

MEILLION SOLAR FARM

EIA SCOPING REPORT

Submitted in respect of a request for a Scoping Direction under Regulation 33 of the
**The Town and Country Planning (Environmental Impact Assessment) (Wales)
Regulations 2017**

December 2022

Prepared by



On behalf of Octo Partners



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1 Introduction

1.1 Introduction

- 1.1.1 This Scoping Report has been prepared by Dulas Ltd on behalf of Octo Partners ('the Applicant'). It sets out the proposed scope of the Environmental Statement (ES) for the Mellon solar farm and ancillary equipment (the 'Proposed Development') on land at Mynydd Drumau, Neath Port Talbot.
- 1.1.2 The ES will be prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Wales Regulations 2017.
- 1.1.3 As a scheme greater than 10 megawatts (MW) in capacity, the Proposed Development is classed under art 2, Regulation 4 of *The Developments of National Significance (Specified Criteria and Prescribed Secondary Consents) (Wales) Regulations 2016* as a Development of National Significance (DNS). The ES will accompany a full DNS planning application to be submitted to Planning and Environment Decisions Wales (PEDW), who manage the process on behalf of Welsh Ministers.
- 1.1.4 The aim of this Scoping Report is to provide information to the Welsh Ministers to enable an EIA Scoping Direction under Regulation 15 of the EIA Regulations. A letter requesting such a direction accompanies this Report.

1.2 The Applicant

- 1.2.1 Octo Partners ('The Applicant'), is a Wales based renewable energy company. Their management team have significant expertise in the renewable sector, having delivered over 400MW of clean energy projects within the UK including the 34MW Mynydd y Betws Wind farm in Carmarthenshire and the 40MW Ravensthorpe Solar Project in North Lincolnshire.
- 1.2.2 The Applicant is committed to delivering sustainable projects by working in partnership with the stakeholders and by combining their expertise with a sense of clarity and integrity. Octo is a development partner of E.ON Renewables UK.
- 1.2.3 The Applicant has appointed an independent renewable energy specialist consultancy, Dulas Ltd., to advise them on the scope of environmental impact assessment (EIA) work and environmental issues, and to provide sufficient environmental information to enable the formulation of an Environmental Statement (ES) which will accompany an application for development consent for the Proposed Development.

1.3 Purpose of the Scoping Report

1.3.1 This Scoping Report supports a request by the Applicant for a Scoping Direction to the Welsh Ministers via the PEDW under Regulation 33 (1) of *The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017*, hereinafter referred to as the 'Regulations'. In accordance with Regulation 33 (2), the following information is provided:

- a) *a plan sufficient to identify the land;*
- b) *a brief description of the nature and purpose of the development including its location and technical capacity;*
- c) *its likely significant effects on the environment;*
- d) *a statement that the request is made in relation to a development of national significance for the purposes of section 62D of the 1990 Act; and*
- e) *such other information or representations as the person making the request may wish to provide or make.*

1.3.2 The purpose of this Scoping Report is to inform the PEDW and Statutory Consultees on relevant aspects of the Proposed Development prior to the formation of a formal Scoping Direction. The information contained herein is indicative only and several iterative alterations to the design and layout of the proposed energy project are likely to be considered before they are finalised prior to completion of the application documentation.

1.3.3 Regard has been made to Appendix 3: Environmental Impact Assessment of the guidance notes for DNS projects (*Guidance on Developments of National Significance – Appendix 3, EIA: PINs Wales March 2016*), which advises in more detail on information to inform a scoping request. The guidance advises that a Scoping Report should contain:

- an outline of the main alternatives considered and the reasons for selecting a preferred option;*
- results of desktop and baseline studies where available;*
- a record of consultation undertaken with relevant bodies (including any public engagement) to date;*
- referenced plans presented at an appropriate scale to convey clearly the information and all known aspects associated with the proposal;*
- guidance and best practice to be relied upon, and whether this has been agreed with the relevant bodies (for example the statutory nature conservation bodies or local authorities) together with copies of correspondence to support these agreements;*
- methods used or proposed to be used to assess impacts and the significance criteria framework used;*
- any mitigation proposed and the extent to which these are likely to reduce impacts;*

where impacts from consequential or cumulative development have been identified, how developers intend to assess these impacts in the ES (for example, a high level assessment of the grid connection where this does not form part of the Proposed Development for a power station);

- *an indication of any European designated nature conservation sites that are likely to be significantly affected by the Proposed Development and the nature of the likely significant impacts on these sites;*

key topics covered as part of developers' scoping exercise; and

- *an outline of the structure of the proposed ES*

1.3.4 Such information has been incorporated into this Scoping Report except where no relevant information is currently available.

1.3.5 It is stressed that this is an early stage in the project development and therefore only brief technical details and a provisional site boundary are provided. This is to allow comment and feedback from consultees, together with information from the environmental assessment, to guide the most appropriate design and layout of an energy project at this location.

1.4 EIA Competency

1.4.1 Part 5, Regulation 17 (4) of the EIA Regulations requires that: *"An environmental statement must (a) be prepared by persons who in the opinion of the relevant planning authority or the Welsh Ministers, as appropriate, have sufficient expertise to ensure the completeness and quality of the statement."* In this respect any developer for a DNS scheme is required under sub-paragraph (b) to include a statement regarding the expertise of the person (company) undertaking the EIA and composing the ES.

1.4.2 The Applicant has engaged Dulas Ltd, a renewable energy consultancy located in Machynlleth, Powys, with 40 years' experience of designing, planning and installing renewable energy schemes. Dulas has through its history managed the undertaking of in excess of 40 published ESs for renewable energy schemes throughout the UK and across a variety of different consenting regimes.

1.4.3 For a decade, Dulas has maintained the Quality Mark accreditation through the Institute of Environmental Assessment and Management (IFEMA). The accreditation is awarded annually subject to meeting a number of commitments, inclusive of reviews of key EIA personnel and ESs in order to ensure they meet the required standards.

- 1.4.4 Through maintaining the IEMA accreditation, Duas ensures it has the required competency to conduct and coordinate TIAs, resulting in the production of ESs which are routinely reviewed by EMA for their quality and accuracy.

2 The Site and the Proposed Development

2.1 Site Location

- 2.1.1 The Proposed Development lies within the administrative boundary of Neath Port Talbot County Borough Council (NPCTBC) (the LPA) and is located approximately 1km to the north west of Neath.
- 2.1.2 The site itself is located on Mynydd Drumau, a prominent landform between Skewen, Birchgrove and Bryncoch with Pontardawe being 2km north of the site, as shown on Figure 1.1.
- 2.1.3 The Proposed Development site extends to 290 hectares and consists of several parcels of land, irregular in size and comprising of agricultural fields which are a mix of grades 4 and 5. The development boundary is presented in Figure 1.2.
- 2.1.4 The Proposed Development land use is currently enclosed agriculture, comprising a series of fields bounded by dry stone walling, post and wire fencing and hedges. Small blocks of conifer are present around the periphery of the site. The altitude of the site ranges from approximately 120 to 276m at its most elevated points. As the Proposed Development is in a former coal mining region, a review of publicly available Coal Authority maps indicates that the site is surrounded by high risk development areas. Intrusive ground investigation works need to be undertaken, the results of which will be provided in the Appendix to Chapter 4: Project Description.
- 2.1.5 The closest large towns to the Proposed Development are Neath, approximately 1km to the south east, Swansea, approximately 5km to the south west and Port Talbot approximately 6km to the south east.
- 2.1.6 The closest villages to the Proposed Development are Birchgrove and Skewen, 0.3km west and 0.7km south respectively.
- 2.1.7 In terms of human settlement, the surrounding valleys to the east and west and the coastal plain to the south are densely populated.

2.2 Site Identification

- 2.2.1 Oedo were aware that the site had been previously assessed for its viability as a wind farm and subsequently refused principally on the grounds of landscape and visual assessment. Over the intervening 24 months, Oedo has engaged with local landowners in the farming community to assemble the appropriate development footprint required to install a utility scale solar and battery project on the same site.

- 2.2.2 Detailed desktop studies informed the initial understanding of technical and environmental constraints that were then examined further in a series of site visits and meetings with landowners to inform preliminary ground mounted solar designs for Meillon Solar Farm.

2.3 Project Description

- 2.3.1 The Applicant proposes to develop a solar PV electricity generating project with an installed generating capacity of approximately 150MW, and associated ancillary infrastructure including a substation.

- 2.3.2 The main components of a solar farm are:

- Solar panels and frames;
- Site Substation;
- Underground cabling;
- Battery energy storage system
- Access Tracks;
- Security fencing;
- CCTV;
- Transformers; and
- Inverters.

- 2.3.3 During construction temporary site compounds will be required to host staff facilities, take delivery of components and store plant and equipment securely when not in use.

- 2.3.4 It is not anticipated that significant groundworks are required for the development – support frame uprights are pile driven into the ground and string inverters are usually mounted onto the support frames while some excavation is required for the transformer's foundations.

- 2.3.5 The majority of the cabling will be run underground. There will use existing tracks where possible.

- 2.3.6 Several existing access points will be explored further and confirmed prior to the submission of the planning application.

- 2.3.7 A solar farm is temporary and fully reversible, with all equipment removed from the site at the end of the project's operational life (approximately 40 years). The methods used in construction mean that remediation work following the removal of panels and associated infrastructure are relatively minor and will return the site to its previous character.

- 2.3.8 The Proposed Development will be designed so that sheep can graze beneath and between the rows of panels, providing an efficient use of the land.

2.4 Consideration of Alternatives

- 2.4.1 The Applicant is pursuing development of a portfolio of renewable energy and energy storage projects across Wales. The two principal site identification and design considerations were the site's proximity to suitable grid infrastructure and the limited landscape and visual impact. For these reasons, the selection of this development site is shown to be an appropriate location for large-scale solar energy generation, and evidence of a more detailed site selection procedure should not be necessary in the EIA.
- 2.4.2 Details of the alternative designs considered for this development scheme, including the location and scale of energy infrastructure, alongside a description of the evolution of the design in response to site-specific, environmental and amenity factors, will be presented in detail in the ES.

3 Environmental Impact Assessment

3.1 General Assessment Approach

3.1.1 The assessment of each environmental topic will form a separate chapter of the E5. The EIA is based on a number of related activities, as follows:

- Establishing existing baseline conditions;
- Consultation with statutory and non-statutory consultees;
- Consideration of relevant local, regional and national planning policies, guidelines and legislation relevant to EIA;
- Consideration of technical standards for the development of significance criteria;
- Review of secondary information, previous environmental studies and publicly available information and databases;
- Physical surveys and monitoring;
- desk-top studies;
- reference to current legislation and guidance; and
- specialist opinion.

3.1.2 Each E5 assessment chapter will identify the potential impacts of the Proposed Development during the construction, operation and decommissioning phases and will identify robust mitigation for such potential impacts as and when appropriate. As well as identifying likely significant impacts, each will set out whether those impacts are positive or adverse, and explain how these conclusions are arrived at.

3.2 Mitigation and Net Gain

3.2.1 The mitigation of potentially adverse effects arising from the Proposed Development will, in the first instance, be inherent in the iterative design process followed during the EIA. Historic data and new baseline data will provide constraints to, and opportunities for, the location of all energy project infrastructure. This, along with the technical constraints and requirements of the solar panels and other energy requirements, will be used to design a solar farm scheme which seeks to reduce environmental impacts as required. The relative importance of each environmental constraint will be balanced with other salient issues, such as the ability to develop designs which can be constructed safely, and detailed proposals discussed with the

relevant consultees in order to arrive at a final design which minimises environmental impacts as far as is reasonably possible.

- 3.2.2 Where significant environmental impacts are still predicted to occur, site specific mitigation techniques, consistent with industry best practice will be developed in order to mitigate these.
- 3.2.3 Pertinent environmental enhancement programmes, such as with biodiversity, will be developed in conjunction with consultees that will seek to provide a net environmental benefit to the assets within the Proposed Development boundary in line with Criterion 5 of Policy 18 of Future Wales.

3.3 Proposed Scope of the EIA

- 3.3.1 A key step in the EIA process is to establish the scope of the assessment in a transparent manner. Consultation with relevant stakeholders is key to establishing scope and this scoping report is designed to provide stakeholders with sufficient information to form an opinion on the adequacy of the proposed scope, to ensure that any likely significant effects will be addressed by the EIA.
- 3.3.2 Based on information currently available regarding the Proposed Development, and an early review of information relating to the site undertaken on behalf of the Applicant, a judgement has been made by specialist assessors as to which areas should be 'scoped in' and 'scoped out' of the EIA.
- 3.3.3 Topics scoped into the EIA are likely, in the absence of mitigation, to have the potential to cause significant environmental effects. Conversely, those scoped out are unlikely to lead to significant effects (see Chapter 12). Where insufficient information is available at this time, a precautionary approach has been taken and the issue has been scoped in.
- 3.3.4 Further information regarding the reason for scoping in a topic area is given in the relevant chapter.

Environmental Topics Proposed to be Scoped into the EIA

- 3.3.5 Based on the assessments made by our specialist assessors, where the base line environmental information and potential environmental effects of the Proposed Development, the following technical topic areas are proposed to be scoped in:
 - Landscape and Visual;
 - Archaeology and Cultural Heritage;
 - Noise;
 - Ecology;

- Ornithology;
- Socio-economic;
- Transport; and
- Hydrology
- Geology/Coal Mining Risk Assessment/

Environmental Topics to be Scoped out of the EIA

3.3.6 The following topics have been scoped out, the rationale for which is included in Chapter 12

- Glint and Glare
- Agricultural Land Assessment

3.3.7 Areas within scoped in topics may also be scoped out and these will be within the relevant topic chapter.

Environmental Statement (ES) Structure:

3.3.8 The ES will comprise three volumes as set out in table below:

Table 3.3.1 Structure of the ES

Non-Technical Summary	
A separate document that summarises the ES using non technical language. This document will be available in both Welsh and English.	
Volume 1 – Written statement:	
Chapter 1	Introduction
Chapter 2	Assessment methodology and Significance Criteria
Chapter 3	Planning Policy Context
Chapter 4	Project Description
Chapter 5	Noise
Chapter 6	Landscape and Visual Amenity
Chapter 7	Ecology and Nature Conservation
Chapter 8	Ornithology
Chapter 9	Archaeology and Cultural Heritage
Chapter 10	Transport and Access
Chapter 11	Socio-economics

Chapter 12	Hydrology, Hydrogeology and Geology
Chapter 13	Air Quality and Climate Change
Volume 2 – Figures	
Including all figures and drawings to accompany the text	
Volume 3 – Appendices	
Including specialist reports which relate to the assessment chapters in Volume 1	

- 3.3.9 A confidential annex may be provided which would contain any sensitive, confidential information, e.g. ornithological information. Initial circulation will be restricted to NRW and RSPB, with circulation to other parties subject to agreement by both organisations.

Other documents

- 3.3.10 A separate Planning Statement will be prepared in support of the application for consent. The Planning Statement will not be part of the ES. It will discuss the relevant energy, environment and planning policies of relevance and assess the identified impacts against those. The Planning Statement will also set out the wider policy context for renewable energy development at the European and national levels.
- 3.3.11 In addition, the following supporting DNS application documents will be provided in order to fulfil regulatory requirements:
- Pre-application Consultation Report;
 - Design and Access Statement;
 - Outline CEMP; and
 - Outline Transport Management Plan

Structure of Technical Chapters

- 3.3.12 Each ES chapter will follow the headings set out below to ensure the final document is transparent, consistent and accessible.
- Introduction;
 - Planning Policy Context;
 - Assessment Methodology;
 - Baseline Conditions;
 - Likely Significant Effects;

- Mitigation Measures;
- Residual Effects;
- Cumulative Effects; and
- Summary

Cumulative and Combined Impacts

- 3.3.13 Cumulative effects are those that are insignificant on their own but can become significant when joint with other changes over time or in one location. In combination effects are those that originate from interactions between project and activities.
- 3.3.14 Relevant developments will be identified with the relevant advisors at NPTC3G and NRW for the purposes of the relevant topic-specific assessments, and at an advanced stage of the EIAs the cumulative baseline will be confirmed with these stakeholders. There are currently no known cumulative solar farm developments.
- 3.3.15 In order to be able to do this effectively the Applicant will seek to agree with the relevant consultees a cut-off date beyond which no further developments (e.g. revision to layouts, refusal, granting of consent, etc.) amongst other solar farms will be taken into account within the cumulative assessments of the various relevant chapters of the ES.
- 3.3.16 The way in which cumulative assessment will be dealt within each ES chapter is described in the relevant topics below.

4 Noise Assessment

4.1 Introduction

- 4.1.1 Ion Acoustics is appointed to advise on noise issues in relation to the Proposed Development, which comprises solar panels, battery storage units and associated electrical equipment such as inverters and transformers.
- 4.1.2 Solar farms are not normally considered noisy and the panels themselves do not generate any noise. However, various electrical components, such as inverters, transformers, and cooling systems within battery units, can emit low levels of noise. As such operational noise levels will be assessed against noise limits set to protect residential amenity. Operational noise will be predicted using computer modelling to determine noise levels at nearby noise-sensitive receptors.
- 4.1.3 Similarly, the transportation of equipment and components will increase noise levels on local roads and there can be some noise associated with pushing in, or driving the solar panel frame supports and other associated construction work. Similarly, some noise will be generated during decommissioning. However, any construction noises will be temporary and carried out during normal working hours only.
- 4.1.4 This Scoping chapter provides an initial commentary on construction and operational noise.

4.2 Legislative Provisions and Published Guidance

Technical Advice Note 11: Noise (1997) (TAN 11)

- 4.2.1 The current Welsh planning guidance in respect of planning and noise in Wales is TAN 11. With regards to a noise generating development, such as the case here, the document states: *“Local planning authorities must ensure that noise generating development does not cause an unacceptable degree of disturbance. They should also bear in mind that if subsequent intensification or change of use results in greater intrusion, consideration should be given to the use of appropriate conditions.*
- Noise characteristics and levels can vary substantially according to their source and the type of activity involved. In the case of industrial development, for example, the character of the noise should be taken into account as well as its level. Sudden impulses, irregular noise or noise which contains a distinguishable continuous tone will require special consideration. In addition to noise from aircraft landing and taking off, noise from aerodromes is likely to result from engine testing as well as ground movements. The impact of noise from sport, recreation and entertainment will depend to a large extent on frequency of use and the design of facilities.*

Advice on assessing noise and on factors to consider in relation to the major noise sources including roads, railways, airports, industrial and recreational noise and their measurement is given in Annex B.”

- 4.2.2 The principles set out above, such as considering the character of the noise as well as its absolute level, are broadly in line with the assessment principles of BS 4142:2014 +A1: 2019, which is discussed below. The link to BS 4142 is explicitly made in Section B17 of TAN 11, although it is noted that the version of the standard being referred to is now outdated. Section B17 is set out below.

“B17. The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the “rating level” defined in BS 4142. This “rating level” should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that, ‘A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance’. Since background noise levels vary throughout a 24 hour period, it will usually be necessary to assess the acceptability of noise levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the Proposed Development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233: 1987.”

BS 4142:2014 +A1: 2019

- 4.2.3 The standard method for assessing operational noise of a commercial or industrial nature affecting housing, is the current version of British Standard BS 4142:2014 “Method for rating and assessing industrial and commercial sound”. A BS 4142 assessment is typically made by determining the difference between the industrial noise under consideration and the background sound level as represented by the L_{A90} parameter, determined in the absence of the industrial noise. The L_{A90} parameter is defined as the level exceeded for 90% of the measurement time, representing the underlying noise in the absence of short duration noise events such as dog barks or individual cars passing.
- 4.2.4 Noise from the solar farm under consideration is assessed in terms of the ambient noise level, L_{Aeq} , but a character correction penalty can be applied where the noise exhibits certain characteristics such as distinguishable tones, impulsiveness or, if the noise is distinctively

intermittent. The ambient noise level, L_{Aeq} is defined as the steady-state noise level with the same energy as the actual fluctuating sound over the same time period. It is effectively the average noise level during the period. The industrial noise level (L_{Aeq}) with the character correction (if necessary) is known as rating level, L_A , and the difference between the background noise and the rating level is determined to make the BS 4142 assessment. The standard then states:

- “Typically, the greater the difference, the greater the magnitude of the impact.
- A difference of around -10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.”

4.2.5 The standard outlines a number of methods for defining appropriate ‘character corrections’ to determine the rating levels to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency.

4.2.6 The standard also highlights the importance of considering the context in which a sound occurs. Factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the existing acoustic character of the area should be considered when assessing the noise impact. The absolute sound level is of particular importance where the measured background sound levels are low, which is typically taken as L_{Aeq} 30dB and below. In regard to low sound levels, the standard states:

“Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.”

BS 8233: 2014 and WHO Guidelines

4.2.7 Examples of absolute noise limits can be found in British Standard BS 8233: 2014 and in the World Health Organisation (WHO) guidelines. These are detailed in Table 4.2.1 below.

Table 4.2.1: BS 8233: 2014 and WHO (1999) Noise Limits

Location	Critical Health Effect	07:00 to 23:00	23:00 to 07:00
Outside Bedroom Windows	Sleep Disturbance (Windows Open)	--	45dB L _{Aeq,9hr} ⁽¹⁾
Amenity Spaces (Gardens / Patios)	Moderate Annoyance Serious Annoyance	50dB L _{Aeq,16hr} ⁽²⁾ 55dB L _{Aeq,16hr} ⁽²⁾	--
Notes: (1) From WHO Community Noise Guidelines (1999) (2) BS 8233: 2014 and WHO Community Noise Guidelines			

- 4.2.8 The daytime limits apply to relatively anonymous noises without character and are commonly applied to traffic noise. The WHO night time threshold of 45 dB L_{Aeq,9hr} represents an 8 hour L_{Aeq} outside noise-sensitive rooms to prevent sleep disturbance. The WHO limit is a level at 1m from the facade. Therefore, the equivalent free field level would be approximately 3dB lower, that is 42 dB L_{Aeq}.

Construction and Decommissioning Noise

- 4.2.9 The following legislation and standards are of particular relevance to construction and decommissioning noise:

- The Control of Pollution Act 1974 (CoPA 1974);
- BS 5228: 2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites.

- 4.2.10 CoPA 1974 provides local authorities in England and Wales with powers to control noise and vibration from construction sites. Section 50 of the Act enables a Local Authority to serve a notice to a contractor of its requirements for the control of site noise. Section 61 of the Act allows for those carrying out construction work to apply to the Local Authority in advance for consent to carry out the works.

- 4.2.11 Construction noise can be assessed using British Standard BS 5228:2009 which provides a calculation method and general guidance on controlling noise and vibration from construction sites. This standard:

- Refers to the need for the protection against noise and vibration of persons living and working in the vicinity of and those working on construction sites;
- Recommends procedures for noise and vibration control in respect of construction operations; and

- Stresses the importance of community relations, stating that early establishment and maintenance of these relations throughout the site operations will go some way towards allaying people's fears.
- 4.2.12 There are no noise limits within the main text of BS 5228 and in fact, the preferred approach is to use best practicable means to reduce noise rather than setting limits. This means that everything practicable should be done to reduce noise. This strategy will be adopted here.
- 4.2.13 However, Annex E of the BS 5228-1 gives "example criteria for the assessment of the significance of noise effects" e.g. for use in Environmental Statements. For quiet areas, where the existing ambient noise levels are low, a significant noise effect is deemed to occur if the construction noise (plus the ambient noise) exceeds the following threshold values:
- 55 dB LAeq Daytime (07.00-19.00) and Saturdays (07.00-13.00)
 - 55 dB LAeq Evenings and Weekends (19.00-23.00 Weekdays, 13.00-23.00 Saturdays and 07.00-23.00 Sundays)
 - 45 dB LAeq Night-time (23.00-07.00)
- 4.2.14 These values can be used in a preliminary assessment to assess the significance of any construction works.
- 4.2.15 Noise can also occur during construction from traffic on local roads during the transportation of construction materials, solar panels and batteries. Where traffic data is available the increase in noise due to construction traffic can be calculated according to the Government guidance "The Calculation of Road Traffic Noise" (CRIN) and rated in accordance with the significance criteria stated in The Design Manual for Roads and Bridges (DMRB).
- 4.2.16 The acceptability of construction noise is likely to be affected by the location of the site relative to the noise sensitive premises; existing ambient noise levels; the duration and working hours of site operations; the characteristics of the noise produced and the attitude of local residents to the site operation.
- 4.2.17 Given that construction noise is generally not substantial and that it is a short term effect, occurring during the daytime, it is not always necessary to consider construction noise within the scope of an Environmental Impact Assessment (EIA).
- 4.2.18 It is therefore proposed that a construction/decommissioning noise assessment is scoped out of the EIA. This assumes that the solar panel frame supports would be pushed into the ground rather than impact driven, and that there is no other noisy activity such as blasting required. This would need to be confirmed by the client.

- 4.2.19 The local planning authority would confirm whether it is appropriate to scope out the construction and decommissioning noise assessments.

4.3 Baseline Conditions and Receptors

- 4.3.1 The proposed solar farm will be situated on fields on a hill side north of the village of Skewen. There will be some noise from the built-up areas to the south including the M4 motorway which is some 750 metres to the south of the southern site boundary. Other noise sources will include the wind blowing through trees and vegetation and potentially water running in streams.
- 4.3.2 Often with solar farms it is not necessary to carry out a noise survey as predicted noise levels are low enough to protect amenity irrespective of the background noise, especially as the sources are mainly operational during the daytime only. However, the cooling fans for the battery units and the battery inverters can operate at night and so consideration of night-time noise levels will also be required. For this application, preliminary modelling has been carried out which indicates that a background noise survey is not necessary as the predicted noise levels can meet absolute noise limits which are low enough to protect amenity irrespective of the background noise. This will be reviewed as the design develops. In the event that a survey is required, this would be carried out over a minimum 48 hour period to determine the variation in background noise levels at representative locations.
- 4.3.3 Various receptors have been identified following an inspection of various mapping sources as indicated in Table 4.3.1. A site visit will be carried out to confirm the locations.

Table 4.3.1 Nearby Receptors

Location	Easting	Northing	Approx Distance (m) to Site Boundary
Tir Abbey	272617	202024	693
Tŷ-y-graig	273084	200960	283
Leoge	272965	200507	195
Dyffryn Farm	273126	200235	265
White Cottages	272952	199604	278
Darran Court	272807	198691	251
Darran Farm	272751	198383	359
Drymma Farm	271995	197907	227
Newydd Drymmau (Nursing Home)	271347	197983	150
Gelli Deg Isaf	271103	198533	within
Glanbran Lane	271371	199506	228
Ci bran Farm	272020	199630	289
Tirmynydd Farm	271488	199928	324
Cwm Llynnau Uchaf	271423	200685	35
Llwyn erch Idwal	272171	200952	59

- 4.3.4 Gellieghalf Farm is within the site boundary and likely to be financially involved with the scheme. Nevertheless, a noise limit would be set to protect amenity, although this may differ from the limit at the other non-associated properties.

4.4 Assessment Methodology

Construction Noise

- 4.4.1 As discussed above a construction noise assessment, if required, would be carried out according to BS 5228 with noise limits set in accordance with the significance threshold in Annex E of that standard.
- 4.4.2 Construction traffic noise would also be assessed if required.

Operational Noise

- 4.4.3 Operational noise will be predicted using IVMI noise modelling software to determine noise levels at the nearest noise sensitive receptor locations. Within the modelling software, propagation of noise will be calculated in accordance with International Standard ISO 9613-2 with the following input parameters:

- Downwind propagation (noise levels under crosswind and upwind conditions will be less);
- Soft ground between the noise source and the receiver locations ($G = 1.0$);
- Ambient air temperature of 10°C and 70% Relative Humidity; and,
- Barriers and screening influence including the effect of the solar panels calculated in accordance with ISO 9613-2.

- 4.4.4 Noise information on the equipment will be taken from manufacturer's data where provided, and from library data used on previous assessments. In most cases, the manufacturer's information does not provide any information on tonality. However, it is known that inverters and transformers can produce tones. For the inverters, this would be generally high frequency tones which are readily dissipated by atmospheric absorption. Tonality will be considered in the noise assessment.

Operational Noise Limits

- 4.4.5 In instances of low rating noise levels, BS4142 indicates that assessment in line with absolute noise limits might be as, or more, appropriate than a relative assessment.

Night-time Noise Targets

- 4.4.6 To ensure the Proposed Development is not a significant or prohibiting factor in achieving the relevant WHO night-time values at sensitive residential receptors, noise generated by the development would need to be approximately 10dB below the guidance levels in Table 4.2.1.
- 4.4.7 Therefore, a target of 32 dB L_{Aeq} (free field) is proposed for the hours of darkness at residential receptors where background noise levels are otherwise low. This is set on the basis of the night-time noise limit to ensure that sleep is protected. Specifically, this is based on a value 10dB below the L_{Aeq} 45dB façade limit from WHO guidance, corrected for façade levels ($= 45 - 3 \cdot 10 = 32$). This limit is a low absolute level which will protect amenity irrespective of the background noise level.

Daytime Noise Target

- 4.4.8 During the daytime, given the presence of the motorway and the nearby urban areas, occasions when the background noise would be less than 30 dB L_{Aeq} would be rare. To avoid adverse impacts, BS 4142 advises that the rating level of the noise should not exceed a level of 5dB above the background noise (subject to context). Therefore the rating level should not exceed 35 dB L_{Aeq} . Again, this daytime limit is considered to be sufficiently low to protect amenity irrespective of the background noise level. The limit would also be applied to the early mornings during the summer from 5am when the solar farm might be operating.

4.5 Anticipated Noise Effects

Operational Noise

- 4.5.1 The Proposed Development is for a renewable energy facility. This will include the following noise generating equipment.

For the solar farm:

- 778 String inverter units; and,
- 36 solar transformers;

- 4.5.2 The string inverters and transformers will be distributed across the site. The string inverters will be installed behind panels. The panels therefore shield noise from the string inverters to some extent. The orientation of the panels ensures there is most shielding to the south and north whereas other directions are less shielded.
- 4.5.3 The nature of solar farms is such that electricity is only generated during daylight hours. This may extend into times considered to be part of the night (that is early mornings before 07:00

hours) and during evenings (after 19:00 hours) during the summer. Note that the early morning periods would often coincide with the dawn chorus. The solar farm would not be operational at the quietest times of the night, nor during the late evening when most people would be trying to get to sleep.

Battery Storage Area

- 10 Containerised Battery Units with Cooling Systems;
- 5 Battery Inverters / Transformers (Conversion Units), and
- Additional transformers switchgear and a substation with a distributed network operator (DNO) transformer.

4.5.4 The battery units would typically operate (discharge) at periods of peak demand. This is typically dark winter evenings when people have returned from work and are cooking. The batteries would be charged during periods of low demand or when the solar farm is at peak capacity. Note however the facility is required to be available on a 24-hour basis so that it is available to compensate for problems elsewhere in the grid. For most of the time, the batteries make no noise and the batteries are in a quiescent mode (neither charging nor discharging).

4.5.5 The noise predictions are presented in the first instance as a daytime noise contour plot in Figure 4.5.1 below, showing the predicted daytime noise levels (dB L_{Aeq}) and the nearest houses. The contours assume that all equipment is running at full capacity, which is only likely to occur in the middle of a sunny day when all plant is operating at 100%. The battery storage area is also assumed to be operational with the cooling fans on high cooling demand.

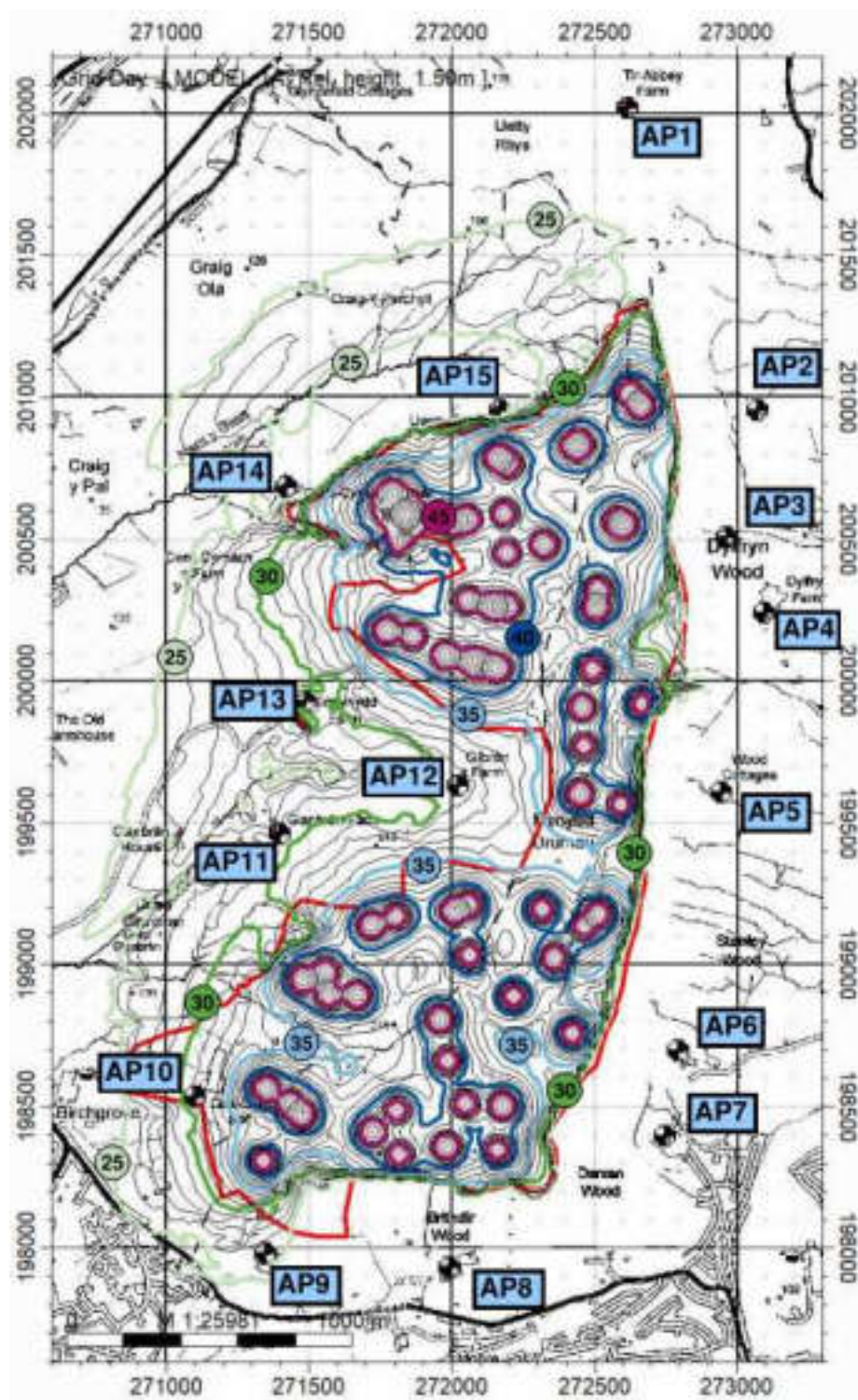


Figure 4.5.1 – Daytime Noise Contours

4.5.6 Predicted noise levels are no higher than 31 dB L_{Aeq} at Gelli-Deg Isa Farm and at the nearest third party receptor AP12 Gibran Farm.

- 4.5.7 The assessment does not include for tonality. However, in most cases, even where tones are audible close to the unit, they are not audible at large distances. If a 2dB tonal penalty is added for a just perceptible tone, then the BS 4142 rating noise levels (dB L_A) will be around 33 dB L_A. Therefore, on the basis of the preliminary assessment with all equipment running at 100% capacity, it is possible to meet the daytime absolute noise limits.
- 4.5.8 During the hours of darkness, it is assumed that the solar farm would not operate and as there will be cooler temperatures it is assumed the battery units can operate with reduced cooling demands. Noise levels will therefore be significantly lower and the proposed 32 dB L_A noise limit for the hours of darkness can also be met.
- 4.5.9 Therefore, on the basis of the preliminary calculations it is possible to meet absolute noise limits and baseline survey would not be necessary.

4.6 Mitigation

- 4.6.1 In principle, mitigation, where required, is best provided at source. A detailed assessment of the equipment noise levels will be carried out during the EIA stage to refine a mitigation strategy.
- 4.6.2 In addition, it will be relatively easy to provide a noise barrier around the battery compound where the battery units and the battery inverter units are located.
- 4.6.3 The string inverters on the solar farm are already screened by the panels but further information on the noise levels and the layout can be considered. The model would allow for even distribution of the noise sources around the site, but it will be possible to a certain extent to position the inverters and solar transformers away from the most sensitive properties to minimize the noise impact.
- 4.6.4 All of these factors will be considered during the EIA process.
- 4.6.5 In respect of construction and decommissioning noise, best practicable means can be used to control construction noise and a Construction Environmental Management Plan (CEMP) will be prepared detailing how environmental effects can be managed. This will include noise.

4.7 Assumptions, Limitations and Uncertainties

- 4.7.1 The prediction methodology in ISO 9613-2 is thought to be accurate to ±3dB but further uncertainty can occur in the source noise levels.
- 4.7.2 Further noise predictions will be made as the design develops. It will be assumed that equipment is running at 100% capacity which is only expected to occur during peak daytime periods. This will ensure a conservative assessment.

- 4.7.3 At present, it is not intended to address construction and decommissioning noise during the FIA as construction noise levels are temporary and noise occurs during the daytime only. However best practical means will be used to control construction noise.

5 Landscape and Visual Amenity

5.1 Introduction

- 5.1.1 A Landscape and Visual Impact Assessment (LVIA) of the Proposed Development will be conducted by AXIS. AXIS is a Registered Practice of the Landscape Institute, and AXIS staff have undertaken LVIA's of a range of major infrastructure developments, including commercial-scale solar scheme proposals in Wales, England and Scotland.
- 5.1.2 Landscape and visual effects are separate, although closely related and inter-linked issues. As such, the assessments of the effects of the Proposed Development upon the landscape and upon visual amenity will be carried out under separate headings within the LVIA.
- 5.1.3 The assessment of landscape effects will consider the potential effects of the Proposed Development on the landscape as an environmental resource. Landscape effects are caused by physical changes to the landscape, which may result in changes to the distinctive character of that landscape and how it is perceived.
- 5.1.4 The visual assessment will be concerned with the potential effects that may occur resulting from the Proposed Development upon the population likely to be affected. It will assess the change in visual amenity experienced by people arising from the presence of a development in the view.

5.2 Policy and Relevant Guidance

Legislation and Policy

- 5.2.1 The UK Government is a signatory of the European Landscape Convention (ELC), which became binding in March 2007. The Convention is aimed at the protection, management and planning of all landscapes and raising awareness of the value of a living landscape. It relates chiefly to public bodies and to the policies, plans and programmes produced by these.
- 5.2.2 The LVIA is a development specific process which accords with Article 6C of the ELC. The LVIA will be informed by extant landscape character studies (including LANDMAP) which more directly relate to the provisions of Article 6C, and which are described in more detail below.
- 5.2.3 The LVIA will also have regard to the requirements of relevant national and local level planning policies insofar as these relate to the potential landscape and visual effects of the Proposed Development.

Guidance and Best Practice

- 5.2.4 The LVIA will be carried out in accordance with good practice guidance provided within the GLVIA¹.
- 5.2.5 The LVIA will also follow the Landscape Institute's guidance regarding the production of visualisations².
- 5.2.6 The assessment of effects upon landscape character will accord with current guidance available via the Natural Resources Wales (NRW) website³.

5.3 Assessment Methodology and Significance Criteria

Introduction

- 5.3.1 The LVIA will be based on the published good practice guidelines set out in the GLVIA. A detailed methodology will be appended to the LVIA. A separate methodology describing how visualisation material (Zones of Theoretical Visibility (ZTVs) and photomontages) have been produced will also be appended to the LVIA.
- 5.3.2 The LVIA will aim to provide:
 - a clear understanding of the Site and its setting in respect of landscape character and visual amenity;
 - an understanding of the Proposed Development in terms of its relationship with the landscape character and visual amenity;
 - an identification of potential effects of the Proposed Development upon the landscape;
 - an identification of potential effects on visual receptors;
 - a description of any proposed mitigation measures; and
 - a conclusion as to the potential residual effects of the Proposed Development.
- 5.3.3 The LVIA process will follow a standard approach, namely:
 - the establishment of the baseline conditions (i.e. the existing character and sensitivity of the landscape, and the type and sensitivity of visual receptors;

¹ Landscape Institute and Institute of Environmental Management and Assessment, 3rd edition 2013. *Guidelines for Landscape and Visual Impact Assessment*. Routledge: Avington.

² Landscape Institute, 2019. *Visual Representation of Development Proposals. Technical Guidance Note 06/19*

³ <https://naturalresources.wales/guidance-and-advice/business-sector/planning-and-development/evidence-to-inform-development-planning/using-evidence-in-landscape-and-visual-impact-assessments-g146/rlang-en>

- the prediction of the magnitude of change that the Proposed Development will bring, allowing for design changes and mitigation measures, upon the landscape and upon visual receptors; and
- an assessment of the significance of effect that would occur, by considering the predicted magnitude of change, together with the sensitivity of the landscape or visual receptors.

5.3.4 Effects will be determined through use of professional judgement set within a structured framework, as recommended in the GLVA, and with details of the process followed to be set out in the methodology appended to the LVIA.

Study Area

5.3.5 The curvature of the earth and the refraction of light through the atmosphere influence what can be seen from any given location. Guidance produced by NatureScot (formerly Scottish Natural Heritage)⁴ in relation to wind farm visualisations, includes a formula that can be used to determine visibility in a flat landscape, as follows:

$$h = \frac{c^2}{2r} (1 - 2k)$$

where: h is the height correction in m
 c is the distance to the object in m
 k is the refraction coefficient (NatureScot state 0.075 as a reasonable average)
 r is the radius of the earth in m (NatureScot state 6,367,000m)

5.3.6 Using the formula above, it can be determined that in a flat landscape, the vertical correction for a 3.0m high solar panel is approximately 6.75km. I.e. the panels would not be theoretically visible beyond this distance when viewed from a similar elevation, although they may potentially be visible when viewed from different elevations.

5.3.7 The nature of the landform surrounding the Site is such that clear visibility is not anticipated from within the valley floors that surround Mynydd Drumau. However, views from the outer slopes of the valleys facing toward the Site, and the hilltops beyond these (which are at a similar or slightly higher elevation than the Site) are likely to be clear.

5.3.8 The Study Area for the LVIA is proposed to extend for approximately 5km from the Proposed Development (refer to Figure 3.1a for the extent of the Study Area). The proposed solar panels are small structures which will not be prominent at long distances. It is not considered that

⁴ Scottish Natural Heritage, 2017. *Visual Representation of Wind Farms version 2.2. Annex D* (page 49).

any visibility of the Proposed Development from distances greater than 5km would result in significant landscape and visual effects.

Significance Criteria

- 5.3.9 The purpose of EIA is to determine the likely significant effects of a development proposal. Not all landscape and visual effects arising as a result of a particular proposal will be significant. It should be noted that there is no statutory definition of what constitutes a significant effect and there is often not a single, definitive, correct answer as to whether an effect is significant or not. However, it is considered that a significant effect is one which is likely to be a material factor in the decision-making process. Where a significant effect is identified, this does not necessarily mean that such an effect is unacceptable to decision makers. The acceptability or otherwise of effects is a matter to be weighed in the planning balance alongside other factors. What is important is that the likely effects of any proposal are transparently assessed and described in order that the relevant determining authority can bring a balanced and well informed judgement to bear as part of the decision-making process.
- 5.3.10 The judgement for this particular LVA will be that greater than 'moderate' effects are more likely to be significant. This is because they would generally result from larger magnitudes of change on higher sensitivity receptors. This does not preclude a 'moderate' effect or lower being significant or a greater than 'moderate' effect not being significant. This judgement *will* depend on the specific circumstances being considered. The detailed methodology appended to the LVA will provide further details regarding the assessment of significance of effect, and as to how judgements relating to significance have been made.

5.4 Potentially Significant Effects and Approach to Mitigation

Baseline

The Site and its Surroundings

- 5.4.1 The Site of the Proposed Development is located on Mynydd Drumau, a locally prominent landform which straddles the boundary between the Neath Port Talbot and Swansea local authority areas. Mynydd Drumau is located north of Neath and north east of Swansea. It forms a hill or ridge, the crest of which runs north-south. The highest point of the hill is approximately 272m AOD.
- 5.4.2 Land use is enclosed agriculture, comprising a series of fields bounded by dry stone walls (some poorly maintained) and post and wire fencing in the majority of the Site, and by hedges in the less elevated western areas. Small blocks of conifer planting are also present.

- 5.4.3 There are no residential properties within the Site, and those located nearby are on the outer-facing slopes of the hill (hence with main views facing away from the Site).
- 5.4.4 The northern, eastern and southern slopes of the hill are very steep, whereas the western slopes (whilst still steep) are notably shallower. The eastern and southern slopes are densely wooded, and parts of this woodland (Coed Maesmolin to the south, and Stanley Wood to the east) are publicly accessible.
- 5.4.5 Several public rights of way run across the Site as follows:
- A bridleway runs along the crest of the ridge from north to south (within Neath Port Talbot);
 - A footpath runs through the site from east to west, crossing the above bridleway at Careg Bica (a standing stone) and continuing west to the local authority boundary;
 - A second footpath runs north-south from the above bridleway to meet the above footpath. This runs close to the eastern boundary of the Site and for much of its length passes through dense vegetation, making access difficult;
 - A bridleway runs into the Site from the west, meeting the above east-west footpath and then running northwards along the local authority boundary;
 - Two further footpaths run westwards from the above bridleway
- 5.4.6 The surrounding valleys to the east and west, and the coastal plain to the south are densely developed. Land to the north and north-east comprises a series of similar ridges. Operational wind farms are visible to the north and east.

Statutory Landscape Designations

- 5.4.7 The nearest statutory landscape designation to the Site is the Gower Area of Outstanding Natural Beauty (AONB), which is located approximately 11.8km to the south-west of the Site and separated from it by urban development in Swansea. At distances of this magnitude, it is clear that any change resulting from the Proposed Development (if indeed visible) would not materially affect the statutory purposes and special qualities of the designation.

Non-Statutory Landscape Designations

- 5.4.8 NPTCBC maintain a Special Landscape Area designation supported by local planning policy. SLA1: Mynydd y Carth SLA is approximately 2.1km to the north-west of the Site. SLA2: Dulais Valley is approximately 2.9km to the east of the Site.

- 5.4.9 Policy EN2 of the *Neath Port Talbot Local Development Plan*⁵ which underpins the designation is very clearly concerned with development within the designation boundary only.
- 5.4.10 Swansea Council also maintain a similar SLA designation. The Vawr Uplands SLA is approximately 2.4km west of the Site. Policy ER5 of the *Swansea Local Development Plan*⁶ is again very clearly concerned with development within the designation boundary only.
- 5.4.11 Nevertheless, the presence of the SLA designations within both local authority areas is indicative of landscapes of higher quality within the Study Area, and the LVIA will include an appraisal of how the Proposed Development would affect the features and characteristics of each SLA within the Study Area, based upon data set out in the *Landscape and Seascope Supplementary Planning Guidance*⁷ and in *Review of Landscape Designations in Swansea*⁸.

Landscape Character

- 5.4.12 48 National Landscape Character Areas (NCLA) have been identified across Wales by Natural Resources Wales (NRW). The Site is located within NCLA37: South Wales Valleys, close to the boundary with NCLA38: Swansea Bay.
- 5.4.13 Key characteristics of NCLA37 are:
- Extensive upland plateaus;
 - Numerous steep-sided valleys;
 - Ribbon urban and industrial areas in valleys;
 - Extensive remains of heavy industry;
 - Contrast of urban valley activity next to quiet uplands;
 - Large blocks of coniferous plantation and deciduous woodland fringes;
 - Heather, rough grassland and steep bracken slopes;
 - Improved pastures on some lower valley sides;
 - Field boundaries;
 - Transport routes restricted to valleys;
 - Iconic cultural identity.

⁵ Neath Port Talbot County Borough Council, adopted 2016. *Local Development Plan (2011-2025)*

⁶ Swansea Council, adopted 2019. *Swansea Local Development Plan 2010-2025*

⁷ Neath Port Talbot County Borough Council, 2018. *Landscape and Seascope Supplementary Planning Guidance*

⁸ Swansea Council, 2012. *Review of Landscape Designations in Swansea*

5.4.14 Key characteristics of NCLA38 are:

- Narrow coastal plain;
- Estuaries;
- Extensive soft coastlines;
- Setting of steeply rising hills;
- Coal measures;
- Limestone outcrops;
- Major glacial moraine deposits by estuaries;
- Urban areas;
- Heavy industry;
- Major transport corridor;
- Ports and docks;
- Historically strategic location;
- Agriculture;
- Rural settlement along roads

5.4.15 The broad geographic reach of the NCLAs means that the key characteristics identified as typical of a particular character area may not necessarily apply to a specific location within that character area. However, they do provide background context for more detailed studies and assessments.

5.4.16 The *Neath Port Talbot Landscape Assessment*⁵ provides a more detailed local level landscape characterisation. The Site is located within Character Area 38: Mynydd Drumau. Key characteristics include:

- Dominant landform, creating a shoulder between the Tawe and Neath Valleys, ranging from 50m AOD to 272m AOD;
- Predominantly coniferous cover with significant pine cover;
- Ridge top and lower reaches of the area are pasture;

⁵ White Consultants, 2004. *Neath Port Talbot LANDVIA¹ Landscape Assessment*. Neath Port Talbot County Borough Council

- Boundaries are dominated by hedges, frequently overgrown at lower elevations;
- Exposed rock on higher ground;
- Significant multi period archaeological sites

5.4.17 No extant characterisation documents published by Swansea Council were identified.

5.4.18 LANDMAP is the formally adopted methodology for landscape assessment in Wales. The use of LANDMAP data as part of LVIA is informed by guidance available via the NRW website¹⁰.

This guidance states that:

"Assessors carrying out LVIA need to judge the appropriate scale of reporting for the development, which may not always be the reporting scale of LANDMAP. For example, a housing proposal may need smaller reporting units whereas a wind farm may need larger ones.

We recommend that LANDMAP is used as the starting point for creating suitably scaled character-based reporting units. Reporting units may be LANDMAP visual and sensory aspect areas, where these are not entirely suitable, other LANDMAP aspect layers can be used to assist with the subdivision or amalgamation of visual and sensory aspect boundaries. Following good practice in landscape character assessment, further detail, refinement, updating and field work should be included when confirming reporting unit boundaries.

LANDMAP surveys provide a basic level of detail about the key characteristics, qualities and values of each aspect area. This will be insufficient for the needs of LVIA and further assessment with field work will be required. Good practice in landscape character assessment and in identifying key views and visual resources will be required to gain sufficient understanding at the right scales to make judgements of effects in LVIA.¹¹

5.4.19 As such, a review of all extant LANDMAP data and all extant characterisation studies applicable to the Study Area will be undertaken as part of the LVIA process. The intended outcome of this process would be to identify a series of consistent character areas that are appropriate in scale for the LVIA and which can be used as a baseline against which the effects of the Proposed Development can be assessed. Details of this process would be appended to the LVIA.

¹⁰ <https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/evidence-to-inform-development-planning/using-landmap-in-landscape-and-visual-impact-assessments-gn16/?lang=en> [accessed 13 Sep 2022]

Zone of Theoretical Visibility

- 5.4.20 The ZTV of the Proposed Development is presented on Figures 5.1a-b). As a development layout has not been drawn up at this stage of the project, for the purposes of Section 5 of the Scoping report, it has been assumed that solar panels could be located across the majority of Site, and therefore modelling for the ZTV has been undertaken on this basis. Colour banding is used to differentiate between locations where more, or fewer solar panels are predicted to be visible.
- 5.4.21 The ZTV was produced using a Free 2m LiDAR Digital Surface Model (DSM) available from National Resources Wales (NRW) via the LIDAR online mapping portal¹⁰. The data was captured in 2017. The ZTVs reflect the theoretical visibility of 3m high solar panels.
- 5.4.22 The ZTV produced using the DSM reflects the presence of screening features in the landscape. However, it does not distinguish between the ground surface and the surface of structures and vegetation. As a consequence, the ZTV output may indicate visibility from areas known to be occupied by woodland and buildings (i.e., views from treetops and roofs). Ordnance Survey open mapping data (OS Zoomstack Wood and) datasets have been added to the ZTV figures, to mask out mapped areas of tree cover and buildings.

Viewpoints

- 5.4.23 The LVIA will include a detailed assessment of visual effects from a series of pre-determined viewpoint locations. A provisional list of viewpoints is set out below (with locations indicated on Figures 5.1a-b), with the intention that a final list be agreed with consultees following receipt of comments (and any further post scoping consultation that is required).
- 5.4.24 Viewpoints fall into three categories, as set out in the GLVIA:
- Representative viewpoints (which represent the experience of different types of receptors in the vicinity);
 - Specific viewpoints (a particular view, for example a well-known beauty spot); and
 - Illustrative viewpoints (which illustrate a particular effect/issue, which may include limited lack of visibility)
- 5.4.25 It should be noted that the viewpoint itself is not the receptor. Rather it is the people that would be experiencing the view from it. People within the Study Area that are likely to experience views of the Proposed Development include:
- ♦ Local residents;

¹⁰ <https://lidar.nrw.gov.uk/> LIDAR data is being migrated to this Map Wales

- Users of public rights of way, and other routes/ land with public access;
- Road users

5.4.26 The LVIA will include a series of photographs from view points representative of this range of receptors. Photomontages and/ or other illustrative material will be prepared from specific key locations (but not necessarily from every view point included in the LVIA).

Table 5.4.1 Viewpoint Locations

Viewpoint	Location	Receptor Type
1: Cwm-bach Road	Minor road on Hills De approximately 3.2 km east of Site	Representative of the views available to road users
2: Lygad-yr-haul, Neath	Suburban street towards the eastern edge of Neath, approximately 2.35km from the Site	Representative of the views available to local residents
3: Cirila Common	Public open space, in suburban area towards the south-eastern edge of Neath, approximately 4.1 km from the Site	Representative of the views available to local residents, and users of the public open space
4: The Park, Neath	Public open space, toward the western edge of Neath, approximately 1.14km south of Site	Representative of the views available to local residents, and users of the public open space
5: Cefn Hengoed Road, Swansea	Road at the edge of a residential area in south eastern Swansea, approximately 3.36km south west of Site	Representative of the views available to local residents
6: Morston Park, Swansea	Public open space in suburban area towards the north of Swansea, approximately 4.5km west of Site	Representative of the views available to local residents, and users of the public open space
7: Mynydd Gelli-wasted	Open land which is easily accessible from nearby settlement, approximately 3.3km west of Site	Representative of the views available to walkers
8: Cwm Clydach Walk, Mynydd Gellionnen	Long distance footpath, approximately 3.6km north-west of Site	Representative of the views available to walkers
9: Bridgeway west of Site	Public right of way, approximately 750m from Site	Representative of the views available to walkers and riders

Viewpoint	Location	Receptor Type
10: Hiral A Fred Wallace, Rhos	Suburban street towards the eastern edge of Neath, approximately 2km north of the Site	Representative of the views available to local residents
11: Bridleway, within Site	Public bridleway running through the northern part of the Site	Representative of the views available to walkers and riders
12: Bridleway, within Site	Public bridleway running through the southern part of the Site	Representative of the views available to walkers and riders

Design Mitigation

5.4.27 Details of how landscape and visual matters have informed the development of the final solar farm layout will be described in the IMIA.

5.4.28 It is likely that a series of measures would be embedded into the design of the Proposed Development, which are likely to include:

- Changes to the layout of solar panels to reduce visual prominence;
- Provision of new planting to screen views or otherwise reduce visibility;
- New planting, and/ or enhanced management of existing features to improve landscape character.

5.4.29 In some cases, proposed landscape and visual mitigation may also dovetail with mitigation proposed in relation to other disciplines. For example, proposed new planting may also provide ecological mitigation.

Impact Prediction and Mitigation

5.4.30 Potentially significant effects are likely to arise from:

- The introduction of the proposed solar panels and associated ancillary structures;
- The views of these from the public rights of way running through the Site;
- The views of the Proposed Development from the surrounding area;
- The influence of the Proposed Development upon the character of the surrounding landscape;
- The effects of construction activities upon views and upon landscape character.

- 5.4.31 The Proposed Development is likely to be a prominent addition to views from the public rights of way which run through the Site. As noted above, mitigation measures would be included in the design of the Proposed Development to mitigate against these potentially significant visual effects.
- 5.4.32 Mitigation measures would also be included in the design of the Proposed Development in order to reduce potential effects upon the surrounding area, both in terms of effects upon landscape character and visual effects.

Cumulative Assessment

- 5.4.33 The LVIA set out in the ES will consider the cumulative landscape and visual effects of the Proposed Development. This will consider two development scenarios. Firstly, the cumulative effects of the Proposed Development were introduced into a baseline where existing (including schemes currently under construction) and consented solar farms are present. Secondly, the cumulative effects of the Proposed Development were introduced into a baseline where existing (including schemes currently under construction), consented and other proposed solar farms are present. Cumulative effects upon the landscape fabric, landscape character and upon views will be considered. The assessment will follow the same process as for the main LVIA. Conclusions will be made using professional judgement informed by reasoned justification.

6 Ecology and Nature Conservation

6.1 Introduction

6.1.1 The Ecological Assessment of the Proposed Development, on flora and fauna (birds are considered separately under Section 7) will be conducted by RSK ADAS Ltd. ADAS has worked on the Ecological Impact Assessment (EclA) of more than 10 large solar farm proposals. All of these EclAs have encompassed the full range of relevant surveys (e.g. vegetation, ornithology, bats, otter, water vole, dormouse, badger, great crested newt) as well as ancillary surveys underpinning ecology (e.g. peat assessment). All of the ADAS proposed surveyors for this project have extensive experience of standard and accepted survey methodologies.

6.2 Policy and Relevant Guidance

6.2.1 An analysis of the legislative and policy framework relevant to the EclA is presented below.

Table 6.2.1: Relevant legislation and planning policy – Ecology

Scale	Legislation/ Planning Policy	Description
	Natura 2000	Natura 2000 is a network of core breeding and resting sites for rare and threatened species, and some rare natural habitat types which are protected in their own right. Sites are present across all 27 member states as well as the United Kingdom, owing to the UK's membership of the European Union at the time of inception. Sites comprise a combination of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), designated for species or habitats valued at a European level.
National	The Wildlife and Countryside Act 1981 (as amended) (WCA)	This piece of legislation remains the primary UK mechanism for statutory site designations (e.g. Sites of Special Scientific Interest, SSSI) and the protection of individual species listed under Schedules 5 and 8 of the Act, each subject to varying levels of protection.
	Protection of Badgers Act 1992	Affords protection to individual badgers from disturbance, injury or killing, and protects their sets from interference.
Regional	Future Wales – The National Plan 2040	Future Wales is the national development framework, setting the direction for development in Wales to 2040. It is a development plan with a strategy for addressing key national priorities through the planning system, including sustaining and developing

Scale	Legislation/ Planning Policy	Description
		a vibrant economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of our communities. Policy 18, Criterion 5 requires that all renewable energy Developments of National Significance (DNS) must include enhancement measures to provide a net benefit to biodiversity.
	Planning Policy Wales Chapter 6: Distinctive and Natural Places (11th ed. 2021)	Chapter 6 of Planning Policy Wales (PPW) sets out the Welsh Government's objectives for Biodiversity and Ecological Networks among other environmental and cultural components of 'Placemaking'. In particular, the Biodiversity and Ecological Networks section puts emphasis on planning authorities to have regard for the State of Natural Resources Report (SoNaRR) and Area Statements published by NRW. In this sense PPW now requires information of ecosystem resilience as well as protected and priority species as outlined by Section 6 and Section 7 of the Environment (Wales) Act 2016.
	Technical Advice Note (TAN) 5 Nature Conservation and Planning (2009)	Technical Advice Note 5 (TAN5) contains a set of principles which includes integrating nature conservation into all planning decisions and for development to provide a net benefit for biodiversity conservation in Wales with no significant loss of habitat or populations of species, locally or nationally.
	The Environment (Wales) Act 2016	The act makes provisions within Wales for the planning and managing of natural resources at national and local level. Section 5 of the act introduces the biodiversity and resilience of ecosystems duty whereby public authorities are required to seek to maintain and enhance biodiversity so far as it is consistent with the proper exercise of those functions. Section 7 of the act introduces a list of living organisms and types of habitat, known as Species or Habitats of Principal Importance, in Wales which are considered of key significance to sustain and improve biodiversity.
	The Countryside and Rights of Way (CROW) Act 2000	This legislation strengthens the provisions of the 1981 Wildlife and Countryside Act, both in respect to statutory sites such as Sites of Special Scientific

Scale	Legislation/ Planning Policy	Description
		Interest (SSSIs) and protected species. It also places a statutory obligation on Local Authorities and other public bodies to further the conservation of biodiversity in the exercise of their functions, thus providing a statutory basis to the Biodiversity Action Plan (BAP) process which began in 1994. Section 74 of the Act lists the habitat types and species of principal importance in England.
Local	Neath Port Talbot Council – Local Development Plan 2011 – 2026	
	SP15 – Biodiversity and Geodiversity	Important habitats, species and sites of geological interest will be protected, conserved, enhanced and managed through the following measures: 1. The identification of the following Internationally and Nationally designated sites within the County Borough. To enable their protection: (a) Special Areas of Conservation (SACs) and Ramsar Sites; (b) Sites of Special Scientific Interest (SSSIs); (c) National Nature Reserves (NNRs). 2. The identification and protection of sites of regional and local importance; 3. The protection of important natural heritage features.
	EN6 – Important Biodiversity and Geodiversity Sites	Development proposals that would affect Regionally Important Geodiversity Sites (RIGS), Local Nature Reserves (LNRs), Sites of Interest for Nature Conservation (SINCs), sites meeting SINC criteria or sites supporting local Biodiversity Action Plan (LBAP) or 542 habitats or species [new Section 7 habitats and species] will only be permitted where: 1. They conserve and where possible enhance the natural heritage importance of the site; - Or 2. The development could not reasonably be located elsewhere, and the benefits of the development outweigh the natural heritage importance of the site. Mitigation and or

Scale	Legislation/ Planning Policy	Description
		compensation measures will need to be agreed where adverse effects are unavoidable.
	EN7 Important Natural Features	Development proposals that would adversely affect ecologically or visually important natural features such as trees, woodlands, hedgerows/field boundaries, watercourses or ponds will only be permitted where: 1. Full account has been taken of the relevant features in the design of the development, with measures put in place to ensure that they are retained and protected wherever possible; or 2. The biodiversity value and role of the relevant feature has been taken into account and where removal is unavoidable, mitigation measures are agreed.
	SP26 – Environmental Protection	Air, water and ground quality and the environment generally will be protected and where feasible improved through the following measures: 1. Ensuring that proposals have no significant adverse effects on water, ground or air quality and do not significantly increase pollution levels; 2. Giving preference to the development of brownfield sites over greenfield sites where appropriate and deliverable; 3. Ensuring that developments do not increase the number of people exposed to significant levels of pollution.

6.2.2 The key legislation for individual species that are relevant to this EclA scoping report is summarised in Table 6.2.2.

Table 6.2.2: Species-specific legislation

Species	Legislation
Plants	Section 13 (Schedule 8) of the Wildlife and Countryside Act (WCA) and Regulations 46-52 (Schedule 5) of the Conservation of Habitats and Species Regulations 2017 (as amended) identify measures for the protection of wild plants. The legislation together protects all plants listed on both Schedules of both pieces of legislation against: > Intentionally picking, collecting, cutting, uprooting or destroying a wild plant; > Selling, offering or exposing for sale, or having in possession or transporting for the purpose of sale, any live or dead wild plant included in the Schedules, or any part of, or anything derived from, such a plant; or > Publishing or causing to be published any advertisement likely to be understood as conveying that he buys or sells, or intends to buy or sell, any of those things. Enforcement provisions of the WCA were extended by the Countryside Rights of Way Act 2000 (CROW), Section 81 and Schedule 12. Section 14 of the WCA prohibits the planting in the wild of plants listed in Part 11 of Schedule 9 or otherwise causing them to grow there. This includes (amongst others) Himalayan balsam <i>Impatiens glandulifera</i> and Japanese knotweed <i>Fallopia japonica</i>.
All species of British bat <i>Chiroptera</i> sp.	All British species of bat are listed on Schedule 2 'European Protected Species of Animals' of the Conservation of Habitats and Species Regulations 2017 (as amended), and as such are known as European Protected Species (EPS). In addition, all British bats are protected under Section 9 (Schedule 5) of the WCA and eight species are listed on Section 7 of the Environment (Wales) Act 2016. In summary, the above legislation collectively prohibits the following: > Deliberate capture, injury or killing of a bat. In court, 'deliberate' is likely to be interpreted as someone who, although not intending to capture/injure or kill a bat, performed the relevant action whilst being sufficiently informed and aware of the consequence their actions will most likely have; > Intentional or reckless disturbance of a bat in its roost or deliberate disturbance of a group of bats; > Damage or destruction of a bat roosting place (even if bats are not occupying the roost at the time);

Species	Legislation
	> Possession or advertisement/sale/exchange of a bat (dead or alive) or any part of a bat; or > Intentional or reckless obstruction of access to a bat roost. Licences are issued by NRW for any actions that may compromise the protection of an FPS, including bats, under the Conservation of Habitats and Species Regulations 2017 (as amended). This includes all developments and engineering schemes, regardless of whether or not they require planning permission.
Hazel dormouse <i>Muscardinus avellanarius</i>	Hazel dormouse are an FPS and also fully protected under Schedule 5 of WCA. This makes it an offence to: > Capture, kill, disturb or injure hazel dormouse (on purpose or by not taking enough care); > damage or destroy a breeding or resting place (deliberately or by not taking enough care) > obstruct access to their resting or sheltering places (deliberately or by not taking enough care) > possess, sell, control or transport live or dead hazel dormouse, or parts of dormouse. Licenses are issued by NRW for any actions that may compromise the protection of an FPS including hazel dormouse, under the Habitats Regulations 2017. This includes all developments and engineering schemes, regardless of whether or not they require planning permission.
Eurasian badger <i>Meles meles</i>	Badgers are subject to legislation contained within the Protection of Badgers Act 1992. This means that it is unlawful to kill, capture, disturb or injure any individual or intentionally damage, destroy or obstruct an area used for breeding, resting or sheltering by badgers.
Water vole <i>Arvicola amphibius</i>	The water vole is fully protected under Schedule 5 of the WCA and is a priority conservation species. This makes it an offence to: > Intentionally capture, kill or injure water voles; > damage, destroy or block access to their places of shelter or protection (on purpose or by not taking enough care); > disturb them in a place of shelter or protection (on purpose or by not taking enough care); or > possess, sell, control or transport live or dead water voles or parts of them (not water voles bred in captivity). Licences are not issued for 'development' under WCA by NRW. However, with the application of sufficient measures to avoid harm and

Species	Legislation
	preparation of a working method statement for the construction period, then it is unlikely that incidental offences will occur. This applies to both permitted development and development requiring planning permission.
Otter <i>Lutra lutra</i>	Otters are an EPS and also fully protected under Schedule 5 of the WCA. This makes it an offence to: > Capture, kill, disturb or injure otters (on purpose or by not taking enough care); > damage or destroy a breeding or resting place (deliberately or by not taking enough care); > obstruct access to their resting or sheltering places (deliberately or by not taking enough care); or > possess, sell, control or transport live or dead otters, or any part of an otter. Licences are issued by NRW for any actions that may compromise the protection of an EPS including otters, under the Conservation of Habitats and Species Regulations 2017 (as amended). This includes all developments and engineering schemes, regardless of whether or not they require planning permission.
Great crested newt <i>Triturus cristatus</i>	Great crested newt (GCN) are an EPS and fully protected under Schedule 5 of the WCA. This makes it an offence to: > Capture, kill disturb or injure a GCN (deliberately, or by not taking enough care); > damage or destroy a breeding or resting place, both pond and terrestrial (deliberately, or by not taking enough care); > obstruct access to their resting or sheltering places, both pond and terrestrial (deliberately, or by not taking enough care); or > possess, sell, control or transport live or dead GCN, or parts of a GCN. Licences are issued by NRW for any actions that may compromise the protection of an EPS, including GCN, under the Conservation of Habitats and Species Regulations 2017 (as amended). This includes all developments and engineering schemes, regardless of whether or not they require planning permission.

6.3 Study Area and Zone of Influence

6.3.1 The assessment conducted for this report has considered the area in which ecological features could be subject to significant effects from the Proposed Development. The area of the

potential effects is often wider than the actual perimeter of the development site and is known as the Zone of Influence (ZOI).

- 6.3.2 The ZOI varies for different ecological features and each designated site, habitat and species has been considered in relation to their sensitivity to the Proposed Development.
- 6.3.3 A 250m ZOI was considered with respect to GCN. It is unlikely that GCN are present at the site, as the area is outside the recognised range for this species and also at a higher altitude than the species is normally found. However, taking a precautionary approach, the species was considered and 250m is the standard recognised radius from a breeding pond that this species is found.

6.4 Assessment Methodology

Scope

- 6.4.1 The EcIA will follow guidelines developed by The Chartered Institute of Ecology and Environmental Management (CIEEM, 2018). These guidelines aim to promote good practice in EcIA relating to terrestrial, freshwater, coastal and marine environments in the UK and Ireland. The Biodiversity: Code of practice for planning and development published by the British Standards Institute (BS 42020:2013) cites the CIEEM EcIA Guidelines as the acknowledged reference on ecological impact assessment. The Guidelines are consistent with the British Standard on Biodiversity, which provides recommendations on topics such as professional practice, proportionality, pre-application discussions, ecological surveys, adequacy of ecological information, reporting and monitoring.
- 6.4.2 The guidelines state that EcIA is a process of identifying, quantifying and evaluating potential effects of development related or other proposed actions on habitats, species and ecosystems. The findings of an assessment can help competent authorities understand ecological issues when determining applications for consent. EcIA can be used for the appraisal of projects of any scale including the ecological component of Environmental Impact Assessment (EIA). When undertaken as part of an EIA, EcIA is subject to the relevant EIA Regulations. Unlike EIA, EcIA on its own is not a statutory requirement. It is an evaluation process undertaken to support a range of assessments. EcIA is a process that is most effective if all contributing ecologists and other specialists work in collaboration. An EcIA report (or the ecological chapter of an EIA Environmental Statement (ES)) should clearly and simply describe the significant effects of any project so that all interested parties understand the implications of what is proposed. The Guidelines explain the key elements of the EcIA process. Key to this is a scientifically rigorous and transparent approach. EcIA should be undertaken by qualified

professionals with an appropriate level of experience in ecological survey and impact assessment who are recognised by a relevant professional body such as CIfEM.

6.4.3 The CIEEM guidelines list the following principles that underpin EcIA:

- **Avoidance.** Seek options that avoid harm to ecological features (for example, by locating on an alternative site).
- **Mitigation.** Negative effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation.
- **Compensation.** Where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
- **Enhancement.** Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

Determining Importance

6.4.4 The importance of the features on site are assessed and defined in a geographical context (see Table 6.4.1). The frame of reference for the habitat features in terms of their geographical importance is in line with guidance set out in CIEEM, 2018.

6.4.5 Species are assessed, where appropriate, against best practice guidelines.

Table 6.4.1: Definitions of nature conservation value for ecological features

Level of Value	Reference	Examples
Very High	International	Very high importance and rarity, international scale and limited potential for substitution. ➤ An internationally designated site or candidate site (SPA, SAC, Ramsar Site, Biosphere reserve or an area which NRW has determined meets the published selection criteria for such designation), irrespective of whether or not it has yet been notified. ➤ Internationally significant and viable areas of a habitat type listed in Annex 1 of the Habitats Directive. ➤ Regularly occurring globally threatened species (i.e. international Union for Conservation of Nature – Red-listed) or species listed on Annex 1 of the Bern Convention. ➤ Regularly occurring populations of internationally important species that are rare or threatened in the UK or of uncertain conservation status.

Level of Value	Reference	Examples
		➤ A regularly occurring nationally significant population/number of any nationally important species.
High	National/ Regional (Wales)	High importance and rarity, national scale and limited potential for substitution. ➤ A nationally designated site, e.g. SSSI, National Nature Reserve (NNR) or a discrete area which meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether it has yet to be notified. ➤ A viable area of a Section 7 Environment Act Habitat of Principal Importance or of smaller areas of such habitat that is essential to maintain the viability of a larger whole, this could include a network of ancient species-rich hedges or even small groups of ancient trees. ➤ A regularly occurring significant population/number of any nationally important species i.e. listed on the WCA 1981 (as amended). ➤ Any regularly occurring population of a nationally important species that is threatened or rare in the county or region.
Medium	County (Neath – Port Talbot)	High or medium importance and rarity, regional scale, limited potential for substitution. ➤ Regional/county significant and viable areas of key habitat identified as being of regional value. ➤ Any regularly occurring significant population of a species listed as being nationally scarce, or in the LBAP or relevant Natural Area on account of its regional rarity or localisation. ➤ Significant populations of a regionally/county important species. ➤ Sites such as Sites of Importance for Nature Conservation (SINC) selected on Regional/County criteria. ➤ Any regularly occurring significant population that is listed in a Local Red Data (RDB) or BAP on account of its rarity or localisation.
Low	Local	Low or medium importance and rarity, local scale. ➤ Areas identified in a LBAP or in the relevant natural area profile.

Level of Value	Reference	Examples
		➤ Sites/features that are scarce within the locality or which appreciably enrich the local area's habitat resource. ➤ A diverse and/or ecologically important valuable hedgerow network. ➤ Diverse and/or ecologically valuable grassland. ➤ A significant population of a local important species i.e. listed on a LBAP. ➤ Species populations of local importance.
Negligible		Very low importance and rarity, local scale. ➤ Areas of habitat considered to appreciably enrich the habitat resource within the context of the Parish or Neighbourhood. ➤ An occasional occurrence or small population of a locally scarce species.

Characterising Potential Impacts

6.4.6 The descriptions in Table 6.4.1 are used to categorise the geographical 'importance' of species and habitats. In characterising potential impacts, the term 'ecological integrity' is used, as defined by the Office of the Deputy Prime Minister (ODPM) Circular 06/2005 on Biodiversity and Geological Conservation (ODPM, 2005) where the integrity of a designated site refers to "coherence of ecological structure and function that enables it to sustain the habitat, complex of habitats and/or levels of populations of species for which it was classified".

6.4.7 For species and for non-designated habitats, the ODPM Circular (and CEFM guidance) refers to 'conservation status'. The Circular states (in Part V, Paragraph 96) that species and habitats are normally legally protected because of their vulnerable conservation status (i.e. the sum of the influences acting on the species concerned that may affect the long term distribution and abundance of its populations). Conservation status is thus a key concept in the assessment of effects on species and non-designated habitats. The judgement on the severity of effects was based on a combination of the following: knowledge of the requirements of the species or habitat in question, and an evaluation of the effect itself. In describing the effects, reference was made to the following factors:

- Confidence in predictions;
- Spatial extent of effect;
- Temporal extent of effect;

- Reversibility of effect; and
- Timing and frequency of effect.

6.4.8 In reality, evaluation of the severity of effects is frequently made on the basis of 'professional judgement' (which would include such factors as the fragility of the habitat receiving the effect) and this *was* used where required.

Magnitude of Potential Effects

6.4.9 Table 6.4.2 outlines the criteria used to determine the magnitude of an impact. Table 6.4.3 outlines the criteria used to determine the temporal magnitude of impacts.

Table 6.4.2: General criteria to describe the magnitude / character of potential effects

Magnitude of Impact		Typical criteria
Major	Adverse	Complete or near complete loss of resource, population/ productivity and/or quality and integrity of the receptor, through mortality, displacement or disturbance. Severe damage to key characteristic features or elements. Quantified as approximately >80% of resource lost.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality. Quantified as approximately a >80% net gain for the resource, in comparison with the baseline.
Intermediate	Adverse	Significant effect on the resource or status of the population/productivity due to mortality, displacement or disturbance, but not adversely affecting the integrity. Partial loss of/damage to key characteristics, features or elements. Quantified as 21-80% of resource lost.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality. Quantified as approximately a 21-80% net gain for the resource, in comparison with the baseline.
Minor	Adverse	Some measurable change: partial reduction in the status of the population/productivity of its attributes, via mortality, displacement or disturbance. Minor loss of or alteration to, one (or maybe more) key characteristics, features or elements of the resource. Quantified as 1-20% of resource lost.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial effect on attribute or a reduced risk of negative effect occurring. Quantified as an approximate 1-20% net gain for the resource in comparison with the baseline.

Magnitude of Impact		Typical criteria
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements. Quantified as <1% of the resource lost.
	Beneficial	Very minor improvement of the status of the population/productivity or quality of the resource. Quantified as a <1% net gain for the resource. No loss or alteration of characteristics, features or elements; no observable effect in either direction.
No change	Neutral	No loss or alteration of characteristics, features or elements; no observable effect either adversely or beneficially. Can also be considered a continuation of the baseline.

Table 6.4.3: Temporal magnitude/timeframe of potential impacts

Temporal Magnitude	Definition
Permanent	Impact continues beyond the span of lifetime of the development (>30 years)
Long-term	Between 15 and 30 years
Medium term	Between 5 and 15 years
Short term	6 months and up to 5 years
Negligible	Less than 6 months

Determining Significant Effects

- 6.4.10 In this assessment, the significance of an effect was determined through a combination of the ecological value of the species and/or habitat (Table 6.1.1) and the magnitude criteria from Table 6.4.2 and Table 6.4.3. The matrix in Table 6.4.4 displays the significance criteria. As an example, a sustainable (i.e. ecologically viable) area of County BA³ habitat would be valued at 'Medium' level of value (Table 6.4.1). If a substantial proportion of this were to be removed for solar panels or access tracks, this would mean the effect was of a large extent (meaning that what habitat remains no longer functions as a viable ecosystem). The effect would also be irreversible (at least for the foreseeable future). The magnitude of the impact is thus major adverse and of long-term duration (Tables 6.4.2 and 6.4.3). A high degree of confidence can be placed in this prediction. The combination of 'Medium' level of value and 'Major' magnitude of effect would give a significance value of 'moderate or large' (Table 6.4.4). In cases such as this, where the significance falls within a range (e.g. between 'moderate' or 'large'), a decision is made as to which is the correct value. This decision is based on the factors listed in 6.1.7 and particularly on 'professional judgement'.
- 6.4.11 In this assessment, any effect that is of at least 'moderate' significance (with Ecological Value of at least medium i.e. 'County' level) is considered as significant in the overall context of the

development and in terms of the EIA Regulations. Where Ecological Value is assessed as Low level or below, effects of 'moderate' significance are considered to be not significant in terms of the EIA Regulations. Professional judgement is an important factor in determining the level of ecological value, the magnitude of the impact and the overall significance. An effect may be either negative or positively significant.

Table 6.4.4: Matrix for assisting in the determination of significant ecological effects

Ecological value	Character / magnitude of impact				
	Major	Intermediate	Minor	Negligible	No change
Very high	Very Large	Large or Very Large	Moderate or Large	Slight	Neutral
High	Large or Very Large	Moderate or Large	Slight or Moderate	Slight	Neutral
Medium	Moderate or Large	Moderate	Slight	Neutral or Slight	Neutral
Low	Slight or Moderate	Slight	Neutral or Slight	Neutral or Slight	Neutral
Negligible	Slight	Neutral or Slight	Neutral or Slight	Neutral	Neutral

Cumulative Effects

6.4.12 Following a review of other existing and proposed sites within a 10km radius, it is considered unlikely that there is much scope for cumulative impacts. ADAS have worked on a number of other sites within a 10km radius and are familiar with their key species and habitats. High quality habitats at the current site are not widely present, and therefore there will be little or no cumulative impact with other sites (particularly as any such habitats are likely to be avoided at the current site through mitigation). Similarly, in terms of species, the site is unlikely to be of sufficient value for any of the mammal (or amphibian) species listed, such that cumulatively, it will cause significant negative impacts. In the light of this, a very detailed cumulative assessment is unlikely to be necessary.

Avoidance and Mitigation

6.4.13 It is anticipated that the key mitigation in terms of the proposal will be in relation to the design of the development. In particular, the location of solar panels and tracks, as well as other associated infrastructure, will be critical in avoiding any significant impacts. Thus, areas of better quality habitat should wherever possible, be avoided. Similarly, the location of key areas for species such as otter holts, badger setts and water vole colonies could and should be avoided. The relative lack of ecological interest (see 6.5) means that the majority of impacts can be avoided through careful siting of infrastructure.

Residual Effects

- 6.4.14 All surveys have followed best practice. Provided key areas of habitat and species are avoided, there should be no residual significant effect.

Compensation

- 6.4.15 Based on the results of baseline surveys (see section 6.5: Baseline Conditions) and the relative lack of ecological interest, it is considered that the need for compensation is minimal.

Enhancement

- 6.4.16 Ecological enhancement of the site will be discussed with Neath Port Talbot Council and NRW, as appropriate.

6.5 Baseline Conditions

- 6.5.1 This section describes the baseline ecology conditions at the site, based on desk study and original field surveys. It outlines existing nature conservation designations. It also describes the species and habitats present in terms of current knowledge.

Desk Study

- 6.5.2 Four statutory sites were located within 5km of the site and 141 non-statutory sites within 2km of the site. See table 6.5.1 for further details.

Table 6.5.1: Statutory and non-statutory designated sites within 5km and 2km of the survey site

Site Name	Description	Designations	Distance from site
Statutory Designated Sites			
Crymlyn Bog	Crymlyn Bog comprises a floodplain valley mire located within a low and coastal context and is the most extensive wetland of its type in Wales. The mire features a complex mosaic of vegetation types, supporting examples of swamp communities. The site supports an exceptionally wide range of rich and productive communities, some of which bear a close floristic affinity to certain floodplain mires in East Anglia. The presence of significant areas of Great Fen-sedge (<i>Cladium mariscus</i>) swamp is notable in extensive stands of this uncommon vegetation type, occurring at only three other sites in Wales. Crymlyn Bog is part of a larger inter-estuarine complex which includes the adjacent Pant-y-Seis-fen.	Ramsar	4.7 km SW
Crymlyn Bog	Designated for the presence of a number of Annex I habitats, namely: "Transition Mires & Quaking Bogs", "Calcareous fens with Great Fen-sedge".	Special Area of Conservation (SAC)	4.7 km SW
Crymlyn Bog	Designation is based on the same mix of species and habitats as for SAC designation.	Site of Special Scientific Interest (SSSI)	4.7 km SW
Fforest Goch Bog	The main habitats present at the site are lowland raised bog and marshy grass and with an edging of scrub on the westerly side. Low and raised bog is a rare resource in Wales, particularly in south Wales, and Fforest Goch Bog represents by far the best and much the least disturbed site.	SSSI	2.2 km NW
Non-statutory Designated Sites			
Cood Bach a'r Cwm	Largely native W10 valley woodland, established along part of the Afon Clydach and one of its tributaries. Wild	Site of Importance for Nature	1.5 km NW

Site Name	Description	Designations	Distance from site
	service-tree is a special feature of the woodland.	Conservation (SINC) (Heath Port Talbot (NPT))	
Dyffryn Woods	An ancient woodland site, formerly part of a large private estate, which was felled and planted with conifers in the 1930s then mostly clear felled in the 1980. Some blocks of conifers and beech were retained and the rest replanted with larch and other conifers.	SINC (NPT)	120m E
Bryncoch Farm	This site comprises a large mosaic of habitats situated immediately north of the village of Bryncoch. The low land meadows and marshy grassland areas have been known to be grazed by cattle but some fields are obviously under grazed and are suffering from scrub invasion. There are two areas of woodland within the SINC which are classed as ancient woodland.	SINC (NPT)	1.3km SE
Graig Dda – Cwm Cymach, Glais	Ancient woodland, upland heath, purple moor-grass and rush-pasture and acid grassland.	SINC (Swansea)	500m W
Coedydd Gŵn Bran	Ancient woodland, purple moor-grass and rush-pasture and neutral grassland.	SINC (Swansea)	590m W
Birchgrove Hill Mynydd Drummau	Ancient woodland and associated scrub.	SINC (Swansea)	1.5 km SE
Craig Ci henore Woods	Upland oak wood with some patches of wet woodland	Wildlife Trust Reserve	2km NW
Ancient Semi Natural Woodland (ASNW)	51 examples of ancient semi natural woodland are found within 2km of the site. These are described as 'These are broadleaf woodlands comprising mainly native tree and shrub species which are believed to have been in existence for over 400 years. The ground vegetation will reflect the naturalness of these	Ancient semi natural woodland	All woodland sites are to the east and north of the site

Site Name	Description	Designations	Distance from site
	woodlands and will frequently feature species which provide clear indication of long and continued wood and cover. They will have been woodland for centuries and contribute substantially to our natural and cultural heritage.'		
Restored Ancient Woodland Sites (RAWS)	38 examples of restored ancient woodland sites are found within 2km of the site. These are described as 'woodlands which are predominately broadleaves now and are believed to have been continually wooded for over 100 years. The use of the term restored ancient woodland describes wood and which appears using remote sensing techniques to have returned to a more natural condition. The inventory designation does not mean that the woodland is fully restored or that it's in good ecological condition.'	Restored ancient woodland	All woodland sites are to the east and north of the site
Plantation or Ancient Woodland Sites (PAWS)	20 examples of plantations on ancient woodland sites are found within 2km of the site. They are described as 'sites which are believed to have been continuously wooded for over 100 years. They have been replanted with native or non-native species most commonly with conifers. They currently have a canopy cover of more than 50% non-native conifer tree species. They will have varying levels of remnant features of ASNW.'	Plantation or ancient woodland site	Mainly to the north and east of the site
Ancient woodlands of unknown category	5 examples of ancient woodlands of unknown category are found within 2km of the site. They are described as 'Woodlands which may be ASNW, RAWS or PAWS. These areas are predominantly in transition where the existing tree cover is described as shrubs, young trees, felled or ground prepared for planting.'	Ancient woodlands of unknown category	All woodland sites are to the east and north of the site

Site Name	Description	Designations	Distance from site
N iW Priority Areas (woodland – PAWS)	20 examples of N iW Priority Areas (woodland – PAWS) are found within 2km of the site. These are described as 'large scale areas which were prioritised for large scale conservation work, based on factors including the habitats within them.'	N iW Priority Areas (woodland – PAWS)	All woodland sites are to the east and north of the site

6.5.3 Table 6.5.2 presents the results of the biological records search. Only data from the last ten years is presented. A large number of records were received from South East Wales Biodiversity Records Centre (SEWBReC) that related to historical records (majority pre 2000).

Table 6.5.2: Records of selected protected or notable species within 2km of the site

Species	Designation	Date	Distance from site	Approx. Location
Noctule <i>Nyctalus noctula</i>	EPS; EAW S. 7	2011	1.9km	Jarran Wood
Common pipistrelle <i>Pipistrellus pipistrellus</i>	FPS; FAW S. 7	2011	1.9km	Jarran Wood
Common pipistrelle	FPS; FAW S. 7	2010	1.8km	Jarran Wood
Grass snake <i>Natrix helvetica</i>	WCA5, FAW S. 7	2011	1.3km	East off south-east corner of site
Common lizard <i>Zootoca vivipara</i>	WCA5, EAW S. 7	2011	500m	Bryn-coch; 3 in drystone wall
Common lizard	WCA5, EAW S. 7	2011	800m	Pond in south of site
Smooth newt <i>Lissotriton vulgaris</i>	WCA5, EAW S. 7	2011	800m	Pond in south of site
Common frog <i>Rana temporaria</i>	WCA5, EAW S. 7	2011	800m	Pond in south of site
Common frog	WCA5, FAW S. 7	2017	496m	Field on edge of site

Species	Designation	Date	Distance from site	Approx. Location
Common toad <i>Bufo bufo</i>	WCA5, EAW S. 7	2013	535m	South-west corner of site
Bluebel <i>Hyacinthoides non-scripta</i>	WCA8, EAW S. 7	2019	1201m	Dyffryn Woods (east of site)

1 Data are given from the last published data.

FDSE=European Protected Species (Habitats Directive/Birds Directive)

WCA1 = Wildlife and Countryside Act 1981 Schedule 1

WCA5 = Wildlife and Countryside Act 1981 Schedule 5

WCA8 = Wildlife and Countryside Act 1981 Schedule 8

S7 = Environment (Wales) Act 2016 species

PBA = Protection of Badger Act 1992

BOCC Red/Amber = Birds of Conservation Concern Red/Amber Wales

Field Surveys

- 6.5.4 A Phase 1 Habitat Survey was conducted in July 2020 by Principal Ecologist Chris Forster Brown MCIEEV, based on the techniques and methodologies described in the Handbook for Phase 1 Habitat Survey (Joint Nature Conservation Committee (JNCC) 2016) and using standard nomenclature (Stace 2019). This included all areas in the east of the site. The habitats present were recorded on to a field map with written target notes providing supplementary information on, for example, species composition, structure and management where relevant. Plant species abundance was rated for each habitat using the DAFOR scale. The abundance of each species was used to determine the habitat type present.
- 6.5.5 This was extended to include notes on fauna and habitats which could potentially support protected species, an approach commonly referred to as an Extended Phase 1 Habitat Survey. The presence of, or potential for, protected species was noted on the field map during the survey.
- 6.5.6 The habitats identified within the Extended Phase 1 Habitat Survey are listed and described below.

- Semi-natural broadleaved woodland;
- Acid grassland;
- Marshy grassland;
- Poor/semi-improved grassland;

- Standing eutrophic water;
- Arable; and
- Water.

Semi-natural broadleaved woodland

- 6.5.7 A linear patch of semi-natural broadleaved woodland was found towards the south of the site. This was entirely comprised of pedunculate oak *Quercus robur* with no associated ground flora. The habitat was little more than a line of trees.

Acid grassland

- 6.5.8 A long linear strip of acid grassland was found towards the south-east of the site (central area). This was ungrazed. It comprised abundant sheep's-fescue *Festuca ovina*, frequent common bent *Agrostis capillaris*, rare early hair grass *Aira praecox*, occasional heath grass *Danthonia decumbens*, occasional tormentil *Potentilla erecta* and frequent/abundant heath bedstraw *Galium saxatile*. There was a noticeable abundance of sheep's sorrel *Rumex acetosella*, particularly associated with anthills. Gorse *Ulex europaeus* was also frequent. The whole area supported hundreds of yellow meadow ant *Lasius flavus* anthills.
- 6.5.9 A very small area of acid grassland was also found in the north of the site, associated with former pillow mounds. This also supported frequent sheep's sorrel. In addition, there was a small population of yellow rattle *Rhinanthus minor* (approximately 50 plants) found in this area.

Marshy grassland

- 6.5.10 One area in the centre of the site is marshy grassland. This appeared ungrazed. It was largely dominated by soft rush *Juncus effusus*. Purple moor-grass *Molinia caerulea* was also patchily present, and it is possible that this area once comprised peatland habitat. A few pools and ditches were evident, though no sphagnum (bog-mosses) were recorded. The pools supported common species such as bulbous rush *Juncus bulbosus*.

Poor semi-improved grassland

- 6.5.11 The majority of the site comprised poor semi-improved grassland. Some areas were either cut or sheep or cattle-grazed and vegetation was low in these areas. Some of these areas were subject to poaching of the ground due to stock trampling. Other sections were uncultivated and ungrazed and featured rank vegetation as a result. The agricultural indicators of improvement, white clover *Trifolium repens* and perennial ryegrass *Lolium perenne* were abundant throughout. Species indicative of a slightly less improved sward were relatively

frequent, and in places the grassland was more akin to semi-improved rather than poor semi-improved. These indicators included frequent crested dog's-tail *Cynosurus cristatus* and frequent Yorkshire-fog *Holcus lanatus*. Less improved conditions were noticeable on steeper banks. Whilst large areas in the west of the site have not been subject to formal habitat survey, bird survey of these areas allowed for an assessment of habitat types. These determined that the west of the site was largely composed of poor semi-improved grassland.

Standing eutrophic water

- 6.5.12 Six ponds were found on site. All of these ponds are best categorised as eutrophic. In general, the ponds were of good quality and there was no evidence of enrichment from run off (no presence of algae). The example in the north of the site supported frequent floating reed-grass *Glyceria fluitans*, common water-sweetwort *Collitriche stagnalis* and soft rush as well as a small patch of bottle sedge *Carex rostrata*. An example in the south of the site was similar, though with the addition of abundant bog pondwee *Potamogeton polygonifolius*. Other examples appeared similar in terms of vegetation.

Arable

- 6.5.13 There were two areas of arable on the site. The first was in the north and surrounded the pond described above. The second was found shortly south of here. Both comprised barley *Hordeum* species. There were also a small number of arable weeds growing alongside the more southerly block of barley in 2020 (these had gone along with the barley in 2022). These included common hemp-nettle *Coleopsis tetralix*, marsh cardweed *Griffithia uliginosa* and corn spurrey *Spergula arvensis*.

Wall

- 6.5.14 Drystone walls formed the majority of boundaries on the site, particularly in the central area. A few were intact though the majority were decrepit and were interspersed with fences.

Bats

- 6.5.15 The linear features on site (drystone walls) appeared suitable for foraging bat species. These were largely contiguous with the surrounding woodlands (eastern slope) and thus provided good extension foraging habitat to these areas. There was no suitable roost site habitat on site.

Badgers

- 6.5.16 No signs of badger were recorded on site. However, the proximity of the surrounding woodland and feeding opportunities in the open pasture on site did mean that the site appeared suitable for this species.

Brown hare

- 6.5.17 Several records of brown hare *Lepus europaeus* were made, in conjunction with the bird survey.

Reptiles

- 6.5.18 No signs of reptiles were recorded on site. However, the presence of small areas of suitable habitat (acid grassland), coupled with potential refugia sites in drystone walls suggests that the site is of potential suitability for common species of reptile (within the habitat areas described).

Amphibians

- 6.5.19 The presence of six on-site ponds, strongly indicated suitability for amphibian species such as common frog *Rana temporaria*, smooth newt *Lissotriton vulgaris* and common toad *Bufo bufo*. No signs of these species were recorded, however SEW3ReC returned records that appeared to derive from the on-site ponds. The ponds were not considered likely to support GCN, due to them lying outside the recognised area for this species and the fact that they were at an altitude that is not normally conducive to supporting this species. However, the ponds were subjected to eDNA sampling. This determined that no GCN eDNA was present in any of the ponds.¹²

Invertebrates

- 6.5.20 The site is suitable for a small range of invertebrates. This is particularly the case in association with the on-site ponds. A small number of dragonfly species were recorded around these ponds (largely hawkers *Aeshna* species and broad-bodied chaser *Zibellata depressa*), as was a large horsefly species *Tabanus bovinus*. The unimproved acid grassland areas are also likely to support a small range of invertebrates.

White-clawed crayfish

- 6.5.21 There was no suitable habitat for white-clawed crayfish.

¹² One of the ponds was dry at the time of survey and therefore sampling could not take place (no newts present). Two of the other ponds returned inconclusive results due to contamination of the sampling. However, given the results from the other ponds and the factors listed above, it was considered that great crested newts were not present in these ponds.

Non-native invasive plants

6.5.22 No non native vascular plants were recorded.

Vascular plants

6.5.23 Corn spurrey, recorded in abundance alongside the barley crop in the north of the site in 2020, is listed as Vulnerable under the Vascular Plant Red Data List for Wales (Dines, 2008).

Receptors Considered to be Important Ecological Features (IEFs)

6.5.24 The areas of marshy grassland (centre of site), linear strip of acid grassland (south-east corner of site) and on-site ponds were considered to be of ecological value. Much of the grass and was of poor ecological value (though associated skylarks – see ornithology in Section 7) and brown hare were found here).

Further Survey

6.5.25 It is considered that Phase I habitat survey should take place across the western half of the site. Badger survey should also take place across the whole site.

6.6 Potentially Significant Effects and Approach to Mitigation

6.6.1 Potentially significant effects are outlined in Table 6.6.1.

Table 6.6.1: Potential significant effects resulting from the Proposed Development

Activity	Potential Effects
Construction Phase	
	Destruction of IEFs including unimproved acid grassland, marshy grass and ponds.
	Reduction in foraging area for mammal species e.g. brown hare.
Operational Phase	
	Reduction in foraging area for mammal species e.g. brown hare.

Decommissioning Effects

6.6.2 No decommissioning effects, aside from temporary disturbance, are envisaged at this time.

Approaches to Mitigation and Biodiversity Benefits

6.6.3 Mitigation will ensure that key habitats are avoided with infrastructure. This should be straightforward to secure as only a small percentage of the overall site supports such habitats. The whole site would benefit from significantly lower grazing levels.

6.7 Residual Effects

6.7.1 None are considered likely.

6.8 References

- Chartered Institute of Ecology and Environmental Management (2017). *Guidelines for Ecological Preliminary Ecological Appraisal. Technical Guidance Series. www.cieem.net*
- Chartered Institute of Ecology and Environmental Management (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Technical Guidance Series. www.cieem.net*
- Dines, T.E. (2008). A Vascular Plant Red Data List for Wales. Plantlife.
- JNCC (2010). *Handbook for Phase 1 Habitat Survey. A technique for environmental audit (reprint)*. Joint Nature Conservation Committee, Peterborough.
- Stace, C. (2019). *New British Flora of the British Isles*. 4th Edition. Cambridge University Press.

7 Ornithology

7.1 Introduction

7.1.1 The Ornithological Assessment of the Proposed Development will be conducted by RSK ADAS Ltd. ADAS has worked on the Ecological Impact Assessment (EclA) of more than 10 large solar farm proposals. All of these EclAs have encompassed the full range of relevant surveys including ornithology. All of the ADAS proposed surveyors for this project have extensive experience of standard and accepted survey methodologies.

7.2 Policy and Relevant Guidance

7.2.1 An analysis of the legislative and policy framework relevant to the EclA (ornithology) is presented in table 7.2.1.

Table 7.2.1: Relevant legislation and planning policy – Ornithology

Scale	Legislation / Policy	Description
International	EC Birds Directive (2009/147/EC)	Annex I of the EC Birds Directive lists rare and vulnerable species of wild birds that are subject to special conservation measures. The Directive also provides for the designation of SPAs, which form part of the Natura 2000 network of sites protected by European wildlife legislation.
	The Conservation of Habitats and Species Regulations 2017 (as amended) – The Habitats Regulations	This legislation transposed the Habitats Directive (European Directive 92/43/EEC) into Welsh and English law during the period where the UK was a member of the European Union. Following the implementation of Brexit, the legislation is enacted into UK law, ensuring continued protection of all habitats and species listed on the Annexes of the Habitats Directive. Certain habitats and species will remain protected as per the objectives of the Directive, and will be referred to as such in this Chapter for ease of reference. Species listed on these Annexes are identified as being threatened or of 'community interest'. Annex I lists habitat types regarded as being of European/international importance, including 'priority habitat types'; Annex II lists species of European/international importance; and Annex IV(a) lists animal species of community interest needing strict protection. Species listed on Annex II and Annex V(a) are commonly referred to as European Protected Species (EPS), and will remain as such following the implementation of Brexit. Under this legislation it is an offence to: ➤ Deliberately capture, injure or kill any wild animal of an EPS;

Scale	Legislation / Policy	Description
		➤ Deliberately disturb wild animals of any such species; ➤ Deliberately take or destroy the eggs of such an animal; or ➤ Damage or destroy a breeding site or resting place of such an animal. Disturbance of animals includes in particular disturbance which is likely: To impair their ability – ➤ to survive, to breed or reproduce, or to rear or nurture their young, or ➤ in the case of animals of a hibernating or migratory species, to hibernate or migrate; or ➤ to affect significantly the local distribution or abundance of the species to which they belong.
National	The Wildlife and Countryside Act 1981 (as amended)	This legislation effectively prevents any kind of activity occurring that might have a detrimental effect on nesting birds. Schedule 1 of the Act also lists a number of species which are protected by special penalties at all times. Nesting periods vary between species, from year to year and in relation to latitude and altitude, however as a general rule, the breeding season for most species occurs between March and the end of July.
	The Countryside and Rights of Way (CROW) Act 2000	This legislation strengthens the provisions of the 1981 Wildlife and Countryside Act, both in respect to statutory sites such as Sites of Special Scientific Interest (SSSIs) and protected species. It also places a statutory obligation on Local Authorities and other public bodies to further the conservation of biodiversity in the exercise of their functions, thus providing a statutory basis to the Biodiversity Action Plan (BAP) process which began in 1994. Section 74 of the Act lists the habitat types and species of principal importance in England.
	RSPB Birds of Conservation Concern (BoCC)	'Red' and 'Amber' lists for Wales have been prepared by the RSPB of species populations and their known breeding population. Red List species are those whose breeding population or range is rapidly declining (50% or more in the last 25 years), recently or historically, and those of global conservation concern. Amber List species are those whose breeding population is in moderate decline (25 – 49% in the last 25 years), rare breeders, internationally important and localised species and those of unfavourable conservation status in Europe. Species included on a Green, "Green" list are not considered threatened or to be in significant decline.

Scale	Legislation / Policy	Description
		These lists confer no legal status; however, they are useful when assessing the significance of predicted impacts and determining the level of mitigation that may be required when birds are affected by development or any other activity.
Regional	Environment (Wales) Act 2016	This act makes provision in respect of biodiversity, pesticides harmful to wildlife, protection of birds and invasive non-native species in Wales. Section 7 of this act includes a duty on public bodies to have regard to the purpose of conserving biodiversity in the exercise of their functions. The list of species included in Section 7 defines the birds that are of principal importance in Wales and should be considered when public bodies exercise their duty.
	Planning Policy Wales: Chapter 6: Distinctive and Natural Places (11 th ed., 2021)	Chapter 6 of Planning Policy Wales (PPW) sets out the Welsh Government's objectives for Biodiversity and Ecological Networks among other environmental and cultural components of 'Placemaking'. In particular, the Biodiversity and Ecological Networks section puts emphasis on planning authorities to have regard for the State of Natural Resources Report (SoNARR) and Area Statements published by Natural Resources Wales (NRW). In this sense PPW now requires information of ecosystem resilience as well as protected and priority species as outlined by Section 6 and Section 7 of the Environment (Wales) Act 2016.
	Future Wales: The National Plan 2040	This development plan recognises the necessity for resilient ecosystems within Wales within Policy 9 of the document. Developments should deliver net biodiversity benefits whilst maximising the provision of green infrastructure, in alignment with Policies 17 and 18.
	Technical Advice Note 5	Technical Advice Note 5 (TAN5) outlines how the land use planning system in Wales should contribute to protecting and enhancing biodiversity and geological conservation. TAN5 details that when considering policies and proposals in planning applications at a local level the principles and material considerations are taken into account.
Local	Neath Port Talbot Council – Local Development Plan 2011 – 2026	
	SP15 – Biodiversity and Geodiversity	Important habitats, species and sites of geological interest will be protected, conserved, enhanced and managed through the following measures: 1. The identification of the following Internationally and Nationally designated sites within the County Borough to enable their

Scale	Legislation / Policy	Description
		protection: (a) Special Areas of Conservation (SACs) and Ramsar Sites; (b) Sites of Special Scientific Interest (SSSIs); (c) National Nature Reserves (NNRs). 2. The identification and protection of sites of regional and local importance; 3. The protection of important natural heritage features.
	EN6 – Important Biodiversity and Geodiversity Sites	Development proposals that would affect Regionally Important Geodiversity Sites (RIGS), Local Nature Reserves (LNRs), Sites of Interest for Nature Conservation (SINCs), sites meeting SINC criteria or sites supporting Local Biodiversity Action Plan (LBAP) or S42 habitats or species [now Section 7 habitats and species] will only be permitted where: 12. They conserve and where possible enhance the natural heritage importance of the site; Or 2. The development could not reasonably be located elsewhere, and the benefits of the development outweigh the natural heritage importance of the site. Mitigation and/or compensation measures will need to be agreed where adverse effects are unavoidable.
	FN7 – Important Natural Features	Development proposals that would adversely affect ecologically or visually important natural features such as trees, woodlands, hedgerows/field boundaries, watercourses or ponds will only be permitted where: 1. Full account has been taken of the relevant features in the design of the development, with measures put in place to ensure that they are retained and protected wherever possible; or 2. The biodiversity value and role of the relevant feature has been taken into account and where removal is unavoidable, mitigation measures are agreed.
	SP16 – Environmental Protection	Air, water and ground quality and the environment generally will be protected and where feasible improved through the following measures: 1. Ensuring that proposals have no significant adverse effects on water, ground or air quality and do not significantly increase pollution levels; 2. Giving preference to the development of brownfield sites over greenfield sites where appropriate and deliverable;

Scale	Legislation / Policy	Description
		3. Ensuring that developments do not increase the number of people exposed to significant levels of pollution.

Study Area and Zones of Influence

- 7.2.2 The assessment conducted for this report has considered the area in which ornithological features could be subject to significant effects from the Proposed Development. The area of the potential effects is often wider than the actual perimeter of the development site and is known as the Zone of Influence (ZOI).
- 7.2.3 The ZOI varies for different ecological features and each designated site, habitat and species has been considered in relation to their sensitivity to the Proposed Development. In the case of bird species, the ZOI is wider than the site boundary and species could potentially use the site for foraging from a large surrounding area.

7.3 Assessment Methodology

Scope

- 7.3.1 The Ornithological Impact Assessment (OIA) will follow guidelines developed by The Chartered Institute of Ecology and Environmental Management (CIEEM, 2018). These guidelines aim to promote good practice in Ecological Impact Assessment (EcIA) relating to terrestrial, freshwater, coastal and marine environments in the UK and Ireland. The Biodiversity: Code of practice for planning and development published by the British Standards Institute (BSI 2020:2013) cites the CIEEM EcIA Guidelines as the acknowledged reference on Ecological Impact Assessment (EcIA). The Guidelines are consistent with The British Standard on Biodiversity, which provides recommendations on topics such as professional practice, proportionality, pre-application discussions, ecological surveys, adequacy of ecological information, reporting and monitoring.
- 7.3.2 The guidelines state that EcIA (and by extension, OIA) is a process of identifying, quantifying and evaluating potential effects of development-related or other proposed actions on habitats, species and ecosystems. The findings of an assessment can help competent authorities understand ecological issues when determining applications for consent. EcIA can be used for the appraisal of projects of any scale including the ecological component of EIA. When undertaken as part of an EIA, EcIA is subject to the relevant EIA Regulations. Unlike EIA, EcIA on its own is not a statutory requirement. It is an evaluation process undertaken to support a range of assessments. EcIA is a process that is most effective if all contributing ecologists and other specialists work in collaboration. An EcIA report for the ecological

chapter of an EIA Environmental Statement (ES)) should clearly and simply describe the significant effects of any project so that all interested parties understand the implications of what is proposed. The Guidelines explain the key elements of the EIA process. Key to this is a scientifically rigorous and transparent approach. EIA should be undertaken by qualified professionals with an appropriate level of experience in ecological survey and impact assessment who are recognised by a relevant professional body such as CIEEM.

7.3.3 The CIEEM guidelines list the following principles that underpin EIA (CIA):

- **Avoidance.** Seek options that avoid harm to ecological features (for example, by locating on an alternative site).
- **Mitigation.** Negative effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation.
- **Compensation.** Where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
- **Enhancement.** Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

Determining Importance

7.3.4 The frame of reference for the ornithological features in terms of their geographical importance is in line with guidance set out in CIEEM, 2018.

7.3.5 Bird species are assessed, where appropriate, against best practice guidelines and with reference to table 7.3.1.

Table 7.3.1: Definition of nature conservation value for bird interest at Meillon

Sensitivity	Definitions
Very High	Qualifying species of an internationally designated site (i.e. SPA or Ramsar) Species present in internationally important numbers (>1% of UK population).
High	Species that contribute to the integrity of a SPA or Site of Special Scientific Interest (SSSI) but which are not cited as species for which the site is designated (SPAs) or notified (SSSIs). Ecologically sensitive species such as rare birds (<300 breeding pairs in the UK).

Sensitivity	Definitions
	Species present in nationally important numbers (>1% Welsh population). Species listed on Annex I of the EC Birds Directive or breeding species listed on Schedule 1 of the Wildlife and Countryside Act. Regularly occurring relevant migratory species, which are either rare or vulnerable, or warrant special consideration (i.e. Schedule 1 of the Wildlife and Countryside Act and Section 7 of the Environment Act) on account of the proximity of migration routes, breeding, wintering and staging areas in relation to the Development.
Medium	Species present in regionally (i.e. south Wales) important numbers (>1% regional population) Species occurring within SPAs and SSSIs but not crucial to the integrity of the sites. Species of Principal Importance as defined in Section 7 of the Environment Act. Regularly occurring relevant migratory species, which are either rare or vulnerable, or warrant special consideration (i.e. BoCC Wales Red List) on account of the proximity of migration routes, breeding, wintering and staging areas in relation to the Development.
Low	Regularly occurring relevant migratory species, which are either rare or vulnerable, or warrant special consideration (i.e. BoCC Wales Amber List) on account of the proximity of migration routes, breeding, wintering and staging areas in relation to the Development. Any other species of local conservation interest such as those listed in the LBAP.

Characterising Potential Impacts

- 7.3.6 The descriptions in Table 7.3.1 are used to categorise the geographical 'importance' of bird species and their habitats. In characterising potential impacts, the term 'ecological integrity' is used, as defined by the Office of the Deputy Prime Minister (ODPM) Circular 06/2005 on Biodiversity and Geological Conservation (ODPM, 2005) where the integrity of a designated site refers to "coherence of ecological structure and function...that enables it to sustain the habitat, complex of habitats and/or levels of populations of species for which it was classified".
- 7.3.7 For species and for non-designated habitats, the ODPM Circular (and C EEM guidance) refers to 'conservation status'. The Circular states (in Part V, Paragraph 96) that species and habitats are normally legally protected because of their vulnerable conservation status (i.e. the sum of

the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations). Conservation status is thus a key concept in the assessment of effects on species and non-designated habitats. The judgement on the severity of effects was based on a combination of the following: knowledge of the requirements of the species or habitat in question, and an evaluation of the effect itself. In describing the effects, reference was made to the following factors:

- Confidence in predictions;
- Spatial extent of effect;
- Temporal extent of effect;
- Reversibility of effect; and
- Timing and frequency of effect.

7.3.8 In reality, evaluation of the severity of effects is frequently made on the basis of 'professional judgement' (which would include such factors as the fragility of the habitat receiving the effect) and this was used where required.

Magnitude of Potential Effects

7.3.9 Table 7.3.2 outlines the criteria used to determine the magnitude of an impact. Table 7.3.3 outlines the criteria used to determine the temporal magnitude of impacts.

Table 7.3.2: General criteria to describe the magnitude / character of potential effects

Magnitude of Impact		Typical criteria
Major	Adverse	Complete or near-complete loss of resource, population/productivity and/or quality and integrity of the receptor, through mortality, displacement, or disturbance. Severe damage to key characteristic features or elements. Quantified as approximately >80% of resource lost.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality. Quantified as approximately a >80% net gain for the resource, in comparison with the baseline.
Intermediate	Adverse	Significant effect on the resource or status of the population/productivity due to mortality, displacement or disturbance, but not adversely affecting the integrity. Partial loss or damage to key characteristics, features or elements. Quantified as 21-80% of resource lost.

Magnitude of Impact		Typical criteria
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality. Quantified as approximately a 21-80% net gain for the resource, in comparison with the baseline.
Minor	Adverse	Some measurable change/partial reduction in the status of the population/productivity of its attributes, via mortality, displacement or disturbance. Minor loss of or alteration to, one (or maybe more) key characteristics, features or elements of the resource. Quantified as 1-20% of resource lost.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial effect on attribute or a reduced risk of negative effect occurring. Quantified as an approximate 1-20% net gain for the resource in comparison with the baseline.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements. Quantified as <1% of the resource lost.
	Beneficial	Very minor improvement of the status of the population/productivity or quality of the resource. Quantified as a <1% net gain for the resource. No loss or alteration of characteristics, features or elements; no observable effect in either direction.
No change	Neutral	No loss or alteration of characteristics, features or elements; no observable effect either adversely or beneficially. Can also be considered a continuation of the baseline.

Table 7.3.3: Temporal magnitude/timeframe of potential impacts

Temporal Magnitude	Definition
Permanent	Impact continues beyond the span of lifetime of the development (>30 years)
Long term	Between 15 and 30 years
Medium term	Between 5 and 15 years
Short term	6 months and up to 5 years
Negligible	Less than 6 months

Determining Significant Effects

7.3.10 In this assessment, the significance of an effect was determined through a combination of the ecological value of the bird species (Table 7.3.1) and the magnitude criteria from Table 7.3.2 and Table 7.3.3. The matrix in Table 7.3.4 displays the significance criteria. As an example, a species present in regionally important numbers would be valued at 'Medium' level of value

(Table 7.3.1). If a substantial part of this population were displaced by disturbance, this would constitute a major adverse effect. The magnitude of the impact is thus major – adverse (Tables 7.3.2). A high degree of confidence can be placed in this prediction. The combination of ‘Medium’ level of value and ‘Major’ magnitude of effect would give a significance value of ‘moderate or large’ (Table 7.3.4). In cases such as this, where the significance falls within a range (e.g. between ‘moderate’ or ‘large’), a decision is made as to which is the correct value. This decision is based on the factors listed in 7.3.7 and particularly on ‘professional judgement’.

- 7.3.11 In this assessment, any effect that is of at least ‘moderate’ significance (with Ornithological Value of at least medium i.e. ‘County’ level) is considered as significant in the overall context of the development and in terms of the EIA Regulations. Where Ornithological Value is assessed as low level or below, effects of ‘moderate’ significance are considered to be not significant in terms of the EIA Regulations. Professional judgement is an important factor in determining the level of ornithological value, the magnitude of the impact and the overall significance. An effect may be either negatively or positively significant.

Table 7.3.4: Matrix for assisting in the determination of significant ecological effects

Ecological value	Character / magnitude of impact				
	Major	Intermediate	Minor	Negligible	No change
Very high	Very Large	Large or Very Large	Moderate or Large	Slight	Neutral
High	Large or Very Large	Moderate or Large	Slight or Moderate	Slight	Neutral
Medium	Moderate or Large	Moderate	Slight	Neutral or Slight	Neutral
Low	Slight or Moderate	Slight	Neutral or Slight	Neutral or Slight	Neutral
Negligible	Slight	Neutral or Slight	Neutral or Slight	Neutral	Neutral

Cumulative Effects

- 7.3.12 Following a review of other existing and proposed sites within a 10km radius, it is considered unlikely that there is much scope for cumulative impacts. ADAS have worked on a number of other sites within a 10km radius and are familiar with their key bird species and bird related habitats. In terms of bird species, the site is not of sufficient value for any of the species listed under criteria in table 7.3.1, such that cumulatively, it will cause significant negative impacts. In the light of this, a very detailed cumulative assessment is unlikely to be necessary.

Avoidance and Mitigation

- 7.3.13 It is anticipated that the key mitigation in terms of the proposal will be in relation to the design of the Proposed Development. In particular, the location of solar panels and tracks, as well as other associated infrastructure, will be critical in avoiding any significant impacts. Thus, areas of better quality habitat should wherever possible, be avoided. These areas are also likely to support bird species of more ornithological value at the site. The relative lack of ornithological interest (see Section 7.4: Baseline Conditions) means that the majority of impacts can be avoided through careful siting of infrastructure.

Residual Effects

- 7.3.14 All surveys have followed best practice. Provided key areas for species are avoided, there should be no residual significant effect.

Compensation

- 7.3.15 Based on the results of baseline surveys (see Section 7.4) and the relative lack of ornithological interest, it is considered that the need for compensation is minimal.

Enhancement

- 7.3.16 Ornithological enhancement of the site will be discussed with Neath Port Talbot Council and NRW, as appropriate.

7.4 Baseline Conditions

- 7.4.1 This section describes the baseline ornithology conditions at the site, based on desk study and original field surveys. It outlines existing nature conservation designations. It also describes the bird species present in terms of current knowledge.

Desk Study

- 7.4.2 Sites designated for their ornithological interest within a 30km radius are detailed in Table 7.4.1.

Sites holding International statutory designations for nature conservation

Table 7.4.1: Sites holding International statutory designations within 30km. Bolded text within the table indicates the feature has been scoped in

Site	Distance from Study Area	Qualifying features	Scoped in/out	Rationale
Burry Inlet SPA	16km	Waterfowl and wader species	Scoped out	Site is not suitable for these species, including on migration

Sites holding National statutory designations for nature conservation

7.4.3 Four statutory sites were located within 5km of the site and 141 non-statutory sites within 2km of the site. These are outlined in table 7.4.2 though it should be noted that none of these have been designated on account of their ornithological interest. However, the fact that all are likely to support habitat of value means that they are likely to support at least some ornithological interest.

Table 7.4.2: Statutory and non-statutory designated sites within 5km and 7km of the survey site

Site Name	Description	Designations	Distance from site
Statutory Designated Sites			
Crymlyn Bog	Crymlyn Bog comprises a floodplain valley mire located within a low and coastal context and is the most extensive wetland of its type in Wales. The mire features a complex mosaic of vegetation types, supporting examples of swamp communities. The site supports an exceptionally wide range of rich and poor fen communities, some of which bear a close floristic affinity to certain floodplain mires in East Anglia. The presence of significant areas of Great Fen-sedge <i>Cladium mariscus</i> swamp is notable in extensive stands of this uncommon vegetation type, occurring at only three other sites in Wales. Crymlyn Bog is part of a larger inter-estuarine complex which includes the adjacent Pant-y-Sais fen.	Ramsar	4.7 km SW

Site Name	Description	Designations	Distance from site
Crymlyn Bog	Designated for the presence of a number of Annex I habitats, namely: "Transition Mires & Quaking Bogs", "Calcareous fens with Great Fen sedge".	Special Area of Conservation (SAC)	4.7 km SW
Crymlyn Bog	Designation is based on the same mix of species and habitats as for SAC designation.	Site of Special Scientific Interest (SSSI)	4.7 km SW
Fforest Goch Bog	The main habitats present at the site are lowland raised bog and marshy grass and with an edging of scrub on the westerly side. Lowland raised bog is a rare resource in Wales, particularly in south Wales, and Fforest Goch Bog represents by far the best and much the least disturbed site.	SSSI	2.2 km NW
Non-statutory Designated Sites			
Cood Bach a'r Cwm	Largely native W10 valley woodland, established along part of the Afon Clydach and one of its tributaries. Wild service-tree is a special feature of the woodland.	Site of Importance for Nature Conservation (SINC) (Neath Port Talbot)	1.5 km
Dyffryn Woods	An ancient woodland site, formerly part of a large private estate, which was felled and planted with conifers in the 1930s then mostly clear felled in the 1980. Some blocks of conifers and beech were retained and the rest replanted with larch and other conifers.	SINC (NPT)	120m
Bryncorch Farm	This site comprises a large mosaic of habitats situated immediately north of the village of Bryncorch. The lowland meadows and marshy grassland areas have been known to be grazed by cattle but some fields are obviously under grazed and are suffering from scrub invasion. There are two areas of	SINC (NPT)	1.3 km

Site Name	Description	Designations	Distance from site
	woodland within the SINC which are classed as ancient woodland.		
Graig Oŵ Cwm Cymach, Glais	Ancient woodland, upland heath, purple moor-grass and rush-pasture and acid grassland.	SINC (Swansea)	600m
Coedydd Gŵn Bran	Ancient woodland, purple moor-grass and rush-pasture and neutral grassland.	SINC (Swansea)	590m
Birchgrove Hill – Mynydd Drummau	Ancient woodland and associated scrub.	SINC (Swansea)	1.5km
Craig Ci henare Woods	Upland oak wood with some patches of wet woodland.	Wildlife Trust Reserve	2km
Ancient Semi-natural Woodland (ASNW)	51 examples of ancient semi-natural woodland are found within 2km of the site. These are described as ‘These are broadleaf woodlands comprising mainly native tree and shrub species which are believed to have been in existence for over 400 years. The ground vegetation will reflect the naturalness of these woodlands and will frequently feature species which provide clear indication of long and continued woodland cover. They will have been wooded for centuries and contribute substantially to our natural and cultural heritage.’	Ancient semi-natural woodland	All woodland sites are to the east and north of the site
Restored Ancient Woodland Sites (RAWS)	38 examples of restored ancient woodland sites are found within 2km of the site. These are described as ‘woodlands which are predominately broadleaves now and are believed to have been continually wooded for over 400 years. The use of the term restored ancient woodland describes woodland which appears using remote sensing techniques to have returned to a more natural condition. The inventory designation does not mean that the	Restored ancient woodland	All woodland sites are to the east and north of the site

Site Name	Description	Designations	Distance from site
	woodland is fully restored or that it is in good ecological condition.'		
Plantation or Ancient Woodland Site (PAWS)	20 examples of plantations on ancient woodland sites are found within 2km of the site. They are described as 'sites which are believed to have been continuously wooded for over 400 years. They have been replanted with native or non-native species, most commonly with conifers. They currently have a canopy cover of more than 50% non-native conifer tree species. They will have varying levels of remnant features of ASNW.'	Plantation or ancient woodland site	
Ancient woodlands of unknown category	5 examples of ancient woodlands of unknown category are found within 2km of the site. They are described as 'Woodlands which may be ASNW, PAWS or PAWS. These areas are predominantly in transition where the existing tree cover is described as shrubs, young trees, felled or ground prepared for planting.'	Ancient woodlands of unknown category	All woodland sites are to the east and north of the site
NRW Priority Areas (woodland – PAWS)	20 examples of NRW Priority Areas (woodland – PAWS) are found within 2km of the site. These are described as 'large scale areas which were prioritised for targeted conservation work, based on factors including the habitats within them.'	NRW Priority Areas (woodland – PAWS)	All woodland sites are to the east and north of the site

7.4.4 Table 7.4.3 presents the results of the biological records search. Only data from the last ten years is presented. A large number of records were received from South East Wales Biodiversity Records Centre (SEWBRCC) that related to historical records (majority pre 2000).

Table 7.4.3: Records of selected protected or notable bird species within 2km of the site

Species	Designation	Date	Distance from site	Approx. Location
Redwing <i>Turdus iliacus</i>	DuCC Wales; Amber	2010	450m	On site (not located)

Field Surveys

- 7.4.5 The upland nature of the site meant that the Brown and Shepherd (1993) methodology was the most suitable technique for breeding birds survey. This is principally aimed at breeding waders but is applicable for recording most species of open habitats and woodland edge. The survey requires a minimum of two visits to a site, though NRW recommend that three visits are carried out. To this end, three visits took place, one on 30th April, one on 20th May and one on 10th June 2021. These covered the eastern half of the site. Further surveys took place in 2022, covering the western half of the site. The surveyors (Chris Forster Brown and Daniel Watson) have extensive experience of the Brown and Shepherd methodology (and of bird survey more generally) and are highly familiar with breeding bird species and species assemblages.
- 7.4.6 The survey area encompassed the whole area within the boundary of the Site and the immediate surrounds.
- 7.4.7 Following the Brown and Shepherd methodology, the observers covered the survey area so that they passed within 100m of all points of the Site. All birds were recorded, using standard British Trust for Ornithology (BTO) symbols on a relevant scale map. The behaviour of individual birds was also recorded, where appropriate. Birds are said to be breeding if they are observed displaying or singing, adults are repeatedly alarm calling, nests, eggs or young are located, distraction displays are seen and/or territorial disputes are seen. Species particularly targeted by the survey were breeding waders (Curlew *Numenius arquata* and Lapwing *Vanellus vanellus*) and raptors associated with open moorland (e.g. Hen Harrier *Circus cyaneus* and Merlin *Falco columbarius*). All species were noted on field maps. Those species that are listed on S.7 of the Environment (Wales) Act and/or are red-listed by RSPB (Wales) as of conservation concern, were also targeted.
- 7.4.8 The site supported a good range of common bird species. Sky lark *Alauda arvensis* (BoCC Wales Amber) was recorded in particularly good numbers, with more than 25 individuals present. The majority of these were in the northern half of the site, associated with the open grassland. Meadow pipit *Anthus pratensis* (BoCC Wales Amber) was also present in good numbers (25+ individuals). Stonechat *Saxicola torquata* (single pair) was [REDACTED], Linnet (BoCC Wales Red) were present (usually in pairs) widely scattered around the site, but particularly associated with [REDACTED] (especially in any areas with gorse). Approximately 20 individuals of linnet were recorded overall.
- 7.4.9 Several species of bird were associated with the woodland adjacent to the eastern edge of the site. These included at least one cuckoo *Cuculus canorus* (BoCC Wales Red), at least three

wood warbler *Phylloscopus sibilatrix* (BoCC Wales Red) [REDACTED]
 [REDACTED] spotted flycatcher *Muscicapa striola* (BoCC Wales Red) [REDACTED]
 quarry area just east of eastern site boundary) and redstart *Phoenicurus phoenicurus* [REDACTED]
 [REDACTED] Tree pipit *Anthus trivialis* (BoCC Wales Amber) was singing
 from [REDACTED]. At least three pairs of wheatear *Oenanthe*
Oenanthe were breeding in [REDACTED]

7.4.10 Willow warbler *Phylloscopus trochilus* (BoCC Wales Red) were recorded occasionally [REDACTED]
 [REDACTED] Single red kite *Milvus milvus* (BoCC Wales Amber) were
 also recorded widely. It is not clear whether any of the individual red kite recorded were
 breeding in the adjacent woodlands, though it was considered unlikely

Table 7.4.4: Notable bird species on site scoped in and/or out

Species	Scoped in / out	Rationale
Skylark	In	High breeding population, habitat impacted
Meadow pipit	In	High breeding population, habitat impacted
Linnet	Out	Moderate breeding population, habitat easily avoided
Cuckoo	Out	No suitable habitat on site itself
Wood warbler	Out	No suitable habitat on site itself
Spotted flycatcher	Out	No suitable habitat on site itself
Tree pipit	Out	No suitable habitat on site itself
Willow warbler	Out	Very little suitable habitat on site itself, easily avoided
Red kite	Out	No suitable breeding habitat on site itself

7.5 Potentially Significant Effects and Approach to Mitigation

Table 7.4.5: Potentially significant effects

Activity	Potential Effects
Construction Phase	
Installation of solar panels (and tracks)	Removal of potential breeding habitat for skylark and meadow pipit
Operational Phase	
Presence of solar panels (and tracks)	Continued non-availability of breeding habitat for skylark and meadow pipit

Decommissioning Effects

7.5.1 No decommissioning effects, aside from temporary disturbance, are envisaged at this time.

Approaches to Mitigation and Biodiversity Benefits

- 7.5.2 Mitigation will ensure that key habitats for skylark and meadow pipit are avoided with infrastructure. This could take the form of leaving larger rows between panels and/or encouraging skylark to move to other parts of the site through reducing grazing levels and thereby increasing the quality of habitat.

7.6 Residual Effects

- 7.6.1 None are considered likely.

7.7 References

Brown A. F. And Shepherd K. B. (1993). A method for censusing upland breeding waders. *Bird Study*, 40:3, 189-195

Chartered Institute of Ecology and Environmental Management (2017). *Guidelines for Ecological Preliminary Ecological Appraisal. Technical Guidance Series.* www.cieem.net

Chartered Institute of Ecology and Environmental Management (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Technical Guidance Series www.cieem.net

8 Archaeology and Cultural Heritage

8.1 Introduction

8.1.1 An Archaeological and Cultural Heritage Assessment of the Proposed Development will be conducted by Headland Archaeology, a Registered Archaeological Organisation of the Chartered Institute for Archaeologists (CIfA) and registered service provider with the Institute for Historic Building Conservation (IHBC). The purpose of the assessment will be to identify the potential effects of the Proposed Development on the historic environment and cultural significance of the area in which the development is located. Historic environment receptors are known as ‘historic assets’.

8.1.2 Examples of what can constitute an historic asset include¹⁵:

- • Listed buildings;
- • Conservation areas;
- • Historic assets of special local interest;
- • Historic parks and gardens;
- • Townscapes¹⁶;
- • Historic Landscapes;
- • World Heritage Sites; and
- • Archaeological remains (including scheduled monuments).

8.1.3 Some historic assets are designated as Registered Historic Landscapes, Scheduled Monuments, Listed Buildings, World Heritage Sites, Conservation Areas, Historic Parks and Gardens, Battlefields, or locally designated through policies in the Local Plan. Non-designated assets may be recorded in Historic Environment Records, while many other assets are currently unrecorded. Historic assets may also derive some, or all, of that interest from their ‘setting’ within the wider landscape.

8.1.4 The Cultural Heritage section of the Environmental Statement (‘ES’) will characterise the historic environment within the site and in the wider study area. It will use the results of consultation, desk-based research, walkover surveys and setting visits to define a study area

¹⁵ PFW11

¹⁶ Cadw has published a number of studies on the character of towns across Wales which provide further information with regards to the concept of townscape as an important historic urban feature: <https://cadw.gov.wales/service-support/place-making/historic-character>

and to assemble a baseline of historic assets within it, and then to assess the potential effects of the Proposed Development on that baseline. Where potential significant effects are identified mitigation measures will be suggested.

- 8.2.5 It is important to note that, although effects upon the significance of historic assets as a result of change within their setting are likely to be primarily visual in nature, the assessment of these visual effects is distinct from the assessment of visual change in the Landscape and Visual Impact Assessment (LVIA). The assessment of effects on setting may be informed by visualisations prepared as part of the LVIA but the conclusions reached regarding visual change in the setting of a historic asset are distinct.

8.2 Policy and Relevant Guidance

- 8.2.1 The assessment will comply with Welsh legislative and planning policy frameworks, and apply Cadw's relevant guidance to ensure the EIA is undertaken in a robust manner.

Policy

- 8.2.2 The assessment will be carried out with reference to the following policies:
- Planning Policy Wales Edition 11, February 2021 (PPW);
 - NPTCBC Local Development Plan (LDP) Strategic Policy: SP21 – Built Environment & Historic Heritage / Issue: Safeguarding features of Local Importance;
 - NPTCBC LDP Strategic Policy: SP21 – Built Environment & Historic Heritage Issue: Protecting Conservation Areas & Other Designated Sites; and
 - Swansea Council (SBC) LDP Policy HC2: Preservation or Enhancement of Buildings and Features;

Guidance

- 8.2.3 The assessment will be carried out with reference to the following guidance:
- Technical Advice Note 24: The Historic Environment (May 2017);
 - Cadw guidance documents: Heritage Impact Assessment in Wales (May 2017) and the Setting of Historic Assets in Wales (2017);
 - Cadw's Conservation Principles (March 2011);

- Standard and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeologists (CIfA 2020),
- Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment (CifA 2020).

8.3 Assessment Methodology and Significance Criteria

Data Sources

8.3.1 The baseline of the assessment will be informed by a full desk-based assessment, using the resources listed below:

- Data on designated historic assets (scheduled monuments, listed buildings, registered parks and gardens, registered historic landscapes) from Cadw;
- Records of historic assets held by Gŵernorgan Gwyn Archaeological Trust HER (GGAT-HER);
- Conservation Area details from NPCCBC and SBC;
- Natural Resources Wales (NRW) Lidar data;
- LANDMAP datasets;
- Maps and plans held in the West Glamorgan archives, Swansea or online sources;
- Relevant internet sources including National Library of Wales;
- Aerial photos held by the Central Register for Aerial Photography Wales (CRAPW) and the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW);
- Readily available published sources and unpublished archaeological reports.

8.3.2 A walkover survey will be undertaken to confirm the presence and condition of known features within the site boundary, and to seek to establish the presence of any currently unknown features within the site boundary following the desk-based data gathering. This site walkover is proposed to include a joint visit with Cadw to examine in particular the prehistoric barrows/cairns within the site. The wider study area will also be visited in order to examine the baseline setting of historic assets in the outer study area from publicly accessible locations.

Consultation

- 8.3.3 Glamorgan Gwent Archaeological Trust (GGAT) as advisors to NPICBC will be consulted for their interest in non-designated historic assets. A written scheme of investigation (WSI) for the desk-based assessment work will be submitted to GGAT for approval before the commencement of the works. If the desk-based assessment work and consultation reveals the need for further archaeological evaluation the scope and timing of this will be agreed with GGAT. WSIs for these phases of work will also be prepared and submitted to GGAT for approval prior to the commencement of such evaluation work.
- 8.3.4 Following Stage 1 of the setting assessment the NPICBC and SBC conservation officers will be consulted for their interest in listed buildings and conservation areas and Cadw will be consulted for their interest in designated historic assets in order to agree which assets will be carried forward to detailed assessment.

Assessment of Likely Effect Significance

Importance

- 8.3.5 Analysis of the historic assets and historic mapping will allow synthesis and interpretation of the historic development of the site to be established in accordance with Cadw's Heritage Impact Assessment, in Wales¹² and Conservation Principles for the sustainable management of the historic environment in Wales¹³. This analysis will also establish what comprises the setting for the historic assets, and what elements of that setting contribute to how the asset is experienced, understood and appreciated. Assessment of the heritage importance (sensitivity) of all assets that may be affected would use the criteria in the following table.

Table 8.3.1: Criteria for Establishing Importance of Heritage Assets

Importance	Description of receptors
Very High	World heritage sites; assets of acknowledged international importance; assets that can contribute significantly to acknowledged international research objectives; Historic landscapes of international value (designated or not) and extremely well preserved historic landscapes with exceptional coherence, time depth or other critical factor(s).
High	Scheduled monuments and non-designated assets of schedulable quality and importance; Grade I and I* Listed

⁷⁴ Cwm 2017 Heritage Impact Assessment in Wales [available at: https://cwm.gov.wales/sites/default/files/2018-03/2017-03-17_Cwm%20Heritage%20Assessment%20in%20Wales%202015-17_0.pdf].

¹⁶ www.walrus-bc.ca/default/files/2019/04/Conservation_Principles_for_the_sustainable_management_of_the_historic_environment_in_Walrus_bay.pdf

Importance	Description of receptors
	buildings and Grade II listed buildings that can be shown to have exceptional qualities in their fabric or associations; Conservation Areas with exceptional qualities; non-designated structures of clear national importance; designated and non-designated historic landscapes of historic interest; assets that can contribute significantly to acknowledged national research objectives.
Medium	Grade II listed buildings; Non-designated assets that contribute to regional research objectives; Locally listed buildings and other historic unlisted buildings that have exceptional qualities; Conservation Areas.
Low	Non-designated assets of local importance including those compromised by poor preservation; assets of limited value but with the potential to contribute to local research objectives; robust non-designated historic landscapes.
Negligible	Assets with very little surviving archaeological interest; buildings of little architectural or historic note; landscapes with little historic interest

Assessment of potential impacts

8.3.6 The Proposed Development would result in a change to the existing baseline, and change might be considered as impacts according to the degree of change in relation to heritage significance. In accordance with EIA regulations, the assessment would identify impacts and effects as direct or indirect, adverse or beneficial, and short term, long term or permanent.

8.3.7 Direct impacts are those which physically alter an asset and therefore its heritage significance. Impacts upon setting are those which affect the heritage significance of an asset by causing visual or sensory change within its setting. Application of Cadw's Managing Setting of Historic Assets in Wales will require a four-stage process in assessment of impacts:

- Stage 1: Identify the Historic Assets
- Stage 2: Define and Analyse the Setting
- Stage 3: Evaluate the Potential Impact of Change or Development
- Stage 4: Consider Options to Mitigate the Impact of a Proposed Change or Development

Criteria for Assessing Magnitude of Impact

- 8.3.8 The impact will reflect the scale of change which would be caused by the Proposed Development and the effect this would have on ability to interpret significance and appreciate the historic asset. Impacts can result either from physical changes to a historic asset or through sensory changes within its setting.
- 8.3.9 An impact may be positive where for example, as part of the Proposed Development, an intrusive building or feature is removed or replaced with a more harmonious one; historic features are restored or revealed; a new feature is added which adds to public appreciation; new views are introduced that add to public experience of an asset, or public interpretation or access is improved to an asset or its setting.
- 8.3.10 Impacts may impart major change, for example where groundworks completely destroy important archaeological remains, to minor change to part of a historic asset's setting, leading to a limited impact on our ability to interpret it, or its context.
- 8.3.11 Utilising the key principles for assessing the implications of change outlined above, an assessment of the magnitude of impact will be implemented for each baseline historic asset (Table 8.3.2).

Table 8.3.2: Criteria for Classifying Magnitude of Impact

Impact Magnitude	Criteria
Major	Change to key historic building elements so that an asset is totally altered; change to most all key archaeological materials such that the resource is totally altered; comprehensive change to the setting
Moderate	Change to many key historic building elements, such as the asset is significantly modified; changes to many key archaeological materials such as the resources is clearly modified; changes to setting of an historic buildings, such that it is significantly modified
Minor	Change to key historic building elements, such that the asset is slightly different; changes to key archaeological materials such that the asset is slightly altered; changes to setting of an historic building, such that it slightly changes
Negligible	Very minor changes to historic building elements, archaeological materials or setting that barely affect them/t
No Change	No change to fabric, archaeological materials or setting

Criteria for Assessing Level of Effect

- 8.3.12 Following a design freeze the EIA will assess the potential direct effects for historic assets from construction activities. The Outer Study Area assessment would be focussed on designated historic assets that, following the filtering process, are considered to have potential for more than minimal visual change with the potential to impact upon significance.
- 8.3.13 The assessment of effects will combine analysis of the data gathered during the DBA and site visit, photographs and wireframe visualisations of the topography and Proposed Development (produced by the LVIA consultants).
- 8.3.14 These assessments will be carried out using professional judgement, taking into account designations and heritage significance as assessed against national standards. Significance of effect will be based on a combination of importance (in other disciplines sometimes referred to as sensitivity of the receptor) and magnitude of impact. The significance of effect matrix is presented in Table 8.3.1 and relates the importance to the magnitude of impact (incorporating contribution from setting where relevant) to establish the likely significance of effect.
- 8.3.15 Effects of Major or Moderate significance are considered to be "significant effects"; those of Minor or Negligible significance are considered not to be significant, but will be described in the assessment. Where Table 8.3.4 provides two possible options for the significance of effect this will be a matter of professional judgement, taking into account the relative importance and heritage significance of the asset, the magnitude of impact and the reversibility or otherwise of the impact.

Table 8.3.4: Level of Effect based on Inter-Relationship between the Importance of a Heritage Asset and the Magnitude of Impact

Magnitude of Impact	Importance and/or Sensitivity				
	Negligible	Low	Medium	High	Very High
High	Minor	Moderate	Moderate	Major	Major
Medium	Negligible / Neutral	Minor	Moderate	Moderate	Major
Low	Negligible / Neutral	Negligible / Neutral	Minor	Minor	Moderate
Negligible	Negligible / Neutral	Negligible / Neutral	Negligible / Neutral	Minor	Minor
None	No effect / Neutral	No effect / Neutral	No effect / Neutral	No effect / Neutral	No effect / Neutral

Cumulative Effect Assessment

- 8.3.16 Cumulative effects on the significance of historic assets may occur where the Proposed Development results in a residual effect on the significance of a historic asset and other developments also have an effect on the same asset.
- 8.3.17 It is proposed that other major planning applications within 5 km of the site be considered for cumulative effects. This is in order to focus the assessment on potentially significant cumulative interactions. An initial search of NPICBC and SBC's planning portals² indicates that there are no such current applications.

8.4 Potentially Significant Effects and Approach to Mitigation

Baselining

- 8.4.1 The baseline used for this scoping section has been compiled using data supplied by GGAT HER, RCAHMW and designation data available as GIS datasets downloaded from Welsh Government's GeoPortal for Wales "DataMapWales". Historic assets within the site are shown on Figure 8.1a and 8.1b, designated historic assets in the surrounding 2km study area are shown on Figure 8.2.
- 8.4.2 The proposed solar farm site contains four scheduled monuments, one (GM549) comprises a group of medieval house platforms on the east facing slopes of the northern parcel of the site, the other three are prehistoric ritual or funerary sites. There is some duplication between the RCAHMW, HER and designation datasets, with individual cairns and house platforms being recorded separately in the RCAHMW and HER datasets where they are grouped in the scheduled monument dataset.
- 8.4.3 In total there are 28 non-designated assets within the site – a Bronze Age cairn, six earthworks of medieval settlement and agricultural activity (long huts, a hearth, a shelter and a pillow mound), earthwork remains of attempts at mineral exploitation, post-medieval farmhouse and two post-medieval field boundaries, a modern triangulation point and a WWI bombing decoy, six assets are undated but likely to be of medieval or post-medieval date (a clearance cairn, cultivation ridges, further house platforms and pillow mounds, a mound, a farm building and a hollow way).
- 8.4.4 A site walkover in February 2022 found that there are some discrepancies in the descriptions of the prehistoric cairns and their physical appearance on site. The round cairn with cist (GM387) recorded in the northern part of the site was found to have no

² 15th September 2022

evidence of a cist, but one of the cairns recorded at GM 383 was found to have stones on which is consistent with the RC IAVW description. A site visit with Cadw to review these assets at an early stage of the project is proposed.

- 8.4.5 There are eight scheduled monuments beyond the site boundary but within 2 km of the potential solar farm site. These include four industrial structures, a canal and the dam for the Neath Abbey Ironworks as well as the remains of Neath Abbey & gatehouse and a medieval cross & grave slab in Neath.
- 8.4.6 There are 53 Listed Buildings within 2 km of the potential solar farm site. Three are grade III* listed (two blast furnaces at Neath Abbey Ironworks and the engine house at Scott's Pit west of Biringrove), four further industrial assets are listed at grade I*. The remaining 46 listed buildings are also grade II. The closest listed buildings to the site are the Pen and Pigsty (11770) c.400 m east of the southern parcel and Capel Saron (72089) c.345 m west of the southern parcel.
- 8.4.7 The remaining listed buildings are mainly located within urban areas and comprise eight churches and chapels, a chapel hall, a war memorial, and a public house. There are also 26 transport structures (bridges, aqueducts, viaducts and milestones) within 2 km of the site.
- 8.4.8 These listed buildings outside of the towns include Manor Park country house (82331), the former icehouse and former stables and coach house associated with Dyffryn House to the east of the site, and the church of St Matthew and its former vicarage (Swiss Gables, 82324), lychgate (82324) and a memorial in the churchyard (82320).
- 8.4.9 There are no Registered Parks and Gardens or Conservation Areas within 2 km of the site. The closest are: Lansanlet Conservation Area, just over 2 km to the southwest, and The Gnoll Registered Park and Garden 3.9 km to the southeast.

Potentially Significant Effects / Mitigation

- 8.4.10 Effects on the historic environment can arise through direct physical impacts, impacts through changes in an asset's setting or indirect impacts.

Direct Impacts

- 8.4.11 Direct physical impacts describe those development activities that directly cause damage to the fabric of a historic asset. Typically, these activities are related to construction works and will only occur within the Proposed Development site boundary.
- 8.4.12 Construction of the solar farm could result in direct physical impacts on the scheduled monuments and non-designated assets within the site. Impacts on the scheduled

monuments would be considered significant effects and impacts on non-designated assets could be significant depending on the scale of the impact and the relative importance of the asset.

- 8.4.13 A direct impact can also occur when the presence of a development changes the setting of a historic asset in such a way that it affects (positively or negatively) the heritage significance of that asset. Visual impacts are most commonly encountered but other environmental factors such as noise, light or air quality can be relevant in some cases. Impacts may be encountered at all stages in the life cycle of a development from construction to decommissioning but they are only likely to lead to significant effects during the prolonged period which is the operational life of the development.
- 8.4.14 The scheduled monuments within the site could experience adverse effects due to changes in their setting during construction and for the operational life of the solar farm. Construction phase changes to the setting of historic assets will be short-term and reversible and are therefore scoped out of the assessment as being unlikely to result in significant effects. The longer term operational phase of the solar farm could result in significant effects as a result of changes within the setting of historic assets.
- 8.4.15 An initial appraisal of the baseline including a site walkover found that the house platforms derive significance from their evidential value as physical remains of former settlement and are experienced on the steep east-facing slopes of Mynydd Drumau. The prehistoric ritual and funerary sites derive significance from their evidential value as examples of this type of monument and are experienced on the plateau of Mynydd Drumau at varying distances, the most prominent being the Carreg Bice standing stone which dominates the plateau.
- 8.4.16 Cultural heritage constraint areas will, where necessary, be defined to include an appropriate buffer around known historic assets. Constraint areas can be treated as a 'trigger' for the identification of potential direct effects: they represent areas within which works may lead to direct effects of more than negligible significance on known historic assets.
- 8.4.17 Potential effects on unknown historic assets will be discussed in terms of the risk that a significant effect could occur. The level of risk depends on the level of archaeological potential combined with the nature and scale of disturbance associated with construction activities and may vary between high and negligible for different elements or activities associated with a development, or for the Proposed Development as a whole.

- 8.4.18 Potential effects on the settings of historic assets will be identified from an initial appraisal ('stage 1 settings assessment') of data from Cadw, RCAI MW and the HTRs and consideration of current maps and aerial images available. Where this initial appraisal identifies the potential for a significant effect, the asset will be visited to define baseline conditions and identify key viewpoints. Visualisations will be prepared (by the EIA consultants) to illustrate changes to key views where potentially significant effects are identified.

Indirect Impacts

- 8.4.19 Indirect impacts describe secondary processes, triggered by the development, that lead to the degradation or preservation of historic assets. For example, changes to hydrology may affect archaeological preservation; or changes to the setting of a building may affect the viability of its current use and thus lead to dereliction.

Decommissioning

- 8.4.20 Historic assets will be avoided through the design and/or construction method for the solar farm and therefore decommissioning effects are scoped out of the assessment.

Mitigation

- 8.4.21 Direct physical impacts to scheduled monuments will be avoided by creating an appropriate buffer around them when designing the solar farm. Where possible non-designated assets will also be avoided in this way, however where impacts cannot be avoided through changes to the layout, alternative construction methods (such as keeping cables above ground, using ballast supports rather than piled foundations for the arrays) can be used to avoid impacts. Where physical impacts to non-designated historic assets cannot be avoided through design changes they will be off-set through a programme of archaeological works which will be set out in a Written Scheme of Investigation approved by CGAT.
- 8.4.22 Impacts resulting from changes to the setting of historic assets can only be avoided through design changes such as removing panels from parts of the site or through vegetation planting to screen the solar arrays. The most appropriate method of avoiding impacts will be considered within the EIA for each historic asset identified as experiencing harmful changes to its setting.

Residual Effects

- 8.4.23 Where potentially significant effects are identified, mitigation measures will be proposed. The preferred mitigation options always to avoid or reduce effects through design, or through precautionary measures such as fencing off historic assets during construction works. Effects which cannot be eliminated in these ways would lead to residual effects. It is anticipated that careful design of the solar farm will avoid significant residual effects to historic assets.

Cumulative Effects

- 8.4.24 Subject to confirmation of any schemes that need to be included in the cumulative assessment no significant cumulative effects are predicted.

9 Transport and Access

9.1 Introduction

- 9.1.1 The section covers the predicted transport and access issues that may arise from the construction of the Proposed Development, the significance of these effects and what suitable mitigation can be put in place to avoid, minimise or offset any adverse impacts.
- 9.1.2 The Transport and Access Environmental Statement (ES) Chapter will be supported by a combined Transport Statement/Construction Traffic Management Plan report and technical figures.
- 9.1.3 The key issues for consideration as part of the assessment will be:
- The temporary change in traffic flows and the resultant, temporary effects on the study network during the construction phase;
 - The design of new access infrastructure; and
 - The consideration of appropriate and practical mitigation measures to avoid, minimise or offset any temporary effects.
- 9.1.4 The potential effects of these will be examined in detail.

9.2 Published Guidance and Approach

- 9.2.1 The following policy and guidance documents will be used to inform the Transport and Access Chapter:
- The Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Assessment (IEA), 1993);
 - Future Wales – The National Plan 2040 (2021);
 - Planning Policy Wales (PPW);
 - Technical Advice Note (TAN) 18 Transport; and
 - Welsh Transport Appraisal Guidance (WTAG) (2017).

9.3 Assessment Methodology

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

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

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

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

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

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

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

9.3.6 It is not anticipated that a formal Transport Assessment will be required as these are not generally considered necessary for temporary construction works. A reduced scope Transport Assessment combined with a Construction Traffic Management Plan is therefore proposed.

9.4 Baseline

9.4.1 Access to the Proposed Development will be taken from a new access junction to be formed on Drunau Road, to the east of the existing residential development. The exact location is currently being investigated.

9.4.2 Construction traffic associated with the development will generally approach from the M1 corridor via Junction 44. Construction vehicles would then access the site via the B462a, B4291 Birchgrove Road, before turning right onto Drunau Road.

- 9.4.3 The study area for the transport assessment will reflect the access routes for the delivery of construction materials and will include the following:
- The M4 to the northwest and southeast of Junction 44;
 - The B4525 between M4 Junction 44 and its junction with B4291 Birchgrove Road;
 - The B4291 Birchgrove Road between its junctions with the B1625 and Drumau Road; and
 - Drumau Road between its junction with Birchgrove Road and the site access junction.
- 9.4.4 Existing traffic count data will be used from the Department for Transport (DfT) database for the M4. New Automated Traffic Count (ATC) surveys for the B4291 and at the site access junction on Drumau Road will be commissioned and deployed for one week to record classified traffic data for a neutral month. The survey information will be factored using Low National Road traffic forecast (NR11) low growth assumptions to develop a future year baseline traffic flow for use in the assessment.
- 9.4.5 Three years of traffic accident data will be collected using the online resource crashmap.co.uk for the study area to inform the baseline review.
- 9.4.6 Online sources such as the National Cycle Route map and Ordnance Survey maps will be used to obtain details of the sustainable travel network.
- 9.4.7 Once operational, it is envisaged that the level of traffic associated with the Proposed Development will be minimal. Regular monthly or weekly visits would be made to the solar farm for maintenance checks. The vehicles used for these visits are likely to be 4x4 vehicles or Light Goods Vehicles (LGV) and there may also be the occasional need for an HGV to access the site for specific maintenance and/or repairs. It is considered that the effects of operational traffic would be negligible, no detailed assessment of the operational phase of the development is proposed and it can therefore be scoped out.
- 9.4.8 The traffic generation levels associated with the decommissioning phase will be less than those associated with the development phase as some elements such as access roads will be left in place on the site. As such, the construction phase is considered the worst case assessment to review the impact on the study area. An assessment of the decommissioning phase will therefore not be undertaken, although a commitment to reviewing the impact of this phase will be made immediately prior to decommissioning works proceeding.

9.5 Impact Prediction and Mitigation

9.5.1 Potential impacts that may arise during the assessment may include the following for users of the road and those resident along the delivery routes:

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

9.5.2 The impacts on receptors within the study area will be reviewed during the construction phase, with a peak construction period assessment undertaken. This will review the maximum impact and presents a robust assessment of the effects of construction traffic on the local and trunk road networks.

9.5.3 The effects that will be considered will be based upon percentage increases in traffic flow and reviewed against the impacts noted above.

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

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

9.6 Residual Effects

9.6.1 There are no predicted residual effects as a result of the construction phase.

9.7 Cumulative Assessment

9.7.1 Committed development traffic, i.e. those from proposals with planning consent, will be included in baseline traffic flows, where traffic data for these schemes is considered significant and is publicly available. Developments that are proposed or at Scoping would not be included.

10 Socio-economic Impacts Assessment

10.1 Introduction

- 10.1.1 This chapter sets out the socio-economic impact assessment that will be conducted as part of the application for the Proposed Development. It outlines the information sources intended to be used for the assessment, the methodology, study area, and potential significant effects.
- 10.1.2 The Proposed Development will have a range of social and economic impacts in the local area to the site as well as wider Wales. These impacts may be both positive and negative.
- 10.1.3 Waverhill, a Welsh based employee owned company has been contracted to provide impartial social and economic research, analysis and evaluation on the proposed Meillon Solar Farm. Waverhill has to date conducted research for seven renewable energy projects, both in Wales and elsewhere in the United Kingdom.

The site

- 10.1.4 The key aspects of the site from a socio-economic perspective are its potential recreation uses and the socio-economic baseline for the surrounding area (using data from the NP/CBC area).
- 10.1.5 Part of the site is classified as access land under the Countryside and Rights of Way (CROW) Act 2000. There is therefore the potential for some recreational use of parts of the site and in its immediate surroundings.
- 10.1.6 No residences are located within the site boundary, though there is some visibility of the site from nearby villages of Clydach (population 12,593), Birchgrove (population 7,302), Cilybebyl (4,769) and Llansamlet (population 7,341) and from the tourist attraction Neath Abbey.

10.2 Published Guidance and Approach

- 10.2.1 There is no specific guidance available which establishes a methodology for undertaking an Environmental Impact Assessment (EIA) of the socio-economic effects of a Proposed Development. Therefore, the approach used in the assessment for the Proposed Development is based on best practice and in consideration of the policy requirements set out in the National Development Plan for Wales, *Future Wales: the National Plan to 2040* and local planning policy.
- 10.2.2 The EIA regulations used in the National Policy Framework request that the EIA assess the direct and indirect impacts of a project on human populations and their interaction with the environment. This recognises that social and economic effects are likely to occur which may

produce both positive and negative impacts for people both locally to the site, but also in other communities and parts of the country.

- 10.2.3 Adherence will be made to the best practice and guidance highlighted in the latest Planning Policy Wales (Edition 11), and other relevant policy and legislation as appropriate from government and industry groups.
- 10.2.4 The support for, and context to, solar farm development in Wales is set out in a range of policies, with sustainability often at the centre of Welsh Government policy activity in the past decade. Foremost, The Wales Environment Act (2016), which introduced the legislation needed to ensure that natural resources *within* Wales are used sustainably and proactively for the future and complements the recently published *Future Wales: The National Plan 2040* which details how Wales will maximise the social and economic opportunities it has in a sustainable manner.

Policy Position

- 10.2.5 The UK government has made a commitment to reach net zero by 2050, and renewable energy, including solar power, is fundamental in achieving this. Welsh Government is also committed to sustainable development and net zero with a pledge campaign across the country to reduce carbon emissions.
- 10.2.6 Other policies and strategies either support, or *will* be supported by, renewable energy development and decarbonisation include the Well-being of Future Generations Act (2015) which places emphasis on the importance of decarbonisation for the future.
- 10.2.7 *Prosperity for All: A Low Carbon Wales* builds on the Wales Environment Act and furthers the importance of reducing greenhouse emission by 2050 and working towards net zero goals. It sets out how a low carbon economy for Wales can be achieved and its benefits, including clean growth, quality jobs, clean air and water and improved health. The development of new solar farm sites, including The Development, directly align and contribute to this and other policy areas, by creating high value jobs, improving sustainability and reducing emissions, diversifying the economy and increasing wellbeing.
- 10.2.8 *Capturing the Potential: A Green Jobs Strategy for Wales*¹⁸ aims to strengthen the low carbon energy sector in Wales, focusing on the transition Wales needs to undergo to become a low carbon economy in all regards. This includes fostering innovation and technological

¹⁸ [Prosperity for All: A Low Carbon Wales \(Welsh Gov\)](#)

¹⁹ [Capturing the Potential: A Green Jobs Strategy for Wales](#)

progression, supporting sustainability in businesses and investing in a more sustainable economy (feeding into later strategies with similar objectives).

10.2.9 The *Programme for Government*²⁰ includes several themes on sustainability including building a greener economy and embedding a response to the climate and nature emergency in everything.

10.2.10 At a regional level, the *Swansea Bay City Deal*²¹ aims to grow the area and develop high value sectors and employment to improve GVA and productivity. The Swansea Bay City Region Deal is an investment of £1.3billion across nine major programmes across Swansea, Carmarthenshire, NPT, and Pembrokeshire, and includes a £58.7million programme to support innovation and low carbon growth across the region.

10.2.11 Neath Port Talbot Local Development Plan (LDP) 2011-2026 includes climate change as one of the overarching policies for the area. The NPT LDP also highlights objectives for economic development. These include objectives to encourage employment opportunities and growth within the county which will be supported by the development of the low and zero carbon sectors.

10.3 Assessment Methodology

Information sources

10.3.1 The following sources of information have been reviewed during the desk-based research for this Scoping Report and will be considered in the assessment:

- ONS Statistics
- Planning Policy Wales (Edition 12)
- Site location information
- Welsh Government environmental and socio-economic policy

Assessment of Social Factors

10.3.2 To assess the socio-economic impact of the Proposed Development a desk-based analysis will be carried out exploring the available evidence. This will include information from a review of economic policy and literature of similar solar farm sites to identify comparable benchmarks. Recognised metrics for construction impacts will also be used, such as data to convert spend

²⁰ [Programme for Government 2021 to 2026](#)

²¹ [Swansea Bay City Deal](#)

into Gross Value Added (GVA) and jobs created for the sectors involved in the development of a solar farm.

- 10.3.3 The impact assessment will include a review of the socio-economic baseline indicators for either the area proximate to the site or, given availability of data at the local authority level, for NPT. Indicators include local demographics and the labour market, economic outputs and average wages, structure of the local economy, job density and comparators with Wales and the United Kingdom (UK). This will support an appraisal of the social and economic policy context at the local, regional and national level. This information will help inform a modelling exercise conducted for the parameters of the Proposed Development to determine the likely scale and scope of any impacts on the GVA and jobs safeguarded and created indicators described above.

Proposed Field Surveys

- 10.3.4 The socio-economic impact assessment will require no field surveys.

Stakeholder consultation

- 10.3.5 To support the understanding of the local context and potential impacts that the Proposed Development may have, a consultation of local stakeholders will be undertaken. This will include the following:

- Local council officers and members
- Community interest groups
- Wood and Trust
- Welsh Government
- Development Bank of Wales
- Swansea Bay City Region

- 10.3.6 Further, consultation with local industry groups and representatives will also be carried out where appropriate to build on previous consultation evidence gathered by the contractor to understand the potential supply chain benefits within the local area and extent to which they will be able to support the Proposed Development.

Assessment methodology

- 10.3.7 There is no published standard for assessing significance of impacts of a solar farm development on different receptor groups, though generally, the proximity of the receptor to

the site, the level of usage of the site itself and the ease of mitigation all determine sensitivity. As the socio-economic receptors considered have the same level of sensitivity (i.e. one job is considered the same as another) then only magnitude will be considered when determining the significance of an impact. These will be based on the criteria set out in the table below.

Table 10.3.1 Scale of Impact and Associated Criteria

Magnitude of Impact	Definition/Criteria
Major	A substantial change to socio-economic loss or gain in the area of impact affecting a large number of people (100+) and/or businesses (30+) to the extent of changing the business and employment structure.
Moderate	A partial change to socio-economic loss or gain in the area of impact affecting a sizeable number of people (20-100) and/or businesses (10-30) to the extent of adjusting business operations and employment.
Minor	A small change to socio-economic loss or gain in the area of impact affecting a group of people (<20) and/or businesses (<10) to the extent of influencing business activities and employment opportunities.
Negligible	No change to socio-economic loss or gain in the area of impact affecting no people and/or businesses permanently and very few people (<10) and/or businesses (<5) temporarily (for less than 1 year).
Neutral	Where there is no positive or negative socio-economic impact.

10.3.8 The economic model will assess the impact of the Proposed Development across multiple scenarios to provide a range of different impacts to help demonstrate the potential impacts. This can then be compared with the economic baseline for the area. The judgments and assumptions underpinning these scenarios and assessments will be based on experience of other projects, the insight offered from the economic baseline and the literature evidence available.

10.3.9 Modelling will consider how the scope and scale of the Proposed Development will bring economic opportunities and potential challenges to the area, the effects this will have on job creation or safeguarding and the overall GVA that will be created.

10.3.10 Accounting for location of expenditure, multipliers, displacement, substitution and leakage will all be carried out to provide the final attributable impact of the Proposed Development on the economy in the area of study, Wales and the United Kingdom (UK). This will also consider the effects of any shared ownership or community benefit fund established as part of the development.

10.4 Study area

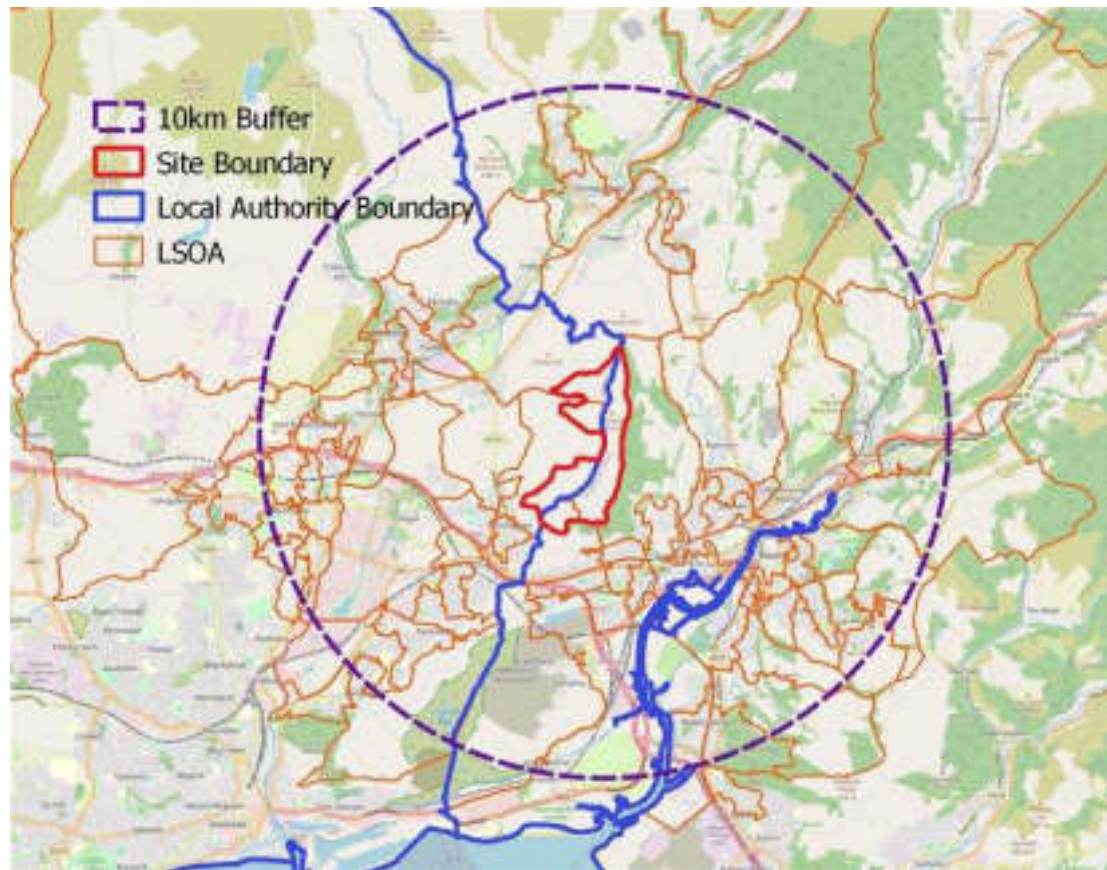


Figure 10.4.1: Map of study area

- 10.4.1 Three areas of impact will be considered in economic impact assessment. A local study area established as wards that fall within 10km of the Proposed Development, Wales and the UK. The Development site is located at the border of the Principal Area City and County of Swansea, a unitary authority (under the jurisdiction of Swansea Council), and the Principal Area Neath Port Talbot (NPT), a county borough part under the jurisdiction of NPICBC.
- 10.4.2 As outlined above, given socio-economic data is more recent and readily available at the Local Authority level, this geographic boundary will be the primary focus of the socio-economic baseline.
- 10.4.3 Where possible and pertinent, ward information may be used to provide a more detail on the area of specific impact, given the smaller scale of the development, Zone of Theoretical Visibility and the communities thereby directly affected.
- 10.4.4 Economic impacts from the scheme will be considered on a national Welsh level and more widely across the UK. This will allow for the fact that much of the economic benefits such as jobs created and GVA will be to businesses based outside of NPT, and potentially even Wales.

Sensitivity to the location of contractors and supply chains will be made to allow for the fact that some economic impacts may be accrued outside of the UK (for instance solar panel manufacture and supply is likely to be from a country outside of the UK).

- 10.4.5 For the socio-economic impact assessment, a study area of the Principal Areas of NPT and the northern communities of Swansea is proposed.

Communities adjacent to the site

- 10.4.6 Immediately adjacent to the site are a mixture of former mining villages and communities including parts of Clybebyll and Blaenboddan and farming and forestry communities. Immediately to the south of the site, the village of Skewen (population 8,500) is connected by rail to Swansea and Cardiff by the South Wales Main Line.

Nearest urban centres to the site

- 10.4.7 The urban areas of Neath, Swansea and Port Talbot were historically important industrial nodes, particularly for the coal mining and copper trades.
- 10.4.8 **Neath** (National Grid Reference SS7700097000) is located 1km to the south of the proposed solar farm site and 7km north east from Swansea. The town has a total population of 50,658 of which 19,258 belong to the parish community.
- 10.4.9 **Swansea** (National grid reference SS 65380 92901) is located approximately 5km to the south-east of the proposed solar farm site. The city has a total population of 246,717 (ONS, 2019).
- 10.4.10 **Port Talbot** (National grid reference SS 76547 90056) is located approximately 6km to the south-west of the proposed farm site. The town has a population of 37,276 (2011 census).

10.5 Baseline

- 10.5.1 A summary of the socio-economic characteristics of NPT are given through a number of indicators against which the area can be assessed, providing comparison figures to Wales and the UK where appropriate. This data is drawn from mainly Office for National Statistics (ONS) sources.

Economic profile of NPT

- 10.5.2 Data generated from the ONS Local Statistics (2019)²² estimated the economy of NPT to be around £3bn of GDP, with an average growth rate up until 2019 of around 2.7% per year. This

²² [Local Statistics \(ONS\) https://www.ons.gov.uk/help/locallstatistics](https://www.ons.gov.uk/help/locallstatistics)

is in line with the Welsh average (2.7%), comparable to neighbouring Carmarthenshire (2.8%) but lower than neighbouring Swansea (3.3%).

- 10.5.3 The productivity of the area, as measured by GVA per head the NUTS3 area of Bridgend and NPT is slightly below the Wales average. The latest data available shows that the GVA per head for Bridgend and NPT is 67% of that of the UK and 93% of that of Wales.
- 10.5.4 In 2021, just under 20% of residents of NPT had a qualification of NVQ Level 4 or above. This falls below the overall average for Wales (39%) and the UK as a whole (44%). This suggests that the skill level in NPT is below that of both Wales and the UK.

Structure of the economy

- 10.5.5 The site of the Proposed Development is adjacent to some Lower Layer Super Output Areas (LSOAs) such as Bryncoch ranked in the bottom third of deprivation in Wales, and Cwcah which is in the bottom 10%. However, deprivation in the area is mixed with Llansamlet in the top half of least deprived LSOAs in Wales. NPT overall has the 5th highest percentage of areas in the most deprived 50th.
- 10.5.6 There are 3,110 enterprises in NPT, with 88.4 per cent (2,750) of these being micro in size (0-9 employees).
- 10.5.7 The top industry by employment is manufacturing (18 per cent of all employment within NPT). Although economic activity is similar to national levels, the availability of work in the area is lower, leading to commuting to places like Swansea and Cardiff.
- 10.5.8 Job density is used to provide an understanding of how urban economies are structured in terms of how jobs are concentrated or dispersed across a given area. The data generated from ONS figures (2021) illustrate a consistently lower job density in NPT (0.63 jobs to population aged 16-64) than both Wales and the UK (0.76 and 0.84 respectively). This points to a focus on manufacturing and logistics sectors in NPT.

Labour market

- 10.5.9 The average salary for full-time employees in NPT in 2021 was £31,456, slightly higher than the Welsh average but lower than the UK as a whole²³. The ONS Annual Survey of Hours and Earnings (2021) showed that the average weekly wage for full-time workers in NPT was £589 compared with that of Wales at £571 and the UK as a whole at £613.

²³ [Welsh Index of Multiple Deprivation 2019](#)

²⁴ [Area Statistics \(ONS\)](#)

10.5.10 Data from ONS Labour Force survey illustrates that in 2021 NPT's unemployment rate is 3.4%, marginally lower than both the Wales and UK as a whole both at 3.8%, and lower than neighbouring Swansea at 6.1% and Carmarthenshire at 4.2%.

10.5.11 ONS data illustrates that the economically active population in NPT has at 75% (In 2021) been consistently lower than that of the UK (78%) and also slightly lower than that of Wales (76%).

Demographics

10.5.12 NPT has a resident population of 144,400, with an average age of 43.4 years. As of 2020, of the total resident population, 62% are of working age (16-64 years old). This is in line with both Wales as a whole and the UK. There has been steady population growth since 2001, from both international and internal migration.

10.6 Impact Prediction and Mitigation

10.6.1 The Proposed Development is likely to represent a significant investment that will likely produce substantial economic benefits for the supply chain and employment opportunities for local residents.

10.6.2 For example, the International Renewable Energy Agency (IRENA) estimated that solar photovoltaics will provide the most jobs in the construction and installation phase, at 67% worldwide²⁵. In contrast, solar manufacturing, which is currently dominated by China, is a relatively small component of the domestic solar value chain. It has been established that the socio-economic impacts will largely apply during the construction phase of the solar park.

10.6.3 The findings by IRENA²⁶ established that solar farms create opportunities for local businesses through the supply chain. This includes suppliers of minerals and aggregates, surveillance, security and monitoring through the operational phase, agricultural specialists and landscaping/fencing contractors throughout construction.

10.6.4 The construction phase of the solar farm development is anticipated to create temporary roles for specialist installation contractors. Research conducted in 2014 by the UK Energy Research Centre estimates that across the solar value chain, 400-500 jobs could be created or supported during installation and construction combined, 200-300 in operations and maintenance, and 100 in advanced manufacturing and R&D per GW of additional solar capacity.²⁷

²⁵ [IRENA Report: Renewable Energy and Jobs Annual Review 2021](#)

²⁶ [IRENA Report: Renewable Energy and Jobs Annual Review 2021](#)

²⁷ [UK-ELC Low Carbon Jobs](#)

- 10.6.5 Economic benefits will accrue also under the development phase with visits to the site from the developer and various consultants supporting local businesses, through the construction phase drawing on local contractors or businesses offering supporting services and through the operation where high value job opportunities and training may support local residents.
- 10.6.6 Further to the local economic impacts are multiplier effects on the wider economy from the injection of investment community benefit fund or shared ownership is also likely to bring economic impacts through spending and support to local businesses and community groups. A community fund is an annual payment given to the community surrounding a project to invest in local initiatives or people and over the operational lifetime of the project. Community funds are managed by an external body and delivered in partnership with local communities. Local people are able to advise on the fund strategy and spend, so they can prioritise issues that are important to the local area. Shared ownership gives local community groups and organisations the opportunity to invest in and share in the profit generated by the project and will be further developed and promoted as plans for the project are progressed. Overall, the economic impacts are expected to be additional Gross Value Added, and jobs safeguarded or created.
- 10.6.7 For the industry as a whole to expand, this will require specialists in R&D, product design, product manufacturing and maintenance. Development of a skilled workforce is a prerequisite for growing solar energy production in Wales. This may draw upon existing specialist training and research at universities and colleges (including the Centre for Alternative Technology in Powys, mid-Wales and renewables clusters at Swansea University), as well as specialist training in photovoltaics, renewable energy systems and low carbon technologies.
- 10.6.8 In addition to direct job creation, the proposed solar farm may contribute to indirectly supporting production of raw materials required for solar farm installation.
- 10.6.9 The economic impacts, such as increased employment and contributions to Gross Value Added will be assessed based on expenditure during the development, construction and operation phases of the solar farm. This will include assumptions from the literature and evidence on the extent of local content of contracts issued.
- 10.6.10 There may be some visual impacts on the landscape and glint/glare from the solar panels which may negatively impact recreation and local wellbeing. Further the impact of the development on the historical environment may also affect recreation and social uses. The effects on recreation will therefore be explored in the FIA.

Mitigation

10.6.11 Mitigation methods will be explored by the developer including screening, which may help reduce any potential negative socio-economic effects. These will be considered during the design phase and commented on during the EIA.

10.6.12 No significant effects on tourism (either positive or negative) are expected in relation to the Proposed Development. The evidence provided in a Welsh Government report, as well as other research²⁶, suggests that impacts of renewable energy on tourism are minimal, with tourism data for NPI showing increases in visitor numbers in the last few years despite development of large wind farms which neighbour the Development. It is therefore proposed to scope out tourism from the EIA and ES.

10.7 Residual Effects

10.7.1 Where the development of the Development may have negative residual effects, approaches will be set out to mitigate against the severity of these or avoid them if at all possible. It is anticipated that the developer will utilise these approaches, where appropriate, to mitigate against such effects, but where they cannot, a full exploration of how this impact may affect the socio-economic assessment will be made.

10.8 Cumulative Assessment

10.8.1 There are no other proposed solar developments in direct proximity to the site with the nearest over 20km away. However, cumulative impacts will be assessed as part of the EIA if planning applications for other solar farm schemes within the study area are submitted within the environmental assessment programme for the Proposed Development.

²⁶ [The economic impacts of wind farms on Scottish tourism, A report for the Scottish Government \(2008\)](#)

11 Hydrology, Hydrogeology and Geology

11.1 Introduction

11.1.1 This Scoping Report describes the baseline environment in relation to hydrology, hydrogeology and geology and sets out the potential effects which could occur as a result of the Proposed Development. A description of mitigation measures that will be included as part of the design of the Proposed Development have also been included.

11.2 Policy and Relevant Guidance

11.2.1 The ES chapter on hydrology, hydrogeology and geology will take into consideration relevant legislation, planning policy, and guidance. This includes (but is not limited to):

- Water Environment (Water Framework Directive) (England and Wales) Regulations 2003
- Environmental Permitting (England and Wales) Regulations 2016
- Land Drainage Act 1991
- The Water Supply (Water Quality) Regulations (Wales) 2018
- River basin management plans (RBMP)
- Flood and Water Management Act 2010
- Planning Policy Wales 11 (PPW 11)²⁶
- Future Wales: The National Plan 2040²⁷
- Technical Advice Note 15 (TAN)²⁸
- GP31: Understanding your environmental responsibilities – good environmental practices²⁹;
- GP35: Works and maintenance in or near water³⁰;
- PPG66: Working at construction and demolition sites³¹; and

²⁶ Welsh Government (2011) Planning Policy Wales, Edition 11.

²⁷ Welsh Government (2018) Future Wales: The National Plan 2040.

²⁸ Welsh Assembly/Government (2004) Planning Policy Wales, Technical Advice Note 15: Development and Flood Risk.

²⁹ Natural Resources Wales, Northern Ireland Environment Agency, and Scottish Environment Protection Agency (2020) GP31: A general guide to preventing pollution.

³⁰ Natural Resources Wales, Northern Ireland Environment Agency, and Scottish Environment Protection Agency (2018) GP35: Works and maintenance in or near water.

³¹ Environment Agency (2016) PPG66: Working at construction and demolition sites.

- GP21: Pollution incident response planning³¹.

11.3 Assessment Methodology and Significance Criteria

11.3.1 This chapter of the scoping report has been developed based on information obtained from a preliminary desk-based study. The information used to determine the impacts in the ES chapter have been listed below in Table 11.3.1.

Table 11.3.1: Sources of Information used to assess Baseline Environment

Topic	Source of Information
LiDAR data	http://le.gov.wales/GridProducts#category:LiDARCompositeDataset ³²
Catchments and watercourses	https://waterwatch.wales.naturalresources.wales.gov.uk/en/index.html
TAN15	https://data.map.gov.wales/layers/inspire:nrv:NRW_TAN15_DEFENDED_ZONES
SSSI and RAMSAC sites	https://data.map.gov.wales/layers/inspire:nrv:NRW_LIDAR_ARCHITECTURE_CATALOGUE
Flood Zone 2 and 3	https://data.map.gov.wales/capabilities/ayergroub/20/3/?ows_s=service=wms

11.3.2 Assessments of impacts will be based on initial desk-based studies in respect of early stage designs of the Proposed Development. An iterative design process will be utilised where potential impacts to hydrology, hydrogeology, geology are identified. These early design changes will help reduce the residual effects on the water environment.

11.3.3 Further site visits, consultation, data processing and analysis will then take place using later stage designs of the Proposed Development, and where impacts cannot be avoided, mitigation measures will be provided to reduce effects.

11.3.4 The assessment will follow these key stages:

- identification of the study area;
- baseline determination;
- review of the Proposed Development to identify potential impacts and effects

³¹ Northern Ireland Environment Agency, Department for Agriculture, Environment and Rural Affairs, Northern Environment Protection Agency and Natural Resources Wales (2021) GP 21: Pollution incident response planning.

³² LiDAR Data is being migrated to DataMap Wales

- evaluation of significance of effects and vulnerability of receptors to determine significance of effects;
- identification of mitigation; and
- assessment of significance of residual effects.

11.3.5 The cumulative effects of developments within the local area will be assessed on a catchment basis. The size of the draining catchments and the proximity to current or other Proposed Developments will be assessed to determine the likely cumulative impacts on the local environment.

Study Area

11.3.6 Impacts upon water quality will be considered on a catchment basis. The catchments draining the Site are presented in Figure 11.1.

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

11.4 Baseline

Surface Hydrology, Site Drainage and Flooding

11.4.1 The Proposed Development site is located in South-West Wales, north of Swansea on the hillside of Myrdd Drumau. The site is located on the boundary of two main river catchments; the River Tawe to the west and the River Clydach to the east. The site drains to these river basins through three main sub-catchments: Tawe, Clydach and Nant-y-Fonlud catchments (Figure 11.1).

11.4.2 The Natural Resources Wales (NRW) fluvial flood map indicates the site is not at risk of fluvial flooding. The NRW pluvial flood map indicates that some sections of the site are expected to experience surface water flooding and are located within flood zones 2 and 3 (Figure 11.2). Here the extent of the flooding appears minimal and follows gullies westwards off the site boundary.

11.4.3 Review of the IAN15 NRW maps indicate the site is wholly situated within development advice zone A²² which means the site is considered to be at little or no risk of flooding.

²²https://maps.cyfoethrcen.co.cymru.gov.uk/11n15viewer/index.html?configbase=https://maps.cyfoethrcen.co.cymru.gov.uk/Geccortex/Esri/als1/sites/Flood_Risk/viewers/-flood_Risk/virtualdirectory/4resources/Config/Default&ayer1fmc=2

11.4.4 Review of the NRW flood risk map¹³ showed the area is not at risk of reservoir flooding.

Geology, Hydrogeology and Soils

11.4.5 Bedrock geology of the site indicates it is underlain almost entirely by Swansea Member sandstone. A small area in the most southerly section of the site is underlain by Swansea Member mudstone. Investigation of the superficial geology shows that the majority of is not underlain by any superficial deposits. No data is available for the site. Small isolated pockets of peat are mapped in the centre of the site (Figure 11.2).

11.4.6 The site is entirely underlain by the Swansea Carboniferous Coal Measure groundwater water body which is a moderately productive aquifer.

Land Use and Designated Sites

11.4.7 The Proposed Development is located within an area of open farmland which slopes away steeply towards the east and more gently towards the northern, southern and western extents.

11.4.8 2km south, downstream of the site, is Crymlyn Bog, a Site of Special Scientific Interest (SSSI) and RAMSAR site. 4.8km downstream is Crymlyn Burrows SSSI. Crymlyn Bog has been described as one of the most important wetland sites in Europe¹⁴ while Crymlyn Burrow is one of the last unmodified areas of the Swansea coast.

Water Quality and Water Use

11.4.9 The area lies within the Tawe to Cadoxton Water Framework Directive (WFD) Management Catchment. Of the three WFD river catchments with available data draining the site (the Tawe confluence with Twrch to tidal limit, Clydach-headwater to confluence with River Neath, Nant y Fendrod-headwater to confluence with Tawe), they all have a moderate overall status.

11.4.10 The Clydach-headwater to confluence with River Neath has a chemical status of high, while Tawe confluence with Twrch to tidal limit and Nant y Fendrod headwater to confluence with Tawe have moderate chemical status¹⁵.

11.4.11 These rivers ultimately drain to the WFD waterbodies of the River Tawe (ID: GB110059032180) to the west of the site, the Nant y Fendrod water body (ID: GB110059025110) located to the

¹³ https://maps.efsc.thredboe.cymru.gov.uk/HTMLViewer/Inc2b.html?configbase=https://maps.efsc.thredboe.cymru.gov.uk/geocortex/Lessentials/3L31/sites/Flood_Risk/viewers/-flood_Risk/virtualdirectory/resources/config/Default&overthemap=0

¹⁴ <https://naturalresources.wales/days-out/places-to-visit/south-west-wales/crymlyn-bog-nr-3largen>

¹⁵ <https://waterwatch.wales.naturalresources.wales.gov.uk/en/index.html>

south west of the site, and the River Neath waterbody (D: GB110058026390) to the east of the site.

- 11.4.12 Several small farmhouses have been identified close to the site which may be using private water supplies. Further investigation and liaison with the local council would be required to gain a more complete understanding of the situation.

11.5 Potentially Significant Effects and Approach to Mitigation

Potentially Significant Effects

- 11.5.1 During construction there is a risk of soil compaction across the whole of the site through operation of machinery and plant to install the panel arrays. This is most likely to occur along the access tracks which would be the most heavily trafficked area on site. This could lead to a minor increase in run-off as the soil compaction could reduce the soil's permeability. This, combined with the increase in impermeable areas due to on-site buildings and the other infrastructure, could lead to short term and long term increased surface water runoff. Which has the potential to increase the flashiness of the catchment during high rainfall events and to temporarily reduce groundwater recharge. This could subsequently increase downstream flood risk.
- 11.5.2 There is a risk of surface water flooding of construction working areas. This is most likely to occur during heavy rainfall events which exceed the capacity of any installed drainage system or due to ground conditions resulting in standing water. Impacts associated with flood risk can also occur due to construction activities such as ground reprofiling which have the potential to alter drainage pathways.
- 11.5.3 Water quality can be impacted by the excavation of the topsoil that would likely be required to lay the proposed access tracks and buried cables. If not appropriately mitigated, this can have a direct impact on the exposed subsoil or rock due to increased risk of erosion. This poses a risk during high rainfall events due to increased siltation of runoff which has the potential to pollute surrounding watercourses. The construction work across the site that could expose surface soils, such as soil stockpiles, could occur adjacent to the natural land drainage ditches or watercourses that are located within various parts of the site. Therefore, there is the potential for sediment laden run-off to enter these watercourses directly.
- 11.5.4 Alongside siltation pollution, there is a low risk of chemical spillages/leakages from construction activities or vehicles harming the water quality. If this were to occur it would have the potential to soak through the subsoil and into the groundwater leading to changes in the in-stream hydrochemistry. Or alternatively be entrained with surface water runoff into

- the watercourses surrounding the site. These risks are considered low, providing that refuelling occurs off site and appropriate emergency plans are put in place to deal with potential spill events.
- 11.5.5 Due to the increased impermeable area of the site caused by its change of use, increased overland flow may occur. This has the potential to increase scour in the watercourse and increase flood risk downstream.
- 11.5.6 Towards the south and west of the site are several small farmhouses which could have a private water supply. If private water supplies are encountered and construction is taking place within the catchment, if appropriate mitigation is not provided there is the potential for any construction pollution to impact the water quality of these supplies.
- 11.5.7 As the site drains overland through Crymlyn Bog (SSSI and RAMS/R) and passes Crymlyn Burrow (SSSI), any flood risk increase or water quality decrease carries the risk of harming protected areas of rare biodiversity.
- 11.5.8 A small pocket of peat is mapped within the centre of the site. Given the nature of the Proposed Development and the limited excavation that would take place, no effects are considered likely for these peat resources. It would be ensured that no access tracks would be located within the area of mapped peat.
- 11.5.9 During operation the potential impacts on the water environment are likely to be low. Due to the static nature of a solar farm and the limited ongoing work that would take place during operation, pollution incidents would be restricted to maintenance vehicles and activities. The limited increase in impermeable areas are not likely to result in significant effects in relation to long term flood risk.

Approach to Mitigation

- 11.5.10 To reduce soil compaction during construction a construction traffic management plan would be adopted to minimise the volume and number of journeys required. This would reduce the concentration and distribution of soil compaction which would help minimise any loss of groundwater recharge. Therefore, the impacts related to soil compaction is proposed to be scoped out of the ES for the construction phase of the Proposed Development.
- 11.5.11 To reduce operational soil compaction, vegetation in the form of a wildflower and/or grasses mix will be maintained around the panels, helping to decompact the ground. The use of heavy machinery during this stage will also be minimal. These measures would mitigate the impacts in relation to soil compaction such that they would not likely to be significant. Therefore, it is proposed to scope out effects in relation to soil compaction from the ES for the operational phase.

- 11.5.12 A Flood Consequence Assessment (FCA) and Outline Surface Water Drainage Strategy will be included to manage any increase in surface water runoff which will likely consist of landscaping and planting of native vegetation to intercept runoff and perimeter swales to store any excess runoff predicted. These methods, combined with the minimal increase in impermeable area caused by solar farms, mean the effects of increased surface water runoff during construction and operation would be low and not significant.
- 11.5.13 To reduce siltation impacting water quality during the construction phase, the lengths of open excavations required to build access tracks would be controlled and replaced with gravel material as soon as possible to reduce the risk of erosion.
- 11.5.14 To reduce the potential impacts on water quality caused by chemical pollution from construction activities and vehicles, best practice mitigation measures would be implemented. With these measures included as part of the Proposed Development the impacts would be reduced. However, due to the close proximity of the site to a wet and SSSI, the impacts in relation to water quality during construction are proposed to be scoped into the ES.
- 11.5.15 During the operational stage the impact of the site on levels of siltation and pollution in the waterways will be minimal and consequently it is proposed that these impacts would be scoped out of the ES. Best practice measures in relation to pollution incidents from maintenance vehicles would be implemented and as such construction water quality effects would not be considered significant.
- 11.5.16 Due to the distance of WFD waterbodies and with the implementation of mitigation measures presented above, a WFD assessment is not considered to be required and will not be provided as part of the ES.
- 11.5.17 During the operational phase minimal construction activities will occur on site so the impact of chemical pollution during the operational stage is scoped out.
- 11.5.18 Liaison with the local council and further investigation into the farmhouses surrounding the proposed site would be required before the impacts of the Proposed Development on private water supplies can be scoped out. Details of any private water supplies will be provided within the ES and an impact assessment undertaken as necessary.
- 11.5.19 As the site is not located within any flood plains, no mitigation methods in terms of fluvial flooding is required. The FCA and Outline Surface Water Management Plan submitted as part of the ES will identify the risks of flooding during the operational period from all sources and will summarise the drainage features that form part of the Proposed Development design.

11.5.20 The long terms operation of the Proposed Development is not likely to result in any effects on the small peat pocket within the site, and therefore effects on peat is proposed to be scoped out of the ES.

Summary

11.5.21 Table 11.5.1 below shows the potentially significant effects of the Proposed Development and the rationale for scoping them in or out at this stage.

Table 11.5.1: Scoping summary table

Aspect	Construction	Operation	Rationale for scoping in or out
Soil compaction resulting in increased runoff and reduced groundwater recharge	Out	Out	By implementing a construction traffic management plan, compaction during the construction phase should be minimal. During the operational phase the use of machinery onsite will be minimal. Grasses would be used to promote healthy top soil and stabilise any movement. Solar panels, once installed, would have a negligible impact on soil compaction. Wildflower and/or grasses would be planted beneath panels to ensure no erosion occurs on the drip lines. Impacts of soil compaction during operation can be scoped out.
Water Quality from siltation of runoff and pollution events (spillages)	In	Out	Best practice mitigation measures would be implemented during the construction phase. Due to the proximity to a wetland SSSI, impacts on water quality are possible. Once in operation, impacts on water quality is expected to be minimal due to the implementation of best practice measures.
Designated Sites	In	Out	
Pluvial Flooding	In	In	Pluvial flood zones 2 and 3 occur at multiple areas across the site. The impacts of this on the PV infrastructure needs to be investigated further and consequently both construction and operational have been scoped in. A FCA and Outline Surface Water Management Plan will be submitted with the ES.

Aspect	Construction	Operation	Rationale for scoping in or out
Private Water Supplies	In	In	Not enough data has been obtained to determine if any households in the area rely on a private water supply at this time. Therefore, these effects are scoped in and an impact assessment will be undertaken as required.
Peat	Out	Out	Available mapping suggests only a small pocket of peat is present within the site. No access tracks will be located within the mapped area of peat. Given the low construction and operational construction activities it is not likely effects would be significant.

12 Topics to be Scoped out of EIA

12.1 Glint and Glare

- 12.1.1 It is recommended that glint and glare effects be scoped out of the EIA.
- 12.1.2 The ground-based receptors identified are residential dwellings and regional roads, with the majority of both located to the south of the development. From an initial review of the available imagery, it's likely that existing vegetation and intervening terrain will obstruct views of reflecting panels; therefore, no impact can be predicted concerning road safety and residential amenity.
- 12.1.3 No railway operations and infrastructure have been identified within 500m of the Proposed Development; therefore, no impact can be predicted concerning railway operations and infrastructure.
- 12.1.4 No licensed and unlicensed aerodromes have been identified within 10km of the Proposed Development; therefore, no impact can be predicted concerning aviation activity.
- 12.1.5 Any significant effects towards the identified ground-based receptors can be adequately mitigated – the most common approach being the provision of screening at the site perimeter to obstruct views of potentially reflecting panels. Where views of reflecting panels are obstructed, no effects can be experienced. Other solutions such as layout modification can be considered but are rarely required in practice. Considering the relative location of the Proposed Development with respect to the surrounding railway and aviation infrastructure, layout modifications are unlikely to be required.

12.2 Agricultural Land Assessment

- 12.2.1 An initial check using the Predictive Agricultural Land Classification (ALC) Map 2¹¹ identified the site as being a mix of grades 4 (poor quality agricultural land) and 5 (very poor quality agricultural land).
- 12.2.2 We conclude that there is little prospect of best and versatile land on this site so propose that ALC be scoped out.

¹¹ https://datamap.gov.wales/layers/inspire-wg:wg_predictive_lac2