PARC DYFFRYN SOLAR FARM

ENVIRONMENTAL IMPACT ASSESSMENT NON-TECHNICAL SUMMARY

JPW1591
Draft
15 June 2022

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
Draft	Non-Technical Summary	EA	DB	DB	June 2022

Approval for issue

Damian Barry		1 June 2022

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1 INTRODUCTION

Introduction

1.1 This Environmental Statement (ES) has been prepared by RPS on behalf of Cenin Renewables Ltd ”Cenin” (the Applicant).

1.2 The ES reports on the findings of the Environmental Impact Assessment (EIA) process and accompanies the planning application for the construction of a solar photovoltaic electricity generating station (‘solar park’ or ‘solar farm’), battery storage facility and associated ancillary development, with an installed generation capacity of approximately 65 MW (referred to as the Proposed Development). The power generated would be fed into the electricity distribution network. The Proposed Development is fully reversible at the end of the Proposed Development ‘s40 year life.

1.3 The Proposed Development site is located on land between Barry and Culverhouse Cross. The site lies immediately to the south of the A48 Cowbridge Road and approximately 500 m to the south east of the village of St Nicholas at the nearest point. It is bounded to the north by the A48 and to the east by the Vianshill farm complex, south and west by agricultural fields. The site location is shown on **Figure 1.1**. The centre of the site lies at approx. grid reference ST 09837 71647.

Statutory framework and purpose of the Environmental Statement

Purpose of EIA

1.4 EIA is a means of identifying and collating information to inform an assessment of the likely significant environmental effects of a project. The findings of the EIA process are reported in an ES in order to inform the relevant planning authority and interested parties as part of the decision-making process.

1.5 This EIA seeks to identify and assess the significance of effects likely to arise from a Proposed Development. This requires consideration of the likely changes to the environment, where these arise as a consequence of the Proposed Development, through comparison with the existing and likely future baseline conditions in the absence of the Proposed Development.

The EIA Directive

1.6 The legislative framework for EIA is set by European Directive 2011/92/EU, as amended by Directive 2014/52/EU (collectively referred to as the EIA Directive). Directive 2014/52/EU entered into force on 15 May 2014.

The EIA Regulations

1.7 In Wales, the requirements of the EIA Directive have been transposed into legislation through the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. These regulations are referred to in this ES as ‘the EIA Regulations’.

Need for EIA

1.8 Schedule 1 of the EIA Regulations identifies development types that always require EIA. Schedule 2 identifies development types that require EIA if they are likely to lead to significant effects on the environment by virtue of factors such as their nature, size or location. Schedule 2 development is defined within the EIA Regulations as development of a description mentioned in Column 1 of the table in Schedule 2 where:

'a) any part of that development is to be carried out in a sensitive area; or
b) any applicable threshold or criterion in the corresponding part of Column 2 of that table is respectively exceeded or met in relation to that development.'

1.9 The Proposed Development falls within the description at paragraph 3(a) 'Industrial installations for the production of electricity, steam and hot water (unless included in Schedule 1)' in column 1 of the table in Schedule 2 to the Regulations. Schedule 2 development requires screening against the criteria set out in Schedule 3 of the Regulations. The criteria include the characteristics of the development, location of development and types and characteristics of the potential impact.

1.10 The Proposed Development would exceed the relevant thresholds for each of these types of development within Schedule 2.

1.11 Schedule 2 developments require consideration against the criteria set out in Schedule 3 of the EIA Regulations to determine whether EIA is required. The criteria include the characteristics of the development, location of development and characteristics of the potential impact.

1.12 A notification of intention to submit a Developments of National Significance (DNS) was sent to Welsh Ministers on 30 May 2022. On 14 June 2022 the Planning Inspectorate (now Planning and Environment Decisions Wales – PEDW) confirmed that the proposed development was a DNS application. A negative screening direction was not submitted with the notification and it was the intent that the applicant would provide an Environmental Statement.

1.13 Accordingly, a Scoping Direction was sought from Welsh Ministers. Further details in relation to this are provided in Chapter 4 (Environmental Assessment Methodology).

Content of the ES

1.14 This ES has been prepared in accordance with the EIA Regulations. Although there is no statutory provision as to the form of an ES, it must contain the information specified in Regulation 17 and Schedule 4 of the EIA Regulations. For the avoidance of doubt, the specified information within Regulation 17 and Schedule 4 is provided in **Appendix 1.1** of this ES.

1.15 This ES provides all information required under Regulation 17 and Schedule 4. The information supplied within this ES is considered to provide a clear understanding of the main and likely significant effects of the Proposed Development upon the environment, and the likely residual effects having regard to the mitigation proposed, taking account of the fact that effects will be both negative and positive.

Structure of the ES

1.16 The ES has been structured in order to allow relevant environmental information to be easily accessible. This volume of the ES (Volume 1) includes the main text of the ES. A description of the project is provided in Chapter 2. Information relating to the main alternatives considered during the evolution of the project and the reasons for the choices made is found within Chapter 3. Chapter 4 outlines the approach and methodology adopted for the EIA. The remainder of Volume 1 contains topic by topic environmental information as shown in **Table 1.1**.

1.17 Figures and appendices to accompany the text of the ES are provided respectively in Volumes 2 and 3. Volume 3 includes specialist reports providing relevant background and technical information. A Non-Technical Summary (NTS) of the ES is available as a separate summary document.

Table 1.1: Structure of ES

Structure of ES	
Non-Technical Summary	Summary of the ES using non-technical terminology
Volume 1: Text	

	Glossary
Chapter 1	Introduction
Chapter 2	Project Description
Chapter 3	Need and Alternatives Considered
Chapter 4	Environmental Assessment Methodology
Chapter 5	Human Health
Chapter 6	Water Quality
Chapter 7	Risk of Major Accidents
Chapter 8	Landscape and Visual Impact
Chapter 9	Biodiversity
Chapter 10	Cultural Heritage
Chapter 11	Climate Change
Volume 2: Figures	
Including all figures and drawings to accompany the text.	
Volume 3: Appendices	
Including specialist reports forming technical appendices to the main text.	

The Applicant

1.18 The applicant is Cenin Renewables Ltd ("Cenin"). Cenin is a Welsh renewable energy developer. Cenin is an innovative market leader in the development of large-scale energy projects and smart energy solutions as demonstrated at its Parc Stormy renewable energy cluster, which incorporates anaerobic digestion, wind and PV generation, ultra-low carbon cement production, and Cardiff University's energy positive SOLCER House.

The assessment team

1.19 The EIA has been managed by RPS, taking into account information provided by the Applicant and design team. RPS is a registrant of the Institute of Environmental Management and Assessment (IEMA) Quality Mark. All authors of this ES are qualified consultants within RPS and a statement setting out how the authors have sufficient expertise to ensure the completeness and quality of the ES is provided in **Appendix 1.2**.

Further information

1.20 This ES is being submitted as part of a planning application for the proposed solar photovoltaic electricity generating station, battery storage facility and associated ancillary development. The application is being submitted to Planning and Environment Decisions Wales (PEDW), formerly the Planning Inspectorate. The planning application, ES and Non-Technical Summary can be viewed at:

Solcer House
Parc Stormy
Bridgend
CF33 4RS

1.21 Copies of the ES and planning application documents can be viewed on the PEDW Developments of National Significance (DNS) website:

https://gov.wales/developments-national-significance-dns-applications

1.22 Further copies of the ES can be obtained from the following address:

RPS

2 Callaghan Square
Cardiff
CF10 5AZ.

1.23 A paper copy of the full ES can be obtained for a cost of £250 plus VAT or an electronic copy (CD) for a cost of £10.

1.24 All comments on the ES (and planning application) should be issued to PEDW.

2 PROJECT DESCRIPTION

Introduction

2.1 This chapter provides a description of the project and forms the basis for the environmental assessment provided in this ES. Further information can be found in the appendices to this chapter provided in Volume 3 of this ES.

2.2 The effects of the project have been assessed throughout the ES based on what is likely. For example, construction information is presented as the 'likely case'. A number of measures which would reduce or avoid adverse environmental effects arising have been included as part of the project design. Details of these measures are provided in this chapter and set out in each topic chapter. This chapter, together with the subsequent topic chapters, provide the data required to identify and assess the main and likely significant effects of the project in accordance with Regulation 17 and Schedule 4 of the EIA Regulations.

2.3 This chapter provides a description of the site and the key components of the project, including an overview of the approach to construction.

The site and surrounding area

Site location

2.4 The Site lies within the administrative boundary of the Vale of Glamorgan Council (the LPA) and is located 7.5km west of Cardiff City Centre.

2.5 The site itself is located immediately to the south of the A48 Cowbridge Road and approximately 500 m to the south east of the village of St Nicholas at the nearest point. The site is bounded to the north by the A48 and to the east by the Vianshill farm complex, south and west by agricultural fields. For a more detail location please see Figure 2.1 in Volume 2 of this ES.

2.6 The site itself extends to approximately 96.5 ha, is irregular in shape and comprises approximately 21 agricultural fields, primarily used for beef cattle grazing, bound by a mixture of mature woodland, trees, hedgerows and fencing.

Geology and topography

2.7 The site is within an identified Mineral Resource Area, with the geology underlying the majority of the site containing limestone resources. Whilst these deposits are present, they are recorded to extend significantly beyond the site boundary.

2.8 The Site is generally steeply sloping and generally trends to the south; falling from approximately 121.5m Above Ordnance Datum (AOD) upon the far northern boundary to 103.04mAOD upon the site's central-southern boundary and to 72.23mAOD from the north of the Site to the site's south-westernmost boundary.

Site history

2.9 The site is currently used for agricultural purposes, comprising of several agricultural fields, primarily used for pasture grazing, bound by a mixture of mature woodland, trees, hedgerows and fencing.

Planning context

2.10 The site lies within the administrative boundary of the Vale of Glamorgan Council (VoGC), which is the LPA, in Wales. Consequently, the Development Plan for the purposes of Section 38(6) of the Planning and Compulsory Purchase Act 2004 comprises of:

- Future Wales: The National Plan 2040, published February 2021; and
- Vale of Glamorgan Development Plan 2011 – 2026 (LDP), adopted June 2017.

2.11 The LDP Proposals and Constraints Map indicate the site is not allocated for any specific use. However, it is affected either in whole or in part by the following designations:

- Special Landscape Area (Policy MG 17); and
- Mineral Safeguarding Area (Policy MG 22).

2.12 The site is also close to the following designations:

- SSSI - River Ely Site of Special Scientific Interest;
- Ancient Woodland; and
- Local Wildlife Sites.

2.13 The ES provides an overview of relevant legislative and planning policy context within each topic chapter. The assessments have regard to national and local policy documents, where relevant.

2.14 The ES does not include a separate chapter on Planning Policy Context. The draft guidance on EIA from the Department for Communities and Local Government *'EIA: A Guide to Good Practice and Procedures'* (DCLG 2006) (paragraph 155) states that there is no requirement to provide chapters on planning and sustainability in Environmental Statements.

2.15 A separate Planning Statement is submitted with the planning application.

Project description

2.16 The project comprises the erection of a solar farm and ancillary development capable of generating approximately 65 MW of electricity for a period of up to 40 years. It also includes a 30MWh energy balancing unit to store any surplus electricity the panels generate during daylight hours. The project is temporary and fully reversible at the end of its 'lifespan'.

Summary of key parameters

2.17 The table below provides a summary of the key parameters which have formed the basis for the assessment of effects in this ES.

Table 2.1: Key Parameters for Environmental Assessment

Element of the Development	Key Parameter for EIA
Site area	85 hectares
Maximum height	Solar panels and tables up to 3.2 m above ground
Area of built development comprising:	
Area covered by solar panels	Approx. 33.2 square metres
Inverters	These are anticipated to be 2.4m wide, 6.9m long and 3m high and current design has 11 inverters
DNO Substation	This is anticipated to be 6.5m wide, 5m long and 3.5m high.
Battery storage facility	Comprising 16 battery storage units in a 0.16ha compound.

CCTV	Numerous CCTV cameras mounted on poles 3m high
Internal Access Roads	Internal access tracks will be fully permeable with no tarmac or other hardstanding type surface.
Security Fencing	Approx. 2.4m height around the perimeter of the site.

Key components

2.18 The project includes the following key components:

- Solar panels and frames;
- Inverters;
- Cabling;
- Security fencing; and
- DNO and Client Substation.

2.19 An indicative proposed site layout plan is provided in **Figure 2.1**. Further details of the key components are provided below.

Solar panels, frames, inverters and transformers

2.20 The panels are arranged in series of rows up to a height of approximately 3m at the highest and 0.8m at the lowest points and tilted southwards at an angle of 10-25 degrees. The support frame uprights are pile driven into the ground. The distance between the rows of panels will vary depending on the gradient of the topography but will typically be spaced between 2m and 8m apart.

2.21 Several inverters will be required across the site, requiring some excavation and gravel base for their foundations.

Cabling

2.22 The majority of the cabling associated with the development will be laid underground via surface dug trenches of approximately 1 m deep and 50 cm wide and backfilled. These will be routed internally and connect to the point of connection at the 132kV compound situated to the west of the site. The location of this compound is shown in **Figure 2.2.**

Substation

2.23 A District Network Operator (DNO) substation, monitoring house and storage building will be positioned towards the northern portion of the site near the road as shown on the Solar Layout Plan in **Figure 2.1**.

Battery Storage

2.24 The proposal will also include a 25 MWh battery storage, which will store any surplus electricity generated by the solar panels during daylight hours and release it when needed. The proposed layout and location of the battery storage facility is shown in Figures 2.3 and 2.4 in Volume 2 of this ES.

Access and parking

2.25 Several existing access points will be used for access for the construction, maintenance and decommissioning of the Proposed Development. Existing farm tracks will be used for internal access

within the site wherever possible. New access tracks, where required, will be formed, normally, using a layer of permeable crushed stone.

2.26 A detailed Construction Traffic Management Plan (CTMP) describing the delivery routes, construction routes, construction compounds and any associated parking or management of construction traffic will be submitted with the planning application.

Transport management

2.27 The Proposed Development will cause limited impacts on the local road network in terms of the construction phase. As stated above, a CTMP will provide details of traffic routing and any accommodation works (with provision for contractor parking). Once operational, the vehicle movements associated with the project are likely to be minimal.

2.28 An outline Construction Traffic Management Plan has been produced and is now included as **Appendix 2.1** to the ES. The statement covers details such as, the construction period, which is expected to take approximately 12-18 months with construction hours expected to be between 07:00 and 18:30 hours Monday to Friday and 07:00 to 13:00 hours on Saturday. It is unlikely that, even at the most intense period of construction there will be more than 3 HGV deliveries per day. It is envisaged that the main construction route will be from the existing Vianshill Farm access on the southern side of the A48 Cowbridge Road. The details of the main construction routes are set out in the outline CTMP. However, it is expected that the final details will be agreed following determination of the application via a planning condition when a final CTMP is submitted prior to construction works commencing.

Appearance and design

2.29 The Proposed Development is low lying in nature, typically shorter in height than the many existing mature trees and hedgerows around the site.

2.30 The appearance will be a more modern and obvious human influence on the landscape compared to that currently formed by industrialised agriculture. Whilst construction would cover a wide area, the works would be temporary and the proposed development itself will be considerably less solid and durable in appearance than traditional buildings. This would mitigate against the likely change in the character of the landscape.

2.31 The Proposed Development would be removed within the it's 40 years lifetime enabling the site to return to its former agricultural character and appearance.

Landscape and open space strategy

2.32 The site currently lies within a locally designated SLA as designated within the LDP. However, it should be noted that the SLA covers much of the wider Borough.

2.33 Landscape and biodiversity enhancements are proposed as part of the Proposed Development, which include enhancements to existing onsite hedgerows, as well as proposals for new hedgerow and tree planting.

2.34 The mitigation includes ecology enhancement and hedgerow infill planting, as necessary, in order to gap-up areas where existing hedge planting is sparse to help redefine field boundaries where they have become fragmented.

2.35 Landscape and biodiversity are considered in more detail in Chapters 8 and 9 of this ES respectively.

Drainage and flood risk

2.36 There is an ordinary watercourse present within the far west of the Site which discharges to the River Waycock some 300m to the south-west of the site.

2.37 The Proposed Development would add a relatively small amount of additional impermeable surfacing relative to the site area.

2.38 A Drainage Strategy and Flood Consequence Assessment (FCA) has been prepared in accordance with Planning Policy Wales Edition 11 (February 2021), Technical Advice Note 15: Development and Flood Risk (July 2004) and latest climate change data to ensure flood risk and hydrological impacts are managed appropriately. This is a separate document appended to the planning statement. The EIA Scoping Direction stated:

"The Inspectorate agrees that flooding can be scoped out of the ES and welcomes the assurance that a Flood Consequences Assessment with be provided as a non-ES document. However, the Inspectorate agrees with the concerns raised by NRW in relation to potential impacts on water quality at construction and decommissioning stages. An outline Construction Environmental Management Plan (CEMP) should be included in the ES, along with specific measures to reduce the risk of increased sediment and fuel spills during construction phase. The Inspectorate notes that NRW has requested a water quality monitoring plan as specified in their response. While the Inspectorate accept that a detailed plan will not be possible at the application stage, an outline monitoring plan including monitoring methods, timescale and triggers that would prompt emergency responses should be submitted within the ES. Baseline conditions of the potentially affected watercourse should be investigated and reported in the ES. Water quality is therefore scoped into the ES."

2.39 Accordingly, the impact of the Proposed Development in relation to water quality is assessed in Chapter 6.

Lighting

2.40 There will be no use of artificial lighting during operation that could adversely affect field boundary habitats and/or adjoining woodland.

2.41 Some temporary task lighting may be required during construction and decommissioning depending on the time of year and sunlight levels.

2.42 The Proposed Development will cause a minimal amount of potential for redirection of light in terms of glint and glare via the surface of the panels. Any effects in terms of glint and glare would be localised and unlikely to be of a magnitude that would be significant in environmental terms. As such, consideration of these effects have been scoped out of the ES as a specific chapter. This was confirmed in the Scoping Direction which confirmed that:

"The Inspectorate welcomes the stated intention to include a Glint & Glare assessment as an appendix to the Landscape & Visual Chapter."

2.43 Accordingly, a Glint and Glare Assessment was undertaken in June 2022 (document reference: 11530A) and is included at **Appendix 8.1** in Volume 3 of this ES.

Sustainability

2.44 This section outlines the effects of the Proposed Development on sustainability factors such energy demand, waste, use of natural resources and residues and emissions.

Energy demand

2.45 The Proposed Development will supply electrical energy to the distribution network rather than generate demand.

2.46 The Welsh Government formally committed Wales to legally binding targets to deliver the goal of net-zero emissions. The Climate Change Committee recommended the following targets that the Proposed Development will contribute to:

- Carbon Budget 2 (2021-25): 37% average reduction with credit ("offset") limit of 0%
- Carbon Budget 3 (2026-30): 58% average reduction
- 2030 target: 63% reduction
- 2040 target: 89% reduction
- 2050 target: 100% reduction (net zero)

2.47 The Proposed Development will also contribute to cost-effective local energy generation and energy security with limited governmental subsidy and will, therefore provide socio-economic and community benefits. Notably, the design of the Proposed Development will allow an efficient dual use of the land for renewable energy generation and agriculture.

Waste

2.48 Waste produced during construction will be kept to a minimum and will be managed and sorted accordingly. Only registered waste management companies will be utilised to dispose of construction waste (packaging, wood, metal) or waste from the construction team (general domestic or canteen/kitchen waste). The specialist EPC hired to construct the solar installation will ensure that all waste is disposed of responsibly using only licensed waste management companies. This will be subject to appropriate due diligence checks prior to contracting.

2.49 Following decommissioning there will be significant potential for recycling many of the materials used in the Proposed Development. There may be some equipment at the end of the project lifespan that would result in some solid waste. However, given the scale and nature of the Proposed Development significant effects are not likely in terms of waste generation. At decommissioning stage, the solar panels will be unscrewed from the mounting frames and packaged either to send to a solar recycling depot, or if they are still operational, they may be sold on second-hand.

Use of natural resources

2.50 An Agricultural Land Classification Survey of the proposed site was completed by RPS Group in November 2020 and is a separate technical document forming part of the planning statement. The assessment confirmed that the majority of the site comprised Grade 3b agricultural land, with only a very small section of the site falling within Grade 3a Best and Most Versatile Land. The distribution of these areas of Grade 3a agricultural land accounts for only 15% of the site and is distributed in discrete pockets throughout the site.

2.51 The Proposed Development is temporary in nature and fully reversable. Appropriate construction techniques will be implemented to reduce above and below ground works and to minimise any compaction of soil mitigating any potential impact on the soil structure and ability to infiltrate water. Most of the soil will not be physically impacted from the development.

2.52 Relatively small, localised areas of earthworks will be required to create level platforms for the substations, transformers and other containerised infrastructure, and to create the trenches for the HV cable and LV cables. Topsoil will be removed from the relevant areas and set aside separately from any subsoil. When backfilling the cable trenches, the subsoil will be replaced first, followed by the topsoil. Any topsoil not required for backfilling will be used to build up areas where new planting

is to be undertaken in accordance with the solar installation Planting Plan, and the remainder will either be thinly spread on the site.

2.53 Following decommissioning, the above would ensure that the future quality of the agricultural land is maintained with no likely significant lasting adverse effects on the quality of the soil.

Residues and emissions

2.54 Details of any potential effects in relation to residues and emissions having regard to water are set out in the Drainage Strategy and FCA appended to the Planning Statement.

2.55 Regarding emissions, Chapter 11 of this ES provides an assessment of the effects of the Proposed Development having regard to climate change, which concludes that the Proposed Development is likely to have a significant beneficial effect.

2.56 As explained in Chapter 11, this will be achieved through the Proposed Development's operation displacing carbon intensive forms of electricity generation outweighing the effect of emissions associated with the Proposed Development's construction. This results in the Proposed Development contributing positively to WG targets for the reduction of greenhouse gas emissions.

Vulnerability to accidents and disasters

2.57 The 2017 EIA regulations state that an EIA must identify, describe and assess, in an appropriate manner, the direct and indirect significant effects arising from the vulnerability of the Proposed Development to risks of major accidents or disasters. Vulnerability of the Proposed Development to major accidents introduced by the location should be considered as well as risks that are an inherent characteristic of the development.

2.58 The objective of such an assessment is to establish whether the Proposed Development increases risks to existing receptors or increases the sensitivity of those receptors to the consequences of the hazard. For example, by introducing new links/pathways between a possible hazard and a receptor.

2.59 Solar photovoltaic technology is a relatively benign and safe form of electricity generation with very low risk of accident or disaster and will not have a significant environmental effect in this regard.

2.60 The solar farm will be enclosed by appropriately designed security fencing and monitored by CCTV, which will lower the risk of unauthorised access and accidents.

2.61 It is acknowledged that there is some element of risk associated with emerging battery storage technology. Risk of major accidents is addressed in Chapter in Chapter 7 of this ES in line with the Inspector's comments in the Scoping Direction:

"The Inspectorate notes that there is a potential fire risk associated with certain types of batteries such as lithium-ion and that safety measures are required in the design to minimise the risk of fire. The Proposed Development should include adequate measures to ensure that an isolated fire would not become widespread and lead to a major incident. The Applicant has confirmed that a Battery Safety Management Plan will be produced. The Inspectorate considers this to be part of the EIA process in line with Schedule 4 of the EIA Regulations (Wales) 2017. The Applicant is reminded of the responsibilities set by the Regulatory Reform (Fire Safety) Order 2005. The ES should ensure that risks of accidents are accounted for and mitigated in line with Schedule 4. Risk of Major Accidents is therefore scoped into the ES."

Construction

2.62 The details of construction methods, timing and phasing are necessarily broad at this stage of the Proposed Development. The limits of the assessment, however, have been set sufficiently wide to allow a robust assessment to be undertaken of a reasonable worst-case scenario.

2.63 A CTMP accompanies the planning application and is contained in **Appendix 2.1**. The project is anticipated to utilise established standard construction methodologies (including piling) for solar farms.

Indicative phasing of construction works

2.64 The timing of the project would be dependent on securing planning permission and the discharge of planning conditions. The indicative construction programme sets out a programme of approximately 12-18 months duration. It is assumed that the construction is likely to be phased as shown in Table 2.2 below.

Table 2.2: Indicative phasing of construction

Phase	Indicative Dates	Activities
1	Q2 2023	Site preparation, fencing, internal access and compounds and drainage works
2	Q2 2023 – Q1 2024	Installing frames and panels
3	Q2 2024	Install associated infrastructure and CCTV
4	Q2 2024	Connection
9	Q2 2024	Landscaping

2.65 The broad sequence of construction activities is likely to be:

- Site preparation which will involve mowing the site area if required and marking out the site;
- Erecting the security fence, creating internal access roads, compound and crane areas;
- Construction of any drainage works;
- Piling the frames into the ground and installing mounting frames;
- Affixing the panels to the mounting frames;
- Trenching for the cable runs to a depth of approximately 1m and laying cables on site;
- Pouring the concrete base for the electrical housing/cabinets (switchgear, transformers etc.);
- Installation of the housing/cabinets;
- Erecting pole mounted CCTV cameras;
- Connecting all the cables up and backfilling the cable trenches;
- Landscaping works in accordance with the Planting Plan.

2.66 The Site would be fenced during construction. It is the intention of the applicant that the site would be registered under the Considerate Constructors Scheme (CCS) or a similar, locally recognised certification scheme.

Construction working hours

2.67 Working hours would be 07:00 to 19:00 hours Monday to Friday, 07:00 to 13:00 hours on Saturday and at no time on Sundays or on public or bank holidays. However, noisy activities such as piling will be undertaken 08:00 to 18:00 hours Monday to Friday and 08:00 to 13:00 hours on Saturday. These hours would be subject to agreement with the LPA. In the event that works are required outside of these hours in exceptional circumstances, this would be agreed with the LPA prior to commencement of the activity, as necessary.

Environmental management during construction

2.68 Construction would be undertaken in accordance with good practice environmental management procedures that will be set out in more detailed plans and method statements contained within a Construction Environmental Management Plan (CEMP) to be developed by the contractor. The CEMP will set out the key management measures that contractors would be required to adopt and implement. These measures will be developed based upon those effects identified during the EIA process and set out in the topic chapters of this ES. They will include strategies and control measures for managing the potential environmental effects of construction and limiting disturbance from construction activities as far as reasonably practicable.

2.69 The CEMP would be prepared during the pre-construction period once a contractor has been appointed. The final CEMP would be submitted to the LPA for approval.

Construction working areas

2.70 A number of temporary facilities would be required during construction including:

- Temporary offices and welfare facilities;
- Storage area for materials, fuels, plant and equipment;
- Waste management areas; and
- Car parking facilities.

2.71 As far as possible, storage areas would be located away from existing properties. Such storage areas would be bunded to mitigate any spillages of potential contaminants and would avoid being located in areas of vegetation or habitat to be retained.

2.72 All construction works will be carried out within the defined project area and no additional land would be required outside of the Proposed Development site boundary.

Construction access

2.73 Several existing access points will be used for access for the construction, maintenance and decommissioning of the solar farm. If necessary, some minor modifications to enable access to the site by all vehicles anticipated to visit it will be undertaken. Existing farm tracks will be used for internal access within the site wherever possible. New access tracks, where required, will be formed, normally, using a layer permeable crushed stone.

2.74 Every effort would be taken to minimise the effects of traffic associated with the construction phase of the project. Materials and resources would be sourced locally where possible and deliveries and construction traffic would endeavour to avoid travel during commuter peaks.

2.75 A CTMP detailing the delivery routes, construction routes, construction compounds and any associated parking or management of construction traffic has been prepared. Transport has been scoped out of the ES.

2.76 Operational traffic movements will be minimal.

Construction vehicles

2.77 The type of construction vehicles would be selected by the contractor prior to and during the construction phase. However, the following vehicles would typically be used during construction:

- Excavators;
- Cranes: Required for assembly and erection;

- Low loaders: Required for transport of construction equipment and plant;
- Concrete lorries;
- Tipper lorries; and
- Construction staff vehicles.

2.78 The peak construction period would require up to a maximum of 100 construction staff, plus no more than 3 heavy goods vehicle (HGV) movements per day. Although it is not expected that the project would generate any abnormal loads, if this was required, the routing and nature of such loads would be agreed with the highway authority prior to work commencing.

2.79 It is anticipated that the peak periods for traffic movements associated with the construction phase would be 07.00-08.00 and 15.00-16.00. Further details of predicted traffic flows associated with the project are provided within the CTMP.

Drainage

2.80 The construction phase would incorporate pollution prevention and flood response measures to ensure that the potential for any temporary effects on water quality or flood risk are reduced as far as practicable.

2.81 Such measures would be implemented through the CEMP, which will require the following:

- Installation of wheel washing facilities at the entrance to the construction compounds;
- Use of sediment fences along existing watercourses when working nearby to prevent sediment being washed into watercourses;
- Covers for lorries transporting materials to/from site to prevent releases of dust/sediment to watercourses/drains;
- Bulk storage areas to be secured and provided with secondary containment (in accordance with the Oil Storage Regulations and best practice);
- Storage of oils and chemicals away from existing watercourses, including drainage ditches or ponds;
- Concrete to be stored and handled appropriately to prevent release to drains;
- Preparation of a flood response plan in the event of flooding during construction works. This would include a procedure for securing or relocating materials stored in bulk;
- Treatment of any runoff water that gathers in the trenches would be pumped via settling tanks or ponds to remove any sediment;
- Obtain consent for any works (e.g. discharge of surface water) that may affect an existing watercourse. The conditions of the consent will be specified to ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial risk;
- Use of a documented spill procedure and use of spill kits kept in the vicinity of chemical/oil storage;
- Storage of stockpiled materials on an impermeable surface to prevent leaching of contaminants and use of covers when not in use to prevent materials being dispersed and to protect from rain; and
- Stockpiles to be kept to minimum possible size with gaps to allow surface water runoff to pass through.

Construction waste

2.82 The specialist EPC hired to construct the Proposed Development will ensure that any waste that is required to be taken off site will be disposed of responsibly to registered waste companies from the sites during and immediately following construction.

2.83 The potential waste generated during the construction process will primarily be related to packaging, and will include:

- The pallets that the solar panels are packaged in. These will be either wood crates, or cardboard boxes. These will be removed from the sites on a regular basis. If they arrive on wooden pallets, which have a financial value, these will either be returned to the manufacturer/distributer, or collection by a local contractor will be arranged. If they arrive packaged in cardboard boxes, then these will be removed on a regular basis, either through a hired skip, or through trips to the closet appropriate recycling station.
- Packing materials for various components, such as screws, cabling, and mounting frames. Any non-recyclable waste will be stored in a skip for regular removal to an appropriate landfill.
- Food waste from workers. Personal rubbish will be collected along with nonrecyclable packaging materials, for disposal at an appropriate landfill.
- Portable toilets will be hired for the duration of the construction period; therefore there will be no human waste issues.
- Excavated soil. The sites require some ground works for access tracks, cable trenching, cabinet platforms. Excavated soil will be used for backfilling activities. Excess subsoil will be removed from the sites and disposed of at an appropriate landfill or sold to a landowner needing additional soil.

Use of natural resources

2.84 The CEMP will consider the main types and quantities of materials required for the project in order to assess potential for sourcing materials in an environmentally responsible way.

2.85 The CCS includes measures relating to the use of resources, including categories in relation to minimising the use of water. Any timbers used would be required to be Forest Stewardship Council (FSC) certified.

2.86 The construction process would take into account the principles of good practice in soil handling and restoration set out in the following documents, wherever possible, to reduce the possibility of damage to soil materials during the construction process:

- Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Soil Handling Guide; and
- Department for Food and Rural Affairs (Defra) (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (including the Toolbox Talks).

2.87 The EIA Directive also refers to the use of land and biodiversity resources. Further details are provided in Chapter 9 (Biodiversity) of this ES as well as the accompanying Agricultural Land Classification Report (reference: OXF11645) and the Planning Statement that accompanies the planning application.

Residues and emissions

2.88 Details of residues and emissions in relation to water are set out in Chapter 6 (Water Quality) of this ES. Details of greenhouse gas emissions are set out within Chapter 11 (Climate Change) of this ES.

2.89 The CEMP will consider ways of minimising construction activity residues and emissions, including spills, noise, vehicle emissions etc. during the construction phase.

Utilities

2.90 On site electrical power from generators will be utilised where necessary during the construction phase. It is not anticipated that new utility connections would be required for the construction compound.

Vulnerability to accidents and disasters during construction

2.91 Foreseeable construction hazards to the environment could include fire and flooding, though risk is considered limited with good construction practices. Flood risk is assessed at Chapter 6 of this ES and recommendations are made for action plans in the event of flooding during construction. Fire risk will be addressed by the contractor when formulating the CEMP.

Operation and maintenance

2.92 Once operational, the solar farm will be operated remotely and only require between 10-20 visits per year for maintenance, monitoring and cleaning of the panels and site.

2.93 Assessment of accidents and emergencies for the operational development is limited at this stage with security fencing and CCTV minimising health and safety risks as far as possible.

2.94 Emissions from activities from the Proposed Development shall be free from odour, noise and vibration at levels likely to cause pollution outside the site.

Measures adopted as part of the project

2.95 In order to avoid or reduce the environmental effects, a number of measures have been designed into the project. Details of these can be found within each topic chapter of the ES and are summarised in Tables 2.3 and 2.4 below.

Table 2.3: Schedule of measures to be adopted as part of the project during construction

Topic	Proposed measures during construction
General/Design	Construction work will be kept away from root protection zones.
Historic Environment	Where archaeological remains are found, a programme of archaeological investigation would be agreed with the archaeological advisors to the planning authority. This would enable a better understanding of the presence, nature and date of any archaeological remains within those parts of the project site were construction activities are planned, and allow for the development of an appropriate strategy to avoid, reduce or offset any impacts that could occur as a result of construction. This programme should be a measure to offset the impact and effect on historic assets and archaeological remains if any are found to be present and to be at risk from construction impacts. Standard best practice measures would be implemented to ensure that construction noise impacts would be controlled and managed to avoid significant adverse effects. Additional landscape planting.
Landscape and Visual	Native hedgerow and tree planting provided to improve screening of the Proposed Development were possible. Allowing existing hedgerows to grow and increase in height.
Ecology and Nature Conservation	Pre-construction ecology update surveys to identify any potential changes in ecology baseline conditions that would need to be taken into account in the ecology mitigation strategy, to prevent significant adverse ecology impacts. Ecology input to the CEMP.

	Ecology Clerk of Works to instruct and/or oversee ecology related works on site. Ecology Management Plan detailed ecology measures required during the construction phase. Ecology method statements for potentially high impact / complex ecology mitigation measures, including works within Coed Nant Bran. Arable reversion species-diverse grassland, and enhancement of the species diversity of existing improved grassland beneath solar panels to provide additional species diverse grassland resources across the site to benefit a wide range of species, including invertebrates, and foraging birds and bats. Protection of arable field margins in targeted locations to retain Rare Arable Weed species on site. Planting up of gaps along existing hedgerows, with native hedgerow species to enhance habitat connectivity and increase species diversity. Retained woodland, trees, scrub and hedgerows to be protected against damage with works-free root protection zones. Measures to prevent significant light spill impacts on adjacent retained vegetation and habitats that may be of value to protected of otherwise notable species (including the use of directional lighting design).
Traffic & Transport	Ongoing Review of Access Routes – any major roadworks on the access routes that result in the deviation of the route will be agreed with officers at VoGC in advance. Transport Co-ordination by the Site Manager to ensure implementation of CTMP, vehicle scheduling, liaison with stakeholders etc. Booking system – to ensure that the deliveries are spread out across the week and across the day to minimise any potential disruption. Route compliance – use of the agreed vehicle routes shall be included as a contractual requirement of the contractor and will be communicated to all drivers. The construction compound will provide an area for loading and unloading of vehicles and will provide a turning area to allow vehicles to exit the site in forward gear. A security fence will be constructed around the site prior to any significant construction works taking place. A wheel washing facility will be provided for the duration of the construction works to ensure levels of soil on roadways near the access junction is minimised. The appointed contractor will strive to procure local contractors for the project, thereby minimising transport costs and impact on the local environment.
Noise and Vibration	Best practice guidance will be implemented throughout the construction stage.
Climate Change	Good working practices during construction will be defined through a Code of Construction Practice (CoCP) which will provide additional information to the CDMS and we expect will be required by a planning condition. Where practicable, prefabricated elements would be delivered to the site ready for assembly, which will reduce on-site construction waste and reduce vehicle movements as part of the construction process. Construction materials will be sourced locally where practicable, to minimise the impact of transportation. Vehicles used in road deliveries of materials, equipment and waste arisings on- and off-site will be loaded to full capacity to minimise the number of journeys associated with the transport of these items. All machinery and plant will be procured to adhere with emissions standards prevailing at the time and should be maintained in good repair to remain fuel efficient. When not in use, vehicles and plant machinery involved in site operations would be switched off to further reduce fuel consumption. Where possible, local waste management facilities will be used to dispose of all waste arisings, to reduce distant travelled and associated emissions. The volume of waste generated will be minimised, and resource efficiency maximised, by applying the principles of the waste hierarchy throughout the construction period. Equipment and machinery requiring electricity will only be switched on when required for use. Procedures will be implemented to ensure that staff adhere to good energy management practices.
Land Contamination	The construction process would take into account the principles of good practice in soil handling and restoration wherever possible, to reduce the possibility of damage to soil materials during the construction process.

and Ground Conditions	
Hydrology and Flood Risk	Construction drainage systems - temporary drainage mitigation techniques including runoff interceptor channels to ensure that discharge from the Site is controlled in quality and volume during construction. Construction techniques and processes inluding dust suppression, storage of materials away from watercourses and standard best practice measues for managing risk of spillage incidents. Excavation and piling mitigation measures - incorporated into the construction techniques to ensure the continued protection of groundwater flow and quality. Incorporation of standard pollution prevention and best practice measures. Regular water quality monitoring throughout the construction phase.
Agricultural Land	Appropriate construction techniques will be implemented to reduce above and below ground works and to minimise any compaction of soil mitigating any potential impact on the soil structure and ability to infiltrate water.

Table 2.4: Schedule of measures to be adopted as part of the project during operation

Topic	Proposed measures during operation
General / Design	The design of the proposed development is low lying in nature, typically shorter in height than the many existing mature trees and hedgerows around the site. Once in operation, this will mitigate against any likely change in the character of the landscape.
Historic Environment	No archaeological effects are anticipated at the operational stage and therefore no further mitigation measures are required in terms of archaeology. No mitigation measures are required with regard to built heritage receptors within the study area, taking into consideration the distance at which they are located from the site and minimal visual effects which will likely arise as a result of the proposed Development. The implementation of proposed landscaping would, however, assist to soften the limited views of the Proposed Development which may exist.
Landscape and Visual	Native hedgerow and tree planting will be provided to improve screening of the Proposed Development where possible. Allowing existing hedgerows to grow and increase in height. Planting native species trees and areas of scrub adjacent to field boundary hedgerows and woodland edges. Gap up/reinforce/replant existing site boundary hedgerows with additional native species planting and appropriate ongoing management where necessary. Existing grassland to be retained and managed beneath the solar panels.
Ecology and Nature Conservation	New and enhanced species-diverse grassland to be managed through sheep grazing and/or mowing, in accordance with the Ecology Management Plan, to retain plant species. Management of rough grass margins around stock fenced field margins, in accordance with the Ecology Management Plan, to provide a margin of tussocky rough grass, and good hedgerow base cover. Margins to be cut on rotation to manage the encroachment of scrub and provide rough grass cover and resources across the site throughout the year. Hedgerows to be managed on a 2 year rotation to encourage the development of wide (1.5-2 m) tall (1.5-2 m) hedgerows, with good base cover and connectivity. Management of targeted field margins to retain Rare Arable Weed species recorded on site.
Traffic & Transport	Given that the Proposed Development is being installed within fields using existing accesses, maintenance and inspection vehicle movements will replace the agricultural vehicle movements that the field generates. Thus, no specific mitigation is required given no intensification of use at the accesses during operation.
Noise and Vibration	Emissions from activities from the Proposed Development shall be free from noise and vibration at levels likely to cause pollution outside the site. Therefore, no specific mitigation is required in terms of noise and vibration.
Air Quality and Climate	As a renewable energy development, climate change mitigation is an inherent aim of the Proposed Development. To ensure maximum energy yield, and therefore maximum GHG emissions displacement, the solar array would be south facing, and rows of panels

	would be distanced between 3 and 8m apart from one another to avoid inter-panel shading.
Land Contamination and Ground Conditions	The Proposed Development will not have an adverse effect on ground conditions during operation. Best practice measures would be implemented during decommissioning to prevent any effects on ground conditions
Hydrology and Flood Risk	Conceptual Surface Water Drainage Strategy – adoption of the SuDS Strategy detailed within the Flood Consequence Assessment and Conceptual Drainage Strategy.
Agricultural Land	The Proposed Development is temporary in nature and fully reversible. The maintenance of grassland under the panels will, over time, increase organic matter within the soil, potentially improving its agricultural quality.

References

Department for Food and Rural Affairs (Defra) (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. [Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf]

Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Soils Handling Guide. [Available online at: https://webarchive.nationalarchives.gov.uk/20090317221756/http://www.defra.gov.uk/farm/environment/land-use/soilguid/index.htm]

The Town and Country Planning (Environmental Impact Assessment) Regulations 2017

Planning and Compulsory Purchase Act 2004

- Welsh Government (WG) (2021) Future Wales: The National Plan 2040. [Available online at: Future Wales: The National Plan 2040 | GOV.WALES)
- The Vale of Glamorgan Council (VoGC) (2017) The Vale of Glamorgan Local Development Plan 2011 – 2026 (LDP). [Available online at: Adopted-LDP-Written-Statement-June-2017-final-interactive-web-version.pdf (valeofglamorgan.gov.uk)

3 NEED AND ALTERNATIVES CONSIDERED

Introduction

3.1 This chapter of the ES provides a summary of the need for the Proposed Development and a description of the reasonable alternatives considered by the Applicant during the EIA process. It includes a summary of the reasons for the selection of the site, together with a description of the alternative design and layout options that have been considered. Further information is provided in the Planning Statement and Design and Access Statement (DAS) that accompany the planning application.

Need for the development

3.2 The need for the Proposed Development stems from two sources:

1. Energy security in terms of increasing demand for electricity;
2. The need to decarbonise energy systems and combat the potentially devastating effects of climate change on current and future generations.

3.3 Consideration of need, having regard to the relevant national and local policy context, is provided below.

National Grid Future Energy Scenarios (July 2021)

3.4 'Future Energy Scenarios' (FES) (National Grid, 2021) outlines different credible pathways for the future of energy for the next 30 years and beyond. The document considers how much energy is needed and where the energy could come from. In all scenarios, the demand for electricity increases; this is brought about by shifting away from high carbon fuels to hit the Government's net-zero emissions target by 2050 and the predicted increase in electric vehicles ahead of the 2040 ban on petrol/diesel driven vehicles.

3.5 For electricity supply, in all scenarios, there are significant increases in renewable energy generation. The 'key messages' of the FES report, with regards to the Proposed Development, include:

- Significant investment in low carbon electricity generation will be required across all net zero pathways;
- Between 34 GW and 77 GW of new wind and solar generation could be required to meet demand in 2030.

3.6 National Grid anticipates annual electricity demand in the UK could more than double from 294 TWh in 2020 to up to 702 TWh by 2050. Similarly, peak demand in 2020 of 58 GW could almost double to up to 113 GW over the same period. There is therefore an urgent need to increase electricity capacity in the UK to ensure a secure and stable supply in the future and achieve renewable energy and net zero targets.

Welsh Government declaration of climate emergency

3.7 On 29 April 2019 the then Environment Minister Lesley Griffiths declared a climate emergency in Wales on behalf of the Welsh Government.

Welsh Government declaration of commitment to net zero by 2050

3.8 On 9 February 2021 the Welsh Government set out its legal commitment to achieve net zero emissions by 2050.

UK Government Net Zero 2050

3.9 On 27 June 2019, the UK became the first major economy in the world to pass laws to end its contribution to global warming by 2050. The target will require the UK to bring all greenhouse gas emissions to 'net zero' by 2050, compared with the previous target set within the Climate Change Act (2008) of at least an 80% reduction of emissions by 2050 (against the 1990 baseline). In support of this target, the Energy white paper: Powering out net zero future (DBEIS, 2020a) was published, setting out the pathway to achieving net zero through the greater reliance on solar and wind energy.

3.10 Net Zero 2050 – A Roadmap for the Global Energy Sector (International Energy Agency (IEA), 2021) outlines the essential conditions for the global energy sector to reach net-zero carbon dioxide (CO2) emissions by 2050. The Roadmap calls for scaling up solar and wind technologies during the 2020s, reaching up to 630 gigawatts (GW) of solar and 390GW of wind by 2030, four times the set record levels in 2020. The Roadmap stresses that for solar, this equates to installing the world's current largest solar farm roughly every day.

National planning policy context

3.11 Planning Policy Wales, Edition 11 published February 2021 (PPW), Future Wales - the National Plan 2040, published February 2021 (Future Wales) and the Technical Advice Notes (TANs) set out the national planning policies of the Welsh Government. Following the publication of Future Wales, TAN 8: Planning for Renewable Energy has been revoked and there is no longer an energy-specific TAN.

3.12 PPW paragraph 5.7.14 confirms that the Welsh Government targets for the generation of renewable energy are:

- Wales to generate 70% of its electricity consumption from renewable energy by 2030;
- One Gigawatt of renewable electricity capacity in Wales to be locally owned by 2030; and
- New renewable energy projects to have at least an element of local ownership by 2020.

3.13 It is noted that it is vital that we reduce our emissions to protect our own wellbeing and to demonstrate our global responsibility. Future Wales together with PPW seeks to ensure the planning system focuses on delivering a decarbonised and resilient Wales through the places we create, the energy we generate, the natural resources and materials we use and how we live and travel.

3.14 Regarding energy generation, Future Wales identifies that Wales can become a world leader in renewable energy technologies. Wales' wind and tidal resources, potential for solar generation, its support for both large and community scaled projects and commitment to ensuring the planning system provides a strong lead for renewable energy development means it is well placed to support the renewable sector, attract new investment and reduce carbon emissions.

3.15 Future Wales contains two policies (17 and 18) of specific relevance to this project.

3.16 Policy 17 – Renewable and Low Carbon Energy and Associated Infrastructure – expresses strong support for the principle of developing renewable and low carbon energy from all technologies and at all scales to meet our future energy needs. The policy states that 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.

3.17 In respect of large-scale solar, Policy 17 states that all proposals should demonstrate that they will not have an unacceptable adverse impact on the environment. It also expects proposals should describe the net benefits the scheme will bring in terms of social, economic, environmental and cultural improvements to local communities. New strategic grid infrastructure for the transmission and distribution of energy should be designed to minimise visual impact on nearby communities.

3.18 Policy 18 – Renewable and Low Carbon Energy Developments of National Significance – deals with Developments of National Significance (DNS). It is a criteria-based policy which states that such developments will be permitted, subject to Policy 17, and the following:

3. 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);
4. there are no unacceptable adverse visual impacts on nearby communities and individual dwellings;
5. 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);
6. 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;
7. the proposal includes biodiversity enhancement measures to provide a net benefit for biodiversity;
8. there are no unacceptable adverse impacts on statutorily protected built heritage assets;
9. there are no unacceptable adverse impacts by way of shadow flicker, noise, reflected light, air quality or electromagnetic disturbance;
10. 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);
11. 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;
12. the proposal includes consideration of the materials needed or generated by the development to ensure the sustainable use and management of resources;
13. 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.

Local policy context

3.19 The development plan for the site for the purposes of Section 38(6) of the Planning and Compulsory Purchase Act 2004 is the Vale of Glamorgan Local Development Plan (LDP), adopted 2017.

3.20 Policy MD19 – Low Carbon and Renewable Energy Generation – states proposals for the generation of low carbon and renewable energy will be permitted where it can be demonstrated that there is no unacceptable impact on the interests of:

1. Best and most versatile agricultural land;
2. Aviation safeguarding;
3. Electrical, radio or other communication systems;
4. Landscape importance;
5. Natural and cultural heritage;
6. Nature conservation;
7. Residential amenity; and

8. Soil conservation.

3.21 In assessing such proposals, Policy MD19 states the cumulative impacts of renewable energy schemes will be an important consideration. Where necessary, proposals should be informed by a landscape and visual impact assessment.

3.22 Policy MD19 adds that favourable consideration will be given to proposals that provide opportunities for renewable and low carbon energy and / or heat generation to be utilised within the local community.

3.23 LDP Policy MG30 – Local Search Areas for Solar Energy – in these areas proposals for solar energy generation schemes up to 50 MW will be permitted.

Overall need

3.24 Overall, there is a significant need to increase electricity supply based on predictions of future consumption due to electrification of transportation and heating, in particular.

3.25 Given the climate emergency, there is a need for the electricity to be produced from zero or near zero carbon and greenhouse gas emission sources.

3.26 Solar power, and other sources of renewable energy, have an important role to play as part of the mix of energy sources required to meet increasing electricity demand in the future and national carbon and greenhouse gas reduction targets, in particular the Welsh and UK Government's legally binding targets of net zero carbon emissions by 2050.

Alternatives considered

3.27 The EIA Regulations 17 3(d) require that an ES should include:

'A description of the reasonable alternatives 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 the option chosen, taking into account the significant effects of the development on the environment.'.

3.28 Schedule 4 of the Regulations expands slightly on the information for inclusion in environmental statements and states:

'A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the applicant or appellant which are relevant to the proposed development and its specific characteristics and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.' (Schedule 4 (2))

3.29 This section therefore sets out the key reasons for the selection of the Site and current layout, taking into account environmental effects.

'Do nothing' scenario

3.30 Under the 'Do nothing' scenario, the Site would continue to be used for agriculture. The benefits of producing renewable energy to feed into the electricity distribution network and help the Welsh and UK Governments to respond to energy security needs, the climate emergency and reach greenhouse gas reduction and net zero targets by 2050 would not be contributed towards as the Site would continue to be used for agriculture.

3.31 The hedgerows and trees would remain in situ and the field margins would continue to be managed. Due to this management (including maintaining short grasses and heights of hedgerows) the habitat value of the field margins would remain species poor under this scenario.

3.32 The Proposed Development would result in ecological benefits; by changing the management regime of the field boundaries (such as alternative cutting programmes and the absence of pesticides and herbicides from spray drift), the floristic diversity of the field margins and the habitats they provide would increase through the use of a species rich grassland which may include wildflower meadows. The introduction of the habitat enhancement areas would provide enhanced habitats and provide a greater variety of flora species. Under the 'Do –nothing' scenario, these benefits would not be achieved.

Site location

3.33 Cenin is committed to delivering renewable developments across the UK to meet the changing needs of current and future generations. In the context of the current climate emergency and the national commitments to meet net zero targets, there is an increased demand to obtain our energy requirements from green sources across the whole of the UK in locations where renewable technologies are optimised to maximise site efficiencies. Cenin undertakes continuous nationwide assessments of land opportunities but this must be where land is available in agreement with landowners' commitments to supporting the provision of green energy production to meet a sustainable future.

3.34 Large scale ground mounted solar farms are generally located in the open countryside. Sites large enough to accommodate a financially viable scheme, with sufficient MW output, are difficult to find in settlements, particularly the towns and villages that are found in the local area. Difficulties in finding suitable brownfield sites include:

- Not enough rooftop areas or existing brownfield land available and competition from other high value sectors such as residential and mixed use for such sites;
- Unsuitable roof structure and standards (including roof orientation, shading, presence of plant and other equipment); and
- Complex multiple landlords/tenant agreements
- Sites within settlements are likely to be considerably more visible to more people.

3.35 In terms of the consideration of alternative locations, a number of other sites were considered within the VoGC area but were discounted for a range of reasons including limited options for connection to the electricity distribution network, prominence in the landscape and visually owing to topography and lack of vegetation screening, and landowner issues and access constraints.

3.36 The key reasons the Site was selected and taken forward to a planning application include proximity and ease of connection to grid infrastructure and because the land parcel is large enough to make the scheme commercially viable. From a visual effect perspective, the field boundary hedges are in good condition allowing considerable screening from local views. In addition, the transport network and access routes are suitable at the Site to allow for construction of the Proposed Development.

Site layout and design

3.37 An evaluation of site constraints and opportunities was undertaken to inform an initial concept design. This has subsequently been refined through a combination of technical assessments and engagement with various stakeholders. As a result, the Proposed Development presents an opportunity to provide the following:

- Approximately 65 MW of renewable electricity to feed into the Electricity distribution network and support the Government's Net Zero targets.
- Provide areas of habitat enhancement.

3.38 Constraining factors that affected the project layout and design included:

- A number of existing public footpaths running through the site;
- Proximity to Listed Buildings;
- Agricultural land grade: majority Grade 3b with some Grade 3a; and
- Ancient woodland adjacent to site boundary.

3.39 The EIA process has influenced the iterative design process of the project, through the identification of the above constraints, responses during the consultation process, and identification of environmental effects. Therefore, there have been a number of iterations and refinements to the layout of the project.

3.40 The current project layout is provided in **Figure 2.1** of this ES.

References

The Town and Country Planning (Environmental Impact Assessment) Regulations 2017

Planning and Compulsory Purchase Act 2004

Welsh Government (WG) (2021) Future Wales: The National Plan 2040. [Available online at: Future Wales: The National Plan 2040 | GOV.WALES)

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4 ENVIRONMENTAL ASSESSMENT METHODOLOGY

Introduction

4.1 This chapter of the ES sets out the approach taken to the EIA of the project. The chapter also includes details of the consultation undertaken to date and the overall approach to the assessment of the likely effects of the project. Further details of topic specific methodologies, such as survey methods, are provided in each topic chapter.

Scoping

4.2 Scoping is the process of identifying the issues to be addressed during the EIA process. Scoping is an important preliminary procedure, which sets the context for the EIA process.

4.3 Regulation 15 of the EIA Regulations allows an applicant to request that the LPA/PEDW sets out its opinion (known as a Scoping Direction) as to the issues to be addressed in the ES. Whilst there is no formal requirement in the EIA Regulations to seek a Scoping Direction prior to submission of an ES, it is recognised as best practice to do so.

4.4 A Scoping Request was submitted to The Planning Inspectorate on 20th January 2021. The Scoping Report that comprised this request is included as **Appendix 4.1**.

4.5 The Planning Inspectorate issued a DNS EIA Scoping Direction on 18th March 2021 and a copy of this is included as **Appendix 4.2**.

4.6 The ES topic chapters provide a summary of the key points raised during consultation with both statutory and non-statutory consultees.

4.7 The Scoping exercise also highlighted a number of areas that consultees wished to see addressed within the ES. Taking into account the nature, size and location of the project, the information provided within the Scoping Direction and other consultation responses provided throughout the EIA process, the following aspects have been scoped in as requiring assessment within this ES:

- Human Health (Chapter 5);
- Water Quality (Chapter 7);
- Risk of Major Accidents (Chapter 8);
- Landscape and Visual Impact (Chapter 9);
- Biodiversity (Chapter 10);
- Cultural Heritage (Chapter 11);
- Climate Change (Chapter 12);

Climate change resilience

4.8 Resilience to future climate change has been considered during the design process. The design has taken into account, for example, future flood risk and resilience to extreme weather events. Further details are provided in Chapter 2 (Project Description), and Chapter 12 (Climate Change).

Changes to future environmental conditions

4.9 Consideration of predicted changes in baseline environmental conditions, including changes resulting from climate change, have been set out within each ES topic chapter, where robust information was available at the time of writing. Details are provided in the methodology section of this chapter.

4.10 The assessment of effects for each topic has taken into account identified trends or changes predicted to arise as a result of climate change.

Topics scoped out of the EIA process

4.11 Effects on other aspects of the environment are not likely to be significant. The topics scoped out of the assessment are set out in the Scoping Report (**Appendix 4.1**) and resultant Scoping Direction (**Appendix 4.2**) and summarised below.

Planning policy

4.12 The ES provides an overview of relevant legislative and planning policy context within each topic chapter and the assessments have had regard to national and local policy documents, where relevant. A separate chapter on planning policy has not been included within the ES, however, a Planning Statement has been prepared to accompany the planning application.

Population, air quality

4.13 Construction will have a temporary effect on employment provision through the creation of construction jobs however, it is unlikely that the proposals will result in a significant change in population as workers are unlikely to relocate to an area on a permanent basis. Therefore, no significant effects are anticipated.

4.14 In terms of air quality. The number of HGV movements during the construction and installation of the solar panels together with the supporting framework will not fulfil the traffic criteria detailed in the IAQM/EP (UK) Planning Guidance. A change in the volume of traffic on the surrounding road network will not have any significant effect on air quality as experienced by the nearest receptors located in the vicinity of the site.

4.15 Therefore, no separate consideration of population or air quality is considered necessary, as confirmed by the Welsh Minister's Scoping Direction.

Material assets

4.16 The EIA Regulations refer to 'material assets', including architectural and archaeological heritage. The phrase 'material assets' has a broad scope, which may include assets of human or natural origin, valued for socio-economic or heritage reasons. Material assets are in practice considered across a range of topic areas within an ES, in particular the topic areas historic environment and socioeconomics. These topics are included within this ES or have been scoped out as set out above. Therefore, no separate consideration of material assets is considered necessary, as confirmed in the Welsh Minister's Scoping Direction.

Land

4.17 Land as a topic was scoped into the EIA as a result of an initially larger scheme which included a Transport Interchange Facility. Since the issuing of the Scoping Direction, the applicant has removed the Transport Interchange Facility from the scope of the DNS application. It is the applicant's intention that this element of the scheme will be delivered through a separate planning application to the Vale of Glamorgan Council in due course.

4.18 The site is within an identified Mineral Resource Area, with the geology underlying the majority of the site containing limestone resources. Whilst these deposits are present, they are recorded to extend significantly beyond the site boundary. Given the temporary nature of the development, unlike permanent development, the development will not sterilise reserves or hinder extraction, or hinder extraction in the future as technology changes. As such, there is no requirement for a minerals assessment for the proposed development.

4.19 The Site is generally steeply sloping and generally trends to the south; falling from approximately 121.5m Above Ordnance Datum (AOD) upon the far northern boundary to 103.04mAOD upon the site's central-southern boundary and to 72.23mAOD from the north of the Site to the site's south-westernmost boundary.

4.20 It is therefore considered that land, both construction and operational, can be scoped out of the ES with adequate detail provided via the submitted Desktop Survey.

Transport

4.21 Transport as a topic was scoped into the EIA as a result of an initially larger scheme which included a Transport Interchange Facility. Since the issuing of the Scoping Direction, the applicant has removed the Transport Interchange Facility from the scope of the DNS application. It is the applicant's intention that this element of the scheme will be delivered through a separate planning application to the Vale of Glamorgan Council in due course.

4.22 The construction period is expected to take approximately 12-18 months. It is expected that construction hours will be between 07:00 and 18:30 hours Monday to Friday and 07:00 to 13:00 hours on Saturday. It is unlikely that, even at the most intense period of construction, there will be more than 3 HGV deliveries per day. It is envisaged that the main construction route will be from the the existing Vianshill Farm access on the southern side of the A48 Cowbridge Road.

4.23 It is therefore considered that transport, both construction and operational, can be scoped out of the ES with adequate detail provided via the submitted CTMP.

Environmental assessment methodology

Relevant EIA guidance

4.24 The EIA process has taken into account relevant government or institute guidance, including:

- Welsh Office Circular 11/99: Environmental Impact Assessment;
- Ministry for Housing, Communities and Local Government (2019a) Planning Practice Guidance at http://planningguidance.planningportal.gov.uk;
- Department of the Environment, Transport and the Regions (DETR) (1997) Mitigation Measures in Environmental Statements. HMSO;
- Highways Agency et al. (2008) Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08;
- Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment;
- Institute of Environmental Management and Assessment (2011) The State of Environmental Impact Assessment Practice in the UK. Special Report; and
- Institute of Environmental Management and Assessment (2015a) Environmental Impact Assessment Guide to Shaping Quality Development;
- Institute of Environmental Management and Assessment (2015b) Climate Change Resilience and Adaptation;
- Institute of Environmental Management and Assessment (2016) Guide to Delivering Quality Development;
- Institute of Environmental Management and Assessment (2017) Assessing Greenhouse Gas Emissions and Evaluating their Significance; and

- Institute of Environmental Management and Assessment (2017) Health in Environmental Impact Assessment: A Primer for a Proportional Approach .

4.25 Other topic specific legislation and good practice guidance will be drawn upon as necessary.

Key elements of the general approach

4.26 The assessment of each environmental topic forms a separate chapter of the ES. For each environmental topic, the following have been addressed:

- Methodology and assessment criteria;
- Description of the environmental baseline conditions;
- Measures adopted as part of the project, including mitigation and design measures that form part of the project;
- Identification of likely effects and evaluation and assessment of the significance of identified effects, taking into account any measures designed to reduce or avoid environmental effects which form part of the project;
- Identification of any further mitigation or monitoring measures envisaged to avoid, reduce and, if possible, remedy adverse effects (in addition to those measures that form part of the project); and
- Assessment of any cumulative effects with other developments planned in the area.

Methodology and assessment criteria

4.27 Each topic chapter provides details of the methodology for baseline data collection and the approach to the assessment of effects. Each environmental topic has been considered by a specialist in that area.

4.28 Each topic chapter defines the scope of the assessment within the methodology section, together with details of the study area, desk study and survey work undertaken and the approach to the assessment of effects. The identification and evaluation of effects have been based on the information set out in Chapter 2 (Project Description) of this ES, EIA good practice guidance documents and relevant topic-specific guidance where available.

Description of the environmental baseline conditions (including future baseline conditions)

4.29 The existing and likely future environmental conditions in the absence of the Proposed Development are known as ‘baseline conditions’. Each topic-based chapter includes a description of the current (baseline) environmental conditions. The baseline conditions at the site and within the study area form the basis of the assessment, enabling the likely significant effects to be identified through a comparison with the baseline conditions.

4.30 The baseline for the assessment of environmental effects is primarily drawn from existing conditions during the main period of the EIA work in the period 2020 to 2022.

4.31 The baseline for the assessment should represent the conditions that will exist in the absence of the project at the time that the project is likely to be implemented. The anticipated start date for construction is Q3 2024, with enabling works likely to occur in Q2 2024. The programme would be of approximately 12-18 months duration (including enabling works). Full operation of the site has been assumed to take place in Q2 2025. Further information about the construction programme assessed as part of the EIA process can be found in Chapter 2 (Project Description) of this ES.

4.32 Consideration has been given to any likely changes between the time of survey and the future baseline for the construction of the project from Q2 2024 and for operation of the project from Q2 2025. In some cases, these changes may include the construction or operation of other planned developments in the area. Where such developments are built and operational at the time of writing and data collection, these have been considered to form part of the baseline environment. Where sufficient and robust information is available, such as expected traffic growth figures, other future developments have been considered as part of the future baseline conditions. In all other cases, planned future developments are considered within the assessment of cumulative effects.

4.33 The consideration of future baseline conditions has also taken into account the likely effects of climate change, as far as these are known at the time of writing. This has been based on information available from the UK Climate Projections project (UKCP18), which provides information on plausible changes in climate for the UK (Environment Agency and Met Office, 2018) and on published documents such as the UK Climate Change Risk Assessment 2017 (Committee on Climate Change, 2016).

4.34 Climate data from the UKCP18 database has been compiled for a 25km2 grid square containing the site, based on a high emissions scenario (RCP8.5). Future cloud cover change data for the period 2040-2069 has been used to inform the consideration of how environmental conditions may change at the site and within the study area in future.

Limitations of the assessment

4.35 Each topic chapter identifies any limitations identified in the available baseline data and whether there were any difficulties encountered in compiling the information required.

Mitigation measures adopted as part of the project

4.36 During the EIA process, environmental issues have been taken into account as part of an ongoing iterative design process. The process of EIA has therefore been used as a means of informing the design.

4.37 The project assessed within this ES therefore includes a range of measures that have been designed to reduce or prevent significant adverse effects arising. In some cases, these measures may result in enhancement of environmental conditions. The assessment of effects has taken into account measures that form part of the project.

4.38 The topic chapters set out the measures that form part of the project and that have been taken into account in the assessment of effects for that topic. These include:

- Measures included as part of the project design (sometimes referred to as primary mitigation)
- Measures to be adopted during construction to avoid and minimise environmental effects, such as pollution control measures. These measures would be implemented through the CEMP
- Measures required as a result of legislative requirements.

Assessment of effects

4.39 The EIA Regulations require the identification of the likely significant environmental effects of the project. This includes consideration of the likely effects during the construction and operational phases. The assessment is based on consideration of the likely magnitude of the predicted impact and the sensitivity of the affected receptor. The process by which effects have been identified and their significance evaluated is set out within each individual topic chapter. The overarching principles are set out below.

Sensitivity or importance of receptors

4.40 Receptors are defined as the physical or biological resource or user group that would be affected by a project. For each topic, baseline studies have informed the identification of potential environmental receptors. Some receptors will be more sensitive to certain environmental effects than others. The sensitivity or value of a receptor may depend, for example, on its frequency, extent of occurrence or conservation status at an international, national, regional or local level.

4.41 Sensitivity is defined within each ES topic chapter and takes into account factors including:

- Vulnerability of the receptor
- Recoverability of the receptor
- Value/importance of the receptor.

4.42 Sensitivity is generally described using the following scale:

- High
- Medium
- Low
- Negligible.

4.43 In some cases, a further category of very high has been used.

Magnitude of impact

4.44 Impacts are defined as the physical changes to the environment attributable to the project. For each topic, the likely environmental impacts have been identified. For each topic the likely environmental change arising from the project has been identified and compared with the baseline (the situation without the project). Impacts are divided into those occurring during the construction and operational phases.

4.45 The categorisation of the magnitude of impact is topic-specific but generally takes into account factors such as:

- Extent
- Duration
- Frequency
- Reversibility.

4.46 With respect to the duration of impacts, the following has been used as a guide within this assessment, unless defined separately within the topic assessments:

- Short term: A period of months, up to one year
- Medium term: A period of more than one year, up to five years
- Long term: A period of greater than five years.

4.47 The magnitude of an impact has generally been defined used the following scale:

- High
- Medium
- Low
- Negligible.

4.48 In some cases, a further category of ‘no change’ has been used.

Significance of effects

4.49 Effect is the term used to express the consequence of an impact (expressed as the 'significance of effect'). This is identified by considering the magnitude of the impact and the sensitivity or value of the receptor.

4.50 The magnitude of an impact does not directly translate into significance of effect. For example, a significant effect may arise as a result of a relatively modest impact on a resource of national value, or a large impact on a resource of local value. In broad terms, therefore, the significance of the effect can depend on both the impact magnitude and the sensitivity or importance of the receptor.

4.1.1 Significance levels are defined separately for each topic. Unless separately defined in the topic chapters, the assessments take into account relevant topic specific guidance, based on the following scale and guidance:

- Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process with regard to planning consent. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer the most damaging impact and loss of resource integrity
- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process
- Moderate: These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

4.51 The terms minor, moderate, major and substantial apply to either beneficial or adverse effects. Effects may also be categorised as direct or indirect, secondary, short, medium or long term, or permanent or temporary as appropriate.

4.52 Each chapter defines the approach taken to the assessment of significance. Unless set out otherwise within the chapter, topic chapters use the general approach set out in Table 4.1. For some topics, a simplified or quantitative approach is considered appropriate.

Table 4.1: Typical assessment matrix

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

4.53 Unless set out otherwise in each topic chapter, effects assessed as moderate or above are considered to be significant in terms of the EIA Regulations within this assessment.

Further mitigation and future monitoring

4.54 Where required, further mitigation measures have been identified within topic chapters. These are measures that could further prevent, reduce and, where possible, offset any adverse effects on the environment.

4.55 Where relevant and necessary, future monitoring measures have been set out within the topic chapters.

Assessment of cumulative effects

4.56 The EIA Regulations require consideration of cumulative effects, which are effects on a receptor that may arise when the project is considered together with other Proposed Developments in the area.

4.57 The cumulative effects of the project in conjunction with other proposed schemes have been considered within each topic chapter of the ES. Other developments considered within the cumulative assessment include those that are:

- Under construction
- Permitted, but not yet implemented
- Submitted, but not yet determined
- Identified in the Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.

4.58 It is noted that developments that are built and operational at the time of submission are considered to be part of the existing baseline conditions.

4.59 Details of the developments included as part of the cumulative assessment are provided in **Appendix 4.3**.

Interrelationships

4.60 Each topic chapter considers whether or not there are any inter-related effects with other topics included within the EIA that have not already been considered in order to identify any secondary, cumulative or synergistic effects.

Summary tables

4.61 Summary tables have been used to summarise the effects of the project for each environmental topic.

Consultation

4.62 The project team has undertaken consultation with, or requested information from a number of organisations throughout the EIA process.

4.63 A summary of this consultation is included in each project Chapter.

Local planning authority

4.64 The project lies within the administrative area of VoGC. Pre-application advice was sought from the LPA on 4th September 2020. The resultant feedback from the LPA received on 18th December 2020

helped to refine the Proposed Development prior to submitting the DNS Scoping Report to the then Planning Inspectorate.

4.65 Further information regarding consultation with topic specific organisations is detailed within the individual topic chapters.

4.66 Meetings have been undertaken throughout the EIA and design process in order to agree methodologies and request and share information regarding existing environmental conditions. In addition to the organisations listed above, the applicant has held meetings to develop links with nearby local authorities, community councils, local education providers, local businesses, local and regional economic organisations and local community groups.

Informal non-statutory consultation

4.67 Throughout the development of the project, the applicant has undertaken informal consultation with the local community in order to gain feedback on the emerging proposals. A summary of the consultation carried out is set out below:

- A unique project website (www.parcdyffryn.com) has informed the local community of the project development.
- A series of update newsletters have been posted to local residents and hosted on the project website informing the local community of the evolution of the scheme, the vision and the anticipated timescales of the project process.
- Engagement with Community Councils has ensured that local communities are fully informed of the emerging proposals.

Statutory public consultation

4.68 As part of the consultation process, the applicant has engaged with the local community in order to inform local people about the project, to explain the Proposed Development and its likely effects and to take on board any concerns or issues raised. A summary of pre-application consultation carried out is set out below:

- A unique project website (www.parcdyffryn.com) has been used to host the formal Pre-Application Consultation.
- A site notices have been erected to inform passers-by of the proposals.
- Notices have been published in the local newspapers (The South Wales Echo and the Western Mail).
- Neighbours and specialist consultees have been informed via post.

Public exhibitions

4.69 A virtual exhibition has been prepared as part of the statutory Pre-Application Consultation process.

4.70 A Pre-Application Consultation (PAC) report will be submitted with the application providing further details of the findings of the exhibitions.

4.71 The comments received will be taken into account by the design team in the preparation of the planning application and, where relevant, in the EIA process.

References

Committee on Climate Change (2016) UK Climate Change Risk Assessment 2017.

Department for Communities and Local Government (DCLG) (2006) Environmental Impact Assessment: A Guide to Good Practice and Procedures – A Consultation Paper.

Department of the Environment, Transport and the Regions (DETR) (1997) Mitigation Measures in Environmental Statements. HMSO.

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Ministry of Housing, Communities and Local Government (2019b) National Planning Policy Framework.

https://gov.wales/welsh-government-makes-climate-emergency-declaration

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

5 HUMAN HEALTH

5.1 An assessment of the likely significant population health effects of the Proposed Development has been undertaken. The approach follows health in EIA good practice and has had regard to relevant HIA guidance as is applicable in the EIA context. The assessment is by a competent expert.

5.2 The assessment considers a proportionate selection of determinants of health, relevant vulnerable groups and the potential for health inequalities.

5.3 The Proposed Development is in a rural context, providing a solar farm on land currently used for agricultural fields. The local baseline suggests that the population in Wenvoe is slightly older than average, but health remains good and social and economic indicators suggest this trend will persist.

5.4 During construction the assessment considers how population physical activity behaviour may be influenced by the re-routing of the public footpath network crossing the site and by disturbance to footpath users due to construction activities. The assessment considers the Wenvoe population, and a sub-population defined in terms of increased vulnerability, including due to age, income, health status and proximity. A **minor adverse** (not significant) effect is identified. This reflects that appropriate access would be maintained and that levels of temporary disrupting and disturbance are unlikely to disincentives the population from using the routes. Improvements in the connectivity of the public footpath network due to the changes are noted, including links to a bus stop in the A48.

5.5 The potential for construction activities to affect public drinking water supplies was considered. The assessment concluded that, due to the committed mitigation measures set out in Chapter 6, the theoretical pathway for pollution to occur and then contaminate drinking water is broken. On this basis there is not the potential for a significant population health effect.

5.6 During operation the visual impacts of the project were considered in determine whether population health may be affected by a change in community identity. This assessment considered the population of Wenvoe and a relevant sub-population of vulnerable groups who may be more susceptible to health effects due to low income, poor health and/or proximity. The assessment was informed by the Chapter 8 landscape and visual assessment. The assessment identifies, at most, a **minor adverse** (not significant) effect. The local context drives this finding with the topography and existing vegetation providing a high degree of screening, such that the effect on population health is very limited.

5.7 The Proposed Development would support operational stage enhancements to the neighbouring retained community woodland Coed Nant-brân. The enhancements relate to provision of outdoor educational facilities. The facilities have the potential to benefit local school aged children as a sub-population of the Vale of Glamorgan population, particularly those from disadvantaged backgrounds and with limited access to green space. The assessment identifies a **minor beneficial** (not significant) effect. This is a conservative assessment on the basis that there is currently limited project detail on the nature and maintained of the facilities.

5.8 The operation of the Proposed Development will support energy security nationally in Wales and the UK, as well as contributing to reducing adverse health effects of climate change. The climate change related benefits apply to a global population, particularly deprived populations in low- and middle-income countries. The assessment identifies a **moderate beneficial** (significant) effect driven by the energy security benefits, but also accounting for the climate change related benefits. Public health is reliant on energy security for many day-to-day health protection, healthcare and health improvement activities, with low-income groups benefiting, particularly where this overlaps with poor health or social disadvantage.

5.9 Cumulative and inter-related effects have been assessed. The effects of these are not considered to result in combined population health effects that are greater than the individual effects.

6 WATER QUALITY

6.1 Using National Resource Flood Mapping the site is predominantly located within Zone A, with marginal areas of the site's western boundary located within Zone B. The entirety of the Site is assessed to have a very low risk from fluvial and sea flooding, a low risk of surface water flooding, and a very low risk and negligible risk of flooding from all other sources.

6.2 The Proposed Development is defined as 'Less Vulnerable' according to the technical Advice Note 15. A small number of panels will be installed within parts of the Site situated in areas at risk of surface water ponding. However, these will be raised a minimum of 1200mm and therefore will not disrupt the flow nor impact on the local capacity of the floodplain to store flood water. In addition, key electrical elements of the panels will be adequately waterproofed to reduce the potential for water to impact these components.

6.3 The report largely recommends SuDS to promote infiltration of surface water runoff from solar panels to ground. Gravel trenches will be provided around inverter units, storage compounds and the DNO control building to provide attenuation for surface water prior to infiltration. An attenuation basin is proposed to attenuate surface water flows from the battery storage facility, with flows discharged at a restricted runoff rate to Nant Bran, an ordinary watercourse to the south of the site. With the implementation of these design measures, the solar farm will be safe for its lifetime even in the unlikely event of flooding.

7 RISK

7.1 The significance of effect of major accidents in relation to fire risk has been assessed within this ES Chapter and has assessed the risk of fire hazard as part of the Proposed Development to be **very low** to **negligible**.

7.2 This chapter demonstrates appropriate mitigation measures which will be implemented through the construction and operation of the Proposed Development which includes implementation of a Battery Storage Management Plan. This chapter demonstrates that the Proposed Development meets the requirements of existing and emerging legislation and guidance.

7.3 The construction of the proposed development has the potential to result in the risk of fire hazard through poor construction techniques and improper installation. Through the implementation of good construction practice techniques as well as implementation of the measures contained within a Battery Storage Management Plan and Code of Construction Practice (CoCP), this risk can be adequately managed.

7.4 The overall significance of the effect on environmental receptors and human health during the construction phase, taking into account the mitigation measures as described in this Chapter, is assessed as **Minor Adverse**.

7.5 The operation of the proposed development has the potential to result in the risk of fire hazard through infrastructure failure. All maintenance operations will be undertaken in line with current health and safety and technical legislation and guidance. Through the implementation of a Battery Storage Management Plan, this risk can be adequately managed. These hazards are therefore mitigated through the design of the systems and appropriate safe systems of work being employed for maintenance.

7.6 The overall significance of the effect on environmental receptors and human health during the operation phase, taking into account the mitigation measures as described in this Chapter, is assessed as **Minor Adverse**.

7.7 Cumulative impacts with other proposed developments screened into the assessment have been assessed and no significant cumulative effects have been identified.

8 LANDSCAPE AND VISUAL IMPACT

8.1 The Landscape and Visual Impact Assessment (LVIA) has identified and addressed the existing landscape and visual resources within the Site and the surrounding 5 km radius study area. This includes identification of the character and features of the landscape and consideration of the changes that would result because of the construction and operation of the Parc Dyffryn Solar Farm. A 5 km radius study area was adopted for the assessment and a computer-generated zone of theoretical visibility (ZTV, Figure 6.3) was mapped to identify the areas from which the Parc Dyffryn Solar Farm would be potentially visible

8.2 The Site and wider study area is representative of the LANDMAP aspect (character) areas which comprises *"…undulating agricultural landscape north of Barry punctuated with occasional semi-natural and planted woodlands and crossed by minor watercourses. These feature together with field boundaries, which are often regularly clipped, form the focus of biodiversity interest. The woodlands are generally Ash dominated but a variety of other broadleaved tree species are also present and some have a diverse ground flora supporting species such as Herb Paris, Goldilocks Buttercup, Thin-spiked Wood-sedge, Wood Millet and Greater Butterfly Orchid"*. Transport and communication routes, such as major roads, rail lines, pylons and telegraph poles and existing solar farms have an impact on the local landscape. A number of locally designated sites are located within the study area, but not within the Site itself.

8.3 The majority of the Site comprises grazed improved grassland, arable fields and small areas of poor semi improved grassland (bounded by hedgerows, field ditches and watercourses). Located between the A48 and St Lythans Road. It lies to the southeast of the settlement of St. Nicholas.

8.4 There are a limited number of isolated residential properties located in close proximity to the Application Site. Within the wider study area there are larger areas of predominantly residential development, including the village of St. Nicholas and the town of Barry at the southern edge of the 5 km study area. People with views of the Site are predominantly vehicle travellers and cyclists on the local roads and walkers using several public rights of way (PRoW) located throughout the study area and in some cases through the site itself. Tall features in the study area, include the large electricity pylons to the immediate northwest and the tall telecommunications tower (Wenvoe Transmitter) to the east.

8.5 The Parc Dyffryn Solar Farm would be primarily accessed via the A48 to the north, with secondary access to the west off Dyffryn Lane, and would involve the construction of a large solar array, invertors, internal access roads and implementation of landscape planting.

8.6 The Parc Dyffryn Solar Farm would include a range of measures that have been designed to reduce or avoid significant adverse landscape and visual effects. The overall external design, including the site layout, has been developed to aid in reducing its overall landscape and visual impact. Existing field boundary planting, such as hedgerows and trees, would be retained and supplemented as appropriate, with newly planted native species trees, hedgerows and scrub areas planted in selected areas.

8.7 The indicative construction programme sets out a programme of approximately 12-18 months duration with limited tall plant such as piling rigs. The Site is located within an area that has been influenced to an extent by energy-based industry. The Project would increase the overall level of development within the study area and infill areas of undeveloped land. Whilst the character of the area has been influenced by transportation corridors, overhead power line pylons and other development, the landscape remains predominantly rural grazed farmland and other grassland habitats. The sensitivity of the landscape character, within which the Project site is located, is medium and direct effects on the site area during construction and at completion of the Project, would result in temporary effects on the landscape character of the Project site itself which, on balance when considering the protection and retention of existing features and relatively small

footprint of a development of this type, are not considered significant. Effects on other landscape character within the study area would not be significant.

8.8 Once operational there would be no significant adverse effect on landscape character in the long term following completion. Over time, as proposed landscape planting matures and the appropriate management of the existing vegetation is implemented, effects on landscape character would reduce further. Overall, the quality and character of the wider landscape within the study area would be maintained and would have the capacity to accommodate the Project without significant effects.

8.9 In terms of views, it is anticipated that the scale of the Parc Dyffryn Solar Farm would cause some localised obstruction to near distant views from footpaths that traverse the site. People would experience temporary significant adverse effects on views from a number of public rights of way (PRoW S11/6/1, S8/4/1, S8/1/1, S8/2/1 (joining S11/11/1) and PRoW W2/62/4) some of which would be temporarily closed or diverted during construction.

8.10 On completion of the Project, there would be significant adverse effects on views from the public rights of way which pass through the site and / or have been diverted. Including, S11/6/1, S8/4/1, S8/1/1, S8/2/1 (joining S11/11/1) and W2/62/4. Landscape planting where appropriate, once established, would help reduce the effect in the long term.

8.11 By year 15, the mature planting proposals and appropriate management of the existing grassland habitats, existing hedgerow and trees would increase species diversity of the Parc Dyffryn Solar Farm, provide a landscape buffer between the site and adjacent woodland and help blend the Project site into the surrounding landscape. Long term landscape benefits associated with the landscape scheme would promote the integration of the Project into the surrounding landscape.

8.12 The proposed Parc Dyffryn Solar Farm would be up to 3 m in height and potentially visible from small areas on higher ground within the 5 km study area and locally (as shown on the ZTV, Figure 5.4). However, it is considered that the potential effects upon longer distance views would not be significant due to the small or barely perceptible change in view. Effects on people experiencing long distance views would not be significant.

8.13 The visual amenity of people within the 5 km study area, due to intervening layered vegetation and topographical variation would generally be maintained. The nature of the Parc Dyffryn Solar Farm would not be entirely uncharacteristic of the study area as a whole and significant effects would be limited to people experiencing views in close proximity during the construction and operational phase from a small number of local public rights way. Over time, as proposed landscape planting matures, visual effects would help reduce levels.

9 BIODIVERSITY

9.1 The results of the ecology baseline surveys identified the following important ecological features that could be affected by the project and so were included in the ecology impact assessment.

Important Ecological Features

Important Ecological Feature	Assessment of Value in EIA terms
Statutory international designated sites	Very high (international) value
Statutory nationally designated sites	High (national) value
Non-statutory designated sites	Medium (regional) value
Ancient woodland / ancient woodland sites	Medium (regional) value
Arable – rare arable weeds	Up to medium (regional) value
Grassland – Land North-West of Nant Bran SINC	Medium (regional - county) value
Grassland – off-site semi-improved	Medium (regional - county) value
Hedgerows	Low (local) value
Scrub	Low (local) value
Trees	Low (local) value
Coed Nant Bran – ancient woodland and SINC	Medium (regional) value
Nant Brân stream	Low (local) value
Breeding birds	Low (local) value
Wintering birds	Low (local) value

9.2 The Ecological Impact Assessment (EcIA) has taken into account the following ecology mitigation measures that have been incorporated into the Project:

- A CEMP to include / reference all ecological mitigation measures required. Measures will include: pre-construction ecology surveys to update the baseline understanding and inform any mitigation updates / amendments required; the requirement for an Ecology Clerk of Works to undertake, instruct, and oversee ecology measures; protected species measures, in particular to protect breeding birds, otter and reptiles, and to prevent animals from becoming trapped or injured on site; and works free root protection zones around woodland, trees, hedgerows and scrub.
- An EMP detailing all ecology management measures required during construction, aftercare/establishment and the operational phases.
- A Rare Arable Weeds Conservation Strategy for the protection of retained field margins containing Rare Arable Weeds and long term management of the margins.
- The requirement for Ecology Method Statements for works to be undertaken in Coed Nant Bran and Land to the North West of Coed Nant Bran SINCs, and for any translocation of soils containing Rare Arable Weeds.
- Arable Reversion and the enhance of grassland beneath solar panels, and the introduction of annual cuts and/or sheep grazing.
- Enhancement planting and management of hedgerows to enhance habitat resources and connectivity across the site.

9.3 The results of the impact assessment confirmed that the Project will have a significant adverse effect on the following important ecological features:

- Land North-West of Nant Bran SINC, due to permanent habitat loss resulting from the construction of a hard surface footpath, the impact of construction is assessed to be of moderate adverse effect. However, it is considered that the in the long term in other parts of the SINC, the reinstatement of an annual late season hay cut and/or sheep grazing after plants

have set seed, will have an ecologically significant enhancement effect on the overall condition and species diversity of the SINC, and will help to prevent further encroachment of scrub. Therefore, in the medium to long term the significant effect of habitat loss during construction would be reduced to an insignificant minor adverse effect, and potentially an insignificant positive effect, in EIA terms.

- Coed Nant Bran SINC, due to permanent habitat loss resulting from the construction of a hard surface footpath, the impact of construction is assessed to be of moderate adverse effect. However, it is considered that the in the long term, the realignment of the footpath will result in less impact on the existing footpath to the south, and the restoration of soils and plants along this existing footpath, which in turn will help to mitigate the loss of habitat along the realigned route.

9.4 It is expected that the operational phase will result in no significant adverse effects on ecology.

10 CULTURAL HERITAGE

10.1 The proposed development site has been assessed for potential impacts on cultural heritage assets, including buried archaeological assets and above-ground built heritage. A cultural Heritage Desk-Based Assessment has been prepared, including the results of a recent geophysical survey. This study identified a high potential for Prehistoric remains to be present within the application site, and a low potential for those of other periods.

10.2 Some extant hedgerows may be considered historically important under the Hedgerow Regulations, having been present since the time of the early 19th-century Tithe mapping. These can be considered as of Low to Medium Sensitivity in EIA terms.

10.3 A Zone of Theoretical Visibility (ZTV) model was used to identify heritage assets in the wider landscape that could be subject to impacts from the proposed development. Eleven such assets were identified and assessed: 5 Scheduled Monuments, 2 Listed Buildings, 1 Listed Building group, 2 Registered Parks and Gardens, 2 Conservation Areas.

10.4 Mitigation in the form of alterations to the scheme design, and/or a programme of archaeological works will be agreed with the planning archaeologists at GGAT prior to construction, and implemented during the construction phase.

10.5 Mitigation of any potential settings impacts has been undertaken in the design, by reducing the area of solar panels and redrawing the boundaries to increase distance to sensitive receptors. A landscape scheme will also be implemented to reduce intervisibility with heritage assets where possible.

10.6 A potential effect of Moderate significance was identified in relation to the buried Prehistoric archaeological remains which could be subject to a High level of impact. It was considered, however, that this effect could be reduced to Minor by the recording of any archaeological features removed, and publication of the findings.

10.7 A potential effect of Minor to Moderate significance was identified in relation to the setting of St Nicholas Conservation Area, which may be significant in EIA terms.

10.8 All other potential effects are considered to be Negligible to Minor, and not significant in EIA terms.

10.9 Any effects on settings of heritage assets will be active in the operational phase of the development.

11 CLIMATE CHANGE

11.1 The potential impact of greenhouse gas (GHG) emissions due to the Proposed Development, resulting in an effect on the global atmospheric GHG concentration that contributes to climate change, has been assessed and reported in this chapter. The potential risks or benefits to the Proposed Development from a changing climate have also been assessed and reported.

11.2 The construction-stage impact due to the extraction of raw materials, manufacturing and transportation of the solar panels, batteries and associated electrical components have been assessed. The GHG impacts were calculated to be approximately 129,088 tCO2e, causing a major adverse effect that is significant. These impacts are immediate at the time of construction.

11.3 The construction-stage GHG effects can be minimised via engagement with the supply chain and procurement decisions that consider GHG emissions performance as documented through verified Environmental Product Declarations, in order to ensure that the solar panel modules, battery packs and associated components selected are those manufactured under conditions with minimised GHG impacts.

11.4 The operational phase GHG effects, due to the generation of zero-carbon electricity and consequent displacement of marginal sources of generation with greater GHG impacts, are expected to be in the order of magnitude of between -362,997 and -442,495 tCO2e over the proposed development's lifetime compared to a current business-as-usual baseline. The operational GHG impact of the Proposed Development has been determined to have a significant beneficial effect.

11.5 The whole-life impact of the Proposed Development has been determined to have a negligible to significant beneficial effect over the course of its lifetime, in line with the definitions of IEMA's guidance for GHG impact assessment. Although a significant initial carbon cost of manufacturing and installation is incurred, by achieving a carbon payback period of 10-12 years and providing subsequent net negative emissions in operation, the proposed development meets, and in some respects exceeds policy goals for the rate of carbon reduction in the context of UK, Wales and Vale of Glamorgan carbon budgets.

11.6 Of the five potential risks to the Proposed Development as a result of climate change assessed in this report, two were considered to have a potentially significant effect in the initial screening risk assessment. Owing to the good practice design measures that will be incorporated into the Proposed Development, this effect was determined to be negligible and not significant.