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Wind2 Ltd

PARC YNNI CALON Y GWYNT

EIA Scoping Report



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EIA Scoping Report

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1 INTRODUCTION

1.1 BACKGROUND

- 1.1.1. Wind 2 Project 3 Limited (hereafter referred to as ‘the Applicant’) has commissioned WSP UK Ltd to produce an Environmental Impact Assessment (EIA) Scoping Report for the Proposed Development of Parc Ynni Calon y Gwynt (hereafter the ‘Proposed Development’). The Proposed Development is located 2.7 km to the north of Clatter mid Wales in the administrative area of Powys County Council (PCC). The Proposed Development comprises of up to eleven wind turbines each with an anticipated capacity of between 6.8 – 7.2 megawatts (MW), solar energy installation (PV) arrays, battery energy storage system (BESS) and associated infrastructure. The site location is shown on **Figure 1.1**.
- 1.1.2. The Proposed Development’s associated infrastructure will consist of the following elements:
- Substation and transformer housing;
 - Temporary construction compound;
 - Temporary site offices;
 - Crane pads and cabling; and
 - Access track construction.
- 1.1.3. The Proposed Development is entirely located within a Pre-Assessed Area (PAA) for Wind Energy as defined in the National Development Framework (NDF) – Future Wales: The National Plan 2040¹ with all turbines located within the PAA 3.
- 1.1.4. Under The Developments of National Significance (Specified Criteria and Prescribed Secondary Consents) (Wales) Regulations 2016², the Proposed Development meets the threshold to qualify as a Development of National Significance (DNS), with a generating capacity of over 10MW.
- 1.1.5. Discussions with the Distribution Network Operator (DNO) and National Grid (NG), surrounding the connection of the Proposed Development to the electricity network are currently on-going. The connection between the on-site substation and the electricity grid will be the subject of a separate application for consent.
- 1.1.6. DNS projects are considered to be those of the greatest significance to Wales, due to their potential benefits and impacts. The purpose of the DNS process is to ensure timely decisions are made on such projects. The process is divided into four stages:
1. **Pre-application** engagement and consultation which involves submitting a notification of intention to submit a DNS and statutory pre-application consultation.
 2. **Application and consultation** which involves the Developer submitting an application with a Consultation Report. Provided the application is valid, PEDW publicises and consults on the application and the Local Planning Authority (LPA) prepares a Local Impact Report. The developer has 10 working days to decide whether or not to amend the application following the end of the consultation period.

¹ Welsh Government, (2021). Future Wales: The National Plan 2040. Available online at: <https://www.gov.wales/future-wales-national-plan-2040>

² The Developments of National Significance (Specified Criteria and Prescribed Secondary Consents) (Wales) Regulations 2016. Available online at: <https://www.legislation.gov.uk/wsi/2016/53/contents/made>

3. **Examination** which comprises an appointed Inspector examining the application and determining the procedure. An examination can be either written representations, a hearing, an inquiry, or a combination of all three. For some DNS Applications, the appointed Inspector then writes a report to the Welsh Minister recommending whether planning permissions should be granted or refused. As of November 2024, the Welsh Government announced that Inspectors now have delegated authority to determine applications for generating stations of 10 MW to 50MW³.
4. **Decision** which is the final stage when the Welsh Ministers issue a decision.

1.2 DEFINITION OF AN ENVIRONMENTAL IMPACT ASSESSMENT

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

1.3 REQUIREMENT FOR ENVIRONMENTAL IMPACT ASSESSMENT

- 1.3.1. Under the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017⁴ (hereafter referred to as the 'EIA Regulations'), the Proposed Development falls within Schedule 2, as an installation for the harnessing of wind power for energy production (wind farms) as it includes the installation of more than two turbines, which exceed 15m. For Schedule 2 Development, an EIA is required only if the project is judged likely to give rise to significant environmental effects by virtue of factors such as the size, nature, and location of the proposal (as detailed in Schedule 3 of the EIA Regulations).
- 1.3.2. Although not a statutory requirement, the EIA Regulations make provision for obtaining a Scoping Direction from Welsh Ministers on the information to be included in the ES. This Scoping Report supports a request for a Scoping Direction to PEDW under Regulation 33 of the EIA Regulations in respect of applications for planning permission to Welsh Ministers' as a DNS project.
- 1.3.3. Regulation 33 (2) instructs that a request for a Scoping Direction should include:
 - (a) a plan sufficient to identify the land;
 - (b) a brief description of the nature and purpose of the development including its location and technical capacity;
 - (c) its likely significant effects on the environment;
 - (d) a statement that the request is made in relation to a development of national significance for the purposes of section 62D of the 1990 Act; and
 - (e) such other information or representations as the person making the request may wish to provide or make.

³ Welsh Government (2024). Welsh Government takes action to accelerate infrastructure planning decisions. Available online at: <https://www.gov.wales/welsh-government-takes-action-accelerate-infrastructure-planning-decisions> [Accessed February 2025].

⁴ The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. Available online at: <https://www.legislation.gov.uk/wsi/2017/567/contents/made>

1.4 PURPOSE OF THE REPORT

- 1.4.1. The purpose of this Scoping Report is to inform PEDW and statutory consultees on relevant aspects of the Proposed Development prior to the formulation of a formal Scoping Direction by PEDW. There is no obligation to request a Scoping Direction, but the Applicant has opted to conduct such an exercise in order to ensure that the public are aware of and are engaged on the Proposed Development, and to provide for the accuracy of the EIA in assessing those effects that have the potential to be significant.
- 1.4.2. The Scoping Report's aim is to ensure that the subsequent EIA is focused on the key impacts likely to give rise to significant effects, and to obtain agreement on the EIA approach, scope and methodologies. As well as identifying elements to be considered in the EIA, this report also identifies those elements that are not considered necessary to assess further. This approach is in line with the general aim to undertake a proportionate EIA, as advocated by industry best practice.
- 1.4.3. Whilst this report seeks to establish the overall framework for the EIA in relation to the environmental topics 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.). The elements of the Proposed Development likely to have a significant environmental effect should be identified. Where uncertainty remains, the applicant should provide as much detail as possible or assume the worst case.
- 1.4.4. **Table 1-1** sets out what information the EIA Regulations state that a request for a Scoping Direction must include within the context of a DNS and where this information can be found in this report.

Table 1-1 – Information Required to Accompany a Request for a Scoping Direction

Information Required	Location within this Report
A plan sufficient to identify the land	Figure 1.1 – Site Location Plan Figure 2.1 – Indicative Turbine Locations
A description of the nature and purpose of the development, including its location and technical capacity	Chapter 2
An explanation of the likely significant effects of the development on the environment	Chapters 5-13
A statement that the request is made in relation to a development of national significance for the purposes of section 62D of the 1990 Act, as per Reg 33 of the EIA Regs.	Chapter 1
Such other information or representations as the person making the request may wish to provide or make	Chapter 4
DNS Requirements⁵	
An outline of the main alternatives considered and the reasons for selecting a preferred option	Section 4.11

⁵ The Planning Inspectorate (2019). Developments of National Significance (DNS) – Appendix 3: EIA Guidance

Information Required	Location within this Report
Results of desktop and baseline studies where available	Chapters 5-13
A record of consultation undertaken with relevant bodies (including any public engagement) to date	Chapters 5-13
Referenced plans presented at an appropriate scale to clearly convey the information and all known aspects associated with the proposal	Figures 1.1 – 12.3
Guidance and best practice to be relied upon, and whether this has been agreed with the relevant bodies (for example the statutory nature conservation bodies or local authorities) together with copies of correspondence to support these agreements	Chapters 5-13
Methods used or proposed to be used to assess impacts, and the significance criteria framework used	Chapters 5-13
Any mitigation proposed and the extent to which these are likely to reduce impacts	Section 4.7, Chapters 5-13
Where impacts from consequential or cumulative development have been identified, how applicants intend to assess these impacts in the ES	Section 4.11, Chapters 5-13
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	Chapters 5 and 6
Key topics covered as part of applicants' scoping exercise	Chapters 5-13
An outline of the structure of the proposed ES	Chapter 14

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

- 2.1.1. This section provides a brief description of the nature and purpose of the Proposed Development, including its location and potential technical capacity. These details form the basis for the assessment of likely significant effects upon the baseline situation.

2.2 PURPOSE OF THE DEVELOPMENT

- 2.2.1. Wind 2 Project 3 Limited, which is part of a joint venture between Wind2 Limited and companies managed by Octopus Energy Generation, is seeking to develop the Parc Ynni Calon y Gwynt located approximately 2.7 km north of Clatter, Powys, in mid Wales. The Proposed Development will include the construction and operation of up to 11 wind turbines, a photovoltaic (PV) solar energy installation and battery energy storage (see section 2.4 for further details).
- 2.2.2. The aim of the Parc Ynni Calon y Gwynt is to increase renewable energy generation in Wales and assist in meeting the relevant targets including UK's net-zero by 2030 climate ambitions, and Wales's ambition for 100% renewable electricity by 2035⁶.

2.3 APPLICATION SITE

- 2.3.1. The Proposed Development site is situated within the administrative area of Powys, in mid Wales (hereafter referred to as the 'Site'). The Site is located on hills to the north of the A470 trunk road, approximately 2.7km north of the village of Clatter, 3.5km northeast of the village of Carno, 3.5km north of the village of Pontdolgoch and 12km northwest of Newtown. The Site is located within the local authority area of Powys County Council (PCC).
- 2.3.2. The Site boundary includes approximately 12km of new track, comprising approximately 2.6km of a new access road over open farmland as well as new on-site access tracks to allow access to the on-site infrastructure. Site access is currently via an unnamed road off the A470 in Pontdolgoch to the south of the Site. The new access road would begin at an existing road junction with the B4568. The new access road would then head north, utilising a combination of existing minor roads and farm tracks where possible as well as open farmland to maintain a suitable gradient and facilitate entry onto the Site.
- 2.3.3. The existing land use of the Site and surrounding area is largely comprised of agricultural pasture used for livestock grazing, and is interspersed by hedgerows, existing access roads and pockets of woodland throughout. A review of the Wales Agricultural Land Classification (ALC) interactive map viewer⁷ suggests that the land mainly comprises Grade 4: poor quality agricultural land and Grade 5: very poor quality agricultural land. The Afon Carno is a Main River located approximately 2km south of the Site boundary. There are two ordinary watercourses within the Site, namely the Nant y Llyn Mawr and Nant Cwmgerwyn. The new access road also intersects a number of unnamed ordinary watercourses and tributaries of the Afon Carno.

⁶ Welsh Government (2023) Available at (online): <https://www.gov.wales/wales-aims-meet-100-its-electricity-needs-renewable-sources-2035> [Accessed February 2025].

⁷ DataMap Wales (2019). Predictive ALC Map 2. Available at (online): https://datamap.gov.wales/maps/new?layer=inspire-wg:wg_predictive_alc2#/ [Accessed February 2025].

- 2.3.4. Llyn Mawr Site of Special Scientific Interest (SSSI) is located immediately adjacent to the southern extent of the Site boundary. The 20.1ha SSSI⁸ consists of an upland lake and associated wetland supporting habitat. The immediate catchment of the lake within the designated site includes some bracken slopes, areas of gorse scrub, acid grassland, wet heath and mesotrophic marshland habitat. The designated site is of ornithological importance and is extensively used by waterfowl. In summer typical species are mallard, tufted duck and goosander, whilst in winter species include whooper swan. The surrounding area is also used by wintering Greenland white-fronted geese.
- 2.3.5. There are several scheduled monuments located within the central and north-western extents of the Site. These largely comprise cairns of varying sizes and stone rows dating from the Bronze Age.
- 2.3.6. There are a small number of isolated residential dwellings and holiday lets in proximity to the Site, the closest is located immediately south of the Site boundary, approximately 200m north of Llyn Mawr Nature Reserve.

2.4 PROPOSED DEVELOPMENT

- 2.4.1. The Proposed Development comprises the construction and operation of an energy park which includes the co-location of up to 11 wind turbines, Solar PV arrays, BESS and associated infrastructure. The main components include:
- Up to 11 three bladed horizontal axis wind turbines, with an anticipated rotor diameter of 163m and height to tip blade of 180 – 200m (approximate generating capacity of up to 79 MW) (see **Figure 2.1 Indicative Turbine Locations**).
 - Solar PV array system, including transformers and cabling;
 - BESS;
 - Crane pads (hardstandings) and laydown areas adjacent to each wind turbine (further information provided below);
 - Power cables linking the wind turbines laid in trenches underground, including cable markers (further information provided below);
 - A control building including substation, parking and a small storage compound;
 - Meteorological mast for pre-construction energy yield and site conditions assessments;
 - Health and safety and other signage;
 - New and upgrading of existing access tracks, passing places and turning heads;
 - Borrow pits (if necessary); and
 - Temporary construction compound(s).

WIND TURBINES

- 2.4.2. The specific models of the proposed turbines are yet to be selected but are likely to have heights to blade tip in a range of between 180 – 200m. The turbines proposed for the development would have a maximum power output of between 6.8MW and 7.2MW dependent on final commercial choice, and therefore a combined rated output in the range 74.8 – 79.2MW of electrical power. The indicative grid references for each turbine are provided in **Table 2-1**.

⁸ NRW. Llyn Mawr SSSI – Official Citation. Available at (online): https://naturalresources.wales/media/676781/sssi_0543_citation_en001.pdf [Accessed February 2025].

Table 2-1 – Indicative Turbine Locations

Turbine No.	Easting (X)	Northing (Y)
1	301672	297929
2	300870	298144
3	300269	297647
4	300070	298081
5	299472	297685
6	299104	298139
7	298899	298618
8	299760	298921
9	300248	298717
10	300423	299421
11	300974	298811

TURBINE FOUNDATIONS

- 2.4.3. The turbines would be installed on foundations, comprising both stone and concrete. These would be dressed back with topsoil to allow re-vegetation. It is currently anticipated that the footprint of each turbine foundation will be approximately 25m in diameter. Turbine foundations could be larger or smaller, depending on imposed loadings, ground conditions and drainage design.

CRANE PADS

- 2.4.4. Each wind turbine requires an area of hardstanding to be built adjacent to the turbine foundation. This provides a stable base on which to lay down turbine components ready for assembly and erection, and to site the two cranes necessary to lift the three tower sections, nacelle and rotor into place. The crane hardstandings will be left in place following construction in order to allow for the use of similar plant should major components need replacing during the operation of the wind farm. These could also be utilised during decommissioning at the end of the wind farm's life. Subject to design evolution, there is potential for areas to be dressed back with topsoil and landscaped into the surrounding area upon completion of turbine erection.

CABLING

- 2.4.5. Underground cables would link the turbines to each other and to the on-site substation. Detailed construction and trenching specifications would depend on the ground conditions encountered at the time. To minimise ground disturbance, cables would be routed along the side of the access tracks wherever practicable.

SITE ACCESS

- 2.4.6. The Proposed Development will involve the construction and modification of approximately 12km (7.22ha) of new access track over open farmland. This would begin at an existing road junction of the A470 with the B4568, and head north, utilising a combination of existing minor roads and farm tracks where possible as well as open farmland to maintain a suitable gradient and facilitate entry onto the Site. The Site Access includes all on-site access tracks leading up to each turbine, solar arrays and BESS.

SOLAR PV ARRAYS

- 2.4.7. The Proposed Development will comprise the construction of a Solar PV array, with an anticipated generating capacity of 30 MW. The Solar PV array design layout and total generating capacity will be determined following site surveys and a design iteration process, and the design submitted with the application for consent will include an on-site substation, inverters, transformers, storage containers, fencing and CCTV for security purposes and access tracks across the Site.

BATTERY ENERGY STORAGE SYSTEM (BESS)

- 2.4.8. The design of the Proposed Development also includes a BESS. The batteries would store excess power generated by the Proposed Development and release the power to the grid when the output from the Proposed Development falls due to decreased wind speed or solar exposure. The BESS and associated infrastructure would be constructed on an area anticipated to be approximately 100m x 100m of hardstanding and will also include a control building, on-site substation including transformers and switchgear. This area of hardstanding is anticipated to form the location of the construction compound during construction of the Proposed Development.
- 2.4.9. The final location of the BESS and substation compound will be confirmed as the design of the Proposed Development progresses.

OFF-SITE INFRASTRUCTURE

- 2.4.10. At the time of writing, February 2025, discussions are ongoing with the Distribution Network Operator (DNO) and National Grid (NG) regarding the Proposed Development's grid connection, which will be subject to a separate consent and will not form part of the DNS application.
- 2.4.11. The on-site substation will connect the Proposed Development into the electricity network, at a voltage yet to be determined. The grid connection will be subject to a separate application for consent.

2.5 CONSTRUCTION

- 2.5.1. It is expected that the construction period of the Proposed Development will be up to 24 months. The Proposed Development does not yet have an anticipated commencement date. Site restoration will be programmed and carried out to allow restoration of disturbed areas progressively and as early as possible during the construction period.
- 2.5.2. The construction stages of the Proposed Development will include the following:
- Site access works including improvements to off-site roads to permit delivery to site of wind turbine components and construction vehicles;
 - Formation of site borrow pits to provide on-site track material (if required);

- Development of internal access routes by improving existing access tracks and constructing additional tracks to the necessary standard;
- Installation of temporary construction facilities including site offices, welfare facilities, component lay-down and storage areas;
- Construction of buildings to house the electrical substation and control equipment;
- Excavation and construction of turbine foundations and the creation of crane pads and laydown areas adjacent to each turbine;
- Construction and commissioning of the solar PV arrays, BESS and associated infrastructure;
- Installation of internal underground cabling network between wind turbine locations, solar PV arrays and electrical facilities, typically following access track routes;
- Delivery of all wind turbine and solar PV array components to site and the erection of turbines and solar PV arrays;
- Testing and commissioning of wind turbines, solar PV arrays and electrical equipment;
- Installation of permanent anemometry mast; and
- Removal of all temporary facilities and reinstatement of temporary construction areas and borrow pits.

2.5.3. Many of these operations will be carried out concurrently, although predominantly in the order identified above to minimise the overall length of the construction programme. In addition, development will be phased such that at different parts of the Site, the civil engineering works will be continuing whilst wind turbines and solar PV arrays are being erected. Site restoration will be programmed and carried out to allow restoration of disturbed areas as early as possible and in a progressive manner.

2.6 OPERATION AND DECOMMISSIONING

- 2.6.1. The Proposed Development will be designed with an operational life of up to 40 years. When dismantling and removing the turbines the bases would be broken out to below ground level and all cables cut at depth below ground level and left in the ground. All solar PV arrays, BESS and associated infrastructure apart from underground cabling would also be dismantled and removed from site. Roads would either be left for use by the landowners or covered with topsoil. No stone would be removed from the Site. The decommissioning works are estimated to take six months. This approach is considered to be less environmentally damaging than seeking to remove foundations and cables entirely.
- 2.6.2. The Proposed Development will be decommissioned in the most sustainable way possible, and the turbine and solar PV array components themselves will be taken to an appropriate recycling facility, where applicable.
- 2.6.3. The proposed scope of each chapter's decommissioning assessment is defined in **Chapters 5 – 13** and summarised in **Table 14-1**. In general, it is not expected that decommissioning activities would generate any new or different effects that would not be expected from the construction phase. Therefore, the assessments of impacts during decommissioning phase is based upon those identified as part of the construction assessment.

2.7 ENVIRONMENTAL MANAGEMENT

- 2.7.1. Through the identification of potential impacts, the ES will set out measures to avoid, prevent, reduce or where necessary offset significant adverse effects. Where appropriate, these measures will also be accompanied by monitoring commitments intended to monitor their effectiveness.
- 2.7.2. A Construction Environmental Management Plan (CEMP) will be implemented during the construction of the Proposed Development by the appointed Contractor. This will include best practice construction management measures including mitigation requirements and measures to manage risks associated with construction of the Proposed Development to the environment and human health, including those associated with pollution and resource use. It is anticipated that the requirement to implement a CEMP will be secured by planning condition.
- 2.7.3. Where possible, the resources required to construct the Proposed Development will be locally sourced. The Applicant will seek to maximise the contracting of local supply chains throughout the Proposed Development phases.
- 2.7.4. Recycled material would be used where available, provided that it meets the relevant engineering specifications, and is cost effective.

3 LEGISLATION AND PLANNING POLICY

3.1 INTRODUCTION

- 3.1.1. This section provides an overview of relevant UK legislation and energy policy, devolved Welsh planning policy and the relevant planning policies of the Powys County Council's Local Development Plan (LDP).
- 3.1.2. The scoping of the topic specific effects set out within the remainder of this report includes a summary of the relevant legislation, planning policies at national and regional /local levels. Planning policy will be used to guide the scope of the assessment and to inform the value ascribed to receptors.
- 3.1.3. The ES will identify all the relevant policies which will be used to inform the scope and assessment of each environmental topic. The extent to which the Proposed Development complies with development plan policy will be presented within a separate Planning Statement that will accompany the DNS application.

3.2 LEGISLATIVE CONTEXT

- 3.2.1. Relevant Welsh primary legislation on sustainability and climate change includes:
- Well-being of Future Generations (Wales) Act 2015⁹ - requires all Wales' based public bodies to put long-term sustainability at the forefront of thinking and actions;
 - The Environment (Wales) Act 2016¹⁰ - sets in place an obligation on Welsh Government to reduce greenhouse gas emissions by 80% against 1990 levels by 2050.
 - The Planning (Wales) Act 2015¹¹ – outlines powers given to Ministers to determine strategic energy projects of 10 - 50MW (subsequently amended to 350MW).

3.3 NATIONAL PLANNING POLICY

- 3.3.1. Future Wales: The National Plan 2040¹², published in February 2021, is the National Development Framework for Wales, setting out the direction for development to 2040. The intention of the National Plan is to provide a clear, long term spatial direction for Government policy, action and investment in Wales. It sets out a framework for addressing key national priorities through the planning system, inclusive of decarbonisation. The National Plan states:

“Future Wales together with Planning Policy Wales will ensure the planning system focuses on delivering a decarbonised and resilient Wales through the places we create the energy we generate, the natural resources and materials we use and how we live and travel.”

⁹ Well-being of Future Generations (Wales) Act 2015 [online]. Available at: <https://www.legislation.gov.uk/anaw/2015/2>. [Accessed February 2025].

¹⁰ The Environment (Wales) Act 2016 [online]. Available at: <https://www.legislation.gov.uk/anaw/2016/3/contents/enacted>. [Accessed February 2025].

¹¹ The Planning (Wales) Act 2015 [online]. Available at: <https://www.legislation.gov.uk/anaw/2015/4/contents>. [Accessed February 2025].

¹² Future Wales: The National Plan 2040 [online]. Available at: <https://gov.wales/future-wales-national-plan-2040-0>. [Accessed February 2025].

- 3.3.2. Policy 17 on renewable and low carbon energy and associated infrastructure and Policy 18 on renewable and low carbon energy developments of national significance within the National Plan provide the criteria-based policies for renewable and low carbon energy developments within Wales. Policy 17 identifies ten 'Pre-Assessed Areas (PAA) for Wind Energy'. The boundary of the Proposed Development is entirely located within PAA 3. This means that this area has been deemed suitable to accommodate renewable energy developments such as onshore wind infrastructure. The National Plan is therefore a principal planning policy statement for renewable energy against which the planning application will be assessed.
- 3.3.3. Planning Policy Wales (PPW), republished in February 2024 (Edition 12)¹³, outlines land use planning policies and is supported by topic based Technical Advice Notes, including TAN8: Renewable Energy (2005)¹⁴. The purpose of PPW is to ensure the planning system supports the delivery of sustainable development and improves social, economic, environmental and cultural well-being. Alongside the National Plan, PPW outlines the way in which the planning system can support this delivery through Strategic and Local Development Plans. PPW states in relation to renewable and low carbon energy that:
- “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”.*
- 3.3.4. Following the publication of PPW 12 in February 2024, there were significant updates to Chapter 6: Distinctive and Natural Places, specifically in relation to Green Infrastructure, Net Benefit for Biodiversity (NBB) and the Step-wise approach, protections for SSSIs, and updated policy around trees and woodlands¹⁵. In particular, further clarity is provided on securing NBB through the application of the step-wise approach, including the acknowledgement of off-site compensation measures as a last resort, and the need to consider enhancement and long-term management at each step of the step-wise approach. PPW 12 also places strengthened focus of the application of the step-wise approach to avoid important environmental features, including peatlands.

¹³ Planning Policy Wales, Edition 12. February 2024 [online]. Available at: https://www.gov.wales/sites/default/files/publications/2024-02/planning-policy-wales-edition-12_1.pdf [Accessed April 2024].

¹⁴ TAN8 has since been revoked but remains a useful resource of relevant information.

¹⁵ Addressing the nature emergency through the planning system: update to Chapter 6 of Planning Policy Wales [online]. Available at: <https://www.gov.wales/addressing-nature-emergency-through-planning-system-update-chapter-6-planning-policy-wales> [Accessed February 2025].

3.4 LOCAL PLANNING POLICY

3.4.1. The Proposed Development is located within the administrative area of Powys County Council. The authority adopted its LDP in April 2018¹⁶. The relevant policies within the Plan which have informed the proposed assessment scope include:

- Policy DM2 – The Natural Environment;
- Policy DM4 – Landscape;
- Policy DM5 – Development and Flood Risk;
- Policy DM6 – Flood Prevention Measures and Land Drainage;
- Policy DM13 – Design and Resources;
- Policy SP7 – Safeguarding of Strategic Resources and Assets; and
- Policy RE1 – Renewable Energy.

3.4.2. PCC has also adopted the following Supplementary Planning Guidance (SPG) which will inform the assessment process:

- Renewable Energy SPG;
- Biodiversity and Geodiversity SPG;
- Archaeology SPG;
- Historic Environment SPG;
- Landscape SPG; and
- Planning Obligations SPG.

¹⁶ PCC. (2018). Local Development Plan 2011 – 2026 Written Statement.
<https://en.powys.gov.uk/article/4898/Adopted-LDP-2011---2026> [Accessed February 2025].

4 APPROACH TO EIA

4.1 INTRODUCTION

- 4.1.1. This chapter sets out the overall approach that will be taken to the EIA for the Proposed Development.
- 4.1.2. The ES will contain the information specified in Schedule 4 of the EIA Regulations. The approach to the assessment has been informed by current best practice guidance.
- 4.1.3. A detailed overview of the guidance and methodology adopted for each environmental topic is provided within the respective environmental topic chapters of this report.
- 4.1.4. The environmental topics listed within Regulation 4(2) of the EIA Regulations are listed below.
- Population and Human Health
 - Biodiversity
 - Land
 - Soil
 - Water
 - Air
 - Climate
 - Material Assets
 - Cultural Heritage
 - Landscape

4.2 CONSULTATION

- 4.2.1. Consultation is an essential element of the EIA and DNS application processes and will be reported within the ES and Pre-Application Consultation (PAC) Report to be submitted as part of the DNS application, in accordance with DNS procedural guidance¹⁷.
- 4.2.2. The Applicant is committed to promoting dialogue with statutory and non-statutory consultees and the local community, seeking to engage with all those with an interest in the Proposed Development to provide transparency during the process.
- 4.2.3. Any consultation undertaken with environmental stakeholders is set out in each relevant Technical Chapter.

¹⁷ The Planning Inspectorate. (2019) Developments of National Significance (DNS) – Procedural Guidance [Online]. Available at: <https://www.gov.wales/sites/default/files/publications/2019-11/developments-of-national-significance-dns-procedural-guidance.pdf> [Accessed February 2025].

4.3 GENERAL ASSUMPTIONS AND LIMITATIONS

- 4.3.1. The design and details of the Proposed Development are still under development. The EIA will clearly define the maximum design parameters, where some uncertainty exists in certain design elements, and establish the evolution of those design parameters and how they have been informed by the EIA process.

4.4 DEFINING THE STUDY AREA

- 4.4.1. This Scoping Report is based upon the indicative Site boundary for the Proposed Development as presented in **Figure 1.1 Site Location Plan**.
- 4.4.2. The informed Study Area for each environmental topic scoped into the EIA is defined within each Technical Chapter below.

4.5 ESTABLISHING BASELINE CONDITIONS

- 4.5.1. Environmental effects will be described in the ES in relation to the extent of changes to the existing baseline environment resulting from the construction and/or operation of the Proposed Development. The baseline environment comprises the existing environmental characteristics and conditions based upon desk-top studies and field surveys undertaken and information available at the time of the assessment.
- 4.5.2. The baseline conditions will vary dependent upon the timing of the survey or the date when data sources will have been produced / accessed. Data accessed from third parties (e.g., historic environment records, biodiversity data etc) may be older. The provenance of all third-party data will be clearly outlined within all the technical components of the ES alongside any limitations identified.
- 4.5.3. No construction activities within the Site have occurred since the commencement of environmental surveys. A planning application will be submitted for the erection of a Met Mast on site. It is currently anticipated that the Met Mast will be erected in 2025. There are no other known activities on site. Therefore, given the minor nature of the proposed Met Mast and the presence of no other infrastructure across the Site, it is considered that the baseline conditions will have remained constant during the process of data collection through desktop reviews and survey work.

4.6 ESTABLISHING FUTURE BASELINE CONDITIONS

- 4.6.1. The 'future baseline' is the description of the likely evolution of the baseline scenario without the implementation of the Proposed Development, as far as natural changes from the baseline scenario can be assessed based on available environmental information and scientific knowledge.
- 4.6.2. The ES will take account of readily available information to provide a description of the natural changes in the local environment over an appropriate timescale that the datasets support. The description of the future baseline conditions will be presented in the ES. The description presented in the ES is likely to include cumulative developments with planning consent due to the relationship and distance between the Proposed Development and the adjacently situated existing and proposed wind farms.

4.7 APPROACH TO MITIGATION

- 4.7.1. Schedule 4, Part 1, Paragraph 7 of the EIA Regulations states that an 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”.*
- 4.7.2. The use of mitigation measures to avoid, reduce or compensate for significant adverse environmental effects is an intrinsic part of the EIA process. These measures can relate to site construction or the completed development (i.e., measures to be undertaken during the operation of the Proposed Development through appropriate site management or through the introduction of specific design elements).
- 4.7.3. In many cases, mitigation measures are embedded within the Proposed Development (either through design or operation), whereby likely significant adverse effects are avoided. For example, standard good practice measures employed during construction may also be considered to provide embedded mitigation. Embedded environmental design measures that form part of the Proposed Development will be described in the description of the Proposed Development at the front of the ES and will be considered within the assessment in identifying significant environmental effects.
- 4.7.4. Where significant environmental effects cannot be avoided, there is a requirement to consider the implementation of further mitigation measures to achieve the anticipated outcome. Any commitments to further mitigation measures will be reported within the relevant environmental topic chapters, as well within the CEMP, Construction Traffic Management Plan (CTMP), and Habitat Management Plan (HMP), which will be secured via planning condition. Any requirements for further survey effort and monitoring to gauge the effectiveness of any proposed mitigation measures will also be captured within the relevant environmental topic chapter.
- 4.7.5. The delivery mechanisms for the mitigation measures outlined in the ES will be presented within a Mitigation Schedule that will form part of the ES.

4.8 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

- 4.8.1. The ES will report on the likely significant environmental effects for the construction, operational, and decommissioning phases of the Proposed Development.
- 4.8.2. The following criteria will be considered when assessing significance:
- Relevant legislation and planning policy;
 - International, national, regional, and local standards / guidance;
 - Probability of occurrence of likely effect;
 - Geographical extent of likely effect;
 - Magnitude and complexity of likely effect;
 - Sensitivity / value / importance of the receptor / receiving environment;
 - Duration (short up to one year, medium one to 10 years, or long-term over 10 years), frequency and reversibility of effect (temporary / permanent); and
 - Inter-relationship between effects (both cumulatively and in terms of potential effect interactions).

- 4.8.3. The method for assessing significance of effect varies between environmental topics but in principle will be based on the environmental sensitivity (or value / importance) of a receptor and the magnitude of change from baseline conditions. The magnitude of change will, in general, be assessed on a scale of large, medium, small, and negligible and sensitivity (or value / importance) will be assessed on a scale of high, medium, low, and negligible (refer to **Table 4-1**).

Table 4-1 – Matrix for Determining Significance of Effect

		Sensitivity (Value / Importance)			
		High	Medium	Low	Negligible
Magnitude of Change	Large	Major	Moderate – Major	Minor - Moderate	Negligible
	Medium	Moderate – Major	Moderate	Minor	Negligible
	Small	Minor - Moderate	Minor	Negligible - Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

- 4.8.4. Where guidance documents for individual environmental topics requires that specific criteria or scales for determining significance which vary from the above are to be used, this will be outlined in the relevant environmental topic chapters presented later in this report.
- 4.8.5. It is important that levels of effect are clearly defined based on their significance. The EIA Regulations do not define significance, and it is, therefore, necessary to state how this will be defined for the Proposed Development. In certain circumstances it is possible for disciplines to use quantitative assessment methodology to predict effects / values that can be compared against published thresholds or indicative criteria. However, it is not always possible to use quantitative measurements / values and as such, some assessments rely on professional judgement, experience, or other evidence. This could be in reference to the Proposed Development description, the level of available information about potential changes that are expected to be caused by the Proposed Development, or the receptors that may be affected.
- 4.8.6. For some of the topics to be considered in the EIA there is published guidance about significance evaluation. Where such topic-specific guidance exists (even in draft form) it will be used to inform the development of the significance evaluation methodologies used. For other topics, a moderate or above level of effect is considered significant in terms of the EIA Regulations. Where the level of effect is minor or less, these are generally not significant in terms of the EIA Regulations. Moreover, depending on the receptor being considered, it is possible that some potentially lesser effects could be judged as significant in terms of the EIA Regulations, and where this is judged to be the case, the rationale for this conclusion will be provided in the environmental topic chapters.
- 4.8.7. Summary effect tables that summarise the likely significant environmental effects associated with each of the environmental topics will be provided at the end of each environment topic chapter. These tables will outline sensitive receptors, mitigation measures and residual effects. A distinction will be made between direct and indirect; short, medium, and long-term; permanent and temporary; and positive and negative effects.

4.9 OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

- 4.9.1. Enhancement measures are those measures implemented as part of the Proposed Development that are 'over and above' mitigation and are not considered when determining the significance of environmental effects.
- 4.9.2. Opportunities for environmental enhancement measures (i.e., off-site planting, NBB etc.) will be considered throughout the design evolution of the Proposed Development and reported in the individual environmental topic chapters where relevant.

4.10 CUMULATIVE EFFECTS

- 4.10.1. The ES will include an assessment of cumulative effects in line with the EIA Regulations and the Planning Inspectorate's 'Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment (CEA) guidance document'¹⁸ in absence of guidance for Wales. It will consider two types of cumulative effects:
- Inter-project cumulative effects: The combined effect of the Proposed Development together with other reasonably foreseeable developments on a common receptor.
 - Intra-project cumulative effects: The combined or synergistic effects on a particular receptor which may collectively cause a more significant effect than individually. A theoretical example is the culmination of disturbance from dust, noise, vibration, artificial light, human presence, and visual intrusion on sensitive fauna (e.g., certain bat species) adjacent to a construction site.
- 4.10.2. In line with standard practice, for the purpose of the EIA, other wind farm developments which are operational, subject to planning approval or subject to a full and validated planning application will be included in the consideration of potential cumulative effects (subject to a cut-off point to allow assessments to be undertaken). It should be noted that not all of the cumulative developments would necessarily have a cumulative effect in respect of any particular environmental topic.
- 4.10.3. Inter-project cumulative effects are to be assessed within each technical chapter. Intra-project cumulative effects will be assessed within a standalone Cumulative Effects chapter of the ES.

¹⁸ Planning Inspectorate (2024). Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment. Available at (online): <https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-cumulative-effects-assessment> [Accessed February 2025].

4.11 ALTERNATIVES CONSIDERED

- 4.11.1. The EIA Regulations require that the ES contains a description of 'reasonable alternatives' considered as part of the design process. This may include alternative designs which are relevant to the objectives of the Proposed Development and its specific characteristics. The ES must report the main reasons for selecting the chosen option, including a comparison of the environmental effects. The ES will include content to:
- Identify, describe, and evaluate the likely significant effects on the environment of implementing the Proposed Development, and reasonable alternatives considering the objectives and the geographical scope of the Proposed Development.
 - Summarise the reasons for choosing the Proposed Development, in the light of the other reasonable alternatives dealt with.
 - Outline the reasons for selecting the alternatives dealt with, including a description of how the assessment was undertaken including any difficulties encountered in compiling the required information.
 - The alternative assessment will focus on layouts, sizing, technologies, and design parameters considered within the Site Boundary.
- 4.11.2. The decision-making processes that have taken place during the design process will be detailed within the ES to outline how environmental constraints and opportunities have defined the Proposed Development.
- 4.11.3. A 'No development' alternative would not deliver additional energy generation capacity therefore it will not be considered further. The ES will include a description of the alternatives considered. This will include their specific characteristics, and an indication of the main reasons for selecting the preferred option during the design process.

5 ECOLOGY

5.1 INTRODUCTION

- 5.1.1. This chapter describes the proposed scope of the assessment of likely significant effects arising from the Proposed Development on ecology. The chapter includes consideration of statutory and non-statutory designated sites, terrestrial and freshwater habitats and legally protected and notable species (birds are considered separately under **Chapter 6: Ornithology**).
- 5.1.2. The chapter (and its associated figures) should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Description of the Proposed Development** and with respect to relevant parts of other technical chapters, such as **Chapter 6: Ornithology**, **Chapter 9: Hydrology**, **Chapter 10: Geology and Soils** and **Chapter 11: Noise and Vibration**.
- 5.1.3. Consultees are requested to confirm the scope of the survey effort and study areas within this report.

5.2 CONSULTATION

- 5.2.1. No consultation has been undertaken as part of this scoping report. Consultation responses in relation to this scoping report will be considered in the preparation of the EIA.

5.3 STUDY AREA

- 5.3.1. The ecological Zone of Influence (Zoi) for the Proposed Development is the area over which the changes arising from the construction and operation of the Proposed Development could lead to ecologically significant influences on the environment. The potential Zoi will vary between different ecological features depending on their sensitivity to an environmental change¹⁹. The study area has been defined by determining a Zoi encompassing all likely ecological effects of the Proposed Development, including those which will occur by land-take and habitat loss or degradation and those which will occur through disturbance, such as noise.
- 5.3.2. The Zoi to be used in the ES will be refined as further information becomes available regarding the potential ecological effects of the Proposed Development and the ecological features present. For the purpose of this EIA Scoping Report, a precautionary Zoi has been used to identify potentially sensitive receptors/Important Ecological Features considered.
- 5.3.3. The Zoi areas under consideration for the Proposed Development are set out in **Table 2-1**.

¹⁹ CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater and Coastal (V1.2). Chartered Institute of Ecology and Environmental Management, Winchester.

Table 5-1 – Potentially Sensitive Receptors/Important Ecological Feature Zol

Receptor	Potential Zone of Influence
Internationally important designated nature conservation sites*, including Special Areas of Conservation (SAC), and Ramsar Sites.	Site boundary and a 10km radius (extended to 30km for sites designated for bats).
Nationally important designated nature conservation sites, including National Nature Reserves (NNR); Sites of Special Scientific Interest (SSSI) and Local Nature Reserves (LNR).	Site boundary and a 2km radius (extended to 30km for sites designated for bats).
Locally important designated nature conservation sites (Sites of Importance for Nature Conservation (SINC) and Local Wildlife Sites (LWS)); areas of ancient woodland.	Site boundary and 2km radius.
Priority Habitats ²⁰ and protected and notable species.	Desk study within the Site boundary and 1km radius for protected species, extended to 10km for bats. Priority habitats within the Site boundary. Protected and notable species, within the Site boundary (and adjacent continuous habitat up to 50m), extended to 200m for riparian mammals ^{21,22} (along watercourses that might be impacted), 200m from turbine locations for roosting bats ²³ , and 500m for great crested newts <i>Triturus cristatus</i> ²⁴ .

*Special Protection Areas (SPAs) are assessed within the ornithology chapter.

5.4 BASELINE CONDITIONS

5.4.1. At this stage, the baseline conditions in the Study Area are based on existing desk study and field data within the Preliminary Ecological Appraisals (PEA) that were produced for both the main site and the access road for the Proposed Development. Following the PEAs, further surveys have been undertaken and are ongoing at the time of writing, as listed below:

- WSP (2024) Calon Y Gwynt, Preliminary Ecological Appraisal. Produced on behalf of Wind2.
- WSP (2024) Calon Y Gwynt – Access Road, Preliminary Ecological Appraisal. Produced on behalf of Wind2.
- Dormouse surveys (access road).
- Riparian mammal surveys (access road)

²⁰ Identified under the provision of the Environment (Wales) Act 2016 following descriptions published by the Joint Nature Conservation Committee (2018).

²¹ Dean, M., Strachan, R., Gow, D. and Andrews R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds. Fiona Matthews and Paul Chanin. The Mammal Society, London.

²² Chanin P (2003). Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough

²³ NatureScot (2021). Bats and onshore wind turbines – survey, assessment and mitigation.

²⁴ English Nature (2001). Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.

- Badger surveys (access road)
- Nature Metrics (2024) Great Crested Newt Environmental DNA Report. Produced on behalf of WSP.
- Bat surveys (in progress).

5.4.2. The desk study undertaken as part of the PEAs included a review of the existing ecological baseline information available in the public domain and to obtain information held by relevant third parties. For the purpose of the desk study exercise, records were collated within various radii from around the Site unless otherwise stated. This approach is consistent with current good practice guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM)^{25,26}. To provide the baseline data for the ecological desk study, the following information was requested from Biodiversity Information Service for Powys & Brecon Beacons National Park (BIS):

- Records of non-statutory nature conservation sites within 2km;
- Records of Ancient Woodland Inventory (AWI) parcels and Priority Habitats within 2km;
- Records of legally protected and/or notable species within 1km; and
- Bats records within 10km.

5.4.3. Records of statutory nature conservation sites within 2km (extended to 10km for statutory designated sites of international importance, to 30km for sites designated for bats) of the Site were identified using DataMapWales²⁷.

5.4.4. No statutory designated sites of international importance were identified within the desk study within 10 km of the Site. The desk study identified one statutory site designated for nature conservation of national importance within 2km of the Site. This was Llyn Mawr SSSI which was located immediately adjacent to the southern extent of the Site. The Llyn Mawr SSSI is an upland lake with botanically rich surrounding habitat. The lake hosts eleven species of caddisfly and four species of dragonfly.

5.4.5. The search was extended to 30km for statutory sites designated for bats (please refer to **Chapter 6: Ornithology** for further information). A total of 15 of statutory sites designated for bats were identified; these are listed in within the PEAs (WSP, 2024) and shown on **Figure 5.1**. The closest SSSI was Gregynog SSSI, which is located 6km from the Site and is known to support foraging lesser horseshoe bats *Rhinolophus hipposideros*. **Table 5-2** summarises the various statutory designated sites within the search radii.

²⁵ CIEEM (2017b). Guidelines for Ecological Report Writing. CIEEM, Winchester.

²⁶ Chartered Institute of Ecology and Environmental Management (CIEEM) (2017). Guidelines for Preliminary Ecological Appraisal. CIEEM, Winchester.

²⁷ <https://datamap.gov.wales/> [Accessed January 2024]

Table 5-2 – Summary of the Statutory Designated Sites within the Various Seach Radii

Site Name	Designation	Distance and Orientation from the Site	Description
Statutory designated sites within 2 km of the Site			
Llyn Mawr	SSSI	Immediately adjacent to the Site	An upland lake only partially modified by agricultural improvement with marginal vegetation consisting of mainly rushes and sedges, with yellow water-lily <i>Nuphar lutea</i> occurring in discrete zones. The lake has ornithological importance for waterfowl including water species such as whooper swan <i>Cygnus cygnus</i> and Greenland white-fronted geese <i>Anser albifrons</i> . The lake also hosts eleven species of caddisfly and four species of dragonfly. Botanically species-rich habitats surround the lake catchment.
Internationally designated sites within 30 km of the Site which are designated for bats and hydrologically connected			
River Wye/Afon Gwy (Wales)	SAC	20 km south-west	The River Wye is designated as a watercourse of plain to montane levels with <i>the Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation. The river system supports many Annex II fish species and otter <i>Lutra lutra</i> .
Tanat and Vyrnwy Bat Sites/Safleoedd Ystlumod Tanat ac Efyrrwy	SAC	23 km north-east	Lesser horseshoe bats are Annex II species that are a primary reason for selection of this. This area in central Wales and contains a good mixture of lesser horseshoe bat maternity and hibernation sites. It is thought to support 4% of the UK species population, though counts in hibernation sites suggests this may be underestimated.

- 5.4.6. Four non-statutory designated sites were identified within 2km of the Site (**Figure 5.1**). Two of which were overlapped with the Site boundary, Llyn Mawr Wildlife Trust Reserve forms part of Llyn Mawr SSSI and overlaps the Sites southern boundary. In addition, the access road and a small part of the northern boundary of the Site have also been designated as a B-line²⁸ (a locally important insect pollinator pathway).

²⁸ B-Lines have been mapped by Buglife to address the problem of the loss of flowers and pollinators. The B-Lines are a series of 'insect pathways' running through our countryside and towns, along which Buglife are restoring and creating a series of wildflower-rich habitat stepping-stones. <https://www.buglife.org.uk/our-work/b-lines/b-lines-wales/> (Accessed July 2023).

- 5.4.7. A total of 47 Ancient Woodland Inventory (AWI) parcels are within 2km of the Site, of which two fall within the Site boundary (being bisected by the proposed access road). A search on DataMapWales for Priority Habitats identified four Priority Habitats within the Site (lowland dry acid grassland, upland heathland, lowland deciduous woodland, and hedgerows) (**Figure 5.2**).'
- 5.4.8. The PEA identified various Phase 1 habitat types within the Site (WSP,2024), of which five qualify or have potential to qualify as Priority Habitats (D1.1 - Acidic dry dwarf shrub heath (Upland heathland); B5 - Marsh/marshy grassland (Purple moor-grass and rush pastures); G1 - Standing water (Ponds); and I1.1 - Inland cliff (Inland rock outcrops and scree habitats). The watercourses were classified as G2 - Running water (rivers), as these all lie within 2.5km of their furthest source and are near natural, they are considered likely to qualify as Priority Habitat Rivers.
- 5.4.9. It is possible that the Site supports peatland habitat (see **Section 10.5**), in addition, Groundwater Dependent Terrestrial Ecosystems (GWDTEs) are likely to be locally limited in extent, but widespread throughout the Site. These would probably be most associated with marshy grassland and rush pasture, although they may be present in other locations.
- 5.4.10. Records of seven species of bat were identified within 10km of the Site in the desk study. These included brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, Daubenton's bat *Myotis daubentonii*, lesser horseshoe bat, Natterer's bat *Myotis nattereri* and noctule *Nyctalus noctula*. There were records of *Myotis* and pipistrelle bats not identified to species level. Ten static bat detectors were deployed during summer and autumn 2023 and spring 2024, the 2023 collected data has been analysed using Kaleidoscope Pro software to determine species assemblage and activity levels. Bat species recorded during the surveys comprised the following species:
- Common pipistrelle;
 - Soprano pipistrelle;
 - Pipistrelle species;
 - Lesser horseshoe
 - Noctule;
 - Leisler's bat *Nyctalus leisleri*;
 - Brown long-eared bat; and
 - Unidentified *Myotis* species
 - Unidentified *Nyctalus* species.
- 5.4.11. Initial analysis and assessment of the bat activity levels indicates that the activity levels were fairly low across each of the monitoring periods with only individual passes occurring on some nights. Common pipistrelle, soprano pipistrelle, serotine, noctule and Leisler's bat are considered to be at high risk of turbine collision, whilst brown long-eared bat, horseshoe species and *Myotis* species are considered to be at low risk of turbine collision. Further analysis and surveys are planned to inform the Proposed Development.
- 5.4.12. Dormouse surveys are ongoing, although initial results confirm presence of dormouse within the Site. It is assumed that dormouse will therefore be present within all suitable connective habitat throughout the Site.

- 5.4.13. Environmental DNA (eDNA) surveys carried out in 2024 returned a positive result for great crested newt at Waterbody 2²⁹ (**Figure 5.2**). All other waterbodies surveyed returned a negative result or were not considered suitable to support great crested newt.

In summary, habitats within the Site were considered suitable to support or confirmed to support European Protected Species (EPS), such as otter, dormouse, bats and great crested newt, as well as other legally protected species such as water voles, reptiles, and badger. These legally protected species will be assessed within the EIA where survey methodologies adhere to recommended survey guidance.

SENSITIVE RECEPTORS/RESOURCES

- 5.4.14. The desk studies and preliminary baseline survey work completed to date have identified designated sites, habitats and protected or otherwise notable species that may form 'Important Ecological Features,' as defined in the CIEEM Ecological Impact Assessment (EclA) Guidelines³⁰. The Important Ecological Features are ecological features that are considered important for nature conservation at a particular geographic scale that may occur within the potential ZoI of the Proposed Development.
- 5.4.15. Species that are considered likely to form Important Ecological Features and will be considered in the EIA include:
- Species listed in Annex II of the Habitats Directive;
 - Species, other than fish, listed in Schedules 5 and 8 of the Wildlife and Countryside Act 1981;
 - Species, other than fish, listed on Section 7 of the Environment (Wales) Act 2016, considered to be Priority Species in Wales; and
 - Any other protected species which may be subject to licensing requirements, such as badger.
- 5.4.16. Based on the initial surveys, the following Important Ecological Features likely to be taken forward for further detailed assessment include Statutory and non-statutory designated sites, priority habitats, Annex I habitats (including peatland habitats), potential GWDTEs, otter, water vole, badger, bat, reptiles, and amphibians. Should any additional sensitive features be identified during the course of the surveys, these would be included within the EIA as appropriate.

5.5 DESCRIPTION OF LIKELY SIGNIFICANT EFFECTS

In line with the EIA Regulations, the EIA for the Proposed Development would consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant effect. Terrestrial, non-avian ecology features have been identified where there is a potential for likely significant effects based on the activities associated with the Proposed Development, these are summarised in **Table 5-3**. The scoping assessment is based on a combination of an understanding of the Proposed Development, the likelihood of embedded environmental measures, baseline data collected to date, CIEEM guidance on Ecological Impact Assessment (2018), and professional judgement.

²⁹ Nature Metrics (2024) Great Crested Newt Environmental DNA Report. Produced on behalf of WSP

³⁰ CIEEM. 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.

Table 5-3 – Ecological Receptors Scoped in or out of Further Assessment for the Proposed Development

Element	Phase	Scoped In	Scoped Out	Justification
Internationally designated sites	Operation		✓	Please refer to Chapter 6: Ornithology for the impacts on the SPA. The Tanat and Vyrnwy Bat Sites/Safleoedd Ystlumod Tanat ac Efyrynwy SAC designated for bats is located >20m from the Site, as the Core Sustenance Zone (CSZ) of lesser horseshoe bat is considered to be 2km³¹ and therefore the Proposed Development is unlikely to impact on the qualifying feature (i.e. roosting bats) of the SAC. The River Wye is hydrologically connected to the watercourses within the Site and are bisected by the access road. Due to the distance downstream >20km from the Site and the very low water levels of the watercourses within the Site / Survey Area (sometimes likely to dry completely), it is unlikely the watercourses would support populations of fish or spawning grounds for migratory species. It is unlikely that any impact associated with the Proposed Development would result in a measurable impact that would affect any of the qualifying features.
Llyn Mawr SSSI and Wildlife Trust Reserve	Construction and Operation	✓		Temporary degradation of the habitat from changes in hydrology or pollution events. Disturbance of species for which the SSSI is designated*.
All other nationally designated sites for the presence of bats	Operation		✓	A total of 12 SSSIs were returned from the desk study that are within 30km of the Site and are designated for the presence of bats. The closest of these statutory designated sites to the Combined Site is Gregynog SSSI, 6km east, which supports lesser horseshoe bats. The Core Sustenance Zone (CSZ)** of lesser horseshoe bat is considered to be 2km³² and therefore the Proposed Development is unlikely to impact on the qualifying feature (i.e. roosting bats) of the SSSI.

³¹ Collins J. (ed.) (2023) Bat Surveys for Professional Ecologists, Good Practice Guidelines (4th Edition). The Bat Conservation Trust, London.

³² Collins J. (ed.) (2023) Bat Surveys for Professional Ecologists, Good Practice Guidelines (4th Edition). The Bat Conservation Trust, London.

Element	Phase	Scoped In	Scoped Out	Justification
Priority Habitats / Ancient Woodland / Peatland / GTDEs	Construction	✓		Potential direct, permanent habitat loss, or indirect degradation of habitat from changes in environmental conditions associated with construction activities.
Bats	Construction and Operation	✓		Potential loss of roosts / roosting resource associated with the construction of the access road. Potential disturbance, injury, or death associated with habitat removal. Potential displacement, injury or death associated with the operational wind turbines.
Dormouse	Construction	✓		Loss of habitat, or foraging resource associated with the construction of the access road. Potential disturbance, injury, or death associated with habitat removal. Fragmentation of suitable connected habitat.
Badger	Construction	✓		Potential damage or destruction of resting places.
Riparian mammals (otter and water vole)	Construction	✓		Potential damage or resting sites, disturbance of individuals using a resting site as a result of the construction activities. Degradation of the habitat suitable to support these species from changes in hydrology or pollution events.
Reptiles and Amphibians	Construction	✓		Potential loss of habitat, or foraging resource associated with the construction of the wind turbines, solar array, BESS.
Invertebrates	Construction		✓	Potential temporary disturbance of common and widespread species of negligible nature conservation importance could be avoided through design and implementation of standard mitigation measures during construction works.
Other Priority Species	Construction		✓	Potential impacts on could be avoided through design and implementation of standard mitigation measures during construction works.

*Ornithology species will be considered separately within the ornithology chapter.

** Core Sustenance Zone is the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost.

5.6 OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

- 5.6.1. Following industry best practice guidance, opportunities to deliver ecological enhancements will be considered for inclusion within the Proposed Development. Any such enhancements will be designed to support important habitats and species, and to strengthen and extend existing ecological networks. Opportunities to deliver multi-functional enhancements will be considered, for example opportunities for habitat enhancements may also provide opportunities to reduce flood risk through slowing overland flows via increased variation in vegetation structure.
- 5.6.2. The Proposed Development will be subject to an assessment of a Net Benefit for Biodiversity (NBB). The assessment will demonstrate whether the Proposed Development achieves a NBB whilst also promoting ecosystem resilience and demonstrating a compliance with planning requirements^{33 34 35}. The below recommendations aim to comply with a NBB approach, by way of delivering an overall improvement in biodiversity without use of a metric. Engaging with these recommendations in the early stages of the Proposed Development would facilitate ecosystem resilience and wider ecosystem benefits being achieved. This approach will support the Welsh Ministers in achieving their Section 6 duty to “*promote the resilience of ecosystems*” when determining planning applications.
- 5.6.3. To encourage compliance with planning policy the following measures are recommended for inclusion within the Proposed Development, where possible:
- Installation of bird and bat boxes in trees to provide additional refuge sites;
 - If planting is required, no planting of Invasive Non-Native Species (INNS) within the Site;
 - Planting of pollinator friendly native species of local provenance for any habitat lost which is suitable for invertebrates; and
 - Enhancing connectivity through the planting of suitable native species where appropriate.

5.7 PROPOSED ASSESSMENT METHODOLOGY

EIA ASSESSMENT METHODOLOGY FOR THE PROPOSED DEVELOPMENT

- 5.7.1. EIA will be a comprehensive assessment that collates relevant baseline information to predict the effects of the Proposed Development on Important Ecological Features with reference to methodology published by the Chartered Institute of Ecology and Environmental Management (CIEEM 2018¹⁹), and the British Standard for Biodiversity (BS 420020:2013³⁶). The assessment will determine the potential effects arising from the construction and operation phases of the Proposed Development (inclusive of embedded mitigation) on Important Ecological Features, both with and without consideration of additional targeted mitigation measures.

³³ Welsh Government (2024). Planning Policy Wales. Edition 12

³⁴ Welsh Government (2016) Environment (Wales) Act 2016

³⁵ CIEEM (2022) Briefing Paper: Welsh Government's Approach to Net Benefits for Biodiversity and the DECCA Framework in the Terrestrial Planning System.

³⁶ British Standard BS 420020:2013. Biodiversity. Code of practice for planning and development.

- 5.7.2. A significant effect is defined as an effect that could have an impact upon the integrity or conservation status of a designated site, habitat/eco-system, or species population where these are defined as Important Ecological Features. The relative importance of ecological features will be valued against a geographic frame of reference. Whilst impacts and resulting effects on the more important ecological features are more likely to be significant, it is also possible that a major scale, long-term or irreversible effect on a feature of lower importance for example of local importance, would also be significant. Therefore, professional judgment will be applied to the assessment of whether or not effects are significant and in relation to cumulative effects.
- 5.7.3. When describing biodiversity impacts and effects, reference will be made to the following characteristics as required in line with current best practice¹⁹³⁰:
- positive or negative
 - extent
 - magnitude
 - duration
 - frequency and timing
 - reversibility
- 5.7.4. Mitigation will be developed on an iterative basis, with the mitigation hierarchy followed; preference will be given to first avoiding effects, then reducing remaining effects, before applying additional targeted mitigation where necessary. Where residual effects remain after application of targeted mitigation measures, compensation will then be considered.
- 5.7.5. The detailed scope of the ecological assessment for the EIA will be refined as the design of the Proposed Development is progressed and additional survey information becomes available.
- 5.7.6. Additional pre-application consultation with NRW may also be used to seek agreement to the detailed scope.

HABITATS REGULATIONS ASSESSMENT

- 5.7.7. It is anticipated that a Habitats Regulations Screening Assessment (HRSa) to assess the potential for Likely Significant Effects (LSE) (the first stage of the Habitats Regulations Assessment (HRA) process) will not be required based on the current design of the Proposed Development (**Table 5-3**) and the lack of impact pathways to the closest SACs. Should the design materially change a further assessment would be required. Should it be necessary to undertake a formal HRSa, this will be carried out in accordance with the requirements of the Conservation of Habitats and Species Regulations 2017, with reference to best practice guidance. Whilst the over-arching objectives of EIA and HRA are similar, their scope, level of detail and terminology vary. As such, these processes will be undertaken separately. However, the scope presented within this report has been developed to ensure that the needs of both processes have been considered to ensure a coordinated assessment.

RELEVANT LEGISLATION AND POLICY

- 5.7.8. The appraisal has been compiled with reference to the following relevant nature conservation legislation, planning policy and the UK Biodiversity Framework from which the protection of sites, habitats and species is derived in Wales.

Legislation

- The Wildlife and Countryside Act 1981 (WCA);
- The Protection of Badgers Act 1992;
- The Wild Mammals (Protection) Act 1996;
- The Hedgerow Regulations 1997;
- Conservation of Habitats and Species 2017 (Habitats Regulations);
- The Town and Countryside (Environmental Impact Assessment) (Wales) Regulations 2017;
- Countryside and Rights of Way Act 2000;
- Environment (Wales) Act 2016; and
- Well-being of Future Generations (Wales) Act 2015.

Policy and Guidance

- Technical Advice Note (TAN) 5: Nature Conservation and Planning 2009;
- The UK Post-2010 Biodiversity Framework (2011-2020) (JNCC and DEFRA, 2012);
- UK Biodiversity Action Plan (UKBAP)²;
- Planning Policy Wales (PPW) (Edition 12) 2024;
- Future Wales: The National Plan 2040;
- Technical Advice Note 5;
- Powys Local Biodiversity Action Plan (LBAP); and
- Powys Nature Recovery Action Plan.

SURVEY METHODOLOGY

- 5.7.9. The PEAs undertaken within 2024 (which followed both best practice JNCC³⁷ and UKHab³⁸ methodology to futureproof the data) identified the habitats present to support protected and notable species. As such, additional targeted protected species surveys will be required prior to any assessment of effects. However, given the results of the initial surveys, further surveys that are ongoing, or are expected, include the following targeted surveys:

- **Bat surveys** – Ground-level static surveys have been undertaken in accordance with current best practice²³. Where potentially important roost features may be located within 200m of a turbine, further surveys will be undertaken²³.

³⁷ JNCC (2016) Handbook for Phase 1 habitat survey – a technique for environmental audit.

³⁸ UKHab (2020). UK Habitats Classification User Manual. Available: <https://ukhab.org/>

- **Badger surveys**—Update surveys are likely to be required on the refinement of the detailed design. Surveys will follow current best practice.^{39,40}
- **Riparian mammal surveys** – Surveys would be undertaken along all watercourses and water bodies within the Proposed Work Areas (and up to a maximum of 250m out with this area where accessible). The surveys would be carried out in accordance with standard methodologies^{41,42}.
- **Dormouse Surveys** – Surveys would be undertaken in all suitable habitat likely to be impacted by the Proposed Development and a minimum of 50m from the Site within continuous habitat in accordance with current best practice⁴³.
- **Reptile Surveys** – Surveys would be undertaken following best practice⁴⁴ to inform mitigation associated with the construction of the solar array and battery storage areas.
- **Great Crested Newt Surveys** – Surveys would be undertaken following best practice^{45,46} for watercourses considered suitable to support great crested newt within the survey area.
- **National Vegetation Classification Surveys** – The surveys would follow industry standard guidelines⁴⁷, classifying communities in accordance with the NVC system and floristic tables⁴⁸.

5.8 MITIGATION

- 5.8.1. A step-wise approach to the mitigation hierarchy will be applied to ecology^{19,33} to ensure designs first seek to avoid significant harm, to mitigate where it is unavoidable, and, as a last resort, to compensate for residual effects that remain after avoidance and mitigation measures are implemented.
- 5.8.2. The design of the Proposed Development will take into consideration Priority Habitats and potential GWDTEs that have been identified during the survey and the desk study, and efforts are made to avoid direct impacts on both Priority Habitat and areas of ancient woodland. In addition, areas that may be identified as peatland should be retained and impacts avoided. This would most effectively be achieved by ensuring that the access road route is designed to avoid / minimise impacts on these habitats and the siting of the solar array and BESS avoids these habitats.

³⁹ Harris, S., Cresswell, P., and Jefferies, D. (1989) Surveying Badgers. The Mammal Society. Bristol

⁴⁰ Andrews, R. (2013). The classification of badger *Meles meles* setts in the UK: A review and guidance for surveyors. In Practice, Edition 82, Institute of Ecology and Environmental Management (IEEM) (Now CIEEM).

⁴¹ Chanin P (2003). Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough

⁴² Liles G (2003). Enhancing the status of the Otter. Conserving Natura 2000 Rivers. Conservation Techniques Series No. 5. English Nature, Peterborough.

⁴³ English Nature (2006) Dormouse Conservation Handbook Second Edition

⁴⁴ Froglife (1999). Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice sheet 10. Froglife, Halesworth

⁴⁵ Gent, A. and Gibson, S. (2003). Herpetofauna Workers Manual. JNCC. Peterborough

⁴⁶ Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford.

⁴⁷ Rodwell, J. S. (2006). NVC Users' Handbook.

⁴⁸ Rodwell, J. S. (Ed), *et al.* (1991 – 2000). British Plant Communities (5 volumes).

- 5.8.3. It is recommended that turbine locations and access road routes are sited to avoid encroaching within 250m of the waterbody that has been confirmed to support great crested newt. In addition, appropriate buffer zones should be used to avoid direct impacts on sensitive receptors.
- 5.8.4. Appropriate precautionary measures would be included in the assessment and commitments captured in a CEMP or other similar, detailing standard best practice measures to be incorporated into construction, including:
- best practice measures for pollution prevention to minimise impacts on surrounding habitats (including water quality), such as the creation of suitable of drainage and use of silt fences, where necessary;
 - employment of noise reduction measures on operational plant machinery and equipment;
 - dust suppression measures;
 - use of sensitive lighting where any night works are required; and
 - potential need for habitat creation and replacement.
- 5.8.5. It has not been possible to develop species-specific design recommendations at this stage of the Proposed Development in the absence of comprehensive baseline survey data. Further surveys will be undertaken and will inform the EIA, and any species-specific design recommendations that is to be adopted.

5.9 ASSUMPTIONS AND LIMITATIONS

- 5.9.1. To ensure transparency within the EIA process, the following limitations and assumptions have been identified:
- Requirements for species specific surveys further than those listed above will be determined by completion of the current surveys and confirmation of the Proposed Development design and cannot be determined at this time.
 - Assessment of cumulative effects have been scoped in at this stage and a detailed assessment of effects will be dependent on available information from the openly accessible datasets and the Local Planning Authority relating to other relevant plans and projects.
 - Ecological survey data is typically valid for two years unless otherwise specified, for example if conditions are likely to change more quickly due to ecological processes or anticipated changes in management. Any delays to completion of the scope of surveys outlined above may therefore require updated surveys to be completed to ensure that any findings presented as part of the EIA are valid.

6 ORNITHOLOGY

6.1 INTRODUCTION

- 6.1.1. This chapter describes the proposed scope of the assessment of likely significant effects arising from the Proposed Development on ornithology. It includes consideration of impacts to species present on Site, mitigation, and proposals for habitat improvement/restoration in line with Net Benefit for Biodiversity (NBB)⁴⁹ where appropriate.
- 6.1.2. The chapter (and its associated figures and appendices) should be considered in conjunction with the description of the Proposed Development presented in **Chapter 2: Description of The Proposed Development** and **Chapter 5: Ecology** which details terrestrial ecology, covering habitats and protected and priority non-avian fauna.

6.2 CONSULTATION

- 6.2.1. **Table 6-1** summarises the extent of consultation that has taken place to date for the Proposed Development.
- 6.2.2. Consultees are requested to confirm the scope of this assessment and provide specific comment on the following:
- Do consultees foresee any additional likely significant effects during construction/operation/decommissioning phases that have not been identified in **6.5**?
 - Confirmation that the study area outlined in **6.3** is considered appropriate.
 - Confirmation that the parameters for cumulative assessment are considered appropriate.
 - Confirmation that there is agreement regarding the scoping of elements 'In' and 'Out', as outlined in **Table 6-3**.
 - The viability and appropriateness of the enhancement opportunities for curlew, as outlined in **6.6.3**.
 - The viability and appropriateness of the enhancement opportunities for kestrel, as outlined in **6.6.4**.

⁴⁹ Planning Policy Wales 12 (Chapter 6) requires an overall net benefit for biodiversity and ecosystem resilience to be delivered through the planning system in accordance with the Section 6 Duty set out in the Section 6 duty of the Environment (Wales) Act 2016.

Table 6-1 – Consultation Undertaken to Date

Body/Organisation	Date of Consultation	Key Outcomes of Discussions
Natural Resources Wales (NRW)	18 January 2023	■ The scope of the work was considered appropriate and reflective of the potential ornithological interest on-site. ■ A second year of ornithological survey effort (specifically Vantage Point, Breeding Raptor and Breeding Wader surveys) was required to gather further baseline data. ■ A second year of survey effort for European nightjar <i>Caprimulgus europaeus</i> was not considered necessary due to the distance of the known territory / suitable habitat from the development (380 m to the west of the site boundary). ■ The key considerations for further assessment at the time of the meeting were i) collision risk potential to red kite <i>Milvus milvus</i>; ii) collision risk and the potential displacement of nesting kestrel <i>Falco tinnunculus</i>; and iii) potential displacement of curlew <i>Numenius arquata</i>. ■ Unlikely to be functional linkage between Berwyn SPA and breeding SPA species on/near site (i.e. red kite and peregrine <i>Falco peregrinus</i>).

6.3 STUDY AREA

- 6.3.1. The Study Area comprised the entire Site boundary, an area of approximately 353 ha, plus an 800 m perimeter for breeding wader surveys, and 2 km perimeter for breeding and winter walkover surveys.
- 6.3.2. Additionally, breeding bird surveys were conducted along the proposed access route, which leaves the A470 at an unnamed road, and runs in an approximately northerly direction for approximately 4 km to meet the development at approximately OSGR SO 01150 97193.
- 6.3.3. The total extent of the Study Area includes both the 353 ha and 2 km buffer footprint of the Site, and the 16.26 ha extent of the access road. The Study Area is shown in **Figure 6.1**.
- 6.3.4. The extent of the survey was calculated following Scottish Natural Heritage [SNH] (2017)⁵⁰ guidance for breeding raptors and breeding waders, which allows for some micro-siting of the turbine layout with the Survey Area.

6.4 BASELINE CONDITIONS

- 6.4.1. The following sources of information have been reviewed during the desk-based research for this Scoping Report and will be considered in the assessment:
- Publicly accessible online aerial imagery and Ordnance Survey mapping.
 - Data from:

⁵⁰ Scottish Natural Heritage (2017). *Recommended bird survey methods to inform impact assessment of onshore wind farms*. SNH, Inverness [NB. Scottish Natural Heritage is now Nature Scot; however, the guidance has not been updated since the rebranding in 2020].

- The UK Government's 'MAGIC' website⁵¹ (principally this is of use in locating statutory designated sites of nature conservation importance);
- The Biodiversity Information Service for Powys & Bannau Brycheiniog National Park (BIS) for non-statutory sites of nature conservation interest and bird records within 2 km of the Study Area.
- The National Biodiversity Network (NBN) Gateway⁵² for publicly accessible biological records relating to birds
- An article on curlew featured in Milvus, the journal of the Welsh Ornithological Society (WOS) (WOS, 2022).
- Montgomeryshire Birds⁵³ for publicly accessible annual bird reports covering 2013 – 2023.

6.4.2. The Study Area is located north-east of Carno, Powys. In brief, the following broad land categories are located within the Study Area:

- Unenclosed pasture (in the western and south-western parts of the Study Area) covering an area of approximately 238 ha.
- Enclosed pasture (in the eastern and north-eastern parts of the Study Area) covering an area of approximately 108 ha.
- Habitats present within the Study Area include:
 - Acid grassland;
 - Extensive patches of bracken covering an area of approximately 18 ha along the western boundary of the Site;
 - Wet modified bog in the north-west of the Study Area covering an area of approximately 4 ha; and
 - Low rock exposures, not extending to more than 3 m in height in the west of the Study Area.
- Minor watercourses which discharge into the Nant y Llyn Mawr, which is a tributary of Afon Rhiw.
- Three freshwater bodies (Llyn Mawr, Llyn Du and Llyn Tarws)

6.4.3. The wider landscape is dominated by rolling enclosed, improved pasture and occasional areas of commercial forestry plantation. An operational wind farm (Mynydd Clogau) is located approximately 1.1km to the east of the Site boundary. The (approximately 4km long) access track passes through agricultural land, predominantly comprising enclosed pasture with small fragments of semi-natural broadleaf and mixed woodlands. The proposed route passes through the western edge of one of the woodlands at OSGR SO 00922 95461, skirting the eastern edge of a second at OSGR SO 01016 94659.

⁵¹ <https://magic.defra.gov.uk/MagicMap.aspx>

⁵² <https://wales.nbnatlas.org/>

⁵³ MONTGOMERYSHIRE BIRDS: County Reports (montgomerybirdblog.blogspot.com)

- 6.4.4. Sensitive ornithological receptors⁵⁴ on Site were defined as the following; all Schedule 1 (WCA) breeding birds; all species listed under Annex 1 of the Birds Directive⁵⁵; all Red and Amber Listed Birds of Conservation Concern (BoCC)⁵⁶ species.

6.5 BASELINE SURVEYS

- 6.5.1. Two consecutive breeding (April – August inclusive) and winter seasons (September to March inclusive) of data collection have been completed in the period April 2022 to March 2024. These were categorised into Year 1 (covering April 2022 – March 2023 inclusive) and Year 2 (covering April 2023 – March 2024 inclusive). Survey work to inform the assessment was conducted in accordance with industry standard SNH (2017)⁵⁷ guidance, supplemented by guidance for raptor survey produced by Hardey *et al.*, (2013), guidance for wader survey by Brown and Shepherd (1993) as amended by Calladine *et al.*, (2009)⁵⁸ in line with SNH (2017) guidance, and guidance for nightjar survey in Gilbert *et al.*, (1998).
- 6.5.2. The following comprises a summary of the main ornithological findings at the Site.
- The Site is located 16 km from the nearest Special Protected Area (SPA), the Berwyn Special Protection Area (SPA), which is classified for its importance to breeding red kite, hen harrier, peregrine and merlin.
 - The Site is located within Important Curlew Area (ICA) 9 (Montgomeryshire), which is one of twelve areas designated for their importance to the Welsh breeding curlew population.
 - Llyn Mawr SSSI is located 115 m from the Site boundary but is not notified for bird interest. Two other non-statutory sites are present nearby, with Llyn Du approximately 520 m south of the Site boundary, and Llyn y Tarw approximately 420 m east south-east of the Site boundary.
 - A total of 57 non-focal species were recorded in Year 1, and 66 non-focal species in Year 2.
 - 12 Red Listed Welsh BoCC species, and 13 Amber Listed BoCC species were recorded during Breeding Bird Surveys of the access track.
- 6.5.3. **Table 6-2** below comprises an overview of species specific findings at the Site.

Table 6-2 – Summary of Year 1 and Year 2 Bird Surveys

Species	Summary
Red kite	Red Kite was the most commonly recorded focal species in flight over the Study Area. One territory was present at the same location outside the Site boundary in both 2023 and 2024. Flight activity was higher during the non-breeding season in both years. More flights were recorded in Year 1 (96) than Year 2 (69).
Peregrine	

⁵⁴ Sensitive ornithological receptors are defined as focal species during the surveys i.e. raptor, wildfowl and wader species

⁵⁵ The Birds Directive - European Commission (europa.eu)

⁵⁶ Johnstone *et al.*, (2022) Birds of Conservation Concern Wales 4: the population status of birds in Wales

⁵⁷ SNH (2017) Recommended bird survey methods to inform impact assessment of onshore wind farms SNH, Inverness

⁵⁸ Calladine *et al.*, (2009) The influence of survey frequency on population estimates of moorland breeding birds

Species	Summary
	[REDACTED] [REDACTED] ⁵⁹ . A combined total of 8 peregrine flights were recorded over the Site across both years of which 4 were in the breeding season.
Kestrel	One pair of kestrel bred within the Study Area. [REDACTED] [REDACTED] Thirty-three kestrel flights were recorded during VP surveys in Year 1, and 18 during VP surveys in Year 2.
Curlew	Curlew was recorded occasionally using the Study Area or flying over it. Breeding wader surveys recorded two territories outside the Study Area (i.e. outside of the 800m buffer) in Year 1, and one territory outside the Study Area in Year 2. The closest turbines to the territories were T1 (approximately 450 m northwest of the territory to the east of the Study Area) and T8 (approximately 600 m south of the territory to the north of the Study Area). The level of activity was highest in the early part of the breeding season in both years, though no evidence of a successful breeding attempt was recorded in either year, suggesting failure at courtship or egg-laying stage. The northern territory was not evident at all in the second year.
Golden Plover	Golden plover <i>Pluvialis apricaria</i> were recorded in both years, with three flights in Year 1, and 21 flights in Year 2. The maximum counts in Years 1 and 2 were approximately 175 and approximately 125 individuals respectively. Activity was mostly outside of the Study Area, and during the spring and autumn passage periods.
Nightjar	One nightjar territory was recorded [REDACTED] [REDACTED]) in Year 1. Consultation with NRW resulted in the species being scoped out of further survey work in Year 2.
Other focal raptor species	Activity of other focal raptor species on Site or within the Study Area was limited to: ■ One hen harrier <i>Circus cyaneus</i> flight in both Year 1 and Year 2 ■ Two short-eared owl <i>Asio flammeus</i> flights in Year 1 and one flight in Year 2 ■ Three incidental records⁶⁰ of merlin <i>Falco columbarius</i> in Year 1, all off Site but within the Study Area, and no records in Year 2.
Wildfowl	Low numbers of wildfowl were recorded from the three waterbodies outside the Site boundary (Section 6.4.6.) throughout the entire survey period, with the maximum counts for each species as follows: goldeneye <i>Bucephala clangula</i> (3) goosander <i>Mergus merganser</i> (4) mallard <i>Anas platyrhynchos</i> (12), tufted duck <i>Aythya fuligula</i> (4) and teal <i>Anas crecca</i> (12), with records mainly during winter/passage periods.

⁵⁹ The confirmation of productivity in Year 1 came from a chance encounter between the bird surveyor and another surveyor working locally.

⁶⁰ Incidental records refer to observations outside of formal raptor surveys, or during surveys for other focal species

Species	Summary
Other Waders	Low numbers of waders were recorded on an occasional basis, with the maximum number for each species as follows: lapwing <i>Vanellus vanellus</i> (2), redshank <i>Tringa totanus</i> (2), snipe <i>Gallinago gallinago</i> (5), turnstone <i>Arenaria interpres</i> (3) ⁶¹ , common sandpiper <i>Actitis hypoleucos</i> (1) and whimbrel <i>Numenius phaeopus</i> (1).

6.6 DESCRIPTION OF LIKELY SIGNIFICANT EFFECTS

- 6.6.1. This section sets out the ornithological features that are scoped into the Ornithological Impact Assessment (OIA) at this stage. Likely significant effects have been separated into those arising from the construction phase, and those arising from the operational phase. It is anticipated that decommissioning effects are expected to be equal to (or less than) those during the construction phase.

Construction Phase

- 6.6.2. The extent of the effects of construction on birds will depend upon the timing of disturbing activities, the degree of displacement (spatially and temporally) that occurs, the size, suitability and proximity of habitats available to displaced birds, and their capacity to accommodate them.
- 6.6.3. Potential for significant construction phase effects is limited to those birds that regularly use the Site for breeding or foraging. In this instance the following species are considered likely to be impacted at the construction phase: red kite, kestrel, curlew and golden plover. Additionally, ground nesting birds (such as meadow pipit *Anthus pratensis* and skylark *Alauda arvensis*) that are present within the Study Area will primarily be considered with regard to legislative compliance.
- 6.6.4. The access track option may require vegetation clearance or removal of sections of hedgerow. This has the potential to impact Red listed BoCC species such as greenfinch *Chloris chloris*, linnet *Linaria cannabina* and willow warbler *Phylloscopus trochilus*, and Amber listed BoCC species such as chaffinch *Fringilla coelebs*, house sparrow *Passer domesticus*, dunnoek *Prunella modularis* and pied flycatcher *Ficedula hypoleuca*, all of which breed within the Study Area.
- 6.6.5. It is unlikely that effects will be significant at more than the local level. They are therefore unlikely to be significant in EIA terms. Due to the distance between the Site and the Berwyn SPA exceeding the foraging ranges of the SPA species recorded, no impacts on SPA species are anticipated, and therefore impacts to the SPA are scoped out of the EIA.
- 6.6.6. Curlew are known to be adversely affected by both the development and operational phases of wind energy developments, as evidenced by declines or complete loss of a population during the construction phase, and the first year of operation (Pearce-Higgins *et al.*, (2012))⁶². Contrary (unpublished) research by Whitfield *et al.*, (2010)⁶³ suggested there was little change in both number of nests/territories between the pre- and post-construction period, with anecdotal evidence that pairs

⁶¹ This record related to three birds on the 16 December 2022, likely moving in response to a period of hard weather

⁶² Pearce-Higgins, J.W., Stephen, L. and Langston, R.H.W. (2012) Greater impacts of wind farms on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis

⁶³ Whitfield, D. P., Green, M. and Fielding, A.H. (2010) Are breeding curlew *Numenius arquata* displaced by wind energy developments? Natural Research Projects Ltd. Banchory, Scotland

were not dissuaded by arrays, with three territories located within 200m of a turbine at one site. Another study by Robson *et al.*, (In Press)⁶⁴ found no evidence of displacement of curlew in areas between 250 m and 1 km from turbines. Although both territories are less than 800 m from the nearest turbine (the maximum distance at which Pearce-Higgins *et al.*, (2009)⁶⁵ concluded that significant displacement effects would occur), it is unlikely that there will be significant effects to curlew present in the area resulting from the development due to the productivity rate. No evidence of breeding success at either of the two closest territories was recorded in either year, with the territory to the north apparently vacant in Year 2, suggesting that other factors are impacting breeding attempts. As the Site is located within ICA 9, Curlew will be carried forward and scoped into the EIA.

Operational Phase

- 6.6.7. There are three ways in which birds can be affected by operational wind farms and related green infrastructure: through displacement due to ongoing disturbance caused by the turbine towers and moving blades (and by periodic servicing of the turbines), through collision with moving blades or associated infrastructure, e.g. the guy lines of meteorological masts; and through habitat loss/fragmentation in areas used for other green infrastructure, such as solar arrays and/or battery energy storage systems (BESS).
- 6.6.8. Operational impacts on focal species (raptors and waders) present within the Study Area will need to be considered. Collision Risk Analysis (CRM) for all regularly occurring raptor and wader species will be undertaken.
- 6.6.9. Species that will be scoped in are hen harrier, peregrine, red kite, kestrel, curlew and spring/autumn passage golden plover. It is unlikely, based on observed flight activity to date, that impacts on most of these species will be significant at more than the Site / Local level.
- 6.6.10. The feasibility of measures to improve habitat quality for some species (particularly curlew) will also need to be assessed (to determine whether meaningful enhancement can be achieved on Site).
- 6.6.11. An overview of elements scoped in or out for further assessment, along with justification for its categorisation is provided in **Table 6-3**.

⁶⁴ Robson, P., Rankin, S. and Whittingham, M. (In Press) Contrasting effects of two large windfarms in Scotland on Common Snipe *Gallinago gallinago* and Eurasian Curlew *Numenius arquata* populations

⁶⁵ Pearce-Higgins, J.W., Stephen, L., Langston, R.H.W., Bainbridge, I.P. and Bullman, R. (2009) The distribution of breeding birds around upland windfarms.

Table 6-3 – Elements Scoped in or Out of Further Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Berwyn SPA	Construction and Operational		✓	The Berwyn SPA is located 16 km from the nearest point of the Site boundary. The species for which the Berwyn are designated (breeding Red Kite, Hen Harrier, Peregrine and Merlin) are either absent or occur rarely (Merlin and Hen Harrier). All have a core ranging area which is smaller than the distance between the Site and the SPA (SNH, 2016 ⁶⁶). The Site is not therefore considered to be functionally linked to the Berwyn SPA.
Red kite	Construction and Operational	✓		Red kite is a S1 species under the Wildlife and Countryside Act 1981. Red kite is known to breed on and near to Site and is at risk of disturbance during the construction phase of the Proposed Development. Additionally, VP survey has demonstrated that red kite use the entirety of the Site and the local landscape which demonstrates the potential for injury / fatalities to occur via collision with turbines during the operational phase.
Peregrine	Construction and Operational		✓	Peregrine is a S1 species under the Wildlife and Countryside Act 1981 and is an Annex 1 species under the Birds Directive 2009. Due to the combination of low utilisation of the Site and the distance between the Proposed Development and the nearest known breeding location, it is considered that the Proposed Development will have no direct or significant indirect impact to breeding peregrine in the local area.
Kestrel	Construction and Operational	✓		Kestrel is a Red listed Bird of Conservation Concern (BoCC) in Wales. Kestrel was recorded breeding and foraging / commuting over the Site, though the majority of foraging took place on rough ground off Site. The change in breeding locality between Year 1 and Year 2 demonstrates that suitable alternative breeding locations are present within the local area. Kestrel is potentially susceptible to disturbance during the construction phase of the Proposed Development. The wide distribution of flight activity recorded demonstrates the potential for injury / fatalities to occur via collision with turbines during the operational phase.

⁶⁶ SNH (2016) Guidance: Assessing connectivity with Special Protection Areas (SPAs) Version 3 – June 2016

Element	Phase	Scoped In	Scoped Out	Justification
Merlin	Construction and Operational		✓	Merlin is a S1 species under the Wildlife and Countryside Act 1981. Merlin was absent from the Site and only recorded incidentally from outside of, or on the boundary of the Site. It is considered that the Proposed Development will have no direct or significant indirect impact on merlin.
Hen harrier	Operational	✓		Hen harrier is a S1 species under the Wildlife and Countryside Act 1981. Hen harrier is also a Red listed BoCC in Wales. Hen harrier utilisation of the Site was low, however there remains a risk of the potential for injury / fatalities to occur via collision with turbines during the operational phase.
Curlew	Construction and Operational	✓		Curlew is a Red listed BoCC in Wales. The Site falls within Important Curlew Area (ICA) 9: Montgomeryshire. There is the potential for disturbance to curlew attempting to breed within the survey area during the construction phase, and some potential for injury / fatalities to occur via collision with turbines during the operational phase. The placement and extent of other green infrastructure (such as solar arrays and BESS) may result in displacement resulting from reducing the overall extent of suitable foraging areas.
Golden plover	Construction and Operational	✓		Golden plover is a Red listed BoCC in Wales. Flocks of up to 175 golden plover use the Site during spring and autumn passage period, with the potential for disturbance during the construction phase of the Proposed Development, and the potential for injury / fatalities to occur via collision with turbines during the operational phase. The placement and extent of other green infrastructure (such as solar arrays and BESS) may result in displacement resulting from reducing the overall extent of suitable foraging areas.
Nightjar	Construction and Operational		✓	Nightjar is Green listed BoCC species in Wales, however, Nightjar is Amber listed in the UK ⁶⁷ . Nightjar was absent from the site, and only recorded outside of the Site, this was due to the lack of suitable habitat for nightjar on Site. NRW recommended that a second year of nightjar survey would not be required. It is considered that the Proposed Development will have no direct or significant indirect impact to breeding nightjar in the local area.

⁶⁷ Stanbury et al., (2021) *The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain*

Element	Phase	Scoped In	Scoped Out	Justification
Other breeding bird assemblages on site	Construction and Operational		✓	The general breeding bird assemblage on Site includes Red and Amber listed Birds of Conservation Concern (BoCC), predominately passerines or near-passerine species. Impacts to these groups are anticipated during the construction phase. Legislative compliance can be achieved through appropriate mitigation (timing of works, use of an Ecological Clerk of Works (ECOW), methods statement etc). Habitat enhancement principally aimed at other species is also likely to benefit the locally breeding bird community. Impacts to passerines and near-passerines resulting from the operational phase are not anticipated, although the placement and extent of other green infrastructure (such as solar arrays and BESS) may result in displacement resulting from reducing the overall extent of suitable foraging/nesting areas.

6.7 OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

- 6.7.1. The approach to enhancing the environment will be based on the requirements in the Environment (Wales) Act 2016 and Planning Policy Wales 12 (PPW12).
- 6.7.2. The footprint of the Proposed Development will result in the fragmentation and loss of existing habitat on Site. In line with the Section 6 Duty⁶⁸ it is imperative that where practicable, existing habitats or ornithological features are to be retained and protected by a stand-off buffer. Habitat must be reinstated where practicable, and consideration of habitat restoration following the decommissioning phase must be undertaken.
- 6.7.3. As the Site falls within ICA 9 and curlew are known to be present in the local area, the improvement of habitat either on Site or within the wider ICA 9 area is the primary opportunity for environmental enhancement. It is recommended that contribution to funding landscape scale habitat restoration within ICA 9 is provided, and that consultation with NRW and Curlew Wales⁶⁹ (joint working group) is undertaken to identify how the development could contribute to ICA 9.
- 6.7.4. Kestrel is present on Site, and the provision of suitable nestboxes outside the Site boundary on adjacent common land favoured by kestrel for foraging, which would increase breeding opportunities and potentially mitigate localised displacement, drawing the birds away from the operational wind farm. Discussion with landowners within the Site boundary to reach an agreement for the installation on their landholdings is required, and a suitably experienced ecologist must identify suitable locations for the installation of the nestboxes.

⁶⁸ Welsh Government (2024). Planning Policy Wales – Edition 12. Available at: <https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf> (Accessed: 20 February 2025).

⁶⁹ [Conservation Partnership | Curlew Wales](#)

6.8 PROPOSED ASSESSMENT METHODOLOGY

- 6.8.1. The approach to the ornithological impact assessment will be based on industry standard Chartered Institute of Ecology and Environmental Management (2018)⁷⁰ 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”.
- 6.8.2. CIEEM recommends 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 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).
 - Applying mitigation to avoid or reduce the significance of effects.
 - Assessment of residual effects.
- 6.8.3. The adopted approach will differ from CIEEM guidance in that mitigation will be embedded within the Proposed Development through the adoption of best practice measures and/or incorporating mitigation into the Proposed Developments design. This approach assumes such measures are implemented and therefore do not require further assessment. Should any additional (i.e. not embedded) measures be required, these will be assessed separately within the EIA process.
- 6.8.4. 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:
- Magnitude⁷¹.
 - Extent.
 - Duration.
 - Frequency.
 - Timing.
 - Reversibility.

⁷⁰ CIEEM (2018) GUIDELINES FOR ECOLOGICAL IMPACT ASSESSMENT IN THE UK AND IRELAND
Terrestrial, Freshwater, Coastal and Marine

⁷¹ Magnitude refers to size, amount, intensity and volume. It is quantified where possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area or the percentage decline in a species population.

- 6.8.5. 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).
- 6.8.6. Any effect that is significant at the district level or above will be considered significant in EIA terms.
- 6.8.7. 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 model⁷², prescribed by NatureScot, is the standard model used to calculate this impact. The predicted annual fatality level generated by the model can be compared with other wind farms, local, regional and national population estimates and the significance of the impact from the wind farm alone and cumulatively can be assessed.
- 6.8.8. The likelihood of significant displacement and disturbance effects on nesting raptors will be assessed with regard to published disturbance distances), wind farm monitoring studies and professional experience.

RELEVANT LEGISLATION AND GUIDANCE

- The Wildlife and Countryside Act 1981⁷³;
- The Conservation of Habitats and Species Regulations 2017⁷⁴;
- 2009/147/EC Birds Directive on the Conservation of Wild Birds⁷⁵;
- Environment (Wales) Act 2016⁷⁶;
- Technical Advice Note (TAN) 5: Nature Conservation and Planning 2009⁷⁷;
- The UK Post-2010 Biodiversity Framework (2011-2020)⁷⁸ and UK Biodiversity Framework 2024⁷⁹;
- UK Biodiversity Action Plan (UKBAP);
- Planning Policy Wales (PPW) (Edition 12) 2024¹³;

⁷² SNH (2013) Avoidance rates for wintering species of geese in Scotland at onshore wind farms. SNH Guidance Note

⁷³ Wildlife and Countryside Act 1981 (c. 69). (1981) Available at: <https://www.legislation.gov.uk/ukpga/1981/69> (Accessed: 20 February 2025)

⁷⁴ As amended within The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

⁷⁵ European Union (2009) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147> (Accessed: 20 February 2025).

⁷⁶ Environment (Wales) Act 2016, c. 3. Available at: <https://www.legislation.gov.uk/anaw/2016/3/contents/enacted> (Accessed: 20 February 2025).

⁷⁷ Welsh Government (2009) Technical Advice Note (TAN) 5: Nature Conservation and Planning. Available at: <https://www.gov.wales/technical-advice-note-tan-5-nature-conservation-and-planning> (Accessed: 20 February 2025).

⁷⁸ Joint Nature Conservation Committee (JNCC) (2012) The UK Post-2010 Biodiversity Framework. Available at: <https://hub.jncc.gov.uk/assets/19a729f6-440e-4ac6-8894-cc72e84cc3bb> (Accessed: 20 February 2025).

⁷⁹ Joint Nature Conservation Committee (JNCC) (2024) The UK Biodiversity Framework. Available at: <https://hub.jncc.gov.uk/assets/19a729f6-440e-4ac6-8894-cc72e84cc3bb> (Accessed: 20 February 2025).

- Future Wales: The National Plan 2040⁸⁰;
- Powys Local Biodiversity Action Plan (LBAP)⁸¹; and
- Powys Nature Recovery Action Plan⁸².

SURVEY METHODOLOGY

Vantage Point (VP) Surveys

- 6.8.9. VP surveys were conducted during the 2022 and 2023 breeding seasons (April to August inclusive) and non-breeding / winter season (September to March inclusive). Key principles of VP survey are set out by SNH (2017)⁸³. These are:
- VPs should be chosen parsimoniously in order to achieve maximum visibility from the minimum number of survey locations.
 - An arc of up to 180 degrees extending up to two kilometres from the observer can be effectively surveyed from each VP.
 - VPs are best located outside of the survey area where possible.
 - Observers should try to position themselves inconspicuously in order to minimise their effect on bird behaviour / movement.
 - VPs that are located within the survey area should not be used simultaneously with other VP locations which overlook them as the presence of an observer either sitting at or moving to / from the VP could affect bird behaviour.
 - At least 36 hours of survey per VP should be conducted per 'season' to enable representative data collection.
- 6.8.10. Two VP locations were selected for survey of land within the Site during the survey period. Both are located on Site boundaries⁸⁴. VP locations are shown in **Figure 6.2**. Three hours was spent at each VP location per "watch" where weather conditions allowed, during which time the surveyor scanned a 180 degree viewshed extending up to two kilometres from the observer using binoculars. During VP survey the viewing arc was scanned constantly until a 'target species' was detected. The bird was then followed until it landed or was lost to view. Height bands of 0-15 m, 15-230 m and 230+ m were used for recording flight height. The height range 15-230 m was considered to represent collision risk height.
- 6.8.11. The following information was recorded for each target species:
- Species

⁸⁰ Welsh Government (2021) Future Wales: The National Plan 2040. Available at: <https://www.gov.wales/future-wales-national-plan-2040> (Accessed: 20 February 2025).

⁸¹ Powys County Council (n.d.) Local Biodiversity Action Plan. Available at: <https://en.powys.gov.uk/article/2553/Local-Biodiversity-Action-Plan#:~:text=The%20Powys%20Local%20Biodiversity%20Action,to%20maintain%20and%20enhance%20hem> (Accessed: 20 February 2025).

⁸² Powys County Council (2022) Powys Nature Recovery Action Plan. Available at: <https://en.powys.gov.uk/article/2573/Powys-Nature-Recovery-Action-Plan> (Accessed: 20 February 2025).

⁸³ SNH (2017) Recommended bird survey methods to inform impact assessment of onshore wind farms. SNH, Inverness.

⁸⁴ VP locations were allocated within the Site boundary due to the topography of the Site reducing the visible survey area within the viewshed when VP locations were positioned off Site.

- Time of observation
- Duration of observation
- Count
- Estimated flight height (every 15 seconds)
- Direction of flight
- Estimated distance and direction of bird from the observer
- Flight type and behaviour, where apparent (e.g., flapping / gliding and foraging, displaying, commuting etc.)

6.8.12. SNH Guidance (2017) states that, “*In most circumstances ... target species will be limited to those species which are afforded a higher level of legislative protection.*” Target (or ‘focal’) species at Parc Ynni Calon y Gwynt were defined as all Schedule 16 and Annex 17 raptors / owls, waders and wildfowl (excluding re-established greylag goose *Anser anser* and feral Canada goose *Branta canadensis*).

Breeding Raptor Surveys

- 6.8.13. Surveys followed SNH (2017) guidance, which recommends that surveys for breeding raptors including red kite and peregrine are completed within 2 km of proposed wind farms. For goshawk *Astur gentilis* and hobby *Falco subbuteo*, which often nest in plantation habitats, 1 km is applicable, however neither species were present on Site, and the Site did not contain suitable breeding habitat.
- 6.8.14. Surveys of potential breeding areas were completed using a combination of walkover raptor survey and mobile VPs on nine visits in both 2022 and 2023 between April and July inclusive. During the surveys, habitat features were searched for signs of raptors. The surveys also involved walking along plantation edge and undertaking short VP watches of up to one hour duration over woodland / plantation and quarries.
- 6.8.15. The survey methods were based on recommendations in SNH (2017) guidance and Hardey *et al.* (2013) and were informed by the emerging results of the ongoing VP survey work. The durations of supplementary VP watches were varied by location depending on the extent to which viewsheds covered the areas in question.

Breeding Wader Surveys

- 6.8.16. Walkover breeding wader surveys of the moorland habitats extended to approximately 800 m beyond the developable area where potentially suitable breeding habitat was present.
- 6.8.17. Surveys followed SNH guidance (2017), which recommends that the Brown & Shepherd (1993)⁸⁵ method as amended by Calladine *et al.* (2009)⁸⁶ is applied, with surveys repeated on four occasions between April and July inclusive (with at least seven days between visits).
- 6.8.18. The work involved walking over moorland areas and applying a constant search effort for upland waders. All parts of the survey area were approached to within approximately 100 m. Frequent stops

⁸⁵ Brown, A.F. & Shepherd, K.B. (1993). A method for censusing upland breeding waders. *Bird Study*, 40: 189-195.

⁸⁶ 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.

were made at local viewpoints in order to listen for singing and calling birds and to scan areas around the observer.

- 6.8.19. In addition to the walkover surveys, a count of waterfowl using Llyn Mawr was conducted once per month over both the 2022 and 2023 breeding season (April to August inclusive) and was typically incorporated into the breeding wader survey. All waterfowl present (including any waders at the pool margins) were recorded systematically. Details of weather conditions during the survey were also recorded.

Nightjar Surveys

- 6.8.20. Areas of suitable breeding habitat for nightjar (defined as permanently open habitat, clear fell and recently re-stocked plantation in accordance with the findings of Scott *et al.* (1998)⁸⁷) were identified. A walked transect with stopping (listening) points was selected, to survey suitable habitat associated with commercial coniferous plantation within 800 m of the developable area.
- 6.8.21. Surveys to locate churring male nightjars were completed based on the methods outlined in Gilbert *et al* (1998). The transect survey was undertaken in June 2022 and repeated in July 2022. Each stop was eight minutes duration. If, after three minutes, no churring nightjars had been recorded, audio playback was used for a duration of 1 minute to attempt to elicit a response.

6.9 MITIGATION

- 6.9.1. Construction phase mitigation will principally be delivered through input to the Outline CEMP. The ornithological objectives of the Outline CEMP will include:
- Appointment of an ecologist to ensure compliance with all relevant regulatory and other requirements, method statements and reporting to the principal contractor and statutory consultees with regards to ornithological issues arising.
 - Input into method statements for all components of the work, demonstrating how the potential for any offences regarding ornithology will be avoided or mitigated.
 - The appointment of an appropriately qualified and experienced ecologist to act as ecological clerk of works (ECoW) when required during the construction phase.
 - The identification of appropriate ecological awareness training for site staff and contractors in respect of the presence of protected and sensitive bird species and the importance of species-specific mitigation measures.
- 6.9.2. Other mitigation measures may include the provision of nestboxes for kestrel within the Site boundary.

6.10 ASSUMPTIONS AND LIMITATIONS

- 6.10.1. To ensure transparency within the EIA process, the following limitations and assumptions have been identified:
- It is assumed that the outlined approach with regard to habitat restoration for curlew will be a workable solution and also agreeable to stakeholders, and that successful consultation will allow for this enhancement to be undertaken within ICA 9.

⁸⁷ G.W. Scott, D.C. Jardine, G. Hills & B. Sweeney (1998) Changes in Nightjar *Caprimulgus europaeus* populations in upland forests in Yorkshire. Bird Study.

- If off Site habitat restoration for curlew is not practicable, it is recommended that a Habitat Management Plan (HMP) is produced, following consultation with stakeholders to assess what practical and demonstrable improvements for bird assemblages can be undertaken on Site.

7 LANDSCAPE AND VISUAL

7.1 INTRODUCTION

- 7.1.1. This chapter sets out the proposed scope of the Landscape and Visual Impact Assessment (LVIA) which would assess the likely significant effects, including cumulative effects of the Proposed Development, on the landscape resource and visual amenity. The following related technical assessments would also be included as part of the scope of the LVIA:
- Night-time Lighting Assessment; and
 - Residential Visual Amenity Assessment (RVAA).
- 7.1.2. This chapter of the report is supported by **Figures 7.1 – 7.5** and should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Description Of The Proposed Development**.
- 7.1.3. Consultees are requested to confirm the scope of this assessment and provide specific comment on other known wind farm developments which should be included in the assessment (**Table 7-5 in Section 7.8**), the proposed viewpoint locations (**Table 7-2 in Section 7.7**), proposed night-time viewpoint locations (**Table 7-3 in Section 7.7**), matters that are proposed to be scoped out of the LVIA (**Table 7-5 in Section 7.5**) and the Assessment Methodology (**Section 7.8**).

7.2 CONSULTATION

- 7.2.1. At this time no consultation has been undertaken with key consultees regarding the assessment of likely significant effects on the landscape resource and visual amenity arising from the Proposed Development. It is therefore intended that this EIA Scoping Report would form the basis for consultation response from key consultees.

7.3 STUDY AREA

- 7.3.1. The LVIA Search and Study Areas for the Proposed Development are illustrated in **Figures 7.1 - 7.5**. They have been defined in accordance with Natural Resources Wales (NRW) guidance contained in LANDMAP Guidance Note 46⁸⁸ - Using LANDMAP in Landscape and Visual Impact Assessments. The LVIA Search and Study Areas are appropriate for the proposed turbine height (200m to blade tip).
- 7.3.2. The LVIA Search Area is based upon a circle that allows a minimum of 30km distance from each of the indicative turbine locations. This accords with the appropriate separation distance ratio of 1:150 between the maximum structure height (200m) and the distance to be included as a Search Area, as specified by Guidance Note 46.
- 7.3.3. Similarly, the LVIA Study Area is based upon a circle that allows a minimum of 27km distance from each of the proposed turbine locations. This accords with the appropriate separation distance ratio of 1:133 for the maximum structure height (200m) to potentially have '*an average low magnitude of effect on a high sensitivity receptor*' as specified by Guidance Note 46.

⁸⁸ Natural Resources Wales. LANDMAP Guidance Note 46: Using LANDMAP in Landscape and Visual Impact Assessments GN46. March 2024.

- 7.3.4. Based upon a review of the preliminary zone of theoretical visibility (ZTV) maps of the blade tip height of the Proposed Development shown on **Figures 7.1 – 7.4**, knowledge of the Site and surrounding area, it is considered that significant landscape effects would be unlikely at separation distances in excess of 10 km.
- 7.3.5. For visual receptors it is considered unlikely that significant effects would be sustained by visual receptors at separation distances in excess of 10 km. However, this distance may vary depending upon local factors and the direction of views toward the Proposed Development. Consequently, the inclusion or exclusion of visual receptors situated between 10km and 27km from the Proposed Development would be informed by viewpoint analysis, which would establish the maximum distance at which likely significant effects may be sustained.

7.4 BASELINE CONDITIONS

THE SITE AND IMMEDIATE SURROUNDING AREA

- 7.4.1. The southern part of the Site of the Proposed Development is located across the upper hill slopes of Garreg-hir, 466m above ordnance datum (AOD), extending in an easterly direction to include the summit of Craig y Llyn-mawr (485m AOD) and north of Llyn Mawr to the northern slopes of Waun Y Llyn, to the south of Mynydd Cerrigllwydion. The northern part of the Proposed Development Site extends to the north-easterly facing slopes of Y Glonc (461m AOD) in the east, to the south of Esgair Cwmowen. To the west, the Proposed Development Site includes the westerly slopes of Blaen-y-Cwm and Garreg-Hir to the north of Pantygesail.
- 7.4.2. The land across the Proposed Development Site comprises predominantly improved upland pasture for sheep grazing, although some intervening areas of marshy grassland or upland heathland are distributed across western and northern areas, providing a contrasting land cover colour and texture. Some small areas of coniferous shelterbelt are in evidence across the southern Site, at Lluestuchaf and north of Llyn Mawr, which in turn is bound to the north by areas of naturally regenerating deciduous woodland. Further margins of scrub vegetation mark the course of the Nany y Llyn Mawr which crosses the eastern part of the Site.
- 7.4.3. The pastoral land within the Proposed Development Site has been sub-divided by fences and intermittent hedgerows into a pattern of regular, large fields. Field boundaries within the western extent of the Site are less clearly defined and irregular. The Site is crossed by a number of existing surfaced access tracks and a large agricultural building is located within the northern part of the Site. The farm buildings and residential property at Llyn Mawr are located on the southern boundary of the Site.
- 7.4.4. The operational Mynydd Clogau and Tirgwynt wind farms adjoin the Proposed Development Site, 930m to the east and 1.3km to the north, respectively.

LANDSCAPE BASELINE

Landscape Character

- 7.4.5. Natural Resources Wales (NRW) has divided Wales into 48 National Landscape Character Areas (NLCA). The NRW Landscape Character Map for Wales⁸⁹ is referred to for a strategic understanding of landscape character within the Study Area. This outlines the wider setting for the Proposed Development and provides a context for the description of local landscape character.
- 7.4.6. The Proposed Development is located within **NLCA21 – Cambrian Mountains** National Landscape Character Area.
- 7.4.7. At a local level, the NRW LANDMAP landscape character information has been referred to for an understanding of landscape character within the Study Area. This outlines the setting for the Proposed Development within the Study Area.
- 7.4.8. LANDMAP⁹⁰ provides an all-Wales resource of landscape characteristics, qualities, and influences, arranged within five aspect layers: Geological Landscape, Landscape Habitats, Visual and Sensory, Historic Landscape and Cultural Landscape.
- 7.4.9. Areas of shared characteristics, termed Aspect Areas, are identified in relation to each of the five Aspects. The Site is located within the following host aspect areas:
- Geological Landscape Aspect Areas – MNTGMGL918: Mynydd Waun Fawr Cefn Gwyn and MNTGMGL760: Llyn Mawr;
 - Landscape Habitats Aspect Areas – MNTGMLH028;
 - Visual and Sensory Aspect Areas – MNTGMVS733: Esgair Cwmowen Uplands;
 - Historic Landscape Aspect Areas – MNTGMHL859: Ffridd Rhyd Ddu; and
 - Geological Landscape Aspect Areas – MNTGMGL918: Mynydd Waun Fawr Cefn Gwyn and MNTGMGL760: Llyn Mawr.
- 7.4.10. LANDMAP Guidance Note 46⁹¹ specifically cross references LVIA using LANDMAP data to the concept of landscape value as identified and defined in the third edition of Guidelines for Landscape and Visual Impact Assessment. In accordance with LANDMAP Guidance Note 46 aspect areas for all five aspect layers would be included within the landscape assessment.
- 7.4.11. The selection of which individual aspect areas to included would be guided by LANDMAP Guidance Note 46, which specifies processes for ‘filtering’ the five different types of aspect area.
- 7.4.12. For Geological Landscape; Landscape Habitats; and Cultural Landscape Services Aspect Areas the prescribed four stage filter process recommends that the landscape assessment is confined to aspect areas that “*overlap fully, partially or are adjacent to the development site boundary*”. Subsequent filters include whether aspect areas are within the ZTV and, for Geological Landscapes or Landscape Habitats, have outstanding or high evaluations for specific survey response questions.

⁸⁹ National Landscape Character Areas for Wales (online) Available at www.naturalresources.wales.

⁹⁰ Natural Resources Wales. Wales Environmental Information Portal. Available online: <https://smnr-nrw.hub.arcgis.com/apps/c7770d2881394c899123bae210afe370/explore>. Accessed: October 2024.

⁹¹ Natural Resources Wales. LANDMAP Guidance Note 46: Using LANDMAP in Landscape and Visual Impact Assessments GN46. March 2024.

- 7.4.13. For Visual and Sensory and Historic Landscape Aspect Areas the prescribed four stage filter process initially requires identification of all these aspect areas across the 30 km LVIA Search Area. The second filter relates to their inclusion within the ZTV (whether blade tip or hub height ZTV is not specified). Subsequent filters focus upon the retained Visual and Sensory Aspect Areas possessing high or outstanding evaluations for specific survey response questions relating to overall evaluation; scenic quality; or character; and for the retained Historic Landscape Aspect Areas possession of outstanding or high overall evaluation.
- 7.4.14. The third filter also stipulates the inclusion of Visual and Sensory Aspect Areas and Historic Landscape Aspect Areas where the overall evaluation is moderate or low if there is potential for a large magnitude of change and opportunities for restoration, enhancement or interpretation.

Landscape Designations

- 7.4.15. Landscape designations within the LVIA Search Area are illustrated in **Figure 7.3** with the blade tip ZTV for the Proposed Development.
- 7.4.16. There are two national landscape designations within the LVIA Search Area. The Eryri National Park (ENP) falls within the north-western part of the LVIA Search Area, lying approximately 16 km from the Proposed Development at its closest point, between Nant-y-dugod and Mallwyd. Two western parts of the Shropshire Hills National Landscape are located within the south-eastern part of the LVIA Search Area, at Anchor and Middleton respectively. The closest area of the National Landscape located within the blade tip ZTV for the Proposed Development (**Figure 7.3**) is in the vicinity of Black Mountain, southwest of Hall of the Forest, approximately 22.5km southeast of the Proposed Development.
- 7.4.17. Local landscape designations within a 15 km radius of the Proposed Development are limited to two Registered Landscapes of Outstanding and Special Historic Interest; Bro Caersws located approximately 3 km south and Dyffryn Clywedog which lies approximately 8.5 km south (**Figure 7.3**). However, Registered Landscapes of Outstanding and Special Historic Interest are not formal landscape designations and would be considered in relation to visual receptors at outdoor recreational destinations by the LVIA.
- 7.4.18. The adopted Powys County Council Local Development Plan⁹² (LDP), which covers the majority of the LVIA Search and Study Areas does not identify any landscape designations.
- 7.4.19. A number of further Registered Landscapes of Outstanding and Special Historic Interest and four Special Landscape Areas (SLAs) designated by the Ceredigion LDP⁹³ and Anglesey and Gwynedd Joint LDP⁹⁴ are located beyond 15 km from the Proposed Development, as illustrated in **Figure 7.3**.

⁹² Powys County Council. Powys Local Development Plan 2011-2026. Adopted April 2018.

⁹³ Ceredigion County Council. Ceredigion Local Development Plan 2007-2022. April 2013.

⁹⁴ Isle of Anglesey County Council and Cyngor Gwynedd Council. Anglesey and Gwynedd Joint Local Development Plan 2011-2026. July 2017.

VISUAL BASELINE

- 7.4.20. The visual assessment would draw upon the ZTV, site visits and viewpoint analysis, assessing the potential visual effects on views and visual amenity likely to be experienced by receptors (people) within the landscape as follows:
- Views from residential properties and settlements;
 - Views experienced whilst traveling through the landscape (road/ rail users, walkers, horse riders and cyclists for example); and
 - Views from tourist and recreational destinations including hill summits and long ranger walking routes.
- 7.4.21. The baseline distribution of these categories of visual receptors is summarised below.
- 7.4.22. For people in settlements, the predominant settlement pattern across the LVIA Study Area is of periodic dense settlement across sections of the valley bottoms and lower valley side connected by a network of 'A' class roads that trace lower lying terrain to negotiate areas of upland. Consequently, vehicular receptors' journeys often pass through extensive areas of built development with limited availability of outward views. Key 'A' roads have been identified as being the A470 routed along the Carno and Severn valleys between Machynlleth and Llangurig, the A483 routed along the River Ithon valley between Crossgates and Welshpool and the A458 between Welshpool and Mallwyd. Upland areas are well-defined with pastoral agriculture the predominant land-use, meaning organised settlement and transport routes much more limited.
- 7.4.23. To the east and southeast of the Proposed Development, where elevations are lower and the river valley is less steeply incised, less distinctive settlement patterns are present. Where river valleys broaden, settlement has often expanded to fill them, with Newtown and Welshpool being examples of this. There are a limited number of residential properties located outside these valley bottom settlements, a good proportion of which are, or at least were, originally farmsteads.
- 7.4.24. The LVIA Study Area includes a wide range of visual receptors undertaking outdoor recreational activities where the availability of views and their composition are likely to contribute to receptors' enjoyment of their activity. Recreational receptors within the blade tip ZTV would be identified under the following categories:
- **Designated long distance footpaths** - (National Trails and Long Distance Recreational Routes). The Offa's Dyke Path and Glyndwr's Way National Trails cross the LVIA Study Area and are illustrated in **Figure 7.4** as overlapped within the blade tip ZTV of the Proposed Development. In addition, the Severn Way and Cambrian Way long distance recreational routes are also located within the LVIA Study Area with theoretical visibility of the Proposed Development (**Figure 7.4**);
 - **Sustrans National Cycle Routes (NCR)** - Sections of NCRs within the LVIA Study Area with potential to interact with the blade tip ZTV of the Proposed Development are NCR 8 and NCR 81;
 - **Prominent publicly accessible elevated locations and summits** - Viewpoint locations, see **Section 7.7**, have been included within the scope of the LVIA from the summit of Black Mountain in the Shropshire Hills National Landscape, Pumlumon Fawr in the Upland Ceredigion Registered Landscape of Outstanding Historic Interest and South Ceredigion Special Landscape Area (SLA) and Maen Du in the Eryri National Park;

- **Public Rights of Way (PRoW) and Open Access Land** - the distribution of PRoW within the Site and in the closest parts of the LVIA Study Area is relatively dense. The highest concentration of PRoW is within the less elevated areas of enclosed fields, but the upland areas are also relatively well served. Designated areas of Open Access Common Land include parts of Bryn y Fawnog and Mynydd Cerrigllwydion to the east of the Proposed Development as well as land to the north of Rhyd and north of Tan-y-Foel Quarry; and
- **Outdoor Recreational Facilities, Public Amenity Areas, Registered (Historic) Parks and Gardens and Country Parks** - The closest Registered Historic Parks and Gardens that may overlap within the blade tip ZTV of the Proposed Development are Plas Dinam (approximately 5.3 km east), Gregynog (approximately 8.6 km south) and Vaynor Park (approximately 14.4 km east). A number of further Parks and Gardens are located beyond 15 km from the Proposed Development, as illustrated in **Figure 7.4**. The LVIA chapter would also consider the attributable visual effects of the Proposed Development upon visual receptors using Country Parks, Campsites and Golf Courses.

DATA SOURCES

Desk Study

- 7.4.25. A range of desk-based and site-based data would be sourced to undertake the LVIA and cumulative landscape and visual impact assessment (CLVIA), covering landscape and visual receptors and other cumulative wind farm development. The desk-based data would be drawn from Ordnance survey maps (1:50,000 and 1:25,000 as required) and a range of document sources in addition to the relevant planning policy documents. Computer modelling of the landscape/ landform, other cumulative developments and the Proposed Development would be undertaken using a variety of software to support the LVIA and cumulative assessment.
- 7.4.26. The LVIA would be prepared in relation to the following data sources:
- National Landscape Character in Wales and LANDMAP Geological Landscape (GLAA), Landscape Habitat (LHAA), Visual and Sensory (VSAA), Historic Landscape (HLAA) and Cultural Landscape (CLAA) aspect areas within the LVIA Study Area (Natural Resources Wales);
 - Relevant planning policy documents listed in **Chapter 3**;
 - Eryri National Park Partnership Plan⁹⁵;
 - Eryri National Park Landscape Character Assessment⁹⁶;
 - Eryri Local Development Plan⁹⁷;
 - Eryri National Park Supplementary Planning Guidance (SPG):Landscape Sensitivity and Capacity Assessment⁹⁸;
 - Eryri National Park SPG: Obtrusive Lighting (Light Pollution)⁹⁹;

⁹⁵ Eryri National Park Authority. Cynllun Eryri: The Eryri National Park Partnership Plan. September 2020.

⁹⁶ Eryri National Park Authority. Supplementary Planning Guidance 7: Landscape and Seascapes of Eryri. July 2014.

⁹⁷ Eryri Local Development Plan. (2016). Local Development Plan (to 2031).

⁹⁸ Eryri National Park. Supplementary Planning Guidance 13: Landscape Sensitivity and Capacity Assessment. October 2016.

⁹⁹ Eryri National Park. Supplementary Planning Guidance 14: Obtrusive Lighting (Light Pollution). October 2016.

- Shropshire Hills National Landscape Management Plan¹⁰⁰;
- Powys Local Development Plan Landscape Character Assessment¹⁰¹;
- Ceredigion Local Development Plan SPG: Special Landscape Areas¹⁰²;
- Anglesey and Gwynedd Joint Local Development Plan (in relation to Special Landscape Areas)¹⁰³;
- CADW Register of Landscapes of Outstanding and Special Historic Interest¹⁰⁴;
- Assessment of onshore wind and solar energy potential in Wales – Stage 1 and 2¹⁰⁵;
- Sustrans National Cycle Network;
- National Trails;
- Ordnance Survey (OS) map data at 1:25,000 and 1:50,000 scale, as appropriate; and
- Site survey and photographic records.

Field Surveys

- 7.4.27. Field surveys would be undertaken to provide a photographic record of each assessment viewpoint in accordance with *Visual Representation of Wind Farms*, Version 2.2¹⁰⁶. The field studies would include documented visits to all relevant landscape and visual receptors to assess the likely effects of the Proposed Development in the field, checking data, ‘ground truthing’ and examining landscape elements, characteristics/ character and views/ visual amenity.

FUTURE BASELINE

- 7.4.28. Further change to the baseline landscape is likely as a result of new applications and/ or eventual decommissioning or repowering of existing wind farms and their associated grid connections, occurring over the next 10 – 20 years.
- 7.4.29. Forestry felling operations and re-stocking is also likely to change the nature of available views across the landscape from various receptor locations within the Study Area.
- 7.4.30. In general, there is long term potential for large-scale changes in agricultural practices in response to national or international agricultural and environmental policy. The long-term continuation of the amalgamation of farm units into fewer, more intensively managed farm businesses could gradually lead to changes such as amalgamation of fields and the introduction of larger scale, less vernacular agricultural buildings. A potential decline in livestock farming could result in a commensurate long-

¹⁰⁰ Shropshire Hills AONB Partnership on behalf of Shropshire Council and Telford & Wrekin Council. Shropshire Hills AONB Management Plan 2019-24. July 2019.

¹⁰¹ Land Use Consultants (LUC) on behalf of Powys County Council. Local Landscape Character Assessment for the Powys Local Development Plan Area: Landscape Character Assessment Final Report. March 2022

¹⁰² Ceredigion County Council. Ceredigion Local Development Plan 2007-2022. Supplementary Planning Guidance: Special Landscape Areas. April 2014.

¹⁰³ Isle of Anglesey County Council and Cyngor Gwynedd Council. Anglesey and Gwynedd Joint Local Development Plan 2011-2026. July 2017.

¹⁰⁴ CADW, NRW and ICOMOS UK. Register of Landscapes of Outstanding or Special Historic Interest in Wales. 2002.

¹⁰⁵ The Welsh Government. Assessment of onshore wind and solar energy potential in Wales – Stage 1 and 2. March and June 2019.

¹⁰⁶ NatureScot. Visual Representation of Wind Farm Guidance. Version 2.2. February 2017.

term decline in the management of field boundaries and a subsequent decline in the strength of field patterns, especially on more marginal elevated areas.

- 7.4.31. The UK climate is changing, and climate models indicate that this rate of change could accelerate. The predicted future baseline would alter in response to future climate change which could result in higher temperatures and changes to rainfall patterns and intensity. Many of these changes would, at least initially, be subtle, for example extended growing seasons for certain crops. The following changes have a high likelihood of occurring and could directly or indirectly affect landscape character or levels of visibility:
- Warmer summers and an associated longer growing season potentially affecting the range of crops that can be grown;
 - Wetter winters with consequent local flooding;
 - Decreases in soil moisture in summer and autumn and associated increased potential for drought stress on vegetation, such as, hedgerows and hedgerow trees; and
 - Increased levels of tree loss, especially of more mature trees, due to the anticipated increase in the incidences and severity of winter storms and the increased incidence of diseases affecting specific tree species such as chalara for ash trees and phytophthora for a variety of species including oak, beech, larch and alder.

7.5 DESCRIPTION OF LIKELY SIGNIFICANT EFFECTS

- 7.5.1. 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. The following identified effects are likely to be cumulative with other wind farm developments and extend through the construction, operation and decommissioning periods of the Proposed Development and are therefore scoped into the assessment of effects.
- Potentially significant landscape effects:
 - ‘Host’ NLCA and LANDMAP Aspect Areas; and
 - Surrounding LANDMAP Aspect Areas up to approximately 3 km.
 - Potentially significant visual effects:
 - Effects on views from residential properties within 2km of the proposed turbines, which would be subject to RVAA;
 - Visual effects on the views from transport routes including the A470, the Cambrian main railway line as well as from recreational routes including the Sustrans NCR 8 and 81, the Glyndwr’s Way National Trail, the Severn Way and Cambrian Way long distance recreational routes as well as from PROW and Open Access Land within close proximity to the Proposed Development; and
 - Visual effects on night-time views from surrounding visual receptors selected as being representative of locations where there are likely to be people at night, including settlements and roads.

POTENTIAL EFFECTS PROPOSED TO BE SCOPED OUT OF FURTHER ASSESSMENT

- 7.5.2. It is requested that the following landscape and visual receptors, listed in **Table 7-1**, be scoped out of the LVIA.

Table 7-1 – Potential Effects Proposed to be Scoped Out

Element	Phase	Scoped Out	Justification
1. Receptors Beyond ZTV Coverage All receptors within the 27km LVIA Study Area that are shown as being located beyond the ZTV coverage for the Proposed Development	Construction and Operation	✓	Receptors beyond the ZTV for the Proposed Development (including wind turbines, associated infrastructure and any 'off site development' such as access and grid connection) would have no view of the Proposed Development.
2. Extent of Regional and Local Receptor Assessment The extent to which regional and local receptors are included in the assessment would be subject to the results of the viewpoint analysis.	Construction and Operation	✓	The viewpoint analysis would be used to identify a conservative 'threshold' distance for significant landscape and visual effects. Regional and local receptors beyond this distance are unlikely to be significantly affected by the Proposed Development and would be excluded from the LVIA.
3. Cumulative Assessment Exclude scoping stage and pre-application schemes beyond 10 km from the CLVIA. Scoping sites within 10km of the Proposed Development would be shown on figures and wirelines visualisations but would not be included in the CLVIA, in line with NatureScot guidance.	Operation	✓	Cumulative schemes at scoping and pre-application stage (as classified under Tier 3 of the Planning Inspectorate's Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment - September 2024) are not usually assessed as the development layout and turbine dimensions are not available and/ or could be subject to change and due to their uncertainty in the planning process. Two 'scoping stage' developments have been identified within 10km of the Proposed Development at S01: Llyn Lort and S02: Mynydd Llest y Graig. These developments will only be included on the figures and viewpoint wirelines, in line with NatureScot guidance.
Exclude all single turbines below 50m to blade tip height.			Turbines of this scale are unlikely to make a significant contribution to cumulative effects.
Exclude all single turbines beyond 10km from the Proposed Development.			
Micro-generation turbines (25-50m) within 5km of the Proposed Development would only be included in the CLVIA if they consist of three or more turbines.			

Element	Phase	Scoped Out	Justification
4. Additional WSP assigned filter for LANDMAP Aspect Areas For each LANDMAP aspect layer (GLAAs, LHAAs, VSAAs, HLAAs and CLSAAs), an additional WSP assigned filter would be applied excluding any aspect areas within the LVIA Study Area that have less than 20% of their area within the blade tip ZTV.	Construction and Operation	✓	Aspect areas illustrated as having less than 20% of their area within the blade tip ZTV are unlikely to be significantly affected by the Proposed Development and would be excluded from the LVIA.
5. Landscape Effects on Eyrri National Park (ENP) Exclude the assessment of the Special Landscape Qualities (SLQ) and effects on the landscape character of the ENP from the LVIA.	Construction and Operation	✓	The limited distribution of theoretical visibility of the Proposed Development across the closest parts of the ENP, the location of intervening operational and consented cumulative wind energy developments between the Proposed Development and this part of the ENP boundary as well as the long intervening distance of approximately 16 km (Figure 7.3) supports the conclusion that the special qualities, integrity and landscape character of the ENP are unlikely to be significantly affected by the Proposed Development.
6. Landscape Effects on the Shropshire Hills National Landscape Exclude the assessment of the SLQs of the Shropshire Hills National Landscape from the LVIA.	Construction and Operation	✓	The very limited distribution of theoretical visibility of the Proposed Development across the closest parts of the Shropshire Hills National Landscape within the 27km LVIA Study Area as well as the long intervening distance of approximately 20km (Figure 7.3) supports the conclusion that the special qualities and integrity of the National Landscape are unlikely to be significantly affected by the Proposed Development.
7. Night-time Landscape Assessment Night time effects on landscape character and designations that do not include dark skies, for example, within their key characteristics or SLQs.	Operation	✓	Scoped out in line with the recent Scottish Government guidance on aviation lighting assessment, with a focus on night-time visual effects undertaken.
8. Special Landscape Areas Exclude the assessment of the SLQs of the following SLAs from the assessment due to their proximity beyond 15km distance from the Proposed Development:	Construction and Operation	✓	Significant effects as a result of the Proposed Development upon each of the SLAs lying more than 15km from the Proposed Development is unlikely due to a combination of very limited ZTV coverage, the location of intervening cumulative wind energy developments between the Proposed

Element	Phase	Scoped Out	Justification
- SLA 48: South Ceredigion Uplands. Exclude the assessment of the SLQs of the following SLAs from the assessment due to their proximity beyond 20km distance from the Proposed Development: - SLA 50: Rheidol Valley; - SLA 59: Dyfi Estuary and Valley; and - SLA 72: Corris.			Development and each SLA and large intervening distances (Figure 7.3).
9. Registered Landscapes of Outstanding and Special Historic Interest Exclude the landscape assessment of all Registered Landscapes of Outstanding and Special Historic Interest within the Study Area.	Construction and Operation	✓	Registered Landscapes of Outstanding and Special Historic Interest are not considered as a landscape designation. Since the Register identifies and provides information on the most important and best-surviving historic landscapes, an assessment of effects (including, where relevant, an assessment of the significance of the impact of development on historic landscape areas (ASIDOHL2)) would be undertaken in Chapter 8: Cultural Heritage by a cultural heritage or historic environment specialist. This aligns with the advice provided in paragraph 5.11 of GLVIA3 which states: “The sharing of relevant baseline information should not be confused with the need for separate cultural heritage appraisals such as historic landscape characterisation and assessment or historic townscape appraisal, or there will be a danger of both double handling and inappropriate judgements by non-experts. It is particularly important that responsibilities are clear in considering any effects on the settings and views for historic buildings, Conservation Areas and other heritage assets.” As such, an assessment of the effects on Landscapes of Historic Interest is scoped out of the LVIA.

7.6 DESIGN AND MITIGATION

- 7.6.1. As set out in **Chapter 2: Description of the Proposed Development**, the ‘scoping layout’ of the Proposed Development represents a maximum of 11 turbines within the Site boundary; each with a maximum 200m height to blade tip. The EIA process would lead to further refinement of this layout as the Site constraints become known and are assessed in greater detail.
- 7.6.2. The time period for the assessment covers the construction of the Proposed Development and associated infrastructure, its operation for a period of up to 40 years, and subsequent decommissioning. The assessment process would involve iterative design and assessment of any remaining residual effects that could not otherwise be mitigated or ‘designed out’.
- 7.6.3. The design strategy for the Proposed Development would be underpinned by a number of design objectives which would be developed and enhanced through the EIA process. Current design objective includes, but are not limited to, the following:
- Maximise the production of renewable energy generation, in the context of the Welsh Government having declared a climate emergency and ambitious targets having been set in the Future Wales - Future Wales: The National Plan 2040¹⁰⁷, Planning Policy Wales, 2024¹⁰⁸, Energy Generation in Wales, 2022¹⁰⁹ and the Welsh’s Government’s Net Zero strategic plan, 2022¹¹⁰.
 - Respect the environmental assets and constraints including watercourses, areas of deep peat and topography, nature conservation interests, landscape, archaeological interests and other environmental qualities of the Site and its surroundings; and
 - Comply with industry best practice in terms of turbine spacing to ensure safety and maximise wind yield.
- 7.6.4. From a landscape perspective there are a number of landscape objectives that reflect the Site constraints and surroundings as follows:
- Notwithstanding that landscape and visual impacts are to be expected as a result of onshore wind farm development, the effects of the Proposed Development should be localised and/ or appropriate design mitigation should be applied to reduce the effects on key landscape and visual receptors;
 - There would be likely significant landscape and visual effects on the landscape character of the Site and localised surroundings. Additional forms of mitigation would be considered in the form of landscape management to address these effects;
 - Critical design review of the ‘scoping layout’ and the subsequent development of a landscape-led revised design strategy and ‘application layout’, underpinned by the above high-level objectives. In particular, the design review would consider:
 - Visibility of aviation warning lights and the potential options for further mitigation in the form of a Lighting Strategy or other alternatives;
 - Likely landscape effects and visibility of turbines from within other designated landscapes and visual receptors resulting in a need for further mitigation in terms of turbine scale and layout; and

¹⁰⁷ The Welsh Government. Future Wales: The National Plan 2040. February 2021.

¹⁰⁸ The Welsh Government. Planning Policy Wales. Edition 12. July 2024.

¹⁰⁹ The Welsh Government. Energy Generation in Wales: 2021. November 2022.

¹¹⁰ The Welsh Government. Welsh Government Net Zero Strategic Plan. December 2022.

- Likely cumulative landscape effects and visibility including landscape change and compatibility with other schemes.

7.6.5. The Applicant is also proposing to implement nature positive measures as part of the Proposed Development. This is likely to include measures to increase biodiversity and landscape improvements.

7.7 SCOPE OF ASSESSMENT

ZONE OF THEORETICAL VISIBILITY AND VIEWPOINT ANALYSIS

- 7.7.1. The ZTVs have been calculated using ReSoft WindFarm computer software. The Digital Elevation Model used as part of the ZTV calculation does not take account of built development or vegetation. As these elements can significantly reduce the extent of actual visibility the ZTVs is considered to represent the maximum theoretical visibility of the Proposed Development. Consequently, the ZTVs are likely to over-estimate the extent of areas from which views of the Proposed Development may be available to visual receptors within their communities, engaged in outdoor recreation or travelling on roads in the LVIA Study Area. The ZTVs therefore provide a starting point in the assessment process.
- 7.7.2. ZTVs and viewpoint analysis play an important role in the on-going landscape design and assessment of the Proposed Development. ZTV maps are also important in defining the scope of the LVIA and cumulative assessment.
- 7.7.3. Two figures of ZTVs of the Proposed Development, based on the scoping layout consisting of 11 turbines each with a maximum blade tip height of 200m above ground level (AGL), a nacelle (hub) height of 118.5m AGL and a rotor diameter of 163m, have been illustrated as follows:
- **Figure 7.1:** Illustrates a ZTV for the Proposed Development, calculated to a 200 m blade tip height within the 30 km radius of the LVIA Search Area. The numbers of turbines which may be theoretically visible are shown in different colours along with provisional viewpoint locations; and
 - **Figure 7.2:** (A0 paper size): Illustrates the same ZTV as shown in **Figure 7.1** but overlaid on a 1:50,000 scale OS map. Provisional viewpoint locations are also illustrated. The purpose of this figure is to allow consultees to examine the ZTV and consider the viewpoint locations in detail, enabling them to confirm or suggest additional or alternative viewpoint locations.
- 7.7.4. For the avoidance of doubt, areas beyond the coloured areas of the ZTV would have no view of the Proposed Development and landscape and visual receptors within these areas are consequently scoped out of the LVIA.

Viewpoint Selection and Visualisations

- 7.7.5. A range of photographic viewpoint locations have been proposed (as illustrated on **Figures 7.1-7.4**) and consultees are requested to confirm the viewpoint selection set out in **Table 7-2**, including requests to scope out viewpoints or recommend additional or alternative locations.
- 7.7.6. Visualisations would be prepared for each viewpoint to accord with NatureScot guidance¹¹¹ and include 90° (cylindrical projection) baseline photographs and wirelines, and 53.5° (planar projection) wirelines and photomontages.

¹¹¹ NatureScot. Visual Representation of Wind Farm Guidance. Version 2.2. February 2017.

Table 7-2 – Preliminary (Day-time) Viewpoint List

Viewpoint Name and Number	Receptor	Visualisation Technique	Viewpoint Type (GLVIA 3)
Viewpoints Within 10 km			
1. A470, Clatter (299921, 294848)	Residents and road users.	Photograph, wireline and photomontage.	Representative viewpoint from the A470 demonstrating the view experienced by a range of receptors.
2. A470, Carno (296324, 296408)	Residents and road users.	Photograph, wireline and photomontage.	Representative viewpoint from the A470 demonstrating the view experienced by a range of receptors.
3. Cefn Coch (304850, 302786)	Residents, road users and tourists/visitors.	Photograph, wireline and photomontage.	Representative viewpoint from the minor road between Cefn Coch and Llanllugan demonstrating the view experienced by a range of receptors, including visitors to the Cefn Coch Inn.
4. A470, east of Talerddig (293425, 302786)	Residents and road users.	Photograph, wireline and photomontage.	Representative viewpoint from the A470 demonstrating the view experienced by a range of receptors.
5. Severn Way, south of Bwlch-y-Ffridd (307114, 295038)	Recreational users (walkers) and road users.	Photograph, wireline and photomontage.	Specific viewpoint representative of views from the Severn Way. The viewpoint is also representative of views experienced by users of the minor road.
6. B4569, west Caersws (302705, 291832)	Recreational users (cyclists and walkers), residents and road users.	Photograph, wireline and photomontage.	Representative viewpoint from the B4569 demonstrating the view experienced by a range of receptors including recreational users of Sustrans NCR 81 and the Severn Way, as well as residents on the edge of Caersws. The viewpoint is also representative of views from the Bro Caersws Registered Landscape of Special Historic Interest.
7. Glyndwr's Way, north of Moelddolwn (298634, 308430)	Recreational users (walkers).	Photograph, wireline and photomontage.	Specific viewpoint representative of views from the Glyndwr's Way National Trail.
8. Minor road, east of New Mills (310826, 300765)	Residents and road users.	Photograph, wireline and photomontage.	Representative viewpoint from the minor road network in the eastern LVIA Study Area demonstrating the view experienced by a range of receptors, including user of local PROWs.
Viewpoints Between 10-20 km			

Viewpoint Name and Number	Receptor	Visualisation Technique	Viewpoint Type (GLVIA 3)
9. Llanidloes Road, Newtown (308528, 290318)	Residents and road users.	Photograph, wireline and photomontage.	Representative viewpoint from Llanidloes Road on the northern edge of Newtown, demonstrating the view experienced by a range of receptors.
10. Sustrans NCR 81 and Severn Way, northeast of Llanidloes (297244, 286655)	Recreational users (cyclists and walkers) and road users.	Photograph, wireline and photomontage.	Representative viewpoint from the minor road between Llanidloes and Oakley Park demonstrating the view experienced by a range of receptors including recreational users of Sustrans NCR 81 and the Severn Way, as well as road users.
11. Glyndwr's Way, north of Llanbrynmair (288569, 304802)	Recreational users (walkers).	Photograph, wireline and photomontage.	Specific viewpoint representative of views from the Glyndwr's Way National Trail.
12. Cambrian Way, west of Bont Dolgadfan (286899, 299717)	Recreational users (walkers).	Photograph, wireline and photomontage.	Specific viewpoint representative of views from the Cambrian Way.
13. B4395, north of Llangadfan (301640, 313006)	Recreational users (walkers), residents and road users.	Photograph, wireline and photomontage.	Representative viewpoint from the B4395 demonstrating the view experienced by a range of receptors, including users of the Glyndwr's Way National Trail.
14. Sustrans NCR 8, west of Dylife (284368, 294856)	Recreational users (cyclists) and road users.	Photograph, wireline and photomontage.	Specific viewpoint representative of views from the Sustrans NCR 8. The viewpoint is also representative of views experienced by users of the minor road west of Dylife and from the Dyffryn Clywedog Registered Landscape of Special Historic Interest.
15. Y Golfa, west of Welshpool (318224, 307104)	Recreational users (walkers and golfers)	Photograph, wireline and photomontage.	Specific viewpoint representative of views from the Glyndwr's Way National Trail. The viewpoint is also representative of views experienced by users of Welshpool Golf Club.
16. Glyndwr's Way, Meifod (315566, 312977)	Recreational users (walkers), residents and road users.	Photograph, wireline and photomontage.	Specific viewpoint representative of views from the Glyndwr's Way National Trail. The viewpoint is also representative of views experienced by residents at Meifod and users of the minor road.

Viewpoint Name and Number	Receptor	Visualisation Technique	Viewpoint Type (GLVIA 3)
Viewpoints Between 20-27 km			
17. Offa's Dyke National Trail, northeast of Montgomery (323509, 297462)	Recreational users (walkers) and road users.	Photograph and wireline	Specific viewpoint representative of views from the Offa's Dyke Path National Trail. The viewpoint is also representative of views experienced by users of the B4386 and from the Bro Trefaldwyn Registered Landscape of Outstanding Historic Interest.
18. Black Mountain, Shropshire Hills National Landscape (318798, 283529)	Tourists/ visitors and road users.	Photograph and wireline.	Specific viewpoint representative of views from the Shropshire Hills National Landscape. The viewpoint is also representative of views experienced by users of the minor road.
19. Cambrian Way, Pumlumon Fawr (279040, 286986)	Recreational users (walkers).	Photograph and wireline.	Specific viewpoint representative of views from the Cambrian Way. The viewpoint is also representative of views from the Ucheldir Ceredigion Registered Landscape of Outstanding Historic Interest.
20. Maen Du, Eryri National Park (282258, 315160)	Recreational users (walkers).	Photograph and wireline.	Specific viewpoint representative of views from an elevated location within the Eryri National Park. The viewpoint is also representative of views experienced from the South Ceredigion Uplands SLA.

Table 7-3 – Preliminary Night-time Viewpoint List

Night-time Viewpoint		Receptor	Visualisation Technique	Viewpoint Type (GLVIA 3)
N1.	A470, Clatter (299921, 294848)	Residents and road users.	Photograph, wireline and photomontage.	Representative viewpoint from the A470 demonstrating the view experienced by a range of receptors.
N4.	A470, east of Talerddig (293425, 302786)	Residents and road users.	Photograph, wireline and photomontage.	Representative viewpoint from the A470 demonstrating the view experienced by a range of receptors.
N8.	Minor road, east of New Mills (310826, 300765)	Residents and road users.	Photograph, wireline and photomontage.	Representative viewpoint from the minor road network in the eastern LVIA Study Area demonstrating the view experienced by a range of receptors.

7.8 PROPOSED ASSESSMENT METHODOLOGY

- 7.8.1. LVIA and cumulative assessment forms one of the key components of the EIA process when assessing proposed wind farm developments. The assessment would be undertaken in accordance with Guidelines for Landscape and Visual Impact Assessment, 3rd Edition¹¹² (GLVIA3). An overview of the LVIA methodology, including cumulative assessment, is provided below with the detailed methodology to be provided as an appendix to the ES.

RELEVANT TECHNICAL GUIDANCE

- 7.8.2. The assessment would be undertaken in accordance with the methods outlined in best practice guidance documents but not limited to the following:
- Guidance Notes for the Reduction of Obtrusive Light, GN01:2011 (Institute of Lighting Professionals, 2011);
 - Landscape Institute and IEMA, Guidelines for Landscape and Visual Impact Assessment, Third Edition, 2013;
 - CAP393, The Air Navigation Order 2016, SI 2016 No.765;
 - Scottish Natural Heritage, Visual Representation of Wind Farms: Good Practice Guidance, Version 2.2, February 2017;
 - Safety & Airspace Regulation Group. Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m Above Ground Level (CAA, 2017);
 - Scottish Natural Heritage, Siting and Design Windfarms in the Landscape, Version 3a, August 2017;
 - Annex 14 to the Convention on International Civil Aviation – Volume I Aerodrome Design and Operations, Eighth Edition (ICAO, July 2018);
 - Landscape Institute, Residential Visual Amenity Assessment (RVAA): Technical Guidance Note, 15 March 2019;
 - Night-time Photography (Institute of Lighting Professionals, 2019);
 - Landscape Institute, Assessing landscape value outside national designations, Technical Guidance Note 02/21;
 - NatureScot, Guidance: Assessing the Cumulative Landscape and Visual Impact of Onshore Wind Energy Developments, March 2021;
 - NatureScot, Guidance for Assessment of Effects on Special Landscape Qualities (AESLQ) – Consultation Draft 2024;
 - Natural Resources Wales, Using LANDMAP in Landscape and Visual Impact Assessments (GN46), March 2024; and
 - Aviation Lighting and Onshore Wind Turbines – Draft Guidance on Aviation Lighting Impact Assessment, Scottish Government, June 2024.

¹¹² Landscape Institute and IEMA. Guidelines for Landscape and Visual Impact Assessment, 3rd Edition. 2013.

LANDSCAPE EFFECTS

7.8.3. Landscape effects are defined by the Landscape Institute as

“An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal would affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. ... The area of landscape that should be covered in assessing landscape effects should include the site itself and the full extent of the wider landscape around it which the Proposed Development may influence in a significant manner”.

7.8.4. The landscape effects occurring during the construction, operation and decommissioning phases of the Proposed Development may potentially include the following:

- Changes to landscape elements: the addition of new elements (wind turbines) or the removal of existing elements such as trees, vegetation and buildings and other characteristic elements of the landscape character type;
- Changes to landscape qualities: degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of landscape character types or contribute to the landscape value;
- Changes to landscape character: landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the cumulative addition of new features, the magnitude of which is sufficient to alter the overall landscape character type of a particular area; and
- Cumulative landscape effects: where more than one wind farm may lead to a potential landscape effect.

VISUAL EFFECTS

7.8.5. Visual effects are concerned wholly with the effect of development on views, and the general visual amenity, and are defined by the Landscape Institute in GLVIA3 paragraph 6.1 as, *“An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern...is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views”.*

7.8.6. Visual effects are identified for different receptors (people) who would experience the view(s) at their places of residence, during recreational activities, at work, or when travelling through the area. The visual effects may include the following:

- Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view(s); and
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

DETERMINING THE SIGNIFICANCE OF EFFECTS

7.8.7. Essentially, the level of landscape and visual effect (and whether this is significant) is determined by assessing the sensitivity of the landscape or visual receptor and the magnitude of change likely to result from the Proposed Development. The LVIA includes an iterative design and assessment process that takes account of design improvements and mitigation. Further assessment is then undertaken of any remaining residual effects that could not otherwise be mitigated or ‘designed out’. In accordance with the relevant EIA Regulations, it is important to determine whether the effects, assessed as a result of the Proposed Development are likely to be significant.

- 7.8.8. A matrix is used to guide the assessment process and is shown in **Table 7-4**, below. Significant landscape and visual effects are highlighted in **bold**, shaded in dark grey and relate to all those effects that result in a '**Substantial**', '**Substantial to Major**', '**Major**', or a '**Major to Moderate**' level of effect. In some circumstances, 'Moderate' levels of effect (shaded light grey in **Table 7-4**) have the potential to be considered as significant, subject to the assessor's opinion. Such exceptions are also highlighted in **bold** and would be explained as part of the assessment where they occur. White or un-shaded boxes indicate a non-significant effect.
- 7.8.9. The type of effect would also be described and may be direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral, or adverse.

Table 7-4 – Evaluation of Landscape and Visual Effects

		Landscape and Visual Sensitivity			
		High	Medium	Low	Very Low
Magnitude of Change	High	Substantial	Major	Moderate	Not used
	High - Medium	Substantial to Major	Major to Moderate	Moderate to Minor	
	Medium	Major	Moderate	Minor	
	Medium - Low	Major to Moderate	Moderate to Minor	Minor	
	Low	Moderate	Minor	Negligible	
	Low – Very Low	Moderate to Minor	Negligible	Negligible	
	Very Low	Minor	Negligible	Negligible	
	Zero	None/ No View			

NIGHT-TIME LIGHTING ASSESSMENT

- 7.8.10. Aviation warning lights attached to turbine hubs and towers are required on all proposed wind turbines $\geq 150\text{m}$ in accordance with Article 222 of the UK Air Navigation Order (ANO)¹¹³ 2016, subject to any proposed lighting mitigation strategy.
- 7.8.11. A proportionate night-time assessment of the proposed aviation lighting would be undertaken in accordance with NatureScot's General Pre-application and Scoping Advice for Onshore Wind Farms, Annex 2¹¹⁴ and Scottish Government's draft guidance *Aviation Lighting and Onshore Wind Turbines – Draft Guidance on Aviation Lighting Impact Assessment*, June 2024. The assessment would be supported by maps indicating the ZTV of any proposed aviation warning lights and three night-time viewpoints. The proposed night-time viewpoints, listed in **Table 7-3**, have been selected as representative of locations where there are likely to be people at night, including settlements and roads.

¹¹³ Civil Aviation Authority. Regulations made under powers in the Civil Aviation Act 1982 and the Air Navigation Order 2016. CAP 393. 2021.

¹¹⁴ NatureScot. General Pre-application and Scoping Advice for Onshore Wind Farms, Annex 2. February 2024.

- 7.8.12. A night-time ZTV of the turbine lighting positions would accompany the visualisations which would aid the assessment. The extent of the study area is likely to be restricted to 10-15km from the outer turbine positions according to the technical criteria of the proposed candidate light fixtures.

RESIDENTIAL VISUAL AMENITY ASSESSMENT

- 7.8.13. Residential amenity is a planning matter that involves a wide number of effects, such as noise and shadow flicker, and benefits of which residential visual amenity is just one component.
- 7.8.14. A RVAA will be undertaken to assess the effects on residential visual amenity likely to be experienced at residential properties within 2km of the Proposed Development. The RVAA will accord with the advice in GLVIA 3 and the Landscape Institute's TGN 02/19: Residential Visual Amenity Assessment¹¹⁵.
- 7.8.15. As a minimum, the visual effects from each property included in the assessment would be illustrated by a wireline.

CUMULATIVE LANDSCAPE AND VISUAL IMPACT ASSESSMENT

- 7.8.16. The assessment of cumulative effects is essentially the same as for the assessment of the 'solus' landscape and visual effects, in that the level of landscape and visual effect is determined by assessing the sensitivity of the landscape or visual receptor and the magnitude of change. Cumulative assessment however considers the magnitude of change posed by multiple developments.
- 7.8.17. The Cumulative LVIA (CLVIA) would assess the following types of cumulative effects:
- Cumulative landscape effects: where more than one wind energy development may have an effect on a particular area of landscape character or landscape designation; and
 - Cumulative visual effects: the cumulative or incremental visibility of similar types of development that may combine to have a cumulative visual effect. These can be further defined as follows:
 - Simultaneous or combined: where two or more developments may be viewed from a single fixed viewpoint simultaneously, within the viewer's field of view and without requiring them to turn their head;
 - Successive or repetitive: where two or more developments may be viewed from a single viewpoint successively as the viewer turns through 360°; and
 - Sequential: where a number of developments may be viewed sequentially or repeatedly at increased frequency, from a range of locations when travelling along a route within the LVIA Study Area.
- 7.8.18. As set out in **Section 4.10**, the identification of cumulative schemes will follow the four-stage approach set out in the Planning Inspectorate's 'Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment' guidance document¹¹⁶. A review has been undertaken of NatureScot guidance on cumulative assessment¹¹⁷, LANDMAP Guidance Note 46 and information

¹¹⁵ Landscape Institute. Technical Guidance Note 02/19: Residential Visual Amenity Assessment (RVAA). March 2019

¹¹⁶ Planning Inspectorate (2024). Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment. Available at (online): <https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-cumulative-effects-assessment> [Accessed November 2024].

¹¹⁷ NatureScot. Guidance: Assessing the Cumulative Landscape and Visual Impact of Onshore Wind Energy Developments. 2021.

on existing, consented and proposed wind farms within the 30km LVIA Search Area; as set out in **Table 7-5** and **Figures 7.1-7.5**. Drawing upon professional judgement and experience, this review has concluded that a CLVIA Study Area of 27km radius, i.e. coterminous with the LVIA Study Area would be fit for purpose, being sufficient to assess all potential significant cumulative landscape and visual effects. This approach accords with the advice on CLVIA in Guidance Note 46.

- 7.8.19. Existing development such as solar farms would be included as part of the baseline visual assessment in the LVIA.
- 7.8.20. The cumulative database would be updated, if required as part of the consultation process, and prior to completion of the assessment.

Table 7-5 – Wind Energy Development Relevant to the Cumulative Assessment (as of October 2024)

Name of Wind Farm	Local Authority	Number of Wind Turbines	Height to Blade Tip (m)	Approximate distance from the Proposed Development (km)	Status
Wind energy developments within 10km					
Esgair Cwmowen	Powys County Council	18	125	0.75	Application
Mynydd Clogau	Powys County Council	17	66	0.96	Operational
Tirgwynt	Powys County Council	12	150	1.3	Operational
Llyn Lort	Powys County Council	25	220	3.2	Scoping*
Mynydd Lluest y Graig	Powys County Council	18	200	5.0	Scoping*
Carno I and II	Powys County Council	68	50.6/79	7.0	Operational
Llanbrynmair	Powys County Council	30	126.5	7.0	Consented
Carno III	Powys County Council	13	149.9	7.0	Consented

Name of Wind Farm	Local Authority	Number of Wind Turbines	Height to Blade Tip (m)	Approximate distance from the Proposed Development (km)	Status
Wind energy developments within 10-20km					
Llandinam	Powys County Council	103	-	12.5	Operational
Garn Fach	Powys County Council	17	149.9	13.0	Consented
Cemmaes	Powys County Council	18	66	14.0	Operational
Bryn Blaen	Powys County Council	6	100	17.0	Operational
Wind energy developments within 20-30 km					
Garreg Lwyd	Powys County Council	17	130	20.5	Operational
Bryn Titli	Powys County Council	22	48.5	22.5	Operational
Cefn Croes	Ceredigion County Council	39	90/ 100	25.0	Operational

* As set out in Table 7-1, cumulative schemes at scoping will be included only on figures/wirelines in line with NatureScot guidance.

- 7.8.21. The cumulative assessment would accord with NatureScot guidance and would be prepared to ensure that, as well as the effects of the Proposed Development, the 'additional' cumulative effects and the 'combined' cumulative effects would also be also reported as follows:
- 7.8.22. **Scenario 1** (the main cumulative assessment) would consider: Existing + Consented + the Proposed Development - the additional and combined cumulative effects of the Proposed Development and existing (including schemes under construction) and consented wind energy developments would be assessed.
- 7.8.23. Further, the cumulative assessment would take account of the timescales for the operation of the existing and consented developments.

- 7.8.24. In addition, a short assessment would also be undertaken for **Scenario 2** which takes into account the additional and combined cumulative effects of the Proposed Development and existing and consented wind energy developments and submitted applications (including schemes with submitted planning applications and schemes at planning appeal). This Scenario is less certain given the unknown decisions on live application wind farms.
- 7.8.25. In accordance with NatureScot Guidance¹¹⁸, the following criteria would be applied to cumulative wind energy developments included in the CLVIA:
- Scoping sites within 10km of the Proposed Development would be shown on figures and wirelines visualisations but *would not* be included in the CLVIA;
 - All single turbines below 50m to blade tip height are excluded from the CLVIA;
 - All single turbines beyond 10km from the Proposed Development are *excluded* from the CLVIA;
 - All variation schemes beyond 10km from the Proposed Development are *excluded* from the CLVIA; and
 - Micro-generation turbines (25-50m) within 5km of the Proposed Development would only be included in the CLVIA if they consist of three or more turbines.

7.9 ASSUMPTIONS AND LIMITATIONS

- 7.9.1. To ensure transparency within the EIA process, the following limitations and assumptions have been identified:
- The scoping chapter related to LVIA is based on the indicative Site Boundary and turbine locations for the Parc Ynni Calon y Gwynt as shown on **Figure 2.1**;
 - Publicly available sources and datasets have been used to provide an overview of the landscape and visual receptors affected by the Proposed Development;
 - Landscape and visual elements are dynamic and subject to change, both seasonally and over time. Consequently, the landscape and visual baseline used for assessment may be subject to change over the timescale of the Proposed Development. Assumptions on the nature and scale of change would have to be made which are potentially subject to a degree of error; and
 - Viewpoints are selected from publicly accessible locations.

¹¹⁸ NatureScot. Guidance: Assessing the Cumulative Landscape and Visual Impact of Onshore Wind Energy Developments. 2021.

8 CULTURAL HERITAGE

8.1 INTRODUCTION

- 8.1.1. This chapter presents the proposed scope of the assessment of effects arising from the Proposed Development upon Cultural Heritage, including archaeology. It includes consideration of both designated and non-designated historic assets.
- 8.1.2. The chapter (and its associated figures and appendices) should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Description of The Proposed Development**.

8.2 CONSULTATION

- 8.2.1. No consultation with stakeholders has taken place to date on the Proposed Development. This chapter is based on desk-based information.
- 8.2.2. For the preparation of the EIA for the Proposed Development, consultation will be undertaken with Cadw, the Henneb: Trust for Welsh Archaeology (Heneb) and conservation officers from Powys County Council (PCC). Information will also be sought from these organisations as well as other sources such as North East Wales archives.
- 8.2.3. Comment is invited on the scope of the assessment set out in this chapter, including proposed study areas and methodology

8.3 STUDY AREA

- 8.3.1. For non-designated historic assets, a study area of 2km from the centre of the Proposed Development will be used. A wider study area of up to 5km will be adopted to assess changes to setting on designated historic assets. The focus will be on historic assets where the setting contributes to their significance and which are deemed to have their setting impacted as shown on a Zone of Theoretical Visibility (ZTV). The study areas are based on professional judgement taken from similar projects in Wales, taking account of the nature of the Proposed Development and the historic character of the area in which it is located.

8.4 BASELINE CONDITIONS

- 8.4.1. A high-level desk-based appraisal of historic assets has been undertaken to inform the scoping assessment using publicly available information. Details of designated historic assets has been gathered from information available on Cadw¹¹⁹ and DataMapWales¹²⁰, which identified the designated historic assets both within the Proposed Development site and within the 5km study area (see **Figure 8.1**). Archwilio¹²¹ was reviewed for an overview of the quantity and character of non-designated historic assets within the Proposed Development site.
- 8.4.2. There are six scheduled monuments within the Proposed Development site, all date to the Bronze age and form an important group, which has the potential to enhance our knowledge of prehistoric settlement, burial and ritual practices. They include; Nant Cwm Gerwyn Cairns (MG278), Round Hut

¹¹⁹ Cadw [online] <https://cadw.gov.wales/> [Accessed February 2025]

¹²⁰ DataMapWales [online] <https://datamap.gov.wales/> [Accessed February 2025]

¹²¹ Archwilio [online] <https://archwilio.org.uk/wp/#intro-widgets>, [Accessed 29/11/2023]

700m NNE of Garreg Hir (MG338), Craig y Llyn Mawr Round Cairn (MG277), Lluest Uchaf Cairns and Stone Row (MG276), Round Hut 400m NE of Garreg Hir (MG339) and Nant Cwm Gerwyn Cairns (MG278).

- 8.4.3. There are 68 designated historic assets within the 5km study area: 31 scheduled monuments, 37 listed buildings and one conservation area. There are no World Heritage Sites or Registered Parks and Gardens within the Proposed Development site or the study area.
- 8.4.4. The scheduled monuments within the 5km study area are predominantly prehistoric in date, comprising cairns, enclosures, standing stones, and settlements. Five of the scheduled monuments date to the Roman period, which relate to Caersws Roman Site (MG001) and Caersws Roman road (MG324). One scheduled monument dates to the early medieval period, a Cross-Incised Stone (now in Carno Church) (MG146), and one to the post-medieval period, the Root Store at Bon-y-Maen 800m NW of Blaen y Cwm (MG218).
- 8.4.5. There are no listed buildings within the Proposed Development site. Of the 38 listed buildings within the 5km study area, seven are Grade II* and 31 are Grade II listed. The listed buildings are predominantly farmhouses and outbuildings, churches, public buildings and milestones.
- 8.4.6. There is one conservation area within the study area, at Llanwnnog, 2.3 km to the south of the Proposed Development. It contains three listed buildings, including a church, farm buildings and a telephone box.
- 8.4.7. The Caersws Basin Registered Landscape of Special Historic Interest (HLW (P) 5) is located within the south of the 5km study area. The Caersws Basin comprises a wide basin floor containing the confluence of the Rivers Carno and Trannon with the Severn and which is enclosed by a range of hills and ridges. This topographic location has made the basin an important point in communication routes which was most clearly shown in the Roman period with the location of a Roman fort east of the present village of Caersws, which had an associated civilian settlement and was connected to a network of roads. Caersws Basin also contains evidence for Iron Age settlement.
- 8.4.8. There are approximately 43 non-designated historic assets identified within the Proposed Development site, ranging from prehistoric to post-medieval in date (see **Figure 8.2a-d**). Prehistoric assets include enclosures, a chambered cairn, cist, hut circles, and cairns. The medieval period is represented by two long huts, a quarry, and an enclosure. Most non-designated historic assets are from the post-medieval period, characterised by farmsteads, sheepfolds, clearance cairns, sheepfolds, a peat stand, and platforms. Further consultation of the HER will provide a more comprehensive overview of the non-designated historic assets within the Proposed Development site and study area. Based on the character of the non-designated historic assets, it would be expected that any as yet unknown historic assets would relate to the prehistoric, medieval and post-medieval periods.

8.5 DESCRIPTION OF LIKELY SIGNIFICANT EFFECTS

- 8.5.1. The baseline research confirms that there are designated and non-designated historic assets within the Proposed Development site and the study area, which have the potential to be affected by the Proposed Development. As a result, there could be potential physical effects on historic assets, caused by the construction of turbines, solar development, access tracks, compounds and associated infrastructure. The operation of the turbines has the potential to have significant effects on historic assets due to changes of their setting.

- 8.5.2. There is potential for previously unrecorded archaeological deposits to survive within the Proposed Development site. These remains could be affected during excavation works at the construction phase, such as ground clearance for turbine bases, compounds, access roads and service trenches.
- 8.5.3. Given the potential for significant effects on the historic environment, Cultural Heritage is scoped into the EIA.

Table 8-1 – Elements Scoped in or Out of Further Assessment

Impact	Phase	Scoped In	Scoped Out	Justification
Potential for direct physical impacts to designated historic assets within the Proposed Development site	Construction	✓		There is potential for physical impacts to be caused by the construction of turbine bases, access tracks, temporary work areas and other associated development, which may cause significant effects to historic assets including; Nant Cwm Gerwyn Cairns (MG278), Round Hut 700m NNE of Garreg Hir (MG338), Craig y Llyn Mawr Round Cairn (MG277), Lluest Uchaf Cairns and Stone Row (MG276), Round Hut 400m NE of Garreg Hir (MG339).
Potential for direct physical impacts to non-designated historic assets within the Proposed Development	Construction	✓		There is potential for physical impacts to be caused by the Proposed Development which may cause significant effects.
Direct physical impacts to historic assets within the Proposed Development	Operational		✓	Any direct physical impacts to historic assets within the Proposed Development will occur during the construction phase. Therefore, no further impacts are anticipated on these assets during the operational phase. This includes known and unknown non-designated historic assets.
Temporary impacts arising from change within the setting of historic assets caused by construction of the Proposed Development	Construction		✓	As these works are temporary and there would be no meaningful distinction between effects on setting during the construction and operational phases, construction phase effects have been scoped out of further assessment.

Impact	Phase	Scoped In	Scoped Out	Justification
Historic Assets within the Proposed Development site, and the 2km and 5km study areas, which have potential to have significant impacts arising from change within their setting.	Operational	✓		Significant impacts may be caused by changes to historic assets where setting contributes to the significance. Only historic assets which have visibility of the turbines, as determined by the ZTV, and for which setting contributes to their significance will be assessed.
Caersws Basin Registered Landscape of Special Historic Interest (HLW (P) 5) which could potentially be subject to significant impacts arising from change within its setting.	Operational	✓		The Caersws Basin historic landscape is approximately 1.5km from the Proposed Development site and so there is a potential for indirect visual impacts should a substantial portion of the landscape fall within the ZTV.
World Heritage Sites, registered battlefields, registered historic parks and gardens	Construction and operational		✓	There are no examples of these within the Proposed Development, or within their study areas.

8.6 OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

- 8.6.1. Opportunities for enhancing the environment through Cultural Heritage can be limited. However, consideration will be given to increase the knowledge of Cultural Heritage to local communities. This may be delivered through activities such as talks to local groups or provision of information boards, as appropriate.

8.7 PROPOSED ASSESSMENT METHODOLOGY

- 8.7.1. The Cultural Heritage assessment will be supported through the production of a historic environment desk-based assessment. This will include a detailed baseline compiled through a standard range of data sources, including:

- Cadw designated historic assets records;
- CPAT Historic Environment Record (HER);
- Local authority data sources;
- Cartographic sources and other documentary research from Conwy County Council Archives;
- North-East Wales archives LiDAR from the Lle Geo-Portal;
- Aerial photography from Royal Commission on the Ancient and Historical Monuments of Wales (Coflein); and
- Topographic, geology and geotechnical data, where available.

- 8.7.2. Walkover surveys undertaken within the Proposed Development site will be limited to turbine locations and any other permanent pieces of infrastructure to assess the known historic assets and the potential for previously unrecorded remains.
- 8.7.3. Historic assets where their setting contributes to their significance, and which are deemed to have their setting affected, as shown on the ZTV, will be visited only if they are publicly accessible or with prior landowner approval. Prior to completion of the assessment of effects to the settings of historic assets, a list of assets to be assessed will be agreed with Cadw. The proposed list will be set out in tabular form which will comprise all designated historic assets within the 5km study area with, in each case, a reason to be scoped in or out of the assessment based on the ZTV and an initial understanding of the setting of the asset.
- 8.7.4. Consideration will be given to potential for effects on the Caersws Basin Registered Landscape of Special Historic Interest (HLW (P) 5) but it is anticipated that there would not be a more than local effect on this landscape and so completion of an assessment of the significance of impact of development on historic landscape (ASIDOHL2) in accordance with relevant guidance¹²² will not be required.
- 8.7.5. Consideration will be given to archaeological field investigation if required, which may include archaeological evaluation techniques, such as geophysical survey or targeted trial trenches, informed by the results of the geophysical survey. The requirement will be defined as the assessment progresses.
- 8.7.6. The assessment of potential effects of the Proposed Development on Cultural Heritage will be undertaken using the methodology set out below.
- 8.7.7. The Conservation Principles set by Cadw, as detailed in Planning Policy Wales¹²³ and Technical Advice Note 24¹²⁴ defines the significance of historic assets according to evidential, historical, aesthetic, and communal values. The determination of the significance is based on statutory designation, professional judgement against these values and as the result of consultation.
- 8.7.8. Each historic asset is evaluated against the range of criteria listed above on a case-by-case basis, in accordance with the criteria listed in **Table 8-2**. This also considers regional variations and individual qualities, where applicable.
- 8.7.9. Unless the nature and exact extent of archaeological remains within any given area has been determined through prior investigation, their significance can be uncertain, and a judgement will be made based on existing knowledge.
- 8.7.10. The assessment considers the contribution which setting makes to the significance of relevant historic assets.

¹²² Cadw/Welsh Government, 2007, Guide to Good Practice on using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process 2nd Edition [online]
https://cadw.gov.wales/sites/default/files/2019-05/LandscapesRegisterGoodPractice_EN_0.pdf

¹²³ Welsh Government, 2024, Planning Policy Edition 12 [online]
<https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf>
[Accessed 29/08/2024]

¹²⁴ Welsh Government, 2017, *Planning Policy Wales Technical Advice Note 24: The Historic Environment* [online] <https://www.gov.wales/sites/default/files/publications/2018-09/tan24-historic-environment.pdf>,
[Accessed 29/11/2023]

Table 8-2 – Value of Historic Assets

Asset Value	Description
Very High	World Heritage Sites
High	Scheduled Monuments Grade I Listed Buildings Grade II* Listed Buildings Grade II Listed Buildings with exceptional qualities in fabric, historical association, and/or association/group value with historic assets of high significance Registered Battlefield Conservation Areas containing very important (Grade I / II*) listed buildings Grade I and II* Registered Parks and Gardens Protected heritage landscapes Burial grounds Non-designated historic assets (above ground structures, landscape, townscape, buried remains) of national importance.
Medium	Grade II Listed Buildings which can be shown to have qualities in their fabric or historical association of regional importance only Conservation Areas containing primarily Grade II listed or Locally Listed Buildings Grade II Registered Parks and Gardens Locally Listed Buildings Non-designated historic assets (above ground structures, landscape, townscape, buried remains) of regional importance.
Low	Non-designated historic assets (above ground structures, landscape, townscape, buried remains) of local importance.
Negligible	Item with no significant heritage value or interest
Uncertain	Historic assets that have a clear potential, but for which current knowledge is insufficient to allow significance to be determined.

- 8.7.11. Determination of magnitude of change upon the significance of known or potential historic assets is based on the severity of likely impact (e.g. physical effects on built historic assets or the permanent presence of new structures etc. that result in changes to the contribution of setting to the heritage significance of a built historic asset). **Table 8-3** describes the criteria used in this assessment to determine the magnitude of change.

Table 8-3 – Magnitude of Change

Magnitude of Change	Description of Change
Large	Change to asset significance resulting in an appreciable change in our ability to understand and appreciate the asset and its historical context, character and setting. Notable alterations to the setting of an asset that affect our appreciation of it and its significance; or the unrecorded loss of archaeological interest.
Medium	Change to asset significance resulting in an appreciable change in our ability to understand and appreciate the asset and its historical context, character and setting. Notable alterations to the setting of an asset that affect our appreciation of it and its significance; or the unrecorded loss of archaeological interest.
Small	Change to asset significance resulting in a small change in our ability to understand and appreciate the asset and its historical context, character and setting.
Negligible	Negligible change or no material change to asset significance. No real change in our ability to understand and appreciate the asset and its historical context, character and setting.
Uncertain	Level of survival / condition of resource in specific locations is not known magnitude of change is therefore not known.
No change	No change

- 8.7.12. The assessment of likely significant effects considers all stages of the Proposed Development. The significance level attributed to each effect will be assessed based on the heritage significance of the affected historic asset and the magnitude of change (impact) to the heritage significance of the historic asset due to the Proposed Development.
- 8.7.13. The environmental effect is outlined in **Table 8-4**. Effects may be either negative (adverse) or positive (beneficial). Where the resulting effect comprises two separate levels (i.e., 'moderate - major' or 'negligible - minor'), professional judgement will be applied to select the most appropriate significance of effect. Where information is insufficient to be able to quantify either the asset significance or magnitude of change with any degree of certainty, the effect is given as 'uncertain'. This might be the case for archaeological assets, the presence, nature, date, extent and significance of which is uncertain due to the absence of any site-based investigation.

Table 8-4 – Significance of Environmental Effect

Magnitude of Change (Impact)	Historic Asset (receptor) Heritage Value				
	Very High	High	Medium	Low	Negligible
Large	Major	Major	Moderate - Major	Minor - Moderate	Negligible
Medium	Major	Moderate – Major	Moderate	Minor	Negligible
Small	Moderate	Minor – Moderate	Minor	Negligible – Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

8.7.14. The following terms have been used to define the significance of the effects identified:

- **Major effect:** where the Proposed Development could be expected to have a considerable effect (either positive or negative) on historic assets (receptors).
- **Moderate effect:** where the Proposed Development could be expected to have a noticeable effect (either positive or negative) on historic assets (receptors).
- **Minor effect:** where the Proposed Development could be expected to result in a small, barely noticeable effect (either positive or negative) on historic assets (receptors).
- **Negligible:** where no discernible effect is expected as a result of the Proposed Development on historic assets (receptors) (i.e., the effect is insignificant).

8.7.15. Residual effects that are classified as moderate or above are considered to be ‘significant’ in EIA terms. Residual effects classified as minor or below are considered to be ‘not significant’.

RELEVANT LEGISLATION AND GUIDANCE

8.7.16. The legislation considered during the preparation of this chapter is summarised as follows:

- Historic Environment (Wales) Act 2023

8.7.17. Relevant policy and guidance comprises:

- Future Wales. The National Plan to 2040
- Planning Policy Wales (PPW) (2024)
- Planning Policy Wales Technical Advice Note 24: The Historic Environment
- Powys Local Development Plan
 - Supplementary Planning Guidance: Archaeology, Adopted July 2021
 - Supplementary Planning Guidance: Historic Environment Including Historic Environment Record, Adopted July 2021
- Conservation Principles for the Sustainable Management of the Historic Environment in Wales, Cadw 2011
- Heritage Impact Assessment in Wales, Cadw 2017
- Setting of Historic Assets in Wales, Cadw 2017

- 8.7.18. Planning Policy Wales (PPW) (2024)¹²⁵ outlines guidance for the historic environment and planning applications in relation to archaeological remains, listed buildings, locally listed historic assets, historic landscapes including the significance and setting of historic assets.
- 8.7.19. The work will be undertaken in accordance with the standards set by the Chartered Institute for Archaeologists (CifA) as well as Cadw's Conservation Principles. All elements of the assessment will be undertaken in accordance with the following regulations and guidelines:
- CifA (2022) Code of conduct: professional ethics in archaeology¹²⁶;
 - CifA (2021) Professional conduct¹²⁷;
 - CifA (2020a) Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment¹²⁸; and
 - CifA (2020b) Standard and guidance for desk-based assessment¹²⁹.

8.8 MITIGATION

- 8.8.1. Mitigation strategies will be developed based on further desk-based research across the Proposed Development. The results of the assessment will determine if any mitigation measures would be required in order to protect, or record designated and non-designated historic assets. This may include archaeological excavation or strip, map, and record to ensure the recording of any historic assets physically affected by the Proposed Development. Any archaeological mitigation would be agreed with the local planning authority's archaeological advisors.

8.9 ASSUMPTIONS AND LIMITATIONS

- 8.9.1. To ensure transparency within the EIA process, the following limitations and assumptions have been identified:
- The scoping assessment is a high-level desk-based appraisal of risk and has not included a review of a full range of resources (e.g. documentary, cartographic, air photographic, and geotechnical, architectural, and engineering sources) that would normally be consulted in a full desk-based assessment for planning.
 - Archaeological remains are for the most part buried and not visible above the surface. In the absence of intrusive archaeological field investigation, it is possible that there are archaeological assets within the Proposed Development that have not been identified by the scoping assessment.

¹²⁵ Welsh Government, 2024, Planning Policy Edition 12 [online] <https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf> [Accessed 17/02/2025]

¹²⁶ Chartered Institute for Archaeologists (CifA), 2022, *Code of Conduct: professional ethics in archaeology*, [online] <https://www.archaeologists.net/sites/default/files/Code%20of%20conduct%20revOct2022.pdf>, [Accessed 17/02/2025]

¹²⁷ Chartered Institute for Archaeologists (CifA), 2024, *Regulations for professional conduct*, [online] https://www.archaeologists.net/sites/default/files/Regulations%20for%20professional%20conduct_0.pdf, [Accessed 17/02/2025]

¹²⁸ Chartered Institute for Archaeologists (CifA), 2020, *Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment*, [online] https://www.archaeologists.net/sites/default/files/CifAS%26GCommissioning_2.pdf, [Accessed 17/02/2025]

¹²⁹ Chartered Institute for Archaeologists (CifA), 2020, *Standard and guidance for historic environment desk-based assessment*, [online] https://www.archaeologists.net/sites/default/files/CifAS%26GDBA_4.pdf, [Accessed 17/02/2025]

9 HYDROLOGY

9.1 INTRODUCTION

- 9.1.1. This Chapter presents the proposed scope of the assessment of effects arising from the Proposed Development upon Hydrology and Hydrogeology.
- 9.1.2. The Chapter (and its associated figures and appendices) should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Description of The Proposed Development** and with respect to relevant parts of other technical chapters, such as **Chapter 5: Ecology**, and **Chapter 10: Geology and Soils**.
- 9.1.3. The scope of the assessment is based on a high-level review of baseline information and will be confirmed through a review of additional data sources.

9.2 CONSULTATION

- 9.2.1. No formal consultation has been undertaken to date. It is therefore intended that this EIA Scoping Report would form the basis for consultation response from key consultees. Consultees are requested to confirm the scope of this assessment and provide specific comment on:
- Is there any other baseline information on the hydrological environment that should be considered?
 - Do you agree with the proposed approach for the assessment of the effects of the Proposed Development on the hydrological receptors?
 - Have all relevant potential impacts on hydrology been identified that might arise from the Proposed Development?
 - Do you agree with the hydrology impacts that have been scoped in and out of the assessment, together with the reasons for doing so?
 - Do you agree the embedded mitigation measures are sufficient to avoid the significant impacts identified?
 - Please confirm the expected timescales for adoption of the updated TAN15 guidance, and if relevant, key considerations for this project.

9.3 STUDY AREA

- 9.3.1. The Proposed Development is located within the county of Powys, central Wales. The Proposed Development is located on the top of a plateau north of the village of Clatter and northeast of the village of Carno. The Site consists of the Energy Park and the access road which links the Energy Park with the A470 road. The Site covers an area of approximately 377ha.
- 9.3.2. The geographical extent of the zone of influence (Zois) extends 1.5km from the Site at all points. This nominated area of interest is considered conservative and sufficient for the purposes of this baseline appraisal, based on hydrological knowledge of the area and professional experience that standard avoidance and management measures would prevent significant effects occurring at a greater distance. Thus, the Study Area has been set to include all land potentially subject to effects from the Proposed Development, and sufficient to demonstrate that these can be managed within. This will enable demonstration that effects at a greater distance from the Site would also be avoided.

9.4 BASELINE CONDITIONS

INTRODUCTION

- 9.4.1. This section provides a high-level review of the current baseline environmental characteristics for the Proposed Development and surrounding area of interest, with particular reference to the water environment. The baseline conditions will be confirmed through review of analysis of additional data sources and further consultation with stakeholders during the next stages of the EIA.
- 9.4.2. Key hydrological features within the area of interest are identified in **Figure 9.1**.

DATA SOURCES

- 9.4.3. The EIA scoping exercise has been undertaken with reference to **Chapter 2: Description of the Proposed Development**, supported by several data sources. The principal data sources used to inform this chapter for potential effects were:

- Natural Resources Wales Flood Risk Maps¹³⁰
- Natural Resources Wales Risk of Flooding from Surface Water¹³¹
- Natural Resources Wales – Water Framework Directive (WFD) Cycle 3 Rivers and waterbodies¹³²
- Natural Resources Wales – Geo Portal for Wales for Source protection areas¹³³
- BGS Geoindex Onshore – Aquifer Designation¹³⁴
- British Geological Survey (BGS) Geology of Britain Viewer for geological information¹³⁵
- Cranfield University – LandIS soilscales viewer¹³⁶
- Ordnance Survey (OS) Mapping¹³⁷
- National Library of Scotland – historical map¹³⁸

¹³⁰ Natural Resources Wales Flood Risk Maps [online] Available at: https://datamap.gov.wales/layers/inspire-nrw:NRW_FLOOD_RISK_FROM_RIVERS (Last accessed February 2025)

¹³¹ Natural Resources Wales Risk of Flooding from Surface Water [online] Available at: https://datamap.gov.wales/layers/inspire-nrw:NRW_FLOOD_RISK_FROM_SURFACE_WATER_SMALL_WATERCOURSES (Last accessed February 2025)

¹³² Natural Resources Wales – Water Framework Directive (WFD) Cycle 3 Rivers and waterbodies [online] Available at: https://datamap.gov.wales/layergroups/geonode:nrw_wfd_cycle_3_classifications (Last accessed February 2025)

¹³³ Natural Resources Wales – Geo Portal for Wales for Source protection zones [online] Available at: https://datamap.gov.wales/layers/inspire-nrw:NRW_Source_Protection_Zones (Last accessed February 2025)

¹³⁴ BGS Geoindex Onshore – Aquifer Designation [online] Available at: <http://mapapps2.bgs.ac.uk/geoindex/home.html> (Last accessed February 2025)

¹³⁵ British Geological Survey (BGS) Geology of Britain Viewer for geological information [online] Available at: <http://www.bgs.ac.uk/data/mapViewers/home.html> (Last accessed February 2025)

¹³⁶ Cranfield University – LandIS soilscales viewer [online] Available at: <http://www.landis.org.uk/soilscales/> (Last accessed February 2025)

¹³⁷ Ordnance Survey (OS) Mapping [online] Available at: <https://www.bing.com/maps/> (Last accessed February 2025)

¹³⁸ National Library of Scotland – historical map [online] Available at: <https://maps.nls.uk/geo/explore/#zoom=14&lat=51.72994&lon=-3.15008&layers=161&b=1> (Last accessed February 2025)

- Powys County Council Local Flood Risk Management Strategy¹³⁹

LAND USE AND TOPOGRAPHY

- 9.4.4. Based on Ordnance Survey (OS) 1:25k Mapping Bing Maps on-line maps, and aerial photography¹⁴⁰, the Site area is largely covered with grassland, with rough grassland interspersed with areas of bracken, especially in the north and western areas. There are areas of marsh in the westerly quadrant surrounding the headwaters of the watercourses draining the Site. The southern section of the Site passes by the occurrence of deciduous woodland which tend to form corridors along the streams and field boundaries. There are areas of coniferous plantation outside the Site area, to the west of Llyn Du and recent timber harvesting near the northwestern corner of the Site area. The occurrence of plantations and timber harvesting will likely have a significant hydrological influence on the local catchment both currently and in the future. The area is largely undeveloped, with the main land use that of agriculture, being sheep farming in this case. Located, just south of the Site area, is Llyn Mawr, a Site of Special Scientific Interest (SSSI), on the basis of the lake and associated bog habitats¹⁴¹. The closest significant settlements are the village of Clatter to the south-west, Carno to the west, Caersws village to the south and the largest of these, Newtown to the southeast. The A470 runs from the south and along the western side of the Site area, while the A483 road runs along the east.
- 9.4.5. The area on which the Site is located has a broad ridge (Craig y Llyn-mawr) which runs from south to north across the western quadrant. This ridge forms the hydrological divide, as the Site drains westward (into the Afon Carno WFD surface waterbody) and eastward (into the Afon Rhiw WFD surface waterbody) respectively, with both watersheds draining into the River Severn.
- 9.4.6. The elevation varies across the Site, with the highest point being 485m above ordnance datum (AOD), whilst the turbines are situated on land ranging from 345m to 458m AOD. The lowest point of the Site in the valley near the village of Pontdolgoch, at 140m AOD, where the Site joins the B4568 before then joining the A470 in the bottom of the Afon Carno valley.

HYDROLOGY

- 9.4.7. The Site area (excluding the Zol), is located within the Severn River Basin District (**Figure 9.1**), and intersect the catchments of four Water Framework Directive (WFD) surface water bodies: Afon Carno (confluence of Afon Cwm-llwyd to confluence River Severn) to the southwest of the Study Area, Afon Rhiw (South Arm) (Ty-Newydd to Dwyrhiew) to the northeast of the Study Area, Nant Rhyd-ros Ian (source to confluence with River Severn) to the east, and Severn (confluence Afon Dulas to confluence River Camland) to the southeast, all detailed in **Table 9-1**.

¹³⁹ Powys County Council Local Flood Risk Management Strategy [online] Available at: <https://en.powys.gov.uk/article/5575/Flood-Risk-Management> (Last accessed February 2025)

¹⁴⁰ Bing Maps (2024). [online]. Available at: <https://www.bing.com/maps> (Last accessed February 2025)

¹⁴¹ Montgomeryshire Wildlife Trust: Llyn Mawr [online] Available at: <https://www.montwt.co.uk/nature-reserves/llyn-mawr> (Last accessed February 2025)

- 9.4.8. The Site is located on the watershed divide between the Afon Carno (GB109054049250) and Afon Rhiw (GB109054049350) waterbodies. The Afon Carno waterbody is situated to the southwest of the Site, with the Afon Rhiw located in the northeast. Both waterbodies are tributaries to the River Severn. The eastern section of the Site drains into the Afon Rhiw (63% of total Site area), while the western section drains into the Afon Carno (35% of total Site area).
- 9.4.9. The access road intersects a further two waterbodies. The Nant Rhyd-ros lan (GB109054049220), and the Severn (GB109054049310). The Nant Rhyd-ros lan drains to the east initially before turning south where the river flows into the Severn, while the Severn water body drains in a southerly direction from the proposed access road and into the River Severn. The Afon Carno, Afon Rhiw, and Nant Rhyd-ros lan WFD surface water bodies achieved an overall classification of 'Good' in the 2021 WFD classification (Cycle 3), while the Severn WFD achieved a 'Moderate'.
- 9.4.10. The Zol intersects a further four waterbodies, the Afon Cwm-llwyd (GB109054049370) to the northwest, the Bechan Bk (GB109054049330) to the east, the Afon Cerist (GB109054044840) to the south and the Afon Trannon (GB109054049230) to the southwest. These four water bodies are not considered further as they are not seen to be hydrologically significant, as any disturbances by the development would be intercepted by other rivers before reaching the source areas of these waterbodies, as the topography separates them hydrologically from the Site area.
- 9.4.11. The Afon Carno is situated approximately 140m southwest at the closest point to the Site area and crosses near the point where the access road joins the A470. The Afon Carno then flows in a south-eastern direction before joining the River Severn at Caersws. Most of the Site area drains in a northeastern direction into the southern arm of the Afon Rhiw. The southern arm of the Afon Rhiw flows in a north-eastern direction away from the Site area before turning east and joining the northern arm of the Afon Rhiw at Dwyrhiew. The Afon Rhiw then continues to flow east before joining the Severn River north of Garthmyl. The Nant Rhyd-ros lan drains a section of the access road in an easterly direction before turning south and then southwest where it joins the River Severn at Rhydlydan. Several minor watercourses occur across the Site area, which include the Nant yr Amros and Nant Cwmgerwyn which both drain south into the Afon Carno, and the Nant y Llyn Mawr which drains north into the Afon Rhiw.

Table 9-1 – Summary of the WFD Surface Water Body and its Associated Status Definitions within Study Area¹⁴²

	Afon Carno (confluence of Afon Cwm-llwyd to Confluence River Severn) Surface Water Body	Afon Rhiw (South Arm) (Ty-newydd to Dwyrhiew) Surface Water Body	Nant Rhyd-ros lan (source to Confluence River Severn) Surface Water Body	Severn (confluence Afon Dulas to Confluence River Camlad) Surface Water Body
Type	River	River	River	River
Water body identifier	GB109054049250	GB109054049350	GB109054049220	GB109054049310

¹⁴² Source: https://datamap.gov.wales/layergroups/geonode:nrw_wfd_cycle_3_classifications Status definitions from 2021 WFD classification (Cycle 3) (Last accessed February 2025)

	Afon Carno (confluence of Afon Cwm-Ilwyd to Confluence River Severn) Surface Water Body	Afon Rhiw (South Arm) (Ty-newydd to Dwyrhiew) Surface Water Body	Nant Rhyd-ros lan (source to Confluence River Severn) Surface Water Body	Severn (confluence Afon Dulas to Confluence River Camlad) Surface Water Body
Catchment	Severn Uplands	Severn Uplands	Severn Uplands	Severn Uplands
HMWB ¹⁴³	No	No	No	Heavily Modified
Overall status	Good	Good	Good	Moderate
Ecological status	Good	Good	Good	Moderate
Chemical status	High	High	High	High
Objectives for 2027 ¹⁴⁴	Hydromorphological supporting elements Morphology	Morphology	Hydromorphological supporting elements Morphology	Ecological Physico-chemical quality elements Phosphate Supporting elements (surface water) Mitigation Measures Assessment Hydromorphological Supporting Elements Morphology
% of Site which drains into Surface Water Body	35	63	1	1

9.4.12. OS mapping shows there are two individual springs (S2 and S3) which are located within the area of the Site which descends towards the Afon Carno valley. Within the Study Area, there are 14 wells and six springs including S2 and S3. A record of these wells and springs is available in **Table 9-2** below.

¹⁴³ Note: HMWB – heavily modified water body

¹⁴⁴ Source: <https://cyfoethnaturiolcymru.sharefile.eu/share/view/sc0c2a20ae9c2429394326eb75e0eda5d> River Basin Management Plan (RBMP) Measures and Objectives: Objectives for 2027 (Last accessed February 2025)

Table 9-2 – The Wells and Springs Identified within the 1.5km area of Interest Surrounding the Site with Distance from Site boundary and National Grid Reference (NGR).

Name	Type	NGR	Distance (m) from Site
W1	Well	SN981970	1132
W2	Well	SO016958	496
W3	Well	SO003953	614
W4	Well	SO004952	483
W5	Well	SO021947	1017
W6	Well	SO021946	1003
W7	Well	SO005944	479
W8	Well	SO004944	539
W9	Well	SO022943	1006
W10	Well	SO014943	243
W11	Well	SO014938	153
W12	Well	SO002932	1106
W13	Well	SO000927	1459
W14	Well	SO014924	1174
S1	Spring	SO021968	888
S2	Spring	SO012966	Within Site area
S3	Spring	SO012060	Within Site area
S4	Spring	SO016958	462
S5	Spring	SO020948	937
S6	Spring	SO002939	875

- 9.4.13. There are three lakes of varying size within the Study Area (**Figure 9.1**), however, none occur within the boundaries of the Site. Both Llyn Mawr, within the Afon Rhiw waterbody, and Llyn Du, within the Afon Carno waterbody, are located at an elevation of 390m AOD. Llyn y Tarw located to the east of the Study Area and within the Nant Rhyd-ros Ian waterbody is at an elevation of 420m AOD.

- 9.4.14. Based on the NRW Licensed Water Abstractions¹⁴⁵ database there are no points of abstraction within the Site or Study Area. Private Water Supplies (PWS) will be assessed within the next stage.

HYDROGEOLOGY

- 9.4.15. The Site is located within the WFD groundwater body Severn Uplands – Lower Palaeozoic. The Penstrowd Grits Formation, which underlies the majority of the study area is classified by NRW as Secondary Undifferentiated aquifers. These are assigned in: “cases where it has not been possible to attribute either category Secondary A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type”. The southern area, and for majority of the area covered by the access road, the aquifer designation changes to that of Secondary B Aquifer, which are defined as “predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering”. These are generally the water-bearing parts of the former non-aquifers. Along areas of the Afon Carno in the valley bottom, the designation changes to that of Primary Aquifer, which are defined as “layers of rock or drift deposits which have high intergranular and/or fracture permeability” which means they usually provide a high level of water storage.
- 9.4.16. The Lower Palaeozoic underlying the Study Area is a designated WFD groundwater body (Severn Uplands – Lower Palaeozoic GB40902G205300) and achieved ‘Good’ quantitative status and ‘Poor’ chemical status in the 2021 WFD classification (Cycle 3).
- 9.4.17. The Site and the wider Study Area are not within a Source Protection Zone (SPZ). The closest SPZ is located 4km to the southeast of the Site. SPZs show the risk of contamination from any activities that might cause pollution to public drinking water supplies.

FLOOD RISK

Terminology

- 9.4.18. In this report, the probability of a flood occurring is expressed in terms of Annual Exceedance Probability (AEP), which is the inverse of the annual maximum return period. For example, the 100-year flood can be expressed as the 1% AEP flood, i.e. a flood that has a 1% chance of being exceeded in any year.
- 9.4.19. **Table 9-3** is provided to clarify the use of the AEP terminology as well a description of the Flood Zone definitions as used by the NRW, and the Welsh Flood Zones set out in the Welsh Assembly Government’s Technical Advice Note 15¹⁴⁶ (TAN15 (2004)) Development Advice Map (DAM)¹⁴⁷. Adoption of an updated version of the Technical Advice Note (TAN 15) ‘Development and flood risk’ guidance¹⁴⁸ (and the replacement of the DAM with the new Flood Map for Planning prepared by

¹⁴⁵ Natural Resources Wales (NRW) Licensed Water Abstractions [online]. Available at:

https://datamap.gov.wales/layers/geonode:nrw_water_resource_permits (Last accessed February 2025)

¹⁴⁶ Welsh Assembly Government Technical Advice Note 15: Development and Flood Risk [online] Available at: <https://www.gov.wales/sites/default/files/publications/2018-09/tan15-development-flood-risk.pdf> (Last accessed February 2025)

¹⁴⁷ NRW online Development Advice Map [online]. Available at: <https://naturalresources.wales/flooding/flood-map-for-planning-development-advice-map/?lang=en> (Last accessed February 2025)

¹⁴⁸ Welsh Assembly Government revised (unadopted) Technical Advice Note 15: Development and Flood Risk [online] Available at: <https://www.gov.wales/technical-advice-note-tan-15-development-flooding-and-coastal-erosion> (Last accessed February 2025)

NRW) has been suspended to allow further consultation with LPAs. No date has yet been announced as to when the outcome of the consultation will be completed and the updated TAN15 adopted. However, the new TAN15 guidance may be concluded and adopted during the course of this assessment process. It should be noted, that whilst still valid, the DAM was last updated in 2020, and now needs to be considered alongside the new NRW Flood Map for Planning (FMfP) which forms the best current source of information on fluvial flood risk at the Site¹⁴⁹.

Table 9-3 – Flood Zone Definitions and Associated Annual Exceedance Probability

WAG TAN15 DAM Flood Zone	NRW Flood Zones	Probability of flooding	AEP	Definition
Flood Zone A	Flood Zone 1	Low Probability	<0.1% AEP of river or sea flooding	Land with less than 1 in 1,000 probability of flooding from rivers or the sea, in any given year
Flood Zone C1 (developed and served by significant flood defences) / Flood Zone C2 (no significant flood defences)	Flood Zone 2	Medium Probability	1% - 0.1% AEP of river flooding 0.5% – 0.1% AEP of sea flooding	Land with between a 1 in 100 and 1 in 1,000 of river flooding; or land having between a 1 in 200 and 1 in 1,000 probability of sea flooding
Flood Zone B	N/A	N/A	N/A	Geological indicators of flooding
N/A	Flood Zone 3	High Probability	>1% AEP of river flooding >0.5% AEP of sea flooding	Land having a 1 in 100 or greater probability of river flooding in any year; or Land having a 1 in 200 probability or greater of sea flooding in any year.

¹⁴⁹ NRW online Flood Map for Planning [online]. Available at: <https://flood-map-for-planning.naturalresources.wales> (Last accessed February 2025)

Historical Flooding

- 9.4.20. NRW's online FMfP does not show historical flooding records at or close to the Site. The closest area of historical flooding occurred below the point at which the Afon Carno River meets the Severn River, 2.7km south of the Site in the village of Caersws. It is also noted in the NRW Flood Risk Management Plan: Mid Wales Place¹⁵⁰ that Caersws and Newtown were noted as experiencing flooding during wet weather in February 2021.

Fluvial and Tidal Flood Risk

- 9.4.21. The NRW's online FMfP (**Figure 9.3**) shows that the Site lies entirely in Flood Zone 1. Within the Study Area to the north of the Site, there are areas of both Flood Zones 2 and 3, associated with the Nant y Llyn Mawr. In the wider Study Area, there are areas of both Flood Zones 2 and 3, associated with the greater Afon Rhiw to the northeast and the Afon Carno in the southwest.

9.4.22. The NRW's DAM shows that the Site is located in Flood Zone A (**Figure 9.4**). Near to the north-western extent of the Study Area, Flood Zones A and C2 occur in the upper reaches of the Nant y Llyn Mawr, Flood Zones B and C2 in the upper reaches of the Afon Rhiw and along the Afon Carno. The risk of flooding from fluvial sources is therefore considered low.

- 9.4.23. The NRW Flood Risk Management Plan: Mid Wales Place lists the downstream village of Caersws as one of the communities at most risk from flooding.

- 9.4.24. Due to the Site's elevation, tidal flooding is not considered a risk to the Proposed Development.

Surface Water Flood Risk

- 9.4.25. Surface water flooding occurs when the intensity of rainfall is greater than the local drainage and infiltration capacity, causing water to flow overland. Where low-points or barriers to flow are present, particularly deep areas of surface water flooding may occur as a result of ponding. These areas are not limited to river corridors or floodplains.

- 9.4.26. The NRW's online FMfP (**Figure 9.5**) shows that the majority of the Site and the Study Area is at very low risk of surface water flooding (<0.1% AEP) from this source.

- 9.4.27. With the Site area situated on a plateau, there are narrow regions of Low and High (0.1 % to >3.3 % AEP) flood risk anticipated along the minor and major watercourses of the Site and wider Study Area. Of particular interest within the Site is the high flood risk associated with the minor watercourse of Nant y Llyn Mawr which feeds out of the Llyn Mawr SSSI area and flows across the study area from the southwest to the northeast. Areas of High risk are also identified near the surrounding lakes of Llyn Mawr and Llyn Du in the southwest of the Site area.

- 9.4.28. Along the lower region of the Site which descends into the Afon Carno valley, there are several areas of high-risk flooding associated with the crossing of minor watercourses which feed in a westerly direction into the Afon Carno at the bottom of the valley. The point at which the Site joins the B4568 is an area of high-risk as the surface runoff water ponds on the surrounding fields and has the potential during extreme events, to cause the low lying portion of the Site to flood. In the Study Area, there are several areas of low and high anticipated flood risk associated with the draining watercourses along the western areas into the Afon Carno in the valley below, and in the northern areas into the Nant y Llyn Mawr.

¹⁵⁰ NRW Flood Risk Management Plan: Mid Wales Place [online]. Available at: <https://naturalresources.wales/media/3hwgt4vp/frmp-cycle-2-place-section-mid.pdf> (Last accessed February 2025)

Groundwater Flood Risk

- 9.4.29. Groundwater flooding occurs as a result of water issuing to the surface from the underlying aquifers. This tends to occur after long periods of sustained high rainfall, with areas most at risk typically situated on permeable geology and low-lying compared to the local water table, and where no watercourse is available to drain the water away.
- 9.4.30. The Severn Preliminary Flood Risk Assessment (PFRA)¹⁵¹ states that the risk of groundwater flooding is low within Wales due to the geology (underlying rock type) and topography (steep sided valleys). There is no mention of groundwater flooding in the NRW Flood Risk Management Plan: Mid Wales Place or the Powys Flood Risk Management Strategy¹⁵².
- 9.4.31. Although groundwater emergence is highly unlikely, any flows are expected to be limited as the Site is on a topographic high and the underlying geology comprises bands of both higher and lower permeability bedrock layers. The elevated topography is likely to channel surface water to the valley floors relatively quickly, limiting the amount of percolation and increasing the amount of surface runoff. The same understanding applies to the area of the Site which descends into the Afon Carno valley where the slope is steady and should promote surface water runoff into the drainage channels.
- 9.4.32. This suggests that although some groundwater may be encountered during excavations in the Site area, groundwater is unlikely to be found in significant quantities.

Sewer Flood Risk

- 9.4.33. Sewer flooding occurs when the local capacity of the underground drainage network is exceeded resulting in the surcharging of water to the surface. The discharge of the drainage network into watercourses can also be affected by overall system capacity (i.e. where pumped), or high-water levels in the receiving waters obstructing the drainage of network outfalls.
- 9.4.34. It is anticipated that there are no/few sewer drainage networks within the Site and the surrounding area of interest.

Artificial Flood Risk

- 9.4.35. The NRW's online FMfP shows that the Site and the wider Study area are not at risk of flooding in the extreme (unlikely) event of a reservoir failure. There are no canals or flood defences within the Study Area.

DESIGNATED SITES

- 9.4.36. A number of designated sites for biodiversity conservation have been identified within or close to the Site area in **Chapter 5: Ecology**.
- 9.4.37. There are no statutory designated sites that have a hydrological or hydrogeological component to their designation within the Site area. The closest statutory designated site with a hydrological component is that of Llyn Mawr SSSI, which falls within the Study Area. Llyn Mawr SSSI is located

¹⁵¹ Severn Preliminary Flood Risk Assessment (2018) [online] Available at: <https://naturalresources.wales/media/687716/pfra-severn.pdf> (Last accessed: February 2025)

¹⁵² Powys Flood Risk Management Strategy (2012) [online] Available at: <https://powys.moderngov.co.uk/Data/Cabinet/20120911/Agenda/xC140%20Flood%20Risk%20Management%20Strategy%20v2.pdf> (Last accessed February 2025)

100m south of the Site. Llyn Mawr is a good example of a moderately oligotrophic upland lake in a catchment only partially modified by agricultural improvement. The Llyn Mawr is upstream of the majority of the Site area. However, there is a portion of the Site which descends into the Afon Carno valley, which is located upgradient of the Llyn Mawr, and the Llyn Mawr could potentially be impacted hydrologically by the Proposed Development at this point. There is also a leat along the southwestern boundary of the Energy Park section of the Site, that does not appear to be connected hydrologically to the Llyn Mawr, but this would need to be confirmed during a site walkover in the next phase.

- 9.4.38. Areas of Peat have been identified within the Site area, as well as the Study Area. Information on the scoping of Peat is covered in **Chapter 10: Geology and Soils**.

FUTURE BASELINE

- 9.4.39. Hydrological and hydrogeological baseline conditions may change even if the Proposed Development is not built out, for the following reasons:
- Climate change will result in increased rainfall seasonality, with generally wetter winters and drier summers; high-intensity rainfall events will become more common. This will lead to greater variation in river flows (low flows and high flows), and increases in flood risk;
 - Changes to land use and land cover due to changes to agricultural practice and societal demands on rural land;
 - The location and rate of surface water and groundwater abstractions in the area could vary over time and may result in changes to the WFD surface water and groundwater body status and SPZ designations;
 - Improvements to WFD waterbody status associated with improvements to individual quality elements (i.e. phosphate reduction) would result in higher-quality, more sensitive waterbodies; and
 - Other new development (e.g. urbanisation settlements) along the valley bottoms may result in changes in hydrological baseline such as surface water runoff (flow and pathways) and increase the number of development receptors.

9.5 PROPOSED ASSESSMENT METHODOLOGY

- 9.5.1. This section describes the approach for the assessment of the effects of the Site on the hydrology receptors.
- 9.5.2. The significance of an effect resulting from the Proposed Development is primarily determined by the value (sensitivity) of a given water feature and the magnitude of the potential effect. In terms of the hydrology, the key determinants of magnitude relate to surface water quantity (level and flow), and water quality.
- 9.5.3. However, depending on the effects of surface water flows, there may also be indirect effects on downstream morphology and sediment dynamics, river water quality and flood risk. The method and criteria used to determine value, magnitude, and significance of effect are described in the sections below.

DETERMINATION OF SIGNIFICANCE

- 9.5.4. The EIA Regulations recognise that developments will affect different environmental elements to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are “likely to be significantly affected by the development”.

- 9.5.5. The EIA Regulations¹⁵³ do not define significance and it will be necessary to state how this will be defined for the EIA. The significance of an effect resulting from a development during construction or operation is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the effect. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the development.
- 9.5.6. **Table 9-4** details the basis for assessing receptor sensitivity. The value of water features is normally related to the importance of the surface water or groundwater feature that might be at risk from effects. The criteria used by WSP in the assessment of water feature value are semi-quantitative, so some professional judgement by the assessor has been required.

Table 9-4 – Establishing the Sensitivity of Water Receptors

Sensitivity	Criteria	Receptor Type*	Examples
High	Features with a high yield, quality or rarity with little potential for substitution.	Aquatic environment	Conditions supporting a site with an international conservation designation (Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site), where the designation is based specifically on aquatic features. WFD surface water body (or part thereof) with overall High status, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body. WFD surface water body (or part thereof) with High status for morphology.
	Water use supporting human health and economic activity at a regional scale.	Water use	Regionally important public surface water or groundwater supply (and associated catchment/GWMU) or permitted discharge.
	Features with a high vulnerability to flooding.	Flood risk	Land use type defined as 'Emergency Services' in the TAN15 development categories (e.g. hospitals, ambulance/police stations that are required to operate during flooding and buildings used to provide emergency shelter in time of flood) and essential infrastructure equivalent (i.e. critical national infrastructure, such as essential transport and utility infrastructure)
Medium	Features with a medium yield, quality or rarity, with a limited potential for substitution.	Aquatic environment	Conditions supporting a site with a national conservation designation (e.g. SSSI, National Nature Reserve (NNR)), where the designation is based specifically on aquatic features. WFD surface water body (or part thereof) with overall 'Good' status/potential, also any associated upstream non-reportable WFD

¹⁵³ The Town and Country Planning Environmental Impact Assessment Regulations 2017 [online] Available at: <https://www.legislation.gov.uk/ukxi/2017/571/introduction/made> (Last accessed February 2025)

Sensitivity	Criteria	Receptor Type*	Examples
			surface water body or non-WFD surface water body. WFD groundwater body (or part thereof) with overall 'Good' status.
	Medium quality watercourse morphology	Watercourse morphology	A watercourse in natural equilibrium and exhibiting a natural range of fluvial processes and morphological features, with little or no modification or anthropogenic influence.
	Water use supporting human health and economic activity at a local scale.	Water use	Local public surface water and groundwater supply (and associated catchment/GWMU) or permitted discharge. Licensed non-public surface water and groundwater supply abstraction (and associated groundwater catchment) which is relatively large relative to available resource, or where raw water quality is a critical issue, e.g. industrial process water, or permitted discharge.
	Features with a medium vulnerability to flooding.	Flood risk	Land use type defined as 'Highly vulnerable development' in the TAN15 development categories (e.g. educational institutions, most types of residential development and vulnerable industrial development)
Low	Features with a low yield, quality or rarity, with some potential for substitution.	Aquatic environment	Conditions supporting a site with a local conservation designation (e.g. Local Nature Reserve (LNR), County Wildlife Site (CWS)), where the designation is based specifically on aquatic features, or an undesignated but highly/moderately water-dependent ecosystem, including a Local Wildlife Site (LWS) and a GWDTE. WFD surface water body (or part thereof) with overall Moderate or lower status/potential, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body. Groundwater body (or part thereof) with overall Poor status.
	Low quality watercourse morphology	Watercourse morphology	A watercourse showing signs of modification and recovery to a natural equilibrium, and currently exhibiting a limited range of fluvial processes and morphological features affected by modification or anthropogenic influence.
	Water use supporting human health and economic activity at household/individual business scale.	Water use	Licensed non-public surface water and groundwater supply abstraction (and associated catchment/GWMU), which is relatively small relative to available resource, or where raw water quality is not critical, e.g. cooling water,

Sensitivity	Criteria	Receptor Type*	Examples
			spray irrigation, mineral washing or permitted discharge. Unlicensed potable surface water and groundwater abstraction (and associated catchment) e.g. private domestic water supply, well, spring or permitted discharge.
	Features with a low vulnerability to flooding.	Flood risk	Land use type defined as 'Less vulnerable development' in the TAN15 development categories excluding water compatible development equivalent (e.g. general industrial, employment, commercial and retail development, transport and utilities infrastructure, mineral extraction sites (except sand and gravel)).
Negligible	Commonplace features with very low yield or quality with good potential for substitution.	Aquatic environment	Conditions supporting an undesignated and low water-dependent ecosystem, including a LWS, GWDTE and pond. Non-reportable WFD surface water body (or part thereof), or non-WFD surface water body, not associated with any downstream WFD surface water body. Non-reportable WFD groundwater body (or part thereof), or non-WFD groundwater body.
	Very low quality watercourse morphology	Watercourse morphology	A highly-modified watercourse changed by channel modification or other anthropogenic pressures, currently exhibiting no active flow processes or morphological diversity.
	Water use does not support human health, and of only limited economic benefit.	Water use	Unlicensed non-potable surface water and groundwater abstraction (and associated catchment) e.g. livestock supply.
	Features that are resilient to flooding.	Flood risk	Land use type defined as 'Less vulnerable development' in the TAN15 development categories which is water compatible development equivalent (e.g. amenity open space, nature conservation and biodiversity, sand and gravel workings, docks, marinas, flood control infrastructure, water transmission infrastructure) and undeveloped land.

*Receptor types map onto receptor lists as follows:

- **Aquatic environment –watercourses/WFD surface water bodies, aquifers/WFD groundwater bodies, conditions supporting Groundwater Dependent Terrestrial Ecosystems (GWDTEs) and designated conservation sites**
- **Water use – springs, abstractions**

- **Flood risk – humans (incorporating both construction workers and residents), properties and infrastructure.**
- **Watercourse morphology - watercourses.**

9.5.7. **Table 9-5** details the basis for assessing magnitude of change. The magnitude of change on water receptors is independent of the value of the receptor, and its assessment is semi-quantitative, based on professional judgement.

Table 9-5 – Establishing the Magnitude of Change

Magnitude	Criteria	Receptor Type*	Example**
Major	Effects will be of a consistently high magnitude and frequency and cause severe damage to key characteristics, features and elements or even total loss; or Major improvement to characteristics, features and elements of receptor.	Aquatic environment	Deterioration in river flow regime, morphology or water quality, leading to sustained, permanent or long-term breach of relevant conservation objectives (COs) or non-temporary downgrading (deterioration) of status of WFD surface water body (including downgrading of individual WFD elements) or dependent receptors, or resulting in the inability of the surface water body to attain Good status in line with the measures identified in the RBMP. Deterioration in groundwater levels, flows or water quality, leading to non-temporary downgrading of status of WFD groundwater body or dependent receptors, or the inability of the groundwater body to attain Good status in line with the measures identified in the RBMP.
		Watercourse morphology	Loss or extensive damage to geomorphological habitat and processes due to extensive modification and/or fine sediment input. Replacement of a large extent of the natural bed and/or banks with artificial material. Extensive change to channel planform.
		Water use	Complete or severely reduced water availability and/or quality, compromising the ability of water users to abstract.
		Flood risk	Change in flood risk resulting in potential loss of life or major damage to the property or infrastructure.
Moderate	Adverse loss of resource or damage to characteristics, features or elements but limited impact on integrity; or Benefit or addition to characteristics, features and elements that improve the receptor.	Aquatic environment	Deterioration in river flow regime, morphology or water quality, leading to periodic, short-term and reversible breaches of relevant COs, or potential temporary downgrading of status of surface water body status (including potential temporary downgrading of individual WFD elements) or dependent receptors, although not affecting the ability of the surface water body to achieve future WFD objectives.

Magnitude	Criteria	Receptor Type*	Example**
			Deterioration in groundwater levels, flows or water quality, leading to potential temporary downgrading of status of WFD groundwater body or dependent receptors, although not affecting the ability of the groundwater body to achieve future WFD objectives.
		Watercourse morphology	Partial loss or damage to geomorphological habitat and processes due to modifications and/or fine sediment input. Replacement of the natural bed and/or banks with artificial material (total length is more than 3% of water body length).
		Water use	Moderate reduction in water availability and/or quality, which may compromise the ability of the water user to abstract on a temporary basis or for limited periods, with no longer-term impact on the purpose for which the water is used.
		Flood risk	Change in flood risk resulting in potential for moderate damage to the property or infrastructure.
Minor	Some measurable changes that are noteworthy and material. Minor benefit or minor loss/detrimental change to the receptors characteristics, features or elements.	Aquatic environment	Slight change in river flow regime, morphology or water quality, but remaining generally within COs, and with no short-term or permanent change to status of WFD surface water body (of overall status or element status) or dependent receptors. Slight deterioration in groundwater levels, flows or water quality, but with no short-term or permanent downgrading of status of WFD groundwater body or dependent receptors.
		Watercourse morphology	Slight change or deviation from baseline conditions, or partial loss or damage or improvement/ gain to in channel habitat and geomorphological processes due to modifications and/or fine sediment input.
		Water use	Minor reduction in water availability and/or quality, but unlikely to affect the ability of a water user to abstract.
		Flood risk	Change in flood risk resulting in potential for minor damage to property or infrastructure.
Negligible	Very minor changes that are not noteworthy or material.	Aquatic environment	No or very slight change in river flow regime or surface water quality, and no consequences in terms of COs or status of

Magnitude	Criteria	Receptor Type*	Example**
			WFD surface water body or dependent receptors. No or very slight change in groundwater levels or groundwater quality, and no consequences in terms of status of WFD groundwater body or dependent receptors.
		Watercourse morphology	Very slight change from surface water baseline conditions, approximating to a 'no change' situation.
		Water use	No, or very slight change in water availability or quality and no change in ability of the water user to exercise licenced rights or continue with small private abstraction.
		Flood risk	Increased frequency of flood flows, but which does not pose an increased risk to property or infrastructure.

*The watercourse morphology receptor type is only relevant when 'in-channel' works (i.e. improvement works within the river channel for restoration purposes) are proposed.

**For the purposes of this assessment of change, relevant WFD elements for surface water body classification include:

- **all biological quality elements e.g. fish, macrophytes, invertebrates;**
- **all physico-chemical quality elements e.g. dissolved oxygen, phosphate;**
- **hydromorphological supporting elements;**
- **Specific Pollutants;**
- **for Artificial and Heavily Modified Water Bodies; and**
- **the mitigation measures assessment.**

Significance evaluation methodology

- 9.5.8. The significance of water-related effects is derived by considering both the value of the feature and the magnitude of change. **Table 9-6** below indicates the level of the effect ranging from negligible to substantial. For purposes of the ES, effects of moderate and higher are considered to be significant effects in all cases.

Table 9-6 – Framework for Identifying Environmental Effects

Receptor sensitivity	Magnitude of impact			
	Negligible	Minor	Moderate	Major
Negligible	Neutral	Neutral	Minor/neutral	Minor
Low	Neutral	Minor	Moderate	Moderate
Medium	Neutral	Moderate	Moderate/Major	Moderate/Major
High	Neutral	Moderate	Moderate/Major	Major

9.5.9. In this assessment, only the potential and residual significance of change with respect to the water environment (groundwater levels, flows and quality, and river flows, quality and morphology) and flood risk are considered. It is important to recognise that a 'Significant' change in the water environment does not necessarily result in a 'Significant' change to ecological features. Indeed, because of the different benchmarks and magnitude criteria used by the two assessments, it is possible that a 'Not Significant' change in the water environment can still sit alongside a 'Significant' change in an associated ecological water feature, and vice-versa.

RELEVANT LEGISLATION AND GUIDANCE

9.5.10. This Scoping Report chapter has been prepared in line with national and local policy, listed below:

- Water Framework Directive (2000/60/EC)¹⁵⁴;
- Water Environment (Water Framework Directive) Regulations 2017¹⁵⁵;
- Water Resources Act 1991¹⁵⁶;
- Flood and Water Management Act 2010¹⁵⁷;
- Land Drainage Act 1991 & 1994¹⁵⁸;
- Future Wales: The National Plan¹⁵⁹ and Planning Policy Wales (Edition 12)¹⁶⁰;
- Technical Advice Note 15: Development, flooding and coastal erosion (2004)¹⁶¹;

¹⁵⁴ The EU Water Framework Directive (2000/60/EC) [online] Available at: <https://www.eea.europa.eu/policy-documents/water-framework-directive-wfd-2000> (Last accessed February 2025)

¹⁵⁵ Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 [online] Available at: <https://www.legislation.gov.uk/ukxi/2017/407/contents> (Last accessed February 2025)

¹⁵⁶ Water Resources Act 1991 [online] Available at: <https://www.legislation.gov.uk/ukpga/1991/57/contents> (Last accessed February 2025)

¹⁵⁷ The Flood and Water Management Act 2010 [online] Available at: <https://www.legislation.gov.uk/ukpga/2010/29/contents> (Last accessed February 2025)

¹⁵⁸ Land Drainage Act 1991 [online] Available at: <https://www.legislation.gov.uk/ukpga/1991/59/contents> (Last accessed February 2025)

¹⁵⁹ Future Wales: The National Plan 2040 [online] Available at: <https://www.gov.wales/future-wales-national-plan-2040-0> (Last accessed February 2025)

¹⁶⁰ Welsh Government Planning Policy Wales Edition 12 [online] Available at: <https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf> (Last accessed February 2025)

¹⁶¹ Welsh Government Technical Advice Note (TAN) 15 [online] Available at: <https://www.gov.wales/technical-advice-note-tan-15-development-and-flood-risk-2004> (Last accessed February 2025)

- Severn River Basin Management Plan (2022)¹⁶²;
- Severn Preliminary Flood Risk Assessment (2018)¹⁶³;
- Powys County Council Preliminary Flood Risk Assessment Addendum (2017)¹⁶⁴; and
- Powys County Council Adopted Local Development Plan (2011 – 2026)¹⁶⁵.

9.5.11. The technical guidance documents that are relevant to the Hydrology assessment include:

- British Standards Institute BS6031: Code of Practice for Earthworks (2009)¹⁶⁶;
- Construction Industry Research and Information Association (CIRIA) Report C532: Control of Water Pollution from Construction Sites (2001)¹⁶⁷;
- CIRIA Report C692: Environmental Good Practice on Site (2010)¹⁶⁸;
- Defra: Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009)¹⁶⁹; and
- Guidance for Pollution Prevention (GPPs)¹⁷⁰ (withdrawn in England only).

9.6 DESCRIPTION OF LIKELY SIGNIFICANT EFFECTS

POTENTIAL RECEPTORS

9.6.1. The water environment receptors identified during this high-level assessment which could potentially be affected by the Proposed Development are detailed in **Table 9-7**.

¹⁶² Natural Resources Wales Welsh part of the Severn River Basin Management Plan (2021-2027) [online] Available at: https://naturalresources.wales/media/695983/severn-rbmp-2021_2027-summary.pdf (Last accessed February 2025)

¹⁶³ Natural Resources Wales Severn Preliminary Flood Risk Assessment [online] Available at: <https://naturalresources.wales/media/687716/pfra-severn.pdf> (Last accessed February 2025)

¹⁶⁴ Powys County Council Preliminary Flood Risk Assessment [online] Available at: <https://en.powys.gov.uk/article/5575/Flood-Risk-Management> (Last accessed February 2025)

¹⁶⁵ Powys County Council Adopted Local Development Plan (2011 – 2026) [online] Available at: <https://en.powys.gov.uk/article/4898/Adopted-LDP-2011---2026> (Last accessed February 2025)

¹⁶⁶ British Standards Institute BS6031: Code of Practice for Earthworks (2009) [online] Available at: https://codehub.building.govt.nz/assets/generated_pdfs/bs-60311981-5593.pdf (Last accessed February 2025)

¹⁶⁷ Construction Industry Research and Information Association (CIRIA) Report C532: Control of Water Pollution from Construction Sites (2001) [online] Available at: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C532 (Last accessed February 2025)

¹⁶⁸ CIRIA Report C692: Environmental Good Practice on Site (2010) [online] Available at: https://www.ciria.org/CIRIA/Training/Training_courses/Environmental_good_practice_on_site.aspx (Last accessed February 2025)

¹⁶⁹ Defra: Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009) [online] Available at: <https://assets.publishing.service.gov.uk/media/5b2264ff40f0b634cfb50650/pb13298-code-of-practice-090910.pdf> (Last accessed February 2025)

¹⁷⁰ Guidance for Pollution Prevention (GPPs) [online] Available at: <https://netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/> (Last accessed February 2025)

Table 9-7 - Identified Water Environment Receptors

Receptor	Reason for Inclusion
Aquatic Environment	
Ordinary watercourses: Nant Cwmgerwyn; Nant yr Amros; Nant y Llyn Mawr;	These ordinary watercourses originate within or are located downgradient of the Site and/or Study Area and could potentially be affected.
Main rivers: Afon Carno; Afon Rhiw; Nant Rhyd-ros Ian; River Severn	These main rivers are located downgradient of and hydrologically connected to the Site and/or Study Area and could potentially be affected.
WFD River waterbodies: Afon Carno (GB109054049250); Afon Rhiw (GB109054049350); Nant Rhyd-ros Ian (GB109054049220); Severn (GB109054049310)	The Site and/or Study Area are located within the catchment boundaries of the listed WFD River waterbodies and could potentially be affected.
WFD groundwater body: Severn Uplands – Lower Palaeozoic (GB40902G205300)	The Site and/or Study Area are located within the catchment boundaries of the listed WFD groundwater body and could potentially be affected.
Llyn Mawr SSSI	The Llyn Mawr SSSI is located within the Study Area and downgradient of elements of the Proposed Development and could potentially be affected.
Water Resources	
Springs	The identified springs are located within the Study Area and could potentially be affected.
Licensed and private surface water abstractions	The licensed and private surface water abstractions which are located within the Site and/or Study Area, could potentially be affected.
Flood Risk	
Plant and personnel involved in construction of the Proposed Development	The review of sources of flood risk indicated that whilst significant/extensive sources of flooding at the Site are limited, localised sources of flood risk – discrete watercourses, overland flow pathways and accumulations within excavations will need to be considered during the construction, operational and decommissioning phases, plant and personnel are susceptible to these risks whilst on site.
Humans/properties/infrastructure downslope and adjacent to the Site including properties at Carno (west), Clatter (southwest), Pontdolgoch (south), Caersws (south), and Newtown (southeast)	Humans, properties and infrastructure in the listed areas are within the Site and/or Study Area or are downgradient/downstream of the Site and could potentially be affected.

- 9.6.2. With receipt of further baseline information, there may be other receptors identified in the ES that require assessment, including surface water or groundwater abstractions within the Study Area.

LIKELY SIGNIFICANT EFFECTS

- 9.6.3. The likely significant water environment effects for the construction, operation and decommissioning phases of the Proposed Development that will be scoped into the EIA are summarised in **Table 9-8**. The effects for the decommissioning phase are expected to be similar in nature to the construction phase. As far as is practicable the Development infrastructure will be removed. Decommissioning effects will typically be temporary, short-term effects that will occur during the break-up and removal of infrastructure.

Table 9-8 – Likely Significant Water Environmental Effects

Element	Phase	Scoped In	Scoped Out	Justification
Watercourses: Nant Cwmgerwyn, Nant yr Amros, Nant y Llyn Mawr	Construction, Operation and Decommissioning Phase	✓		Potential for impact from the release of pollutants (e.g. chemicals, hydrocarbons and other construction materials) directly (e.g. accidental spillages into the surface water) or indirectly (via surface water runoff) leading to deterioration in the surface water quality environment. Potential for impact from temporary increase in sediment-loading of surface water runoff from construction/dismantling areas leading to deterioration in the surface water quality environment. Potential for impact from an increase in surface water runoff and therefore increase in flood risk downstream and, increase in potential erosional power of surface overland flow impacting channel morphology. Potential for impact from sediment ingress due to more connected drainage systems.
WFD surface water bodies: Afon Carno, Afon Rhiw, Nant Rhyd-ros lan, Severn	Construction, Operation and Decommissioning Phase	✓		Potential for impact from the release of pollutants (e.g. chemicals, hydrocarbons and other construction materials) directly (e.g. accidental spillages into the surface water) or indirectly (via surface water runoff) leading to deterioration in the surface water quality environment, deterioration in the status of WFD surface water bodies. Potential for impact from temporary increase in sediment-loading of surface water runoff from construction/dismantling areas leading to deterioration in the surface water quality environment and deterioration in the status of WFD surface water bodies.

Element	Phase	Scoped In	Scoped Out	Justification
				Potential for impact from an increase in surface water runoff and therefore increase in flood risk downstream and, increase in potential erosional power of surface overland flow impacting channel morphology. Potential for impact from temporary changes to watercourse flow conveyance leading to deterioration in the status of WFD surface water bodies. Potential for impact from sediment ingress due to more connected drainage systems.
Ponds/lakes: Llyn Mawr; Llyn Du; Llyn y Tarw.	Construction, Operation and Decommissioning Phase	✓		Potential for impact from the release of pollutants (e.g. chemicals, hydrocarbons and other construction materials) directly (e.g. accidental spillages into the surface water) or indirectly (via surface water runoff) leading to deterioration in conditions supporting local conservation sites. Temporary increase in sediment-loading of surface water runoff from construction/dismantling areas leading to deterioration in pond/lake water quality. Potential for sediment ingress due to more connected drainage systems.
Springs within the Study area	Construction, Operation and Decommissioning Phase	✓		Potential for the impact from the release of pollutants (e.g. chemicals, hydrocarbons and other construction materials) directly (e.g. accidental spillages into the ground water) leading to deterioration in groundwater quality
Groundwater in Severn Uplands – Lower Palaeozoic (WFD groundwater body and Secondary Undifferentiated Aquifer)	Construction, Operation and Decommissioning Phase	✓		Potential for the impact from the release of pollutants (e.g. chemicals, hydrocarbons and other construction materials) directly (e.g. accidental spillages into the ground) leading to deterioration in the groundwater quality, deterioration in the status of WFD groundwater bodies
Local surface water and groundwater abstractions (if present)	Construction, Operation and Decommissioning Phase	✓		Potential for the impact from the release of pollutants (e.g. chemicals, hydrocarbons and other construction materials) directly (e.g. accidental spillages into the ground/surface water) or indirectly (via surface water runoff) leading to deterioration in the surface

Element	Phase	Scoped In	Scoped Out	Justification
				water and groundwater quality environment. Potential for impact from sediment ingress due to more connected drainage systems.
Humans/properties/infrastructure downslope and adjacent to the Study Area including properties at Carno (west), Clatter (southwest), Pontdolgoch (south), Caersws (south), and Newtown (southeast).	Construction, Operation and Decommissioning Phase	✓		Potential for the impact from the increase in surface water runoff and therefore increase in flood risk downstream and, increase in potential erosional power of surface overland flow impacting channel morphology. Potential for the impact from the permanent culverting of the watercourse could lead to concentration of flow leading to an increase in potential erosional power of channel flow impacting channel morphology. Potential for blockage of culverts and increased upstream flooding risk.

- 9.6.4. A Flood Consequence Assessment (FCA) will be produced in accordance with TAN15 as the Study Area exceeds 1ha and is within Flood Zone 1. The FCA will be produced to accompany the ES and will demonstrate how flood risk to the Proposed Development and any potential to increase flood risk to third parties due to the Proposed Development, will be managed over its lifetime. As part of this, the effects of climate change will be given due consideration. The FCA will include an outline surface water drainage strategy, which will ensure that surface water runoff from the Site is managed and attenuated on Site, so that the risk of flooding is not increased off-site. The most suitable surface water drainage strategy for the Proposed Development will be ascertained by undertaking a high-level SuDS Assessment considering the SuDS hierarchy.

EFFECTS SCOPED OUT

- 9.6.5. At this stage, it is not proposed to scope out any effects, and these will be evaluated further at the Environmental Statement (ES) stage.

9.7 OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

- 9.7.1. Preparation of the various assessments (primarily water, ecology and geology) will, via a combination of desk study, consultation and site walkovers identify potential opportunities that may be appropriate for the scheme to assist in improving the local water environment.

9.8 MITIGATION

- 9.8.1. Potential impacts to the water environment arising from the Proposed Development will be avoided as much as possible through the design process and through careful construction and the use of standard good practice measures. The assessment will therefore be undertaken on the basis that a number of standard measures are assumed to be in place during construction and therefore are considered to be 'embedded mitigation'. These measures include the use of appropriate drainage design, the use of runoff and sediment control measures where necessary and through the

implementation of good working practice and adherence to a Construction Environmental Management Plan (CEMP), an outline of which will be provided with the ES.

9.8.2. The CEMP will include as a minimum:

- Adoption of best practice pollution prevention, drainage control, and waste management procedures;
- Control of drainage and sediment runoff from excavation areas and any access tracks;
- Agreement on watercourse crossing schedule (method and type of structure);
- Control of drainage and sediment runoff during the construction of watercourse crossings (where applicable);
- Control of concrete pouring; and
- Appropriate design of foundation installation, the management of soil water levels and the potential to generate excessive quantities of groundwater contaminated sediments.

9.8.3. An outline drainage strategy will be produced as part of the FCA to accompany the ES. The outline drainage strategy is anticipated to be the subject of a planning condition and will be prepared by the contractor before being agreed with NRW and the LLFA. The strategy will incorporate the use of appropriate SuDS techniques as required, treating and infiltrating/attenuating surface water run-off generated from the Site, prior to discharging into the local surface water network at an agreed rate.

9.8.4. Water quality monitoring will be considered downstream of key construction works (access tracks and turbine foundations) prior to and during the construction period.

9.8.5. The anticipated impact to water quality during the operation phase is anticipated to be minimal.

Residual Risk

9.8.6. Residual risk is that which remains after the flood risk management mitigations and measures set out above have been applied to a development. It is anticipated that the assessment of potential impacts will inform the Proposed Development and best practice measures would be implemented during the construction, operation and decommissioning of the Proposed Development, that significant effects to the hydrological environment would be avoided. However, if potential significant effects to the water environment are identified through the assessment process described above, suitable mitigation measures will be set out in the subsequent EIA. Following this process of design and assessment, water environment risks will have been fully considered to ensure the scheme either avoids the potential, applies suitable management measures, or includes suitable mitigation. Any remaining risks are termed 'residual' on the basis that they can be considered extremely unlikely following application of this hierarchy to current planning and design standards. The acceptability of these would be agreed with regulators as part of the design and planning process.

9.9 ASSUMPTIONS AND LIMITATIONS

9.9.1. The scope of the assessment is based on a high-level review of desk-based baseline information and will be confirmed through review of additional data sources, a site walkover and further consultation with stakeholders (NRW, LLFA, LPA) during the next stages of the EIA. The site walkover will be conducted to confirm the desk reviews of the hydrological baseline environment and review if the local mapped surface water features are hydrologically active.

10 GEOLOGY AND SOILS

10.1 INTRODUCTION

- 10.1.1. This chapter reports the proposed scope of the assessment of effects arising from the Proposed Development upon the Ground Conditions. It includes consideration of geology, land contamination and soil receptors (including peat).
- 10.1.2. The chapter (and its associated figures and appendices) should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Description of The Proposed Development** and with respect to relevant parts of other technical chapters, such as **Chapter 9: Hydrology** and **Chapter 5: Ecology** where there is an overlap or relationship, e.g., hydrogeology.
- 10.1.3. The scope of the assessment is based on a review of desk-based baseline information and existing site surveys. Where required, further site surveys, site reconnaissance and additional data sources will be reviewed, the findings of which will be reported in the Environmental Statement.

10.2 CONSULTATION

- 10.2.1. Consultees are requested to confirm their agreement to the scope of this assessment. In particular, Natural Resources Wales are asked to confirm that the proposals comply with its wind farm guidance with respect to peat surveys and peat management during construction.
- 10.2.2. Natural Resources Wales and Powys County Council will also be approached to provide environmental data to support understanding of the baseline conditions of the Site with respect to geology and soils including peat.
- 10.2.3. Other stakeholders will also be approached during the wider consultation process as appropriate.

10.3 STUDY AREA

- 10.3.1. A detailed description of the Site is included in **Chapter 2: Description of the Proposed Development**. The study area for ground conditions includes a 750m buffer surrounding the Site boundary. This is considered appropriate based upon professional experience in land contamination and land stability site assessment. In respect to peat landslide impacts the immediate impacts are typically limited by topographical and hydrological constraints and runout distances that rarely extend beyond 750m. Other impacts on soil receptors (including peat) caused by development generally occur within the Site boundary and therefore the study area for these receptors is focused on the Site.

10.4 DATA SOURCES

- 10.4.1. The EIA scoping exercise has been undertaken with reference to **Chapter 2: Description of the Proposed Development**, supported by a number of data sources. The principal data sources used to inform this chapter are listed below:
 - Ordnance Survey (OS) maps:
 - OS 1:25,000, Explorer Sheet 215: Newtown & Machynlleth, OS 1:25,000, Explorer
 - OS 1:10,000 Raster map (Bing Maps)

- DataMapWales, LiDAR Viewer¹⁷¹
- National Library of Scotland Map Imagery website¹⁷²
- British Geological Survey (BGS) GeoIndex (onshore) (1:50,000) ¹⁷³
- BGS Bedrock and Superficial Deposits, 1:50,000, Sheet 150, Dinas Mawddwy (2012)¹⁷⁴
- BGS Bedrock and Superficial Deposits, 1:50,000, Sheet 150, Llanidloes (2010) ¹⁷⁵
- BGS Aquifer Designation Wales, Bedrock and Superficial Deposits map¹⁷⁶
- Coal Authority Interactive Map¹⁷⁷
- Natural Resources Wales (NRW) Water Watch Wales Map Gallery¹⁷⁸
- Land Information System (LandIS) Soilscales Map¹⁷⁹
- NRW Welsh Peatland Data Portal¹⁸⁰
- NRW Wales Environmental Information Portal ¹⁸¹
- NRW DataMapWales, Unified Peat Map of Wales¹⁸²
- DataMapWales, Historic Landfill Sites¹⁸³
- DataMapWales, Environmental Permitting Regulations – Waste Sites¹⁸⁴
- DataMapWales, Environmental Permits for disposal of waste sheep dip to land¹⁸⁵
- DataMapWales, Geological Conservation Review (GCR) Site Boundaries¹⁸⁶
- DataMapWales, Regionally Important Geodiversity Sites (RIGS)¹⁸⁷
- Multi-Agency Geographic Information for the Countryside (MAGIC) interactive map¹⁸⁸

¹⁷¹ <https://datamap.gov.wales/maps/lidar-viewer/view#/>

¹⁷² <https://maps.nls.uk/>

¹⁷³ <https://mapapps2.bgs.ac.uk/geoindex/home.html>

¹⁷⁴ viewed on the BGS Maps Portal, <https://www.bgs.ac.uk/information-hub/bgs-maps-portal/>

¹⁷⁵ viewed on the BGS Maps Portal, <https://www.bgs.ac.uk/information-hub/bgs-maps-portal/>

¹⁷⁶ <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/>

¹⁷⁷ <https://mapapps2.bgs.ac.uk/coalauthority/home.html>

¹⁷⁸ <https://waterwatchwales.naturalresourceswales.gov.uk/en/>

¹⁷⁹ <http://www.landis.org.uk/soilscales/#>

¹⁸⁰ <https://naturalresources.wales/evidence-and-data/maps/peatland-data-portal-map-layers/?lang=en>

¹⁸¹ <https://smnr-nrw.hub.arcgis.com/>

¹⁸² <http://lle.gov.wales/map#m=-3.39055,51.59686,14&b=europa&l=1738>

¹⁸³ https://datamap.gov.wales/layers/inspire-nrw:NRW_Historic_Landfill_Sites

¹⁸⁴ https://datamap.gov.wales/layers/geonode:nrw_waste_permits

¹⁸⁵ https://datamap.gov.wales/layers/geonode:nrw_sheep_dip_permit

¹⁸⁶ https://datamap.gov.wales/layers/inspire-nrw:NRW_GCR_SITES

¹⁸⁷ https://datamap.gov.wales/layers/inspire-nrw:NRW_RIG_SITES

¹⁸⁸ <https://magic.defra.gov.uk/MagicMap.aspx>

FIELD SURVEYS

- 10.4.2. A Phase 1 peat depth survey of the turbine area of the Site has been undertaken in accordance with Scottish Government best practice for peatland surveys¹⁸⁹ (in the absence of a Welsh equivalent). The survey was undertaken on a 100m x 100m grid in November 2023 and comprised a total of 382 peat depth measurements. The peat depth survey recorded thicknesses of organic material at the surface of between 0.00m and 2.65m. The survey also identified areas of peat soils (i.e. organic surface horizons >0.3m in thickness¹⁹⁰) throughout the Site and areas of peat >1.0m located to the north of Llyn Mawr, near the summit of Garreg-hir, along the northern boundary and to the north-west of Y Glonc. The available peat depth survey results and an interpolated peat depth map covering areas of the Site where data is available is shown in **Figure 10.1**.
- 10.4.3. Based on the baseline information a Phase 2 peat depth survey will be undertaken to establish the depth of peat at the proposed infrastructure locations, including where peat is recorded along the access track and in areas of the Site not covered in the existing Phase 1 peat depth survey. Further details are provided in Section 10.8.

10.5 BASELINE CONDITIONS

- 10.5.1. This section provides a high-level review of the current baseline understanding of the ground conditions and peat at the Site. The current baseline provides a description of the Site history, topography, pedology (soils), geology, mining and land contamination based on desk-based sources of information and field surveys. The baseline conditions will be confirmed through review of additional data sources, site visits, surveys and consultation with stakeholders during the next stages of the EIA.
- 10.5.2. The current baseline also provides information on the hydrological and hydrogeological setting as well as the presence of any statutory designated sites and geodiversity sites within the study area. This information is included as impacts originating from the Site have the potential to affect the sensitive receptors.

CURRENT AND HISTORICAL LAND USE

- 10.5.3. Based on aerial imagery and site reconnaissance during the Phase 1 peat depth survey the current land use of the Site is dominated by rough upland grazing pasture.
- 10.5.4. A review of historical mapping available from the National Library of Scotland indicates that the Site has been predominantly undeveloped. The only historical features of note within the Site are footpaths and the current access tracks/roads leading up to Llyn Mawr. In contemporary Ordnance Survey mapping a quarry is identified in the north of the site near Y Glonc at SO0037398679.
- 10.5.5. The study area surrounding the Site has also had a limited development history. The historical mapping identifies two old quarries at SN9845797545 and SO0138694761 and railway land immediately west of the access track at Henblas. A corn mill is identified to the west of the Site at SO0106993692.

¹⁸⁹ Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatlands

¹⁹⁰ In the absence of superficial deposits across much of the site it is assumed that the peat soils directly overly bedrock and therefore a thickness >0.3m is defined as peat.

TOPOGRAPHY

- 10.5.6. A detailed description of the Site topography is provided in **Chapter 9: Hydrology**. In summary, Ordnance Survey mapping indicates that the Site encompasses a number of minor summits including Garreg-hir located in the south-west and an unnamed summit in the central north of the Site.
- 10.5.7. Welsh Government LiDAR data indicates that the Site is situated at an elevation of between approximately 135m AOD and 485m AOD with Garreg-hir being the highest point. Slope angle analysis indicates that slope angles within the Site range between $<1.8^{\circ}$ and 90° . The steepest ground is identified along the western boundary of the Site and along the numerous crags situated through the centre of the Site.

PEDOLOGY

- 10.5.8. The LandIS Soils map⁹ indicates that the dominant soil types are:
“slowly permeable wet very acid upland soils with a peaty surface and very acid loamy upland soils with a wet peaty surface”.
- 10.5.9. The Site also contains *freely draining acid loamy soils over rock* on the steep slopes at the western boundary and *freely draining slightly acid loamy soils* along the southern half of the access track.
- 10.5.10. The definition of peat soils used by the Peatlands of Wales Map (as adopted from the Soil Survey of England and Wales) will be used for the purpose of assessment in the EIA. Peat soils are defined by the Soil Survey of England & Wales as:
- more than 40 cm of organic (O horizon) material within the upper 80cm, excluding fresh litter (L) and living moss; or
 - more than 30 cm of organic (O horizon) material resting directly on the bedrock (R or Cr) or extremely stony material; and,
 - no overlying non-humose material mineral horizon that has a colour value of 4 or more and extends below 30cm depth.
- 10.5.11. In the interests of simplicity, the threshold of >30 cm shall be used to identify the presence of peat.
- 10.5.12. The Peatlands of Wales Map and Phase 2 Lowland Peatland Survey of Wales map indicates that the Site contains a number of areas of peat. These are located principally around the north and north-west of Llyn Mawr and along the northern boundary of the Site. The Site also contains a number of small pockets within the central east and west. The Peatlands of Wales: Thickness theme indicates that peat depths around Llyn Mawr ranged between <0.4 m and 1.0m in thickness. The thicknesses throughout the remainder of the Site are predominantly <0.4 m except for a pocket around the north-west slopes of Y Glonc and in the central east of the Site.
- 10.5.13. The Predictive Agricultural Land Classification (ALC) Map indicates that the agricultural land classification within the Site is dominated by Grade 4 or 5 which is described as *very poor or poor quality agricultural land*. Along the access track areas of Grade 3b and 2 are identified that are classified as *moderate and good quality agricultural land*. While the access track passes through an area of ‘best and most versatile’ (BMV) land (grades 1, 2 or 3a) near Henblas the section of track through Grade 2 land where new track is required is only approximately 165m in length. As such, the potential effects on the best and most versatile land are not considered significant and have therefore been scoped out of the EIA.

GEOLOGY

- 10.5.14. The British Geological Survey (BGS) mapping indicates that superficial deposits are thin or absent across most of the western part of the Site. However, a number of pockets of Glacial Till (diamicton) and peat are identified. The eastern part of the Site is shown to be underlain by Glacial Till (diamicton) and a large area of peat is identified immediately to the north-west of Llyn Mawr. Along the access track the lower slopes of the Afon Carno valley are dominated Glacial Till (diamicton) and higher elevations are underlain by thin or absent deposits. Additionally, the access track is shown to pass through a pocket of peat to the west of Pant-y-bryn at SO0116395859. Alluvial Fan Deposits of sand and gravel are identified at Henblas. There are no areas of man-made artificial ground identified within the Site or the wider study area.
- 10.5.15. The BGS indicates that the Site is underlain by five bedrock formations. The majority of the Site is shown to be underlain by the Penstrowed Grits Formation of sandstone and mudstone which is described as comprising mudstones with thick beds of medium to coarse-grained greywacke sandstones. The access track is shown to be underlain by the Nant-Ysgollon Mudstone Formation and a further three mudstone formations that include the Dolgau, Caerau and Glanyrafon Formation (Upper Tongue) with the latter also containing interbedded sandstones.
- 10.5.16. The BGS mapping indicates that the Site is underlain by eight geological faults located in the far central north, along the northern site boundary, far south and four that cross the access track.
- 10.5.17. The BGS digital geological map is presented as **Figure 9.2** of this Scoping Report.
- 10.5.18. The BGS GeoIndex reveals that there are no borehole records within the boundary of the Site.

MINERAL EXTRACTION

- 10.5.19. The review of historical mapping indicates that mineral extraction activities within the study area have been limited to extraction of a commodity from a small quarry in the north of the Site. This quarry is recorded on the BGS British Pits dataset as the Y Glonc quarry at SO0035298713 and is recorded as ceased.
- 10.5.20. The Coal Authority Interactive Map indicates that the Site is not situated within a Coal Mining Reporting Area. As such, further consultation with the Coal Authority and a coal mining risk assessment can be scoped out of the EIA.

GEODIVERSITY

- 10.5.21. The MAGIC interactive map indicates that there are no geological SSSIs located within the Site or in the wider study area.
- 10.5.22. The DatamapWales datasets for Regionally Important Geodiversity Sites (RIGS) and Geological Conservation Review (GCR) Site Boundaries were consulted and indicate there are no RIGS or GCR sites within the Site or in the wider study area.
- 10.5.23. Given the absence of non-statutory and statutory geological designations within the Site or in the study area, these receptors can be scoped out of the EIA.

CONTAMINATION

- 10.5.24. Historical mapping indicates that the Site has a limited development history. The only potential source of contamination is a quarry in the northern part of the Site. However, site reconnaissance indicates that the quarry hasn't been restored and is unlikely to have been significantly infilled. A review of the Natural Resources Wales datasets including information on historical landfills and permitted waste sites indicates that there are no registered landfill activities within the Site and wider study area. The nearest registered waste activity is an environmental permit for disposal of sheep dip waste to land located approximately 240m south-west of the Site. The recorded activity is downslope and hydraulic gradient downgradient from the Site therefore is unlikely to impact on the Proposed Development.
- 10.5.25. Given the absence of significant potential sources of contamination within the Site or in the wider study area, the assessment of land contamination has been scoped out of the EIA.

POTENTIAL RECEPTORS

- 10.5.26. The principal receptors that have been identified as being potentially subject to likely significant effects are listed below:
- 10.5.27. Human health of future site users and adjacent users (including construction workers and the general public);
- Controlled waters (i.e. groundwater and surface water bodies);
- 10.5.28. Property (buildings, crops and grazing animals);
- Designated Sites (i.e. Llyn Mawr SSSI); and,
- 10.5.29. Soils and peat (including topsoils and subsoils).
- 10.5.30. The Proposed Development has the potential to have significant effects on soils (topsoil and subsoil) including peat, through ground disturbance activity, compaction, soil sealing and the temporary or permanent displacement of soil during construction. The Proposed Development also has the potential to have indirect significant effects as a result of these activities such as silt run off and nutrient loading which are discussed in **Chapter 9: Hydrology**.

10.6 DESCRIPTION OF LIKELY SIGNIFICANT EFFECTS

- 10.6.1. The likely significant ground conditions effects that will be taken forward for assessment in the Environmental Statement are summarised in **Table 10-1**.

Table 10-1 – Likely Significant Ground Condition and Peat Effects

Activity	Potential Effect	Receptor
Construction activities: ■ Use of plant and machinery, vehicle movements ■ Excavation including temporary or permanent displacement of soil to construct foundations and tracks or temporary tracks and hardstanding for cranes and compounds ■ Dewatering activities ■ Material stockpiling	Ground disturbance during construction leading to remobilisation of existing contamination. Contamination of soils, due to accidental release of pollutants during works. Permanent loss of soils and soil sealing. Loading of peat leading to peat instability	Peat soils and peatland habitats. Ground Stability Land contamination
Peat working	Ground disturbance leading to sediment loading and/ or the remobilisation of existing contamination Contamination of soils due to accidental release of pollutants during works. Peat disturbance leading to breakdown of peat structure and disturbance of peat hydrology resulting in drying and erosion of peat. Disturbance of peat leading to peat instability.	Peat soils and peatland habitats Land contamination
Operational facilities and activities	Contamination of soils due to accidental release of pollutants during maintenance activities. Contamination of soils due to chemical leaks and concrete leaching.	Peat soils and peatland habitats. Ground Stability Land contamination

- 10.6.2. The main potential ground conditions and peat impacts associated with the Proposed Development relate to the construction phase, in particular from deep excavations for foundations and removal or improvement of shallow soils to construct tracks. The EIA will identify the location and the nature of the impact from this construction and upgrading activities. It will then prescribe measures to be adopted during construction to mitigate against negative impacts on soils and peat.
- 10.6.3. Impacts during decommissioning are likely to be similar to those during the construction phase but will depend on the exact nature of the decommissioning activities that take place. However, it is likely that the ground disturbance will be much less. Mitigation similar to that implemented during the construction and operational phases (updated to reflect changes in legislation / guidance) will also help ensure that the significance of such impacts is minimised, and it is therefore currently proposed that consideration of decommissioning effects is 'scoped out' of the EIA.

10.6.4. The effects scoped in or out of further assessment in the EIA are summarised in **Table 10-2**.

Table 10-2 – Effects Scoped in or Out of Further Assessment

Receptor	Phase	Scoped In	Scoped Out	Justification
Geodiversity sites	Construction		✓	No permanent damage to locally or nationally important Geosites is possible because they are not present on or surrounding the Site.
Peat (including stability)	Construction and Operation	✓		The baseline information and Phase 1 peat survey has identified areas of peat within the Site with the potential for significant impacts.
BMV Agricultural Land	Construction		✓	The Predictive Agricultural Land Classification (ALC) Map indicates that only the access track passes through an area of 'best and most versatile' (BMV) land (categories 1, 2 or 3a). However, the affected piece of land is only approximately 165m in length and as such, the potential effects are not considered significant and have therefore been scoped out.
Land contamination	Construction and Operation		✓	The Site has a limited development history, and no waste activities have been identified within the Site. Given the absence of significant potential sources of contamination within the Site or in the study area, the assessment of land contamination has been scoped out. A desk-based review, including an assessment of ground condition and contamination constraints, will be undertaken as part of the detailed design following consent. This will include a Phase 1 Geoenvironmental Desk Study once the full details of the Proposed Development are known.
Ground stability (mineral soil slope stability)	Construction and Operation	✓		Land stability in relation to mineral soil slope stability within the Site will be addressed throughout the design and construction process by compliance with the Construction (Design and Management) Regulations 2015 and the basis of the structural design being completed in accordance with appropriate design standards. A desk-based review, including an assessment of ground condition and land stability, will be undertaken as part of the detailed design following consent. This will include a Phase 1 Geoenvironmental Desk Study once the full details of the Proposed Development are known.

10.7 OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

- 10.7.1. Throughout the layout design process, opportunities to deliver positive effects for ground conditions and peat will be explored. This will include adopting a hierarchy of controls to minimise impacts on peat through avoidance of peat depths >0.3m where possible, minimisation of peat extraction through exploring alternative construction techniques and restoration where potential significant impacts are unavoidable.
- 10.7.2. The Phase 1 peat survey and aerial imagery of the Site indicates that many of the peat soils are artificially drained by drainage ditches and grips. Where feasible the drainage ditches and grips may be blocked to promote the retention of surface water run-off, the growth of peat forming plant communities and the development of semi-confined peatlands. The benefits of peatland restoration on the Site may include carbon capture, creation or development of peatland habitats and a reduction in downstream flooding.

10.8 PROPOSED ASSESSMENT METHODOLOGY

GENERAL APPROACH

- 10.8.1. This section describes the approach to the assessment of potential effects relating to ground conditions arising from the Proposed Development on receptors. The proposed approach will be confirmed with Natural Resources Wales (NRW) and the Local Planning Authority (LPA) during the next stages of the EIA.
- 10.8.2. The generic project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to EIA**. This section describes how this methodology will be applied, and adapted as appropriate, to address the specific needs of the geology and soils assessment.
- 10.8.3. The effect of the Proposed Development will be assessed through a desk-based study informed by further peat surveys to understand the baseline environment relevant to the geology, soil type and the location of peaty soils. Consultations with NRW and the LPA will be undertaken to obtain more local detailed information.

RELEVANT LEGISLATION AND GUIDANCE

- 10.8.4. This scoping report chapter has been prepared in line with the relevant planning policy documents outlined in **Chapter 3: Legislation and Planning Policy**. In particular, attention has been paid to the following pieces of legislation and policy:
- Environmental Protection Act (1990) Part 2A¹⁹¹;
 - The Environment Wales Act 2016¹⁹²;
 - National Development Framework (Future Energy Wales: The National Plan 2040)¹⁹³;

¹⁹¹ DEFRA (2012). Environmental Protection Act 1990: Part 2A. Contaminated Land Statutory Guidance

¹⁹² Environment (Wales) Act 2016, c. 3. Available at: <https://www.legislation.gov.uk/anaw/2016/3/contents/enacted> (Accessed: 20 February 2025).

¹⁹³ Welsh Government (2021) *Future Wales: The National Plan 2040*. Available at: <https://www.gov.wales/future-wales-national-plan-2040> (Accessed: 20 February 2025).

- Planning Policy Wales, Edition 12 2024¹⁹⁴; and
- Powys Local Development Plan April 2011 to March 2026¹⁹⁵.

10.8.5. Further relevant policy and general guidance includes the following:

- Land Contamination Risk Management, Environment Agency, 2020¹⁹⁶;
- Various British Standards (e.g. BS10175:2011+A2: 2017 Investigation of potentially contaminated sites - code of practice);
- Various Construction Industry Research and Information Association (CIRIA) reports;
- Department for Food, Environment and Rural Affairs (Defra) (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites¹⁹⁷;
- Ministry of Agriculture, Forestry and Food (MAFF) (2000) Good Practice Guide for Handling Soils;
- Scottish Environment Protection Agency (SEPA) (2017) WST-G-052 Developments on Peat and Off-Site Uses of Waste Peat¹⁹⁸
- Scottish Renewables publications including:
 - Scottish Renewables and SEPA (2012) Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste¹⁹⁹;
 - Scottish Renewables, NatureScot, SEPA, Forestry & Land Scotland and Historic Environment Scotland (HES) (2015) Good Practice During Wind Farm Construction²⁰⁰.
- Scottish Government (2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition)²⁰¹;

¹⁹⁴ Welsh Government (2024) *Planning Policy Wales, Edition 12*. Available at: <https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf> (Accessed: 20 February 2025).

¹⁹⁵ Powys County Council (2018) *Powys Local Development Plan April 2011 to March 2026*. Available at: <https://en.powys.gov.uk/article/4898/Adopted-LDP-2018> (Accessed: 20 February 2025).

¹⁹⁶ Environment Agency (2020) *Land Contamination Risk Management*. Available at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm> (Accessed: 20 February 2025).

¹⁹⁷ Defra (2009) *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites*. Available at: <https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites> (Accessed: 20 February 2025).

¹⁹⁸ SEPA (2017) *WST-G-052 Developments on Peat and Off-Site Uses of Waste Peat*. Available at: <https://www.sepa.org.uk/media/287064/wst-g-052-developments-on-peat-and-off-site-uses-of-waste-peat.pdf> (Accessed: 20 February 2025).

¹⁹⁹ Scottish Renewables and Scottish Environment Protection Agency (SEPA) (2012) *Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste*. Available at: <https://www.gov.scot/publications/assessment-of-peat-volumes-reuse-of-excavated-peat-and-minimisation-of-waste-guidance/> (Accessed: 20 February 2025).

²⁰⁰ Scottish Renewables, NatureScot, Scottish Environment Protection Agency (SEPA), Forestry & Land Scotland and Historic Environment Scotland (HES) (2015) *Good Practice During Wind Farm Construction*. Available at: <https://www.nature.scot/doc/good-practice-during-wind-farm-construction> (Accessed: 20 February 2025).

²⁰¹ Scottish Government (2017) *Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition)*. Available at: <https://www.gov.scot/publications/peat-landslide-hazard-risk-assessments-best-practice-guide-proposed-electricity/> (Accessed: 20 February 2025).

- Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatlands²⁰²
- Forestry Commission Wales Guidance of Peat Soils; and
- Natural Resources Wales, National Peatland Action Programme

SOILS AND PEAT APPROACH

- 10.8.6. A Phase 2 peat depth survey targeting the proposed wind farm infrastructure will be undertaken prior to the ES in accordance with Scottish best practice guidance (in the absence of a Welsh equivalent). Further details on the proposed survey are provided in the Survey Methodology section.
- 10.8.7. If necessary, information and plans for peat management will be included in a Peat Management Plan presented as a Technical Appendix to the Environmental Statement. The Peat Management Plan will be based on the findings of the Phase 1 and 2 peat depth surveys and will include details on the:
- Distribution of peat across the Proposed Development (depicted the peat depth maps described above);
 - Characteristics of the peat;
 - Measures taken to avoid peat and minimise disturbance. Where necessary measures to re-use, restore or rehabilitate disturbed peat will be included;
- 10.8.8. Quantities of acrotelmic, catotelmic and amorphous peat potentially disturbed by each part of the Proposed Development; and,
- Management of peat during construction (e.g., temporary storage locations and measures).
- 10.8.9. As per the stepwise approach, the first priority must be to avoid impacts to soils, peatland bodies and their functioning. If development on peat is unavoidable, the EIA will also look for opportunities to restore, improve or protect peatland habitats and where necessary compensate for the peat disturbance as a result of the Proposed Development. Where necessary the Peat Management Plan will make reference to other EIA assessments such as biodiversity and ecology.
- 10.8.10. To address potential significant effects associated with peat landslides a Peat Landslide Risk Assessment will also be undertaken in accordance with Scottish Government guidance document *“Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Developments”* (2017).²⁰³
- 10.8.11. This approach is in accordance with published best practice guidance and the Environment (Wales) Act 2016²⁰⁴ with regard to the protection of natural resources and
- 10.8.12. The magnitude / consequence of the loss or damage to peat resources is based upon:
- 10.8.13. The likely nature and scale of effects (positive, neutral or negative) during the construction and the operational phases of the Proposed Development.

²⁰² Scottish Government, Scottish Natural Heritage, and Scottish Environment Protection Agency (SEPA) (2017) *Peatland Survey: Guidance on Developments on Peatlands*. Available at: <https://www.gov.scot/publications/peatland-survey-guidance/> (Accessed: 20 February 2025).

²⁰³ <https://www.gov.scot/publications/peat-landslide-hazard-risk-assessments-best-practice-guide-proposed-electricity/>

²⁰⁴ <https://law.gov.wales/environment-wales-act-2016>

- The likelihood of the Proposed Development resulting in significant effects.
- The issues requiring further assessment and the methods to be applied.

10.8.14. The approach to assigning levels of sensitivity will be based on the Design Manual for Roads and Bridges (DMRB) LA 109²⁰⁵ guidance, as summarised in **Table 10-**.

10.8.15. Peat is not referred to specifically in the DMRB guidance. The Institute of Environmental Management & Assessment²⁰⁶ have built on the DMRB guidance to include peat soils. **Table 10-** provides the DMRB and IMEA sensitivity classification for soils and peat that will be used in the assessment for the Proposed Development. The sensitivity of the soil on the Site will be assigned on the basis of the findings of the peat surveys and other relevant survey or desk-based information. The classifications in **Table 10-** are intended to reflect the importance of peat soils in relation to their soil organic matter content and climate change resilience and mitigation, and biodiversity and flood management functions, and the Welsh Government's Peatland Policy.

Table 10-3 – Sensitivity Classifications for Soils and Peat

Value / Sensitivity	Description Example
Very High	Soils: soils (other than peat) directly supporting an EU designated site (e.g. SAC, SPA, Ramsar) or ALC grade 1 & 2 or LCA grade 1 & 2 Peat: peat soils
High	Soils: soils (other than peat) directly supporting a UK designated site (e.g. SSSI) or ALC grade 3a, or LCA grade 3.1 Peat: organo-mineral soils (i.e. peaty soils)
Medium	Soils: soils (other than peat) supporting non-statutory designated sites (e.g. Local Nature Reserves (LNR), LGS's, Sites of Nature Conservation Importance (SNCIs)) or ALC grade 3b or LCA grade 3.2. Peat: mineral soils
Low	Soils: soils (other than peat) supporting non-designated notable or priority habitats or ALC grade 4 & 5 or LCA grade 4.1 to 7. Peat: mineral soils
Negligible	Soils: soils (other than peat) on previously developed land formerly in 'hard uses' with little potential to return to agriculture

10.8.16. The approach to assigning the consequence of any damage or loss will be based on the DMRB LA 109 guidance summarised in **Table 10-**.

²⁰⁵ Highways England (2019) Design Manual for Roads and Bridges, Sustainability & Environment Appraisal, LA 109 Geology and soils, Revision 0.

²⁰⁶ Institute of Environmental Management and Assessment (2022) A New Perspective on Land and Soil in Environmental Impact Assessment

Table 10-4 – Consequence Classifications for Soils and Peat

Magnitude	Description Example
Major	Soil: physical removal or permanent sealing of soil resource or agricultural land.
Moderate	Soils: permanent loss / reduction of one or more soil function(s) and restriction to current or approved future use (e.g. through degradation, compaction, erosion of soil resource.)
Minor	Soils: temporary loss / reduction of one or more soil function(s) and restriction to current or approved future use (e.g. through degradation, compaction, erosion of soil resource)
Negligible	Soils: no discernible loss / reduction of soil function(s) that restrict current or approved future use.
No Change	Soils: no loss / reduction of soil function(s) that restrict current or approved future use

10.8.17. The determination of significance will combine the sensitivity and magnitude using the matrix presented in **Table 10-5**. Where professional judgement is applied in assigning a sensitivity or magnitude (e.g., in relation to peat, which is not referred to directly in the DMRB LA 109 guidance), this will be clearly defined, and the resulting assessment conclusions clarified in the Environmental Statement.

Table 10-5 – Significance Classifications for Soils and Peat

		Magnitude of Change				
		No Change	Negligible	Minor	Moderate	Major
Sensitivity/ Importance/ Value	Very High	Neutral	Minor	Minor or Moderate	Moderate or Major	Major
	High	Neutral	Minor	Minor or Moderate	Moderate or Major	Major
	Medium	Neutral	Neutral or Minor	Minor	Moderate	Moderate or Major
	Low	Neutral	Neutral or Minor	Neutral or Minor	Minor	Minor or Moderate
	Negligible	Neutral	Neutral	Neutral or Minor	Neutral or Minor	Minor

Note: Significant effects are those identified as 'Very Major' or 'Major'. 'Moderate' effects have the potential to be significant, and indeed they would normally be deemed to be significant. However, there may be some exceptions, depending on the environmental topic and the application of professional judgment.

SURVEY METHODOLOGY

- 10.8.18. A Phase 2 peat depth survey targeting the proposed wind farm infrastructure will be undertaken prior to the ES. In the absence of any guidance from NRW the Phase 2 survey will be conducted in accordance with best practice guidance document “*Peatland Survey. Guidance on Developments on Peatland*” published by the Scottish Government and NatureScot. The survey will comprise:
- 10.8.19. A 10m x 10m grid of peat depth probing points within the turbine micro-siting areas, substation and temporary construction compound (if required);
- Peat depth probing locations every 50m along any new or upgraded access tracks with a probe point 10m perpendicular to either side of the proposed access tracks; and,
- 10.8.20. Additional peat depth probing at the crane pads and turning heads as required.
- 10.8.21. The baseline information on peat indicates the presence of peat west of Pant-y-Bryn along the access. If a new track or an upgrade to the existing track is required a peat depth survey will be undertaken at the area of peat identified by baseline information.
- 10.8.22. In addition to peat depth probing, the Phase 2 peat depth survey will also include the collection of soil/peat cores where peat depths are >0.5m. This will enable the full thickness of peat to be characterised in accordance with the von Post humification scale and enable the collection of samples for total organic carbon, soil moisture, organic matter content and bulk density testing. This information can be used to inform the carbon balance calculation for the Proposed Development (see Section 15.4).
- 10.8.23. The results of the Phase 2 peat depth survey (and subsequent surveys if necessary) will be combined with the Phase 1 survey results and presented in a series of drawings within the ES. The drawings will be prepared in accordance with Scottish Government and NatureScot guidance, in the absence of Welsh guidance. The drawings will show the proposed wind farm layout overlain on peat depths presented as a set of colour coded points and a interpolated peat depth map presented as a colour ramp image.
- 10.8.24. In addition, the peatland condition will be assessed using the four peatland condition classes established by NatureScot in their guidance document *Peatland ACTION – Peatland Condition Assessment*, 2016²⁰⁷, in the absence of a Welsh equivalent.

10.9 MITIGATION

- 10.9.1. In the assessment of effects, account will be taken of ‘embedded’ mitigation measures i.e., those mitigation measures that are inherent to the Proposed Development. These measures include all mitigation usually assumed to be in place during construction and operation and that are generally regarded as industry standard or Best Practice. With respect to geology and soils, these include, but are not limited to, the following:
- Avoidance of steep gradients, particularly where peat is present when establishing the footprint of the Proposed Development;
 - Use of micro-siting if unforeseen ground conditions are encountered;
 - Adoption of measures to avoid damage and erosion of peatlands outlined in a Peat Management Plan (PMP) that will accompany a Construction Environment Management Plan (CEMP);

²⁰⁷

<https://www.nature.scot/doc/peatland-action-how-do-i-assess-condition-my-peatland>

- Deeper excavations will be designed so that they can freely drain by gravity where possible and incorporate perimeter cut-off drains. Any required dewatering and associated discharge will be undertaken in accordance with Best Practice guidance and permit authorisations;
- Ground investigation will be undertaken at the Proposed Development to determine the presence and extent of any shallow soil contaminants;
- Peat storage areas will be located away from sensitive slopes.

10.9.2. Additional mitigation measures to remove or suitably reduce significant effects will be identified through the assessment, as required. Mitigation measures required to comply with legislative obligations will also be identified. The ES chapter will fully detail any additional measures including responsibilities, timescales and any follow-on monitoring requirements.

10.9.3. Where residual effects remain potentially significant, compensation required to offset this will be identified.

10.9.4. Any requirement for post-construction monitoring will also be identified.

10.10 ASSUMPTIONS AND LIMITATIONS

10.10.1. This scoping assessment is based on a high-level review of the freely available desk-based information that will be confirmed through further desk-based review, site surveys and assessment.

The above provides a comprehensive summary of the tasks to be undertaken in the EIA for the Proposed Development. Any impacts likely to have a significant effect would be evaluated within the EIA.

11 NOISE AND VIBRATION

11.1 INTRODUCTION

- 11.1.1. This chapter considers the potential noise impacts associated with the Proposed Development and describes the scope, methodology and extent of assessment to be provided in support of the forthcoming planning application.
- 11.1.2. Operational wind farm noise will be assessed in accordance with ETSU-R-97²⁰⁸, and with reference to the UK Institute of Acoustics' Good Practice Guide²⁰⁹ (GPG).
- 11.1.3. Construction noise will be assessed according to BS 5228-1:2009+A1:2014²¹⁰.
- 11.1.4. Operational noise from any Battery Energy Storage System (BESS), or solar elements, that are included as part of the Proposed Development, will be assessed in accordance with the methods outlined in BS 4142:2014+A1:2019²¹¹.
- 11.1.5. Vibration from the operation or construction of the Proposed Development, is proposed to be scoped out of the detailed assessment.

11.2 CONSULTATION

- 11.2.1. In regards to the noise aspects of the Proposed Development, it is understood that no consultation has taken place to date. As part of the steps to be undertaken, it is planned to discuss and agree the proposed methodology of the noise assessment with environmental health representatives of Powys County Council.
- 11.2.2. Consultees are asked to confirm the scope of the noise assessment and provide specific comment on any aspect of the proposed noise assessment methodology. For example, such aspects may include (but not limited to): the background noise monitoring locations, justification methods for the choice of the daytime limiting value between 35-40 dB, or wind farms to be included in the cumulative noise assessment.

11.3 STUDY AREA

- 11.3.1. The proposed study area will be defined such that noise sensitive residential receptor locations are included in the operational noise assessment where the predicted operational noise levels from the Proposed Development acting in isolation are above 25 dB L_{A90} . This may effectively be akin to considering receptor locations up to approximately 3 km away, but this distance will ultimately depend upon such aspects as the proposed turbine model type(s) and turbine layout. In terms of construction noise related impacts, consideration will also be given to receptor locations that lie on or near the proposed main access routes for abnormal load components and other construction related activities and deliveries.

²⁰⁸ ETSU-R-97. "The Assessment and Rating of Noise from Wind Farms", ETSU for the Department of Trade and Industry (1996).

²⁰⁹ "A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise", Institute of Acoustics, 2013.

²¹⁰ BS 5228-1:2009+A1:2014. "Code of practice for noise and vibration control on construction and open sites – Part 1: Noise".

²¹¹ BS 4142:2014+A1:2019. "Methods for rating and assessing industrial and commercial sound".

- 11.3.2. The potential operational noise impact will be considered at all residential receptor locations neighbouring the proposed wind farm, at receptor locations where noise levels arising from the Proposed Development are predicted to be more than 25 dB L_{A90} . This is 10 dB below the ETSU-R-97 lower daytime noise limit. For more distant receptor locations where predicted levels are less than 25 dB L_{A90} , it can be concluded that impacts from the Proposed Development would be negligible towards a total cumulative wind farm noise level, or noise limit, of 35 dB L_{A90} or more.
- 11.3.3. This study area may be subject to refinement later in the project life cycle.

11.4 BASELINE CONDITIONS

- 11.4.1. The existing baseline noise environment at noise sensitive receptors in the vicinity of the Proposed Development consists mostly of natural sounds. Natural sounds include birdsong, local watercourses, and wind generated effects such as wind in the trees and foliage. Other sounds include farming activities, and for some receptors to the south road traffic noise from the A470. For the Ty Hir location (see Paragraph 12.4.5), the existing noise environment is also at times partially affected by noise from the operational Mynydd Clogau wind farm. It is cumulative wind farm noise levels that ultimately need to comply with the ETSU-R-97 noise criteria, and as such noise from existing wind farms should not be considered part of the baseline noise environment for the purposes of the noise assessment. Therefore, steps will be taken to ensure the Mynydd Clogau wind farm does not unduly inflate the measure of prevailing background noise level at this location.
- 11.4.2. Following the ETSU-R-97¹ and GPG² approach, background noise levels were monitored at six noise receptors neighbouring the Proposed Development, during April – July 2023. It is intended that this baseline noise survey will be used to derive noise limits in line with ETSU-R-97. The results will be adjusted to ensure existing turbine noise is not included in the prevailing background noise levels and the subsequently derived noise limits.
- 11.4.3. The baseline noise measurements were undertaken according to the GPG requirements. This included concurrent hub height wind speed measurements, undertaken at a location likely to be representative of the proposed turbine locations. Baseline noise data expressed in terms of the L_{A90} measurement index, will be plotted against standardised 10m wind speed, for the ‘quiet daytime’ (or also known as ‘amenity’) and ‘night-time’ hours as defined in ETSU-R-97. Best fit polynomial curves will be plotted through these datasets (after excluding abnormal events such as rainfall or lawnmowing) to define the ‘prevailing’ background noise level as a function of wind speed.
- 11.4.4. Noise limits will be derived from the measured prevailing background noise levels, according to the requirements of ETSU-R-97, which specifies that noise should not exceed 5 dB above the ‘prevailing’ background noise level, subject to a lower limiting value of 35-40 dB during the day, 43 dB at night, and 45 dB for properties occupied by anyone with a financial involvement with the development.
- 11.4.5. **Plate 11.1** below details the locations where baseline noise monitoring has been undertaken. This was performed at:
- Llyn Mawr (H3);
 - Field neighbouring Lakeside View (H4);
 - Fir Tree Lodge (H56);

- Pantygesail (H53);
- Blaen-y-cwm (H47); and
- Ty Hir (H7).

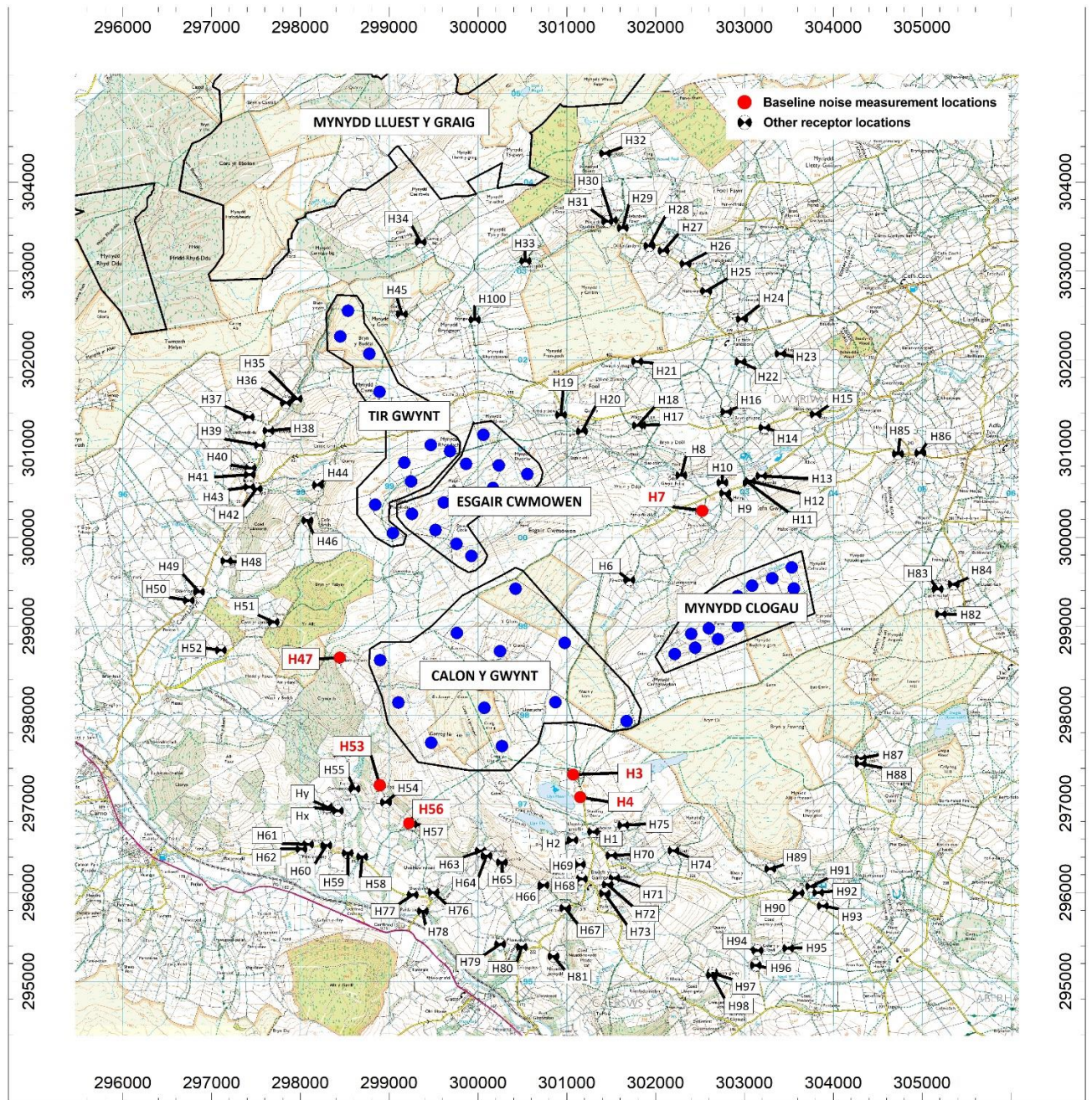


Plate 11-1 – Baseline Noise Monitoring Locations

- 11.4.6. As ETSU-R-97 suggests, consideration will also be given to whether background noise levels vary significantly between amenity periods and night-time periods, and therefore whether a single lower fixed limit of 35 – 40 dB should be used, based upon a combined dataset of amenity and night-time periods analysed together.
- 11.4.7. The methodology and analysis approach for the background noise measurements will be discussed and agreed with environmental health representatives of Powys County Council.

11.5 DESCRIPTION OF LIKELY SIGNIFICANT EFFECTS

WIND FARM OPERATIONAL NOISE EFFECTS

- 11.5.1. Wind turbine sound can be audible at nearby properties, depending on the turbine type and locations, and noise limits are often included in planning consents to protect amenity and prevent sleep disturbance.
- 11.5.2. Operational noise from wind turbines includes aerodynamic noise from the movement of the blades, and mechanical noise from the turbine components (such as the generator and the gearbox). Turbine manufacturers have, over time, been able to control most of the mechanical sources and, as a result, reduce mechanical noise emissions. Aerodynamic noise can be restricted by control systems to regulate the pitch and rotational speed of the rotor blades thus minimising noise as required.
- 11.5.3. The sound from modern wind turbines rises quickly from the cut-in wind speeds and then remains at the same level from close to the rated power to the cut-out wind speed. The background noise, such as that from wind blowing through trees and vegetation, is low at low wind speeds and increases steadily with wind speed. Background noise at high wind speeds can therefore mask the sound from wind turbines. However, at low to medium wind speeds, there may be very little masking provided by background noise, and the wind turbine sound may be clearly audible, even if the noise limit is met. Appropriate noise limits can be derived using ETSU-R-97 and the GPG. These limits are based on a set margin above the background noise level for daytime and night-time periods, with a lower limiting value that should depend on certain factors that reflect the overall planning merit of the development.
- 11.5.4. Where predicted operational noise levels are found to exceed the derived noise limits, appropriate mitigation will be identified to ensure that the final proposed design will meet the required noise criteria. The ES will cover the assessment and results, alongside an evaluation of other factors which may be of concern to interested parties such as tonal noise, amplitude modulation, wind shear and infrasound. Wind farm noise levels will be deemed to be not significant where the ETSU-R-97 criteria are predicted to be met.

CONSTRUCTION RELATED NOISE EFFECTS

- 11.5.5. Noise from construction activities may be audible at some residences neighbouring the development. Hence there may be a short-term noise impact at some locations from the construction of the wind turbines and associated infrastructure. This may also be the case for noise from traffic movements associated with the delivery of construction materials and turbine components. However, construction works will generally be carried out during daytime hours and likely only for a short period. Noise predictions associated with the construction stages of the Proposed Development will be undertaken according to the methods outlined by BS 5228-1. This will be based upon noise levels of typical or intended construction plant, that would be considered likely for the anticipated various construction phases of the development.

OPERATIONAL NOISE EFFECTS FROM BESS OR SOLAR ELEMENTS

- 11.5.6. In terms of further energy generation and storage infrastructure, the Proposed Development is anticipated to include some form of Battery Energy Storage System (BESS), and/or some form of solar photovoltaic (PV) element. If such elements are included, it is proposed that operational noise effects associated with these elements, are assessed in accordance with BS 4142:2014.

EFFECTS SCOPED OUT - VIBRATION

- 11.5.7. Vibration from the operation of wind turbines is low, nevertheless it has been measured in the past, but only by extremely sensitive equipment, for example that at the Eskdalemuir monitoring station for detecting nuclear tests in remote parts of the world, to enforce the nuclear test ban treaty.
- 11.5.8. The ETSU study W/13/00392/REP²¹² found that vibration from wind turbines, as measured at 100m from the nearest machine, was well below the BS6472-1:2008 criteria recommended for human exposure in critical working areas such as precision laboratories. At greater distances from turbines, vibration levels will be even lower. This has been confirmed by the Keele University study²¹³ which showed vibration levels of around 10^{-8} m.s^{-2} at a distance of 2.4 km from the Dun Law Wind Farm site under high wind conditions. This was several orders of magnitude lower than the criteria referred to above, which specify levels in the region of 0.005 m.s^{-2} . It can therefore be concluded that measured vibration levels are far below the thresholds for human perception, even on wind farm sites.
- 11.5.9. These issues were also considered in an article in the IOA Acoustics Bulletin²¹⁴ which concludes:
- "...there is no robust evidence that low frequency noise (including 'infrasound') or ground-borne vibration from wind farms, generally has adverse effects on neighbours".*
- 11.5.10. Vibration has been scoped out of the operational and construction assessments as levels of vibrations will not be significant. Ground-borne vibration during the operational phase of the Proposed Development will not be perceptible at receptor locations, nor on the wind farm site itself.
- 11.5.11. For the construction phase, levels of vibration will meet the criteria for human tolerance and for cosmetic damage, as set out in BS 5228-2²¹⁵. Levels of vibration during construction are generally unlikely to be perceptible, however specific operations may result in short-term vibration being experienced depending on source type and ground conditions, especially if in the near vicinity of receptor locations. For activities such as blasting, piling, or vibrating compactors on nearby tracks, even though levels will not cause any damage, it will be worthwhile to forewarn residents that such activities are taking place. It is envisaged such forewarning would form part of the Construction Environmental Management Plan.
- 11.5.12. For the above reasons it is not considered necessary to carry out specific assessments of vibration effects from the operational or construction stages of the Proposed Development.

²¹² ETSU W/13/00392/REP (1997), "Low Frequency Noise and Vibrations Measurement at a Modern Wind Farm".

²¹³ Styles et al, 2005. "Microseismic and Infrasound Monitoring of Low Frequency Noise and Vibrations from Windfarms".

²¹⁴ Bowdler et al, (2009). "Prediction and assessment of wind turbine noise – agreement about relevant factors for noise assessment from wind energy projects". Acoustics Bulletin Vol 34 No. 2 March / April 2009.

²¹⁵ BS 5228-2:2009+A1: (2014). "Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration".

Table 11-1 – Elements Scoped in or Out of Further Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Wind Farm Operational Noise Effects	Operation	✓		Potential for operational noise to be audible, and above relevant ETSU-R-97 noise criteria
BESS and Solar PV Operational Noise Effects	Operation	✓		Potential for operational noise to be audible, and above relevant BS 4142 noise criteria
Construction Noise Effects	Construction	✓		Potential for construction noise to be audible, and above relevant BS 5228-1 noise criteria
Operational Vibration Effects	Operation		✓	Ground-borne vibration during the operational phase will not be perceptible at residential locations and will be significantly below the relevant criteria set out in BS 5228-2.
Construction Vibration Effects	Construction		✓	Ground-borne vibration during the construction phase is unlikely to be perceptible, except if there are short term construction activities in the near vicinity of receptor locations, where vibration levels will in any case be below the human tolerance and cosmetic damage criteria set out in BS 5228-2.

11.6 PROPOSED ASSESSMENT METHODOLOGY

RELEVANT LEGISLATION AND GUIDANCE

11.6.1. The below lists the relevant planning legislation and guidance that will be considered as part of the noise assessment:

- Future Wales: The National Plan 2040²¹⁶
- Planning Policy Wales, Edition 12 2024²¹⁷
- Powys Local Development Plan 2011 to 2026²¹⁸

²¹⁶ Welsh Government (2021) *Future Wales: The National Plan 2040*. Available at: <https://www.gov.wales/future-wales-national-plan-2040> (Accessed: 20 February 2025).

²¹⁷ Welsh Government (2024) *Planning Policy Wales, Edition 12*. Available at: <https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf> (Accessed: 20 February 2025).

²¹⁸ Powys County Council (2018) *Powys Local Development Plan April 2011 to March 2026*. Available at: <https://en.powys.gov.uk/article/4898/Adopted-LDP-2018> (Accessed: 20 February 2025).

- Powys Local Development Plan 2011 – 2026. Supplementary Planning Guidance: Renewable Energy²¹⁹
- ETSU-R-97. The Assessment and Rating of Noise from Wind Farms²²⁰
- Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise²²¹
- Noise and Soundscape Plan for Wales²²²

11.6.2. The relevant policies and how they inform the noise assessment are set out in further detail below due to the nuances associated with wind farm related noise assessments.

Planning Policy Wales – Edition 12 (February 2024)

11.6.3. Planning Policy Wales - Edition 12²¹⁷ (PPW12) with regards to energy, Footnote 164 in Paragraph 6.7.15 states the following:

“Further guidance on wind turbine noise assessment can be found in ETSU-R-97: (www.assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/49869/ETSU_Full_copy__Searchable_.pdf) and further good practice guidance published by the Institute of Acoustics: (www.ioa.org.uk/publications/wind-turbine-noise).

Powys Local Development Plan & Supplementary Guidance

11.6.4. The Proposed Development is classified as a development of national significance, and so will ultimately be determined by the Welsh Government. Nevertheless, due consideration here is also given to local planning guidance. The current Powys Local Development Plan²¹⁸ (LDP), was adopted by Powys County Council in 2018 and will remain in force until 2026-2027.

11.6.5. In regards the ‘Design and Resources’ of a Proposed Development and its potential noise impact, Policy DM13 states:

“Development proposals must be able to demonstrate a good quality design and shall have regard to the qualities and amenity of the surrounding area, local infrastructure and resources.

Proposals will only be permitted where all of the following criteria, where relevant, are satisfied: ...

²¹⁹ Powys County Council (2019) *Powys Local Development Plan 2011 – 2026. Supplementary Planning Guidance: Renewable Energy*. Available at: <https://powys.moderngov.co.uk/documents/s40159/Appendix%20%20-%20Renewable%20Energy%20SPG%20April%202019%20changes%20shown.pdf> (Accessed: 20 February 2025).

²²⁰ Department of Trade and Industry (1996) *ETSU-R-97: The Assessment and Rating of Noise from Wind Farms*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/49869/ETSU_Full_copy__Searchable_.pdf (Accessed: 20 February 2025).

²²¹ Institute of Acoustics (2013) *Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise*. Available at: <https://www.ioa.org.uk/sites/default/files/IOA%20Good%20Practice%20Guide%20on%20Wind%20Turbine%20Noise%20-%20May%202013.pdf> (Accessed: 20 February 2025).

²²² Welsh Government (2023) *Noise and Soundscape Plan for Wales 2023 to 2028*. Available at: <https://www.gov.wales/sites/default/files/publications/2023-11/noise-and-soundscape-plan-for-wales-2023-2028.pdf> (Accessed: 20 February 2025).

11. The amenities enjoyed by the occupants or users of nearby or proposed properties shall not be unacceptably affected by levels of noise, dust, air pollution, litter, odour, hours of operation, overlooking or any other planning matter."

11.6.6. Paragraph 4.2.84 states:

"Amenities. Development must respect the existence and amenities of neighbouring uses including approved development. These amenities include privacy (affected by overlooking), light (natural and man-made), noise (including that which arises from hours of operation), air quality (odour, fumes and dust), and pests (vermin and birds attracted by litter). Key determinants of impact are scale of development, proximity, proposed land use and the massing of buildings on site. ..."

11.6.7. Policy RE1 addresses Renewable Energy and states:

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

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

...

- 3. Proposals for all types of renewable and low carbon energy development and associated infrastructure either on their own, cumulatively or in combination with existing, approved or proposed development, shall comply with all other relevant policies in the LDP.*
- 4. Satisfactory mitigation shall be in place to reduce the impact of the proposal and its associated infrastructure. Proposals shall make provision for the restoration and after-care of the land for its beneficial re-use.*
- 5. Where necessary, additional compensatory benefits will be sought by agreement with applicants in accordance with Policy DM1 - Planning Obligations."*

11.6.8. In regards the noise impact, Paragraph 4.10.13 states:

"All renewable energy proposals and associated infrastructure, such as power lines or battery storage facilities, must respect the existence and amenities of neighbouring residential and sensitive properties including approved development. This is particularly the case when it comes to 'shadow flicker', reflected light or noise from wind turbines, 'glint and glare' from solar developments, and odour associated with anaerobic digestion."

11.6.9. Further details are included within a Supplementary Planning Guidance (SPG) document on renewable energy²¹⁹. This provides details on the information that should be provided by development proposals and was prepared to assist decision-making on planning applications within the Powys LDP area.

11.6.10. Section 9 of the SPG discusses the criteria for determining renewable energy schemes, where Paragraph 9.1.2 states:

"For all renewable energy proposals including associated transmission / storage infrastructure, considerations will vary relative to the scale of the proposal and area characteristics, but the information requested by the Council are likely to include:

- *Net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities;*
- *The scale of contribution to renewable energy generation targets;*
- *Effect on greenhouse gas emissions;*
- *Cumulative impacts - developers should be clear about likely cumulative impacts arising from all of the considerations below, recognising that in some areas the cumulative impact of existing and consented energy development may limit the capacity for further development;*
- *Impacts on communities and individual dwellings, including zones of theoretical visibility (ZTV), visual impact and residential amenity;*
- *The potential for pollution, noise, dust, odours, vibration, reflected light and shadow flicker; ..."*

The Assessment and Rating of Noise from Wind Farms (ETSU-R-97)

11.6.11. The assessment methodology for operational wind turbine noise is described in ETSU-R-97²²⁰. The basic aim of ETSU-R-97 is to provide:

"Indicative noise levels thought to offer a reasonable degree of protection to wind farm noise neighbours, without placing unreasonable restrictions on wind farm development or adding unduly to the costs and administrative burdens on wind farm developers or local authorities."

11.6.12. ETSU-R-97 specifies operational daytime limits in the range of 35-40 dB L_{A90} or the prevailing background noise level + 5 dB, whichever is the greater. There should be a balanced approach where the planning merit of the development should be reflected in the choice of the daytime lower limiting value. That is, if there are large positive aspects to the development (such as a significant generating capacity that can power many homes) then a higher noise limit may be justified. Conversely, if there is a small generating capacity that can only benefit a few homes, then a lower noise limit may be more appropriate. ETSU-R-97 suggests that the lower limiting value (in the range 35 – 40 dB) should depend upon:

- The number of dwellings in the neighbourhood of the wind farm;
- The effect of noise limits on the number of kWh generated;
- The duration and level of exposure

11.6.13. The choice of the daytime limiting value will be determined once the site design has been finalised. A value towards the upper end of the possible range may be appropriate. Where this is appropriate, supporting justification may be provided in terms of (but not necessarily limited to): the potential loss in generating capacity as a result of adopting lower noise limits, relevant precedent in respect of other wind farm development, the baseline noise environment and the likely duration and level of noise exposure, and the number of dwellings affected.

- 11.6.14. ETSU-R-97 specifies an operational night-time limit of 43 dB L_{A90} or the prevailing background noise level + 5 dB, whichever is the greatest.
- 11.6.15. Furthermore, where a resident is financially involved with the development, a limit of 45 dB L_{A90} or the prevailing background noise level + 5 dB, whichever is the greater, can be assumed.
- 11.6.16. ETSU-R-97 also suggests that where the local authority and developer are in agreement that the background noise levels do not vary significantly between the quiet daytime periods and the night-time, then a single lower fixed limit of 35-40 dB can be imposed based upon background noise levels taken during both the quiet daytime and night-time analysed together.

Institute of Acoustics Good Practice Guide

- 11.6.17. In May 2013, the UK Institute of Acoustics (IOA) published the 'Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'²²¹. The document was prepared with the purpose of agreeing current good practice in the application of the ETSU-R-97 methodology to wind turbine schemes.
- 11.6.18. The Welsh Government has formally endorsed the GPG, and the planning advice recommends that it be used for wind turbine noise assessments. Since May 2013, a number of supplementary guidance notes have also been published providing further detail. The GPG and the supplementary guidance notes should be regarded as a refinement of the ETSU-R-97 guidance to ensure consistency, and the noise assessment will follow the guidelines stated therein.
- 11.6.19. The GPG provides general advice on noise monitoring and data processing for noise surveys, and on how to provide an appropriate noise prediction of the proposed development. It clarifies a number of issues including the following:
- The background noise measurements (and thereby noise limits) should preferably take account of wind shear by correlating the background noise measurements with the standardised wind speed at 10m height. The standardised wind speed is defined as the hub height wind speed corrected to 10m height based on the reference ground roughness length of 0.05 m.
 - That ISO 9613-2 ²²³ is to be used for wind turbine noise predictions, with defined parameters that reflect noise propagation from wind turbines.
 - Consideration of cumulative noise issues including how noise impacts from existing and consented wind farm schemes must be assessed, and the use of directivity corrections for specific situations so that the effect of wind direction on noise propagation can be accounted for as necessary.

Noise and Soundscape Plan for Wales

- 11.6.20. Noise and Soundscape Plan for Wales²²² sets out a national strategy on soundscapes. The issue of onshore wind turbines is considered within Section 5.3 which states the following:

"Irrespective of location or scale, the design and micro-siting of proposals must seek to minimise their impact, particularly those in close proximity to homes and tourism receptors. Communities should be protected from significant cumulative impacts to avoid unacceptable situations whereby, for example, smaller settlements could be potentially surrounded by large wind schemes."

²²³ ISO 9613-2:1996. "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation".

The current UK wind turbine noise assessment guidance comprises a report known as ETSU-R-97, published by the Department of Trade and Industry in 1996, and a Good Practice Guide on the application of ETSU-R-97, published by the IOA in 2013, with Supplementary Guidance Notes published by the IOA in 2014. As it was considered the most up-to-date professional guidance for assessing onshore wind turbine noise available at that time, the Welsh Government has endorsed the use of this guidance in Wales.

Since the ETSU-R-97 guidance was published, the context has changed:

- *Onshore wind energy generation technology has evolved.*
- *There is increased understanding of the range of physical and operational factors that influence wind turbine sound.*
- *Further research has been undertaken to investigate the effects of wind turbine sound exposure on individuals and communities.*
- *A feature of wind turbine sound known as "amplitude modulation" has been reported as impacting people beyond the extent that was considered at the time of ETSU-R-97.*
- *New approaches to addressing the impacts of wind turbine noise, including amplitude modulation, have been developed.*
- *The UK Government has introduced legislation mandating the target to reduce all greenhouse gas emissions to net zero by 2050, the achievement of which will require increased deployment of onshore wind energy generation capacity.*

The UK Government recently commissioned a review on the adequacy of ETSU-R-97 and the IOA Good Practice Guide. The findings of this review were published in February 2023²⁷.

It is clear that the current UK guidance would benefit from being updated to address a number of unresolved issues, including how to assess the impacts of amplitude modulation. As a minimum, the WSP review of ETSU-R-97 raises questions that need to be answered by professional organisations with expertise in this field."

11.6.21. Until such time as it is amended, the current planning guidance for assessing the potential effects of sound from onshore wind turbines within Wales, remains to be the guidance within ETSU-R-97 and the IOA Good Practice Guide.

ASSESSMENT METHODOLOGY

Operational noise

11.6.22. Operational noise associated with the Proposed Development operating in isolation, and cumulatively with other existing or prospective development will be assessed. Predicted cumulative operational noise levels will be compared with the limits set out within ETSU-R-97 and the development will be designed such that planning requirements in this respect can be met. Wind farm noise levels will be deemed to be not significant where the appropriate ETSU-R-97 criteria are predicted to be met.

11.6.23. The development is currently proposed to have turbines with a tip height of up to 200 m. In terms of predicting potential noise from the development, source noise levels will be based upon a range of candidate turbine models that are currently available in the market of maximum tip height considered. A combined sound power level curve that encompasses the maximum noise levels of the various candidate turbine models will be modelled.

Wind Turbine Developments Considered in Cumulative Assessment

11.6.24. It is required for cumulative noise levels, from all wind turbine developments combined, to meet the ETSU-R-97 noise criteria. The cumulative noise assessment will consider all other existing, proposed²²⁴, or consented wind turbine developments that are close enough to be relevant²²⁵ to the noise sensitive receptors neighbouring this Proposed Development. When modelling the other wind turbine developments, consideration will be given to the 'controlling property' and 'significant presented headroom' approaches outlined in the GPG. If it is possible and realistic, it will be assumed that the other wind turbine developments are at their respective noise limits.

11.6.25. This will be kept under review, but currently the other wind turbine developments that are planned to be included in the cumulative noise assessment are:

- Mynydd Clogau (operating, M/1998/0669)
- Tir Gwynt (operating, P/2013/0026)
- Esgair Cwmowen (proposed, P/2010/0890)
- Mynydd Lluest y Graig (proposed, scoping, DNS/3213154)
- Llyn Lort (proposed, scoping CAS-02362-P3S4H4)

11.6.26. In terms of the existing wind farms of Mynydd Clogau and Tir Gwynt, their noise limits are referenced to a measured 10m wind speed, rather than a standardised 10m wind speed, as is nowadays considered good practice. Therefore, within the cumulative noise assessment, to take account of this, the limits will be adjusted for wind shear effects, to equivalent values referenced to a standardised 10m wind speed.

Construction related noise

11.6.27. Construction and decommissioning of the turbines will occur at distances that are unlikely to result in a breach of typical construction noise limits as prescribed within relevant guidance such as BS 5228. This, combined with the temporary nature of the works, means that an assessment of the construction and decommissioning noise impacts can often be scoped out. They have not been scoped out here because not enough information is currently known about the exact machinery and methods that will be used in the various phases of construction. For example, possible upgrades to local roads and provision of additional tracks relating to construction access requirements could occur in close proximity to certain dwellings, depending on the method and route taken. This will be kept under review throughout the EIA process. It is also the case that in practicality, a Construction Management Plan can usually be agreed between relevant parties, such that residents can be kept informed of construction activities, and that the noise impact be managed throughout the phases of construction.

²²⁴ Including those subject to appeal.

²²⁵ As per the GPG, this will be determined by whether the other wind turbine development is predicted to be within 10dB of the most dominant wind farm, at the noise sensitive receptor in question.

11.6.28. Noise predictions associated with the construction and decommissioning stages of the proposed development, will be undertaken according to the methods outlined by BS 5228. This will be based upon noise levels of typical or intended construction plant, that would be considered likely for the anticipated various construction phases of the development.

11.7 MITIGATION

11.7.1. There are a number of possible mitigation measures that could be used to reduce the noise impact at specific noise sensitive receptors if required. Such measures include:

- Removing turbines from the layout;
- Moving turbines further away from particular receptors;
- Using turbine models with lower source noise levels (that may include models with blades with serrated trailing edges); or
- Using restricted modes of operation (with lower source noise levels) for particular wind conditions;

12 ACCESS, TRAFFIC AND TRANSPORT

12.1 INTRODUCTION

- 12.1.1. This chapter describes the proposed scope of the assessment of likely significant effects arising from the Proposed Development upon traffic and transport. It includes consideration of traffic and transport receptors.
- 12.1.2. The chapter (and its associated figures and appendices) should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Description of The Proposed Development** and with respect to relevant parts of other technical chapters, such as **Chapter 11: Noise and Vibration**.

12.2 CONSULTATION

- 12.2.1. No consultation has been undertaken with regard to the information set out within this scoping chapter to date. This scoping chapter has been provided to inform on the relevant aspects of the Proposed Development with respect to likely traffic and transport effects. Consultees are requested to confirm the scope of the access, traffic and transportation chapter and the proposed methodology of assessment.
- 12.2.2. It is intended that consultation will be undertaken with the relevant highway authorities (North and Mid Wales Trunk Road Agent and Powys County Council) as part of the EIA process.

12.3 STUDY AREA

- 12.3.1. This section sets out the proposed access route to the Proposed Development from the trunk road network and then sets out the proposed temporal and spatial scope of the traffic and transport study area for assessment within the EIA.

ACCESS

- 12.3.2. The current access to the Site is via an unnamed road off the A470 in Pontdologoch.
- 12.3.3. The Site boundary includes approximately 12km of new track, comprising approximately 2.6km of new access road over open farmland as well as on-site access tracks to allow access to the on-site infrastructure. The new access road would route from the existing access track from the B4568, currently used to access the chicken farm at Henblas, north to the existing unnamed access road and then diverge to access the Site. The exact route and alignment of the proposed Site access track is being designed and will be set out within the EIA.
- 12.3.4. The existing access route from the A470 to the Site and the Site are depicted within **Figure 12.1**.

SPATIAL SCOPE

- 12.3.5. The spatial scope of the traffic and transport assessment is proposed to include the following roads:
 - B4568 – between the A470 and the proposed Site access;
 - Unnamed road – routing north from the A470;
 - A470 - Between the B4568 and the A489 (South of the proposed Site access); and
 - A470 - A470 Between the B4568 and the A489 (North of the proposed Site access).

- 12.3.6. The road sections that form the traffic and transport study area provide comprehensive coverage of the proposed access routes from the Site to the A470 which is part of the trunk road network. The traffic and transport study area also includes the A470 which runs from the A489 at Glantwymyn past the Site to the A489. Beyond these roads, traffic from the Proposed Development would access the wider road network where its effect would be diluted by existing traffic on these routes or would distribute to a point where the effects from traffic would be minimal.
- 12.3.7. The spatial scope of the traffic and transport study area is subject to change and refinement during the development of the EIA as further information becomes known and the routes for construction traffic is defined. This will be based on, for example: locations of specific trip origin/destinations of materials e.g. transport interchanges such as ports or material sources such as quarries; vehicle types for construction which may or may not be constrained by the highway environment on certain routes to Site such as a height restricted bridge on the A470 north of the B4568.

TEMPORAL SCOPE

Construction Phase

- 12.3.8. While the number of construction traffic movements across the Proposed Development construction programme is not currently known, it is anticipated that, due to the nature of the Proposed Development, the construction phase will generate the most transport trips as compared to the operational and decommissioning phases. The anticipated peak daily construction traffic movements for the Proposed Development will be identified within the traffic and transport chapter of the ES and will be assessed as the worst-case scenario of traffic impacts following the methodology set out within **Section 12.7**.

Operational Phase

- 12.3.9. Once the Proposed Development is operational, it is envisaged that the amount of associated traffic would be minimal.
- 12.3.10. Occasional visits may be made to the Site for maintenance checks. The vehicles used for these visits are likely to be a 4x4 or similar and there may be an occasional need for a Heavy Goods Vehicle (HGV) to access the Site for maintenance and repairs.
- 12.3.11. It is considered that the effects of operational traffic would be negligible and therefore it is proposed that the assessment of the operational phase of the development is 'scoped out' of the EIA with regard to traffic and transportation.

Decommissioning Phase

- 12.3.12. The traffic baseline may be different to the current baseline traffic conditions when decommissioning is undertaken after the 40-year operational phase.
- 12.3.13. **Chapter 2** outlines that once the 40-year operational phase is complete decommissioning works are estimated to take six months. During decommissioning above ground infrastructure will be dismantled and removed and access track left in situ or covered with topsoil while below ground infrastructure will remain in situ.
- 12.3.14. Based on the assumption that below ground infrastructure and access tracks will remain in situ, less traffic will be generated during decommissioning than during construction. Therefore, the effects on the road network during decommissioning are likely to be similar in nature though of lower magnitude than that relating to the construction phase as less vehicle movements would be required. It is proposed, therefore, that the assessment of the decommissioning phase of the development is 'scoped out' of the EIA with regard to traffic and transportation.

SUMMARY

12.3.15. The assessment of traffic and transport is proposed to consist of the effects of the Proposed Development traffic during the construction phase of the development and is likely to consist of the following road sections that form the traffic and transport study area (shown on **Figure 12.1**):

- B4568 – between the A470 and the proposed Site access;
- Unnamed road – routing north from the A470;
- A470 - Between the B4568 and the A489 (South of the proposed Site access); and
- A470 - A470 Between the B4568 and the A489 (North of the proposed Site access).

12.3.16. It is proposed to scope out the operational phase and decommissioning phase from the assessment.

12.4 BASELINE CONDITIONS

DATA SOURCES

12.4.1. The sources of information that have been referenced to form this scoping chapter and/or will be used for the Traffic and Transport assessment are anticipated to be those listed below:

- Google Earth/Google Maps²²⁶ - Online mapping.
- Department for Transport (DfT) STATS19 data sourced via the WSP Collision Analysis – UK Wide Dashboard - Personal Injury Accident (PIA) data – for the last five years of verified published data which currently is the years 2018 to 2022 inclusive.
- DfT: Road traffic statistics²²⁷ - Traffic flow (AADT) information.
- Powys County Council: Public Rights of Way Map²²⁸ - Public Right of Way information.
- Lloyds Coaches²²⁹ - Bus service information.
- Southwestern Railway²³⁰ - Rail service information.
- Sustrans²³¹ - National Cycle Network (NCN) information.
- TrawsCymru²³² - Bus service route information.

²²⁶ Google (2025) Google Maps (online). available at: <https://www.google.co.uk/maps> [Accessed February 2025]

²²⁷ Department for Transport (2024) Road Traffic Statistics (online). available at: <https://roadtraffic.dft.gov.uk/#6/52.603/-10.272/basemap-regions-countpoints> [Accessed: February 2025]

²²⁸ Powys County Council (2024) Public Right of Way Information (online). available at: <https://en.powys.gov.uk/article/13184/Public-Rights-of-Way-Map> [Accessed: February 2025]

²²⁹ Lloyds Coaches (2024) T12 Timetable (Online). available at <https://lloydscoaches.com/t12mar24/> [Accessed February 2025]

²³⁰ South Western Railway (2024) Travelling with us (Online). available at: <https://www.southwesternrailway.com/travelling-with-us/at-the-station> [Accessed February 2025]

²³¹ Sustrans (2024) National Cycle Network (Online). available at: <https://www.sustrans.org.uk/national-cycle-network/> [Accessed October 2024]

²³² TrawsCymru (2024) T12 (Online). Available at: <https://traws.cymru/en/journey/TANV:TCAT012:T12:T12MFTCA8:l:9?atcoCode=5610AWA17112&time=10%3A23> [Accessed October 2024]

- 12.4.2. Subject to the scoping response from the highway authorities, if required, traffic surveys will be undertaken to source suitable traffic flow data for roads within the traffic and transport study area. It is considered that where 2019 or 2023 DfT AADT manual count flow data is available that data will be sufficient for a robust assessment²³³.

CURRENT BASELINE

- 12.4.3. This section presents an overview of the existing transport network baseline within the anticipated traffic and transport study area (shown in **Figure 12.1**). The baseline information will be expanded on within the ES and will be subject to change/refinement based on any changes to the proposed traffic and transport study area as outlined in **Section 12.3**. For context a description of the full extent of the Unnamed road is provided as the road providing current access to the Site.

Local Road Network

B4568

- 12.4.4. The section of the B4568 that routes between the A470 and the proposed Site access is a 5.4m wide single carriageway subject to the national speed limit without pedestrian footways or streetlighting. The surrounding land use is predominately agricultural.

Unnamed road between Wtrawen and the Northern Extent of the Road

- 12.4.5. The unnamed road between Wtrawen and northern extent of the road is subject to the national speed limit. The surrounding land use is primarily agricultural the road provides access to a small number of properties. It is a surfaced single carriageway road (narrow single track) which is, on average, approximately 4m wide. It does not have pedestrian footways or streetlighting.

Unnamed road between A470 and Wtrawen

- 12.4.6. The unnamed road between the A470 and Wtrawen is subject to the national speed limit. The surrounding land use is primarily agricultural. It provides access to a small number of properties of varying set back from the carriageway. It is a surfaced single carriageway road (narrow single track) which is, on average, approximately 4m wide. It does not have pedestrian footways or streetlighting.

Strategic Road Network

A470 Between the B4568 and the A489 (South of the Proposed Site Access)

- 12.4.7. The A470²³⁴ south of the Site access connects to the A489. It is a single carriageway road, approximately 6.5m wide. The speed limit on the section of road south of the B4568 is 50mph and there is no footway. On approach to Caersws the speed limit is 40mph and on the outskirts of the settlement there is intermittent lighting and pedestrian footways north and south of Caersws.
- 12.4.8. Within the settlement of Caersws streetlighting and footways are present along both sides of the carriageway, there are pedestrian crossings, and the road is subject to a 20mph speed limit. Exiting Caersws southbound the A470 crosses the River Severn via a narrow bridge (signed for oncoming vehicles in middle of road). The A470/A489 junction is a priority junction with a level crossing directly to the southwest of the junction on the A470. The adjacent land-use is predominantly agricultural on this section of the A470 with residential and commercial in Caersws adjacent to the carriageway.

²³³ 2019 data is pre-COVID pandemic data (the COVID pandemic UK travel restrictions will have impacted the 2020 to 2022 traffic flow data) and reasonably recent and the 2023 data is the most up to date data available.

²³⁴ It should be noted that on Google Maps labelling of the A470 is inconsistent (with sections labelled as A489) for the avoidance of doubt this chapter refers to the A470 for the full section of trunk road between the A489 at Glantwymyn and the A489 south of Caersws.

A470 Between the B4568 and the A489 (North of the Proposed Site Access)

- 12.4.9. The A470 north of the B4568 routes connects to the A489 near Glantwymyn. It is a single carriageway road which varies in width, typically being a minimum of approximately 5.8m or greater.
- 12.4.10. North of the B4568 the A470 is subject to a 40mph speed limit and routes under a 4.4m (14'6") height restricted bridge and the road has no pedestrian footway. North of the height restricted bridge, in the settlement of Pontdolgoch, the A470 has pedestrian footway on the west of the carriageway but does not have streetlighting. A small number of residential and commercial properties are adjacent to the carriageway. North of Pontdolgoch, the road routes through a rural area and is subject to a 50mph speed limit and does not have pedestrian footways and lighting.
- 12.4.11. On approach to the settlement of Clatter, the A470 is subject to a 40mph speed limit. Within the residential centre of Clatter, the A470 has streetlighting and a short section of footway on both sides of the carriageway.
- 12.4.12. Northbound from Clatter the A470 is subject to the national speed limit and does not have footway or streetlighting through rural areas. The A470 routes through the settlement of Carno, Plas Llysyn, Dolfach and Llanbrynmair and within these areas the A470 is typically subject to a 40mph speed limit and has streetlighting and footways on a minimum of one side of the carriageway. Through the settlement of Talerddig there is direct frontage of properties onto the A470 with no footway, north of the settlement there is an arc bridge signed for high vehicles (4.8m/16'0") to use the middle of the road. West of Llanbrynmair there is a settlement where the A470 is subject to a 20mph speed limit and there are no footways.
- 12.4.13. On approach to the A489/A470 roundabout the A470 routes through the settlement of Glantwymyn, the A470 is typically subject to a 40mph speed limit and has intermittent streetlighting and footways, there is a school related part time 20mph speed limit.

Public Transport

- 12.4.14. The nearest railways station to the Site is Caersws Railway Station, which is approximately 7.4km driving distance from the Site (shown on **Figure 12.2**). The station is on the Cambrian railway line and is served by services to Birmingham International, Aberystwyth and Pwllheli.
- 12.4.15. The nearest bus stops to the Site are on the B4568 (marked by a bus flag and has seating) and A470 (southbound stop has a shelter). The local bus service that routes near to the Site follows the route of this service is shown in **Figure 12.2**. T12 (Lloyds Coaches) – operates between Machynlleth and Wrexham, with a minimum of eight services per day per direction Monday to Saturday.

Active Travel

- 12.4.16. There is limited pedestrian footway provision on the roads within the proposed traffic and transport study area, as previously outlined. The nearest National Cycle Network (NCN) route to the Site is route 81 which connects Aberystwyth and Wolverhampton, the A470 near Caersws is an on-road part of route 81.

Public Rights of Way

12.4.17. There are numerous PRoW within and near to the Site, as shown in **Figure 12.3**. The PRoW that are within the Site boundary are set out below:

- Footpaths: 244/10/1, 244/57/4, 244/73/1, 244/73/2, 246/28/1, 246/27/2 and 244/68/1.
- Bridleways: 244/72/1; 244/74/1, 244/74/2, 246/26/4, 244/78/2, 244/70/2, 244/70/3, 206/71/1, 236/57/1, 244/71/1 and 244/70/1.

12.4.18. In addition, there are PRoW which route in proximity to the existing access route that is not within the Site boundary: restricted byway 244/67/2; footpaths 244/45/1, 244/77/2 244/77/1 244/76/2 and 244/75/1.

Traffic flow

12.4.19. There is a DfT count point (ID 20541) with 2019 manual count data on the A470 in Clatter which details the following traffic flow information:

- All motor vehicles AADT – 3,854
- HGV AADT – 177.

12.4.20. The location of the DfT count point is shown in **Figure 12.2**.

12.5 DESCRIPTION OF LIKELY SIGNIFICANT EFFECTS

12.5.1. The potential effects of the Proposed Development that are likely to be significant with regards to Traffic and Transport are identified within the Institute of Environmental Management and Assessment (IEMA) Guidelines: Environment Assessment of Road Traffic and Movement (EATM)²³⁵ and are summarised below.

- Severance: the separation of people from places and other people and places or impede pedestrian access to essential facilities.
- Driver delay: traffic delays to non-development traffic.
- Non-motorised user amenity: the effect on the relative pleasantness of a pedestrian journey resulting from changes in traffic flow, traffic composition and pavement width / separation from traffic.
- Non-motorised user delay: the ability of people to cross roads as a result of changes in traffic volume, composition and speed, the level of pedestrian activity, visibility and general physical conditions of the Proposed Development.
- Fear and intimidation: the change in fear and intimidation levels experienced by people as a result of an increase in traffic volume and its proximity or the lack of protection caused by such factors as narrow pavement widths.
- Road safety: the risk of accidents occurring where the Proposed Development is expected to produce a change in the character of traffic.
- Impacts of Abnormal Indivisible Loads (AILs).
- Impacts of Hazardous Loads.

²³⁵ Davis, S., Hoare, D., Howard, R. and Ross, A. (2023) Institute of Environmental Management and Assessment (IEMA) Guidelines: Environmental Assessment of Road Traffic and Movement

- 12.5.2. These effects will be assessed within the EIA traffic and transport chapter for highway sections that are identified as requiring detailed assessment with the exception of impacts of AIL movements and hazardous load movements. These effects are scoped out of the assessment as no hazardous load movements are anticipated to be required for the Proposed Development. The impacts of AILs will be assessed within a separate AIL access study and appropriate mitigation and management will be identified within that document for discussion and agreement with the highway authorities.
- 12.5.3. The likely significant traffic and transport effects will be assessed within the EIA traffic and transport chapter. An outline Construction Traffic Management Plan (CTMP) will be produced as part of the EIA which will set out mitigation measures to minimise the impact of construction traffic on the road network within the defined study area and, if applicable, on PRoW affected by the construction of the Proposed Development.
- 12.5.4. **Table 12-1** summarises elements scoped in and out of the traffic and transport assessment.

Table 12-1 – Elements Scoped in or Out of Further Assessment

Element	Phase	Scoped In	Scoped Out	Justification
All traffic and transport elements.	Operation		✓	It is considered that the effects of operational traffic would be negligible (as set out in detail in Section 12.3).
Severance; Driver delay; Non-motorised user amenity; Non-motorised user delay; Fear and intimidation; and Road safety PRoW.	Construction	✓		Proposed Development traffic movements during the construction phase of the Proposed Development are considered to be the worst-case (peak daily) impact on highways receptors (as set out in Section 12.3). These factors will therefore be assessed within the traffic and transport assessment.
Impacts of AILs.	Construction		✓	The impacts of AILs will be assessed within a separate AIL access study and appropriate mitigation and management will be identified and agreed with the highway authorities to minimise impacts of these movements.
Impacts of Hazardous Loads.	Construction		✓	No hazardous load movements are anticipated to be required for the Proposed Development.
All traffic and transport elements.	Decommissioning		✓	As less traffic will be generated during decommissioning than during construction, the effects on the road network during decommissioning are likely to be similar in nature though of lower magnitude than that relating to the construction phase (as set out in detail in Section 12.3).

12.6 OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

- 12.6.1. There are not anticipated to be any notable opportunities for enhancing the environment from a traffic and transport perspective. As set out in **Chapter 2: Description of the Proposed Development** it may be that constructed access tracks are left as part of decommissioning which could benefit accessibility for the landowners. **Chapter 2: Description of the Proposed Development** also notes that Site access works are to include improvements to off-site roads to permit delivery to Site of wind turbine components and construction vehicles, these improvements may provide minor benefits to non-Proposed Development traffic.

12.7 PROPOSED ASSESSMENT METHODOLOGY

GENERAL APPROACH

- 12.7.1. The guidance in EATM²³⁵ outlines that the greatest environmental change will generally be when the Proposed Development traffic is at the largest proportion of the total flow. For the Proposed Development, this would occur during the construction phase.
- 12.7.2. The peak daily Proposed Development construction traffic during the construction programme will be identified and used to assess the worst-case impact of the construction traffic on the highway network. The year in which the peak daily construction traffic movements is anticipated to occur will be the assessment year for assessment of traffic and transport effects. Baseline AADT traffic flows will be adjusted to the assessment year using growth factors derived from the DfT's Trip End Model Presentation Program (TEMPro) (version 8.1).
- 12.7.3. EATM states two rules to be used to establish the need for an environmental assessment of traffic and transport impacts on receptors based on the change to traffic flow with the Proposed Development traffic:
- "Rule 1: Include highway links where traffic flows will increase by more than 30% (or where the number of heavy goods vehicles will increase by more than 30%)*
- Rule 2: Include highway links of high sensitivity where traffic flows have increased by 10% or more".*
- 12.7.4. EATM's Rule 1 and Rule 2 will be used to identify highways within the study area that require detailed assessment.

POTENTIAL TRAFFIC AND TRANSPORT RECEPTORS AND RECEPTOR SENSITIVITY

Identification of Receptors

- 12.7.5. Transport receptors are the users or beneficiaries of the highways network assets and facilities, such as pedestrians, cyclists, equestrians, and drivers who travel within the vicinity of the Proposed Development. EATM identifies the following key user groups: non-motorised users (NMU), PRoW users, motorists/freight vehicles, public transport and emergency services. It further identifies sensitive locations or users that may be affected:
- *"People at home;*
 - *People at work;*
 - *Sensitive and/or vulnerable groups (including young age; older age; income; health status; social disadvantage; and access and geographic factors);*
 - *Locations with concentrations of vulnerable users (e.g. hospitals, places of worship, schools);*
 - *Retail areas;*

- *Recreational areas;*
- *Tourist attractions;*
- *Collision clusters and routes with road safety concerns;*
- *Junctions and highway links at (or over) capacity”.*

12.7.6. EATM details that the identified sensitive receptors should be assigned to the nearest highway link for assessment, with each highway link then assigned a sensitivity value. Where a road passes through a location, users are considered subject to the highest level of sensitivity (defined by either the road or location characteristics). Therefore, the highway is assigned the highest level of sensitivity identified along its length.

12.7.7. Sensitive locations/users within the EIA traffic and transport study area will be identified once the traffic and transport study area is confirmed.

Determination of Receptor Sensitivity

12.7.8. Each highway link included in the assessment will be assigned a sensitivity in accordance with EATM and informed by professional judgement based on factors including the proximity of sensitive receptors to the highway link and the highway environment. EATM outlines that the impact of development traffic is dependent upon a wide range of factors which include the volume of traffic, traffic speeds and traffic composition (such as percentage of HGVs of total traffic).

12.7.9. **Table 12-2** summarises the classification of receptor sensitivity.

Table 12-2 – Receptor Sensitivity Summary

Sensitivity	Description/Reason	Receptor
High	Highway links with a high sensitivity to changes in traffic flows include routes: ■ with sensitive receptors alongside them (such as schools, colleges and playgrounds); and/or ■ where there are land uses which result in high volumes of pedestrian/cycle users and the road is narrow and/or footway provision is poor, or non-existent and/or existing traffic volumes are high for the type of road resulting in congestion and road safety issues.	Occupants of land uses alongside the highway link and users of the highway link.
Medium	Highway links with a medium sensitivity to changes in traffic flows include routes: ■ with some sensitive receptors alongside them (such as retail areas); and/or ■ where there are land uses which result in some pedestrian/cyclist users, road design and footway provision is adequate/appropriate and/or existing traffic volumes can be accommodated for the type of road but approaching capacity.	Occupants of land uses alongside the highway link and users of the highway link.
Low	Highway links with low sensitivity to changes in traffic flows include routes: ■ with no sensitive receptors and some land uses alongside and no/very limited pedestrian/cyclist users and/or road design and footway provision is appropriate and existing traffic volumes can be accommodated for the type of road.	Occupants of land uses alongside the highway link and users of the highway link.

Sensitivity	Description/Reason	Receptor
Negligible	Highway links with negligible sensitivity to changes in traffic flows include routes: with no sensitive receptors and very few land uses alongside them, which have no direct access or are sufficiently set back from the carriageway, and no/very limited pedestrian/cyclist users and existing traffic volumes can be accommodated for the type of road.	Users of the highway link.

12.7.10. For highway links where the sensitivity is judged as 'High' or 'Medium' Rule 2 (sensitive areas where traffic flows are predicted to increase by 10% or more) is applied. For highway links where the sensitivity is judged as 'Low' or 'Negligible' Rule 1 (areas where traffic flows are predicted to increase by more than 30% or where the number of HGVs is predicted to increase by more than 30%) is applied.

MAGNITUDE

12.7.11. The magnitude of impact will be determined in accordance with the advice provided in EATM and based on professional judgement. **Table 12-3** sets out the magnitude of impact (high, medium, low or negligible) criteria of potential significant impacts of transport set out in **Section 12.5**.

Table 12-3 – Magnitude of Change Summary

Traffic and Transport Impact	Magnitude of Change			
	High	Medium	Low	Negligible
Severance	Change in total traffic or HGV flows over 91%.	Change in total traffic or HGV flow of 61% to 90%.	Change in total traffic or HGV flows of 31 to 60%.	Change in total traffic or HGV flows of less than 30%.
	Context should, also, be considered including the local population and number of local facilities potentially impacted. EATM states caution should be applied with applying these thresholds to highway links with low baseline flows.			
Driver Delay	High increase in queuing at junctions and/or congestion on road links.	Medium increase in queuing at junctions and/or congestion on road links.	Low increase in queuing at junctions and/or congestion on road links.	Negligible or no increase in queuing at junctions and/or congestion on road links.
Non-motorised User Amenity	A halving or doubling of traffic flow (or HGV flow) can be used as a broad threshold when considered in the local context and applied with caution. Assignment of magnitude is based on a variety of factors including general level of pedestrian activity, visibility, and physical conditions such as traffic flow, traffic composition, crossing points and pavement width/separation from traffic.			

Traffic and Transport Impact	Magnitude of Change			
	High	Medium	Low	Negligible
Non-motorised User Delay	Generally, increases in traffic may lead to greater delay, though is dependent on the level of non-motorised users' activity in the area. Magnitude is assigned on pedestrian delay experienced when crossing highway links considering a range of factors including crossing type, pedestrian flows, traffic levels, visibility and general highway condition.			
Fear and Intimidation	Magnitude is assigned based on the scoring system provided in EATM (which is dependent on 18hr average traffic flow; 18hr average HGV traffic flow and vehicle speed). The scores comprise extreme (71+); great (41 to 70); moderate (21 to 40) and small (0 to 20).			
	Two step change in level score of fear and intimidation.	One step change in level score of fear and intimidation and >400 average 18hr vehicle increase or >500 HGV 18hr vehicle increase.	One step change in level score of fear and intimidation and <400 average 18hr vehicle increase or <500 HGV 18hr vehicle increase.	No step change in level score of fear and intimidation.
Road Safety	Magnitude is assigned by reviewing existing collision patterns and trends based upon existing personal injury accident records and the forecast increase in traffic that may change the risk of serious and fatal injuries.			
Hazardous Loads	Hazardous loads are assessed, where the number of hazardous loads is significant, based on risk/catastrophe analysis examining the potential for an accident to occur and the likely effect of an accident as per the guidance in EATM and the IEMA Major Accident and Disasters in EIA: A Primer guidance (IEMA, 2020).			

SIGNIFICANCE

12.7.12. The classification of significance of a likely traffic and transport impact is derived by considering the sensitivity of the receptor (**Table 12-2**) and the magnitude of change (**Table 12-3**) as defined in **Table 12-4**. Professional judgement will be applied to evaluate the magnitude of change and the level of significance. on the

Table 12-4 – Traffic and Transport Significance Evaluation Matrix

Receptor Sensitivity	Magnitude of Change			
	High	Medium	Low	Negligible
High	Major (Significant).	Major (Significant).	Moderate (Significant).	Negligible (Not Significant).
Medium	Major (Significant).	Moderate (Significant).	Minor (Not Significant).	Negligible (Not Significant).
Low	Moderate (Significant).	Minor (Not Significant).	Negligible (Not Significant).	Negligible (Not Significant).
Negligible	Negligible (Not Significant).	Negligible (Not Significant).	Negligible (Not Significant).	Negligible (Not Significant).

POTENTIAL CUMULATIVE IMPACTS

- 12.7.13. As outlined above, TEMPro will be used to growth the baseline traffic flow data to the future year of assessment. DfT's TEMPro forecasts of traffic growth take into account national projections of population, employment, housing, car ownership and trips rates. Therefore, TEMPro should account for all cumulative and anticipated development within the local plans at the time of its production.
- 12.7.14. Consideration will be given as to whether any of the highways receptors which would be taken forward for detailed assessment are likely to be subject to cumulative effects because of the traffic and transport effects generated by other proposed developments in the area that are not reasonably thought to be included within the TEMPro growth factor (i.e. recently approved development that was not part of a local plan allocation). If this is likely to be the case, a cumulative assessment would be undertaken.

12.8 MITIGATION

- 12.8.1. Mitigation measures that are taken into account within the environmental assessment of traffic and transport include an outline CTMP which will include measures to minimise the impact of the Proposed Development construction on the highway and PRoW networks and ensure safety
- 12.8.2. The impact of AILs is scoped out of the ES traffic and transport chapter (as set out in **Section 12.5**) as this will be dealt with separately by an AIL access study which will assess the proposed AIL routes and mitigation requirements. The AIL access study will be produced in consultation with the highway authorities and impacts and proposed mitigation measures will be agreed..

12.9 ASSUMPTIONS AND LIMITATIONS

- 12.9.1. To ensure transparency within the EIA process, the following limitations and assumptions have been identified:
- Assumptions:
 - No hazardous loads are anticipated as part of the Proposed Development;
 - An AIL study will be undertaken to identify management and mitigation measures required for the movement of AILs

- The proposed access road will be used as the construction access route from the A470 via the B4568.

■ Limitations:

- The traffic and transport study area is subject to change as the proposal progresses beyond scoping which may result in additional highways receptors being identified and assessed. Additionally, multiple construction traffic routes may be required depending on the range of vehicle type/size, for example, and highways constraints such as the height restricted bridge on the A470 approximately 270m north of the B4568 which may be a constraint on routeing north on the A470 for some vehicles. If multiple construction traffic routes form the construction traffic routing strategy assumptions will be made within the traffic and transport assessment as to the proportion of the Proposed Development construction traffic routing along each route.
- An estimate of the likely significant traffic and transport effects cannot be provided at this stage due to the unknowns relating to construction traffic generation and construction traffic routing.

12.9.2. The limitations listed above will be addressed within the traffic and transport assessment as further information is anticipated to be defined by this stage. The assumptions listed above will be reviewed as part of the traffic and transport assessment and if changed the proposed scope of the assessment will be altered as required.

13 INFRASTRUCTURE AND OTHER ISSUES

- 13.1.1. This Chapter presents the proposed scope of the assessment of effects with respect to infrastructure and other issues, including aviation and radar, shadow flicker, telecoms, climate, air quality, socio-economics and population and health arising from the Proposed Development.

13.2 AVIATION AND RADAR

INTRODUCTION

- 13.2.1. The development of wind turbines has the potential to cause a variety of adverse effects on aviation during turbine operation. These include (but are not limited to): physical obstructions, the generation of unwanted returns on Primary Surveillance Radar (PSR) and adverse effects on the overall performance of Communications, Navigation and Surveillance (CNS) equipment. A full aviation assessment of the Proposed Development will be undertaken as part of the Environmental Statement to identify and assess the likely aviation issues associated with the Proposed Development.

- 13.2.2. This section of the report has been prepared by Wind Farm Aviation Safeguarding (WFAS) Ltd.

CONSULTATION CRITERIA

- 13.2.3. Consultation criteria for aviation is based upon the guidance provided in Civil Aviation Publication (CAP) 764 (Policy and Guidance on Wind Turbines Version 6, Feb 2016). The consultation criteria listed below also provide the basis for establishing the study area used when assessing potential aviation impacts on the relevant aviation stakeholders:
- Officially safeguarded aerodromes and aerodromes with a surveillance radar facility need to be consulted if the proposed wind turbines are within 30km;
 - Within airspace coincidental with any published Instrument Flight Procedure (IFP) to take into account the aerodrome's requirement to protect its IFPs;
 - Consultation with the operators of officially safeguarded technical sites is required if the proposed wind turbines are within 10km;
 - Further assessment and/or consultation will be required if turbines are planned within:
 - 17km of a licensed aerodrome within a runway of 1100m or more;
 - 5km of a licensed aerodrome with a runway of less than 1100m;
 - 4km of an unlicensed aerodrome with a runway of more than 800m; and/or
 - 3km of an unlicensed aerodrome with a runway of less than 800m.
- 13.2.4. CAP764 goes on to state that these distances are for guidance purposes only and do not represent the radar/safeguarding range beyond which all wind turbine developments will be approved or within which they will always be objected to. These quoted ranges are intended as a prompt for further discussion between developers and aviation stakeholders.
- 13.2.5. It is also necessary to take into account the aviation and air defence activities of the Ministry of Defence (MoD). The types of issues that will be addressed include:
- Ministry of Defence Airfields (radar and non-radar equipped);
 - Ministry of Defence Remote Air Traffic Control Radars;

- Ministry of Defence Air Defence Radars;
- Ministry of Defence Low Flying; and
- Ministry of Defence Meteorological Radars.

13.2.6. The MoD does not stipulate consultation distances for their radars.

13.2.7. It will also be necessary to take into account the possible effects of wind turbines upon the National Air Traffic Services (NATS) radar systems, a network of primary and secondary radars and navigation facilities around the country.

13.2.8. No consultation with any affected stakeholder has been undertaken at this stage. Consultees are requested to confirm their agreement to the scope of this assessment.

STUDY AREA

13.2.9. The study area will be based upon the consultation criteria listed in Paragraph 15.2.4 above and take into account the operating parameters of aviation stakeholders.

BASELINE CONDITIONS

13.2.10. The Proposed Development is located in an area that is relatively remote from any aviation facilities. The Proposed Development is within Class G unregulated airspace which extends from ground level to Flight level 195 (approximately 19500ft).

Non-Radar Equipped Licensed Aerodromes

13.2.11. There are no non-radar equipped licensed aerodromes within the consultation distance. The nearest is at Welshpool, approximately 24km to the east of the Proposed Development.

Unlicensed Aerodromes

13.2.12. An extensive search of available documentation has revealed there are no unlicensed aerodromes within the stipulated consultation distances. However, this will be kept under review due to the potential for private airstrips.

Ministry of Defence

MoD ATC Radars

13.2.13. The nearest MoD ATC radar is at RAF Shawbury approximately 58km to the northeast of the Proposed Development and is the main helicopter training base for the RAF and RN. Rotary wing training activity is concentrated within the Shawbury AIAA which extends out to approximately 40km from the airfield. The Proposed Development is located approximately 15km beyond the boundary of the AIAA.

13.2.14. All of the turbines will be visible to the Shawbury radar in an area which the MoD are likely to consider as key to military operations and training. Having established that the turbines will show on the radar, the MoD will need to assess the operational impact of the resultant clutter on their procedures. The MoD will be invited to respond through the scoping process and the impacts will be reassessed once the finalised layout is confirmed and reported in the ES.

13.2.15. Aberporth is a range control radar operated on behalf of the MoD by QinetiQ. Aberporth is located approximately 89km to the southwest of the Proposed Development. The radar will not be capable of detecting the turbines and there should be no MoD objection based on this facility.

MoD Air Defence Radars

- 13.2.16. Initial radar modelling shows that no MoD Air Defence radars will be affected. If this is confirmed by the MoD this receptor will be scoped out of the ES.

MoD Low Flying

- 13.2.17. The Proposed Development is in MoD Low Flying Area (LFA 7) which covers most of Wales and is integrated with a series of important weapons ranges and ground training areas. The LFA provides flying units located in the south of the UK with quality airspace where they can operate and train with a high degree of tactical freedom. Situated within LFA7 is Tactical Training Area 7 (TTA 7) which is smaller than the low flying area. However, the TTA provides airspace where fixed wing fast jet and tactical transport aircraft can operate down to 100ft and 150ft respectively above ground level, as opposed to the normal 250ft minimum. The Proposed Development is outside the north-eastern side of TTA7, and it should be expected that MoD will assess any impact on aircraft routing to/from the TTA very carefully. During the hours of darkness, the area surrounding the Proposed Development becomes part of Fixed Wing Night Region Five Charlie North (5CN). Just to the northeast of the location is Night Rotary Region Nine (NRR9). This configuration of low flying airspace means that the area around the Proposed Development is an important training facility for both fixed wing aircraft and rotary wing helicopters both day and night.
- 13.2.18. The MoD will consider this proposal and any impact on Low Flying, both day and night. Due to the tip height the turbines will need to be lit in accordance with CAA policy and it should be expected that the MoD may require that the turbines be lit to MoD specification along with CAA requirements and/or require a lighting assessment. It is expected that this will be confirmed through the MoD response during the scoping process.

Met Office Weather Radars

- 13.2.19. Previously safeguarded by the MoD, the Met Office are now a consultee in their own right. The Met Office Weather Radar Network underpins forecast services and warnings of severe/hazardous weather and flooding delivered to the public, partners, government agencies/departments (including the MoD, aviation stakeholders and the Environment Agency) and emergency responders.
- 13.2.20. The detrimental impact of wind turbines on the operation of weather radar networks is a well-documented issue. The rotating blades can cause clutter, partial beam blocking and inaccurate Doppler velocities. The European meteorological network (EUMETNET) programme for the Operational Exchange of weather Radar information (OPERA) recommend that no turbines should be built within 5 km of a weather radar and that proposed developments between 5 and 20 km range should be subject to an impact assessment (OPERA, 2006 and 2010). These recommendations were further endorsed by the World Meteorological Organisation and thus the Met Office has adopted these guidelines for its network safeguarding operations.
- 13.2.21. There are no Met Radars within consultation or safeguarding distance.

Civil Aviation

- 13.2.22. West Wales airport is a small, licensed airport immediately adjacent to the Aberporth Range, located approximately 88km to the southwest of the Proposed Development. The radar should not be capable of detecting the turbines and the airport is outside of the stipulated consultation distance.

NATS En Route Ltd (NERL)

13.2.23. The main radar in the area utilised by NATS (NERL) to contribute to the air picture is at Clee Hill approximately 60 km to the southeast of the Proposed Development. Initial radar modelling shows that all of the turbines will be visible to the Clee Hill radar, and some close to or at ground level, and the implications of this need to be considered in the context of the airspace use and NERL will consider this development against their operations and any effects that they consider might be relevant. It is expected that NERL will confirm this in their scoping response and provide an assessment of any other possible CNS effects. Once the NERL response is received the applicant will engage with NERL and report the outcome in the ES.

Aviation Obstruction Lighting

13.2.24. CAA extant lighting policy is covered in “CAA Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom” with a maximum blade tip height at or in excess of 150 m Above Ground Level (01/06/17). It states that any obstruction in excess of 150 metres above ground level constitutes an “en route navigation hazard”. Wind turbines are to be lit with medium intensity (2000 candela) fixed red lights located on the highest practical point, in this case the nacelle. There is also currently a requirement for low intensity, 32 candela lights halfway up the tower of a limited number of the turbines. In addition, the MoD may require additional lighting to account for night training.

PROPOSED ASSESSMENT METHODOLOGY

13.2.25. WFAS Ltd. has an established methodology of considering the potential impact of wind turbines established at any given potential wind farm development site. The methodology is based on assessing the airspace infrastructure and aviation operations arrangements that exist in the area of the Proposed Development, be they technical or physical, and within a study area based on the ranges of all radars with the capability to provide surveillance over the area. The methodology includes:

- Analysis of the airspace structure in the area of the Proposed Development
- Analysis using specialised radar modelling software
- Assessment of Communication, Navigation and Surveillance (CNS) systems
- Operational ATC implications
- Assessment of physical safeguarding constraints against any airport/airfield Obstacle Limitation Surfaces
- Assessment of Visual Flight Rules flight (including military low flying, unlicensed aerodromes and airstrips)
- Consultation with affected aviation stakeholders.

13.2.26. The radar projections shown in this report have been produced using specialist propagation prediction software (RView) which has been designed and refined specifically for the task. RView uses a comprehensive systems database which incorporates the safeguarding criteria for a wide range of radar and radio navigation systems and models terrain using the Ordnance Survey (OS) Landform Panorama digital terrain model, which has a post spacing of 50 metres and has a root mean square (RMS) error of 3 metres. The results are verified using the Shuttle Radar Topography Mission (SRTM) dataset, a separate smoothed digital terrain model with data spacing of 3 arc seconds. By using two separate and independently generated digital terrain models, anomalies are identified and consistent results assured. RView models the refractive effects of the atmosphere on

radio waves and the First Fresnel Zone. RView can perform calculations using the true Earth Radius at the midpoint between the radar and the wind turbine or the simplified 4/3 Earth Radius model. If needed, RView is also capable of modelling a range of atmospheric refractive conditions and models the trajectory of radar signals at different elevations permitting the modelling of both volume surveillance and pencil beam radars as well as the effects of angular sterilisation as applied, for example, in Met Office radars.

13.3 SHADOW FLICKER

- 13.3.1. The term “Shadow Flicker” refers to the flickering effect caused when rotating wind turbine blades periodically cast shadows over nearby residential buildings (receptors). Shadow flicker can only occur inside a building and under a certain set of conditions.
- 13.3.2. For shadow flicker to occur, the receptor must be directly in line with a wind turbine when the sun is low in the sky. The receptor must also be within 10 rotor diameters of and located within 130° to either side of north of the wind turbine locations (assessment area). This approach is recommended within both national and local planning guidance²³⁶, and recognised as industry best practice. In these circumstances, the moving turbine blade briefly blocks / reduces the intensity of light entering an opening to a room (such as a window or door) on each rotation, causing a flickering to be perceived.
- 13.3.3. Given the potential for significant effects, and further consultation requirements, shadow flicker is **scoped in** to the EIA.
- 13.3.4. A desktop study using data and mapping from the Ordnance Survey and aerial photography shall be used to identify receptors within the vicinity of the Proposed Development. If, after design development, any receptors were to be located within the assessment area, they will be assessed for shadow flicker. If no receptors are located within the assessment area then this will be evidenced in the EIA.
- 13.3.5. In the open, shadow flicker is generally not perceived as light outdoors is reflected from all directions.
- 13.3.6. A shadow flicker model based on the candidate turbine, and meteorological and topological data of the Proposed Development Site shall be used to assess potential impacts. For this assessment a worst-case scenario based upon the following assumptions will be used to determine the maximum potential impact due to shadow flicker at each of the receptors:
- There is direct sunlight during all daylight hours;
 - All the turbines are visible from each location (no screening from e.g., other structures);
 - A bare earth topology model (no screening from e.g., trees);
 - The wind turbines are always operating; and
 - The receptor and wind turbine is always aligned with the sun (the turbine rotor casts the maximum possible shadow).

²³⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48052/1416-update-uk-shadow-flicker-evidence-base.pdf

- 13.3.7. The methodology and results of modelling, including assessment and figures shall be included as a chapter in the Environmental Statement along with proposed mitigation measures should they be necessary.
- 13.3.8. To date, no consultation has been undertaken regarding shadow flicker. If the impacts assessed in the EIA require mitigation then there are a number of highly effective mitigation measures available. For example, screening in the form of an appropriate hedge or similar and appropriate wind turbine control modules to inhibit the conditions required for shadow flicker to occur.

13.4 TELECOMS, ELECTROMAGNETIC AND TV INTERFERENCE

- 13.4.1. Telecommunication systems use a variety of electromagnetic (EM) signals, commonly described as radio waves. Uses primarily include television (TV); radio; mobile telephony; and microwave communications. Interference of EM signals can cause distorted sound and images, or disrupted data transmission. Disruption can potentially occur when existing telecommunication systems are not adequately considered during a windfarm's design and development. Therefore, the assessment of telecoms and EM signals is **scoped in** to the EIA.
- 13.4.2. A desktop study will be undertaken to identify telecommunications, utility and other infrastructure operators with EM equipment within the vicinity of the Proposed Development, as well as Spectrum, the OFCOM department for managing civilian use of the radio spectrum (operators).
- 13.4.3. The Study Area will comprise the Proposed Development Site Only operators with line-of-sight links that travel close to the wind turbine locations will be impacted by the Proposed Development and therefore there is no need to widen the Study Area.
- 13.4.4. A consultation exercise will be undertaken to identify any constraints or issues arising from existing EM and telecommunications operators. The consultation responses will be collated and presented in the Environmental Statement. Where an operator has indicated that there could be potential fixed links within the vicinity of the Proposed Development we would engage with them early to understand impacts and if required investigate potential mitigation options to reduce any impacts.
- 13.4.5. Where a residual potential effect is identified, the nature of the effect and mitigation that may be appropriate would be described in the Environmental Statement. Where effective mitigation is available and embedded as part of the scheme design then the assessment would conclude that there is no effect.
- 13.4.6. TV interference is now considered to be a low risk due to analogue TV signals no longer being in use and so this aspect is proposed to be **scoped out** of the EIA. In the unlikely instance that TV interference occurs, it is considered that this can be appropriately covered by a suitably worded planning condition and complaints procedure to implement any necessary mitigation.

13.5 CLIMATE CHANGE

- 13.5.1. The Proposed Development will reduce demand for fossil fuel electricity generation and will support the transition to a low carbon energy system, as described in **Chapter 2: Description of the Proposed Development**. Given the inherent carbon benefit of renewable energy park projects, a standalone Greenhouse Gas (GHG) ES chapter is not required, and it is proposed that GHGs are **scoped out** of the EIA. Instead, a Carbon Balance Assessment for the Proposed Development will

be undertaken using the Scottish Government Carbon Calculator Tool²³⁷ as the best available tool for this type of assessment. GHG emissions in the construction (including the production, transportation, erection), operation and decommissioning phases of the Proposed Development will be estimated, and this assessment will determine the benefit of the Proposed Development by estimating the carbon payback.

- 13.5.2. The design of the Proposed Development will comply with guideline flood return periods including climate change allowances and flood risk will be considered in the EIA as discussed in **Chapter 9: Hydrology** of this report. Other factors such as extremes of temperature, storms, and drought have been considered as part of the Major Accidents and Disasters discussed in Section 13.10 and no significant effects are likely.
- 13.5.3. The Carbon Balance Assessment will also consider the vulnerability of the Proposed Development to climate change and report on the design measures. It is therefore proposed that an assessment of Climate Change Resilience is also **scoped out** of the EIA.

13.6 GLINT AND GLARE

- 13.6.1. The Proposed Development will include the installation of photovoltaic (PV) solar panels. PV solar panels are specifically designed to absorb light rather than reflect it. Light reflecting from solar panels results in the loss of energy output. PV modules are dark in colour due to their anti-reflective coatings and are manufactured with low-iron, ultra-clear glass with specialised coatings and textures to enable maximum absorption. The combination of these factors significantly increases electrical energy production of the panels and at the same time significantly reduces reflected rays.
- 13.6.2. Following further development of the Proposed Development design, including details on the location and extent of PV solar panels, a glint and glare assessment will be undertaken considering ground-based receptors (roads and dwellings). Detailed geometric analysis will be undertaken using a bespoke glint and glare model for all receptors potentially affected by the Proposed Development.
- 13.6.3. The glint and glare assessment will sit as a separate technical appendix to the ES. Any impacts from glint and glare would be considered within the Landscape and Visual, Traffic and Transport Cultural Heritage and Aviation chapters of the ES. A description of any relevant mitigation measures and safety considerations of the Proposed Development will be included within the project description chapter of the ES.

13.7 AIR QUALITY

- 13.7.1. The Site is not located near an Air Quality Management Area (AQMA) and operational emissions to air, water and soil are anticipated to be negligible given the nature of the Proposed Development. The only appreciable emission to air caused by the Proposed Development would be emissions from construction traffic. However, given the rural nature of the routes to be used and that the levels of pollution in the background air quality are low, construction of the Proposed Development is not considered to lead to sufficient traffic levels to have the potential for air pollution levels approaching any relevant limit values. The CEMP will contain standard industry best practice mitigation regarding emissions during construction and therefore no significant air quality effects are anticipated. It is therefore proposed that an assessment of air quality impacts is **scoped out** of the EIA.

²³⁷ Scottish Environment Protection Agency (2020). *Carbon Calculator Tool v1.8.1* [online]. Available at: <https://informatics.sepa.org.uk/CarbonCalculator/index.jsp> [Accessed February 2025].

13.8 SOCIO-ECONOMICS

- 13.8.1. Following a review of the Proposed Development and our experience of other similar scale energy projects in the UK, it is not considered that the Proposed Development is likely to give rise to significant effects in relation to Socio-Economics which would merit a standalone assessment in the EIA. While it is accepted that the Proposed Development will give rise to local economic benefits, they do not exist at a level which can be considered significant in EIA terms. The primary economic benefits resulting from renewable energy generation schemes of this scale are associated with the construction spend and employment, but it is rare that the level of spend in the local area to the Proposed Development, can be confirmed at this early stage of the project. Further into projects, it is also the case that the nature of the construction work required means that it is unlikely that contractors will be able to be secured within the rural location of these types of projects. Extrapolating data from research into construction spend for onshore wind farm projects in Scotland, around 12% of construction spend could go to the local authority area. For a Proposed Development of this scale that is estimated as being around £3m per annum over a 24 month construction programme. The majority of spend would therefore be expected to be at a Welsh level. The size of the Welsh construction economy as a whole means the spending power is diluted to below a significant level. As an EIA is intended to only consider the significant effects of a Proposed Development, it would not be appropriate to assess economic benefits at a 'non-significant' level in the EIA. Instead, the economic assessment of the project will be assessed in the Planning Statement against the relevant economic based planning policies.
- 13.8.2. Considering any effects which do need considering on the 'social' side of this subject, these would normally occur on tourism and recreational receptors. These effects can adequately be covered by other subjects in the EIA such as traffic and transport, noise or visual impacts. Other socio subjects such as population changes or impact on local services, would not see any changes from a Proposed Development of this scale sufficient to warrant an EIA level assessment.
- 13.8.3. It is therefore proposed to **scope out** socio-economics from being a standalone chapter in the ES, with the economic assessment taking place in the Planning Statement and the socio assessment taking place elsewhere in the EIA.

13.9 POPULATION AND HUMAN HEALTH

- 13.9.1. The potential effects on population and human health arising from the Proposed Development would be considered in the context of the other factors identified in Paragraph 2 of Schedule 4 of the EIA Regulations given that any environmentally related health issues (both beneficial and adverse) are likely to result from, for example, exposure to traffic, changes in living conditions resulting from noise, and increased employment opportunities. It is therefore proposed that population and human health effects of the Proposed Development are incorporated within the relevant technical chapters such as traffic and transport, noise, shadow flicker and landscape & visual (in respect of residential amenity in particular).
- 13.9.2. However, to clearly demonstrate that population and human health effects are included in the Environmental Statement, and to assist with ease of reference, it is proposed that a summary table that identifies the potential effects and the Environmental Statement chapter that considers the matter in more detail will be included.

13.10 MAJOR ACCIDENTS AND DISASTERS

- 13.10.1. A review was undertaken of the potential effects deriving from the vulnerability of the Proposed Development to risks of major accidents and disasters.
- 13.10.2. Paragraph 8 of Schedule 4 of the EIA Regulations states that an Environmental Statement should describe *“the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned”*.
- 13.10.3. The scope for the EIA to consider major accidents and disasters has been initially considered in **Table 13-1**. Major accidents or disasters have been scoped in where they represent a risk to the Proposed Development, either from the proposed location or from the Proposed Development itself. A high risk is considered to be where there is reasonable likelihood of the accident or disaster occurring, or where the effect of the accident or disaster would lead to the requirement for mitigation which is beyond the usual scope of construction or operational activities. Where an accident or disaster has been scoped in, the Environmental Statement chapter(s) identified will consider the matter in more detail. This further detail may show that no further assessment is needed, or it may lead onto an appropriate level of assessment and/or identification of appropriate mitigation.

Table 13-1 – Major Accidents and Disaster Scope

Major Accident or Disaster	Risk Due to Location	Risk Due to Proposed Development	Scoped In/Out Due to Risk	Rationale	Environmental Statement Chapter
Biological hazards: epidemics	Very low	Very low	Out	The probability of epidemics which would affect the construction or operation of the Proposed Development is considered to be very low.	N/A
Biological hazards: animal and insect infestation	Very low	Very low	Out	The probability of animal and insect infestations which would affect the construction or operation of the Proposed Development is considered to be very low.	N/A
Earthquakes	No	No	Out	Any earthquakes in the vicinity of the Proposed Development would be of a very small magnitude and the design of	N/A

Major Accident or Disaster	Risk Due to Location	Risk Due to Proposed Development	Scoped In/Out Due to Risk	Rationale	Environmental Statement Chapter
				turbine foundations etc. is adequate to withstand such low magnitude events.	
Tsunamis / tidal waves / storm surges	No	No	Out	The general location of the Proposed Development and its distance from the coast means there is no risk of these phenomena affecting the Proposed Development.	N/A
Volcanic eruptions	No	No	Out	There are no active volcanos in the vicinity of the Proposed Development.	N/A
Famine / food insecurity	Negligible	Very low	Out	The probability of famine / food insecurity which would affect the construction or operation of the Proposed Development is considered to be negligible.	N/A
Displaced populations	Negligible	Very low	Out	The probability of displaced populations affecting the construction or operation of the Proposed Development is considered to be negligible.	N/A
Landslide / subsidence	Medium	Low	In	The construction of the Proposed Development could result in Peat Slip due to	Hydrology and Hydrogeology chapter – Peat Landslide appendix will

Major Accident or Disaster	Risk Due to Location	Risk Due to Proposed Development	Scoped In/Out Due to Risk	Rationale	Environmental Statement Chapter
				the presence of peat on Site.	support the ES Chapter.
Severe weather: storms	Medium	No	Out	Turbines are equipped with lightning conductors and automatically shut down when wind speeds are at a level which could damage internal components.	N/A
Severe weather: droughts	Very Low	No	Out	The probability of severe drought occurring in the vicinity of the Proposed Development is considered to be very low. Furthermore, turbines would be unaffected by drought conditions.	N/A
Severe weather: extreme temperatures	Low	Very Low	Out	The probability of icing on structures is very low in Wales due to the mild climate conditions in the winter. The probability of extreme heat occurring in the vicinity of the Proposed Development is also considered to be very low.	N/A
Floods	Low	Very Low	Out	All watercourse structures would be designed and constructed following good practice techniques and would be of sufficient capacity	N/A

Major Accident or Disaster	Risk Due to Location	Risk Due to Proposed Development	Scoped In/Out Due to Risk	Rationale	Environmental Statement Chapter
				to receive storm flows with an allowance for increased flows due to climate change. Therefore, it is considered that the Proposed Development would not increase local flood risk.	
Wildfires	No	No	Out	N/A	N/A
Industrial accidents	No	Yes	In – from construction and maintenance activities.	Manual labour, working at height and use of specialist plant all bring risk of industrial accidents. Relevant UK health and safety legislation will be adhered to; site construction management practices will include, but are not limited to, temporary diversions of public rights of way, relevant signage and fencing of potentially hazardous construction areas where appropriate.	Construction activities are covered by separate H&S legislation and guidelines. Approach to EIA (Site Selection and Alternatives Considered) and CEMP.
Urban fires	No	No	Out	The Proposed Development is not in close proximity to any urban areas.	

13.11 HEAT AND RADIATION

- 13.11.1. Paragraph 5(c) of Schedule 4 of the EIA Regulations requires “a description of the likely significant effects of the development on the environment resulting from... the emission of heat and radiation”.
- 13.11.2. Due to the nature and extent of the Proposed Development and given the processes and measures that are in place as part of the Proposed Development, effects related to heat, and radiation are not considered to be significant, and it is therefore proposed that this topic be **scoped out** of the EIA.

13.12 MATERIAL ASSETS AND WASTE

- 13.12.1. Considering the nature and scale of the Proposed Development, significant effects on material assets are not anticipated. The manufacturing or construction of the Proposed Development is not anticipated to result in significant use of primary or secondary materials; existing access tracks will be used as far as practicable and borrow pits, if required, will be sought on-site to avoid the need to import materials. There would be negligible waste generation during construction, and this would be minimised through controls to minimise material use and waste generation which will be contained in the CEMP. During operation, material resource use and waste generation are anticipated to also be negligible and concern routine maintenance of the turbines only. As such, it is therefore proposed that this topic be **scoped out** of the EIA.

13.13 FIRE RISK

- 13.13.1. Considering the nature of the Proposed Development, there is a negligible risk of the of fire outbreak associated with the operation of BESS and any other infrastructure on Site. However, it is considered this will be controlled via other safety measures and regulations. As such, it is therefore proposed that this topic be **scoped out** of the EIA.

14 SUMMARY OF SCOPE

14.1 TECHNICAL SCOPE SUMMARY

14.1.1. **Table 14-1** summarises the technical topics to be scoped in and scoped out from further detailed assessment as part of the EIA of the Proposed Development.

Table 14-1 – Description of Topics and Elements Scoped in and out from Further Assessment

Topic	Scoped in Receptors and Potential Impacts	Scoped out and Justification
Ecology	Llyn Mawr SSSI and Wildlife Trust Reserve: - Temporary degradation of the habitat from changes in hydrology or pollution events. - Disturbance of species for which the SSSI is designated. Priority Habitats / Ancient Woodland / Peatland / GWDTEs: - Direct, permanent habitat loss, or indirect degradation of habitat from changes in environmental conditions associated with construction activities. Bats: - Potential loss of roosts / roosting resource associated with the construction of the access road. - Disturbance, injury, or death associated with habitat removal. - Displacement, injury or death associated with the operational wind turbines. Badger: - Damage or destruction of resting places. Dormouse: - Loss of habitat, or foraging resource associated with the construction of the access road. - Disturbance, injury, or death associated with habitat removal. - Fragmentation of suitable connected habitat. Riparian mammals (otter and water vole): - Damage or resting sites, disturbance of individuals using a resting site as a result of the construction activities.	Internationally designated sites and all other nationally designated sites for the presence of bats, given the distance from the Proposed Development. Temporary disturbance of common and widespread species of negligible conservation importance and other priority species (e.g brown hare), as impacts can be avoided through design and implementation of standard mitigation measures during construction.

Topic	Scoped in Receptors and Potential Impacts	Scoped out and Justification
	- Degradation of the habitat from changes in hydrology or pollution events. Reptiles and amphibians: - Loss of habitat, or foraging resource associated with the construction of the wind turbines, solar array, BESS.	
Ornithology	Red Kite: Red kite is a S1 species under the Wildlife and Countryside Act 1981. Red kite is known to breed on and near to Site and is at risk of disturbance during the construction phase of the Proposed Development. Additionally, VP survey has demonstrated that red kite use the entirety of the Site and the local landscape which demonstrates the potential for injury / fatalities to occur via collision with turbines during the operational phase. Kestrel: Kestrel is a Red listed Bird of Conservation Concern (BoCC) in Wales. Kestrel was recorded breeding and foraging / commuting over the Site, though the majority of foraging took place on rough ground off Site. The change in breeding locality between Year 1 and Year 2 demonstrates that suitable alternative breeding locations are present within the local area. Kestrel is potentially susceptible to disturbance during the construction phase of the Proposed Development. The wide distribution of flight activity recorded demonstrates the potential for injury / fatalities to occur via collision with turbines during the operational phase. Hen Harrier: Hen harrier is a S1 species under the Wildlife and Countryside Act (1981 as amended). Hen harrier is also a Red listed BoCC in Wales. Hen harrier utilisation of the Site was low, however there remains a risk of the potential for injury / fatalities to occur	Berwyn SPA: The Berwyn SPA is located 16km from the nearest point of the Site boundary. The species for which the Berwyn SPA is designated (breeding Red kite, Hen harrier, Peregrine and Merlin) are either absent or occur rarely (Merlin and Hen Harrier). All have a core ranging area which is smaller than the distance between the Site and the SPA (SNH, 2016). The Site is not therefore considered to be functionally linked to the Berwyn SPA. Peregrine: Peregrine is a S1 species under the Wildlife and Countryside Act 1981 and is an Annex 1 species under the Birds. Due to the combination of low utilisation of the Site and the distance between the Proposed Development and the nearest known breeding location, it is considered that the Proposed Development will have no direct or significant indirect impact to breeding peregrine in the local area. Merlin: Merlin is a S1 species under the Wildlife and Countryside Act 1981. Merlin was absent from the Site and only recorded incidentally from outside of, or on the boundary of the Site. It is considered that the Proposed Development will have no direct or significant indirect impact on merlin. Nightjar: Nightjar is Green listed BoCC species in Wales, however, Nightjar is Amber listed in the UK. Nightjar was absent from the Site, and only recorded outside of the Site, this was due to the lack of suitable habitat for nightjar on Site. NRW recommended that a second year of nightjar survey would not be required. It is considered that the Proposed Development will have no direct or significant indirect impact to breeding nightjar in the local area. Other breeding bird assemblages on site: The general breeding bird assemblage on site includes Red and Amber listed Birds of

Topic	Scoped in Receptors and Potential Impacts	Scoped out and Justification
	via collision with turbines during the operational phase. Curlew: Curlew is a Red listed BoCC in Wales. The Site falls within Important Curlew Area (ICA) 9: Montgomeryshire. There is the potential for disturbance to curlew attempting to breed within the survey area during the construction phase, and some potential for injury / fatalities to occur via collision with turbines during the operational phase. The placement and extent of other green infrastructure (such as solar arrays and BESS) may result in displacement resulting from reducing the overall extent of suitable foraging areas. Golden plover: Golden plover is a Red listed BoCC in Wales. Flocks of up to 175 golden plover use the Site during spring and autumn passage period, with the potential for disturbance during the construction phase of the Proposed Development, and the potential for injury / fatalities to occur via collision with turbines during the operational phase. The placement and extent of other green infrastructure (such as solar arrays and BESS) may result in displacement resulting from reducing the overall extent of suitable foraging areas.	Conservation Concern (BoCC), predominately passerines or near-passerine species. Impacts to these groups are anticipated during the construction phase. Legislative compliance can be achieved through appropriate mitigation (timing of works, use of an Ecological Clerk of Works (ECOW), methods statement etc). Habitat enhancement principally aimed at other species is also likely to benefit the locally breeding bird community. Impacts to passerines and near-passerines resulting from the operational phase are not anticipated, although the placement and extent of other green infrastructure (such as solar arrays and BESS) may result in displacement resulting from reducing the overall extent of suitable foraging/nesting areas.
Landscape and Visual	Landscape effects during construction, operation and decommissioning phases of the Proposed Development: - Changes to landscape elements: the addition of new elements (wind turbines) or the removal of existing elements such as trees, vegetation and buildings and other characteristic elements of the landscape character type; - Changes to landscape qualities: degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of	Receptors beyond ZTV coverage: Receptors within the 27km LVIA Study Area that are shown to be beyond the ZTV coverage for the Proposed Development (including wind turbines, associated infrastructure and any 'off site development' such as access and grid connection) would have no view of the Proposed Development. Extent of regional and local receptor assessment: The viewpoint analysis would be used to identify a conservative 'threshold' distance for significant landscape and visual effects. Regional and local receptors beyond this distance are unlikely to be significantly affected by the Proposed

Topic	Scoped in Receptors and Potential Impacts	Scoped out and Justification
	landscape character types or contribute to the landscape value; - Changes to landscape character: landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the cumulative addition of new features, the magnitude of which is sufficient to alter the overall landscape character type of a particular area; and - Cumulative landscape effects: where more than one wind farm may lead to a potential landscape effect. Visual effects during construction, operation and decommissioning phases of the Proposed Development: - Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view(s); and - Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect. Residential Visual Amenity Assessment (RVAA): A RVAA will be undertaken to assess the effects on residential visual amenity likely to be experienced at residential properties within 2km of the Proposed Development. The RVAA would accord with the advice in GLVIA 3 and the Landscape Institute's TGN 02/19: Residential Visual Amenity Assessment. Night-time lighting assessment: A proportionate night-time lighting assessment of the proposed aviation lighting would be undertaken in accordance with NatureScot's General Pre-application and Scoping Advice for Onshore Wind Farms,	Development and would be excluded from the LVIA. Cumulative Assessment: Exclude scoping stage and pre-application schemes beyond 10 km from the CLVIA. Scoping sites within 10km of the Proposed Development would be shown on figures and wirelines visualisations but would not be included in the CLVIA, in line with NatureScot guidance. Single turbines below 50m to blade tip height. All single turbines beyond 10km of the Proposed Development. Micro-generation turbines (25-50m) within 5km of the Proposed Development would only be included in the CLVIA if they consist of three or more turbines. LANDMAP Aspect Areas: Aspect areas illustrated as having less than 20% of their area within the blade tip ZTV are unlikely to be significantly affected by the Proposed Development and would be excluded from the LVIA. Landscape effects on Eryri National Park (ENP): The limited distribution of theoretical visibility of the Proposed Development across the closest parts of the ENP, the location of intervening operational and consented cumulative wind energy developments between the Proposed Development and this part of the ENP boundary as well as the long intervening distance of approximately 16km (Figure 7.3) supports the conclusion that the special qualities, integrity and landscape character of the ENP are unlikely to be significantly affected by the Proposed Development. Landscape effects on the Shropshire Hills National Landscape: The very limited distribution of theoretical visibility of the Proposed Development across the closest parts of the Shropshire Hills National Landscape within the 27km LVIA Study Area as well as the long intervening distance of approximately 20km (Figure 7.3) supports the conclusion that the special qualities and integrity of the National Landscape are unlikely to be significantly affected by the Proposed Development. Night-time landscape assessment: Scoped out in line with the recent draft Scottish Government guidance on aviation lighting

Topic	Scoped in Receptors and Potential Impacts	Scoped out and Justification
	Annex 2 and Scottish Government's draft guidance Aviation Lighting and Onshore Wind Turbines – Draft Guidance on Aviation Lighting Impact Assessment, June 2024. The assessment will be supported by maps indicating the ZTV of any proposed aviation warning lights and three night-time viewpoints.	assessment, with a focus on night-time visual effects undertaken. Special Landscape Areas: Significant effects as a result of the Proposed Development upon each of the SLAs lying more than 15km from the Proposed Development is unlikely due to a combination of: very limited ZTV coverage, the location of intervening cumulative wind energy developments between the Proposed Development and each SLA and large intervening distances (Figure 7.3). Registered landscapes of Outstanding and Special Historic Interest: Registered Landscapes of Outstanding and Special Historic Interest are not considered as a landscape designation.
Cultural Heritage	Direct physical impacts to designated historic assets within the Proposed Development site: Physical impacts caused by the construction of turbine bases, access tracks, temporary work areas and other associated development, which may cause significant effects to historic assets including; Nant Cwm Gerwyn Cairns (MG278), Round Hut 700m NNE of Garreg Hir (MG338), Craig y Llyn Mawr Round Cairn (MG277), Lluest Uchaf Cairns and Stone Row (MG276), Round Hut 400m NE of Garreg Hir (MG339). Direct physical impacts to non-designated historic assets within the Proposed Development site: Physical impacts caused by the construction of turbine bases, access tracks and temporary work areas, which may cause significant effects. Historic Assets within the Proposed Development site, and their study areas which have potential to have significant impacts arising from change within their setting: Significant impacts may be caused by changes to historic assets where setting contributes to the significance. Only historic assets which have visibility of the turbines, as	Operational direct physical impacts to non-designated historic assets within the Proposed Development site: It is assumed that non-designated historic assets will be removed during the construction phase. Therefore, no further impacts are anticipated on these assets during the operational phase. This includes known and unknown non-designated historic assets. Temporary impacts arising from change within the setting of historic assets caused by construction of the Proposed Development: As these works are temporary and there would be no meaningful distinction between effects on setting during the construction and operational phases, construction phase effects have been scoped out of further assessment. World Heritage Sites, registered battlefields, registered historic parks and gardens and marine protected areas: There are no examples of these within the Proposed Development, or within their study areas.

Topic	Scoped in Receptors and Potential Impacts	Scoped out and Justification
	determined by the ZTV, and for which setting contributes to their significance will be assessed. Caersws Basin Registered Landscape of Special Historic Interest (HLW (P) 5): The Caersws Basin Registered Landscape of Special Historic Interest is approximately 1.5km from the Proposed Development site and so there is a potential for indirect visual impacts should a substantial portion of the landscape fall within the ZTV.	
Hydrology	Watercourses: Nant Cwmgerwyn, Nant yr Amros, Nant y Llyn Mawr - Impact from the release of pollutants (e.g. chemicals, hydrocarbons and other construction materials) directly (e.g. accidental spillages into the surface water) or indirectly (via surface water runoff) leading to deterioration in the surface water quality environment. - Impact from temporary increase in sediment-loading of surface water runoff from construction/dismantling areas leading to deterioration in the surface water quality environment. - Impact from an increase in surface water runoff and therefore increase in flood risk downstream and, increase in potential erosional power of surface overland flow impacting channel morphology. - Impact from sediment ingress due to more connected drainage systems. WFD surface water bodies: Afon Carno, Afon Rhiw, Nant Rhyd-ros lan, Severn: - Impact from the release of pollutants (e.g. chemicals, hydrocarbons and other construction materials) directly (e.g. accidental spillages into the	N/A

Topic	Scoped in Receptors and Potential Impacts	Scoped out and Justification
	surface water) or indirectly (via surface water runoff) leading to deterioration in the surface water quality environment, deterioration in the status of WFD surface water bodies. ■ Impact from temporary increase in sediment-loading of surface water runoff from construction/dismantling areas leading to deterioration in the surface water quality environment and deterioration in the status of WFD surface water bodies. ■ Impact from an increase in surface water runoff and therefore increase in flood risk downstream and, increase in potential erosional power of surface overland flow impacting channel morphology. ■ Impact from temporary changes to watercourse flow conveyance leading to deterioration in the status of WFD surface water bodies. ■ Impact from sediment ingress due to more connected drainage systems. Ponds/Lakes: Llyn Mawr, Llyn Du, Llyn y Tarw: ■ Impact from the release of pollutants (e.g. chemicals, hydrocarbons and other construction materials) directly (e.g. accidental spillages into the surface water) or indirectly (via surface water runoff) leading to deterioration in conditions supporting local conservation sites. ■ Temporary increase in sediment-loading of surface water runoff from construction/dismantling areas leading to deterioration in pond/lake water quality. ■ Sediment ingress due to more connected drainage systems. Springs within area of interest: ■ Impact from the release of pollutants (e.g. chemicals, hydrocarbons and other	

Topic	Scoped in Receptors and Potential Impacts	Scoped out and Justification
	construction materials) directly (e.g. accidental spillages into the ground water) leading to deterioration in groundwater quality. Groundwater in Severn Uplands – Lower Palaeozoic (WFD groundwater body and Secondary Undifferentiated Aquifer): - Impact from the release of pollutants (e.g. chemicals, hydrocarbons and other construction materials) directly (e.g. accidental spillages into the ground) leading to deterioration in the groundwater quality, deterioration in the status of WFD groundwater bodies. Local surface water and groundwater abstractions (if present): - Impact from the release of pollutants (e.g. chemicals, hydrocarbons and other construction materials) directly (e.g. accidental spillages into the ground/surface water) or indirectly (via surface water runoff) leading to deterioration in the surface water and groundwater quality environment. - Impact from sediment ingress due to more connected drainage systems. Humans(construction workers and residents)/properties/infrastructure downslope and adjacent to the Study Area: - Potential for the impact from the increase in surface water runoff and therefore increase in flood risk downstream and, increase in potential erosional power of surface overland flow impacting channel morphology. - Potential for the impact from the permanent culverting of the watercourse could lead to concentration of flow leading to an increase in potential erosional power of channel flow impacting channel morphology. Potential for	

Topic	Scoped in Receptors and Potential Impacts	Scoped out and Justification
	blockage of culverts and increased upstream flooding risk.	
Geology and Soils	Peat (including stability): The baseline information and Phase 1 peat survey has identified areas of peat within the Site with the potential for significant impacts. Ground stability (mineral soil slope stability): Land stability in relation to mineral soil slope stability within the Site will be addressed throughout the design and construction process by compliance with the Construction (Design and Management) Regulations 2015. An assessment of ground conditions and land stability in the form of a Phase 1 Geoenvironmental Desk Study will be completed once the full details of the Proposed Development are known.	Geodiversity sites: No permanent damage to locally or nationally important Geosites is possible because they are not present on or surrounding the Site. BMV Agricultural Land: The Predictive Agricultural Land Classification (ALC) Map indicates that only the access track passes through an area of 'best and most versatile' (BMV) land (categories 1, 2 or 3a). However, the affected piece of land is only approximately 165m in length and as such, the potential effects are not considered significant and have therefore been scoped out. Land Contamination: The Site has a limited development history and no waste activities have been identified within the Site. Given the absence of significant potential sources of contamination within the Site or in the study area, the assessment of land contamination has been scoped out. A desk-based review, including an assessment of ground condition and contamination constraints, will be undertaken as part of the detailed design following consent. This will include a Phase 1 Geoenvironmental Desk Study once the full details of the Proposed Development are known.
Noise	Operational noise effects: Potential for operational noise to be audible, and above relevant BS 4142 noise criteria. This applies to wind turbines, BESS and Solar PV. Construction noise effects: Potential for construction noise to be audible, and above relevant BS 5228-1 noise criteria.	Operational vibration effects: Ground-borne vibration during the operational phase will not be perceptible at residential locations and will be significantly below the relevant criteria set out in BS 5228-2. Construction vibration effects: Ground-borne vibration during the construction phase is unlikely to be perceptible, except if there are short term construction activities in the near vicinity of receptor locations, where vibration levels will in any case be below the human tolerance and cosmetic damage criteria set out in BS 5228-2.
Traffic and Transport	Construction related impacts related to severance, driver delay, non-motorised user amenity, non-motorised user delay, fear and intimidation and road safety:	All operational and decommissioning traffic and transport elements: It is considered that the effects of operational traffic would be negligible. As less traffic will be generated during decommissioning than during

Topic	Scoped in Receptors and Potential Impacts	Scoped out and Justification
	Proposed Development traffic movements during the construction phase of the Proposed Development are considered to be the worst-case (peak daily) impact on highways receptors. These factors will therefore be assessed within the traffic and transport assessment.	construction, the effects on the road network during decommissioning are likely to be similar in nature though of lower magnitude than that relating to the construction phase. Impact of AILs: The impacts of AILs will be assessed within an AIL access study and appropriate mitigation and management will be identified to minimise impacts of these movements. Hazardous Loads: No hazardous load movements are anticipated to be required for the Proposed Development.
Infrastructure and other issues	Potential effects on existing infrastructure, telecommunications and broadcast services: ■ Television ■ Aviation ■ Radar ■ Radio-communication signals Shadow Flicker: ■ If after design, any properties are located within 10 rotor diameters of a turbine and within a 130 degree segment either side of due north. Glint and glare: The glint and glare assessment will sit as a separate technical appendix to the ES. Any impacts from glint and glare would be considered within the Landscape and Visual, Traffic and Transport and Cultural Heritage chapters of the ES. A description of any relevant mitigation measures and safety considerations of the Proposed Development will be included within the project description chapter of the ES. Climate: ■ Carbon balance assessment including a full lifecycle assessment to determine carbon benefit, considering GHG emissions in the production, transportation, erection, operation and decommissioning phases. The Carbon Balance Assessment will also consider the vulnerability of the Proposed Development to	Population and Human Health: Effects of the Proposed Development will be incorporated into the relevant technical chapters of the ES such as Traffic and Transport, Noise, Shadow Flicker and LVIA. Socio-economics: Following a review of the Proposed Development and our experience of other similar scale energy projects in the UK, it is not considered that the Proposed Development is likely to give rise to significant effects in relation to Socio-Economics which would merit a standalone assessment in the EIA. While it is accepted that the Proposed Development will give rise to local economic benefits, they do not exist at a level which can be considered significant in EIA terms. It is therefore proposed to scope out socio-economics from being a standalone chapter in the ES, with the economic assessment taking place in the Planning Statement and the socio assessment taking place elsewhere in the EIA. This will provide a streamlined and more efficient EIA. Climate: Vulnerability of the Proposed Development to climate change and extreme climate events has been scoped out as this will be considered within the engineering design. Air Quality: The Site is not located near an Air Quality Management Area (AQMA) and operational emissions to air, water and soil are anticipated to be negligible given the nature of the Proposed Development. The only appreciable emission to air caused by the Proposed Development would be emissions from construction traffic. The CEMP will contain standard industry best practice mitigation regarding emissions during construction and therefore no significant air quality effects are anticipated. It is therefore proposed that an

Topic	Scoped in Receptors and Potential Impacts	Scoped out and Justification
	climate change and report on the design measures. Major accidents or disasters in respect of: ■ Landslide / subsistence (Geology and Soils chapter); ■ Transport accidents (Approach to EIA chapter and Traffic and Transport chapter); and ■ Industrial accidents (Site Selection and Design and CEMP).	assessment of air quality impacts is scoped out of the EIA. Major accidents or disasters in respect of: ■ Biological hazards; ■ Tsunamis / tidal waves / storm surges; ■ Volcanic eruption; ■ Famine / food insecurity; ■ Displaced populations; ■ Sever weather – storms and droughts; ■ Wildfires and fire risk; ■ Urban fires. Heat and Radiation: Due to the nature and extent of the Proposed Development, effects related to heat and radiation are not considered to be significant and are therefore scoped out. Material Assets and Waste: The manufacturing and construction of the Proposed Development is not anticipated to result in significant use of primary or secondary materials. There will be negligible waste generation, with this being minimised and controlled through measures to be set out in the Outline CEMP. Fire Risk: Given the nature of the Proposed Development, there is a minor risk of fire outbreak associated with the operation of BESS and other infrastructure. It is considered this will be controlled via other safety measures and regulations and any effects would not be significant. It is therefore Scoped out of the EIA.

14.2 PROPOSED STRUCTURE OF THE ES

14.2.1. The technical topics and factor-specific elements scoped in and out of further assessment as part of the ongoing EIA process are outlined in **Chapter 5-13** of this Scoping Report.

14.2.2. The anticipated structure of the ES is set out below:

- Volume I: Non-Technical Summary
- Volume II: Environmental Statement
 - Chapter 1: Introduction
 - Chapter 2: Approach to EIA
 - Chapter 3: Scheme Need, Alternatives and Iterative Design Process
 - Chapter 4: Description of the Proposed Development
 - Chapter 5: Ecology
 - Chapter 6: Ornithology
 - Chapter 7: Landscape and Visual
 - Chapter 8: Cultural Heritage
 - Chapter 9: Hydrology
 - Chapter 10: Geology and Soils
 - Chapter 11: Noise
 - Chapter 12: Traffic and Transport
 - Chapter 13: Other issues (Aviation and Radar, and Telecommunications)
 - Chapter 14: Shadow Flicker
 - Chapter 15: Cumulative Effects
- Volume III: Supporting Figures and Plans
- Volume IV: Supporting Technical Appendices



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