

# ENVIRONMENTAL STATEMENT: VOLUME 1 PARC SOLAR TRAFFWLL

TRAFFWLL | ANGLESEY



PREPARED BY



PREPARED FOR



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# 1. INTRODUCTION

## 1.1 SUMMARY OF SITE AND PROPOSAL

1.1.1 This Environmental Statement (ES) has been prepared on behalf of Parc Solar Traffwll Ltd (the “Applicant”) to accompany a planning application for the construction, operation and decommissioning of a solar farm across a total area of approximately 63ha. The proposed development encompasses three parcels of land (known as Development Areas (DA)) which are located to the west and south-east of the village Llanfihangel yn Nhowyn and to the south and south-east of the village Bryngwran. RAF Valley is situated to the south and the A55 Expressway lies to the north. The Application Site is situated within the administrative area of the Isle of Anglesey.

1.1.2 **Drawing LOC1001/11/01** identifies the site location.

1.1.3 Parc Solar Traffwll will have an export capacity of circa 35MW of electricity, enough to power approximately 11,600 homes per year and offset over 7,840 tonnes of CO<sub>2</sub> every year, the equivalent of taking around 3,620 cars off the road.

## 1.2 PLANNING APPROACH

1.2.1 As the scheme comprises an electricity generating station with a potential generating capacity of between 10MW and 350MW, it falls within the definition of a ‘Development of National Significance’ (DNS) under section 4 of the Developments of National Significance (Specified Criteria and Prescribed Secondary Consents) (Wales) Regulations 2016<sup>1</sup>, for the purposes of section 62 (D) of the Town & Country Planning Act 1990 as amended by s19 of the Planning (Wales) Act 2015<sup>2</sup> (“the Wales Act”).

1.2.2 Part 5 of the Planning (Wales) Act 2015 sets out DNS as a new category of planning application. The Provisions in the Act came into force in March 2016 and require the Planning Inspectorate Wales (PINS) to manage the DNS process on behalf of the Welsh Government. Future Wales: The National Plan 2040 (February 2021) is the development plan for DNS decision-making purposes. The Act requires the applicant to carry out pre-application consultation before submitting the planning application to PINS. The purpose of the DNS process is to ensure timely decisions are made on those planning applications that are of the greatest significance to Wales because of their potential benefits and impacts.

## 1.3 REQUIREMENT FOR AN ENVIRONMENTAL IMPACT ASSESSMENT

1.3.1 The Development falls within Category 3 of Schedule 2, ‘Energy industry’, sub section (a) ‘industrial installations for the production of electricity, steam and hot water (unless included in Schedule 1). The applicable threshold for Environmental Impact Assessment (EIA) development exceeds 0.5 hectares, and, as such, the Local Planning Authority must screen the proposal (by the criteria listed in Schedule 3) to ascertain whether there are likely to be the potential for likely significant effects on the environment.

1.3.2 The applicant volunteered to undertake an EIA prior to the submission of the planning application. Regulation 5 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 confirms that where an applicant submits a statement referred to as an Environmental Statement for the purposes of the

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<sup>1</sup> 2016 No. 53 (W.23)

<sup>2</sup> 2015 anaw 4

Regulations then that development is EIA development.

- 1.3.3 An Environmental Statement (ES) is a document which presents the results of the detailed assessment of the potential beneficial or adverse environmental effects and impacts arising from the construction, operation and decommissioning phases of the proposed development. The ES must contain information specified in EIA Regulation 2 (1) and Schedule 4.

#### 1.4 REQUEST FOR A SCOPING DIRECTION

- 1.4.1 In May 2019 the Applicant submitted a request for a formal Scoping Direction from PINS under Regulation 33 of the EIA Regulations. The purpose of the request for a Scoping Direction is to:

- Define the scope of the Environmental Statement (ES) which will accompany the planning application;
- Anticipate and so allow potentially adverse environmental impacts to be considered at an early stage;
- Define methodologies to be used in the EIA process to assess the potential effects of the proposal; and
- Engage relevant stakeholders at an early stage of the proposals to enable contribution of relevant information.

- 1.4.2 PINS issued a Scoping Direction on 30th July 2019 (copy included in **Appendix 1.1**). **Table 1.1** below summarises the environmental topics scoped in and out of the EIA.

Table 1.1: Summary of Environmental Topics to be Considered by the EIA

Scoped In Environmental Topic	Scoped Out Environmental Topics
Hydrology and Drainage	Major Accidents and/or Disasters
Ecology and Nature Conservation	Soils and Agricultural Land
Noise and Vibration	Public Health and Wellbeing
Landscape and Visual Impact	Air Quality
Historic Environment	Traffic and Transport
Climate Change	Socio Economic
Cumulative Impacts	Glint and Glare

- 1.4.3 Some of the environmental topics scoped out of the EIA have been subject to standalone assessments, the results of which are presented in standalone reports submitted to accompany the planning application. These include:

- Soils and Agricultural Land – A Soil Survey Report is presented in **Appendix 5.1**;
- Traffic and Transport – A Construction Traffic Management Statement and Traffic Statement are presented in **Appendix 3.1 and 3.2**, respectively; and
- Glint and Glare – The assessment that considers aviation receptors is presented in **Appendix 6.1**.

#### 1.5 PRE-APPLICATION DISCUSSIONS

- 1.5.1 A request for pre-application discussions was made to the Isle of Anglesey County Council (IACC) in May 2019. Following preliminary consultations with the Authority’s in-house consultees. IACC issued a response on 6<sup>th</sup> June 2019 which is included in **Appendix 1.2**.

## 1.6 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

- 1.6.1 There is no statutory requirement regarding the form an ES must take, as this is dependent upon the nature of the development under consideration and the sensitivity of the baseline environment. The EIA Regulations set out the minimum information to be included in an ES, within Regulation 17(3) and Schedule 4.
- 1.6.2 Furthermore, Appendix 3 of Guidance on Developments of National Significance<sup>3</sup> provides advice on the implementation of the EIA Regulations, and summarises the information to be included in an ES. **Table 1.2** identifies the locations within this ES where the information required for inclusion within an ES in accordance with EIA Regulations 2017: Schedule 4 can be found.

Table 1.2: Information for Inclusion in Environmental Statements

Required Environmental Information	Document that Contains the Information
<p>1. Description of the development, including in particular—</p> <p>(a) a description of the location of the development;</p> <p>(b) a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works and the land-use requirements during the construction and operational phases;</p> <p>(c) a description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;</p> <p>(d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, oil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operational phases.</p>	<p>Environmental Statement Vol. 1, Chapter 2</p> <p>Environmental Statement Vol. 1, Chapter 3</p> <p>Environmental Statement Vol. 1, Chapter 3</p> <p>Environmental Statement Vol. 1, Chapters 6 to 12. Supporting technical reporting in Environmental Statement Vol. 2, Chapters 6 to 12</p>
2. A description of the reasonable alternatives	Environmental Statement Vol. 1,

<sup>3</sup> <https://gov.wales/topics/planning/developcontrol/developments-of-national-significance/guidance/?lang=en>

<p>(for example in terms of development design, technology, location, size and scale) studied by the applicant or appellant which are relevant to the proposed development and its specific characteristics and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.</p>	<p>Chapter 5</p>
<p>3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.</p>	<p>Environmental Statement Vol. 1, Chapters 6 to 12. Supporting technical reporting in Environmental Statement Vol. 2, Chapters 6 to 12</p>
<p>4. A description of the factors specified in regulation 4(2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.</p>	<p>Environmental Statement Vol. 1, Chapters 6 to 12. Supporting technical reporting in Environmental Statement Vol. 2, Chapters 6 to 12</p>
<p>5. A description of the likely significant effects of the development on the environment resulting from, inter alia -</p> <p>(a) the construction and existence of the development, including, where relevant, demolition works;</p> <p>(b) the use of natural resources in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;</p> <p>(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances and the disposal and recovery of</p>	<p>Environmental Statement Vol. 1, Chapters 6 to 12</p> <p>Environmental Statement Vol. 1, Chapters 6 to 12</p> <p>Environmental Statement Vol. 1, Chapters 6 to 12</p>

<p>waste,</p> <p>(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);</p> <p>(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;</p> <p>(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;</p> <p>(g) the technologies and the substances used.</p> <p>The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development. This description should take into account the environmental protection objectives established at European Union or Member State level which are relevant to the project, including in particular those established under Council Directive 92/43/EEC and Directive 2009/147/EC</p>	<p>Environmental Statement Vol. 1, Chapters 6 to 12</p> <p>Environmental Statement Vol. 1, Chapters 6 to 12</p> <p>Environmental Statement Vol. 1, Chapter 6</p> <p>Environmental Statement Vol. 1, Chapters 3, 6 to 12</p>
<p>6. A description of the forecasting methods or evidence used to identify and assess the effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved</p>	<p>Environmental Statement Vol. 1, Chapters 6 to 13</p>
<p>7. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the</p>	<p>Environmental Statement Vol. 1, Chapters 6 to 12</p>

<p>extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.</p>	
<p>8. A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of the Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.</p>	<p>Environmental Statement Vol. 1, Chapters 6</p>
<p>9. A non-technical summary of the information provided under paragraphs 1 to 8.</p>	<p>Environmental Statement Vol. 3, Non-Technical Summary</p>
<p>10. A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.</p>	<p>Environmental Statement Vol. 1, Chapters 6 to 12</p>

1.6.3 Information has been gathered for each environmental topic area. This ensures that a comprehensive technical assessment of the potentially significant effects of the proposed development has been undertaken.

1.6.4 Each of the technical assessments has considered:

- **Context:** This sets out the relevance of each environmental topic in both planning and technical terms, including an explanation of the terminology to be used;
- **Proposed Development:** This outlines the proposed development focussing on aspects pertinent to the topic chapter;
- **Assessment Approach:** This includes details of the initial data gathering undertaken for the scoping exercise and how this has influenced the scope of

the assessment;

- **Baseline Conditions:** It describes baseline environmental conditions relating to the environmental topic and the identification of potentially sensitive receptors;
- **Assessment of Effects:** This outlines how data has been collected and the method used to identify any potentially significant effects. It concludes by predicting the effects of the proposed development and their significance;
- **Proposed Mitigation:** This outlines the measures that have been incorporated into the proposed development to reduce and minimise the environmental effects;
- **Cumulative Effects:** Assess the potential for likely significant cumulative effects as a result of committed and reasonably foreseeable developments within an identified study area;
- **Summary of Predicted Effects:** This brings all of the effects, both adverse (negative) and beneficial (positive) together in tabular form and summarises the findings using defined and consistently applied criteria;
- **Implementation of Mitigation:** This section summarises the mitigation measures that will form part of the development proposals and who will be responsible for their implementation. It also states how measures will be monitored where appropriate;
- **Residual Impacts:** This section identifies that impacts that potentially remain following implementation of the mitigation. Residual impacts should not lead to any significantly adverse effects on identified receptors, equally residual impact may have positive effects.
- **Summary and Conclusions**

1.6.5 The purpose of the EIA is to identify the likely 'significance' of environmental effects (beneficial or adverse) arising from a development. In broad terms, environmental effects are described as:

- Adverse – detrimental or negative effects to an environmental resource or receptor;
- Beneficial – advantageous or positive effect to an environmental resource or receptor; or
- Negligible – a neutral effect to an environmental resource or receptor.

1.6.6 Effects have been assessed in terms of:

- The magnitude of the impact –the degree of alteration (both positive and negative) from the baseline state; and
- The sensitivity of the receptor(s) subjected to the impact –this may relate to the value of a resource and the reversibility of impacts.

1.6.7 Significance of effect is evaluated as a combination of the sensitivity of the receptor and the magnitude of change the development results in. Although the matrix in **Table 1.3** is designed to demonstrate an objective rationale to reach a conclusion about the potential significance of impact a degree of professional judgement is a key element in the evaluation process.

Table 1.3: Significance of Effects

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

1.6.8 Any effect of Moderate or Major significance is considered to represent a likely significant effect for the purposes of the EIA Regulations. Significance of effects would be considered before and after mitigation.

1.6.9 The criteria for determining magnitude of impact is set out below in **Table 1.4**.

Table 1.4: Magnitude of Effects and Criteria

Magnitude of Impact	Criteria
High	Total loss or major/substantial alteration to elements/features of the baseline (pre-development) conditions such that the post development character/composition/attributes will be fundamentally changed.
Medium	Loss or alteration to one or more elements/features of the baseline conditions such that post development character/composition/attributes of the baseline will be materially changed.
Low	A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible/detectable but the underlying character/composition/attributes of the baseline condition will be similar to the pre-development.
Negligible	Very little change from baseline conditions. Change not material, barely distinguishable or indistinguishable, approximating to a 'no change' situation.

1.6.10 The sensitivity of a receptor is based on the importance of the receptor using the criteria below in **Table 1.5**.

Table 1.5: Degrees of Sensitivity Criteria

Sensitivity	Criteria
High	The receptor/resource has little ability to absorb change without fundamentally altering its present character or is of international or national importance.
Medium	The receptor/resource has moderate capacity to absorb change without significantly altering its present character or is of high and more than local (but not national or international) importance.
Low	The receptor/resource is tolerant of change without detrimental effect, is of low or local importance.
Negligible	The receptor/resource can accommodate change without material effect, is of limited importance.

## 1.7 FORMAT OF THE ENVIRONMENTAL STATEMENT

1.7.1 The required information has been incorporated into this Environmental Statement which is presented in 3 volumes:

- ES Volume 1 - Environmental Statement;
- ES Volume 2 - Appendices and Annexes of Technical Reports, Plans and Photographs; and
- ES Volume 3 - Non-Technical Summary.

### Environmental Statement - Volume 1

1.7.2 The introductory chapters of this ES set out the main characteristics of the site and its surroundings, and outline the proposed development, methodology of assessment and scope of the Environmental Statement.

1.7.3 Schedule 4 of the EIA Regulations 2017 requires a description of the likely significant impacts, direct and indirect, on the environment, explained by reference to its possible impact on:

- the construction and existence of the development, including, where relevant, demolition works;
- the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;
- the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;
- the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);
- the culmination of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;
- the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change; and
- the technologies and the substances used.

1.7.4 For the purposes of the ES and subject to the Scoping Direction (where non-relevant environmental topics have been 'scoped out') the assessments have been grouped into topic areas as set out below:

Introduction	Outline of Planning Application Purpose of ES Requirement for an ES Format of ES
The Site	Site and Environs Site Access Site History
The Development	Introduction Background Proposal Description
Summary of Relevant Planning Policy	National Planning Policy Local Plan Material Considerations
Need and Alternatives	Alternative Options and Scenarios
Hydrology, Hydrogeology and Drainage Ecology and Nature Conservation Noise and Vibration Landscape and Visual Impact Historic Environment Summary of Environmental Effects and Cumulative Impacts	
Conclusions	

#### Topics 'Scoped Out' of the Environmental Impact Assessment

- 1.7.5 As confirmed by the Scoping Direction (**Appendix 1.1**) the following environmental topic areas are considered unlikely to give rise to significant environmental effects as a consequence of the proposed development. As such they do not have a standalone ES chapter.
- Major Accidents and/or Disasters
  - Soils, Geology and Agricultural Land
  - Public Health and Wellbeing
  - Air Quality
  - Traffic and Transport;
  - Climate change; and
  - Socio Economic
- 1.7.6 Of the above environmental topics, traffic and transport, agricultural land quality, glint and glare and socio-economic will have separate standalone technical statements which have been submitted with the application.

#### Environmental Statement - Volume 2

- 1.7.7 Each topic area considered is supported, where necessary, by detailed technical reports that form appendices to this main ES document in Volume 1.

#### Non-Technical Summary – Volume 3

- 1.7.8 The NTS provides summary information about the proposal and its likely environmental effects. It is written for the non-specialist reader and provides a summary overview of the EIA. The NTS adopts the following format:
- Summary
  - Introduction
  - Site and Surroundings

- Descriptions and Proposals
- Summary of main topic areas and predicted environmental effects; and
- Summary and Conclusions

## 1.8 COMPETENT EXPERTS

1.8.1 Following pre-application discussions a project team was assembled to carry out the assessments within the EIA process. The EIA has been undertaken by a team of environmental consultants with expertise in their relevant disciplines. EIA coordination and preparation of the ES has been undertaken by Sirius Planning Ltd. In compliance with Regulation 18(5), the consultants involved in undertaking the EIA are listed below in **Table 1.6**, by EIA topic responsibility and details of their qualifications.

Table 1.6: Competent Experts

EIA Topic	Name	Company	Qualifications
Planning Policy	James Cook	Sirius Planning Ltd	MRTPI
Alternatives	James Cook	Sirius Planning Ltd	MRTPI
Hydrology, Hydrogeology and Drainage	Keelan Sargeant	KRS Environmental	BSc (Hons), MSc, MCIWEM
Ecology and Nature conservation	Dr Guy Parker	Wychwood Biodiversity	MCIEEM
Noise and Vibration	Dean Kettlewell	NVC Ltd	MSc MAE MIOA I.Eng
Landscape and Visual Impact	Alex Stappard	Sirius Planning Ltd	CMLI
Historic Environment	Neil McGuinness	Gwynedd Archaeological Trust	BA MA MCIfA
Cumulative	James Cook	Sirius Planning Ltd	MRTPI

## 1.9 STAKEHOLDER CONSULTATION

1.9.1 DNS guidance strongly advises early engagement with stakeholders prior to the submission of an application. There is also a statutory requirement for a 6-week period of pre-application consultation in advance of the planning application being submitted to PINs for acceptance and examination. The Applicant implemented an expansive programme of consultation throughout the EIA process starting with non-statutory pre-application discussions in November 2018 through to the formal pre-application consultation in July 2021. A Consultation Report on these activities has been submitted as a standalone report in support of the application.

## 1.10 OBTAINING INFORMATION

1.10.1 Electronic copies of all documents submitted to the Planning Inspectorate Wales in respect of the planning application are available at the following website:

<https://parcsolartraffwll.commonplace.is/>

1.10.2 Paper format copies of the planning application and supporting information are available on request at the following prices:

Full Hard Copy - £175  
CD Copy - £25

1.10.3 All requests for hard copy information should be addressed to the following:

Sirius Planning  
4245 Park Approach  
Thorpe Park  
Leeds  
LS15 8GB

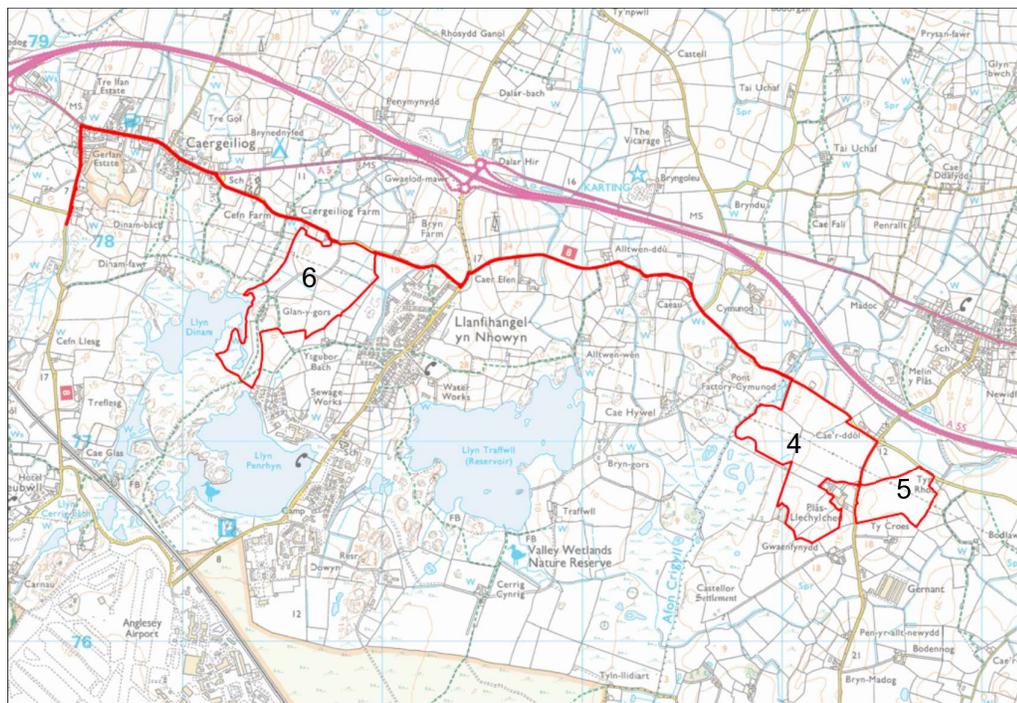


## 2. THE SITE AND SURROUNDINGS

## 2.1 INTRODUCTION

- 2.1.1 This chapter provides a description of the site in terms of its location, history, and surrounding land uses. It also sets the development within the context of surrounding land uses.
- 2.1.2 This Environmental Statement (ES) has been prepared on behalf of Parc Solar Traffwll Ltd (the “Applicant”) to accompany a planning application for the construction, operation and decommissioning of a solar farm across a total area of approximately 63ha. The Application Site comprises three parcels of land (known as Development Areas (DA)) connected by below ground cabling that will link the site to the existing substation at Caergeiliog. The Application Site is located to the west and south-east of the village Llanfihangel yn Nhowyn and to the south and south-east of the village Bryngwran. RAF Valley is situated to the south and the A55 Expressway lies to the north. The Application Site is situated within the administrative area of the Isle of Anglesey County Council.
- 2.1.3 The site location and extent of site boundaries are shown in **Drawing LOC1001/11/01** and below in **Figure 2.1**. The redline site boundary for the planning application extends to a total area of approximately 63ha.

Figure 2.1: Site Location



## 2.2 SITE OVERVIEW

- 2.2.1 The Application Site and surrounding areas are rural in nature, characterised by farmland, rough scrubland, dunes, wetlands and waterbodies. RAF Valley to the south-west and the villages of Llanfihangel yn Nhowyn, Bryngwran and Caergeiliog are the principal developed areas. Llanfihangel yn Nhowyn is approximately 250m east of DA6 (the western most parcel of land). Bryngwran is approximately 100m

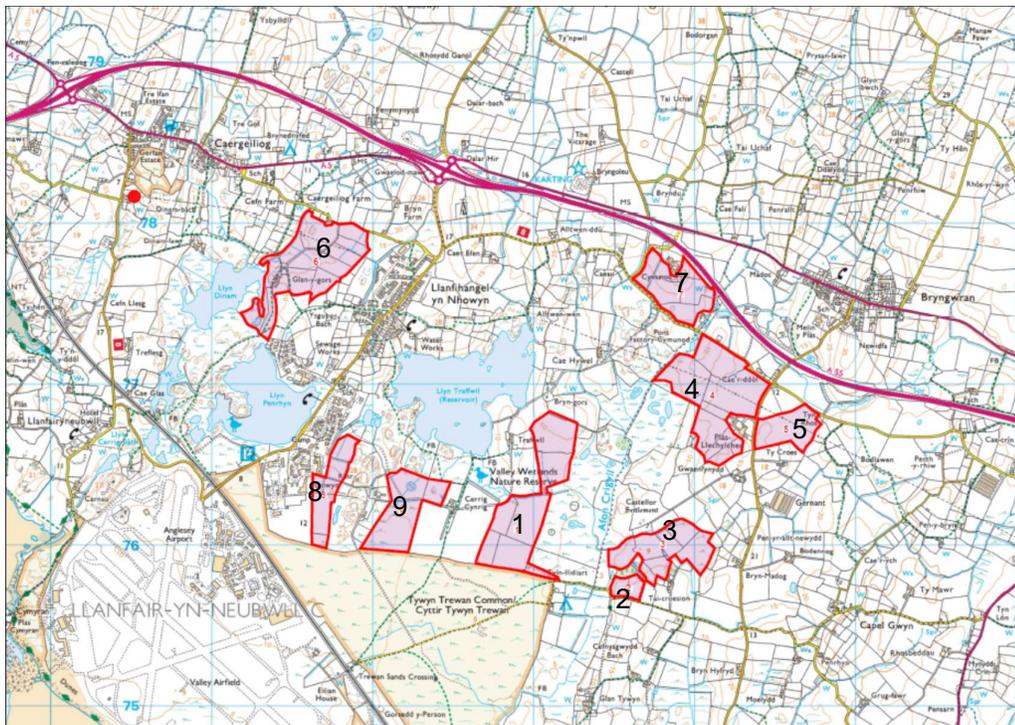
north of DAs 4 and 5 (the eastern parcels).

- 2.2.2 The development areas will be connected to the substation (point of connection to the grid) by underground cabling in the highway. The cable routes are outlined in **drawing LOC1001/11/23 and 24** and **Figure 2.1** above.

### 2.3 EVOLUTION OF PROPOSED DEVELOPMENT

- 2.3.1 Prior to undertaking the EIA, the Parc Solar Traffwll proposal comprised nine individual development areas, numbered 1 to 9. As baseline surveys and assessments were undertaken it became clear that some development areas had the potential to create significantly adverse environmental effects that could not be effectively mitigated. These development areas were subsequently removed from the proposed development. The removed development areas are 1, 2, 3, 7, 8 and 9. **Figure 2.2** below identifies the development areas originally proposed.

Figure 2.2: Outline of All Initial Development Areas



- 2.3.2 Below is a description of the retained development areas considered for the Parc Solar Traffwll proposal. A description of the development areas removed from the proposal prior to submission of the application is provided in chapter 5 of this ES. For ease of reference, the original numbering of the development areas has been retained for the application.

- 2.3.3 **Drawing LOC1001/11/02** identifies the environmental designations and constraints of land in and around the application site. According to NRW's flood maps approximately 60% of DA4 and c. 50% of DA5 have a higher risk of flooding. Development in these two development areas will accommodate flood resilient infrastructure.

## 2.4 RETAINED DEVELOPMENT AREAS

### Development Area 4

- 2.4.1 Development Area 4 (DA4) comprises 4 grazing fields and measures c. 23ha. The perimeter field boundaries have mature hedgerows, but internal fields boundaries are largely post and wire stock fencing. The highest part is towards the eastern boundary at 14m AOD. The western boundary, adjacent to the Afon Crigyll is the low point of the application site at 3.5m AOD. Overhead power lines run across the land in an east to west alignment. There is a barn (50m by 11m by 4m high) and foundations (21m by 10m) associated with a residential development that was consented in 2011 (ref. no. 16c132D) located in the northern most field of DA4. The ground adjacent to the Afon Crigyll is marshy/boggy.
- 2.4.2 Access is from an un-named road via an existing field gate on the northern boundary that provides access to the existing barn. There is also access via a small triangular shaped parcel of land located along the northern boundary which has been historically used for the storage of silage bales.

### Surrounding Development Area 4

- 2.4.3 The nearest residential properties are Plas-Llechylched and Plas Farm located adjacent to the eastern boundary, Cae'r-ddol and Pen Bont on the opposite side of the highway that runs along the northern boundary. There are two properties (Ty Capel Hebron and Dolafon) located to the immediate north of the crossroads at the north-eastern corner.
- 2.4.4 Afon Crigyll runs along the western boundary, where a pond is also located. The western boundary of DA4 abuts the RSPB Valley Wetlands Nature Reserve which is also Cors Plas Local Wildlife Site.
- 2.4.5 Castellor Hut Group is the closest Scheduled Ancient Monument, located circa 45m south-west of the boundary. The nearest Listed Buildings include Pandy Cymunod (a Grade II former woollen mill and workshop built in the late 18<sup>th</sup> and early 19<sup>th</sup> centuries located approximately 100m to the north) and Pont Factory Cymunod (a Grade II listed bridge over the Afon Crigyll which is the earliest of two associated bridges located approximately 20m to the west).

### Development Area 5

- 2.4.6 Development Area 5 (DA5) comprises a grazing field measuring approximately 7ha. The perimeter is bounded by mature hedgerows. Its highest part is located towards the western boundary at approximately 16m AOD. The lowest point is located centrally at 12m AOD. Two overhead power lines cross DA5 and intersect towards its northern boundary.
- 2.4.7 Access is from an un-named road via the existing field gate located on the western boundary.

### Surrounding Development Area 5

- 2.4.8 The nearest residential properties to DA5 include Tyn Rhos located adjacent to the north-eastern boundary, Ty Croes approximately 100m to the south, Y Ddol approximately 165m to the south and Plas-Llechylched 50m to the west.

- 2.4.9 The nearest watercourse is located approximately 25m from the boundary on the opposite side of the road that forms the northern boundary of the site.
- 2.4.10 Castellor Hut Group is the closest Scheduled Ancient Monument to DA5, located approximately 700m southwest. The nearest Listed Buildings include Pandy Cymunod, a Grade II former woollen mill and workshop built in the late 18th and early 19th centuries, located approximately 700m to the north-west; and a Grade II milestone that was part of the road improvements associated with Thomas Telford following the Act of Union 1801, which is located approximately 800m north of the boundary.

#### Development Area 6

- 2.4.11 Development Area 6 (DA6) comprises 15 grazing fields that measure approximately 25ha in total. Field sizes range from 0.8ha to 3.5ha. A private surfaced road runs through it to access Glan-y-gors Farm which comprises several buildings. Two fields are located to the west of the private road, a rock outcrop is located in the northern most field. Most the fields to the east and south of the private road are bound by drainage ditches. A small rock outcrop is located in the south eastern most field. Mature vegetation bounds the perimeter. It has a low point of 7m AOD at the southern boundary and a highpoint of 12m AOD on the northern boundary. Four overhead power cables cross DA6.
- 2.4.12 The Llynnau y Fali Site of Special Scientific Interest (SSSI) is located partially within DA6 as is the Lyn Dinam Special Area of Conservation (SAC). The designated areas of DA6 will not be subject to development and a biodiversity management plan will be implemented.
- 2.4.13 Access is from an un-named road via a private road from the north, there are numerous field gates that allow access to the fields. Two public rights of way pass through the southern extent of Area 6, the paths are referenced as 32/017/1 and 32/014/2.

#### Surrounding Development Area 6

- 2.4.14 The nearest residential properties to DA6 include Ysgubor Bach located approximately 60 from the south-eastern boundary, Arfryn approximately 90m to the north east, and Cae'r-pwll adjacent to the north.
- 2.4.15 A drain enters the land on the eastern boundary that originates from Llanfihangel yn Nhowyn and discharges into Llyn Dinam which is adjacent to the western boundary of the development area. Llyn Dinam is located approximately 40m to the south.
- 2.4.16 The closest SAMs are Felin Carnau Tide Mill, Felin Wen Tide Mill and Bodior Tide Mill. The former is located 1.9km southwest. Felin Wen Tide Mill is located 1.5km west southwest and the latter is located 2.7km. The closest listed building is the Church of St. Mihangel located 390m southeast, and Ceargeiliog Chapel house with stables and cart shed built in the early 19th century, the chapel house is a two-storey range with a lofted cart shed appended. The chapel is located 523m northwest of DA6.

## 2.5 SITE ACCESS

- 2.5.1 Access to the DAs is achieved from junction 4 (Caergeiliog and Bodedern) of the A55

Expressway and through the local highway network. The principal set down area is proposed within DA4 close to its northern boundary and will be accessed from junction 4, then the A5 to Bryngwran, then south, under the A55 and turning west at Hebron crossroads.

- 2.5.2 A 7.5t weight restriction is in the place on the bridge over Afon Crigyll adjacent to Pont Factory Cymunod, to the north-west of DA4. This bridge is particularly narrow measuring 2.4m in width.
- 2.5.3 Further details on highway baseline conditions are presented in the Transport Statement and accompanying Construction Traffic Management Statement submitted as a standalone document with the application.

## 2.6 PLANNING HISTORY

- 2.6.1 The relevant planning history for the development areas is set out in **Table 2.1** below.

Table 2.1: Site Planning History

Planning Reference	Planning Description	Decision Date
<b>Development Area 4</b>		
EL/974/E	Erection of electricity lines on land near Plas Llechylched, Bryngwran.	18/01/1980
16C132A	Erection of an agricultural shed on O.S 1815, Bryngwran.	19/04/2007
16C132B	Construction of track to gain access to the agricultural shed approved under planning application ref: 16C132A on land at Plas Llechylched, Bryngwran.	08/10/2007
16C132D	Full application for the erection of an agricultural dwelling on land adjacent to Plas Llechylched, Bryngwran.	04/04/2011
16C132E	Application to determine whether prior approval is required for the erection of an extension to the agricultural shed to store agricultural equipment and machinery on land forming part of O.S. enclosure SH 3477 1815, Bryngwran.	02/08/2011
16C187	Erection of an agricultural shed together with the construction of a new access to the field opposite Plas Llechylched, Bryngwran.	13/12/2010
16C145G	Application to determine whether prior approval is required for the construction of a hardstanding area on land at Plas Llechylched Farm, Bryngwran.	12/07/2012
16C151	Alterations and extensions including the erection of a private double garage at Plas Llechylched Farm, Bryngwran.	22/08/2003
16C151A	Full application for the re-siting of the garage previously approved under planning permission 16C151 together with alterations to the existing dwelling at Plas Llechylched, Bryngwran.	10/10/2014
16C204	Full application for conversion of outbuildings into 5 dwellings and 2 holiday letting units together with the installation of a package treatment plant at Plas Llechylched, Bryngwran.	07/06/2016
16C204A/DIS	Application to discharge conditions (06) (management and maintenance for the communal foul and surface water system), (07)(full photographic record) and (11) (copy of an European Protected Species Licence) of planning permission 16C204 at Plas Llechylched, Bryngwran.	10/01/2017
16EL/1361/E	Erection of overhead electricity lines at Plas Farm, Bryngwran.	19/08/92
16/C/71	Formation of an 18 hole golf course with a hotel and club house at Llechylched Farm, Bryngwran.	06/04/1992
<b>Development Area 5</b>		
N/A		
<b>Development Area 6</b>		
N/A		

### 3. THE PROPOSED DEVELOPMENT

### 3.1 OUTLINE OF THE PROPOSAL

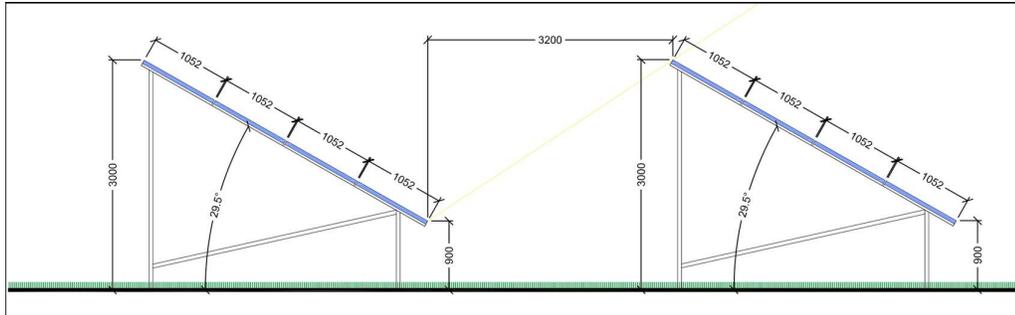
- 3.1.1 The proposed development comprises the construction, operation, maintenance and decommissioning of a ground-mounted solar park plus ancillary infrastructure including the following:
- Photovoltaic (PV) panels to a maximum height of circa 3m;
  - Mounting frames - matt finished small section metal structure;
  - Scheme of landscaping and biodiversity enhancement;
  - Central Inverters (inverters and transformers will be housed together in prefabricated containers to a maximum height of circa 3m), substations (DNO and Customer to a maximum height of circa 3m) and associated cabling (below ground);
  - Point of connection;
  - Stock fencing up to a height of circa 2m to secure the development areas;
  - Infra-red CCTV (CCTV cameras would operate using motion sensors and would be positioned inward only to ensure privacy to neighbouring land and property);
  - Temporary set down areas;
  - Internal service roads; and
  - Site access for the construction, operational and decommissioning phases.
- 3.1.2 Parc Solar Traffwll will have an export capacity of circa 35MW of electricity, enough to power approximately 11,600 homes per year and offset over 7,840 tonnes of CO<sub>2</sub> every year, the equivalent of taking around 3,620 cars off the road.
- 3.1.3 The panels will be arranged in rows in an east-west alignment across the development areas and orientated south. The scheme will be operational for 40 years after which all equipment can be removed from site.

### 3.2 SITE DESIGN AND LAYOUT

- 3.2.1 The proposed layout is shown on **Drawing LOC1001/11/04 and 05**. Due to commercial constraints, potential changes in solar panel, inverter, transformer and substation manufacturer during the determination process an element of flexibility is required in relation to their dimensions, appearance and their arrangement. The submitted layout is therefore indicative as the detailed layout and phasing of construction will be agreed with the Local Planning Authority (LPA) by way of planning condition following grant of planning permission. This approach is commonplace in solar farm planning permissions and has been agreed with IACC during pre-application dialogue.
- 3.2.2 The panels will be arranged in rows in an east-west alignment across the development areas and will be angled at up to 29.5° from the horizontal and orientated south. The height of the panels will be up to 3m above ground level; the lowest part of the panel will measure approximately 0.9m above ground level. The rows of panels will be set a minimum of 3.2m apart to avoid shadowing and allow for scheduled maintenance, this will be dependent on local topography.
- 3.2.3 During construction, operation and decommissioning 4m setbacks will be established from the hedgerows, ditches and field drains, with the exception of DA6 where the set back from ditches will be 6m. A 15m buffer from open water is also provided in line with National Resources Wales (NRW) requirements.
- 3.2.4 The mounting frames will be matt finished galvanised steel that will be fixed to the

ground employing a pile mounting system, depending on ground conditions. **Drawing LOC1001/11/06** and **Figure 3.1** below provide a specification of the panel and frames. The piles will be pushed into the ground via a mobile piling rig.

Figure 3.1: Panel and Frames Specification



3.2.5 The solar panels will be connected to central inverter units. The inverters convert the electricity from Direct Current (DC) to Alternating Current (AC). The inverters then feed the transformers which step up the voltage ready to export into the local distribution network via the substation buildings and connecting cables. Details of the proposed ancillary equipment within the site are provided on:

- Drawing LOC1001/11/07 and 08 - substation specifications;
- Drawing LOC1001/11/04 to 05 - equipment locations across the development areas; and
- Drawing LOC1001/11/09 and 10 - outline details of the containers housing the inverters and transformers.

3.2.6 Cabling from the inverters to the substation for each development area will be below ground. An earth cable will be required around the perimeter of each development area. Trench depths will vary from 0.4m to 1.3m depending on whether they are for earthing or AC cabling.

### 3.3 POINT OF CONNECTION AND CABLE ROUTE

3.3.1 The proposed point of connection is located at an existing SP Energy Networks substation to the south of Caergeiliog on the eastern side of Cymyran Road. A customer substation will be located on DA6 and from here a cable will connect directly into the existing substation on Cymyran Road. DA4 and DA5 will be connected to the main customer substation at DA6 by underground cabling which will be located within the adopted highway or within land where agreement is in place with the landowner.

3.3.2 The indicative cable routes are presented in **drawings LOC1001/11/23 and 24**. The drawings show a 'corridor' largely within the highway in which the cable will be laid. The exact alignment of the route is to be confirmed at detailed design stage via separate authorisation from the Local Highway Authority.

3.3.3 No upgrade works to the existing SP Energy Networks substation are required as these have already been implemented by SP Energy Networks as the Distribution Network Operator (DNO). It is proposed that a cable will be laid to the existing substation compound boundary, the Distribution Network Operator will then connect the cable in the compound.

### 3.4 SITE SECURITY

- 3.4.1 The development areas will be secured by a circa 2m stock fence or similar. Infra-red (non-visible at night), inward facing pole mounted CCTV cameras (c. 2.5m – 3m in height) will also be provided at between 50m and 100m intervals along the boundary fence. These will enable remote surveillance of the site. Fencing and CCTV camera details are presented on **drawings LOC1001/11/11 to 13**. The CCTV cameras will be positioned to avoid views of any private property.

### 3.5 CONSTRUCTION PROGRAMME

- 3.5.1 The construction of the solar farm is expected to last approximately 4-5 months and employ up to 190 staff over the construction period. An outline Construction Traffic Method Statement (CTMS) accompanies the application as an Appendix to Transport Statement. The CTMS and provides details of proposed access arrangements, the anticipated build programme, construction vehicle numbers and type, construction worker numbers and the proposed construction hours. The CTMS will be subject to final approval by the LPA post-consent under the terms of an appropriately worded planning condition.

### 3.6 SITE ACCESS

- 3.6.1 Access to the DAs is proposed to be achieved from junction 4 (Caergeiliog and Bodedern) of the A55 Expressway and through the local highway network. The principal set down area is proposed within DA4 close to its northern boundary and will be accessed from junction 4, then the A5 to Bryngwran, then south, under the A55 and turning west at Hebron crossroads.
- 3.6.2 From the principal set down area, smaller vehicles (typically 10m rigid vehicles) will transfer equipment and materials to DA5 and DA6. There will also be some instances where direct deliveries to the development areas will be made.
- 3.6.3 A series of vehicle swept-path analyses presented in Appendix B to the CTMS demonstrate that:
- a 10m long rigid body vehicle can access all development areas; and
  - an articulated 16.5m HGV can access Area 4.
- 3.6.4 Vehicles egressing from DA6 will be via a private road that also serves local farms, whereas access to DA4 and DA5 are via existing field gates onto the adopted highway. No improvements to the existing access points are required for DA6. To facilitate egress for DA4 an existing low wall will require setting back on the eastern bell mouth by approximately 3m.
- 3.6.5 In all cases, egress will be onto a single-track highway and whilst they are subject to a 60mph national speed limit, they typically experience low vehicle speeds due to the limited width of the carriageway. Given the limited visibility of the access points, the CTMS proposes that a banksman and temporary signage will be employed to ensure vehicles can safely enter and leave the public highway to minimise the impact on the local highway network.
- 3.6.6 Details of the proposed access arrangements during construction are presented in the Outline CTMS. Once operational, the proposal will generate minimal traffic from monthly inspections and maintenance. The CTMS will be subject to final approval by

the LPA post-consent under the terms of an appropriately worded planning condition.

### 3.7 PUBLIC RIGHTS OF WAY

- 3.7.1 Three public rights of way (PRoW) cross DA6 in a north south alignment close to Glan-y-gors. The PRoWs are referenced as 32/017/1, 32/014/1 and 32/014/2. Only PRoW 32/017/1 will pass through a proposed development area, the other two PRoWs are located within areas of the site that will not be subject to development.
- 3.7.2 From the outset of the construction phase, the area of DA6 subject to development will be protected using temporary fencing (Heras or similar) until the perimeter security fence is erected. The fencing will ensure that users of the PRoW do not gain access to the development area and will also stop construction activity occurring beyond the development area.
- 3.7.3 Public access along the PRoWs will not be affected by the Parc Solar Traffwll proposal during the construction phase.

### 3.8 BIODIVERSITY ENHANCEMENTS AND LANDSCAPING

- 3.8.1 Biodiversity and landscape enhancements are at the fore of the Parc Solar Traffwll proposals. In addition to land between and beneath the panels, there will be a significant area of non-development land located in DA6 that will be brought under formal management for the life of the scheme.
- 3.8.2 The landscape and visual impact assessment and ecology and nature conservation chapters (ES Chapters 7 and 11 respectively) provide full details of the enhancement proposals, but in summary these include:
- To manage grassland to create a diverse sward beneath and between the solar arrays;
  - To manage wet grassland margins for wildlife;
  - To reinforce (and plant new) hedgerows to improve visual containment of development areas and provide habitat for a range of species;
  - Minimise sediment runoff to improve water quality of surrounding water bodies;
  - To manage marshland and wet grassland habitat within the site boundary that is associated with Llyn Dinam SAC/Llynau y Fali SSSI; and
  - To monitor the site and assess the success of biodiversity management.
- 3.8.3 A Landscape and Biodiversity Enhancement and Management Plan is shown in **Drawings LOC1001/11/14 to 16**.

### 3.9 SITE WASTE MANAGEMENT PLAN

- 3.9.1 A Construction Environmental Management Plan (CEMP) will be prepared prior to development works commencing on site. This will be secured by means of an appropriately worded planning condition – an approach agreed with IACC.
- 3.9.2 A Site Waste Management Plan (SWMP) will be prepared as part of the CEMP. The SWMP will detail:
- Actions to meet the waste hierarchy;
  - Identify the person with responsibility for the SWMP;
  - Details of the types and quantities of waste that will be produced by the Contractor as part of the construction phase; and
  - Details of all consignments made for example a WRAP waste recording and

reporting spreadsheet.

### 3.10 SURFACE WATER MANAGEMENT

- 3.10.1 Although the solar panels will divert the downward path of falling rain, being raised off the ground on frames, they will not reduce the permeable area where they are sited. Rainfall that does fall onto the site will, as now, infiltrate into the soil substrate. Therefore, the surface water runoff from the developed site will be no different pre and post-development. There will be no increase in surface water run-off or exacerbation of off-site risk as a result of the proposals.
- 3.10.2 Whilst no formal scheme of surface water management is proposed, works are required to improve an existing drainage ditch that runs through DA6 from a neighbouring housing estate. Chapter 10 of this ES provides full details. A separate application for SAB approval will be submitted and a draft is provided in **Appendix 10.3**, together with the pre-application SAB advice from IACC.

### 3.11 DECOMMISSIONING

- 3.11.1 After 40 years of operation the panels and associated infrastructure can be removed from site. The CTMS presented in the Transport Statement details the programme and anticipated vehicle movements associated with this phase of proposal.

## 4. POLICY CONTEXT

## 4.1 INTRODUCTION

4.1.1 This section presents the key policy, legislation and guidance relevant to the proposed development. Section 38(6) of the Planning and Compulsory Purchase Act 2004 Act states that:

*“...if regard is to be had to the development plan for the purpose of any determination to be made under the Planning Acts the determination must be made in accordance with the plan unless material considerations indicate otherwise”*

4.1.2 The following section considers relevant national strategies, policy and guidance, and Development Plans as far as they are relevant to the proposed development. This relates to matters of energy and planning.

## 4.2 National Energy Context

### Climate change Act

4.2.1 The Climate Change Act 2008 required long term targets for the UK to achieve an 80% reduction in greenhouse gases by 2050 against 1990 levels. In June 2019, the Climate Change Act 2008 (2050 target Amendment) Order came into effect which required the net UK carbon account for the year 2050 to be 100% of 1990 levels.

4.2.2 The UK Act requires governments to set legally binding ‘carbon budgets’. Each budget provides a five-year cap on total greenhouse emissions; in order to meet the UK’s emission reduction commitments caps should not be exceeded.

4.2.3 The first carbon budget (2008-12) and the second (2013-17) have been met and the UK is on track to outperform the third (2018-22). However, it is not on track to meet the fourth (2023-27) or the fifth (2028-32).

### Environment (Wales) Act 2016

4.2.4 The Act provides the necessary legislation to improve planning and management of natural resources in Wales. Part 2 of the Act relates to Climate Change and places an obligation on Welsh Ministers to reduce greenhouse gas emissions such that in the year 2050 they are at least 80% lower than baseline figures for 1990 or 1995, depending the type of GHG.

### Advice Report: Path to a Net Zero Wales

4.2.5 Required under the Environment (Wales) Act 2016, the Report provides ministers with advice on Wales’ climate targets between now and 2050 and assesses progress on reducing emissions to date. Prepared in December 2020 by the Climate Change Committee (an independent statutory body) the report states that meeting the Net Zero target in Wales requires action across four key areas; Reducing demand for carbon-intensive activities; Take-up of low-carbon solutions; Expansion of low-carbon energy supplies; Land; and Flexibility to meet Net Zero.

4.2.6 In April 2019, the Welsh Government Minister for the Environment, Energy and Rural Affairs, Lesley Griffiths AM declared a climate emergency in Wales. The Welsh Government initially committed to a 95% reduction in emissions by 2050, but in February 2021 amended this to a legal commitment to achieve net zero emissions by 2050, with a stated ambition to “*get there sooner*”. IACC declared a climate

emergency in September 2020.

### 4.3 NATIONAL CONTEXT

#### Future Wales: The National Plan 2040

4.3.1 Future Wales: The National Plan 2040 (Adopted February 2021) is the national plan that sets the direction of development in Wales to 2040. Future Wales constitutes the development plan for DNSs in line with s38(6) of the Planning and Compulsory Purchase Act 2004. It states:

*Wales can become a world leader in renewable energy technologies. Our wind and tidal resources, our potential for solar generation, our support for both large and community scaled projects and our commitment to ensuring the planning system provides a strong lead for renewable energy development, mean we are well placed to support the renewable sector, attract new investment and reduce carbon emissions.*

4.3.2 As set out in legislation (Planning & Compulsory Purchase Act 2004 as amended by the Planning (Wales) Act 2015), applications for Developments of National Significance must be determined in accordance with Future Wales, which is the national development plan for Wales.

4.3.3 Future Wales identifies 11 Outcomes to be achieved in 20 years-time. Outcome 9 seeks a Wales where people live in places that sustainably manage their natural resources and reduce pollution. Outcome 11 seeks a Wales where people live in places which are decarbonised and climate-resilient.

4.3.4 Future Wales states:

*Wales is abundant in opportunities to generate renewable energy and the Welsh Government is committed to maximising this potential. Generating renewable energy is a key part of our commitment to decarbonisation and tackling the climate emergency.*

4.3.5 Furthermore, Future Wales sets the following ambitious targets for the generation of renewable energy:

- For 70% of electricity consumption to be generated from renewable energy by 2030.
- For one gigawatt of renewable energy capacity to be locally owned by 2030.
- For new renewable energy projects to have at least an element of local ownership from 2020.

4.3.6 The National Plan includes Policies 17 and 18 which are strategic spatial and detailed criteria-based policies respectively and should be considered together in the determination of applications.

4.3.7 Policy 17 demonstrates the Welsh Government's support in principle for all renewable energy projects and technologies. Proposals should ensure there is no significant unacceptable detrimental impact on the surrounding natural environment and local communities and that the development delivers positive social, environmental, cultural and economic benefits. Policy 17 - Renewable and Low Carbon Energy and Associated Infrastructure states:

*The Welsh Government strongly supports the principle of developing renewable and low carbon energy from all technologies and at all scales to*

*meet our future energy needs. In determining planning applications for renewable and low carbon energy development, decision-makers must give significant weight to the need to meet Wales' international commitments and our target to generate 70% of consumed electricity by renewable means by 2030 in order to combat the climate emergency....*

*Proposals should describe the net benefits the scheme will bring in terms of social, economic, environmental and cultural improvements to local communities....*

- 4.3.8 Policy 18 provides a decision-making framework for renewable and low carbon energy technologies. Policy 18 - Renewable and Low Carbon Energy Developments of National Significance states:

*Proposals for renewable and low carbon energy projects (including repowering) qualifying as Developments of National Significance will be permitted subject to policy 17 and the following criteria:*

- 1. outside of the Pre-Assessed Areas for wind developments and everywhere for all other technologies, the proposal does not have an unacceptable adverse impact on the surrounding landscape (particularly on the setting of National Parks and Areas of Outstanding Natural Beauty);*
- 2. there are no unacceptable adverse visual impacts on nearby communities and individual dwellings;*
- 3. there are no adverse effects on the integrity of Internationally designated sites (including National Site Network sites and Ramsar sites) and the features for which they have been designated (unless there are no alternative solutions, Imperative Reasons of Overriding Public Interest (IROPI) and appropriate compensatory measures have been secured);*
- 4. there are no unacceptable adverse impacts on national statutory designated sites for nature conservation (and the features for which they have been designated), protected habitats and species;*
- 5. the proposal includes biodiversity enhancement measures to provide a net benefit for biodiversity;*
- 6. there are no unacceptable adverse impacts on statutorily protected built heritage assets;*
- 7. there are no unacceptable adverse impacts by way of shadow flicker, noise, reflected light, air quality or electromagnetic disturbance;*
- 8. there are no unacceptable impacts on the operations of defence facilities and operations (including aviation and radar) or the Mid Wales Low Flying Tactical Training Area (TTA-7T);*
- 9. there are no unacceptable adverse impacts on the transport network through the transportation of components or source fuels during its construction and/or ongoing operation;*
- 10. the proposal includes consideration of the materials needed or generated by the development to ensure the sustainable use and management of resources;*
- 11. there are acceptable provisions relating to the decommissioning of the development at the end of its lifetime, including the removal of infrastructure and effective restoration.*

*The cumulative impacts of existing and consented renewable energy schemes should also be considered.*

### Prosperity for All: A Low Carbon Wales

- 4.3.9 The Environment (Wales) Act 2016 requires Welsh Government to reduce emissions of greenhouse gases (GHGs) in Wales by at least 80% for the year 2050 from 1990 levels with a system of interim emissions targets and carbon budgets. The Plan sets out how Wales aims to meet the first carbon budget (2016-2020) and consequently the 2020 interim target through 100 policies and proposals across Ministerial portfolios.

### Planning Policy Wales Edition 11

- 4.3.10 The Welsh Government published Planning Policy Wales Edition 11 (PPW) in February 2021. This provides the overarching national level source of planning policy for Wales and is a material consideration alongside Future Wales. It has been updated to take into account Future Wales and the Wellbeing of Future Generations Act which incorporates 7 wellbeing goals. It seeks to support the requirement for sustainable development via the planning system whereby the presumption in favour of sustainable development forms the overarching role together with a firm view on improving population wellbeing

- 4.3.11 PPW sets out the specific planning policies for achieving sustainable development across Wales. Figure 4 sets out the key planning principles of this national policy, stating that

*“The planning system has a vital role to play in making development resilient to climate change, decarbonising society and developing a circular economy for the benefit of both the built and natural environments and to contribute to the achievement of the well-being goals.”*

- 4.3.12 Chapter 5 (Productive and Enterprising Places) of the PPW sets out the Welsh Government’s policies regarding Enterprising Placemaking and Well-being across Wales. One of the key aims in relation to energy is:

- For Wales to generate 70% of its electricity consumption from renewable generation by 2030;
- For one Gigawatt of renewable electricity capacity in Wales to be locally owned by 2030; and
- Actively managing the transition to a low carbon economy.

- 4.3.13 Chapter 5 of the PPW outlines the importance of the planning system to deliver these targets, paragraph 5.7.15 states:

*“The planning system has an active role to help ensure the delivery of these targets, in terms of new renewable energy generating capacity and the promotion of energy efficiency measures in buildings.*

- 4.3.14 Paragraph 5.9.19 states that:

*“In determining applications for the range of renewable and low carbon energy technologies, planning authorities should take into account:*

- *the contribution a proposal will make to meeting identified Welsh, UK and European targets;*

- *the contribution to cutting greenhouse gas emissions; and*
- *the wider environmental, social and economic benefits and opportunities from renewable and low carbon energy development.*

4.3.15 Paragraph 5.9.20 continues stating:

*Planning authorities should also identify and require suitable ways to avoid, mitigate or compensate adverse impacts of renewable and low carbon energy development. The construction, operation, decommissioning, remediation and aftercare of proposals should take into account:*

- *the need to minimise impacts on local communities, such as from noise and air pollution, to safeguard quality of life for existing and future generations;*
- *the impact on the natural and historic environment;*
- *cumulative impact;*
- *the capacity of, and effects on the transportation network;*
- *grid connection issues where renewable (electricity) energy developments are proposed; and*
- *the impacts of climate change on the location, design, build and operation of renewable and low carbon energy development. In doing so, consider whether measures to adapt to climate change impacts give rise to additional impacts.*

4.3.16 Chapter 5 also outlines that before an application is submitted “...developments should, wherever possible, consider how to avoid, or otherwise minimise, adverse impacts through careful consideration of location, scale, design and other measures”. Furthermore, active engagement with the local community should be undertaken at pre-application stage.

## 4.4 LOCAL CONTEXT

4.4.1 The Anglesey and Gwynedd Joint Local Development Plan was adopted in July 2017 and provides the overarching strategic planning framework for Anglesey and Gwynedd to 2026.

4.4.2 As Future Wales is the national, and highest, tier of development plan in Wales, Local Development Plans are required to be in accordance with it. s38(5) of the Planning & compulsory Purchase Act confirms that:

*“If to any extent a policy contained in a development plan for an area conflicts with another policy in the development plan the conflict must be resolved in favour of the policy which is contained in the last document” –*

4.4.3 For this application, the last document is Future Wales.

4.4.4 The key policies relating to sustainable development and renewable energy at the local level are:

- Strategic Policy PS 5: Sustainable Development
- Strategic Policy PS 6: Alleviating and Adapting to the Effects of Climate Change
- Strategic Policy PS 19: Conserving and Where Appropriate Enhancing the Natural Environment
- Strategic Policy PS 7: Renewable Energy Technology
- Policy PCYFF 1: Development Boundaries
- Policy PCYFF 2: Development Criteria

- Policy PCYFF 4: Design and Landscaping
  - Policy ADN 2: PV Solar Energy
  - Policy TRA 4: Managing Transport Impacts
  - Policy AMG 3: Protecting and Enhancing Features and Qualities That Are Distinctive to the Local Landscape Character
  - Policy AMG 5: Local Biodiversity Conservation
  - Policy AMG 6: Protecting Sites of Regional or Local Significance
  - Policy PS 20: Preserving and Where Appropriate Enhancing Heritage Assets
- 4.4.5 Each of the above polices are detailed below.
- 4.4.6 Strategic Policy PS5 seeks to support development where is it consistent with the principles of sustainable development such as to “alleviate the causes of climate change...”.
- 4.4.7 Strategic Policy PS 6: Alleviating and Adapting to the Effects of Climate Change states that:
- “In order to alleviate the effects of climate change, proposals will only be permitted where it is demonstrated that they have fully taken account of and responded to the following:*
- The energy hierarchy;*
- Reducing energy demand;*
- Energy efficiency;*
- In order to adapt to the effects of climate change, proposals will only be permitted where it is demonstrated with appropriate evidence that they have fully taken account of and responded to the following: ...*
- Ensuring that the ability of landscapes, environments and species to adapt to the harmful effects of climate change is not affected, and that compensatory environments are provided if necessary...”*
- 4.4.8 Strategic Policy PS 19: Conserving and Where Appropriate Enhancing the Natural Environment states that
- “The Councils will manage development so as to conserve and where appropriate enhance the Plan area’s distinctive natural environment, countryside and coastline, and proposals that have a significant adverse effect on them will be refused unless the need for and benefits of the development in that location clearly outweighs the value of the site or area and national policy protection for that site and area in question.”*
- 4.4.9 Strategic Policy PS 7: Renewable Energy Technology seeks to ensure that the Plan area wherever feasible and viable realises its potential to provide renewable and low carbon energy technologies. The policy states
- “by promoting:*
- 1. Renewable energy technologies within development proposals which support energy generation from a variety of sources which include biomass, marine, waste, water, ground, solar and wind, including micro generation;*
- 2. Free-standing renewable energy technology development.”*
- 4.4.10 Policy PCYFF 1: Development Boundaries seeks to approve proposals in accordance with other policies within the Plan. The policy states that:

*“Outside the development boundaries development will be resisted unless it is in accordance with specific policies in this Plan or national planning policies or that the proposal demonstrates that its location in the countryside is essential.”*

4.4.11 Policy PCYFF 2: Development Criteria

*“A proposal should demonstrate its compliance with:*

- 1. Relevant policies in the Plan;*
- 2. National planning policy and guidance.”*

4.4.12 Policy PCYFF 4: Design and Landscaping provides guidance to what a landscape scheme should demonstrate and identity as part of a proposal. The policy states that:

*“All proposals should integrate into their surroundings. Proposals that fail to show (in a manner appropriate to the nature, scale and location of the proposed development) how landscaping has been considered from the outset as part of the design proposal will be refused.”*

4.4.13 Policy ADN 2: PV Solar Energy supports proposals for Solar PV Farm of 5MW or more and other solar schemes of up to 5MW providing the proposal conforms to the listed criteria. The policy states

*“Proposals for Solar PV Farms of 5MW or more should be directed to the potential search areas shown on the Proposals Map. Proposals of this scale will only be permitted in other locations in exceptional circumstances when the need for a scheme can be justified and there are specific locational circumstances.”*

4.4.14 Policy TRA 4: Managing Transport Impacts of the LPD states:

*Proposals that would cause unacceptable harm to the safe and efficient operation of the highway, public transport and other movement networks including pedestrian and cycle routes, public rights of way and bridle routes, will be refused...”*

4.4.15 Policy AMG 3: Protecting and Enhancing Features and Qualities That Are Distinctive to the Local Landscape Character states that

*“The Councils will manage development so as to conserve and where appropriate enhance the Plan area’s distinctive natural environment, countryside and coastline, and proposals that have a significant adverse effect on them will be refused unless the need for and benefits of the development in that location clearly outweighs the value of the site or area and national policy protection for that site and area in question.*

*A proposal will be granted provided it doesn’t have significant adverse impact upon features and qualities which are unique to the local landscape in terms of visual, historic, geological, ecological or cultural aspects.”*

4.4.16 Policy AMG 5: Local Biodiversity Conservation seeks for proposals to protect and, where appropriate, enhance biodiversity that has been identified as being important to the local area. The policy states

*“A proposal affecting sites of local biodiversity importance will be refused unless they can conform with all of the following criteria: -*

- 1. That there are no other satisfactory alternative sites available for the development.*

*2. The need for the development outweighs the importance of the site for local nature conservation;*

*3. That appropriate mitigation or compensation measures are included as part of the proposal.*

*Where necessary, an Ecological Assessment which highlights the relevant local biodiversity issues should be included with the planning application.”*

4.4.17 Policy AMG 6: Protecting Sites of Regional or Local Significance states that

*“Proposals that are likely to cause direct or indirect significant harm to Local Nature Reserves (LNR), Wildlife Sites (WS) or regionally important geological / geomorphologic sites (RIGS) will be refused, unless it can be proven that there is an overriding social, environmental and/or economic need for the development, and that there is no other suitable site that would avoid having a detrimental impact on sites of local nature conservation value or local geological importance.”*

4.4.18 Policy PS 20: Preserving and Where Appropriate Enhancing Heritage Assets seeks to support the wider economic and social needs of the Plan area, the Local Planning Authorities will preserve and where appropriate, enhance its unique heritage assets. The policy states:

*“Proposals that will preserve and where appropriate enhance the following heritage assets, their setting and significant views into and out of the building/area will be granted:*

*1. Scheduled Ancient Monuments and other areas of archaeological importance (in line with Policy AT 4).*

*2. Listed Buildings and their curtilages.*

*3. Conservation Areas (in line with Policy AT 1).*

*4. Beaumaris Castle and Caernarfon Castle and Town Walls World Heritage Sites (in line with Policy AT 1).*

*5. Candidate World Heritage Sites.*

*6. Registered Historic Landscapes, Parks and Gardens (in line with Policy AT 1).*

*7. Buildings of architectural/ historic/ cultural merit that are not designated or protected (in line with Policy AT 3).”*

## 4.5 SUMMARY AND CONCLUSION

4.5.1 This section of the ES outlines the policy context for the determination of Parc Solar Traffwll.

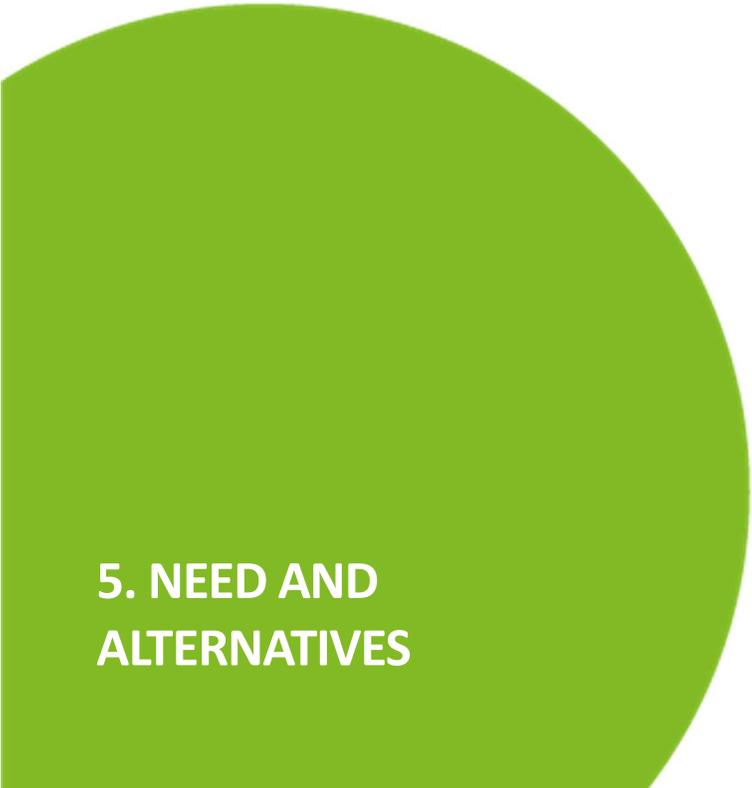
4.5.2 There is clear policy support for renewable energy schemes at both the local and national level, particularly as such schemes will support a vibrant and decarbonised economy.

4.5.3 Whilst policy takes a positive approach to the renewables sector, development proposals need to be mindful of local constraints, communities and natural resources.

4.5.4 This ES reports on a detailed assessment of the site and its environs and how they are anticipated to interact with the proposed development.

4.5.5 The Planning Statement that accompanies the planning application presents a

detailed appraisal of the proposal in the context of the above policies.



## 5. NEED AND ALTERNATIVES

## 5.1 INTRODUCTION

5.1.1 This chapter sets out the need for the proposed solar farm and presents the site selection and design evolution process including the consideration of alternatives.

5.1.2 Schedule 4 of the EIA Regulations states that an ES should include:

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

5.1.3 This chapter includes the following sections:

- Need for the development; and
- Alternatives:
- Consideration of alternative sites and the reasons for selecting the preferred location.
- Consideration of alternative renewable energy technology, site design and configuration

## 5.2 NEED FOR THE DEVELOPMENT

5.2.1 The importance of renewable energy generation as part of the response to climate change is recognised at both a UK Government level and at a local level. Future Wales confirms ‘in principle’ support for the development of renewable energy at all scales and Paragraph 5.9.15 of Planning Policy Wales Edition 11 confirms that the need for renewable energy generation is not a material planning consideration. It states:

*“...planning applications for renewable and low carbon energy developments should be determined based on the merits of the individual proposal. The local need for a particular scheme is not a material consideration, as energy generation is of national significance and there is a recognised need to optimise renewable and low carbon energy generation”.*

5.2.2 Chapter 4 of this ES has set out the key national and local planning policy that is relevant to the Development.

5.2.3 Both Future Wales and PPW set the following ambitious targets for the generation of renewable energy in Wales:

- For 70% of electricity consumption to be generated from renewable energy by 2030;
- For one gigawatt of renewable energy capacity to be locally owned by 2030
- For new renewable energy projects to have at least an element of local ownership from 2020.

5.2.4 In February 2021, the Welsh Government set out its legal commitment to achieve net zero emissions by 2050<sup>4</sup>. The Energy Generation in Wales 2018 report<sup>5</sup> estimates that 50% of electricity consumption comes from renewable sources leaving a significant shortfall if the Government’s target is to be met.

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<sup>4</sup> <https://gov.wales/wales-commits-net-zero-2050-sets-out-ambitions-get-there-sooner>

<sup>5</sup> Energy Generation in Wales 2018: <https://gov.wales/sites/default/files/publications/2019-10/energy-generation-in-wales-2018.pdf>

- 5.2.5 At the local level, IACC's Joint LDP outlines an objective to promote renewable and low carbon energy production and it is understood that the Council are producing a Climate Change Masterplan having declared a climate emergency in September 2020.
- 5.2.6 It is widely accepted that electricity produced from solar energy has a positive benefit compared to traditional forms of electricity generation in terms of avoiding carbon emissions. Furthermore, renewable energy from solar PV supports the national economic objective to diversify energy supply and to lessen dependence on the generation of fossil fuels. The Welsh Government consequently considers that the wider benefits to society and the economy (of renewable energy) are significant and must be given weight by decision makers in reaching their decisions on individual applications.
- 5.2.7 Parc Solar Traffwll will have an export capacity of circa 35MW of electricity, enough to power approximately 11,600 homes per year and offset over 7,840 tonnes of CO<sub>2</sub> every year, the equivalent of taking around 3,620 cars off the road. In addition, the operation of the scheme would reduce the emissions of the gases sulphur dioxide and nitrogen oxides, which contribute to the production of acid rain.

### 5.3 SITE SELECTION

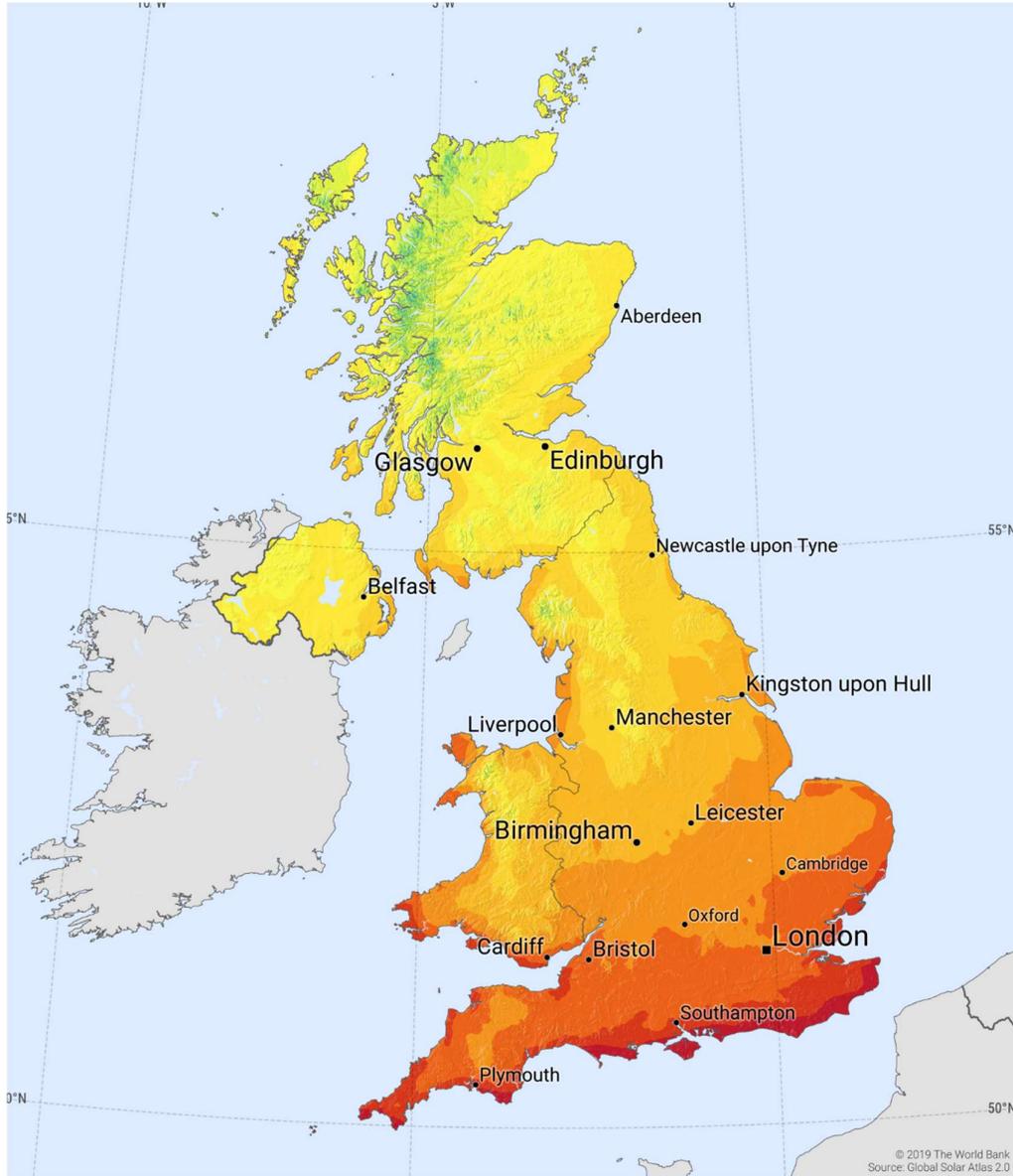
- 5.3.1 The development areas that make up the Application Site were selected through an extensive search criteria exercise undertaken by the Applicant. Anglesey represents a particularly favourable area for solar deployment because of the high levels of solar irradiation through its proximity to the coastline. This can increase power generation over sites of equivalent size located away from the coast. Using the Renewable Energy Capacity Assessment from the Joint LDP as a guide to focus the site search, the Applicant reviewed a number of sites across Anglesey to assess the potential for the development of solar projects.
- 5.3.2 A range of technical, environmental and economic factors are considered when assessing a site for ground-mounted solar PV development. Key factors for consideration include:
- Solar irradiation levels;
  - Availability and proximity of the local distribution network (grid);
  - Proximity to local population;
  - Topography;
  - Field size and shape;
  - Potential for overshadowing;
  - Development Plan Policy;
  - Access to the site for construction/decommissioning traffic;
  - Agricultural land quality;
  - Landscape sensitivity and visual impact amenity;
  - Nature conservation and potential for enhancement;
  - Flood risk; and
  - Land availability.

#### Solar Irradiation Levels

- 5.3.3 UK irradiation levels are illustrated below in **Figure 5.1**. It shows that the coastal area around the west of Anglesey (where the site is located) receives some of the highest

amounts of sunshine within North Wales. This presents a particularly favourable area for solar development as it allows for significantly more electricity generation than other site locations.

Figure 5.1: UK Irradiance Levels

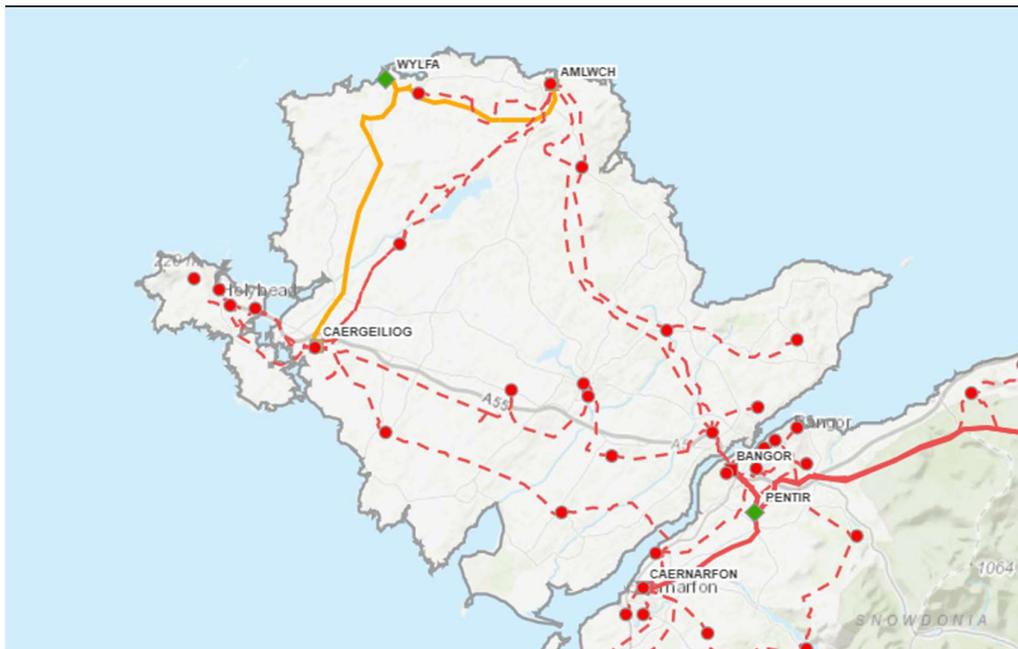


### Availability and Proximity to Distribution Network

- 5.3.4 An important aspect of solar farm development is having access to the local distribution network, or 'grid'. To export electricity generated by a solar farm there must be sufficient capacity on the network to accommodate the additional power from the development.
- 5.3.5 **Figure 5.2** below is the Scottish Power Energy Network (SPEN) Heatmap from May

2021 which illustrates the local grid network and where there is available capacity to export energy back into the grid. The substations and circuits highlighted in red have at least one factor close to their operational limit and therefore installation of most levels of distributed generation and a local connection is highly unlikely and may require extensive reinforcement works. The substations and circuits highlighted in orange have at least one factor nearing its operational limit and depending on these factors and detailed studies capacity may be available subject to potential network reinforcement works. The substations and circuits highlighted in green have all operational factors within tolerable limits. As can be seen from the map, the area of search is therefore severely restricted due to the lack of grid capacity.

Figure 5.2: Scottish Power Energy Network Heatmap, May 2021

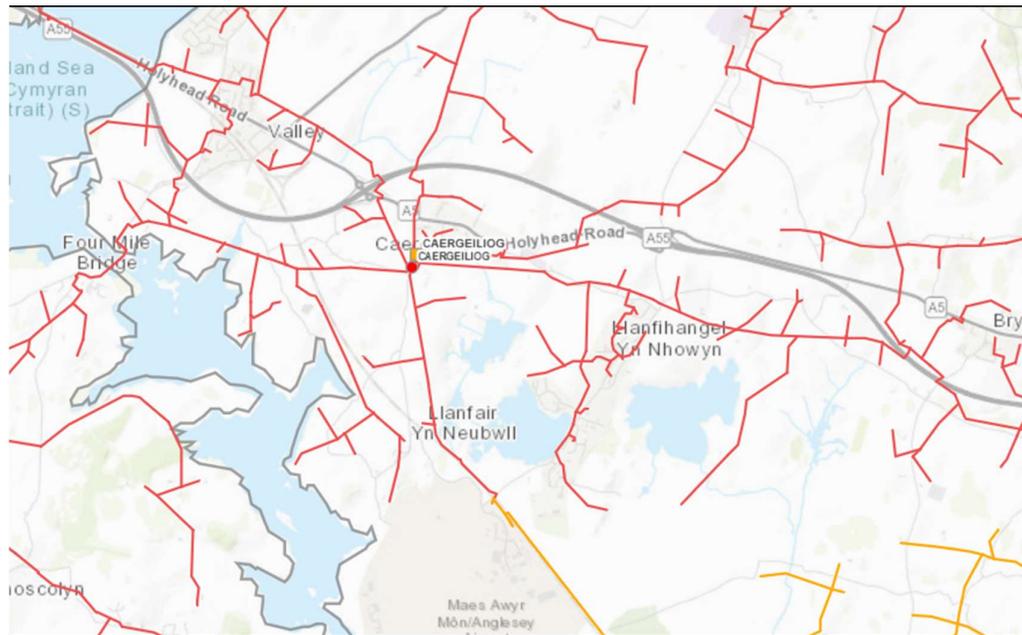


5.3.6

5.3.7 There are two supergrid substations where operational factors are in tolerable limits (green). The proposed development was able to secure the remaining viable capacity at the substation at Caergeiliog. The remaining network is at capacity without significant upgrades.

5.3.8 Caergeiliog substation is currently the only feasible option for connecting to the distribution network on Anglesey. Connecting to the supergrid substations or the National Grid transmission network would be a significant financial undertaking and one that a solar scheme of this scale could not accommodate. Connecting direct onto the 132kV line between Caergeiliog and Amlwch would require larger connecting infrastructure in the form of a 33kV to 132kV substation compound. Connecting directly into the existing 33kV substation, in this instance, avoids having to build unnecessary infrastructure or the DNO having to reinforce the network. **Figure 5.3** shows the 11kV distribution network surrounding Caergeiliog substation which is at operational limits. Notwithstanding existing limited capacity on the medium voltage network, exporting power from the solar farm onto this line would not be suitable as they typically struggle to accept more than 5MW.

Figure 5.3: 11kV Distribution Network Surrounding Caergeiliog Substation, May 2021



- 5.3.9 Proximity to an available grid connection is critical to the viability of any renewable energy project, particularly solar PV. The industry-standard approach is to secure sites within 3.5km of a grid connection. This is partly due to the excessive costs of the cable and the trenching works, partly due to the requirement for easements to enable the crossing of third-party land, and necessary roadworks which may disrupt local communities. Additionally, long cables introduce voltage drops and unwanted energy losses which cause further difficulties for the distribution network operators.

#### Proximity to Local Population

- 5.3.10 For any development, minimising potential impacts to residential amenity is a key aspect. Therefore, distance from centres of population is a key locational factor for proposed solar farms. In some cases, it is not possible to be distant from the curtilage of every residential property however it is an important element of the site selection process to minimise impacts on local residences.
- 5.3.11 The low height of the solar panels (up to 3m above ground level), the proposed screening, landscaping and the generally flat nature of the topography means that longer distance views from nearby villages are limited for the proposed development site. This has been confirmed in the Landscape and Visual Impact Assessment (LVIA) as reported in Chapter 7 and **Appendix 7.5** of this ES. Where there are residential properties adjacent to the development areas, a buffer zone (and additional hedgerow planting where appropriate) has been applied to set back the panels from the curtilage of properties so as avoid negatively impacting the enjoyment of these areas.
- 5.3.12 The development areas were selected due to their relative distances from nearby villages of Llanfihangel yn Nhowyn (over 100m from DA6 at its closest point),

Bryngwran (approximately 480m from DA4) and Caergeiliog (approximately 275m from DA6). Furthermore, the proposed site arrangements (**drawings LOC1001/11/04 and 05**) show buffer areas from adjacent residential properties.

### Topography

- 5.3.13 Flat or gently undulating land is preferred for solar development as construction is more straightforward, shading between arrays is limited and more consistent and flat land is generally less visible than slopes where the surrounding topography is also flat or has gentle gradients. The design of the development will however respond to the terrain and physical features
- 5.3.14 The vast majority of the Application Site is flat, with little or no gradient, and so it is well suited to the proposed development.

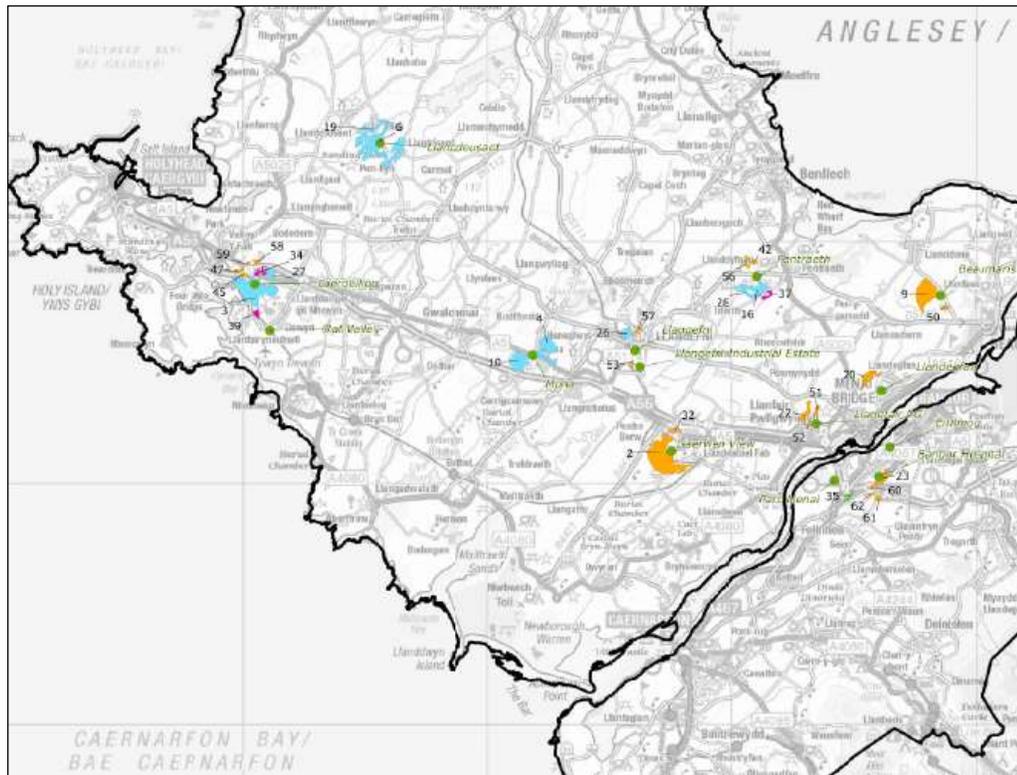
### Field Size

- 5.3.15 In the efficient deployment of solar large, open fields are preferable. However, smaller fields with established field boundaries will help to visually contain a solar proposal and be more sympathetic to local landscape character. Therefore, a balanced approach to field size and boundary treatment is needed.
- 5.3.16 The application site includes a range of field sizes with larger ones included in DA4 and 5 and well contained fields in DA6.

### Site Specific Allocation

- 5.3.17 The JLDP identifies areas of search for solar which is based on an Assessment of the Potential for Solar PV Farms in Gwynedd and Ynys Môn (2016). Using this assessment as a guide, Low Carbon undertook a review of sites across Anglesey to consider the potential for the development of a solar project. It should be noted that since the assessment was published in 2016, grid capacity constraints have changed and therefore the Applicant has also undertaken their own network capacity review, see 5.3.4 - 5.3.8 above.

Figure 5.4: Search Areas for Solar (Assessment of Potential for Solar PV Farms in Gwynedd and Ynys Môn (2016)



- 5.3.18 **Figure 5.4** above illustrates the search areas for solar on Anglesey. The highlighted blue areas are opportunity areas over 12ha considered to be of lower sensitivity. The orange areas are opportunity areas either less than 6ha or with higher sensitivity. As can be seen, the area around Caergeiliog is highlighted blue and shown as an allocated search area for solar development.
- 5.3.19 On review of the light blue opportunity area around Caergeiliog it was found that a significant proportion of this area was constrained by rocky outcrops which would make deployment very difficult and the project not viable. Land to the immediate north-east, east and south-east of the substation was vegetated with scrub and trees. Approaches were made to landowners within the solar search area but none were interested in having solar on their land.
- 5.3.20 The application site is considered to be the closest available to identified solar search areas.

#### Access to Site for Construction

- 5.3.21 Appropriate access to the solar development areas must be available for the construction and decommissioning phases. The A55 runs east to west to the north of the development areas from which there are two junctions that serve the site. From these junctions Minffordd Road (to the east) and the A4080 (to west) provide vehicular access to the sites via a series of roads and lanes. These roads and lanes serve local homes, farms and businesses.
- 5.3.22 All indicative development areas have vehicular access in the form of field gates from

the public highway.

- 5.3.23 A Construction Traffic Management Statement (CTMS) accompanies the Transport Statement and sets out the proposed access arrangements to each of the development areas; vehicle routing from the A55(T); the anticipated construction programme, construction vehicle numbers; construction worker numbers and the proposed construction hours.

#### Agricultural Land Classification

- 5.3.24 National level guidance on the deployment of ground mounted solar expresses a preference to avoid 'Best and Most Versatile Agricultural Land'. Grades 1, 2 and 3A of the Agricultural Land Classification are considered to be best and most versatile land, whilst 3B, 4 and 5 are not.
- 5.3.25 The soil survey presented in **Appendix 5.1** of this ES has determined there are elements of 'Best and Most Versatile' agricultural land within the development areas. However, on sites with varying grades of agricultural land, the land can only be farmed to the lowest grade within the field. The historic agricultural practices within the development areas reflect this, hence the land has always been grazed or used for haymaking.
- 5.3.26 Furthermore, the solar farm will operate along-side grazing as part of the management of the grass sward. In addition, the construction and decommissioning of the solar farm will have little impact on the land quality as the fields will be returned to full agricultural use on removal of the solar farm and associated infrastructure.

#### Landscape Designations

- 5.3.27 Consideration of national and local landscape designations such as Areas of Outstanding Natural Beauty, National Parks and Special Landscape Areas was undertaken when assessing the potential solar sites.
- 5.3.28 The development areas are not subject to any national or local level landscape designations. The Anglesey AONB is located approximately 1km to the south-west of DA6, the closest of the development areas to the AONB. Effects upon landscape character and views from the AONB have been assessed by landscape and visual impact assessment presented in Chapter 7 of the ES.

#### Nature Conservation Designations

- 5.3.29 Consideration of national and international ecological designations such as Sites of Scientific Interest (SSSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites was undertaken when assessing the site's potential for a solar proposal.
- 5.3.30 Biodiversity enhancement schemes are an integral part of solar proposals as the land is effectively managed for 40 years for the benefit for ecology. As part of the proposals for Parc Solar Traffwll, ecological management is a core element. Not only are the development areas managed for species rich grassland, areas within the site not subject to solar PV development will also be managed to secure ecological benefits. For example, Llynau Y Fali Valley Lakes SSSI and Llyn Dinam SPA are located partially within DA6. It is not the intention to deploy PV in these designated

areas, but rather provide a scheme of ecological management to secure enhancements. ES Chapter 11 outlines a land management option for the part of DA6 which will remain free of development. This also justifies the approach to the proposed management and how such options will be implemented.

- 5.3.31 The RSPB also manages the Valley Wetlands Nature Reserve which is centred on Llyn Traffwll. Following extensive bird surveys and discussions with the RAPB and NRW, it was decided to remove DAs 1, 8 and 9 from the proposed development due to their close proximity to the Nature Reserve. Effects on designated ecological sites and mitigation measures proposed are addressed in Chapter 11.

#### Flood Risk

- 5.3.32 Pre-application dialogue with IACC confirmed that the development would fall in the 'less vulnerable' category as defined by TAN15: Development and Flood Risk.
- 5.3.33 The majority of the application site is located within Flood Zone A and therefore considered to be at little or no risk of fluvial or tidal / coastal flooding. A proportion of DA4 and DA5 are located within Flood Zone C2 and therefore a justification test is required to demonstrate the suitability of the proposal together with a Flood consequences assessment (FCA). The FCA is included in **Appendix 8.1** to this ES and the justification test is presented in the Planning Statement submitted in support of the application. The submitted statements demonstrate that the justification test has been met and the identified risks are acceptable.

#### Commercial Agreement with the Landowner

- 5.3.34 Having established the area's potential to accommodate the development it was then necessary to investigate whether sufficient land would be available to allow the development to proceed. To this effect, discussions were held with local landowners to determine interest.
- 5.3.35 The proposed development presents an attractive proposition to the landowners due to the comparative uplift in returns that could be achieved from the land. Commercial terms have been agreed with the landowners for the construction and operation of a solar farm subject to the necessary consents. This established the fundamental deliverability of the development on these sites.

## 5.4 CONSIDERATION OF ALTERNATIVES

### Do Nothing Scenario

- 5.4.1 Should the proposal not be implemented it is likely the site would continue to be used as grazing land. As a result, the following benefits of the proposed scheme would not be realised:
- Powering approximately 11,600 homes per year from a renewable source of energy offsetting approximately 7,840 tonnes of CO<sub>2</sub> each year for the life of the development;
  - Potential for community ownership of part or all of the scheme should this be welcomed;
  - The labour force employed throughout the initial four-month construction stage could generate between £2.3m and £2.6m in GVA and annual business rates of approximately £115,000 the local authority; and

- Significant enhancement of local biodiversity and improvements to the adjacent ecological designations.

### Alternative Schemes for Renewable Energy

- 5.4.2 Alternative renewable energy developments were considered for utilising the grid connection. Onshore wind turbines / wind farm to generate power were investigated in this location, however the close proximity to RAF Valley and the potential for collision with aircraft and interference with radar present significant constraints. Given the RSPB Valley Wetlands Reserve is located central to the development areas, wind turbines were also not considered suitable due to the potential ornithological impacts. In addition, it is important to consider the residential amenity of nearby dwellings when siting wind turbines. There are a number of residential properties within 500m of the development areas which would significantly constrain any prospective wind turbine development on grounds of noise disturbance and shadow flicker. Therefore, onshore wind turbines were discounted.

### Alternative Sites

- 5.4.3 Solar farms require a viable connection to the distribution network. The point of connection is determined by the distribution network operator which is purely based on the sensitivities of the network, therefore the general location of solar farms is not under the control of a developer. Once a point of connection has been identified site specific constraints are assessed as per those identified above (section 5.3).

### Alternative Configuration of Sites

#### Description of Development Areas Removed from the Proposed Development

- 5.4.4 Chapter 2 of this ES identifies 9 development areas that were initially included in the proposal as shown in **Figure 2.1**, but DAs 1, 2, 3, 7, 8 and 9 were removed from the proposals. Below is an outline description of these areas and a reason for their removal.

#### Development Area 1

- 5.4.5 DA1 comprised six grazing fields and measured 18.1ha. The area is bisected by a small water course that flows from Llyn Traffwll to the west to Afon Crigyll in the east. Land to the north of the water course comprises a single field and rises gently from 5m AOD to 8m AOD south to north. Land to the south of the water course comprises five fields and has a high point of 8m AOD in the south western corner. A rocky outcrop is located centrally within the southern part of Area 1 reaching a height of 11m AOD. The fields within Area 1 are bound by stock fencing and ditches. A bund measuring approximately 1m high runs along the western boundary of Area 1. An overhead power line runs across the site in a north west – south east alignment.

#### Development Area 2

- 5.4.6 DA2 comprised 2 grazing fields that measured approximately 2.1ha. The boundary is demarcated by hedgerows and vegetation. A farm access track to Tai-hirion runs along the eastern boundary. Access is from the highway that forms the southern boundary.

#### Development Area 3

- 5.4.7 DA3 comprises six grazing fields and measures approximately 13ha. Some of the field boundaries have well established vegetation albeit sparse in some locations. The highest point is 13m above ordnance datum (AOD) located on the southern boundary adjacent to Tai-croesion farmhouse. The land slopes gently northwards to a low point of between 4m AOD and 6m AOD. Along the northern boundary is a ditch/water course that flows into the Afon Crigyll to the west. An overhead electricity pylon enters DA3 but terminates just within its southern boundary.

#### Development Area 7

- 5.4.8 DA7 comprised 3 grazing fields that measured 8.2ha. The boundary is demarcated by hedgerows and vegetation. The north-eastern boundary is demarcated by the A55, adjacent to the south-eastern boundary is Pandy Cymunod a Grade II former woollen mill and workshop. A lane forms the south-western and north-western boundaries. Cymunod is located adjacent to the northern boundary of the Area. The Area falls from north to south having a high point of 20m AOD.

#### Development Area 8

- 5.4.9 DA8 comprised 6 grazing fields that measured c. 8.5ha. The boundary is largely post and wire fencing with some vegetation along the western boundary. Internal field boundaries are post and wire fencing and ditches. A private track providing access to DA9 and the dwelling of Cerrig Cynrig and Cerrig Cynrig Farm and Traffwll bisects the area. On the eastern boundary to the south of the track is large rock outcrop. An overhead power line crosses the Area at this point also. The rocky outcrop is the high point of the site at over 14m AOD. The low point on the northern boundary is 8m AOD.

#### Development Area 9

- 5.4.10 DA9 comprised grazing fields that measured approximately 12ha. The boundary is demarcated by post and wire fencing with sparse vegetation along the western boundary. Internal field boundaries are post and wire fencing. A private track providing access to DA9 and the dwelling of Cerrig Cynrig and Cerrig Cynrig Farm and Traffwll bisects the area. A pond is located centrally to the north of the track and a rock outcrop is located in the eastern most field. Overhead power lines cross over the rock outcrop in the eastern most field. The southern boundary is the high point at 11m AOD and the northern boundary is the low point at 8m AOD.

#### Reasons for Removal

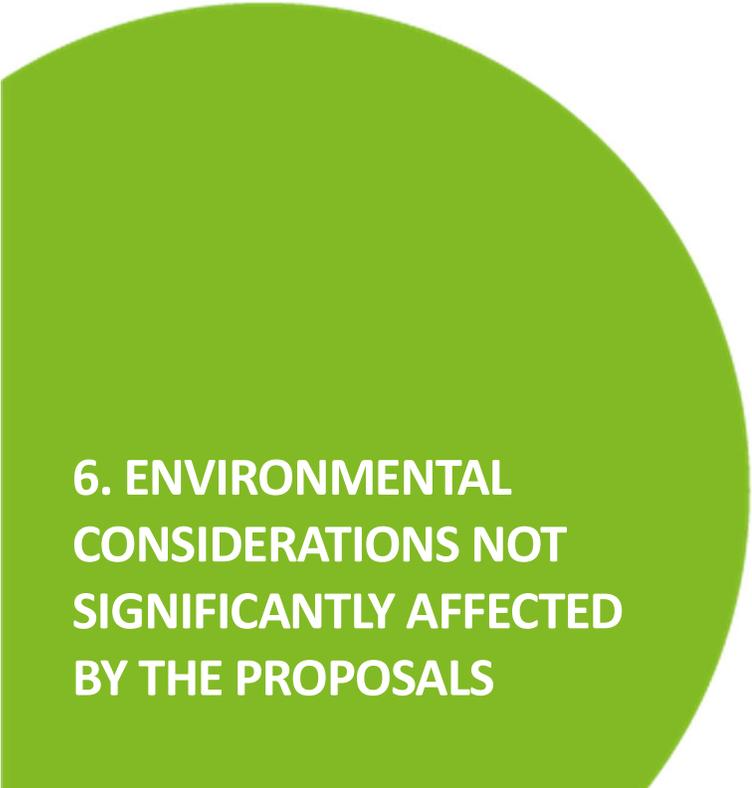
- 5.4.11 As environmental impact assessment work was undertaken the above areas were removed from the scheme as it was considered that the potentially significant adverse impacts of the development on identified receptors could not be mitigated effectively. An overview of the reasons these areas were removed is provided below.
- 5.4.12 The results of the winter bird survey during 2019/2020 and historic survey work confirmed the presence of foraging by post breeding and wintering Chough associated with the Glannau Ynys Gybi / Holy Island Coast SPA on Development Areas 1, 8 and 9. The impact assessment considered that the traditional foraging habits of the chough could experience a significantly adverse impact from the

implementation of the solar arrays in these areas. As a result, it was decided to remove DAs 1, 8 and 9 from the proposal. See **Appendix 11.4** for further details.

- 5.4.13 The Historic Asset Setting Impact Assessment presented in **Appendix 9.4** identified there would be a detrimental impact from DA3 on the setting of the Castellor Hut Settlement, a Scheduled Ancient Monument. As a result, it was decided to remove DA3 from the proposed development.
- 5.4.14 Following initial landscape and visual impact assessment survey work, an amenity buffer of 50m was recommended from residential properties to edge of PV arrays. Once a 50m buffer was in place from Tai-hirion (residential property to the immediate north of DA2 the amount of available land was not viable to accommodate PV arrays and hence removed from the proposal.
- 5.4.15 DA7 was removed from the proposals due to landowner request part way through the initial consultation exercise.
- 5.4.16 The extent of the application site has evolved throughout the EIA process. This iterative approach has allowed the results of pre-application discussions along with the environmental / technical studies carried out to inform the EIA to guide the evolution of the development and allowed the design to be modified in order to avoid or minimise environmental effects where possible.

## 5.5 CONCLUSION

- 5.5.1 It has been demonstrated through the above site selection criteria that there are no suitable and available alternatives within a reasonable distance of the point of connection at the existing Cargeiliog substation. Once the preferred sites (Development Areas 1 to 9) were identified, the EIA and iterative design process necessitated further refinement so that only Development Areas 4, 5 and 6 remain as part of the planning application. The remaining development areas have been through a series of modifications following environmental and technical assessments in order to minimise potential adverse environmental effects and enhance benefits where possible.



## 6. ENVIRONMENTAL CONSIDERATIONS NOT SIGNIFICANTLY AFFECTED BY THE PROPOSALS

## 6.1 INTRODUCTION

6.1.1 This chapter considers those topics that are not deemed to be significantly affected by the proposal and were confirmed as being ‘scoped out’ of the Environmental Impact Assessment (EIA) by the Scoping Direction provided by the Planning Inspectorate in July 2019 (**Appendix 1.1**). Scoped out environmental topics include:

- Climate Change
- Major Accidents and/or Disasters
- Soils, Geology and Agricultural Land
- Public Health and Wellbeing
- Air Quality
- Traffic and Transport
- Socio Economic
- Glint and Glare

6.1.2 Although scoped out of the ES, the Scoping Direction issued by PINS recognised that a proportionate approach would be taken to the assessment of climate change in the ES. The assessment is presented in this chapter.

## 6.2 CLIMATE CHANGE

6.2.1 In order to satisfy the requirements of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017<sup>6</sup>, an assessment has been undertaken on the effects of the Development with regard to climate change:

*‘The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of proposed development on the following:*

*(c) land, soil, water, air and climate.’*

Guidance - Institute of Environmental Management and Assessment (IEMA): Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation<sup>7</sup>

6.2.2 The Guide to Climate Change Resilience and Adaptation (June 2020) provides an updated framework for the effective consideration of climate change resilience and adaption in the EIA process in line with the Town and Country Planning (EIA) Regulations (2017). This document is a revision of the 2015 IEMA guidance on Climate Change Resilience and Adaption in EIA and reflects lessons learnt from emerging practice.

6.2.3 A step by step method presented within this guidance is set out below and has been incorporated within this section. EIA Reports produced in line with this guidance are to be proportionate in their approach and not include superfluous assessment that does not address likely material issues.

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<sup>6</sup> 2017 No.567: Part 1, 4 (2)(c)

<sup>7</sup> IEMA (June 2020): IEMA Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation

### IEMA Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance<sup>8</sup>

- 6.2.4 IEMA published this guidance (referred to hereafter to as IEMA GHG Guidance) to complement the guidance above and to assist practitioners with addressing greenhouse gas (GHG) emissions assessment and mitigation in statutory and non – statutory EIA. The guidance indicates that a ‘good practice’ approach is advocated where GHG emissions are always considered and reported but at varying degrees of detail depending on the project.
- 6.2.5 The guidance sets out there are a number of different assessment methods available for measuring and quantifying the GHG emissions associated with the built environment, ranging from general guidance to form standards for the use of an EIA. The Guidance recognising that ‘*qualitative assessments are acceptable, for example: where data is unavailable or where mitigation measures are agreed early on in the design phase with design and engineering teams*’.

#### Assessment Methodology - General Approach

- 6.2.6 ‘Climate’ is generally understood to mean the weather conditions prevailing over a long period of time and climate change refers to changes in recorded long term climate trends. As a topic for the assessment within EIA, climate change is relatively new. Guidance is evolving and there is no prescribed way in which climate change should be incorporated into an ES, however, some guidance has been prepared by IEMA, discussed further below, which sets out the two main approaches that can be taken to determine a project’s climate change impact. These involve identifying:
- The vulnerability of the Development to climate change (climate change adaptation / resilience); and
  - The direct and indirect influence on the Development on climate change (climate change mitigation).
- 6.2.7 The vulnerability of the Development to climate change considers effects on the Development as a receptor (this is referred to in IEMA Guidance as Climate Change Resilience and Adaptation). A high-level climate change risk and resilience assessment has been undertaken to identify the potential risks of climate change on the Development and to high design measures to increase its resilience and adaptation to climate hazards, such as extreme hot and cold weather, intense rainfall, high winds and storm events.
- 6.2.8 In lieu of a prescribed methodology, IEMA guidance on Climate Change Resilience and Adaptation (2020) has been prepared to assist practitioners with the effective consideration “of both climate change resilience and adaptation in the EIA process”. The guidance stresses that climate change should be an integrated consideration within the EIA, by undertaking an assessment that is “*proportional to the evidence base available to support any assessment*” and focusses on impacts “*specific to project*”.

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<sup>8</sup> IEMA. Assessing greenhouse gas emissions and evaluating their significance. [online]. Accessed from: [https://www.iaia.org/pdf/wab/EIA%20Guide\\_GHG%20Assessment%20and%20Significance\\_IEMA\\_16\\_May17.pdf](https://www.iaia.org/pdf/wab/EIA%20Guide_GHG%20Assessment%20and%20Significance_IEMA_16_May17.pdf)

### Scope of Assessment

- 6.2.9 The scope of this assessment was proposed within a request for a Scoping Direction submitted to the Welsh Ministers on 7<sup>th</sup> June 2019 which stated that the assessment would: '*consider the resilience of proposed mitigation and enhancements in terms of projected climate change within its [the Development's] operational life*'. The Planning Inspectorate, in issuance of its Scoping Direction (Ref: 3217391) on 30<sup>th</sup> July 2019 agreed that climate change would be proportionately addressed as part of the ES.
- 6.2.10 Owing to the nature of the Development as a proposed solar farm providing renewable electricity, an assessment of carbon emissions throughout the construction and operational phases has not been undertaken. During the construction phase, any emissions associated with construction traffic is expected to be minor and temporary in nature. During the operational phase, no emissions are expected. An embodied carbon assessment has also not been undertaken.
- 6.2.11 The assessment has assumed a lifespan of the Development of 40 years, with the Development being fully operational from 2023.

### Assessing Resilience to Climate Change

- 6.2.12 To ensure climate change adaptation is assessed, this section draws on recognised climate change projections, existing guidance and emerging good practice as well as relevant information presented in the ES and documents, which form part of the planning application to ensure that appropriate project mitigation and risk management is included in the Development design. In particular, this chapter draws upon the findings of Chapter 11 Ecology and Chapter 10 Hydrology and Flood Consequences.
- 6.2.13 A comprehensive Flood Consequence Assessment (FCA) (**Appendix 10.1**) has been carried out, in consultation with the Welsh Government and Natural Resource Wales (NRW) to assess the vulnerability of the Development to all possible types of flooding. The FCA identifies and assesses the risks of all forms of flooding to and from the Development and demonstrates how these flood risks will be managed, taking climate change into account. The FCA should identify opportunities to reduce the probability and consequences of flooding.
- 6.2.14 Chapter 11 (Ecology and Nature Conservation) provides a detailed assessment of potential ecological impacts associated with the Development and evaluates the importance of the habitats and species present on the Site. Climate Change and biodiversity (in particular, the loss of biodiversity) are intrinsically linked, with the effects brought about by rapid climate change through shifting weather patterns and extreme weather events resulting in changing habitats for species. Therefore, this chapter draws upon the Ecology chapter which is based on a wide array of surveys as described in Chapter 11, to assess the resilience of the Site to climate change.

### Identifying Climate Change Projections

- 6.2.15 The current projections, 'UKCP18', released in November 2018, are now the most up to date climate change projections available. The Met Office states that UKCP18 provides a valid assessment of the UK's future climate over land, but that when considering decisions that are sensitive to projected future changes in summer

rainfall, additional information should also be used. In line with IEMA Guidance, this Chapter utilises climate projections using the ‘worst case scenario’ of future weather projections, and therefore Representative Concentration Pathway (RCP) 8.5 scenarios are used. This worst-case scenario assumes a ‘business-as-usual’ pathway through a combination of assumptions about high population levels, relatively slow income growth with modest rates of technological change and energy intensity improvements, leading in the long term to high energy demand and GHG emissions in absence of climate change policies<sup>9</sup>.

6.2.16 Taking into account the nature and location of the Development, the following climate related parameters are also considered to have the potential to impact upon the operation of the Development:

- Wind (speed, direction and gustiness);
- Temperature; and
- Precipitation.

#### Assessment of Likely Significant Effects

6.2.17 The resilience of the Development to climate change impacts is qualitatively assessed, based on professional expertise and judgement, with quantitative evidence where appropriate.

6.2.18 A high value receptor that has very little resilience to changes in climatic conditions should be considered more likely to be significantly affected than a high value receptor which is more resilient to changes in climatic conditions. If there is uncertainty about how a receptor will adapt to a changing climate, then a precautionary approach should be employed (IEMA, 2015). Therefore, receptors have been assumed to have a high sensitivity to the changing climate.

#### Limitations and Assumptions

6.2.19 The following assumptions and limitations that apply to this assessment have been set out in this section.

6.2.20 The UKCP18 climate change projections are not climate change predictions as they include a degree of uncertainty. As stated in the UKCP18 Science Overview Report<sup>10</sup>.

*“While the global and regional projections of future climate use the latest climate models and are diverse they cannot cover all potential future climate outcomes out to 2100 (or beyond in the case of sea level) ...”*

6.2.21 The 21st century projections presented in this report are produced for the Representative Concentration Pathways (RCP)<sup>11</sup> climate change scenarios. The results are therefore subject to any inherent limitations of the assumed emissions scenarios including:

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<sup>9</sup> Riahi, K., Rao, S., Krey, V. *et al.* RCP 8.5—A scenario of comparatively high greenhouse gas emissions. *Climatic Change* **109**, 33 (2011). <https://doi.org/10.1007/s10584-011-0149-y>

<sup>10</sup> Met Office (Nov 2018, updated March 2019) UKCP18 Science Overview Report. Available at: <https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Overview-report.pdf> [accessed 02.06.21]

<sup>11</sup> Established by the Intergovernmental Panel on Climate Change (IPCC).

*“The probabilities represent the relative strength of evidence supporting different plausible outcomes for UK climate, based on the climate models, physical insight, observational evidence and statistical methodology used to produce them. However, they may not capture all possible future outcomes, because, for example, some potential influences on future climate are not yet understood well enough to be included in climate models.”*

6.2.22 The following receptors identified in other ES topic chapters and other supporting documents, are considered potentially sensitive to climate change:

- **Chapter 11 Ecology and Nature Conservation:** A changing climate and weather patterns can influence the prevalence and health of species;
- **Chapter 10 Water Resources and Flood Risk:** recommended ‘Contingency Allowances’ for Climate Change are guided by NRW. Considerations include fluvial flooding, groundwater, surface water runoff generation and overland flow. The FCA is to be found at **Appendix 10.1**.

### Baseline Conditions

#### Current Climate Conditions

6.2.23 This section summarises current climate conditions for the local area based on historic weather data and information about extreme weather events. The information presented below presents average weather conditions along with exceptional weather occurrences. To maintain relevance to current weather trends the displayed information has been calculated using data collected over the past two decades. The climate profile is taken from closest available data source to the Site, located at ‘Valley’ on the Isle of Anglesey, approximately 2.0km to the north<sup>12</sup>.

6.2.24 Regionally, the climate is warm and temperate with a significant rainfall all-year-round. The climate here is classified as ‘Ocean Atlantic’ (Cfb) by the Köppen-Geiger system;

*“these climates are dominated all year round by the polar front, leading to changeable, often overcast weather. Summers are mild due to cool ocean currents, although hotter, stable weather patterns can set in for periods of time. Winters are milder than other climates in similar latitudes, but usually very cloudy”.*

6.2.25 In a year, the average rainfall is 841.1 mm (37% less than the mean annual UK rainfall). The driest month is May (an average of 48.4 mm). Most of the precipitation here falls in November, averaging 103.5 mm.

6.2.26 The average annual maximum temperature is 13.2 °C. With an average of 18.8 °C, August and July are the warmest months. February is the coldest month, with temperatures averaging 8.2 °C.

#### Ecology

6.2.27 There are several important ecological features which are designated and proximate to the Site. Within the Zone of Influence identified in Chapter 11, two European Designated Sites were assessed: the Special Area of Conservation (SAC) at Llyn

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<sup>12</sup> Met Office: Climate Station. Available online at:  
<https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/u10hb54gm>  
[accessed 02.06.2021]

Dinam and the Glannau Ynys Gybi/Holy Island Coast Special Protection Area (SPA). Furthermore, two Sites of Special Scientific Interest (SSSI) at Llynnau y Fali and Llyn Traffwll were assessed. These designated sites are of National/County importance.

- 6.2.28 There are also a number of non-statutory designated sites within the Zone of Influence. In particular, three sites abut some of the Site, namely: Cors Plas, Tywyn Trewan and the RSPB Valley Wetlands Reserve.
- 6.2.29 The Site predominantly comprises semi-improved neutral or improved grassland. The fields are currently grazed by sheep, cattle and horses. There are small areas of other habitats, including dense scrub, woodland and hedgerows.
- 6.2.30 Surveys of protected species have found that the Site supports Badgers, Bats, Otters, Water Voles, Brown Hare and Birds. These are considered to be of importance at the Local to District/Borough level. Badgers are also afforded legal protection.
- 6.2.31 An assessment of ecosystem service potential was undertaken for the proposed development by entering the proposed land management activities, as bulleted below, from this Ecological Impact Assessment (EclA) into SPIES<sup>13</sup>. The SPIES tool generates a list of likely changes to ecosystem services, based upon the proposed management actions. By comparing the proposed land management options with the existing land management practices, the SPIES tool generated a list of ecosystem services affected, the overall direction of the effect for each service (i.e. 'enhanced' or 'degraded') and the number of papers that provided evidence for each result (the 'score') as summarised in **Table 11.13** in the Ecology and Nature Conservation Chapter.

#### Water Resources

- 6.2.32 The Site is a rural expanse of agricultural fields, which are drained by a network of drainage ditches that serve extant farms and other rural buildings. Development Area (DA) 4 and 5 are located within the Afon Crigyll catchment which discharges into the Cymryan Bay at Rhosneigr. DA6 is within an unnamed catchment.
- 6.2.33 The FCA submitted in support of the planning application demonstrates that DA5 and DA6 are not at risk of fluvial flooding, with the majority of DA4 also not at risk of fluvial flooding. An extent of DA4 is at a low risk of fluvial flooding, described as being a chance of less than 1 in 1000 year (0.1%), however the majority of DA4 would be flood free during the 1 in 1000 year event. A small area on the western boundary of DA4 is at high risk of fluvial flooding, with a chance of flooding of greater than 1 in 30 years.

#### Future Climate Conditions (up to 2070)

##### Temperatures

- 6.2.34 The central estimate of increase in mean annual temperature is 2.1°C; it is very unlikely to be less than 0.8°C and is very unlikely to be more than 3.6°C. The central estimate of increase in winter mean temperature is 2.0°C; it is very unlikely to be less than 0.3°C and very unlikely to be more than 3.8°C. The central estimate of increases in summer mean temperature is 2.5°C; it is very unlikely to be less than 0.5°C and

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<sup>13</sup> See 11.3.31 (Ecology and Nature Conservation Chapter for more details).

very unlikely to be more than 4.8°C.

#### Precipitation

- 6.2.35 Winter rainfall is projected to increase and summer rainfall is most likely to decrease. The central estimate of change in winter mean precipitation is 13%; it is very unlikely to be less than -9% and is very unlikely to be more than 38%. The central estimate of change in summer mean precipitation is -25%; it is very unlikely to be less than -55% and is very unlikely to be more than 3%.
- 6.2.36 With respect to the continued validity of UKCP18 projections for summer rainfall (see above), whilst the full range of summer rainfall outcomes from UKCP18 are considered to remain valid in informing planning decisions, rainfall patterns across the UK are not consistent and will vary dependent on seasonal and regional scales and will continue to vary in the future (Met Office, 2019)<sup>14</sup>.

#### Wind Speed and Storms

- 6.2.37 Winds associated with major storm events can be some of the most damaging and disruptive events for the UK with implications for property, power networks, road and rail transport and aviation. Calm periods with little wind, particularly over prolonged periods, can affect air quality whilst winds from a particular direction can be a critical factor in the spread of pathogens. Both of these cases are also examples where the combination of factors such as wind, temperature and precipitation can exacerbate their impacts (e.g. air quality issues tend to be worse under conditions of light winds and higher temperatures; pathogen spread can require wind, temperature and precipitation conditions to be favourable) (Met Office, 2019)<sup>15</sup>.
- 6.2.38 Changes in wind speeds are not currently available at the regional level and there remains considerable uncertainty in the projections, with respect to wind speed. However, there are small changes in projected wind speed (Met Office, 2019). Across the UK, near surface wind speeds are expected to increase in the second half of the 21st century with winter months experiencing more significant impacts of winds (Met Office, 2019). This is accompanied by an increase in frequency of winter storms over the UK. However, the increase in wind speeds is projected to be modest. There are no compelling trends in storminess as determined by maximum gust speeds from the UK wind network over the last four decades<sup>16</sup>.

#### Summary

- 6.2.39 The north Wales region, where the Site is located, is set to experience hotter, drier summers and milder, wetter winters. With winter precipitation and the number of heavy rain days projected to increase, flooding events may be more likely and occur on a more frequent basis. Conversely, summer precipitation is expected to decrease.

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<sup>14</sup> Met Office (2019): UKCP18 National Climate Projections: An Overview. Available online [accessed 02.06.2021]: [https://www.ice.org.uk/getattachment/eventarchive/flooding-conference-2019-cardiff/Carol-McSweeney-\(no-notes\).pdf.aspx](https://www.ice.org.uk/getattachment/eventarchive/flooding-conference-2019-cardiff/Carol-McSweeney-(no-notes).pdf.aspx)

<sup>15</sup> Met Office (2019): UKCP18 Factsheet: Wind. Available online [accessed 02.06.2021]: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-factsheet-wind.pdf>

<sup>16</sup> Royal Meteorological Society (July 2018): International Journal of Climatology; State of the UK Climate 2017. Available online [accessed 02.06.2021]: <https://rmets.onlinelibrary.wiley.com/doi/epdf/10.1002/joc.5798>

Coupled with a central estimate of summer temperatures increasing by 2.1°C, the area may experience an overall reduction in water resources. Whilst there are large uncertainties in the frequency and intensity of storms increasing under climate change, wind speeds are expected to increase slightly as well.

### Climate Change Adaptation and Resilience

- 6.2.40 This section provides an assessment of the main potential risks presented by a changing climate to the Development. It outlines the relevant disciplines of climate change adaptation to the four key trends identified: the projected increase in mean summer and winter temperatures; projected increase in annual precipitation; projected decrease in mean summer precipitation; and extreme weather events (such as heavy and/or prolonged precipitation and storm events). It is recognised that owing to the multi-faceted nature of climate resilience in both habitats and species, there is cross-over between disciplines.

#### Temperature

- 6.2.41 With the projected trend to warmer conditions, a rise in temperature has the potential to impact on habitat which in turn may affect the behaviour of animals such as birds, while changes in temperature could affect the composition and growth rates of plant communities and invertebrates and habitats.

#### Wind

- 6.2.42 Over the lifetime of the Development, UKCP18 shows the change in wind speeds and storms is limited to well within the limits of current inter-annual variability. Therefore, no effects are anticipated. Given the maximum heights of the Development and the projected modest increase in central wind speeds, it is anticipated that there will be no likely effect as a result of increased wind speeds during the operational phase of the Development.

#### Biodiversity

- 6.2.43 As outlined, the Site supports a range of habitats and species, with statutorily designated and non-statutorily designated sites proximate to the Site. Changes in precipitation and temperature could potentially affect the future of bird assemblages, particularly when taking changes in habitat into consideration.
- 6.2.44 A calculation of Biodiversity Net Gain has been made using the Defra Biodiversity Metric 2.0. The overall gain for grassland habitats is 17.2%, with the main gains coming from the conversion of agricultural grassland to higher value habitats such as wild flower meadows, wild bird seed mixes and wet pasture in DAs4 and 5. The overall gain for hedgerow habitats is 37%. This comes from improving the quality of existing hedges through careful management and planting the new species rich hedgerows.
- 6.2.45 This includes but is not limited to targeted land management of grassland grazing areas throughout the Site; sowing wild flower and grass seed; planting of a 600 metre new hedgerow in DA4; and sowing tussock and wild flower margins around every field.
- 6.2.46 Through ensuring that the planting is suited to adapt to the climatic changes outlined and through increasing the biodiversity of the Site, it is considered that the

Development will be increasingly resilient to the effects of climate change. Although the effects of climate change are uncertain, the enhancement in biodiversity will result in a positive significant effect.

#### Precipitation & Flood Risk

- 6.2.47 The risk from increased precipitation is the potential for flooding, particularly if it is associated with extreme events. For the Development, this increases the risk for potential destruction/disruption of infrastructure. The effects of flooding are discussed later. UKCP18 show that over the winter season precipitation is projected to increase.
- 6.2.48 The FCA (**Appendix 10.1**), outlines inherent mitigation measures aimed to minimise risk of flooding. Modelling for allowances for increased rainfall projected due to a changing climate have been agreed with Anglesey County Council, with the Development designed to withstand a 1 in 100 year (+25%) flood event.
- 6.2.49 The solar arrays and vulnerable infrastructure will be located above the ground level. The modules will be raised off the ground, such that the leading edge of each panel will be approximately 0.90m above the ground, and the top edge approximately 3m off the ground. The frame supporting the solar panels should not impede overland flows or reduce flood storage capacity as only the legs of the panels will be below ground. The panels themselves have been designed so that they have minimal foundations as to not impede or disturb soil and reduce the volume of concrete required. Thereby limiting the potential for disrupting surface and groundwater flows.
- 6.2.50 Ancillary structures such as substations and transformers also require shallow foundations and will limit ground disturbance and disruption. The Development will maintain existing drainage, with only minimal areas of impermeable surfacing proposed.
- 6.2.51 Climate change is projected to increase the likelihood of flooding from most flood sources and therefore an assessment of the effects has been considered over the estimated development lifetime. Given the embedded mitigation<sup>17</sup> and FCA conducted and submitted as part of the planning application, the magnitude of effect on the operation of the Development is assessed as low and the overall significance of effect is not significant.

#### Conclusions

- 6.2.52 A Climate Resilience assessment has been undertaken with respect to the Development, drawing on best practice guidance. The assessment has included a thorough review of the interplay between different facets of climate resilience and the existing baseline conditions of the Site. The assessment has concluded that the Development has embedded mitigation measures which will result in the Development being resilient to changes in temperature, extreme weather events (including flooding), changes in wind and shifting habitats. No additional mitigation measures are proposed with respect to Climate Resilience.

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<sup>17</sup> Outlined in Chapter 3 – Development Description. Also refer to supporting Design and Access Statement.

### 6.3 MAJOR ACCIDENTS AND / OR DISASTERS

6.3.1 The proposals comprise a circa 35MW solar farm and associated infrastructure. The benign nature of the proposed development is such that it is unlikely to release pollutants or any hazardous, toxic or noxious substances to air or land and is unlikely to have a significant effect in terms of pollution and nuisance.

6.3.2 A search was conducted using COMAH 2015 Public Information Search<sup>18</sup> from the Health and Safety Executive (HSE). No results were found within 4.8km of the application site.

#### Potential for the Development to Cause Major Accidents / Disasters

6.3.3 The development is not considered likely to cause a significant accident or disaster risk during either the construction or operational phases.

#### Construction Phase

6.3.4 Health and Safety during the construction phase is addressed in section 6.4 below which concludes that the risk to both construction workers and the general public is low. A Construction Environmental Management Plan (CEMP) will be implemented during the construction period and will include the requirement for all construction activities to be undertaken in accordance with statutory requirements and best practice methods.

#### Operational Phase

6.3.5 When operational, the proposed development will comprise fixed photovoltaic (PV) panels, together with associated electrical infrastructure including inverters, transformers, substations and cabling. All development on the site will be subject to routine maintenance such that it is not considered to pose a significant risk of creating an accident or disaster. Risks associated with fire are also considered low as the proposed electrical systems will have cooling mechanisms and will automatically shut down should any overheating occur.

6.3.6 All development areas will be secured by a 2m stock fence or similar with CCTV ensuring there is no public access and ensuring public safety.

#### Vulnerability of the Development from Major Accidents/Disasters

6.3.7 Consideration has been given to the vulnerability of the proposed development to major accidents / disasters, particularly in terms of the potential from flooding. A Flood Consequence Assessment (FCA) has been prepared as part of the hydrological assessment presented in Chapter 10 of this ES. The FCA (a copy of which is included in **Appendix 10.1**) confirms that whilst some parts of the application site have a higher flood risk, flood sensitive equipment such as inverters, transformers and substations will be positioned out of these areas. As an additional precaution such infrastructure will be elevated at least 300mm above ground level. PV arrays that will be located in the higher flood risk areas will be resilient to the likely flood events considered by the FCA.

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<sup>18</sup> <https://notifications.hse.gov.uk/COMAH2015/Search.aspx>

- 6.3.8 The FCA also considers the potential contribution to flood risk from the proposal. Whilst the panels themselves will be impermeable surfaces, surface water will run off the panels and onto the permeable ground beneath. Therefore, surface water runoff from the site will be largely the same as existing levels.
- 6.3.9 In addition, the facility can also be controlled remotely so that the transmission of electricity could be quickly disabled if any concerns should arise resulting from major accidents/disasters.

#### Conclusion

- 6.3.10 The potential for major accidents and disasters from the proposed development is considered to be low and this topic has therefore been scoped out of the EIA accordingly.

### 6.4 PUBLIC HEALTH AND WELLBEING

- 6.4.1 The proposed development is unlikely to release pollutants or any hazardous, toxic or noxious substances to air or land. Potential health impacts are therefore related primarily to construction and operational related impacts.

#### Health Impacts During the Construction Phase

- 6.4.2 Comprehensive health and safety assessments are an essential part of the construction process and would be carried out prior to construction by the contractor in accordance with legislation. The appointed Site Management will have the responsibility of Health and Safety on site during the construction phase and all personnel working on site will be required to wear the appropriate Personal Protective Equipment (PPE).
- 6.4.3 The potential impacts from noise and vibration during the construction and operational phases has been assessed and the results are presented in Chapter 8 of this ES. The assessment concludes that the proposal will not result in significant environmental effects to identified receptors.
- 6.4.4 A Transport Statement incorporating an outline Construction Traffic Management Statement (CTMS) has been prepared. This sets out the anticipated traffic generation associated with the proposed development. Given the short duration of the construction phase and the relatively low background traffic numbers, it is expected that proposed vehicle movements will not lead to significantly adverse effects on health from vehicle emissions. All deliveries will take place within temporary construction set down areas and away from the public highway, therefore no adverse impacts on road safety are anticipated. Once operational, visits to site will be limited to largely monthly visits by car or van.
- 6.4.5 Dust can be created from the movement of construction traffic and from general construction activities and particles can be carried by prevailing wind. Construction traffic carrying loose materials will be covered to reduce dust generation. Weather and ground conditions will be observed on a daily basis throughout the construction phase. In addition, plant and equipment will be maintained in accordance with manufacturer's specifications to help control air emissions. Vehicle and construction equipment shall be switched off when not in use (where practicable) to avoid unnecessary emissions. Consideration of potential effects on air quality is presented

in section 6.5 of this ES.

- 6.4.6 A detailed CEMP will be implemented during the construction period and will include the requirement for all construction activities to be undertaken in accordance with statutory requirements and best practice methods.

#### Health Impacts During the Operational Phase

- 6.4.7 Once operational, there will be no public access to the solar farm which will be secured by fencing and monitored by CCTV.
- 6.4.8 The generation and transmission of electricity produced by the proposed development can be safely managed. The panels themselves are inert, static structures with there being no issues relating to the release of light, heat energy or electromagnetic radiation likely. The power generated by each array would be transmitted through insulated cables buried below the ground. The associated electrical equipment would be housed in sealed containers mounted above the ground.
- 6.4.9 In addition, the scheme can be controlled remotely so that the transmission of electricity could be quickly disabled if any immediate health and safety concerns should arise.

#### Conclusion

- 6.4.10 The potential for adverse impacts on public health and wellbeing from the proposed development is considered to be low and public health and wellbeing has therefore been scoped out of the EIA accordingly.

### 6.5 LAND USE

- 6.5.1 The application site has been in agricultural use since the 1800s (determined by map regression). As such there is unlikely to be land contamination associated with previous uses. Therefore, ground contamination has been scoped out of the EIA accordingly.
- 6.5.2 An Agricultural Land Classification (ALC) survey has been undertaken across the development areas. The assessment is presented in **Appendix 5.1** to this ES.

#### Land Quality

- 6.5.3 The assessment concludes that agricultural land classification (ALC) grades 2 and 3a occur across approximately 15.4ha of the deployment area (land within the proposed security fence) with grade 2 accounting for approximately 3.3ha.<sup>19</sup>
- 6.5.4 The assessment shows that the majority of the 12.8ha within deployment area of DA6 is graded either 4 or 3b, with a very small area (0.2ha) of grade 3a. The fields that make up DA4 and DA5 have a mix of both BVM and Non BVM land:
- Land within the deployment area of DA4 measures 18.6ha of which there is 10.6ha of grade 3a land and 0.7ha of grade 2 land.
  - Land within the deployment area of DA5 measures 6ha of which there is 1.1ha

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<sup>19</sup> The deployment area is the available land for the siting of the PV panels, the development area includes non-operational land for provision of biodiversity management and or grazing as necessary for example.

of grade 3a land and 2.6ha of grade 2 land.

- 6.5.5 In total, the scheme will result in the development of 12ha of Grade 3a and 3.3ha of Grade 2 land. If the areas within the security fence that will not be developed for solar (including internal access roads and ancillary equipment) are discounted, the area of BMV land to be developed falls to 0.7ha of land.
- 6.5.6 Given these areas are farmed/managed as whole fields, agricultural use is influenced by the poorer grades. This reflects historical agricultural use of the land for grazing or haymaking only. In summary the DAs have variable land quality based on their drainage and soil types under the moist local climate. The majority of the land is better suited to cattle and sheep rearing than arable use due to the presence of wet areas (in a patchwork with better draining ones) which could practically not be managed separately.
- 6.5.7 Land within and outside the security fence will continue to be grazed as part of the management of the grass sward but not to the intensity as currently experienced. In addition, the construction and decommissioning of the solar farm will have little impact on the land quality as the fields can be returned to agricultural use on removal of the solar farm and associated infrastructure.
- 6.5.8 It should also be noted that the Welsh Government commissioned an Assessment of Onshore Wind and Solar Energy Potential in Wales in 2019<sup>20</sup>. The criteria used to identify priority areas for solar energy excluded ALC grades 1 and 2 from the search, suggesting that ALC grades 3a, 3b, 4 and 5 were all considered acceptable areas for solar development.

### Conclusion

- 6.5.9 The assessment has determined that there are areas of 'Best and Most Versatile' agricultural land within the development areas. In total, 9% of the deployment land is Grade 2 and 32% of the deployment land is Grade 3a. Given the varied nature of the identified ALC grades, however, it is not possible to farm the land that reflects (in part) the higher grades. As such, agricultural management of the land has always fallen within the capabilities of the lowest grade meaning that the higher quality land could only be farmed to the lowest grade. In addition, given that in the preparation of Future Wales the Welsh Government considered it acceptable to identify areas of Grade 3a land as potentially suitable for solar development, it is considered that the loss of 3.5ha of Grade 2 land (less than 7% of the overall development area), distributed as it is amongst land of lower grades, is not significant. The proposed development does not therefore result in a detrimental impact on land quality or the supply of BMV land.

## 6.6 AIR QUALITY

- 6.6.1 Solar developments have no direct source of emissions to atmosphere during the operational phase. Possible impacts to local air quality only have the potential to occur during the short period of the construction phase through vehicular and plant emissions and through the creation of dust.

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<sup>20</sup> <https://gov.wales/sites/default/files/publications/2019-08/stage-1-development-of-priority-areas-for-wind-and-solar-energy.pdf>

- 6.6.2 The site is not within or near an Air Quality Management Area and proposed traffic generation will not lead to significant vehicle emissions. Excessive dust is unlikely to be generated through anchoring of the frames to the ground as the frames will be secured by piles that will be pushed into the ground. Excavation is limited to trenching thus minimising the potential for ground disturbance and the entertainment of dust. Vehicle movements on site will be limited to transportation of equipment from the set down area to solar array development areas.
- 6.6.3 A detailed CEMP will be implemented during the construction period and will outline measures to control dust and air emissions.
- 6.6.4 Given the limited duration of the proposed construction works and the nature of works during the construction phase the potential for dust creation will be relatively low.

### Conclusion

- 6.6.5 It is considered that potential effects on air quality will not be significant and air quality has been scoped out of the EIA accordingly. However, a CEMP will be implemented during the construction phase and will require all construction activities to be undertaken in accordance with best practice methods.

## 6.7 GLINT AND GLARE

- 6.7.1 Pre-application discussions with the Ministry of Defence confirmed the need for a glint and glare assessment. However, it was agreed that the assessment should only cover the potential from DA6, the closest development area to the runways at RAF Valley.
- 6.7.2 The glint and glare assessment, presented in **Appendix 6.1** confirms that no impact upon the Air Traffic Control Tower or the approach paths for runway 01, 19 and 31 is expected. Whilst a solar reflection is possible towards up to 1.3 miles of the 2-mile approach path, at worst (from 1.2 miles to 1.3 miles) a marginal 'yellow' glare could occur, but only for 14 minutes of the year and would be on the periphery of a pilot's field of vision. Following further consultation with the MoD it was agreed that these potential risks were acceptable. A copy of the Ministry of Defence's comments is presented in **Appendix 6.3**.
- 6.7.3 In light of the above, the potential impacts from glint and glare have been scoped out of the EIA.

## 6.8 TRAFFIC AND TRANSPORT

- 6.8.1 The Scoping Direction included at **Appendix 1.1** confirmed that traffic and transport matters could be scoped out of the assessment but advised that a Construction Traffic Method Statement (CTMS) is included with the submission. Following a request from IACC, a standalone Transport Statement (TS) has also been prepared to accompany the application.
- 6.8.2 The TS and CTMS set out the current and proposed access arrangements to the three development areas which form the application site, the anticipated construction programme, construction vehicle numbers and routing of deliveries, construction worker numbers and the proposed construction hours. The CTMS also gives consideration to the decommissioning phase. Below is a summary of the TS and

outline CTMS.

- 6.8.3 Access to the site is from the A55 Expressway from junction 4 (Caergeiliog and Bodedern) which leads to the A5, from which the areas can be accessed by the local highway network. The proposed principal set down area located on the northern boundary of DA4 will be accessed from junction 4, then the A5 to Bryngwran, then south along Lon Salem, under the A55 and turning west at Hebron crossroads.
- 6.8.4 From the principal set down area, smaller vehicles (typically 10m rigid vehicles) will transfer equipment and materials to DA5 and DA6. There will also be some instances where direct deliveries to the areas will be made.
- 6.8.5 A series of vehicle swept-path analyses presented in Appendix B to the CTMS demonstrate that:
- a 10m long rigid body vehicle can access all development areas; and
  - an articulated 16.5m HGV can access DA4 and the drop off area.
- 6.8.6 Vehicles egressing from DA6 will be via a private road that also serves local farms, whereas access to DA4 and DA5 are via existing field gates. No improvements to the existing access points are required for DA6. To facilitate egress for DA4 an existing low wall will require setting back on the eastern bell mouth by approximately 3m.
- 6.8.7 In all cases egress will be onto a single-track highway and whilst they are subject to a 60mph national speed limit, they typically experience low vehicle speeds due to the limited width of the carriageway. Given the limited visibility of the access points a banksman and temporary signage will be employed to ensure vehicles can safely enter and leave the public highway to minimise the impact on the local highway network.
- 6.8.8 The construction of the solar farm is expected to last 4-5 months. During this period, there will be journeys associated with the arrival and departure of site staff and the delivery of parts and construction materials.
- 6.8.9 It is anticipated that the construction phase will generate approximately 330 return journey deliveries to site, or 660 individual movements. The first month will see the highest deliveries to site at 128. Even at the most intense period of construction when solar panels, frames, posts and electrical support equipment and fencing are being delivered, there would be approximately an average of just over 5 HGV deliveries per working day. As all deliveries will result in a return journey for the vehicle there will be up to an average of just over 10 movements per working day.
- 6.8.10 Some materials and equipment will be delivered directly to the other plots but in most cases will be transferred by smaller vehicles to and from DA4. These will be additional movements between the areas.
- 6.8.11 The project will employ between 120 and 190 people during the construction period. It is envisaged that staff will be from both local and regional contractors who will be encouraged to use shared transport such as minibuses providing this is possible in terms of current public health guidelines. All vehicle parking will be provided within the temporary construction compounds associated with each development area, there will be no parking on the local highway network.
- 6.8.12 The extent of proposed mitigation measures will be dependent on the appointed

contractor for the construction of the facility. However, below are several broad measures that could be readily implemented:

- The use of a banksman to help guide deliveries into sites;
- Advisory temporary signage on the highway for works in the area;
- Temporary signage along the proposed route from the A55 to ensure deliveries follow agreed routes;
- Provide sufficient parking areas within the plots and adjacent to the temporary construction compound so there is no parking on the highway or potential blockage to access tracks;
- Vehicles carrying loose material shall be sheeted;
- The use of bowsers/sprays as necessary during dry conditions to prevent dust and the use of wheel cleaning facilities to prevent transfer on to the highway as required;
- Secure the site to prevent unauthorised access;
- Regularly monitor the condition of the highway for spoil transfer or damage and rectify as required;
- Contact local residents prior to construction works commencing advising of anticipated duration and a contact number to advise of any issues/concerns; and
- Turning engines off when not in use.

## 6.9 SOCIO-ECONOMIC

- 6.9.1 The Scoping Direction included at **Appendix 1.1** confirmed that socio economic considerations could be scoped out of the assessment. But the Direction also states “...*this does not prevent the developer from providing separate assessments to support the decision-making process*”. In light of this, and following a request from IACC, a standalone Socio-Economic Statement has been prepared to accompany the application. Below is a summary of the Statement.
- 6.9.2 National, regional and local economic growth policy refers to Wales being well positioned to support the renewable sector, attract investment and reduce carbon emissions. The North Region, and in particular the Isle of Anglesey are noted as developing clusters for the energy industry.
- 6.9.3 One of the Welsh Government’s key priorities is for low carbon electricity to become the main source of energy in Wales. Not only is this a reaction the Welsh Government setting out its legal commitment to achieve net zero emissions by 2050, but also to the realisation that renewable and low carbon energy developments offer significant potential for communities and small businesses.
- 6.9.4 Of National concern is the significant economic leakage because of the current energy system. There is a need to create an energy system that retains more of the economic value for Wales. The Plan notes that through localised production more benefits can be directed to the local communities through skills, quality jobs and a greater retention of economic value.
- 6.9.5 At a local level the need to mitigate the effects of climate change, e.g., reduce greenhouse gas emissions, promote generating renewable energy and low carbon is accepted as a key issue. Anglesey is one of ten Enterprise Zones across Wales. The vision for Anglesey Enterprise Zone is to create a world-renowned centre of excellence for the production, demonstration, and servicing of low carbon energy.
- 6.9.6 Based on this, the Proposed Development would contribute to local and regional

economic growth aspirations, supporting the area as an energy cluster and providing progress in meeting energy targets.

- 6.9.7 The Solar PV network now accounts for around 12% of all renewable electricity generated in Wales. The Energy Generation in Wales Report 2019 suggests a significant decrease in renewable distribution levels compared to the last few years, therefore progress has slowed with regard to meeting targets and transitioning local economies to clean energy. Despite this it does highlight an existing internal network of knowledge and skills growth across Wales with regard to Solar PV development.
- 6.9.8 Section 2 of the Statement identifies current skill levels as a barrier to growth within the energy industry. Section 5 of the Statement clearly demonstrates that the across the lifecycle of Solar PV projects a range of skills and training are required. It highlights the transferability of skills from other sectors and the numerous entry points for employment across the different phases. It is evident that a development, such as the proposed, has the potential to create domestic value in each segment of the chain.
- 6.9.9 Notably the Isle of Anglesey and Gwynedd authority area, and the North Region, have a higher concentration of professional, scientific and technical jobs when compared to Wales as a whole. This is also the case for business administration, information communication and finance/insurance roles. This highlights the areas potential to meet the skills requirement.
- 6.9.10 It is also evident from higher education development and regional skills plans that the environment and energy are becoming attractive career paths. For example, Bangor University has a growing specialism in Nuclear and Low Carbon energy research and development. By locating on the Isle of Anglesey the Solar Farm would be supporting the industries development as a key growth sector.
- 6.9.11 The Proposed Development could potentially generate numerous socio-economic and economic benefits throughout the 40 year lifespan.
- 6.9.12 The Proposed Development will deliver multiplier economic and socio-economic benefits throughout its lifecycle. With an export capacity of circa 35MW, which will be fed straight into the local network, at peak capacity this could generate enough electricity to power the equivalent of approximately 11,600 homes. The Solar Farm would contribute to a reduction in the emissions of CO<sub>2</sub> of around 7,840 tonnes per annum. This has a preventive carbon value of around £7m up to the year 2030.
- 6.9.13 The Development could employ between 120 and 190 people in the initial 4-5 month construction phase, followed by approximately two maintenance staff over the 40 year lifespan. The labour force employed throughout the initial four-month construction stage could generate between £2.3m and £2.6m in GVA. The two employees working throughout the 40-year operation phase could generate a further £3.3m in GVA.
- 6.9.14 Employment onsite would support local business through daily expenditure and also any accommodation required for the construction period. The Proposed Development could also allow local business to operate on clean energy. Allowing them to market themselves as low carbon businesses. It could be particularly attractive to investors, clients and the tourism market.

- 6.9.15 The need to upskill the current and future workforce across North Wales is a key aspiration within policy guidance and growth strategies. The Proposed Development offers the opportunity to build awareness of the energy sector and expand the knowledge network through potential collaboration with local schools. In addition to this the Applicant actively works with university research programs.
- 6.9.16 The Proposed Development will also contribute to local services and infrastructure through the payment of around £115,000 in business rates per annum.

## 7. LANDSCAPE AND VISUAL IMPACT ASSESSMENT

## 7.1 INTRODUCTION

7.1.1 This chapter sets out the assessment of the landscape and visual impact of the proposed development. It presents the findings of a Landscape and Visual Impact assessment (LVIA) which conforms to the relevant parts of the Guidelines for Landscape and Visual Impact Assessment, Third Edition (Landscape Institute and IEMA, 2013). The assessment focuses on the identification of likely 'significant' landscape and visual effects, including those that are, positive and negative, direct and indirect, long, medium and short term, and reversible and irreversible, as well as cumulative effects. This includes the potential effects on local landscape character and landscape designations as well as the potential effects on views experienced by people (receptors) including (but not limited to); settlements, public rights of way, registered parks and gardens and transportation corridors.

7.1.2 This chapter outlines the data gathering methodology that was adopted for the LVIA. It then leads to a description of the assessment methodology, the overall baseline conditions, and an assessment of potential effects. The chapter concludes with a summary of the assessment results.

### Study Area

7.1.3 It is accepted practice within LVIA work that the extent of the study area for a development is broadly defined by the visual envelope of the proposed development and the anticipated extent of the visibility based on landform combined with developed and natural features. The study area for this appraisal extends to a c.5 km radius from the perimeter of the proposed development.

7.1.4 Although the study area and ZTV extend to 5km, detailed consideration of the landscape and visual effects of the solar farm development areas will be focused to a c.2.5 km study area. The study area was selected for the assessment on the basis of the scale of the proposal; up to 3 m high panels and their actual theoretical visibility considering local screening features and the nature of the surrounding topography. The likelihood of the panels being substantially perceptible at distances over 2.5km from the site is considered to be very low. GLVIA, section 5.2, additionally states that a study area should

*“include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner. This will usually be based on the extent of landscape character areas likely to be significantly affected either directly or indirectly”.*

7.1.5 The study area is further refined for each part of the assessment process as follows:

- Landscape Assessment: Landscape assessment with regard to landscape character is restricted to a 5km radius study area. Emphasis has been placed on assessing the landscape receptors likely to experience significant effects (direct and indirect), those within 2km;
- Visual assessment: This is restricted to a 5km study area as it is only within this area that it is considered that significant effects, if any, would occur. The focus of study is further guided by the results of the zone of theoretical visibility. Emphasis is placed upon assessing the visual effects of groups of potential receptors considered to have the greatest potential to sustain higher magnitudes of visual change, so a focused study area of up to 2km is undertaken, although

the viewpoints and identified landscape and recreational receptors consider views from outside this area; and

- Cumulative Assessment: mapping of all Development Area within the study area, assessment guided through the production of a cumulative ZTV.

7.1.6 The study area has been agreed with IACC during pre-application dialogue.

### Scoping

7.1.7 In May 2019, the Applicant submitted a request for a formal Scoping Direction from the Planning Inspectorate Wales (PINS) (on behalf of the Welsh Ministers) under Regulation 33 of the EIA Regulations. The purpose of the request for a Scoping Direction was to define the scope of this Environmental Statement (ES), including the LVIA methodology. PINS issued a Scoping Direction on 30th July 2019 and this is presented in **Appendix 1.1**.

7.1.8 A request for pre-application discussions was made to the Isle of Anglesey County Council (IACC) in May 2019. Following preliminary consultations with the Authority's in-house consultees. IAAC issued a response on 6<sup>th</sup> June 2019 which is presented in **Appendix 1.2**.

7.1.9 Following this, a series of meetings and discussions were held with IACC Officers to confirm the scope and in particular the visual assessment viewpoint locations. This work included an accompanied site visit to many of the Development Areas and selected viewpoint locations. The viewpoint locations were subsequently updated and agreed following this consultation.

### Project Development

7.1.10 Prior to undertaking the EIA, the proposal comprised nine individual Development Areas (DAs), numbered 1 to 9. As baseline surveys and assessments were undertaken it became clear that some Development Areas had the potential to create significantly adverse environmental effects. This was primarily due to ecological, landscape / visual and cultural heritage reasons. These Development Areas were removed from the proposal as potential significant residual effects following mitigation could not be adequately addressed. The removed DAs are 1, 2, 3, 7, 8 and 9, which are discussed further within chapter 5 of this ES.

### Assessment Structure

7.1.11 This chapter is structured as follows:

- Introduction;
- Methodology;
- Policy Context;
- Baseline Landscape Conditions;
- Baseline Visual Conditions;
- Scheme Design, Mitigation and Enhancement;
- Assessment of Landscape Effect (including Cumulative);
- Assessment of Visual Effect (including Cumulative)
- Assessment of Viewpoints and Photomontages; and,
- Summary and Conclusion.

## 7.2 METHODOLOGY

### Introduction

- 7.2.1 The methodology for this LVIA conforms to the relevant parts of the ‘*Guidelines for Landscape and Visual Impact Assessment, Third Edition (Landscape Institute and IEMA, 2013)*’. The assessment focuses on the identification of likely landscape and visual effects, including those that are, positive and negative, direct and indirect, long, medium and short term, and reversible and irreversible, as well as cumulative effects.
- 7.2.2 Detailed explanation of the methodology including the basis on which judgements have been made on the sensitivity of the receptors, magnitude of change and level of effects is contained within **Appendix 7.1**.
- 7.2.3 The methodology and assessment viewpoints were agreed with IACC. Copies of relevant email correspondence is also included within **Appendix 7.7**.
- 7.2.4 For the purposes of clarity, the European Landscape Convention (ELC) (2000), defines the term ‘landscape’ as:
- “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors”.*
- 7.2.5 The ELC confirms that the
- “landscape should be considered as a resource in its own right. It provides an integrated way of conceptualising our surroundings and is increasingly considered to provide a useful spatial framework for thinking about a wide range of environmental, land use and development issues”.*
- 7.2.6 The ELC applies to all landscapes; natural, rural, urban and peri-urban areas, including land, inland water and marine areas. It considers landscapes that might be considered outstanding as well as every day or degraded landscapes.
- 7.2.7 Additional guidance has also been taken from the following publications:
- Landscape Institute Technical Guidance Note 06/19 September 2019, Visual Representation of Development Proposals;
  - Landscape Character Guidance for England and Scotland, Topic Paper 9, Climate change and natural forces, the consequences for landscape character, SNH/CA;
  - Landscape Character Guidance for England and Scotland, Topic Paper 6, Techniques for Judging Capacity and Sensitivity, SNH/CA, 2004;
  - Landscape Character Assessment: Guidance for England and Scotland (The Countryside Agency and Scottish Natural Heritage, 2002); and,
  - Council of Europe, The European Landscape Convention (2000, ratified 2006) ETS No. 176.

### Assessment Process

- 7.2.8 This LVIA assessment has 3 key stages, summarised as follows:
- **Baseline** – gathering of documented information; existing landscape character studies, identification of landscape and visual receptors, scoping of the assessment, agreement of viewpoints and assessment parameters, discussion with relevant consultees and the local planning authority, site visits and initial reporting of design issues with client designer;
  - **Design** – Review of initial design and ongoing design iterations following

baseline survey, including responses to other specialisms e.g. ecology and cultural heritage. Consideration of mitigation options and enhancement (where appropriate); and,

- **Assessment** – involves of an assessment of the landscape and visual effects of the scheme, involves site and desk based survey and assessment. Due to the scale of development, site focussed and height above ground level, any cumulative effects are also considered within this stage.

### Landscape and Visual Effects

7.2.9 LVIA is a tool used to identify and assess the effects and significance of change resulting from development on both the landscape as an environmental resource in its own right and on people's views and visual amenity (GLVIA 2013, para 1.1).

7.2.10 Landscape and visual effects are assessed separately within this LVIA,

*“the assessments are known as impact assessments but the European Union Directive refers to assessment of the effects, which are changes arising from the development that is being assessed”. (GLVIA 2013, para 1.15).*

7.2.11 Impact is defined as ‘action being taken’ and the effect is defined as the ‘change resulting from the action’.

7.2.12 Landscape effects are defined as:

*“An assessment of landscape effects deals with the effects of change and development on landscape as a resource. How the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character” (GLVIA 2013 para 5.1).*

7.2.13 Visual effects are defined as:

*“An assessment of visual effects deals with the effects of change and development on the views available to people and their visual amenity. Assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and/or introduction of new elements” (GLVIA 2013 para 6.1).*

### Timescale of Effects

7.2.14 The principal landscape and visual effects, which are reversible, occur during the operational lifetime of the Solar Farm which will be 40 years, and owing to the size of the solar arrays, and potential for mitigation screening, the effects of the development will reduce over time. It is however expected that any mitigation planting and enhancement areas (hedgerows, trees and woodland blocks) would be retained following the operational lifetime period. Effects during construction, operation and decommissioning are considered.

7.2.15 The only receptor likely to experience construction effects that are markedly different to the operational effects is the site itself, which will temporarily take on the character of a construction site. These effects will be short term, different in nature to those experienced once the development is complete, but similar in terms of their magnitude and significance.

### Seasonal Effects

7.2.16 Within the assessment, consideration is given to the seasonal differences in effects

arising from the varying degree of screening and/or filtering of views by vegetation that will apply year-round. The assessment considers the visual screening effects that vegetation would provide in both summer and winter months (when deciduous vegetation is not in leaf), and if it is considered that there would be substantial differences in the screening and/or filtering of vegetation between the summer and winter months, it will be stated.

### Significance – Level of Effect

- 7.2.17 The scheme is EIA development therefore an assessment of significant effects will be undertaken. The significance of effect is determined by consideration of the landscape or visual sensitivity and the magnitude of change.
- 7.2.18 The detailed criteria used to determine the significance of effect is listed in **Appendix 7.1 Methodology**. As with all LVIA's, it should be noted that while the methodology is designed to be robust and transparent, in line with best practice, professional judgement is finally applied to determine the significance of effects, and whether the effects are considered 'Significant' or 'Not Significant'.

### Subjectivity of the Nature of Effects

- 7.2.19 This LVIA does not state explicitly whether the effects of the development on landscape and visual amenity is adverse, neutral or beneficial. However, it is acknowledged that the GLVIA 2014 states that professional opinion should be applied and a positive or negative judgement stated (Para 5.37 and 6.29).
- 7.2.20 It is commonly accepted that the nature (or valency) of effects of a development are subjective based upon the attitude of the individual. The application site is set within a rural area, but large-scale developments such as RAF Valley airfield and main transport routes are present within the study area. The development may be seen as a further landscape detractor; or, be seen as a positive addition to the evolving energy generation role the landscape can play reflecting the need to generate clean renewable energy. In examining visual effects, it is not realistic to ignore public opinion (nor the likelihood that professionally qualified landscape architects may have differing positions) when discussing the effect upon views perceived by the public.
- 7.2.21 In accordance with GLVIA, a precautionary approach is taken and therefore, although the nature of effects is not stated within the assessment, it can be assumed effects would be negative unless stated otherwise. This precautionary approach of negative effects should be considered with the caveat that the valency of effect must always be considered by the decision makers, the approach should not be concluded to be the final judgement and it should be acknowledged that many people would see the development as either a positive or neutral addition.

### Assessment Limitations

- 7.2.22 The assessment of landscape and visual effects is undertaken from publicly accessible locations only including roads, parks, common land and public rights of way to represent potential impacts on a range of receptors. Consideration of the effect on views from residential receptors is undertaken from representative publicly accessible points and analysis of map data close to the properties. This assessment does not consider or assess impacts from every theoretical location where the

development would be visible. The LVIA does not assess the effects of any necessary electricity connection cables and ancillary works outside of the application boundary.

### Design Mitigation

- 7.2.23 Mitigation is proposed to prevent / avoid, reduce, offset or remedy potential effects of the proposed development. Mitigation will be considered and referenced in the assessment of effects where applicable.
- 7.2.24 Mitigation has been incorporated in the layout, design and construction of the proposed development to limit its effects. Those that would mitigate potential effects on landscape and visual amenity are considered within this assessment of effects and discussed in Section 7.5.

### Residual Effects

- 7.2.25 Residual effects are defined as the effects remaining after any proposed methods of mitigation have been implemented.
- 7.2.26 The potential for specific residual effects on landscape and visual amenity during the construction and decommissioning phase is limited given the relative short length of these phases and it is considered that the impacts would be less than those experienced during the operational phase. Where this is different the residual effects will be highlighted.

## 7.3 POLICY CONTEXT

- 7.3.1 This section sets out the landscape and visual focussed planning policies and material considerations, which are relevant both to the site and the type of development proposed, giving consideration to National, and local planning policy.
- 7.3.2 Section 38(6) of the Planning and Compulsory Purchase Act 2004 requires planning applications to be determined in accordance with the provisions of the Development Plan unless material considerations indicate otherwise.

### Future Wales: The National Plan 2040

- 7.3.3 Future Wales: The National Plan 2040 (Adopted February 2021) is the national plan that sets the direction of development in Wales to 2040. Applications for Developments of National Significance must be determined in accordance with Future Wales. Policies 17 and 18 contain strategic spatial and detailed criteria-based policies respectively and should be considered together in the determination of applications.
- 7.3.4 Policy 17 - Renewable and Low Carbon Energy and Associated Infrastructure states:

*The Welsh Government strongly supports the principle of developing renewable and low carbon energy from all technologies and at all scales to meet our future energy needs. In determining planning applications for renewable and low carbon energy development, decision-makers must give significant weight to the need to meet Wales' international commitments and our target to generate 70% of consumed electricity by renewable means by 2030 in order to combat the climate emergency....*

*Proposals should describe the net benefits the scheme will bring in terms of social, economic, environmental and cultural improvements to local communities....*

- 7.3.5 Policy 18 – Renewable and Low Carbon Energy Developments of National Significance provides the decision-making framework for renewable and low carbon energy technologies. The Policy states:

*Proposals for renewable and low carbon energy projects (including repowering) qualifying as Developments of National Significance will be permitted subject to policy 17 and the following criteria:*

- 1. outside of the Pre-Assessed Areas for wind developments and everywhere for all other technologies, the proposal does not have an unacceptable adverse impact on the surrounding landscape (particularly on the setting of National Parks and Areas of Outstanding Natural Beauty);*
- 2. there are no unacceptable adverse visual impacts on nearby communities and individual dwellings;*
- 3. there are no adverse effects on the integrity of Internationally designated sites (including National Site Network sites and Ramsar sites) and the features for which they have been designated (unless there are no alternative solutions, Imperative Reasons of Overriding Public Interest (IROPI) and appropriate compensatory measures have been secured);*
- 4. there are no unacceptable adverse impacts on national statutory designated sites for nature conservation (and the features for which they have been designated), protected habitats and species;*
- 5. the proposal includes biodiversity enhancement measures to provide a net benefit for biodiversity;*
- 6. there are no unacceptable adverse impacts on statutorily protected built heritage assets;*
- 7. there are no unacceptable adverse impacts by way of shadow flicker, noise, reflected light, air quality or electromagnetic disturbance;*
- 8. there are no unacceptable impacts on the operations of defence facilities and operations (including aviation and radar) or the Mid Wales Low Flying Tactical Training Area (TTA-7T);*
- 9. there are no unacceptable adverse impacts on the transport network through the transportation of components or source fuels during its construction and/or ongoing operation;*
- 10. the proposal includes consideration of the materials needed or generated by the development to ensure the sustainable use and management of resources;*
- 11. there are acceptable provisions relating to the decommissioning of the development at the end of its lifetime, including the removal of infrastructure and effective restoration.*

*The cumulative impacts of existing and consented renewable energy schemes should also be considered.*

Planning Policy Wales Edition 11

- 7.3.6 The Welsh government published the revised Planning Policy Wales Edition 11 (PPW) in February 2021 which forms the overarching national level source of

planning policy for Wales. It seeks to support the requirement for sustainable development via the planning system whereby the “*presumption in favour of sustainable development*” forms the overarching role.

7.3.7 Chapter 6, Recognising the Special Characteristics of Places is the most relevant to this LVIA. Paragraph 6.3.3 states that

*Considering landscape at the outset of formulating strategies and policies in development plans and when proposing development is key to sustaining and enhancing their special qualities, and delivering the maximum well-being benefits for present and future generations as well as helping to deliver an effective and integrated approach to natural resource management over the long term. Collaboration and engagement with adjacent planning authorities, Natural Resources Wales (NRW), Cadw and the third sector will be necessary to draw on a wide range of expertise and evidence. This means:*

- *Ensuring Wales contributes to meeting international responsibilities and obligations for landscapes*
- *Ensure statutory and non-statutory designated sites are properly protected and managed;*
- *Ensuring that the value of all landscapes for their distinctive character and special qualities is protected; and*
- *Ensuring the opportunities landscapes provide for tourism, outdoor recreation, local employment, renewable energy and physical and mental health and well-being are taken into account and multiple well-being benefits for people and communities secure.”*

Local Planning Policy

7.3.8 The Anglesey and Gwynedd Joint Local Development Plan (JLDP) was adopted in July 2017 and provides the overarching strategic planning framework for Anglesey and Gwynedd to 2026. Within the adopted Anglesey and Gwynedd Joint Local Development Plan Proposals Map, the site lies outside defined development limits and is therefore considered to lie within the ‘open countryside’.

7.3.9 The following table provides an assessment of policies within the JLDP which are considered relevant to the proposed development and this appraisal of landscape and visual effects.

Table 7.1: Landscape and Visual Amenity Policy Considerations

Policy	Commentary
<p><b><u>Policy PCYFF 4: Design and Landscaping</u></b></p> <p><i>“All proposals should integrate into their surroundings. Proposals that fail to show (in a manner appropriate to the nature, scale and location of the proposed development) how landscaping has been considered from the outset as part of the design proposal will be refused. A landscape scheme should, where relevant:</i></p>	<p>The LANDMAP landscape classification is reviewed in addition to the Isle of Anglesey Landscape Strategy Update 2011. The assessment of landscape character and impacts will have due regard to the policy and these documents.</p>

Policy	Commentary
<p><i>Demonstrate how the proposed development has given due consideration to the Landscape Character Area Assessment or Seascape Character Area Assessment;</i></p> <p><i>Provide details of any proposed new landscaping together with a phased programme of planting; ...”</i></p>	
<p><b><u>Strategic Policy PS 7: Renewable Energy Technology</u></b></p> <p><i>“The Councils will seek to ensure that the Plan area wherever feasible and viable realises its potential as a leading area for initiatives based on renewable or low carbon energy technologies by promoting:</i></p> <p><i>Renewable energy technologies within development proposals which support energy generation from a variety of sources which include biomass, marine, waste, water, ground, solar and wind, including micro generation;</i></p> <p>...</p> <p><i>2. Free-standing renewable energy technology development ...</i></p> <p><i>This will be achieved by:</i></p> <p>...</p> <p><i>4. Ensuring that installations in accordance with PS 19 do not individually or cumulatively compromise the objectives of international, national and local nature conservation designations;</i></p> <p><i>5. Supporting installations outside designated areas provided that the installation would not cause significant demonstrable harm to landscape character, biodiversity, or amenity of residential or holiday accommodation, either individually or cumulatively. ...”</i></p>	<p>This assessment will assess whether significant landscape or visual effects arise from the scheme proposals</p>
<p><b><u>Policy ADN 2: PV Solar Energy</u></b></p> <p><i>“Proposals for Solar PV Farms of 5MW or more and other solar schemes of up to 5MW will be permitted provided that the proposal conforms to the following criteria:</i></p>	<p>This assessment seeks to assess whether significant landscape or visual effects arise from the scheme proposals, and where effects are noted mitigation proposals are</p>

Policy	Commentary
<p><i>All impacts on landscape character, heritage assets and natural resources have been adequately mitigated, ensuring that the special qualities of all locally, nationally and internationally important landscape, biodiversity and heritage designations, including, where appropriate, their settings are conserved or enhanced;</i></p> <p><i>The proposal will not result in significant harm to the safety or amenity of sensitive receptors including effect from glint and glare and will not have an unacceptable impact on roads, rail or aviation safety;</i></p> <p><i>The proposal will not result in significant harm to the residential visual amenities of nearby residents; ...”</i></p>	<p>considered</p>
<p><b><u>Strategic Policy PS 19: Conserving and Where Appropriate Enhancing the Natural Environment</u></b></p> <p><i>“When determining a planning application, consideration will need to be given to the following:</i></p> <p><i>Safeguard the Plan area’s habitats and species, geology, history, the coastline and landscapes;</i></p> <p><i>Protect or enhance biodiversity within the Plan area and enhance and/or restore networks of natural habitats in accordance with the Local Biodiversity Action Plans and Policy AMG 5;</i></p> <p><i>Protect or enhance biodiversity through networks of green/ blue infrastructure;</i></p> <p><i>Safeguard internationally, nationally and locally protected species;</i></p> <p><i>Protect, retain or enhance trees, hedgerows or woodland of visual, ecological, historic cultural or amenity value.”</i></p>	<p>This assessment seeks to assess whether significant landscape or visual effects arise from the scheme proposals, specific regard is given to the protection and retention of vegetation around the Development Areas.</p>
<p><b><u>Policy AMG 3: Protecting and Enhancing</u></b></p> <p><i>“A proposal will be granted provided it doesn’t have significant adverse impact upon features and qualities which are</i></p>	<p>This assessment seeks to assess whether significant landscape or visual effects arise from the scheme proposals</p>

Policy	Commentary
<p><i>unique to the local landscape in terms of visual, historic, geological, ecological or cultural aspects. Measures should be taken to ensure that the development does not:</i></p> <ol style="list-style-type: none"> <li><i>1. Cause significant adverse impact to the character of the built or natural landscape;</i></li> <li><i>2. Fail to harmonise with, or enhance the landform and landscape;</i></li> <li><i>3. Lose or fails to incorporate traditional features, patterns, structures and layout of settlements and landscape of both the built and natural environment.”</i></li> </ol>	

Technical Advice Note 5 (TAN 5): Nature Conservation and Planning (2009)

7.3.10 TAN 5 provides advice on planning nature conservation in relation to development proposals. TAN 5 outlines support will be given to development if it can retain and enhance the local landscape, paragraph 3.2.2 states:

*“Sensitive landscaping and planting, the creation, maintenance and management of landscape features important to wildlife, and the skilled adaption of derelict areas can provide extended habitats.”*

7.3.11 TAN 5 outlines support will be given to development if it can be proven there is little to no demonstrable harm to local biodiversity conservation, paragraph 1.4.4 states:

*“Section 40(1) of Natural Environment and Rural Communities Act 2006 (NERC) places a duty on every public authority, in exercising its functions, to “have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity”.*

7.3.12 TAN 5 further outlines the importance of biodiversity in paragraph 1.5.1

*“Biodiversity is an important indicator of sustainable development. Biodiversity and geodiversity add to the quality of life and local distinctiveness”.*

7.3.13 Stated within paragraph 1.6.1

*“Biodiversity conservation and enhancement is an integral part of planning for sustainable development.”*

7.3.14 Local and National planning policies are appraised in the Planning Statement submitted with the application.

7.4 LANDSCAPE ASSESSMENT – BASELINE CONDITIONS

7.4.1 An overview of the existing landscape for both the application site and the wider study area as a whole has been determined by observations made during site visits and review of the published Landscape Character Assessments (LCA).

7.4.2 It follows from the above that in order to assess whether landscape character is ‘significantly’ affected by a development, it should be determined what and how each of the key characteristics would be affected. The judgement of magnitude therefore

reflects the degree to which the key characteristics and elements which form those characteristics will be altered by the proposals. The scale of the development, the nature and sensitivity of the receiving landscape, and local 'barriers' in the landscape (such as breaks of topography, woodlands, settlements, and roads or rivers) will influence the exact extent of effect of the development.

### National Landscape Character

#### Wales National Landscape Character Areas

- 7.4.3 The National Landscape Character Areas (NLCA) undertaken by National Resources Wales (NRW) form the broadest scale of landscape character assessment in Wales. The NLCAs are defined at a broad landscape scale and the descriptive profiles for the 48 individual character areas highlight what distinguishes one landscape from another, with reference to their regionally distinct natural, cultural and perceptual characteristics.
- 7.4.4 Within the study area, the proposed development is contained within NLCA02 Central Anglesey, but upon the boundary with NLCA01 Anglesey Coast. The boundary between both NLCAs broadly corresponds with the boundaries within the Isle of Anglesey landscape Strategy Update, LCA 17 and LCA 5 follow a similar alignment to the boundary with the coastal zone, LCA 18.

#### LANDMAP

- 7.4.5 LANDMAP (Natural Resources Wales) details the Welsh national level approach to landscape assessment. It is a GIS (Geographical Information System) based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data set.
- 7.4.6 LANDMAP is formally recognised in PPW as the starting point for landscape assessments in Wales. LANDMAP provides information for all of Wales' landscapes apart from the built-up areas of Cardiff and Swansea. LANDMAP GN 46 discusses the use of LANDMAP in LVIA, Planning Policy Wales (para. 6.3.20) also advocates the use of LANDMAP assessments to inform development management decisions, landscape character assessment, design and landscape sensitivity studies. LANDMAP is used to inform a thorough understanding of the landscape baseline from nationally mapped set of datasets.
- 7.4.7 LANDMAP Information is defined by five methodological chapters: Cultural Landscape, Geological Landscape, Historic Landscape, Landscape Habitats and Visual & Sensory. These chapters are considered the key national level landscape guidance for Wales. LANDMAP, as the most comprehensive landscape resource, will be utilised in this assessment.
- 7.4.8 LANDMAP does not specifically discuss solar farm development however Guidance Note 3 discusses the scale of the study area and Aspect Areas to be considered when assessing wind turbine development. Whilst solar is a large scale renewable development the vertical scale of the development types, and surface area required, is substantially different. As such the approach to the assessment of Aspect Areas is used as a guide only, and the following is considered appropriate for this assessment. With regard to Table 1 within LANDMAP Guidance Note 3 the following aspect area

study area radius have been considered:

Table 7.2: Approach to Aspect Areas

Aspect	Search area defined by aspects which:	Typical study area radius dependent on wind farm and turbine size and location	Evaluation of aspect areas which should be main focus of study	Useful thematic maps to inform study (can be overlaid with ZTV)
<b>Geological Landscape</b>	Contain site boundary and those adjacent	Site area	Outstanding and high overall evaluation	Overall evaluation and rarity / uniqueness evaluation criteria
<b>Landscape Habitats</b>	Contain site boundary and those adjacent	1 km	Outstanding and high overall evaluation	Overall evaluation and connectivity / cohesion criteria
<b>Visual and Sensory</b>	Are inter visible with development	2.5 km	Outstanding and high overall evaluation. Plus moderate evaluation (where scenic quality and/or character criteria are outstanding or high).	Overall evaluation and scenic quality and character evaluation criteria
<b>Historic Landscape</b>	Are inter visible with development	1 km	Outstanding and high overall evaluation	Overall evaluation
<b>Cultural Landscape Services</b>	Are inter visible with development	Site and immediately adjoining areas	Outstanding and high in rarity and group value evaluation criteria	Overall evaluation and rarity and group value evaluation criteria

7.4.9 With regard to the study area, the proposed development and LANDMAP Aspect Areas are illustrated on (all included in Appendix 7.3 to this ES):

- Figure 7.5 Landmap Geological Landscape
- Figure 7.6 Landmap Landscape Habitats
- Figure 7.7 Landmap Visual and Sensory
- Figure 7.8 Landmap Historic Landscape
- Figure 7.9 Landmap Cultural landscape

7.4.10 The DAs within the proposed development are located within the following LANDMAP

Aspect Areas:

- Geological Landscape:
  - Development Areas 4 & 5: GL020 Llanerchymedd. **High evaluation.** plus small area of GL071 Llyn Penrhyn-Llyn Traffwll. **Moderate evaluation** and GL070 Afon Crigyll. **Moderate evaluation.**
  - Development Area 6: GL019 Bodedern. **Moderate evaluation.** Plus small area of GL071 Llyn Penrhyn-Llyn Traffwll. **Moderate evaluation.**
- Landscape Habitats:
  - All Development Areas: LH084 Farmland between old A5 and Railway line. **Low Evaluation.**
  - Development Area 6 LH103 Farmland between Inland Sea and A5. **Moderate Evaluation.**
- Outstanding and High evaluation Aspect Areas within 1 km:
  - LH016 Valley Lakes. **Outstanding evaluation**
  - LH015 Llyn Traffwll. **High evaluation.**
  - LH024 RAF Valley Airfields. **High evaluation.**
- Visual and Sensory:
  - Development Areas 4 & 5 VS012 Central Smooth Belt. **Moderate evaluation.**
  - Development Area 6 VS020 Caergeiliog craggy lowland. **Moderate evaluation.** (plus small area of VS029 Llanfihangel lakes and dunes, non deployment area). **Moderate Evaluation.**
    - Outstanding and High evaluation Aspect Areas within 2.5 km:
  - VS030 Holy Island Straight. **High evaluation**
  - VS007 Holy Island. **High evaluation**
  - VS053 South West Coast – Rhosneigr. **High evaluation**
- Historic Landscape:
  - All Development Areas: HL079 Inland Southern Anglesey. **Outstanding evaluation.**
    - Outstanding and High evaluation Aspect Areas within 1km:
  - HL016 Fieldscape Central East. **Outstanding evaluation**
  - HL026 RAF Valley. **Outstanding evaluation**
- Cultural Landscape Services:
  - Development Areas 4 & 5: CLS017 Central Smooth Belt
  - Development Area 6: CLS026 Caergeiliog craggy lowland (Plus very small area of CLS037 Llanfihangel lakes and dunes)
    - Outstanding and High evaluation Aspect Areas within 1km:
  - Aspect areas not classified

7.4.11 The referenced Aspect Areas are discussed in detail in **Appendix 7.2.**

## Regional Landscape Character - The Isle of Anglesey, Landscape Strategy Update 2011

7.4.12 TACP Consultants were appointed by Isle of Anglesey Council in April 2010 to undertake a review of the Landscape Character Areas (LCAs) identified within the original LANDMAP landscape assessment study for Anglesey, published in 1999.

7.4.13 As stated in the report introduction:

*'The LANDMAP methodology provides a wealth of data for the individual evaluated aspect topics. These provide detail of the nature and importance of the individual aspect layers. However, it is also important to understand how the aspect topics combine to produce distinctive areas of landscape with a recognisable 'sense of place' or 'local identity'. These form the individual LCAs. They are defined by overlaying the different aspect topic layer information and identifying areas where the combination of aspects is broadly the same and/or have distinct characteristics and a coherent sense of identity. LCAs provide a useful framework for description, management and policy formulation.'*

*It is important to recognise that the boundaries between LCAs are rarely distinct. Effectively they are based upon best judgement of a gradual, but discernible change in character.*

*'The topography of the island is generally subdued with a rolling, undulating pattern interspersed by harder, rocky outcrops. The landform falls east to west, with a number of low lying areas along the western coast.*

*'This general character belies a complex, underlying geology and effects of geomorphological processes such as glaciation. The island contains some of the oldest rocks in Wales and Britain as a whole, and these are clearly illustrated in the topography of the island. Extensive tree cover is generally scarce. The island shows a rich cultural history with evidence of man's actions extending over some 8000 years. There are over 200 Scheduled Ancient Monuments ranging from Bronze Age burial chambers to later medieval features.'*

*'More recent landscape features include the planned landscapes of large estates, such as Plas Newydd, major transportation routes, industrial features including nuclear power and windfarms. The rich variation and quality in the coastal landscape is reflected in its designation as an Area of Outstanding Natural Beauty. This designation underpins the focus of any management or design guidance within its area.'*

### Landscape Character Areas (LCA)

- The Landscape Strategy Update 2011 contains the updated LCAs and in each instance the landscape character elements which define each area are set out, together with the key landscape issues arising from the LANDMAP exercise. This is further supported by reference to the relevant LANDMAP aspect areas by each topic which form the LCA (and as discussed in the previous section of this assessment).
- DA4 and DA5 are located within LCA 17, West Central Anglesey. DA4 also borders a small area of the LCA 18 Valley Airfield Environs.
- DA6 is set within LCA 5, North West Anglesey and LCA 18 Valley Airfield Environs, although the deployment area is predominantly within LCA 5.
- LCA 3 inland Sea is also located within the study area, but located over 1 km

west of DA6.

- 7.4.14 The boundaries of the LCAs are illustrated on **Figure 7.9**, Landscape Character, Regional (included in Appendix 7 to this ES).

LCA 17, West Central Anglesey

- 7.4.15 Sections of the LCA description relevant to this assessment and DAs 4 and 5 include:

*“An expansive LCA which includes a large area of the rural heartland of Anglesey.*

*The topography is generally undulating which reflects its underlying geology, particularly the Coedana Granites. This results in a number of rocky outcrops that typify the landscape of this part of the island. These, together with small areas of semi-natural habitats – hedges, trees, mires – are scattered throughout the area within a matrix of improved agricultural grassland.*

*These are mirrored by the complex of small areas of semi-natural habitat – mires, trees, hedgerows and hedge banks which are found throughout the area within a larger matrix of improved agricultural grassland. These form an important landscape resource and contribute markedly to the character of the area, breaking up areas of uniformity within the wider landscape.*

*The A5 and A55 roads pass through the area, whilst the main railway passes along its southern edge. The main settlements within the LCA are Llangefni and Gwalchmai and nearby adjacent to the A5 are the Anglesey Showground and Mona Airfield.”*

- 7.4.16 The rocky outcrops and undulating topography (in particular) and semi natural habitats (hedges, trees and mires) referenced in the description are considered characteristic of the local areas close to the DAs within this LCA. The DAs are set within the referenced areas of improved agricultural grassland. It is noted that the trees and hedge banks ‘form an important landscape resource and contribute markedly to the character of the area, breaking up areas of uniformity within the wider landscape’. The DAs are set within these important features. The A55 transport corridor and RAF Valley Airfield are also prominent built features within the locality of the deployment areas.

- 7.4.17 The LCA highlights the following key issues which will be considered in the assessment of effects section:

*Habitat Management - An extensive LCA, covering the rural heartland of Anglesey. Any proposals should take into account:*

- *The management of the range of semi-natural habitats - mires, trees and hedgerows found scattered throughout the area.*
- *The management of wider habitats to increase their value and reflect Local Biodiversity Action Plan objectives.*
- *That direct and indirect effect upon habitats is properly addressed.*

*Transportation Corridors - The main railway line and A5/A55 corridors pass through the LCA. It is important any new development or management proposals ensure that:*

- *Visual impacts from and to these principal transport corridors are properly considered.*

- *Mitigation measures reflect the wider landscape structure and sites are not considered in isolation.*

*Settlement Edge - Development around settlement edges should:*

- *Be of a form and character appropriate to each settlement.*
- *Be considered in terms of impacts upon the wider landscape, rather than the site above.*
- *Seek to integrate using landform, vegetation etc to minimise impacts.*
- *Ensure that standard solutions are not used in order that the inherent characteristics of the area are contained within the design.*

LCA 5, North West Anglesey

- 7.4.18 LCA 5 covers the north eastern area and DA6 is located upon the southern boundary of it, at the transitional zone to LCA 18, as such it is likely to contain landscape character features consistent with both areas. Relevant sections of the LCA description to this assessment and DA6 is included:

*'The majority of the landscape is characterised by improved grassland, especially in the drumlin field. However there are a number of marshy grasslands amongst the drumlins as well as small scattered areas of scrub. There are also extensive areas of scattered rocky outcrops associated with the Carreglefn quartzite deposits. Here dry ericaceous heath and acid grasslands are found, interspersed with low lying marshy areas.*

*The western edge of the LCA is formed by the A5 corridor, which is a key element within the historic and cultural development of the island. The construction of this road by Telford, as a response to the need to improve links with Ireland, cemented the development of Holyhead as a major port. Another, more distinctive feature of the landscape is the development of wind farms, particularly to the north of Llyn Alaw (outside of the study area).'*

- 7.4.19 DA6 is located within the southern fringes of the LCA, straddling the boundary with LCA 18 and close to the boundary of LCA 17, which is the host LCA of the other two development areas. Due to the location of the site close to two LCAs, it is considered the area of DA6 is more of a transitional one. The DA displays features including the referenced rocky outcrops although the deployment area of DA6 within LCA 5 is more enclosed with numerous mature hedgerows and drain corridors in the low lying area. As the A5 and A55 corridors are less than 1km from DA6, intervisibility will be considered.

- 7.4.20 The LCA highlights the following key issues which will be considered in the assessment of effects section:

*Coastal Landscapes - Abutting LCA 4, any development or management proposals should:*

- *Have regard to the AONB Management Plan.*

*Settlement Edge - Any proposals for development or landscape management should reflect:*

- *Seek to use landform, vegetation patterns to mitigate impacts.*
- *Ensure scale, form and materials respect the local vernacular.*
- *Utilise and retain local field boundary patterns – cloddiau, fences, hedgerows*

*Habitat Management - Although a relatively intensely farmed area, there are a range of semi-natural habitats throughout the LCA. It includes Llyn Alaw which is an important biodiversity resource. Any development or management proposals should:*

- *Provide for the management of semi-natural habitat features, including open water.*
- *Develop and enhance network of sites and link to local BAP targets.*

*Energy Landscapes - The area is characterised by a number of windfarms. In considering any further developments particular emphasis should be given to cumulative effects upon the landscape character.*

- 7.4.21 With regard to habitat management, substantial work has been undertaken in support of the proposed development to improve habitat management and biodiversity within the DAs. See Section 7.8. Mitigation and Chapter 11 of this ES (Ecology and Conservation).

*LCA 18 Valley Airfield Environs*

- 7.4.22 Small areas of DAs 4 and 6 are located within this LCA, the scale of which, and transient natures of LCA boundaries, has an impact on all DAs. Relevant sections of the LCA description to this assessment and all DAs are as follows:

*'A rather disparate LCA which recognises the social, cultural and economic effects of the RAF Station at Valley. The LCA includes the airfield and the adjacent 20th century holiday settlement of Rhosneigr, and its associated coastal landscapes of Traeth Cymyrau and Traeth Crigyll, as well as the series of wetlands and reserves (Llyn Penrhyn, Llyn Traffwll) inland and on either side of the settlement of Llanfihangel yn Nhowyn.*

*The airfield operations which include both military and civil flights has a major impact upon the statutory qualities of the area, in fact on the island and surrounding area as a whole. The nature and scale of the buildings, associated hard standings and runways visually dominate the LCA. The LCA is also traversed by the main Holyhead railway line which runs alongside the airfield.'*

- 7.4.23 The LCA highlights the following key issues which will be considered in the assessment of effects section:

*Coastal Landscapes - The coastline element of the LCA contains a number of habitat types – dunes, water bodies, wetlands. It is important that any development or management proposals take into account:*

- *Ensure that visual qualities - open, exposure - are properly addressed by any management proposals.*
- *Have regard to the AONB Management Plan.*

*Settlement Edge - The LCA includes a live military airfield and includes the settlement of Llanfihangel yn Nhowyn and Rhosneigr. Given this it is important to work closely with the authorities to ensure that both single and cumulative effects of operational developments are fully considered given its juxtaposition to the AONB and wider landscape.*

- 7.4.24 The boundaries of the LCAs are illustrated on Figure 7.9, Landscape Character, Regional.

Landscape Sensitivity and Capacity Assessment - Isle of Anglesey,  
Gwynedd & Snowdonia National Park Landscape Sensitivity and Capacity  
Assessment (2014)

- 7.4.25 The Isle of Anglesey, Gwynedd and Snowdonia National Park published a Landscape Sensitivity and Capacity Assessment in 2014. The conclusions of the assessment on the overall sensitivity of the landscape character areas to 'field scale' solar PV development is summarised below. The landscape character area boundaries follow the alignments as set out in the Landscape Strategy Update 2011.
- 7.4.26 The following site size criteria used in the assessment with regard to capacity for field scale solar:
- Large, over 5mw, 10 – 20 hectares.
  - Very Large, over 10mw, over 20 hectares

A 17, West Central Anglesey: Low / Medium Sensitivity

- 7.4.27 This extensive area comprises a large area of the Isle of Anglesey's agricultural heartland including the settlements of Gwlachmai and Llangefni. Key characteristics: medium scale, open landscape, rolling and undulating and form, expansive agricultural heartland of the Isle of Anglesey.

*"This medium scale, low lying landscape comprises large areas of mixed farmland. Field systems are typically regular with medium to large scale fields bounded by a mixture of stone walls and hedgerows which is indicative of a lower sensitivity and introduces the possibility of increasing vegetation height to provide further localised screening.*

*The Mona airfield and A5/A55 corridor detract from the tranquillity of the landscape, further reducing sensitivity.*

*This lowered sensitivity is counterbalanced slightly by the cultural heritage value of the landscape.*

*The most westerly tip of the LCA falls within Anglesey AONB, increasing the sensitivity in this area."*

- 7.4.28 Indicative Overall Capacity

*"...Outside the AONB and SLAs it is considered there may be some capacity for micro to small scale developments. There may also be limited capacity for larger scale developments, in particular towards the south west where the landscape is already influenced by modern infrastructure; however, any new development should be carefully sited to avoid cumulative effects with other developments".*

- 7.4.29 None of the development areas within A 17 are within (or close to, >2km) the AONB, it is considered that all are located within (or close to) the main road corridor and RAF Valley Airfield which reduces tranquillity. The medium scale landscape is also bounded by mixed hedgerows which provide localised screening. It is agreed that the overall landscape scale and features of the development areas are indicative of a lower sensitivity.

A 05, North West Anglesey: Medium Sensitivity

*"This medium scale landscape is influenced in many places by modern day developments such as wind farms, 400 kV and 132 kV overhead lines and*

*major transport corridors; the presence of which reduces sensitivity to field-scale solar PV energy development. A typically regular pattern of medium to large scale fields with a mixture of field boundaries introduces the possibility of increasing vegetation height to provide localised screening of such developments thus reducing sensitivity further.*

*In counterbalance, localised areas of less regular and more complex field patterns to the north, together with scenic areas designated within the Anglesey AONB, are considered more highly sensitive to field-scale solar PV energy development. The distinctive wild landscape of Mynedd Mechell & Surrounds SLA is also particularly sensitive and sensitivity is further enhanced by the cultural heritage value of the landscape.”*

7.4.30 Indicative overall capacity:

*“Outside the AONB and SLA it is considered there may be some capacity for micro to small scale developments, in particular where these would relate well to the existing built environment/urban landcover. There may also be limited capacity for very infrequent sensitively sited small to medium scale development towards the south of the LCA.”*

7.4.31 The location of DA6 towards the south of the area is considered to display features of reduced sensitivity to solar development, including the presence of overhead lines, main transportation corridors, and medium fields with mature hedgerows to be utilised as screening vegetation.

A18, Valley Airfield: Medium Sensitivity

7.4.32 This LCA comprises a flat coastal plain extending from the RAF Valley Airfield in the north down past Rhosneigr in the south. Key characteristics are: medium scale, open landscape, flat coastal plain, RAF Valley Airfield.

*“This typically medium scale, coastal landscape is heavily influenced by modern development, particularly the RAF Valley Airfield which brings a level of visual intrusion to the area. The flat landform away from the coast comprises medium to large scale systems enclosed by a mixture of boundaries including hedgerows which introduce the possibility of increasing vegetation height to provide further localised screening and therefore lessen sensitivity to field-scale solar PV energy development.*

*This is counterbalanced by the presence of open and expansive views afforded along the coastline and the intervisibility with areas of Anglesey AONB which (together with the cultural heritage value of the landscape) increases the sensitivity to development.”*

7.4.33 Indicative Overall Capacity:

*“...Outside the AONB and SLAs it is considered there may be some capacity for well sited micro scale developments, in particular where these may relate to the existing built environment/urban landcover”.*

7.4.34 Within the assessment, the following definitions of overall sensitivity are given:

**Very High** - *The key characteristics and qualities of the landscape are very highly sensitive to change from the type and scale of development being assessed.*

**High** - *The key characteristics and qualities of the landscape are highly sensitive to change from the type and scale of development being assessed.*

*Medium / High - The key characteristics and qualities of the landscape are sensitive to change from the type and scale of development being assessed.*

*Medium – Some of the key characteristics and qualities of the landscape are sensitive to change from the type and scale of development being assessed.*

*Low / Medium – Few of the key characteristics and qualities of the landscape are sensitive to change from the type and scale of the development being assessed.*

*Low - Key characteristics and qualities of the landscape are robust and less likely to be adversely affected by the type and scale of development being assessed.*

7.4.35 In summary, the sensitivity conclusions given to the 3 DAs are highlighted below:

- **A17, West Central Anglesey: Low / Medium Sensitivity** - Few of the key characteristics and qualities of the landscape are sensitive to change from the type and scale of the development being assessed. With regard to solar development the following is stated:

*‘There may also be limited capacity for larger scale developments, in particular towards the south west where the landscape is already influenced by modern infrastructure; however, any new development should be carefully sited to avoid cumulative effects with other developments.’*

- **A05, North West Anglesey: Medium Sensitivity** - Some of the key characteristics and qualities of the landscape are sensitive to change from the type and scale of development being assessed. With regard to solar development the following is stated:
- ‘There may also be limited capacity for very infrequent sensitively sited small to medium scale development towards the south of the LCA.
- **A18, Valley Airfield: Medium Sensitivity** - Some of the key characteristics and qualities of the landscape are sensitive to change from the type and scale of development being assessed. With regard to solar development the following is stated:

*‘there may be some capacity for well sited micro scale developments, in particular where these may relate to the existing built environment/urban landcover.’*

7.4.36 The character and sensitivity of the individual DAs are considered to be generally as outlined within this study however the DAs’ local study area will be assessed further against the characteristics and conclusions of the study, with an assessment of landscape value and susceptibility to change undertaken within the main assessment. It is noted that, overall, the solar development areas are predominantly within A17 West Central Anglesey, an area noted as having some capacity for large scale developments, particularly towards the south west (the area of the solar development areas) and areas influenced by modern infrastructure.

#### Local Landscape Character

7.4.37 An overview of the existing landscape elements and features of the site and the study area has been determined by observations made during site visits and through review of the LANDMAP classification information and Regional LCA and Capacity Study up to the defined study area boundaries. The local landscape of the site, and its immediate surroundings, is not covered by any national or local landscape

designations. Local landscape character is considered in detail at a site level and within the focussed study area.

- 7.4.38 Aerial photographs and panoramic ‘birds eye’ views over the 3 DAs are included within **Figures 7.11 to 7.13** presented in **Appendix 7.3**. These illustrate the local landscape context.

### Landscape Value

- 7.4.39 Paragraph 5.19 of GLVIA3 identifies that following a review of existing landscape designations “the value attached to undesignated landscapes also needs to be carefully considered and individual elements of the landscape – such as trees, buildings or hedgerows – may also have value.” This LVIA provides a review of undesignated landscapes and landscape elements, which includes (but is not limited to) field structure, hedgerows, woodland, watercourses and trees, and attributes a value to these elements.
- 7.4.40 The value of the landscape potentially affected by a proposed development is evaluated when establishing the landscape baseline and is judged as being High, Moderate or Low. This is in accordance with paragraph 5.44 of GLVIA3. Landscape value is also referred to in the following section as part of the method for ‘Assessing the Level of Landscape Effects’.
- 7.4.41 The landscape value of the site and the immediate adjoining area is considered with reference to the indications of Landscape Value as identified in Table 1.2 of the Methodology (**Appendix 7.1**). **Table 7.3** provides an analysis of each of the indicators and classifies the landscape value in accordance with the Methodology.
- 7.4.42 The landscape value descriptions and criteria are considered for all of the DAs (4, 5 and 6) combined, but where there are specific differences, it is noted. Due to the geographic distribution of the DAs, in many cases DA4 and DA5 are likely to have similar characteristics, whereas DA6 may have more notable differences.

**Table 7.3: Landscape Value Appraisal**

Landscape Indications of Value	Description	Value Method Criteria	Value Assessment
Landscape Quality (condition)	Solar Development Area set within a range of field sizes, medium – large for Development Areas 4 and 5 and small – medium for Development Area 6. There is a large proportion of unmanaged, high hedgerow field boundaries around Development Area 6, but these are more regular around Development Areas 4 and 5. Field patterns are	Does not lie within or adjacent to a designated landscape. Some local landscape characteristics of note	Low/Medium

Landscape Indications of Value	Description	Value Method Criteria	Value Assessment
	retained, development is set within the established structure which is protected. Development Areas within a gently undulating to flat landform, a transitional zone to lowland landscape approaching coast. Development Areas contain pastoral grass land coverage of varying quality with some areas of some wet grazing, but away from deployment zones.		
Scenic Quality	The Development Areas are close to major infrastructure, in local context, with main transports corridors to the north. RAF Valley Airfield, aircraft noise and movement a major feature. Overall sparsely populated areas away from the main road corridors. Locally distinctive but Moderate LANDMAP visual sensory evaluation	Present locally distinctive landscape characteristics of some scenic interest	Medium
Rarity	Development Areas are located within large scale LCAs, features within the Development Areas are characteristic of the wider areas, no remarkable features or rare elements within the Development Areas.	Low rarity at local scale	Low
Representativeness	The solar Development Areas are representative of the wider LCAs, typical features but none that are singularly considered important examples.	No distinctive landscape characteristics focussed to Development Areas	Low
Conservation Interests	The study area has features of ecological and cultural importance, all are considered in detail independently. These features contribute to landscape value in terms	Presents public amenity value by way of biodiversity and cultural features (but	Medium

Landscape Indications of Value	Description	Value Method Criteria	Value Assessment
	of visible features / perceptual aspects, which are minimal. No direct effects. Outstanding historic landscape LANDMAP consideration. Low / Moderate Landscape Habitat evaluation	not accessible)	
Recreational Value	The Development Areas do not have any valued recreational features within the boundaries, excluding a footpath in Development Area 6, but this is outside the development area and unaffected. There are trails and PROWs within the wider study area, potential for indirect effects if visible affecting wider setting of the route.	Limited public amenity value by way of access	Low
Perceptual Aspects	Although sparsely populated it is still a settled and active landscape close to visible (and audible) signs of human activity and development – A5 / A55 corridor, overhead pylons and RAF Valley Airfield. Development areas and local landscape semi-enclosed by vegetation, with limited distant views to urban features resulting in remote and rural feel.	Site areas part of wider localised landscape, with pockets of relative tranquillity	Low/medium
Associations	Baseline work has not revealed any landscape associations linked with the particular Development Areas	Low importance	Low
<b>Landscape Value Summary</b>	<b>The Development Areas combined are noted for their contribution towards landscape condition (intact field systems), scenic quality (quieter areas away from transport corridors and the airfield) and conservation interests (cultural and ecological features). These are all features considered to be generally unaffected by the proposed form of development. The Development</b>		<b>Low-Medium</b>

Landscape Indications of Value	Description	Value Method Criteria	Value Assessment
	<b>Areas do however contain commonplace landscape features, seen throughout the host LCAs and provide very limited direct recreational value. Landscape perceptions are also influenced by the near transport corridors, overhead electricity pylons and views (and audible disturbance) from RAF Valley Airfield.</b>		

## Landscape Receptors

### Landscape Designations

7.4.43 Landscape designations within the study area (applicable to this LVIA) are illustrated on Figure 7.3 presented in **Appendix 7.3**. Relevant designations mapped at this stage include: Registered Parks and Gardens (RPG); Country Parks (CP); and, landscape designations within the Local Plan/Development Framework (if still applicable) such as: Special Landscape Areas (SLA) and any national landscape designations; Areas of Outstanding Natural Beauty (AONB); and, National Parks (NP).

7.4.44 With the exception of the Anglesey AONB, no other designated landscapes such as National Parks, World Heritage Sites or regional and local designations such as SLAs are found within the study area. Landscape value is formally recognised by designation, but value can also be informed by published documentation such as tourist leaflets; art and literature. Review of local information has confirmed that there is no additional published information relating the local landscape.

### Anglesey AONB

7.4.45 The Anglesey AONB is within the study area, c.850m south-west of DA6, the closest of the DAs to the AONB. However, whilst the boundary of DA6 is c850m from the AONB, the part of the site that will be subject to development is actually c.1.1 km from the AONB. Additionally, the AONB is 3.1 km west of DA4 and 3.2 km south of DA5. Effects upon landscape character and views from the AONB have been considered within the assessment. There are no other landscape receptors; including Registered Parks and Gardens and Country Parks within the study area.

7.4.46 The AONB covers the majority of the Isle of Anglesey's 201km coastline and its immediate hinterland (one third of the island and 21,500 ha), the largest AONB in Wales. The vision for the AONB as contained within the AONB 'Management Plan 2009 – 2014'. It is described as '*a peaceful and tranquil rural retreat and an ideal location in which to relax and enjoy quiet forms of recreation.*' The plan states that the objective is that development within and adjacent to the AONB reflects the objectives of the Management Plan and the traditional character of the island. Within the study area there is a notable gap within the area of the AONB, as RAF Valley Airfield and the near environs is omitted from the designation.

*'The landscape of the AONB is a diverse mixture of many features, which are both distinctive and appealing. As the Anglesey AONB is predominantly a coastal designation, features such as cliffs, rocky shores, islands, sandy beaches and sand dunes tend to dominate the landscape. A significant proportion of the AONB is farmland, whilst there are also significant areas of heathland, semi natural woodland, intertidal wetlands and lakes.*

*The AONB has a relatively open, rolling, undulating landscape. The topography of Anglesey generally falls from the north east to the south west, and this is represented in the landscape of the AONB. The North and North West coastlines are dominated by impressive ancient Precambrian and Cambrian sea cliffs, particularly on Holy Island, while on the eastern side of the Island; limestone cliffs provide an interesting contrast. The south western coast is characterised by a series of rocky headlands and intervening sandy bays and dunes which generally enclose shallow lakes or marshes. The Menai Strait shore has low cliffs capped with woodland and rolling farmland on glacial deposits. There is limited natural woodland coverage in the AONB'.  
(Management Plan 2009 – 2014)*

- 7.4.47 The ZTVs have been reviewed to consider the potential for inter-visibility between the AONB and the development areas. Focussing on the DA6 ZTV (as the closest DA, see Figure 7.16) the AONB boundary area is easily discernible, formed by the railway line to the south west and RAF Valley Airfield to the south east. The ZTV illustrates the potential for theoretical visibility to DA6 from a small area of the AONB immediately to the north of the airfield, around the hamlet of Llanfairyneubwll, an area of <2km<sup>2</sup>. Visibility from the AONB is discussed further in the viewpoint assessment. Effects upon landscape setting are considered within the landscape assessment.

#### Tywyn Trewan Common

- 7.4.48 Tywyn Trewan Common (open access land) adjoins RAF Valley Airfield and the railway corridor. This area of open access land also contains marked public rights of way. Visibility from the area is considered within the viewpoint assessment PROWs and effects upon the landscape setting of the common are also considered.

## 7.5 PROPOSED DEVELOPMENT

- 7.5.1 The scheme is described in detail in chapter 3 of the Environmental Statement (ES). In summary, the proposal relates to the construction, operation, maintenance and decommissioning of a ground mounted solar park plus ancillary infrastructure as comprising the following:

- Photovoltaic (PV) panels to a maximum height of 3m;
- Mounting frames - matt finished small section metal structure;
- Scheme of landscaping and biodiversity enhancement;
- Inverters, transformers (transformers will be housed in prefabricated containers to a maximum height of 3m), substations (DNO and customer to a maximum height of 3m) and associated cabling (below ground);
- Point of connection;
- Stock fencing up to a height of 2m;
- Infra-red CCTV (CCTV cameras would operate using motion sensors and would be positioned inward only to ensure privacy to neighbouring land and property);
- Temporary set down areas;
- Internal service roads; and
- Site access for the construction, operational and decommissioning phases.

- 7.5.2 Parc Solar Traffwll will have an export capacity of circa 35MW of electricity, enough to power approximately 11,600 homes per year and offset over 7,840 tonnes of CO<sub>2</sub> every year, the equivalent of taking around 3,620 cars off the road.
- 7.5.3 The proposed point of connection is located at an existing substation to the south of Caergeiliog on the eastern side of Cymyran Road. A customer substation will be located on DA6 and from here a cable will connect directly into the existing substation on Cymyran Road. DAs 4 and 5 will be connected to the customer substation by underground cabling which will be predominantly located within the adopted highway.
- 7.5.4 The panels will be arranged in rows in an east-west alignment across the development areas and orientated south. The scheme will be operational for 40 years after which all equipment can be removed from site.
- 7.5.5 The development areas will be secured by up to a 2m high stock fence or similar with wooden posts. In limited areas the fence line will be lower than 2m to for ecological reasons.
- 7.5.6 Chapter 5 of the ES details how the scheme has evolved through the design and consultation process, but in summary the consideration of landscape and visual issues has been key in refining the layout of the proposed development and has led to the removal of a number of higher sensitivity DAs from the scheme altogether.

#### Duration

- 7.5.7 From a landscape and visual assessment perspective, although the proposed development is ultimately temporary and reversible, its effects on the landscape have been considered over its anticipated 40 year lifespan.

## 7.6 VISUAL ASSESSMENT – BASELINE CONDITIONS

### Zone of Theoretical Visibility (ZTV)

- 7.6.1 As discussed in the methodology, land that may potentially be visually connected with the proposed development has been identified and mapped at the outset in accordance with paragraph 6.6 of GLVIA 3. ZTV mapping has been produced to determine the area over which the proposed development theoretically could be seen. ZTV maps are generated by a computer from a Digital Terrain Model (DTM) representing the bare ground topography, with visual barriers added, overlaid on a map base.
- 7.6.2 The ZTV indicates the maximum theoretical area in which the proposed development may be visible. The analysis was carried out using representative height points spaced within the internal Development Areas, at a height of 3m above ground level.
- 7.6.3 The analysis uses map data (taken from Ordnance Survey Vector Map District) and includes the addition of the 'Building' layer, modelled at an assumed average height of 8m above ground level, and the 'Woodland' layer, modelled at an assumed average height of 13m above ground level.
- 7.6.4 The addition of these visual barriers over the bare earth topographic model provides a more realistic indication of the potential visibility of the development within the local landscape setting. Visibility mapping is presented on 1:10,000 scale OS base mapping. Areas with theoretical visibility at represented height points arranged within

the site (at least one) to a height of 3m above ground level are shaded.

- 7.6.5 Visibility levels are further refined through the site survey and consideration of visibility from the identified receptors, settlements, recreational routes, landscape receptors and through the viewpoint assessment.
- 7.6.6 Visibility mapping to the 3 DAs is provided to a 2.5 km study area, illustrated on the following figures (presented in **Appendix 7.3**):
- Figure 7.14, Zone of Theoretical Visibility (ZTV) plan – Development Area 4
  - Figure 7.15, Zone of Theoretical Visibility (ZTV) plan – Development Area 5
  - Figure 7.16, Zone of Theoretical Visibility (ZTV) plan – Development Area 6
  - Figure 7.17, Zone of Theoretical Visibility (ZTV) plan — Cumulative - all Development Areas (at least one Development Area visible)

Figure 7.14 Zone of Theoretical Visibility (ZTV) plan – Development Area 4

- 7.6.7 With regard to visual barriers, the main buildings around the site are shown but there are very limited woodland screening blocks shown on the OS data. In reality the site is surrounded by mature hedgerows and trees, including a prominent bank of wind swept Pine trees. Extensive theoretical visibility is shown extending over the lower lying Valley Wetland and Tywyn Trewan Common, extending to the rail corridor and RAF Valley Airfield. Visibility is shown to the south and the rising landscape approaching Rhosneigr.
- 7.6.8 Theoretical visibility to the east is limited, screened by the gently rising land to the east of DA5, with only partial visibility from the A55 corridor to the east. Visibility to the north is focussed to the rising land north of the A55, a pastoral landscape with many hedgerows around the small fields. Views shown to the southern edge of Bryngwran only. Westerly views are possible over the lower lying landscape and Llyn Traffwll to the edge of Llanfihangel yn Nhowyn, which screens further visibility west with no visibility shown to DA6.

Figure 7.15 Zone of Theoretical Visibility (ZTV) plan – Development Area 5

- 7.6.9 With regard to visual barriers, the main individual buildings around the site are shown but there are very limited woodland screening blocks shown on the OS data. In reality the site is surrounded by mature hedgerows. In contrast to DA4, to the west of the site there is limited visibility shown over the lower lying area of Valley Wetlands and Tywyn Trewan Common, visibility focussed to the western areas approaching RAF Valley Airfield and Llanfihangel yn Nhowyn. The settlement, upon a local low ridge, again screens further visibility west with no visibility shown to the area around DA6.
- 7.6.10 Visibility to the south is restricted, but visibility is focused east to the undulating landscape around Capel Gwyn and extending to the A4080 corridor. Visibility north is focussed to the near area of the A55, and the rising slopes beyond to Bryngwran. Theoretical visibility north west over DA4 to the A55 corridor and the small scale pastoral landscape that gently rises above this zone.

Figure 7.17, Zone of Theoretical Visibility (ZTV) plan – Development Area 6

- 7.6.11 With regard to visual barriers, the main individual buildings around the site are shown but there are very limited woodland screening blocks shown on the OS data. In reality the site is surrounded by numerous mature hedgerows and blocks of scrub

vegetation. The zone of theoretical visibility for DA6 is substantially different from that seen for DA4 and DA5. Theoretical visibility is focussed to the corridor between rising land to the east, with Llanfihangel yn Nhowyn upon it and to the west by the undulating land approaching Caergeiliog.

- 7.6.12 Visibility is focussed to the south west over Llyn Dinam and Llyn Penrhyn extending over RAF Valley Airfield, but screened from the coastal area. Visibility extends north east to the A55 corridor, but with only limited visibility beyond, over the rising pastoral landscape. There is no visibility east to DAs 4 and 5.

Figure 7.18, Zone of Theoretical Visibility (ZTV) plan – Cumulative, all Development Areas (at least one Development Area visible)

- 7.6.13 When the limited woodland blocks (as mapped by the OS) and dispersed nature of buildings, set within the gently undulating landscape factors are considered, these features combine to allow extensive visibility over the local study area. DA6 does however stand out as an entirely different ZTV, compared to the similar visual distribution illustrated for DAs 4 and 5. Views are generally focused to the lower lying Valley Wetlands area, extending southward to the railway corridor and RAF Valley Airfield. Visibility from the east is the most restricted, limited by the undulating landscape that rises above the level of the DAs.

- 7.6.14 Visibility from the north is focused to the near A55 corridor area approaching the settlement of Bryngwran and over the surrounding pastoral landscape. Theoretical visibility is shown over DAs 4 and 5. DA6 ZTV is distinct from DAs 4 and 5, however at a cumulative level, as illustrated, this has the effect of illustrating a larger area that is theoretically visible to all DAs, when in reality it may just be one, which is why the individual DA ZTVs are provided and considered the most representative.

## 7.7 POTENTIAL RECEPTORS

- 7.7.1 The key visual receptors within the study area will consist of (people within) settlements, users of public rights of way (cycle ways and footpaths), and users of recreational facilities, transportation and public access networks. Registered parks and gardens and country parks are considered in the landscape baseline and effects sections but views are only considered where a view is a key component of the designated landscape.

### Settlements

- 7.7.2 Settlements are considered to have a high sensitivity to visual change as there is the potential for large numbers of receptors (people) to be concentrated in these areas. It should be noted that many individual dwellings and dwellings within settlements, even when close to other proposed developments, may have 'no' or 'limited visibility' of the proposed development. For each individual property close to the development site, the exact degree of visibility will depend on the orientation of the property, the orientation of the windows in the property, and the degree of screening provided by trees, hedgerows, vegetation and surrounding buildings. With reference to the ZTV, excluding areas shown to have no theoretical visibility (i.e. screened by landform) the main residential receptors have been assessed. Individual properties within 1km of the site (grouped where appropriate) are considered in addition to settlements, measurements are approximate to the closest of the grouping.

7.7.3 Residential properties and (individual groups) within 200m of the Development Areas include:

- Development Area 4
  - P4R1 – Plas Farm (Plas Llechylched) – c.10m to the east
  - P4R2 – Grouping of YR Hen Grougloff Gwar, Y Cerbyty, Y Stablau (2), YR Hen Laethoy – c. 25m to the east
  - P4R3 - Caer Ddol – c.23m to the north
  - P4R4 — Gefaely Y Gof and Hen Gwet Tac Ceffylau – c. 26m to the east
  - P4R5 - Pen Bont – c.27m to the north
  - P4R6 - Dolafon – c.42m to the north
  - P4R7 - TY Capel Hebron – c.92m to the north
  - P4R8 – Gwaenfynyod – c.95m south
  - P4R9 - Pandy Cymnod – c.101m to the north-west

It is noted that the DA4 landowner has recently commenced construction on a new residential property next to the barn within the central area of DA4. As the property is financially connected to the scheme it will not be assessed.

- Development Area 5
  - P5R1 – Tyn Rhos – c.30m to the east
  - P5R2 – Ty Croes – c.104m to the south
  - P5R3 – Y Ddol – c.154m to the south
- Development Area 6
  - P6R1 - Glan Gors – within the Development Area boundary
  - P6R2 - Old School House – c.12m to the north
  - P6R3 – 1 - 31 Tudor Court – c.23m – 185m to the south-east
  - P6R4 - Cae'r Pwll – c.31m to the north
  - P6R5 - Tap Ty Hefyd – c.60m to the north-west
  - P6R6 - Yscubor Bach – c.63m to the east
  - PR67 - Tros Lon – c.66m to the north-west
  - P6R8 - Neuadd – c.70m to the north-west
  - P6R9 - Arfryn – c.94m to the north-east
  - P6R10 - Caergeiliog Farm – c.94m to the north-west
  - P6R11 - 2 – 48 Dol Eithin - c.127m - 189m to the east
  - P6R12 - Cern Farm – c.160m to the west
  - P6R13 - Rhos Bach – c.183m to the east
  - P6R14 - 30 Ffordd Cerrig Mawr – c.198m to the south-east
  - P6R15 - 29 Ffodd Cerrig Mawr – c.202m to the south-east
  - P6R16 - 27 Ffordd Cerrig Mawr – c.211m south-east
- Settlements (and main residential groups) within 2km:
  - Chapel Gwyn, c. 1.3km south-east of Development Area 5
  - Bryngwran, c. 700m north-east from Development Area 4 and 800m north of Development Area 5
  - Llanfihangel-yn-Nhywyn, c. 300m east of Development Area 6
  - Caergeiliog, c. 800m north-west of Development Area 6
  - Llanfair-yn-neubwll, c.1.3km south-west of Development Area 6

*\*Distances quoted from the boundary of the Development Areas to the closest area of the settlement / settlement group.*

- 7.7.4 The potential impact of the proposed development on the visual amenity of the properties listed above has been assessed within the Residential Visual Amenity Assessment (RVAA) included in **Appendix 7.6** to this ES. Those receptors which are considered to experience significant effects will be considered in more detail. The selected properties assessed in the RVAA have been agreed in consultation with IACC, and copies of the consultation emails confirming this are included within **Appendix 7.6**.

### Recreational Routes

- 7.7.5 The Public Rights of Way (within 500 m) surrounding the Development Areas with the potential for theoretical visibility include:

- 16/004/01 – 310m north of Development Area 4 running north-south
- 13/021/1 – 740m north-west of Development Area 4 running north-south
- 13/023/1 – 900m north-west of Development Area 4 running north-south
- 13/019/3 – 1.03km north-west of Development Area 4 running north-south
  
- 16/008/1 – 140m east/southeast of Development Area 5 running north-south
- 16/009/1 – 400m east/southeast of Development Area 5 running north-south
- 16/007/2 – 730m north-east of Development Area 5 running east-west
- 16/003/1 – 800m north of Development Area 5 running north-south
- 16/006/1 – 820m north-east of Development Area 5 running northwest-southeast
- 16/010/1 – 880m south-east of Development Area 5 running northwest-southeast
  
- 32/014/1 – within Development Area 6 running northwest-southeast
- 32/014/2 – within Development Area 6 running north-south
- 32/017/1 – within Development Area 6 running northwest-southeast
- 32/014/3 – Immediate south of Development Area 6 running north-south
- 32/029/1 – 50m northwest of Development Area 6 running north-south
- 32/028/1 – 60m west of Development Area 6 running north-south
- 32/028/2 – 60m west of Development Area 6 running east-west
- 32/015/1 – 80m east of Development Area 6 running east-west
- 32/013/2 – 100m southeast of Development Area 6 running southwest – northeast
- 32/022/1 – 300m east of Development Area 6 running north-south
- 32/027/1 – 370m west of Development Area 6 running north-south
- 32/016/1 – 390m east of Development Area 6 running east-west
- 32/027/2 – 400m west of Development Area 6 running east-west
- 32/009/1 – 530m west of Development Area 6 running east-west
- 32/020/1- 640m southeast of Development Area 6 running northwest-southeast
- 32/018/1 – 650m south-west of Development Area 6 running northeast – southwest
- 32/011/2 – 650m south of Development Area 6 running southwest-northeast
- 32/008/1 – 660m west of Development Area 6 running north-south

- 32/030/1 – 680m west of Development Area 6 running south
- 32/014/04 – 780m south of Development Area 6 running northwest – southeast
- 32/019/1 – 800m east of Development Area 6 running north-south
- 32/011/1 – 840m south of Development Area 6 running east-west
- 32/012/3 – 900m south of Development Area 6 running north-south
- 32/010/1 – 960m southwest of Development Area 6 running east-west
- 32/012/1 – 1km south of Development Area 6 running north-west to south-east
- 32/012/2 – 1.05km south of Development Area 6 running northwest – southeast
- 32/013/1 – 1.06km south of Development Area 6 running north-south
- 32/016/2 – 1.08km east of Development Area 6 running north-south
- 32/025/1 – 1.24km north west of Development Area 6 running north

7.7.6 Due to the vast numbers of recreational routes within the study area only those within 250m of the solar deployment areas will be considered in the assessment, unless they are part of a higher sensitivity route.

7.7.7 National Cycle Network Route 8 is approximately 380m to the east of DA6 and beside the northern boundaries of DAs 4 and 5.

#### Key Transport Routes

7.7.8 The main roads within 1km of the proposed development with the potential for theoretical visibility include:

- A55, c.200m north of Development Area 4, c.700m to the north of Development Areas 5 and 6
- A5/Holyhead Road, c. 400m north-west of Development Area 6 (closest point)

7.7.9 The minor roads within 1km of the proposed development with the potential for theoretical visibility include:

- Alltwn Goch runs along the northern boundaries of Development Areas 4 and 5
- An un-named road runs between the boundaries of Development Areas 4 (east) and 5 (west)
- An un-named road runs along the northern boundary of Development Area 6
- Lon Satem runs north-south in between Development Areas 4 and 5
- Minffordd Road, c. 400m to the east of Development Area 6

7.7.10 Within the assessment section only the minor / local roads that pass immediately beside the boundary of the proposed development area have been considered.

7.7.11 The main Anglesey railway line runs c. 930m to the south-west of DA6. Due to the separation distance, views from the railway corridor have not been considered in the assessment section.

#### Selected Recreational / Cultural Destinations

7.7.12 Heritage designations including listed buildings and Scheduled Ancient Monuments will be considered independently in the heritage assessment (where applicable) - see ES Chapter 9. Within the study area, there are no other 'high sensitivity' recreational or cultural destinations, (e.g. Registered Parks and Gardens) which have a focus on landscape appreciation, that should be considered. No other recreational receptors within 1km of the proposed development are considered.

## Viewpoint Assessment

- 7.7.13 Nineteen viewpoints have been selected on the basis that they provide views to (or illustrate the limited visibility) of the proposed development from sensitive receptors (residential, recreational and PROW) and are representative or locations within the study area. A full list of viewpoints including: a description of location; justification for selection; and approximate distance from the site and baseline views is included in table within **Appendix 7.5**.
- 7.7.14 The viewpoints were discussed and agreed with IACC prior to the assessment process, the locations of the viewpoints are illustrated on **Figure 7.23** Viewpoint Location Plan in **Appendix 7.3**.
- 7.7.15 Baseline views are considered with reference to:
- The type and relative nature of people (visual receptors) likely to be affected with consideration of the activities they are involved in.
  - The location, nature and characteristics of the chosen viewpoints (representative, specific and illustrative).
  - The nature, direction, composition and characteristics of the existing views experienced at the viewpoints; and
  - The visual characteristics and elements of the existing views e.g. nature and extent of skyline, aspects of visual scale and proportion, landform or other elements that may interrupt or otherwise influence views.
- 7.7.16 The baseline photographs are included on the Photomontage and Viewpoint Sheets, Figures 31 to 49 presented in **Appendix 7.3 and 7.4**. The viewpoints are listed below and the baseline conditions of the viewpoints are described in Section 5.2 of **Appendix 7.5**.
- VP1 Tywyn Trewan Common
  - VP2 Valley Wetlands / Cerrig Cynrig
  - VP3 Local lane close to Pen y Bryn / public footpath, east of Development Area 5.
  - VP4 Local Road (between Development Area 4 and 5)
  - VP5 Local road, close to the entrance to Plas-Llechylched
  - VP6 Local road, close to Caer Ddol Farm
  - VP7 Local road close to the entrance to Plas-Llechylched
  - VP8 Road, close to Tyn Rhos
  - VP9 Caer Elen, North of Llyn Traffwll
  - VP10 Local Road, close to Arfryn.
  - VP11 Tros Lon (public footpath)
  - VP12 View over Llyn Traffwll
  - VP13 Dinam Fawr footpath
  - VP14 Llanfairneubwll (north of)
  - VP15 Tywyn Trewan Common / Dunes, Cymyran Bay
  - VP16 Local Road near Bryn Madog
  - VP17 Bryngwran
  - VP18 Landscape north of the A55 / A5
  - VP19 A55 (east of the Caergeiliog junction)
- 7.7.17 The viewpoints are considered within the visual assessment section and **Appendix 7.5**, supplemented with photomontages of the Development Areas from selected locations.

## 7.8 LANDSCAPE AND VISUAL MITIGATION MEASURES

- 7.8.1 Landscape, visual and biodiversity enhancements are an inherent part of the proposed development. In addition to land between and around the panels, there will be significant areas of non-deployment land located in DA6 that will be brought under formal management for the life of the scheme.
- 7.8.2 This chapter combined with the Ecology and Nature Conservation chapter (chapter 11) provides full details of the mitigation and enhancement proposals.
- 7.8.3 Development Areas 1, 8 and 9 have been removed from the proposed development. Their removal is primarily for ecological reasons as it will avoid impacts to chough (bird species) foraging during winter months. The Development Area removal avoids impacts to this species, which is a mobile component of Glannau Ynys Gybi / Holy Island SPA. The removal of these 3 Development Areas, an area of proposed solar development of c 47 ha. also has substantial landscape and visual benefits, reducing the overall spread of solar development within the central, low lying and open zone of the study area (an area with few hedgerows or trees and open field boundaries) as well as reducing the overall distribution and visibility from sensitive visual receptors.
- 7.8.4 In summary, the proposed development will provide the following landscape and biodiversity enhancements:
- Manage grassland to create a diverse sward between and around the solar arrays / Development Area fringes;
  - Manage wet grassland margins for wildlife;
  - Reinforce hedgerows to improve visual containment of deployment areas, improve landscape structure and provide habitat for a range of species;
  - Minimise sediment runoff to improve water quality of surrounding water bodies;
  - Manage marshland and wet grassland habitat associated with Llyn Dinam SAC/Llynau y Fali SSSI;
  - Provide additional hedgerow and tree / scrub planting mitigation to improve landscape structure and screen views from sensitive receptors,
  - Maintain a minimum offset distance of at least 50m from all residential receptors that will remain clear of all development; and
  - Monitor the site and assess the success of biodiversity management.
- 7.8.5 Mitigation is an integral part of the design and assessment process. The mitigation proposals incorporate features for landscape / visual and biodiversity mitigation and enhancements. Chapter 5 of the ES and the Design and Access Statement explain how the site layout has evolved to respond to the findings of the consultation process and to the landscape / visual and biodiversity context. The following masterplan drawings illustrate the proposed mitigation for the DAs:
- **Figure 7.21** Landscape Masterplan – Development Area 4 & 5
  - **Figure 7.22** Landscape Masterplan – Development Area 6
- 7.8.6 With regard to the mitigation proposals for DAs 4 and 5, which are within LCA 17 West Central Anglesey, the baseline section highlights a number of landscape management objectives for this LCA. The mitigation proposals for DAs 4 and 5 has been developed in accordance with the document and seek to:
- Ensure that the management of the range of semi-natural habitats - mires, trees

- and hedgerows found scattered throughout the area is maintained (see general hedgerow / vegetation management and the specific proposals for Development Area 6).
- Ensure that the management of wider habitats increases their value and reflect Local Biodiversity Action Plan objectives.
  - Ensure that the visual impacts from and to the principal transport corridors (main railway line and A5/A55 corridors) are properly considered.
  - Ensure that the proposed mitigation measures reflect the wider landscape structure and that Development Area are not considered in isolation.
- 7.8.7 With regard to DA6, which is within both LCA 5 and LCA 18, a number of management objectives are outlined within the LCA analysis in the baseline section. The following objectives are incorporated into the mitigation proposals for DA6, and seek to:
- Use landform, vegetation patterns to mitigate impacts.
  - Utilise and retain local field boundary patterns – cloddiau, fences, hedgerows.
  - Habitat Management - Although a relatively intensely farmed area, there are a range of semi-natural habitats throughout the LCA. It includes Llyn Alaw which is an important biodiversity resource.
- 7.8.8 A large area of DA6 is set aside, free of development in response to this objective. The development and management proposals seek to:
- Provide for the management of semi-natural habitat features, including open water.
  - Develop and enhance network of sites and link to local BAP targets.
- 7.8.9 Mitigation, developed following review of the Isle of Anglesey Landscape Strategy Update (2011), seeks to integrate the development into the local landscape, screen and filter views to the site from sensitive receptors and provide landscape (and ecological) enhancement using unutilised land within the site areas, and off site if necessary. The layout of the solar arrays within the site is designed so that the existing mature vegetation around the site boundaries (and within) are retained. Appropriate buffers are integrated to the vegetation (typically a minimum of 4m from existing vegetation to the site boundary fence and a further 4m from the fence to the solar arrays) with development restricted from within the canopy of trees.
- 7.8.10 The small and medium scale nature of the local pastoral landscape is established, the DAs are located upon pastoral land set within the existing field structure allowing for focussed enhancements to the established structure.
- 7.8.11 The construction process of the solar arrays, the main land use feature of the development, is of a light footprint as the steel posts (of the panel frames) are driven into the ground with no foundations required. This construction method is of a minimal disturbance to ground conditions, the land cover of the field can remain grass pasture, the field remains available for low intensity grazing or left as fallow, partially retaining the current agricultural landscape characteristic of the site areas.
- 7.8.12 General mitigation principles applied to all the DAs includes:
- All existing boundary hedgerows will be retained, including hedge trees. Where appropriate on the boundary adjoining receptors (residential, roads and footpaths) the hedges will be allowed to grow up to at least 3m tall to help to screen visibility from publicly accessible areas to the solar Development Areas.

- Maintain a minimum offset distance of at least 50m from all residential receptors that will remain clear of all development.
- In the minimum 4m gap between the boundary hedges and site security fence, the grass will be subject to a low intensity management regime (cut every 2 years) to form a tussock grassland. These grassland fringes will provide enhanced habitat for reptiles, invertebrates and birds overall contributing to improved biodiversity levels in the local area. The areas of tussock grassland would act as a reservoir of grassland invertebrates particularly over winter which should have indirect benefits for Chough and will also benefit other bird species and small mammals.
- In the main solar development areas, within the site security fence, the grassland will be managed as a meadow grassland (species-rich wild flower and fine grass mix) a supplementary seed mix will be sown where required following construction damage. The DAs will be managed as meadow grassland (suitable for farmland birds) allowed to grow or grazed by sheep as deemed appropriate by the operator.
- Extensive seasonal grazing will be required on all parcels within the security fencing to manage grassland in a manner than encourages a variable and diverse sward. The maximum stocking density of sheep will be 4 animals per Ha. On DAs 4 and 5 particularly, this will encourage the development of species-rich semi-improved grassland of greater biodiversity value than the improved and intensively grazed grassland it replaces.
- The creation of areas of structurally diverse grassland will provide both cover and foraging areas for breeding Lapwing. A regime of low intensity sheep grazing will create the desired mix of short foraging sward and longer sward for cover;
- Where there are current gaps in the perimeter hedgerows, these will be in filled with a native locally appropriate mixed species hedgerow mix.
- Additional feathered sized hedge trees will be planted along the hedgerows at random spacing's to increase local tree coverage levels, filter visibility and provide green links between existing woodland and scrub areas.
- A landscape and ecological management plan will be produced and adhered to for all retained and created habitats in order for them to maintain existing value and/or realise enhanced value, making sure that management is appropriate and ongoing for the life of the development (secured by planning condition).

### Visual Mitigation

7.8.13 Additional hedgerows and tree / scrub planting mitigation blocks are proposed at selected locations primarily to screen (and filter) views from sensitive receptors whilst also improving landscape structure. Areas Include:

- Development Area 4
  - New hedgerow to be added around the eastern boundary of the site area, c.600 linear metres. Occasional hedge trees will also be added to the hedge line. The hedgerow will screen and filter views from the near residential property grouping at Plas Llechylched (Plas Farm and Gefaely y Gof. The hedgerow is located beyond the minimum 50 m clear zone from the properties, set beside the site boundary fence. New infill hedgerow to be added to gap in existing hedge upon the western boundary, close to the local road and Caer Ddol and Pen Bont properties.
  - Three grass pasture fields to the south west of the Plas Farm grouping (which are within the site boundary) to be left clear of all development to reduce the scale of landscape and visual effects upon the residential

- grouping.
- 50m clear zone of development incorporated into scheme layout upon the northern boundary when close to residential receptors.
- Development Area 5
  - New hedgerow to be added around the eastern boundary of the site area, c.170 linear metres. Occasional hedge trees will also be added to the hedge line. The hedgerow will screen and filter views from the near residential property of Tyn Rhos. Hedgerow is located beyond the minimum 50 m clear development zone from the property, set beside the site boundary fence.
- Development Area 6
  - All internal hedgerows and scrub banks / ditches to be retained. Retention of existing structural vegetation will break up the large areas of arrays, reducing the overall scale, when viewed from elevated locations to the north east. New hedge trees added to the north eastern site boundary to filter views from the nearby residential receptor of Arfyrn.

#### Ecological Specific Mitigation – Development Area 6

- 7.8.14 The management of c.7 ha. of the southernmost and western fields of DA6 as wet pasture / floodplain grazing marsh will provide a positive water quality improvement to Llyn Dinam SAC and Valley Lakes SSSI. Specifically, the management will be such that cattle will graze the land adjoining the designations to control grazing to create a variable sward height.
- 7.8.15 In addition, along the principal drain through DA6 a series of small, vegetated forebays will be created to trap mobilised silt and sediment designed to maintain the slow the flow of water to aid settling out of sediment and filter the water.
- 7.8.16 Ecological specific mitigation is discussed in more detail within the Ecology and Nature Conservation Chapter (11) of this ES.

#### Hedgerow Specific Mitigation

- 7.8.17 All hedges (including scrub and gorse blocks where these form field boundaries) are to be retained around the site, with infilling of the gaps of missing sections undertaken. In addition to benefiting landscape and visual issues the retention of hedges will ensure that foraging, refuge and hibernation opportunities, protection from predators, and connectivity between habitats for wildlife within the local area is maintained and enhanced.
- 7.8.18 The retained hedgerows will undergo sympathetic hedgerow management throughout the life of the solar farm, thus providing landscape and ecological benefits. Outline hedgerow management recommendations include:
- Hedges will be trimmed at three-year intervals at the most and maintained at a height of at least 3 m with sections extending up to around 4.5 m;
  - At least 30% of site hedges will be left to grow for at least seven to ten years (most likely on the northern boundaries of the solar to avoid shading);
  - Ensure rotationally only 30% of hedges are cut in any one year, to allow hedge trees to fruit heavily;

- Laying will be used to manage hedgerows that become ‘gappy’ or lack dense branches at their base; and
- If hedgerow size needs to be restricted, hedges will be cut on one side and not the top (but within a maximum height of ~3m – 4.5 m).

### Construction and Decommissioning Phase Mitigation

7.8.19 Aside from the minor access improvements, due to the method of construction there will be minimal other physical changes to the structure of the fields. This will reduce the potential for long term landscape effects of the scheme and allowing ease of restoration and a change back to pastoral use when the scheme is decommissioned.

7.8.20 Specific mitigation measures considered during the construction phase relevant to landscape and visual issues include:

- There will be limited vegetation loss, the existing access points and farm tracks will be used. Access tracks for construction will largely follow existing farm tracks and utilising existing entrances. The existing farm tracks within the site will be improved as required by adding stone/granular material which will weather over time. Where additional temporary tracks are required for construction, these will be created using interlocking sheet material to avoid longer term soils damage; and
- The temporary construction compounds will be located within the DA (see **drawing LOC1001/11/04**) minimising direct and indirect effects on landscape elements, landscape character and visual receptors.

7.8.21 The proposed development will be operational for 40 years, at the end of which it can be dismantled and removed and the site reinstated to previous conditions.

7.8.22 Specific mitigation measures, considered during the decommissioning phase relevant to landscape and visual issues include:

- The temporary de-commissioning compound and all disturbed and excavated areas will be reinstated following completion of de-commissioning activities. Any concrete foundations (if used) will be broken up, removed and earth reinstated to make up levels;
- There will be no vegetation loss, mitigation vegetation to remain as landscape features;
- Existing entrances, tracks and access points will be used (including temporary access tracks where required); and
- The site will be reinstated to previous use, grass pasture.

### Proposed Mitigation – Approximate Areas / Quantities, Development Areas 4, 5 and 6

7.8.23 The mitigation treatments and existing features are shown on the proposed Landscape Masterplan and Mitigation **drawings LOC1001/06/21 - 22** in **Appendix 7.3**.

Table 7.4: Development Area 4 – Proposed Landscape Planting

Development Area 4 - Mitigation Treatment	Number / Area
Tussock Grassland outside site security fence	c.1.2ha. (excludes internal area around retained barn)

Meadow Grassland within site security fences	c.4.9 ha.
Proposed Native Hedgerows (new and infill)	c.620 l/m
Proposed Hedgerow Trees	c.3 no. per 100 l/m
Proposed Native Woodland / Scrub	n/a – existing site vegetation retained
Managed Wet Grazing Grassland	c.1.2 ha.
Managed Meadow Grassland – winter seed source for birds	c.4 ha.
Length of existing hedgerows around and within site (retained and protected)	All existing hedgerows retained
Area of solar arrays	c.7.8 ha. (within overall deployment area of c.18.2 ha.)

Table 7.5: Development Area 5 – Proposed Landscape Planting

Development Area 5 - Mitigation Treatment	Number / Area
Tussock Grassland outside site security fence	c. 0.8 ha.
Meadow Grassland within site security fences	c.3.5 ha.
Proposed Native Hedgerows (new and infill)	c.170 l/m (site entrance and close to residential property) remaining hedgerows retained.
Proposed Hedgerow Trees	c.3 no. per 100 l/m
Proposed Native Woodland / Scrub	n/a
Managed Meadow Grassland – winter seed source for birds	c.0.5 ha.
Length of existing hedgerows around and within site (retained and protected)	All existing hedgerows retained
Area of solar arrays	c.2.4 ha. (within overall deployment area of c.6 ha.)

Table 7.6: Development Area 6 – Proposed Landscape Planting

DEVELOPMENT AREA 6 - Mitigation Treatment	Number / Area
Tussock Grassland outside site security fence	c.2.2 ha.
Meadow Grassland within site security fences	c.6.7ha.
Proposed Native Hedgerows (new and infill)	n/a c.24 no. standard trees to hedgerow on N and NE boundary
Proposed Hedgerow Trees	c.3 no. per 100 l/m
Proposed Native Woodland / Scrub	n/a
Managed Wet Grazing Grassland	c.2.6 ha.
Managed Meadow Grassland – winter seed source for birds	c.0.7ha.
Ecological management of SSSI / SAC	c.3.3 ha. (to be agreed)

Length of existing hedgerows around and within site (retained and protected)	All existing hedgerows retained
Area of solar arrays	c.4.1 ha. (within overall deployment area of c.12.6 ha.)

7.8.24 Overall, the mitigation and enhancement proposals seek to reduce the landscape effects of the solar development areas and integrate the site within the host LCAs. Mitigation proposals are also developed to screen and filter the development from the view of sensitive receptors, whilst also providing a range of ecological mitigation enhancements. This is considered to be a benefit over the current grazed pasture land use of the development area which is discussed further in the ecological chapter.

7.8.25 The overall areas of the development zones (within the Development Area security fences) considered against the overall deployment footprint of the solar arrays (excluding the limited access tracks and supporting infrastructure) presents the following areas:

- Total area of the solar deployment zones and internal security fenced areas = c.37.3 ha.
- Total area of solar arrays and site infrastructure (all Development Areas) = c.15.2 ha.
- Overall ground coverage of development = c.41% focussed upon the solar arrays. The remaining areas of the internal deployment zones (c.22.1 ha.) would be set aside for ecological mitigation (predominantly grassland) and the conservation of the retained vegetation within the Development Area boundaries.
- Note the area of non deployment also excludes the additional mitigation areas outside of the deployment zone of Development Area 6, which total c.6.5 ha. and the areas set aside as grassland fringes and clear development zones (available as grassland or grazing) when close to residential receptors, a substantial c.16.5 ha. of retained grassland that will remain undeveloped, but in positive management.

## 7.9 CUMULATIVE EFFECTS

7.9.1 Opportunities exist for potential cumulative views, where more than one solar farm, including the proposed development, may be seen either simultaneously or sequentially. Solar farms with the potential to generate cumulative effects include those which; are constructed, are in construction; have planning permission and are not yet constructed; or, are awaiting determination of planning permission. There are no other cumulative solar schemes within the study area.

7.9.2 Consideration has also been given to potential cumulative influences from other environmental topics assessed as part of this EIA and from significant and non-solar proposals beyond the application site boundary.

7.9.3 Details of such schemes are listed in Chapter 13 of this ES. The identified schemes that have the greatest potential to create cumulative impacts are located a considerable distance from the application site (beyond the ZTV presented in **Appendix 7.3**) and as such are unlikely to contribute to a significant effect on landscape character and / or visual amenity.

7.9.4 The ES demonstrates that no significantly adverse effects will be created from other environmental topics during both the construction and operational phases of the proposal therefore no 'in combination' effects will occur. Furthermore, the baseline

assessment has considered surrounding land-uses that may influence local landscape and visual amenity.

## 7.10 ASSESSMENT OF THE LEVEL OF LANDSCAPE EFFECT

### Introduction

- 7.10.1 In order to assess whether landscape character is ‘substantially’ affected by a development, it should be determined what and how each of the key characteristics would be affected. The judgement of magnitude therefore reflects the degree to which the key characteristics and elements which form those characteristics will be altered by the proposals. The scale of the development, the nature and sensitivity of the receiving landscape, and local ‘barriers’ in the landscape (such as breaks of topography, woodlands, settlements, and roads or rivers) will influence the exact extent of effect of the development. The assessment focuses on the operational phase. Temporary and short term effects during the construction and decommissioning phases are discussed following the main effects where applicable.
- 7.10.2 Landscape assessment involves assessing the sensitivity of a landscape receptor against the magnitude of change that will be likely to be caused by a development to evaluate the significance of effects upon that receptor.
- 7.10.3 The significance of the effect of a development on the landscape is not an absolute scale but is a judgement based on the magnitude of the anticipated effect (or scale of change) and the sensitivity of the landscape to development.

### Effects on Landscape Character - Landscape Character Areas, Landmap Aspect Areas and Landscape Receptors

- 7.10.4 The landscape resource is assessed in terms of sensitivity, which combines judgements of their susceptibility to the type of change or development concerned and the value attached to the landscape. Sensitivity is specific to the project/development.
- 7.10.5 Landscape characteristics of the application site and consequences of the development upon the landscape character of the development areas (and wider study area) is considered. The assessment includes the host and near adjoining landscape character areas (LCA 17, LCA 5 and LCA 18). In addition, consideration is given to landscape effects upon the host LANDMAP Aspect Areas and those within the study area selected for further consideration due to higher level classifications as discussed within Section 7.4.
- 7.10.6 Detailed assessment tables are included with **Appendix 7.5** and are summarised in the below table.

Table 7.7: Assessment of Landscape effect – Summary Table

Receptor	Landscape Sensitivity	Magnitude of Landscape Effect	Level of Landscape Effect (SIGNIFICANCE)	Comment
LCA 17: West Central Anglesey	Medium / Low	Medium	<b>Moderate (Not Significant)</b>	Host area for Development Areas 4 & 5

Receptor	Landscape Sensitivity	Magnitude of Landscape Effect	Level of Landscape Effect (SIGNIFICANCE)	Comment
LCA 5: North West Anglesey	Medium	Low	<b>Moderate / Minor (Not Significant)</b>	Host area for the main deployment zone of Development Area 6
LCA 18: Valley Airfield Environs	Medium	Negligible	<b>Minor (Not Significant)</b>	Non deployment area of Development Area 6
LANDMAP				
Visual and Sensory				
VS012: Central Smooth Belt (HOST)	Medium (moderate evaluation)	Medium	<b>Moderate (Not Significant)</b>	Host area for Development Area 4 & 5
VS020: Caergiliog craggy lowlands (HOST)	Medium (moderate evaluation)	Medium	<b>Moderate (Not Significant)</b>	Host area for Development Area 6, all deployment area
VS029: Llanfihangel Lakes and Dunes (HOST)	Medium (moderate evaluation)	Negligible	<b>Minor (Not Significant)</b>	Non deployment area of Development Area 6
VS030: Holy Island Straight.	High evaluation	No Change	<b>Neutral (Not Significant)</b>	
VS007 Holy Island	High evaluation	No Change	<b>Neutral (Not Significant)</b>	
VS053 South West Coast – Rhosneigr	High evaluation	No Change	<b>Neutral (Not Significant)</b>	
Geological Landscape				
GL020 Llanerchymedd. (HOST)	High evaluation	No Change	<b>Neutral (Not Significant landscape effect, geological)</b>	
GL019 Bodedern (HOST)	Moderate evaluation	No Change	<b>Neutral (Not Significant landscape effect, geological)</b>	
Landscape Habitats				
LH084 Farmland		Low	<b>Minor</b>	

Receptor	Landscape Sensitivity	Magnitude of Landscape Effect	Level of Landscape Effect (SIGNIFICANCE)	Comment
between old A5 and Railway line (HOST)	Low Evaluation		<b>(Not Significant landscape effect, landscape habitats)</b>	
LH103 Farmland between Inland Sea and A5 (HOST)	Moderate Evaluation.	Low	<b>Minor (Not Significant landscape effect, landscape habitats)</b>	
LH016 Valley Lakes	Outstanding evaluation	No Change	<b>Neutral (Not Significant landscape effect, landscape habitats)</b>	
LH015 Llyn Traffwll	High evaluation	No Change	<b>Neutral (Not Significant landscape effect, landscape habitats)</b>	
LH024 RAF Valley Airfields	High evaluation	No Change	<b>Neutral (Not Significant landscape effect, landscape habitats)</b>	
Historic Landscape				
HL079 Inland Southern Anglesey (HOST)	Outstanding evaluation.	Low	<b>Minor (Not Significant landscape effect historic landscape)</b>	
HL016 Fieldscape Central East	Outstanding evaluation	No Change	<b>Neutral (Not Significant landscape effect historic landscape)</b>	
HL020 RAF Valley	Outstanding evaluation	No Change	<b>Neutral (Not Significant landscape effect historic landscape)</b>	
Cultural Landscape Services				
CLS017 Central Smooth Belt	n/a	Not assessed	<b>n/a</b>	
CLS026 Caergeiliog craggy lowland	n/a	Not assessed	<b>n/a</b>	
Landscape Receptors				
Anglesey AONB	High	Negligible	<b>Minor - Neutral, a Not Significant landscape effect upon the AONB</b>	
Tywyn Trewan Common	High	Negligible	<b>Minor - Neutral, a Not Significant landscape effect upon the common</b>	

- 7.10.7 As presented in **Appendix 7.5** and the above table, analysis of the published landscape character assessment and LANDMAP data, considered with the particular characteristics of the study area, has concluded that there would be no significant effects upon landscape character as a result of the development. Due to the scale of the local landscape and LANDMAP areas, the development form and local context (vegetation, built form and topographic elements), the scheme will have a limited but adverse impact on characteristic elements, notably the pastoral landscape pattern and coverage. Despite being considered a Moderate level of effect (at the most adverse) these are effects that are geographically restricted to the reduced number of Development Areas (3 no. in total) and set within the expansive landscape character and LANDMAP aspect areas within the study area.

#### Site Level Effects on Landscape Character – Landscape Sensitivity

- 7.10.8 The landscape resource is assessed in terms of sensitivity which combines judgements of its susceptibility to the type of change or development concerned and the value attached to the landscape. Sensitivity is specific to the project/development.
- 7.10.9 Landscape characteristics of the application site and consequences of the development (up to ~250m) are considered.

#### Site Level (Development Areas) Susceptibility to Change

- 7.10.10 The susceptibility to change of the landscape to the solar farm development, within the three development areas, is determined with reference to the baseline assessment of the existing landscape and is assessed by considering the ability of the landscape to accommodate the specific proposed development without undue negative consequences for the maintenance of the landscape baseline situation and/or achievement of landscape planning policies or strategies.
- 7.10.11 Considering the scale of the proposed solar farm development (vertical and overall surface area) within the three DAs, local landscape features (gentle undulating landform surrounded by blocks of mature hedgerows and scrub), the susceptibility to change of the pastoral landscape is considered to be **Medium**. It is accepted that there would be some undue consequences as a result of development, but that the landscape receptor has some capacity to accept change due to the development form and scale.
- 7.10.12 The development would lead to a loss of pastoral grazing land at the local level, although the use can still continue at a lower intensity. It is also considered that due to the distribution of the individual development areas in the study area (and the overall reduction in number of development areas from the original proposal) that the local landscape and immediate surroundings could accommodate this particular form of development without a significant change in local character. The development areas contain few landscape characteristics that would be vulnerable to the proposal.
- 7.10.13 The Medium classification within this assessment corresponds with the character area sensitivity classifications of Medium/Low for LCA 17, Medium for LCA 5 and Medium for LCA 18 within the Isle of Anglesey, Gwynedd & Snowdonia National Park Landscape Sensitivity and Capacity Assessment (2014). A medium classification is

defined as, 'Some of the key characteristics and qualities of the landscape are sensitive to change from the type and scale of development being assessed'.

- 7.10.14 With regard to field scale solar within LCA 17, it is reiterated that the 2014 assessment report states: "...There may also be limited capacity for larger scale developments, in particular towards the south west where the landscape is already influenced by modern infrastructure; however, any new development should be carefully sited to avoid cumulative effects with other developments".

#### Value of the Landscape Receptor (Site <250m)

- 7.10.15 The value of the landscape receptor, the host pastoral / grazing fields of the 3 solar DAs, is considered with regard to the baseline landscape value conclusions.
- 7.10.16 The DAs and surrounding areas (<250m) are not subject to any national, regional or local landscape designations and contain few sensitive elements cited in the referenced landscape character and sensitivity assessments.
- 7.10.17 The DAs are noted for their landscape condition, focussed on intact field systems, but this is a commonplace feature within the study area, and as development will be set within the field structure, the main change is the ground coverage, from pastoral grassland to solar farm infrastructure with surrounding pastoral elements. The DAs are noted for their individual scenic quality (quieter areas away from transport corridors and the airfield) although (excluding DA6) are not publicly accessible, providing no recreational value. When visible, or close to the development areas, landscape perceptions are also influenced by the local detractors including; the near transport corridors, overhead electricity pylons and views (and audible disturbance) to and from RAF Valley Airfield.
- 7.10.18 It is acknowledged that the visual aesthetic (character) locally of the DAs will change however, the retention and management of surrounding vegetation (acknowledged to be one of the key landscape characteristics) and proposed mitigation will lessen the visual prominence of the solar farms, aiding landscape integration.
- 7.10.19 Overall, it is considered that the site areas are of a **Medium-Low** landscape value.
- 7.10.20 In accordance with the LVIA methodology (**Appendix 7.1**), a Medium-Low landscape value judgement can be explained as "Areas identified as having some redeeming feature(s) and possibly identified for improvement. Does not lie within or adjacent to a designated landscape..... Presents some locally important / distinctive landscape characteristics, with some scenic interest but does not provide public amenity value by way of access or opportunity for quiet enjoyment."

#### Overall Sensitivity of the Site and Local Area

- 7.10.21 The susceptibility to change of the local landscape and landscape value indicators are considered **Medium** and **Low - Medium**. The landscape sensitivity of the site to the proposed development is therefore concluded to be Medium (low), **Medium** overall, due to the local scale of the development, spread over 3 Development Areas. In accordance with the LVIA methodology, **Appendix 7.1**, the Development Area are described as "*comprised of commonplace elements and features creating generally unremarkable character, but some sense of place. Elements with a medium susceptibility to change, partly able to accommodate the proposed development*

*without undue consequences but contains few (affected) features that could not be replaced”.*

- 7.10.22 Mitigation measures proposed would, over time, improve the landscape and ecological structure and aid the integration of the development, contributing to wider scale improvements to green infrastructure and local biodiversity gains within the local area.

#### Magnitude of Landscape Effects

- 7.10.23 Landscape effects arising as a result of the proposed development are considered with reference to the criteria established in the methodology including size and scale of effect; geographical extent; and, duration and reversibility. The type of effect considered includes:

- The potential operational effects upon the landscape fabric within the site (direct effect);
- The potential operational effects on the host landscape character area (direct effect), including the consideration of any effects within designated areas; and,
- The potential operational effects on the wider landscape character areas within the study area (indirect effects), including consideration of any effects within designated areas and cumulative landscape effects as a result of other solar farms.

- 7.10.24 The direct effect of the proposed development upon the landscape character of the site and local area depends on; the key characteristics of the receiving environment (as previously considered), and, the degree to which the development may be consistent or at odds with the landscape and how the development would be perceived within the landscape. Perceptions can be influenced by; the distance to the site, weather conditions, appearance/fit of the development (levels of visibility), and, relationships to other built and natural features in the landscape.

- 7.10.25 It is acknowledged that there is an overlap between perception of change to landscape character and visual amenity; landscape character is derived from the combination pattern of landscape elements in the view. The effects of a development on landscape character arise from its relationship to these combinations and patterns.

#### Scale of Effect

- 7.10.26 Consideration is given to the scale of the change in the landscape that is experienced as a result of the development and can include both the loss and addition of new features. The development would result in a change to an area of pastoral farmland (and rough grazing), total site area of the three DAs is c. 60 ha of which solar is deployed on c.37 ha (the area within the security fences). Within the deployment areas the solar arrays and infrastructure will cover c.15 ha. of the ground area, the remainder is grass. The zones outside the security fences, c.23 ha. will be low intensity managed grassland, areas of existing hedgerows and trees, or managed for specific ecological purposes e.g. wet grazing.
- 7.10.27 The main landscape element affected is the pastoral grass coverage (rough grazing for DA6), as the fields host the development. The field systems contribute extensively to the landscape character, but this is in conjunction with surrounding hedgerows, scrub and tree coverage, which frame and knit the landscape together. These

features are unaffected. The solar arrays within the field systems will alter the local aesthetic aspect, forming notable new features, but contained and set within the established structure. The landscape character areas are of a large scale, the changes to the three DAs will not have notable effects upon the wider distinctive, but commonplace, character. The overall scale of effect is considered to be **Moderate**, a partial change to existing landscape elements and characteristics.

#### Geographical Extent

7.10.28 The geographical extent of effects is influenced by the landscape setting (established features around the site), the scale of the proposed development, localised topography and is distinct from the scale of effect.

7.10.29 Due to the form of development, up to c.3m tall solar arrays set within pastoral field systems, combined with the established landscape features around the site and gentle topographic variations, the geographical extent of effect is considered focussed to site level, but can extend over immediate localised areas to a maximum of 250m. The geographical extent of effect is **Minor**.

#### Duration and Reversibility of Effect

7.10.30 The effects have been assessed over the lifespan (40 years) of the proposed development – effects which are ultimately reversible (and therefore temporary) due to the method of construction (and time limited nature of the application / permission). The solar arrays and limited ancillary infrastructure could be removed, and the fields returned to pastoral (or conservation) use. Despite being ultimately reversible, a **High-Moderate** level of effect is concluded with regards to duration and reversibility of landscape effects.

#### Overall Magnitude of Landscape Effects

7.10.31 Magnitude is considered with regard to the scale, geographical extent, and duration and reversibility of landscape effects, as set out in the methodology. The magnitude of landscape change arising from the proposed development is considered to be **Medium**.

7.10.32 In accordance with the methodology this is a “Partial loss to landscape elements of the baseline and introduction of elements that may be prominent but not necessarily substantially uncharacteristic with the attributes of the receiving landscape but which could co-characterise parts of the landscape”.

#### Overall Level (Significance) of Landscape Effect

7.10.33 The significance of landscape effect of the proposed development upon the local area is determined by consideration of the landscape sensitivity and magnitude of landscape effect.

7.10.34 With reference to the evaluation of the landscape effects and with regard to the methodology, a ‘Medium’ landscape sensitivity and a ‘Medium’ magnitude of change is considered to result in a **‘Moderate’** significance of landscape effect overall, as discussed in the methodology this is judged to be ‘Not Significant’ effect overall. The landscape effects are considered to be centred at a local level (focussed study area), but will have an adverse impact on characteristic features (pastoral grassland). It is judged that the development would cause a medium sensitivity landscape to be

markedly changed due to the nature of the developments scale, although it is noted effects are largely contained by retained field structure and topographic features of the local area.

### Assessment of Predicted Landscape Effect during Construction and Decommissioning Phases

7.10.35 Construction activities which have the potential to temporarily affect the landscape character and landscape receptors include:

Frequency of deliveries to site and vehicle movements on and off site;

- Effects upon local tranquillity by installation of site infrastructure - fencing with CCTV, solar arrays, switchgear, substation and inverters; and
- Formation of temporary construction compound (welfare and construction equipment) and reinstatement works to areas disturbed by construction activities.

7.10.36 De-commissioning activities which have the potential to affect the landscape character and landscape receptors include:

- Dismantling and removal of all installed infrastructure resulting in increased vehicle movements to and from site;
- Effects upon local tranquillity through the activity of construction operations (machines and movement); and
- Reinstatement works to areas disturbed by de-commissioning activities and time period for reinstatement works to establish.

7.10.37 From the description of the construction and de-commissioning activities as outlined above, any effects on landscape character and landscape receptors during the construction and de-commissioning phases will be temporary and short term in duration. There would be no direct changes to the landscape immediate outside of the site boundaries (no additional requirements for space), the construction and decommissioning operations retained within.

7.10.38 Any damaged fields as a result of de-commissioning activities will be re-seeded with a locally appropriate grassland mix. It is therefore considered that the short-term, reversible and temporary nature of the construction and de-commissioning activities on landscape character will ensure that the overall effects will be, at worst, Minor. These are considered to be limited to the local context of the site boundaries, short term and temporary effects, overall a 'Not Significant' nature.

### Assessment of Predicted Effect on Landscape Receptors

7.10.39 The baseline landscape section established the following landscape receptors within the study area with the potential to be adversely affected by the proposed development. The receptors are considered in further detail within **Appendix 7.2**.

#### Anglesey AONB

7.10.40 Review of the individual Development Area ZTVs (Zone of Theoretical Visibility) and analysis of theoretical visibility over the AONB confirms that the geographical area of the AONB with the potential for visibility to the DAs would be extremely limited, and when theoretically visible, focussed to DA6 only.

7.10.41 The ZTVs illustrate the potential for theoretical visibility to DA6 from a small area of the AONB immediately to the north of the airfield, around the hamlet of

Llanfairyneubwll, an area of <2km<sup>2</sup> and an area further west, upon rising land beyond the inland sea. The areas shown to have theoretical visibility are very small, with limited public access. Considering the separation distances and potential for intervening screening by vegetation (and with reference to the Viewpoints close to the AONB boundary) it is considered that the landscape effects upon the setting of the AONB, as a result of the development would be **Minor / Neutral** – a ‘Not Significant’ Landscape effect.

Tywyn Trewan Common Open Access Land

7.10.42 Review of the ZTVs confirms that there is the potential for theoretical visibility from the common to DAs 4 and 5. It is noted that the ground level within the common is lower than the DAs to the north, considering the areas of vegetation within the intermediate area to the north, the potential for intervisibility between the Development Areas and the common is limited. Due to the viewing angle, dense gorse vegetation within the common and the separation distances it is considered that the landscape effects upon the setting of the common, as a result the development would be **Minor / Neutral** – a ‘Not Significant’ Landscape effect.

7.11 ASSESSMENT OF THE LEVEL OF VISUAL EFFECT

Assessment of Predicted Visual Effect on Residential Properties / Receptor Groups

7.11.1 As outlined within the baseline section, there are 35 residential receptors / groups within the study area to be assessed which may have visibility to the proposed development, detailed assessment tables are included with **Appendix 7.5**, and a summary is provided in the below table. Effects upon views and visual amenity during the construction and decommissioning phases are considered separately. Residential receptors are illustrated on **Figure 7.20, 7.21 and 7.22**.

Table 7.8: Assessment of Visual Effect on Residential Properties – Summary Table

Receptor (distance to closest area of site boundary)	Magnitude of Visual Effect	Potential Level of Visual Effect (SIGNIFICANCE)	Level of visual effects (longer term), c. 5 – 10 years, after establishment of mitigation (where applicable)
Development Area 4			
P4R1 – Plas Llechlched – c.10m to the east	High	Major, a SIGNIFICANT visual effect	Major-Moderate, a SIGNIFICANT visual effect. Mitigation hedgerow will filter closest ground level views but due to viewing angle, large (but more distant areas) of the DA likely to remain visible.

Receptor (distance to closest area of site boundary)	Magnitude of Visual Effect	Potential Level of Visual Effect (SIGNIFICANCE)	Level of visual effects (longer term), c. 5 – 10 years, after establishment of mitigation (where applicable)
P4R2 – Grouping of 1 - YR Hen Grouglofft Gwar 2 - Y Cerbyty, 3 - Y Stablau, 4 - YR Hen Laethoy – 25m to the east	Medium-High	Major - Moderate, a NOT SIGNIFICANT visual effect	Moderate, a NOT SIGNIFICANT visual effect. Mitigation hedgerow will filter the closest ground level views and due to viewing angle and site specific topography, will also filter large and more distant areas of the DA.
P4R3 - Caer Ddol – c.23m to the north	High	Major, a SIGNIFICANT visual effect	Major-Moderate, a SIGNIFICANT visual effect. Mitigation hedgerow and hedge trees will filter near ground level views and some distant views however due to the separation distance large areas of the DA likely to remain visible, but remain focused to upper storey windows.
P4R4 – Gefaely Y Gof and Hen Gwet Tac Ceffylau – 26m to the east	Medium-High	Major, a SIGNIFICANT visual effect	Major-Moderate, a SIGNIFICANT visual effect. Mitigation hedgerow will filter the closest ground level views but due to viewing angle and site specific topography, slightly elevated views remain to the more distant areas of the DA.
P4R5 - Pen Bont – c.26m to the north	High	Major, a SIGNIFICANT visual effect	Major-Moderate, a SIGNIFICANT visual effect. Mitigation hedgerow and hedge trees will further filter near ground level views and some distant views however due to the separation distance large areas of the DA likely to remain visible, but views remain

Receptor (distance to closest area of site boundary)	Magnitude of Visual Effect	Potential Level of Visual Effect (SIGNIFICANCE)	Level of visual effects (longer term), c. 5 – 10 years, after establishment of mitigation (where applicable)
			focused to upper storey windows.
P4R6 - Dolafon – c.42m to the north	High	Major, a SIGNIFICANT visual effect	Major-Moderate, a SIGNIFICANT visual effect. Mitigation hedgerow and hedge trees will filter near ground level views and some distant views however due to the separation distance large areas of the DA likely to remain visible, but remain focused to upper storey (side and rear) windows.
P4R7 - Ty Capel Hebron (Property next to) – c.92.3m to the north	Low	Minor, a NOT SIGNIFICANT visual effect	
P4R8 – Gwaenfynyod – 95.1m south	Low - Negligible	Minor, a NOT SIGNIFICANT visual effect	
P4R9 - Pandy Cymnod – 101m to the north-west	Negligible	Neutral, a NOT SIGNIFICANT visual effect	
<b>Development Area 5</b>			
P5R1 – Tyn Rhos – c.30m to the east	High	Major, a SIGNIFICANT visual effect	Major-Moderate, a SIGNIFICANT visual effect. Mitigation hedgerow upon site boundary will filter the closest ground level views but due to gently rising topography of the DA, views to internal areas to remain, particularly from 1st floor windows.
P5R2, Ty Croes	Medium	Moderate, a NOT SIGNIFICANT visual effect	
P5R3, Y Ddol	Negligible	Neutral, a NOT SIGNIFICANT visual effect	
<b>Development Area 6</b>			

Receptor (distance to closest area of site boundary)	Magnitude of Visual Effect	Potential Level of Visual Effect (SIGNIFICANCE)	Level of visual effects (longer term), c. 5 – 10 years, after establishment of mitigation (where applicable)
P6R1, Glan Gors (within site)	Medium	Moderate, a NOT SIGNIFICANT visual effect	
P6R2 - Old School House – c.11m to the north	Low	Moderate-Minor, a NOT SIGNIFICANT visual effect	
P6R3 – 1 - 31 Tudor Court – c.25m – 185m to the south-east	Low-Negligible	Minor, a NOT SIGNIFICANT visual effect	
P6R4 - Cae'r Pwll – c.30m to the north	Low	Minor, a NOT SIGNIFICANT visual effect	
P6R5 - Tap Ty Hefyd – c.65m to the north-west	Low	Minor, a NOT SIGNIFICANT visual effect	
P6R6 - Yscubor Bach – c.63.m to the east	Negligible	Neutral, a NOT SIGNIFICANT visual effect	
PR67 - Tros Lon – c.60m to the north-west	Low	Minor, a NOT SIGNIFICANT visual effect	
P6R8 - Neuadd – c.70m to the north-west	Medium-Low	Moderate/Minor, a NOT SIGNIFICANT visual effect	
P6R9 - Arfryn – c.90m to the north-east	High	Major, a SIGNIFICANT visual effect	Major-Moderate, a SIGNIFICANT visual effect. Mitigation tree planting upon the near north east site boundary will filter the views over the site area, although large expanses of solar still likely to be visible.
P6R10 - Caergeiliog Farm – c.93m to the north-west	Negligible	Neutral, a NOT SIGNIFICANT visual effect	
P6R11 - 2 – 48 Dol Eithin - c.127m - 189m to the east	Medium	Moderate, a NOT SIGNIFICANT visual effect	
P6R12 - Cern Farm – c.160m to the west	Negligible	Neutral, a NOT SIGNIFICANT visual effect	

Receptor (distance to closest area of site boundary)	Magnitude of Visual Effect	Potential Level of Visual Effect (SIGNIFICANCE)	Level of visual effects (longer term), c. 5 – 10 years, after establishment of mitigation (where applicable)
P6R13 - Rhos Bach – c.180m to the east	Negligible	Neutral, a NOT SIGNIFICANT visual effect	
P6R14 – 27, 29 and 31 Ffordd Cerrig Mawr – c.195m to the south-east	Negligible	Neutral, a NOT SIGNIFICANT visual effect	
Settlements (and main residential groups) within 2km:			
Chapel Gwyn, c. 1.3 km south-east of Development Area 5	Negligible	Neutral, a NOT SIGNIFICANT visual effect	
Bryngwran, c. 700m north-east from Development Area 4 and 800m north of Development Area 5	Negligible	Neutral, a NOT SIGNIFICANT visual effect (excluding area of village assessed in Viewpoint assessment, VP 17)	
Llanfihangel-yn-Nhywyn, c. 300m east of Development Area 6	Negligible	Minor - Neutral, a NOT SIGNIFICANT visual effect (excluding area of village assessed in residential assessment, P6R3)	
Caergeiliog, c. 800m north-west of Development Area 6	Negligible	Neutral, a NOT SIGNIFICANT visual effect	
Llanfair-yn-neubwll, c.1.3km south-west of Development Area 6	Negligible	Neutral, a NOT SIGNIFICANT visual effect	

7.11.2 In summary, the main residential visual receptors within c.200m of the site have been assessed. With regard to DA4, the largest of all the solar Development Areas under assessment, 9 no. residential receptors (inc groups) were considered, and within this assessment 5 no. properties / groups are considered to experience potentially significant visual effects. These properties are all located close to the site boundary, with near range views, generally from upper storey windows and therefore over large areas of the site. Mitigation proposals will be implemented to screen and filter views to the solar arrays over time (hedgerow and tree planting plus management of

existing hedgerows) however at scheme opening, visual effects from 5 no. receptors are considered to be 'major', therefore 'significant' in accordance with the methodology. Visual effects for these 5 no. properties are considered to reduce over time as the mitigation is implemented and matures, however due to the separation distances, it is only likely to filter views and the visual effects, although reduced, will remain at a 'significant' level.

- 7.11.3 The properties close to DA4 judged to experience 'significant' visual effects are subject to additional assessment of Residential Visual Amenity, see **Appendix 7.6** and the summary at 7.11.10 to 11 below.
- 7.11.4 The visual assessment of DA5 considered 3 no. residential receptors. It is noted that some of the properties within 200m of DA5 were considered within the DA4 assessment, with reference made if the receptors would have potential visibility over DA5 in the main appraisal tables. Overall, there would be very limited potential for visibility to both DAs 4 and 5 from the properties close to the site boundaries. One residential property, Tyn Rhos, is considered to experience significant visual effects. The property is located immediately beside the DA with open views from the house over the adjoining field, host to the solar arrays. Significant effects are to be expected due to the near range open views from curtilage, ground and first floor. An offset clear zone has been incorporated into the scheme design (increasing the separation distance) to reduce the scale of effects and mitigation proposals will be implemented to screen and filter views to the solar arrays over time (hedgerow and tree planting). However, at scheme opening, visual effects are considered to be 'major', therefore 'significant' in accordance with the methodology. Following the establishment of mitigation planting, effects are considered to reduce to major-moderate but remain 'Significant' due to the near distance, potential for elevated views from the property and the sloping nature of the site area which gently rises to the south-west away from the property, increasing visible areas.
- 7.11.5 The properties close to DA5 judged to experience 'significant' visual effects are subject to additional assessment of Residential Visual Amenity, see **Appendix 7.6** and the summary at 7.11.10 to 11 below.
- 7.11.6 Fourteen individual residential receptors / groups were assessed around DA6. Only one individual property, Arfryn, is considered to experience 'significant' visual effects. The property occupies a locally elevated position close to the northern boundary of the site. Due to the local change in ground level, there is the potential for expansive views aligned to the south west over the Development Area. Additional mitigation tree planting is proposed for the near (northern and north east) boundary. This will filter the views to the near areas over time however due to the viewing angle visibility will remain, but to the more distant areas of the site. Effects are still concluded to remain 'Significant', but reducing from a major to a major-moderate scale of effect.
- 7.11.7 The properties close to DA6 judged to experience 'significant' visual effects are subject to additional assessment of Residential Visual Amenity, see **Appendix 7.6** and the summary at 7.11.10 to 11 below.
- 7.11.8 Five additional settlements within the study area were considered, the assessment concluded that there would be extremely limited visibility to the DAs from the settlements. The scale of visual effect was considered to be 'negligible' and therefore

'not significant' visual effects are concluded from the local settlements.

- 7.11.9 Overall, the residential visual assessment has concluded that 7 no. properties / groups (out of 31 no. assessed) would experience 'major' visual effects, that are considered 'significant'. It is noted that these are effects considered at scheme opening. Despite the mitigation proposals, which reduce the scale of effects over time, due to the location of the properties relative to the solar DAs, significant effects, albeit of a reduced level, are still concluded to remain.

#### Residential Visual Amenity Assessment Summary

- 7.11.10 Those properties with identified potential significant visual effects were considered in further detail through a Residential Visual Amenity Assessment (RVAA) See **Appendix 7.6**. RVAA is a stage beyond LVIA and focusses exclusively on private views and private visual amenity.
- 7.11.11 The RVAA, considered the properties close to DA boundaries that were judged to experience visual effects of a 'significant' nature. Views were considered from the near garden areas with analysis of property windows and potential views towards the development areas. The RVAA reviewed the 14 selected properties (agreed with IACC) against the defined criteria to consider the effect of the solar development upon the residential visual amenity on the living conditions of the residents. Significant visual effects (upon selected properties) are acknowledged within this LVIA but with regard to case law and residential visual amenity guidance, the assessment has judged that there would be no situation where the solar development would appear 'overbearing, overwhelming or oppressive' in such a way that the visual effects would render the properties as an unattractive and uninhabitable places to live.
- 7.11.12 In summary the RVAA confirms that identified residential receptors will not experience significant adverse effects.

#### Assessment of Predicted Visual Effect on Recreational Routes within 250m

- 7.11.13 As discussed in the baseline section there is an extensive network of footpaths and trails within the study area, many are continuous routes however the different sections are named independently within the baseline section and illustrated on **Figure 7.3** (to a 1km study area). Detailed assessment tables are included with **Appendix 7.5**, summarised in the below table.

Table 7.9: Assessment of Visual Effect on Recreational Routes – Summary Table

Receptor (distance to closest area of site boundary)	Magnitude of Visual Effect	Level of Visual Effect	Comment
Development Area 4 (no public rights of way within 250m of Development Area 4)			
National Cycle Network Route 8	Low	Moderate - Minor, a NOT SIGNIFICANT visual effect	Note, this is an overall assessment excluding occasional open

Receptor (distance to closest area of site boundary)	Magnitude of Visual Effect	Level of Visual Effect	Comment
			gate areas which are assessed within Viewpoint section.
<b>Development Area 5</b>			
National Cycle Network Route 8	Low	Moderate - Minor, a NOT SIGNIFICANT visual effect	Note, this is an overall assessment excluding occasional open gate areas which are assessed within Viewpoint section.
16/008/1 – 140m east/southeast of Development Area 5 running north-south	Low	Minor, a NOT SIGNIFICANT visual effect	
<b>Development Area 6</b>			
32/014/1 – within Development Area 6 running northwest-southeast	Low	Minor, a NOT SIGNIFICANT visual effect	
32/014/2 – within Development Area 6 running north-south	Low	Minor, a NOT SIGNIFICANT visual effect	
32/017/1 – within Development Area 6 running northwest-southeast	High	Major – A 'Significant' visual effect	Note, significant effects focussed to the section beside the site, a length of c.170m, overall PROW of a 'Not Significant' level.
32/014/3 – Immediate south of Development Area 6 running north-south	Negligible	Neutral, a NOT SIGNIFICANT visual effect	
32/029/1 – 50m northwest of Development Area 6 running north-south	Negligible	Neutral, a NOT SIGNIFICANT visual effect	
32/028/1 – 60m west of Development	Medium - Low	Moderate - Minor, a NOT SIGNIFICANT visual effect	

Receptor (distance to closest area of site boundary)	Magnitude of Visual Effect	Level of Visual Effect	Comment
Area 6 running north-south			
32/028/2 – 60m west of Development Area 6 running east-west	Negligible	Neutral, a NOT SIGNIFICANT visual effect	
32/015/1 – 80m east of Development Area 6 running east-west	Negligible	Neutral, a NOT SIGNIFICANT visual effect	
32/015/2 – 100m southeast of Development Area 6 running southwest – northeast	Low	Minor – A ‘Not Significant’ visual effect	

- 7.11.14 In summary, no public rights of way (footpaths and bridleways) pass within 250m of DA4, however the National Cycle Network Route 8 route passes along the road that forms the northern boundary of the DA. Viewpoint Photomontage 6 (**Appendix 7.4**) illustrates the view over DA4 from the open site access gate. Overall, the scale of effect upon users of the National Cycle Route was considered to be ‘moderate – minor’ and therefore ‘Not Significant’, views are generally screened and filtered by mature roadside vegetation and that around the DAs.
- 7.11.15 Visual effects upon users of the National Cycle Network Route 8 were also considered within the DA5 assessment as the route passes beside the site upon a shorter section beside the boundary. Excluding an open gate area (the location of Viewpoint Photomontage 8) the visual effect upon users is again considered to be ‘Not Significant’. One other public footpath was assessed close to DA5, ‘Not Significant’ effects are concluded due to the restricted visibility.
- 7.11.16 DA6 has the greatest concentration of public rights of way within 250m, 9 no. in total. Only 1 no. footpath was considered to experience effects of a ‘significant’ nature, footpath 32/017/1, which passes directly beside the southern boundary of the solar arrays within the Development Area boundary. The route follows the hedge line and would be aligned in the meadow fringes between the hedgerow and site security fence. It may be possible to mitigate views from the footpath over time through the provision of a new native hedgerow beside the site security fence. Overall visual effects from the PROW away from the immediate site area would remain at a ‘Not Significant’ level, views screened by near mature hedgerows.
- 7.11.17 Overall, the assessment of recreational routes has concluded that only the users of 1 no. footpath would experience visual effects of a ‘significant’ nature. It is though highlighted that these significant visual effects are limited to a short section of the path which passes immediately beside the boundary of the deployment area of DA6.

Away from the section beside the deployment area of DA6, effects upon users of the footpath would be of a 'Not Significant' level.

**Assessment of Predicted Visual Effect on Vehicular Routes within 1km**

- 7.11.18 As stated in the baseline section, within the 1 km study area there are a number of roads, those close to the proposed development are considered in addition to the main 'A' roads within the study area that experience higher vehicle journeys, and act as a gateway to the island.
- 7.11.19 Detailed assessment tables are included with **Appendix 7.5**, summarised in the below table:

**Table 7.10: Assessment of visual effect on vehicular routes – Summary Table**

Receptor (distance to closest area of site boundary)	Magnitude of Visual Effect	Level of Visual Effect	Comment
<b>'A' Roads</b>			
A55, c.200m north of Development Area 4, c. 700m to the north of Development Area 6	Low-Medium	Minor-Moderate – A 'Not Significant' visual effect	Refer to additional illustrative views from the road, Viewpoint Sheet 20
A5/Holyhead Road, c. 400m north-west of Development Area 6	Low	Minor - Neutral – A 'Not Significant' visual effect	
<b>Minor / Local Roads</b>			
Alltwn Goch runs along the northern boundaries of Development Areas 4 and 5	The local road that runs beside the northern boundary of Development Areas 4 and 5, Alltwn Goch has been considered within the National Cycle Network assessment. Local road of lower sensitivity than national cycle route so overall level of visual effect reduced, remaining Not Significant.		
An un-named road runs between the boundaries of Development Areas 4 (east) and 5 (west)	The road runs between the boundaries of Development Areas 4 (to the west) and 5 (to the east), views from the road corridor as considered within Viewpoints 4, 5, 7 and 16. Range from 'significant' at the open gate area to 'not significant' when screened by near hedgerows / intermediate vegetation and buildings.		
An un-named road runs along the northern boundary of Development Area 6	Road runs along the northern boundary of Development Area 6 – views from the road corridor which will be most extensive when travelling west. Visual effects considered within the viewpoint assessment as it is the location of Viewpoint 10, 'significant' from elevated open location of Viewpoint 10.		

- 7.11.20 In summary, the main vehicular routes have been assessed and concluded the effects from the main 'A' roads that pass through the study area would be 'Not Significant'.
- 7.11.21 Views from the A55 dual carriageway, due to the relative near distance and high vehicle numbers are considered to be the most important. At the request of IACC, illustrative photographs taken from the passenger side of a moving vehicle are provided in Viewpoint 20 (**Appendix 7.4**). The photos seek to assist in demonstrating the level of visibility from the main road corridor (an area where it is not possible to stop and take photographs). Overall, it is considered that visibility to the DAs would be very limited and of a short duration. The road corridor passes through shallow cuttings and low embankments within the local landscape, bordered by areas of mature scrub and tree vegetation which combine to restrict extensive visibility from the corridor other than that illustrated within Viewpoint 20.
- 7.11.22 As illustrated upon Viewpoint 20, there is a very small section of carriageway to the south of Bryngwran with open views (south) to DAs 4 and 5. Angled and glimpsed views are possible to DA 4, however as the road passes upon an embankment to the north of DA 5, there are elevated views to the northern area of DA 5, the zone between the properties of Dolafon, Pen Bont and the Plas Farm grouping. The grass pasture of the site is visible in addition the line of electricity pylons and the existing barn within the site. Once the A55 road corridor passes west of Pen Bont there are no further views to DA 5, and no discernible views to DA 6 further to the west.
- 7.11.23 Visual effects from the minor roads that pass the DA boundaries have additionally been considered as they are the location for numerous viewpoints. The viewpoint assessment concluded a range of both 'significant' and 'not significant' effects from these roads. It is noted that for road users all views would be transient and glimpsed in nature, of a short term duration. The viewpoint assessment focussed on the most visible locations, i.e. stationary views from open field gates, so not wholly representative of views experienced by travellers upon the local roads.

#### Assessment of Predicted Visual Effect during Construction and Decommissioning Phases

- 7.11.24 Construction activities which have the potential to temporarily affect the views and visual amenity of receptors include:
- Frequency of deliveries to site and vehicle movements on and off site;
  - Effects upon local views to the site to the installation of site infrastructure - fencing with CCTV, solar arrays, switchgear, substation and inverters. Visible construction operations / machinery; and
  - Views of the temporary construction compound (welfare and construction equipment) and reinstatement works to areas disturbed by construction activities.
- 7.11.25 De-commissioning activities which have the potential to affect the views and visual amenity of receptors include:
- Dismantling and removal of all installed infrastructure resulting in increased vehicle movements on and off site;
  - Effects upon local views to the site through the visible activity of construction operations (machines and movement); and
  - Short term views to areas disturbed by de-commissioning activities and time

period for reinstatement works to establish.

- 7.11.26 From the description of the construction and de-commissioning activities as outlined above, any effects on views and visual receptors during the construction and de-commissioning phases will be temporary and short term in duration.
- 7.11.27 Any damaged fields as a result of de-commissioning activities will be re-seeded with a locally appropriate grassland mix, all landscape mitigation will remain so the level of visual containment of the sites will be unaffected. It is therefore considered that the short-term, reversible, and temporary nature of the construction and de-commissioning activities on views and visual receptors will ensure that the overall effects will be, at worst, Minor. These are considered to be experienced by a small number of people and form small features in the overall view. The effects would be short term and temporary and overall considered to be of a 'Not Significant' nature.

#### Assessment of Predicted Visual Effects on Viewpoints

- 7.11.28 Visual receptor sensitivity to change is defined as being High, Medium, Low or Negligible depending upon the activity of the receptor. For further information in relation to sensitivity see the Methodology in **Appendix 7.5**. The location of the viewpoints is illustrated on Figure 7.23.
- 7.11.29 To assist in the description and comparison of the effects on views, issues to be considered include:
- The nature of the view of the development e.g. full, partial, glimpse.
  - The proportion of the development or features that would be visible e.g. full, most, small, part, none.
  - The distance of the viewpoint from the development and whether the viewer would focus on the development due to its scale and proximity or whether the development would be only a small, minor element in a panoramic view.
  - Whether the view is stationary or transient or one of a sequence of views, as from a footpath or moving vehicle; and,
  - The nature of the changes e.g. changes in the skyline profile, a new visual focus, changes in visual simplicity or complexity and alteration of visual scale.
- 7.11.30 The existing level of visibility from the viewpoints is illustrated as a baseline photograph on the viewpoint sheets. Detailed analysis of the viewpoints is made with reference to the current baseline views and then assessed against the photomontage or annotated site extents (where appropriate). The viewpoint assessment considers the existing visible local features, e.g. trees and built structures and the proposed mitigation vegetation at scheme opening, considered to be the time of greatest visibility to the development. Further comment is made regarding ~5 – 10 years from planting to take account of the screening and enhancement potential of the existing vegetation and proposed mitigation.
- 7.11.31 Detailed analysis of the viewpoints is made with reference to the current baseline views (Section 7.6). The analysis of the magnitude of change, and the resulting visual effect, are summarised in the following table, detailed assessment tables are contained within **Appendix 7.5**.

#### Table 7.11: Assessment of visual effect on viewpoints – Summary Table

Receptor (distance to closest area of site boundary)	Magnitude of Visual Effect	Level of Visual Effect
VP1 Tywyn Trewan Common	Negligible	Minor - Neutral – a 'Not Significant' visual effect
VP2 Valley Wetlands / Cerrig Cynrig	Low - Negligible	Minor – a 'Not Significant' visual effect
VP3 Local lane clos to Pen y Bryn / public footpath, east of Development Area 5	Low	Minor – a 'Not Significant' visual effect
VP4 Local Road (between Development Area 4 and 5)	No Change	Neutral – a 'Not Significant' visual effect
VP5 Local road, close to the entrance to Plas- Llechlched	Medium	Moderate – a 'Not Significant' visual effect
VP6 Local road, close to Caer Ddol Farm	High	<b>Major – a 'Significant' visual effect</b>
VP7 Local road close to the entrance to Plas- Llechlched	High	<b>Major – a 'Significant' visual effect</b>
VP8 Road, close to Tyn Rhos	High	<b>Major – a 'Significant' visual effect</b>
VP9 Caer Elen North of Llyn Traffwll	Low	Minor – a 'Not Significant' visual effect
VP10 Local Road, close to Arfryn.	High	<b>Major – a 'Significant' visual effect</b>
VP11 Tros Lon (public footpath)	Medium	Moderate – a 'Not Significant' visual effect
VP12 View over Llyn Traffwll	Low	Minor – a 'Not Significant' visual effect
VP13 Dinam Fawr footpath	Negligible	Minor / Neutral – a 'Not Significant' visual effect
VP14 Treflesg	Negligible	Neutral – a 'Not Significant' visual effect
VP15 Tywyn Trewan Common / Dunes, Cymyran Bay	n/a – no visibility	Neutral – a 'Not Significant' visual effect
VP16 Local Road near Bryn Madog	n/a – no visibility	Neutral – a 'Not Significant' visual effect
VP17 Bryngwran	Medium	Major / Moderate – a 'Not Significant' visual effect
VP18 Landscape north of the A55 / A5	Low	Minor – a 'Not Significant' visual effect
VP19 A55 (east of the Caergeiliog junction)	Medium - Low	Moderate – a 'Not Significant' visual effect

7.11.32 The viewpoint assessment considered an extensive range of publicly accessible locations to illustrate the greatest (and representative) levels of visibility to the 3 solar Development Areas within the study area. All locations were agreed in consultation with IACC. 19 no. viewpoint locations have been assessed, the viewpoints considered close range views to the DAs and also the potential visibility of multiple

DAs distributed within the study area. Four viewpoints were considered to experience visual effects of a 'significant' nature.

- 7.11.33 Viewpoint 6 visual effects are 'significant'. The viewpoint is located at the open field entrance to DA4 and as is to be expected, offers near open views through the gap in the hedgerow to the solar arrays. The viewpoint is representative of fleeting views from passing vehicles and riders upon National Cycle Route 8, and partially representative of nearby individual residential property. It is however noted that the viewpoint location represents the most open and visible location upon this section of road (when stationary), views from the vast majority of the road upon this boundary would be filtered and screened, a similar aspect to that shown on Viewpoint 5. Views from the road are considered within Section 7.11.
- 7.11.34 Visual effects from Viewpoint 7 are also considered to be 'significant'. The viewpoint is located at a similar viewing angle and distance to Viewpoint 6, the open field (future site) access, but to DA5. Again, as is to be expected, this location would offer the greatest level of visibility over the new solar arrays of DA5. The viewpoint is representative of the fleeting view possible to users of the road corridor, although it is highted that the view represents a stationary and glimpsed view away from the direction of travel. As per Viewpoint 6, views from the vast majority of the road upon this boundary would be filtered and screened, a similar aspect to that shown on Viewpoint 5. Views from the road are considered within Section 7.11.
- 7.11.35 Viewpoint 8 is also considered to experience visual effects of a 'significant' nature, aligned towards DA5. The location is similar in aspect to Viewpoints 6 and 7, the viewpoint is located at an open field access point. The road in the local area is bordered by mature hedgerows but this location offers the greatest level of visibility. Views also partially representative of nearby individual residential property. It is again highlighted that the view represents a stationary and a glimpsed view away from the direction of travel.
- 7.11.36 Viewpoint 10 (overlooking DA6) was also considered to experience 'Significant' visual effects. These effects would be focussed to road users travelling west, at this particular point, but also partially representative of views from near individual residential property. This viewpoint location is again considered to be at a position with the most open views over DA6. Views from the majority of the road corridor in this area would be filtered and screened by mature hedgerows beside the road. It is again highted that the view represents a stationary and a fleeting view is only possible at this specific elevated location from a short section of highway.
- 7.11.37 The remaining viewpoints, despite some locations offering visibility to the Development Areas, were all considered to experience visual effects overall of a 'Not Significant' nature. These are effects that although considered to be noticeable in many instances, would not be dominating when the development is viewed within the overall visual environment. These would be effects that would not be material in the planning decision making process.

## 7.12 SUMMARY AND CONCLUSIONS

### Landscape Assessment

- 7.12.1 With regard to landscape value the assessment has concluded that the DAs were of

a 'Low-Medium' value combined based on the criteria within the methodology.

7.12.2 The DAs are noted for their contribution towards landscape condition (intact field systems), scenic quality (quieter areas away from transport corridors and the airfield) and conservation interests (cultural and ecological features). These are all features considered to be predominantly unaffected by this form of solar development. The DAs also contain commonplace landscape features that are seen throughout the host LCAs and provide very limited direct recreational value / public access. Landscape perceptions are also influenced by the near busy transport corridors, overhead electricity pylons and views to (and audible aircraft disturbance) from RAF Valley Airfield.

7.12.3 The published landscape character and capacity assessments for Anglesey the; *Isle of Anglesey, Gwynedd & Snowdonia National Park Landscape Sensitivity and Capacity Assessment (2014)* was reviewed as part of the baseline assessment, and key points have been highlighted. The DAs are within 3 different landscape character areas. It is notable that the study states for LCA17: West Central Anglesey (assessed to be of a low/medium sensitivity) and covering the majority of Development Areas 3, 4 and 5 that:

*"...Outside the AONB and SLAs it is considered there may be some capacity for micro to small scale developments. There may also be limited capacity for larger scale developments, in particular towards the south west where the landscape is already influenced by modern infrastructure; however, any new development should be carefully sited to avoid cumulative effects with other developments".*

7.12.4 The study states for LCA18: Valley Airfield (assessed to be of a medium sensitivity), which is considered to representative of Development Area 6:

*"This typically medium scale, coastal landscape is heavily influenced by modern development, particularly the RAF Valley Airfield which brings a level of visual intrusion to the area. The flat landform away from the coast comprises medium to large scale systems enclosed by a mixture of boundaries including hedgerows which introduce the possibility of increasing vegetation height to provide further localised screening and therefore lessen sensitivity to field-scale solar PV energy development".*

*"...Outside the AONB and SLAs it is considered there may be some capacity for well sited micro scale developments, in particular where these may relate to the existing built environment/urban landcover".*

7.12.5 Overall the assessment concluded with regard to the landscape sensitivity of the solar Development Area that:

*"Some (when medium sensitivity – LCA 5 & 18) and Few (when Low/medium sensitivity – LCA 17) ... of the key characteristics and qualities of the landscape are sensitive to change from the type and scale of development being assessed."*

7.12.6 With regard to landscape receptors in the study area, with the exception of the Anglesey AONB there are no other designated landscapes such as National Parks, World Heritage Sites or regional and local designations such as SLAs. Tywyn Trewan Common, as a large area of open access, is also considered within the assessment.

7.12.7 Analysis of the published landscape character assessment and LANDMAP Visual

Sensory data, considered with the particular characteristics of the study area, has concluded that there would be no significant effects upon landscape character and LANDMAP areas as a result of the development. Due to the scale of the areas, the form of development and local context (vegetation, built form and topographic elements) the schemes will have a limited adverse impact on characteristic elements, notably affecting the pastoral landscape pattern. Despite being considered a Moderate level of effect (at the most adverse) these are effects that are geographically restricted within the expansive landscape character / visual sensory areas.

- 7.12.8 The susceptibility to change of the landscape to the solar farm development, within the three DAs, considered the ability of the landscape to accommodate the specific proposed development. Due to the scale of the proposed solar farm development (vertical and overall surface area) within the three DAs, local landscape features (gentle undulating landform surrounded by blocks of mature hedgerows and scrub), the susceptibility to change of the pastoral landscape is considered to be **Medium**. It is accepted that there would be some undue consequences as a result of development, but that the landscape receptor has some capacity to accept change due to the development form and scale.
- 7.12.9 The development would lead to a loss of pastoral grazing land at the local level, although the use can still continue at a lower intensity. It is also considered that due to the distribution of the individual DAs in the study area (and the overall reduction in number of DAs from the original proposal) that the local landscape of the DAs and immediate surroundings could accommodate this particular form of development without a significant change in local character. The DAs contain few landscape characteristics that would be vulnerable to the proposal.
- 7.12.10 The value of the landscape receptor, three solar DAs, which consist of a range of pastoral fields, is considered with regard the baseline landscape value conclusions. The DAs and surrounding areas (<250m) are not subject to any national, regional or local landscape designations and contains few sensitive elements cited in the referenced landscape character and sensitivity assessments.
- 7.12.11 The DAs are noted for the landscape condition, intact fields systems, but this is a commonplace feature in the study area. The DAs are noted for their individual scenic quality (quieter areas away from transport corridors and the airfield) although (excluding DA6) are not publicly accessible, providing no recreational value.
- 7.12.12 It is acknowledged that the visual aesthetic (character) locally of the DAs will change however, the retention and management of surrounding vegetation (acknowledged to be one of the key landscape characteristics) and proposed mitigation will lessen the visual prominence of the solar farm, aiding landscape integration.
- 7.12.13 Overall, it is considered that the DAs are of a **Medium-Low** landscape value. In accordance with the methodology these are:

*“Areas identified as having some redeeming feature(s) and possibly identified for improvement. Does not lie within or adjacent to a designated landscape..... Presents some locally important / distinctive landscape characteristics, with some scenic interest but does not provide public amenity value by way of access or opportunity for quiet enjoyment.”*

- 7.12.14 Magnitude is considered with regard to the scale, geographical extent, and duration and reversibility of landscape effects, as set out in the methodology. The magnitude of landscape change arising from the proposed development is considered to be **Medium**.
- 7.12.15 In accordance with the methodology this is a
- “Partial loss to landscape elements of the baseline and introduction of elements that may be prominent but not necessarily substantially uncharacteristic with the attributes of the receiving landscape but which could co-characterise parts of the landscape”.*
- 7.12.16 The significance of landscape effect of the solar DAs upon local area is determined by consideration of the landscape sensitivity and magnitude of landscape effect.
- 7.12.17 A ‘Moderate’ significance of landscape effect is concluded overall, this is a ‘Not Significant’ effect. Although not significant effects are stated, adverse landscape effects are acknowledged and the moderate effects are still of a level to form an important consideration (although not in itself material) in the overall planning decision making process. The solar farm proposal over the three DAs by nature of its scale would at a localised level markedly change a medium value / susceptibility to change landscape, diminish the sense of place and adversely impact characteristic features (focused on the pastoral fields within the established structure).
- 7.12.18 With regard to the construction and de-commissioning activities, any effects on landscape character and landscape receptors during the construction and de-commissioning phases will be temporary and short term in duration. There would be no direct changes to the landscape immediately outside of the site boundaries (no additional requirements for space), as the construction and decommissioning operations retained within.
- 7.12.19 It is therefore considered that the short-term, reversible and temporary nature of the construction and de-commissioning activities on landscape character will ensure that the overall effects will be, at worst, Minor. These are considered to be limited to the local context of the site boundaries, short term and temporary effects, overall a ‘Not Significant’ nature.
- 7.12.20 Not significant landscape effects are concluded upon the identified landscape receptors within the study area; Anglesey AONB and Tywyn Trewan Common.

### Visual Assessment

- 7.12.21 With regard to DA4, the largest of all the solar DAs under assessment, 9 no. residential receptors (inc groups) were considered, and within this assessment 5 no. properties / groups are considered to experience ‘significant’ visual effects. Mitigation proposals will be implemented to screen and filter views to the solar arrays over time. Visual effects for these 5 no. properties are considered to reduce over time as the mitigation is implemented and matures, however due to the separation distances, it is only likely to filter views and the visual effects, although reduced, will remain at a ‘significant’ level.
- 7.12.22 The visual assessment of DA5 considered 3 no. residential receptors. A single

residential property, Tyn Rhos, is considered to experience 'significant' visual effects. The property is located immediately beside the DA with open views from the house over the adjoining field, host to the solar arrays. Mitigation proposals will be implemented to screen and filter views to the solar arrays over time (hedgerow and tree planting). However, due to the location of the property and viewing angle relative to the DA, visual effects would remain at a 'significant' level.

- 7.12.23 Fourteen individual residential receptors / groups were assessed around DA6. Only one individual property, Arfryn, is considered to experience 'significant' visual effects. The property occupies a locally elevated position close to the northern boundary of the site. Additional mitigation tree planting is proposed for the site boundary. This will filter the closest views over time however due to the viewing angle visibility will remain, but focussed away from the site, however effects would remain 'significant'.
- 7.12.24 Overall, the residential visual assessment has concluded that 7 no. properties / groups (out of 31 no. assessed) would experience 'major' visual effects, that are considered 'significant'. These are generally effects that are considered material in the planning decision making process.
- 7.12.25 Those properties with identified 'significant' visual effects are considered in further detail through a Residential Visual Amenity Assessment (RVAA). The RVAA reviewed the properties against the defined criteria to consider the effect of the solar development upon the residential visual amenity on the living conditions of the residents. Significant visual effects (upon selected properties) are acknowledged within this LVIA, but with regard to case law and residential visual amenity guidance, the assessment judged that there would be no situation where the solar development would appear 'overbearing, overwhelming or oppressive' in such a way that the visual effects would render the properties as an unattractive and uninhabitable places to live.
- 7.12.26 Five additional settlements within the study area were considered, the assessment concluded that there would be extremely limited visibility to the DAs from the settlements. The scale of visual effect was considered to be 'negligible' therefore 'not significant' visual effects are concluded from the local settlements.
- 7.12.27 The network of footpaths and trails within 250m of the DA boundaries have been assessed.
- 7.12.28 With regard to National Cycle Network Route 8, the route passes along the road that forms the northern boundary of both DA4 and DA5. The scale of effect upon users of the National Cycle Network Route was considered to be 'moderate – minor' and therefore 'not significant'.
- 7.12.29 DA6 has the greatest concentration of public rights of way within 250m, 9 no. in total. Only 1 no. footpath was considered to experience effects of a 'significant' nature, footpath 32/017/1, which passes directly beside the southern boundary of the solar arrays within the DA boundary. Away from the site area, effects are considered to be of a 'not significant' level.
- 7.12.30 The main vehicular routes have been assessed and it is concluded the effects from the main 'A' roads that pass through the study area would be 'not significant'. These routes are subject to the greatest volume of traffic movements in the study area,

notably the A55 dual carriageway.

- 7.12.31 Visual effects from the minor roads that pass close to the DAs have been considered as they are the location for numerous viewpoints. The viewpoint assessment concluded a range of both 'significant' and 'not significant' effects from these roads. It is noted that for road users all views would be transient and glimpsed in nature, of a short term duration.
- 7.12.32 With regard to the construction and decommissioning phases, any effects on views and visual receptors during the construction and de-commissioning phases will be temporary and short term in duration. Any damaged fields as a result of de-commissioning activities will be re-seeded with a locally appropriate grassland mix, all landscape mitigation will remain so the level of visual containment of the sites will be unaffected. The effects would be short term and temporary and overall considered to be of a 'Not Significant' nature.

#### Viewpoint Assessment

- 7.12.33 The viewpoint assessment considered an extensive range of publicly accessible locations to illustrate the greatest (and representative) levels of visibility to the three solar DAs from within the local landscape of the study area.
- 7.12.34 Four viewpoints were considered to experience visual effects of a 'significant' nature. Viewpoint 6, Viewpoint 7 and Viewpoint 8 are considered to be 'significant' and whilst located overlooking different DAs, the locations are similar in that they are located at the open field access gates. Significant effects are to be expected due to the near range views, representative of the view possible by users of the road corridor, although it is highlighted that the view is transient and a glimpsed view away from the direction of travel. The view from the majority of the near road corridors is generally filtered and screened.
- 7.12.35 Viewpoint 10 (overlooking DA6) was also considered to experience 'significant' visual effects. These effects would be focussed to road users travelling west, at the particular point, but also partially representative of views from the near individual residential property. This viewpoint location is again considered to be at a position with the most open views over DA6. Views from the majority of the road corridor in this area would be filtered and screened by mature hedgerows beside the road. It is again highlighted that the view is transient and a glimpsed view at this locally elevated location.
- 7.12.36 The remaining viewpoints, despite some locations offering visibility to the DAs, were all considered to experience visual effects overall of a 'not significant' nature. These are effects that although considered to be noticeable in many instances, would not be dominating when the development is viewed within the overall visual environment. These are effects that would not be material in the planning decision making process.

#### Cumulative Summary

- 7.12.37 As discussed in Section 7.9 opportunities exist for potential cumulative views, where more than one solar farm, including the proposed development areas, may be seen either simultaneously or sequentially. The three solar DAs are considered independently and in combination where applicable within the assessment. Solar

farms with the potential to generate cumulative effects include those which; are constructed, are in construction; have planning permission and are not yet constructed; or, are awaiting determination of planning permission. The baseline assessment confirmed that there are no other cumulative solar schemes within the study area.

- 7.12.38 Consideration has also been given to potential cumulative influences from other environmental topics assessed as part of this EIA and from significant and non-solar proposals beyond the application site boundary. Details of such schemes are listed in Chapter 13 of this ES. The identified schemes that have the greatest potential to create cumulative impacts are located a considerable distance from the application site (beyond the ZTV presented in **Appendix 7.3**) and as such would not contribute to a significant effect on landscape character and / or visual amenity.

### Residual Impacts

- 7.12.39 This assessment of landscape and visual effects has considered the likely 'Significant' direct and indirect effects of the proposed development including the prescribed landscape mitigation measures during construction, operation and decommissioning. Mitigation measures are permanent and discussed in detail in Section 7.8, they are considered to positively contribute to the landscape structure of the site areas. Landscape and visual issues were also considered during the iterative design process, pre assessment, which resulted in changes to the scheme design. The identified landscape and visual effects are therefore also the residual effects. Where the Development Area specific mitigation will alter long term landscape and/or visual effects this has been noted in the assessment conclusions.

### Final Comment

- 7.12.40 This LVIA demonstrates that the proposed Development Areas of Parc Solar Traffwll Solar Farm could be successfully integrated into the local landscape of Anglesey without causing significant and wide scale harm to the landscape character. The development allows for opportunities for enhanced mitigation and management of the unused areas of the development site, totalling c.29 ha. The assessment concludes that there would be no significant adverse effects upon the protected landscape with the study area; the Anglesey AONB.
- 7.12.41 Whilst visual effects are noted, the assessments have established that these would be focussed upon a limited number of near residential, transportation and recreational receptors only, receptors focused to the site boundary areas, outside of this near zone, visual effects reduce to not significant levels. It is expected that the extensive proposed planting mitigation and management of existing vegetation over time will filter views to the Development Areas and reduce the level of visual effects in many cases to 'not significant' levels.



## 8. NOISE AND VIBRATION

## 8.1 INTRODUCTION

8.1.1 This chapter presents an assessment of the likely significant environmental effects of the Proposed Solar Farm with regard to noise. It describes the methods used to assess the effects, the baseline conditions that currently exist and the potential future baseline in the vicinity of the Site and the potentially affected noise sensitive receptors. The chapter also sets out direct and indirect likely significant effects arising from the construction and operation of the proposed development and provides details of the mitigation measures required.

8.1.2 The assessment includes the consideration of:

- information on existing baseline sound level climate;
- information on the noise levels from site noise sources;
- information and predictions on the noise impact on nearest Noise Sensitive Receptors (NSRs) from plant operations;
- information and predictions on the noise and vibration impact on NSRs from construction activities;
- information on the cumulative impact of other permitted site activities on Site or in the local area; and
- where appropriate, information on noise mitigation measures to comply with current noise standards and guidance.

8.1.3 The above potential noise impacts are considered in the context of the existing background noise at the site, which is generally affected by distant road traffic movements, aircraft noise from RAF Valley, farm animals and birdsong.

8.1.4 **Appendix 8.1** to this ES provides details of technical terms within the chapter, for ease of reference. There is also a chart showing typical everyday noise levels to assist in understanding the subjective level of noise in terms of decibels.

8.1.5 The associated plant will consist of the following:

- Photovoltaic panels and associated supporting frames and ground mounting;
- Inverters (mounted within prefabricated containers);
- Transformer stations (housed in prefabricated containers);
- Cabling linking inverters and transformer stations to the substation;
- Perimeter fencing and CCTV (invisible infra-red illumination at night, only pointing into the site);
- DNO Substation;
- Client Substation;
- Internal service roads;
- Scheme of landscaping;
- Temporary Compound & set down area.

### Proposed Development

8.1.6 A full description of the proposed development is provided in Chapter 3. The location of the Proposed Development (the Site) is shown on **Drawing LOC1001/11/01**.

8.1.7 Solar Farms are an inherently quiet installation as there are no moving parts. Noise is generated from the associated plant to convert the DC current to AC at the correct voltage involves the use of inverters and transformers.

8.1.8 Transformers are not particularly noisy plant and generate a low level 'hum' at

relatively close distances driven by the mains frequency. The inverters would be located within purpose-built containers. By its nature the proposed development will only be operational during daylight hours, however during peak generation during the summer months (i.e. under conditions of high temperatures) there may be occasional periods when the operation of the inverters and transformers occurs just after sun rise (i.e. earliest sunrise in the year being around 0500 to 0600 hours), but this would not be at full capacity and noise levels would be less than used in the assessment. The assessment for the sunrise scenario is therefore a robust view of impacts at NSRs.

8.1.9 A baseline noise survey commenced on 17th April 2020 for a week in the vicinity of the Proposed Development to determine existing representative background and residual sound levels. The aim of the sound survey was to:

- identify the existing baseline sound levels for use as a reference for background and residual sound levels in the assessment of impacts related to the operation of the Proposed Development;
- enable the assessment baseline to be established and understand the effects of existing developments on the future baseline; and
- characterise the nearest NSRs or noise sensitive sites.

8.1.10 The methodology and approach to the sound survey and assessment included the following:

- establishing the nearest NSRs;
- evaluation of present and assessment background and ambient sound levels;
- evaluation of noise sources from the Proposed Development in terms of typical operating levels;
- assessment of specific noise sources in relation to appropriate guidance and standards (e.g. TAN11, BS5228:2009+A1:2014+A1:2019);
- evaluation of construction noise and vibration sources relative to nearest receptors; and
- identification of any noise control necessary where noise generated from the Proposed Development has been identified as exceeding relevant guidance and standards.

### Consultation

8.1.11 The noise assessment has benefited from pre-application discussions with the IACC's Environmental Health Officer and submissions relating to the scoping exercise. During the consultation process, the assessment methodology, baseline monitoring positions and relevant standards and guidance were agreed. The pre-application discussion is presented in the report included in **Appendix 8.1** to this ES.

### Future Baseline

8.1.12 The site has been assessed against the current baseline which includes all relevant established permitted noise sources. We therefore consider that this represents a good indication of the likely future baseline for the assessment of impact.

### Competence

8.1.13 The author of this assessment has over 35 years' experience in the field of industrial and environmental acoustics with a Masters Degree in Acoustics and is a Member of

the Institute of Acoustics, Member of the Association of Noise Consultants, Member of the Academy of Experts and an Incorporated Engineer.

## 8.2 CONTEXT

### Introduction

- 8.2.1 The ambient environmental noise at any location will vary according to the activities in progress around the location. In the vicinity of a busy motorway, for example, the noise level will remain fairly constant due to the relatively steady noise input from road traffic, whereas the noise level close to a source of high noise over short periods, such as an airport, will vary over a much wider range. It is therefore necessary to consider how to quantify the existing noise levels in an area in order to accurately assess the acceptability of the introduction of a new noise source.

### Planning Policy

- 8.2.2 To establish the impact of the Proposed Development in respect of noise on existing or proposed residential receptors it is necessary to consider the relevant noise guidance, standards and policy for an industrial development. The following section examines the guidance and establishes the methodology to be adopted for assessing noise impacts. It also outlines the key planning policy and guidance that relates to the assessment of residential amenity and protection of residents from general environmental and industrial noise sources.
- 8.2.3 Future Wales' *Policy 18 – Renewable and Low Carbon Energy Developments of National Significance* provides 'in principle' support for renewable energy projects provided that there are no unacceptable adverse impacts by way of noise.

### Technical Advice Note (Wales) 11 (TAN11) 'Noise': 1997

- 8.2.4 Within the introduction of Technical Advice Note (Wales) 11: 1997 'Noise' it states:

*"This note provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business."*

- 8.2.5 Technical Advice Note 11 (TAN 11) provides the following information:
- It indicates how noise issues should be handled in development plans and development control;
  - outlines ways of mitigating the adverse impact of noise;
  - provides specific guidance on noisy and noise-sensitive development;
  - introduces the use of noise exposure categories;
  - gives guidance on the use of planning conditions relating to noise.
- 8.2.6 The guidance introduces the concept of Noise Exposure Categories (NEC), which have been derived to assist local planning authorities in their consideration of planning applications for residential development near transport-related noise sources. The NEC procedure is only applicable for the introduction of a new residential development into an area with an existing noise source. At Annex 1, guidance is given for various types of noise sources, which includes road traffic, aircraft and railways.

- 8.2.7 For reference, the recommended noise exposure categories for new dwellings near existing sources are shown below in **Table 8.1**. Note that these noise categories are based upon measurements taken in an open site (i.e. without any proposed noise attenuating features in place).
- 8.2.8 The level at the boundary of NEC A and NEC B is based on guidance provided by the World Health Organisation (WHO) health criteria from 1980, which states that “*general daytime outdoor noise levels of less than 55dB(A) Leq are desirable to prevent any significant community annoyance*”.
- 8.2.9 The night-time noise level at the boundary of NEC A and NEC B is also based upon the WHO health criteria, stating “based on limited data available, a level of less than 35dB(A) is recommended to preserve the restorative process of sleep”.
- 8.2.10 **Table 8.1** below provides an interpretation of the NEC categories in terms of granting planning permission.

**Table 8.1: NEC Categories**

NEC Category	Description	Noise Range LAeq,T dB
A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.	<55dB(A) daytime (16hr) <45dB(A) night-time (8hr) Road, rail and mixed sources
B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.	55-63dB(A) daytime (16hr) 45-59dB(A) night-time (8hr) Road, rail and mixed sources

- 8.2.11 For noisy industrial development, the guidance refers to BS 4142 - ‘Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas’ (updated in 2021).  
[BS4142: 2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’](#)
- 8.2.12 BS4142: 2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ is based on the measurement of background sound using LA90 noise measurements, compared to source noise levels measured in LAeq units. Once any corrections have been applied for source noise tonality, distinct impulses etc., the difference between these two measurements (i.e. known as the ‘rating’ level) determines the impact magnitude. Typically, the greater the difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact (although this can be dependent 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 source 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 (although this can be dependent on the context).

- 8.2.13 In order to establish the rating level, corrections for the noise character need to be taken into consideration. The Standard states that when considering the perceptibility:

*“Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.”*

- 8.2.14 The subjective method adopted includes the following character corrections:

Table 8.2: BS4142: 2014 Character Corrections

Level of Perceptibility	Correction for tonal character dB	Correction for impulsivity dB	Correction for intermittency dB	Correction for 'other character' dB
Not perceptible	0	0	0	0
Just perceptible	+2	+3	0	0
Clearly perceptible	+4	+6	+3*	+3*
Highly perceptible	+6	+9	+3*	+3*

\*Standard defines this should be readily distinctive against the residual acoustic environment, it is interpreted therefore to be either clearly or highly perceptible as a character. If characteristics likely to affect perception and response are present in the specific sound, within the same reference period, then the applicable corrections ought normally to be added arithmetically. However, if any single feature is dominant to the exclusion of the others then it might be appropriate to apply a reduced or even zero correction for the minor characteristics

**BS8233: 2014 'Guidance on sound insulation and noise reduction for buildings'**

- 8.2.15 The British Standard BS8233 provides additional guidance on noise levels within buildings. These are based on the WHO recommendations and the criteria given in BS8233 for unoccupied spaces within residential properties.
- 8.2.16 The guidance provided in section 7.7 of BS8233 provides recommended internal ambient noise levels for resting, dining and sleeping within residential dwellings. **Table 8.3** provides detail of the levels given in the standard.

Table 8.3: BS8233:2014 Indoor Ambient Noise Levels for Dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB L <sub>Aeq,16hours</sub>	-
Dining	Dining room/area	40 dB L <sub>Aeq,16hours</sub>	-
Sleeping (daytime resting)	Bedroom	35 dB L <sub>Aeq,16hours</sub>	30 dB L <sub>Aeq,8hours</sub>
Study and work requiring concentration	Staff/Meeting Room, Training Room Executive Office	35-45dB L <sub>Aeq8hours</sub> 35-45dB L <sub>Aeq8hours</sub>	

- 8.2.17 This standard would be appropriate to apply to existing or proposed residential development. The Site noise contribution should be within the proposed internal noise

levels, which would include the following noise limits:

- Living room areas:  $\leq 35\text{dB } L_{Aeq,16\text{hours}}$  (0700-2300 hours) [equivalent to an external level of approximately  $65\text{dB } L_{Aeq,16\text{hours}}$  based on typical standard double-glazed units in the closed position and approximately  $50\text{dB } L_{Aeq,16\text{hours}}$  in the open position].
- Bedrooms:  $\leq 30\text{dB } L_{Aeq,8\text{hours}}$  (2300-0700 hours) [equivalent to an external level of approximately  $60\text{dB } L_{Aeq,8\text{hours}}$  based on typical standard double glazed units in the closed position and approximately  $45\text{dB } L_{Aeq,8\text{hours}}$  in the open position].
- Offices:  $35\text{dB}$  to  $45\text{dB } L_{Aeq, 8\text{hours}}$  [equivalent to an external level of approximately  $65\text{dB}$  to  $75\text{dB } L_{Aeq, 8\text{hours}}$  based on typical standard double-glazed units in the closed position].

- 8.2.18 The above internal bedroom limits would comply with sleep disturbance criteria defined by World Health Organisation guidelines (WHO). The WHO night noise guidelines for Europe refers to sleep disturbance limit of  $42\text{dB}$ - $45\text{dB } L_{Amax}$  for regular peak events within bedrooms [which is approximately  $57\text{dB}$ - $60\text{dB } L_{Amax}$  external to the bedroom window in the open position].

#### World Health Organisation (WHO) Guidelines for Community Noise: April 1999

- 8.2.19 This document provides further updated information on noise and its effects on the community. Within the document, for noise 'In Dwellings', it states that "*The effects of noise in dwellings, typically, are sleep disturbance, annoyance and speech interference*". For bedrooms, the critical effect is sleep disturbance. Indoor guideline values for bedrooms are  $30\text{dB } L_{Aeq}$  for continuous noise and  $45\text{dB } L_{Amax}$  for single sound events. Lower noise levels may be disturbing depending upon the nature of the noise source. At night-time, outside sound levels about 1 metre from the facades of living spaces should not exceed  $45\text{dB } L_{Aeq}$ , so that people may sleep with bedroom windows open. This value was obtained by assuming that the noise reduction from outside to inside with the window open is  $15\text{dB}$ . To enable casual conversation indoors during daytime, the sound level of interfering noise should not exceed  $35\text{dB } L_{Aeq}$ . To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed  $55\text{dB } L_{Aeq}$  on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed  $50\text{dB } L_{Aeq}$ . Where it is practical and feasible, the lower outdoor sound level should be considered to represent the maximum desirable sound level for new development.

#### World Health Organisation (WHO) - Night noise guidelines for Europe: 2009

- 8.2.20 The WHO regional office for Europe set up a working group of experts to provide scientific advice to the Member States for the development of future legislation and policy action in the area of assessment and control of night noise exposure. Considering the scientific evidence on the thresholds of night noise exposure indicated by  $L_{\text{night, outside}}$  as defined in the Environmental Noise Directive (2002/49/EC), an  $L_{\text{night, outside}}$  of  $40\text{dB}$  should be the target of the night noise guidance (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly.  $L_{\text{night, outside}}$  value of  $55\text{dB}$  is recommended as an interim target for the countries where the NNG cannot be achieved in the short term for

various reasons, and where policy-makers choose to adopt a stepwise approach.

### World Health Organisation (WHO) – Environmental Noise Guidelines for the European Region: 2018

- 8.2.21 The objective of the 'Environmental Noise Guidelines for the European Region' is stated in the Executive Summary of the report:

*“The main purpose of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from various sources: transportation (road traffic, railway and aircraft) noise, wind turbine noise and leisure noise. Leisure noise in this context refers to all noise sources that people are exposed to due to leisure activities, such as attending nightclubs, pubs, fitness classes, live sporting events, concerts or live music venues and listening to loud music through personal listening devices. The guidelines focus on the WHO European Region and provide policy guidance to Member States that is compatible with the noise indicators used on the European Union's END.”*

- 8.2.22 The document provides recommendations for road traffic, railway, aircraft, wind turbine and leisure noise based on a strong or conditional recommendation.

- 8.2.23 In terms of road traffic noise, where NSRs are predominantly affected by road traffic the 'strong' recommendation for protection of residential receptors is as follows:

*“For average noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic below 53 decibels (dB) Lden, as road traffic noise above this level is associated with adverse health effects. For night noise exposure, the DGG strongly recommends reducing noise levels produced by road traffic during night time below 45dB Lden, as night-time road traffic noise above this level is associated with adverse effects on sleep.”*

### Road Traffic Noise

- 8.2.24 No guidance exists to assess increased traffic noise on existing roads from new developments. However, any change in noise levels along affected roads would be relevant to subsequent planning applications.

- 8.2.25 The standard index used in the UK for describing road traffic noise is LA10, which is the 'A' weighted sound level in dB exceeded for 10% of the assessment period (ref. LA 111 Terms and Definitions). Daytime noise is assessed using the 18-hour LA10, following the methodology given in the Department of Transport's Calculation of Road Traffic Noise (CRTN).

- 8.2.26 For the proposed development, during the construction phase the vehicle movements would be restricted to a 12-hour daytime period. Therefore, an assessment has been undertaken on the impact of road traffic in relation to the increase in noise level based on a 12-hour average using an LA10 index. In respect to impacts, a 12-hour period would present a worst case compared with the use of an 18-hour time frame and is therefore considered to represent a robust assessment.

- 8.2.27 For road traffic noise, the CRTN calculation method can be used to predict noise levels from the movement of traffic along adjacent roads. Construction predicted noise levels at sensitive receptors can be compared with predicted noise without the Proposed Development, to establish any likely significant increase in overall traffic

noise. Traffic data for the CRTN assessment presented in this chapter is based on the figures contained within the Transport Statement (TS) which accompanies the planning application documentation.

- 8.2.28 The TS sets out predicted traffic data for the assessment year based on established growth factors and known committed developments. In this regard the impact of road traffic noise is inherently a cumulative assessment.
- 8.2.29 According to CRTN where the traffic flow volumes are very low (i.e. where traffic flows below 50 vehicles per hour or 1,000 vehicles per 18 hours) then the CRTN methodology is unreliable (ref. paragraph 30 of CRTN). For the assessment of on-site traffic, we have therefore applied ISO9613-2 calculation methodology using a 'line source' to represent moving vehicles with appropriate speed and empirical sound power levels obtained from other similar sites in the UK.

#### Guidance on Construction Noise: BS 5228-1: 2009+A1: 2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites'

- 8.2.30 BS5228 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 and open sites. It recommends procedures for noise and vibration control in respect of construction operations and aims to assist architects, contractors and site operatives, designers, developers, engineers, local authority environmental health officers and planners."
- 8.2.31 BS5228 Part 1 deals with noise in terms of background legislation and gives recommendations for basic methods of noise control relating to construction and open sites where significant noise levels may be generated. The guidance is aimed at giving advice on achieving 'best practice' in controlling noise and vibration from construction and open sites. There is an example of noise limits given in Annex E, which sets out cut-off limits between 65dB(A) and 75dB(A) or 5dB(A) above the ambient noise, whichever is the greater. Part 2 of BS 5228 deals specifically with vibration control and provide the legislative background to the control of vibration and recommendations for controlling vibration at source and management controls (e.g. liaison with communities, supervision, preparation and choice of plant etc.).

#### Future Baseline

- 8.2.32 The site has been assessed against the current baseline which includes all relevant established permitted noise sources. We therefore consider that this would represent a good indication of the likely future baseline for the assessment of impact.

#### Guidance on Ground Vibration

- 8.2.33 Most of the available data relating to the effects of ground vibration on buildings have been obtained during tests using explosives. From these studies, two regimes of building damage have evolved, those of structural damage involving major failures of whole or parts of buildings and architectural damage involving cracking plaster or other brittle materials.
- 8.2.34 Architectural, sometimes called cosmetic, damage is thought to be more annoying than dangerous and would start to occur at lower levels of vibration than structural damage. Recent International and BS define and categorise building damage under

three main headings:

- Cosmetic - the formation of hairline cracks on drywall surfaces or the growth of existing cracks in plaster or drywall surfaces. In addition, the formation of hairline cracks in mortar joints of brick / concrete block construction.
- Minor - the formation of large cracks or loosening and falling of plaster or drywall surfaces, or cracks through bricks/concrete blocks.
- Major - damage to structural elements of the building, cracks in support columns, loosening of joints, spalling of masonry cracks, etc.

8.2.35 An investigation into the effects of induced vibration undertaken by the British Standards Institution has culminated in BS7385:1993; Part 2 which gives guide values to prevent cosmetic damage to property of 15 to 20mms<sup>-1</sup> between 4Hz and 15Hz, whilst above 40 Hz the guide value is 50mms<sup>-1</sup>. The BSI suggests reducing these figures by a factor of 50% for continuous vibration, for example from rail traffic, thus the values become 7.5-10mms<sup>-1</sup> at 4-15Hz, and 25.0mms<sup>-1</sup> at 40Hz and above.

8.2.36 With regard to the threshold of cosmetic damage, for continuous vibration such as road or rail traffic, levels below 5.0mms<sup>-1</sup> are unlikely to be significant. For a given level of vibration the risk of damage decreases as the frequency of that vibration increases.

8.2.37 BS5228-2:2009 Annex B gives guidance on the effects of vibration levels, which is summarised below in **Table 8.4**.

Table 8.4: Guidance on Effects of Vibration Levels

Vibration Level mm.s <sup>-1</sup>	Effect
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments.
1.0	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
10	Vibration is likely to be tolerable for any more than a very brief exposure to this level.

### Vibration Nuisance

8.2.38 The fact that the human body is very sensitive to vibration can result in subjective concern being expressed at energy levels well below the threshold of damage.

8.2.39 Guidance on the human response to vibration in buildings may be found in British Standard BS 6472- 1:2008. Weighting curves related to human response to vibration of buildings are presented within this document. Estimates are given on the probability of adverse comment, which might be expected, from human beings experiencing vibration in buildings. This is based on a vibration dose value (VDV), assessed from frequency weighted vibration measurements and based on a 16-hour day.

## 8.3 ASSESSMENT APPROACH

8.3.1 To establish the impact of the proposed development in relation to noise on existing residential areas, it is necessary to consider the relevant noise guidance, standards

and policy for the relevant development. The following information examines the guidance and establishes the methodology to be adopted for assessing noise impacts.

8.3.2 Information used in this assessment has been obtained from the following sources:

- Ordnance Survey maps of the local area;
- Site plans of working areas;
- BS5228-1:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites – Noise;
- Department of Transport 'Calculation of Road Traffic Noise': 1988;
- Design Manual for Roads and Bridges, LA111 Noise and Vibration: November 2019;
- ISO 9613-2: 1996 Acoustics – Attenuation of Sound During Propagation Outdoors;
- BS7385:1993, Part 2; Evaluation and measurement for vibration in buildings. Guide to damage levels from ground borne vibration;
- BS6472: 2008 'Guide to the evaluation of human exposure to vibration in buildings';
- New Zealand Transport Agency research paper entitled 'Ground Vibration from Road Construction' in May 2012;
- BS 4142: 2014 +A1:2019 'Methods for rating and assessing industrial and commercial sound'; and
- BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'

#### Environmental Effects Assessment - Noise Predictions

8.3.3 In terms of noise predictions, this assessment has used the calculation method based upon ISO9613-2, which is an internationally recognised methodology, which takes into account source distance, screening effects, operating time and direction in relation to the nearest NSR. The noise model includes suitable calculation method settings and assumes that all relevant plant is operational to ensure the highest likely noise levels are assessed. Section 8.5 provides further detail of the noise model settings and assumptions made in respect of plant noise levels.

8.3.4 The plant noise levels assumed within this assessment have been based on actual noise levels measured at other similar sites in the UK and from advice provided by technology providers who are involved in the detailed design of such developments.

#### Environmental Effects Assessment Evaluation

8.3.5 The level of an effect is a function of the sensitivity or importance of the receiver, or receptor, and the scale or magnitude of the effect. In the case of this assessment the level of the effect has been determined by reference to existing guidance and standards that are explained below.

8.3.6 Four types of receptor have been identified:

- Residents of existing houses adjacent to the Site who could experience site construction noise during daytime periods.
- Residents of existing houses adjacent to the Site who could experience site operational noise during daytime and early morning periods.
- Residents of existing houses who could experience additional road noise from the construction of the Site.
- Ecological sensitive sites, which may have wildlife receptors.

Construction Noise

- 8.3.7 For residents of houses that could be exposed to construction noise, BS5228:2009+A1:2014 is considered to be the appropriate standard. This standard does not prescribe limits but requires ‘best practicable means’ (“BPM”) to be employed to control noise generation. The criterion therefore is that BPM should be employed and conditions implemented for example to restrict construction noise to non-sensitive hours.
- 8.3.8 The construction impact semantic scale, set out in **Table 8.5**, is based on the ABC method of assessment described in Annex E of BS5228, which sets out threshold values depending upon the ambient noise at receptors, which have been defined from the baseline sound survey.
- 8.3.9 According to the guidance found within the DMRB LA 111, the lowest observable adverse effect level (LOAEL) and significant observable adverse effect level (SOAEL) for noise sensitive receptors during construction are shown in **Table 8.5**.

Table 8.5: Construction Time Period – LOAEL and SOAEL

Time Period	LOAEL	SOAEL	Guidance Level LAeq <sub>1hr</sub> dB
Day (0700-1900 hours Weekday and 0700-1200 Saturdays)	Baseline noise levels L <sub>Aeq,T</sub>	Threshold level determined as per BS5228-1:2009+A1:2014 Section E3.2 and Table E.1 BS 5228-1:2009+A1:2014	65-70
Night (2300-0700 hours)	Baseline noise levels L <sub>Aeq,T</sub>	Threshold level determined as per BS5228-1:2009+A1:2014 Section E3.2 and Table E.1 BS 5228-1:2009+A1:2014	45-50
Evening and weekends (time periods not covered above)	Baseline noise levels L <sub>Aeq,T</sub>	Threshold level determined as per BS5228-1:2009+A1:2014 Section E3.2 and Table E.1 BS 5228-1:2009+A1:2014	55-60

- 8.3.10 The magnitude of impact for construction noise is outlined in **Table 8.6** (as defined in DMRB LA 111).

Table 8.6: Impact Magnitude Category: Construction Noise

Magnitude of Impact	Construction Noise Level
Negligible	Below LOAEL
Minor (Slight)	Above or equal to LOAEL and below SOAEL
Moderate	Above or equal to SOAEL and below SOAEL +5dB
Major (Substantial/Severe)	Above or equal to SOAEL +5dB

- 8.3.11 DMRB LA 111 defines the short term and long-term scenarios which are considered

to represent the situation when a new road opens (short term) and 15 years after a road opens (long term). The magnitude of change criteria are set out in **Table 8.7** for the short term and **Table 8.8** for the long term.

**Table 8.7: Magnitude of Change – Road Traffic Noise- Short Term**

Short term magnitude	Short term noise change (dB L <sub>A10,18hr</sub> or L <sub>night</sub> )
Negligible	Less than 1.0
Minor (Slight)	1.0 to 2.9
Moderate	3.0 to 4.9
Major (Substantial/Severe)	Greater than or equal to 5.0
Negligible	Less than 1.0

**Table 8.8: Magnitude of Change – Road Traffic Noise- Long Term**

Long term magnitude	Long term noise change (dB L <sub>A10,18hr</sub> or L <sub>night</sub> )
Negligible	Less than 3.0
Minor (Slight)	3.0 to 4.9
Moderate	5.0 to 9.9
Major (Substantial/Severe)	Greater than or equal to 10.0
Negligible	Less than 3.0

- 8.3.12 The impact magnitude categories can then be correlated with the receptor sensitivity categories provided in **Table 8.15** to establish a level of effect as defined in **Table 8.16**.

**Construction Phase – Road Traffic**

- 8.3.13 The magnitude of impact for construction noise is outlined in **Table 8.9** (as defined in DMRB LA 111).

**Table 8.9: Impact Magnitude Category: Construction Road Traffic Noise**

Magnitude of Impact	Increase in basic noise level of closest public road used for construction traffic (dB)
Negligible	Less than 1.0
Minor (Slight)	Greater than or equal to 1.0 and less than 3.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Major (Substantial/Severe)	Greater than or equal to 5.0

Note: Construction noise and construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- 1) 10 or more days or nights in any 15 consecutive days or nights;
- 2) a total number of days exceeding 40 in any 6 consecutive months.

**Construction Phase – Vibration**

- 8.3.14 For construction phase vibration the LOAEL and SOAEL is set out in DMRB LA 111 and provided in **Table 8.10**.

Table 8.10: Impact Magnitude Category: Construction Road Traffic Noise

Time Period	LOAEL	SOAEL
All time periods	0.3mm/sec PPV	1.0mm/sec PPV

8.3.15 The magnitude of impact for construction vibration is therefore determined in accordance with **Table 8.11**, as defined in DMRB LA 111.

Table 8.11: Impact Magnitude Scale: Construction Phase Ground Borne Vibration for Residential Receptors

Impact Magnitude	Vibration Level
Negligible	Below LOAEL
Minor (Slight)	Above or equal to LOAEL and below SOAEL
Moderate	Above or equal to SOAEL and below 10mm/s PPV
Major (Substantial/Severe)	Above or equal to 10mm/s PPV

Note: Construction vibration shall constitute a likely significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- 1) 10 or more days or nights in any 15 consecutive days or nights; or
- 2) a total number of days exceeding 40 in any 6 consecutive months.

### Operational Noise

8.3.16 **Table 8.12** shows the proposed impact magnitude methodology considering the guidance contained within BS4142: 2014+A1:2019 for fixed noise (e.g. transformer, switchgear and inverters).

Table 8.12: Impact Magnitude Scale – Future Noise Against Existing in Accordance with BS4142:2014 (Operational Phase)

Rating Level Above Background Noise dB(A) as BS4142: 2014+A1:2019	Description of Effect	Impact Magnitude
-10 to 0	No discernible effect on the receptor	Negligible
+0.1 to +4.4	Non-intrusive - Noise impact can be heard but does not cause any change in behaviour or attitude. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Slight
+4.5 to +9.4	Intrusive - Noise impact can be heard and causes small changes in behaviour and/or attitude. Affects the character of the area such that there is a perceived change in the quality of life. Potential for non-awakening sleep disturbance.	Moderate
+9.5 or greater	Disruptive – Causes a material change in behaviour and/or attitude e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty getting to sleep. Quality of life	Substantial

Rating Level Above Background Noise dB(A) as BS4142: 2014+A1:2019	Description of Effect	Impact Magnitude
	diminished due to change in character of the area.	
Undefined*	Physically Harmful – Significant changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm	Severe

Note: The 'rating' level is the difference between the noise contribution from Site and the existing background sound level allowing for any adjustments required for noise characteristics (i.e. tonal, impulsive or intermittent noise character). The Standard advises that rounding of numbers to one decimal place should relate to levels of 0.5dB or above, which is reflected in the table limits. The impact magnitude scales in Tables 8.12 to 8.13 are used in the assessment of operational noise impacts. \* The level at which physical harm occurs will be dependent upon a number of site-specific factors, which may include type and character of noise source, location, human sensitivities, duration and receptor expectations etc.

- 8.3.17 The Institute of Environmental Management and Assessment (IEMA) has provided 'Guidelines for Environmental Noise Impact Assessment'. The guidelines set out an example of how changes in noise level may be assessed in terms of residual LAeq. This assists in determining the impact of Site operational noise relative to the context of the noise climate, which is detailed in **Table 8.13**.

Table 8.13: Impact Magnitude Scale – General Site Noise

Change in Sound Levels LAeq dB	Description of Effect	Impact Magnitude
< +2.9	No discernible effect on the receptor	Negligible
+3.0 to +4.9 (high receptor sensitivity)	Non-intrusive - Noise impact can be heard but does not cause any change in behaviour or attitude. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Slight
+5.0 to +9.9 (high receptor sensitivity)	Intrusive - Noise impact can be heard and causes small changes in behaviour and/or attitude. Affects the character of the area such that there is a perceived change in the quality of life. Potential for non-awakening sleep disturbance.	Moderate
+10 or greater (high receptor sensitivity)	Disruptive – Causes a material change in behaviour and/or attitude e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty getting to sleep. Quality of life diminished due to change in character of the area.	Substantial
Undefined*	Physically Harmful – Significant changes in	Severe

	behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm	
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\*The level at which physical harm occurs will be dependent upon a number of site-specific factors, which may include type and character of noise source, location, human sensitivities, duration and receptor expectations etc.

- 8.3.18 The WHO thresholds for night noise exposure indicated by  $L_{\text{night, outside}}$  as defined in the Environmental Noise Directive (2002/49/EC), relates to a  $L_{\text{night, outside}}$  level of 40dB to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. **Table 8.14** sets out the semantic scale for absolute levels relating to specific noise thresholds relating to rural areas and sleep disturbance.

**Table 8.14: Impact Magnitude Scale – Absolute Noise (Operational Phase) in accordance with WHO guidelines (night-time)**

Site Noise Levels LAeq dB 15mins	Subjective Response	Impact Magnitude
<=35	Complaint highly unlikely	Negligible
>35 to <=40	Complaint unlikely	Slight
>40 to 45	Marginal significance	Moderate
>45	Complaint Likely	Substantial
>55	Complaint highly likely	Severe

- 8.3.19 In order to determine the level of the effect, not only must the magnitude of this impact be determined but also the sensitivity of the receptors to the impact. For this assessment, the categories presented in Table 8.15 have been adopted.

**Table 8.15: Receptor Sensitivity**

Receptor Sensitivity	Type of Receptor
High	Dwellings / residential properties including houses, flats, old people's homes, hospitals, caravans
Medium	Schools, churches and open spaces/conservation areas.
Low	Commercial premises including retails and offices etc.
Negligible	Industrial premises including warehouses and distribution etc.

- 8.3.20 Based upon the assessment of impact magnitude and the sensitivity of individual receptors, the matrix shown in **Table 8.16** has been developed in order to provide an indication of the possible level of effect for each predicted noise impact. Given that there are many factors which may affect the level of the effect of an impact, not least, the character of the noise and timescales over which the noise operates, the overall level of effect must be assessed on an individual basis using professional judgement and experience. Therefore, whilst the matrix provides a useful indication of the likely significance it cannot be applied in all situations.

Table 8.16: Level of Effect Matrix

Impact Magnitude	Receptor Sensitivity		
	High	Medium	Low/Negligible
Severe	Major	Major / Moderate	Moderate / Minor
Substantial	Major / Moderate	Moderate	Minor
Moderate	Moderate	Moderate / Minor	Minor / Neutral
Slight	Minor	Minor / Neutral	Neutral
No Significant Impact (Negligible)	Neutral	Neutral	Neutral

8.3.21 Where a level of effect is defined as Major or Major / Moderate then the effect (Severe or Substantial magnitude) is likely to be considered significant i.e. an impact that is likely to be a key material factor in the decision-making process.

#### Survey Techniques

8.3.22 The monitoring of environmental noise undertaken during the assessment, has been carried out in terms of monitoring and meteorological conditions in accordance with advice given in BS 7445:2003 'Description and measurement of environmental noise.'

#### Limitations

8.3.23 The baseline levels measured in April 2020 are potentially lower than normal traffic flow conditions, due to Covid 19 restrictions in place at the time. The A55 is one of the dominant noise sources for the NSRs in the area, therefore this is likely to have slightly reduced residual and background sound levels. With an artificially lower background, this assessment is therefore presented on a worst-case basis. We understand that there were some restrictions on flights to and from RAF Valley at the time of the baseline survey, which may have had some effects on assumed residual LA<sub>max</sub> and LA<sub>eq</sub> levels (i.e. baseline levels may have been slightly higher at times under normal flight activities, which would potentially reduce the assumed impacts).

## 8.4 BASELINE CONDITIONS

### Baseline Noise Survey

8.4.1 A detailed environmental baseline sound survey was carried out in the vicinity of the nearest NSR positions on 17th April 2020.

8.4.2 The main source of existing noise affecting NSR properties relates to the movement of traffic along local and distant roads, intermittent aircraft noise from RAF Valley, farm animals and birdsong.

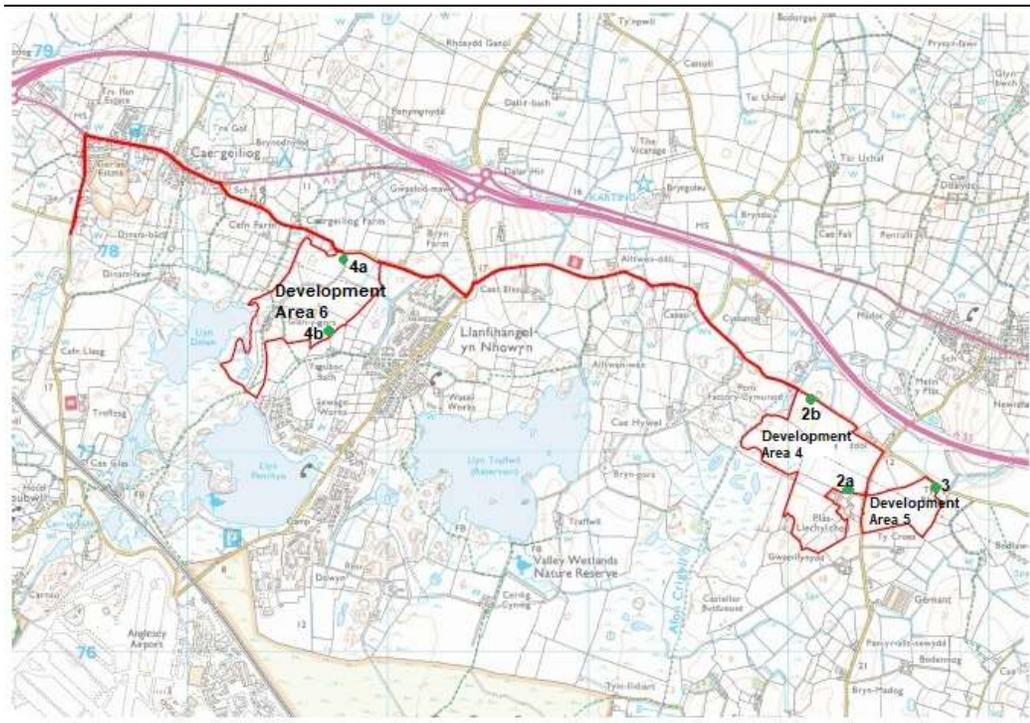
8.4.3 Monitoring locations previously identified in consultation with the Local Authority are referenced to establish the NSRs, which are detailed below:

- Position 2a: South east of DA4 (grid reference 234921 376812)

- Position 2b: North of DA4 (grid reference 234136 377262)
- Position 3: Northeast of DA5 (grid reference 234758 376823)
- Position 4a: North of DA6 (grid reference 231776 377990)
- Position 4b: East of DA6 (grid reference 231699 377581)

8.4.4 The fixed monitoring positions provide broadband noise data of the existing sound climate around the site, at the NSRs. The noise monitoring exercise was carried out over a 7-day period to establish the representative ambient sound climate. Details of the instrumentation used for the survey are detailed in **Appendix 8.2**. The noise monitoring positions are presented in **Figure 8.1**, below.

Figure 8.1: Noise Monitoring Positions



Baseline Sound Survey Results

8.4.5 The results of average noise levels and representative background levels recorded at the fixed monitoring positions are presented below in **Table 8.17** and detailed measurements in **Appendix 8.3**.

Table 8.17: Baseline Levels during Daytime (0700-2300 hours weekday and weekend)

Location (Refer to Figure 8-1)	Average LAeq dB	Average LA10 dB	Average LA90 dB	Representative LA90 dB	LAmx dB Range
2a. Southeast of DA4	54	56	47	47	50-95
2b. North of DA4	57	52	43	43	50-98
3. Northeast of DA5	57	52	43	43	48-98
4a. North of DA6	51	52	38	38	38-88
4b. East of DA6	52	53	40	40	43-94

Note: Representative LA90 based on average or most commonplace value.

Table 8.18: Baseline Levels during 0500-0600 hours (weekday and weekend)

Location# (Refer to Figure 8-1)	Average LAeq dB	Average LA10 dB	Average LA90 dB	Representative LA90 dB	LAmaz dB Range
2a. Southeast of DA4	48	50	42	42	50-78
2b. North of DA4	48	49	38	38	50-80
3. Northeast of DA5	47	50	39	39	52-77
4a. North of DA6	55	59	39	38	50-82
4b. East of DA6	56	52	39	39	61-93

Note: Representative LA90 based on average or most commonplace value.

8.4.6 For the operation, based on the results of the background noise survey and the guidance provided within BS4142:2014+A1:2019, the site rating level should not exceed the representative background level. **Table 8.19** provides the assessment of noise criteria relative to the solar farm operations.

Table 8.19: Proposed Noise Criteria at NSRs

NSR (Refer to Figure 8-1)	Grid Reference X Y	Residual LAeq (dB) Daytime (0500- 0600hrs)	Daytime Representative Background (0500-0600 hrs) LA90 (dB)	Low Impact According to BS4142:2019 Rating Level LAeq,τ (dB)
<b>Development Areas 4 &amp; 5</b>				
R1. Tyn Rhos	234772 376798	57 (47)	43 (39)	<=47 (<=39)
R2. South Area 5	234527 376519	57 (47)	43 (39)	<=47 (<=39)
R3. Southwest Area 5	243393 376432	57 (47)	43 (39)	<=47 (<=39)
R4. Southwest Area 5	234400 376363	57 (47)	43 (39)	<=47 (<=39)
R5. Gwaenfyndd	234248 376460	57 (47)	43 (39)	<=47 (<=39)
R6. Southwest Area 5	234284 376405	57 (47)	43 (39)	<=47 (<=39)
R7. Plas-Llechylched	234230 376811	54 (48)	47 (42)	<=47 (<=42)
R8. Southeast Area 4	234241 376744	54 (48)	47 (42)	<=47 (<=42)
R9. Southeast Area 4	234295 376702	54 (48)	47 (42)	<=47 (<=42)
R10. Capel Hebron	234411 377070	57 (48)	43 (38)	<=43 (<=38)
R11. North Area 4	234149 377272	57 (48)	43 (38)	<=43 (<=38)
R12. Landowners Bungalow*				
<b>Development Area 6</b>				
R13. Glan-y-gors	231403 377662	52 (56)	40 (39)	<=40 (<=39)
R14. Ysgubor Bach	231716 377511	52 (56)	40 (39)	<=40 (<=39)
R15. Ordd Cerrig Mawr	231872 377499	52 (56)	40 (39)	<=40 (<=39)
R16. Off Dynam Road	232019 377677	52 (56)	40 (39)	<=40 (<=39)
R17. Llanfihangel yn Nhowyn	232118 377798	52 (56)	40 (39)	<=40 (<=39)
R18. Arfryn	232065 377941	51 (55)	38 (38)	<=38 (<=38)

R19. Off Lon Bach	231993 378021	51 (55)	38 (38)	<=38 (<=38)
R20. Caer-Pwll	231722 378032	51 (55)	38 (38)	<=38 (<=38)
R21. Old School House	231626 378076	51 (55)	38 (38)	<=38 (<=38)
R22. Cefn Farm	231497 378043	51 (55)	38 (38)	<=38 (<=38)
R23. Tudor Court	231485 377272	52 (56)	40 (39)	<=40 (<=39)

## 8.5 SENSITIVE RECEPTORS

8.5.1 Based on relative distance to the Proposed Development from the site boundary fence, the nearest NSRs are provided below:

### Development Areas 4 & 5:

- R1. Tyn Rhos north east of Area 5 (circa 40m distance).
- R2. South of Area 5 (approximately 140m distance)
- R3. Southwest Area 5 (circa 190m distance)
- R4. Southwest Area 5 (circa 320m distance)
- R5. Gwaenfyndd southwest of Area 5 (circa 190m distance)
- R6. Southwest Area 5 (approximately 230m distance)
- R7. Plas-Llechylched south east of Area 5 (circa 40m distance)
- R8. Southeast Area 4 (circa 60m distance)
- R9. Southeast Area 4 & west of Area 5 (circa 40m to 100m distance)
- R10. Capel Hebron – group of properties to northeast of Area 4 (circa 30m-40m distance)
- R11. North of Area 4 (circa 30m-40m distance)
- R12. Landowners Bungalow\* towards centre of Area 4 (circa 20m distance)

### Development Area 6:

- R13. Glan-y-gors southwest of Area 6 (circa 70m distance)
- R14. Ysgubor Bach south of Area 6 (circa 65m distance)
- R15. Ordd Cerrig Mawr southeast of Area 6 (circa 150m distance)
- R16. Off Dynam Road east of Area 6 (circa 120m distance)
- R17. Llanfihangel yn Nhowyn northeast of Area 6 (circa 140m distance)
- R18. Arfryn northeast of Area 6 (circa 75m distance)
- R19. Off Lon Bach northeast of Area 6 (circa 70m distance)
- R20. Caer-Pwll north of Area 6 (circa 40m distance)
- R21. Old School House northwest of Area 6 (circa 40m distance)
- R22. Cefn Farm northwest of Area 6 (circa 60m distance)
- R23. Tudor Court south of Area 6 (circa 260m distance)

\*Permitted development but not built, unlikely to be built prior to construction of development

### Grid Connection

8.5.2 The proposed point of connection is located at an existing substation to the south of Caergeiliog on the eastern side of Cymyran Road. A customer substation will be located on Development Area (DA) 6 and from here a cable will connect directly into the existing substation on Cymyran Road. DA4 and DA5 will be connected to the customer substation by cabling in the highway and over third-party land.

8.5.3 The indicative cable routes are presented in **drawings LOC1001/11/08 to 12**. The drawings show a `corridor' largely within the highway in which the cable would be laid. The exact alignment of the route is to be confirmed at the detailed design and can be agreed by way of a separate authorization from the Highway Authority. No upgrade works to the existing substation are required as these have already been implemented by the Distribution Network Operator (DNO). It is proposed that a cable

would be laid to the existing sub-station compound boundary, the DNO will then connect the cable in the compound.

- 8.5.4 As set out in Chapter 3 of this ES, it is the intention for the connection to the Distribution Network will be undertaken by an Independent Connections Provider. These works i.e. the laying of the cable along the cable route, forms part of the planning application.
- 8.5.5 The assessment considers the potentially significant environmental effects associated with construction / decommissioning and operation of this route.

## 8.6 PROPOSED DEVELOPMENT

8.6.1 The proposal will comprise the following:

- Photovoltaic (PV) panels to a maximum height of circa 3m;
- Mounting frames - matt finished small section metal structure;
- Scheme of landscaping and biodiversity enhancement;
- Central Inverters (inverters and transformers will be housed together in prefabricated containers to a maximum height of circa 3m), substations (DNO and Customer to a maximum height of circa 3m) and associated cabling (below ground);
- Point of connection;
- Stock fencing up to a height of circa 2m to secure the development areas;
- Infra-red CCTV (CCTV cameras would operate using motion sensors and would be positioned inward only to ensure privacy to neighbouring land and property);
- Temporary set down areas;
- Internal service roads; and
- Site access for the construction, operational and decommissioning phases.

8.6.2 The construction of the solar farm is expected to last approximately 4-6 months and employ up to 150 staff at the peak of the construction period. The TS accompanying the planning application provides details of proposed access arrangements, the anticipated programme, construction vehicle numbers and type, construction worker numbers and the proposed construction hours.

## 8.7 ASSESSMENT OF EFFECTS

### Incorporated Mitigation

Predicted noise levels from the Proposed Development have been calculated using the indicative design layout (see **Drawing No. LOC1001/11/04 to 06**) prepared in conjunction with assumed plant noise levels provided below. These noise levels are based on measured data from similar plant used on other UK Solar Farm sites. Mitigation measures include the following:

- Design of the site to maximise wherever practicable the separation distance from NSR to plant equipment.
- Use of containerised inverter systems. Noise levels from the container and cooling/heating system for the container would be designed to achieve a level not exceeding 65dB(A) @ 1m, if above this level the use of acoustic fencing will be used to achieve this requirement as shown in **drawing LOC1001/11/10**.
- Noise levels from transformers: 65dB LAeq @ 1m sound pressure level (typically 55dB LAeq @ 7m). Smaller inverter transformers produce a noise level between 40dB to 50dB LAeq @ 1m.

- Containerised substation switchgear noise level would be designed not to exceed a noise level of 65dB(A) @ 1m.

### Construction/Decommissioning Phase Effects

- 8.7.1 Construction works would involve the movement of soils, piling and the construction of infrastructure and solar panels and associated plant. Excavators, haulage lorries, hydraulic piling, cranes, mobile plant, concrete plant and power tools would all, at some time during the construction programme, be operating on the Site. In addition, ancillary equipment such as small generators, pumps and compressors may also be operating periodically.
- 8.7.2 The above noise sources and their associated activities would vary from day to day, may be in use at different stages of the construction period, and for relatively short durations. The noisiest activities are expected to be generated during soil movement and site set-up during the initial stages of construction and during plant installation when piling rigs, power tools, mobile plant or similar may be in use.
- 8.7.3 The actual noise level produced by construction work would vary at the nearest property boundary at any time depending upon a number of factors including the plant location, duration of operation, hours of operation, intervening topography and type of plant being used (see **Appendix 8.4** for details of the construction plant inventory that has been used to inform the assessment).
- 8.7.4 Empirical field data obtained from plant on site and noise data from library or manufacturer's data have been used to calculate the expected resultant noise contribution at the nearest property boundary locations during daytime and sunrise morning period operations.
- 8.7.5 The results of calculations for vehicle movement, infrastructure, PV installation and general site activities are shown below in **Table 8.20**.
- 8.7.6 Construction works would take place during normal daytime operating hours. The daytime construction activities and associated noise levels are provided in **Table 8.20**, which is based on the ABC method of assessment within BS5228: 2009+A1:2014 (Annex E.3.2.).

Table 8.20: Construction Noise Predictions

NSRs (Refer to Figure 8-1)	Approx. Distance to receptor (m)	Works	Noise Level range at NSRs, LAeq <sub>1hr</sub> dB	Typical Residual Sound (i.e. existing) LAeq dB	BS5228 Threshold Value LAeq dB Daytime
Area 5: NSRs R1 to R6	45-400 40-400 40-400 40-400 45-400	Piling (mini rig) Site Preparation General site activities Infrastructure PV installation	39-62 44-64 44-64 38-64 44-65	54	65
Area 4: NSRs R6 to 11	35-500 30-500 40-500 30-500 35-500	Piling (mini rig) Site Preparation General site activities Infrastructure PV Installation	37-65 42-67 42-67 40-67 42-68	57	65
Area 6: NSRs R11 to 23	45-450 40-450 40-450 40-450 45-450	Piling (mini rig) Site Preparation General site activities Infrastructure PV Installation	38-62 43-64 43-64 37-64 43-65	51	65

8.7.7 On the basis of the above predictions the increase in noise, as a result of construction, is likely to result in an impact magnitude classification of **negligible to moderate** resulting in a **neutral to moderate adverse** level of effect at receptors, without mitigation.

8.7.8 The application of applying best practice in accordance with BS5228-1:2009+A1:2014 would also assist in minimising impact from construction noise.

**Road Traffic Noise - Construction and De-commissioning Phase**

8.7.9 The construction of the solar farm is expected to take circa 4-5 months to complete. This would include around 150 staff on site during the peak of the construction phase and between 15 and 105 HGV deliveries per month, which, under peak periods of vehicle movements would only amount to just over 4 HGVs travelling to and from Site during a daytime period. The number of HGVs during an hour period is therefore unlikely to be more than 1 to 2 in any one hour.

8.7.10 The proposed operating hours are:

- Monday to Friday      0800 hours to 1800 hours
- Saturdays                0800 hours to 1600 hours

8.7.11 Taking into account HGV peak movements to the set down area of Plot 4, car staff movements and additional movement of LGV or smaller HGV vehicles from Area 4 to other Areas, we have assessed the highest likely noise levels at NSRs, which is provided below in **Table 8.21**.

Table 8.21: Predicted Highest Likely Noise Level from Road Traffic Noise during the Construction Phase at NSRs (refer to Appendix 8.6 for noise mapping)

NSR (Refer to Figure 8-1)	Measured Residual LA10dB at NSR (Saturday & Weekday)	Noise contribution from construction traffic LA10,T dB	Cumulative level with site noise & residual LA10,T dB	Level difference LA10,T dB	Impact
<b>Area 5</b>					
R1. Tyn Rhos	48-52	30	48-52	0	Negligible
R2. South Area 5	48-52	31	48-52	+0.1	Negligible
R3. Southwest Area 5	48-52	29	48-52	+0.1	Negligible
R4. Southwest Area 5	48-52	27	48-52	0	Negligible
R5. Gwaenfyndd	48-52	29	48-52	+0.1	Negligible
<b>Area 4</b>					
R6. Southwest Area 5	48-52	28	48-52	0	Negligible
R7. Plas-Llechylched	48-56	38	48-56	0 to +0.4	Negligible
R8. Southeast Area 4	48-56	35	48-56	+0.2	Negligible
R9. Southeast Area 4	48-56	41	49-56	0 to +1	Slight
R10. Capel Hebron	50-52	45-48	51-54.1	+1 to +2.1	Slight
R11. North Area 4	50-52	38	50-53	0 to +0.3	Negligible
<b>Area 6</b>					
R13. Glan-y-gors	45-53	28	45-53	0 to +0.1	Negligible
R14. Ysgubor Bach	45-53	29	45-53	0 to +0.1	Negligible
R15. Ordd Cerrig Mawr	45-53	28	45-53	0 to +0.1	Negligible
R16. Off Dynam Road	45-53	29	45-53	0 to +0.1	Negligible
R17. Llanfihangel yn Nhowyn	45-53	30	45-53	0 to +0.1	Negligible
R18. Arfryn	46-52	37	47-52	0 to +1	Slight
R19. Off Lon Bach	46-52	34	46-52	0 to +0.3	Negligible
R20. Caer-Pwll	46-52	34	46-52	0 to +0.3	Negligible
R21. Old School House	46-52	27	46-52	0 to +0.1	Negligible
R22. Cefn Farm	46-52	29	46-52	0 to +0.1	Negligible
R23. Tudor Court	45-53	23	45-53	0	Negligible

Note: LAeq levels converted to LA10 by adding +3dB

- 8.7.12 The above results show the increase in road traffic noise at NSRs during the construction phase would be between 0dB and +2.5dB LA10<sub>8hrs/10hrs</sub>. According to **Table 8.9** the increase in road traffic noise would be **negligible to slight** impact and **neutral to minor adverse** level of effect and is therefore not a significant effect.
- 8.7.13 The decommissioning phase is likely to involve similar or fewer vehicle movements in order to remove the plant from site, we would therefore expect impacts and effects to be similar to that concluded for the construction phase.

#### Operation Phase – Road Traffic Noise

- 8.7.14 Once operational, the solar farm will be unmanned and access for occasional maintenance and inspections will be typically made by light goods vehicles, e.g. vans or 4x4 vehicles. Maintenance will occur roughly once a week. In view of the very limited vehicle movements to and from the Solar Farm site during the operational phase no significant impacts would occur in relation to road traffic noise at NSRs. The impact would therefore be **negligible** and the effect of **neutral** significance.

#### Construction and Decommissioning of Grid Connection

- 8.7.15 See **drawing LOC1001/11/08 to 12** for cable route details which is largely in the highway. This section assesses the potential construction and decommissioning phase impacts each route would have upon the noise environment.
- 8.7.16 The cable route extends a long distance and the level of noise and vibration would vary depending on the separation distance from the excavation to the NSRs along the route. The cable route includes isolated dwellings and towards the existing substation it would pass through the village of Caergeiliog. The highest level of noise and vibration is likely to occur where the cable route is nearest to NSR's. However, the works would only be carried out over a short duration and would be temporary at each location as the cable is laid and moved along the route. Based on typical noise and vibration levels from plant used in the excavation of roads, infilling and resurfacing of the road or surface during the laying of cables and application of 'best practice' it is anticipated that the highest impact magnitude from noise would be **slight to moderate** and a **minor to moderate** significance effect and **slight to moderate** impact magnitude from vibration and **minor to moderate** significance effect. These effects would **not** be significant in EIA terms as any effects would be short in duration due to the temporary nature of the activity relative to NSRs.
- 8.7.17 In terms of noise generation and impact and in overall terms, and as a temporary and transitional noise source the route would not result in any unacceptable adverse effects and would therefore be acceptable in noise terms.

#### Decommissioning of Cable Connection

- 8.7.18 At the end of its operational life, it is anticipated that the ducting for the cable connection would be capped off and left in situ unless it is likely to cause problems with farming operations, such that there would be no decommissioning works and therefore no potential significant effects in relation to noise and vibration.

#### Vibration - Construction & Decommissioning Phase

- 8.7.19 The highest levels of vibration generated by plant is likely to include the following:

- Small hydraulic piling rigs
  - Compaction plant
  - Loading or unloading of HGVs
- 8.7.20 The distance from nearest residential receptors to any likely use of hydraulic piling rigs, mobile plant and offloading of HGVs is likely to be a minimum distance of 30 to 50 metres based on the NSRs.
- 8.7.21 The New Zealand Transport Agency published a research paper entitled 'Ground Vibration from Road Construction' in May 2012 (refer to **Appendix 8.7**), which includes a table of measured PPV values for different types of plant. The results indicate that vibratory compaction would typically produce a vibration level of 0.3mm/sec at 30m distance. Similarly, the report indicates that the loading of trucks produces a vibration level of 0.2mm.sec PPV at 30m distance and small hydraulic or screw piling rigs produce around 0.1mm.sec to 0.15mm.sec PPV at a similar distance. Predicted vibration levels at separation distances of 30m to 50m would be at or below 0.3mm/sec.
- 8.7.22 Based upon the above information, it is evident that even at the closest approach to existing residential properties, the likely levels of ground-borne vibration would be at or below perceptible levels of vibration (i.e. 0.3mm/s) at all receptors. The results of empirical measurements of vibration from vibratory plant at distances greater than around 30 metres according to BS6472:2008 would indicate that the vibration levels are unlikely to give rise to an 'adverse comment' from a nuisance aspect.
- 8.7.23 It should be noted that the type of equipment, ground conditions and structural form could all affect the resultant level of vibration. At this stage, it has been assumed that the highest likely vibration level scenario occurs (i.e. a conservative estimate of potential effects).
- 8.7.24 The levels of vibration, as a result of the operation of mobile plant or offloading of dump trucks, are likely to result in an impact magnitude classification of **negligible to slight** and a level of effect of **neutral to minor** adverse during general and peak vibration during the construction phase. Similarly, during de-commissioning the use of mobile plant and loading of HGVs to remove plant from site would produce levels of vibration that are at or below the level of perceptibility and therefore no significant effects would occur.

#### Vibration from Road Traffic

- 8.7.25 Monitoring of ground-borne vibration have been previously undertaken of vehicles travelling along local roads at other sites in the UK. Further detail is provided in **Appendix 8.8** and vibration parameters are presented in **Appendix 8.7**.
- 8.7.26 The results of seismograph monitoring showed that based on a distance of 2m from the kerbside of the road during HGV movements the maximum levels of vibration recorded ranged between 0.2mm/s to 0.5mm/s. This level of vibration is very low (i.e. where 0.3mm/sec is said to be the level below which vibration is imperceptible) and experience has shown that according to BS6472: 2008, even when properties are at this distance, there is normally a 'low probability of adverse comment' over the operating period indicating that nuisance conditions are unlikely.
- 8.7.27 In view of the separation distance to NSRs it is clear that vibration levels would be

imperceptible and therefore produce a negligible impact and neutral effect significance. In terms of BS6472 this would conclude that vibration levels would be well below a 'low probability of adverse comment' and therefore nuisance conditions are highly unlikely to occur.

### Operational Noise Effects - Plant Noise

- 8.7.28 The following section provides an assessment of predicted noise levels from the operation of the proposed Solar Farm. The Applicant and their prospective EPC contractor have been progressing the design of the Proposed Development, and this has enabled indicative scheme drawings to be prepared (see **drawings LOC1001/11/04 to 06**). The design of the Site has been developed in sufficient detail to enable an accurate prediction of resultant noise levels at NSRs to be undertaken and provide a good level of confidence in the likely noise contribution and to show that the noise limits can be achieved in practice. Section 8.7.1 provides details of the assumed plant noise levels, which is based on measured data from similar plant used on other UK Solar Farm sites.
- 8.7.29 In terms of the potential noise characteristics of the Solar Farm plant, the following provides the details of the appropriate noise criteria applied in the assessment in accordance with BS4142: 2014+A1:2019.

### Tonality

- 8.7.30 In terms of tonality, the plant that is likely to contain this type of characteristic (without mitigation) would be the transformers and any associated cooling fans for the inverter containers at close range positions. However, with proposed mitigation measures and separation distance from NSRs to the plant is likely to be sufficient to prevent any perceptible tonal noise at NSRs. This opinion is supported by results of a number of Solar Farm facility noise surveys in the UK by the author of this chapter. It is therefore assumed that no tonal noise character penalty is required.

### Impulsivity

- 8.7.31 In terms of impulsivity, this type of character would not occur with the type of plant being proposed.

### Intermittency

- 8.7.32 In terms of intermittency, the plant would tend to operate for long periods when there is sufficient sunlight to power the equipment and therefore this is not expected to be a distinctive character at NSRs.
- 8.7.33 In conclusion, no character penalty is deemed to be necessary or appropriate based on the type of plant being proposed and NVC's subjective observations at other similar sites in the UK.
- 8.7.34 **Table 8.22** below details the predicted noise levels for the operation of the fixed plant all operating together on-site at full load. CadnaA noise modelling software has been used to calculate the resultant maximum noise levels.

Table 8.22: Predicted Highest Likely Noise Level from Solar Farm Operations at NSRs During Daytime Operations: 0700-2300 hours (refer to Appendix 8.6 for noise mapping)

NSR (Refer to Figure 8-1)	Rating <sup>1</sup> Noise Level from Solar Farm Operations LAeq <sub>1hr</sub> dB	Representative Background Level LA90 dB (Residual LAeq)	Noise Level Difference Background & Site LAeq <sub>1hr</sub> dB	Impact Significance	Increase in Residual LAeq dB
<b>DA4 &amp; DA5</b>					
R1. Tyn Rhos	27	43 (57)	-16	Negligible	0
R2. South DA5	28	43 (57)	-15	Negligible	0
R3. Southwest DA5	26	43 (57)	-17	Negligible	0
R4. Southwest DA5	24	43 (57)	-19	Negligible	0
R5. Gwaenyndd	26	43 (57)	-17	Negligible	0
R6. Southwest DA5	27	43 (57)	-16	Negligible	0
R7. Plas-Llechylched	33	43 (57)	-10	Negligible	0
R8. Southeast DA4	33	43 (57)	-10	Negligible	0
R9. Southeast DA4	35	43 (57)	-8	Negligible	0
R10. Capel Hebron	32	43 (57)	-11	Negligible	0
R11. North DA4	28	43 (57)	-15	Negligible	0
R12. Landowners Bungalow*	40	43 (57)	-3	Negligible	+0.1
<b>DA6</b>					
R13. Glan-y-gors	28	40 (52)	-12	Negligible	0
R14. Ysgubor Bach	29	40 (52)	-11	Negligible	0
R15. Ordd Cerrig Mawr	28	40 (52)	-12	Negligible	0
R16. Off Dynam Road	34	40 (52)	-6	Negligible	+0.1
R17. Llanfihangel yn Nhowyn	31	40 (52)	-9	Negligible	0
R18. Arfryn	29	38 (51)	-9	Negligible	0
R19. Off Lon Bach	30	38 (51)	-8	Negligible	0
R20. Caer-Pwll	31	38 (51)	-7	Negligible	0

NSR (Refer to Figure 8-1)	Rating <sup>1</sup> Noise Level from Solar Farm Operations LAeq <sub>1hr</sub> dB	Representative Background Level LA90 dB (Residual LAeq)	Noise Level Difference Background & Site LAeq <sub>1hr</sub> dB	Impact Significance	Increase in Residual LAeq dB
R21. Old School House	31	38 (51)	-7	Negligible	0
R22. Cefn Farm	31	38 (51)	-7	Negligible	0
R23. Tudor Court	23	40 (52)	-17	Negligible	0

<sup>1</sup>The solar farm is not expected to produce any noise character due to absolute noise levels compared with residual LAeq levels at NSRs. This residential development has been recently approved under planning ref. C16C132D and belongs to the landowner and is therefore of low sensitivity to noise.

8.7.35 The above results show no significant levels of noise predicted for all the plant in operation at full load. The noise levels are well below the noise limit criteria according to BS4142:2014+A1:2019 and would therefore, result in a **negligible** impact magnitude and **neutral** level of effect (refer to **Table 8.12**) and therefore not considered significant in EIA terms.

8.7.36 In respect of the increase in residual (LAeq) levels the results show the increase ranges between no change to +0.1dB LAeq (refer to **Table 8.13**) which results in a **negligible** impact and **neutral** level of effect and therefore not significant.

Table 8.23: Predicted Highest Likely Noise Level from Solar Farm Operations at NSRs During Sunrise (i.e. 0500-0600 hours) Operations (refer to Appendix 8.6 for noise mapping)

NSR (Refer to Figure 8-1)	Rating <sup>1</sup> Noise Level from Solar Farm Operations LAeq <sub>15mins</sub> dB	Representative Background Level LA90 dB (Residual LAeq)	Noise Level Difference Background & Site LAeq <sub>15mins</sub> dB	Impact Significance According to BS4142:2019	Increase in Residual LAeq dB
<b>DA4 &amp; DA5</b>					
R1. Tyn Rhos	27	39 (47)	-12	Negligible	0
R2. South Area 5	28	39 (47)	-11	Negligible	+0.1
R3. Southwest Area 5	26	39 (47)	-13	Negligible	0
R4. Southwest Area 5	24	39 (47)	-15	Negligible	0
R5. Gwaenfyndd	26	39 (47)	-13	Negligible	0
R6. Southwest Area 5	27	39 (47)	-12	Negligible	0
R7. Plas-Llechylched	33	42 (48)	-9	Negligible	+0.1

R8. Southeast Area 4	33	42 (48)	-9	Negligible	+0.1
R9. Southeast Area 4	35	42 (48)	-7	Negligible	+0.2
R10. Capel Hebron	32	38 (48)	-6	Negligible	+0.1
R11. North Area 4	28	38 (48)	-10	Negligible	+0.1
R12. Landowners Bungalow*	40	38 (48)	+2	Slight	+0.6
<b>DA6</b>					
R13. Glan-y-gors	28	39 (56)	-11	Negligible	0
R14. Ysgubor Bach	29	39 (56)	-10	Negligible	0
R15. Ordd Cerrig Mawr	28	39 (56)	-11	Negligible	0
R16. Off Dynam Road	34	39 (56)	-5	Negligible	0
R17. Llanfihangel yn Nhowyn	31	39 (56)	-8	Negligible	0
R18. Arfryn	30	38 (55)	-8	Negligible	0
R19. Off Lon Bach	30	38 (55)	-8	Negligible	0
R20. Caer-Pwll	31	38 (55)	-7	Negligible	0
R21. Old School House	31	38 (55)	-7	Negligible	0
R22. Cefn Farm	31	38 (55)	-7	Negligible	0
R23. Tudor Court	23	39 (56)	-16	Negligible	0

<sup>1</sup>The solar farm is not expected to produce any noise character due to absolute noise levels compared with residual LAeq levels at NSRs. This residential development has been recently approved under planning ref. 16C132D and belongs to the landowner and is therefore of low sensitivity to noise.

- 8.7.37 The above results show no significant levels of noise predicted for all the plant in operation at full load. The noise levels are well below the noise limit criteria according to BS4142:2014+A1:2019 and would therefore result in a **negligible** impact magnitude and **neutral** level of effect (refer to **Table 8.12**) and therefore not considered significant in EIA terms. The only receptor where the impact is **slight** relates to permitted development (but not yet built) for a residential property on DA4, which belongs to the landowner of the Area and is therefore likely to be less sensitive.
- 8.7.38 In respect of the increase in residual (LAeq) levels the results show the increase ranges between no change to +0.6dB LAeq (refer to **Table 8.13**) which results in a **negligible** impact and **neutral** level of effect and therefore not significant.
- 8.7.39 The calculations use the methodology given in ISO9613-2. Under this methodology the sound power level of the noise source is defined and the attenuation is calculated between its location and the selected receiver, taking account of distance, ground

attenuation, screening and the time that a noise source would be operating.

- 8.7.40 The operational phase noise impacts from the Proposed Development are therefore not considered to represent a significant impact in EIA terms.

### Ecological and Heritage Receptors

- 8.7.41 Ecological sensitive areas (i.e. Llynau y Fali Site of Special Scientific Interest (SSSI) and Lyn Dinam Special Area of Conservation (SAC) are located to the southwest of DA6. The Castellor Hut Group (Scheduled Ancient Monument site) is located to the south of DA4. The nearest listed building to the development areas is just north of DA4. The predicted noise levels for the nearest ecological boundary to the Solar Farm is indicated to be between 35m to 70m at the closest approach relative to the SSSI and SAC, between 450m and 650m at closest approach for the Scheduled Ancient Monument and 90m to 330m to the nearest listed building.
- 8.7.42 The predicted noise levels during the construction phase for the SSSI and SAC at the closest boundary positions would vary between 46dB and 67dB LAeq<sub>1hr</sub> which would be for a temporary and short-term peak period. This compares with typical residual levels of 51-52dB LAeq and in view of intermittent and regular peak noise from jet aircraft in the area and the application of 'best practicable means' and the receptor of medium sensitivity, is not expected to be higher than a **moderate** impact without mitigation and **minor** impact with mitigation and would therefore not produce a significant effect.
- 8.7.43 For the Scheduled Ancient Monument site, the predicted noise levels during the construction phase at the closest boundary positions would vary between 34dB and 42dB LAeq<sub>1hr</sub> which would be for a temporary and short-term peak noise periods. This compares with typical residual levels of circa 50dB LAeq and in view of intermittent and regular peak noise from jet aircraft in the area and the application of 'best practicable means' and the receptor of medium sensitivity, is not expected to be higher than a **negligible** impact without mitigation and would therefore not produce a significant effect.
- 8.7.44 The site predicted noise level during the temporary construction phase at the closest boundary positions to the Listed Buildings would vary between 40dB and 59dB LAeq<sub>1hr</sub>, which compares with residual levels of circa 57dB LAeq<sub>1hr</sub>. With the receptor of high sensitivity (i.e. residential), it is not expected to be higher than a **negligible** impact (without mitigation) and would therefore not produce a significant effect.

## 8.8 PROPOSED MITIGATION

### Construction and Decommissioning Phase

- 8.8.1 In accordance with BS 5228, best practice would be employed to control the noise generation. In consideration of applying best practice, the following measures would be proposed, which would form part of a Construction & Environmental Management Plan (CEMP):
- Restricting operation to current permitted hours during the daytime;
  - Regular maintenance of plant;
  - Where required, use of local screening where plant is being used in close proximity to sensitive receptor boundaries or around plant (e.g. within 30m of

- sensitive boundary) using temporary hoarding; and
  - Site management.
- 8.8.2 It is proposed that a planning condition be included on any permission granted to ensure that the noise criteria for daytime operations are achieved. This approach has been agreed with IACC.
- 8.8.3 The predicted noise levels from the site have been calculated without any further noise mitigation measures, however the following proposed management control measures applies best available techniques to control airborne noise from site to minimise noise levels at nearest receptors.

### Site Management

- 8.8.4 The following measures would assist in minimising radiated noise from site:
- The use of a banksman to help guide deliveries into site;
  - Advisory temporary signage on the highway for works in the area;
  - Temporary signage along the proposed route from the A55 to ensure deliveries follow agreed routes;
  - Provide sufficient parking areas so there is no parking on the highway or block access tracks;
  - Vehicles carrying loose material shall be sheeted;
  - The use of bowsers/sprays as necessary during dry conditions to prevent dust and the use of wheel cleaning facilities to prevent 'drag out' on the highway as required;
  - Secure the site to prevent unauthorised access;
  - Regularly monitor the condition of the highway for 'drag out' or damage and rectify as required;
  - Contact local residents prior to construction works commencing advising of anticipated duration and a contact number to advise of any issues/concerns; and
  - Turning engines off when not in use.
  - All mobile plant operating on-site should be designed such that reverse alarm use is minimised.
  - Where practicable, the mobile plant should be fitted with broadband noise type alarms (i.e. non 'beeper' type);
  - Ensure drivers are instructed to minimise engine revving and avoid un-necessary impact noise;
  - Ensure plant is regularly maintained and fitted with efficient exhaust silencers;
  - Plant equipment should not have engine covers or hoods removed except for maintenance; and
  - Introduce a complaints procedure and/or site liaison contact or committee for local residents so that they can be informed of site progress and to be able to make contact with site.

### Vibration

- 8.8.5 The application of 'best practicable means' would ensure that vibration generated during the construction phase would be below the level of perceptibility. This may for example include:
- Selection of vibratory plant to minimise vibration.
  - Wherever practicable, ensure distance between NSR and compaction activity is greater than 30m.

### Operational Phase

- 8.8.6 The incorporated mitigation measures described previously (refer to section 8.7.1) adequately address the needs to avoid, reduce and compensate for any potential effects of the Proposed Development in terms of noise and vibration and ensures there are no significant effects.

### 8.9 CUMULATIVE IMPACTS

- 8.9.1 Consideration has been given to potential cumulative influences from other environmental topics assessed as part of this EIA and from proposals beyond the application site boundary. The assessment demonstrates that no significant effects will be created during both the construction and operational phases of the proposal therefore no in combination effect will occur. Furthermore, the baseline survey would have captured surrounding land-uses that may influence the local noise climate and as such the assessment demonstrates there would be no significant effects created.
- 8.9.2 Consideration has also been given to significant planning permissions which have yet to become fully operational within the vicinity of the application site. Details of such schemes are listed in chapter 13 of this ES. The identified schemes that have the greatest potential to create cumulative impacts are located a considerable distance from the application site (greater than 1km) and as such are unlikely to contribute to a significant effect at identified noise sensitive receptors.

### 8.10 RESIDUAL EFFECTS

#### Construction and Decommissioning

- 8.10.1 During the construction and decommissioning phases there would be a variety of noise sources in use at different stages and their associated activities would vary from day to day. The highest noise levels relative to nearest NSRs are likely to occur during site preparation and infrastructure activities. The peak noise activities do not normally occur over long periods of time and best practical means would be employed to control the noise being generated. It is concluded that the increase in construction noise with the implementation of mitigation measures, using best practice, during peak noise events, is likely to result in an impact magnitude classification of **negligible to slight** at receptors and a **neutral to minor adverse** level of effect.
- 8.10.2 In terms of vibration during the temporary construction period, with the application of 'best practicable means' to control vibration, it is concluded that the impact from vibration with the implementation of mitigation measures would result in a **negligible** magnitude impact and a **neutral** level of effect at the nearest residential receptor and well within guidance limits for nuisance and cosmetic damage. The effect would not be significant.

#### Road Traffic Noise

- 8.10.3 The assessment of impact on existing residential areas from any increase in road traffic noise during the daytime construction / decommissioning stage of the Proposed Development shows no significant change in noise levels and therefore there is likely to be a **negligible to slight** magnitude impact at receptors, resulting in a **neutral to minor adverse** level of effect. The effect would not be significant. During the operational phase the impact from road traffic noise would be **negligible** and a

**neutral** level of effect.

### Operational Noise

- 8.10.4 The assessment shows that there would be no significant impacts during the operation of the Proposed Development following the implementation of appropriate mitigation. The incorporated mitigation is provided in section 8.7.1, which includes the use of containerised inverters with suitable attenuation measures and maintaining good separation distance between equipment plant and NSRs. The magnitude of impact during the operational phase at receptors of high sensitivity would be **negligible** resulting in a **neutral** level of effect.

### Cumulative Effects

- 8.10.5 The cumulative effect of other developments in the local area that have planning permission or have not been determined have been considered. It is concluded that there will be no cumulative environmental effects at residential receptors arising from the Proposed Development in combination with the identified developments during either the construction or operational phases.

### Cable Route

- 8.10.6 The effect of the construction work involved in providing a grid connection for the proposed Solar Farm have been considered and based on the highest likely noise and vibration levels from plant required to excavate and infill the trenchwork. It is concluded that the environmental effects arising from the temporary and short-term works would be **negligible** to **moderate** impact and **negligible** to **moderate** adverse effect, which is not significant.

## 8.11 SUMMARY OF PREDICTED EFFECTS

- 8.11.1 In summary, no significant noise or vibration **effects** have been identified by the noise assessment in relation to construction or operation of the Proposed Development. **Table 8.24** below summarises the predicted residual effects of the construction / decommissioning, and operation of the Proposed Development.

**Table 8.24: Residual Impact at Nearest Receptor after Mitigation Measures**

Source	Nature of Effect	Time Period	Effect	Impact Magnitude	Proposed Mitigation	Residual Effect	Residual Impact Magnitude
Construction/ Decommissioning noise	Direct & Temporary	Daytime	Neutral to Moderate	Negligible to Moderate	CEMP	Neutral to Minor	Negligible to Slight
Road traffic noise (construction/ decommissioning)	Direct & Temporary	Daytime	Neutral to Minor	Negligible to Slight	Inherent traffic routes	Neutral to Minor	Negligible to Slight
Road traffic noise (operation)	Direct & Permanent	Daytime	Neutral	Negligible	Inherent traffic routes	Neutral	Negligible
Industrial noise (operation)	Direct & Permanent	Daytime	Neutral	Negligible	None required	Neutral	Negligible
		Night	Neutral	Negligible		Neutral	Negligible
Construction/ Decommissioning	Direct & Temporary	Daytime	Neutral to Minor	Negligible to Slight	CEMP	Neutral	Negligible

Source	Nature of Effect	Time Period	Effect	Impact Magnitude	Proposed Mitigation	Residual Effect	Residual Impact Magnitude
Vibration							
Operational Vibration	Direct & Permanent	Daytime Night	Neutral Neutral	Negligible Negligible	None required	Neutral Neutral	Negligible Negligible
Road traffic Vibration	Direct & Permanent	Daytime	Neutral	Negligible	None required	Neutral	Negligible
Cumulative Effects	Direct & Permanent	Daytime	Neutral	Negligible	None	Neutral	Negligible
Grid Connection	Direct & Temporary	Daytime	Neutral to Moderate	Negligible to Moderate	CEMP	Neutral to Moderate	Negligible to Moderate

## 8.12 SUMMARY AND CONCLUSIONS

- 8.12.1 Noise and vibration levels have been considered and assessed during the construction / decommissioning and operational phases of the proposed development. Relevant and appropriate noise and vibration guidance and standards have been used to determine the impact. The assessment has been undertaken to inform and guide the design of the Solar Farm, such that any likely noise and vibration impact on existing and potential sensitive receptors is minimised.
- 8.12.2 To establish any likely impact from noise a robust assessment of baseline sound levels has been considered by undertaking fixed position noise monitoring at six noise sensitive receptor areas around the Site. This was carried out over a week period in April 2020 during Covid 19 restrictions to establish the lowest likely representative background levels for robustness.
- 8.12.3 The Environmental Health Team at IACC has been formally consulted to seek advice and reach agreement in respect of baseline survey methodology, assessment methodology and receptor locations.
- 8.12.4 In accordance with appropriate standards, best practical means would be employed to control the noise generation during the construction period. Measures may include restriction on operating hours, sensible routing of equipment to site and careful choice of piling rigs to minimise noise. Such measures would be defined within the Construction Environmental Management Plan.
- 8.12.5 The assessment shows that there would be no significant adverse effects during the construction or operation of the Proposed Development.



## 9. HERITAGE RESOURCES

## 9.1 INTRODUCTION

9.1.1 This chapter of the ES considers the potential impact of the proposed Parc Solar Traffwll project on archaeological and cultural historic assets. The chapter describes the scope, assessment methodology and the baseline conditions currently existing at the site and its immediate environs. It then considers any potential significant effects the proposed development might have on the baseline and the mitigation measures required to prevent, reduce or offset any significant adverse effects.

9.1.2 The assessment compiles information from other assessments and evaluations undertaken in support of the pre-application:

- Garcia Rovira, I, and Sinnot, S, 2019, Caergeiliog, Anglesey: Desk Based Assessment and Site Visit, Archaeology Wales Report 1758 (draft version);
- McGuinness, N, 2020, Parc Solar Traffwll, Archaeological Evaluation (Geophysical Survey), Gwynedd Archaeological Trust Report No. 1560;
- Reilly, S, Ryan Young, C, Roberts, J, and Ferreira, C, 2021, Parc Solar Traffwll, Ynys Môn, Archaeological Evaluation (Trial Trenching), Gwynedd Archaeological Trust Report No. 1571;
- McGuinness, N, 2021, Parc Solar Traffwll, Llanfihangel Yn Nhowyn, Ynys Môn, Historic Asset Setting Impact Assessment, Gwynedd Archaeological Trust Report No. 1584.

9.1.3 Draft versions of each of the above documents have been submitted to Gwynedd Archaeological Planning Service (GAPS) and Cadw for comment prior to completion. The comments provided by GAPS and Cadw have been incorporated into the final versions of the documents (included in **Appendix 9.1 to 9.4** to this ES) and have informed the assessment presented in this chapter.

### Proposed Development

9.1.4 A full description of the proposed development is provided in Chapter 3. The location of the Proposed Development (the Site) is shown on **Drawing LOC1001/11/01**.

### Consultation

9.1.5 GAPS and Cadw were consulted in relation to the archaeological assessment. The consultation took place before the assessment was undertaken, at each stage of the assessment process thereafter and in relation to final reporting.

9.1.6 The archaeological assessment conformed to the following guidelines:

- Conservation Principles for the Sustainable Management of the Historic Environment in Wales (Cadw 2011);
- Design Manual for Roads and Bridges (DMRB) LA 104 Environmental assessment and monitoring, Version 1, Highways England 2020;
- Design Manual for Roads and Bridges (DMRB) LA 106 Cultural Heritage assessment, Revision 1, Highways England 2020;
- Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs) Version 1.1 (The Welsh Archaeological Trusts, 2018);
- Guidelines for digital archives (Royal Commission on Ancient and Historic Monuments of Wales, 2015);
- Management of Archaeological Projects (English Heritage, 1991);
- Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide (Historic England, 2015);

- Planning Policy Wales, 11th edition (Welsh Government 2021);
- Standard and Guidance for Archaeological Field Evaluation (Chartered Institute for Archaeologists, 2020); and
- Standard and Guidance for Desk-Based Assessment (Chartered Institute for Archaeologists, 2020).

9.1.7 Gwynedd Archaeological Trust (GAT) is certified to ISO 9001:2015 and ISO 14001:2015 (Cert. No. 74180/B/0001/UK/En) and is a Registered Organisation with the Chartered Institute for Archaeologists and a member of the Federation of Archaeological Managers and Employers (FAME).

9.1.8 The project was monitored by the GAPS on behalf of the Local Planning Authority.

### Competence

9.1.9 The author of this chapter, Stuart Reilly, is a senior archaeologist with GAT. Stuart has worked at GAT for seven years and has 22 years field experience on a diverse range of archaeological projects of all sizes and periods, in the UK and Ireland. At GAT Stuart has extensive knowledge of working on projects at various levels, from inception to completion, and has comprehensive experience of project management, in particular archaeological and administrative. Stuart is a Member of Chartered Institute for Archaeologists (MCIfA membership number 10279) and Site Management Safety Training Scheme (SMSTS) for the Construction and Civil Engineering Industries.

## 9.2 CONTEXT

### Introduction & Planning Policy

9.2.1 The Environmental Impact Assessment (EIA) in relation to cultural heritage was undertaken in accordance with the best-practice guidance outlined in Design Manual for Roads and Bridges (DMRB) LA 104 Environmental assessment and monitoring, Version 1, (Highways England 2020) further to consultation with GAPS.

### Methodology

9.2.2 This section details the methodology used to determine the significance of the impacts of the proposed solar farm on archaeological and cultural historic assets. The assessment criteria and assignment of significance with respect to archaeology and cultural heritage are based on available standards and guidance (as outlined in section 9.1 above and DMRB LA 104), good practice, consultation and professional judgement.

9.2.3 Identifying the impact of a development upon historic assets is a four-stage approach. Initially, historic assets potentially impacted need to be identified (Stage 1), whilst their significance (heritage interest) also needs to be understood (Stage 2). Identification of historic assets was undertaken as part of the Desk-based Assessment (DBA) (refer to Archaeology Wales Report 1758 in **Appendix 9.1**), whilst an initial assessment of significance is also undertaken in the DBA and refined as part of this ES. Following this, the magnitude of effect needs to be identified (Stage 3) followed by an assessment of impact significance to the historic asset (Stage 4).

9.2.4 A historic assets' significance, for the purposes of this report, is identified as anywhere from negligible (no significant heritage interest) to high (an asset with

significant heritage interest) (see **Table 9.1** below). The categories and definitions of heritage significance do not necessarily reflect a definitive level of importance of an asset. They are intended to provide a provisional guide to the assessment of perceived heritage significance, which is to be based upon professional judgement incorporating the evidential, archaeological, historical, aesthetic, architectural and communal heritage values of the asset or assets.

**Table 9.1 Definitions of Significance (Heritage interest)**

Heritage Significance	Definition
Very High (perceived International Importance)	World Heritage Sites; Historic landscapes of international value, whether designated or not; Extremely well preserved historic landscapes with exceptional coherence, time-depth, or other critical factor(s).
High (perceived National Importance)	Grade I and II* Listed Buildings or structures; Scheduled Monuments; Other listed buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the listing grade; Conservation DAs containing very important buildings; Undesignated structures of clear national importance; Designated historic landscapes of outstanding interest. Undesignated landscapes of outstanding interest; Undesignated landscapes of high quality and importance, and of demonstrable national value; Well preserved historic landscapes, exhibiting considerable coherence, time-depth or other critical factor(s).
Medium (perceived Regional Importance)	Grade II Listed Buildings; Conservation DAs containing buildings that contribute significantly to its historic Character; Historic Townscape or built-up DAs with important historic integrity in their buildings, or built settings (e.g. including street furniture and other structures); Designated special historic landscapes; Undesignated historic landscapes that would justify special historic landscape designation, landscapes of regional value; Averagely well-preserved historic landscapes with reasonable coherence, time-depth or other critical factor(s).
Low (perceived Local Importance)	'Locally Listed' buildings (Scotland Category C(S) Listed Buildings); Historic (unlisted) buildings of modest quality in their fabric or historical association; Historic Townscape or built-up DAs of limited historic integrity in their buildings, or built settings (e.g. including street furniture and other structures);

Heritage Significance	Definition
	Robust undesignated historic landscapes; Historic landscapes with importance to local interest groups; Historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations.
Negligible	Buildings of no architectural or historical note; buildings of an intrusive character; Assets with no significant value or archaeological / historical interest; Landscapes with little or no significant historical interest.
Unknown	Buildings with some hidden (i.e. inaccessible) potential for historic significance; Assets with an unknown value or archaeological / historical interest.

9.2.5 The classification of the magnitude or scale of impact (**Table 9.2** below) on known historic assets takes account of such factors as:

- The physical scale and nature of the anticipated impact; and
- Whether specific features or evidence would be lost that is fundamental to the historic character and integrity of a given asset, and its understanding and appreciation.

**Table 9.2: Magnitude of Impact**

Magnitude of Effect	Criteria for assessing impact
Major	Total loss of or substantial harm to an asset
Moderate	Partial loss of, harm to or alteration of an asset which will affect its significance
Minor	Minor loss of or alteration to an asset which leaves its significance largely intact
Negligible	Minor alteration to an asset which does not affect its significance in any notable way.
No change	No alteration to an asset.

9.2.6 Following identification of the magnitude of impact, the significance of the effect is predicted. To provide a consistent framework for the consideration and evaluation of impacts on different environmental parameters, the following terminology will be used (**Table 9.3**).

Table 9.3 Definitions for Significance of Effect

Significance of Effect	Criteria
Major adverse	The impact gives rise to serious concern that should factor into the decision-making process for the development.
Moderate adverse	The impact gives rise to some concern, but it is likely to be tolerable (depending on its scale and/or duration)
Minor adverse	The impact is undesirable, but of limited concern
Negligible	The impact is considered to be of limited or no concern
Minor beneficial	The impact is of minor significance but has some heritage-related benefit
Moderate beneficial	The impact provides some tangible benefit to the historic environment
Major beneficial	The impact provides a significant positive benefit to the historic environment

9.2.7 Assessment of the significance of the effect is reliant on professional judgement and experience and is tailored to each historic asset. Any judgment is accompanied by a narrative description to qualify that opinion. The following matrix (**Table 9.4**) for calculation of the significance of effect should therefore be seen as a framework to aid in understanding how the level has been reached, rather than as a direct tool for direct decision making.

Table 9.4 Effect Significance Assessment

	<b>Very High</b>	Neutral	Slight	Moderate/ Large	Large or Very Large	Very Large
	<b>High</b>	Neutral	Slight	Moderate/Slight	Moderate/Large	Large/Very Large
<b>VALUE</b>	<b>Medium</b>	Neutral	Neutral/Slight	Slight	Moderate	Moderate/Large
	<b>Low</b>	Neutral	Neutral/Slight	Neutral/Slight	Slight	Slight/Moderate
	<b>Negligible</b>	Neutral	Neutral	Neutral/Slight	Neutral/Slight	Slight
		<b>No change</b>	<b>Negligible</b>	<b>Minor</b>	<b>Moderate</b>	<b>Major</b>
				<b>MAGNITUDE OF IMPACT</b>		

9.2.8 Both direct physical and indirect non-physical (for example visual, setting) effects on historic assets are considered relevant. Effects may be adverse or beneficial. Depending on the nature of the impact and the duration of development, effects can also be temporary and / or reversible or permanent and / or irreversible. The finite nature of archaeological remains means that physical impacts are almost always adverse, permanent and irreversible; the ‘fabric’ of the asset and, hence, its potential to inform our historical understanding, will be removed.

9.2.9 For this assessment, ‘major’ and ‘moderate’ effects are generally deemed to be significant. In addition, whilst, minor, effects are not significant in their own right, it is important to distinguish these from other non-significant (negligible) effects as they may contribute to significant effects cumulatively or through interactions between historic assets or elements of the historic environment (or historic landscape).

## 9.3 BASELINE CONDITIONS

### Historic Landscape

- 9.3.1 The proposed Parc Solar Traffwll development is located on the western side of Ynys Môn, spread across three development areas (DA4, DA5 and DA6) positioned between the A55 and RAF Valley. DA3, located 1.5km to the southwest of Bryngwyrán, just to the north of the farm at Tai Croesion Newydd (Figure 01), has been removed from the proposed development as a consequence of the heritage assessment undertaken. Some references to DA3 remain within this chapter when the context requires it.
- 9.3.2 DA4 and DA5 are located 0.5km to the southwest of Bryngwyrán. DA4 sits on the western side of the Bryngwran to Llanfaelog road, to the west of Plas Llechylched Farm. It is bounded on its western side by boggy, waterlogged ground and ponds and the Afon Crigyll, and to the north by the minor road from Llanfihangel yn Nhowyn to Engedi. The site of the former church of St Ulched abuts the southeast side of DA4.
- 9.3.3 DA5 is located on the opposite, eastern side of the Bryngwran to Llanfaelog Road to DA4. It is bounded on its north, south and eastern sides by pasture fields and the Llanfihangel yn Nhowyn to Engedi road forms the boundary at its northeastern corner.
- 9.3.4 DA 6 is located 100m to the west of Llanfihangel yn Nhowyn, to the north and east of the farm at Glan-y-gors. The minor road, Lon Bach, forms its northern boundary, while marshy ground, the Glan-y-gors farm and Llyn Dinam lie to the west. Pasture fields separate the DA from Llanfihangel yn Nhowyn to the east and more pasture fields lie to the south.
- 9.3.5 The proposed development is set within a landscape of flat or gently undulating low-lying ground with a maximum elevation of 10m AOD. The three DAs are currently used for pasture, with DA4 and DA5 being improved grassland while DA6 is more marginal ground. The fields are defined by a mixture of drystone walls, post and wire fences and drainage ditches.
- 9.3.6 The underlying geology is comprised of Ordovician Rocks (undifferentiated) - Sandstone and Conglomerate, interbedded. Superficial: Till, Devensian - Diamicton (BGS, 2020) in DA4. Whereas DA5 consists of Ordovician Rocks (undifferentiated) - Sandstone and Conglomerate, interbedded to the west. Coedana Complex-Gneiss, Micaceous to the east. Superficial: Till, Devensian - Diamicton (BGS, 2020). DA6 is New Harbour Group - Mica Schist and Psammite, New Harbour Group – Jasper in northwestern corner. Superficial: Till, Devensian - Diamicton (BGS, 2020).
- 9.3.7 The soils within the proposed development varied. In DA6 these consisted of slowly permeable seasonally wet acid loamy and clayey soils (Soilscapes, 2020). Whereas DA4 has slowly permeable seasonally wet acid loamy and clayey soils to the north, freely draining slightly acid loamy soils to the south and DA5 freely draining slightly acid loamy soils to the south (Soilscapes, 2020).

### History

#### Prehistory and Roman Archaeology

- 9.3.8 No known upstanding Prehistoric or Roman archaeological sites are present within

the proposed DAs. There are though several monuments from Prehistory (250,000 BC to AD 43) and Roman (AD 43 to 410) within the immediate vicinity of the proposed development. A more in-depth examination of the Prehistoric/Roman archaeological sites in the vicinity of the development can be viewed in Appendix I.

- 9.3.9 The earliest known activity includes a findspot for a stone axe (PRN 2575) located 656m east of DA6, and the burial chambers of Presaddfed (AN010), Ty-Newydd (AN013) and Castellor (PRN 1539).
- 9.3.10 Presaddfed burial chamber is located on even ground at the southern end of Llyn Llywenan, approximately 3.7km northeast of DA4 and DA5. The monument is composed of two distinct burial chambers of Neolithic (4000 – 2000 BC) date. It is possible that these chambers were never directly connected but were enclosed within a single mound (Garcia Rovira and Sinnot 2019, 56).
- 9.3.11 Ty-Newydd burial chamber is positioned approximately 2.7km south of DA4 and DA5. It is the remnants of a megalithic chamber with a large cracked capstone. The monument was excavated in 1936 and this revealed the chamber may have once measured 2.8m by 1.2m as defined by a spread of charcoal with a hearth at the eastern end. Beaker pottery was recovered during the excavation but it is highly likely that represent the reuse of an earlier, Neolithic monument.
- 9.3.12 Castellor burial chamber is located a maximum of 800m southwest of DA4 and DA5 (and is also in close proximity (140m north) to DA3 which is not part of the application scheme). The monument comprises two standing stones with a capstone. It has been observed though that the capstone may be the result of prehistoric action or post-medieval clearance activity (Garcia Rovira and Sinnot 2019, 85).
- 9.3.13 Later Prehistoric activity within the local vicinity of the proposed development includes Bronze Age (2000 – 650 BC) Palstave findspot (PRN 7624) 941m northeast of DA6 as well as a series of burnt mounds that were uncovered and investigated as part of the groundworks for the A55, located to the immediate north of the proposed development. The closest being the burnt mounds PRN31812-4) that were 770m north of DA6 (Rovira I. G. & Sinnot S, 2019, 108). In addition, a Bronze Age site (PRN 61578) located approximately 600m north of DA6 included a number of pits which may have been the remnants of ovens (Rovira I. G. & Sinnot S, 2019, 108).
- 9.3.14 There are also a number of Iron Age/Roman (650 BC – 410 AD) settlements in close proximity of the proposed development, the most notable being the Castellor Hut Group (AN088; PRN 2520) a scheduled monument that is situated 45m southwest of DA4 and 700m southwest of DA5. The monument is defined by the remains of a group of hut circles located in two pasture fields. The settlement spans 200-280m of an area above the confluence of Afon Crigyll and an unnamed stream. Many of the features are upstanding and visible above ground with locations of two enclosed roundhouse settlements to the north (NPRN 308122) and south (NPRN 308123) of the scheduled area; the latter with satellite roundhouses. NPRN 308122 contains traces of a 10m diameter roundhouse with a 1m wide stone founded wall and joined to an angle of walling. NPRN 308123 is the location of two late prehistoric roundhouses that are about 9m in diameter with stone walls about 1m wide set on the west side of a rectangular stone-walled enclosure about 20m by 30m. There are remains of three similarly sized detached or satellite roundhouses about 25-45m

away to the northwest and west. Both areas appear to have been associated with a cluster of settlements within Castellor. These roundhouse settlements are characteristic of later prehistoric activity, with evidence of material that suggests later use of the site during the Roman (43 – 410 AD) period. Artefacts recovered during clearance in the 19th century, included quernstones, stone mortars, unspecified coins and 'gold' tweezers. Three copper ingots or cakes were discovered at the site, one of which is now housed at the National Museum (Accession No. 19.298A/1); all are believed to be Roman (Rovira I. G. & Sinnot S, 2019, 36).

- 9.3.15 In addition to the Castellor Hut Settlement, there are Melin Y Plas hut settlement (PRN 9945) and Ynys Leurad Hut Circles (AN035) in the immediate vicinity of the proposed development areas. The Melin Y Plas hut settlement was excavated as part of the A55 Road Scheme Project; the A55 is positioned to the north of DA4, DA5 and DA6. The excavation identified four phases of occupation that extended from the Late Neolithic (c. 3000 – 2000 BC) to Medieval (1110 – 1539 AD) period (Rovira I. G. & Sinnot S, 2019, 65). The structures at Melin Y Plas that dated from the Roman period (43 – 410 AD) were constructed with thick clay or possibly turf walls bounded by narrow gullies; the gullies may have been the base of a wattle or timber revetment. These structures date from the early 1st to late 2nd or 3rd century AD and may have been preceded by Iron Age occupation (Ghey E., Edwards N. & Johnston R., 2008, 14-15).
- 9.3.16 Ynys Leurad Hut Circles are located 4km northwest of DA6 on a peninsula situated between Ynys Mon and Ynys Gybi. The site is comprised of a small group of hut circles, the best preserved are located on the north side of the group being on average c.9m in diameter, and those in the centre are c.6m diameter. At the southern end is a large ruined hut with a small rectangular 'workshop' to the east. Traces of enclosures can also be seen but they are not certainly contemporary. The general appearance and the dry masonry are similar to those of the huts on Ty Mawr, which suggest the settlement dates from the Roman period (43 – 410 AD).
- 9.3.17 North of the development is Y Werthyr Hillfort (AN042) situated on a low knoll above the marshes around Afon Caradog. The site is almost enclosed by marshland, except on the south side. The fragmentary remains consist of two concentric lines of ramparts enclosing an area 180m by 200m, except on the northeastern side where there are three concentric ramparts. On the western side of the monument, the line of the outer rampart is represented by a terrace with a retaining wall, which incurves towards the road which now cuts through the hillfort from northwest to southeast (RCAHMW).
- 9.3.18 An enclosure of Iron Age date (PRN 2517) is located more than 662m northeast of DA6. This enclosure has been recorded in historical Ordnance Survey maps; however, it is presently in poor condition due to ploughing. The latter has revealed a stone axe and a spindle whorl of possible Iron Age origin (Rovira I. G. & Sinnot S, 2019, 108).

#### Medieval and Post-Medieval Archaeology

- 9.3.19 No known upstanding Medieval or Post-Medieval archaeological sites are present within the proposed development areas. There are though several monuments from Medieval (Early Medieval 410 – 1110 AD & Medieval 1110 – 1539 AD) and Post-

Medieval (1539 – 1750 AD) periods within the immediate vicinity of the proposed development. A more in-depth examination of the Medieval/Post-Medieval archaeological sites in the vicinity of the development can be viewed in Appendix I.

- 9.3.20 Early Medieval sites include Bodedern Early Christian Cemetery (AN099) which is located approximately 2.km north of DA4 and DA5. This site was excavated in 1971. Burials belonging to three distinct phases as well as a curvilinear ditched enclosure were revealed during the excavation but there was no trace of the church or other associated infrastructure within the limits of the excavation. The area is currently occupied by two houses. The excavation at the site uncovered 114 extended inhumations comprising both long cists and unprotected dug graves. The latest period for the initial phase of the burials was from the 6<sup>th</sup> century. The burials ranged from simple dug graves to full lintel grooves all in a contemporary context. The earliest phase of burials consisted of scattered graves orientated north-south. A central, grave free, *'focal'* area of post settings was identified and may be of prehistoric origin. The central feature of the cemetery had multiple phases, one of which may be a small wooden chapel. One phase of the cemetery indicates east-west aligned burial and shows a tendency towards radial arrangement. In a secondary context, a 1.5m wide walled cist was capped by an inscribed stone (bearing the name *Ercagni*) lying face downwards. This stone now resides in Bodedern Church. The walled cist on which the Erchan stone had been re-used as a lintel had been built over a 'V-profile' ditch which had been deliberately back-filled with stones before the cist was built. The ditch was sectional in three places and appears to have enclosed the hilltop. No entrance causeway to the enclosed area was found. No graves were found cut into the ditch fill, but the presence of graves on both sides of it implies that an existing earthwork was used as a division of the sacred from the profane when the site was adapted for Christian use (Rovira I. G. & Sinnot S, 2019, 36-37).
- 9.3.21 Other Early Medieval sites include the Bodfeddan Inscribed Stone (AN021) and Pen-Sieri Inscribed Stone (AN058). The former is 2km southeast of DA4 and DA5, while the latter 5km south of DA4 and DA5. Bodfeddan is a memorial stone, of probable 5<sup>th</sup> or 6<sup>th</sup> century AD origin. It is a rough pillar stone, 2.0m high and roughly square sectioned, 0.8m-0.9m across. On the stone's north face there is vertically inscribed two line inscription: *'CVNOGVS\_HIC IACIT'* or *'the Stone of Cunogus(s)us He lies here'* (RCAHMW).
- 9.3.22 Pen-Sieri Inscribed Stone measures 1.6m in length and 0.4m in width, with the word *'MAILIS'* inscribed in one vertical line. The stone is now located at Trecastle Barn and use as a lintel stone in the west wall of a barn (Rovira I. G. & Sinnot S, 2019, 78).
- 9.3.23 Another possible Early Medieval site is Cappel Lur (PRN 2522) which is located 700m north of DA4 according to the Gwynedd Historic Environment Record. The existence of this chapel is recorded in Baynes (1920), however the actual location of this building is unknown.
- 9.3.24 Another church site of possible Medieval origins, St Ulched's Church (Site of) (PRN 2525), is located immediately adjacent to the southern boundary of DA4. The church is thought to have been medieval in date, though no standing remains survive. The churchyard wall does survive and forms part of the southern boundary of DA4. It is possible that the remains of early graves may be located within the part of the area

in proximity to the church site.

- 9.3.25 The remaining known archaeological sites are of Post-Medieval origin. The most notable, being scheduled monuments Felin Wen Tide Mill (AN130), Carnau Tide Mill (AN131) and Bodior Tide Mill (AN132) are located 4-5km west of DA4 and DA5. The tide mills are located along the Cymyran Strait that separates Ynys Mon and Ynys Gybi; Felin Win and Carnau are situated along the west coast of Ynys Mon while Bodoir is positioned on the east coast of Ynys Gybi. Felin Wen Tide Mill consists of a long dam across the mouth of the tidal inlet with the mill set on a rocky outcrop at the east end; the outcrop is linked to the shore by a short length of dam. Carnau Tide Mill was built on a small island, with dams in either direction from it across a small bay. The mill platform is visible as low foundations, with the remains of a channel on its west side and the hexagonal collar of an iron wheel. The remains of Bodior Tide Mill cut across the tidal inlet, and a rectangular mill building on a rocky outcrop at the south end of the dam (RCAHMW).
- 9.3.26 These mills were powered by seawater at high tide, a technique that was an important source of power for grinding corn from the early modern period in Anglesey. The first documentary evidence in relation to Felin Wen Tide Mill dates to 1724 and it appears to have operated until 1829. The first documentary reference to Bodior Tide Mill dates to 1778 (Rovira I. G. & Sinnot S, 2019, 96).
- 9.3.27 In addition, in the vicinity of DA6, there is the Stanley Embankment (AN146), which is located 3.8km of DA6, Thomas Telford's causeway between Valley and Ynys Gybi. It is 1.2km long, some 35m wide at the base, and up to 4.8m high. It crosses Beddmanarch Bay and was opened in 1823 (RCAHMW and Rovira I. G. & Sinnot S, 2019, 96).
- 9.3.28 Further along the coast of Ynys Mon (and 3.4km northwest of DA6) there is the Newlands Fish Weir (AN145). It is defined by dry stone walling on its northeast side, which together with natural rocks, encloses an area at the southeastern edge of the foreshore. The inner edge of walling is depicted as a 'Fish Weir' on historic (1889-1900) Ordnance Survey mapping. The section of walling runs northeast along the edge of the River Alaw channel for approximately 280m, before terminating at the point where the channel curves to the east. The trap is open at its northwest end, and is defined by rocks (bordering the coastline) on its south and southwestern edges (RCAHMW).
- 9.3.29 The remaining known Post-Medieval archaeological sites in proximity of the development include:
- Trackway, Cymunod (PRN 37225) is located 250m north of DA 4. The track is now covered in grass and it is known to run between Cymunod and the A5 (Davidson et al 1996);
  - Milestone (PRN 66114) is located 0.8km northeast of DA5;
  - Parish Church of St. Ulched (PRN 5372) is located 600m northeast of DA4. It is documented on the RCHAMWS 1937. The church is now destroyed, however, the churchyard wall is still standing;
  - Capel Salem, Bryngwran (PRN 7822) is a post-medieval non-conformist chapel documented by the RCAHMW Chapel Survey of 1994. The chapel is located 400m north of DA4;
  - Melin Cae Fadog (PRN 36148) is located 665m northeast of DA4. This mill is

- documented in Davidson's 'The Medieval Mills of Anglesey' (2002);
- Building Foundations, Bryngwran (PRN 1780) is located 665m north of DA4. The Gwynedd Historic Environment Record note that in 1968 a visit to the building was carried out during works associated with refurbishing the mill. The works revealed the foundations of a building;
  - Pandy Cymunod, Bodedern (PRN 36105) is located 125m northwest of DA4 according to the Gwynedd Historic Environment Record. Davidson (2002) defined it as a possible site of a medieval mill, fully developed during the 19th century as a woollen mill;
  - Pont Factory Cymunod (PRN 11669) is located 0.06km northwest of DA4;
  - Melin y Plas (PRN 18366) is located 511m east of DA4. A photographic record of the mill was carried out prior its conversion, and it is recorded in Davidson's 'The Medieval Mills of Anglesey' (2002);
  - Pont Melin-y-plas, Bryngwran (PRN 5750) is located 241m northeast of DA4. The Gwynedd Historic Environment Record notes the bridge as disused. The stream over which the bridge was built is the stream used by Melin y Plas;
  - Capel Hebron, Bryngwran (PRN 7824) is a post-medieval chapel documented by the RCAHMW Chapel Survey of 1994. The chapel is located 100m northeast of DA4;
  - The RCAHMWs noted the presence of a pond (PRN 28950) 145m southwest of DA4;
  - PRNs 28942-8 are mostly associated with Afon Crigyll and take the form of footbridges. A number of these sites have been documented on cartographic sources, however, they are no longer any upstanding remains;
  - PRN 16630 refers to a large free-standing boulder defining a parish boundary (Smith 2003) located approximately 2km south of DA6;
  - PRN 28935 (positioned approximately 1.4km southwest of DA6) refers to a building recorded on the 1st Edition Ordnance Survey map of 1889. While Cerrig Bach building has been recoded as to be of unknown date, it is likely that it dates to post-medieval chronologies;
  - PRNs 28937, 28939, 28940, 28946 refer to footbridges documented on historic maps postdating 1889, although they could be earlier in date;
  - Finally, the Gwynedd Historic Environment Record documents a building of modern date. PRN 33382 records the presence of a hangars within the community of Llanfair-yn-Neubwll (Batten 2011) located approximately 1.8km southeast of DA6.

#### Listed Buildings

9.3.30 There are no listed buildings within the proposed development area but 94 listed buildings are located within the 5km search area of the desk-based assessment (Rovira I. G. & Sinnot S, 2019). The majority of these buildings were shown not to be indivisible with the layout of the development (see Appendix II of the Desk Based Assessment in **Appendix 9.1**). The listed buildings that are adjacent to and may be affected by the solar farm include:

- Pandy Cymunod - Grade II- LB 19488 – is a woollen mill and workshop built in the late 18th and early 19th centuries. It is a 2 storey 3 bay building with a single-storey workshop and cart shed. It is thought that the workshop might also have been used as a dye house. The buildings are constructed from rubble walls and the roofs dressed with small slates. A dove coat is located in the eastern gable. A plan of 1878 depicts this range of buildings illustrating a workshop, cart shed and mill pool. The mill is located 0.1km north of DA 4;
- Pont Factory Cymunod, over Afon Crigyll - Grade II – LB 5278 – is the earliest of

two associated bridges, composed of rubble masonry with two arches with different structures and widely separated. The westward arch being high and roughly hewn compared to the other segmented, squared arch with voussiors. A rough parapet spans both arches. The bridge is located 0.06km north of DA4; and

- Church of St Mihangel - Grade II -LB 5309- incorporates the construction material from an earlier church; the Church of St Mihangel was largely rebuilt in 1862 by Kennedy and Rogers of Bangor. Renovated in 1988, it is now used as a Royal Air Force church by RAF Valley. The church is located 1.7km west of DA4.

9.3.31 Details of the 94 listed buildings examined as part of the desk-based assessment can be found in Appendix I of the Desk Based Assessment in **Appendix 9.1**.

#### Archaeological Evaluation

9.3.32 Further to the completion of the Desk-based Assessment and the guidance provided in the EIA Scoping Direction for the proposed development, archaeological evaluation was conducted within the four Development Areas (DA3, DA4, DA5 and DA6) of the proposed development to help determine the level of subsurface archaeology present therein. The archaeological evaluation was a two staged process that comprised a geophysical survey conducted using a combination of a Bartington cart mounted multi-sensor gradiometer array and a handheld non-GPS Bartington Grad 601-2 dual fluxgate gradiometer (GAT Report 1560). Subsequent to the conclusion of the survey 131 trial trenches were excavated to investigate geophysical anomalies and blank development areas on the geophysical survey (GAT Report 1571).

#### Geophysical Survey (Appendix 9.2)

9.3.33 GAT undertook a magnetometer survey in July and August 2020 in DA3, DA4, DA5 and DA6. The survey did not identify any probable archaeological anomalies but it did reveal anomalies of possible archaeological provenance in DA3 and DA4 (Figures 02 & 03). In DA4, the corner of a possible ditched enclosure [4.1], a possible prehistoric burnt mound [4.2] recorded in the desk-based assessment as a possible prehistoric cairn (CAG-005) in the desk-based assessment, an enclosure [4.3], a small rectangular possible ditched settlement feature [4.4] and a possible kiln site [4.5] have been recorded (McGuinness, 2020, 40).

9.3.34 Former field boundaries recorded on 19th century historic maps have been identified in DA5 and DA6 (Figures 02 – 04). Anomalies which appear to represent field boundaries not recorded on historic maps have been identified in DA4 and DA5. In DA4 and DA5 these possible boundaries can be resolved into distinct field systems. The remains of ridge and furrow cultivation have been identified in DA4 and DA5 and modern ploughing is evident in DA4 and DA5. Land drains and other modern agricultural features were identified in DA4 and DA6.

#### Trial Trenching (Appendix 9.3)

9.3.35 A total of 131 trenches were excavated during November/December 2020 of which 77 contained no archaeological evidence. The remaining 55 trial trenches confirmed the presence of archaeological features, primarily linears, which upon investigation proved to be agricultural in nature, being for example, former field boundaries, former trackways, plough furrows or land drains. The identified remains of 51 probable field

boundaries varied in size and depth. The field boundaries that were excavated ranged in width from 0.48m to 1.85m and in depth from 0.04m to 0.80m; the average mean width of the boundaries was 0.57m with an average mean depth of 0.15m. On the whole, of the probable field boundaries that were investigated, the majority proved to be relatively shallow (as indicated by the mean average sum) that barely cut the surface of the underlying natural and their fills were broadly indistinguishable from that of the overlying subsoil or topsoil. The majority of the fills of these features were sterile with no presence of charcoal inclusions or organic material and only a handful produced limited 19th century pottery sherds, typically black glazed earthenware and tin glazed earthenware; the pot sherds examined, noted on the relevant GAT pro-forma and discarded.

- 9.3.36 There were though other more substantial or distinct linear features that are most likely former field boundaries and yet they do not correspond with field layouts depicted on available historical maps. This was notably the case, for example, with the linears investigated in Fields A and B in DA4 as well as the linears uncovered in the western half of DA5 (Figures 05 & 06; see Appendix IV). The ditches that corresponded with geophysical anomalies 4.6, 4.7, 4.8 and 5.4 (PRNs 91517-23, 91526, 91531-32, 91525-26, 91524-25 and 91537-39) were quite substantial which makes it highly probable that they were field boundary ditches but no artefacts were retrieved from the fills and ecofacts were not recovered as they were sterile and almost indistinguishable from the overlying topsoil. Aspects of geophysical anomaly 4.1 would also appear to correspond with the remnants of a clawdd (PRN 91529). Due to the lack of artefactual/ecofactual and cartographic evidence (the latter dating from the 19th century) it may be supposed that these linears are the remnants of field boundaries that pre-date the 19th century.
- 9.3.37 The remnants of burnt mound spreads were also sporadically identified across the proposed DAs, in Trench 4, Field D, DA4 (PRN 91534) (Figure 07). As were other probable prehistoric features such as a small ring ditch [1003] in Trench 10 (PRN 91542) and a possible standing stone [1306] in Trench 13 (PRN 91546), both in DA5 (Figure 10).
- 9.3.38 The remaining archaeological features uncovered within the trial trenches were isolated pits; in total four such features were identified in the trial trenches. The most notable of these were [1306] that contained a standing stone in DA5 and [104] in Trench 1, Field C, DA6 (PRN 91565) the basal fill of which (106) was sampled due to its charcoal content.

#### Historic Asset Setting Impact Assessment (Appendix 9.4)

- 9.3.39 A four-stage assessment of the impact of the proposed development on the Castellor Hut Group Scheduled Monument was completed in accordance with the guidance in Cadw's "Setting of Historic Assets in Wales". It was determined that the proposed solar farm, primarily DA3, would have a negative impact on the setting of Castellor Hut Group Scheduled Monument (AN088), and the magnitude of this impact was assessed as moderate, as the scale and proximity of the proposed development would result in considerable changes to the setting of the historic asset that significantly modify the setting. As a consequence of this, it was decided that the removal of DA3 from the proposed development was appropriate.

## 9.4 PROPOSED DEVELOPMENT

9.4.1 The proposal will comprise the following:

- Photovoltaic (PV) panels to a maximum height of circa 3m;
- Mounting frames - matt finished small section metal structure;
- Scheme of landscaping and biodiversity enhancement;
- Central Inverters (inverters and transformers will be housed together in prefabricated containers to a maximum height of circa 3m), substations (DNO and Customer to a maximum height of circa 3m) and associated cabling (below ground);
- Point of connection;
- Stock fencing up to a height of circa 2m to secure the development areas;
- Infra-red CCTV (CCTV cameras would operate using motion sensors and would be positioned inward only to ensure privacy to neighbouring land and property);
- Temporary set down areas;
- Internal service roads; and
- Site access for the construction, operational and decommissioning phases.

9.4.2 The construction of the solar farm is expected to last approximately 4 to 5 months and employ up to 150 staff at the peak of the construction period. The Construction Traffic Method Statement appended to Transport Statement provides details of proposed access arrangements, the anticipated programme, construction vehicle numbers and type, construction worker numbers and the proposed construction hours.

## 9.5 ASSESSMENT OF EFFECTS

### Incorporated Mitigation

9.5.1 The archaeological assessments and evaluations have identified a wide variety of historic assets that may be impacted upon by the proposed development. The significance of the historic assets is outlined in **Table 9.5**.

Table 9.5: Key Historic Assets and Heritage Significance

Cadw/GAT PRN	Name	Designations	Significance
LB 19488	Pandy Cymunod	Grade II	Medium
LB 5309	Church of St Mihangel	Grade II	Medium
PRNs 91517-23	Geophysical anomaly 4.6; possible pre-19 <sup>th</sup> century field boundary	Undesignated	Medium
PRN 91526, PRNs 91531-32	Geophysical anomaly 4.7; possible pre-19 <sup>th</sup> century field boundary	Undesignated	Medium
PRNs 91524-25	Geophysical anomaly 4.8; possible pre-19 <sup>th</sup>	Undesignated	Medium

Cadw/GAT PRN	Name	Designations	Significance
	century field boundary		
PRNs 91537-39	Geophysical anomaly 5.4; possible pre-19 <sup>th</sup> century field boundary	Undesignated	Medium
PRN 91529	Geophysical anomaly 4.1; possible pre-19 <sup>th</sup> century clawdd	Undesignated	Medium
PRN 91514	Burnt mound spread	Undesignated	Medium
PRN 91515	Burnt mound spread	Undesignated	Medium
PRN 91534	Burnt mound spread	Undesignated	Medium
PRN 91542	Small ring ditch	Undesignated	Medium
PRN 91546	Possible standing stone	Undesignated	Medium
PRN 915565	Pit with charcoal rich deposit	Undesignated	Medium
PRN 91527	Geophysical anomaly 4.13; pre-19 <sup>th</sup> century field system	Undesignated	Low
PRN 91535	Stone filled pit in Field E, DA4	Undesignated	Low
PRN 91536	Geophysical anomaly 5.2; former trackway depicted on historic maps	Undesignated	Low
PRN 91543	Ridge and furrow DA5	Undesignated	Low
PRN 91544	Geophysical anomaly 5.5; possible former field boundary	Undesignated	Low
PRN 91545	Geophysical anomaly 5.4; possible former field boundary	Undesignated	Low
PRN 91549	Possible remnants of hedgerows, Field A, DA6	Undesignated	Low

Cadw/GAT PRN	Name	Designations	Significance
PRN 91550	Geophysical anomaly 6.1; possible former field boundary	Undesignated	Low
PRN 91553	Probable former 19 <sup>th</sup> century field boundary	Undesignated	Low
PRN 91556	Possible post hole Trench 01, Field B, DA 6	Undesignated	Low
PRN 91560	Possible post hole Trench 05, Field B, DA6	Undesignated	Low
PRN 91568	Unexcavated pit, Field D, DA6	Undesignated	Negligible
PRN 91569	Modern machine cut linear, Field D, DA6	Undesignated	Negligible
PRN 91561	Ephemeral linear, Field B, DA6	Undesignated	Negligible
PRN 91562	Ephemeral linear, Field B, DA6	Undesignated	Negligible
PRN 91563	Unexcavated linear, Field B, DA6	Undesignated	Negligible
PRN 91564	Unexcavated linear, Field B, DA6	Undesignated	Negligible
PRN 91566	Drainage ditch Field D, DA6	Undesignated	Negligible
PRN 91567	Unexcavated pit, Field D, DA6	Undesignated	Negligible
PRN 91557	Ephemeral linear, Field B, DA6	Undesignated	Negligible
PRN 91558	Ephemeral linear, Field B, DA6	Undesignated	Negligible
PRN 91559	Ephemeral linear, Field B, DA6	Undesignated	Negligible
PRN 91555	Possible drainage ditch Field B, DA6	Undesignated	Negligible
PRN 91554	Possible drainage ditch Field B, DA6	Undesignated	Negligible
PRN 91551	Unexcavated linear, Field A, DA6	Undesignated	Negligible

Cadw/GAT PRN	Name	Designations	Significance
PRN 91552	Ephemeral linear, Field A, DA6	Undesignated	Negligible
PRN 91547	Unexcavated linear, DA5	Undesignated	Negligible
PRN 91548	Unexcavated linear, Field A, DA6	Undesignated	Negligible
PRN 91540	Unexcavated linear, DA5	Undesignated	Negligible
PRN 91541	Modern machine cut linear DA5	Undesignated	Negligible
PRN 91533	Unexcavated linear Field C, DA4	Undesignated	Negligible

### Construction/Decommissioning Phase Effects

#### Archaeological Remains

9.5.2 Based on the results of the trial trenching (GAT Report 1571) it was recommended that a programme of archaeological mitigation be carried out in advance of the proposed development groundworks. This might take the form of a controlled strip of the topsoil/subsoil in the vicinity of:

- The burnt mound spread (PRN 91534; medium value) in Trench 04, Field D, DA4 that would include the associated palaeochannels. This appears to be a well-preserved, large example of a burnt mound spread which is within 0.10m of the existing ground surface;
- The small ring ditch [1003] in Trench 10, DA5 (PRN 91542; medium value) to better determine its extent and confirm if there are associated features or burials within it or immediately adjacent to the monument;
- The possible standing stone [1306] in Trench 13, DA5 (PRN 91546; medium value) better determine its extent and confirm if there are associated features immediately adjacent to the monument. Also to better determine if it is a prehistoric monument or a gate post at the terminal of a field boundary.

9.5.3 The field boundaries that may pre-date the 19th century in Fields A and B, DA4 (PRNs 91517-26, 91529, 91531-32 & 91537-39; all medium value) may be sufficiently covered by an archaeological watching brief. This will be dependent on the confirmed layout of the solar panels and associated infrastructure of this area of the site.

#### Listed Buildings

9.5.4 There are no listed buildings within the proposed development site but 94 listed buildings are located within the 5km search area of the desk-based assessment (Rovira I. G. & Sinnot S, 2019). The assessment also assessed the potential of the visual impact of the project on the listed buildings (see Appendix II). It was found that four of the listed buildings would be impacted in this manner:

- Pany Cymunod (LB 19488; medium value) and Pont Factory Cymunod (LB 5278; medium value) would have partial views of DA4;
- Church of St Mihangel (LB 5309; medium value) the ZTV models predict slight views of DA6 but this was considered to be negligible. It may be necessary to

confirm this through field inspection.

#### Scheduled Monuments

- 9.5.5 The desk-based assessment identified 13 scheduled monuments within the 5km search area of the proposed development (Rovira I. G. & Sinnot S, 2019). The desk-based assessment and the Historic Asset Setting Impact Assessment (McGuinness, N., 2021) determined that the majority of the scheduled monuments will not be directly or indirectly impacted upon by the proposed development. The one exception was Castellor Hut Settlement (AN 088; high value), which the Historic Asset Setting Impact Assessment determined that *“the impact of the proposed development on the setting of historic asset was assessed as being negative, and the magnitude of this impact moderate, as the visibility, density, scale and proximity of the proposed development in DA3 will result in considerable changes to the setting of the historic asset that significantly modify the setting, affecting the character of the historic asset and negatively impacting its illustrative historical and aesthetic heritage values. The impact on the setting is reversible however and limited in duration by the lifespan of the development, currently estimated at approximately 40 years”* (McGuinness, 2021, 43).
- 9.5.6 Based on the conclusions of the desk-based assessment (Rovira I. G. & Sinnot S, 2019) and Historic Asset Setting Impact Assessment (McGuinness, N., 2021) it was determined that DA3 would be removed from the proposed development due to the level of impact it would have on the adjacent Castellor Hut Settlement (AN 088; high value). The remainder of the proposed development areas are either not indivisible with the scheduled monument or the impact on it will be mitigated by distance as well as the screening effect of existing trees and hedgerows.

#### Operation Phase

##### Archaeological Remains

- 9.5.7 No additional mitigation will be required for archaeological remains when the solar farm is operational as it should have been suitably resolved prior to or during the construction phase of the project.

##### Listed Buildings

- 9.5.8 It is anticipated that no additional mitigation will be required for listed buildings during the operation of the solar farm. The partial views to the Grade II listed buildings outlined above (Section 9.5.2) from the solar farm should be suitably mitigated through a combination of landscaping and/or the introduction of additional vegetation.

##### Scheduled Monuments

- 9.5.9 The operational stage of the solar farm will not have a negative impact on the scheduled monuments in the proximity of the development. The removal of DA3 (as outlined in Section 9.5.5) will ensure that there will not be an adverse effect on the setting of the Castellor Hut Settlement (AN 088).

## 9.6 RESIDUAL EFFECTS

### Construction and Decommissioning

- 9.6.1 This section outlines the residual effects having taken into account the good practice

and mitigation described above. A summary of the residual effects and their significance for archaeological remains, listed buildings and scheduled monuments are provided in **Table 9.6**.

9.6.2 After mitigation (see Section 9.5.2), no significant effects on any known archaeological remains, listed buildings and scheduled monuments are predicted.

9.6.3 The residual significance of effect during the three phases of operation of the development has been assessed to be minor adverse for the archaeological remains and most of the affected listed buildings; the exception being the Church of St Mihangel which the solar farm will have a negligible effect. This projection is provided with caveats, as it is dependent on:

- suitable archaeological mitigation for the highlighted archaeological remains during or before the construction phase (in relation to the scope of said mitigation refer to Section 9.5.2 and conclusions of GAT Report 1571 in Appendix IV); and
- where necessary landscaping and/or additional vegetation for the remaining listed buildings.

**Table 9.6: Summary of Residual Effects on Historic Assets**

Historic Asset	Description of potential effect	Value of Historic Asset	Potential magnitude of Effect	Potential significance of Effect	Additional mitigation	Post-mitigation magnitude of Effect	Significance of residual Effect
Burnt mound spread (PRN 91535)	Physical impacts as a result of construction activity	Medium	Major	Moderate adverse	Archaeological Excavation	Minor	Minor adverse
Ring Ditch (PRN 91542)	Physical impacts as a result of construction activity	Medium	Major	Moderate adverse	Archaeological Excavation	Minor	Minor adverse
Standing Stone (PRN 91546)	Physical impacts as a result of construction activity	Medium	Major	Moderate adverse	Archaeological Excavation	Minor	Minor adverse
Pre-19th century field boundaries, Area 4	Physical impacts as a result of construction activity	Medium	Moderate	Moderate adverse	Archaeological Excavation	Minor	Minor adverse
Pany Cymunod (LB 19488)	Visual change in setting for duration of operational life of solar farm	Medium	Minor	Minor adverse	Landscaping and/or additional vegetation	Minor	Minor adverse
Church of St Mihangel (LB 5309)	Visual change in setting for duration of operational life of solar farm	Medium	Negligible	Negligible	Landscaping and/or additional vegetation	Negligible	Negligible
Tyn Lidiart Bridge (LB 20428)	Visual change in setting for duration of operational life of solar farm	Medium	Minor	Minor adverse	Landscaping and/or additional vegetation	Minor	Minor adverse

### Cumulative Effects

9.6.4 There is potential for historic assets to experience cumulative effects due to the construction and operation of the proposed Parc Solar Traffwll project on archaeological and cultural historic assets. This potential has been considered within the cultural heritage impact assessment. It is considered that the proposed development will not result in any cumulative effects on cultural heritage.

## 9.7 SUMMARY OF PREDICTED EFFECTS

9.7.1 In summary, the construction of the proposed Parc Solar Traffwll project will have a minor adverse residual effect on the historic assets PRNs 91535, 91542, 91546 and the pre-19<sup>th</sup> century field boundaries identified in DA4; see Table 6 above.

9.7.2 The construction of the proposed Parc Solar Traffwll project will have a negligible to minor adverse residual effect on three listed buildings (reference **Table 9.6**) during the construction and operation phase of the development.

## 9.8 SUMMARY AND CONCLUSIONS

9.8.1 The assessment shows that there would be no significant impacts during the

construction or operation of the Proposed Development following the implementation of appropriate mitigation.

## 10. HYDROLOGY AND FLOOD CONSEQUENCES

## 10.1 INTRODUCTION

- 10.1.1 This chapter sets out the assessment of the environmental impacts of the proposed development relating to hydrology, drainage and flood risk. It describes the baseline conditions, identifies key water resources and sensitivities, and assesses the direct and indirect impacts of the development on the hydrological environment. This chapter also assesses the potential for flood risk in accordance with Welsh Government guidance and the requirements of Natural Resources Wales (NRW). The need for any water resource mitigation measures is addressed and any post-mitigation residual impacts are identified.
- 10.1.2 A Flood Consequence Assessment (FCA) has been undertaken in accordance with CIRIA 624, Planning Policy Wales (PPW) (Edition 11) and the accompanying Technical Advice Note 15: Development and Flood Risk (TAN15). An FCA is required for less vulnerable development proposals in Flood Zones C1 and C2 that meet the justification test. A copy of the FCA is included in Appendix 10.1 to this ES.
- 10.1.3 The FCA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed, taking climate change into account. The FCA should identify opportunities to reduce the probability and consequences of flooding.
- 10.1.4 A SuDS Design has been undertaken which details the methods that will be used to discharge the surface water runoff in accordance with the six standards requiring evaluation as part of a SuDS Approval Body (SAB) application. This has been subject to pre-application dialogue with the SAB. Copies of the pre-application correspondence and the draft applications for SAB consent are included in **Appendix 10.3**.

### Statement of Competence

- 10.1.5 This chapter was written by Keelan Serjeant BSc (Hons), MSc, MCIWEM who has over 17 years of experience in hydrology, flood risk and the planning process. He is a member of the British Hydrological Society and a Member of the Chartered Institute of Water and Environmental Management (CIWEM). He has written more than 1,000 Flood Risk Assessments and Environmental Statements and has taken training courses in the Flood Estimation Handbook (FEH), Urban Hydrology, SuDS, FRAs, water quality and planning. He has successfully delivered both site and strategic assessments for a range of private and public sector clients nationwide including developers, planning consultants, architects, private individuals, local planning authorities and the Environment Agency.

## 10.2 CONTEXT

### Legislation

- 10.2.1 There is a wide range of legislation associated with drainage and hydrological impact that apply in the UK. The legislation includes:
- [Water Industry Act \(1991\)](#)
- 10.2.2 The Water Industry Act relates to the supply of water and the provision of sewerage services and applies to all Sewerage Undertakers.

Water Resources Act (1991 as amended)

- 10.2.3 The Water Resources Act relates to the National Rivers Authority, whose activities are now assumed by the Environment Agency (now NRW in Wales) and sets out the responsibilities of NRW in relation to water pollution, resource management, flood defence, fisheries, and in some areas, navigation. The Act regulates activities that may affect the water environment. Discharge to controlled waters is only permitted with the consent of NRW. An aim of the Act is to ensure that the polluter pays the cost of the consequences of their discharges.

Land Drainage Act (1991)

- 10.2.4 The Land Drainage Act outlines the constitution of Internal Drainage Boards (IDB) and the powers of the National Rivers Authority (now assumed by NRW). It also includes a definition of watercourses; all rivers and streams and all ditches, drains, culverts, dykes, sewers (other than public sewers) and passages through which water flows.

The EU Water Framework Directive (WFD) (2000)

- 10.2.5 WFD has been the cornerstone legislation in the EU and UK planning policy. The aim of the Directive is to generate a more integrated approach to water management ensuring that where possible links with ecology are increased. It also strives to ensure that water quality is improved and that any proposed developments will not have a detrimental impact upon water quality. The WFD was transposed into English & Welsh law via The Water Environment (Water Framework Directive) (England & Wales) Regulations 2003. The purpose of these regulations is to implement a strategic planning process to be established for managing, protecting and improving the quality of water resources within defined river basin catchment areas.

Water Act (2003)

- 10.2.6 The Water Act is an act whose provisions are mainly to amend other legislation, such as the Reservoirs Act 1975, Water Industry Act 1991 and the Water Resources Act 1991.

Flood Risk Regulations (2009)

- 10.2.7 The Flood Risk Regulations transpose the EC Floods Directive into domestic law and implement its provisions.

Water Framework Directive (2000)

- 10.2.8 The European Water Framework Directive was transposed into UK law in December 2003, as the Water Environment Regulations 2003. The framework commits the UK Government (and all other European Union members) to improving the quality of all water bodies and coastal waters such that they attain at least 'Good' status for chemical and ecological criteria.
- 10.2.9 Any modification to a waterbody and its floodplain are now required to be Water Framework Directive (WFD) compliant. Assessments should be undertaken to determine the impacts on interventions within a waterbody on the designated Ecological Status of that waterbody. All water bodies have to achieve a Good Ecological Status or Good Ecological Potential (for heavily modified water bodies) by

2027. Some water bodies have targets to reach a Good Status by either 2015 or 2021.

- 10.2.10 The Act puts a duty on local authorities to take into consideration the aims and objectives of the act and any relevant River Basin Management Plan during the completion of their duties and to ensure no adverse effect upon the environment.

#### European Floods Directive (2007)

- 10.2.11 The aim of the European Floods Directive is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The directive sets out requirements for the UK Government (and all other European Union members) to assess and map flood risk from all major rivers. Preliminary Flood Risk Assessments (PFRAs) have been produced by all Lead Local Flood Authorities, with the flood mapping stage completed by 2013. By 2015, Flood Management Plans will need to be produced, focussing on flood prevention, protection and preparedness. The EU Floods Directive has been transposed into UK law in the Flood Risk Regulations (2009).

#### Planning Policy

- 10.2.12 PPW11 (February 2021) objective to support sustainable development is for the 'avoidance of development in areas of flooding from the sea or from rivers'. Local Planning authorities are advised to take a precautionary approach on a strategic scale which requires consideration of the catchment as a whole. Development proposals need to decrease not increase flood risk arising from fluvial or coastal flooding or from additional run-off created by new developments.
- 10.2.13 PPW considers flood risk to developments using a sequential characterisation of risk. This is presented in the TAN15 Development Advice Maps (DAMs) which identify flood zones A, B, C1 and C2. The initial study requirement is to identify the flood zones and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions.
- 10.2.14 TAN15 requires a detailed Flood Consequence Assessment (FCA) to be produced for all developments located within DAM zones C1 and C2. Flood Zone B only requires an FCA if site levels are below the extreme (0.1%) flood level (as defined in Technical Guidance TAN15, Figure 1). The proposed development is located within DAM Zone A however as small areas are located is within DAM Zones B and C2, a detailed FCA is therefore required.
- 10.2.15 The vulnerability classification of different development types is identified in Figure 2 of TAN15. Utilities infrastructures are classed as less vulnerable development and are permitted within DAM Zones A, and Zone B and in Zone C2 subject to the application of the justification test. The Planning Statement submitted with the application demonstrates that the proposed development meets the justification test.
- 10.2.16 The Anglesey and Gwynedd Joint Local Development Plan (JLDP) 2011 - 2026 Written Statement (31 July 2017) includes development management policies which seek to engender sustainable living by '*Minimize, adapt and mitigate the impacts of climate change. This will be achieved by: - ensuring that highly vulnerable development is directed away from areas of flood risk wherever possible.*'

10.2.17 Identified relevant policies are:

- Strategic Policy PS5: Sustainable Development, Item 9 - Proposals are required to: 'manage flood risk and maximise use of sustainable drainage schemes'.
- Policy PCYFF2: Design and Policy Shaping – development proposals to be permitted subject to meeting relevant criteria of which item 8 states 'its drainage systems are designed to limit surface water run-off and flood risk and prevent pollution'.

### 10.3 ASSESSMENT APPROACH

10.3.1 In order to establish the environmental impact of the proposed development on the hydrological regimes of the application site and its immediate environs, it was necessary to undertake the assessment in a number of stages. The initial stage comprised a desk study review of available information in order to determine (where possible) site conditions in terms of water features (both surface and ground), water quality and flood risk.

10.3.2 The sources of information used in the desktop study are listed in in **Table 10.1**. A site walkover survey was undertaken to identify local surface water features (i.e. watercourses, drainage ditches etc.) on the Site, and within the study area, observations included land use, hydrological regime, land drainage features, watercourse morphology and the Site topography.

10.3.3 Consultation has taken place with the relevant statutory bodies via pre-application discussions and the submission of an EIA Scoping Report submitted to the Planning Inspectorate Wales.

Table 10.1: Data Sources

Topic	Sources of Information
Topography	Ordnance Survey Maps Site topographic survey
Geology	BGS Bedrock and Superficial Geological Map BGS online data
Hydrogeology	NRW online data Relevant scientific literature
Hydrology	Metrological Office Historic Rainfall Data Flood Estimation Handbook (FEH) Webservice National Soil Resource Institute NRW Flood Risk Maps Development Advice Maps (DAM) The SuDS Manual

10.3.4 The hydrological regime was considered in terms of existing conditions, and the effects of the proposed development. An assessment of the application-site location in terms of flood risk was also undertaken. Existing conditions local to the site (within the site boundary) were also considered in terms of hydrological management and the collection of surface water.

10.3.5 In terms of assessing the development site, the following phases of the proposal have been considered, namely the construction, operational and decommissioning

phases.

- 10.3.6 There are a number of potential impacts that have to be considered that could have a direct or indirect effect on hydrology, flood risk, water quality and drainage. These impacts may be transitional, but also can be more permanent in nature. The primary concerns relate to potential impacts on controlled water receptors which are considered to be of high significance.
- 10.3.7 The purpose of the EIA is to identify the likely ‘significance’ of environmental effects (beneficial or adverse) arising from a development. In broad terms, environmental effects are described as:
- Adverse – detrimental or negative effects to an environmental resource or receptor;
  - Beneficial – advantageous or positive effect to an environmental resource or receptor; or
  - Negligible – a neutral effect to an environmental resource or receptor.
- 10.3.8 Effects have been assessed in terms of:
- The magnitude of the impact –the degree of alteration (both positive and negative) from the baseline state; and
  - The sensitivity of the receptor(s) subjected to the impact –this may relate to the value of a resource and the reversibility of impacts.
- 10.3.9 Any effect of Moderate or Major significance is considered to represent a likely significant effect for the purposes of the EIA Regulations. Significance of effects would be considered before and after mitigation.
- 10.3.10 The criteria for determining magnitude of impact are set out below in **Table 10.2**.
- 10.3.11 The sensitivity of a receptor is based on the importance of the receptor using the criteria below in **Table 10.3**.

Table 10.2: Magnitude of Impacts and Criteria

Magnitude of Effect	Criteria
High	Total loss or major/substantial alteration to elements/features of the baseline (pre-development) conditions such that the post development character/composition/attributes will be fundamentally changed.
Medium	Loss or alteration to one or more elements/features of the baseline conditions such that post development character/composition/attributes of the baseline will be materially changed.
Low	A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible/detectable but the underlying character/composition/attributes of the baseline condition will be similar to the pre-development.
Negligible	Very little change from baseline conditions. Change not material, barely distinguishable or indistinguishable, approximating to a ‘no change’ situation.

Table 10.3: Degree of Sensitivity Criteria

Sensitivity	Criteria
High	The receptor/resource has little ability to absorb change without fundamentally altering its present character or is of international or national importance.
Medium	The receptor/resource has moderate capacity to absorb change without significantly altering its present character or is of high and more than local (but not national or international) importance.
Low	The receptor/resource is tolerant of change without detrimental effect, is of low or local importance.
Negligible	The receptor/resource can accommodate change without material effect, is of limited importance.

10.3.12 Significance of effect is evaluated as a combination of the sensitivity of the receptor and the magnitude of change the development results in. Although the matrix in Table 10.4 is designed to demonstrate an objective rationale to reach a conclusion about the potential significance of impact a degree of professional judgement is a key element in the evaluation process.

Table 10.4: Significance of Effect

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

#### Data Limitations

10.3.13 Geological and hydrogeological data beneath the site is limited to information which has been obtained from available 'desk' based sources, including maps and limited data from boreholes surrounding the site. Full determination of the under geological and hydrogeological regime beneath site would require further intrusive investigation, which is not proposed for this assessment.

10.3.14 The NRW flood maps and the TAN15 DAMs can change over time. However, it is not considered that the above limitations would have a significant bearing on the outcome of this assessment.

#### 10.4 BASELINE CONDITIONS

10.4.1 The assessment of baseline conditions included a review of the pertinent information available.

#### Site Description and Topography

10.4.2 The area proposed for development is located to the south of the A55 and distributed across three parcels of land (known as 'development areas') to the south-west of the village Bryngwran and in the vicinity of the village Llanfihangel yn Nhowyn, Anglesey. The development areas (DAs) are located to the west and south-east of the village of Llanfihangel yn Nhowyn and to the south and south-east of the village of

Bryngwran. RAF Valley is situated to the south and the A55 lies to the north. The development areas are denoted as DA4, DA5 and DA6.

- 10.4.3 The application site is a rural expanse of agricultural fields, with a mix of arable and pasture, drained by network of drainage ditches and served by farms and other rural buildings.
- 10.4.4 The proposed solar farm occupies an area comprising fields with boundary hedges and ditches. The fields are accessed from the nearby roads, and then either through fields or along tracks to give access to each field. The ditches are crossed by culverts of various sizes.
- 10.4.5 Each development area is considered in further detail below:

#### Development Area 4

- 10.4.6 DA4 comprises 4 grazing field, measuring 23ha and is irregular in shape and lies adjacent to the farm buildings at Plas Llechylched, to the east of the Afon Crigyll, and is bound by roads to the north and east. The highest part is towards the eastern boundary at 14mAOD. The western boundary, adjacent to the Afon Crigyll is the low point of the site at 4.00mAOD. South western boundary of western field has large pond encroaching.

#### Development Area 5

- 10.4.7 DA5 comprises a grazing field measuring 7ha and is irregular in shape and lies to the north of the farm buildings at Ty Croes and is bounded by roads to the north and west. The highest part of the area is located towards the western boundary at approximately 16.00mAOD, the lowest point is located centrally at 12.00mAOD.

#### Development Area 6

- 10.4.8 DA6 comprises 15 grazing fields with an area of 25ha and is irregular in shape and lies to the west of the village of Llanfihangel yn Nhowyn, to the east of Llyn Dinam, to the north of Llyn Penrhyn, and to the south of a road named Lon Bach. DA6 has a low point of 7.00mAOD at the southern boundary and a highpoint of 12.00mAOD on the northern boundary. This parcel of land is low lying fields with drainage ditches.

#### Catchment Hydrology

- 10.4.9 All the rivers are fed by a network of agricultural drains and springs/issues which flow through or adjacent to the development areas. Currently the surface water runoff from all the sites discharges via infiltration to the ground or to the adjacent drainage ditches.
- 10.4.10 DA4 and DA5 are located within the Afon Crigyll catchment. The Afon Crigyll is located to the east of the DAs and flows from north to south before discharging into Cymran Bay at Rhosneigr and has a catchment area of 50.13km<sup>2</sup>. Within this catchment and located adjacent to the development areas is the Llyn Traffwll (reservoir).
- 10.4.11 DA6 is located within an unnamed catchment, the unnamed watercourse flows from north to south before discharging into Cymran Bay adjacent to RAF Valley and has a catchment area of 8.77km<sup>2</sup>. Within this catchment and located adjacent to the

development area is the Llyn Dinam, Llyn Penrhyn and Llyn Cerrig Bach.

- 10.4.12 DA6 is immediately upstream of Llyn Dinam Special Area of Conservation (SAC). The area has a network of ditches and drains, many of which are currently partially silted up and well vegetated. There is a history of flooding in the nearby Dol Eithin housing area and surface water from the estate flows into DA6, and on a number of occasions surface water has surcharged into the surface floodwater. At present the water discharged from the estate flows slowly through DA6 and much of the silt and nutrients settles out or is lost en route before it reaches the SAC.

#### Rainfall

- 10.4.13 The Application Site is located within an area of average rainfall. The 1961-1990 Standard Average Annual Rainfall (SAAR) for the Site as recorded in the Flood Estimation Handbook (FEH) web service is 900mm per annum. The UK national average is 832mm per annum.

#### Source Protection Zone

- 10.4.14 The site is not located within a NRW Source Protection Zone (SPZ).

#### Soil

- 10.4.15 Information from the National Soil Resources Institute details the site area as being situated on slowly permeable seasonally wet acid loamy and clayey soils and sand dune soils. The soil classification for WRAP type is 2: i) Very permeable soils with shallow ground water; ii) Permeable soils over rock or fragipan, commonly on slopes in western Britain associated with smaller areas of less permeable wet soils; (fragipan - a natural subsurface horizon having a higher bulk density than the solum above. Seemingly cemented when dry but showing moderate to weak brittleness when moist. The layer is low in organic matter, mottled and slowly or very slowly permeable to water. It is found in profiles of either cultivated or virgin soils but not in calcareous material); and iii) Moderately permeable soils, some with slowly permeable subsoils.

#### 10.4.16 Surface Water Quality

- 10.4.17 The Water Framework Directive (WFD) water quality information for the Afon Crigyll is shown in Table 10.5 and for the unnamed - Crigyll/Caradog catchment is shown in **Table 10.6**. The WFD water quality information for Llyn Dinam is shown in **Table 10.7** and for Cymyran Bay is shown in **Table 10.8**.

- 10.4.18 There are no drinking water protected areas or nitrate vulnerable zones within the catchments.

Table 10.5: Afon Crigyll WFD Water Body Classification

	2009 Cycle 1	2015 Cycle 2	2018 Cycle 2	Objectives
Overall Water Body	Good	Moderate	Moderate	Good by 2027
Ecological	Did not require assessment	Moderate	Moderate	Good by 2027
Chemical	Good	Good	Good	Good by 2027

Table 10.6: Unnamed - Crigyll/Caradog catchment WFD Water Body Classification

	2009 Cycle 1	2015 Cycle 2	2018 Cycle 2	Objectives
Overall Water Body	Moderate	N/A	N/A	Good by 2027
Ecological	Did not require assessment	N/A	N/A	Good by 2027
Chemical	Moderate	N/A	N/A	Good by 2027

Table 10.7: Cymyran Bay WFD Water Body Classification

	2009 Cycle 1	2015 Cycle 2	2018 Cycle 2	Objectives
Overall Water Body	Moderate	N/A	N/A	Good by 2027
Ecological	Moderate	N/A	N/A	Good by 2027
Chemical	Good	N/A	N/A	Good by 2027

Table 10.8: Llyn Dinam WFD Water Body Classification

	2009 Cycle 1	2015 Cycle 2	2018 Cycle 2	Objectives
Overall Water Body	Good	N/A	N/A	Good by 2015
Ecological	Did not require assessment	N/A	N/A	Good by 2015
Chemical	Good	N/A	N/A	Good by 2015

## Surface Water Abstractions

10.4.19 **Table 10.9** shows the licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records.

**Table 10.9: Surface Water Abstractions**

Details	
Status: Historical Licence No: WA/102/0004/001 Details: Lake & Pond Throughflow Direct Source: EAW Surface Water Point: UN-NAMED TRIBUTARY OF THE AFON CRIGYLL Data Type: Point Name: RSPB Easting: 233127 Northing: 376323	Annual Volume (m <sup>3</sup> ): 80000 Max Daily Volume (m <sup>3</sup> ): 1036.8 Original Application No: - Original Start Date: 31/07/2001 Expiry Date: 31/03/2026 Issue No: 1 Version Start Date: 07/05/2015 Version End Date: -
Status: Active Licence No: WA/102/0004/001 Details: Lake & Pond Throughflow - Very Low Direct Source: - Point: - Data Type: Point Name: - Easting: 233127 Northing: 376323	Annual Volume (m <sup>3</sup> ): 80,000 Max Daily Volume (m <sup>3</sup> ): 1,036.80 Original Application No: - Original Start Date: May 7 2015 12:00AM Expiry Date: Mar 31 2026 12:00AM Issue No: - Version Start Date: - Version End Date: -
Status: Historical Licence No: 23/102/4/0008 Details: Lake & Pond Throughflow Direct Source: EAW Surface Water Point: UN NAMED STREAM FROM LLYN TRAFFWLL Data Type: Point Name: RSPB Easting: 233140 Northing: 376320	Annual Volume (m <sup>3</sup> ): 124416 Max Daily Volume (m <sup>3</sup> ): 1036.8 Original Application No: - Original Start Date: 31/07/2001 Expiry Date: 31/03/2015 Issue No: 1 Version Start Date: 10/04/2007 Version End Date: -
Status: Active Licence No: 23/102/4/0009 Details: Unknown (Impounding) - Direct Source: - Point: - Data Type: Point Name: - Easting: 233790 Northing: 377110	Annual Volume (m <sup>3</sup> ): 0 Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: Dec 31 2008 12:00AM Expiry Date: - Issue No: - Version Start Date: -

### Flooding

10.4.20 An FCA has been carried out for the Proposed Development in accordance with guidance contained in Planning Policy Wales and TAN15. The FCA identifies and assesses the risks of all forms of flooding to and from the development and

demonstrates how these flood risks would be managed so that the development remains safe throughout its lifetime, taking climate change into account. The FCA includes an assessment of the existing and proposed surface water drainage of the Site.

- 10.4.21 A review of the Development Advice Map (DAM) which accompanies TAN15 is shown in **Table 10.11**. The DAM zones represent the undefended fluvial and tidal flood extents derived from a combination of detailed and generalised modelled data. The DAs are not located within the tidal zones but the fluvial Flood Zones.
- 10.4.22 The fluvial zones have been produced by the Generalised Model and give only an indication of flood risk. Although areas of the DAs have been shown to be located within the DAM Zones it should be taken into account that the DAM Zones have been produced by the Generalised Model and only give an indication of flood risk. Therefore, it is likely that the actual risk of fluvial/tidal flooding at the site is much reduced compared to the DAM Zones.
- 10.4.23 Further detailed assessments of flood risk shows that the DAs are not at risk of tidal flooding, this has been confirmed by NRW. Furthermore, DA6 has been shown to be not at risk of fluvial flooding.
- 10.4.24 The only DA potentially at risk of fluvial flooding is DA4, modelling undertaken by NRW for the Fluvial NRW Flood Risk Assessment Wales map shows that the majority of DA4 is not at risk of fluvial flooding and has a very low risk of fluvial flooding with a chance of flooding of less than 1 in 1000 (0.1%) years. The majority of DA4 would be flood free during the 1 in 1000 year event.
- 10.4.25 A small area, approximately 10%, within the centre of DA4 is shown to have a low risk of fluvial flooding with a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%) years. A very small area, less than 5%, on the western boundary of DA4 is shown to have a high risk of fluvial flooding with a chance of flooding of greater than 1 in 30 (3.3%) years and is associated with areas immediately adjacent to the Afon Crigyll. Therefore, the risk of flooding from fluvial flooding for DA4 is considered to be of low significance.

**Table 10.11: DAM Zones Across the Sites**

Development Area	DAM Zones
4	Half Zone A, half Zone C2
5	Half Zone A, half Zone C2
6	Majority Zone A, small proportion Zone B

- 10.4.26 TAN15 categorises development according to its vulnerability to flooding. There are three categories: emergency services; highly vulnerable development; and less vulnerable development. All residential premises are categorised as highly vulnerable development. Commercial, retail and general industrial development are categorised as less vulnerable development.
- 10.4.27 TAN15 does not explicitly define the flood risk vulnerability of renewable energy developments such as solar parks. However, it confirms that less vulnerable

development describes development, such as the case with the proposed development, where the ability of occupants to decide on whether they wish to accept such risk is greater than in the highly vulnerable category, such as residential uses.

- 10.4.28 Furthermore, the proposed development will not have permanent staff located on the site, the solar arrays are lifted off the ground and any sensitive equipment can be located to respect the Flood Zones and not within the areas at risk of flooding. The proposed development is not especially vulnerable to flooding and the proposed development would be considered as utilities infrastructure.
- 10.4.29 Recent planning applications for solar parks (some of which have also been assessed by the Planning Inspectorate) have been classified as 'less vulnerable' such as Rhyd Y Groes, Anglesey (ref: 20C310B/EIA/RE), Gwent Farmers' Community Solar Scheme, Llanwern, Newport, NP26 3D (ref: 18/0129) and Mamhilad Solar Park on land south of Little Mill Brickworks, Little Mill near Pontypool in Torfaen (ref: 15/P/00436). The Isle of Anglesey County Council (IACC) confirmed that the planning application for a solar park at Rhyd Y Groes, Anglesey (ref: 20C310B/EIA/RE) was classified as 'less vulnerable'.
- 10.4.30 As part of pre-applications discussions with IACC it was confirmed that the proposed development is considered to be less vulnerable development. Pre-application discussions are presented in **Appendix 10.2**. The existing uses within the vicinity of the sites are predominantly agricultural fields and can be classified as 'less vulnerable'. The DAM classification therefore indicates that the site is suitable for the proposed use subject to the application of justification test, including acceptability of consequences. The Planning Statement submitted with the application demonstrates that the proposed development meets the justification test.

### Geology

- 10.4.31 The British Geological Survey (BGS) map shows that the superficial deposits vary across the DAs and consist of:
- Alluvium - clay, silt, sand and gravel. Superficial deposits formed up to 2 million years ago in the Quaternary Period in a local environment previously dominated by rivers (U).
  - Blown Sand - Sand. Superficial Deposits formed up to 3 million years ago in the Quaternary Period.
  - Till, Devensian - Diamicton. Superficial Deposits formed up to 2 million years ago in the Quaternary Period.
  - Tidal Flat Deposits - Clay and Silt. Superficial Deposits formed up to 2 million years ago in the Quaternary Period.
- 10.4.32 The bedrock deposits vary across the Sites and consist of:
- Ordovician Rocks (undifferentiated) - Sandstone and Conglomerate, Interbedded. Sedimentary Bedrock formed approximately 444 to 485 million years ago in the Ordovician Period.
  - New Harbour Group - Mica Schist and Psammite. Metamorphic Bedrock formed approximately 541 to 635 million years ago in the Ediacaran Period.
  - New Harbour Group - Lava. Igneous Bedrock formed approximately 541 to 635 million years ago in the Ediacaran Period.
  - Coedana Complex - Granite, Gneissose. Metamorphic Bedrock formed approximately 541 to 635 million years ago in the Ediacaran Period.

- Ordovician Rocks (undifferentiated) - Mudstone and Sandstone, Interbedded. Sedimentary Bedrock formed approximately 444 to 485 million years ago in the Ordovician Period.
- Unnamed Igneous Intrusion of Unknown Age - Gabbro, Microgabbro and Diorite.
- Unnamed Igneous Intrusion of Unknown Age - Serpentinite. igneous bedrock.

### Groundwater

- 10.4.33 NRW has designated the superficial Secondary A Aquifers and Secondary Undifferentiated Aquifers. The bedrock deposits are designated as Secondary B Aquifers.
- 10.4.34 Secondary A Aquifers are described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
- 10.4.35 Secondary Undifferentiated Aquifers are assigned where it is not possible to attribute either category A or B to a rock type. In general, these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
- 10.4.36 Secondary B Aquifers are described as predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.
- 10.4.37 According to the BGS Hydrogeological Map of England and Wales, 1:625,000 scale, the bedrock is considered a low productivity aquifer with limited groundwater in the near surface. NRW has designated the bedrock as a Secondary B aquifer, lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.
- 10.4.38 The superficial deposits are designated unproductive strata, defined as rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. The alluvial drift deposits are classed as a Secondary A aquifer, defined as permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important base flow to rivers.

### Groundwater Quality

- 10.4.39 The WFD groundwater quality information is shown in **Table 10.12**.

Table 10.12: WFD Groundwater Body Classification

	2016	2015 Cycle 2	2018 Cycle 2	Objectives
Overall Water Body	Poor	Moderate	Moderate	Good by 2027
Quantitative	Good	Moderate	Moderate	Good by 2027
Chemical	Poor	Good	Good	Good by 2027

### Groundwater Abstractions

10.4.40 There are no groundwater water abstraction licences within 2km of the Sites.

### Designated Sites

10.4.41 The designated sites located within 2km are shown in **Table 10.13**.

**Table 10.13: Designated Sites**

Name	Designation
Llyn Traffwll	Site Scientific Special Interest (SSSI)
Llynnau Y Fali - Valley Lakes	SSSI
Beddmanarch-Cymyran	SSSI
Llyn Dinam	SAC
Anglesey Terns / Morwenoliaid Ynys Môn	Special Protection Area (SPA)

## 10.5 IDENTIFIED RECEPTORS

10.5.1 Based on the baseline conditions presented above, **Table 10.14** presents the sensitive receptors which have been considered in the following assessment, along with their sensitivity to change.

**Table 10.14: Identified Receptors**

Receptor	Sensitivity	Description
Site workers (i.e. construction workers)	Medium	Flooding may impact upon workers during the operation phase, but their sensitivity is lowered as a result of their competency in their role as well as operating in teams and/or prescribed systems.
Groundwater	Medium	Any water quality or quantity issues would only be felt over short distance and would be diluted rapidly.
Surface waters	Medium	Any water quality or quantity issues would only be felt over short distance of the watercourses compared to the overall length of the watercourses. Water quality issues would also be diluted rapidly within the watercourses.
Llyn Dinam SAC	High	Surface water runoff from the DA6 and through the site from upstream may impact upon the integrity of the SAC.

## 10.6 PROPOSED DEVELOPMENT

10.6.1 The proposal will comprise the following:

- Photovoltaic (PV) panels to a maximum height of circa 3m;

- Mounting frames - matt finished small section metal structure;
- Scheme of landscaping and biodiversity enhancement;
- Central Inverters (inverters and transformers will be housed together in prefabricated containers to a maximum height of circa 3m), substations (DNO and Customer to a maximum height of circa 3m) and associated cabling (below ground);
- Point of connection;
- Stock fencing up to a height of circa 2m to secure the development areas;
- Infra-red CCTV (CCTV cameras would operate using motion sensors and would be positioned inward only to ensure privacy to neighbouring land and property);
- Temporary set down areas;
- Internal service roads; and
- Site access for the construction, operational and decommissioning phases.

10.6.2 The proposed point of connection is located at an existing substation to the south of Caergeiliog on the eastern side of Cymyran Road. The DAs will be connected to the substation by cabling in the highway. All DAs will utilise the same grid connection.

10.6.3 The panels will be arranged in rows in an east-west alignment across the DAs and orientated south for maximum efficiency. All panels will be mounted on frames and have a maximum height of 3m above ground level; the lowest part of the panel will be circa 0.9m above ground level. The scheme will be operational for 40 years after which all equipment can be removed from site.

10.6.4 The DAs will be secured by up to a 2m high stock fence or similar with wooden posts.

## 10.7 ASSESSMENT OF EFFECTS

### Hazard/Risk Source

10.7.1 The following potential sources of hazard/risk have been identified based on a review of the baseline environment, and construction and operational phases of the proposed development:

- Leaks and spills of fuels and oils associated with vehicles and equipment;
- Sediment loading of watercourses;
- Improvement in drainage;
- Discharge of poor-quality water to watercourses; and
- Flooding of development site.

10.7.2 The significance of any potential pollution or changes in groundwater levels and flow would be dependent on the nature of the incident, the mitigation measures, timing of the measures, and effectiveness of the measures and sensitivity of the potential receptors.

### Conceptual Model and Preliminary Impact (Risk) Assessment

10.7.3 The site conceptual model and assessment of the environmental risk during both the construction and operation phases of the development is presented in **Table 10.15** and **Table 10.16**. The potential effects from the decommissioning phase are likely to be similar to the construction phase.

Table 10.15: Conceptual Model and Preliminary Impact (Risk) Assessment – Construction and Decommissioning Phase

Hazard/Risk Source	Receptor	Pathway	Magnitude	Sensitivity	Significance of Effect
Leaks and spills of fuels and oils associated with vehicles and equipment	Site Users, groundwater and surface waters	Direct contact, ingestion and inhalation and also contaminant transport through permeable geology and groundwater	Medium	Medium	<b>Moderate Adverse</b> - small quantities of fuels and oils to be held onsite and geology will impede transfer of significant level of contaminants to groundwater
Sediment loading of watercourses	Surface waters	Surface flows	Medium	Medium	<b>Moderate Adverse</b> - inappropriate management of surface waters during construction could result in sediment loading of watercourses
Improvements in drainage	Llyn Dinam SAC	Surface flows	Medium	High	<b>Major Adverse</b> - improved drainage could result in nutrient enrichment and pollution of the SAC
Discharge of poor quality water to watercourses	Surface waters	Surface flows	Medium	Medium	<b>Moderate Adverse</b> - inappropriate management of surface waters during construction could result in discharge of poor quality water to watercourses
Flooding of development sites generating physical hazards and contamination of floodwaters	Construction workers and equipment	Direct contact	Low	Medium	<b>Minor/Moderate Adverse</b> - the risk of flooding of the sites is low, is well understood and a warning system will be in place
	Neighbouring site users	Direct contact	Low	Medium	<b>Minor/Moderate Adverse</b> - the risk of flooding of the sites is low, is well

Hazard/Risk Source	Receptor	Pathway	Magnitude	Sensitivity	Significance of Effect
					understood and a warning system will be in place
	Surface waters	Surface flows	Low	Medium	<b>Minor/Moderate Adverse</b> - the risk of flooding of the sites is low, is well understood and a warning system will be in place

Table 10.16: Conceptual Model and Preliminary Impact (Risk) Assessment – Operation Phase

Hazard/Risk Source	Receptor	Pathway	Magnitude	Sensitivity	Significance of Effect
Leaks and spills of fuels and oils associated with vehicles and equipment	Site Users, groundwater and surface waters	Direct contact, ingestion and inhalation	Low	Medium	<b>Minor/Moderate Adverse</b> - small quantities of fuels and oils to be held onsite and geology will impede transfer of significant level of contaminants to groundwater
Sediment loading of watercourses	Surface waters	Surface flows	Low	Medium	<b>Minor/Moderate Adverse</b> - inappropriate management of surface waters could result in sediment loading of watercourses
Improvements in drainage	Llyn Dinam SAC	Surface flows	Medium	High	<b>Major Adverse</b> - improved drainage could result in nutrient enrichment and pollution of the SAC
Discharge of poor quality water to watercourses	Surface waters	Surface flows	Low	Medium	<b>Minor/Moderate Adverse</b> - inappropriate management of surface waters could result in discharge of poor quality water to watercourses

Hazard/Risk Source	Receptor	Pathway	Magnitude	Sensitivity	Significance of Effect
Flooding of development sites generating physical hazards and contamination of floodwaters	The site	Direct contact	Negligible	Medium	<b>Negligible</b> - the risk of flooding of the sites is low, is well understood and a warning system will be in place
	Neighbouring site users	Direct contact	Negligible	Medium	<b>Negligible</b> - the risk of flooding of the sites is low, is well understood and a warning system will be in place
	Surface waters	Surface flows	Negligible	Medium	<b>Negligible</b> - the risk of flooding of the sites is low, is well understood and a warning system will be in place

## 10.8 PROPOSED MITIGATION

- 10.8.1 The design of the solar farm has incorporated opportunities to mitigate the potential impacts to the water environment. It is considered that the potential impacts associated with the construction/decommissioning and operational phases of the development on potential receptors can be adequately mitigated by the measures discussed below.
- 10.8.2 The solar arrays and vulnerable infrastructure will be located above ground level. The modules are raised off the ground such that the leading edge of each panel will be approximately 0.9m off the ground and the top edge approximately 3m above ground level. Consequently, the panels will be unaffected by floodwater depths.
- 10.8.3 The frame supporting the solar panels should not impede overland flow or reduce flood storage capacity, as it would only be the legs which would be within the path of overland flow or floodwaters. The legs are of narrow dimension (60mm) and well-spaced (between 4 to 6m apart).
- 10.8.4 The panels are designed so that they have minimal foundations. This limits disturbance of soils/loss of resource and reduces the volume of concrete required. This would also therefore limit the potential for disruption of surface and groundwater flows.
- 10.8.5 The ancillary structures such as substation and transformers are also small structures and therefore only require shallow foundations, limiting ground disturbance and disruption to overland flow routes. The proposals are based on maintaining the existing drainage, the structures associated with the solar farm will introduce only small areas of impermeable surfacing. It is not proposed to install new drainage infrastructure but maintain existing greenfield runoff rates.
- 10.8.6 Existing farm access tracks will be used, and the position of new access tracks will avoid the necessity for watercourse crossings to avoid changes to in-channel flow and disturbance of the riparian habitat.
- 10.8.7 The sites and surrounding area are located within DAM Zone A and therefore a permanently safe and dry access can be maintained. The existing highways are generally raised about 600mm above the neighbouring fields. The highways will therefore be coincident with the upper confidence interval flood level in the 1 in 100 year and 1 in 200 year event at the end of the lifetime of the development.
- 10.8.8 Furthermore, solar farms are controlled remotely and attendance at the site in adverse weather conditions is not conducive to maintenance activities etc. If the weather is inclement, or a warning of flooding is issued, the solar farm will not be visited.
- 10.8.9 It is recommended that the operator is registered with the NRW flood warning service and that if a warning is issued, all visits are cancelled until the risk and/or hazard have passed. Return to site should not be attempted until the roads are declared clear and safe, and the senior management for the operator has declared the site safe.
- 10.8.10 A 4m minimum buffer strip on DA4 and DA5, and 6m on DA6, adjacent to the top of any small watercourse will need to be retained for maintenance purposes. This will be free of built development and is required by NRW and the Local Planning

Authority/Lead Local Flood Authority. The buffer strip will also mitigate the impact of flooding from fluvial sources.

### Construction Phase

- 10.8.11 Construction best practice measures/mitigation will be in operation during the period of construction of the solar farm. All details of best practice will be based on current guidance produced by CIRIA and NRW which cover good construction techniques and pollution prevention and control measures. The proposed measures will be detailed within the Construction Environmental Management Plan (CEMP) which is likely to be required by means of a planning condition.
- 10.8.12 The contractor for the works will provide 24 hour emergency contact details to NRW's Senior Environment Officer prior to the commencement of the works on site.
- 10.8.13 A Surface Water Management Plan (SWMP) has been developed to manage the additional site runoff anticipated during the construction phase. The detail will be confirmed within the SAB submission. The SAB pre-application advice received stated 'Following review of the attached information [the SAB pre-application and SuDS strategy] I am pleased to confirm that we believe you would satisfy the SuDS legislation with this submission and would support your applications in this instance.'
- 10.8.14 The main elements to the CEMP would be:
- Soil management.
  - Erosion and sediment control.
  - Storage/Use of Construction Materials.
  - Vehicle Maintenance.
  - Environmental Monitoring.
  - Spillage – Emergency Action.
  - DA6.
- 10.8.15 During construction (and decommissioning) it is anticipated that a temporary compound will be established to allow the materials to be off-loaded from HGVs, and then transferred to the DAs using smaller vehicles. The construction compound will have a temporary surfacing of hardcore; on completion of the construction works the hardcore surface will be removed and panels will be installed and the ground seeded. Any rainfall on the temporary compound will runoff to adjacent grassed permeable areas.

### Soil Management

- 10.8.16 Topsoil stripping will be minimised to reduce site runoff volumes. The main areas of soil disturbance will be when new access tracks are formed and for excavation of foundations for substation/transformers, this should be limited in areal extent based on the current proposal. In order to avoid/minimise compaction of the soils, the access tracking and compounds will be formed pre-construction using permeable materials; gravel laid onto geotextile to limit compaction and hence surface water runoff intensification.
- 10.8.17 Preserving the quantity and quality of the site topsoil is critical to preserving the site runoff rates both during and after construction and to promote stabilisation vegetation establishment. Topsoil stripping will be limited to the areas necessary for access

road and construction and for the creation of temporary laydown areas, as required. All stripped topsoil must remain on the Site and be reused for landscaping or restoration. Erosion and sediment control measures for topsoil stockpiles are described below.

### Erosion and Sediment Control Plan

- 10.8.18 The existing and proposed (post-construction) ground surface slope gradients at the Site are classified as shallow and gentle (< 4%), with predominantly long slopes (greater than 30m). Site soils are sands and silty sands, which have low and high erosion potentials, respectively.

### Erosion and Sediment Control Measures

- 10.8.19 The various construction activities required to construct the Proposed Development include minor grading activities and general construction traffic. If left unmitigated, these activities will result in impacts ranging from disturbance of soils to potential erosion and sediment transport to offsite locations.
- 10.8.20 All existing drainage in the surrounding area should be identified and protected to avoid unintentional damage/interruption as a consequence of the site operations and ensure they continue to operate effectively.
- 10.8.21 The current proposals do not require the installation of additional drainage infrastructure as it is not anticipated that the development will create additional runoff. However, during construction works where temporary surface water drainage is provided it should be designed with suitable sediment, oil and fuel control (such as proprietary silt traps, catch pits, straw bales, swales etc). This will ensure that any sediment, oils and fuels carried by overland flow during rainfall events are collected and trapped prior to discharge of surface water to the field boundary drains/main rivers.
- 10.8.22 It is unlikely given the low permeability of the soils and the shallow foundations required for the ancillary structures that excavations will require dewatering. However, if this is required, any waters pumped from excavations will be disposed to the temporary drainage system which will include sediment traps prior to discharge to watercourses.
- 10.8.23 Spillage and Emergency Procedures outlined in the CEMP would be followed in the event of a pollution incident. The plan would include the provision of appropriate emergency response equipment on-site and staff training in emergency procedures.
- 10.8.24 During construction, all site runoff would be intercepted and treated to remove sediment prior to discharge off site. The following guidelines will be observed during the operation of the Site:
- CIRIA. Control of water pollution from construction sites C532 (2001).
  - CIRIA. Environmental Good Practice on Site C650 (2005).
  - CIRIA. The SuDS Manual C753 (2015).
  - Pollution Prevention Guidelines PPG1: Understanding Your Environmental Responsibilities (July 2013).
  - Guidance for Pollution Prevention GPP2: Above ground oil storage tanks (January 2018).

- Guidance for Pollution Prevention GPP5: Works and maintenance in or near water (January 2017).
- Pollution Prevention Guidelines PPG6: Working at construction and demolition sites (March 2012).
- Pollution Prevention Guidelines PPG7: The safe operation of refuelling facilities (July 2011).
- Guidance for Pollution Prevention GPP8: Safe storage and disposal of used oils (July 2017).
- Guidance for Pollution Prevention GPP13: Vehicle washing and cleaning (April 2017).
- Guidance for Pollution Prevention GPP21: Incident Response Planning (July 2017).
- Guidance for Pollution Prevention GPP22: Dealing with spills (October 2018).
- Guidance for Pollution Prevention GPP23: Safe storage - drums and intermediate bulk containers (February 2019).
- Government Guidance 'Oil storage regulations for businesses' (2015).
- Government Guidance 'Manage water on land: guidance for land managers' (2015).

10.8.25 Erosion control will be achieved primarily by:

- Managing disturbed soils using soil conservation practices to reduce runoff and sediment transport during construction.
- Constructing barriers to filter runoff.

10.8.26 Erosion and sediment control measures will be implemented prior to any grading or servicing works commencing and include, but are not necessarily limited to, the following measures:

- A perimeter silt fence will be installed at the downstream side of the work limits.
- A 5m wide vegetated buffer will be provided on the downstream side of all disturbed areas. The vegetated buffer will consist of undisturbed native vegetation and any areas of sparse vegetation will be seeded. The vegetation will trap mobilised silt and sediment.
- A construction entrance feature ("mud mat") will be provided at the site entrance to minimise the offsite transport of sediment via construction vehicles.
- The access road will be cleaned of any sediment deposited by site construction traffic.
- Stabilise topsoil stockpiles expected to be left in place longer than 30 days with vegetative cover (i.e., hydroseeding) or a rolled erosion control product in the event of unfavourable growing conditions (i.e., during the winter).
- Re-vegetate all disturbed areas where construction is not expected for 30 days with a minimum 50mm of topsoil and hydro-seeding or other stabilizing vegetation / erosion protection measures. If vegetation establishment is not possible, given seasonal restriction or other revegetation limiting factors, the disturbed area should be stabilised against erosion impacts by non-vegetated means such as erosion control blankets.
- In the event of inclement weather or unfavourable terrain for construction, construction best practices, such as temporary rig-mats may be used to prevent disruption of surface soils and vegetative cover by construction vehicles and equipment.

10.8.27 The erosion and sediment control measures shall be maintained in good repair during the entire construction period and removed as contributing drainage areas are restored and stabilised where they are not required anymore otherwise they will be

left in-situ for the operational phase. In addition, the condition of erosion control works, their overall performance, and any repairs, replacement, or modifications to the installed item shall be noted in logbooks to be kept on-site.

### Erosion and Sediment Control Contingency Plan

- 10.8.28 The purpose of the Erosion and Sediment Control contingency plan is to help minimise the risk or consequence of failure of the erosion and sediment control works. Failure could result from insufficient measures, lack of maintenance, or severe weather conditions. The contingency plan includes two areas of consideration: the contingency measures that will be implemented where there is potential for failure; and the procedures that will be followed where a failure has occurred.
- 10.8.29 The Contractor shall be responsible for following the Erosion and Sediment Control contingency plan, and will prepare the following items:
- Workers shall be on call for emergency situations for all aspects of the emergency from design to construction of emergency sediment and erosion control measures. Any associated health and safety issues are the responsibility of the Contractor.
  - Heavy duty silt fence, pumps, double-net straw matting erosion control blankets, straw bales and stakes, sandbags, appropriately sized riprap, and clean gravel fill shall be available on-site for emergency installation.
  - Heavy equipment shall be on standby for emergency works.
  - A contact list for any further required equipment or materials shall be prepared and made available for emergency use.

### Contingency Measures where there is a High Risk of Failure

- 10.8.30 Conditions that may potentially cause failures can be identified through two methods:
- High Risk Identified Through Monitoring
    - Where monitoring has identified a high potential for failure, steps shall be immediately taken to reduce the risk. These measures may include repair to existing measures, modification of existing measures, and the addition of new measures.
  - Severe Weather Anticipated
    - In cases where the weather forecast indicates that significant rainfall (>10mm) is expected within a 24-hour period, the Contractor shall immediately complete the following:
      - Verify that all erosion and sediment control measures are secure and that there is no exposed soil that could erode and be deposited downstream.
      - Verify that all other measures are in good working order.
      - Monitor all measures during the rainfall event, and where a potential for failure is identified, take corrective measures.
- 10.8.31 If unforeseen events cause the strategies set out in the contingency plan to be insufficient or inappropriate to meet the objective of containing sediment within the work limits, the Contractor will respond in a timely manner with all reasonable measures consistent with safety, to prevent, counteract or remedy any negative effects on the natural environment or adjacent properties.

### Contingency Measures in Case of Failure

- 10.8.32 In the event of a failure, the Contractor will cease all construction related work and focus on erosion and sediment control as required to effectively stabilise the site where a failure has occurred or is imminent.
- 10.8.33 If significant long-term damage to downstream habitat or property is suspected, the Contractor will immediately assess and document the situation and report the incident to NRW. Development of the initial restoration plan will begin within 24 hours of the discovery of failure and will be implemented as soon as possible. The plan will address:
- Removal and disposal of sediment from outside the work limits.
  - Restoration of the affected area.
  - Restoration of any areas disturbed through deposition or removal.

### Erosion and Sediment Control Monitoring Programme

- 10.8.34 To ensure the effectiveness of the various erosion and sediment control measures, a routine programme should be implemented which includes the inspection of the erosion and sediment controls daily and after each significant rainfall event (10mm), and immediate repair of any deficiencies. Non-urgent repairs (i.e. no immediate risk of sediment discharges to the downstream environment) will be completed within 48 hours of identifying the deficiency, or prior to the next anticipated rainfall event, whichever is less. This program will consist of the following activities:
- Visual inspection of the measures to ensure discharged flows are generally free of sediment and turbidity.
  - Inspection of vegetation protection, erosion control blankets and silt fencing to ensure that they are maintained in good repair.
  - Removal of construction debris that may accumulate.
  - Implementation of remedial measures including erosion stabilisation, repair of damaged measures and any other remediation where required.

### Storage/Use of Construction Materials

- 10.8.35 All soil stockpiles, construction materials, equipment and chemicals will be placed away from watercourses and outside the DAM Zone C2 (including welfare facilities). All regulations will be adhered to for the storage of fuels and chemicals including adequate bunding, location onto gravelled areas within the construction compound. All vehicle refuelling will be within the construction compound, away from watercourses.
- 10.8.36 When excavating to form the service roads, work should be programmed to ensure that volumes of excavated and imported material are not stored for significant lengths of time.
- 10.8.37 High risk construction activities such as concrete batching which can produce alkaline runoff which is highly toxic to aquatic organisms will be undertaken on gravelled areas at a suitable distance from surface watercourses/drains. Its transportation to the point of use on site will be controlled, no wet concrete will be used in and around watercourses.
- 10.8.38 All welfare facilities to be adequately designed and maintained to ensure all sewage

disposed of appropriately, likely to be tankered for off-site disposal.

10.8.39 Standard pollution prevention procedures are to be implemented during the operational phase based on industry best practice and the GPPs PPGs, other NRW guidance, CIRIA document C532 “Control of Water Pollution from Construction Sites” and CIRIA document C753 “The Site SuDS Manual” would mitigate the risks to surface water quality. Examples of some of the measures that would be adopted at the Site are included below, to mitigate potential impacts on the water environment:

- Silt traps, straw bales placed within stream channel and temporary settlement lagoons.
- Protective coverings to stockpiles and locations away from watercourses.
- Retention of vegetated strips along watercourses.
- Tanked areas for plant and wheel washing.
- Bunded fuel storage and refuelling areas.
- Provision of spill kits.
- Location refuelling areas away from watercourses.
- Provision of vegetation/grass cover on earth stockpiles.

#### Vehicle Maintenance

10.8.40 It is expected that all vehicles used will be in good order and fit for purpose, therefore only emergency maintenance will be undertaken within designated areas away from watercourses etc.

10.8.41 In accordance with the GPPs and PPGs, all fuel tanks on site shall have a bunded containment of a minimum of 110% fuel tank capacity. There would be no drainage point from the bunded containment area; tamperproof taps and valves would be installed, and all empty fuel containers or drums would be stored within a containment area prior to their removal or disposal from the Site. Oil traps would be incorporated in pertinent drainage systems to prevent accidental spillage being discharged into surface runoff. Spill kits would be stored at refuelling areas and would include sand or other suitable containment and absorbent material.

10.8.42 Best practice measures would be undertaken when refuelling of plant and machinery. Where fuelling of large machinery is required, drip trays and absorbent mats and pellets would be used to contain or absorb accidental spillages. Plant maintenance would also be undertaken in a designated area and similar contamination prevention measures would be adopted.

#### Spillage – Emergency Action

10.8.43 All materials and equipment used for site preparation and construction will be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, etc.) from migrating to offsite receivers.

10.8.44 Spillage and Emergency Procedures outlined in the CEMP would be followed in the event of a pollution incident and would be developed in consultation with NRW. The plan would include the provision of appropriate emergency response equipment on-site and staff training in emergency procedures. GPP21 would be integrated into the Site emergency procedures.

10.8.45 Refuelling and maintenance of construction equipment should occur in designated areas, a minimum of 30m from a water body, wetland, or other sensitive receiver.

- 10.8.46 Most spillages on development sites are of compounds that do not pose a serious risk to the environment if they enter the drainage in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore, small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommended by NRW with residual spillage allowed to bioremediate in the drainage system.
- 10.8.47 In the event of a serious spillage, either by volume or of unknown or toxic compounds, then isolate the spillage with soil, turf or fabric and block outlet pipes from chamber(s) downstream of the spillage with a bung(s), (A bung for blocking pipes may be made by wrapping soil or turf in a plastic sheet or closely woven fabric.)

#### Development Area 6

- 10.8.48 Following site surveys and pre-application discussions with NRW and LLFA it was noted that currently water discharged from the Dol Eithin housing estate and flows slowly through DA6 and the poor state of the ditch network means that much of the silt and nutrients settles out in very localised temporary ponding/ flooding area or is lost en route before it reaches the Llyn Dinam SAC.
- 10.8.49 The proposed development has the potential to improve the drainage which could result in nutrient enrichment and pollution of the SAC. Discussions have taken place with NRW, the LLFA and SAB it has been agreed that mitigation measures specific to DA6 would be developed which would include silt mitigation, pollution control measures and an emergency response plan.
- 10.8.50 As part of providing vehicular access during the construction phase ditch crossing points are required. Proposed drainage ditch crossing routes has the potential to speed up the flow of water through DA6 and in the Llyn Dinam SAC. Therefore, upstream of any pipework used to allow for the vehicle crossing points a small vegetated sediment forebay will be constructed to trap mobilised silt and sediment.
- 10.8.51 This could be easily formed by making sure that the upstream invert level of the drainage ditch is below the invert level of the pipework, so that water would only discharge through the pipework when water levels are high. For the majority of the time the pipework would be dry and would allow sediment to become trapped upstream. This will be planted up to slow any catastrophic flood/sediment before it re-enters the drainage ditch.
- 10.8.52 Details on the positioning of these crossing points and ditch management options will be provided as part of the SAB approval submission.

#### Operational Phase

- 10.8.53 The proposed access tracks that will be used to service the inverter and transformer units will be constructed from permeable material. This will ensure that the access tracks remain permeable allowing surface water to infiltrate into the soil substrate, therefore the access tracks will not result in an increase in the impermeable area.
- 10.8.54 The proposed transformers, cabins and substations will be constructed from impermeable surfaces however, these will stand on an area of permeable surfaces.
- 10.8.55 The transformer and cabin plinths will be founded on concrete pads surrounded by

permeable surfaces.

- 10.8.56 The proposed PV modules will consist of an aluminium frame, with stainless steel supports and concrete shoes. Greenfield conditions will be retained as alluded to in the BRE Planning Guidance for the Development of Large Scale Ground Mounted Solar PV Systems. Although the solar panels will divert the downward path of falling rain, being raised off the ground on frames, they will not reduce the permeable area where they are sited. Any rainfall that does fall onto the site will, as now, infiltrates into the soil substrate.
- 10.8.57 It is anticipated that rain falling on each of the solar PV modules will fall underneath the downslope of the panels. A gap of approximately 20mm will allow water to drain off each PV module (the 20mm gap surrounds all sides of the panels). The erection of the solar panels will require the use of light machinery; however, it is anticipated that this would not lead to irreversible compaction of soils on the site. Therefore, infiltration should not be limited by compaction of soils. The land on the site can continue to be used for agricultural purposes (sheep grazing or similar) or for biodiversity enhancement following installation of the panels.
- 10.8.58 There should, therefore, be no perceivable changes to the upstream or downstream hydrology and to flood risk as a result of the proposals. In terms of surface water runoff, the proposals will not increase the impermeable area on the site, as the size of the transformers and PV modules are considered to be negligible in the context of the site areas.
- 10.8.59 It is generally accepted that the presence of solar panels on a site may slightly change the pattern of runoff with the potential for minor erosion at the base of the panels. There is empirical evidence (Cook and McCuen (2013) Hydrologic Response to Solar Farms, pg 536-541, Journal of Hydrologic Engineering, ACSE, May 2013), however, on the effect of solar development which found that with well-maintained grass underneath the panels, the solar panels themselves did not have a significant impact on the runoff volumes, peaks or time to peak. The analysis found that, with bare ground or gravel cover beneath the panels as a result of design decisions or lack of maintenance, peak discharge may increase resulting in the need for stormwater management.
- 10.8.60 Natural England has provided guidance on solar parks in the form of Technical Information Note (TIN) 101, although TIN101 is not specific to Wales, it provides useful information. This guidance provides an overview of the potential effects and possible mitigation measures for soil erosion and increased runoff, amongst others. TIN101 states that “The key to avoiding increased run-off and soil into watercourses is to maintain soil permeability and vegetative cover. Permeable land surfaces underneath and between panels should be able to absorb rainfall as long as they are not compacted and there is some vegetation to bind the soil surface.”
- 10.8.61 TIN101 concludes that “the risks of run-off and soil erosion are lowest on low gradient land with cohesive soils and highest on dry, sandy and steeply sloping soil surfaces”; this highlights the effect of slope on runoff rates and soil erosion. Furthermore, the slope aspect of the land can also have an effect on runoff rates and soil erosion. The aspect of the solar panels will always be south-facing (in the UK) and, therefore, north or south facing slopes will result in runoff flowing in a parallel direction to that of the

runoff from the panels thereby remaining relatively diffuse and unlikely to result in concentrated flows that could cause soil erosion, apart from where very steep slopes occur.

- 10.8.62 The proposed development is considered to have a relatively low gradient, with south-facing slope. A grassed surface will be maintained at the site to reduce the likelihood of overland flow or soil erosion occurring which, based on this assessment, is considered to be low.
- 10.8.63 Any local erosion which might result from this trend will be mitigated by the thick sward of tussocky grass germinated both beneath and between the panels and its regime of regular maintenance and therefore, there will be no increase in flood risk off the site.
- 10.8.64 As there is no history of surface water flooding at the site it is likely that the current drainage system is sufficient for the current and proposed site use. The surface water runoff will not increase post-application compared to pre-application and there will be no increase in surface water flood risk to the site and off-site locations. No changes to the current surface water network are proposed. Following development, surface water flows from the site will continue to discharge to the ground.
- 10.8.65 Recent solar project experience has shown that several growing seasons are necessary for the site restoration vegetation to become fully established. Consequently, the proposed vegetated buffers used to manage runoff during the site construction will remain post-construction to mitigate the risk of downstream flooding or erosion caused by the proposed development.
- 10.8.66 Temporary erosion and sediment control measures implemented during construction will remain in place until the site restoration vegetation has become sufficiently established to provide adequate stabilisation. The temporary erosion and sediment control measures can then be removed and disposed of off-site.
- 10.8.67 Natural England's 'Technical Information Note TIN101: Solar Parks: Maximising Environmental Benefits' encourages existing land drainage to be maintained. Existing onsite features will therefore be retained in their existing state and will continue to intercept overland flows from the site.
- 10.8.68 An SWMP has been developed to manage the site runoff anticipated during the operational phase. The detail will be confirmed within the SAB submission. A draft of the SAB submission is presented in **Appendix 10.3**.

#### Vegetated Buffers

- 10.8.69 Vegetation can be used to provide water quality benefits, this is achieved by the runoff/vegetation interaction which reduces the velocity of runoff, thereby promoting the sedimentation of particulate matter. The vegetation also provides nutrient uptake benefits to help reduce biological pollutants such as nitrogen and phosphorous. Where required the vegetation will be re-instated and replanted to improve the current situation. The vegetation will trap mobilised silt and sediment.

#### Stabilisation Vegetation

- 10.8.70 All permeable surfaces within the Site will be stabilised with a restoration seed mix

that will provide year-round surface cover. The stabilisation vegetation will improve the Site hydrologic characteristics, reducing both the peak flows and volumes.

- 10.8.71 Prior to restoration seeding, the work limits will be scarified to a minimum depth of 150mm, to mitigate soil compaction caused by construction traffic and to promote seed establishment. In accordance with the guidance presented, scarification will be performed with a chisel plow to retain as much vegetation residue on the soil surface as possible.

#### Long Term Erosion and Sediment Control

- 10.8.72 Approximately one year after completion of construction, the Applicant will complete a site inspection to ensure that long-term erosion control measures have been effective. Seeded or replanted areas will be inspected to ensure that vegetation measures were successful and reseeding or replanting will occur where necessary.
- 10.8.73 If erosion control measures are found to be less than fully effective during this survey, reseeding or replanting of problem areas will take place. Should there be residual effects noted during post-construction monitoring, advice on contingency measures will be sought and applied.

#### Development Area 6

- 10.8.74 The small vegetated sediment forebay will be maintained and monitored so that water would only discharge through the pipework when water levels are high. For the majority of the time the pipework would be dry and would allow sediment to become trapped upstream.

#### Monitoring and Maintenance

- 10.8.75 The proposed SWMP incorporates passive and simple surface water runoff management practices, with operational and maintenance requirements to match. The site Owner's inspection, operational, and maintenance activities generally consist of:
- A semi-annual walking inspection of the entire site should be completed during the spring and autumn to identify areas of bare soil and/or erosion. Remediation efforts would typically involve re-grading the affected area and/or re-vegetating with sod or appropriate seed mix, with fertilizer and water applied as necessary to ensure germination and stabilisation.
  - Concurrent with the walking inspections, a visual assessment of any areas of persistent sediment build-up should be identified. Excessive sedimentation is an issue requiring attention if it remains in a non-vegetated condition and is, therefore, prone to re-suspension and transport downstream. If any such condition occurs, the sediment should be removed and the area re-stabilised.
  - The walking inspections will also include a review of the ground surface conditions along the entire downstream site perimeter to identify any areas of erosion or concentrated surface water discharge. Downstream impacts will be identified, and the Owner will develop a remediation plan to address them.
  - The density and health of vegetation should be evaluated during the walking inspections. Deficiencies in this regard could be indicative of poor species selection or poor growth, and replanting should be undertaken to ensure sufficient vegetation densities.
  - Driving on the site should be avoided during wet periods to reduce the possibility

of excessive rutting.

## 10.9 RESIDUAL IMPACTS

10.9.1 This section summarises the significance of the anticipated residual environmental effects, which are those that remain after all proposed mitigation measures are implemented. The residual effects are summarised below in **Table 10.17** below.

Table 10.17: Summary of Residual Effects

Potential Effect	Significance of Effects	Mitigation	Residual Effect
<b>Construction Phase and Decommissioning Phase</b>			
Leaks and spills of fuels and oils associated with vehicles and equipment	Moderate Adverse	CEMP, Surface Water Management Plan	Negligible
Sediment loading of watercourses	Moderate Adverse	CEMP, Surface Water Management Plan	Negligible
Improvements in drainage	Major Adverse	CEMP, Surface Water Management Plan	Negligible
Discharge of poor-quality water to watercourses	Moderate Adverse	CEMP, Surface Water Management Plan	Negligible
Flooding of development site generating physical hazards and contamination of floodwaters	Minor/Moderate Adverse	CEMP, Surface Water Management Plan	Negligible
<b>Operation Phase</b>			
Leaks and spills of fuels and oils associated with vehicles and equipment	Minor/Moderate Adverse	EMP, Surface Water Management Plan	Negligible
Sediment loading of watercourses	Minor/Moderate Adverse	EMP, Surface Water Management Plan	Negligible
Improvements in drainage	Major Adverse	CEMP, Surface Water Management Plan	Negligible
Discharge of poor-quality water to watercourses	Minor/Moderate Adverse	EMP, Surface Water Management Plan	Negligible

Flooding of development site generating physical hazards and contamination of floodwaters	Negligible	EMP, Surface Water Management Plan	Negligible
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## 10.10 SUMMARY AND CONCLUSIONS

- 10.10.1 All sources of flooding have been considered, these are fluvial (river) flooding, tidal (coastal) flooding, groundwater flooding, surface water (pluvial) flooding, sewer flooding and flooding from artificial drainage systems/infrastructure failure. NRW identifies parts of DA4 and DA5 are with DAM Zones B and C2 from undefended fluvial flood extents.
- 10.10.2 A Flood Consequence Assessment (FCA) has been carried out for the Proposed Development in accordance with guidance contained in Planning Policy Wales and TAN15. The FCA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks would be managed so that the development remains safe throughout the life of the development taking climate change into account.
- 10.10.3 Due to the higher flood risk areas in DA4 and DA5, the FCA and the Planning Statement demonstrate that the Justification Test as prescribed in section 6 of TAN 15 is met.
- 10.10.4 There is empirical evidence of the effect of solar development, which has found that, with well-maintained grass underneath the panels, the solar panels themselves do not have a significant impact on the runoff volumes of surface water.
- 10.10.5 At present surface water runoff is discharged from the Dol Eithin housing estate and flows slowly through DA6 to Llyn Dinam (SAC). Currently the poor state of the ditch network means that much of the silt and nutrients settles out in very localised temporary ponding/ flooding area or is lost en route before it reaches Llyn Dinam. As part of a package of enhancements the ditch network will be managed to ensure surface waters are retained for a sufficient period to maximise sediment and nutrient fall out prior to entering the SAC. Details of the enhancement are presented in the Sustainable Urban Drainage Approval Body (SAB) submission in **Appendix 10.3**.

## 11. ECOLOGY AND CONSERVATION

## 11.1 INTRODUCTION

- 11.1.1 The purpose of this chapter is to identify key features of ecology and nature conservation and assess the likely significant effects of the proposed development upon these features. The development proposals are described in Chapter 3 of this ES.
- 11.1.2 This chapter sets out the assessment methodology, the current baseline conditions of the Application Site and its surroundings, the likely significant ecological effects and proposed mitigation measures required to prevent, reduce or offset any significant adverse effects. Effects on biodiversity which may arise from decommissioning the PV array areas have not been assessed at this stage.
- 11.1.3 The following Appendices have been provided to support this assessment:
- 11.1 - Great Crested Newt Survey Report
  - 11.2 - Common Bird Census (Breeding Birds) Survey Report
  - 11.3 - Wintering Birds Survey Report
  - 11.4 - Chough Report
  - 11.5 - Bat Report and Data Appendices
  - 11.6 - Water Vole and Otter
  - 11.7 - Pre-Application and Scoping Responses from Consultees
  - 11.8 - Phase 1 habitat maps
  - 11.9 - Results of desktop data search - protected species & habitats
  - 11.10 - Reptile habitat suitability assessment
  - 11.12 - Habitats Regulation Assessment (HRA)
  - 11.13 – SuDS Sustainable Drainage Strategy
  - 11.14 – Biodiversity Net Gain Assessment
- 11.1.4 Chapter 2 of this ES identifies that initially the proposed development comprised 9 development areas (DAs). As the EIA progressed it became apparent that some DAs would not be suitable for development largely for ecological and visual impact factors (with the exception of DA3, DA2 and DA7), leaving just 3 DAs suitable for solar deployment. These remaining DAs (DA4, DA5 and DA6) are assessed in this chapter.
- 11.1.5 The application area (referred to as the 'site' from here onwards) covers an area of approximately 63Ha<sup>21</sup> and consists of semi-improved grassland and rush pasture and improved grassland, used for grazing of sheep, cattle and horses, and in some cases cut for silage or hay. The generally small fields are enclosed by hedgerows and ditches, with scattered hedgerow trees, scrub patches and several blocks of woodland occurring between the DAs.
- 11.1.6 The site adjoins the Llyn Dinam Special Area of Conservation (SAC) and Llynau y Fali – Valley Lakes Site of Special Scientific Interest (SSSI).
- 11.1.7 Following consultation with statutory and non-statutory consultees, Wychwood Biodiversity Limited was commissioned to undertake baseline studies to characterise the ecology of the proposed site and surroundings. An impact assessment was conducted following the principles of the Chartered Institute of Ecology and Environmental Management's (CIEEM) 'Guidelines for Ecological Impact

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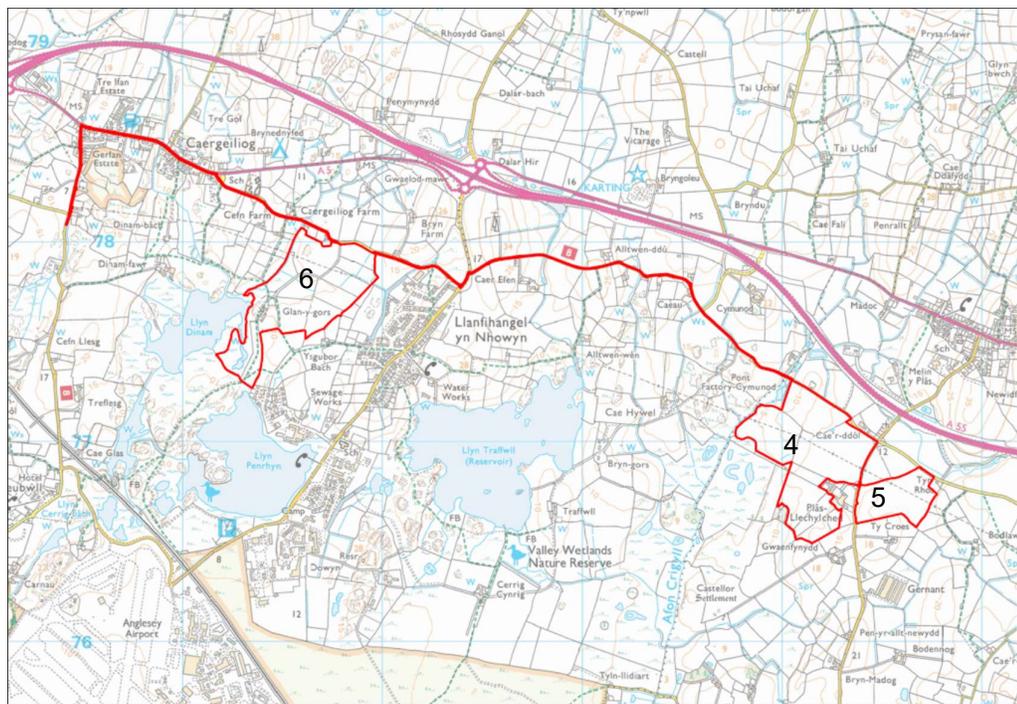
<sup>21</sup> This application area includes the cable route (in highway land).

assessment, 2016'. This chapter identifies appropriate mitigations and enhancements which are applied through the mitigation hierarchy, first avoiding and minimising impacts wherever possible, then restoring and compensating residual impacts.

Table 11.1: Size of Development Area Included in this Assessment

Development Area (excluding cable route)	Size
4	27.3Ha
5	7.5Ha
6	25.2Ha
Total	60Ha

Figure 11.1: Proposed Development Areas and Cable Route



### Scoping Response - Planning Inspectorate

- 11.1.8 In May 2019 the Applicant submitted a request for a formal Scoping Direction from the Planning Inspectorate Wales (PINS) under Regulation 30 of the EIA Regulations. PINS issued an EIA Scoping Direction on 30<sup>th</sup> July 2019, following consultation with Isle of Anglesey County Council (IACC), Natural Resources Wales (NRW) and RSPB Cymru as the primary statutory consultees on ecology.
- 11.1.9 The Scoping Direction indicated that the Applicant should provide a breakdown of the baseline habitats in each of the development areas in terms of list provided at Section 7 of The Environment (Wales) Act 2016, in line with the response from IACC. The Applicant has scoped in detailed survey work in relation to:

- Birds;
- Bats;
- Great Crested Newts;
- Otter;
- Water Vole;
- Badger;
- European Eel; and
- Invertebrates

11.1.10 PINS directed that each of the above topics is Scoped In, and that Reptiles should also be Scoped In.

11.1.11 Further, NRW stated:

- Two years of (winter) bird surveys should be undertaken to allow for annual variation. The Applicant should conduct the surveys in accordance with the advice provided by RSPB.
- The Applicant should ensure the ES is clear as to whether any linear features are likely to be affected, and that the approach taken to bat assessment is proportionate, given the concerns raised by NRW.
- The Applicant should liaise with NRW regarding the approach to Great Crested Newts, and the need to provide Environmental DNA evidence.

11.1.12 The Scoping Direction also notes

*“The Conservation of Habitats and Species Regulations 2017 require competent authorities, before granting consent for a plan or project, to carry out an Appropriate Assessment (AA) in circumstances where the plan or project is likely to have a potential significant effect on a European site (either alone or in combination with other plans or projects). The Competent Authority in respect of an application for a Development of National Significance (DNS) is the Welsh Minister who makes the final decision. It is the Applicant’s responsibility to provide sufficient information to the Competent Authority to enable them to carry out an AA or determine whether an AA22 is required.”*

11.1.13 The above works were addressed in full by the baseline studies described in this chapter.

#### Scoping Response - Isle of Anglesey County Council

11.1.14 IACC provided a response to PINS’ Scoping consultation on 6<sup>th</sup> June 2019 following a meeting with the applicant and submission of a request for pre-application advice. They raised the following points:

- The scope should be extended to include amphibians, reptiles and mammals as well as birds likely to be (or have potential to be) in the areas of the proposal whilst making full use of ‘COFNOD’ local records;
- Any adverse impacts upon Natura 2000 sites are likely to be unacceptable and would be subject to the provisions of The Habitats Regulations Act 2017 (as amended);

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<sup>22</sup> An Appropriate Assessment or Habitats Regulations Assessment (HRA) refers to the several distinct stages of Assessment which must be undertaken in accordance with the [Conservation of Habitats and Species Regulations 2017 \(as amended\)](#) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) to determine if a plan or project may affect the protected features of a habitats site before deciding whether to undertake, permit or authorise it.

- The applicant's pre-application discussion document also omits any reference to Local Wildlife Sites; and
- The inclusion of part of the proposal area within the Llynau y Fali/ Valley Lakes SSSI and SAC sites will trigger an Appropriate Assessment, as required by The Habitat Regulations Act 2017 (as amended). This Assessment would have to determine whether proposals could lead to any significant effects on the SAC designated features.

11.1.15 The above works were addressed in full by the baseline studies described in this chapter.

#### Scoping Response - NRW, July 2019

11.1.16 A detailed Scoping Response was received from NRW in July 2019 as part of the Direction from PINS. The following was specified:

- The Proposed Development may affect:
  - Glannau Ynys Gybi/ Holy Island Coast Special Protection Area (SPA);
  - Llyn Dinam Special Area of Conservation (SAC);
  - Llynau y Fali - Valley Lakes Site of Special Scientific Interest (SSSI); and
  - Llyn Traffwll SSSI
- The Applicant should assess the potential effects on these sites and their features by the following pathways:
  - Effects on mobile features of these sites which may utilise the areas (e.g. overwintering though foraging in the area). NRW recommend 2 years of survey to assess effects on relevant mobile features;
  - Changes to hydrology/drainage patterns in the catchments of the sites and any impact on water quality this may have in the short and long term;
  - Direct effects on features where the redline boundary enters the sites;
  - Risks from construction activities -which will depend on the construction methods employed;
  - Risk posed by operation of the facility (e.g. washing panels with chemicals, changes to grazing regimes etc.).
  - Risk of collision from the potential grid connections on mobile features; and
  - Biosecurity during construction and operation.

11.1.17 NRW specified that the assessments undertaken must clearly substantiate how the features of each protected site have been adequately assessed, the magnitude of effects and any subsequent measures required to avoid, mitigate or compensate for any potential effect on each feature.

11.1.18 NRW also stated the Competent Authority should carry out a test of likely significant effects (TLSE) for the European Protected Sites, as per Regulation 63 of The Conservation of Habitats and Species Regulations 2017.

11.1.19 Good practice for Great Crested Newts recommends the use of habitat suitability index (HSI) scoring for ponds as a first stage in assessment. However, the HSI is not a reliable indicator to evidence the absence of individuals from a pond. Notwithstanding the results of any HSI scoring, NRW is likely to require, as a minimum, eDNA analysis to evidence absence. Without this information, the Applicant must detail appropriate measures to account for the potential presence of

this species.

- 11.1.20 The above works were addressed in full by the baseline studies described in this chapter, with the exception of: risks from construction and operation which are assessed in this chapter and measures to manage them will be provided in the CEMP and LEMP documents; and biosecurity will be dealt with through the CEMP and LEMP documents. In addition, it was agreed with NRW that a single year of chough data may be sufficient if plots 8, 9 and 1 were removed from the development, and if specific conditions for data collection were met (see points 11.1.24 and 11.1.25).

#### Scoping Response - RSPB

- 11.1.21 RSPB Cymru offered the following advice on coverage and methods for the required bird surveys and an appropriate buffer:

- Breeding birds – survey effort over one breeding season

*“We recommend applying the Common Bird Census (CBC) method modified to 4 visits, ideally with at least ten days between each visit from late March to late June. The survey should record all species of bird with attention given to Red and Amber listed species and Section 7 species. In addition, it would be helpful to observe usage by waders during the breeding season (to include crepuscular and nocturnal surveillance) and recommend vantage point surveys to establish the usage of the site by waders. Special attention should be given to lapwing commuting from the RSPB reserve to the development site(s).”*

- Winter (non-breeding) bird survey - Survey effort over 2 years

*“We recommend winter bird surveys are undertaken by conducting field by field transects to record all species of bird with special attention given to SPA species i.e. Chough plus grassland waders, and also Red and Amber listed species and Section 7 species). The surveys should be undertaken once per fortnight between September and March.”*

*A 250m buffer should be applied to the development area for both breeding and non-breeding bird surveys. There is some overlap with RSPB bird survey areas. Specified fields within the overlap subject to annual RSPB bird surveys can be excluded from the breeding bird surveys. Areas for exclusion due to overlap and difficult access owing to boggy ground conditions have been identified with the applicant.*

- 11.1.22 The above works were addressed in full by the baseline studies described in this chapter.

#### NRW - Discretionary Advice Service

- 11.1.23 On 22nd October 2019, the Applicant submitted a request through the Discretionary Advice Service (DAS), seeking NRW’s advice on the scope of the wintering bird surveys that will inform the planning application for the Proposed Development, with specific reference to chough as a target species. In their response on 11<sup>th</sup> November 2019, NRW stated the following:

*“Due to the location of the development and the potential for functional linkage between Glannau Aberdaron and Ynys Enlli/ Aberdaron Coast and Bardsey Island, Glannau Ynys Gybi/ Holy Island Coast and Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal Special Protection Areas (SPAs), adverse*

*effects on integrity of these SPAs cannot be excluded (for the Project alone). The survey data will be needed to inform the Habitats Regulations Assessment for these SPAs.”*

11.1.24 They also stated:

*“...we advise that there is a need for Chough specific surveys that follows established methods as recommended by the RSPB. These surveys may provide further information on the numbers and distribution of winter foraging Chough within the Development Area and associated buffer of 250m and the use foraging Chough make of the habitats therein during the winter period.”*

11.1.25 Methods would comprise the following:

- Fortnightly walked transects following identified routes.
- Recording numbers of Chough, their location and behaviour.
- Recording details of any colour-ringed Chough.
- Recording the following habitat variables in all fields in the study area:
  - number and type of livestock present;
  - approximate sward height within three categories (0 = 0-5 cm, 1 = 5-10 cm, 2 = >10 cm);
  - broad habitat classification (e.g. pasture, arable, heath); and;
  - any land management operations (e.g. ploughing, manure dressing or cutting).

11.1.26 These surveys are designed to determine chough usage of all DAs, and to test the hypothesis that “*choughs are unlikely to be using DAs 3, 4, 5 and 6*”.

11.1.27 The applicant stated in their DAS request:

*“RSPB evidence gathered to-date suggests chough activity is consistently limited to plots 8, 9 and 1. If these three plots were to be removed from the proposal I write to seek confirmation that the winter bird survey effort will reduce accordingly to one year. The intensity of the surveys would remain as recommended and the inclusion of the 250m buffer surrounding the remaining plots would still apply. On completion of the year’s survey a review would be conducted and shared with NRW/RSPB to confirm than no additional survey is required”.*

11.1.28 NRW responded:

*“In principle, NRW would accept the concept of review on condition that i) a non-breeding chough specific survey following established methods is undertaken and results presented, and ii) the referenced RSPB 10-year Chough dataset is presented as supporting evidence for NRW to consider.”*

11.1.29 The Applicant stated in the DAS: “...during the survey period we would alert NRW/RSPB to any abnormal conditions during the survey as per the following criteria:

- Unseasonal weather;
- Adverse ground conditions; and
- Out of the ordinary agricultural activities for the time of year.

11.1.30 Should ‘normal’ environmental conditions prevail for the survey area and period then all parties should agree that the data is representative. Subject to the findings of the first year data, agreement that no additional winter bird survey work is required will be confirmed.”

11.1.31 NRW concludes: “Please note that a non-breeding Chough specific Survey is

required, following established methods, to inform the decision-making as to whether 1 or 2 years of non-breeding Chough survey(s) are required. The conclusion with regard to the need for 1 or 2 years will also be dependent on the results of year 1 in combination with the RSPB Chough data – though we have not yet seen this in full.”

11.1.32 The above requirements for Choughs are addressed within this chapter and also in a separate Habitats Regulations Assessment (HRA; **Appendix 11.11**).

11.1.33 In response to the Applicant’s request for discretionary advice on 24<sup>th</sup> June 2020, NRW provided response relating to the scope of the HRA, management options for land falling within the Llyn Dinam SAC and the chough summary report in July 2019.

### Scope of the HRA

11.1.34 NRW states:

*“Due to the locations of sites 3, 4 and 5 in relation to designated sites the following comments refer to site 6 only. Based on the information currently available, we consider it will be unlikely to conclude no likely significant effect on Llyn Dinam Special Area of Conservation (SAC) (Option A of Section 1.4) due to the following potential impact pathways associated with site 6:*

- *possible eutrophication arising from improved drainage through site 6 during the operational phase.*
- *the proximity of Llyn Dinam SAC to the proposed solar arrays within site 6, with the potential for pollution during construction/erection of the arrays.*

### Possible Eutrophication Arising from Improved Drainage Through Site 6 During the Operational Phase.

11.1.35 NRW states:

*Site 6 is immediately upstream of Llyn Dinam SAC. This area has a network of ditches and drains, many of which are currently partially silted up and well vegetated. There is a history of flooding in the nearby Dol Eithin housing area and surface water from the estate flows into site 6, and on a number of occasions sewage has surcharged into the surface floodwater. At present the water discharged from the estate flows slowly through site 6 and much of the silt and nutrients settles out or is lost en route before it reaches the SAC.*

*No information is available at present regarding the drainage proposals for the site. However, the document “Parc Solar Traffwll, Land Management Options SAC/SSSI Parcel 6” states that “the main threat at present to the integrity of the site is nutrient enrichment (diffuse sources)” and it is likely that this could be worsened by any improvement of the drainage of plot 6 enabling water to flow straight through the site and into the SAC taking with it any pollutants. This aspect should therefore be considered in any assessment of impacts on the SAC as it will be an integral part of the development.*

*Furthermore, the inclusion of parts of Llyn Dinam SAC as part of the “ecological enhancement strategy” will be severely undermined if this aspect of the lake’s catchment is not appropriately managed.*

### The Proximity of Llyn Dinam SAC to the Proposed Solar Arrays within Site 6, with the Potential for Pollution during Construction/Erection of the Arrays.

11.1.36 NRW states

*Notwithstanding the consideration of pollution prevention measures for the proposal in general, we advise the assessment of pollution impacts on Llyn Dinam SAC due to construction of any arrays within site 6, including risks from pollution by oils and mobilised sediments, especially along tracks through the fields within the catchment. Suitable cut-off drains and the use of silt curtains or other pollution prevention materials should be implemented to deal with any run-off, as well as suitable hardstanding and temporary tracking employed. In view of Llyn Dinam SAC already showing some signs of eutrophication, pollution prevention measures will need to be effective and capable of coping with the extreme rainfall events which have been experienced at the site in recent years.*

*We advise that such measures should be included in the method statement/Construction Environmental Management Plan (CEMP) for the development.*

*In addition, a risk assessment should be carried out before the start of the development considering the soil type, groundwater levels and the normal annual pattern of rainfall and the pollution risk, to enable the construction work to be carried out at a time of year that will minimise the risk of silt pollution of nearby watercourses and the adjoining designated sites.”*

- 11.1.37 A Sustainable Drainage (SuDS) Strategy provides details of the method that will be used to discharge the surface water runoff in accordance with the six standards requiring evaluation as part of a SuDS Approval Body (SAB) application for the proposed development of Parc Solar Traffwll. Copies of pre-application advice provided by the SAB are included in **Appendix 10.3**.

#### Management Options for Land Falling within the Llyn Dinam SAC

- 11.1.38 NRW states:

*“We welcome the proposal to manage areas of the Llynnau y Fali Site of Special Scientific Interest (SSSI) and the adjacent fields for nature conservation. Conservation grazing and scrub removal is likely to be appropriate for this part of the SSSI and adjacent areas and we would welcome further discussion about this in due course. However, these comments should not be construed as formal consent for such grazing or scrub removal.*

*We consider that the proposed management options prescribed for site 6 would benefit chough. Securing and maintaining favourable management on sites 1, 8, and 9 for chough would also be welcomed, if the applicant still has options on those fields.”*

#### Chough Summary Report

*“The chough summary report draws on a ten year historical dataset of chough sightings as well as contemporary survey. Whilst in principle this historical dataset would remove the need for further survey, before we can confirm this position, we will require confirmation about the spread of sighting effort across sites 3, 4, 5 and 6 in comparison with sites 1, 8, and 9.”*

- 11.1.39 On 18/09/20 the Applicant noted that NRW had requested confirmation from the Applicant about the spread of sighting effort associated with the Valley extract of the ten-year historical dataset of chough sightings. NRW gave the response on 16/10/20 as follows:

*“Given the nature of the data we are satisfied with the information that has been provided and that the different parcels were subject to a similar level of effort overall.”*

11.1.40 In effect, this statement confirms NRW are content with the historical and year 1 survey data sets presented by the Applicant.

## 11.2 CONTEXT

11.2.1 The following section provides a summary of legislation and policy relating to biodiversity and ecosystems at the international, national and local levels.

### International Legislation and Policy

Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora 1992 (The Habitats Directive).

11.2.2 The EU Habitats Directive aims to provide protection for a range of natural and semi-natural habitats and species. Its Annexes identify a number of priority habitats and species requiring special protection. Member states are required to identify sites within their territory for designation as Special Areas of Conservation (SACs) for the protection of these habitats and species. The Habitats Directive is implemented in England and Wales by the Conservation of Habitats and Species Regulations 2010.

11.2.3 While the ramifications of the UK leaving the EU upon existing environmental law are unknown, it is assumed that the Habitats Directive would remain intact for the foreseeable future.

### Ramsar Convention on Wetlands

11.2.4 The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty that provides a framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are presently 154 Contracting Parties to the Convention, with 1674 wetland sites, totalling 150 million ha, designated for inclusion in the Ramsar List of Wetlands of International Importance.

### National level Legislation and Policy

Wildlife and Countryside Act 1981 (as amended)

11.2.5 The 1981 Act allows for the designation of National Nature Reserves (NNRs) and SSSIs to protect areas that support habitats and species of national or international importance. The network of SSSIs forms the basis for selection of the SPAs and SACs within the UK.

11.2.6 All bird species, including eggs, young and nests while in use are protected under the Wildlife and Countryside 1981 Act as amended. These include a number of specially protected birds (listed in Schedule 1). Other animals that are afforded protection are listed in Schedule 5 and a number of protected plant species are included in Schedule 8. The nests of certain bird species that re-use their nests are also protected while no longer in use.

Conservation of Habitats and Species Regulations 2010 (as amended)

11.2.7 The habitats and species protection provided within the ‘Habitats Directive’ (Council

Directive 92/43/EEC) is transcribed into UK legislation through the Conservation of Habitats and Species Regulations 2010. The Habitats Regulations 2010 consolidates the Conservation (Natural Habitats, & c.) Regulations 1994 and its several amendments, which provide the original transcription of Habitats Directive into UK legislation. Special Protection Areas and SACs are designated under the Habitats Regulations 2010. These sites, including those throughout the European Union, form a network termed Natura 2000.

- 11.2.8 The Regulations make provisions for the management of Natura 2000 sites for the benefit of nature conservation, particularly in respect of features for which the sites have been designated, and prevent actions that would otherwise damage the nature conservation value of these sites. The Regulations also require the effect of relevant planning permissions on the integrity of Natura 2000 sites to be considered and, subject to certain exceptions, restrict those permissions where the integrity of a Natura 2000 site would be adversely affected.
- 11.2.9 The Regulations make it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4. However, these actions may be permitted through licenses, which may be granted for a number of purposes, such as science and education, conservation, preserving public health and safety, but only if it can be demonstrated that there are no satisfactory alternatives and that such actions will have no detrimental effect on wild population of the species concerned. Schedules 2 and 4 contain lists of species that are protected under the EC Habitats Directive and occur within the UK. Where these species formerly appeared within Schedules 5 and 8 of the Wildlife and Countryside Act 1981 (as amended) they have been removed. These species are termed European Protected Species (EPSs).

#### Countryside and Rights of Way (CRoW) Act 2000

- 11.2.10 The CRoW Act 2000 gives greater protection to SSSIs and strengthens wildlife enforcement legislation by the introduction of the offence of 'reckless disturbance'. The Act also requires Government Departments to have regard to biodiversity and conservation; Section 74 of the Act required lists of habitats and species of principal importance to be produced, for which conservation steps should be taken or promoted. The requirement to prepare such lists of habitats and species was extended originally by the NERC Act 2006 which has now been superseded by the Environment Act (Wales) 2016.

#### Environment (Wales) Act 2016

- 11.2.11 The Environment Act (Wales) 2016 (EA(W)) was passed by the Welsh Government: "to promote sustainable management of natural resources; to provide for targets for reducing emissions of greenhouse gases; to reform the law on charges for carrier bags; to provide for the separate collection of waste, prohibit disposal of food waste to sewers and provide for prohibiting or regulating disposal of waste by incineration; to make provision about Several Orders and management of fisheries for fish or shellfish; to make provision about fees for marine licences; to establish the Flood and Coastal Erosion Committee; and to make minor changes to the law about land drainage and byelaws made by the Natural Resources Body for Wales".

- 11.2.12 Parts 1 and 2 of the Act refer to Sustainable Management of Natural Resources and Climate Change respectively.
- 11.2.13 Section 6 under Part 1 of the Environment (Wales) Act 2016 introduced an enhanced biodiversity and resilience of ecosystems duty (the S6 duty) for public authorities in the exercise of functions in relation to Wales. The S6 duty requires that public authorities must seek to maintain and enhance biodiversity so far as consistent with the proper exercise of their functions and in so doing promote the resilience of ecosystems.
- 11.2.14 Part 1, Section 7 of the Act - *Biodiversity lists and duty to take steps to maintain and enhance biodiversity*, includes the provisions of The Natural Environment and Rural Communities (NERC) Act 2006 in Wales where; it imposes a “*duty to conserve biodiversity*” through fulfilment of their functions on all public authorities. Under the Act the Welsh Government must compile and maintain a list of species and habitats considered to be of principal importance for the purpose of conserving biodiversity.
- 11.2.15 These species are listed in Section 7 of the Act and are currently the same as those listed in Section 42 of the NERC Act 2006. The Welsh Ministers will publish, review and revise lists of living organisms and types of habitat in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales. Section 7 species have been considered throughout this report.
- 11.2.16 The Welsh Ministers must also take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section, and encourage others to take such steps.
- 11.2.17 Part 1 of the Act, including Sections 6 and 7, came into force on May 21, 2016.

#### Protection of Badgers Act 1992

- 11.2.18 Under the Protection of Badgers Act 1992 all badgers and their setts are protected from disturbance. The Act also includes provisions for the grant of licences permitting interference with a badger sett in the course of development. Such a licence will normally incorporate conditions to ensure that undue disturbance and suffering to badgers is avoided in the course of the development works.

#### Hedgerow Regulations 1997

- 11.2.19 Under the Hedgerow Regulations 1997, provision is made for the notification of “important” hedgerows. To qualify for notification, hedgerows must fulfil a range of criteria relating to their historical, landscape or wildlife character. In accordance with the Regulations, the intention to remove any hedgerow should be notified to the LPA via a hedgerow removal notice. The planning authority may issue a Hedgerow Retention Notice to prevent the loss of an “important” hedgerow. Where permission is granted to remove an “important” hedgerow, the LPA may impose conditions to mitigate the loss.

#### Planning Policy and Guidance

##### National Planning Policy

##### FUTURE WALES The National Plan 2040

- 11.2.20 *Future Wales – the National Development Plan 2040* is the national development

framework, setting the direction for development in Wales to 2040. It was published in February 2021 as the highest tier of the development plan system in Wales and provides the primary policy context against which planning applications for Developments of National significance (DNS) will be determined. Future Wales presents the Welsh Government's strategy for addressing key national priorities through the planning system, including sustaining and developing a vibrant economy, achieving decarbonisation and climate resilience, developing strong ecosystems and improving the health and wellbeing of our communities.

11.2.21 Future Wales states:

*Wales can become a world leader in renewable energy technologies. Our wind and tidal resources, our potential for solar generation, our support for both large and community scaled projects and our commitment to ensuring the planning system provides a strong lead for renewable energy development, mean we are well placed to support the renewable sector, attract new investment and reduce carbon emissions.*

11.2.22 Future Wales Policy 17 provides a presumption in favour of renewable energy development subject to the criteria in Policy 18. Policy 17 states that:

*The Welsh Government strongly supports the principle of developing renewable and low carbon energy from all technologies and at all scales to meet our future energy needs.*

*In determining planning applications for renewable and low carbon energy development, decision makers must give significant weight to the need to meet Wales' international commitments and our target to generate 70% of consumed electricity by renewable means by 2030 in order to combat the climate emergency.*

11.2.23 In terms of the criteria against which DNS applications will be assessed, Policy 18 includes the following in respect of biodiversity:

*“3. there are no adverse effects on the integrity of Internationally designated sites (including National Site Network sites and Ramsar sites) and the features for which they have been designated (unless there are no alternative solutions, Imperative Reasons of Overriding Public Interest (IROPI) and appropriate compensatory measures have been secured);*

*4. there are no unacceptable adverse impacts on national statutory designated sites for nature conservation (and the features for which they have been designated), protected habitats and species*

*5. the proposal includes biodiversity enhancement measures to provide a net benefit for biodiversity;”*

Planning Policy Wales

11.2.24 In February 2021, alongside Future Wales, the Welsh Government published Edition 11 of Planning Policy Wales (PPW). PPW sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters.

11.2.25 The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural wellbeing of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation.

11.2.26 Section 3.34 ‘Sustainable Management of Natural Resources’ states:

*The Environment (Wales) Act 2016 introduces the Sustainable Management of Natural Resources<sup>12</sup> (SNMR) and sets out a framework to achieve this as part decision-making. The objective of the SMNR is to maintain and enhance the resilience of ecosystems and the benefits they provide. The Welsh Government is required to prepare, publish and implement a statutory Natural Resources Policy setting out its priorities in relation to the SMNR while Natural Resources Wales (NRW) is required to produce a ‘State of Natural Resources Report’ and prepare ‘Area Statements’ to inform place-based action. The Natural Resources Policy and Area Statements are a key piece of evidence which must be taken into account in development plan preparation.*

Section 3.37 states:

*‘The planning system is wide in its social, economic environmental and cultural scope and takes an all-embracing approach to sustainable development where decisions on short- and long-term needs and cost and benefits come together. It secures outcomes where multiple benefits (more than one ecosystem benefit) can be provided as part of plan making strategies or individual development proposals. The key features of the SMNR approach to which the planning system can contribute are:*

- *improving the resilience of ecosystems and ecological networks;*
- *halting and reversing the loss of biodiversity;*
- *maintaining and enhancing green infrastructure based on seeking multiple ecosystem benefits and solutions;*
- *ensuring resilient locational choices for infrastructure and built development, taking into account water supplies, water quality and reducing, wherever possible, air and noise pollution and environmental risks, such as those posed by flood risk, coastal change, land contamination and instability;*
- *taking actions to move towards a more circular economy in Wales; and*
- *facilitating the move towards decarbonisation of the economy.*

*The health and well-being of people and places and the need to address climate change and its consequences provide added impetus for proactive action through the planning system.’*

11.2.27 Section 5 ‘Productive and Enterprising Places’ states that investment in renewable and low carbon energy sources is core to creating a ‘prosperous Wales’. Furthermore, in this section, it is stated that:

*‘The planning system should facilitate delivery of both this and Welsh, UK and European targets on renewable energy’,*

and

*'The benefits of renewable and low carbon energy, as part of the overall commitment to tackle climate change and increase energy security, is of paramount importance.'*

11.2.28 Section 6 on 'The Distinctive and Natural Places' theme of planning policy topics covers historic environment, landscape, biodiversity and habitats, coastal characteristics, air quality, soundscape, water services, flooding and other environmental (surface and sub-surface) risks.

11.2.29 Section 6.4 'Biodiversity and Ecological Networks' refers to the s6 Duty under the Environment (Wales) Act 2016 and states that:

*The planning system has a key role to play in helping to reverse the decline in biodiversity and increasing the resilience of ecosystems, at various scales, by ensuring appropriate mechanisms are in place to both protect against loss and to secure enhancement. Addressing the consequences of climate change should be a central part of any measures to conserve biodiversity and the resilience of ecosystems. Information contained in SoNaRR, Area Statements and species records from Local Environmental Record Centres should be taken into account.*

*Development plan strategies, policies and development proposals must consider the need to:*

- *support the conservation of biodiversity, in particular the conservation of wildlife and habitats;*
- *ensure action in Wales contributes to meeting international responsibilities and obligations for biodiversity and habitats;*
- *ensure statutorily and non-statutorily designated sites are properly protected and managed;*
- *safeguard protected and priority species and existing biodiversity assets from impacts which directly affect their nature conservation interests and compromise the resilience of ecological networks and the components which underpin them, such as water and soil, including peat; and*
- *secure enhancement of and improvements to ecosystem resilience by improving diversity, condition, extent and connectivity of ecological networks.*

11.2.30 Section 6 further states that

*'Implementing the section 6 duty' requires addressing of the following biodiversity considerations:*

- *diversity between and within ecosystems;*
  - *the connections between and within ecosystems;*
  - *the scale of ecosystems;*
  - *the condition of ecosystems including their structure and functioning; and the adaptability of ecosystems.*

11.2.31 Section 6.4.10 entitled 'Designated Sites' states:

*'Many of the most important areas of nature conservation value have been statutorily designated. These statutorily designated sites make a vital*

*contribution to protecting biodiversity and can also be important in providing opportunities for achieving wider well-being objectives'*

11.2.32 In relation to development within statutorily designated areas, Section 6.4.14 states:

*'Statutory designation of a site does not necessarily prohibit development, but proposals must be carefully assessed to ensure that effect on those nature conservation interests which the designation is intended to protect are clearly understood; development should be refused where there are adverse impacts on the features for which a site has been designated. International and national responsibilities and obligations for conservation should be fully met, and, consistent with the objectives of the designation, statutorily designated sites protected from damage and deterioration, with their important features conserved and enhanced by appropriate management.'*

11.2.33 Section 6.4.15 deals specifically with 'Protection and Management of Designated Sites'. It states:

*'Statutorily designated sites must be protected from damage and deterioration, with their important features conserved and enhanced by appropriate management. The contribution of the designated site to a wider network of resilient ecosystems should be recognised and captured as part of policy and decision making.'*

11.2.34 Section 6.4.17 deals with 'Sites of Special Scientific Interest'. It states:

*'SSSIs are of national importance. The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000, places a duty on all public bodies, including planning authorities, to take reasonable steps, consistent with the proper exercise of their functions, to further the conservation and enhancement of the features by reason of which a SSSI is of special interest. SSSIs can be damaged by developments within or adjacent to their boundaries, and in some cases, by development some distance away. There is a presumption against development likely to damage a SSSI and this presumption should be appropriately reflected in development plans and development management decisions. In particular, before authorising development likely to damage any of the notified features of a SSSI, planning authorities must give notice of the proposed operations to NRW, and must take its advice into account in deciding whether to grant planning permission and in attaching planning conditions.'*

11.2.35 Section 6.4.18 is concerned with 'Special Protection Areas, Special Areas of Conservation and Ramsar Sites'. It states that

*'SACs and SPAs are of European importance. Under the Conservation of Habitats and Species Regulations (2017) (the Habitats Regulations), all public bodies (including planning authorities) must have regard to the requirements of the EC Habitats and Birds Directives when carrying out their functions. SACs and SPAs on land are underpinned by notification as SSSIs and hence subject to protection afforded by the SSSI provisions. Before authorising development or adopting a land use plan which is likely to have a significant effect on a SAC or SPA (including where outside the boundary of the SAC or SPA), planning authorities must carry out an appropriate assessment of the implications for the designated features, consult NRW and have regard to NRW's representations. The development can normally only be authorised or the plan adopted, if the planning authority ascertains that it will not adversely affect the integrity of the site, if necessary taking into account any additional measures, planning conditions or obligations. 'Development or policies in land*

*use plans for which there is no alternative solution and which must be carried out for imperative reasons of over-riding public interest may be authorised notwithstanding a negative assessment of the implications, subject to notifying Welsh Ministers. Any necessary compensatory measures to protect the overall coherence of the network of SACs and SPAs must be secured.'*

11.2.36 In section 6.4.20, 'Protection for Non-statutory Designations' is presented:

*'Although non-statutory designations carry less weight than statutory designations, they can make a vital contribution to delivering an ecological network for biodiversity and resilient ecosystems, and they should be given adequate protection in development plans and the development management process. Before authorising development likely to damage a local wildlife designation, planning authorities should give notice of the proposed operation to the County Ecologist and third sector environmental organisations.'*

11.2.37 Section 6.4.21 details 'Maintaining and Enhancing Biodiversity'. It encourages:

*'Planning authorities must follow a step-wise approach to maintain and enhance biodiversity and build resilient ecological networks by ensuring that any adverse environmental effects are firstly avoided, then minimized, mitigated, and as a last resort compensated for; enhancement must be secured wherever possible.'*

11.2.38 Section 6.4.22 deals with Protected Species. It states:

*'The presence of a species protected under European or UK legislation, or under Section 7 of the Environment (Wales) Act 2016 is a material consideration when a planning authority is considering a development proposal which, if carried out, would be likely to result in disturbance or harm to the species or its habitat and to ensure that the range and population of the species is sustained. Planning authorities should advise anyone submitting a planning application that they must conform with any statutory species protection provisions affecting the site, and potentially the surrounding area, concerned. An ecological survey to confirm whether a protected species is present and an assessment of the likely impact of the development on likely impact of the development on a protected species may be required in order to inform the development management process. It is considered best practice that screening to determine the presence of protected species should be carried out by a competent ecologist on the basis of data provided by the relevant Local Environmental Record Centre.'*

11.2.39 6.4.23 further states:

*'Developments are always subject to the legislation covering European protected species regardless of whether or not they are within a designated site.'*

11.2.40 Section 6.4.24 provides for Trees, Woodlands and Hedgerows. It states:

*'Trees, woodlands, copses and hedgerows are of great importance for biodiversity. They are important connecting habitats for resilient ecological networks and make a valuable wider contribution to landscape'.*

The Planning (Wales) Act 2015

11.2.41 The Planning (Wales) Act 2015 also contains information regarding Sustainable Development and states that

*“The function must be exercised, as part of carrying out sustainable development in accordance with the Well-being of Future Generations (Wales) Act 2015, for the purpose of ensuring that the development and use of land contribute to improving the... environmental... well-being of Wales”.*

### Local Planning Policy

Strategic Policy PS 7 ‘Renewable Energy Technology’ and Policy ADN 2 ‘PV Solar Energy’.

11.2.42 The key policies for a solar farm application determined at the local level within the JLDP are Strategic Policy PS 7 ‘Renewable Energy Technology’ and Policy ADN 2 ‘PV Solar Energy’.

11.2.43 Strategic Policy PS 7 promotes renewable energy technologies provided that they comply with the criteria within the Policy. For this specific proposal regard should be given towards criteria (4) and (5) of this Policy:

*4. Ensuring the installations in accordance with PS 19 do not individually or cumulatively compromise the objectives of international, national and local nature conservation designations;*

*5. Supporting installations outside designated areas provided that the installation would not cause significant demonstrable harm to landscape character, biodiversity or amenity of residential or holiday accommodation, either individually or cumulatively.*

11.2.44 In addition, due to close proximity / slight overlap with both natural and built environment designations, the following Policies within the JLDP are also relevant:

- PS 19 ‘Conserving and where appropriate enhancing the Natural Environment’
- AMG 3 ‘Protecting and Enhancing features and qualities that are distinctive to the local landscape character’
- AMG 5 ‘Local Biodiversity Conservation’

### Anglesey Local Biodiversity Action Plan (BAP)

11.2.45 At the Rio summit in 1992 world leaders pledged to fight against wildlife’s extinction and strive to protect the variety of living nature on earth and the Convention on Biological Diversity was signed. The UK generated the UK Biodiversity Action Plan in response to this agreement. Local Biodiversity Action Plans (LBAP) were adopted at the county level to generate action on the ground and help meet UK targets.

11.2.46 The Anglesey LBAP is administered by the Isle of Anglesey County Council and was written to help secure partnership work between local people and organisations to ensure local resources are valued and looked after in the future (See chapter 4).

11.2.47 The Anglesey BAP (2005) details the different habitats and species identified as priorities for meeting the LBAP targets on the Island. It is divided into Habitat Action Plans (HAPs) and Species Action Plans (SAPs) and includes the location(s) of the resources, their current condition, factors causing decline, overall objectives, and proposed actions for management, protection and restoration. Habitats and species identified from the plan that are potentially relevant to the proposed Traffwll development are listed below:

- Habitat Action Plans

- Hedgerows
- Coastal and Floodplain Grazing Marsh
- River and Stream Habitats
- Ponds
- Flower-rich Road Verges
- Lakes
- Field Edges
- Scrub
- Species Action Plans
- Brown Hare
- Noctule Bat
- Pipistrelle Bat (Common and Soprano)
- Red Squirrel
- Water Vole
- Otter
- Bittern
- Chough
- Skylark
- Song Thrush

11.2.48 There are an additional twelve species of bird of conservation concern that are listed in the Anglesey LBAP that will benefit from the Local Habitat Action Plans.

- Amphibians
- Great Crested Newt

#### Ecosystem Services in Policy

11.2.49 Ecosystem services are the benefits that nature provides to humankind that contribute to making life both possible and worth living<sup>23</sup>. The UK Government conducted a full national ecosystem assessment to enable effective policy responses to degradation of ecosystem services. Consistent with the Millennium Ecosystem Assessment (2005), it identifies four broad categories of ecosystem services. It provides a starting point for identifying links between ecological features (e.g. broad habitats) and ecosystem services and assessing how land use change might affect the value that ecosystems provide.

11.2.50 The UKNEA Follow-on further developed the assessment and its applicability to decision and policy making.

#### Natural Environment White Paper (2011) – The natural choice: securing the value of nature

11.2.51 This sets out a broad 50-year vision for the natural environment and how Government in England intends to put natural capital at the heart of economic thinking and decision making. The White Paper outlines a number of initiatives to restore the natural environment, new programmes for connecting people and nature, and several proposals for capturing the economic value of nature and measuring green growth.

#### A Green Future: Our 25 Year Plan to Improve the Environment (2018)

11.2.52 This UK Government 25-year plan for the environment frames its goals and targets around the primary goods and benefits provided by a healthy environment. It is

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<sup>23</sup> UK National Ecosystem Assessment (2011) <http://uknea.unep-wcmc.org/>

underpinned by the natural capital approach and seeks to embed a 'net environmental gain' principle into development.

Environment (Wales) Act, 2016.

- 11.2.53 This Act focuses on the sustainable management of natural resources. It has the core objective of maintenance and enhancement of ecosystems and the benefits that they provide for people. The Act sets a duty on public authorities to take account of the resilience of ecosystems.

### 11.3 APPROACH TO ASSESSMENT AND METHODOLOGY

- 11.3.1 In this section the approach to assessing baseline conditions of ecology and the methodology for undertaking the EIA is presented. For completeness, the section describes the survey work undertaken across all of the 9 development areas originally identified as part of the proposed development. The approach adopted has addressed all comments made by the statutory consultees, as summarised in the Scoping Response.

#### Baseline Methods

##### Desktop study

- 11.3.2 A desktop study was undertaken on statutory and non-statutory designated sites by Wychwood Biodiversity in March 2019. Biological records and information on locally designated wildlife sites within 5km of the site's boundary was purchased from COFNOD, the North Wales Environmental Information Service. A data search was undertaken in MAGIC<sup>24</sup> ([www.magic.gov.uk](http://www.magic.gov.uk)) for statutory designated sites within 15km of the proposed site.

##### Phase 1 Habitat Survey

- 11.3.3 A Phase 1 habitat survey was undertaken in April and May 2019 (a copy of the survey is included in **Appendix 11.8**) following best practice guidance for methodology<sup>25</sup>. Hedgerows and hedgebanks within the proposed site were surveyed as part of Phase 1 habitat surveys.

##### Protected and Key Species

- 11.3.4 All signs of protected species or groups encountered during the survey visits were recorded. The structure and quality of the habitats present were assessed for their suitability to support fauna, paying particular attention to detecting signs of occupation by or suitability for protected species.
- 11.3.5 The following key species or groups were given particular consideration during the surveys, as per best practice for baseline surveys.

##### Great Crested Newts

- 11.3.6 In addition to the information requested from COFNOD, a desktop search was conducted in April 2019 using Ordnance Survey online maps to identify any ponds within the proposed site, and up to 500m from the boundary.

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<sup>24</sup> MAGIC – Multi-Agency Geographic Information for the Countryside

<sup>25</sup> JNCC (\*\*\*\*)

- 11.3.7 Each pond was assessed for its suitability to be used by great crested newts during their breeding cycle, using the standard Habitat Suitability Index<sup>26</sup>.
- 11.3.8 Ponds that were accessible and contained water were sampled using the standard methodology for eDNA analysis, taking 20 samples from each water body, between the 24<sup>th</sup> and 27<sup>th</sup> May 2019.
- 11.3.9 The full GCN survey report is displayed in **Appendix 11.1**.

#### Breeding Birds

- 11.3.10 As per the scoping guidance of the RSPB, the Common Bird Census (CBC) method, modified to 4 visits, was utilised for the survey of breeding birds. All species of birds were recorded with particular attention given to those species of elevated conservation or legislative status (hereafter described as notable).
- 11.3.11 Wherever possible, a 250m buffer was surveyed in addition to the DAs themselves, with the exception of private residences and their associated gardens, areas where access was not permitted by the landowner, and areas that posed a health and safety risk to surveyors. Certain areas owned or managed by the RSPB were omitted with their consent to avoid unnecessary disturbance to sensitive bird populations.
- 11.3.12 In addition to the diurnal CBC surveys two crepuscular / nocturnal surveys were made to determine any night-time usage of the application areas by waders.
- 11.3.13 The full breeding bird survey report is displayed in **Appendix 11.2**.

#### Wintering Birds

- 11.3.14 The methodology for surveying winter birds was in accordance with RSPB/NRW scoping guidelines and involved bi-weekly site visits to record all bird species, particularly those of conservation importance (hereafter notable) from September 2019 to March 2020.
- 11.3.15 Fixed transect routes were devised to cover all application DAs plus a surrounding buffer of 250m, on a field-by-field basis.
- 11.3.16 The full winter bird survey report is shown in **Appendix 11.3**.

#### Chough

- 11.3.17 An in-depth desktop study was carried out to obtain all available information and enable analysis on chough at a site, local, county and national scale. Key sources included data from the RSPB and the Cross & Stratford Welsh Chough Project.
- 11.3.18 As per the guidance of NRW and the RSPB, field surveys comprised fortnightly walked transects between September and March. Transects passed through all fields of both the DAs and buffer.
- 11.3.19 As specified by NRW the following information was recorded during the surveys:
- Numbers of Chough, their location and behaviour;
  - Details of any colour-ringed Chough; and

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<sup>26</sup> Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10(4), 143-155.).

- A number of habitat variables in the fields of the study area:

11.3.20 The full chough report is displayed in **Appendix 11.4**.

#### Bats

11.3.21 Data on bats was requested from COFNOD in March 2019. In addition Gwynedd Bat Group was also consulted for information on local bat species.

11.3.22 All trees within the study area were inspected for features that may be of interest to roosting bats or any evidence of bat occupation during the extended Phase 1 Habitat Survey.

11.3.23 All buildings within the study area were inspected in July 2019 for bat roosting potential by a licensed surveyor.

11.3.24 Bat transect surveys and static surveys were carried out in May/July 2019 and August 2020 following the current guidance from the Bat Conservation Trust: Bat Survey Guidelines (2016).

11.3.25 The full bat survey report is displayed in **Appendix 11.5**.

#### Otters and Water Voles

11.3.26 Baseline survey methods for otters and water voles are combined here owing to the similarity of habitat used. Aside from the COFNOD search, data was requested from several external sources running independent surveys of these species most notably the RSPB and Menter Mon.

11.3.27 A desktop study of an Ordnance Survey map at a scale of 1:50,000 and satellite imagery found that DAs 4 and 6 had the potential to contain waterways suitable for water voles and/or otters. DA 5 was not seen to contain suitable waterways.

11.3.28 Surveys of the waterways identified as having potential to support water voles and otters were carried out in July 2019 and August/September 2020. The full survey reports for otters and water voles are displayed in **Appendix 11.6**.

#### Badgers

11.3.29 Signs of badger activity were searched for within the proposed development area and within 30m of the site where accessible, as part of the extended Phase 1 Habitat Survey. The survey followed the recommended methodology detailed in the Mammal Society's manual *Surveying Badgers*<sup>27</sup>.

#### Red squirrel

11.3.30 Signs of red squirrels including dreys were searched for along boundary woodland and hedgerow trees during Phase 1 habitat surveys carried out in 2019.

#### Ecosystem services

11.3.31 The most appropriate means of assessing ecosystem services on solar farms is SPIES<sup>28</sup>, a decision-support tool jointly developed by the Universities of Lancaster

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<sup>27</sup> Harris, S., Cresswell, P. and Jefferies, D. (1989) *Surveying Badgers*. Mammal Society (Occasional Publication No 9).

<sup>28</sup> SPIES – Solar Park Impact on Ecosystem Services

and York. The SPIES tool is designed to assist companies involved in developing and operating solar parks. SPIES draws on over 700 pieces of evidence from more than 450 peer-reviewed scientific publications to assess what management actions can best support biodiversity and ecosystem service supply.

## 11.4 ASSESSMENT METHODOLOGY

### Determining the Value of Ecological Features

11.4.1 The value and sensitivity of ecological features was determined based on the guidance given in 'Guidelines on Ecological Impact Assessment' produced by CIEEM. Individual ecological features (habitats and species that could be affected by the scheme) were assigned levels of importance for nature conservation in one of the following categories, determined by geographic context:

- International;
- National;
- Regional;
- Metropolitan, County or Vice County;
- Local; or
- Within the immediate zone of influence (Zoi) only.

11.4.2 For a given feature, determination of value includes consideration of the size, conservation status and quality of the species or feature.

### Valuation of Habitats

11.4.3 Some sites are assigned a nature conservation value through designation and the reason for designation is taken into account in EclA. Designated sites are considered at the following levels:

- International – Special Areas of Conservation (SAC), Special Protected Areas (SPA) and Ramsar Sites. World Heritage Sites also are considered to be of international value at the site level, but not necessarily in terms of their ecological value.
- National – Sites of Special Scientific Interest (SSSI) in England, Scotland or Wales and Areas of Special Scientific Interest (ASSI) in Northern Ireland
- County– sites designated by Local Authorities or County Wildlife Trusts and others.

11.4.4 Habitats that are not subject to specific nature conservation designations have been valued against published selection criteria where possible, including the following:

- Habitats Directive, 1992;
- Guidelines for the section of biological SSSI; and
- Species and habitats included in the Section 7 list (list of species and habitats of principal importance in Wales), as required under The Environment Act (Wales) 2016.

11.4.5 In determining the value of habitats, consideration is also given to national and local Biodiversity Action Plans in conjunction with critical appraisal of the size, status and quality of the habitat affected.

### Valuation of Species

11.4.6 The value of species populations is determined based on the legal status of species,

as well as their size and status on the site and within the geographic area. Certain species receive legal protection, which has been taken into account when determining value. Relevant legislation includes:

- The Conservation (Natural Habitats &c.) Regulations, 2010;
- The Wildlife and Countryside Act, 1981 (as Amended); and
- The Environment Act (Wales) 2016.

11.4.7 The presence of invasive alien species, injurious weeds or legally controlled plants is considered to be a negative ecological feature.

### Zone of Influence

11.4.8 The 'zone of influence' for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries.

11.4.9 The study area incorporates the application area within the red line boundary, and also includes watercourses within 30m, ponds within 500m, non-statutorily designated sites within 2km and Natura 2000 sites within 15km of the site.

### Characterising Ecological Impacts

11.4.10 The purpose of the EIA is to identify the likely significance of environmental effects (positive or negative) arising from a development. In broad terms, environmental effects are described as:

- negative – adverse or negative effects to an environmental resource or receptor;
- positive – beneficial or positive effect to an environmental resource or receptor;
- or
- negligible – a neutral effect to an environmental resource or receptor.

11.4.11 Effects are assessed in terms of:

- Magnitude—the degree of alteration (both positive and negative) from the baseline state; and
- The sensitivity of the receptor(s)— this may relate to the value of a resource and the reversibility of impacts.

11.4.12 The criteria for determining the magnitude of impact are set out below in **Table 11.2**. Criteria for determining the sensitivity of receptors are displayed in **Table 11.3**.

Table 11.2: Magnitude of Impact

Magnitude of impact	Criteria
High	Total loss or major/substantial alteration to elements/features of the baseline (pre-development) conditions such that the post development character/composition/attributes will be fundamentally changed.
Medium	Loss or alteration to one or more elements/features of the baseline conditions such that post development character/composition/attributes of the baseline will be materially changed.

Low	A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible/detectable but the underlying character/composition/attributes of the baseline condition will be similar to the pre-development.
Negligible	Very little change from baseline conditions. Change not material, barely distinguishable or indistinguishable, approximating to a 'no change' situation.

Table 11.3: Sensitivity Criteria

Sensitivity	Criteria
High	The receptor/resource has little ability to absorb change without fundamentally altering its present character or is of international or national importance.
Medium	The receptor/resource has moderate capacity to absorb change without significantly altering its present character or is of high and more than local (but not national or international) importance.
Low	The receptor/resource is tolerant of change without detrimental effect, is of low or local importance.
Negligible	The receptor/resource can accommodate change without material effect, is of limited importance.

11.4.13 Significance of effect is evaluated as a combination of the sensitivity of the receptor and the magnitude of change the development results in. The matrix in **Table 11.4** below is designed to demonstrate an objective rationale to reach a conclusion about the significance of effect, but a degree of professional judgement is a key element in the evaluation process.

Table 11.4: Significance of Effects

		Sensitivity of Receptor			
		High	Medium	Low	Negligible
Magnitude of impact	High	Major Adverse/Beneficial	Major - Moderate Adverse/Beneficial	Moderate - Minor Adverse/Beneficial	Negligible
	Medium	Major - Moderate Adverse/Beneficial	Moderate - Minor Adverse/Beneficial	Minor Adverse/Beneficial	Negligible
	Low	Moderate - Minor Adverse/Beneficial	Minor Adverse/Beneficial	Minor Adverse/Beneficial - Negligible	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

11.4.14 Any effect of Moderate or Major significance is considered to represent a likely significant effect for the purposes of the EIA Regulations. Significance of effects would be considered before and after mitigation.

11.4.15 When characterising ecological impacts, reference will be made to the following characteristics as required:

- Positive or negative;
- Extent;

- Magnitude;
- Duration;
- Frequency and timing; and
- Reversibility

11.4.16 Positive and negative impacts and effects should be determined according to whether the change is in accordance with nature conservation objectives and policy:

- **positive** – a change that improves the quality of the environment e.g. by increasing species diversity, extending habitat or improving water quality. This may also include halting or slowing an existing decline in the quality of the environment.; or
- **negative** – a change which reduces the quality of the environment e.g. destruction of habitat, removal of foraging habitat, habitat fragmentation, pollution.
- **Extent** - the spatial or geographical area over which the impact/effect may occur under a suitably representative range of conditions (e.g. noise transmission under water).
- **Magnitude** - refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
- **Duration** - should be defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species. The duration of an activity may differ from the duration of the resulting effect caused by the activity. For example, if short-term construction activities cause disturbance to birds during their breeding period, there may be long-term implications from failure to reproduce that season. Impacts and effects may be described as short, medium or long-term and permanent or temporary.
- **Frequency and timing** - the number of times an activity occurs will influence the resulting effect. For example, a single person walking a dog will have very limited impact on nearby waders using wetland habitat, but numerous walkers will subject the waders to frequent disturbance and could affect feeding success, leading to displacement of the birds and knock-on effects on their ability to survive. The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons e.g. bird nesting season.
- **Reversibility** - an irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation. In some cases, the same activity can cause both reversible and irreversible effects.

11.4.17 The assessment only needs to describe those characteristics relevant to understanding the ecological effect of the impacts and determining its significance. For example, timing of the removal of a hedgerow is unlikely to be of particular relevance to the assessment of the effect on hedgerows, although it may be relevant in assessing the effect on a species using the hedgerow, such as nesting birds.

#### Assumptions and Limitations

11.4.18 The findings of this assessment are based upon available information and field surveys. As with any surveys of this kind, the information collected defines the habitat types and quality and is not intended to be a record of every species present.

11.4.19 When carrying out the breeding and winter bird surveys, wherever possible, the integrity of the 250-metre buffer was maintained, except for: private residences and their associated gardens; areas where access was not permitted by the landowner; and areas that posed a health and safety risk to surveyors. Certain areas owned or managed by the RSPB were omitted with their consent to avoid unnecessary disturbance to sensitive bird populations.

11.4.20 For the winter bird/Chough surveys, thirteen of fifteen planned survey visits were achieved during September 2019 to early March 2020. Two further survey visits were planned for the middle and end of March but due to the Covid-19 outbreak and the associated control measures these had to be cancelled in the interest of public health. However, this is not believed to have had a significant detrimental effect on the survey results and the wintering avifauna (including Chough) are deemed to have been adequately sampled.

#### Mitigation

11.4.21 This section describes how best practice approaches to mitigating impacts have been applied to the proposed Parc Solar Traffwll EclA.

#### Mitigation Hierarchy

11.4.22 A sequential process has been adopted to avoid, mitigate and compensate negative ecological impacts and effects in order to achieve a net gain for biodiversity. This process is often referred to as the 'mitigation hierarchy'. Avoidance, mitigation, compensation and enhancement measures have been applied in turn as part of the EclA process.

#### Avoidance

11.4.23 Negative impacts should always be avoided where possible, for example, by deciding not to locate a project in a particular area or making a change to scheme layout to avert negative impacts to priority biodiversity. Avoidance can be spatial or temporal, for example careful timing of an activity to prevent an impact occurring.

#### Mitigation

11.4.24 Where avoidance has been applied but residual impacts are still predicted, then mitigation options will be applied to address the impacts. Mitigation can cover a range of activities, from construction practices to equipment selection to operational controls, each designed to minimise a particular impact. For example, selecting low ground pressure vehicles for construction work will minimise the risk of soil compaction and sediment release during construction.

#### Mitigation by Design

11.4.25 Avoiding and/or minimising negative impacts is best achieved through consideration of potential impacts of a project from the earliest stages of scheme design and throughout its development. Many impacts can be avoided or reduced by consideration of alternatives.

11.4.26 Mitigation measures incorporated into the scheme design are often described as 'embedded mitigation' or 'mitigation by design'. This can include the re-design of the layout of the scheme, or adjusting the location of certain activities. Mitigation by

design is particularly beneficial as there is greater certainty that it will be delivered. Through a process of collaborative dialogue with the engineering team, Wychwood have ensured the principles of mitigation by design have been applied to the proposed development.

#### Compensation

- 11.4.27 Compensation describes measures taken to offset residual effects resulting in the loss of, or permanent damage to, ecological features despite mitigation. For example, it may take the form of replacement habitat or improvements to existing habitats. Compensation can be provided either within or outside the project site (defined by the red line of a planning application). Compensation should always be seen as a last resort, when all other mitigation options have been exhausted.
- 11.4.28 As a general rule, compensation should be focused on the same type of ecological features as those affected and equivalent levels of ecological 'functionality' sought. There will be cases when it is not possible to achieve ecological equivalence through compensation. Any replacement area should be similar in terms of ecological features and ecological functions that have been lost or damaged, or with appropriate management have the ability to reproduce the functions and conditions of those ecological features. Compensation should be provided as close as possible to the location where effects have occurred and benefit the same habitats and species as those affected.
- 11.4.29 Where the delivery of compensation measures, including biodiversity offsets, is likely to involve access to land, or land purchase, outside a scheme footprint and a commitment to long-term management through legal agreements, this has been flagged in the EclA.

#### Enhancement

- 11.4.30 Enhancement is improved management of ecological features or provision of new ecological features, resulting in a net benefit to biodiversity, which is unrelated to a negative impact or is 'over and above' that required to mitigate/compensate for an impact. For example, mitigation for bats may involve erecting bat boxes in a woodland to replace suitable bat roosting features that have been removed, and the woodland habitat itself may be enhanced for foraging bats by increased woodland planting and the creation of glades. Enhancement could be linked to the delivery of wider socio-economic benefits such as wetland restoration and flood risk management. Enhancement measures are described further in the relevant sections of this EclA.

#### Consultation

- 11.4.31 Consultation was undertaken with the following organisations relating to agreeing the appropriate scope of survey work:
- **RSPB** Formal Scoping responses were received from the RSPB on 11<sup>th</sup> July 2019. An ongoing dialogue has been maintained with the RSPB from the outset of Wychwood Biodiversity's involvement in the project, with a series of formal and informal meetings taking place between November 2018 and the present.
  - **Natural Resources Wales** Formal Scoping responses were received from NRW on 11<sup>th</sup> July 19. A series of Discretionary Advice Service requests were made, related specifically to the issue of potential Chough usage of proposed

development areas. Details of species surveys and surface water management of DA6 were solicited and received from NRW on 11<sup>th</sup> November 2019, 14<sup>th</sup> July 2020 and 16<sup>th</sup> October 2020.

- **Isle of Anglesey County Council (IACC)** provided a response to PINS Scoping consultation on 6th June 2019 following a meeting with the applicant and submission of a request for pre-application advice.
- **Gwynedd Bat Group** were contacted via email in order to seek further information on bat species, in particular myotis species, found on the Island of Anglesey. The Gwynedd Bat Group responded via email offering the information they had on file.
- **Cross and Stratford Welsh Chough Project** Engagement with the Cross and Stratford Welsh Chough Project, a key consultee, first occurred with a Chough focus meeting at the RSPB Bangor offices in May 2019. Subsequent to this, advice and data has been received from Adrienne Stratford on both a commercial and pro-bono basis.

11.4.32 The responses from the above organisations are presented in **Appendix 11.7**.

## 11.5 BASELINE CONDITIONS

### Designated Sites

#### Statutory Sites Designated Under European legislation

11.5.1 There are five statutory sites designated for nature conservation under European legislation within 10km of the application area. Two statutory sites, Llyn Dinam Special Area of Conservation and Glannau Ynys Gybi /Holy Island Coast Special Protection Area have been scoped into the assessment as detailed below. The remaining statutory sites have been scoped out of the assessment on the basis that there are no ecological or hydrological links between the designated sites in question and the application area. See **Appendix 11.9** for details.

#### Llynn Dinam SAC

11.5.2 Llyn Dinam is a coastal eutrophic lake designated as a SAC for the presence of Annex 1 habitats: 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation. Llyn Dinam is also a component of Llynnau y Fali SSSI which will be detailed separately.

11.5.3 Common reed, and to a lesser extent common club-rush, dominate the shoreline. Rigid hornwort is abundant in shallow open water, often in association with autumnal starwort and ivy-leaved duckweed. Fennel-leaved pondweed, perfoliate pondweed and lesser pondweed have been recorded.

11.5.4 Water chemistry characteristics are consistent with those expected in eutrophic lakes, including relatively high pH, alkalinity and phosphorus levels. Llyn Dinam is the least-enriched of a series of Anglesey lakes which have been subjected to sediment diatom analysis.

11.5.5 The Llyn Dinam management plan of 2008 indicated that the site was in unfavourable condition largely because broadleaved Potamogeton species are absent and because the Mean Annual Total Phosphorous level exceeds the limit for this type of lake at 58 µg/l. However, it was concluded that the nutrient status of Llyn Dinam was moving towards favourable condition, although continued action to reduce catchment inputs will be needed to maintain this trend.

11.5.6 The north-east corner of the SAC falls within the southern part of DA6 of the application area. The area of overlap is approximately 5 hectares, the SAC itself totals 36.72 hectares. DA6 as a whole is hydrologically linked to the Llyn Dinam SAC.

#### Glannau Ynys Gybi/Holy Island Coast SPA

11.5.7 The Glannau Ynys Gybi /Holy Island Coast SPA is designated for breeding and wintering populations of the Annex 1 bird species the Chough.

11.5.8 As laid out in the 2008 Management Plan for the site, favourable conservation status would comprise:

- A breeding population of Chough within the SPA of at least 18 pairs, of which at least 12 should be within the Glannau Ynys Gybi / Tre Wilmot SSSI and at least 6 should be within the Glannau Rhoscolyn SSSI;
- A non-breeding population of Chough is at least 18 individuals or 2.5 % of the GB wintering population;
- Sufficient suitable habitat (including Atlantic sea cliffs, maritime grassland, maritime heath, wet heath and dry heath) is present and in appropriate condition to support the breeding populations; and
- All factors affecting the achievement of these conditions are under control.

11.5.9 The condition of Chough within the SPA is considered to be “unfavourable declining”. This is because, despite the steady increase in breeding numbers over the past 30 years, the utilisation of land within the SPA by feeding birds appears to have diminished. Thus the SPA does not provide the support necessary to the breeding population and birds fly to adjacent farmland to feed.

11.5.10 The 2016 UK SPA review (Stroud et al 2016) considered the sufficiency of the existing Chough SPA suite in terms of population numbers, range and ecological sufficiency and whether additional conservation measures were considered necessary. For both breeding and non-breeding Chough SPAs the suite was considered sufficient in terms of population, but insufficient in range and ecological sufficiency. These issues are currently under assessment by NRW.

11.5.11 As stated by the RSPB and the Welsh Chough Project, fields south of Llyn Traffwll are known to be used for foraging by post breeding and wintering Chough associated with the Glannau Ynys Gybi /Holy Island Coast SPA.

#### Statutory Sites Designated Under National Legislation

11.5.12 There are six statutory sites designated for nature conservation under national legislation within 10km of the application area. Two statutory sites, Llynnau y Fali SSSI and Llyn Traffwll SSSI have been scoped into the assessment as detailed below. The remaining statutory sites have been scoped out of the assessment on the basis that there are no ecological or hydrological links between the designated sites in question and the application area see Appendix 11.10 for details.

#### Llynnau y Fali - Valley Lakes Site of Special Scientific Interest (SSSI)

11.5.13 Llynnau y Fali consists of a mosaic of open water areas with associated mesotrophic marshland and damp grassland habitats. There are two lakes, Llyn Penrhyn and Llyn Dinam, together with a number of smaller standing water bodies.

11.5.14 The qualifying features of the site include standing water habitats and aquatic plants

found therein, reedswamp and marsh fern.

- 11.5.15 The site is also designated for wintering shoveler and breeding bird assemblage of open waters and their margins (gadwall, pochard, shoveler and Cetti's warbler).
- 11.5.16 The diversity of habitats supports a wide range of other species including eleven species of dragonfly and damselfly, including the hairy dragonfly (*Brachytron pratense*) and the variable damselfly (*Coenagrion pulchelum*) and water beetles (*Gyrinus spp.*) including the rare *G. suffriana* and the nationally scarce species *G. paykulli*.
- 11.5.17 The Llyn Dinam/Llynnau y Fali Management Plan of 2008 indicated that the site was in unfavourable condition on account of nutrient status. Llyn Dinam was regarded as moving towards favourable condition whilst Llyn Penryhn was in unfavourable declining condition.
- 11.5.18 The north-east corner of the SSSI, also designated as a Llyn Dinam SAC, falls within the southern part of DA6 of the application area. The area of overlap is approximately 5 hectares, the SSSI itself totals 100.8 hectares. DA6 as a whole is hydrologically linked to the Llyn Dinam component of the SSSI.

#### Llyn Traffwll SSSI

- 11.5.19 Llyn Traffwll is primarily of biological interest. It is an example of a moderately base rich lake and the aquatic flora includes characteristic species such as lesser pondweed (*Potamogeton pusillus*) and spiked water-milfoil (*Myriophyllum spicatum*). Among the rare and uncommon species that have been recorded are the eight-stamened waterwort (*Elatine hydropiper*) and flowering rush (*Butomus umbellatus*).
- 11.5.20 The site is also designated for its wintering wildfowl including wigeon, gadwall, goldeneye, pochard, tufted duck and notably the shoveler duck, whose numbers frequently represent greater than one percent of the British total.
- 11.5.21 As well as the features listed above, Llyn Traffwll has other habitats that contribute to the special interest. These include areas of marshy grassland, marginal swamp, willow scrub and the outflow stream at the southern end of the lake. This mixture of habitats is important for a range of wildlife, such as otters and water vole various insect species (including dragonflies and damselflies) and nesting birds.
- 11.5.22 No condition assessment was found for the site. Llyn Traffwll SSSI lies between DA6 to the west and DA4 & DA5 to the east but is not directly hydrologically linked to these DAs.

#### Non-Statutory Sites

- 11.5.23 There are 14 non-statutory sites designated for nature conservation within 2km of the application area. Details of these sites including the reasons for the designation and the distance from the application area are provided in **Appendix 11.9**. All of the non-statutory sites are considered to be of importance to nature conservation at a Local to County level.
- 11.5.24 Three sites abut some of the DAs and will be taken forward for assessment namely; Cors Plas, Tywyn Trewan and RSPB Valley Wetlands Reserve. The remaining sites have been scoped out of the assessment since there are no ecological features that

are likely to be affected by biophysical changes as a result of the proposed development.

#### Cors Plas Wildlife Site

- 11.5.25 The site comprises an extensive area of marshy grassland with several excavated pools and some willow scrub. The site is important mainly for its wildfowl. In winter there are large numbers of teal, mallard, wigeon and shoveler on the site with smaller numbers of pintail, pochard, gadwall and tufted duck. It also holds a nationally important colony of breeding lapwing.
- 11.5.26 A large part of this Wildlife Site is managed by the RSPB. Cors Plas abuts with DA 4 of the application area.

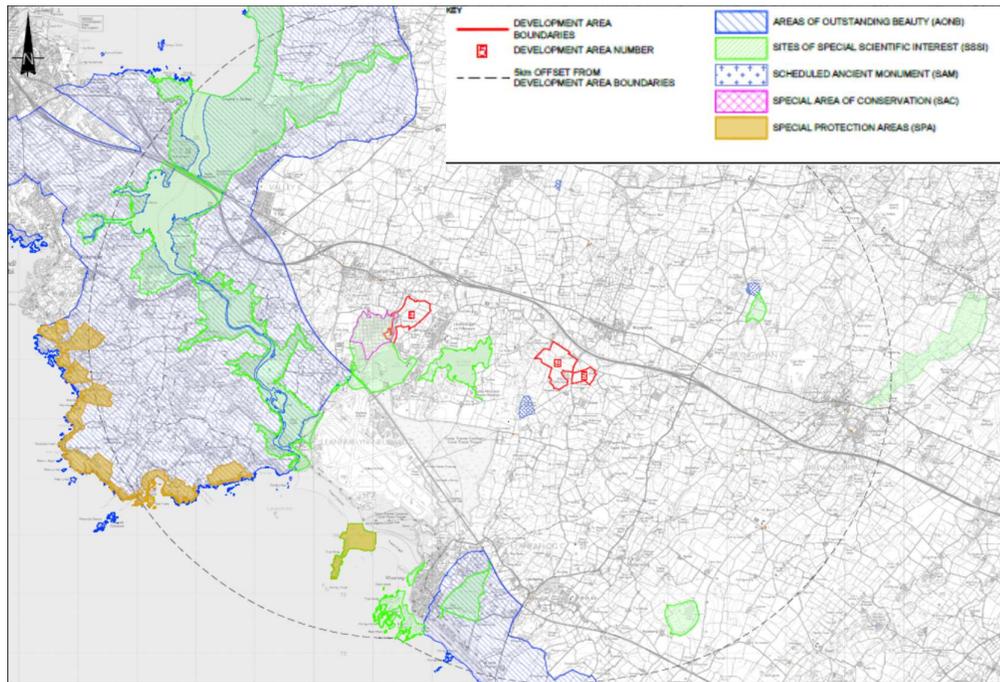
#### Tywyn Trewan Wildlife Site

- 11.5.27 The site comprises 282.5 hectares that includes an extensive sand dune system with salt marsh and heath/grassland mosaic at the northern end. The sand dune system exhibits all of the zones of dune succession: fore, yellow and grey dune with dune grassland, scrub, heath and slacks. The heath grassland mosaic is present on the landward side of this dune system;
- 11.5.28 Plant species of particular interest, especially in the dune slacks, include many species of orchids such as pyramidal, bee, early marsh and northern marsh and marsh helleborine. Nationally rare species present are early sand-grass and sea heath in its only Welsh locality. The latter is abundant where the dunes grade into salt marsh.
- 11.5.29 Tywyn Trewan Wildlife Site is more than 500m distant from DA4 and with no direct hydrological linkage.

#### RSPB Valley Wetlands Nature Reserve

- 11.5.30 A significant proportion of the land area designated as the aforementioned Llyn Dinam SAC and the Llynnua y Fali and Traffwll SSSIs forms part of the Valley Wetlands Nature Reserve which is owned and managed by the RSPB.
- 11.5.31 The reserve is primarily managed for breeding bittern and other reedbed wildlife. Over the years a programme of ditch and pool creation, reed planting and management, scrub clearance and water level control has helped to enhance the wetland ecosystem. This work has also benefitted the breeding and wintering wildfowl which utilise the wetlands.

Figure 11.6: Statutory and Non-Statutory Designated Sites within 5km of Parc Solar Traffwll



### Phase 1 Habitats

11.5.32 Habitats are listed below in order of dominance across the DAs.

#### Grassland

11.5.33 The total area of proposed development is approximately 63 Ha (inclusive of cable run), the majority of which is either semi-improved neutral or improved grassland. Semi-improved neutral grassland is dominant across DA6 (25Ha) while improved grassland comprises approximately 35Ha of the application site area (and is found within DA4 and DA5). The fields are grazed by sheep, cattle and horses.

11.5.34 Rush pasture intermixed with the semi-improved grassland is present in DA6, particularly in the eastern half, comprising approximately 20-25% of the grassland area.

11.5.35 Species composition of the semi-improved grassland areas included, but was not limited to, a range of common grass species and variety of herbs as listed in Tables 11.5 and 11.6 below.

Table 11.5: Grass Species of Semi-Improved Grassland

Grass species	
Sweet Vernal Grass	Anthoxanthum odoratum
Crested Dogs tail	Cynosurus cristatus
Red Fescue	Festuca rubra
Yorkshire Fog	Holcus lanatus
Meadow grass sp	Poa sp(p)

Table 11.6: Herb Species of Semi-Improved Grassland

Herb species	
Hardheads	Centaurea nigra
Creeping thistle	Cirsium arvense
Meadowsweet	Filipendula ulmaria
Ribwort Plantain	Plantago lanceolata
Fleabane	Pulicaria dysentrica
Meadow Buttercup	Ranunculus acris
Sheep's Sorrel	Rumex acetosella
Common Ragwort	Senecio jacobaea
White Clover	Trifolium repens

11.5.36 Neither semi-improved nor neutral grassland is listed as a habitat of principal importance under Section 7 of the Environment (Wales) Act 2016 or included within the Biodiversity Action Plan (BAP) for Anglesey. Given the extent and relatively diverse nature of the semi-improved grassland, including the areas of rush pasture In DA6, semi-improved grassland habitat is considered to be important at a local level.

#### Coastal and Floodplain Grazing Marsh

11.5.37 Several areas of grassland consisting of both semi-improved and improved pasture, where the application DAs are immediately adjacent to water courses/features are considered to fall under the category of floodplain grazing marsh. This includes the south western corner of DA6 which overlaps onto the Llyn Dinam SAC and is also adjacent to the Valley SSSI, and the western borders of DA4 which abuts the river Crigyll.

11.5.38 Coastal grazing and floodplain grazing marsh is listed as a habitat of principal importance under Section 7 of The Environment (Wales) Act 2016 and is included in the Habitat Action Plan for Anglesey. In the latter it is defined as 'lowland areas sometimes flooded by rivers or streams' Consequently, these areas can be considered to be of **Regional** importance.

#### Hedgerows, Scattered Trees

11.5.39 Hedgerows form an important component of the overall ecology of the development areas comprising an approximate combined length of 7.2km. The highest concentration occurs on DA6, which, with relatively small fields, has the greatest length of hedgerow at >4km. Access routes for farm machinery and gates for livestock are present throughout the hedgerows.

11.5.40 Additional ecological value is provided within the application area by the presence of approximately 5Km of dry-stone walls and earthen hedge-banks, upon which hedgerows and/or trees have become established (DA4: 2695m, DA5: 1110m, DA6:1295m)

11.5.41 The total across all DAs is approximately:

- 1,395m of species rich native intact hedgerow
- 160m of species rich defunct hedgerow
- 675m of species poor intact hedgerow

- 1,730m of species poor intact hedge on an earth bank base
- 225m of species poor defunct hedge on dry stone walls
- 630m of species poor defunct hedge
- 1135m of species poor defunct hedge on an earth bank base
- 1,110m of species poor hedge on a dry-stone wall base

- 11.5.42 Hedges are mapped in **Appendix 11.8** Phase 1 Habitats. Hedgerows predominantly comprise blackthorn *Prunus spinosa*, hawthorn *Crataegus monogyna* and willow *Salix* sp., gorse *Ulex europeaeus*, elder *Sambucus nigra*, bramble *Rubus fruticosus* agg, dog rose *rosa* sp(p), ash *Fraxinus excelsior* and some oak *Quercus* sp.
- 11.5.43 Standard trees within the application area are predominantly associated with hedgerows and field boundaries and include mature specimens of willow, oak, ash and sycamore.
- 11.5.44 All hedgerows and trees are listed as habitats of principal importance under Section 7 of the Environment (Wales) Act 2016 and are also included in the habitat action plan for Anglesey as they comprise over 80% native species. Earth and stone banks, which also can support dense hedgerow vegetation are also included in the action plan. Consequently, hedgerows and trees within the application area are considered to be of importance to nature conservation at a **Regional** level.
- 11.5.45 Note that a considerable proportion (approximately 30 %) of hedgerows within the application area have been classified as being defunct and so would benefit from a management policy of restoration.

#### Scrub

- 11.5.46 Relatively small areas of dense scrub occur throughout the application area, sometimes associated with rocky outcrops as in DA6 but also in un-grazed field corners or edges along stock fence boundaries. The most substantial area of scrub, comprising a total of approximately 1.35 ha, is found in DA6 to the west of the track that bisects the DA north to south, abutting an area of marshy swamp along the north west boundary and the north eastern corner of Llyn Dinam. Species include bramble *Rubus fruticosus* agg., gorse *Ulex europeaeus*, hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, elder *Sambucus nigra*, willow *Salix* sp and some Larch *Larix decidua*.
- 11.5.47 Scrub vegetation is not listed as a habitat of principle importance under Section 7 of the Environment (Wales) Act 2016 or in the Anglesey BAP. However, although the areas of scrub consist of common species this habitat is considered to be important at the **local** level as it provides habitat connectivity between the interface of marshland and grassland, as in DA6, or woodland and marsh as elsewhere on the site, and supports a wide variety of invertebrates and birds.

#### Woodland

- 11.5.48 Relatively small patches of woodland with a combined total of 0.6ha occur within DA4 (0.36 ha) and DA6 (0.24 ha) and comprise planted broad leaved and mixed woodland. Dominant species include sycamore *Acer pseudoplatanus* and ash *Fraxinus excelsior*. There are a small number of black pine trees *pinus nigra* at the boundary of DA4 in the north-eastern most field.
- 11.5.49 Just outside the south west boundary of DA4 there is a small copse (0.25ha) of mainly

larch *Larix decidua* in which a small heronry is located.

- 11.5.50 Planted woodland is not listed as a habitat of principal importance under Section 7 of the Environment (Wales) Act 2016 or included in the Anglesey BAP. Consequently, given the small area of woodland cover within the application area this habitat is considered to be of importance to nature conservation in the immediate **ZoI** only.

#### Watercourses

- 11.5.51 A network of ditches/field drains amounting to approximately 615m is present within DA6, most of which is seasonally wet, only in the wetter areas typical wetland plants such as yellow iris *Iris pseudacorus*, sedges *Carex sp(p)*, common reed *Phragmites australis*, soft rush *Juncus effusus* and compact rush *Juncus comglomeratus* are present.
- 11.5.52 There are several ponds in DA4 but they are all quite small comprising a total area of <500 m<sup>2</sup>.
- 11.5.53 There is a substantial area of marshland comprising approximately 2.1km<sup>2</sup> along the western side of DA6 that for Phase 1 habitat assessment purposes has been classified as swamp. At the north end it consists of marshy grassland but gradually becomes wetter, with increasing amounts of emergent marginal plants until reaching a reed bed at the south end. A large proportion of this habitat, at the extreme south west corner of the DA, overlaps onto the Llyn Dinam SAC. Vegetation composition in these areas is dominated by species adapted to wet or seasonally wet conditions and include common reed, reedmace *Typha sp(p)*, sedges and yellow iris.
- 11.5.54 The River Crigyll runs north-south immediately adjacent to the west boundary of DA4. Note that although the course of the river does not flow directly through any of the DAs, the core area is within river floodplain and should therefore be given due consideration.
- 11.5.55 Rivers, ponds and lowland fens are all listed as habitats of principal importance under Section 7 of the Environment (Wales) Act 2016 and rivers and ponds are also included in the Anglesey Local Biodiversity Plan.
- 11.5.56 The Llyn Dinam SAC is of **International** importance while the River Crigyll can be considered to be of **Regional** importance. However, given the small number of ponds and limited amount of fen and swamp habitat (other than associated with the SAC), the overall importance of the watercourses on the application area is considered to be important at the **Local** level.

#### Protected and Key Species

##### Great Crested Newt

- 11.5.57 COFNOD returned 407 records of amphibians within 2km of the site boundary, recorded between 1982 and 2018. 178 of these records related to great crested newts (*Triturus cristatus*), between 1998 and 2017. The remainder of the amphibian records related to common toad (*Bufo bufo*) with 59 records, palmate newt (*Lissotriton helveticus*) with 110 records, smooth newt (*Lissotriton vulgaris*) with 1 record and common frog (*Rana temporaria*) with 59 records.
- 11.5.58 The Extended Phase 1 Habitat Survey identified 14 ponds within 500m of the site, 5

of which were within the boundaries of the DAs. A further pond was identified alongside the proposed cable route. Terrestrial habitat within the site consisted mostly of permanent grasslands with hedgerows, with the boundary hedgerows and woodlands more suitable than grasslands for use by terrestrial newts as commuting routes, however all habitat was considered to be of some value.

- 11.5.59 Habitat Suitability Index calculations and great crested newt presence/absence surveys were carried out as required (see **Appendix 11.1**).
- 11.5.60 No evidence of great crested newts was found through either eDNA analysis or manual surveys. A single palmate newt was recorded in a pond adjacent to the site, as well as small newt eggs in another adjacent pond. A single common frog was recorded in an onsite pond, and frog tadpoles were recorded in a pond adjacent to the site.
- 11.5.61 The lack of evidence of GCN breeding on site or within 500m of the application area means they are not considered likely to occur. Impacts and mitigation have been presented in the event the species is discovered on site.

#### Breeding Birds

- 11.5.62 A total of 66 species of bird were recorded over the course of the breeding bird surveys, this includes all birds that showed some form of association with the study area whether breeding or not. However, birds that were seen simply flying over the study area, other than hunting raptors or foraging hirundines (swallows and martins) were not included.
- 11.5.63 Thirty-two of the species were deemed notable by virtue of their elevated conservation and or legislative status. As per the methodology, the focus of the breeding bird surveys was very much on the notable species and whilst all species were recorded during the surveys, territory maps for the non-notable species have not been created. Instead, the breeding status of non-notables has been presented in the baseline report in **Appendix 11.2**.
- 11.5.64 A total of 19 notable species were classified as confirmed or probable breeders across the DAs and their buffers, as displayed in 35 territory maps. If the DAs and buffer areas are considered separately, they have a respective 11 and 14 notable species that are confirmed or probable breeders.
- 11.5.65 **Table 11.7** presents the 19 notable species and for each, it indicates conservation/legislative status and the number of confirmed territories recorded per DA. There are four species which stand out in having both a relatively high number of territories and having territories in most of the different DAs or their associated buffers. These are dunnock (*Prunella modularis*), song thrush (*Turdus philomelos*), whitethroat (*Sylvia communis*) and willow warbler (*Phylloscopus trochilus*). Whitethroat and willow warbler are red listed species whilst dunnock and song thrush are amber listed species on the Birds of Conservation Concern in Wales (BoCCW3). All of these species were nesting in the hedgerows, scrubby margins or woodland edges of field boundaries.

Table 11.7: Summary of all Notable Species that are Confirmed or Probable Breeders within the DAs and Buffer Areas

#	Species	Scientific Name	BoCC4	BoCCW3	BDir1	Section 7	Local BAP	WCA1.1	DA # Application Area (# of Territories)	DA # Buffer Area (# of Territories)
1	Bullfinch	<i>Pyrrhula pyrrhula</i>	Amber	Red		✓				<b>4B</b> (1), <b>6B</b> (1)
2	Cetti's arbler	<i>Cettia cetti</i>	Green	Green				✓	<b>6A</b> (1)	
3	Dunnock	<i>Prunella modularis</i>	Amber	Green		✓			<b>4A</b> (3), <b>5A</b> (2), <b>6A</b> (9)	<b>4B</b> (11), <b>5B</b> (3), <b>6B</b> (11)
4	Grasshopper warbler	<i>Locustella naevia</i>	Red	Red		✓			<b>6A</b> (1)	
5	Grey heron	<i>Ardea cinerea</i>	Green	Amber						<b>4B</b> (1 colony approx. 6 nests)
6	House martin	<i>Delichon urbicum</i>	Amber	Green						<b>5B</b> (1)
7	House sparrow	<i>Passer domesticus</i>	Red	Amber		✓				<b>4B</b> (1 colony 4 pairs), <b>5B</b> (1 colony 2 pairs) <b>6B</b> (5 small colonies)
8	Kestrel	<i>Falco tinnunculus</i>	Amber	Red		✓			<b>6A</b> (1)	<b>4B</b> (1)
9	Linnet	<i>Carduelis cannabina</i>	Red	Red		✓				<b>4B</b> (3), <b>5B</b> (2), <b>6B</b> (1)
10	Little egret	<i>Egretta garzetta</i>	Green	Green	✓					<b>4B</b> (1 colony 3 nests)
11	Long-tailed tit	<i>Aegithalos caudatus</i>	Green	Amber					<b>4A</b> (1)	

#	Species	Scientific Name	BoCC4	BoCCW3	BDir1	Section 7	Local BAP	WCA1.1	DA # Application Area (# of Territories)	DA # Buffer Area (# of Territories)
12	Mallard	<i>Anas platyrhynchos</i>	Amber	Amber					<b>6A (2)</b>	<b>4B (1), 5B (1)</b>
13	Meadow pipit	<i>Anthus pratensis</i>	Amber	Amber						<b>4B (3), 6B (1)</b>
14	Mistle thrush	<i>Turdus viscovorus</i>	Red	Amber					<b>6A (1)</b>	
15	Reed bunting	<i>Emberiza schoeniclus</i>	Amber	Amber		✓			<b>6A (5)</b>	<b>4B (3)</b>
16	Song thrush	<i>Turdus philomelos</i>	Red	Amber		✓	✓		<b>4A (1), 6A (3)</b>	<b>4B (2), 5B (2), 6B (5)</b>
17	Stock dove	<i>Columba oenas</i>	Amber	Green						<b>4B (1)</b>
18	Whitethroat	<i>Sylvia communis</i>	Green	Red					<b>6A (4)</b>	<b>4B (2), 5B (2), 6B (3)</b>
19	Willow warbler	<i>Phylloscopus trochilus</i>	Amber	Red					<b>4A (1), 6A (7)</b>	<b>4B (3), 5B (3), 6B (6)</b>

- 11.5.66 Six of the 19 species were uncommon breeders with a total of two or less territories across all DAs. This group comprised bullfinch (*Pyrrhula pyrrhula*), grasshopper warbler (*Locustella naevia*), kestrel (*Falco tinnunculus*), long-tailed tit (*Aegithalos caudatus*), mistle thrush (*Turdus viscivorus*) and stock dove (*Columba oenas*).
- 11.5.67 There was one heronry recorded in the study area, in the buffer of DA4, and this comprised approximately 6 grey heron (*Ardea cinerea*) and 3 little egret nests (*Egretta garzetta*). The little egret is notable for being an EU Birds Directive Annex 1 species.
- 11.5.68 A further 4 notable species were categorised as being possible breeders (**Table 11.8**); gadwall (*Anas strepera*), goldcrest (*Regulus regulus*) lapwing (*Vanellus vanellus*) and whinchat (*Saxicola rubetra*). All of these species were seen on only one of the four CBC visits and on one DA only. The whinchat record comprised a pair of birds sighted on the May visit in an area of unimproved grassland with some gorse scrub. Given the scarcity of whinchat as a breeder in lowland areas it is most likely that these birds were on passage, but they are categorised as possible breeders due to their appearance as a pair in suitable breeding habitat. The single sighting of a pair of lapwing in the application area of DA6 was in the marshy area that will not be developed but managed as part of the scheme's biodiversity enhancement measures.
- 11.5.69 In addition, five of the species already mentioned as confirmed or probable breeders in certain DAs were possible breeders in different DAs. The species were bullfinch, grasshopper warbler, linnet, mistle thrush and stock dove.

Table 11.8: Notable Species that were Possible Breeders

#	Species	Scientific Name	BoCC4	BoCCW3	BDir 1	Section 7	WCA 1.1	DA # Application Area	DA # Buffer Area
1	Bullfinch	<i>Pyrrhula pyrrhula</i>	Amber	Red		ü			5B
2	Gadwall*	<i>Anas strepera</i>	Amber	Green				4A	4B
3	Goldcrest*	<i>Regulus regulus</i>	Green	Amber				4A	
4	Grasshopper warbler	<i>Locustella naevia</i>	Red	Red		ü			4B
5	Lapwing*	<i>Vanellus vanellus</i>	Red	Red		ü		6A	
6	Linnet	<i>Carduelis cannabina</i>	Red	Red		ü		5A	
7	Mistle thrush	<i>Turdus viscivorus</i>	Red	Amber				4A	4B
8	Stock dove	<i>Columba oenas</i>	Amber	Green					6B
9	Whinchat*	<i>Saxicola rubetra</i>	Red	Red					4B

\* Species that were not recorded as confirmed or probable breeders on any part of the study area.

11.5.70 As well as those species breeding within the DAs and their boundaries there were also seven notable species that were utilising certain DAs exclusively as a foraging resource whilst breeding elsewhere in the local area (**Table 11.9**). Three of these were species of gull (black-headed, herring and lesser black-backed gull), two were raptors (marsh harrier and peregrine) and the remaining two species starling and swift.

11.5.71 Two species were recorded foraging on every DA on at least one occasion and these were house martin (*Delichon urbicum*) and starling (*Sturnus vulgaris*). The latter were recorded foraging on all DAs in at least two out of the four visits.

**Table 11.9: Notable Species that were Utilising Specific DAs Exclusively for Foraging**

#	Species	Scientific Name	BoCC4	BoCC W3	BDir 1	Secti on 7	WC A 1.1	DA # Applicati on Area	DA # Buffer Area
1	Black-headed gull*	Chroicocephalus ridibundus	Amber	Red		ü			6B
2	Grey heron	Ardea cinerea	Green	Amber				6A	6A, 6B
3	Herring gull*	Larus argentatus	Red	Red				5A,	5B
4	House martin	Delichon urbicum	Amber	Green				4A, 6A	All
5	Kestrel	Falco tinnunculus	Amber	Red		ü			5B
6	Lesser black-backed gull*	Larus fuscus	Amber	Amber				5A, 6A	5B
7	Little egret	Egretta garzetta	Green	Green	ü			6A	
8	Marsh harrier*	Circus aeruginosus	Amber	Amber	ü		ü		4B
9	Peregrine*	Falco peregrinus	Green	Green	ü		ü	6A	6B
10	Starling*	Sturnus vulgaris	Red	Red		ü		All	All
11	Swift*	Apus apus	Amber	Amber				6A	6B

\* Species that were not recorded as confirmed/probable or possible breeders on any part of the study area.

11.5.72 In addition to the notable species there were also 27 non-notable species that are

confirmed or probable breeders. Most of these are commonly occurring hedgerow or scrubland species and they are breeding across the various DAs and buffers.

#### Nocturnal Surveys

11.5.73 Overall, few birds were encountered but of note was the recording of the amber listed snipe. On the nocturnal April survey, three snipe were recorded on the north-eastern fields of DA6, these birds were flushed whilst feeding. Snipe were also recorded on the first CBC visit in DA6 after which no further birds were recorded. Consequently, it is thought that the April snipe records concern late wintering or passage individuals.

11.5.74 Other than snipe, additional notable species that were recorded were small numbers of mallard (DA5), and a grasshopper warbler (reeling in the south-western buffer of DA4).

#### Breeding Birds by Habitat

##### Hedgerows, Scrubland and Woodland

11.5.75 Ten of the 19 notable species that were confirmed or probable breeders, within the study area, are birds nesting in the hedgerows, the small areas of woodland and scrubland. The species are; bullfinch, dunnock, house sparrow, linnets, mistle thrush, song thrush, stock dove, whitethroat and willow warbler. Of these 10 species, 4 are red listed on BoCCW3; bullfinch, linnets, whitethroat and willow warbler. Extensive hedgerow networks, of varying species and structural composition, were found in DA4, DA5 and DA6.

11.5.76 Also located in a small area of woodland just outside the south-western boundary of DA4 is the heronry comprising approximately 6 grey heron nests and 3 little egret nests.

##### Open Fields

11.5.77 Of the notable species that were confirmed/probable breeders the only ground-nesting species primarily associated with open areas was the meadow pipit. This species had a small number of confirmed territories in the buffer areas of DAs 4 and 6.

11.5.78 A further ground-nesting species, the red listed grasshopper warbler, was recorded as holding one territory in the main application area of DA6. This is a species that is found in a variety of habitats that are characterised by having thick ground layer vegetation and in the context of DA6 this comprised areas of rank marshy grassland (Glue 1990).

11.5.79 Of the nine notable species that breed out-with the survey area, but utilise the application area as a foraging resource, six were associated with the open fields (black-headed, herring and lesser black-backed gull, house martin, swift and starling).

##### Wetland

11.5.80 The study area overlapped parts of two substantial areas of wetland, the RSPB managed Cors Plas to the south of DA4 adjacent to the River Crigyll and the area of marshland that runs along the western boundary of DA6. The southern portion of the DA6 marshland lies within both the Llyn Dinam SAC and the Llynnau y Fali SSSI. The latter is designated for both its wintering wildfowl and its breeding bird

assemblage of open waters and their margins (gadwall, pochard, shoveler and Cetti's warbler). It should be stated that no solar deployment is planned for the marshland or SAC/SSSI component of DA6.

11.5.81 In these areas, three notable species were probable or confirmed breeders with one Cetti's warbler (a Schedule 1 species of the Wildlife and Countryside Act 1981) territory and a number of reed bunting and mallard territories recorded. A further species of particularly elevated conservation concern, the bittern, was also recorded in Cors Plas, but out-with the survey area.

Wintering Birds

11.5.82 A total of 74 species of bird were recorded during the survey period. This included all birds that were seen foraging, roosting, or loafing, and therefore showed some form of association with the sites. Birds that were seen simply flying over the sites, other than hunting raptors such as harriers, were not included.

11.5.83 Forty-seven species had some form of conservation designation (notable - **Table 11.10**). However, four of these (swift, house martin, willow warbler and spotted flycatcher) all recorded early during the survey period, are all summer migrants and therefore not relevant to the study. A further 27 common or stable species that have no specific conservation designations were also recorded (**Appendix 11.3**).

11.5.84 The remaining 43 notable species included a wide range of different bird families that utilised a variety of habitats including larks, pipits, starling, waders and gulls feeding or roosting on the open fields, a variety of wildfowl on the river and associated floods, hunting raptors, and songbirds such as thrushes and finches associated with hedgerows and woodland edge. The high proportion of notable species indicates that the area supports an important winter avifauna assemblage.

11.5.85 An Excel database has been compiled containing key statistics for individual DAs split between core and buffer areas of all recorded notable species including conservation status, dates and frequency of occurrence, and maximum counts. A summary of this information is included in the full report in **Appendix 11.3**.

Table 11.10: Traffwll Winter Bird Survey 2019-2020 List of Recorded Notable Species and their Conservation Designations/Protections

English vernacular name	Scientific name	BoCC4	BoCC W3	EC Birds Dir. 1	W Env Act S 7	WC A 1.1
Bittern	Botaurus stellaris	Amber	Amber	ü	ü	
Black-headed Gull	Chroicocephalus ridibundus	Amber	Red		ü	
Bullfinch	Pyrrhula pyrrhula	Amber	Red		ü	
Cetti's Warbler	Cettia cetti	Green	Green			ü
Common Gull	Larus canus	Amber	Red			
Curlew	Numenius arquata	Red	Red		ü	
Dunnock	Prunella modularis	Amber	Green		ü	
Fieldfare	Turdus pilaris	Red	Amber			ü
Gadwall	Anas strepera	Amber	Green			

English vernacular name	Scientific name	BoCC4	BoCC W3	EC Birds Dir. 1	W Env Act S 7	WC A 1.1
Goldcrest	Regulus regulus	Green	Amber			
Golden plover	Pluvialis apricaria	Green	Red	ü		
Great Black-backed Gull	Larus marinus	Amber	Red			
Green Sandpiper	Tringa ochropus	Amber	Amber			ü
Grey Heron	Ardea cinerea	Green	Amber			
Grey Wagtail	Motacilla cinerea	Red	Amber			
Hen Harrier	Circus cyaneus	Red	Red	ü	ü	ü
Herring Gull	Larus argentatus	Red	Red			
House Martin *	Delichon urbica	Amber	Green			
House Sparrow	Passer domesticus	Red	Amber		ü	
Jack snipe	Lymnocyptes minimus	Green	Amber			
Kestrel	Falco tinnunculus	Amber	Red		ü	
Lapwing	Vanellus vanellus	Red	Red		ü	
Lesser black-backed Gull	Larus fuscus	Amber	Amber			
Linnet	Carduelis cannabina	Red	Red		ü	
Little egret	Egretta garzetta	Green	Green	ü		
Long-tailed tit	Aegithalos caudatus	Green	Amber			
Mallard	Anas platyrhynchos	Amber	Amber			
Marsh Harrier	Circus aeruginosus	Amber	Amber	ü		ü
Meadow pipit	Anthus pratensis	Amber	Amber			
Mediterranean Gull	Larus melanocephalus	Amber	Green	ü		ü
Merlin	Falco columbarius	Red	Red	ü		ü
Mistle thrush	Turdus viscivorus	Red	Amber			
Peregrine	Falco peregrinus	Green	Green	ü		ü
Redshank	Tringa totanus	Amber	Red			
Redwing	Turdus iliacus	Red	Amber			ü
Reed Bunting	Emberiza schoeniclus	Amber	Amber		ü	
Shoveler	Anas clypeata	Amber	Amber			
Skylark	Alauda arvensis	Red	Red		ü	
Snipe	Gallinago gallinago	Amber	Amber			
Song thrush	Turdus philomelos	Red	Amber		ü	
Spotted Flycatcher *	Muscicapa striata	Red	Red		ü	
Starling	Sturnus vulgaris	Red	Red		ü	
Stock dove	Columba oenas	Amber	Green			
Swift *	Apus apus	Amber	Amber			
Teal	Anas crecca	Amber	Amber			
Willow Warbler *	Phylloscopus trochillus	Amber	Red			
Woodcock	Scolopax rusticola	Red	Red			

**Key to species list table**

Abbreviation	
Red	BoCC4 and BoCCW3 red listed species
Amber	BoCC4 and BoCC3 W amber listed species
Green	BoCC4 and BoCC3 W green listed species
EC Birds dir. 1	EC Birds Directive 2009 Annex 1, (Table 1, ECB1)
W Env Act S 7	Environment (Wales) Act 2016 – Section 7
WCA 1.1	Wildlife and Countryside Act 1981 (As Amended) Schedule 1, (Table 1, WCA1)
*	Summer migrant (recorded on the early autumn visits only)

Key Findings

11.5.86 The following tables provide summaries of the occurrence of each notable species recorded during the survey. This includes an indication of overall numbers, habitats and areas utilised and any significant concentrations. Note that mention of the river in the text refers to the River Crigyll which runs north to south bordering the eastern application DAs. Within the text, DAs are suffixed by a capital DA followed by the relevant DA number. More detail is provided in the Excel spreadsheet in **Appendix 11.3**.

Table 11.11: Traffwll WBS 2019-20 Summaries of Notable Bird Species Occurrence Wildfowl (geese and ducks)

Species	Notes	Development Areas	
		Core	Buffer
Gadwall	Small-moderate numbers recorded river floods and ponds. Regular on ponds NW buffer DA4 (max 15). Six were on the Llyn Dinam SAC floods on 14 Nov at the SW corner of DA6.	6	4, 5
Teal	Regular in moderate-large numbers throughout the survey along the west boundary buffer of P4 along the river with a max of 190-200 (average 49-50), and in smaller numbers on the Llyn Dinam SAC floods at the SW corner of P6 (max 23, average 10).	6	1, 4
Mallard	Small-moderate numbers on ponds, ditches, river floods, also in isolated pairs/small flocks in field ditches. Highest counts and most regular along P4 river floods, max of 24. Small numbers SAC floods SW corner of P6.	All	All

Species	Notes	Development Areas	
		Core	Buffer
Shoveler	Regular in small-moderate numbers west boundary buffer of P4 (max 11). Also, up to 17 during the early winter period on the Llyn Dinam SAC floods at the SW corner of P6.	6	4 6
<b>Herons (Bittern, Egrets)</b>			
Bittern	One flew from the SW (P6 buffer) into the Llyn Dinam reed bed SAC (P6 core) on 17 Sept.	6	6
Little Egret	Small numbers (1-2) seen most frequently on RSPB land adjacent to or along the river and occasionally the Llyn Dinam SAC area (P6 core and buffer)	6	6
Grey Heron	Seen in ones or twos throughout the survey period, usually near water or marshland, e.g. the buffer along the river, Llyn Dinam SAC (P6). By the last survey visit some birds were attending the heronry in the P4 buffer.	6	4
<b>Birds of prey (raptors including owls)</b>			
Marsh Harrier	Female seen infrequently throughout the survey period often flying over the application areas from RSPB land and vice versa. Also seen over the Llyn Dinam SAC reed bed.	4, 6	4
Hen Harrier	'Ringtail' seen 27 Nov P6 buffer and core (Llyn Dinam SAC reed bed). Probably the same bird seen from P4 over the RSPB reed bed, also in November.	6	6
Kestrel	Recorded infrequently hunting mostly over rough grassland, usually seen singly, but occasionally two birds seen.	6	4, 6
Merlin	Two records of single birds P4: 29 Dec 2019 (core area) and 5 February 2020 (buffer area)	4	4
Peregrine	Two records (two P6 Nov and 1 P4 January).	4, 6	4
<b>Waders</b>			
Golden Plover	Small single figure counts only.	6	4, 5, 6,
Lapwing	Regular on the P6 core Llyn Dinam SAC floods area (avg. 17, max 35).	6	

Species	Notes	Development Areas	
		Core	Buffer
Curlew	Small numbers, usually in single figures, recorded on open pasture fields, e.g. regular on the P6 west core field (avg. 3.2, max 5).	4, 6	6,
Green Sandpiper	A single bird on 4 dates along the river adjacent to P4 (or flushed from the ditch along the northern boundary of the RSPB reserve reed bed), from late October to early March.		4
Redshank	Single recorded twice along the river in Dec and March.		4
Jack Snipe	Occasional records during Jan-March, of mainly single birds in similar habitat to snipe (soft rush dominated damp areas).	6	4, 5, 6
Woodcock	Small numbers (1-3) regularly recorded from Dec-March in damp field edges or ditches, especially those partially over-hung by hedgerow vegetation containing gorse.	6	6
Snipe	Recorded on damp areas, mostly containing rushes, and along/adjacent to the river. The most significant concentration, with birds recorded throughout the survey, was on the wet core fields of P6 (avg. 14, max 39). Also recorded P4 buffer: avg. 2.8. max 5.	4, 6	All
<b>Gulls</b>			
Black-headed Gull	Medium-large flocks recorded throughout the survey period on open fields or along/adjacent to the river. Highest numbers were on open, short-cropped P5 buffer fields (avg. 63, max 255) and the large core fields on P4 (avg. 26, max 100).	4, 5	4, 5
Mediterranean Gull	Two records of adults with mixed gull flocks on P4: 29 Dec 2019 (buffer) and 18 Feb 2020 (core).	4	4
Common Gull	Mostly single figures on open fields with other gulls in scattered locations. Occasionally in double figures. Highest numbers and most regular on P5 core fields (avg. 16, max 37).	4, 5,	4

Species	Notes	Development Areas	
		Core	Buffer
Lesser Black-backed Gull	Small-moderate numbers recorded. The highest numbers were seen on the open fields of P5 buffer (avg. 10, max 25) and P4 core (avg. 7, max 15).	4, 5, 6	5, 6
Herring Gull	Encountered regularly throughout the survey period, in scattered pairs or small groups but some sizeable flocks. Highest numbers consistently on P5 (avg. 5, max 39) and P4 (avg. 16, max 82).	5, 6	5, 6
Great Black-backed Gull	Just two records of 2 birds on buffer fields. Other individuals were seen flying over the application area but have not been included.		4, 5,
<b>Songbirds (passerines)</b>			
Goldcrest	Ones and twos widely scattered across the survey area, in trees, hedgerows and scrub. Most consistently recorded in P5 and 6.	4, 5, 6	4, 5, 6
Skylark	Small numbers (1-7) on open fields across the buffer areas of all application DAs.		4, 5, 6
Cetti's warbler	Small numbers (usually 1-2) restricted to thick scrub within or adjacent to wetland habitats. Regularly 1- 2 in the area of marsh along the west boundary of P6, NE of the Llyn Dinam SAC.	6	6
Long-tailed Tit	Encountered infrequently, mostly in small flocks of up to 10, in hedgerows, trees or scrub.	6	4, 6
Starling	Medium-large flocks (up to 265) foraging on short cropped sward on all parcels (Very large numbers, est. 80,000, west of P4 early morning of 27 Nov 2019, assumed to be post-roost dispersal from the reed-bed).	All	All
Fieldfare	Recorded throughout the survey in flocks (12-65) in core and buffer areas in hedgerows or open fields. The highest count was of approx. 400 in hawthorns along the east buffer of P6	4, 5, 6	4, 5, 6

Species	Notes	Development Areas	
		Core	Buffer
	on 29 Oct 2019. Note: on this date high numbers (approx. 1300) were seen flying mostly south/south easterly over the application area in many flocks indicating a large influx of this species.		
Song Thrush	Small numbers, usually 1-3, along hedgerows and scrub across most parcels. Most frequently recorded and highest counts on P6, e.g. max. of 10.	All	All
Redwing	Medium-large sized flocks recorded throughout the survey, feeding on hawthorn berries along hedgerows or foraging on open, usually short cropped fields. On average higher numbers on the core areas (total avg. per visit 17.9) than the buffer areas (13.4). The highest single count of 177 was in the DA5 core field. Recorded most frequently on DA6 in both core and buffer areas. (combined avg. c30 birds per visit).	All	All
Mistle Thrush	1-3 recorded infrequently throughout the survey period, across most parcels, usually foraging on open fields.	All	4, 5, 6
Dunnock	Widespread and frequent in small numbers across most parcels where hedgerows and scrub predominate. Marginally higher average and max counts in DA6 buffer areas than elsewhere.	All	All
House Sparrow	Small numbers (1-6) recorded throughout the survey period in the vicinity of farm buildings and houses.	4, 6	4, 5, 6,
Grey Wagtail	Single bird record in October	4	
Meadow Pipit	Frequently recorded, often in double figures, particularly in DAs 4 and 6, throughout the survey period, foraging on open fields often on damp areas containing rushes. The average maximum count for all parcels was notably higher in the buffer areas (26.3) than the core fields (9).	4, 5, 6	4, 5, 6

Species	Notes	Development Areas	
		Core	Buffer
Linnet	Recorded mainly in small numbers (2-32) on the core area of DA6 during the autumn, and once on the buffer area of DA4 (flock 25), January foraging in ground vegetation. Absent from short cropped sward.	6	4, 6
Bullfinch	Recorded infrequently throughout the survey period, in hedgerows and scrub, usually in ones and twos, max of 4 in DA6.	4, 5, 6	5, 6
Yellowhammer	Two records, late in the survey period of one and two birds resp.		5
Reed Bunting	Mostly small numbers usually associated with damp habitats, e.g. hedgerows/scrub adjacent to, or within, wet fields/areas containing soft rush or marshland along the river. Highest concentrations were in DA6 buffer (avg. 3.2, max 10).	6	4, 6
Stock Dove	Two birds recorded in DA4 and DA6 on separate dates were the only sightings.	4	6
<b>Summer migrants (passing through on migration)</b>			
Swift	4, 18 Sept 2019		4
House Martin	13 and 6, 17 Sept 2019	6	6
Willow Warbler	2 and 2, 17 Sept 2019	6	6
Spotted Flycatcher	2, 17 Sept 2019	6	

#### Notable Wintering Birds by Habitat Type

11.5.87 The following sections discuss the main findings of the survey by habitat types and the winter bird assemblage they support. The dependence on certain habitats by notable species which may be impacted by the development, particularly on the core areas is described. An overview of the areas, fields or habitats identified by the survey as being of high importance for certain species or groups of species are shown in **Appendix 11.4**.

#### Damp Fields

11.5.88 Damp fields, particularly those containing soft rush, support a range of notable species, the most important of which in the context of the development, is snipe. Snipe were recorded regularly across all DAs on damp areas and along or adjacent to the River Crigyll. Significant concentrations were recorded throughout the survey period in the north and eastern fields of DA6.

11.5.89 Other notable species that utilise this habitat include small numbers of reed bunting, flocks of meadow pipits, and the occasional curlew and jack snipe.

#### Dry Open Pasture Fields

- 11.5.90 Sizeable mixed flocks of ground-feeding winter thrushes (redwings and fieldfares), often in excess of 100 birds, large numbers of starlings and small-medium sized flocks of meadow Pipits were recorded regularly across the core and buffer areas of most DAs.
- 11.5.91 Curlew were recorded consistently, albeit in relatively low numbers, on the core field on the west side of DA6 and on one occasion on short cropped dry fields within the core of DA4.

#### Hedgerows/Woodland Edge/Scrubby Field Boundaries/Ditches

- 11.5.92 Apart from specialised waders and ground feeding songbirds mentioned above, the most productive habitats were the mature hedgerows and the associated scrubby field margins and woodland edge habitats. These areas support a wide range of notable songbirds including resident species like dunnock, song thrush, goldcrest and long-tailed tit, but also good numbers of wintering/passage thrushes like fieldfare and redwing which utilise the trees and hedges for cover and feeding, especially on hawthorn berries, before moving onto open fields to forage for invertebrates. Small numbers of woodcock were recorded in DA6 in damp field edges often next to scrub and particularly along ditches over-hung by thick mature hedgerows.

#### River Crigyll and Associated Floods

- 11.5.93 Good numbers of teal, plus smaller numbers of gadwall and shoveler were recorded regularly either on or adjacent to the River Crigyll, next to DA4 before it enters the RSPB reed bed area.

#### SAC Wetland Overlapping DA6 and Associated Flooded Shoreline

- 11.5.94 A range of notable wildfowl and waders, including teal, shoveler, snipe, lapwing and gulls were regularly recorded in good numbers on the floods adjacent to and within the long narrow field that abuts the SAC.
- 11.5.95 The survey also revealed that a small area of marsh and scrub along the west boundary of DA6, northeast of the SAC, is important for several notable species, including Cetti's warbler, a resident breeding species which requires thick scrub adjacent to wetland, reed bunting and wintering snipe.

#### Chough

##### Desk Based Survey

- 11.5.96 COFNOD data was procured by Wychwood Biodiversity in November 2018 as part of a preliminary scoping exercise. The search area comprised all of the DAs that were under consideration at the time (1, 2, 3, 4, 5, 6, 7, 8 and 9) and a 2km buffer around the perimeter of the DAs. The data indicated that chough were well recorded in the search area with 65 chough sightings between 1999 and 2016.
- 11.5.97 The Cross & Stratford Welsh Chough Project data set provides a record of chough foraging sightings in the Valley area, which covers the proposed development areas and their associated 250m buffer, from January 2009 until November 2019 (Appendix 11.4). Prior to May 2019 the ownership of the data set was shared with the RSPB after which the ownership lies exclusively with the Cross and Stratford Welsh Chough

Project.

- 11.5.98 A review of the data set was carried out to ascertain the use of the proposed DAs and their buffers by foraging chough. At the time of the review four DAs (1, 3, 8 and 9) in addition to the three (4, 5 and 6) that are actually being proposed for development, were under consideration. The Chough Summary Report details the findings for all DAs under consideration at that time and its findings resulted in DAs 1, 8 and 9 being dropped from the scheme. DA3 was subsequently removed from the scheme due to archaeological Impacts.
- 11.5.99 There were no records of choughs utilising DA 4, 5 or 6. There was just one record, in October 2015, of a group of 3 birds perched on a rocky outcrop just inside the north-western buffer of DA4, approximately 230 metres from boundary of the DA.
- 11.5.100 A formal request was made to the RSPB Data Unit for all chough records within the proposed development areas and their 250m buffer for the last twenty years. Comparison of the RSPB data set with the Cross and Stratford 'Chough Location' data set which was received at a later date indicated the content of the two were the same prior to May 2019. As mentioned, ownership of the 'Chough Location' data set was shared between the RSPB and the Welsh Chough Project until May 2019 after which the database was continued by the Welsh Chough Project. For completeness, a map of the RSPB data set has been included in the baseline report in **Appendix 11.4**.

#### Chough Field Surveys

- 11.5.101 The chough sighting data from the September 2019 to March 2020 fortnightly field surveys recorded no chough for DAs 4, 5 and 6 or their respective buffer zones. The full survey data is presented in the baseline report, in **Appendix 11.4**.

#### Habitat Variables

- 11.5.102 The fields of DAs 4 and 5 all comprised improved grassland with a high proportion of perennial rye grass in the sward. They were subject to annual applications of artificial fertiliser and slurry and used for a mix of intensive sheep grazing and hay/silage production. DA5 was reseeded in 2018 with a rye grass dominated agricultural seed mix.
- 11.5.103 The fields of DA6 comprised an approximately equal mix of semi-improved and marshy grassland, as classified by the Phase 1 surveys. These fields were not subject to any inputs. All fields were extensively grazed by free-roaming horses which, in the semi-improved fields has resulted in a mosaic of tall vegetation interspersed with closer cropped areas. As the winter progressed the horses were largely seen in the drier fields though even these drier fields became heavily poached.

#### Summary

- 11.5.104 For DAs 4, 5 and 6, neither the desk-based study nor the field surveys recorded any usage by choughs. There was only one historic record of a chough sighting and that was in the outer part of the buffer for DA 4 in 2015.
- 11.5.105 Furthermore, assessment of the habitat variables for DAs 4, 5 and 6 indicated that they possessed a variety of attributes and were subject to management inputs that are deemed unfavourable for chough (Bullock et al 1983, Mackay 1996, Rylands

et al 2012, Stratford pers. comm 2019). The fields of DA4 and DA5 are dominated by rye grass, subject to artificial fertiliser application and the sheep subject to regular de-worming treatments. The latter inputs are all deemed detrimental in regard to creating grasslands that support chough foraging. The fields of DA6, whilst not subject to any agricultural inputs, are for the large part either too wet and or insufficiently grazed to favour Chough foraging.

### Bats

11.5.106 COFNOD returned 88 records of bats within 2km of the application area, recorded between 1989 and 2018. Records returned for the area were of whiskered bats (*Myotis mystacinus*) with 2 records, natterer's bats (*Myotis nattereri*) with 1 record, noctule (*Nyctalus noctula*) with 18 records, indeterminate pipistrelle bats (*Pipistrellus spp.*) with 12 records, common pipistrelle (*Pipistrellus pipistrellus*) with 1 record, soprano pipistrelle (*Pipistrellus pygmaeus*) with 49 records and brown long-eared (*Plecotus auritus*) with 5 records.

11.5.107 The site contained one building and no mature trees. There were trees adjacent to boundaries to the south and east of DA4. The building, situated in DA4, was a large open-sided barn with corrugated sides and roof that had negligible bat roosting potential, except as a feeding roost. Groups of mature trees to the south and east of DA4 were generally of low value to roosting bats although some larger trees had medium bat roosting potential. There was a derelict stone building adjacent to the southern part of DA6 and a small stone building adjacent to the south of DA4, both of which have bat roosting potential although checks carried out in 2019 did not find any evidence of roosting bats.

### Summary of Transect Surveys

11.5.108 The site was considered to provide suitable foraging habitat, which varied in quality between areas of the site. In DAs 4 and 5, and the western field in DA6, the grassland sward was grazed short or was low-diversity meadow which did not contain a varied structure or diversity that would attract diverse invertebrates attractive to foraging bats. The north-east fields of DA6 contained a more varied structure and diversity of more potential interest to foraging bats.

11.5.109 Transect surveys recorded at least 7 bat species throughout the site with bats recorded commuting and foraging in all DAs. Activity was concentrated along field boundaries, with bats frequently seen commuting and foraging along hedgerows, ditches and stone walls and foraging around trees, woodland edges, ponds and wetlands. Occasional foraging activity was also observed within fields, by common, habitat generalist species, in all DAs, with occasional activity in DAs 4 and 5 in the centre of the site and in DA6 concentrated nearer the hedgerows. Pipistrelles were recorded foraging within the large open barn within DA4.

11.5.110 The majority of recordings were of common noctule and soprano pipistrelle bats, with common pipistrelle also making up a high proportion of recordings. Myotis bats were recorded occasionally in all DAs, in particular Daubenton's which were recorded in all DAs particularly foraging around wet areas, but also very occasionally natterer's, whiskered and/or Brandt's. Myotis bats were most frequently recorded in DA6 where they made up just under one fifth of recordings, concentrated around the

northeast of the site largely along boundary features. Occasional recordings were also made of brown long-eared bats along field boundaries and nathusius' pipistrelle in DA6. Detailed results are presented in Appendix 11.5 (transect and static maps), where descriptions of the recorded and observed activity during each transect are also provided.

Summary of Static Surveys

11.5.111 Overall, at least 9 bat species were recorded during static surveys. Seven bat species were recorded in DA4, 6 in DA5 and 9 in DA6. The majority of activity was attributed to noctule (40%), soprano pipistrelle (39%) and common pipistrelle (11%). Brandt's/whiskered made up 4.5% of recordings and Daubenton's made up 3.6% of recordings, the remaining species each made up less than 1% of recordings.

11.5.112 The highest levels of bat activity (>200 recordings per night) were recorded in DA6. Detector M5, situated within the south of DA6, was the busiest, with 459 bat passes per night. The detector was placed along a scrubby hedgerow next to a horse-grazed field and close to the lake, with the hedgerow connected to a busy bat commuting pathway. Recordings were dominated by noctule (51%) and soprano pipistrelle (35%). Detectors J4a and 6C, also placed along boundary features within DA6, were also busy, with 306 and 227 passes per night, respectively. These detectors were dominated by noctule (73% and 83% of passes, respectively) Detector J5, placed within a field in the northeast of DA6, had 357 bat passes per night, dominated by soprano pipistrelle (41%), Brandt's/whiskered (28%) and noctule (19%). Due to the small field sizes in DA6 the detector was placed around 25m from two intersecting hedgerows and is likely to have picked up bat passes from along the hedgerows as well as from within the field.

11.5.113 A table of the full results is presented in **Appendix 11.5** and a summary by species is presented in **Table 11.12** below.

Table 11.12: Bat Survey Results per Species

Species	Summary of results
Soprano pipistrelle	Soprano pipistrelle was the second most frequently recorded overall, making up 39% of all recordings and recorded at all locations. Higher levels of Soprano pipistrelle activity (>200 passes per night) were recorded at location J4a in DA6 and indicate areas where they were foraging or commuting more regularly.  Recordings were made shortly after sunrise on detector M4 in DA6 on 28 <sup>th</sup> May, indicating that there could be a roosts nearby.
Common pipistrelle	Common pipistrelle made up 11% of total recordings and was recorded at all detector locations. The highest numbers of bat passes per night were on detectors M5 and 6B in DA6.

Species	Summary of results
Nathusius' pipistrelle	Nathusius' pipistrelle was recorded a total of 18 times on 9 detectors. The most recordings (6 passes) were on detector 6B in DA6.
Noctule and Leisler's	Noctule was the most commonly recorded species, with 40% of all recordings and was recorded at all but one location. Higher levels of activity were seen at one location, M5 in DA6, where there were 234 passes recorded per night on average. Detector 6C in DA6 also recorded over 100 passes per night; the remaining detectors recorded fewer than 100 passes per night.  Recordings were made within 15 minutes of sunrise on M5, suggesting a nearby roost.  Leisler's was recorded four times throughout the static surveys, on detectors M5 in DA6 and J3 in DA5. It is thought that this could be two individual bats passing through rather than making use of the site.
Daubenton's	Daubenton's made up 3.6% of all bat recordings, with the species recorded at all but four locations. The highest recordings per night were on detector A6.3, with 15 passes per night. This detector was placed in DA 6 along a hedgerow in the east of the DA.
Brandt's /whiskered	Brandt's/whiskered bats made up 4.5% of all bat recordings and was only recorded in DA 6. Detectors M5, J4a and A6.3 had fewer than 10 passes per night but detector J5, situated in a northeast field near to hedgerows, picked up 200 passes over two nights, with foraging activity picked up.
Natterer's	Overall, there were 3 recordings of Natterer's bats, all recorded at detector J5 in DA6.
Brown long-eared	Brown long-eared made up 0.4% of total recordings and was recorded between 1 and 3 times per night. Brown long-eared was recorded in all three DAs.

#### Summary of Bat Survey Findings

- 11.5.114 Surveys did not find any bat roosts within the DAs. Bats were using an open-sided building on DA4 for foraging. Soprano pipistrelle is also thought to roost close to DA6 and noctule is thought to roost close to DA4 and to the east of DA6. Trees adjacent to DAs 4 and 6 had low bat roosting potential.
- 11.5.115 Transect and static monitoring surveys found a majority of foraging and commuting activity concentrated along boundary features with trees, woodland, hedgerows and ditches favoured and a higher level of activity along the hedge-lined

road in DA6. Some foraging activity was observed within fields by common habitat generalist species. Overall, the majority of activity was from three species: soprano pipistrelle, noctule and common pipistrelle, with whiskered and Daubenton's also showing concentrations of activity. Other recorded species showed relatively low activity levels throughout the survey effort.

- 11.5.116 Taking into account the diversity of species, their distribution and their levels of activity throughout the site, as well as the size of the site and the surrounding land uses, the value of the identified DAs for commuting and foraging bats is deemed to be at the **County** scale.

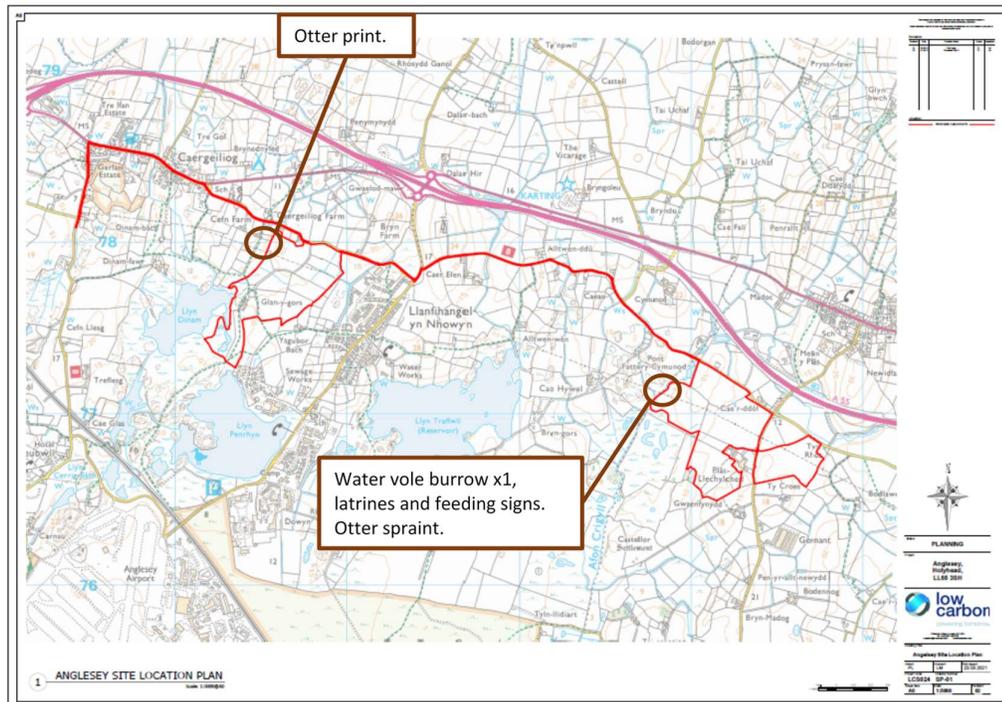
### Otters

- 11.5.117 COFNOD returned 67 records of otters within 2km of the site boundary, with records dating between 1995 and 2017. Otters were re-introduced to Anglesey in the mid-2000's and have a known presence in the vicinity of the application site.
- 11.5.118 No field signs of otter were found directly within the DAs during surveys in 2019, but signs of otter were found on adjacent land: Along the Afon Crigyll to the west of DA4 and along the bank of the small stream that runs along the western boundary of DA6. The network of drains within the DAs provides suitable connecting habitat between foraging areas such as the large lakes and the Crigyll stream. The marshy land south of the small stream in the west of DA6 was considered to be suitable habitat for foraging otters, with the remainder of the stream also having low potential with small fish and potentially small numbers of amphibians along its length.
- 11.5.119 Otters are increasing in number throughout Anglesey and much of the UK and individual otters hold fairly large territories, such that they are likely to move throughout the waterways in the locality of the site. Due to the low potential for on-site habitats to act as foraging grounds or be of use for holts, and the lack of evidence on the site itself, the application site is considered to be of **local** value to otters.

### Water Voles

- 11.5.120 COFNOD returned 202 records of water voles within 2km of the site boundary, with records dating between 1977 and 2017. The local monitoring program run by Menter Mon has found water voles throughout waterways in the locality of the site.
- 11.5.121 The desktop search and site walkover identified that the waterway running along the western boundary of DA4 had potential for burrowing water voles and Menter Mon surveys have found water vole evidence in the local area (**Figure 11.3**). Water voles were also confirmed to regularly use the Afon Crigyll and site surveys found a burrow along the section bordering DA4. Other drains in DA6 had suitability for water voles moving between sites and low potential for burrowing. Other drains identified during the desktop search were found to be dry or unsuitable for water voles at the time of the survey. The surveys in July 2019 did not find any evidence of water voles along any waterways on site within the red-line boundary (**Appendix 11.6**).

Figure 11.3: Evidence of Otters and Water Voles Identified during Field Surveys 2019-2020



11.5.122 Due to the connectivity of the site with the known water vole populations in the wider environment, the site is considered to be of value to water voles at the **County** level.

### Badgers

11.5.123 The COFNOD data search returned 4 records of badgers within 2km of the site between 1982 and 2012.

11.5.124 No signs of badger setts were found within the application area. However, this area, with its mixture of semi-improved and improved grassland, hedgerows and scrub, provides suitable foraging habitat. The limited records of badger signs indicate the species may occasionally use this site as part of a wider foraging resource. However, given the absence of setts and the abundance of suitable habitat in the wider area, the site is considered to be of **local** value to badgers.

### Other Species of Conservation Concern

#### Red Squirrel

11.5.125 No records of red squirrels were returned from within 2km of the site.

11.5.126 No formal survey effort was commissioned for red squirrel, owing to their woodland / tree habitats not being directly impacted by the proposed development. Nevertheless, four incidental observations of red squirrels were made during baseline surveys, three within small patches of woodland to the northern and eastern boundaries of DA4. No dreys were observed.

11.5.127 Given the relatively low numbers of squirrels, and their patchy distribution

across Anglesey, the site was considered to be of **County** importance to this species.

#### Brown hare

11.5.128 A total of 34 brown hare (*Lepus europaeus*) records, dating from 1973 and 2017, were provided by COFNOD. During surveys, brown hares were sighted regularly on DAs 4.

11.5.129 Brown hare are listed in Section 7 of the Environment (Wales) Act 2016. The site has suitable habitats to support brown hare as the fields and hedgerows provide grazing and cover, particularly during the Winter. However, given the abundance of suitable habitat in the wider area the habitats on site are considered to be of importance to brown hare at a **Local** level.

#### Hedgehog

11.5.130 Forty-seven records of European hedgehog (*Erinaceus europaeus*) were provided by COFNOD between 1966 and 2018. No hedgehogs were observed during baseline surveys. This species is listed in Section 7 of The Environment (Wales) Act 2016. The fields, field margins, scrub and hedgerow bases on site provide suitable foraging opportunities for hedgehog. However, given the abundance of suitable habitat within the wider area, this site is considered to be of importance for hedgehog within the **ZoI** only.

#### Reptiles

11.5.131 An assessment of potential reptile habitat was carried out during three site visits between May and July 2019 and includes all DAs under consideration at that time. The habitats identified are all field boundary features or rocky outcrops. The main field areas were not considered suitable habitat for reptiles due to intensive livestock grazing (sheep, cattle and horses) or regular cutting for grass crops (silage and hay) (**Appendix 11.10**).

#### European Eel

11.5.132 COFNOD provided 13 records of European eel (*Anguilla anguilla*) between 1995 and 2016. This species was not specifically surveyed for owing to the proposed development being unlikely to cause impacts to eel habitat. The ditches and waterways at the boundary of the site could provide suitable habitat for European eels and are part of a large network into the wider landscape. This species may be using the site as part of a wider territory. Eels spend many years in fresh water environments before return to spawn in the sea.

11.5.133 Eel numbers have declined markedly in recent years and they are considered to be critically endangered on the International Union for the Conservation of Nature Red List. They are also listed in Section 7 of The Environment (Wales) Act 2016.

11.5.134 The eel population at the boundary of the site is likely to be of up to **Regional** importance.

#### Invasive and Alien Species

11.5.135 No signs of invasive or alien species were observed during field visits and invasive and alien species were not identified during consultations or discussions with landowners.

## Ecosystem Services

11.5.136 An assessment of ecosystem service potential was undertaken for the proposed development by entering the proposed land management activities, as bulleted below, from this Ecological Impact Assessment (EclA) into SPIES. The SPIES tool generates a list of likely changes to ecosystem services, based upon the proposed management actions.

11.5.137 It should be noted that the SPIES assessment does not consider the more involved ecological enhancement plans that are intended for those areas of DA 6 that lie within or abut Lynn Dinam SAC and Llynnau y Fali SSSI.

11.5.138 The management activities specific to the proposed solar farm are as follows:

- graze later in the year
- reduce grazing intensity if previously grazed
- create / maintain artificial refugia
- create / maintain field margins / buffer zones
- install / maintain bird boxes
- install / maintain bat boxes
- reduce / cease pesticide / fertilizer
- plant / maintain wild flower/nectar seed mixes
- plant / maintain hedges
- cut hedges in winter
- remove mowing clippings from wild-flower meadows

11.5.139 By comparing the above land management options with the existing land management practices, the SPIES tool generated a list of ecosystem services affected, the overall direction of the effect for each service (i.e. 'enhanced' or 'degraded') and the number of papers that provided evidence for each result (the 'score') as summarised in **Table 11.13** below.

**Table 11.13: Likely Changes to Ecosystem Services arising from Proposed Future Land Management**

Category	Ecosystem Service	SPIES Outcome (strong negative, negative, neutral, positive, strong positive)	Evidence Score (Current →Future)	Primary Cause of Change
Provisioning	Food provision	Strong negative	2 (0 →2)	Reduced intensity of livestock grazing
	Biomass materials provision	Negative	1 (0 →1)	
Regulating	Air quality regulation	Positive	1 (0 →1)	
	Climate regulation	Positive	9 (1→9)	A move to more extensive grassland management is

				likely to have a small positive carbon balance over time.
	Water quality regulation	Positive	16 (1→16)	Mature grassland, tussocky margins and buffer strips help reduce, slow and filter surface water
	Water cycle support	Positive	3 (1→3)	Mature grassland facilitates local cycling of water through uptake through root system and release through transpiration
	Soil erosion regulation	Positive	7 (1 →7)	Mature grassland extensively managed grassland minimises soil erosion
	Soil quality regulation	Neutral	8 (0 →8)	
	Pest and disease regulation	Positive	12 (5→12)	Increased provision of habitat for beneficial invertebrates
	Flood regulation	Positive	7 (2 →7)	Permanent mature grassland reduces run-off and increases surface water infiltration
	Pollination regulation	Positive	31 (2 →31)	Increased provision of habitat for pollinating invertebrates.
	Pollution regulation	Positive	1 (0 →1)	
Cultural	Maintaining habitats and biodiversity	Positive	154 (22 →154)	Wildflower seeding works & extensive grassland management will increase the biodiversity of the grassland
	Spiritual or religious enrichment	Neutral	1 (0 →1)	
	Recreation and aesthetic value	Neutral	0	
	Educational/cultural interactions	Neutral	1 (0 →1)	

11.5.140 The output of the SPIES tool indicates that future land management options would strengthen the delivery of a number of ecosystem services, in particular maintenance of habitats and biodiversity, and broaden the range of services provided. Whilst food provisioning and biomass materials provisioning would be degraded by future land management, this has to be balanced with the provision of clean, zero carbon energy production. Taken as a whole, the SPIES results indicate that there would be a net gain in provision of the different ecosystem services.

## 11.6 IDENTIFIED RECEPTORS

### Key Ecological Features

11.6.1 The following key ecological receptors have been identified for inclusion in the impact assessment taking into consideration the results of the baseline studies and the design of the proposed development.

Table 11.14: Key Identified Receptors

Ecological feature	Nature conservation value
Glannau Ynys Gybi / Holy Island Coast SPA Qualifying feature: breeding & wintering Chough	International
Llyn Dinam SAC	International
Llynnau y Fali – Valley Lakes SSSI Qualifying features: mosaic of open water areas with associated mesotrophic marshland and damp grassland habitats: Wintering wildfowl e.g. shoveler; teal, tufted duck, pochard and goldeneye	National
Llyn Traffwll SSSI	National
Cors Plas	National
Tywyn Trewan Common	Local
RSPB Valley Wetlands Reserve	National
Semi-improved grassland	Local
Coastal and floodplain grazing marsh	Regional
Hedgerows and scattered trees	Regional
Scrub	Local
Woodland	ZoI
Watercourses	Local
Amphibians	Local
Notable breeding ground-nesting birds (lapwing, meadow pipit, skylark, grasshopper warbler)	National for lapwing; local for other species
Notable breeding, hedgerow, scrub & woodland birds	Local
Heronry: breeding little egret (BDir1) & grey heron (DA 4)	National for little egret; local for grey heron
Chough (winter)	International
Snipe and Jack Snipe (winter)	Local/County
Suite of important Waterfowl species (winter) associated with the River Crigyll and floods: (wigeon, teal, mallard, shoveler, gadwall, lapwing, snipe)	Local
Fieldfare and redwing, starling (winter)	Local
Granivorous passerines e.g. finches, buntings, larks	Local
Bats	County
Otters	Local
Water voles	County

Badgers	Local
Red squirrel	County
Brown hare	Local
Hedgehog	ZoI
Reptiles	Local
European eel	Regional

## 11.7 PROPOSED DEVELOPMENT

11.7.1 The proposal will comprise the following:

- Photovoltaic (PV) panels to a maximum height of circa 3m;
- Mounting frames - matt finished small section metal structure;
- Scheme of landscaping and biodiversity enhancement;
- Central Inverters (inverters and transformers will be housed together in prefabricated containers to a maximum height of circa 3m), substations (DNO and Customer to a maximum height of circa 3m) and associated cabling (below ground);
- Point of connection;
- Stock fencing up to a height of circa 2m to secure the development areas;
- Infra-red CCTV (CCTV cameras would operate using motion sensors and would be positioned inward only to ensure privacy to neighbouring land and property);
- Temporary set down areas;
- Internal service roads; and
- Site access for the construction, operational and decommissioning phases.

11.7.2 The panels will be arranged in rows in an east-west alignment across the development areas and will be angled at up to 29.5° from the horizontal and orientated south. The height of the panels will be up to 3m above ground level; the lowest part of the panel will measure approximately 0.9m above ground level. The rows of panels will be set a minimum of 3.2m apart to avoid shadowing and allow for scheduled maintenance, this will be dependent on local topography

11.7.3 The mounting frames will be matt finished galvanised steel that will be fixed to the ground employing a pile mounting system, depending on ground conditions. **Drawing LOC1001/11/05** provides a specification of the panel and frames. The piles will be pushed into the ground via a mobile piling rig.

11.7.4 Cabling from the inverters/transformer to the substation for each DA will be below ground. An earth cable will be required around the perimeter of each DA. Trench depths will vary from 0.4m to 1.3m depending on whether they are for earthing or AC cabling.

11.7.5 The DAs will be secured by up to a 2m stock fence or similar. Infra-red (non-visible at night), inward facing pole mounted CCTV cameras (c. 2.5m – 3m in height) will also be provided at appropriate intervals along the boundary fence. These will enable remote surveillance of the site.

11.7.6 The proposed point of connection is located at an existing SP Energy Networks substation to the south of Caergeiliog on the eastern side of Cymyran Road. A customer substation will be located on DA6 and from here a cable will connect directly into the existing substation on Cymyran Road. DA4 and DA5 will be connected to the main customer substation at DA6 by underground cabling which will be located within

the adopted highway

- 11.7.7 The indicative cable route is presented in **Figure 11.1** and **drawings LOC1001/11/08 to 12**. The exact alignment of the route is to be confirmed at the detailed design stage and will be delivered by means of a separate agreement with the Local Highway Authority (potentially under s50 of the New Roads and Street Works Act 1991.). If the cabling is ultimately required to cross natural habitat, a full assessment of potential impacts will be made once the exact route is finalised. This will include assessment of potential impacts to protected species and habitats along the route affected by the construction process, as well as suitable reinstatement measures.
- 11.7.8 The construction of the solar farm is expected to last approximately 4-5 months and employ up to 190 staff at the peak of the construction period. The CTMS accompanying the Transport Statement provides details of proposed access arrangements, the anticipated programme, construction vehicle numbers and type, construction worker numbers and the proposed construction hours.
- 11.7.9 A Construction Environmental Management Plan (CEMP) will be prepared prior to development works commencing on site. A Site Waste Management Plan (SWMP) will be prepared as part of the CEMP.

#### Proposed Mitigation

- 11.7.10 The following embedded mitigation has been designed into the project:
- Existing farm access tracks will be used wherever possible during construction, operation and decommissioning; improvements to these tracks including application of a hardcore base and possible widening will be required.
  - Vegetation clearance will be minimal and confined to cable crossings at hedgerows. Existing vegetation will be retained wherever possible.
  - No hedgerows are planned to be removed during the construction, operation or decommissioning of this solar farm. Existing hedgerow gaps will be utilised for access wherever possible. Non-destructive methods will be used to avoid impacts to hedgerows along the cable route, e.g. directional drilling.
  - During construction, root protection zones of 8m will be established between hedges and trees and the edge of the construction area.
  - Solar panels will be bolted to a metal frame (table), which will be mounted on steel posts which will be pile driven into the ground. No substantial areas of concrete construction will be required, with the possible exception of foundations for the inverter/transformer stations. This minimises unnecessary land take and impacts on grassland habitats.
  - No field margins will be constructed upon as a result of the scheme, avoiding impacts to invertebrates, reptiles and foraging birds.
  - The inclined angle of the solar panels, along with spacing of rows of approximately 3.2m will ensure the area of permanent shading is minimal. This, coupled with the semi-transparent nature of the solar panels will enable vegetation to grow throughout the site.
  - During construction, operation and decommissioning 4m setbacks will be established from the ditches and field drains (6m in DA6), and 15m buffers from open water, in line with NRW requirements, in order to prevent impacts to reptiles and amphibians, water vole, otter, breeding birds and water birds.
  - No new lighting regime will be introduced adjacent to any hedgerow, woodland or watercourses to prevent impacts to invertebrates and bats. Temporary lighting would only be required at the setdown areas during construction.

- Existing watercourse crossing points will be used by construction traffic and where possible to minimise impacts to ditches and associated species.
- Security fencing will be designed with a 20cm gap between the fence base and the ground to allow small and medium mammals access to the site.
- There will be no construction activities within Llyn Dinam SAC / Llynnau y Fali – Valley Lakes SSSI. There will be no deployment of solar panels in the SAC area of DA 6 (western and southernmost fields and the abutting fields). These fields will be managed specifically for water quality and conservation goals.

11.7.11 The following mitigation has been developed in response to predicted impacts:

- Low pressure tracked vehicles will be used wherever possible to minimise rutting and soil inversion. Cessation of plant operation in periods of extended high rainfall to avoid excessive poaching, compaction and killing of vegetation.
- A system of intelligent traffic design and control will ensure roads are minimised and traffic is routed to minimise impacts to the existing vegetation. Sensitive vegetation, e.g. wet pasture, will be protected from vehicle movements by aluminium-style tracks.
- A Construction Environmental Management Plan (CEMP) will be enacted to govern the strict control of hydrocarbons and other hazardous materials during the entire construction period.
- A watching brief will be enacted for protected species to ensure they are adequately protected if discovered during construction.
- Surface water will be carefully managed during construction, including consideration of soil management, erosion and sediment control, storage and use of construction materials, vehicle maintenance, environmental monitoring and emergency spillage actions (see KRS.0297.012.R.002.A – Parc Solar Traffwll\_SuDS Strategy (**Appendix 10.3**) for further details).
- The drainage system of DA 6 will be maintained to retain the status quo and ensure that Llyn Dinam SAC is buffered by a fairly inefficient network of vegetated drainage ditches. This will be augmented by vegetated setbacks of 6m, the cessation of ditch clearance and maintenance and the creation of small vegetated ponds to trap mobilised sediment (see KRS.0297.012.R.002.A – Parc Solar Traffwll\_SuDS Strategy (**Appendix 10.3**) for further details).

11.7.12 For layouts of each DA, please refer to drawings **LOC1001/11/04 and 05**.

## 11.8 ASSESSMENT OF EFFECTS

11.8.1 In this section the potential environmental impacts of the proposal are considered for construction, operations and decommissioning.

### Construction Impacts and Effects

11.8.2 Construction of the solar farm is expected to last 4 -5 months and will involve the erection of fencing and security cameras, piling and assembly of solar panel frames and tables, trenching and underground cabling, and the construction of hardcore tracks and inverter/transformer stations with concrete bases. There will be vehicle movements, construction activities and associated human presence, potential noise and dust generation during this period.

11.8.3 A number of mitigation measures are proposed, as described in Section 11.7.10. These include 15m setbacks from open water and 6m setbacks from ditches on DA6 and 4m for the other DAs, and 8m setback from hedgerows and woodland. Measures will also be taken to minimise vegetation disturbance and sediment run-off. Lighting

will be limited to laydown areas. Watching briefs will be established for protected species, and standard good practices will be applied to the management of hydrocarbons and other hazardous materials.

### Protected Sites

#### Glannau Ynys Gybi /Holy Island Coast SPA

- 11.8.4 The Holy Island SPA lies approximately 5km to the west of the site and was designated for breeding and wintering chough. Given the distance of the application site from the SPA, no direct effects are expected. Further, for the mobile features of this site – overwintering chough – no direct effects are expected from construction, as the species does not use DAs 4, 5 & 6 for foraging.
- 11.8.5 The sensitivity of the receptor is **high**, owing to its importance at the international scale. Considering the distance between the application area and the SPA, and the lack of activity of the chough, the impacts of construction upon Glannau Ynys Gybi /Holy Island Coast SPA are considered to be **negligible**. Overall, the significance of impact is judged to be **negligible**.

#### Llyn Dinam SAC

- 11.8.6 Llyn Dinam SAC covers 36Ha of Llyn Dinam lake and surrounding shoreline and has been designated on account of its character as a natural eutrophic lake with Magnopotamion or Hydrocharition type vegetation. DA6 neighbours Llyn Dinam and overlaps approximately 5Ha of the SAC to its north eastern side.
- 11.8.7 Potential impacts during construction include sediment increased run-off from the construction site into water courses, leading to a reduction in water quality. This specifically relates to construction on DA6, which adjoins the SAC. However, during construction as part of the mitigation, sediment control structures will be in place to minimise sediment release to water ways. A 15m buffer from open water and a 6m buffer adjacent to water courses in DA6 will be retained and vegetation will be retained in these buffers wherever possible.
- 11.8.8 In DA6, the closest point of construction is approximately 50m distant from the edge of the SAC, with mature vegetation and a road with culvert in between, so no direct effects from run-off are anticipated. A series of small vegetated holding ponds will be designed in the main drainage channel to further slow and filter water before it leaves DA6.
- 11.8.9 Surface water will be carefully managed during construction, as detailed in the SuDS strategy (see **Appendix 10.3** to this ES).
- 11.8.10 There is potential for accidental pollution from hydrocarbons during construction, resulting in significant negative effects upon the water quality of the SAC and the aquatic flora and fauna it supports. This will be mitigated through adherence to the strict requirements on fuel management, storage and refuelling within the CEMP.
- 11.8.11 A small portion of the proposed development's boundary overlaps the Llyn Dinam SAC on the western boundary of DA6. This amounts to approximately 5Ha of land. As part of the embedded mitigation no development is planned on this area and there will be no access to this area during construction. Therefore, no impacts are anticipated to this location during the construction phase. This area will be used to

achieve biodiversity gains for wet pasture and snipe, as part of compensatory measures for DA6, as described in the 'Mitigations' section.

- 11.8.12 The sensitivity of the receptor is **high**, owing to its importance at the **international** scale. Considering the mitigation by design measures, the impacts of construction upon Llyn Dinam SAC relating to water quality are considered to be **negligible**. Overall, the significance of effect is judged to be **negligible**.

**Llynnau y Fali – Valley Lakes SSSI**

- 11.8.13 Llynnau y Fali – Valley Lakes SSSI comprises a series of larger lakes and small shallow lakes covering 100Ha that support a variety of aquatic flora and fauna. DA6 neighbours Llyn Dinam and is hydrologically linked to the Llyn Dinam component of the SSSI. Llynnau y Fali / Valley Lakes SSSI is designated for wintering shoveler and breeding bird assemblage of open waters and their margins (gadwall, pochard, shoveler and Cetti's warbler).

- 11.8.14 Potential impacts during construction include increased sediment run-off from the construction site into water courses, leading to a reduction in water quality. This specifically relates to construction on DA6, which adjoins the SSSI.

- 11.8.15 However, during construction, as part of the proposed mitigation, sediment control structures will be in place to minimise sediment release to water ways. A 6m buffer will be retained adjacent to all water courses in DA6 and vegetation will be retained in these buffers wherever possible. In DA6, the closest point of construction is approximately 50m distant from the edge of the SSSI with mature vegetation and a road in between, so no direct effects from run-off are anticipated. A series of small vegetated holding ponds will be designed in the main drainage channel to further slow and filter water before it leaves DA6.

- 11.8.16 There is potential for accidental pollution from hydrocarbons during construction, resulting in significant negative effects upon the water quality of the SSSI and the aquatic flora and fauna it supports. However, this risk will be mitigated through strict adherence to fuel management requirements in the CEMP.

- 11.8.17 Surface water will be carefully managed during construction, as detailed in the SuDS strategy (see **Appendix 10.3** to this ES).

- 11.8.18 The sensitivity of the receptor is **high**, owing to its importance at the **national** scale. Taking into account the embedded mitigation, the impacts of construction upon Valley Lakes SSSI water quality are considered to be **negligible**. Overall, the significance of effect is therefore judged to be **negligible**.

- 11.8.19 As for Llyn Dinam SAC, a small portion of the proposed development's boundary overlaps the Llynnau y Fali – Valley Lakes SSSI on the western boundary of DA6. This amounts to approximately 5Ha of land. No development is planned for this area and there will be no access to this area during construction. Therefore, no impacts are anticipated to this location during the construction phase. This area will be used for enhancement measures, as described in the 'mitigation' section.

- 11.8.20 During construction, winter bird populations associated with the SSSI (especially wintering wildfowl e.g. shoveler, teal, tufted duck, gadwall, pochard and goldeneye) could be displaced from areas close to the construction site (closest distance

between lake shore and construction activity is approximately 120m) by noise disturbance from piling and other activities if construction takes place between September-March. This is likely to be temporary for a period of approximately 4 - 5 months and only affecting those areas close to the construction site. Breeding birds of open water/margins (part of SSSI designation) would be affected between March-August. This disturbance would be minimised through no development or construction activities within 120m of the main Llynnau y Fali – Valley Lakes SSSI water body. Furthermore, there would be a 6m setback from water courses within DA6 and a 15m setback from open water, depending on extent of flood zone.

- 11.8.21 The sensitivity of the receptor is **high**, owing to its importance at the **national** scale. However, the nature of the impact is such that it is both temporary (4 -5 months in any one location), >100m from the construction zone and reversible over a small area. Therefore, the sensitivity is considered to be **local**. Considering the proposed mitigation measures, the impacts of construction disturbance upon Valley Lakes SSSI's birds are considered to be **negative** and **low**. Overall, the significance of effect is therefore judged to be **minor**.

#### Llyn Traffwll SSSI

- 11.8.22 Llyn Traffwll SSSI is an example of a moderately base-rich lake containing rare aquatic flora and wintering wildfowl including wigeon, gadwall, goldeneye, pochard, tufted duck and notably the shoveler duck.
- 11.8.23 Llyn Traffwll SSSI lies between DA6 to the west and DA 4 & 5 to the east but is not directly hydrologically linked to these DAs. Consequently, no direct impacts are expected during construction.
- 11.8.24 The sensitivity of the receptor is **high**, owing to its importance at the **national** scale. Taking into account the lack of a direct hydrological link, the distance between the DAs and the proposed mitigation, the impacts of construction upon Llyn Traffwll SSSI water quality are considered to be **negligible**. Overall, the significance of effect is therefore judged to be **negligible**.
- 11.8.25 If construction occurs during winter, then winter bird populations associated with the SSSI (especially wintering wildfowl) are unlikely to be disturbed by noise disturbance from piling and other activities, due to the large distance between the application area and the SSSI.
- 11.8.26 The sensitivity of the receptor is **high**, owing to its importance at the **national** scale. However, the impact is judged to be **negligible**.

#### Local Wildlife Sites

##### Cors Plas

- 11.8.27 Cors Plas comprises an extensive area of marshy grassland with several excavated pools and some willow scrub. The site is important mainly for its winter wildfowl, including large numbers of teal, mallard, wigeon and shoveler on the site with smaller numbers of pintail, pochard, gadwall and tufted duck.
- 11.8.28 Cors Plas neighbours DA4 of the application area. Potential impacts during construction include increased sediment run-off from the construction site into water courses, leading to a reduction in water quality. However, during construction, as part

of the proposed mitigation, sediment control structures will be in place to minimise sediment release to water ways. A 4m buffer will be retained adjacent to all water courses and vegetation will be retained in these buffers wherever possible.

- 11.8.29 There is potential for accidental pollution from hydrocarbons during construction, resulting in significant negative effects upon the water quality of the wildlife site and the aquatic flora and fauna it supports. However, this risk will be mitigated through strict adherence to fuel management requirements in the CEMP.
- 11.8.30 Surface water will be carefully managed during construction, as detailed in the SuDS strategy (see **Appendix 10.3** to this ES).
- 11.8.31 The sensitivity of the receptor is **high**, owing to its importance at the **national** scale. Taking into account the proposed mitigation, the impacts of construction upon the water quality of Cors Plas are considered to be **negligible**. Overall, the significance of effect is therefore judged to be **negligible**.
- 11.8.32 If construction occurs during winter months, winter bird populations associated with Cors Plas (especially wintering wildfowl) could be displaced from areas close to the construction site by noise disturbance from piling and other activities. However, this is likely to be limited by the distance from the construction zone and the temporary nature (4 -5 months) of the disturbance. This will be further helped by no deployment or construction activities within 4m of water courses and a 15m setback from open water, depending on extent of flood zone.
- 11.8.33 The sensitivity of the receptor is **high**, owing to its importance at the **national** scale. However, considering the temporary and reversible nature of the impact, and its relatively small extent, the sensitivity is considered to be **low**. Considering the proposed mitigation measures, the impacts of construction disturbance upon Cors Plas birds are considered to be **negative** and **low**. Overall, the significance of effect is therefore judged to be **minor**.

#### Tywyn Trewan Common

- 11.8.34 The site comprises 282.5 hectares that includes an extensive sand dune system with salt marsh and heath/grassland mosaic at the northern end, which is more than 500m from the closest DA of the application area. The main features of interest are botanical and given no changes to hydrology/run off characteristics there would be no predicted potential impacts.
- 11.8.35 The sensitivity of the receptor is **low**, owing to its importance at the **local** scale. Considering the distance to the nearest DA and the inherent mitigation measures, the impacts to the botanical features of the common from construction are considered to be **negligible**. Overall, the significance of effect is therefore judged to be **negligible**.

#### RSPB Valley Wetlands

- 11.8.36 The RSPB Reserve is comprised to a large extent by the aforementioned Llyn Dinam SAC and the Llynnau y Fali and Traffwll SSSIs for which the potential impacts have already been considered. More generally the reserve is primarily managed for breeding bittern and other reedbed wildlife and if construction occurs during the breeding season (March - June), there is potential for displacement from areas close to the construction site by noise disturbance from piling and other activities. To

minimise disturbance, there will be no deployment or construction activities within 4m of water courses (6m on DA6) and a 15m setback, depending on extent of flood zone.

- 11.8.37 The sensitivity of the receptor is **high**, owing to its importance at the **national** scale. Considering the mitigation proposed, the impacts of construction disturbance upon the bitterns of RSPB Valley Wetlands are considered to be **negative** and **temporary** and at the **local** scale and therefore **low**. Overall, the significance of effect is therefore judged to be **moderate**.

### Phase 1 Habitats

#### Semi-Improved Grassland

- 11.8.38 Semi-improved grassland covers most of DA 6. The majority of this habitat will be retained during construction. Grassland areas that will be lost will be limited to the construction of tracks and inverter/transformer stations. As per the proposed mitigation more sensitive areas of vegetation, e.g. wet pasture, will be protected during construction by aluminium-style tracks and intelligent traffic controls and limited access routes, and use of low pressure construction vehicles to minimise compaction and vegetation wear. These actions will minimise the creation of bare soil and sediment flow into water courses.
- 11.8.39 During the temporary construction phase given the proposed mitigation there is predicted to be little or no change to the site's hydrology, as such there should be minimal impact to wet pasture. The permanent land take for hardcore tracks and inverter/transformer bases is expected to be less than 2.5% of the total grassland area. Semi-improved grassland will remain under the solar panels post-construction, and there is an abundance of this habitat type in the wider landscape.
- 11.8.40 The sensitivity of this receptor is **low**, being important at the **local** scale. Impacts to this habitat from construction are considered to be **negative** and **temporary** at the **local** scale and therefore **low**. Overall, effects are considered to be **minor**.

#### Coastal and Floodplain Grazing Marsh

- 11.8.41 There are several areas of floodplain grazing marsh including the southernmost field of DA 6 which borders Llyn Dinam, and the western edge of DAs 4 which borders Afon Crigyll. The southern and western component of DA6 falls within the Llyn Dinam SAC/Llynnau y Fali SSSI and none of this area will be developed in any commercial way, its inclusion in the proposal area is to help integrate ecological enhancements. The same applies to the southernmost field of DA6, which borders the SAC. Both will be included as compensatory land as described in full in the 'Mitigation' section of this chapter. For the westernmost field borders of DA4, a 15m setback from the high-water mark will be maintained. This mitigation measure should mitigate any impact during construction and operations entirely.
- 11.8.42 The sensitivity of this receptor is **medium**, being important at the **regional** scale. Considering the proposed mitigation, the magnitude of impact to this habitat from construction are **negligible**. Overall, impacts are **negligible**.

#### Hedgerows and Scattered Trees

- 11.8.43 All hedgerows and trees are listed as habitats of principal importance under Section 7 of The Environment (Wales) Act 2016 and therefore have **regional** importance.

There are approximately 9km of hedgerows across the DAs. All existing hedgerows and trees will be retained, and no hedgerow removal will be required, save for small adjustments to field openings which may be required for access in several cases. These would be no larger than a standard farm gate in total. The cable run will be directionally drilled beneath hedgerows and so minimal disturbance to hedges will occur. Setbacks of a minimum of 8m (4m to fenceline, and a further 4m to the solar array) will be established from the base of every hedgerow to protect the roots and marginal vegetation.

- 11.8.44 The sensitivity of this receptor is **medium**, being important at the **regional** scale. Considering the inherent mitigations, the magnitude of impact to hedgerows and scattered trees from construction are considered to be **negligible**. Overall, impacts are **negligible**.

#### Scrub

- 11.8.45 No existing scrub is predicted to be removed, hence the construction impacts upon this habitat are predicted to be negligible.

#### Woodland

- 11.8.46 No trees are planned to be removed as part of this proposal. The woodland bordering the site will be protected by a setback of 8m (4m to fence line, and a further 4m to the solar array) which will protect the root systems from direct impacts and soil compaction.

- 11.8.47 The sensitivity of this receptor is **low**, being important at the **ZoI** scale. Considering the proposed site layout, the magnitude of impact to woodland from construction is considered to be **negligible**. Overall, effects are considered to be **negligible**.

#### Watercourses

- 11.8.48 Water courses throughout the site will be protected through mitigation including: sediment control structures and procedures as defined in the CEMP; use of low pressure construction vehicles to minimise compaction and vegetation wear; minimisation of vehicle movements through smart controls and limited access routes. These actions will minimise the creation of bare soil and sediment flow into water courses. There will also be no deployment or construction activities within 4m of water courses (6m in DA6) or 15m of open water. These buffers will be fully vegetated, so further minimising the risk of sediment entering water courses.

- 11.8.49 There is also the risk of an accidental spill of hydrocarbons or other hazardous materials flowing into the waterways. This will be mitigated by applying the fuel and hazardous materials management requirements, as part of the CEMP for the construction period.

- 11.8.50 Surface water will be carefully managed during construction, as detailed in the SuDS strategy (see **Appendix 10.3** to this ES).

- 11.8.51 The sensitivity of this receptor is **low**, being important at the **local** scale. Considering the proposed mitigation, the magnitude of impact to watercourses from construction is considered to be **negligible**. Overall, effects are considered to be **negligible**.

## Protected and Key Species

### Great Crested Newts

- 11.8.52 Great crested newts (GCN) were not found within 500m of the application boundary. Therefore, no breeding or foraging habitat is considered to be affected by the proposed development.

### Amphibians

- 11.8.53 Suitable habitat for amphibians was found mainly along the boundary features of the fields within the site, especially ditches and hedgerows.
- 11.8.54 It is not anticipated that any suitable on-site habitats would be lost as a result of the proposed development. No ponds or water bodies will be removed or altered in any way. All hedgerows will remain intact and no mature boundaries, including ditches, will be lost. While impacts to amphibian habitat will be avoided, there is potential for direct impacts to any amphibians within the construction area through disturbance, injury and mortality without appropriate mitigation. The CEMP will include a watching brief to ensure all contractors are aware of protected species and habitats.
- 11.8.55 The sensitivity of amphibians is **low**, being important at the **local** scale. Considering the site layout and proposed CEMP, the magnitude of impact to amphibians from construction is considered to be **low** and **temporary**. Overall, effects are considered to be **minor**.

### Breeding Birds

#### Notable Breeding Ground-Nesting Birds

- 11.8.56 Grasshopper warbler was the one notable ground-nesting species breeding within one of the DAs, namely DA6. Meadow pipit, the other notable ground-nesting species that was recorded, was nesting only in the buffer areas of DA4 and DA6.
- 11.8.57 In the absence of mitigation, construction during the breeding season (March – July) would result in impacts to ground nesting birds from noise, dust, vibration and human presence and would likely result in disruption to breeding within the abovementioned DAs and potentially on adjoining land.
- 11.8.58 The sensitivity of the other species is **low**, these being important at the **local** scale. The impacts to their breeding during construction will be **negative, temporary** and of **medium** magnitude. Overall, effects are considered to be **moderate / minor**.

#### Notable Breeding Hedgerow, Scrub and Woodland Birds

- 11.8.59 No removal of hedgerows, trees or woodland is planned during the construction phase, so direct impacts to nesting habitat for notable hedgerow, scrub and woodland birds will be avoided. Further, during construction a setback of 8m (4m to fenceline, and 4m from fenceline to solar panels) will be maintained from all watercourses including ditches across the site. In addition, an 8m buffer will be maintained between hedgerows, hedgebanks and stone walls and the edge of the solar array, with a minimum of 4m root protection area being maintained between hedgerow and security fence. These setbacks will protect hedgerows, trees and woodland from impacts during construction and maintain their value as foraging and commuting habitat for birds.

11.8.60 The sensitivity of the breeding hedgerow, scrub and woodland birds is **low**, these species being important at the **local** scale. If construction occurs outside the breeding season, then impacts would be **negligible**. If construction occurs during the breeding season (1<sup>st</sup> March – 31<sup>st</sup> August), some disturbance to breeding birds, is anticipated from piling and construction activities through noise, vibration and dust. These impacts are considered to be **negative, temporary** and of **medium** magnitude. Overall, effects are considered to be **moderate / minor**.

#### Heronry

11.8.61 A heronry containing breeding herons and little egrets is located adjacent to the south western boundary of DA4.

11.8.62 If construction were to avoid the breeding season, impacts would be **negligible**. However, if construction occurs in the breeding season (February – July), noise from piling and other activities, vibration, dust and human presence may disrupt breeding and could even cause the colony to be abandoned. If construction in proximity to the heronry occurs outside the main breeding season this impact would be avoided.

11.8.63 The impacts of construction upon the heronry are considered to be **negative, significant, temporary** and **national** for little egret and **local** for grey heron in effect.

11.8.64 The sensitivity of the little egret is **high**, this species being important at the **national** scale. The impacts to little egrets will be negative, temporary and of **medium** magnitude. Overall, effects are considered to be **major**.

11.8.65 The sensitivity of the grey heron is **low**, this species being important at the **local** scale. The impacts to breeding herons will be negative, temporary and of **medium** magnitude. Overall, effects are considered to be **moderate / minor**.

#### Wintering Birds

##### Chough

11.8.66 Chough are found to habitually forage in fields to the south of the application area, and would be unaffected by construction activities.

11.8.67 The sensitivity of the chough is **high**, this species being important at the **national** scale. However, owing to the distance between the application area and the chough foraging area, the effects of construction upon this species are considered to be **negligible**.

##### Snipe

11.8.68 Foraging snipe are found in greater numbers in DA 6. If construction were to happen in winter months, noise/vibration/dust disturbance could result in displacement of foraging snipe and several other notable species, including Jack snipe. During construction, a setback of 6m within DA 6 will be maintained from all watercourses including ditches across DA 6, and aluminium style tracks would be used in habitat bordering ditches. This would protect snipe habitat from direct impacts during construction and these habitats are likely to recover. It is anticipated snipe would return to the marginal habitats of the site once construction is completed.

11.8.69 The sensitivity of the snipe is precautionarily considered to be **medium**, this species being important at the **local/County** scale. The impacts to snipe will be **negative**,

**temporary** and of **low** magnitude. Overall, effects are considered to be **moderate / minor**.

#### Lapwing and Golden Plover

- 11.8.70 Lapwing and golden plover do not forage or nest within the application area. If construction occurs in the winter months, disruption to foraging birds from noise/vibration/dust is therefore unlikely to result in displacement.
- 11.8.71 The sensitivity of lapwing and golden plover is **medium**, these species being considered important at the **regional** scale. The impacts to these species will be **negligible**.

#### Waterfowl

- 11.8.72 During Winter, a suite of important waterfowl species is associated with the Afon Crigyll, including wigeon, teal, mallard, shoveler, gadwall, lapwing and snipe. If construction occurs during Winter, then there could be localised disturbance to foraging and roosting waterfowl, due to noise of machinery and human activity to the west side of DA4.
- 11.8.73 There will be a 15m setback of fencing from the high-water mark associated with the Afon Crigyll which will provide a buffer to construction disturbance.
- 11.8.74 The sensitivity of this suite of waterfowl is considered to be **low**, these species being considered important at the **local** scale. The impacts to these species will be **negative, temporary** and of **medium** magnitude. Overall, effects are considered to be **moderate / minor**.

#### Fieldfare, Redwing and Starling

- 11.8.75 If construction occurs in Winter, then wintering fieldfare, redwing and starling could be disturbed along hedgerows due to noise from piling and other construction activities, vibration, dust and human presence. The proposed installation of an 8m setback (4m to fenceline, and 4m from fenceline to solar panels) from all hedgerows will help to minimise disturbance, but some birds may be disturbed locally. In addition, these birds would be unable to access grassland foraging within the construction areas. Given the abundance of similar foraging habitat locally, and the temporary nature of this disturbance, this impact is considered to be negligible.
- 11.8.76 The sensitivity of fieldfare, redwing and starling is **low**, these species being considered important at the **local** scale. The impacts to these species will be **negative, temporary** and of **low** magnitude. Overall, effects are considered to be **minor**.

#### Granivorous Passerines

- 11.8.77 Grain-eating passerines such as larks, finches and buntings which are resident through the winter may be disturbed by construction activities if construction occurs in Winter. These birds would be unable to access grassland foraging within the construction areas during the construction period. Given the abundance of similar foraging habitat locally, and the temporary nature of this disturbance, this impact is considered to be **negligible**.
- 11.8.78 The sensitivity of granivorous passerines is considered to be **low**, these species

being considered important at the **local** scale. The impacts to these species will be **negligible** in magnitude. Overall, the effects of construction upon granivorous passerines is considered to be **negligible**.

## Mammals

### Bats

- 11.8.79 The majority of bat commuting and foraging activity was concentrated around the field boundaries, comprising hedgerows, trees, ditches and stone walls. There is low potential for bats to roost in trees adjacent to DA4.
- 11.8.80 If construction occurs in summer months when bats are actively foraging, then construction activities could affect roosting, foraging and commuting activities through lighting, as artificial lighting is known to result in a range of impacts including roost desertion and delayed emergence of roosting. If construction occurs in winter months, then construction impacts would be limited to bat roosts. To mitigate this impact, artificial lighting will be restricted to the laydown areas and will be directional, so the impacts should be temporary and limited to a small area of the Zol.
- 11.8.81 Removal of trees containing roosting bats could result in mortality. The protection of existing trees and hedgerows and the setback of 8m from woodland should avoid direct impacts to roosting bats. However, there is the potential for disturbance of bat roosts from noise, vibration and human disturbance during the day.
- 11.8.82 Bats are considered to be important at the **County** scale and are therefore considered to be **medium** sensitivity. With mitigation in place, the impacts to these species will be **temporary** and **low** in magnitude. Overall, the effects of construction upon bats is considered to be **moderate / minor**.

### Otters

- 11.8.83 Otters have been recorded historically and are likely to use the watercourses throughout the landscape as part of their wider commuting and foraging areas. Assessment on the ground found that waterways in DAs 4 and 6 were potentially suitable for otters. The DAs could provide sheltering habitat for otters where DA 4 borders Afon Crigyll, but this is considered unlikely owing to the grazed nature of the grassland within these DAs.
- 11.8.84 The proposed 15m setbacks from open water and 4m setbacks from ditches and field drains (6m in DA6) should minimise direct impacts to otter habitat during construction. Further, existing watercourse crossing points will be used by construction traffic and where possible to minimise impacts to ditches and associated species. However, there is likely to be disturbance to otters which may be present from noise, vibration and human presence during the construction period.
- 11.8.85 Otters are considered to be important at the **local** scale and are therefore considered to be **low** sensitivity. With inherent mitigations in place, the impacts to these species will be **temporary** and **low** in magnitude. Overall, the effects of construction upon otters is considered to be **minor**.

### Water Voles

- 11.8.86 There are historical records of water voles Llyn Traffwll and Llyn Penrhyn.

Assessment on the ground found that waterways in DAs 4, and 6 were suitable for water voles.

- 11.8.87 The proposed 15m setbacks from open water and 4m setbacks from ditches and field drains (6m in DA6) should minimise direct impacts to water vole habitat during construction. Further, existing watercourse crossing points will be used by construction traffic and where possible to minimise impacts to ditches and associated species. However, there is likely to be disturbance to water voles which may be present from noise, vibration and human presence during the construction period.
- 11.8.88 The sensitivity of water voles is **medium**, these species being considered important at the **County** scale. The impacts to these species will be **negative, temporary** and of **low** magnitude. Overall, effects during construction are considered to be **moderate / minor**.

#### Badger

- 11.8.89 No badger setts were observed during survey work. The majority of the site is considered to be low-lying and saturated with water during the winter months, so less suitable for sett building, though the land is potentially suitable foraging habitat.
- 11.8.90 During construction, badgers within the construction area could be injured or killed through falling into excavations or becoming trapped in wire or other construction materials. Construction close to a sett could cause the sett to be abandoned and badgers to be injured or breeding to be affected.
- 11.8.91 Surveying for badgers immediately prior to construction and setting back construction 15m from any active sett and implementing a watching brief during construction to ensure all excavations are covered and construction materials are safely stored should mitigate any impacts to badgers during construction. The temporary loss of foraging is not seen to be significant, given the abundance of similar habitat within the wider landscape.
- 11.8.92 The sensitivity of badgers is **low**, these species being considered important at the **local** scale. Considering the lack of badger signs, and the above mitigation, the impacts to badgers during construction is considered to be **negative, temporary** and of **low** magnitude. Overall, effects are considered to be **minor**.

#### Other Species of Conservation Concern

##### Red squirrel

- 11.8.93 Red squirrels could be affected by removal of trees with dreys and could be displaced by disturbance resulting from construction. However, the avoidance of impacts to trees and woodland, and the setback of 8m (4m to fence line and a further 4m to the solar panels) from trees and hedgerows should avert direct impacts to red squirrel habitat.
- 11.8.94 Disturbance from noise, vibration and human activity during construction could cause significant disturbance to a breeding drey if one were present within 50m of the construction area.
- 11.8.95 The sensitivity of red squirrels is **medium**, these species being considered important at the **County** scale. With no mitigation in place, impacts to these species will be

**negative, temporary** and of **medium** magnitude. Overall, effects are considered to be **moderate**.

#### Brown hare

- 11.8.96 During construction, brown hare resident within the DAs may be temporarily displaced. However, there is abundant suitable habitat for this species within the adjacent land and wider landscape. They are likely to recolonise the application area post-construction.
- 11.8.97 The sensitivity of brown hare is **low**, these species being considered important at the **local** scale. With no mitigation in place, impacts to these species will be **negative, temporary** and of **medium** magnitude. Overall, effects are considered to be **moderate / minor** in significance.

#### Hedgehog

- 11.8.98 Hedgehogs are most likely to utilise the field margins and bases of hedgerows within the application area. These habitats will be protected by the development setbacks of 8m. During construction, any hedgehogs within the construction area could be injured or killed through falling into excavations or becoming trapped in wire or other construction materials.
- 11.8.99 The setting back of construction 8m from hedgerows (4m to fence line and a further 4m to the solar panels) and implementing a watching brief during construction to ensure all excavations are covered and construction materials are safely stored should mitigate any impacts to hedgehogs during construction.
- 11.8.100 The sensitivity of hedgehogs is **low**, these species being considered important at the **local** scale. With mitigation in place, impacts to these species will be **negative, temporary** and of **low** magnitude. Overall, effects are considered to be **minor**.

#### Reptiles

- 11.8.101 Suitable reptile habitat was found mainly along the boundary features of the fields within the site. During construction a setback of 4m (6m on DA6) will be maintained from all ditches and field drains across the site. In addition, an 8m buffer (4m to security fence and a further 4m to the solar panels) will be maintained between hedgerows, hedgebanks and stone walls and the edge of the solar array, with a minimum of 4m being maintained between hedgerow and security fence. These setbacks will protect hedgerows, banks, walls and waterways from impacts during construction and maintain their value as foraging and commuting habitat for reptiles. No waterways or boundary features are anticipated to be lost in the course of construction, so habitat loss for reptiles is anticipated to be minimal.
- 11.8.102 There is potential for direct impacts to any reptiles within the construction area through disturbance, injury and mortality without appropriate mitigation. A watching brief will be enacted, and any reptile found during construction will be safely removed using approved methods.
- 11.8.103 Given that habitat impacts will be insignificant, impacts to reptiles should be confined to those within the immediate work areas. Reptile incidence within the open field areas is predicted to be low, so these impacts are judged to be **moderate** but **temporary** and confined to the **ZOI**.

11.8.104 Reptiles are considered to be important at the **local** scale and are therefore considered to be **low** sensitivity. With suitable setbacks in place, the impacts to these species will be **low** in magnitude. Overall, the effects of construction upon reptiles is considered to be **negligible**.

#### European Eel

11.8.105 Eels may use the ditches and waterways at the boundaries of the site. The proposed scheme will maintain a minimum of a 4m standoff from any ditches (6m on DA6) and a 15m standoff from any open water. There will also be measures to control sediment, including retention of existing vegetation, use of aluminium-style tracks to protect vegetation along ditches, use of low-pressure vehicles.

11.8.106 There is also the risk of an accidental spill of hydrocarbons or other hazardous materials flowing into the waterways. This will be mitigated by applying fuel and hazardous materials management requirements, as part of the CEMP for the construction period.

11.8.107 Therefore, considering the above, the impact upon European eels during construction is considered to be **negligible**.

11.8.108 European eels are considered to be important at the regional scale and are therefore considered to be medium sensitivity. Direct impacts to this species are considered unlikely and therefore **negligible**. Overall, the effects of construction upon European eels is considered to be **negligible**.

#### Operational Impacts and Effects

11.8.109 Once constructed, Parc Solar Traffwll will be operational for 40 years. The site would be visited occasionally by technicians to maintain or replace infrastructure and to maintain grassland within the site and hedgerows and trees at its boundaries. The proposed mitigation by design previously described will be maintained through the life of the project.

#### Protected Sites

##### Glannau Ynys Gybi /Holy Island Coast SPA

11.8.110 The operation of the solar farm is not anticipated to directly or indirectly impact the Holy Island Coast SPA. Owing to the distance between the winter foraging fields for chough and the application area, the operations are considered not to affect the mobile features of this site.

11.8.111 The importance of the SPA chough population is **international**, and their sensitivity is therefore **high**. However, owing to the distance between the winter foraging fields and the application area, this impact is considered to be **negligible**

##### Llyn Dinam SAC

11.8.112 Llyn Dinam SAC is adjacent to DA6 and overlaps by approximately 5Ha. DA6 is hydrologically linked to this water body.

11.8.113 During operations, the intention is to manage the land within the solar farm for extensive grazing. This means no chemical inputs and a low stocking density of sheep to maintain a longer sward, which will encourage a more biodiverse grassland

than the current heavy grazing. This approach is also a lot less carbon intensive than mowing but allows the land to continue in agricultural use. On balance, therefore extensive grazing at a low stocking density is considered to be beneficial for the site. The cessation of agricultural impacts, extensive grazing and longer sward, and retention of tussocky grassland at the field margins should result in a positive impact upon water quality for Llyn Dinam SAC.

11.8.114 The retention of vegetated buffers of 6m around all waterways within DA6, avoiding de-silting the ditches and creating small vegetated ponds are all designed to slow the water flow and maximise filtration and settling out of sediment (see SuDS Strategy details in **Appendix 10.3** to this ES).

11.8.115 The importance of the SAC is **international**, and its sensitivity is therefore **high**. This impact is considered to be **positive, long-term** and **low** in magnitude. Overall, the effect upon the SAC is therefore considered to be **positive** and **moderate**.

#### Llynnau y Fali – Valley Lakes SSSI

11.8.116 One of the lakes in this SSSI - Llyn Dinam - is adjacent to DA6 and the application area overlaps the SSSI by approximately 5Ha. DA6 is hydrologically linked to this water body.

11.8.117 During operations, the intention is to manage the land within the solar farm for extensive grazing. This means no chemical inputs and a low stocking density of sheep to maintain a sward of mixed height which will encourage a biodiverse grassland. This approach is also a lot less carbon intensive than mowing but allows the land to continue in agricultural use. On balance, therefore extensive grazing at a low stocking density is considered to be beneficial for the site. The cessation of agricultural impacts, extensive grazing and longer sward, and retention of tussocky grassland at the field margins should result in a positive impact upon water quality for Llynnau y Fali – Valley Lakes SSSI.

11.8.118 As for Llyn Dinam SAC, the proposed drainage within DA6 is designed to slow the water flow and maximise filtration and settling out of sediment (see SuDS Strategy).

11.8.119 Llynnau y Fali – Valley Lakes SSSI is considered to be important at the **national** scale and is therefore **high** sensitivity. With the above land management in place, direct impacts to the SSSI would be positive, long term and **low** in magnitude. Overall, the impacts of operations on the SSSI are considered to be **positive** and **moderate**.

11.8.120 During operations, winter bird populations associated with the SSSI (especially wintering wildfowl e.g. shoveler; teal, tufted duck, pochard and goldeneye) may be at risk of colliding with security fences around the solar farm if the fencing is placed too close to the SSSI. There is also the risk of disruption to foraging and roosting waterfowl.

11.8.121 This impact will be avoided through no deployment of solar panels in the southernmost field of DA6, and in the overlapping land. Therefore, no fencing or solar panels will occur within 50m of the SSSI boundary. The development is therefore considered to have a **negligible** effect upon the SSSI.

### Llyn Traffwll SSSI

- 11.8.122 Llyn Traffwll SSSI lies between DA6 to the west and DAs 4 & 5 to the east but is not directly hydrologically linked to these DAs. This SSSI should not be affected by operations.
- 11.8.123 Llyn Traffwll SSSI is important at the **national** scale and is therefore considered to be **high** sensitivity. Overall, the impacts upon the SSSI are considered to be **negligible**.

### Local Wildlife Sites

#### Cors Plas

- 11.8.124 Cors Plas abuts DA 4 of the application area.
- 11.8.125 During operations, the intention is to manage the land within the solar farm for extensive grazing. This means no chemical inputs and a low stocking density of sheep to maintain a diverse sward of mixed height. The cessation of agricultural impacts, extensive grazing and longer sward, and retention of tussocky grassland at the field margins should result in a positive impact upon water quality for Cors Plas.
- 11.8.126 Cors Plas is considered to be important at the **national** scale and is therefore **high** sensitivity. With the above land management in place, direct impacts to the Reserve would be **positive, long term** and **low** in magnitude. Overall, the impacts of operations on the Reserve is considered to be **positive** and **moderate**.
- 11.8.127 The proximity of solar panels to the boundary of Cors Plas could cause disruption of foraging and roosting behaviour for waterfowl associated with the Reserve, and there is risk of collision with the security fencing. The setting back of all fencing by 15m from the high-water mark will minimise this risk of collision from waterbirds and should reduce the risk of disruption to roosting and foraging.
- 11.8.128 This effect is judged to be **negligible**.

#### Tywyn Trewan Common

- 11.8.129 The heath grassland component of Tywyn Trewan Common is more than 500m distant from the nearest application area. The main features of interest are botanical and primarily occur in the dune slacks to the south of the heathland, at even greater distance.
- 11.8.130 The effect of operations on the heathland vegetation and dune slacks is considered to be **negligible**.

#### RSPB Valley Wetlands Reserve

- 11.8.131 The reserve is comprised to a large extent by the aforementioned Llyn Dinam SAC and the Llynnau y Fali and Traffwll SSSIs for which the potential operational impacts have already been considered. More generally the reserve is primarily managed for breeding bittern and other reedbed wildlife, but no additional impacts are anticipated. The effect of this development on the Reserve is therefore regarded as **negligible**.

## Phase 1 Habitats

### Semi-Improved Grassland

- 11.8.132 The management of grassland within the solar farm through extensive grazing is likely to improve the quality of the semi-improved grassland over time. The cessation of chemical inputs and a low stocking density of sheep will maintain a longer sward and should encourage botanical diversity over time.
- 11.8.133 Shading of grassland beneath the solar panels could result in changes to botanical species composition and dominance. The combination of wildflower meadow seeding and extensive grazing is intended to result in a diverse grassland sward, with species tolerant to shade and full sunlight being present.
- 11.8.134 Semi-improved grassland is important at the **local** scale and its sensitivity is **low**. The impact of operations upon semi-improved grassland is judged to be **positive** for the **life of project** and **low in magnitude**. The overall effect is considered to be **positive** and **minor**.

### Coastal and Floodplain Grazing Marsh

- 11.8.135 Floodplain grazing marsh includes the southernmost field in DA6 which borders Llyn Dinam, and the western edges of DA4 which border Afon Crigyll. The southernmost field of DA6 partially overlaps with the Llyn Dinam SAC and this entire field will therefore not have solar panels constructed on it. Instead, it will be included as enhancement land as described in the 'mitigation' section below. For the westernmost field borders of DA4, a 15m setback from the high-water mark should mitigate any impact during operations entirely.
- 11.8.136 During operations, the intention is to manage the land within the solar farm for extensive grazing. This means no chemical inputs and a low stocking density of sheep to maintain a diverse sward of mixed height. The cessation of agricultural impacts, extensive grazing and longer sward, and retention of tussocky grassland at the field margins should result in
- 11.8.137 Floodplain grazing marsh is important at the **regional** scale and its sensitivity is **medium**. The impact of operations upon this habitat is judged to be **positive** for the **life of project** and **low in magnitude**. The overall effect is therefore considered to be **positive** and **moderate / minor**.

### Hedgerows and Scattered Trees

- 11.8.138 During operations, all hedgerows would be managed sympathetically to improve structure and flowering / fruiting by following national guidance for hedgerow management<sup>29</sup>.
- 11.8.139 The sensitivity of hedgerows and scattered trees is **medium**, reflecting their importance at the **regional** scale. The impact of operations upon this habitat is judged to be **positive** for the **life of project** and **low in magnitude**. The overall effect on this habitat from operations is therefore considered to be **positive** and **moderate / minor**.

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<sup>29</sup> NE hedgerow management

### Scrub

- 11.8.140 No existing scrub is predicted to be removed, hence the construction impacts upon this habitat are predicted to be **negligible**.

### Woodland

- 11.8.141 The solar panels will be set back 8m from any woodland and there should be no operational impacts from the operations of the solar development. The switching of land management to a more extensive grazing approach, with the cessation of chemical inputs and ploughing should benefit trees through reduced disturbance from agricultural operations. Therefore, there should be no negative effects from the operations of the solar farm, and there is predicted to be a minor positive impact through the life of the project resulting from the changes to land management.
- 11.8.142 The sensitivity of woodland is **low**, reflecting their importance at the **local** scale. The impact of operations upon this habitat is judged to be **positive** and **low** in **magnitude**. The overall effect on this habitat from operations is therefore considered to be **positive** and **minor**.

### Watercourses

- 11.8.143 Any vegetation damage post-construction is likely to recover quickly, with areas of compaction being treated and re-seeded, so sediment risk will remain low. During operations, the cessation of agricultural inputs, especially chemical fertilizers and pesticides, should improve water quality in the water courses running through and bounding the site. Therefore, there should be no negative effects from the operations of the solar farm, and there is predicted to be a moderate positive impact to water courses through the life of the project at the local scale resulting from the changes to land management.
- 11.8.144 Watercourses are considered to be important at the **local** scale and their sensitivity is **low**. The impact of operations upon this habitat is judged to be **positive** for the **life of project** and **low** in magnitude. The overall effect is therefore considered to be **positive** and **minor**.

### Protected and Key Species

#### Great Crested Newts (GCN)

- 11.8.145 No breeding or foraging habitat is considered to be affected by the proposed development.
- 11.8.146 During operations, no impacts are anticipated to GCN. A setback of 4m (6m on DA6) will be maintained from all ditches and field drains across the site. In addition, an 8m buffer (4m to security fence, and a further 4m to the solar panels) will be maintained between hedgerows, hedgebanks and stone walls and the edge of the solar array, with a minimum of 4m root protection area being maintained between hedgerow and security fence, which will maintain their value as foraging and commuting habitat for GCN.
- 11.8.147 The management of the field margins (between the boundary feature and the security fence) as tussocky grassland should benefit foraging GCN, as should the maintenance of the main solar farm through extensive grazing, leading to a variable

sward length. Further, the cessation of agricultural inputs should improve the water quality in the surrounding waterways.

- 11.8.148 Great crested newts are considered to be important at the **County** scale and their sensitivity is **medium**. The impact of operations upon this species is judged to be **positive** for the **life of project** and **low** in magnitude. The overall effect is therefore considered to be **positive** and **moderate / minor** in magnitude.

#### Amphibians

- 11.8.149 No breeding habitat is considered to be affected by the proposed development. During operations, no impacts are anticipated to amphibians. A setback of 4m (6m on DA6) will be maintained from all ditches and field drains across the DAs. In addition, an 8m buffer will be maintained between hedgerows, hedgebanks and stone walls and the edge of the solar array, with a minimum of 4m root protection area being maintained between hedgerow and security fence, which will maintain their value as foraging and commuting habitat for amphibians.

- 11.8.150 The management of the field margins (between the boundary feature and the security fence) as tussocky grassland should benefit foraging amphibians, as should the maintenance of the main solar farm through extensive grazing, leading to a variable sward length. Further, the cessation of agricultural inputs should improve the water quality in the surrounding waterways.

- 11.8.151 Amphibians are judged to be important at the **local** scale and their sensitivity is **low**. The impact of operations upon these species is judged to be **positive** for the **life of project** and **low** in magnitude. The overall effect is therefore considered to be **positive** and **minor** in significance.

#### Breeding Birds

##### Notable Ground-Nesting Birds

- 11.8.152 Grasshopper warbler was the only notable ground-nesting species breeding within one of the DAs, with a single breeding territory identified in DA6. Meadow pipit, the other notable ground-nesting species that was recorded, was nesting only in the buffer areas of DA4 and DA6. There is no evidence indicating the impact of solar panel deployment on breeding grasshopper warblers. This is a species that is found in a variety of habitats, including young conifer plantations, that are characterised by having thick ground layer vegetation in which the bird nests and feeds largely unseen. Providing areas of thick ground vegetation remain, for example alongside the ditch networks and wayleaves of DA6, it is likely that grasshopper warbler will continue to use the site.

- 11.8.153 The sensitivity of other notable ground-nesting species is **low**, reflecting their importance at the **local** scale. The impact of operations upon these species is judged to be **negative** for the **life of project** and **medium in magnitude**. The overall effect on this species from operations is therefore considered to be **moderate / minor**.

##### Notable Hedgerow, Scrub and Woodland Birds

- 11.8.154 The management of hedgerows for wildlife in line with national guidance is expected to benefit hedgerow, scrub and woodland birds by providing improved and some additional habitat for foraging and nesting. Specifically, the cutting regime will

ensure no disturbance during the bird breeding season and will promote a dense and bushy structure favourable for nesting birds.

- 11.8.155 The sensitivity of notable hedgerow, scrub and woodland birds is **low**, reflecting their importance at the **local** scale. The impact of operations upon these species is judged to be **positive** for the **life of project** and **medium** in magnitude. The overall effect on this species from operations is therefore considered to be **positive** and **moderate / minor**.

#### Heronry

- 11.8.156 No impacts or effects are expected from the solar farm once it is operational. Therefore, the operational effects are considered to be **negligible**.

#### Wintering Birds

##### Chough

- 11.8.157 Chough are found to habitually forage in fields to the south of the application site and would be unaffected by operations.

- 11.8.158 The sensitivity of the chough is **high**, this species being important at the **national** scale. However, owing to the distance between the application area and the chough foraging area, the impacts of operations upon this species are considered to be **negligible**.

##### Snipe and Jack Snipe

- 11.8.159 Foraging snipe are found in greater numbers in DA6. Deployment of solar panels in open wet fields is likely to result in a reduction of open accessible snipe foraging habitat including rush pasture. It is likely this will displace some birds to similar wet pasture habitat elsewhere in the area, which is locally abundant. However, it is predicted that snipe will continue to use the ditch edges and marginal habitat of the solar farm which will be managed by extensive grazing.

- 11.8.160 Snipe are judged to be important at the **local/County** scale and their sensitivity is precautionarily considered to be **medium**. The impact of operations upon this species is judged to be **negative** for the **life of project** and **low** in magnitude. The overall effect is therefore considered to be **moderate / minor** in significance.

##### Lapwing and Golden Plover

- 11.8.161 Winter foraging lapwing and golden plover are found on the east of DA 6 in small numbers. The presence of solar panels during the operation of the site (and the removal of the preferred open field habitat) is likely to displace wintering birds from this area.

- 11.8.162 Lapwing and golden plover are important at the **regional** scale and their sensitivity is precautionarily considered to be **medium**. The impact of operations upon these species in DA 6 during operations is judged to be **negative** for the **life of project** and **minor** in magnitude. The overall impact is therefore considered to be **minor** in significance.

##### Waterfowl

- 11.8.163 The suite of important waterfowl associated with the Afon Crigyll and floods

during winter includes wigeon, teal, mallard, shoveler, gadwall, lapwing, snipe. During operations the presence of solar panels on fields adjoining the river could affect foraging and possibly roosting habitat for waterfowl. However, the 15m setback from the high-water mark will limit this impact. There is also risk of collision with the security fencing, but again the 15m setback from the high-water mark would minimise this risk.

- 11.8.164 With the above design mitigations, the effects on waterfowl during the solar farm's operation are considered to be **negligible**.

#### Fieldfare, Redwing and Starling

- 11.8.165 The impacts of the development to fieldfare, redwing and starling during operations are considered to be positive. The management of hedgerows for wildlife in line with national guidance is expected to provide improved foraging habitat. Specifically, the cutting regime will promote a dense structure and maximal fruit production.

- 11.8.166 The grassland within the solar farm will be managed through extensive sheep grazing at low stocking density which will promote a variable sward height that should enhance foraging potential for these bird species.

- 11.8.167 The sensitivity of fieldfare, redwing and starling is **low**, reflecting their importance at the **local** scale. The impact of operations upon this species is judged to be **positive** for the **life of project** and **medium** in magnitude. The overall effect on this species from operations is therefore considered to be **positive** and **moderate / minor**.

#### Granivorous Passerines

- 11.8.168 The impacts of the development to granivorous passerines during operations are considered to be positive. The grassland within the solar farm will be managed through extensive sheep grazing which will promote a variable sward height and greater seed production that should enhance foraging potential for these bird species. This effect will be most strongly felt in DAs 4 and 5 where intensive grazing currently occurs.

- 11.8.169 The sensitivity of granivorous passerines is **low**, reflecting their importance at the **local** scale. The impact of operations upon this species is judged to be **positive** for the **life of project** and **medium** in magnitude. The overall effect on this species from operations is therefore considered to be **positive** and **moderate / minor**.

#### Mammals

##### Bats

- 11.8.170 The proposed development should not affect bat roosting during operations. However, the changed nature of grassland through addition of solar panels could potentially disrupt foraging habitat. This is especially relevant to DA6, where rushy and wet pasture occurs, and which is considered to be high quality bat foraging habitat.

- 11.8.171 The proposed setbacks of 8m (4m to security fence and a further 4m to the solar panels) from hedgerows and 4m from ditches and field drains (6m in DA6), and

the retention of rushy and wet pasture in these areas through extensive sheep grazing should help avoid impacts to bat foraging along these linear features at the site's boundary and internally.

11.8.172 Artificial lighting will not be utilised during the operation of the solar farm.

11.8.173 The sensitivity of bats is **medium**, reflecting their importance at the **regional** scale. The magnitude of impact of solar panels upon bat foraging is considered to be **negative** for the **life of project** and **low**. The overall effect on bats from operations is therefore considered to be **negative** and **moderate / minor**.

#### Otters and Water Voles

11.8.174 No significant negative impacts are predicted for otters or water voles during the operation of the solar farm. The extensive grazing together with no agricultural inputs and varied sward are likely to moderately improve water quality in the waterways within and surrounding the site.

11.8.175 The sensitivity of otters is **low**, reflecting their importance at the **local** scale. The magnitude of impact of the site's operations upon otters is considered to be **positive** for the **life of project** and **low**. The overall impact on otters from operations is therefore considered to be **positive** and **minor**.

11.8.176 The sensitivity of water voles is **medium**, reflecting their importance at the **County** scale. The magnitude of impact of operations upon water voles is considered to be **positive** for the **life of project** and **low**. The overall effect on otters from operations is therefore considered to be **positive** and **moderate / minor**.

#### Badger

11.8.177 No significant negative impacts are predicted for badgers during the operation of the solar farm. Indeed, the extensive grazing with no agricultural inputs and varied sward are likely to provide a greater abundance of invertebrates for foraging.

11.8.178 The sensitivity of badgers is **low**, reflecting their importance at the **local** scale. The magnitude of impact of operations upon badgers is considered to be **positive** for the **life of project** and **low**. The overall effect on badgers from operations is therefore considered to be **positive** and **minor**.

#### Other Species of Conservation Concern

##### Red Squirrel

11.8.179 No significant negative impacts are predicted for red squirrels during the operation of the solar farm. Therefore, the operational impacts are considered to be **negligible**.

##### Brown Hare

11.8.180 No significant negative impacts are predicted for brown hares during the operation of the solar farm. Indeed, the extensive grazing with no agricultural inputs and varied sward are likely to provide a greater abundance of foraging.

11.8.181 The sensitivity of hares is **low**, reflecting their importance at the **local** scale. The magnitude of impact of operations upon hares is considered to be **positive** for the **life of project** and **medium**. The overall effect on hares from operations is

therefore considered to be **positive** and **moderate / minor**.

#### Hedgehog

11.8.182 No significant negative impacts are predicted for hedgehogs during the operation of the solar farm. The plan for extensive grazing with no agricultural inputs and varied sward are likely to provide a greater abundance of foraging.

11.8.183 The sensitivity of hedgehogs is **low**, reflecting their importance at the **local** scale. The magnitude of impact of operations upon hedgehogs is considered to be **positive** for the **life of project** and **low**. The overall effect on hedgehogs from operations is therefore considered to be **positive** and **minor**.

#### Reptiles

11.8.184 Suitable reptile habitat was found mainly along the boundary features of the fields within the site. During operations, no impacts are anticipated to reptiles. A setback of 4m (6m in DA6) will be maintained from all ditches and field drains across the site. In addition, an 8m buffer (4m to security fence; a further 4m to solar panels) will be maintained between hedgerows, hedgebanks and stone walls and the edge of the solar array, with a minimum of 4m root protection area being maintained between hedgerow and security fence, which will maintain their value as foraging and commuting habitat for reptiles.

11.8.185 The management of the field margins (between the boundary feature and the security fence) as tussocky grassland should benefit reptiles, as should the maintenance of the main solar farm through extensive grazing, leading to a variable sward length. These effects will be especially positive in DAs 4 and 5 which are currently managed through intensive grazing.

11.8.186 The sensitivity of reptiles is **low**, reflecting their importance at the **local** scale. The impact of operations upon reptiles is considered to be **positive** for the **life of project** and **medium**. The overall effect on reptiles from operations is therefore considered to be **positive** and **moderate / minor**.

#### European Eel

11.8.187 No significant negative impacts are predicted for European eels during the operation of the solar farm. The plan for managing grassland through extensive grazing with no agricultural inputs and varied sward are likely to moderately improve water quality in the waterways within and surrounding the site.

11.8.188 The sensitivity of European eels is **medium**, reflecting their importance at the **regional** scale. The magnitude of impact of operations upon European eels is considered to be **positive** for the **life of project** and **low**. The overall effect on the European eel from operations is therefore considered to be **positive** and **moderate / minor**.

#### Decommissioning

11.8.189 The decommissioning stage will occur at the end of the project's life. At this point, all infrastructure can be removed, and the land returned to a pre-ordained land use with the exception of cabling which will be capped off and remain under the ground. Decommissioning will require construction vehicles, a sizeable workforce

and the establishment of temporary laydowns, as for the construction period. Any potential impacts during decommissioning are therefore likely to be very similar to those described during construction.

- 11.8.190 Given the elapsed time between construction and decommissioning, there could be considerable changes in the ecology of the site. Further, in this time it is probable that development of new techniques and approaches to decommissioning will be developed. For this reason, it is recommended the impacts of decommissioning are assessed by a qualified ecologist prior to its commencement.

#### Designated and Local Wildlife Sites

- 11.8.191 Any potential impacts upon designated and local wildlife sites in close proximity to the site arising from decommissioning are likely to be similar to those identified during construction. The proposed environmental management established for construction, including traffic controls, use of low-pressure vehicles, setbacks from open water, ditches, hedgerows and woodland sediment, protection of valuable vegetation using aluminium-style tracks, and the strict adherence to a best practice CEMP will be required. Potential impacts to designated sites during decommissioning should be assessed by a qualified ecologist prior to works commencing.

#### Phase 1 Habitats

- 11.8.192 Any potential impacts upon Phase 1 habitats within the site and at its boundaries arising from decommissioning are likely to be similar to those identified during construction. Environmental management as proposed or the construction period will be required. Access tracks established for construction and operation will be used during decommissioning. No hedgerows or woodland will be removed or impacted by decommissioning. Potential impacts to phase 1 habitats including water courses during decommissioning should be assessed by a qualified ecologist prior to works commencing.
- 11.8.193 There is likely to be temporary disturbance of grassland habitats from vehicle movements during decommissioning, but these negative **impacts** are considered to be **temporary** and confined to the **Zol**.

#### Protected and Key Species

- 11.8.194 All infrastructure will be removed other than any waterway crossings which will remain in place as it would minimise impacts to riparian species by leaving them in place. The inherent mitigations established for the construction phase would be implemented for decommissioning.
- 11.8.195 Given the long lifespan of the project, the status of protected species is likely to change both in terms of the status of individual species present, and the potential for different species to occur. Therefore, it is not possible to determine the full decommissioning impacts at present.
- 11.8.196 It is recommended that surveys of key species and habitats are undertaken at regular intervals through the life of the project including prior to decommissioning. Survey results will be used to advise on the decommissioning approach, including what time of year the decommissioning should proceed. However, the impacts are likely to be minimal and temporary in nature.

11.8.197 Any effects to species arising from decommissioning are anticipated to be significant in the **immediate Zol** only and would be **temporary** in nature.

## 11.9 PROPOSED MITIGATION

11.9.1 Mitigation, compensation and enhancement measures are detailed in this section. These activities are applied in addition to the mitigation by design defined in Section 11.4 All mitigation will be applied according to the Mitigation Hierarchy, avoiding impacts wherever possible, then minimising. If impacts are unavoidable, then restoration will be applied. Finally, where residual impacts still occur, compensation measures will be considered as a final stage. A Landscape and Ecology Management Plan (LEMP) (controlled by an appropriately worded condition) will provide further details prior to commencement of development of the mitigation, and how it should be implemented and managed through the file of the project.

11.9.2 Mitigation is presented for the construction, operation and decommissioning phase for each ecological feature of value, below.

### Designated and Local Wildlife Sites

11.9.3 No impacts are predicted to the chough from the application area, which is a mobile component of Glannau Ynys Gybi / Holy Island SPA. This results in **negligible** impacts to the SPA and chough for all stages of the proposal.

11.9.4 No impacts are predicted to Llyn Traffwll SSSI from a water quality perspective and from disturbance to wintering fowl. This results in **negligible** impacts to Llyn Traffwll SSSI and its waterfowl.

11.9.5 The management of the southernmost and western fields of DA6 as wet pasture / floodplain grazing marsh will provide a positive water quality improvement to Llyn Dinam SAC and Valley Lakes SSSI. In addition, the principal drain through DA6 will be managed as a vegetated ditch designed to slow the flow of water to aid settling out of sediment, and filter the water. Both the SAC and the SSSI are **high** sensitivity and the magnitude of the positive impact is deemed to be **low**. Therefore, the significance of this impact is **positive** and **moderate**.

11.9.6 The avoidance of construction activities within 100m of the boundary of the RSPB Valley Wetlands Reserve will mitigate impacts to breeding bitterns and will result in **negligible** impact.

### Phase 1 Habitats

#### Semi-Improved and Improved Grassland

11.9.7 The removal of any concrete bases for inverter/transformer and other infrastructure during decommissioning will minimise the long-term impact of land take upon grassland habitats. Access tracks will remain in place as a permanent but minor removal of semi-improved and improved grassland.

11.9.8 All DAs will be enhanced through re-sowing with a species-rich wild flower and fine grass mix suitable for grazing on any areas damaged by construction. Extensive seasonal grazing will be required on all DAs within the security fencing to manage grassland in a manner than encourages a variable and diverse sward. The maximum stocking density of sheep will be in the region of 4 animals per Ha. On DAs 4 and 5,

this will encourage the development of species-rich semi-improved grassland of greater biodiversity value than the improved and intensively grazed grassland it replaces.

- 11.9.9 Semi-improved grassland is judged to be **low** sensitivity and the magnitude of the positive impact is deemed to be **high**. Therefore, the significance of this effect is **positive** and **moderate**.

#### Coastal and Floodplain Grazing Marsh

- 11.9.10 The southernmost field of DA6 will be managed as wet pasture / floodplain grazing marsh. Specifically, the management will be such that cattle will graze the land and grazing pressure will be controlled to create a variable sward height. The same will apply to the western field of DA6 which overlaps with the SAC. It may be necessary to remove small areas of scrub to restore this location to grazing marsh and maximise its benefits to breeding and wintering birds. This would only be done in agreement with RSPB.

- 11.9.11 Coastal and floodplain grazing marsh is judged to be **medium** sensitivity and the magnitude of the positive impact is deemed to be **medium**. Therefore, the significance of this effect is **positive** and **moderate**.

#### Hedgerows and Scattered Trees

- 11.9.12 No trees are scheduled to be removed as part of this scheme. If any tree is found to present a health and safety risk, then it will be fully assessed for bats. If signs of bats are discovered the tree will be retained until such time as a license could be attained from NRW. Any tree removed will be replaced like for like with a new planting.

- 11.9.13 A total of 750m of new species rich hedgerow will be planted in DA4 and DA5. This hedgerow will represent an increase in this habitat type and a benefit to all species that utilise hedgerows, including farmland birds, small mammals, bats, reptiles, amphibians and a range of invertebrates.

- 11.9.14 Hedgerows and scattered trees are judged to be **medium** sensitivity and the magnitude of the positive impact is deemed to be **medium**. Therefore, the significance of this effect is **positive** and **moderate**.

#### Watercourses

- 11.9.15 Extensive low intensity grazing in the south-western and southernmost fields of DA6, with no agricultural inputs, will result in a minor improvement to water quality in the associated waterways.

- 11.9.16 Watercourses are judged to be **low** sensitivity and the magnitude of the positive impact is deemed to be **low**. Therefore, the significance of this effect is **positive** and **minor**.

#### Protected and Key Species

##### Great Crested Newts, Amphibians and Reptiles

- 11.9.17 The planting of approximately 760m of new species-rich hedgerow across the application site will benefit great crested newts, amphibians and reptiles by providing foraging and commuting habitat. Proposed landscape planting for the DAs is shown

in **Drawings LOC1001/11/14 to 16**. Further, the management of field margins as tussocky grassland, with occasional winter cuts, will provide forage and shelter through the Winter months. As a further enhancement, hibernacula will be built in each DA at suitable locations (e.g. close to existing ponds, ditches and woodland) to provide suitable refuge habitat for amphibians and reptiles.

- 11.9.18 Great crested newts are judged to be **medium** sensitivity and the magnitude of the positive impact is deemed to be **medium**. Therefore, the significance of this effect is **positive** and **moderate**.

#### Notable Ground-Nesting Birds

- 11.9.19 Disturbance to breeding ground-nesting birds across the site would be avoided through the timing of construction for outside the breeding season (1<sup>st</sup> March – 31<sup>st</sup> August). If construction is necessary during the breeding season, then an ecological clerk of works (ECoW) will be engaged to assess all open areas of suitable habitat for ground nesting birds prior to construction activities commencing.
- 11.9.20 The management of the western and south western fields of DA 6 for ground nesting birds is judged to compensate for any losses of habitat elsewhere. Therefore, the impact from this solar scheme upon notable ground-nesting birds would be considered **negligible**.

#### Notable Hedgerow, Scrub and Woodland Birds

- 11.9.21 The planting of a new native hedgerow of 990m in length across the application site will provide new foraging and nesting habitat for hedgerow bird species. In addition, bird boxes of different specifications will be installed at suitable locations throughout the hedgerow trees and woodland at the margins of the deployment area.
- 11.9.22 Notable hedgerow, scrub and woodland birds are judged to be **low** sensitivity and the magnitude of the positive impact is deemed to be **high**. Therefore, the significance of this effect is **positive** and **moderate**.
- 11.9.23 Disturbance to hedgerow-nesting birds while breeding could further be avoided through the timing of construction for outside the breeding season (1<sup>st</sup> March – 31<sup>st</sup> August). If construction is necessary during the breeding season, then an ecological clerk of works (ECoW) will be engaged to assess all suitable habitat for breeding birds prior to construction activities commencing.

#### Heronry

- 11.9.24 During construction, disturbance to the heronry would most effectively be avoided through avoiding the heron and egret breeding season (1<sup>st</sup> February – 31<sup>st</sup> July). With this mitigation in place, the impact from this solar scheme upon breeding herons and little egrets would be considered **negligible**.
- 11.9.25 If this is not possible, a setback of 50m from the edge of the heronry would minimise disturbance to these species while breeding. Little egrets are judged to be **high** sensitivity and the magnitude of the negative impact is deemed to be **medium**. Therefore, the significance of this effect is **negative** and **major**.

#### Chough

- 11.9.26 Impacts to choughs foraging in winter are not anticipated, owing to the removal of

DAs 1, 8 & 9 from the scheme, and the long distance between the winter foraging areas and the application site. Chough are faithful to their winter-feeding sites and are not known to utilise any other fields in the scheme. With DAs 1, 8 & 9 removed, the impact from this solar scheme upon winter foraging chough is considered **negligible**.

Snipe and Jack Snipe (winter)

- 11.9.27 Impacts from construction and presence of solar panels in DA6 will be compensated through the retention of ditch-side damp grassland rush pasture through extensive grazing in these DAs. Further, the management of the southernmost and western fields of DA6 as wet pasture / floodplain grassland through cattle grazing will compensate for the loss of suitable habitat in the deployment areas of DA6.
- 11.9.28 Snipe are judged to be important at the **local/County** scale and their sensitivity is precautionarily considered to be **medium**. The above mitigations would reduce impacts to this species to negligible in magnitude. Therefore, the overall significance of the effect would be **negligible**.

Lapwing and Golden Plover (Winter)

- 11.9.29 The loss of open field foraging habitat in Winter for lapwing and golden plover will be avoided through the removal of DAs 1 and 9 from the scheme. In addition, the southernmost field of DA6 will be managed as wet pasture suitable for lapwing foraging. Consequently, the impact from this solar scheme upon lapwing and golden plover in winter would be considered **minor and positive**.

Fieldfare, Redwing and Starling (Winter)

- 11.9.30 Winter foraging habitat will be enhanced for fieldfare, redwing and starling through the planting of 990m of new species-rich native hedgerow across the application site.
- 11.9.31 Fieldfare, redwing and starling are judged to be important at the **local** scale and their sensitivity is considered to be **low**. The above mitigations would be considered positive and **medium** in magnitude. Therefore, the overall significance of the effect would be **positive** and **moderate / minor**.

Granivorous Passerines (Winter)

- 11.9.32 Creating tussocky field margins with wild flowers, cut every 2 years on rotation, and the establishment of species-rich wild flower meadows within the scheme, will provide additional seed sources for granivorous birds through the winter, in the form of a variety of uncut grasses. These will benefit foraging flocks across the site.
- 11.9.33 Granivorous passerines are judged to be important at the **local** scale and their sensitivity is considered to be **low**. The above mitigations would be considered **positive** and **medium** in magnitude. Therefore, the overall significance of the effect would be **positive** and **moderate / minor**.

Bats

- 11.9.34 The reduction in bat foraging habitat in the form of open semi-improved grassland, especially in DA6, will be compensated through the following:
- Management of the western and southernmost fields of DA6 as wet pasture with diverse structure, so increasing the foraging quality of these areas for bats.

- Management of entire solar farm within security fencing as extensive grazing to encourage a more diverse sward structure, which is likely to increase the invertebrate diversity. This positive effect is likely to be greatest on DAs 4 and 5, currently intensively grazed.
- Sowing of wild flower grassland across all DAs where invertebrate life is likely to increase greatly, so providing new high quality bat foraging habitat
- Planting of 990m of new native, species-rich hedgerows
- Installing bat boxes of multiple designs in taller trees at the margins of the solar deployment areas.

11.9.35 Bats are judged to be important at the **County** scale and their sensitivity is considered to be **medium**. The above mitigations would be considered to negate the potentially negative impacts of the solar farm upon bats and would provide a **minor positive** impact. Therefore, the overall significance of the effect would be **moderate / minor**.

#### Red Squirrel

11.9.36 To minimise impacts to any red squirrel dreys located close to the construction / decommissioning site, a survey will be undertaken prior to works commencing. Where dreys are discovered, and during the red squirrel breeding season (February – September), a 50m exclusion zone will be enforced around the drey. With the above mitigations in place, the effect from this solar scheme upon red squirrels is considered **negligible**.

### 11.10 RESIDUAL IMPACTS

#### Construction and Decommissioning

11.10.1 Temporary displacement of amphibians, reptiles, mammals (including otters and badgers) and birds may occur as a result of disturbance from noise, vibration and human presence during construction and decommissioning. This may lead to temporary displacement and disturbance of foraging behaviour. However, this impact will be temporary (4 - 5 months) and, taking into account all the proposed mitigations, the scale should be contained within the immediate Zol of this development.

11.10.2 There will be a minor and permanent loss of grassland habitat to hardcore tracks. However, in itself this habitat representing an additional habitat for basking reptiles, some inverts and gritting birds. From a grassland perspective, the improvement of quality of grassland across the site would more than compensate for this impact.

#### Operations

11.10.3 Negative impacts on snipe are not expected during operations, given the mitigation provided by enhanced habitat at DA 6.

11.10.4 A positive improvement of water quality is expected as a result of reduced agricultural inputs, tussocky field margins, compensation areas being managed for a longer sward through extensive grazing. This will benefit the water quality of the surrounding protected areas and their aquatic flora. Improved water quality is also likely to benefit European eels, water voles, otters and other aquatic biodiversity.

11.10.5 There will be increased botanical diversity of grassland through the following actions:

- Extensive grazing of grassland throughout the solar farm area, within the security fencing

- Sowing wild flower and grass seed on areas damaged in construction
- Tussock and wild flower margins around every field
- Management of two compensation areas neighbouring DA6 as wet pasture through extensive cattle grazing.

11.10.6 This increase in botanical diversity will lead to an increase in invertebrate diversity. In combination, such enhancements are likely to produce significant benefits for breeding and wintering birds, small mammals, bats, reptiles and amphibians.

11.10.7 An increase in the length of species-rich hedgerow will benefit a wide range of biodiversity. Further, management of all hedgerows to maximise flower and fruit production, and to promote density, will benefit breeding and wintering birds.

#### Biodiversity Net Gain

11.10.8 A calculation of Biodiversity Net Gain has been made using the Defra Biodiversity Metric 2.0, based upon the above mitigations and enhancements (**see Appendix 11.12**). The overall gain for grassland habitats is 17.2%, with the main gains coming from the conversion of agricultural grassland to higher value habitats such as wild flower meadows, wild bird seed mixes and wet pasture in parcels 4 and 5. Note that in parcel 6, there are some negative scores for the loss of species rich grassland in the panel area, but overall, the score is positive. The overall gain for hedgerow habitats is 37%. This comes from improving the quality of existing hedges through careful management and planting the new species rich hedgerows

#### Cumulative Effects

11.10.9 Chapter 12 of the ES considers in combination and cumulative effects. The chapter also considers potential cumulative effects with schemes that have been consented but not yet implemented or have become operational.

11.10.10 It is considered unlikely that identified ecological impacts will give rise to potential cumulative effects. This is largely due to intervening distances between sites but also the benign nature of the solar proposal. Such that it will not generate emissions to atmosphere, ground or hydrology, the potential visual amenity effects will be limited in extent and once constructed will not generate vehicle movements of any note.

#### Monitoring

11.10.11 A monitoring programme will be established to assess the effects of the development, mitigation and enhancements upon key elements of biodiversity. The monitoring will be systematically designed to provide results that are comparable between years and between DAs. This systematic monitoring programme will be detailed in the LEMP.

11.10.12 New planting and sowing will be monitored regularly during the establishment period to ensure the habitat is developing as expected and to detect any problems, e.g. weed flushes, disease, early in the process so they can be rapidly addressed.

11.10.13 Bird and bat boxes and hibernacula will be checked annually in Winter to ensure they are secure and functional.

## 11.11 SUMMARY AND CONCLUSIONS

- 11.11.1 The proposed solar farm for Land at Traffwll, West Anglesey consists of three separate DAs of land covers an area of approximately 60ha and consists of semi-improved grassland and rush pasture and improved grassland, used for grazing of sheep, cattle and horses, and in some cases cut for silage or hay. The generally small fields are enclosed by hedgerows and ditches, with scattered hedgerow trees, scrub patches and several blocks of woodland occurring between the DAs.
- 11.11.2 In line with scoping responses from NRW and other consultees, the following ecological groups were assessed through desktop and/or field surveys: breeding and wintering birds, bats, Great Crested Newts, otters and water voles, badgers, European eels, and invertebrates.
- 11.11.3 There are five statutory sites designated for nature conservation under European legislation within 10km of the application area. Two statutory sites, Llyn Dinam Special Area of Conservation and Glannau Ynys Gybi /Holy Island Coast Special Protection Area have been scoped into this assessment.
- 11.11.4 There are six statutory sites designated for nature conservation under national legislation within 10km of the application area. Two statutory sites, Llynnau y Fali SSSI and Llyn Traffwll SSSI have been scoped into the assessment. Three non-statutory sites abut some of the DAs and have been assessed here, namely; Cors Plas, Tywyn Trewan and RSPB Valley Wetlands Reserve. NRW raised the following specific concerns in relation to the European designated sites. For Llyn Dinam SAC:
- possible eutrophication arising from improved drainage through site 6 during the operational phase.
  - the proximity of Llyn Dinam SAC to the proposed solar arrays within site 6, with the potential for pollution during construction/erection of the arrays.
  - For Glannau Ynys Gybi/ Holy Island Coast SPA, survey data on choughs (wintering choughs are mobile features of the SPA) will be needed to inform the Habitats Regulations Assessment for the SPA, using methods proposed by RSPB.
  - The value and sensitivity of ecological features was determined based on the guidance given in 'Guidelines on Ecological Impact Assessment' produced by CIEEM.
- 11.11.5 Mitigation of impacts was undertaken through the application of the mitigation hierarchy. Key avoidance measures include:
- the removal of DAs 1, 8 & 9 from the proposal to avoid impacts to chough winter foraging, and lapwing, golden plover breeding and foraging. This also avoids impacts to breeding skylarks.
  - No deployment in overlap areas with Llyn Dinam SAC, and management of said areas for key wildlife.
  - Enhancements to SAC / SSSI through moderate improvements to water quality from extensive management and no agricultural inputs
- 11.11.6 A large number of mitigation measures have been designed into the proposed development, designed to avoid and minimise impacts during the construction and operation of the solar farm. These include setbacks from boundary features, careful management of surface water through the formulation of a Sustainable Drainage Strategy (SuDS), minimisation of vehicle movements and retention of hedgerows and

trees.

11.11.7 Species-specific mitigations include the following:

- For snipe, this includes the removal of DA 8 from the scheme, setbacks of 6m from all ditches in DA6 and the creation of wet pasture in land adjoining DA6.
- For breeding herons, specific mitigations include either timing construction to avoid the breeding season or undertaking a 50m setback from construction during this period.
- For bats, compensation of potential loss of foraging land on DA6 will be compensated through creation of wet pasture in the southern and south western fields of DA6, the creation of 4 fields of native wild flower rich meadow and the planting of 990m of species rich hedgerow.
- Further, ongoing land management is expected to yield significant biodiversity benefits:
- Extensive grazing of grassland throughout the solar farm area, within the security fencing
- Sowing wild flower and grass seed on areas damaged in construction
- Sowing tussock and wild flower margins around every field
- Management of two compensation areas neighbouring DA6 as wet pasture through extensive cattle grazing.

11.11.8 The combination of mitigations described herein is considered to address the potential impacts to biodiversity predicted for the development. Overall, with all mitigations enacted, this development is considered to deliver a significant gain to biodiversity.

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Table 11.15: Summary of Impacts and Mitigations

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Feature	Value of feature (calculation)	Phase	Environmental effects	Nature of impact / effect	Mitigation by Design	Significance without additional mitigation	Proposed mitigation & enhancements	Residual impacts	Residual significance
Glannau Ynys Gybi / Holy Island Coast SPA - Qualifying feature breeding & wintering Chough	International	Construction & decommissioning	Noise/vibration/dust disturbance	Disruption to winter foraging of chough	None	Negligible	None	Negligible	Not significant
		Operation	Deployment of solar panels on open fields	Displacement of chough from favoured winter foraging sites (panels likely to render habitat unsuitable for chough foraging)	None	Negligible	None	Negligible	Not significant
Llyn Dinam SAC	International	Construction & decommissioning	Run off of sediment into watercourses	Reduction in water quality	Sediment control structures and procedures (see SuDS Strategy); retain existing grass sward; use low pressure construction vehicles; minimise vehicle movements, no deployment or construction activities within 6m of water courses on DA 6 and 4m on remaining DAs 15m setback, depending on extent of flood zone Avoidance through no deployment of solar panels in the SAC area of DA 6	Negligible	Management of southern and south western portions of DA 6 grassland as wet pasture / floodplain grazing marsh Creation vegetated ponds along the main drain through DA 6.	Moderate positive	Positive, significant

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					and the abutting fields. No deployment within 50m of Llyn Dinam				
			Accidental pollution e.g. hydrocarbon spill	Reduction in water quality	CEMP in place which specifies safe and environmentally sensitive methods for fuelling and management of hazardous materials.	Negligible	None	Negligible	Not significant
		Operations	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing; retention of tussocky grassland	None	Moderate Positive	Management of southern and south western portions of DA 6 grassland as wet pasture / floodplain grazing marsh	Moderate Positive	Positive, life of project, local
Llynnau y Fali - Valley Lakes SSSI- Qualifying features: mosaic of open water areas with associated mesotrophic marshland and damp grassland habitats: Wintering wildfowl e.g. shoveler; teal, tufted duck, pochard and goldeneye	National	Construction & decommissioning	Run off of sediment into watercourses	Reduction in water quality	Sediment control structures and procedures (see SuDS Strategy); retain existing grass sward; use low pressure construction vehicles; minimise vehicle movements; , no deployment or construction activities within 6m on DA 6 and 4m on remaining DAs of water	Negligible	Management of southern and south western portions of DA 6 grassland as wet pasture / floodplain grazing marsh. Creation of vegetated ponds along the main drain through DA 6.	Negligible	Not significant

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					courses Avoidance through removal of solar panels from western portion of DA 6 (SAC) and the southern portion next to Llyn Dinam 15 m setback, depending on extent of flood zone				
			Disturbance to waterfowl due to noise of machinery and human activity.	Disruption to foraging and roosting waterfowl	No deployment or construction activities within 6m on DA 6 and 4 on remaining DAs of water courses 15 m setback, depending on extent of flood zone Avoidance through no deployment of solar panels in the SAC area of DA 6 and the abutting fields. No deployment within 50m of Llyn Dinam	Minor, negative	None	Negligible	Not significant
			Accidental pollution e.g. hydrocarbon spill	Reduction in water quality	CEMP in place which specifies safe and environmentally sensitive methods for fuelling and management of	Negligible	None	Negligible	Not significant

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					hazardous materials.				
		Operations	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing and variable sward; retention of tussocky grassland at field margins	None	Moderate Positive	Management of southern and south western portions of DA 6 grassland as wet pasture / floodplain grazing marsh	Moderate Positive	Positive, moderate, life of project Positive improvement of water quality through reduced agricultural inputs
			Proximity of solar panels and fencing to habitat.	Disruption to foraging and roosting waterfowl and risk of birds colliding with security fencing	No deployment of solar infrastructure in the south-western component of DA 6. Approximately 50m buffer and hedge lined road between SSSI boundary nearest solar deployment	Negligible	None	Negligible	Not significant
Llyn Traffwll SSSI is an example of a moderately base-rich lake containing rare aquatic flora. Wintering wildfowl including wigeon, gadwall, goldeneye, pochard, tufted duck and notably the shoveler duck	National	Construction & decommissioning	Run off of sediment into watercourses	Reduction in water quality	Sediment control structures and procedures (see SuDS Strategy); retain existing grass sward; use low pressure construction vehicles; minimise vehicle movements; no deployment or construction activities within 6m of water courses on DA 6 and 4m on remaining DAs	Negligible		Negligible	Not significant

			Disturbance to waterfowl due to noise of machinery and human activity.	Disruption to foraging and roosting waterfowl	No deployment or construction activities within 8m of water course on DA 6 and 4m on remaining DAs s 15 m setback, depending on extent of flood zone	Negligible		Negligible	Not significant
			Accidental pollution e.g. hydrocarbon spill	Reduction in water quality	CEMP in place which specifies safe and environmentally sensitive methods for fuelling and management of hazardous materials.	Negligible		Negligible	Not significant
		Operations	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing and variable sward; retention of tussocky grassland at field margins		Negligible	None	Negligible	
			Proximity of solar panels and fencing in DAs 1, 8 & 9 to habitat.	Disruption to foraging and roosting waterfowl and risk of birds colliding with security fencing	Closest point between DA 8 and open water is 100m with significant scrub in between. 15m setback, depending on extent of flood zone to minimise the likelihood of waterfowl colliding with fencing	Negligible		Negligible	Not significant

Cors Plas, noted for its wildfowl in winter including teal, mallard, wigeon and shoveler on the site with smaller numbers of pintail, pochard, gadwall and tufted duck.	National	Construction & decommissioning	Cors Plas abuts DAs 1 and 4 of the application area and is hydrologically linked to DA 3. Run off of sediment into watercourses	Reduction in water quality	Sediment control structures and procedures (see SuDS Strategy); retain existing grass sward; use low pressure construction vehicles; minimise vehicle movements; no deployment or construction activities within 8m of water courses on DA 6 and 4m on remaining DAs	Negligible		Negligible	Not significant
			Disturbance to waterfowl due to noise of machinery and human activity.	Disruption to foraging and roosting waterfowl	No deployment or construction activities within 8m of water courses on DA 6 and 4m on remaining DAs 15 m setback, depending on extent of flood zone	Minor Negative		Negligible	Not significant
			Accidental pollution e.g. hydrocarbon spill	Reduction in water quality	CEMP in place which specifies safe and environmentally sensitive methods for fuelling and management of hazardous materials.	Negligible	None	Negligible	Not significant
	Operations	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing and	None	Moderate Positive	None	Moderate Positive	Positive, moderate, life of project, local	

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				variable sward; retention of tussocky grassland at field margins					Positive improvement of water quality through reduced agricultural inputs
			Proximity of solar panels and fencing in DA 4 to habitat.	Disruption to foraging and roosting waterfowl and risk of birds colliding with security fencing	15 m setback, depending on extent of flood zone to minimise the likelihood of waterfowl colliding with fencing	Negligible		Negligible	Not significant
Tywyn Trewan Common, extensive sand dune system with salt marsh and heath/grassland mosaic	Local	Construction & decommissioning	None Identified	N/A		Negligible		Negligible	
		Operations	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing and variable sward; retention of tussocky grassland at field margins	None	Negligible	None	Negligible	Minor positive improvements to water quality unlikely to affect botany of dune systems
RSPB Valley Wetlands Reserve - wildfowl and bittern	National (bittern)	Construction & decommissioning	Disturbance to bitterns due to noise of machinery and human activity.	Disruption to foraging and roosting bitterns	No deployment or construction activities within 6m of water course on DA 6 and 4m on remaining DAs 15 m setback, depending on extent of flood zone	Moderate Negative	Avoidance of construction during bittern breeding season (March – June) within 100m of reed beds	Negligible	Not significant
		Operations	None Identified	N/A	None	Negligible	None	Negligible	None
Semi-improved grassland, including	Local	Construction & decommissioning	Disturbance from vehicle/machine	Compaction and removal of vegetation	Protection of wet pasture through aluminium-style	Minor Negative	Removal of concrete bases (but	Minor Negative	Minor loss of habitat to permanent

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wet pasture (majority of DA 6)			ry movements <5% land take for hardcore tracks and concrete inverter bases	through vehicle/machinery movements	tracks Use low pressure construction vehicles; minimise vehicle movements through limited routes and smart traffic control		not hardcore tracks) post-construction		hardcore tracks
		Operations	Shading of grassland underneath panels	Changes to species composition/dominance	None	Minor positive	The combination of wildflower meadow seeding in 4 fields and extensive grazing is intended to result in a diverse grassland sward	Moderate positive	Positive, life of project, Zol
			Extensive management of grassland	Cessation of agricultural impacts; extensive grazing and variable sward; retention of tussocky grassland at field margins	None	Minor, positive	None	Moderate positive	Positive, life of project, Zol
Coastal and floodplain grazing marsh (southern and westernmost fields of DA 6)	Regional	Construction & decommissioning	Disturbance from vehicle movements	Compaction and removal of vegetation through vehicle/machinery movements	No deployment or construction activities within 6m on DA 6 and 4m on remaining DAs of water courses 15 m setback, depending on extent of flood zone	Negligible	None	Negligible	None

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					Avoidance through no deployment of solar panels in the south-western or southern fields of DA 6. No deployment or construction activities within 6m of water courses on DA 6 and 4m on remaining DAs or 15m of open water in DA 4				
		Operations	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing and variable sward	Avoidance through no deployment of solar panels in the SAC area of DA 6	Moderate / minor Positive	Management of southern and south western portions of DA 6 grassland as wet pasture / floodplain grazing marsh; extensive winter grazing with cattle in the south-western component of DA 6	Moderate positive	Positive, life of project, Zol
Hedgerows and scattered trees	Regional	Construction & decommissioning	Disturbance from vehicle movements, soil compaction and disturbance to roots	Damage to root systems causing loss of vigour or mortality	All existing hedgerows and trees to be retained Setbacks of 8m from hedgerows during works (4m	Negligible	None	Negligible	Not significant

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					from hedge to security fence; 4m from security fence to solar panels)				
		Operation	Sympathetic management of hedgerows and their margins	Improved structure and diversity of hedgerows	None	Moderate / minor Positive	Reinforcement planting of internal hedgerows Planting of c.790m of hedgerow to east side of DA 4 and north of DA 5 (for screening)	Moderate positive	Positive, regional Improved quality and increased quantity of hedgerow and field boundary habitat
Scrub	Local	Construction & decommissioning	None Identified	N/A	None	Negligible	None	Negligible	Not significant
		Operations	None Identified	N/A	None	Negligible	None	Negligible	Not significant
Woodland	Zol	Construction & decommissioning	Disturbance from vehicle movements, soil compaction and disturbance to roots	Damage to root systems causing loss of vigour or mortality	All existing hedgerows and trees to be retained Setbacks of 8m from hedgerows during works (4m from hedge to security fence; 4m from security fence to solar panels)	Negligible	None	Negligible	Not significant
		Operations	Extensive management of grassland	Cessation of agricultural impacts; no ploughing or chemical inputs	None	Minor Positive	None	Minor positive	Positive, life of project, local
Watercourses	Local	Construction & decommissioning	Run off of sediment into watercourses	Significant temporary reduction in water quality	Sediment control structures and procedures (see SuDS Strategy);	Negligible	None	Negligible	Not significant

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					retain existing grass sward; use low pressure construction vehicles; minimise vehicle movements; no deployment or construction activities within 6m of water courses on DA 6 and 4m on remaining DAs or 15m of open water				
		Construction & decommissioning	Accidental pollution e.g. hydrocarbon spill	Significant temporary reduction in water quality	CEMP in place which specifies safe and environmentally sensitive methods for fuelling and management of hazardous materials.	Negligible	None	Negligible	Not significant
		Operations	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing and variable sward; retention of tussocky grassland at field margins	None	Minor positive	Extensive winter grazing with cattle in the south-western component of DA 6	Minor positive	
Great crested newts	County	Construction & decommissioning	Injury or mortality through construction activities, equipment etc	Injury or mortality	Watching brief during construction Setbacks of 8m from hedgerows, hedgebanks and stone walls and	Negligible	None	Negligible	Not significant

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					ditches and waterways				
		Operations	Sympathetic management of hedgerows and field margins	Improved habitat for commuting and foraging	None	Moderate / minor Positive	Reinforcement planting of internal hedgerows Planting of new species-rich hedgerow to east of DA 4 and north of DA5 (for screening) Building hibernacula, log piles.	Moderate positive	Positive, life of project, local (County) Improved quality and increased quantity of hedgerow and field boundary habitat
		Operations	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing; retention of tussocky grassland, especially in DAs 4 and 5	None	Moderate / minor Positive	None	Moderate / minor Positive	Positive, life of project, local (County?) Positive improvement of water quality through reduced agricultural inputs
Amphibians	Local	Construction & decommissioning	Injury or mortality through construction activities, equipment etc	Injury or mortality	Watching brief during construction	Minor Negative	None	Negligible	Not significant
		Operations	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing; retention of tussocky grassland, especially in DAs 4 and 5	None	Minor Positive	None	Minor positive	Positive, moderate, life of project, local (County?) Positive improvement of water

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									quality through reduced agricultural inputs
Notable breeding ground-nesting birds (meadow pipit, grasshopper warbler)	Local	Construction & decommissioning	Noise/vibration/dust disturbance & temporary land take in DAs 4 & 6	Disruption to breeding both within and adjacent to DAs.	None	Moderate / minor negative	Construct outside of the breeding season where possible.	Negligible	Not significant Low impact: likely displacement of 1 or two pairs
		Operations	Deployment of solar panels on open fields in DAs 4 & 6 Provision of predator vantage points (security solar fence)	Displacement from breeding habitat within DAs (panels render habitat unsuitable for species in question). Loss of foraging habitat may impact the breeding success of the lapwing colony.	None	Moderate / minor negative	Management of compensation areas of DA 6 for ground nesting birds	Negligible	Not significant Low impact: likely displacement of one or two pairs of MP in DA 3 of application area
Notable breeding, hedgerow, scrub & woodland birds	Local	Construction & decommissioning	Disturbance to hedgerows from noise, human activity	Disruption to breeding and across all DAs and immediately adjacent areas (March - July).	Setbacks of 8m from hedgerows (and ditches?) during works (4m from hedge to security fence; 4m from security fence to solar panels)	Moderate / minor Negative	Avoid construction during bird breeding season (March - July); watching brief if not.	Moderate / minor negative	Negligible if breeding season is avoided; low impact if not
		Operation	Sympathetic management of hedgerows and their margins	Improved habitat for foraging and nesting	None	Moderate / minor Positive	Reinforcement planting of internal hedgerows Planting of new species-rich hedgerow to east of DA 4	Moderate Positive	Positive at local level Improved quality and increased quantity of hedgerow and field

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							and north of DA 5 (for screening)		boundary habitat
Heronry: breeding little egret (BDir1) & grey heron (DA 4)	National for little egret; local for grey heron	Construction & decommissioning	Noise/vibration/dust disturbance to heronry which is located just outside a deployment area	May disrupt breeding & even cause the colony to be abandoned	None	Major negative for little egret; moderate / minor for grey heron	Avoid construction during grey heron/little egret breeding season (Feb - July); if not possible then no construction within 50m of heronry	Moderate if within breeding season; Negligible if outside breeding season	Not significant, if breeding season is avoided
		Operation	None Identified	N/A	None	Negligible	N/A	Negligible	N/A
Chough (winter)	International	Construction & decommissioning	Noise/vibration/dust disturbance	Disruption to winter foraging	None	Negligible		Negligible	Not significant
		Operation	Deployment of solar panels on open fields	Displacement of chough from winter foraging sites	None	Negligible		Negligible	Not significant
Snipe and Jack Snipe (winter)	Local/County	Construction & decommissioning	Noise/vibration/dust disturbance resulting in displacement of foraging snipe in DA 6	Disruption of foraging habits	Protection of wet pasture through aluminium-style tracks Use low pressure construction vehicles; minimise vehicle movements through limited routes and smart traffic control	Moderate / minor Negative	None	Negligible	Not significant
		Operation	Deployment of solar panels in open wet fields resulting in reduction of open accessible snipe foraging	Disruption of foraging habits	Setbacks of 6m from ditches on DA 6 and 4m on remaining DAs; retention of wet pasture vegetation	Moderate/min or Negative	Maintenance of suitable damp grassland/rush pasture in most heavily	Negligible	Not significant

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			habitat including rush pasture and displacement of some birds to similar habitat elsewhere in the area				used DA 6. Management of southwestern and southern fields in DA 6 as wet pasture suitable for snipe foraging		
Lapwing and Golden Plover (Winter) on open fields	Regional	Construction & decommissioning	Disruption to foraging birds from noise/vibration/dust,	Negative temporary, regional	None	Negligible		Negligible	Not significant
		Operation	Loss of open uninterrupted foraging habitat (Mainly P1 and P9 but also P6 east dry field).	Negative, life of project, regional	None	Minor Negative	Management of southwestern and southern fields in DA 6 as wet pasture suitable for lapwing foraging	Minor positive	Not significant
Suite of important Waterfowl species (winter) associated with the River Crigyll and floods: (wigeon, teal, mallard, shoveler, gadwall, lapwing, snipe)	Local	Construction & decommissioning	Disturbance of foraging and roosting waterfowl, due to noise of machinery and human activity on the west side of DA 4	Negative, temporary, local	Exclusion zone of 15m from the high-water mark to be incorporated to protect area from disturbance	Moderate / minor Negative	Avoid winter period (Nov – March) for construction adjacent to these areas where possible	Negligible	Not significant Negative/advise, short term, reversible
		Operation	Deployment of solar panels adjacent to the river reducing	Negative, local, life of project	15 m setback, depending on extent of flood zone, where solar	Negligible	None	Negligible	Not significant

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			available foraging and roosting habitat for waterfowl and potential collision hazard (security fencing) to flying wildfowl.		panels close to course of river in DA 4. This will minimise the likelihood of night-flying wildfowl colliding with fencing				
Fieldfare and Redwing, Starling (winter)	Local	Construction & decommissioning	Disturbance of foraging birds along hedgerows due to noise of machinery and human activity	Likely localised displacement of foraging flocks	Setbacks of 8m from hedgerows (and ditches?) during works (4m from hedge to security fence; 4m from security fence to solar panels)	Minor Negative	Avoid construction during Winter; watching brief if not.	Minor negative / negligible	None if breeding season is avoided; minor negative impact if not
		Operation	Sympathetic management of hedgerows and their margins; extensive grazing regime	Improved fruiting of hedgerows for winter forage; extensive grazing produces a variable sward.	Retain/enhance hedgerows and associated trees.	Moderate / minor Positive	Reinforcement planting of internal hedgerows Planting of new species-rich hedgerow to east of DA 4 and north of DA 5 (for screening). Enhanced foraging habitat within fields and buffers.	Moderate / minor Positive	Positive: local level, life of project Improved quality and increased quantity of hedgerow and field boundary habitat
Granivorous passerines e.g. finches, buntings, larks	Local	Construction & decommissioning	Disturbance of foraging birds in grassland due to noise of machinery and human activity	Likely localised displacement of foraging flocks	None	Negligible	None	Negligible	

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		Operation	Improved foraging for winter flocks of finches and buntings in DAs 1, 3 4 & 5	Cessation of agricultural impacts; extensive grazing; retention of tussocky grassland	None	Moderate / minor Positive	LEMP: Sympathetic field management to provide winter food resource, e.g. uncut grasses at site's margins. Wildflower mix will increase the amount of seed available to birds.	Moderate / minor Positive	Positive, life of project, local Beneficial, long term. Encourage greater numbers of these species to counter the national decline
Bats	County	Construction & decommissioning	Lighting	Temporary disturbance to commuting routes, disruption of foraging habits	Use only necessary lighting for security and safety, e.g. setdown area; use directional lighting only.	Moderate / minor negative	None	Negligible	Not significant
		Construction & decommissioning	Removal of or impacts to roosting trees; disturbance from noise and vibration during the working day	Disruption of roosting or potentially mortality	No trees or hedgerows to be removed as part of this proposal; Setbacks of 8m from hedgerows and ditches during works (4m from hedge to security fence; 4m from security fence to solar panels)	Moderate / minor negative	None	Negligible	Not significant
		Operations	Changed nature of grassland through addition of solar panels (DA 6)	Disruption of foraging habits	Avoidance through setbacks from hedges and ditches	Moderate / minor Negative	Compensation through suitable management of equivalent	Moderate / minor positive	Positive, not significant.

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							land in the southern and south western fields of DA 6 Creation of new wild flower meadows Provision of bat boxes		
Otters	Local	Construction & decommissioning	Disturbance to otter movements and foraging within DAs 3, 6 and 9 and along the boundaries of DAs 1 and 4.	Disruption of foraging habits	15 m setback, depending on extent of flood zone, where solar panels close to course of river (P3 and 4). 6m setbacks from all watercourses on DA 6 and 4m on remaining DAs. Use of existing waterway crossing points.	Minor Negative	None	Negligible	Negative, temporary, Zol Some disturbance from noise, vibration, human presence
		Operation	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing; retention of tussocky grassland	None	Minor Positive	None	Minor Positive	Positive, moderate, life of project, local (national?) Positive improvement of water quality through reduced agricultural inputs
Water voles	County	Construction & decommissioning	Disturbance to water vole movements and	Disruption of foraging habits	15m setback, depending on extent of flood	Moderate / minor negative	None	Negligible	Not significant

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			foraging within DA6 and along the boundary of DA 4.		zone, where solar panels close to course of river (DA 4). 6m setbacks from all watercourse on DA 6 and 4m on DA 4. Use of existing waterway crossing points.				
		Operation	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing; retention of tussocky grassland	None	Moderate / minor positive	None	Moderate / minor positive	Positive, moderate, life of project, local (national?) Positive improvement of water quality through reduced agricultural inputs
Badgers	Local	Construction & decommissioning	Injury or death through becoming trapped in excavations or building materials	Injury or death of individuals	Pre-construction survey for setts and set-back of 15m from active sett; watching brief during construction	Minor Negative		Negligible	Not significant
		Operation	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing; retention of tussocky grassland	None	Minor Positive	None	Minor Positive	Positive, moderate, life of project, Zol Positive improvement of foraging through reduced agricultural inputs

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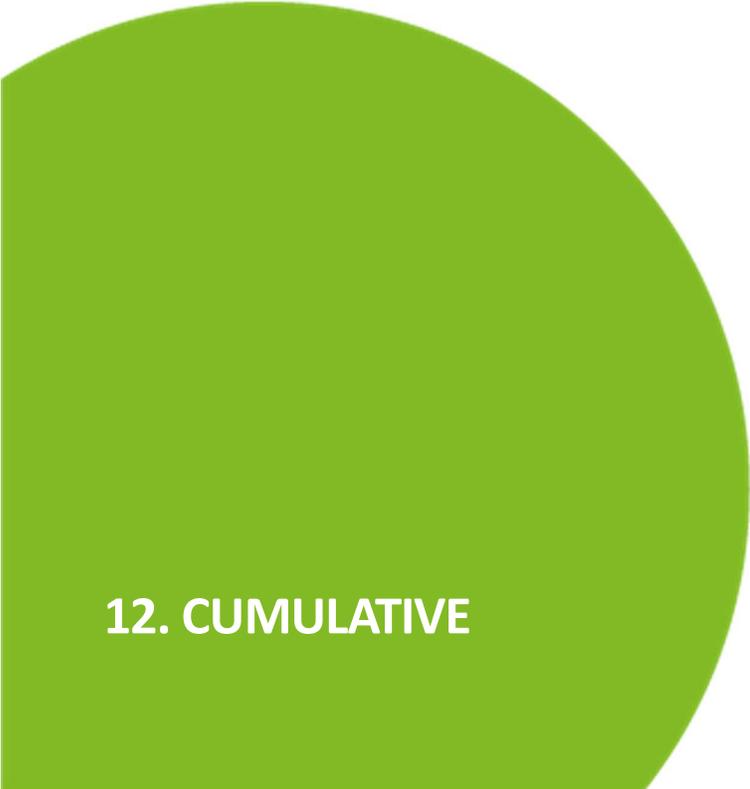
Red squirrel	County	Construction & decommissioning	Direct and indirect disturbance to red squirrel breeding and foraging habitat	Disturbance to breeding drey; disruption of foraging habits	No felling of trees, 8m setback from woodland, works to be undertaken October - January if possible, otherwise pre-construction surveys for dreys	Moderate Negative	50m exclusion to be established around any drey being actively used for breeding	Negligible	Not significant
		Operation	None Identified	N/A	None	Negligible	N/A	Negligible	None
Brown hare	Local	Construction & decommissioning	Disturbance of brown hares in open grassland habitats	Disruption of foraging habits	Watching brief during construction	Moderate / minor Negative	None	Negligible	Not significant
		Operation	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing; retention of tussocky grassland	None	Moderate / minor Positive	None	Moderate / minor Positive	Positive, moderate, life of project, Zol Positive improvement of foraging through reduced agricultural inputs
Hedgehog	Local	Construction & decommissioning	Disturbance to field margins and hedge bases; injury or death through becoming trapped in excavations or building materials	Injury or death of individuals	Set-back of 8m from hedgerows; watching brief during construction	Minor Negative	None	Negligible	Not significant
		Operation	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing; retention of tussocky grassland	None	Minor Positive	Reinforcement planting of internal hedgerows Planting of new species-rich	Moderate / minor Positive	Positive improvement of foraging through reduced agricultural inputs

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							hedgerow to east of DA 4 and north of DA 5 (for screening) Building hibernacula, log piles.		
Reptiles	Local	Construction & decommissioning	Injury or mortality through construction activities, equipment etc	Injury or mortality	Watching brief during construction Setbacks of 8m from hedgerows, hedgebanks and stone walls and ditches and waterways	Negligible	None	Negligible	Not significant
		Operations	Sympathetic management of hedgerows and field margins	Improved habitat for commuting and foraging, especially in DAs 4 & 5	None	Moderate / minor Positive	Reinforcement planting of internal hedgerows Planting of new species-rich hedgerow to east of DA 4 and north of DA 5 (for screening) Building hibernacula, log piles.	Moderate / minor Positive	Positive at local level Improved quality and increased quantity of hedgerow and field boundary habitat
European eel	Regional	Construction & decommissioning	Run off of sediment into watercourses	Reduction in water quality	15m setback, depending on extent of flood zone, where solar panels close to course of river (P3 and 4). 6m setbacks from all watercourse on DA 6 and 4m on	Negligible	None	Negligible	Not significant

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					remaining DAs . Use of existing waterway crossing points. Sediment control structures and procedures; retain existing grass sward; use low pressure construction vehicles; minimise vehicle movements.				
		Construction & decommissioning	Accidental pollution e.g. hydrocarbon spill	Significant temporary reduction in water quality	CEMP in place which specifies safe and environmentally sensitive methods for fuelling and management of hazardous materials.	Negligible	None	Negligible	Not significant
		Operation	Extensive management of grassland	Cessation of agricultural impacts; extensive grazing; retention of tussocky grassland	None	Moderate / minor Positive	None	Moderate / minor Positive	Positive, moderate, life of project, local (national) Positive improvement of water quality through reduced agricultural inputs



## 12. CUMULATIVE

## 12.1 INTRODUCTION

12.1.1 Chapters 7 to 11 of the Environmental Statement have considered the proposed development relative to the current baseline conditions which exist at the site and the surrounding area. Where appropriate, mitigation measures have been proposed and the residual effects of the development have been assessed.

## 12.2 SUMMARY OF EFFECTS

12.2.1 **Table 12.1** below presents a concise summary of the predicted residual environmental effects of the proposed development.

Table 12.1: Summary of Predicted Environmental Effects

	Phase	Summary of Predicted Effect Prior to Mitigation	Summary of Predicted Residual Effects (Post Mitigation)	Sensitivity
Hydrology & Flood Risk	Construction/ Decommissioning	<p><b>Surface Water Runoff/Flooding</b> – potential for improved drainage and flood damage - Impacts without mitigation considered <b>minor to moderate adverse</b>.</p> <p><b>Surface Water Quality</b> – increased erosion, sediment loading and risk of spills- Impacts without mitigation considered <b>moderate to major adverse</b>.</p>	<p><b>Surface Water Runoff/Flooding</b> – this phase would not lead to irreversible compaction of soils on the site therefore not reducing infiltration - Impacts considered <b>negligible</b></p> <p><b>Surface Water Quality</b> – Erosion and sediment control measures will be implemented prior to any grading or servicing works commencing - Impacts considered <b>negligible</b></p>	Local
	Operational	<p><b>Surface Water Runoff</b> – Flooding of Application Site generating physical hazards and contamination of floodwaters - Impacts without mitigation considered <b>minor adverse</b>.</p> <p><b>Surface Water Quality</b> – increased erosion, sediment loading and risk of spills - Impacts without mitigation considered <b>minor to major adverse</b>.</p>	<p><b>Surface Water Runoff</b> – rain would fall off each PV panel to ground where it would infiltrate and the impermeable bases of the inverters / transformers and substations are negligible in comparison to the site area. It is not anticipated the proposal will create additional runoff from the site - Impacts considered <b>negligible</b></p> <p><b>Surface Water Quality</b> – Long term erosion and sediment control measures will be monitored and maintained where necessary to ensure minimal impacts to water quality - Impacts considered <b>negligible</b></p>	Local

	Phase	Summary of Predicted Effect Prior to Mitigation	Summary of Predicted Residual Effects (Post Mitigation)	Sensitivity
Ecology & Nature Conservation	Construction/ Decommissioning	<p><b>Designated Sites</b> - - Largely through potential adverse impacts to water quality on Area 6 and its pathway to Llyn Dinam - impacts considered <b>moderate to major adverse</b>.</p> <p><b>Habitats</b> – Construction of tracks will lead to a small loss of semi improved grassland habitat and very small amount of hedgerow removal around site access – a <b>minor adverse</b> impact</p> <p><b>Species</b> – Due to potential impacts to identified breeding/foraging birds Impacts considered <b>minor to major adverse</b>.</p>	<p><b>Designated Sites</b> - Erosion and sediment control measures will be implemented prior to any grading or servicing works commencing and use of low-pressure construction vehicles - Impacts considered <b>negligible</b></p> <p><b>Habitats</b> – Construction of tracks will lead to a small loss of semi improved grassland habitat and very small amount of hedgerow removal around the access – a <b>minor adverse</b> impact</p> <p><b>Species</b> – Avoid bird breeding season and maintain buffer from Afon Crigyll, ditches and hedgerows - Impacts considered <b>negligible</b></p>	<p><b>Local to National</b></p> <p><b>Local to regional</b></p> <p><b>Local to national</b></p>
	Operational	<p><b>Designated Sites</b> – Cessation of agricultural impacts; reduced grazing allowing variable sward and retention of tussocky grassland at field margins – impacts considered <b>moderate beneficial</b>.</p> <p><b>Habitats</b> – Wildflower meadow seeding, managed grazing will provide a diverse grassland sward across the development areas along with new and reinforcement planting of hedgerows and cessation of</p>	<p><b>Designated Sites</b> – Management of non-deployment area of Area 6 as wet pasture/floodplain grazing marsh and the principal drain through Area 6 as a vegetated channel to maintain current flows to Llyn Dinam - Impacts considered <b>moderate beneficial</b>.</p> <p><b>Habitats</b> – Wildflower meadow seeding, managed grazing will provide a diverse grassland sward across the development areas along with new and reinforcement planting of hedgerows and cessation of</p>	<p><b>Local to National</b></p> <p><b>Local to regional</b></p>

	Phase	Summary of Predicted Effect Prior to Mitigation	Summary of Predicted Residual Effects (Post Mitigation)	Sensitivity
		<p>agricultural fertilisers - Impacts considered <b>moderate beneficial</b>.</p> <p><b>Species</b> – Wildflower meadow seeding, managed grazing will provide a diverse grassland sward across the development areas along with new and reinforcement planting of hedgerows and cessation of agricultural fertilisers - Impacts range from <b>negligible to moderate beneficial</b></p>	<p>agricultural fertilisers - Impacts considered <b>moderate beneficial</b>.</p> <p><b>Species</b> – Wildflower meadow seeding, managed grazing will provide a diverse grassland sward across the development areas along with new and reinforcement planting of hedgerows and cessation of agricultural fertilisers - Impacts range from <b>negligible to moderate beneficial</b></p>	<b>Local to national</b>
<b>Heritage Resources</b>	<b>Construction/ Decommissioning</b>	<p><b>Archaeology (Direct)</b> – proposed works will have a <b>minor adverse</b> effect on identified historic assets.</p> <p><b>Heritage (Indirect)</b> – the proposal will have a <b>negligible to minor adverse</b> effect on identified historic assets.</p>	<p><b>Archaeology (Direct)</b> – proposed works will have a <b>minor adverse</b> effect on identified historic assets.</p> <p><b>Heritage (Indirect)</b> – the proposal will have a <b>negligible to minor adverse</b> effect on identified historic assets.</p>	<b>Borough</b>
	<b>Operational</b>	<p><b>Archaeology (Direct)</b> – the proposed facility will have a <b>moderate adverse</b> effect on identified historic assets.</p> <p><b>Heritage (Indirect)</b> – the proposal will have a <b>negligible to minor adverse</b> effect on identified historic assets.</p>	<p><b>Archaeology (Direct)</b> – the proposed facility will have a <b>minor adverse</b> effect on identified historic assets.</p> <p><b>Heritage (Indirect)</b> – the proposal will have a <b>negligible to minor adverse</b> effect on identified historic assets.</p>	<b>Borough</b>
<b>Noise &amp; Vibration</b>	<b>Construction/ Decommissioning</b>	<p><b>Noise</b> – Delivery vehicles and construction / decommissioning activities over a 4-5 month-period – impacts without mitigation considered <b>minor to moderate adverse</b>.</p>	<p><b>Noise</b> – Construction and decommissioning works will not significantly alter the local noise climate – impacts considered <b>negligible</b>.</p>	<b>Local</b>

	Phase	Summary of Predicted Effect Prior to Mitigation	Summary of Predicted Residual Effects (Post Mitigation)	Sensitivity
		<b>Vibration</b> - impacts without mitigation considered <b>negligible to minor adverse</b> .	<b>Vibration</b> – Impacts considered <b>negligible</b> .	
	<b>Operational</b>	<p><b>Noise</b> - Operational noise will be within acceptable standards – impacts without mitigation considered <b>negligible</b>.</p> <p><b>Vibration</b> – Impacts considered <b>negligible</b>.</p>	<p><b>Noise</b> – Operational will not significantly alter the local noise climate – impacts considered <b>negligible</b>.</p> <p><b>Vibration</b> – Impacts considered <b>negligible</b>.</p>	<b>Local</b>
<b>Visual Landscape</b>	<b>Construction/ Decommissioning</b>	<p><b>Landscape Character</b>– The short-term and reversible nature of these activities on landscape character will ensure that the overall effects will be, at worst, <b>minor adverse</b>. These will be limited to the local context of the site boundaries, short term and temporary effects.</p> <p><b>Visual Impact</b> - The short-term and reversible nature of these activities on views and visual receptors will ensure that the overall effects will be, at worst, <b>minor adverse</b>. These will be experienced by a small number of receptors and form small features in the overall view.</p>	<p><b>Landscape Character</b>– The short-term and reversible nature of these activities on landscape character will ensure that the overall effects will be, at worst, <b>minor adverse</b>. These will be limited to the local context of the site boundaries, short term and temporary effects.</p> <p><b>Visual Impact</b> - The short-term and reversible nature of these activities on views and visual receptors will ensure that the overall effects will be, at worst, <b>minor adverse</b>. These will be experienced by a small number of receptors and form small features in the overall view.</p>	<b>Borough</b>

	Phase	Summary of Predicted Effect Prior to Mitigation	Summary of Predicted Residual Effects (Post Mitigation)	Sensitivity
	Operational	<p><b>Landscape Character</b> – Landscape mitigation has been incorporated into the design of the scheme and will be implemented from the outset of the proposal. Therefore, the conclusions of the post mitigation effects should only apply.</p> <p><b>Visual Impact</b> - Visual mitigation has been incorporated into the design of the scheme and will be implemented from the outset of the proposal. Therefore, the conclusions of the post mitigation effects should only apply.</p>	<p><b>Landscape Character</b> - The scale of the proposal would markedly change a medium value/susceptibility to change landscape largely through localised impacts to the sense of place and characteristic features (largely pastoral fields within an established structure). Whilst adverse landscape effects are acknowledged, a <b>moderate adverse</b> significance of landscape effect is concluded overall. This is a 'Not Significant' effect.</p> <p><b>Visual Impact</b> – The residential visual assessment concluded that 7 no. properties (out of 31 no. assessed) would experience potential 'major' visual effects, that are considered 'significant'. These 7 properties were considered in further detail through a Residential Visual Amenity Assessment (RVAA) which concluded that the proposal would not be 'overbearing, overwhelming or oppressive'.</p> <p>Only one footpath was considered to experience effects of a 'significant' nature which passes within the southern boundary of DA6. Main vehicular routes were concluded not to experience significant visual effect, minor roads were concluded</p>	Borough

	Phase	Summary of Predicted Effect Prior to Mitigation	Summary of Predicted Residual Effects (Post Mitigation)	Sensitivity
			<p>to experience a range of 'significant' and 'not significant' effects.</p> <p>Of the 19 viewpoints considered, 4 were assessed to have significant visual effects, 3 of which were in open field gate accesses with near range views of the development areas where significant effects would be expected. The remaining 'significant' viewpoint was from a locally elevated position on the highway. The majority of the road corridor close to this viewpoint is filtered and screened by mature hedgerows allowing transient and a glimpsed view. Overall significant visual effects will be experienced by 4 viewpoints which are near range local highway receptors.</p>	

## 12.3 CUMULATIVE IMPACTS

12.3.1 In isolation, a proposed development maybe considered to have insignificant environmental impacts. However, these effects have the potential to be magnified when considered in conjunction with other existing or proposed developments. These are referred to as cumulative impacts and such impacts have the potential to occur in the following ways:

- Whether any of the individual environmental effects of the proposed development will combine to create a cumulative effect that is greater than the sum of the individual effects, this is known as combined impacts; and
- How effects from the proposed development could be combined with similar effects from other sites to result in significant cumulative effects.

12.3.2 **Table 12.1** provides a summary of the predicted residual environmental effects resulting from the proposed development. These effects have been identified by the EIA as those remaining following mitigation. It must be remembered that the baseline assumed as part of the EIA accounts for current land-uses in the vicinity of the application site i.e., background noise levels.

12.3.3 Of the environmental topic areas considered as part of the EIA, the significance of impacts from the proposed development considered to be greater than negligible are limited to:

- Ecology
- Landscape and visual
- Heritage

12.3.4 The potential impacts on ecology were identified during the construction and decommissioning phase as negative minor but moderate positive during the operational phase. The minor negative impact was due to potential disturbances to species and their habitats, a temporary minor adverse impact during the 4-5 month construction/decommissioning phases. However, once the solar farm is operational moderate positive impacts will be experienced by identified designated sites and the on-site habitats and species over a period of 40 years.

12.3.5 The potential impacts on landscape character and visual amenity were identified during the construction and decommissioning phase as minor (negative) due to the short duration. During the operational phase whilst adverse landscape effects are acknowledged, a moderate significance of landscape effect is concluded, this is not significant in EIA terms. In terms of visual amenity, up to and including major adverse significant impacts will be limited to several near range highway receptors such as views from existing field gate points of access.

12.3.6 Chapter 9 of this ES identifies that the potential residual physical impacts to known archaeology during the construction phase will be minor adverse. In terms of potential indirect impacts to nearby Listed Buildings, the operational phase of the proposed development will realise up to a minor adverse impact.

### Assessing Interactive Impacts – Site Based

12.3.7 In terms of assessing the interactive impacts from the proposal in isolation, it is

considered that the following topics will have an adverse effect:

- Minor impacts to certain habitats and species during the 4-5 months construction/decommissioning phases;
- Minor impacts to landscape character and some nearby visual receptors during the 4-5 months construction/decommissioning phases.
- Moderate impacts to landscape character and up to major impacts for some nearby visual receptors during the operational phase.
- Minor impacts to known archaeology within the deployment area; and
- Minor impacts to nearby Listed Buildings.

12.3.8 It is considered there is no synergistic characteristics between temporary impacts to certain site based habitats and species, landscape character/visual amenity and known archaeology during the construction and decommissioning phases.

12.3.9 During the operational phase potential impacts to nearby visual receptors and landscape character were assessed, as were potential impacts to nearby Listed Buildings. It is considered that opportunities for synergistic effects to increase the impacts on identified receptors beyond that assessed individually are negligible given the different sensitivities of the identified receptors.

#### Assessing Cumulative Impacts – Off Site

12.3.10 In terms of cumulative influences from beyond the application site boundary, it should be remembered that the baseline of the EIA included surrounding land-uses. Discussions with IACC, PINS and interrogation of the Planning Register and the list of DNS proposals allowed a review of applications received within the last three years. **Appendix 12.1** presents a summary review of the proposals considered within a 5km radius of the application site and a short justification why they were not assessed further in terms of potential cumulative effects. For more significant proposals, such as 'Energy Island Projects', all proposals on Anglesey were assessed.

12.3.11 The information presented in **Appendix 12.1** demonstrates there is limited potential for the proposed Parc Solar Traffwll to create cumulative effects with schemes that have been consented but not yet implemented or have become operational. This is largely due to intervening distances between sites but also the nature of the solar proposal. Such that it will not generate emissions to atmosphere, ground or hydrology, the potential visual amenity effects will be limited in extent and once constructed will not generate vehicle movements of any note.

12.3.12 No further consideration of potential cumulative effect will be given to the identified proposals.

## 12.4 CONCLUSION

12.4.1 Overall, the effects of the proposed development are not considered to be significant either by way of the land use and location of the scheme or by virtue of the proposed operation. The potential impacts have been fully assessed for the proposed development and where appropriate mitigated as a result of an iterative review process and through careful consideration of process management, abatement techniques and landscape design. Therefore, as there are no residual impacts which are considered to be significant in terms of intensity or characteristics, as suggested

in section 12.3, there is limited potential for the creation of cumulative impacts resulting from the proposed development.

## 13. SUMMARY & CONCLUSIONS

## 13.1 SUMMARY AND CONCLUSION

- 13.1.1 This Environmental Statement (ES) has been prepared on behalf of Parc Solar Traffwll Ltd (the “Applicant”) to accompany a planning application for the construction and operation of a solar farm across 63ha of land in west Anglesey. The development areas are located to the west and south-east of the village Llanfihangel yn Nhowyn and to the south and south-east of the village Bryngwran. RAF Valley is situated to the south and the A55 Expressway lies to the north.
- 13.1.2 Parc Solar Traffwll will have an export capacity of circa 35MW of electricity, enough to power approximately 11,600 homes per year and offset over 7,840 tonnes of CO2 every year, the equivalent of taking around 3,620 cars off the road.
- 13.1.3 Prior to undertaking the EIA the Parc Solar Traffwll proposal comprised nine development areas (DA). As baseline surveys and assessments were undertaken it became clear that some DAs had the potential to create significantly adverse environmental effects. These DAs were removed from the proposal as potential significant residual effects following mitigation could not be adequately addressed. The removed DAs were 1, 2, 3, 7, 8 and 9.
- 13.1.4 In terms of layout, the panels will be arranged in rows in an east-west alignment across the DAs and orientated south. All panels will be mounted on frames and have a maximum height of 3m above ground level; the lowest part of the panel will be circa 0.9m above ground level. The scheme will be operational for 40 years after which all equipment will be removed from site.
- 13.1.5 The DAs will be secured by up to a 2m high stock fence or similar with wooden posts.
- 13.1.6 Access to the DAs is achieved from junction 4 (Caergeiliog and Bodedern) of the A55 Expressway and through the local highway network. The principal set down area is proposed within DA4 close to its northern boundary and will be accessed from junction 4, then the A5 to Bryngwran, then south, under the A55 and turning west at Hebron crossroads.
- 13.1.7 From the principal set down area, smaller vehicles (typically 10m rigid vehicles) will transfer equipment and materials to DAs 5 and 6. There will also be some instances where direct deliveries to the DAs will be made.

## 13.2 BIODIVERSITY AND LANDSCAPING MITIGATION AND ENHANCEMENTS

- 13.2.1 Biodiversity and landscape mitigation and enhancements are at the fore of Parc Solar Traffwll proposals. In summary the key enhancement measures include:
- No development in DA 6 where it overlaps the SAC/SSSI areas and undertake management of adjacent non-development area for key wildlife;
  - Enhancements to SAC/SSSI through no agricultural inputs to the DA and management of the principal drain through DA 6 to improvement water quality;
  - To manage grassland to create a diverse sward beneath and between the solar arrays;
  - To manage wet grassland margins for wildlife;
  - To reinforce hedgerows to improve visual containment of DAs and provide habitat for a range of species;
  - Minimise sediment runoff to improve water quality of surrounding water bodies; and

- To monitor the site and assess the success of biodiversity management.

13.2.2 This increase in botanical diversity will lead to an increase in invertebrate diversity. In combination, such enhancements are likely to produce significant benefits for breeding and wintering birds, small mammals, bats, reptiles and amphibians.

### 13.3 ENVIRONMENTAL ASSESSMENT

13.3.1 Of the environmental topic areas considered as part of the EIA, the significance of impacts from the continued operations considered to be greater than negligible are limited to:

- Ecology
- Landscape character and visual amenity; and
- Heritage

13.3.2 The potential impacts on ecology were identified during the construction and decommissioning phase as negative minor but moderate positive during the operational phase. The minor negative impact was due to potential disturbances to species and their habitats, a temporary minor adverse impact during the 4-5 month construction/decommissioning phases. However, once the solar farm is operational moderate positive impacts will be experienced by identified designated sites and the on-site habitats and species over a period of 40 years.

13.3.3 The potential impacts on landscape character and visual amenity were identified during the construction and decommissioning phase as minor (negative) due to the short duration. During the operational phase whilst adverse landscape effects are acknowledged, a moderate significance of landscape effect is concluded, this is not significant in EIA terms. In terms of visual amenity, up to and including major adverse significant impacts will be limited to several near range highway receptors such as views from existing field gate points of access.

13.3.4 Chapter 9 of this ES identifies that the potential residual physical impacts to known archaeology during the construction phase will be minor adverse. In terms of potential indirect impacts to nearby Listed Buildings, the operational phase of the proposed development will realise up to a minor adverse impact.

### 13.4 CONCLUSION

13.4.1 The potential impacts have been fully assessed for the development and where appropriate mitigated as a result of an iterative design process and through careful consideration of process management, abatement techniques, landscape design and biodiversity enhancement. The landscape and visual impact assessment concluded there would be potential major adverse visual impacts to several specific near range views of the proposal. However, the extent of these potential impacts would be specific to that viewpoint/receptor location.

