. The following comprises a summary of the main ornithological findings.

- The Site is adjacent to the Elenydd-Mallaen SPA<sup>68</sup>, with the SPA boundary overlapping the Site slightly along the north-eastern and southern edge. The SPA is classified for its importance to breeding red kite *Milvus*, merlin *Falco columbarius* and peregrine *Falco peregrinus*. The SPA takes in land to the northeast, east and southeast of the Site, as illustrated in **Figure 7.1**. Local parts of the SPA are characterised by open moorland, steep-sided valleys with rock escarpments and screes along their sides and semi-natural broadleaved woodland that borders the valleys at their bases. These rocky areas and areas of broadleaved woodland are not typical of the Site.
- The Site is located immediately adjacent to the Gwenffrwd-Dinas RSPB reserve. The RSPB reserve is located fully within the boundary of the larger Elenydd-Mallaen SPA.
- No notable records or substantial data sets with regard to locally-breeding or wintering birds have been located to date as part of the desk study.

<sup>63</sup> The breeding season has been defined as April to August inclusive and the winter period September to March inclusive for the purposes of the survey work.

<sup>64</sup> Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Version 2. Scottish Natural Heritage, Inverness. Available at: [www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms](http://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms) [Accessed: 28/11/2023]

<sup>65</sup> In the absence of their own guidance relating to bird survey at onshore wind farms, SNH guidance is applied in Wales by Natural Resources Wales (NRW) and other nature conservation stakeholders.

<sup>66</sup> Hardey, J., Crick, H., Riley, H., Etheridge, B., and Thompson, D. (2013) Raptors: A field guide to surveys and monitoring. The Stationery Office; 3rd revised edition.

<sup>67</sup> Gilbert, G., Gibbons, D. W & Evans, J. (1998). Bird monitoring methods. RSPB, Sandy.

<sup>68</sup> The Cwm Doethie-Mynydd Mallaen Site of Special Scientific Interest (SSSI) extends outside the SAC boundary in places, including along the northern Site boundary. The reasons for notification are not precisely defined in the citation, but appear to reflect the interest features of the SPA (and a Special Area of Conservation with the same name).

- Vantage Point (VP) surveys have found that the most commonly-recorded focal species in flight over the Site is red kite. A total of 223 flights (almost 6.5 hours of flight activity) were recorded over the breeding season of 2022. Activity levels were sustained during the autumn of 2022, but dropped considerably over winter with few flights in the first quarter of 2023. A total of 98 flight were recorded during the breeding season of 2023. Three red kite territories in 2022, and four territories in 2023 were located within 2 km of the Site (all off-site).
- A peregrine eyrie was located in a valley approximately 850 m to the south of the Site in 2022; a territory is also present in this area in 2023. There were six breeding season flights recorded from VPs in 2022, and three recorded in 2023. Winter records were very limited.
- Merlin was only noted in May 2022 (two flights) during the breeding season, with more regular presence during the autumn and winter. No evidence of local breeding was recorded.
- Other focal raptor species recorded from VP watches during 2022 were hobby *Falco subbuteo* (a pair has been present in excess of 2 km to the south of the Site in both 2022 and 2023), kestrel *Falco tinnunculus* (which was most commonly recorded in late summer and autumn 2022), osprey *Pandion haliaetus* (one June record), hen harrier *Circus cyaneus* (mainly in mid to late autumn) and goshawk *Accipiter gentilis*. The latter was noted holding territory in an off-site plantation.
- Breeding waders are limited to a small number of snipe *Gallinago gallinago*. Small flocks of lingering wintering golden plover *Pluvialis apricaria* were noted in April 2022, in the late autumn of 2022 and early spring of 2023.
- Nocturnal surveys did not record nightjar in 2022, but one male was heard churring approximately 1.2 km from the Site in 2023. A roding woodcock *Scolopax rusticola* was noted in Blaen Rhisglog plantation to the south of the Site boundary.
- Quail *Coturnix* have been heard calling from marsh grassland in both years of survey, and are assumed to have held territory on-site in both 2022 and 2023.

7.2.4 Further information on the survey methods adopted are contained in **Section 7.4**.

## 7.3 Design Considerations

- 7.3.1 The developing design is being informed by the outcome of ecological survey work at the Site, and takes a step-wise approach to mitigation and in securing biodiversity net-benefit (as required by Chapter 6 of Planning Policy Wales 11).
- 7.3.2 The design will incorporate a stand-off from deciduous woodland within and adjacent to the Elenydd Mallaen SPA, as this habitat supports or has the potential to support breeding red kite. There is no indication that other SPA raptor species breed (or have the potential to breed) within or close enough to the Site to require design-led mitigation. A suitable stand-off distance is yet to be established, and this will be confirmed as part of the EIA.
- 7.3.3 Construction phase measures to minimise impacts on and ensure legislative compliance with regard to breeding birds will be detailed in a CEMP. Pre-construction surveys will be required to determine whether any new ornithological issues have arisen.

## 7.4 Assessment Scope and Methodology

### *Legislation and Guidance*

- 7.4.1 Particular consideration has been given to those species listed under Annex 1 of the Birds Directive (2009/47/EC), Schedule 1 of the 1981 Act and Section 7 of the Environment (Wales) Act 2016 in deriving the detailed approach to the work. The provisions of the Conservation of

Habitats and Species Regulations 2017 (as amended) have also been considered with regard to interaction with Special Protection Areas (SPAs).

- 7.4.2 The assessment will be based principally on the 2018 CIEEM Guidelines. There will also be regard to the widely adopted guidance and advice published by SNH (which is adopted in Wales) in the following documents:
- Windfarms and Birds - Calculating a theoretical collision risk assuming no avoiding action (SNH, 2000)<sup>69</sup>.
  - A review of disturbance distances in selected bird species (Goodship & Furness, 2022)<sup>70</sup>.
  - Use of Avoidance Rates in the SNH Wind Farm Collision Risk Model (SNH, 2018a)<sup>71</sup>.
  - Developing field and analytical methods to assess avian collision risk at wind farms (Band et al., 2007)<sup>72</sup>.
  - Assessing the Cumulative Impact of Onshore Wind Energy Developments (SNH, 2018b)<sup>73</sup>.
  - Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas (SNH, 2018c)<sup>74</sup>.
- 7.4.3 There are no survey or assessment guidance documents that relate specifically to the development of solar PV arrays.
- 7.4.4 The assessment will consider relevant national planning policy (including Planning Policy Wales (PPW; currently at edition 11), Future Wales: The National Plan 2040, and Technical Advice Note (TAN) 5 Nature Conservation and Planning) and local policy and planning guidance documents of Carmarthenshire and Ceredigion CCs.
- 7.4.5 Of relevance are amendments to Chapter 6 of PPW 11 (updated in October 2023). These amendments have been made with the aim of ensuring the planning system in Wales meets the challenges set out in the Global Biodiversity Framework<sup>75</sup>, the Biodiversity Deep Dive recommendations developed in response to this (Welsh Government, 2022), and the Duty, under Section 6 of the Environment (Wales) Act 2016, to maintain and enhance biodiversity and ecosystem resilience in Wales.
- 7.4.6 Key principles of this update to PPW 11 will be considered and referenced in the assessment.
- Scope of the Assessment*
- 7.4.7 Potentially significant effects associated with the construction and operation of the Proposed Development include:

<sup>69</sup> Scottish Natural Heritage (2000) Windfarms and Birds - Calculating a theoretical collision risk assuming no avoiding action. SNH Guidance Note. Available at [www.nature.scot/doc/wind-farm-impacts-birds-calculating-theoretical-collision-risk-assuming-no-avoiding-action](http://www.nature.scot/doc/wind-farm-impacts-birds-calculating-theoretical-collision-risk-assuming-no-avoiding-action) [Accessed on 28/11/2023]

<sup>70</sup> Goodship, N.M. & Furness, R.W. Disturbance distances review: an updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

<sup>71</sup> Scottish Natural Heritage (2018a). Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model. Version 2. Scottish Natural Heritage, Inverness. Available at <https://www.nature.scot/doc/wind-farm-impacts-birds-use-avoidance-rates-naturescot-wind-farm-collision-risk-model> [Accessed on 28/11/2023]

<sup>72</sup> Band, W, Madders, M, & Whitfield, D.P. (2007) Developing field and analytical methods to assess avian collision risk at wind farms. In: Janss, G, de Lucas, M & Ferrer, M (eds.) Birds and Wind Farms. Quercus, Madrid. 259-275

<sup>73</sup> Scottish Natural Heritage (2018b). Assessing the Cumulative Impact of Onshore Wind Energy Developments. Scottish Natural Heritage, Inverness. Available at <https://www.nature.scot/doc/guidance-assessing-cumulative-impacts-onshore-wind-farms-birds> [Accessed on 28/11/2023]

<sup>74</sup> Scottish Natural Heritage (2018c). Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas. Scottish Natural Heritage, Inverness. Available at <https://www.nature.scot/doc/guidance-assessing-significance-impacts-bird-populations-onshore-wind-farms-do-not-affect-protected> [Accessed on 28/11/2023]

<sup>75</sup> See: <https://www.cbd.int/gbf/>

- A short-term reduction in breeding or wintering bird populations due to construction disturbance leading to displacement of Schedule 1 species including breeding red kite (around the fringes of the Site) and quail, and the destruction of nests of ground-nesting birds;
- A permanent reduction in breeding or wintering bird populations due to loss of habitat critical for nesting, roosting or feeding; and
- A permanent reduction in breeding or wintering populations due to loss of individuals through collision with the turbines.

7.4.8 Particular consideration will need to be given to whether modelled fatality levels will impact on populations of red kite, peregrine and merlin associated with the Elenydd-Mallaen SPA.

7.4.9 Impacts on the following will be scoped into the assessment, on the basis that there is potential for significant effects:

- Elenydd-Mallaen SPA and Cwm Doethie-Mynydd Mallaen SSSI;
- Red kite;
- Merlin;
- Peregrine;
- Hen harrier;
- Goshawk;
- Hobby;
- Breeding snipe;
- Non-breeding golden plover; and
- Breeding quail.

7.4.10 Impacts on osprey (for which a single flight was recorded) and nightjar (which are present in low numbers beyond the boundary of the Site) can be scoped out of detailed assessment. Impacts on non-statutory designated sites (including the adjacent (off-Site) RSPB Gwenffrwd-Dinas Reserve which supports a breeding passerine assemblage<sup>76</sup>) will also be scoped out of the assessment if no significant impacts on habitats are identified by the ecological impact assessment (see Chapter 6).

#### *Study Area*

- 7.4.11 The ornithological study area has taken in extensive perimeter areas of land. The extent of this has been modified as the Site layout has been refined through multi-disciplinary constraints mapping work.
- 7.4.12 In both 2022 and 2023 the study area included a search area for breeding raptors up to 2 km around the emerging turbine layout (see the Breeding Raptor Surveys section, below). Vantage-point (VP) surveys have also taken in a wider area than the Site (for context) the viewshed of which are shown in **Figure 7.1**, and wader surveys have included an 800 m perimeter survey area around the likely areas of turbine and infrastructure development in both years<sup>77</sup>.
- 7.4.13 These survey areas reflect industry standard guidance (SNH, 2017) and the expectations of NRW with regard to other schemes.

<sup>76</sup> SNH (2017) guidance states, "It is generally considered that passerine species are not significantly impacted by wind farms." This is likely to reflect the conclusions of studies that indicate no population level effects in passerines resulting from wind farm collision.

<sup>77</sup> All land beyond the Site was surveyed from publicly accessible areas.

### *Baseline Characterisation*

#### Vantage Point (VP) Survey

- 7.4.14 The ornithological study area is currently being surveyed from seven VP locations. Viewsheds were modelled in GIS and confirmed by reconnaissance prior to the commencement of survey work<sup>78</sup>. VPs have not only been selected to overlook the Site, but also to help determine if there are regular flightlines between the Site and the Elenydd-Mallaen SPA.
- 7.4.15 A minimum of 36 hours of survey will be undertaken from the seven VP locations during the period between April and August 2023, and again between September 2023 and March 2024 (the non-breeding season / winter period). One of the VPs is close to an area where quail have been heard calling in both 2023 and 2022; watches at this VP included a proportion of crepuscular starts / finishes to maximise the potential to record the species.
- 7.4.16 An equivalent level of survey effort was completed in the 2022 breeding season and winter of 2022/23.
- 7.4.17 The locations of the VPs, their modelled viewsheds, and the position of the Elenydd-Mallaen SPA in relation to the Site are shown on **Figure 7.1**.

#### Breeding Raptor Surveys

- 7.4.18 Survey work covering an area extending to 2 km from the Site has been completed in both 2022 and 2023 for species including red kite, merlin, peregrine, hen harrier and short-eared owl. A 1 km perimeter search area has been adopted for goshawk, which predominantly nests in mature woodland. Surveys of buildings for barn owl are also being completed (within 1 km of the Site where access is possible) during 2023. All work is being completed under relevant Schedule 1 licences.
- 7.4.19 Surveys have involved walking and / or scanning all accessible steep-sided stream valleys, areas of rank heather moorland, tussocky and rushy grassland, fence lines, rock escarpments, any quarries and plantation edge within 2 km of the Site. Where access has not been possible, due to terrain or land ownership, local VPs have been set up and short watches completed over suitable habitat (each typically for 30-40 minutes duration).
- 7.4.20 During 2023, raptor survey work commenced with watches for displaying goshawk in February and March and for nest-building and territorial red kite in March and early April. These surveys are ongoing.

#### Breeding Wader Surveys

- 7.4.21 Four walkover survey visits have been completed to survey for breeding waders in both 2022 and 2023. The method has followed that of Brown & Shepherd (1993)<sup>79</sup> as amended by Calladine *et al.*, (2009)<sup>80</sup>.
- 7.4.22 SNH (2017) guidance does not currently specify a distance around wind farm proposals that wader surveys should cover, but Pearce-Higgins *et al.* (2009<sup>81</sup> and 2012<sup>82</sup>) concluded that

<sup>78</sup> Some VP locations have changed between years as the potential layout has contracted and in response to the denial of access to one location from Autumn 2022 onwards. As a result, there are seven remaining VPs with identification numbers between 1 and 9

<sup>79</sup> Brown, A.F. & Shepherd, K.B. (1993) A method for censusing upland breeding waders. *Bird Study*, 40: 189-195.

<sup>80</sup> Calladine, J., Garner, G., Wernham, C. & Thiel, A. (2009). The influence of survey frequency on population estimates of moorland breeding birds. *Bird Study*, 56: 3, 381-388.

<sup>81</sup> Pearce-Higgins, J.W., Stephen, L., Langston, R., Bainbridge, I., and Bullman, R. (2009) The distribution of breeding birds around upland wind Farms. *Journal of Applied Ecology*, 46, 1323-1331

displacement effects on curlew extend to 620 m from wind turbines. The breeding wader study area was extended to 800 m (to account for turbine micro-siting). Four visits (as recommended by SNH, 2017) were completed between April and July based on standard methods (Brown & Shepherd (1993)).

#### Nightjar Surveys

7.4.23 Areas of young plantation, plantation affected by windthrow and open clearfell within and adjacent to the Site were surveyed for nightjar in 2022 and 2023. The approach reflects industry standard guidance in terms of effort and timing (Gilbert *et al.*, 1998), but has been adapted to be suitable for the Site. Driven transects with stopping points were completed in the large plantation area in the eastern part of the Site, while in smaller peripheral areas a walked transect with stopping points has been used.

7.4.24 Surveys were completed over ten nights during 2022 (five between late May and early June, and five in mid-July), and over eight nights (four in June and four in July) in 2023.

#### Consultation

7.4.25 Consultation with NRW through their discretionary planning advice service will be undertaken. Consultation will also be sought with the local planning authority ecologists. It is proposed that discussions will cover:

- A review of the adequacy of the desk study and field survey proposed / completed;
- Discussion of the main issues in terms of impact assessment and the Habitats Regulations Assessment process; and
- How impacts can be most effectively mitigated through design and other measures.

7.4.26 Data for locally breeding waders, grouse and raptors will also be requested from the RSPB to support the assessment.

#### Method of Assessment

7.4.27 The approach to the ornithological impact assessment will be based on the 2018 CIEEM guidance. Although this is recognised as the industry standard for ecological assessment, the guidance is not prescriptive and does not recommend the use of matrices; rather, it aims to “provide guidance to practitioners for refining their own methodologies”.

7.4.28 CIEEM recommends assessment involves:

- Identification of important ecological features in relation to a Site.
- Establishing a ZoI based on desk study, field survey, consultation, an assessment of the sensitivity of ornithological features, consideration of the outline design and liaison with other technical disciplines.
- Assessing the importance of the features within a geographical context.
- Identifying the nature of any potential effects.
- Assessing the significance of effects with reference to the integrity of sites or ecosystems and / or the conservation status of habitats or species. This will include collision risk analysis using the model developed by SNH (Band *et al.*, 2007<sup>83</sup>).
- Applying mitigation to avoid or reduce the significance of effects.

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<sup>82</sup> Pearce-Higgins, J.W., Stephen, L., Douse, A., Langston, R. (2012) Greater impacts of wind farms on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis. *Journal of Applied Ecology*. 49, 2, April 2012, 386-394

<sup>83</sup> Band, W, Madders, M, & Whitfield, D.P. (2007) Developing field and analytical methods to assess avian collision risk at wind farms. In: Janss, G, de Lucas, M & Ferrer, M (eds.) *Birds and Wind Farms*. Quercus, Madrid. 259-275.

- Assessment of residual effects.

7.4.29 The ornithological features and designated sites identified within the study area would be assigned an ornithological importance using the standards set out by CIEEM. In order to characterise an impact on a feature, the following parameters would be considered:

- direction;
- magnitude;
- extent;
- duration;
- frequency;
- timing; and
- reversibility.

7.4.30 Characterising and quantifying effects and assessing their significance will be completed through:

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

7.4.31 The flight data collected during the VP surveys will be used to undertake a Collision Risk Assessment (CRA) to predict the impact that the operational Proposed Development will have on local bird populations. The Band model, prescribed by NatureScot, is the standard model used to calculate this impact. The model output will be compared with local population estimates and the significance of the impact can be assessed.

7.4.32 The likelihood of significant displacement and disturbance effects on nesting raptors and waders will be assessed using professional judgement and experience from monitoring of operational sites, in addition to consideration of published disturbance distances in Goodship & Furness (2022)<sup>84</sup>.

#### *Cumulative Effects*

7.4.33 Cumulative effects are most likely to result with regard to those receptors for which a significant residual effect is predicted as a result of development. Effects are likely to arise if the extent or condition (habitats) or core range of those receptors (species) are also likely to be affected by planned, consented or built development. It is also possible that non-significant effects on ecological features from multiple projects may result in a significant cumulative effect.

7.4.34 Cumulative effects may therefore be:

- Cumulative 'zone of influence' effects whereby two or more developments affect the same specific feature.
- Cumulative effects on the total resource (or population) of an ecological feature in a region due to two or more developments (e.g. two developments affecting the same feature reducing its overall extent or number).

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<sup>84</sup> Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

7.4.35 For the Proposed Development a 10 km ZoI is likely to be appropriate as this will cover the core ranging distance of mobile species using the Site and the likely maximum extent of any potential impacts on features remote from it that might result from construction or operation.

## 7.5 Summary Questions

1. Are NRW satisfied that the scope of ornithological survey and desk study is appropriate?
2. Do NRW have ornithological concerns with regard to the Proposed Development, and if so could they outline what they see the principal ornithological issues as being?
3. Do consultees agree with the ornithological receptors that are proposed to be scoped in (and out) of the EIA, given the available evidence gathered to date?
4. Do NRW intend to officially revise the numbers of breeding raptors for which the Elenydd-Mallaen SPA is designated to reflect the considerable population growth of red kite in Wales (and UK-wide) since its classification?
5. Can NRW clarify the status of peregrine in terms of the Elenydd-Mallaen SPA? The species is currently not included on the Natura 2000 Data Form for the Site.
6. Can NRW outline the relevant sources of information from which county, regional and national species populations should be taken, to inform assessment?

## 8. NOISE AND VIBRATION

### 8.1 Introduction

8.1.1 This Chapter has been prepared by TNEI. Noise will be emitted during the construction, operation, and decommissioning phases of the Proposed Development. Vibration will be emitted during the construction phase. This Chapter provides a summary of the noise and vibration effects anticipated for each phase and, where appropriate, details of the proposed scope and methodology for the assessment work.

### 8.2 Existing Baseline

8.2.1 The Site is located within a rural location with large areas of forestry, hills and valleys in the immediate surroundings. There are a relatively small number of scattered residential properties within and around the Site, which will need to be considered as Noise Sensitive Receptors (NSRs). No existing baseline noise surveys suitable for the assessment exists, therefore a new baseline will be established via a comprehensive noise survey as part of the noise assessment.

8.2.2 A review of nearby potential cumulative schemes will be undertaken as part of the design progress. No existing operational wind farm developments are located near the Site.

### 8.3 Design Considerations

8.3.1 For the construction phase, standard good practice construction techniques will be considered for mitigation and will be outlined in the CEMP.

8.3.2 One of the key design considerations will be in relation to operational noise levels. As part of the assessment, noise limits for operational wind farm noise will be established at sensitive receptors. Mitigation of wind turbine operational noise will be achieved through the design of the Proposed Development, such that the relevant ETSU-R-97 noise limits can be achieved at the surrounding properties with commercially available wind turbines.

8.3.3 Standard good practice construction techniques and compliance with policy and legislation would be requirements of the outline CEMP. Mitigation of wind turbine operational noise will be achieved through the design of the Proposed Development, such that the relevant ETSU-R-97 noise limits can be achieved at the surrounding properties with commercially available wind turbines.

### 8.4 Assessment Scope and Methodology

#### *Legislation and Guidance*

8.4.1 The relevant legislation and guidelines to be considered will be:

- Future Wales: The national plan 2040;
- Planning Policy Wales (PPW), for overall context of planning policies in Wales;
- Welsh Assembly Government. Practice Guidance - Planning Implications of Renewable and Low Carbon Energy. February 2011 – for context of planning policies for renewable energy projects;
- The Working Group on Noise from Wind Turbines (1996) ETSU-R-97 The Assessment and Rating of Noise from Wind Farms' (ETSU-R-97) – to assess wind farm operational noise;
- Institute of Acoustics' A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise', 2013 (IOA GPG) – to assess wind farm operational noise;
- BS5228-1: 2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise (BS5258) – to assess construction noise; and

- BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' (BS4142) - to be used if required for assessment of operational noise from the potential Solar PV array and BESS.

### *Scope of the Assessment*

8.4.2 The noise assessment will consider the following potentially significant impacts:

- Noise associated with construction of the Proposed Development.
- Noise associated with the operation of the proposed wind farm element of the Proposed Development (including cumulative noise due to operation of any neighbouring wind farms). A detailed noise survey and assessment in accordance with ETSU-R-97 and current good practice will be undertaken.

8.4.3 Where noise levels resulting from the construction or decommissioning of the Proposed Development are likely to be above the relevant limit levels, there will be the potential for significant effects to occur. Where noise levels resulting from the operation of the Proposed Development are likely to be above the relevant limit levels, derived in line with ETSU R 97 and the IOA GPG, it is likely that this will result in the occurrence of significant effects. Where operational noise levels meet the ETSU R 97 noise limits, there will be no potential for significant effects to occur.

8.4.4 The following impacts are not considered likely to give rise to significant effects on any receptors and will therefore be scoped out of the assessment:

- Noise associated with the operation of the solar PV array and BESS elements of the Proposed Development. Given the likely distances to receptors noise from Solar PV and BESS is not likely to be significant at receptors, however this will be kept under review as more detail arise during the course of the EIA process;
- Vibration - Given the nature of the construction activities proposed, and the relative distances from residential receptors, the risk of ground borne vibration during construction activities impacting on residential receptors is considered very low. Any impact from operational vibration is also likely to be imperceptible;
- Decommissioning noise - The potential noise impacts from the decommissioning phase will be no greater than those predicted during the construction phase. On this basis, it is not proposed to undertake an assessment of decommissioning noise;
- Low-Frequency Noise (discussed further below); and
- Amplitude modulation (discussed further below).

#### Low-Frequency Noise

8.4.5 Low-frequency noise and infrasound has been considered in the 'Review of noise guidance for onshore wind turbines' by WSP / BEIS (2023)<sup>85</sup>. The report considered a number of studies which investigate claimed links between adverse health symptoms and infrasound emissions from wind turbines. The report notes on page 116 that:

*"It has been demonstrated in controlled experiments, including the involvement of participants self-reporting to be sensitive to wind turbine infrasound, that exposure to infrasound at levels representative of wind turbine emissions at dwellings is not associated with physiological or psychological health effects, whereas the expectation of effects from being exposed to wind turbine infrasound, and positive or negative messages influencing that expectation, can affect health symptom reporting.*

<sup>85</sup> WSP (on behalf of the Department for Business, Energy and Industrial Strategy), 2023. A Review of noise guidance for onshore wind turbines. Project Report. May 2023.

*Overall, the findings from the existing evidence base indicate that infrasound from wind turbines at typical exposure levels has no direct adverse effects on physical or mental health, and reported symptoms of ill-health are more likely to be psychogenic in origin.*

*It is expected that further evidence from ongoing studies into wind turbine infrasound effects will emerge soon, in particular from the NHMRC studies in Australia. However, based on the existing scientific evidence, it does appear probable that the above findings will not be contradicted by newer evidence”.*

8.4.6 Since the publication of the report, the study that was granted funding by the National Health and Medical Research Council of Australia (NHMRC) was presented in the Environmental Health Perspectives (EHP) journal, which is published by the United States National Institute of Environmental Health. The study<sup>86</sup> aims to test the effect of exposure to 72 hours of infrasound (designed to simulate a wind turbine infrasound signature) on human physiology, particularly sleep; it concluded that, *“Our findings did not support the idea that infrasound causes WTS<sup>87</sup>. High level, but inaudible, infrasound did not appear to perturb any physiological or psychological measure tested in these study participants”.*

8.4.7 It is therefore not considered necessary to carry out specific assessments of low frequency noise and infrasound and that they should be scoped out.

#### Amplitude Modulation (AM)

8.4.8 AM by definition, is the regular variation in noise level of a given noise source. This variation (the modulation) occurs at a specific frequency, which, in the case of wind turbines, is defined by the rotational speed of the blades (i.e. it occurs at the rate at which the blades pass a fixed point (e.g. the tower)), known as Blade Passing Frequency.

8.4.9 The WSP / BEIS report discusses AM, and on page 119 states that, “At present, it seems evident that reliable predictions of AM in the context of development planning and noise assessment guidance are unlikely to be practically feasible in the near future”.

8.4.10 At the time of writing there is no agreed methodology which can be used to predict the occurrence of AM and as such no assessment of AM will be undertaken. Therefore, this topic is considered to be scoped out.

#### Study Area

8.4.11 The study area will include the nearest NSRs 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 proposed wind farm element of the Proposed Development should, as a minimum, be the area within which noise levels from the proposed, consented and existing wind turbines may exceed 35 dB LA90 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)). **Figure 8.1** shows the identified NSRs closest to the Proposed Development.

<sup>86</sup> The Health Effects of 72 Hours of Simulated Wind Turbine Infrasound: A Double-Blind Randomized Crossover Study in Noise-Sensitive, Healthy Adults. Available at The Health Effects of 72 Hours of Simulated Wind Turbine Infrasound: A Double-Blind Randomized Crossover Study in Noise-Sensitive, Healthy Adults - PMC (nih.gov)

<sup>87</sup> WTS stands for Wind Turbine Syndrome which is a term for adverse human health effected related to the proximity of wind turbines.

- 8.4.12 Noise Monitoring Locations (NMLs), locations where background noise monitoring will be undertaken to establish the noise baseline, are currently under development and consultation. At present, NML locations are subject to consultation and agreement, and the survey is expected to be completed in early 2024.

#### *Baseline Characterisation*

- 8.4.13 A baseline noise survey will be undertaken by monitoring noise levels at proposed NMLs. The locations of the NMLs will be agreed with the Local Authorities in advance of the survey and the final locations will depend on the consultation response and practical aspects such as agreements from local residents to access their properties. Noise monitoring equipment (sound level meters) will be installed at or near receptors (i.e. residential property gardens).
- 8.4.14 The survey will be undertaken for a minimum of 28 days. Equipment for measuring wind conditions will be installed at the Site for the duration of the noise survey to collect wind speed and direction data at various heights, with the highest as close as possible to the proposed hub height, to determine the wind speed at turbine hub height in accordance with the guidance in the IOA GPG.
- 8.4.15 Simultaneous 10-minute measurements will be taken by the wind and noise monitoring equipment over a period of at least 28 days. More detail about the noise survey is included below in the methodology.

#### *Consultation*

- 8.4.16 Consultation with the following stakeholders will be undertaken prior to commencement of the noise survey and assessment in order to agree the NMLs and approach to the survey and assessment:
- Ceredigion CC Environmental Health Department; and
  - Carmarthenshire CC Environmental Health Department.

#### *Method of Assessment*

##### Construction Noise

- 8.4.17 At this stage it is anticipated that a construction noise assessment will be undertaken to determine the potential noise impacts during the construction of the wind turbines and ancillary infrastructure for the Proposed Development only. The construction noise assessment will be undertaken in accordance with BS5228.
- 8.4.18 However, due to the large separation distances expected between the proposed wind turbines or access tracks to the nearest NSRs, it is anticipated that the large majority of construction working areas will be sufficiently remote that a detailed assessment of construction noise may not be required. This will be investigated further as the Proposed Development design progresses.
- 8.4.19 In the event that a detailed construction noise assessment is not required, the ES will provide a summary of relevant guidance and best practice construction methods, along with a commitment to adhere to best practice means of controlling noise from construction activities, as advocated by BS 5228.

##### Operational Noise – Wind Farm

- 8.4.20 ETSU-R-97 details the methodology for establishing noise limits for proposed wind farm developments and the limits that should not be exceeded. ETSU-R-97 states that noise limits should be set relative to existing background noise levels at the nearest receptors and that these limits should reflect the variation in both turbine source noise and background noise with

wind speed. Separate noise limits apply for quiet daytime and for night-time periods. Quiet daytime limits are chosen to protect a property's external amenity, and night-time limits are chosen to prevent sleep disturbance indoors, with windows open.

- 8.4.21 ETSU-R-97 recommends that wind farm noise for quiet daytime periods should be limited to 5 dB(A)<sup>88</sup> above the prevailing background or a fixed minimum level within the range 35 – 40 dB LA<sub>90,10min</sub>, whichever is the higher. The precise choice of criterion level within the range 35 – 40 dB(A) depends on a number of factors, including the number of dwellings in the neighbourhood of the wind farm (relatively few dwellings suggest a figure towards the upper end), the effect of noise limits on the number of kWh generated (larger sites tend to suggest a higher figure) and the duration and level of exposure to any noise. These factors will be taken into account with justification for deriving suitable noise limits included in the noise assessment.
- 8.4.22 An exception to the setting of both quiet daytime and night-time fixed minimum limit occurs where a property occupier has a financial involvement with the Proposed Development. In that case the fixed minimum limit can be increased to 45 dB LA<sub>90,10min</sub> or the prevailing background noise LA<sub>90</sub> plus 5 dB, whichever is the greater for both the quiet daytime and night-time periods.
- 8.4.23 A background noise survey is typically not required for situations where predicted wind turbine noise levels at the nearest NSRs is limited to an LA<sub>90,10min</sub> of 35dB(A) up to wind speeds of 10 m/s at 10 m, as the protection of the amenity of those properties can be controlled through a simplified noise condition as detailed in ETSU-R-97. ETSU-R-97 states that, *"For single turbines or wind farms with very large separation distances between the turbines and the nearest properties, a simplified noise condition may be suitable. If the noise is limited to an LA<sub>90,10min</sub> of 35dB(A) up to wind speeds of 10m/s at 10m height, then this condition alone would offer sufficient protection of amenity, and background noise surveys would be unnecessary"*. For this reason, and as described above, the eight suggested NMLs are in areas where noise levels are predicted to exceed this level.

#### Operational Noise – Solar PV array and BESS

- 8.4.24 Subject to the final Proposed Development layout, the solar PV array and BESS within the Proposed Development may require a noise assessment in accordance with BS4142, if electrical plant (inverter/ transformer / large batteries containers) are located in close proximity to NSRs. The level of detail required for this assessment will be investigated further as the Proposed Development design progresses.

#### Cumulative Effects

- 8.4.25 Cumulative construction noise with other significant development in the area is unlikely to occur and is not anticipated to be of a significant effect.
- 8.4.26 Cumulative operational noise from the Proposed Development in combination with identified cumulative schemes will be assessed unless it is considered that these effects are likely to be negligible. The IOA GPG suggests that cumulative noise effects need not be considered where differences between the noise level contribution of two wind farms are 10 dB or more. The approach to the cumulative noise assessment will be agreed with the Local Authorities.

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<sup>88</sup> A logarithmic scale is used in noise level measurements because of this wide range. The scale used is the decibel (dB) scale which extends from 0 to 140 decibels (dB) corresponding to the intensity of the sound level. The correction factor is called 'A Weighting' and the resulting measurements are written as dB(A). The dB(A) is internationally accepted and has been found to correspond well with people's subjective reaction to noise.

8.4.27 It is not expected that noise from the Solar PV and BESS will have a cumulative effect with other development in the area, or with the proposed wind development.

## **8.5 Summary Questions**

- 1.** Can the consultees confirm that they agree with the proposed assessment methodologies, specifically the use of ETSU-R-97 and the Institute of Acoustics (IOA) Good Practice Guide (GPG) to assess operational noise ?
- 2.** Can consultees agree that assessment of vibration, infrasound, low frequency noise and amplitude modulation be scoped out of the EIA?

## 9. TRANSPORT AND ACCESS

### 9.1 Introduction

- 9.1.1 This Chapter has been prepared by Vectos (now SLR). This Chapter considers the environmental impacts that are potentially significant where the Proposed Development is likely to result in increased traffic flows. This Chapter sets out the existing conditions in the Study Area where these are currently known and the proposed scope and assessment methodology to be adopted in the assessment of transport and access impacts.
- 9.1.2 Potentially significant traffic related environmental effects may result during construction from:
- the transportation of turbine components as Abnormal Indivisible Loads (AIL); and
  - the import of construction materials transported by heavy goods vehicles (HGVs) and low loaders.
- 9.1.3 These are likely to impact on road users as well as pedestrians and cyclists on the existing pedestrian/cycle networks and also on any of the PRoWs that may cross the Site or access roads.
- 9.1.4 The transport assessment will be based on the worst-case assumptions to ensure a robust assessment for the construction and operation of the Proposed Development.

### 9.2 Existing Baseline

- 9.2.1 The Site is located northeast of Pumsaint, between the towns of Lampeter to the west and Llanwrtyd Wells to the east. There are a small number of existing access tracks within the Site and forestry, and two PRoWs that traverse the Site.
- 9.2.2 The proposed access routes to the Site will originate at Swansea Port which is considered to be the closest and most suitable port to the Site. The proposed route from Swansea is described in **Chapter 2**.

### 9.3 Design Considerations

- 9.3.1 The design of the access arrangements both within and off-site will give full consideration to the road safety and amenity of all road users.
- 9.3.2 The identified construction routes may require upgrades to accommodate general construction traffic, abnormal load deliveries and ongoing operational access to the Proposed Development. The routes will be considered in a separate Abnormal Loads Routes Assessment (ALRA) report which will include swept path analysis and a detailed review of the preferred routes for access. The ALRA will be included as a Technical Appendix to the Transport and Access ES Chapter and set out the traffic management requirements to ensure the safe and efficient delivery of the AILs to the Proposed Development.
- 9.3.3 In addition, the following standard mitigation measures will be included as part of the transport assessment:
- Preliminary Construction Traffic Management Plan (CTMP);
  - Preliminary AIL Traffic Management Plan; and
  - Sustainable Staff Access Plan.

## 9.4 Assessment Scope and Methodology

### *Legislation and Guidance*

9.4.1 The following policy and guidance documents will be used to inform the Transport and Access ES Chapter:

- Institute of Environmental Management and Assessment (IEMA) Guidelines: Environmental Assessment of Traffic and Management (July 2023);
- Planning Policy Wales, Edition 11 (Welsh Government), February 2021;
- Future Wales: The National Plan 2040 (Welsh Government), February 2021;
- TAN 18: Transport (Welsh Government), March 2007;
- Carmarthenshire Local Development Plan 2006-2021 (Carmarthenshire CC), Adopted December 2014;
- Second Deposit Revised Local Development Plan 2018-2033 (Carmarthenshire CC), August 2022 (Draft);
- Ceredigion Local Development Plan (LDP1) 2007-2022 (Ceredigion CC), Adopted 2013; and
- Welsh Government Procedure and Advice Guidance (PAG) 'Pulling Together' Best Practice for Transporting Abnormal Loads in Wales' (Welsh Government), Version 1 – September 2020.

### *Scope of the Assessment*

#### Effects Scoped In

9.4.2 The assessment will consider the potential effects associated with construction and operation of the Proposed Development as detailed below. The key issues for consideration as part of the assessment will be:

- The temporary change in traffic flows and the resultant, temporary effects on the study area during the construction phase;
- The physical mitigation associated with the delivery of abnormal loads;
- The design of new access infrastructure; and
- The consideration of appropriate and practical mitigation measures to offset any temporary effects.

9.4.3 All receptors within the study area will be scoped in during the construction phase of the Proposed Development. This is due to the potential increase in traffic flows on the access routes during the construction phase.

9.4.4 The impacts on all receptors will be assessed against the following factors in accordance with IEMA guidance (1993):

- driver severance and delay – the potential delays to existing drivers and their potential severance from other areas;
- community severance and delay – the potential severance to communities and the delays to movements between communities;
- vulnerable road users and road safety – the potential effect on vulnerable users of the road (e.g. pedestrians/cyclists);
- hazardous and dangerous loads – the potential effect on road users and local residents caused by the movement of abnormal loads; and
- dust and dirt – the potential effect of dust, dirt and other detritus being brought onto the road.

- 9.4.5 In addition to the effects listed above, human health effects will be considered in transport terms in reference to pedestrians within the vulnerable road user and road safety effects.
- 9.4.6 The significance of the likely effect will be determined by consideration of the sensitivity of receptors to change, taking account of the specific issues relating to the study area, and then the magnitude of that change.
- 9.4.7 The assessment will be based on the peak construction period in order to ensure a robust assessment. The effects will be considered based on percentage increases in traffic flow along the routes in the study area.
- 9.4.8 Whilst the construction effects will be temporary and assessed within the ES chapter, a Transport Assessment (TA) for the delivery route will be prepared as part of the submission.
- 9.4.9 A Road Safety Audit (RSA) will also be undertaken as part of the TA. The scope of the TA will be agreed with highways departments of Carmarthenshire County Council and Ceredigion County Council to ensure that the TA meets the necessary requirements.

#### Effects Scoped Out

- 9.4.10 Routine maintenance, such as safety checks and repairing faults during operation of the Proposed Development would normally require light vans or similar vehicles and would use the same routes as those used during construction.
- 9.4.11 Once operational, it is envisaged that vehicle trips generated by the operational activities on-site would be no greater than those expected and accounted for in the background variations to the existing traffic flows. As such negligible traffic flows would be indistinguishable from normal daily traffic flows and therefore assessment of operational effects on all receptors will be scoped out of the assessment.
- 9.4.12 The Proposed Development will be designed with an operational life cycle of up to 50 years. At the end of this period or before time, if necessary, the turbines would be decommissioned or an application may be submitted to repower the wind farm.
- 9.4.13 Trip generation associated with the decommissioning activities is not likely to exceed the average level of trip generation for the construction phase of the Proposed Development, and it is likely to be considerably lower. Therefore, an assessment of impacts associated with the decommissioning phase of the Proposed Development will be scoped out of the assessment for all receptors.

#### Study Area

- 9.4.14 The study area has been defined based on the sections of the road network likely to see the greatest effects associated with traffic generated by the Proposed Development. The study area includes the sections of road nearest to the Site and the route along the public highway from the A40 and A482/B4302 (subject to confirmation of construction access routes). The study area excludes any routes that would not be affected by construction traffic movements.
- 9.4.15 As vehicles travel further from the Site, vehicle movements will be distributed across the wider highway network. Beyond the study area, professional judgement suggests that effects relating to the Site access, traffic and transport would be unlikely to be significant.

### Baseline Characterisation

- 9.4.16 The baseline transport conditions will be established through a combination of traffic surveys on the local road network, desk-based audits and on-site observations undertaken in April and June 2023, along with TEMPro<sup>89</sup> growth.
- 9.4.17 To determine the baseline conditions against which the effects of the Proposed Development will be assessed, Automatic Traffic Count (ATC) surveys will be undertaken at the following locations:
- A482 Llanwrda;
  - A40 near Llanwrda;
  - A482 south of Pumsaint;
  - B4302 Llandeilo; and
  - A40 near Llandeilo.
- 9.4.18 The ATC surveys will be undertaken over a seven-day period for 24 hours a day, at 15-minute intervals. The surveys will be undertaken during a neutral month (April, May, June, September and October) and will count volume/speed/class of vehicle, by direction.
- 9.4.19 Additional traffic data will be obtained from the Department for Transport (DfT) traffic count data. Data will be obtained for the following sites:
- Manual count point 50513 (A40 west of Llandeilo);
  - Manual count point 20515 (A40 west of Llanwrda);
  - Manual count point 20516 (A40 east of Llanegwad);
  - Manual count point 514 (A40 east of Abergwili);
  - Manual count point 70088 (A40 west of A40/A485 rb);
  - Manual count point 70086 (A40 north of Pensarn rb); and
  - Manual count point 40515 (A40 west of Llandeilo).
- 9.4.20 TEMPro will be used to provide a growth factor to establish the future year assessment based on the expected construction traffic peak.
- 9.4.21 Personal Injury Collision data will be obtained, where possible, for the identified study area for the most recent five-year period. Data will be obtained from Welsh Government (if available) or CrashMap<sup>90</sup>. A review of height and weight restrictions will also be undertaken along the proposed construction transport routes.
- 9.4.22 The following desk-based research and data sources could also be used to inform the assessment:
- Google Maps;
  - Traveline Website (for travel information);
  - Sustrans (for cycle route information);
  - Carmarthenshire CC and Ceredigion CC websites (used to obtain planning policy); and
  - Public Transport Operators.
- 9.4.23 Information on PRoWs will be obtained from Carmarthenshire CC and Ceredigion CC websites to determine if there are any PRoWs which cross the Site or are located in the vicinity of the Site or the proposed access route/s.

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<sup>89</sup> Department for Transport, 2023. Trip End Model Presentation Program (TEMPro)

<sup>90</sup> CrashMap Data: Great Britain 2011 – 2021. Available at <https://www.crashmap.co.uk/>

### *Consultation*

9.4.24 Consultation will be undertaken with the following consultees:

- Carmarthenshire CC (as local highway authority);
- Ceredigion CC;
- Welsh Government (as trunk road authority), North and Mid Wales Trunk Road Agency (which covers Ceredigion) and the South Wales Trunk Road Agency (which covers Carmarthenshire);
- National Trust (who own the forestry tracks from Pumsaint); and
- Road and structure operators along the proposed AIL access route/s.

9.4.25 It is also proposed to consult with City and County of Swansea Council (CCSC) as the AILs will travel from Swansea Port (as the port of entry) to the Site via the highway network within Swansea.

9.4.26 Where relevant, the issues raised by each consultee will be used to develop the scope of assessment and identify any specific matters that warrant more detailed analysis.

### *Method of Assessment*

9.4.27 The likely significance of the potential effects from the Proposed Development will be determined by considering the magnitude of change in traffic movements and the sensitivity of the receptors which would be affected by these changes. This will be undertaken in accordance with the IEMA guidance and standard good practice, based on the experience of the assessor.

9.4.28 The IEMA guidance suggests that a day-to-day traffic flow variation of +/- 10% is to be expected in the baseline situation and that projected traffic flow increases of less than 10% would be imperceptible to the general public and would create no discernible environmental impact. Therefore, increases in traffic levels below 10% are considered insignificant.

9.4.29 The IEMA guidelines provide two thresholds when considering predicted increase in traffic, whereby a full assessment of the impact is required:

- Rule 1 - where the total traffic would increase by 30% or more (10% in sensitive areas); and/or
- Rule 2 - where the HGV traffic would increase by 30% or more (10% in sensitive areas).

9.4.30 The estimated traffic generation of the Proposed Development will be compared with baseline traffic flows in order to determine the percentage increase in traffic. Potentially significant environmental effects will then be assessed where the thresholds are exceeded.

9.4.31 The potential sensitivity of receptors to change in traffic levels has been determined by considering the study area and the presence of receptors in relation to each potential impact.

9.4.32 The IEMA guidance does not define a sensitive area and therefore the assessor will make a judgement based on experience and the nature of the study area. Each receptor will be assessed individually to determine its sensitivity on a scale of Negligible, Low, Medium or High.

**9.4.33** The magnitude of impact or change will be considered according to the criteria defined in **Table 9.1**.

**Table 9.1: Magnitude of Impact Criteria**

Impact	Negligible	Low	Medium	High
<b>Driver severance &amp; delay</b>	<10% increase in traffic	Quantitative assessment of road capacity based on existing traffic flows and predicted future traffic levels		
<b>Community severance &amp; delay</b>	<10% increase in traffic	<30% increase in traffic	<60% increase in traffic	>60% increase in traffic
<b>Noise</b>	<25% increase in traffic	>25% increase in traffic. Quantitative assessment based on predicted increase in traffic against measured baseline		
<b>Vulnerable road users</b>	<10% increase in traffic	Qualitative assessment of existing accident records and predicted increases in traffic		
<b>Dangerous loads</b>	0% increase in traffic	<30% increase in traffic	<60% increase in traffic	>60% increase in traffic
<b>Dust and dirt</b>	<10% increase in traffic	<30% increase in traffic	<60% increase in traffic	>60% increase in traffic

9.4.34 In terms of community severance and delay, any potential impacts on the PRoWs located within the Site will be assessed and any necessary mitigation implemented which could involve diverting or upgrading the routes.

9.4.35 Sensitivity and magnitude of change as assessed under the detailed criteria would then been considered collectively to determine the potential effects and their significance. The collective assessment is a considered assessment by the assessor, based on the likely sensitivity of the receptor to the change (e.g. is a receptor present which would be affected by the change), and then the magnitude of that change, as set out in the significance matrix in Table 9.2. Effects of ‘major’ and ‘moderate’ significance are considered to be ‘significant’ in terms of the EIA Regulations.

**Table 9.2: Significance Criteria**

Sensitivity of Receptor	Magnitude of Impact			
	High	Medium	Low	Negligible
<b>High</b>	Major	Major	Moderate	Negligible
<b>Medium</b>	Major	Moderate	Minor	Negligible
<b>Low</b>	Moderate	Minor	Negligible	Negligible
<b>Negligible</b>	Minor	Negligible	Negligible	Negligible

*Cumulative Effects*

9.4.36 An assessment will be made of the likely significant cumulative effects of the Proposed Development in combination with other wind farms and large-scale developments where relevant. The criteria for including schemes in the cumulative assessment are set out above in **Chapter 3**. In addition, cumulative effects will only be considered in detail where the predicted scale of traffic impact is greater than 10%. This will be based on the worst-case assumption

that all trips associated with the committed developments and the Proposed Development will occur at the same time.

9.4.37 Details of cumulative sites will be provided and confirmed with Carmarthenshire CC and Ceredigion CC.

## **9.5 Summary Questions**

- 1.** Do consultees consider the proposed methodologies appropriate?
- 2.** Do consultees agree that the traffic survey locations and the methods for obtaining traffic data are acceptable?
- 3.** Is the use of TEMPro acceptable to determine the future year assessment?

## 10. HYDROLOGY, HYDROGEOLOGY, GEOLOGY AND PEAT

### 10.1 Introduction

- 10.1.1 This Chapter has been prepared by Ramboll. This Chapter outlines the preliminary hydrology, hydrogeology and geology baseline including peat resources, and sets out the proposed scope of the ES assessment with regard to surface and ground water resources.
- 10.1.2 The scope of the assessment is based on a high-level review of baseline information and will be confirmed through review of additional data sources, a site visit and consultation with stakeholders.
- 10.1.3 Consideration has been given to:
- geology, soils and peat;
  - groundwater and surface water quality;
  - hydrology and flood risk;
  - public and private water supplies (PWS);
  - designated sites; and
  - groundwater aquifers and related GWDTEs.

### 10.2 Existing Baseline

- 10.2.1 Ordnance Survey (OS) mapping indicates there are numerous streams and drains crossing the Site with the west of the Site mainly draining towards the Afon Cothi, and the east of the Site draining to the Gwenffrwd or the Afon Pysgotwr Fach. All of these are tributaries of the Afon Tywi. There are also likely to be a network of forestry drains which have similar downstream connectivity such that land in the centre and northeast of the Site may no longer follow a natural drainage regime.
- 10.2.2 The baseline condition of watercourse condition (as assessed by NRW) is summarised in **Table 10.1**.

<b>Table 10.1: Baseline Water Framework Directive (WFD) Watercourse Condition Criteria</b>				
<b>WFD Watercourse Stretch Name</b>	<b>Proximity to Site</b>	<b>Overall WFD Status*</b>	<b>Ecological WFD Status*</b>	<b>Chemical WFD Status*</b>
Afon Cothi - headwaters to confluence with Twrch	Crosses western part of Site	Good	Good	Good
Pysgotwr Fawr - headwaters to confluence with Doethie	Adjacent to northeast	Moderate	Moderate	High
Afon Doethie - Pysgotwr Fawr confluence to confluence with Afon Tywi	Adjacent to east	Moderate	Moderate	High
Gwenffrwd - headwaters to confluence with Afon Tywi	1.1 km south, hydrological connection via Afon Gwenffrwd	Good	Good	High
Afon Tywi - conf with Doethie to conf with Llandovery Bran	2.5 km southeast, downstream extent of stretches as identified above	Good	Good	High
As assessed by the NRW under Cycle 3 (2021) of the WFD classification scheme				

- 10.2.3 Whilst the Cwm Doethie-Mynydd Mallaen SAC, and SSSI with the same name, lies adjacent to and partly within the Site, the SAC is designated for its oak woodland and heathland habitats and not specifically for its aquatic environment. However, there could be a potential for significant changes to the local hydrology to impact on the habitat.
- 10.2.4 A significant proportion of the Site is dominated by commercial forestry plantation, which is likely to have altered the hydrology through drainage.
- 10.2.5 The Site also has downstream connectivity with the Afon Tywi SAC and SSSI which is designated due to a large spawning population of twaite shad *Alosa fallax* and presence of otter. However, the designated sections of watercourse are more than 10 km downstream of the Site (see Chapter 6 for further context).
- 10.2.6 The majority of the Site is shown to be located within a low-risk flood zone with regard to rivers or small watercourses. Tidal flooding is not a factor at this location. There are small areas of land adjacent to the watercourses within the Site where a potential flood risk is predicted. However, these appear to be narrow in their extent.
- 10.2.7 There are approximately 25 properties within 2 km of the Site for which further research will be undertaken to identify if they are served by private drinking water abstractions or public water supplies.
- 10.2.8 The Site is underlain by a low productivity (Secondary) aquifer, and not located within a groundwater Safeguard Zone or Source Protection Zone.

- 10.2.9 The British Geological Survey (BGS) Geoindex<sup>91</sup> indicates the Site is entirely underlain by Silurian age sedimentary bedrock comprising sandstone, siltstone and mudstone. Several existing borrow pits are present within the Bryn Arau Duon plantation. From an initial inspection of the rock undertaken during a geological site walkover, it is considered that Site won rock will be suitable for infrastructure construction with the exception of where Class 6 structural fill is required. This is due to the argillaceous nature of the sedimentary siltstone and mudstone rocks.
- 10.2.10 Superficial geology mapping indicates that superficial deposits at the Site predominantly comprise glacial till and hummocky glacial deposits, and pockets of peat. The latter is supported by the Unified Peatland of Wales map<sup>92</sup> which shows localised areas of peat are likely present within the Site, particularly within the Bryn Arau Duon plantation and to the west of Nant-yr-Ast, around the base of Crug Siarls. Superficial deposits are absent across many of the steeper slopes on-site, where bedrock is anticipated to be near the surface.
- 10.2.11 An initial review of historical Ordnance Survey mapping indicates that the Site has been predominantly undeveloped, in agricultural use (grazing) or commercial plantation. No likely significant sources of contamination associated with these land uses have been identified following review of Ordnance Survey mapping. A number of residential properties, farmsteads and agricultural buildings are shown. Made Ground is not shown to be present on BGS mapping.
- 10.2.12 The initial map review identified that there are a number of disused shafts and mine entries present in the area, although none are noted to be present within the Site itself. The closest entries are located approximately 1 km to the northeast and south of the Site, at Bryn-Ambor and Creigiau Merched respectively, both associated with the extraction of lead ore.
- 10.2.13 On this basis, it is considered that there are no likely potential significant sources of contaminated land across the Site and has been scoped out of the assessment.
- 10.2.14 A phase 1 peat survey was undertaken in July/August 2023. A total of 969 peat probe depth measurements were undertaken at 100 m intervals across the Site to confirm the presence and depth of peat. The results of the survey are shown on **Figure 10.1** with the findings summarised below:
- maximum peat depth of 3.4 m was recorded within the forestry plantation in the eastern part of the Site, near Bryn Arau Duon;
  - based on the results of the survey approximately 700 probe locations (73%) across the Site were shown to be absent of peat;
  - 104 probe locations (10%) recorded organic soils between 0.1 to 0.3 m depth;
  - 48 Probe locations (5%) recorded peat deposits between 0.3 and 0.5 m depth;
  - 89 probe locations (9%) recorded peat deposits between 0.5 to 1.0 m;
  - 23 probe locations (2.5%) recorded peat deposits between 1.0 to 2.0 m; and
  - 5 probe locations (0.5%) recorded peat deposits where the depth was greater than 2 m.
- 10.2.15 Deep peat deposits (>0.3 m) were predominantly recorded within localised areas of the commercial plantation near Bryn Arau Duon plantation, and in more widespread extents in the area northwest of Crug Siarls and to the west of Bryn Crach.

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<sup>91</sup> BGS Geoindex (2023) [online]. Available: [https://geologyviewer.bgs.ac.uk/?\\_ga=2.212958103.2073147265.1663841675-1559331147.1663841675](https://geologyviewer.bgs.ac.uk/?_ga=2.212958103.2073147265.1663841675-1559331147.1663841675) [date accessed: 05/12/2023]

<sup>92</sup> DataMapWales (2022) Peatland of Wales Maps [online] Available: <https://datamap.gov.wales/maps/peatlands-of-wales-maps/> [date accessed: 05/12/2023]

- 10.2.16 One area to the south and west of Crug Siaris was not probed due to access constraints during the survey. However, desk top information indicates that peat is present in this area<sup>92</sup>. Several watercourses are also present in the area. This will be addressed through further survey and constraints analysis as part of the turbine layout development process.
- 10.2.17 As indicated in **Section 2.5**, at the time of writing the proposed turbine layout has not been amended to respond to the results of the peat survey, hence there are a small number of turbine locations corresponding with deeper areas of peat. This will be addressed in future design iterations of the turbine layout developed during the EIA.
- 10.2.18 Mapping for predictive Agricultural Land Classification (ALC) provided by DataMapWales<sup>93</sup> show land within the Site boundary to comprise predominantly Grade 5 (very poor quality) and 'non-agricultural' land, with small areas of Grade 4 (poor quality) land, the latter primarily associated with the valley bottoms. There is no Best and Most Versatile Land (ALC classifications 1 to 3a) located on or near the Site.

### 10.3 Design Considerations

- 10.3.1 The design of the Proposed Development will seek to avoid any significant effects on receptors, by ensuring:
- a 50 m buffer applied around all watercourses, within which infrastructure would be avoided where possible, to minimise the risk of potential impacts due to changes in runoff, sedimentation, or water quality;
  - infrastructure would seek to avoid fluvial flood risk zone as defined by NRW;
  - watercourse crossings would be designed to accommodate a climate change adjusted 1 in 100 annual probability peak flow rate;
  - areas of known or suspected slope instability would be avoided;
  - areas of deep peat will be avoided where possible. Where avoidance is not possible, the design would seek to minimise impacts by adopting alternative construction techniques (such as floating roads or piling beneath solar PV arrays); carefully planning site drainage; and following good practice for handling, storing and reinstating peat materials;
  - areas with an influence on GWDEs will be avoided where possible; and
  - Soils will be managed in accordance with UK best practice and subject to a Soil Resource Plan (SRP) during construction. This will sit alongside and compliment the Materials Management Plan (MMP).
  - sustainable drainage measures will be incorporated to ensure discharge rates and water quality are controlled in an appropriate manner.

### 10.4 Assessment Scope and Methodology

#### *Legislation and Guidance*

- 10.4.1 Key legislation of relevance to the assessment is considered to include:
- Future Wales: The National Plan 2040 (Welsh Government), February 2021;
  - The Control of Pollution Act 1974;
  - Environmental Protection Act 1990;
  - Environment Act 1995;

<sup>93</sup> DataMapWales (2019) Predictive Agricultural Land Classification (ALC) Map 2 [online] Available: [https://datamap.gov.wales/layers/inspire-wg:wg\\_predictive\\_alc2?\\_ga=2.117562953.1357798552.1702457958-932361752.1698247914](https://datamap.gov.wales/layers/inspire-wg:wg_predictive_alc2?_ga=2.117562953.1357798552.1702457958-932361752.1698247914) [date accessed: 13/12/2023]

- Countryside Council for Wales (CCW, now NRW) Guidance Note Assessing the impact of windfarm developments on peatlands in Wales;
- Planning Policy Wales TAN 15: Development and Flood Risk, 2004 (due to be replaced); and
- Welsh Government Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems.

10.4.2 The following guidance would be followed for survey and assessment work:

- Countryside Council for Wales (CCW) Guidance Note: Assessing the impact of windfarm developments on peatlands in Wales (2010);
- Developments on Peatland: Guidance on the assessment of peat volumes, reuse of excavated peat and the minimisation of waste (Scottish Renewables and SEPA, 2012);
- Natural Resources Wales (NRW) Field Assessment Tool for Deep Peat (2017);
- Scottish Government, Scottish Natural Heritage (SNH), SEPA and Guidance on Developments on Peatland (2017);
- Peat Landslide Hazard and Risk Assessments, Best Practice Guide for Proposed Electricity Generation Developments (2<sup>nd</sup> Edition) (Scottish Government, 2017);
- Good practice during windfarm construction (4<sup>th</sup> Edition) (Scottish Renewables, SNH, SEPA & Forestry Commission Scotland, 2019);
- Good practice guidance on peat excavation and reuse (Scottish Renewables and SEPA, 2012);
- Land Use Planning System SEPA Guidance Note 31 Version 3 Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (2017);
- Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems (Welsh Government 2018);
- Ceredigion County Council Sustainable Drainage Systems (SuDS) Local Guidance (2018); and
- The Welsh Government is yet to publish a soil policy statement, but provides a range of evidence based sources via its online guidance on soil management<sup>94</sup>.

#### *Scope of the Assessment*

10.4.3 Potential impacts that will be scoped in to the assessment are:

- water quality (including both surface water and groundwater bodies) and assessment of the impacts from pollution;
- flood risk, both risk to the Proposed Development and the potential for direct and indirect impacts of the Proposed Development on off-site flood risk;
- water resources, impacts on flow regimes and the geomorphological characteristics of watercourses as a result of proposed watercourse crossings;
- any alterations to regimes of water supplying PWS, either in the locale of the Proposed Development or with potential hydrological connection to the Site;
- the potential for impacts of the Proposed Development on hydrology or hydrogeology to lead to secondary effects on GWDTE;
- impacts on minerals and mineral safeguarding;

<sup>94</sup> Welsh Government (2022) Guidance: Soil Management [online] Available: <https://www.gov.wales/soil-management> [date accessed: 15/12/2023]

- direct effects during construction on soils and peat, including but not limited to soil erosion, excavation losses and compaction of soil; and
- destabilisation of the peat, resulting in an increased risk of peat slide.

10.4.4 Disturbance of carbon-rich soils and peat can also lead to carbon losses. A carbon balance assessment will be included as a Technical Appendix to the ES.

10.4.5 Impacts or particular receptors that will be scoped out of the assessment:

- detailed assessment of potential flow rates at proposed watercourse crossing locations would be carried out by a contractor at the detailed design stage such that all of the watercourse crossings identified for the Proposed Development would be designed in compliance with NRW requirements. The design of watercourse crossings would also take account of the future 'with climate change' baseline and (to avoid altering the flow regime) would be sized for a 1:100 year plus climate change flood event. Therefore, detailed flow rate calculations will not be provided within the ES;
- direct effects on geological resources and their integrity;
- impacts on agricultural land or the 'Best and Most Versatile Land', given the very low ALC grades likely to be present on Site; and
- contamination.

#### *Study Area*

10.4.6 An initial 2 km buffer around the Site would be considered as the study area. However, as effects on water quality and flood risk are often considered at catchment level, the study area for such topics would extend to watercourses with downstream connectivity with the Site.

10.4.7 Flood risk will be considered within the Site and to third parties outside of the Site as far as any flood modelling suggests any impacts may occur. It is assumed that information provided by NRW models and online mapping is sufficient for this assessment.

10.4.8 Impacts on peat will be considered within the Site and on adjacent peatlands where these are hydrologically connected to peat deposits within the Site. The extent of peat will be determined using the results of the Phase 1 probing survey and supplemented where required with detailed Phase 2 probing.

#### *Baseline Characterisation*

10.4.9 A desk study would be undertaken to gather baseline information which will be used to identify Site constraints, hazards and sensitive receptors. This information will be used to inform the design input and the Site layout. The desk study will:

- describe surface water hydrology including watercourses, springs and ponds, and potential GWDTE locations based on review of ecology NVC data;
- identify existing catchment pressures;
- identify private drinking water abstractions and public water supplies within the study area;
- identify flood risks;
- describe the hydromorphological conditions and of watercourses and the status of waterbodies with respect to the WFD;
- collect soil, geological and hydrogeological information; and
- confirm surface water catchment areas and watersheds based on a Digital Terrain Model (DTM) obtained for the study area.

10.4.10 The following data sources will be used:

- DEFRA Magic Maps;

- DataMap Wales (Welsh Government);
- Ordnance Survey (OS) Mapping (Ordnance Survey 2022);
- BGS Geology of Britain Viewer: 1:50,000 Geological Mapping (British Geological Society 2022a);
- NRW Flood Risk Map Viewer (NRW 2022); and
- Water quality information at and near the Site set out in NRW river basin management plans and NRW water watch Wales map gallery.

10.4.11 Mapping of constraints would include the following:

- surface water features and buffers (50 m);
- potential GWDTE locations and buffers (100 m and 250 m);
- potential Private Water Supply (PWS) locations and buffers (250 m);
- potential watercourse crossings;
- catchment maps;
- hydrogeology maps; and
- peat depths.

10.4.12 A Site walkover will be conducted to confirm the location of surface water features or potential overland flow conveyance routes identified via desk study, and to provide for assessment of proposed watercourse crossing points to record stream attributes at the proposed crossing points (bank width, stream depth, substrate and bank conditions), and assessment of any existing watercourse crossings that may be utilised or upgraded. If any PWS locations are identified within 250 m, or in potential hydraulic connection to the Proposed Development, surveying shall include a photographic record of the location and site-specific target notes to the extent that access allows. Surveying shall include 'ground truthing' of any potential hydraulic connectivity to the Proposed Development.

10.4.13 As described above, a Phase 1 peat survey has been undertaken. A Phase 2 peat survey will be carried out once a refined infrastructural layout of the Proposed Development has been confirmed and will encompass iterations made as part design development.

10.4.14 Phase 2 peat surveys will be carried out in accordance with Guidance on Developments on Peatland (Scottish Government, SNH, SEPA, 2017) and other relevant guidance, as outlined above in **Section 10.4.1** which states that surveys are to be carried out along proposed new access tracks, turbine bases, crane pads and blade storage locations, compounds; and borrow pit locations. The aim of the survey will be to identify areas of deep peat around proposed infrastructure locations with the aim of refining the Proposed Development layout to avoid disturbance of deep peat. The survey will inform the design, micro-siting and the requirement for any further mitigation or compensatory measures. Typically, the Phase 2 survey will comprise:

- proposed new tracks: will be surveyed over sections of 20 m, at 5 m and 15 m offset from the track centreline. Point density will be increased where peat depth consistently exceeds 1 m, by including additional points between sections, and at an offset further from the track, but parallel to the track centreline; and
- turbine bases, crane pads, BESS, solar and other infrastructure: 20 m grid, increasing to a 10 m grid in areas where peat depth consistently exceeds 1 m.

- 10.4.15 During the Phase 2 survey, peat cores taken in representative areas of the Site will be logged using the von Post classification<sup>95</sup>, with samples of known volume taken for laboratory analysis (bulk density; moisture, organic content, carbon content, and pH).

#### *Consultation*

- 10.4.16 Consultations would be undertaken with NRW and relevant department of the Welsh Government to confirm whether hydraulic modelling of flood risks has been undertaken at the Site. Consultation will also be undertaken with NRW and Welsh Government Soil Policy and Agricultural Land Use Planning Unit regarding peat and carbon rich soils. Consultations would also be carried out with the Local Drainage Officer to obtain private water supply records.

#### *Method of Assessment*

- 10.4.17 The impact assessment chapter would include an assessment of the infrastructure locations with reference to the hydrological and geological constraints, and thus the assessment of the impacts upon the baseline environment through short-term construction impacts and long-term permanent impacts.
- 10.4.18 The significance of potential effects will be categorised using professional judgement against a matrix, considering three key factors: the sensitivity of the receiving environment, the likelihood of that effect occurring (or probability) and potential magnitude of any effect that does occur.
- 10.4.19 The sensitivity of receptors will be based on factors that include designated status, water quality, aquatic ecology, fluvial geomorphology, and groundwater vulnerability, with sensitivity ranging from low-medium-high. Magnitude will be evaluated based on the change that occurs to the baseline condition, considering temporal issues and ranging from negligible-minor-moderate-major. The probability of an effect occurring will be evaluated as ranging from low-medium-high.
- 10.4.20 The assessment will draw largely from a number of supporting technical assessments and report, which are summarised below.

#### *Flood Consequences Assessment*

- 10.4.21 A Flood Consequence Assessment (FCA) will be undertaken to consider potential risks to the Proposed Development arising from all sources of flooding and will include:
- obtaining commercial flood risk data for the Site which will include information on the risks associated with surface water run-off and groundwater flood risk;
  - obtaining NRW data for the Site and reviewing in the context of the Site topography and the Proposed Development;
  - considering the effects of Climate Change in accordance with current best practice; and,
  - undertaking a review of the local Strategic Flood Risk Assessment (SFRA) to ascertain any local flooding issues, including evidence of flooding from sewers.
- 10.4.22 It is not anticipated that any hydraulic modelling would be undertaken as part of the FCA as the Site is not located within a medium or high risk flood zone.

#### *Outline Sustainable Drainage Strategy*

- 10.4.23 An Outline Sustainable Drainage Strategy will also be prepared for the Proposed Development and include recommended sustainable drainage systems (SuDS) features and discharge options. The Strategy will take into account the design storm period and intensity; methods to

<sup>95</sup> Von Post Humification Scale. Based on Von Post, L. (1922). Sveriges geologiska undersöknings torvinventering och några av dess hittills vunna resultat. Sven. Mosskulturfören. Tidskr 1, 1–27.

delay and control the surface water discharged from the Site; and measures to prevent pollution of the receiving groundwater and/ or surface waters.

#### Private Water Supply Assessment

- 10.4.24 A screening assessment will be undertaken to identify any supplies at potential risk from the Proposed Development utilising information available from the local authorities, considering intervening distance and topography with the Site.

#### GWDTE Assessment

- 10.4.25 Relevant NVC communities within 100 m and 250 m buffer zones around the proposed infrastructure locations will be identified and assessed considering the change in groundwater contribution areas pre and post-development.

#### Peat Landslide Risk Assessment (PLHRA)

- 10.4.26 Peat is a naturally unstable material and is liable to instability without anthropological interference. A PLHRA will be undertaken (if required, subject to the design layout) in accordance with current guidance<sup>96</sup> and included as a Technical Appendix to the ES. The assessment would comment on the potential risk from natural stability where this could be affected by the Proposed Development.

- 10.4.27 The proposed assessment methodology will follow current best practice guidance<sup>96</sup> and shall incorporate the following stages:

- desk study and site reconnaissance including aerial photography;
- survey of peat depth and character, including identification of areas of potential or past instability, flow pathways for potential slide events and down gradient environmental receptors;
- preliminary stability analysis and hazard ranking; and
- full peat Stability Report to include:
  - results of detailed assessment (including estimating impact of potential peat slides);
  - identification of hazards and plan(s) to advise/refine infrastructure layout design;
  - identification of mitigation measures; and
  - recommendations for further work to be undertaken at the detailed design stage (post-consent).

#### Outline Peat Management Plan (OPMP)

- 10.4.28 If disturbance of peat at the Site is unavoidable, an OPMP will be produced to provide an estimation of the excavated peat volume, based on site-specific data relating to infrastructure dimensions, measured peat depths and threshold values for floating tracks. The plan will utilise peat depth data gathered to identify quantities of soil and/or peat that will require excavation in line with current guidance.

- 10.4.29 The management plan will outline measures necessary to minimise peat and habitat disturbance and provide a clear description of mitigation measures to minimise potential adverse impacts on peat and peatland functioning, and ensure best practice and effective excavating, moving and re-using / reinstating of peat. This may include integration of peat reuse measures with habitat management proposals to improve site conditions where there is benefit in so doing. The OPMP will be developed using the peat mitigation hierarchy.

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<sup>96</sup> Scottish Government (2017) Peat Landslide Hazard and Risk Assessments, Best Practice Guide for Proposed Electricity Generation Developments

### *Soils*

10.4.30 The Welsh Government guidance on soil management states that soil provides ecosystem services including:

- food and fibre production;
- water regulation;
- contributions to climate regulation; and
- enhancing biodiversity.

10.4.31 Current threats to soil resources in Wales include climate change, current management/farming and future land use change.

10.4.32 As part of the EIA, soil types at the Site will be defined through desk study information, which will be used to determine how vulnerable to impacts the soil resource is. This will in turn be used to shape prescribed management practices for construction. Environmental effects for soil resources will be presented primarily as a factor of the receptor to which soil contributes, which for this Site are likely to be hydrology, ecology/biodiversity, agriculture and climate/carbon. Potential impacts to heritage and landscape and visual amenity will also be considered. Information on soils will therefore be utilised in other respective topics as required. Based on the routine implementation of a SRP during construction and on the well-established practices for the management of soils at wind farm developments, significant effects for soil/soil resources are not anticipated as a result of the Proposed Development. Nevertheless, the Geology, Hydrogeology, Hydrology and Peat Chapter will provide sufficient information on soils to inform other subtopics within the chapter and within other chapters as necessary.

### *Borrow Pits*

10.4.33 The potential impacts that may arise as a result of the use of borrow pits on Site and their subsequent restoration post-construction will be presented in the introductory chapters of the ES, and assessed within each relevant technical chapter, which may include Ecology, Landscape and Visual Amenity, Cultural Heritage, and Geology, Hydrogeology, Hydrology and Peat.

### *Cumulative Effects*

10.4.34 The potential for cumulative effects to occur will be assessed based on:

- the potential hydrological connection of identified cumulative schemes with the Proposed Development;
- the potential for concurrent phases of construction with identified cumulative schemes with the potential for hydrological connection to the Proposed Development; and
- applicable planning conditions with regard to the potential impact of identified cumulative schemes on the water environment.

## 10.5 Summary Questions

1. Are there any known locally specific flood risk issues downstream of the Site that the Proposed Development has a potential to impact on, either adversely or beneficially?
2. Does the Local Authority hold records of any Private Water Supplies within 2 km of the Site?
3. Is the methodology and proposed survey work considered to be appropriate?
4. Does NRW have any specific guidance on the assessment of peat and peat management in relation to wind farm and/or solar PV arrays?
5. If not, can NRW advise if and/or when peat guidance in relation to wind farm and solar farm developments will be available?
6. In the absence of any guidance on wind farm development being published within the timescales of the assessment, can NRW confirm that the guidance listed in this Chapter will be appropriate?
7. In the absence of any guidance on solar PV arrays on peatlands, can NRW provide their view and preferred approach to development?
8. Currently, we intend to assess significant effects on peatlands as follows: peatland habitats in the Ecology Chapter, peat hydrology and peat (carbon) excavation and reuse in the Hydrology, Hydrogeology, Geology and Peat Chapter. Would NRW confirm that this is an acceptable subdivision of the peatland topic across the ES?

## 11. AVIATION

### 11.1 Introduction

11.1.1 This Chapter has been prepared by Aviatica. Wind turbines have the potential to affect the performance of radars used for air traffic control, air defence and meteorological forecasting and of aeronautical radio navigation aids. They can also present an obstacle hazard to aircraft flying at low altitude. They may affect the specified minimum altitudes for aircraft using instrument flight procedures (IFPs) at airports.

### 11.2 Existing Baseline

11.2.1 The Proposed Development is located within uncontrolled (Class G) airspace extending from ground level up to Flight Level (FL) 195 (approximately 19,500 feet above mean sea level (amsl)). Above that level is the Class C controlled airspace of the London Flight Information Region (FIR) and Upper Information Region (UIR). There are no designated Air Traffic Service Routes (commonly known as 'airways') crossing the airspace over the Site since the airspace is in regular use by military aircraft using one or both of two designated portions of airspace:

- The Valley Aerial Tactics Area (ATA), which extends from 6,000 feet amsl to FL660 over the Site. It is used for air combat training by Texan and Hawk aircraft from RAF Valley; and
- The North Wales Military Training Area (NWMTA) South, which extends from FL195 to FL660 over the Site. It is used for air combat training by a variety of RAF and USAF fast jet aircraft.

11.2.2 In addition, the Site is located under a designated Danger Area, D202C, which is periodically activated for use by unmanned aerial systems ('drones') operating from West Wales Airport. This airspace extends upwards from a base of FL100 to FL225.

11.2.3 The Site is located within military Low Flying Area 7(T), where Operational Low Flying training is permitted. For military night low flying, the Site is located within Allocated Region 5D North (AR5DN) which extends from St David's Head in the southwest to Trawsfynydd in the north.

11.2.4 Initial radar line of sight assessment has determined that the Site is beyond the coverage of all civil, military and Meteorological Office primary surveillance radars (PSRs). There are no aeronautical radio navigation aids, airfields or launching sites within 20 km of the Site.

### 11.3 Design Considerations

11.3.1 Consultation with relevant stakeholders, including NATS and the Ministry of Defence (MoD), will be undertaken as the design of the Proposed Development develops. Any relevant restrictions on the design of the Proposed Development and any required mitigation, such as aviation lighting, will be incorporated into the design of the Proposed Development and be referenced and assessed within the LVIA.

### 11.4 Assessment Scope and Methodology

11.4.1 Effects on military low flying will be assessed by reviewing the location of the Proposed Development relative to other horizontal and vertical constraints on the flight paths of low flying aircraft in the vicinity, including terrain, steep valleys, vertical obstructions, choke points and one-way flows in the military low flying system and airspace constraints.

11.4.2 Since the Proposed Development consists of wind turbines with blade tip heights of 150 m or more above ground level (agl), it will be subject to the mandatory aviation obstruction lighting requirements of Article 222 of the Air Navigation Order 2016 (ANO). The aviation assessment will include an aeronautical study of the types and volumes of night low level air traffic in the vicinity of the Site as a basis for a proposal to be submitted to the CAA for the Proposed

Development to be lit, other than in accordance with Article 222 of the ANO. An assessment will also be conducted of the feasibility of equipping the Proposed Development with an aircraft detection lighting system (ADLS) which switches on any visible lighting only when an aircraft is detected in the vicinity.

#### *Legislation and Guidance*

11.4.3 The aviation assessment will be carried out in accordance with the following legislation and guidance:

- The ANO;
- CAA Policy and Guidelines on Wind Turbines (CAP 764);
- CAA, Air Traffic Services Safety Requirements (CAP 670);
- CAA, Safeguarding of Aerodromes (CAP 738); and
- CAA Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level (June 2017).

#### *Scope of the Assessment*

11.4.4 Given the existing Site context in relation to aviation receptors, potentially significant effects on military low flying will be scoped in to the assessment. Effects on all other aviation receptors will be scoped out of the assessment.

#### *Study Area*

11.4.5 The study area for aviation has been based on the criteria set out in CAA guidance CAP 764, adapted to ensure that all possible effects on aeronautical, defence and meteorological radars are captured. The radii used for aviation assets are as follows:

- 300 km radius for en route air traffic control (ATC) and air defence PSRs;
- 120 km radius for airport ATC PSRs;
- 60 km radius for instrument flight procedures at licensed or certificated aerodromes;
- 30 km radius for licensed and certificated aerodromes and Meteorological Office radars;
- 20 km radius for aeronautical radio navigation aids and secondary surveillance radars; and
- 15 km radius for unlicensed aerodromes and launching sites and specialist military low flying areas.

#### *Baseline Characterisation*

11.4.6 Aviation baseline data has been derived from the UK Aeronautical Information Publication (AIP); the UK Military AIP; CAA and MoD aeronautical charts; and published NATS and MoD radar coverage data.

#### *Consultation*

11.4.7 Consultations will be undertaken with the MoD and NATS.

#### *Method of Assessment*

**11.4.8** The significance of effects on aviation will be determined in accordance with the criteria set out in **Table 11.1**.

<b>Table 11.1: Aviation Significance Criteria</b>	
<b>Significance of Effect</b>	<b>Description</b>
<b>Major</b>	Regular, frequent or permanent effects which require changes to existing operational and/ or technical practice in order to mitigate adequately, or which are not capable of being mitigated adequately; <b>and/or</b> the owner of the affected aviation asset requires mitigation; <b>and/or</b> mitigation is required by law.
<b>Moderate</b>	Periodic effects experienced which may require alterations to existing operational practice; <b>and/or</b> the owner of the affected aviation asset requires mitigation; <b>and/or</b> mitigation is required by law.
<b>Minor</b>	Occasional effects experienced which do not require any alteration of existing operational and technical practice.
<b>Negligible</b>	Normally no measurable change from baseline conditions; occasional, fleeting or very short-term effects experienced which do not require any alteration of existing operational and technical practice.
<b>None</b>	No measurable change from baseline conditions.

### *Cumulative Effects*

- 11.4.9 An assessment of cumulative effects on military low flying will be undertaken as part of the aviation assessments.

## **11.5 Summary Questions**

1. Do consultees consider that the scope and methods of the proposed aviation assessment is appropriate?

## 12. TELECOMMUNICATIONS

### 12.1 Introduction

12.1.1 This Chapter has been prepared by Aviatica. Wind turbines have the potential to affect the performance of fixed telecommunications links, if positioned close enough to those links. There is also some potential for wind turbines to affect terrestrial television reception, although this is rare since the advent of digital television signals (completed in Wales in 2011).

### 12.2 Existing Baseline

12.2.1 Consultations with telecommunications operators have determined that there are no scanning telemetry or television re-broadcasting links passing over or within 2 km of the Site. Ofcom data show one fixed microwave link, operated by Mobile Broadband Network Limited (MBNL), passing through the north-western part of the Site.

12.2.2 Planning consent for an extension to a telecommunications mast at Nant-y-Bai, 5 km southeast of the Site includes proposals for one or more microwave link passing through the Site.

### 12.3 Design Considerations

12.3.1 The Scoping layout has been designed to provide a minimum of 100 m separation between the maximum extent of any turbine blade tips and the centre of the MBNL microwave link. All further iterations of the layout will be designed to maintain those minimum clearances.

12.3.2 Appropriate minimum clearances will also be provided between the turbine blade tips and any links routing to/from the proposed Nant-y-Bai telecommunications mast.

### 12.4 Assessment Scope and Methodology

12.4.1 All fixed microwave and Ultra High Frequency (UHF) scanning telemetry telecommunications links within 2 km of the Site boundary will be identified using Ofcom data and consultations with telecommunications operators.

12.4.2 For any links identified within the study area, their proximity to the Proposed Development will be mapped and quantified.

12.4.3 The potential for the Proposed Development to adversely affect the performance of any such link(s) will be assessed by calculating, using the Ofcom-recommended 'Bacon Formula', whether any proposed turbines are within zones where adverse effects may be experienced.

12.4.4 The potential for effects on terrestrial television reception will be assessed by identifying the main and local television transmitters serving the area surrounding the Proposed Development; applying BBC criteria to establish the area in which the potential for adverse effects on reception may occur; and map study of the prevalence of domestic properties within those zones.

### 12.5 Summary Questions

1. Do consultees consider that the scope and methods of the proposed telecommunications assessment is appropriate?

## 13. SHADOW FLICKER

### 13.1 Introduction

- 13.1.1 Under certain combinations of geographical position, times of day and year, the sun may pass behind the turbine rotor and cast a shadow over the windows of neighbouring buildings. When the blades rotate and the shadow passes a window, to a person within that room, the shadow appears to flick on and off; this effect is known as 'shadow flicker'. This effect occurs only within buildings where the flicker appears through a window aperture and in the UK typically occurs only in buildings within 130 degrees either side of north relative to a turbine.
- 13.1.2 The magnitude of the shadow flicker varies both spatially and temporally and depends on a number of environmental conditions coinciding at any particular point in time, including, the position and height of the sun, wind speed and direction, cloudiness, and position of the turbine relative to a sensitive receptor and the size and orientation of windows/apertures at the residential property.
- 13.1.3 The further the observer is from the turbine the less pronounced the effect will be due to:
- There are fewer times when the sun is low enough to cast a long shadow;
  - When the sun is low it is more likely to be obscured by either cloud on the horizon or intervening buildings, vegetation and topography; and
  - The centre of the rotor's shadow passes more quickly over the land reducing the duration of the effect.
- 13.1.4 Shadow flicker can potentially result in nuisance, although guidance suggests the potential for significant health effects from shadow flicker is very low.

### 13.1 Existing Baseline

- 13.1.1 The Site is situated within an upland area with complex topography that will influence the zones in which shadow flicker might be expected to occur.
- 13.1.2 A desk-based search suggests there are a number of residential properties located within the search area recommended in guidance for identifying significant shadow flicker effects (see **Section 13.3**).
- 13.1.3 The Site is located within the southern half of the United Kingdom, and is therefore well within the latitudes to which current UK guidance on shadow flicker effects is considered to be applicable.

### 13.2 Design Considerations

- 13.2.1 The potential for shadow flicker effects will be minimised by maximising the distance between proposed turbine locations and residential properties as much as possible.
- 13.2.2 Modern turbine blades are much larger and rotate at slower speeds than turbines a decade or more ago when current guidance was developed. Slower turbine rotation speeds are associated with lower probability of nuisance from shadow flicker effects. The probability of shadow flicker resulting in significant effects is therefore considered to be inherently lower for the Proposed Development in comparison to older more established wind farms.

### 13.3 Assessment Scope and Methodology

- 13.3.1 Planning guidance in the UK requires developers to investigate the impact of shadow flicker, but does not specify methodologies.

- 13.3.2 Current guidance for the assessment of shadow flicker effects in the UK stems from the now withdrawn Companion Guide to Planning Policy Statement (PPS) 22<sup>97</sup>, which states “*although problems caused by shadow flicker are rare, for sites where existing development may be subject to this problem, applicants for planning permission for wind turbine installations should provide an analysis to quantify the effect*”. It also states that “*Only properties within 130 degrees either side of north, relative to the turbines can be affected at these latitudes in the UK*” and that “*flicker effects have been proven to occur only within ten rotor diameters of a turbine*”.
- 13.3.3 In 2011, the Department of Energy and Climate Change (DECC) published a report updating the evidence base for shadow flicker effects in the UK<sup>98</sup>. The report concluded that use of the 130 degrees either side of north and 10-rotor diameter distance as a means of gauging the zone in which significant effects may likely occur at a residential property are appropriate.
- 13.3.4 The report also concluded that the use of computational modelling typically produces a ‘worst case’ assessment, and that a more realistic approximation can be produced if variables such as sunshine hours/cloud cover and wind speed are taken into account.
- 13.3.5 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<sup>99</sup>, Germany and Belgium, is 30 hours per year with a maximum of 30 minutes per day.
- 13.3.6 A review of shadow flicker policy was published in 2017 ClimateXChange<sup>100</sup>, with the aim of providing guidance to the Scottish Government on how to adapt policy and guidance for shadow flicker assessments. The 2017 ClimateXChange study is not referenced in any current national or local policy or guidance. This report makes a number of recommendations, including:
- Remove reference to 10 rotor diameters from guidance documents and planning policy, on the basis that insufficient evidence was available in the literature review undertaken to fully justify its application;
  - Remove reference to 130 degrees either side of north from policy/guidance.
- 13.3.7 The report does not directly challenge the validity of applying 10 rotor diameters as a means of determining the zone inside which significant effects may be likely to occur, or the conclusions of the 2011 DECC report. It also does not provide any new evidence or studies that show that significant effects for shadow flicker are likely to occur outside this distance. The report also acknowledges that any disapplication of the 130 degrees either side of north from guidance/policy would be “unlikely to be significant”. The report states that the focus should be on modelling and the application of appropriate significant thresholds. It is stated that these two rules should not be used as strict parameters outside which significant effects cannot occur.
- 13.3.8 Based on the longstanding application of these thresholds within ESs for UK onshore wind farm projects, the location of the Proposed Development within the southern portion of the latitudes in which this guidance is likely to maintain its validity, and the absence of any updated policy or

<sup>97</sup> Ove Arup and Partners et al. (on behalf of Office of the Deputy Prime Minister) (2004) Planning for Renewable Energy A Companion Guide to PPS22. Her Majesty’s Stationery Office.

<sup>98</sup> Parsons Brinkerhoff (On behalf of the Department of Energy and Climate Change) (2011). Update of UK Shadow Flicker Evidence Base [online] Available: <https://www.gov.uk/government/news/update-of-uk-shadow-flicker-evidence-base> [date accessed: 29/11/2023]

<sup>99</sup> Department of the Environment, Best Practice Guidance to Planning Policy Statement 18 ‘Renewable Energy’, 2009

<sup>100</sup> Land Use Consultants (2017) Review of Light and Shadow Effects from Wind Turbines in Scotland [online] Available: <https://www.climateexchange.org.uk/research/projects/review-of-light-and-shadow-effects-from-wind-turbines-in-scotland/> [date accessed: 29/11/2023]

guidance in light of the 2017 study, it is concluded that the recommendations of the 2011 DECC report is still valid. Professional judgement will be used to determine whether the Proposed Development could result in significant effects beyond these parameters.

- 13.3.9 Given the distribution of residential properties surrounding the Site and based on the current turbine layout, it is considered likely that residential properties will be located within the 10-rotor diameter study area and within the zone defined by 130 degrees either side of north. Whilst this would not directly translate to likely significant effects, as a precautionary approach, shadow flicker is scoped in for inclusion in the ES, and a shadow flicker assessment will be undertaken. In the event that in later design iterations it is confirmed that no residential properties remain within the nominal risk area for shadow flicker, shadow flicker will be scoped out and justification for this will be presented in the ES.
- 13.3.10 Proprietary software (either Resoft WindFarm or WindPro) will be used to identify the potential receptors susceptible to shadow flicker based on the turbine dimensions and orientations. Following this, a desk study will be undertaken to confirm the orientation of the buildings, the location of windows and the location of any features that may act to screen the buildings from shadow flicker. This will utilise, where necessary, information gathered through site surveys, for example, those undertaken for landscape and visual. If insufficient information is available through desk study, this will be supplemented through site visits, if required.
- 13.3.11 Following the desk study, shadow flicker modelling will be undertaken to provide details on the predicted frequency of occurrence of shadow flicker at each window location.
- 13.3.12 As noted above, there is no standard for the assessment of shadow flicker in Wales/wider UK and there are no guidelines with which to quantify what exposure levels would represent a significant versus not significant effect. In the absence of specific guidelines, the assessment will consider the guidance from Northern Ireland which recommends that "shadow flicker at neighbouring offices and dwellings within 500 m should not exceed 30 hours per year or 30 minutes per day". For the purposes of this assessment, all residential properties within 10 rotor diameters of the turbine locations would be considered against these criteria, with properties meeting/exceeding these criteria considered to be subject to significant effects.
- 13.3.13 If shadow flicker effects are predicted above these thresholds at any residential properties, operational mitigation measures will be considered. Such measures could include a software operated 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 a worst-case scenario of clear sunny skies.
- 13.3.14 The potential for cumulative effects at any one property, both from cumulative wind farm schemes within the wider area and between topics including Noise and Vibration and Landscape and Visual will be considered and presented in the ES.

## 13.4 Summary Questions

1. Do consultees consider that the scope and methods of the proposed shadow flicker assessment is appropriate?

## 14. TOPICS SCOPED OUT OF THE ASSESSMENT

### 14.1 Introduction

14.1.1 This Chapter sets out those potential impacts associated with the Proposed Development which are considered unlikely to give rise to any significant environmental effects, and are accordingly scoped out of the EIA. Stand-alone technical appendices will be prepared for topics that are scoped out but considered necessary to provide further environmental information to support other topics, and these are detailed further in the respective sections below.

### 14.2 Forestry

14.2.1 The Site for the Proposed Development includes a number of woodlands and forests as shown on the National Forest Inventory Woodland Wales (NFIWW)<sup>101</sup>. **Figure 6.2** habitat mapping shows two areas of predominantly coniferous forest and a number of smaller broadleaved woodlands within the Site.

14.2.2 The broadleaved woodlands, outside the coniferous plantations, are recorded in the Ancient Woodland Inventory (AWI) Wales<sup>102</sup> as approximately 44 ha of ancient semi natural woodlands and 2 ha of ancient woodland site of unknown category. The initial layout has avoided all the AWI woodland areas within the Site. There is a possibility that the proposed access routes may pass through an area of AWI woodland (via an existing road/track) however, other access options within the immediate vicinity of the Site are currently being considered. Consideration will be given to impacts on ancient woodland if relevant to the access route proposals.

14.2.3 The larger coniferous woodland, Cefn Gwenffrwd, is approximately 652 ha and is in the process of felling and replanting. This woodland includes 2.5 ha of broadleaved trees. The smaller coniferous woodland, Waun Bara-ceirch, is approximately 37 ha of both mature and young trees.

14.2.4 Consultation with stakeholders to date has revealed that a significant portion of the coniferous forest on Site is managed as continuous cover forestry, for the benefit of wildlife including red squirrels.

14.2.5 Forests are dynamic and constantly changing through landowner activities and natural events. The final location of the Solar PV array, BESS and compound will avoid areas of forestry on-site. The wind farm elements of the Proposed Development will, however, require clearing areas of coniferous plantation forest, both for turbine bases/crane pads and for access tracks. A 'keyhole' approach will likely be taken to forest clearance to facilitate the Proposed Development, whereby only the space needed to accommodate access and the turbine infrastructure and construction will be cleared. Existing tracks and cleared areas will be used where possible. Further details of the area of forest clearance will be developed as the EIA progresses.

14.2.6 Future forest management will be carried out through specific forest plans in accordance with UK Forestry Standards (UKFS)<sup>103</sup> and the Welsh Government's Strategy for Woodlands and

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<sup>101</sup> The National Forest Inventory (NFI) <https://www.forestresearch.gov.uk/tools-and-resources/national-forest-inventory/national-inventory-of-woodland-and-trees/national-inventory-of-woodland-and-trees-wales> (Accessed 31/06/2023)

<sup>102</sup> Natural Resources Wales Ancient Woodland Inventory. <https://naturalresources.wales/evidence-and-data/research-and-reports/ancient-woodland-inventory> (accessed 31/06/2023)

<sup>103</sup> Forestry Commission (2017, 4th Ed.) The UK Forestry Standard. Forestry Commission, Edinburgh. The UK Forestry Standard outlines the UK Governments' Approach to Sustainable Forestry, and is the key document in the production of national standards for forest certification, aligned with European and international protocols for sustainable development. It is also the guiding document for the Woodlands for Wales document and the Woodlands for Wales Action Plan.

Trees<sup>104</sup>. The integration of the Proposed Development into the Forest Plan will be a key part of the design process. A wind farm felling plan would be prepared setting out the forestry felling and management requirements, including any replanting associated with the construction and operation of the Proposed Development. Similarly, a wind farm replanting plan will be provided as part of the Forest Plan – this would, amongst other objectives, clearly identify the areas where peatland habitat restoration is the prime objective and therefore would not be replanted.

- 14.2.7 The UK Woodland Assurance Standard (UKWAS) 4.0 (2018)<sup>105</sup> is an independent certification standard for verifying sustainable woodland management in the UK that is used for both Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC) certification. Any forest operations required by the Proposed Development will adhere to the commitments made through the forest certification schemes.
- 14.2.8 Areas of temporary felling (for example, to accommodate temporary construction offsets) will be replanted in situ, unless targeted for peatland habitat restoration.
- 14.2.9 Potential impacts on forestry assets will be minimised where practicable during the design of the Proposed Development and opportunities for compensatory planting and/or habitat improvements will be explored. Where replanting takes place on-site, compensatory planting is not required. Compensatory planting is not required where woodland is permanently removed for biodiversity improvement on-site such as peatland habitat restoration. All measures relevant to compensatory planting and habitats will be addressed in the Ecology Chapter of the ES.
- 14.2.10 With regard to ancient woodland along the proposed access route, impacts will be avoided where possible in line with the mitigation hierarchy. Should any localised felling be required to accommodate, for example, localised widening for abnormal loads, every endeavour will be made to minimise and compensate for the loss. Potential impacts to ancient woodland will be assessed as an integral component of the Ecology Chapter of the ES. Therefore, repetition under a forestry Chapter would be unnecessary.
- 14.2.11 On the basis of the above, it is not considered likely that the Proposed Development will result in significant effects to forestry, although it is recognised that forestry management plays a significant role in other topics, including but not necessarily limited to hydrology/peat management, climate change, landscape and visual, and ecology/ornithology. It is therefore proposed that a Forest Assessment is produced and included as a Technical Appendix to the ES, which will then be cross referenced within the ES where required.
- 14.2.12 The Forestry Assessment will include the calculation of areas of temporary and permanent woodland loss, address changes to woodland management – for example woodland composition and felling programmes – and measures for compensatory planting. It will utilise criteria established by the UKFS to assess forestry impacts.
- 14.2.13 The assessment will take into consideration felling for the Proposed Development, which will be calculated in terms of temporary felling which can be replanted on-site, and permanent felling which will remain unplanted due to infrastructure and environmental stand-off requirements.
- 14.2.14 The AWI Wales has been considered for the small areas of ancient woodlands within the Site and immediately adjacent to the Site. Similarly, NFIWW data will be reviewed to ensure all woodland areas are included. However, the primary forest data will be provided by the forest owners or agents in the form of compartment schedules showing as a minimum the planting

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<sup>104</sup> Welsh Government (2018) Woodlands for Wales: Welsh Government's Strategy for Woodland and Trees [online] Available: <https://www.gov.wales/woodlands-wales-strategy> [date accessed: 29/11/2023]

<sup>105</sup> UK Woodland Assurance Standard (UKWAS) <https://ukwas.org.uk/> (Accessed 31/06/2023)

year and species present. Field survey will confirm the desk-based data provided and will also consider the tree stand stability and potential wind firm boundaries within the forest which will aid forest design incorporating the Proposed Development.

- 14.2.15 Further consultation with landowners, forestry managers and other stakeholders (such as the Wildlife Trust) known to operate within the coniferous forest areas on the Site will be consulted throughout the EIA process and their feedback utilised to shape design and future forest plans for the Site.
- 14.2.16 Secondary effects resulting from forestry activities including effects on habitats and species, ornithology, hydrology and landscape and visual effects would be considered within their respective chapters of the ES and will not be covered by the Forestry Assessment.
- 14.2.17 In summary, forestry is scoped out and will be considered as a standalone Forestry Assessment, to be appended to the ES.

### **14.3 Socio Economics**

- 14.3.1 The Proposed Development would generate temporary employment opportunities during the construction phase, with associated indirect and induced economic effects through additional spending on local services and resulting beneficial impacts on the local economy. Job creation during the operational phase would be relatively small.
- 14.3.2 The economic effects of the Proposed Development are expected to be beneficial but are unlikely to be significant in the long-term. This is supported by the numerous assessments of socio-economic effects undertaken as part of the EIA process for other wind farm developments in Wales and elsewhere in the UK, which consistently conclude that any effects are not significant in EIA terms. There would be no significant effect to existing economic use of the Site (such as farming and forestry) as a result of the Proposed Development. In light of this, and in the interest of keeping the scope of the EIA proportionate, it is proposed to scope out an assessment of socio-economic effects from the ES.
- 14.3.3 Instead, a standalone economic benefits statement will be submitted as part of the DNS application. Baseline economic and labour data will be collated through various sources. The most relevant, recent and up to date, publicly available data will be used wherever possible. The data will be used to provide an overview of the baseline conditions within the study area and wider catchment. Data sources include, but are not limited to:
- Census 2021;
  - Annual Population Survey;
  - Nomis;
  - Business Register and Employment Survey;
  - Stats Wales; and
  - Any relevant local authority reporting and statistics.
- 14.3.4 The report will set out the following:
- Impacts on the regional and/or national economy due to expenditure during the construction phase;
  - Impacts on the regional and/or national economy due to expenditure associated with the on-going operation and maintenance of the Proposed Development;
  - Impacts on the local economy as a result of any additional public expenditure that could be supported by the additional tax revenue that would be generated by the Proposed Development during the operational phase; and

- Impacts on the local economy that could be supported by any community funding that might be provided by the applicant during the operational.

- 14.3.5 In respect of tourism and recreation, a wealth of literature exists that looks at the impacts of wind farms specifically on tourism. This include research carried out by the Welsh Government itself, which found there is little evidence that wind farms have an adverse effect on tourism across Wales and the UK as a whole. Some literature is in fact suggestive of the potential for a positive relationship to exist between tourism and wind farm development. In any case, any effects that may occur are not expected to be significant in the context of the EIA Regulations.
- 14.3.6 The solar PV array element of the Proposed Development is also not expected to have any impact on tourism and recreation.
- 14.3.7 At the Site level, no significant effects are anticipated for access to PROWs, byways, common land or designated sites. The Site is predominately private land with limited public access and PROWs would be retained.
- 14.3.8 Wider potential impacts for tourism to Brecon Beacons National Park and other landscape scale receptors, as well as cultural heritage receptors and PRoW will be assessed as part of the Landscape and Visual Cultural Heritage and Transport Chapters in the ES.

## 14.4 Climate

### *Carbon Emissions*

- 14.4.1 The Proposed Development will contribute positively to helping Wales meet its targets for carbon reduction through the production of low carbon renewable energy and a corresponding net reduction in carbon emissions in comparison to more carbon intensive generation sources. There will be an increase in carbon emissions during the construction phase, which will then be offset during the operational phase.
- 14.4.2 A transparent account of carbon emissions for the Proposed Development throughout its lifecycle will be provided in the form of a Carbon Emissions Report, which will be prepared and submitted as a Technical Appendix to the ES. The report will include a calculation of the expected carbon savings over the lifetime of the Proposed Development, and will be presented using the latest version of the Scottish Government's Carbon Calculator Tool. This remains the best available standardised tool for use in relation to net carbon saving calculations for wind farm developments across the UK.
- 14.4.3 The assessment will be undertaken in accordance with Scottish Government recommended methodology 'Calculating Carbon Savings from Wind Farms on Scottish Peatlands – A New Approach'<sup>106</sup> and will present the carbon emissions associated with ground conditions, access preparations, foundation excavations, materials used on-site, the transportation of materials and components to Site, and any other carbon loss (e.g. through the degradation of peat / peaty soils). At present there is no equivalent guidance specific to Wales.

### *Climate Resilience*

- 14.4.4 The Proposed Development's response to climate resilience risks will be provided in the introductory chapters of the ES and description of the Proposed Development. Consideration will be given to proposed mitigation measures (both inherent and additional) to ensure the Proposed Development is resilient to a changing climate.

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<sup>106</sup> Scottish Government (2010, as amended) Calculating Carbon Savings from Wind Farms on Scottish Peatlands – A New Approach [online] Available: <https://www.gov.scot/publications/calculating-carbon-savings-wind-farms-scottish-peat-lands-new-approach/pages/0/> [date accessed: 29/11/2023]

- 14.4.5 Key climate resilience risks for the Proposed Development and the Site as a whole are presented in **Table 14.1**, along with an account of how they will be addressed for the Proposed Development.

<b>Table 14.1: Climate Risks and Project Response</b>	
<b>Climate Risk</b>	<b>Response</b>
Increased risk of extreme rainfall events and drought.	Assessed as part of Hydrology, Hydrogeology, Geology and Peat Chapter.
Increased risk of moorland fires.	Considered within design development.
Increased risk of extreme temperatures.	Considered within design development.
Increased risk of storms/high wind.	Considered within design development.
Changes to hydrology/hydrogeology.	Assessed as part of Hydrology, Hydrogeology, Geology and Peat Chapter.
Risks to biodiversity as a result of changing climate.	Factored into Ecology Chapter.

- 14.4.6 With adoption of a climate resilient design and the assessment of key environmental risks associated with climate change as an integral part of 'scoped in' technical chapters as outlined above, climate resilience is proposed to be scoped out, and a standalone technical chapter will not be produced as part of the ES.

## 14.5 Glint and Glare

- 14.5.1 Glint and glare arises from reflection of light from solar panels. Glint refers to a momentary flash of bright light which is witnessed by moderate to fast moving receptors whereas glare refers to a continuous source of bright light which is witnessed by a static or slow-moving receptors. Combined these are referred as reflections.
- 14.5.2 There is no adopted guidance in Wales for the assessment of glint and glare for solar farms. Guidance produced by Page Power<sup>107</sup> states that there are four common types of receptors that can be significantly affected by glint and glare. These include:
- aviation infrastructure (including pilots and air traffic controllers);
  - rail infrastructure (including train drivers);
  - road users on surrounding roads, and
  - residents in surrounding dwellings.
- 14.5.3 Impacts to aviation, rail and road infrastructure relate to safety while impacts to residents relate to residential amenity.
- 14.5.4 For the Proposed Development, glint and glare will be considered as a routine component of the design development for the solar PV array, and through consultation with key stakeholders. There are no major roads or railways within close proximity to the Proposed Development.

<sup>107</sup> Page Power, Solar Photovoltaic and Building Development – Glint and Glare Guidance (Fourth Edition), 2022

There are residential properties within close proximity to the Proposed Development and potential aviation receptors.

- 14.5.5 Impacts of glint and glare on aviation receptors will be considered, where appropriate, as part of the Aviation Chapter of the ES. Impacts of glint and glare on residential properties will be considered within the Landscape and Visual Amenity Chapter of the ES. On this basis, glint and glare is scoped out of the ES as a standalone chapter.
- 14.5.6 A glint and glare assessment will be undertaken and reported in a Technical Appendix to the ES, to support the Aviation and Landscape and Visual Amenity Chapters.
- 14.5.7 The assessment methodology would be undertaken in accordance with guidance published by Page Power. This guidance provides study areas for each of the four common receptors mentioned above. The study area for each receptor will be taken as follows:
- dwellings within approximately 1 km of a proposed development that may have a view of the solar panels;
  - national roads (i.e. UK A roads or motorways), or those with greater significance, within approximately 1 km of a proposed development that may have a view of the solar panels;
  - railway lines within approximately 100 m of a proposed development that may have a view of the solar panels (train drivers, signals, crossings or vital railway infrastructure within 500 m of the solar panels); and
  - aviation receptors out to 30 km from a proposed development.

## 14.6 Air Quality

- 14.6.1 The Proposed Development is not considered likely to give rise to significant air quality effects. The main activities that have the potential to give rise to air quality impacts would be limited to:
- construction and decommissioning works, giving rising to dust emissions from earthworks (potentially including occasional blasting) and trackout from construction vehicles; and
  - exhaust emissions from fixed and mobile construction plant and vehicles.
- 14.6.2 Construction works would be localised, short term, intermittent and controllable through the application of best practice on-site. Fixed and mobile plant would be limited in size and number and would operate for short periods. Measures to manage air quality during construction, such as dust management, will be included in the outline CEMP to be appended to the ES.
- 14.6.3 There are no Air Quality Management Areas (AQMA) around the Site. The contributions of exhaust emissions (NO<sub>2</sub> and PM<sub>10</sub>) from construction vehicles are likely to be low, and orders of magnitude below current Air Quality Objectives.
- 14.6.4 The proposed access route passes through an AQMA at Llandeilo. This part of the route is common to both access route options currently being considered. The AQMA is designated due to local exceedances of Nitrogen Dioxide (NO<sub>2</sub>) due to unspecified road transport. The AQMA applies to a section of the A483 north of the A476 and up to and including the A40 roundabout. The proposed access route clips the northern end of the AQMA only at the A40 roundabout – it is not proposed to route construction traffic along the A483 through Llandeilo. Any impact to traffic numbers using this route during construction as a result of the Proposed Development is expected to be negligible and will be managed in accordance with a CTMP. On this basis, no significant effects from construction traffic passing through Llandeilo AQMA or any other parts of the construction route are anticipated.
- 14.6.5 Once operational, the only source of emissions would be from occasional maintenance vehicles, and any impacts would be negligible.

14.6.6 Accordingly, it is proposed to scope out air quality from the EIA.

## 14.7 Population and Human Health

14.7.1 It is not proposed to include a stand-alone chapter on human health as part of the ES. The ES will inherently consider human health in terms of the following potential impacts:

- impacts on health from noise, as part of the Noise Chapter;
- impacts on amenity associated with shadow flicker, as part of the Shadow Flicker Chapter;
- impacts on pedestrian amenity and safety, as part of the transport Chapter; and
- impacts on amenity associated with visual impacts, as part of the Landscape and Visual Chapter, including glint and glare.

14.7.2 In addition, appropriate control measures to ensure potential impacts on air and water quality are managed appropriately during the construction phase will be set out in the outline CEMP to be included as a Technical Appendix to the ES.

14.7.3 Population and human health is therefore scoped out.

## 14.8 Risk of Major Accidents and Disasters

14.8.1 Major Accidents and Disasters assessment considers the potentially significant effects of a development on the environment as a result of its vulnerability to, or introduction of, risks of major accidents and/or disasters.

14.8.2 A major accident is an event, such as a train derailment or major road traffic accident, which threatens immediate or delayed serious environmental effects to human health, welfare and/or the environment, and requires the use of resources beyond those of the client or its appointed representatives (i.e. contractors) to manage. Major accidents can be caused by disasters resulting from both man-made and natural hazards.

14.8.3 A disaster is a manmade/external hazard such as an act of terrorism, or a natural hazard such as an earthquake or extreme weather event, with the potential to cause an event or situation that meets the definition of a major accident (for example, a weather-triggered landslide which results in a train derailment).

14.8.4 In 2020, the Institute of Environmental Management and Assessment (IEMA) published a Primer to better define the assessment methodology for major accidents and disasters in EIA<sup>108</sup>. The Primer states that "*major accidents and/or disasters should be considered as part of an assessment where the development has the potential to cause the loss of life, permanent injury and/ or temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration*".

14.8.5 Potential major accident risks that could affect the Site/Proposed Development include:

- Road accidents, particularly involving AILs;
- Risk of aircraft collisions with turbines and glint and glare risks to aircraft;
- Fire risk – both from external influences such as moorland fires and arising as a result of the Proposed Development;
- Flood risk; and
- Geotechnical risks – namely landslides and peat slips which are an inherent risk in upland landscapes.

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<sup>108</sup> Arup (2020) Major Accidents and Disasters in EIA: A Primer [online] Available: <https://www.iema.net/resources/blog/2020/09/23/iema-major-accidents-and-disasters-in-eia-primer> [date accessed: 30/11/2023]

- 14.8.6 Fire, flood and geotechnical risks are likely to be exacerbated by climate change during the lifetime of the Proposed Development.
- 14.8.7 The construction, operation and decommissioning of the Proposed Development would be undertaken under relevant health and safety regulations including the requirements of the Construction (Design and Management) Regulations 2015 and Health and Safety at Work Act 1974. A risk assessment process will be followed by the Principal Designer during the design stage, which will ensure that all potential risks are identified at an early stage and appropriate mitigation is implemented.
- 14.8.8 Road accidents, particularly involving AILs, will be assessed in the transport and access assessment and managed appropriately through an AIL Management Plan. Aviation risks including collision risk and glint and glare will be addressed through the design and through consultation and agreement with key stakeholder including CAA/NATS and the MoD.
- 14.8.9 The geotechnical design of the Proposed Development permanent infrastructure and access tracks will take into account geotechnical risks from unstable slopes and peat.
- 14.8.10 Flood risk will be limited for the majority of the Site given its upland nature and the Proposed Development will be designed to avoid areas at significant risk of fluvial and surface water flooding. Upland environments at the head of river catchments are recognised for their high influence over downstream flood risk. The Proposed Development will be designed so as not to increase flood risk to downstream receptors, including managing impacts to forestry and peat. Flood risk will be assessed as part of the Hydrology, Hydrogeology, Geology and Peat Chapter of the ES. A PLRA will also be produced.
- 14.8.11 Fires associated with technology such as BESS and inverters are considered unlikely as technology will have built in safety features including fire resistant construction, fire detection, suppression systems, emergency stop functions and isolation monitoring. If the BESS is included in the final development proposals the Applicant will consider producing an Outline Battery Safety Management Plan (OBSMP) to be submitted with the DNS application. The latest lithium-ion battery energy storage facilities present a very limited risk of fires starting or spreading through what is called 'thermal runaway'. The systems are built with a number of layered failsafes to prevent fires:
- A Battery Management System (BMS) monitors and manages the battery system, allowing any signs of overheating to be addressed for signs of potential overheating and developing fire risk. In the event any issues are detected, individual cell stacks can be easily deactivated and replaced as part of regular maintenance;
  - Fire and gas detection and suppression systems are installed to provide immediate suppression of fires should they arise; and
  - Battery systems have a modular construction which limits potential fire spread between individual units.
- 14.8.12 The Proposed Development is situated in close proximity to forest and upland moorland, both of which present a risk of fire spreading, should it arise, and a risk of wildfires which could affect the Proposed Development infrastructure. To manage this risk, all BESS, substation and turbine infrastructure will be situated on hardstanding and a minimum 10 m buffer applied between the buildings and potentially inflammable vegetation. Grass within the buffer zone will be kept short as required to minimise fire risk.

- 14.8.13 The Proposed Development will be designed and managed in accordance with guidance from the National Fire Chiefs Council regarding fire risk from battery storage facilities<sup>109</sup>.
- 14.8.14 With the above-described routine design and management measures, the risk of major accidents presented to/by the Proposed Development is very low, and the criteria outlined in the IEMA Primer unlikely to be met or exceeded, major accidents and disasters are therefore scoped out.
- 14.8.15 Accordingly, it is proposed to scope out an assessment of major accidents and disasters from the EIA.

## 14.9 Heat and Radiation

- 14.9.1 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 will be not considered in the EIA.

## 14.10 Materials and Waste

- 14.10.1 A description of the potential streams and volumes of construction materials and waste disposal will be described within the ES. 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.
- 14.10.2 As part of any detailed CEMP, there would be a requirement to develop and implement a Site Waste Management Plan (SWMP) and MMP in advance of the construction works. Management of soil resources will be covered by production of a SRP. Resources will be managed in accordance with the waste hierarchy, favouring sustainable re-use on-site.
- 14.10.3 The design of tracks, turbine foundations, hardstanding etc. would minimise the amount of soil disturbance and waste produced. Where soils and peat would be excavated, they would be stored on the Site in accordance with the CEMP/SRP/MMP, and then used in the restoration of the Site post-construction to minimise the volume of waste that requires removal from Site. It is not intended to remove significant quantities of excavated arisings from the Site during construction. Where possible, soil arisings will be balanced through a cut and fill exercise to retain volumes on-site.
- 14.10.4 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.
- 14.10.5 There would be minimal waste arisings generated during the operational phase and the requirement for material assets will be limited to maintenance and replacement parts.
- 14.10.6 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.
- 14.10.7 In light of the above it is proposed to scope out materials and waste from further assessment in the EIA.

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<sup>109</sup> National Fire Chiefs Council (2022) Grid Scale Battery Energy Storage System planning – Guidance for FRS [online] Available: <https://nfcc.org.uk/wp-content/uploads/2023/10/Grid-Scale-Battery-Energy-Storage-System-planning-Guidance-for-FRS.pdf> [date accessed: 30/11/2023]

### **14.11 Summary Questions**

- 1.** Do consultees agree to the proposed approach to assessing impacts of Forestry?
- 2.** Do consultees agree that there are unlikely to be significant socio-economic effects associated with the Proposed Development and that an Economic Impacts Report will be sufficient for the purposes of the application?
- 3.** Do consultees agree that Climate, Glint and Glare, Air Quality, Population and Human Health, Major Accidents and Disasters, Heat and Radiation and Materials and Waste can be scoped out on the basis that there are either no likely significant effects or that they are appropriately covered within other 'scoped in' topics?

## 15. PROPOSED STRUCTURE OF THE ES

15.1.1 The proposed structure of the ES is as follows:

- Non-Technical Summary
- Volume 1: Main Report
  1. Introduction
  2. EIA Approach and Methodology
  3. Site Description and Proposed Development
  4. Design Evolution and Alternatives
  5. Landscape and Visual
  6. Cultural Heritage
  7. Ecology
  8. Ornithology
  9. Traffic and Transport
  10. Noise
  11. Hydrology, Hydrogeology, Geology and Peat
  12. Aviation
  13. Telecommunications
  14. Shadow Flicker
  15. Mitigation Schedule
  16. Summary of Residual Effects
- Volume 2: Technical Appendices
- Volume 3a: Figures
- Volume 3b: Visualisations

## FIGURES

## **APPENDICES**

## **APPENDIX 5.1: GAZZETEER OF HERITAGE ASSETS AND EVENTS**

## **CONFIDENTIAL APPENDIX 7.1: ORNITHOLOGY REPORTS**

**Note: This appendix contains sensitive ecological information and is therefore excluded from public copies of the Scoping Report**