Glöyn Byw | Butterfly Solar Farm

Land to the North of the B5426, Wrexham

Environmental Impact Assessment Scoping Report

Prepared for

RWE Renewables UK

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Revision	Date	Prepared By	Reviewed / Approved By
3456-01-SCP-01	February 2025	C Fairhead	A Russell

Well House Barns, Chester Road, Bretton, Chester, CH4 0DH

Camelia House, 76 Water Lane, Wilmslow, Cheshire, SK9 5BB

T: 0344 8700 007
enquiries@axis.co.uk
www.axis.co.uk

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1.0 INTRODUCTION

1.1 Background

1.1.1 RWE Renewables UK ('the Applicant') has commissioned this Environmental Impact Assessment (EIA) Scoping Report for the Glöyn byw / Butterfly Solar Farm project ('the Proposed Development'). The Proposed Development comprises a new solar energy generating station and an associated on-site Battery Energy Storage System (BESS) on land to the north of the B5426, Wrexham ('the Site'). The Proposed Development also includes the associated infrastructure and connection to the Legacy National Grid substation.

1.1.2 The current design for the Proposed Development would enable the export of up to 99.9 megawatts (MW) of electricity, as well as the storage of electricity in the BESS.

1.1.3 As the Proposed Development would have an electrical generating capacity of more than 10 MW, it would be defined as a Development of National Significance (DNS) and therefore the Proposed Development will be determined by Planning and Environment Decisions Wales (PEDW).

1.1.4 The Site is located within Wrexham County Borough Council ('the Council' or 'WCBC'), approximately 3km to the south of the City of Wrexham and 1.5km to the east of Johnstown. The solar array and associated infrastructure would be located on land to the north of the B5426 and the east of the A483.

1.1.5 The solar array is divided into three principal areas referred to as the Western, Central and Eastern Array Areas (the WAA, CAA and EAA respectively). The development areas are shown on Figure 1.1 and are described in detail within Chapter 3.0 of this Scoping Report.

1.1.6 An initial layout design is illustrated on Figure 1.2a-c. It is important to note that this may be refined as the Proposed Development design progresses, taking into account the findings of the ongoing environmental and technical assessments and consultation responses, as well as the Council's and PEDW's formal pre-application advice responses.

1.1.7 This document provides all the information necessary to enable PEDW to adopt a Scoping Opinion in respect of the information to be included within the EIA for the Proposed Development.

1.2 The Applicant

1.2.1 The Applicant is a market leading solar developer, having secured consent for over 1 GW of solar and battery storage projects throughout the UK. The Applicant places a special focus on improving local biodiversity of sites, with a minimum biodiversity net gain of over 50% across its sites and has a strong record of engaging with and winning the support of local communities, who in turn help to shape their developments. As a result, they have a 98% success rate in planning.

1.2.2 The Applicant is part of the RWE group, the largest energy producer in Wales, and the country's number one renewable energy generator. RWE are currently involved in over 3 GW of power generation in Wales across 12 sites, of which around 1 GW is renewable, and have invested over £3bn in the country since 2010. The company's existing renewable energy portfolio already generates one third of Wales' renewable energy production – enough to power 550,000 homes. RWE plays a critical role in driving Wales' decarbonisation, working in partnership with Welsh Government and wider partner organisations. Through its past and future investments RWE is helping to create a clean, affordable and secure power system, which will act as the springboard to the decarbonisation of wider economic sectors across Wales, such as industry and transport. It currently employs over 350 full time staff in Wales across its three offices in Port of Mostyn, Dolgarrog and Baglan, and runs a highly competitive apprenticeship scheme with over 100 participants, training future generations with the skills needed for a just transition to net zero.

1.3 Requirement for Environmental Impact Assessment

1.3.1 The requirement for EIA was prescribed by European law under Council Directive 85/337/EEC. This Directive has been amended four times, with the latest amendment, the Environmental Impact Assessment (EIA) Directive (2014/52/EU) entering into force on 15 May 2014.

1.3.2 In Wales, the Directive has been transposed most recently into law via the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, hereafter referred to as 'the EIA Regulations'.

1.3.3 The Environmental Assessment of Plans and Programmes and the Environmental Impact Assessment (Miscellaneous Amendments) (Wales) (EU Exit) Regulations

2019 made on 13 February 2019 ensure that the EIA Regulations continue to apply in Wales following Brexit.

1.3.4 The EIA Regulations prescribe the types of development for which EIA is mandatory (Schedule 1 development) and others that may require an assessment if they have the potential to give rise to significant environmental effects (Schedule 2 development). The Proposed Development is for the construction and operation of a solar farm and associated grid connection, with a total Site area of approximately 160 ha, which is covered by Schedule 2, Part 3(a) of the EIA Regulations:

"*3 Energy Industry*

(a) Industrial installations for the production of electricity, steam and hot water (unless included in Schedule 1).

The area of the development exceeds 0.5 hectare."

1.3.5 Whilst the Proposed Development qualifies as a Schedule 2 development, a formal screening opinion has not been sought to determine if it is considered to represent EIA Development i.e. a project likely to give rise to significant environmental effects. However, the Applicant consider that by virtue of the nature, size and location of the Proposed Development it would have the potential to meet the Criteria in Schedule 3 of the EIA Regulations and therefore, has the potential to give rise to likely significant environmental effects. As a consequence, the Applicant has elected to prepare an Environmental Statement (ES) in support of the application. Further details on the scope of the proposed EIA are reported in Chapter 4.0 of this report.

1.4 Purpose of Scoping

1.4.1 The objective of the EIA process is to identify and evaluate all significant, direct and indirect environmental effects of the Proposed Development, during both construction and operation, on the environment. The EIA process culminates in the production of an ES.

1.4.2 Scoping is the part of the EIA process through which the content and extent of matters to be covered by the ES are identified, by considering the potential impacts that could arise from the construction, operation and decommissioning of the Proposed Development.

1.4.3 Only the significant environmental effects of the development should be subject to full environmental assessment within the ES. Paragraph 3.9 of DNS Guidance Appendix 3 (Environmental Impact Assessment) states:

"applicants should ensure that all aspects of the environmental likely to be significantly affected by the development are addressed."

1.4.4 In light of the above, environmental topics that have been identified as 'scoped in' to the EIA process are summarised at Section 4.2 and described in more detail at Sections 6.0 – 9.0 of this document. Section 4.3 of this document also provides details of the environmental topics proposed to be 'scoped out' of the EIA process together with supporting justification.

1.4.5 The scoping process ensures that mitigation and enhancement measures are considered at an early stage of the design process. It also provides opportunities for PEDW and other stakeholders to ensure areas of the environment that have the potential to be significantly affected by the Proposed Development are fully considered within the ES.

1.4.6 The scoping process also helps to identify potential design constraints at the start of the project evolution. This helps to ensure that environmental protection and sustainability are key factors in the final proposed solution.

1.4.7 Although the scoping process is often regarded as a discrete stage it should continue throughout the development of the EIA. It may be necessary to alter the extent of research required for a particular discipline as the understanding of the magnitude and significance of an impact is established. This is vital to ensure that resources and efforts are focused on the issues that have the potential to cause the most impact. Where a variation of any agreed scope is required, this will be confirmed in writing with PEDW.

1.4.8 This EIA Scoping Report will be issued by PEDW to several consultees who will be invited to comment on:

i) the development proposals;
ii) the proposed scope of assessment;
iii) relevant issues for consideration during the EIA process; and
iv) the scoping out of environmental matters that are considered unlikely to be significant.

1.5 The EIA Team

1.5.1 Axis is an independent planning and environmental consultancy specialising in environmental impact assessment of major infrastructure projects. Axis has been appointed as lead EIA consultant for the Proposed Development and will undertake planning, traffic and transport, and landscape and visual assessments for the project using its own in-house specialists. The Axis project team will work alongside a team of specialist consultants who will assess the potential impacts of the Proposed Development upon their specific areas of expertise. The preliminary team comprises:

i) Noise and Vibration: InAcoustic
ii) Historic Environment: AOC
iii) Ecology: Avian

1.6 Content of this Scoping Report

1.6.1 Following on from this Introduction, the remainder of this scoping report is organised to the following structure:

i) Chapter 2.0 of the report briefly describes the Site and its surroundings;
ii) Chapter 3.0 provides a description of the Proposed Development;
iii) Section 4.0 provides a summary of the proposed EIA scope, including details of environmental topics proposed to be scoped out of the EIA process.
iv) Chapter 5.0 outlines the broad principles of the EIA methodology;
v) Chapters 6.0 to 9.0 describe what the Applicant considers to be the main environmental issues that could arise through the construction, operation and decommissioning of the Proposed Development and how they will be assessed; and
vi) Chapter 10.0 sets out the proposed structure of the ES.

2.0 THE SITE

2.1.1 The location of the Site is shown on Figure 1.1.

2.1.2 The Site is divided into three principal areas referred to as the Western, Central and Eastern Array Areas (the WAA, CAA and EAA respectively), each of which is described below. Each of the array areas are separated by approximately 1.8km and they would be connected to each other via underground cabling, which in turn would link to a main onsite substation located within the WAA. The application also includes an underground cable connection from the onsite substation to the Legacy National Grid Sub-Station, which is located approximately 1.3km to the north of Rhosllannerchrugog.

2.1.3 The OS grid references for each of the array areas are:

i) WAA – 331692, 346263
ii) CAA – 333959, 345629
iii) EAA – 336679, 346129

2.1.4 The entirety of the Site covers an area of approximately 150ha.

2.1.5 The Predictive Agricultural Land Classification (ALC) Map 2 classifies the majority of the Site as being Grade 3b land, with small pockets of Best and Most Versatile (BMV) land present. The BMV land would be surveyed and assessed and reported within an Agricultural Land Classification Report which would be provided to accompany the planning application.

2.1.6 The following sections describe key environmental designations relevant to the Site, these are also illustrated on Figure 2.1.

Western Array Area

2.1.7 The WAA covers approximately 22ha and comprises agricultural fields bound by hedgerows, some of which contain mature trees. The WAA is located to the immediate east of the A483, approximately 1km to the east of Johnstown.

2.1.8 There is a private road leading through the WAA which provides access from Haford Road in the west (west of the A483) to a private residential dwelling, Hafod y Bont in the east. The road is also a Public Right of Way (PRoW), footpath RUA/119. This

private road is not proposed as an access route into the WAA. Access would be gained into the WAA from the B5426 to the south.

2.1.9 The nearest residential property to the Site is Hafod y Bont, located adjacent to the eastern boundary of the WAA. The property is well screened in all directions by mature trees. The Haford House Rest Home is located approximately 220m to the west of the Site, to the west of the A483. The Haford Industrial Estate is also located to the west of the A483, approximately 300m from the WAA boundary.

2.1.10 The Bonc yr Haford Country Park is located 215m to the west. Within the same area there is also the Stryt Las a'r Haford Site of Special Scientific Interest (SSSI) and the Johnstone Newt Sites Special Area of Conservation (SAC).

2.1.11 The WAA is not located within a Special Landscape Area.

2.1.12 There are a number of cultural heritage assets within the vicinity of the Site. The Grade II listed properties 'Haford House' and 'Haford House Farmhouse' are located approximately 220m to the west of the Site and form part of the aforementioned Haford House Rest Home. There is a Grade II listed 'Signpost at SW End' located approximately 715m to the north and there are two more listed buildings further north of the signpost. The Grade II listed 'Old Sontey Hall' is located approximately 1.2km to the east. The Wat's Dyke scheduled monument is located approximately 260m to the east of the WAA, which is also a PRoW and forms part of the Wat's Dyke Way Heritage Trail (footpath RUA/120 and MAR/41).

2.1.13 The NRW Flood Map for Planning shows that Site is at very low risk to flooding from seas and rivers. The Site is predominantly at very low risk to flooding from surface water and small watercourses.

Central Array Area

2.1.14 The Central Array Area (CAA) covers approximately 70ha and comprises agricultural fields bound by hedgerows, some of which contain mature trees. Marchwiel Hall Road runs up the centre of the CAA which would be used to access the CAA. The CAA is divided into four distinct parcels, two to the west of the Marchwiel Hall Road and two to the east. Narrow areas of woodland lie between and to the south of the two eastern parcels, these areas of woodland follow minor watercourses and the woodland is designated as Ancient Woodland. The areas of Ancient Woodland lie outside but adjacent to the boundary of the Site and are also locally designated

wildlife sites. A number of ponds are illustrated within the CAA on the OS 1:25000 mapping.

2.1.15 There are several properties close to the southern boundary of the CAA, to the north and south of the B5426. These properties form part of the settlement of Eyton. Eyton Primary School is also located in this area, to the south of the B5426. Residential properties are located along Marchwiel Hall Road and lie close to the boundary of the CAA. A golf course and the Plassey Holiday Park is located to the east of the CAA.

2.1.16 Bwgan Ddu Lane runs east west approximately 200m to the north of the CAA, the cable connection between the CAA and the Eastern Array Area (EAA) runs along Bwgan Ddu Lane, this route is described further below.

2.1.17 The Sontley Marsh SSSI and the Errdig Park Country Park are located approximately 1.35km and 1.7km to the north of the Site respectively.

2.1.18 The CAA is not located within a Special Landscape Area.

2.1.19 There are a few cultural heritage assets within the vicinity of the CAA, the nearest of which are the Grade II listed 'Former House at The Groves' and 'The Groves', located along the eastern boundary of the northern part of the CAA. The Grade II listed 'Kiln Farmhouse including former Malthouse to rear' is located approximately 400m to the north.

2.1.20 The NRW Flood Map for Planning shows the CAA is at very low risk to flooding from seas and rivers. The CAA is predominantly at very low risk to flooding from surface water and small watercourses, however, there are a small number of areas adjacent to the aforementioned watercourses which are shown to be a high risk from flooding from surface water and small watercourses.

2.1.21 No PRoW are located within the CAA. Footpath MAR/7 connects the B5426 with Marchwiel Hall Road and runs along a section of the southern boundary of the CAA.

Eastern Array Area

2.1.22 The EAA covers approximately 54ha and comprises agricultural fields bound by hedgerows, some of which contain mature trees. An area of woodland, approximately 30m in width and 350m in length, is located centrally within the EAA,

this woodland is not designated as Ancient Woodland. Two blocks of Ancient Woodland are found adjacent to the boundary of the EAA, forming part of land associated with Gerwyn Hall. Kiln Lane, a minor road, forms the northern boundary of the EAA. This would be used to gain access into the EAA.

2.1.23 There are a number of residential properties located along Kiln Lane, on its northern side. The aforementioned Gerwyn Hall is located immediately to the east of the EAA. A residential property and commercial premises are located to the south of the EAA. The nearest settlement to the EAA is the village of Cross Lanes, approximately 850m to the northeast. The village of Bangor-on-Dee is located approximately 1.5km to the southeast.

2.1.24 The B5426 runs east west approximately 600m to the south.

2.1.25 The River Dee SSSI is located approximately 920m to the south, as is the River Dee SAC. The River Dee (Holt – Worthenbury) Geological Conservation Review site is located approximately 2.8km to the east.

2.1.26 The eastern most field within the EAA (circa 6ha) lies within the Lower Dee Floodplain Special Landscape Area.

2.1.27 There is little presence of cultural heritage assets within the immediate vicinity of the EAA. The Grade II listed 'White House' is approximately 825m to the southwest and the Grade II listed 'Ivydale' is located approximately 870m to the northwest.

2.1.28 The NRW Flood Map for Planning shows the EAA is at very low risk to flooding from rivers, seas, surface water and small watercourses.

2.1.29 Footpath SES/6 runs through the eastern most parcel of the EAA. Footpath SES/9 runs along the southern boundary of the EAA and connects to footpath SES/6. There are a number of other footpaths within the vicinity of the EEA.

Electrical Connections

2.1.30 The Site includes the roads which connect the three solar array areas, within which cables will be laid to connect the solar farm to the main site substation, located in the WAA. The EEA would be connected to the CAA via the B5130 (Kiln Lane), Cockbank Lane, Bwgan-Ddu Lane and Marchwiel Hall Road. The CAA would be connected to the WAA via Marchwiel Hall Road and the B5426.

2.1.31 As described in the following section, the Site also includes the electricity connection from the solar farm substation in the WAA to the Legacy Substation. Two routes are currently under consideration, shown on Figure 1.1.

2.1.32 The first, the Northern Option, would route west along the B5426 from the WAA, before turning north along Haford Road and Corkscrew Lane, to the junction with the B5605 (Wrexham Road). The cable would then cross Wrexham Road and proceed along Smithy Lane, before routing north along Talwrn Road and then west along the unnamed B5426 to Legacy Substation entrance road.

2.1.33 The second option, the Western Option, would route west along the B5426 from the WAA towards Johnstown where it would turn north along the B5605 (High Street/Wrexham Road). It would continue north to the junction with Smithy Lane, and then follow the same route as the Northern Option from this point to Legacy Substation.

3.0 THE PROPOSED DEVELOPMENT

3.1 Introduction

3.1.1 The Applicant proposes to develop a solar photovoltaic electricity generating station (or 'solar farm') with an export capacity of up to 99.9 MW, battery storage and associated ancillary development, including a 132 kV substation. The electricity generated would be enough to meet the needs of over 33,500 typical Welsh homes and result in an approximate saving of over 2.2 million tonnes of CO_2, compared with generation from fossil fuels. The inclusion of batteries ensures the maximum efficiency working with the electricity distribution system to enable surplus energy to be stored and released as needed, and provide vital balancing services to the grid network, avoiding intermittency of supply, and allowing a transition to a net zero renewable energy future.

3.1.2 The main components of the Proposed Development are:

i) Photovoltaic solar panels and associated support frames
ii) Central Inverter and Switchgear Stations
iii) Battery Energy Storage Systems (BESS), including battery storage containers, DC-DC converters and associated hybrid inverters
iv) Onsite electrical cabling
v) An electrical substation compound (132kV) comprising a new substation and control building
vi) Spare parts storage container(s)
vii) Wooden post deer/stock fencing
viii) In-ward facing infrared CCTV cameras on 3 m poles
ix) Landscaping and ecological enhancements
x) Electrical cabling between the solar array areas
xi) Electrical cabling to the National Grid Legacy Sub-Station

3.1.3 The point of connection to the National Grid would be via the Legacy Substation located adjacent to the Talwrn Water Tower to the north of Bronwylfa Road (the B5426), approximately 2.7 km to the northwest of the main solar farm area. The solar farm would connect to the substation via an underground electrical cable. The grid connection route would be approximately 4 km from the WAA. For the majority of this route, the underground cable would sit beneath the existing highways boundary. As

described previously two potential grid connection options are under consideration, shown on Figure 1.1.

3.2 The Solar Farm

3.2.1 Solar panels typically 'over sail' between 25% and 40% of the land which they occupy and are mounted on frames and arranged in series of rows approximately 4 to 10 m apart and up to a height of 3 m at the highest point, tilted southwards at an angle of 15-24 degrees. Fencing will be situated at least 5 m from any field boundaries with a further 2 m separation from panels to perimeter deer fencing to allow for maintenance of the site/field margins. Furthermore, an offset of 8 m would be maintained to any ditches around the Site.

3.2.2 The presence of Ancient Woodland adjacent to the Site, along with mature trees (potentially Veteran) within the field boundaries of the Site, means that there will be a need to ensure these are adequately protected from harm. A tree survey, in accordance with BS5837, has been conducted to ensure that adequate buffers are provided from infrastructure.

3.2.3 Whilst some minor excavation is required for transformers', inverters', and battery storage containers foundations, these will occupy a minimal overall area, and no significant ground works are required for the development, with the support frames for the panels using piles, driven into the ground.

3.2.4 Underground cabling would be laid throughout the Site, connecting the solar panels to the battery storage units. These cables would be laid within trenches dug to approximately 1m deep and 0.5 m in width.

3.2.5 Cables would also connect the three solar array development areas. The connection between the WAA and the CAA would be along the B5426. The connection between the CAA and the EAA would be north along Marchwiel Hall Road, east along Bwgan Ddu Lane, Cockbank Lane and Kiln Lane.

3.2.6 The electrical connections would be located within the hard surfacing of the highway or footway, or within the highways verge. The precise location of the cable will be dictated, in part, by the presence of other utilities within the highway. The trenching works would be undertaken in short sections, managed using traffic control systems or where considered necessary under road closures supported by diversions. In this

regard the cable trenching works would be similar to other regular utilities works undertaken within the highway.

3.2.7 The proposal would include an on-site 132 kV substation, which would comprise an open compound with support stanchions and cabling. The substation would be located within the WAA located away from the residential property to the east of the WAA and positioned to take advantage of the screening provided by the adjacent woodland. The substation's main structural elements would be painted in a muted mid-tone neutral shade to ensure that they are visually recessive within the landscape.

3.2.8 It is anticipated that the substation would sit within a 60 m x 25 m compound comprising hardstanding and enclosed within a 2.4 m galvanised security palisade fencing. A 4 m high control room building would also sit within the substation compound.

3.2.9 The array areas would be enclosed by 2m wood stock post 'deer' fencing. This would sit approximately 5 m from existing hedgerows. Inward facing unlit infrared security cameras, sitting on 3 m posts would be installed around the Site for health, safety and security purposes.

3.3 Battery Storage Facilities

3.3.1 The Proposed Development includes battery storage facilities within containerised battery energy storage systems (BESS). These would be situated around the Site and positioned away from residential properties and sensitive receptors. The BESS units would be housed in metal containers measuring approximately 12.5 m x 2.4 m and 2.6 m tall. These containers would be equipped with modern heat ventilation and cooling (HVAC) units, and fire suppressant systems, ensuring that they operate at safe temperatures and that safety measures are in place in the unlikely event of a fire breaking out.

3.3.2 The BESS containers (and solar array) would be supported by inverters, transformers and associated infrastructure.

3.3.3 The purpose of battery energy storage would be to capture any unused or excess energy generation from the solar panels and store it, which can then be released to the grid as and when necessary. This will maximise the efficiency of the solar farm. The batteries can also store surplus electricity from the wider electricity distribution

network at times of low usage and high generation elsewhere in Wales and then release it back when the grid requires. This practice is called ‘grid balancing’ and enables increasing deployment of renewable energy throughout the UK.

3.3.4 The BESS units would be connected to the PV system via inverters. The Site would have a grid export capacity of 99.9 MW.

3.3.5 The battery storage components would not require any significant ground works to install as they are prefabricated offsite and then brought to the Site where they are installed on concrete platforms. Some minor ground levelling would be required to ensure the components sit on stable ground.

3.3.6 The BESS units have the potential to generate heat and therefore it is necessary to adopt sufficient management and control measures. The BESS would include cooling systems which are designed to regulate temperatures. The units would also contain highly sensitive fire detection and suppression systems, enabling identification of potential thermal runaway well in advance of any occurrence, and allowing units to be switched off remotely to avoid any such incident. Currently over 1 GW of battery storage is safely operating in the UK.

3.3.7 A Battery Safety Management Plan (BSMP) will be implemented during the operation of the Proposed Development. The BSMP will detail the regulatory guidance reviewed to ensure that all safety concerns around the BESS element of the Proposed Development are addressed so far as is reasonably practicable such that likely significant effects would not arise from their operation.

3.4 Dual Use and Reversibility

3.4.1 The layout of the solar farm would allow for sheep grazing beneath and between the rows of panels, providing an efficient dual use of land for renewable energy generation and livestock. The Proposed Development would have a design lifespan of 40 years. This is considered a temporary (albeit long term) and fully reversible use, as all equipment and shallow hardstanding surfaces could be removed from Site upon decommissioning.

3.4.2 The methods used in construction are such that remediation/decommissioning works following the removal of the solar panels, BESS units and associated infrastructure would be relatively easy to achieve. As such, the Site could be returned to its existing state as agricultural land.

3.5 Landscaping and Ecological Enhancement

3.5.1 Following construction, a programme of site reinstatement and habitat creation will commence, noting that ecological protection measures will be included in a Construction Environmental Management Plan (CEMP) for the construction stage. A Landscape and Ecological Management Plan (LEMP) would be developed for the operational stage which would specify the management requirements for the lifetime of the development to ensure that the ecological mitigation measures proposed continue to deliver the benefits intended.

3.5.2 Landscaping mitigation plans will be developed as the ecological assessment and the landscape and visual assessment are progressed. The scheme will be developed to deliver a minimum biodiversity gain of 50%, significantly in excess of the industry standard of 10%.

4.0 EIA SCOPING SUMMARY

4.1 Introduction

4.1.1 This section provides a list of the environmental topics to be 'scoped in' to the EIA process for the Proposed Development together with details of the topics proposed to be scoped out of the EIA process and the reasons why.

4.2 Environmental Topics Scoped into the EIA Process

4.2.1 The following environmental topics are scoped into the EIA process; further information regarding the proposed scope for these environmental topics is provided at **Chapter 6.0 – 9.0** of this document.

Table 4.1 – Environmental Topics Scoped In

Topic	Further Information in this Document
Landscape and Visual Impacts	Chapter 6.0
Ecology and Biodiversity	Chapter 7.0
Noise and Vibration	Chapter 8.0
Historic Environment	Chapter 9.0

4.3 Environmental Topics Scoped Out

4.3.1 The following environmental topics (with supporting justification below the table) are proposed to be scoped out of the EIA process.

Table 4.2 – Environmental Topics Scoped Out of the EIA Process

Topic	Construction Effects	Operational Effects
Traffic and Transport	Limited requirement for construction traffic. Average vehicle movements will be in the order of twelve deliveries (twelve inbound plus twelve outbound movements) per day over the 39 – 52 week construction period. There will only be minor fluctuations in this scheduling. The relatively good access and limited low frequency of traffic, which would be manged via a Construction Traffic	Isolated and infrequent maintenance will be required, resulting in negligible operational traffic movements.

Topic	Construction Effects	Operational Effects
	management plan would limit the magnitude of impact.	
Air Quality	There is the potential for air quality impacts from increased vehicle movements and construction works giving rise to dust. However, as set out above the construction traffic would be relatively limited and good practice measures can be adopted to reduce dust arising, this would be controlled via a Construction Environmental Management Plan.	No likely significant effects due to minimal traffic generation and no emissions from onsite technology.
Population and Human Health	No likely significant effects at a community level with respect to local amenity. No significant temporary or permanent realignments of Public Rights of Way are proposed, and suitable offsets from footpaths from any development have been incorporated into the design. Aspects of human health associated with the construction phase will be addressed, as appropriate, within relevant chapters of the ES.	
Geology and Soils	A small proportion of the Proposed Development is located on Best and Most Versatile (BMV) land. Soil management protocols will be included as standard within a Construction Environmental Management Plan (CEMP). Solar installations will not impact geological features due to limited piling into soil.	Vehicle and worker movements unlikely to impact soil characteristics. The absence of agricultural activity allows soils to restore over the duration of the development.
Material Assets and Waste	Waste will be minimised through construction and no significant impacts on landfill sites are anticipated. Sustainable sourcing of construction materials will be advocated within the supply chain.	Negligible amounts of waste will be produced during operation, with waste materials managed via an Operational Site Waste Management plan which would implement the waste hierarchy.

Topic	Construction Effects	Operational Effects
	Mineral Safeguarding assets would be preserved.	
Climate Change	Embodied carbon will be calculated and reported within the Proposed Development chapter of the ES. Embodied carbon would be offset by the generation of renewable electricity. The Site is not located in a flood zone and there are no other likely significant effects in relation to climate resilience.	No impacts on climate change will be experienced during operation. Benefits associated with non-fossil fuel generation of electricity will be reported in the Proposed Development Chapter of the ES.
Flood Risk and Water Resources	Potential increase in surface run off from soil compaction. However, impacts would be very localised and given the rural nature of the Site any increased runoff effects would be short terms and negligible in the context of the wider catchment. A CEMP would be used to avoid pollution of local water resources.	Operational solar farms have very limited areas of hardstanding, as such there is unlikely to be any offsite impact on flood risk. Furthermore, there is a potential beneficial effects from reduced water infiltration as a result of a change in agricultural practices. Similarly there are no significantly sources of pollution in an operational solar farm, again reduction in the intensity of agricultural practices i.e. reduced use of fertilizer, pesticides and winter crop rotations, can improve water quality.
Major Accidents and Disasters	Unlikely that any major accidents or disasters will occur during construction due to scale and type of construction activity.	No major accidents or disasters are likely due to the operational characteristics of the Site. It is unlikely that the Proposed Development would be susceptible to any realistic accidents or disasters.
Lighting / Glare	Lighting of construction sites will be addressed as part of the Landscape and Visual assessment and so no	Site lighting will be minimal and designed in a way as to not significantly affect residential properties or sensitive species.

Topic	Construction Effects	Operational Effects
	standalone assessment chapter is proposed.	Glint and glare study will inform the design process and be considered embedded mitigation. Significant impacts from glint and glare will be designed out.

Traffic and Transport

4.3.2 The construction period is expected to take in the order of 9 to 12 months. It is expected that construction hours would be between 07:30 and 18:00 hours Monday to Friday and 08:00 to 14:00 hours on Saturday, with no works on Sundays or Bank Holidays, in line with Wrexham Council Guidance[1].

4.3.3 Over the duration of the 9 to 12 month construction period, it is predicted there would be an average of up to 12 HGV deliveries per day (12 inbound and 12 outbound HGV movements per day).

4.3.4 As above, construction vehicles are predicted to be low and temporary in nature. Their movement is expected to be no different to the current farm and agricultural vehicles that travel along the access route.

4.3.5 A detailed Construction Traffic Management Plan detailing the delivery routes, construction compounds and a suite of traffic management measures to minimise impacts and maintain road safety is being prepared.

4.3.6 Once operational, the development will be operated remotely, thus there would be no daily requirement for access. Access is only required for maintenance and inspection which is undertaken by a 4x4 type vehicle approximately once per month.

4.3.7 The vehicle movements associated with the occasional visits to the operational development would have a negligible influence on the surrounding population and highway network.

[1] *https://www.wrexham.gov.uk/service/noise-complaints/noise-nuisance-tips*

4.3.8 As above, a detailed Construction Traffic Management Plan is being prepared which will contain a suite of traffic management measures to minimise impacts and maintain road safety. This will be submitted as part of the DNS application.

4.3.9 In addition, a Transport Statement is being prepared which will detail the vehicle movements generated by the development when it is being constructed and when it is operational. The Transport Statement will undertake assessments of the impact of these vehicle movements and identify mitigation measures in coordination with the Construction Traffic Management Plan such that the transport related impacts of the development are acceptable. This will be submitted as part of the DNS application.

4.3.10 On the basis of the above, it is therefore considered that transport, both construction and operational can be scoped out of the ES and adequately addressed through the submission of separate standalone technical reports, which will accompany the DNS application.

Air Quality

4.3.11 Based on the vehicle movements described above, it is unlikely that the number of construction vehicle movements would give rise to potentially significant environmental effects. Notably the predicated HGV numbers during construction do not exceed the Institute of Air Quality Management (IAQM) thresholds for screening the requirement of a detailed air quality assessment.

4.3.12 Construction activities will be controlled by a CEMP, with appropriate measures to mitigate air quality and dust impacts on receptors during construction. These measures would follow best practice guidance set out by the IAQM. A draft CEMP will be submitted with the DNS application which will document the measures which the construction contractors would be required to implement.

4.3.13 There would be no onsite processes that would result in any pollutants being released. Operational vehicle movements will be minimal and unlikely to be of a scale that would give rise to significant effects. The operational vehicle movements will be reported in the ES as part of the description of the development.

4.3.14 On this basis it is considered there is unlikely to be significant impacts on air quality.

Population and Human Health

4.3.15 No community level impacts, and subsequent significant effects, are likely to occur as a result of the construction or operation of the Proposed Development. No community facilities will be lost, and it is unlikely that PRoW and other recognised routes would be either temporarily or permanently severed or significantly diverted.

Geology and Soils

4.3.16 An Agricultural Land Classification assessment is being prepared for the Site. The Predictive Agricultural Land Classification (ALC) Map 2 classifies the majority of the Site as being Grade 3b land, with small pockets of Best and Most Versatile (BMV) land present. The ALC assessment will be provided with the DNS application.

4.3.17 Due to the limited intrusion into the ground during panel installation, with there being no deep excavations or foundations required, there is unlikely to be any disturbance to geological features.

4.3.18 Due to the historic and current agricultural use of the Site, it is unlikely that contamination would be an issue. Any isolated discoveries of contamination would be covered through protocols included within the CEMP.

4.3.19 The draft CEMP to be submitted with the DNS application will reference measures set out in the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites to ensure soils are carefully managed throughout the construction period.

4.3.20 The two potential grid connection options are located within an area where there are very small ‘pockets’ of land designated as Development High Risk Area (DHRA) by the Mining Remediation Authority. Where there are areas of the grid connection route within the DHRA, it is where the grid connection cable would route along the existing highway, therefore risk is considered to be minimal.

Flood Risk and Water Resources

4.3.21 The NRW Flood Map for Planning shows that Site is at very low risk to flooding from seas and rivers, with the solar array development areas lying within Flood Zone 1. The Site is shown to be predominantly at very low risk to flooding from surface water and small watercourses. There are some small isolated areas, generally immediately

adjacent to field ditches / small watercourses, shown as Flood Zone 2 and 3 for surface water and small watercourses. On this basis there is unlikely to be any significant effects related to flood risk, with all essential infrastructure components such as BESS units, transformers, inverters, located within areas of low risk.

4.3.22 Operational solar farms have very limited areas of hardstanding, as such there is unlikely to be any offsite impact on flood risk. Furthermore, there is a potential beneficial effects from reduced water infiltration as a result of a change in agricultural practices.

4.3.23 Similarly there are no significant sources of pollution in an operational solar farm, again reduction in the intensity of agricultural practices i.e. reduced use of fertilizer, pesticides and winter crop rotations, can improve water quality.

4.3.24 Construction activities will be controlled by a CEMP, with appropriate best practice measures adopted to avoid surface water pollution from fuel, oils and chemicals, as well as measures to prevent silt polluting watercourses. A draft CEMP will be submitted with the DNS application which will document the measures which the construction contractors would be required to implement.

Material Assets and Waste

4.3.25 The Proposed Development will use market ready components for the solar panels and frames, minimising any further use of natural resources. This will in turn help minimise construction waste generated on site. Therefore, there is unlikely to be any detrimental impact on local or regional landfill capacity.

4.3.26 Construction and Operational Site Waste Management Plans will be implemented to ensure that waste generated by the development is managed in accordance with the waste hierarchy, maximising reduction, reuse and recycling and minimising disposal.

Climate Change

4.3.27 Climate change is a global issue and whilst the contribution of individual projects may be negligible, each renewable energy generation project can make a valuable contribution to combating climate change. Given the nature of the Proposed Development, it is not deemed proportionate to undertake an individual topic assessment as a standalone chapter within the ES. Instead, aspects of climate change will be addressed within relevant sections of the ES, namely:

i) Assessment of embodied carbon – The introductory chapters of the ES will outline the embodied carbon within construction material as well as reporting the carbon emissions associated with construction vehicle movements. This will be set against relevant UK climate budgets.
ii) Climate change resilience – the design of the Proposed Development will be reported in the introductory chapters of the ES and will explain the standards and specifications adhered to relation to structural integrity. The Water Resources section of the ES will include how climate change allowances have been incorporated into the assessment of flood risk.
iii) In Combination Climate Change Assessment – the inter and intra climate change related impacts (e.g., land take, habitat removal, construction plant operation) will be identified and assessed within the specific cumulative effects section of the ES.

Major Accidents and Disasters

4.3.28 The Site is not likely to be at risk from slope instability, earthquakes or coastal flooding. High winds are unlikely to materially damage the solar panels as they will be installed to withstand high wind conditions. Furthermore, commercial solar arrays are not susceptible to extremes of temperature, as they have a normal operating range of -40°c to 80°c.

4.3.29 Operation of the Proposed Development will not give rise to any major accidents or disasters. All technology will adhere to best practice standards and will be maintained to an agreed schedule.

Lighting / Glare

4.3.30 Temporary lighting required to construct the Proposed Development, will be controlled through the Construction Environmental Management Plan and be designed to avoid any significant impact on residential properties or ecological receptors.

4.3.31 No permanent lighting will be required during the operation of the Proposed Development and security lighting will use infrared technology to prevent any nuisance or constant light spill.

5.0 OVERARCHING IMPACT ASSESSMENT METHODOLOGY

5.1 Introduction

5.1.1 This chapter provides a brief description of the approach to the environmental assessment process and describes the broad principles that will be applied within each technical assessment. Each technical assessment included in the ES will follow a similar approach as follows:

i) An **introduction** describing the basic scope and approach undertaken to the assessment.
ii) A description of the relevant **legislation, planning policy and guidance** used to inform the assessment.
iii) A description of the **assessment methodology** applied to the assessment including but not limited to the scope of surveys undertaken, the Study Area, the criteria used in the impact assessment (noting that the topic-specific significance matrix may differ slightly to that presented in **Table 5.1** below as required by topic specific guidance); any limitations and assumptions made would also be described.
iv) A presentation of the **baseline conditions** relevant to that discipline, including the future do-nothing baseline.
v) A description of the **incorporated mitigation and enhancement measures** taken into account into the earlier development/design stages to avoid or minimise the potential for significant environmental effects, and other committed mitigation e.g. outline CEMP subject to a planning condition.
vi) An **impact assessment** that describes the effects that are likely to arise from the Proposed Development. The assessment will include a description of the nature, extent and significance of these effects. The assessment will consider the development design and incorporated mitigation measures described above.
vii) Where not considered (and clearly identified as such) as an inherent part of the impact assessment, a description of the **inter-relationship of potential effects** (where other environmental topic effects could have a subsequent direct or indirect effect on the topic e.g. lighting and noise impacts on biodiversity) will be provided.
viii) A description of additional **mitigation measures** will be provided as well as any compensation measures proposed to either further reduce the negative effects

of the Proposed Development or to provide benefits to the local environment. Enhancement measures will be described separately as required.

ix) Each ES topic chapter will include a section on the **residual impacts and conclusions** of the assessment. This section will describe the residual effects of the Proposed Development following the implementation of any additional mitigation measures (enhancement measures will be excluded from the summary of residual effects) and will summarise the findings of the assessment.

x) A description of potential significant **cumulative effects** with projects within the study area of each technical chapter will be provided.

5.2 Decommissioning

5.2.1 Planning permission is being sought for development with a specified life span of 40 years, with the exception of the substation and its ancillary infrastructure which will remain in perpetuity, after which the Proposed Development will require decommissioning. All solar PV modules, mounting poles, cabling, BESS units, inverters and transformers would be removed from the Site and recycled or disposed of in accordance with good practice and market conditions at that time. Currently, around 99% of all materials used on a solar farm can be recycled. The Site will be returned to its original use after decommissioning.

5.2.2 Decommissioning is expected to take between 9 and 12 months and could be undertaken in phases.

5.2.3 The effects of decommissioning are often similar to, or of a lesser magnitude than, construction phase effects. As such it is not proposed to provide a separate decommissioning assessment within each technical chapter, unless there are specific issues related to decommissioning which could give rise to materially greater impacts than construction. Where this occurs an assessment of these impacts will be provided within the ES.

5.3 Baseline Environment

5.3.1 A description of the environmental baseline (as this relates to the respective topic being assessed) will be provided. Baseline conditions will be established through consultation, collation and analysis of existing datasets and reports, and gathering of site-specific field data. The baseline assessment will identify any sensitive receptors that will need to be considered in the assessment.

5.3.2 In accordance with the EIA Regulations, an outline of the likely evolution of the environment will be set out by predicting future natural change in the baseline conditions in the absence of the Proposed Development. The future baseline will then be considered when assessing the likely effects of the Proposed Development over its operational lifetime.

5.4 Determining Impact Significance

5.4.1 Each of the technical disciplines will describe the predicted environmental effects of the Proposed Development on the baseline conditions of the Site and the local environment. The assessment will include a description of the nature, extent and significance of these effects. The assessment will consider any mitigation measures that have been specifically incorporated into the development proposals to reduce the environmental effects of the Proposed Development.

5.4.2 The EIA Regulations do not provide definitive methods for the assessment of significance and a variety of methods are employed within EIAs. The method used to assess the effects will be specific to each discipline. Where available and appropriate the assessments will follow impact assessment criteria and methodology set out by relevant professional institutions e.g., Institute of Ecology and Environmental Management, Landscape Institute etc. Where such guidance is not available or prescriptive methods are not set out by the relevant professional body then assessment criteria will be developed by the technical specialists to enable a clear and structured assessment to be undertaken.

5.4.3 The significance of the effects of the Proposed Development will, in general, be derived by considering the magnitude of the impact and the sensitivity of the receptor to a change (or changes) resulting from the Proposed Development.

5.4.4 Depending on the discipline there will be several factors that will need to be considered when establishing the nature and magnitude of impact, including:

i) The scale/degree of change from baseline.
ii) Whether the impact is adverse or beneficial.
iii) Whether it is temporary or permanent, and if temporary the likely duration (i.e. short-term, medium-term or long-term).
iv) Whether it is direct or indirect.
v) Extent or spatial scale of the impact.

vi) Duration of the impact.
vii) Whether the impact is reversible.
viii) Probability/likelihood of the impact.

5.4.5 Similarly, the sensitivity of a receptor will be the function of several elements dependent on the discipline and impact being assessed, these could include:

i) Designation and legal status.
ii) Quality.
iii) Rarity.
iv) Ability to change.

5.4.6 In general, the classification of an effect is based on the magnitude of the impact and sensitivity or importance of the receptor, using the matrix shown in **Table 5.1** below. Where there are deviations away from this matrix (due to the technical guidance for a specific assessment topic), this will be highlighted within the relevant ES topic chapter and the reason for the variation explained.

Table 5.1 – Example Level of Effect Matrix

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

5.4.7 There is no statutory definition of what constitutes a significant effect and there is often not a single, definitive, correct answer as to whether an effect is significant or

not. However, it is considered that a significant effect is one which is likely to be a key material factor in the decision-making process. A significant effect does not necessarily mean that such an effect is unacceptable to decision-makers. This is a matter to be weighed in the planning balance alongside other factors. What is important is that the likely effects of any Proposed Development are transparently assessed and described in order that the relevant determining authority can bring a balanced and well-informed judgement to bear as part of the decision-making process.

5.4.8 Where the findings of an assessment are set out as different levels of effect (e.g. major, moderate, minor, etc.) the assessment will clearly set out where an effect is significant. This approach will be used to assist the decision maker, consultees and other interested parties in establishing the most critical environmental effects of the project.

5.4.9 Where a matrix is not used, the magnitude of change and the sensitivity of the receptor will be used to make a reasoned judgement to establish when an effect is significant or not significant.

5.4.10 In all instances the assessment will set out the basis of the judgements made so that the readers of the ES can see the weight attached to the different factors and can understand the rationale of the assessment. In this sense the ES will clearly explain how the impact significance has been derived.

5.4.11 Where it is possible to quantify effects, qualitative assessments will be undertaken based on available knowledge and professional judgment. Where any uncertainty exists, this will be noted in the relevant ES topic chapter.

5.4.12 To enable comparison between technical topics and aid understanding of the EIA findings, standard terms will be used wherever possible to classify effects throughout the ES (major, moderate, minor and negligible), and effects will be described as being adverse, neutral or beneficial. Where the guidance for each discipline requires any deviation from these terms, this will be described in the relevant ES topic chapters.

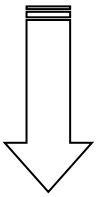
5.4.13 Definitions of the standard terms are provided indicatively below, recognising that how these relate to different topics or to the specific effects experienced by individual receptors may vary to a greater of lesser degree. The specific circumstances of the

change experienced by an individual receptor is the ultimate determining factor in the level of effect that would occur:

i) Negligible – imperceptible effect to an environmental resource or receptor.
ii) Minor – slight, very short or highly localised effect.
iii) Moderate – limited effect (by extent, duration or magnitude).
iv) Major – considerable effect (by extent, duration or magnitude) of more than a local scale or in breach of recognised acceptability, legislation, policy or standards.
v) Adverse – detrimental or negative effects upon an environmental resource or receptor.
vi) Neutral – effects to an environmental resource or receptor that are neither advantageous nor detrimental.
vii) Beneficial – advantageous or positive effect upon an environmental resource or receptor.

5.5 Mitigation

5.5.1 It is a requirement of the EIA Regulations to describe the measures envisaged to prevent, reduce and where possible offset any significant effects on the environment. Mitigation can be achieved in a number of ways as listed below. This approach is often referred to as the mitigation hierarchy with mitigation being selected as high up the hierarchy as possible.



Avoid
Reduce
Remediate
Offset / Compensate

5.5.2 Some mitigation measures (development design and impact avoidance measures as described above) are embedded into the Proposed Development because of decisions made during the design stage. These include any measures required for legal compliance, as well as any measures that implement the requirements of best practice guidance documents which are committed to e.g. via planning condition requiring implementing of an outline CEMP. On the basis that these mitigation measures are incorporated into the Proposed Development, they will be taken into

account when coming to a judgement of the likely significance of the effects of the Proposed Development.

5.5.3 Additional mitigation, compensation or monitoring will then be identified where practicable and where environmental assessments identify that additional measures are required to further reduce impacts.

5.5.4 This mitigation section of each ES topic chapter will provide a description of additional mitigation measures proposed to prevent, reduce or offset adverse effects unavoidable through design, or to provide benefits to the Proposed Development/local environment. An explanation will be provided of how these measures will mitigate/reduce the identified effects of the Proposed Development.

5.5.5 Enhancement measures will be identified where practicable and will be discussed with the relevant stakeholder(s).

5.6 Residual Effects and Conclusions

5.6.1 This section will provide a textual description of the residual effects of the Proposed Development following the implementation of any additional mitigation measures. Enhancement measures would not be required in EIA and planning terms i.e. not necessary to ensure the Proposed Development is acceptable and would therefore not be considered when describing the residual effects.

5.6.2 The conclusions will summarise the key elements of the assessment and include a statement on whether the Proposed Development is considered likely to result in any significant environmental effects.

5.7 Cumulative Effects

5.7.1 The EIA Regulations require that a description of the likely significant effects of the development on the environment should be included in the ES, including cumulative effects. The EIA Regulations do not define cumulative effects; however, a commonly accepted description is:

"Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project" (European Commission, 1999)

5.7.2 Paragraph 3.15 of DNS Guidance Appendix 3 (Environmental Impact Assessment) states that the Scoping Report should contain information setting out how applicants intend to assess impacts from consequential or cumulative development.

5.7.3 There is no defined methodology in the UK as to how cumulative effects should be assessed. In determining the approach to be adopted, reference will be made to the following guidance:

i) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission 1999);
ii) Cumulative Effects Assessment Practitioners Guide (Canadian Environmental Assessment Agency 1999);
iii) Guidelines for Environmental Impact Assessment (Institute of Environmental Management and Assessment 2006);
iv) The State of Environmental Impact Assessment Practice in the UK (Institute of Environmental Management and Assessment 2011); and
v) DNS Guidance Appendix 3 (Environmental Impact Assessment).

5.7.4 The regulations are specific about the projects that should be considered to result in cumulative effects i.e., existing and/or approved projects. However, it is also considered relevant to include projects that are currently awaiting determination within the cumulative assessment, as there is a possibility that these projects could be approved whilst the application for the Proposed Development is being determined. Accordingly, the assessment of cumulative impacts will encompass the effects of the Proposed Development in combination with:

i) existing development, under construction;
ii) approved development, awaiting implementation; and
iii) schemes awaiting determination within the planning process.

5.7.5 The presence of existing operational schemes (and for some disciplines, schemes that are under construction, but not yet operational) is an established influence upon the environment. Such impacts will be accounted for when determining the baseline for the non-cumulative assessment for each ES topic chapter. The assessment of effects section of each ES topic chapter will have full regard to the presence of such schemes when arriving at any conclusions.

5.7.6 The additional schemes that would form part of the assessment of cumulative effects will be 'major projects'. In this context, major projects are developments of 10,000m^2 in size or greater and/or projects that have been subject to EIA.

5.7.7 Projects that fall outside the above criteria will only be included in the assessment if specifically identified by stakeholders and agreed as material to the ES.

5.7.8 Each topic will have a different spatial zone where potential cumulative significant effects could occur. A preliminary search area of 2.5 km from the Site has been used to identify schemes that, given the nature of the Proposed Development, have the potential to result in cumulative effects.

5.7.9 A search was undertaken via the interactive search facilities on WCBC's website. Additionally, a search was undertaken on the Welsh Inspectorate website to identify any other Developments of National Significance that may interact with the Proposed development either during construction or operation.

5.7.10 The initial list of schemes to be considered in the cumulative assessment is set out in **Table 5.2** below and shown on Figure 5.1.

Table 5.2 – Initial List of Other Projects for Cumulative Assessment

Figure 5.1 Reference	Application Reference	Project Detail	Status	Included in Scope?
1.	DNS/3237973	30MW Colliery Spoil Energy Plant	Pre-Application (EIA Development)	No – PEDW website shows the case to be closed with the last correspondence in 2021.
2.	DNS/3253253	Plas Power Estate Solar Farm	Pre-Application (EIA Development)	Yes
3.	P/2020/0363	Glasshouse with packing facility and offices, energy centre, recovery plant and reservoirs	Allowed at Appeal (Non-EIA)	Yes
4.	P/2023/0593	Outline application for 1,520 dwellings	Pending (EIA Development)	No - It is considered that the distance from the closest solar array area (approximately 3km), nature of the development (residential housing), its location to the north of the urban area of Rhostyllen which lies between the application site and the Proposed Development means significant cumulative effects are not likely.

Figure 5.1 Reference	Application Reference	Project Detail	Status	Included in Scope?
5.	P/2021/0441	57MW BESS (Legacy)	Approved (Non-EIA)	No – whilst the grid connection would run close to these developments, the main solar array would be 3km from these development sites, and are located on the opposite side of the A483. The scale of the development is such that cumulative significant landscape effects are not considered likely, with the ZTV (Figure 6.2a) showing there would be virtually no visibility of the Proposed Development to the west of the A483.
6.	P/2024/0155	400MW BESS (Legacy)	Pending (EIA not yet determined)	
7.	P/2022/0541	9.9MW Solar Farm	Approved (Non-EIA)	Yes

5.7.11 Information on the scale, type and nature of the projects included within the cumulative assessment will be obtained either via online data on their website or directly provided by WCBC. Where available, this information will be sourced from a project EIA. If environmental information is not available, reasonable assumptions will be made on the likely environmental effects of the project. Each technical discipline will consider the likelihood of significant cumulative effects initially through a qualitative assessment and if necessary, through quantitative modelling. Where significant cumulative effects are identified these will be clearly reported and, if practicable, mitigation measures will be recommended.

6.0 LANDSCAPE AND VISUAL IMPACT

6.1 Introduction

6.1.1 This section sets out the proposed approach to the assessment of potential landscape and visual effects associated with the construction, operation, and decommissioning of the Proposed Development.

6.1.2 Landscape and visual effects are separate, although closely related and interlinked issues. As such, the assessments of the effects of the Proposed Development upon the landscape and upon visual amenity will be carried out under separate headings within the Landscape and Visual Impact Assessment (LVIA).

6.1.3 The assessment of landscape effects considers the potential effects of the Proposed Development on the landscape as an environmental resource. Landscape effects are caused by physical changes to the landscape, which may result in changes to the distinctive character of that landscape and how it is perceived.

6.1.4 The visual assessment is concerned with the potential effects that may occur resulting from the Proposed Development upon the population likely to be affected. It assesses the change in visual amenity experienced by people, arising from the presence of a development in the view.

6.1.5 The LVIA will be undertaken in accordance with the good practice guidance set out in *Guidelines for Landscape and Visual Impact Assessment*[2] (hereafter referred to as the GLVIA). Where appropriate, reference will be made to other environmental topics and other Chapters of the ES.

6.2 Baseline Environment and Proposed Study Area

Introduction

6.2.1 This section provides a description of the baseline environment and proposed Study Area relevant to this topic.

[2] Landscape Institute and Institute of Environmental Management and Assessment, 3rd edition 2013. *Guidelines for Landscape and Visual Impact Assessment*. Routledge: Abingdon.

Surveys Undertaken

6.2.2 Existing surveys undertaken to date include:

i) Review of extant landscape character assessment studies published by NRW and by WCBC.
ii) Shooting of baseline photography from all of the proposed viewpoint locations (shot in January 2024).

Baseline Environment

The Site and its Surroundings

Overview

6.2.3 As set out in Chapter 3.0, the Site of the Proposed Development would comprise three distinct solar array areas, namely the Western, Central and Eastern Array Areas (the WAA, CAA and EAA respectively). In addition, the Site includes the grid connection route that would link the WAA, CAA and EAA, and which would also link to the Legacy National Grid Substation. Refer to Figure 1.1 for locations.

6.2.4 Further detail regarding the components of the Site which are particularly relevant to the LVIA is set out below under separate headings.

Western Array Area

6.2.5 The WAA is located adjacent to the A483, which forms its western boundary. The WAA is separated from the road itself by a dense hedgerow. Other boundaries to the north, east and south are also formed by hedgerows. In these directions the WAA borders onto farmland.

6.2.6 The WAA itself comprises a series of irregular shaped fields, the boundaries of which are defined by a series of hedgerows, some of which include mature trees. A farm access track runs through the centre of the WAA, and this is lined on both sides, by further hedgerows, which again include mature trees. A public footpath follows the line of the track.

6.2.7 The WAA is undulating, with the highest parts towards the southern and western boundaries, and a slight fall in elevation towards the north and east. The proposed

access would run southwards from the southeastern corner of the WAA, to the B5426 approximately 375m away.

6.2.8 The surrounding area is predominantly rural and agricultural. The A483 corridor is a major transport route. A line of electricity pylons runs close to the northern boundary of the WAA, and ultimately leads to the Legacy National Grid Substation.

6.2.9 A single property is located adjacent to the north-eastern boundary of the WAA at Hafod y Bont. Further properties are located at Caretaker House (west of the A483, approximately 175m away), Hafod House (west of the A483, approximately 180m away), at Eddisbury Grange to the south (approximately 300m away), at Ty Coch Farm to the north (approximately 325m away), and at Hafod y Bwch to the north (approximately 410m away).

6.2.10 The village of Rhosllanerchrugog is located approximately 750m west of the WAA. This is a former coal mining community that has a very different character to the surrounding rural areas.

6.2.11 As noted above, a public footpath runs through the WAA. This runs broadly east-west and crosses the A483 via an overbridge. Approximately 375m east of the WAA the footpath connects with the Wat's Dyke Way, which is a promoted long-distance path that runs from Llanymynech on the England-Wales border in Shropshire, north to the Dee Estuary.

Central Array Area

6.2.12 The CAA includes a series of separate parcels of land located to the north of the B5426. These are all currently in agricultural use. Boundaries are generally comprised by hedgerows, some including mature trees. Some sections of the CAA boundary are formed by belts of woodland (Well Wood, Oak Wood, and Yorke's Dingles) that run along steep narrow valleys. A minor road runs north-south through the CAA, and the proposed access would be off this road.

6.2.13 The landform of the CAA is undulating. The highest parts are towards the western boundary, with a fall in elevation of up to approximately 30m between the western and eastern boundaries. A series of steep, narrow valleys cut into the landform, and it is these valleys (all outside the Site boundary) that divide the CAA into its constituent parcels.

6.2.14 The CAA generally borders onto adjacent areas of farmland. The B5426 to the south is more developed, with a small settlement at Plas Eyton located along the road, and with further scattered properties along minor roads to the south. A further small cluster of properties and a large farmstead (The Groves) is located along the minor road that runs through the Site.

6.2.15 The surrounding area is predominantly rural and agricultural. The largest concentrations of built development are clusters of farm buildings. A line of electricity pylons runs close to the northern boundary of the CAA, and continues westwards to the Legacy National Grid Substation.

6.2.16 The nearest properties (7 no.) are located adjacent to the Site boundary along the minor road that runs through the CAA. Two further properties on the northern side of the B5426 also adjoin the Site. Approximately 35 no. further properties are located with approximately 200m of the CAA boundary (mostly to the south).

6.2.17 A public footpath runs along part of the southern boundary of the CAA. A second public footpath runs westwards from the western boundary of the CAA. Other routes run through the fields in the surrounding area, and this network of public rights of way is denser to the south of the B5426.

Eastern Array Area

6.2.18 The EAA comprises several large farm fields south-east of the B5130. The boundaries of these are typically open, but with some mature tree cover located along them. Parts of the eastern boundary with the adjacent property at Gerwyn Hall are more densely wooded. The proposed access would be direct from the B5130. The landform of the EAA falls by approximately 20m from north-west to south-east. A line of electricity pylons runs through the southern part of the EAA, continuing westwards to the Legacy National Grid Substation.

6.2.19 The surrounding area is predominantly rural and agricultural. Scattered properties are located throughout, including adjacent to the Site boundary at Gerwyn Hall to the east and 3 no. along the B5130 to the north. Approximately 8 no. further properties are located within approximately 200m of the Site boundary.

6.2.20 The nearest settlement is at Cross Lanes approximately 675m to the north-east of the EAA. Bangor-on-Dee is located approximately 1.6km to the east. Bangor Racecourse is approximately 1km south-east of the EAA at the closest point.

6.2.21 A public footpath crosses the easternmost part of the EAA, and a second public footpath runs along part of the southern boundary. Other routes run through the fields in the surrounding area, and this network of public rights of way is denser to the north of the EAA.

Grid Connection Route

6.2.22 As set out in Chapter 3.0, the proposed grid connection route would comprise underground cables following the existing public highway network between the three array areas. The connection between WAA and the Legacy National Grid Substation would follow one of two potential routes, both of which would also follow the public highway network, and which would also be underground. The routes follow sections of the B5130 and B5426 as well as smaller minor rural roads.

Landscape Designations

Statutory

6.2.23 The Clwydian Range and Dee Valley AONB is located approximately 715m west of the Site at the closest point (refer to Figure 6.1 for location). However, the AONB is located approximately 3.5km from the nearest of the solar array areas (the WAA).

6.2.24 AONBs are a statutory designation, first designated under the auspices of the National Parks and Access to the Countryside Act 1949. The primary purpose of an AONB, as set out in the Countryside and Rights of Way Act 2000, is to "*conserve and enhance the natural beauty*".

6.2.25 The special qualities of the AONB are set out in the *Management Plan 2014-2019*[3] as follows:

i) Tranquillity.
ii) Remoteness and Wildness, Space and Freedom.
iii) Heather Moorland and Rolling ridges.
iv) Broadleaved woodlands and veteran trees.
v) River Valleys and the River Dee.
vi) Limestone grasslands, cliffs and screes.

[3] Clwydian Range and Dee Valley Area of Outstanding Natural Beauty, undated. *Management Plan 2014-2019.*

vii) Historic Settlement and Archaeology.
viii) Industrial Features and the World Heritage Site.
ix) Historic Defence Features.
x) Small historic features.
xi) Traditional boundaries.
xii) Iconic Visitor and Cultural Attractions.
xiii) The Offa's Dyke National Trail and Promoted Routes.
xiv) The Built Environment.
xv) People and Communities.

Non-statutory

6.2.26 A single field within the EAA is located within the boundaries of Special Landscape Area (SLA) 004: Lower Dee Floodplain. The remainder of the site lies outside the SLA. Refer to Figure 6.1 for location.

6.2.27 SLAs are protected by Policy NE5 of the Wrexham Local Development Plan[4]. This states the following:

"Priority will be given to protecting, managing and enhancing the character and quality of the following Special Landscape Areas (SLAs) as shown on the proposal map…

…Within SLAs, development will only be permitted where proposals include measures to protect and enhance the character and quality of the particular landscape features for which the SLA has been designated having regard to:

a) the impact, including cumulative impact, of the Proposed Development on the key features, landscape character and quality of the SLA; and

b) the ability of the development to provide appropriate mitigation and enhancement measures"

[4] Wrexham County Borough Council, adopted 2023. *Wrexham Couty Borough Local Development Plan 2013*-2028

6.2.28 Details of each SLA are set out in the *Special Landscape Areas Study*[5]. The special valued landscape qualities and features of key importance of SLA004 are:

i) The SLA displays valued landscape qualities and is perceived as attractive, safe, with apparent remoteness and tranquillity in terms of the lack of intensive road network.
ii) Public access is limited other than by PROW, especially in time of flood. It is a settled, domestic landscape with a well-defined if simplistic field pattern and structure. The area appears wild, untamed and awe inspiring in times of flood.
iii) There is a potential impact on rural character from commuter pressure, both in terms of settlement expansion and infrastructure capacity and provision.
iv) Conservation and management of historic parks, gardens and boundary walls. Hedgerow and hedgerow tree conservation and restoration.
v) Impact of flood defence measures, both in terms of visual impacts and settlement boundaries – Bangor-on-Dee.
vi) Impact on historic landscape and biodiversity features through agricultural practices. Including potential degradation of traditional buildings through conversion and potential loss of hibernating/roosting habitat for wildlife.
vii) Effects of economic diversification and recreation in the countryside – changes in land management, public access and impacts on an otherwise little visited area.

Landscape Character

6.2.29 Forty-eight National Landscape Character Areas (NLCA) have been identified across Wales by NRW. The broad geographic reach of the NCLAs means that the key characteristics identified as typical of a particular character area may not necessarily apply to a specific location within that character area. However, they do provide background context for more detailed studies and assessments. The majority of the Proposed Development would be located within NLCA13: Deeside and Wrexham. The eastern edge of the EAA would be located within NLCA14: Maelor. NLAC boundaries are illustrated on Figure 6.1.

6.2.30 The Natural Resources Wales (NRW) LANDMAP study is the formally adopted methodology for landscape assessment in Wales and, as such, forms the baseline

[5] TACP, 2017. *Special Landscape Areas Study*. Wrexham County Borough Council

for landscape character assessment. The *Wrexham LANDMAP Supplementary Planning Guidance*[6] (adopted 2007) uses LANDMAP data to subdivide the Borough into a series of four broad landscape types and twenty-seven geographically distinct landscape character areas (LCA). Given this, the LCAs identified by Wrexham County Borough Council (WCBC) will be used as the baseline against which to assess effects on landscape character.

6.2.31 The majority of Proposed Development, including the CAA and EAA, would be located within LCA 13a: Welsh Maelor. The WAA overlaps the boundary between LCA13a and LCA 7c: Rhosllanerchrugog, Rhostyllen, Ruabon, Pen y Cae.

Visual Baseline

ZTV

6.2.32 Zone of Theoretical Visibility mapping of the Proposed Development is presented on Figures 6.2a-d, reflecting the theoretical visibility of the proposed 3m high solar panels. Separate ZTVs have been prepared for the WAA, CAA and EAA individually, and for the entirety of the Proposed Development as a whole. Colour banding is used to indicate areas where more or fewer solar panels are predicted to be visible.

6.2.33 The ZTV was produced using a free 2m LIDAR Digital Surface Model (DSM) available from NRW under the terms of the Open Government Licence. The data was captured during 2020.

6.2.34 The ZTV produced using the DSM reflects the presence of screening features in the landscape. However, it does not distinguish between the ground surface and the surface of structures and vegetation. As a consequence, the ZTV output may indicate visibility from areas known to be occupied by woodland and buildings (i.e., views from treetops and roofs). Ordnance Survey open mapping data (OS Zoomstack Woodland) datasets have been added to the ZTV Figures, as a solid white hatch on top of the ZTV information (but beneath base mapping), to mask out mapped areas of tree cover and buildings, noting this is unlikely to be exhaustive but helps refine the ZTV.

[6] Wrexham County Borough Council, adopted 2007. *Wrexham LANDMAP Supplementary Planning Guidance*

6.2.35 The ZTVs illustrate the degree to which the Proposed Development is likely to be enclosed visually by surrounding vegetation cover. There are very few locations outside of the Site boundary where more than 20% of any of the three proposed solar arrays are predicted to be visible.

Viewpoints

6.2.36 The LVIA will include a detailed assessment of visual effects from a series of pre-determined viewpoint locations. Viewpoints fall into three categories, as set out in the GLVIA:

i) Representative viewpoints (which represent the experience of different types of receptors in the vicinity);
ii) Specific viewpoints (a particular view, for example a well-known beauty spot); and
iii) Illustrative viewpoints (which illustrate a particular effect/ issue, which may include limited/ lack of visibility)

6.2.37 It should be noted that the viewpoint itself is not the receptor. Rather it is the people that would be experiencing the view from it. People within the Study Area that are likely to experience views of the Proposed Development include:

i) Local residents.
ii) Users of public rights of way, and other routes/ land with public access.
iii) Road users.

6.2.38 Table 6.1 lists the fourteen viewpoints that are proposed to be included in the LVIA. Viewpoint locations are illustrated on Figures 6.2a-d. Baseline photography from each Viewpoint, shot in January 2024, is presented on Figures 6.3a-n. Each sheet of Figures 6.3a-n illustrates a 90 degree field of view, with some viewpoints extending over more than one sheet.

Table 6.1 - Viewpoint Locations

Viewpoint	Location	Receptor Type
1: Public footpath, bridge over A483	The bridge over the A483, immediately west of the WAA	*Specific* view available to walkers
2: Public footpath, east of WAA	The footpath at the eastern boundary of the WAA	*Representative* of the views available to walkers on the footpath

Viewpoint	Location	Receptor Type
3: Wat's Dyke Way, Middle Sontley	Long-distance path to the north-east of the WAA	*Representative* of the views available to walkers on the Wat Dyke Way, and to residents in the adjacent properties
4: Public footpath, west of CAA	The footpath to the west and north-west of the southern part of the CAA	*Representative* of the views available to walkers
5: Minor road through CAA	The road that runs through the CAA	*Representative* of the views available to residents in the adjacent property and to road users
6: Minor road near Stryt-yr-hwch	The junction of two minor roads north of the CAA. The proposed grid connection corridor follows the line of the roads	*Representative* of the views available to residents in the nearby properties and to road users
7: B5130, Bedwell	Road at the northern boundary of the EAA, close to properties	*Representative* of the views available to residents in the nearby properties and to road users
8: Public footpath, near Waterylane Wood	Footpath approx. 1.1km south of the EAA	*Representative* of the views available to walkers
9: B5426, Royton Wood	Road approx. 500m south of the EAA.	*Representative* of the views available to residents in the nearby properties and to road users
10: Public footpath, southern boundary of EAA	Footpath adjacent to the southern boundary of the EAA	*Representative* of the views available to walkers
11: Public footpath, eastern boundary of EAA	Footpath adjacent to the eastern boundary of the EAA	*Representative* of the views available to walkers
12: Public footpath, east of EAA	Footpath approx. 250m from the boundary of the EAA	*Representative* of the views available to walkers
13: Public footpath, off Millbrook Lane	Footpath approx. 2.4km from the EAA	*Representative* of the views available to walkers
14: Millbrook Lane	Footpath approx. 2.46km from the EAA	*Representative* of the views available to residents in the nearby properties and to road users

Study Area

6.2.39 Using the formula above, it can be determined that in a flat landscape a 3m high solar panel would not be theoretically visible beyond approximately 6.71km when

viewed from a similar elevation, although they may potentially be visible when viewed from different elevations.

6.2.40 The study area for the LVIA has been determined based upon the extents of the ZTVs presented on Figures 6.1 and 6.2a-d. These demonstrate that little theoretical visibility is predicted beyond a 2.5km radius from the three solar array areas. As such, this 2.5km radius is proposed as the extent of the Study Area, with a localised extension to include the western end of the proposed grid connection route. The extent of the proposed Study Area is illustrated on Figures 6.1 and 6.2a-d.

6.3 Potential Effects

Construction and Decommissioning

6.3.1 Potentially significant effects could arise from:

i) Temporary activities associated with the construction of the Proposed Development, including the temporary presence of construction plant;
ii) Temporary activities associated with the decommissioning of the Proposed Development, including the temporary presence of decommissioning plant.

Operational

6.3.2 Potentially significant effects could arise from:

i) Direct physical effects upon the landscape fabric of the Site arising from the introduction of the Proposed Development;
ii) Views of the new structures from the surrounding area, affecting the visual amenity of local residents in their properties, users of the public rights of way network and other routes/land with public access, and road users;
iii) The influence of these upon the character of the surrounding landscape, with potential changes in the characteristics of those LCAs where visibility is predicted;
iv) The presence of the Proposed Development upon the identified purposes and qualities of landscape designations; and
v) Cumulative effects that would occur as a result of interactions between the Proposed Development and other consented of proposed schemes.

Potential Mitigation / Enhancement

6.3.3 Potential mitigation and enhancement measures that could incorporated into the Proposed Development include:

i) Buffers between proposed structures and field boundaries, public rights of way, residential properties, watercourses and ditches, and tree and woodland cover, to protect these landscape features;
ii) Planting of new screening vegetation to reduce the visual effects of the Proposed Development;
iii) Landscape and Ecological Management Plan (LEMP) to ensure that landscape proposals are managed and maintained for the operational life of the Proposed Development.

6.4 Assessment Methodology

Introduction

6.4.1 This section provides details of the proposed EIA methodology to be adopted relevant to this topic. Where deviation is proposed from the generic significance matrix shown in Table 5.1 above, this is clearly described below.

Additional Surveys

6.4.2 Additional fieldwork will be undertaken in order to confirm that there have no changes within the Study Area that would invalidate any of the information obtained to date, including for example recent construction activities or vegetation removal.

Assessment Methodology

6.4.3 The LVIA will be carried out in accordance with a project specific methodology prepared in accordance with good practice guidance provided within the GLVIA[7], which will be appended to the LVIA. The proposed draft methodology is included as Appendix 6.1, and this includes details of how conclusions regarding significance of effects will be arrived at.

[7] Landscape Institute and Institute of Environmental Management and Assessment, 3rd edition 2013. *Guidelines for Landscape and Visual Impact Assessment*. Routledge: Abingdon.

6.4.4 Not all landscape and visual effects arising as a result of a particular proposal will be significant. Furthermore, where likely significant environmental effects are predicted, this does not automatically mean that such effects are unacceptable and, indeed, some significant effects may be beneficial. The acceptability of landscape and visual effects is a matter to be weighed in the planning balance alongside other factors. What is important is that the likely environmental effects of any proposal are transparently assessed and described in order that the relevant determining authority can bring a balanced and well-informed judgement to bear as part of the decision-making process.

6.4.5 The judgement in relation to the LVIA of the Proposed Development is that a greater than 'moderate' level of effect is more likely to be significant. This is because such an effect would generally result from larger magnitudes of change on higher sensitivity receptors. This does not preclude a 'moderate' effect or lower being significant, or a greater than 'moderate' effect not being significant. The professional judgement made will depend on the specific circumstances being considered.

6.4.6 The LVIA will aim to provide:

i) a clear understanding of the Site and its setting in respect of landscape character and visual amenity;
ii) an understanding of the Proposed Development in terms of its relationship with the landscape character and visual amenity;
iii) an identification of potential effects of the Proposed Development upon the landscape, including upon landscape designations;
iv) an identification of potential effects on visual receptors, including an identification of potential effects upon the experiences of users of public rights of way (i.e. sequential visual effects);
v) a description of any proposed mitigation measures; and
vi) a conclusion as to the potential residual effects of the Proposed Development (reflecting any temporal changes in effects once mitigation provided by new planting and changes to the management of existing vegetation is effective).

6.4.7 The LVIA process will follow a standard approach, namely:

i) the establishment of the baseline conditions i.e. the existing character and sensitivity of the landscape, and the type and sensitivity of visual receptors;

ii) the prediction of the magnitude of change that the Proposed Development will bring, allowing for mitigation measures, upon the landscape and upon visual receptors; and

iii) an assessment of the significance of effect that would occur, by considering the predicted magnitude of change, together with the sensitivity of the landscape or visual receptor.

6.4.8 The LVIA will be informed by updated ZTV mapping reflecting the final development layout.

6.4.9 The LVIA will also be informed by a series of annotated photographs from each Viewpoint representative of this range of receptors. Photomontages will be prepared from specific viewpoints as set out in Table 6.2.

Table 6.2 – Visualisation Type

Viewpoint	Visualisation Type
1: Public footpath, bridge over A483	Type 1 Annotated Photograph
2: Public footpath, east of WAA	Type 4 Scale verified Photomontage
3: Wat's Dyke Way, Middle Sontley	Type 1 Annotated Photograph
4: Public footpath, west of CAA	Type 4 Scale verified Photomontage
5: Minor road through CAA	Type 4 Scale verified Photomontage
6: Minor road near Stryt-yr-hwch	Type 1 Annotated Photograph
7: B5130, Bedwell	Type 4 Scale verified Photomontage
8: Public footpath, near Waterylane Wood	Type 1 Annotated Photograph
9: B5426, Royton Wood	Type 1 Annotated Photograph
10: Public footpath, southern boundary of EAA	Type 4 Scale verified Photomontage
11: Public footpath, eastern boundary of EAA	Type 1 Annotated Photograph
12: Public footpath, east of EAA	Type 1 Annotated Photograph
13: Public footpath, off Millbrook Lane	Type 1 Annotated Photograph
14: Millbrook Lane	Type 1 Annotated Photograph

6.4.10 All photography and any visualisations will be prepared and presented in accordance with the requirements of *Technical Guidance Note 06/19* (TGN 06/19)[8].

6.4.11 A separate methodology document setting out how all visualisation materials have been produced will be appended to the LVIA. This will include details of the processes followed in producing ZTVs, taking viewpoint photography and producing photomontages and other visualisation material. Any limitations inherent to these processes will also be set out.

6.4.12 The development of mitigation measures, including measures embedded into the design of the Proposed Development will be informed by *Design for Renewable Energy in Wales*[9].

[8] Landscape Institute, 2019. *Visual Representation of Development Proposals. Technical Guidance Note 06/19*
[9] Design Commission for Wales, 2023. *Designing for Renewable Energy in Wales*

7.0 ECOLOGY AND NATURE CONSERVATION

7.1 Introduction

7.1.1 This section of the Scoping Report introduces the ecological baseline of the Site and wider area, describes surveys undertaken to date and surveys planned, explains how receptors can be affected, and outlines the methodology to be employed for the Ecological Impact Assessment (EcIA).

7.1.2 This section is supported by the following appendices:

- Appendix 7.1: Preliminary Ecological Assessment;
- Appendix 7.2: Breeding Bird Surveys;
- Appendix 7.3: Wintering Bird Survey Report; and
- Appendix 7.4: Great Crested Newt Presence or Absence (eDNA) Survey Report.

7.1.3 It should be noted that the Site boundary has been amended since the initial PEA and Breeding Bird Surveys were conducted. However, these reports provide valuable information to inform the Scoping Opinion for the Proposed Development.

7.2 Baseline Environment and Proposed Study Area

Introduction

7.2.1 The following section briefly describes surveys undertaken to date, surveys planned to be undertaken prior to submission of the application and describes the ecological baseline on Site and surrounding area, where considered relevant.

Surveys Undertaken

7.2.2 The following baseline ecological surveys have been undertaken to date, covering the WAA, CAA and EAA:

- Desk study (September 2022) (see Appendix 7.1);
- Extended Phase 1 habitat survey (May 2022) (see Appendix 7.1);
- Breeding bird surveys (May to June 2022 and April to June 2023) (See Appendix 7.2);
- Non-breeding bird surveys (October 2023 to March 2024) (see appendix 7.3).
- Great crested newt eDNA surveys (June 2023) (see appendix 7.4);
- Great crested newt eDNA (update 2024) (see appendix 7.4);

- Bat activity surveys (October 2023 to Summer 2024); see Paragraphs 7.2.21-7.2.22 and 7.2.37-7.2.39 of this Report.

7.2.3 In addition to the above, the following surveys are planned to be undertaken prior to submission:

- Desk study (update)
- Extended habitat survey (update)

7.2.4 Methodologies of surveys, including study areas, are briefly described in the relevant sections below.

Desk Study

7.2.5 A review of Magic[10] was undertaken to identify statutory designated sites for nature conservation within 2km of the Site, extending to 5km for internationally designated sites.

7.2.6 A data request was submitted to COFNOD to obtain information relating to non-statutory designated sites for nature conservation and protected and notable species within 1km of the central grid reference of each of the array areas

7.2.7 DataMapWales was further reviewed for information relating to protected and notable habitats and species within 2km of the Site, including the following data sources:

- Priority Habitats;
- Ancient Woodland; and,
- Great crested newt habitats.

7.2.8 The Ancient Tree Inventory (ATI) was also consulted for existing records of ancient or veteran trees.

7.2.9 Desk study results are presented for each ecological receptor in the relevant sections.

[10] *https://magic.defra.gov.uk/MagicMap.aspx*

7.2.10 The Desk Study will be updated prior to submission of the ES, to ensure the above study areas account for any future iterations of the Proposed Development boundary.

Extended Phase 1 Habitat Survey

7.2.11 A walkover survey of the array areas was undertaken broadly following the Joint Nature Conservation Committee (JNCC) Phase 1 survey methodology[11], further extended to record additional information relating to ecological receptors (e.g. field signs indicating presence of a protected species).

Breeding Bird Survey

7.2.12 A total of three walk over survey visits were completed between the 18th May 2022 and 22nd June 2022, with a further six survey visits undertaken between 7th April 2023 and 24th June 2023. A transect route was walked around the array areas, stopping at intervals to scan for target species with binoculars, within the Site and on surrounding land. All breeding bird activity was recorded and mapped. Surveys were undertaken during favourable weather conditions, avoiding periods of prolonged heavy rain and strong winds.

7.2.13 The survey methodology was based on the standard Common Bird Census (CBC) methodology (Bibby *et al.* 2000)[12]. All bird registrations were recorded on suitably scaled field maps using standard British Trust for Ornithology (BTO) species codes and behaviour notations. The approximate locations of bird territories were determined using standard territory mapping techniques to identify and isolate areas within which birds consistently displayed breeding behaviours.

7.2.14 Only the breeding territories of notable species are mapped given these are the most relevant species to this assessment. Notable species are defined as any species listed on any of the following:

- Schedule 1 of the Wildlife and Countryside Act;
- Birds of Conservation Concern 4 (BOCC4) Wales[13]; and

[11] *https://data.jncc.gov.uk/data/9578d07b-e018-4c66-9c1b-47110f14df2a/Handbook-Phase1-HabitatSurvey-Revised-2016.pdf*
[12] Bibby, C.J., Burgess, N.D., Hill, D.A., and Mustoe, S.H. (2000). *Bird Census Techniques, 2nd ed. Academic Press, London.*
[13] Johnstone, I.G., Hughes, J., Balmer, D.E., Brenchley, A., Facey, R.J., Lindley, P.J., Noble, D.G. & Taylor, R.C. (2022) *Birds of Conservation Concern Wales 4: the population status of birds in Wales*

- Section 7 of Environment (Wales) Act 2016.

Non-breeding Bird Survey

7.2.15 A non-breeding bird survey was undertaken between October 2023 and March 2024 encompassing the array areas and land up to 600m, where accessible. Surveys comprised a total of six visits, with one visit undertaken monthly.

7.2.16 Each survey comprised a 'walk-over' survey adopting the 'look-see' methodology (Gilbert *et al*. 1998), observing each field using public rights of way (PRoWs) and roads and where possible, walking the boundaries and stopping at intervals and scanning the fields for Target Species, with binoculars. All Target Species heard or seen were recorded onto base maps. The number of Secondary Species was tallied during the survey.

7.2.17 Target species are defined as wetland bird species (waders, waterfowl and gulls (excluding feral species e.g. Canada goose)), Annex 1/Schedule 1 raptors and notable flocks (>10 birds) of BoCC Amber and Red List species.

Great Crested Newt eDNA Survey

7.2.18 Ponds within the array areas and up to 250m beyond these were subject to survey between 2022 and 2024, where accessible.

7.2.19 Ponds subject to survey were assessed for suitability to support great crested newt using the Habitat Suitability Index (HSI) Assessment methodology as developed by Oldham *et al.* (2000)[14] and as detailed within ARG UK guidance (ARG UK, 2010)[15]. Where suitable for great crested newt (i.e., ponds holding water), ponds were also subject to eDNA survey sampling to determine the presence or likely absence of great crested newt.

7.2.20 The protocol for sampling followed that outlined within the technical advice note for field and laboratory sampling of great crested newts (Biggs *et al*., 2014)[16], which

[14] Oldham, R. S., Keeble, J., Swan, M. J. S. & Jeffcote, M. (2000) *Evaluating the suitability of habitat for the great crested newt.* The Herpetological Journal Vol 10 No. 4.
[15] *https://www.arguk.org/info-advice/advice-notes/9-great-crested-newt-habitat-suitability-index-arg-advice-note-5/file*
[16] Biggs, J., Ewald, N., Valentini, A., Gaboriaud, C., Griffiths, R. A., Foster, J., Wiilkinson, J., Arnett, A., Williams, P., & Dunn, F. *(2014). Analytical And Methodological Development for Improved Surveillance of the Great Crested Newt. Defra Project WC1067 Appendix 5. Oxford: Freshwater Habitats Trust*

required the collection of 20 x 30ml subsamples from each pond, spaced as evenly as possible around the pond margin. Samples were then sent to SureScreen Scientifics for laboratory analysis.

Bat Activity Survey

7.2.21 Night-time Bat Walkover surveys ('walked transect' surveys) have been undertaken in accordance with Bat Conservation Trust guidance (Collins *et al*. 2023[17]). The transect surveys were undertaken in October 2023, May 2024 and August 2024, within the Autumn, Spring and Summer survey periods. Walked transects have covered field boundary habitats in each of the array areas.

7.2.22 The walked transects have been supplemented by data collected using automated static detectors, deployed in suitable weather conditions for a minimum of five nights in October 2023 and monthly between April 2024 and September 2024.

Baseline Environment

Designated Sites for Nature Conservation

7.2.23 Statutory designated Sties for Nature conservation are shown on Figure 2.1: Environmental Constraints.

7.2.24 The Johnstown Newt Sites Special Area of Conservation (SAC) and underlying Stryt Las a'r Haffod Site of Special Scientific Interest (SSSI) is located approximately 215m west of the WAA, and immediately adjacent to the proposed cable route, the River Dee SAC and SSSI is located approximately 920m south of the EAA and the Sontley Marsh SSSI is located approximately 1.35km north of the CAA.

7.2.25 A total of five non-statutory designated sites for nature conservation are located with 1km of the Array Areas. Yorke's Dingles and Well Wood Wildlife site and Oak Wood Wildlife Site are located adjacent to the CAA, whilst Hopyard Wood Wildlife Site is located adjacent to the EAA. Gefeiliau Brook Wildlife Site and Erddig Estate Wildlife Site are located 600m west of the CAA central point and 745m north-east of the WAA central point, respectively.

[17] *Collins, J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edn). The Bat Conservation Trust, London.*

Habitats

7.2.26 The Site consists of agricultural land mostly comprised of arable fields, with occasional fields of pasture or silage crops. The field compartments are enclosed by a mixture of managed hedgerows, woodland edge, lines of trees, fencing or occasional ditches. Other habitats that are contained within the Site include mixed scrub, semi-natural broadleaved woodland, and small pockets of semi-improved grassland and ruderal communities which are mostly associated with field margins. Minor watercourses are present within/adjacent to all three array areas. Two ponds are located within the Site, a further three are directly adjacent to the Site boundary. Access roads of bare ground, hard standing and tarmac are present in the Central and Eastern Array Areas.

7.2.27 Areas of Ancient Woodland are shown on Figure 3: Environmental Constraints. No areas of Ancient Woodland are located within the Site, but are immediately adjacent to the CAA, EAA and proposed Cable Route. No ancient or veteran trees as identified by the ATI are located within the Stie. An Arboricultural assessment has been undertaken and this has identified 12 veteran trees within the Site or on the Site boundary.

Protected and Notable Species

Breeding Birds

7.2.28 The breeding bird assemblage recorded within the Site during the surveys is characteristic of rural habitats in this region, with a total of 51 species recorded during 2022 surveys and 67 species recorded during 2023 surveys.

7.2.29 Notable species activity was mostly associated with field boundaries such as hedgerows and woodland. During 2023 surveys a single skylark territory was recorded beyond the Site boundary, in adjacent fields. A grey partridge territory was recorded and it is likely that this is within the Site boundary. Survey results are provided at Appendix 7.2.

Non-Breeding Birds

7.2.30 The Site was found to support a non-breeding bird species assemblage typical of the land use and geographic area. Numbers of birds recorded were typically low, with occasional larger flocks of winter thrush species and starling.

7.2.31 A total of 15 species were recorded during the 2023/2024 surveys within the Site, consisting: black headed gull, fieldfare, greylag goose, lesser black-backed gull, redpoll, mallard, meadow pipit, redwing, reed bunting, rook, snipe, sparrowhawk, starling, teal and woodpigeon.

7.2.32 Habitats in the Wider Survey Area were similarly found to support low to moderate numbers of a narrow range of species.

7.2.33 Survey results are provided at Appendix 7.3.

Amphibians

7.2.34 A total of 37 ponds were visited during the course of surveys between 2022 and 2024, of which 26 were subject to eDNA survey. The remainder were found to be dry or no longer existed.

7.2.35 Results of eDNA surveys indicated that none of the ponds subject to survey supported great crested newt, however great crested newt is known to be present within the wider area, including at the Johnstown Newt Sites SAC located adjacent to the proposed cable route.

7.2.36 Ponds are considered suitable to support a range of common species of amphibian, including common frog, common toad, and commoner species of newt. Survey results are provided at Appendix 7.4.

Bats

7.2.37 Habitats within the Site are suitable for a range of foraging and commuting bat species. Static monitoring data indicates that common and soprano pipistrelle are the most frequently recorded, followed by myotis species (not identified to species level), noctule, brown long-eared bat and lesser horseshoe bat.

7.2.38 While detailed analysis is yet to be undertaken, lesser horseshoe bats (a rarer species) were recorded only infrequently, accounting for less than 0.01% of calls recorded. All other species recorded are relatively common and widespread. Full analysis of results will be undertaken prior to submission of an application.

7.2.39 Additionally, several trees within the Site offer features suitable for roosting bats and this will also be detailed in the planning application. As noted in Chapter 3.0 a tree

survey has been conducted to ensure the scheme can be designed to avoid the loss of any mature trees.

Study Area

7.2.40 The study areas for the project have been based on 'zones of influence' for different ecological features which may be affected by biophysical changes as a result of the Proposed Development. The zones of influence that extend beyond the direct land-take required for the Proposed Development have been identified based upon the nature of the project and the construction, operation and decommissioning activities to be undertaken, informed by Chartered Institute of Ecology and Environmental Management (CIEEM), Natural England and established best practice guidance[18], where available[19].

7.2.41 The zones of influence will therefore vary for different ecological features depending on their sensitivity to an environmental change. The identified zones of influence were used to establish the scope of baseline ecological surveys and the extent of survey area and desk study.

7.2.42 Zones of influence for the Proposed Development have been based on the Proposed Development Boundary and comprise:

- **Statutory Designated Sites** – up to 5km from the Site boundary, extending to 10km (30km for bats) for internationally designated sites with mobile qualifying features.
- **Non-statutory Designated Sites** – Up to 2km from the Site boundary
- **Habitats** – Land within the Site and immediately surrounding habitats
- **Breeding Birds –** Land within the Site and up to 100m for potential disturbance of Schedule 1 species;
- **Wintering Birds** – the Site and surrounding fields up to 600m from the Site;
- **Water vole and Otter** – Ditches and watercourses within the Site;
- **Badger** – Land within the Site and immediately surrounding habitats;

[18]

[19] *Where specific guidance documents do not stipulate specific required zones of influence from a proposed Site, professional judgement has been applied based on the understanding of the site and developments similar in nature, size, and scale to the Proposed Development.*

- **Great Crested Newt** – the Site and suitable terrestrial and aquatic habitats up to 250m from the Array Areas and 50m from the Cable Route;
- **Reptiles** – Land within the Site and immediately surrounding habitats; and,
- **Invertebrates** – Land within the Site and immediately surrounding habitats.

7.2.43 Field survey areas may not align with the Zones of Influence outlined above, and are discussed separately.

7.3 Potential Effects

Construction and Decommissioning

7.3.1 Potential construction phase ecological effects associated with the Proposed Development are considered to relate to:

- Direct land take (habitat loss) to accommodate the Proposed Development;
- Temporary disturbance and land take for laydown areas and construction compounds;
- Disturbance to, fragmentation or severance of connecting habitat or potential commuting routes within and adjacent to the site; and
- Disturbance and pollution (indirect effects such as noise and vibration, dust, pollution from surface water run-off) resulting from site clearance and construction, plant and vehicles movements and site workers' activities.

7.3.2 Impacts to ecological receptors associated with decommissioning are considered commensurate with those experienced during construction.

Operational

7.3.3 Operational phase effects are defined as effects following the construction of the Proposed Development. Operational phase effects generally relate to disturbance of habitats or species, on either a temporary or permanent basis. Some effects may reduce with habituation or remain for the lifetime of the Proposed Development.

7.3.4 Emerging evidence suggests that the presence of solar arrays may affect the behaviour of some ecological receptors, including foraging and commuting bat species. Additionally the presence of solar development can preclude nesting of some ground nesting bird species which favour open spaces, such as skylark and lapwing.

7.3.5 There are no additional operational effects relating to land take or habitat loss other than those already addressed in the construction phase.

7.3.6 When managed appropriately, solar farms can contribute positively to biodiversity through the creation of high value, undisturbed habitats including species rich grassland.

7.3.7 Human disturbance from operation of the Proposed Development is not anticipated to be any greater than current levels of agricultural and recreational activity.

Potential Mitigation / Enhancement

7.3.8 Mitigation and enhancement measures will follow the mitigation hierarchy and Planning Policy Wales Step-Wise Approach, whereby impacts will first be avoided through the design of the Proposed Development, and where this is not possible impacts will be reduced, mitigated and as a last resort and residual impact compensated for. The scheme will also commit to overall ecological enhancement (net biodiversity benefit (NBB)) as required by Planning Policy Wales.

7.3.9 The Scheme's design evolution will seek to avoid areas of significant biodiversity value, such as field boundary hedgerows, ditch networks, ancient woodland and mature trees. Habitat enhancement measures and ongoing management practices will be proposed in line with guidance published by the Building Research Establishment (Biodiversity Guidance for Solar Developments[20]) ('the BRE Guidance') that will enhance and safeguard key habitats for the benefit of wildlife, and enhance the ecological value of land currently under agricultural use.

7.3.10 The BRE guidance states that:

'with appropriate land management, solar farms have the potential to support wildlife and contribute to national biodiversity targets. Indeed, solar farms may have several additional advantages in that they are secure sites with little disturbance from humans and machinery once construction is complete. Recent research suggests biodiversity gains on solar farms can be significant'.

[20] : BRE (2014) Biodiversity Guidance for Solar Developments. Eds G E Parker and L Greene

7.3.11 The ES chapter will provide commitments for long-term management of the land for the duration of the project to conserve and improve landscape habitat connectivity with the wider landscape for wildlife through protecting and enhancing potentially important wildlife corridors and habitats. This will contribute to the establishment of coherent ecological networks, supporting the NBB targets of Planning Policy Wales.

7.4 Assessment Methodology

7.4.1 The assessment will be carried out in accordance with current CIEEM (2018)[21] guidance for ecological impact assessment. The assessment will form the Ecology and Nature Conservation Chapter of the Environmental Statement. The Ecology Chapter will consider the likely significant effects on biodiversity (including habitats and species) during construction, operation and decommissioning of the Proposed Development.

7.4.2 The ecological impact assessment will also cross-refer to the results of the assessments of other environmental disciplines or committed management measures outline in the draft CEMP. This may include, but not necessarily be limited to water quality protection measures and noise assessments. Any required mitigation and enhancement measures will also be developed where appropriate, in conjunction with the landscape design of the Proposed Development.

Significance Criteria

7.4.3 To determine the overall significance of each ecological effect, judgements on the sensitivity of the receptor(s) and the magnitude of impact from the Proposed Development will be considered together in order to determine whether or not an effect is likely to be significant. This will involve a combination of quantitative and qualitative assessment and the application of professional judgement.

7.4.4 For the purposes of the assessment, effects will be categorised as significant or not significant. The assessment will consider effects at different geographic scales i.e., where effects may be discernible at a local scale but are not considered significant

[21] *CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.*

in the context of the EIA Regulations. For the purpose of the assessment, moderate and major effects are deemed to be 'significant' in EIA terms unless stated otherwise.

7.4.5 A 'significant effect' is considered to be an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general.

7.4.6 Effects on ecological receptors will be assessed based upon the interaction between the importance, or sensitivity, of the feature and the magnitude of change it is likely to experience. In accordance with the CIEEM guidelines (2018), an EcIA need only assess in detail, impacts upon important ecological features i.e. those that are considered important and potentially affected. It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable. Where ecological receptors are not considered important enough to warrant further consideration, or where they would not be significantly affected, these will be scoped out of the assessment, and justification for exclusion will be provided.

Ecological Receptors Scoped into the Assessment

7.4.7 The ecological receptors to be scoped into the assessment will be reviewed as the project design evolves and as additional information is gathered from planned surveys. The below information presents the rationale for each ecological receptor to be scoped in or out of the ES based on the information gathered to date and professional opinion.

Designated Sites for Nature Conservation

7.4.8 Johnstown Newt Sites SAC and underlying Stryt Las a'r Haffod SSSI is located immediately adjacent to the cable route, and therefore will be scoped into the assessment.

7.4.9 Yorke's Dingles and Well wood Wildlife site and Oak Wood Wildlife Site are located adjacent to the CAA while Hopyard Wood Wildlife Site is located adjacent to the EAA, and therefore will be scoped into the assessment.

7.4.10 It is considered that all other statutory designed sites are sufficiently distanced from the Proposed Development such that considering embedded best practice pollution

prevention measures, no impacts are anticipated. Therefore all other statutory designed sites are proposed to be scoped out of the assessment.

Habitats

7.4.11 While habitats within the Site are typically of low intrinsic value, they may support other protected and/ or notable flora or fauna and would be impacted directly during construction of the Proposed Development. Therefore, following a precautionary approach such habitats are anticipated to be scoped in for detailed assessment in the ES for construction phase impacts.

7.4.12 It is expected that embedded habitat creation and enhancement, as well as favourable management practices introduced for the lifetime of the Proposed Development would enhance the habitats within the Site, resulting in overall beneficial effects throughout operation.

Breeding Birds

7.4.13 Data collected thus far indicates that the breeding bird assemblage is likely to be of value at the Local level only, and does not support large numbers of ground nesting species (e.g., skylark).

7.4.14 Given the scarcity of ground nesting species within the Site and taking into account the embedded retention of most hedgerows and boundary features within the Site, no adverse impacts are anticipated.

7.4.15 It is expected that embedded habitat creation and enhancement, as well as favourable management practices introduced for the lifetime of the Proposed development would enhance the Site for the breeding bird assemblage as whole throughout the operational period.

7.4.16 The Site breeding bird assemblage is therefore proposed to be scoped out of the assessment. Mitigation measures would be proposed to ensure legislative compliance.

Non-breeding birds

7.4.17 Based on data collected to date, given the low numbers of common and widespread non-breeding bird species present it is proposed that non-breeding birds are scoped out of detailed assessment in the ES.

7.4.18 Any potential for operational impacts is limited to disturbance through maintenance visits, which is considered likely to be no more than existing agricultural management activities.

Roosting Bats

7.4.19 While trees offering bat roosting potential are located within the Site these will be retained and protected in line with embedded avoidance and mitigation measures. No buildings with bat roost potential are anticipated to be affected by the Proposed Development.

7.4.20 Due to the absence of direct or indirect impacts to suitable roost habitats during construction and operation, roosting bats are proposed to be scoped out of detailed assessment in the ES.

7.4.21 Should future design iterations require impacts to trees or buildings and surveys confirm likely bat presence, the species would be scoped into the ES.

Foraging and Commuting Bats

7.4.22 Important bat foraging and commuting features such as field boundary habitats would be retained and protected through embedded avoidance and mitigation measures, including buffers around field boundary habitats.

7.4.23 Minor and localised removal of hedgerows may be required, and taking into account emerging evidence regarding bat aversion to solar arrays, following a precautionary approach foraging and commuting bats will be scoped into the ES for construction impacts.

7.4.24 It is expected that embedded habitat creation and enhancement, as well as favourable management practices introduced for the lifetime of the Proposed Development would result in higher quality foraging habitat and so enhance the Site for foraging bats during the operational period. It is however acknowledged that the presence of solar PV panels may affect bat foraging and commuting habits during operation of the Proposed Development, and therefore bats are scoped in for this phase of development.

Amphibians

7.4.25 No records of great crested newt presence was returned during eDNA survey, however habitats within the Site are suitable for the species, and other common species of amphibian.

7.4.26 Due to access limitations, surveys were undertaken at 37 ponds, with 26 subject to eDNA survey. Access was not possible at 54 ponds, representing survey coverage of 40%. Ponds surveyed are those located within and in close proximity to the Array Areas, and so this sample represents the ponds most likely to be subject to impacts. The surveyed ponds cover a wide geographic area, spread over 5km. Therefore the sampling is considered proportionate, however a precautionary approach will be taken to the assessment.

7.4.27 While no evidence of great crested newt presence has been gathered to date, given the known presence of the species within the local landscape, the suitable habitats on site, and proximity of the cable route to the Johnstown Newt Sites SAC amphibians will be scoped into the assessment in relation to construction.

7.4.28 It is expected that embedded habitat creation and enhancement, as well as favourable management practices introduced for the lifetime of the Proposed Development would result in higher quality habitat for amphibians throughout the operational period.

7.4.29 A Habitats Regulations Assessment with regards to Great Crested Newt and the Johnstown Newt Sites SAC will also be undertaken as part of the planning application.

Reptiles

7.4.30 Agricultural land that dominates the Site provides suboptimal habitat for reptiles. More suitable reptile habitat, such as field boundaries and watercourse corridors, will largely be retained and protected throughout construction of the Scheme with suitable buffers implemented. Due to these embedded mitigation measures reptiles will be scoped out of detailed assessment in the ES. Mitigation measures will be outlined within the ES / draft CEMP to ensure legal compliance.

7.4.31 It is expected that embedded habitat creation and enhancement, as well as favourable management practices introduced for the lifetime of the Proposed

Development would result in higher quality habitat for reptiles, if present within the Site and surrounding areas.

Badger

7.4.32 Badgers are a common and widespread species at both a local and national level, and while protected by law this is primarily due to welfare concerns. Therefore, while avoidance and mitigation measures will be implemented to ensure compliance with legal requirements, impacts to badger will be scoped out of detailed assessment in the ES as any effect is not likely to be considered significant. Badger will be considered with regards to legislative compliance (mitigation).

Otter

7.4.33 No suitable watercourses for otter are located within the Site. Due to embedded avoidance and mitigation measures in place to protect watercourses and ditches within the Site, no impacts are anticipated on this species during construction or operation of the Proposed Development and therefore water vole are scoped out of the ES.

Water vole

7.4.34 No suitable watercourses to support water vole are located within the Site. Due to embedded avoidance and mitigation measures in place to protect watercourses and ditches, no impacts are anticipated on this species during construction or operation of the Proposed Development and therefore water vole are scoped out of the ES.

7.4.35 Should localised crossings be required habitat suitability assessments, and if appropriate presence/ likely absence surveys, would be undertaken. Should water vole presence be confirmed, and impacts be anticipated as a result of watercourse crossings, the species would then be scoped into the assessment.

Dormouse

7.4.36 There are some records of dormouse within Wrexham. The mature, dense and scrubby hedgerows across the Site will provide suitable cover and food sources for dormouse, the hedgerows also provide good connectivity to mature woodland adjacent to the Site. The habitats present on Site and offsite therefore have some potential to support a Dormouse population.

7.4.37 All hedgerows and trees on the Site are being retained and would be buffered by at least 5m. Localised widening of existing access into fields will be limited to the removal of short sections of managed hedgerow next to farm gates during construction with subsequent replacement planting. Additional hedgerows and areas of woodland would be created as part of the Proposed Development, along with the strengthening and improvement the weaker hedgerows on Site. As such it is likely that the Proposed development would have a positive impact on local Dormouse populations if present. As such it is proposed that impacts on Dormouse are scoped out of the ES.

Invertebrates

7.4.38 Given the agricultural habitats present, being both widespread and of low value to invertebrates, and taking into the account the implementation of buffer zones around the most suitable habitats (e.g., hedgerows, margins, ditches and woodland) it is currently anticipated that invertebrates will be scoped out of the ES.

7.4.39 It is expected that embedded habitat creation and enhancement, as well as favourable management practices introduced for the lifetime of the Proposed development would result in higher quality habitat for a range of invertebrate species throughout operation.

8.0 NOISE AND VIBRATION

8.1 Introduction

8.1.1 This section of the Scoping Report sets out the proposed approach to the assessment of potential noise effects associated with the construction, operation, and decommissioning of the Proposed Development.

8.1.2 Liaison with WCBC Environmental Health Officers (EHO) will be undertaken to agree the location of noise sensitive receptors (NSRs) relative to the Site, noise criteria and assessment methodology which are set out in this chapter.

8.1.3 The noise chapter of the ES will be supported by a detailed noise assessment which provides an assessment of the likely noise impacts which would arise from the Proposed Development to recognised technical guidance and standards. The assessment would be informed by background sound monitoring undertaken in proximity to the nearest NSRs.

8.2 Baseline Environment and Proposed Study Area

Introduction

8.2.1 An assessment of potential effects of the Proposed Development with respect to noise will be undertaken. This will include construction phase (temporary) and operational phase (permanent) effects. As set out in Chapter 5.0 decommissioning effects are likely to be similar to those experienced during the construction phase.

Baseline Environment

8.2.2 Initial analysis of satellite imagery has shown that road traffic noise from the A483 (located adjacent to the western Site boundary of the WAA), is likely to dominate the acoustic environment across the Site, and NSRs in the vicinity of the WAA. NSRs surrounding the WAA are also likely to experience some railway noise associated with the Shrewsbury–Chester railway line which runs approximately 770m to the west of the WAA.

8.2.3 NSRs located to the west of the A483 may experience some commercial/industrial sound associated with Hafod Industrial Estate, in addition to road traffic noise.

8.2.4 The acoustic environment in the vicinity of the CAA is likely to be dominated by road traffic noise from local surrounding roads including the B5426 which runs adjacent to the southern Site boundary. Distant road traffic noise from the A483 may also be audible.

8.2.5 The acoustic environment in the vicinity of the EAA is likely to be dominated by road traffic noise from local surrounding roads including the A528, A525, B5426 and B5130 which surround the EAA. Some commercial sound may be audible associated with units at Gerwyn Fechan, located to the south east of the EAA.

Study Area

8.2.6 The study area will comprise the NSRs located adjacent to the Site and those sections of the surrounding road network anticipated to experience a significant change in road traffic as a result of the construction and decommissioning of the Proposed Development.

8.3 Potential Effects

Construction and Decommissioning

8.3.1 The assessment will consider the transient noise and vibration effects arising from on-site construction and decommissioning activities.

8.3.2 The assessment will consider the transient noise effects of off-site construction and decommissioning traffic.

8.3.3 Due to the relatively low impact construction techniques (micro-piling) typically used for this type of development, this technique gives rise to vibration levels that are sufficiently low so as to ensure that significant effects are considered unlikely at the NSRs. It is therefore proposed to scope out the assessment of construction vibration.

Operational

8.3.4 Solar farms are an inherently quiet installation with no noise generated from the panels themselves. The associated plant to convert the DC current to AC at the correct voltage involves the use of inverters and transformers, which do produce noise.

8.3.5 Transformers are not particularly noisy plant and generate a low level 'hum' at relatively close distances driven by the mains frequency. By its nature the solar array is only operational during daylight hours, however during peak generation over the summer months (i.e. under conditions of high temperatures) there may be occasional periods when the operation of the inverters and transformers occurs just after sun rise (i.e. around 0500 hours to 0700 hours), but this would not be at full capacity and noise levels would be lower than during daylight periods.

8.3.6 The assessment will consider potential effects arising from sound associated with static plant installations within the completed sites, primarily associated with cooling fans serving the inverter stations and energy storage containers.

8.3.7 Given the nature of the Proposed Development, road traffic noise effects during the operation of the completed site are not considered likely to result in significant effects. It is therefore proposed to scope this out of the assessment.

Potential Mitigation / Enhancement

8.3.8 Contractors will be required to ensure that works are carried out in accordance with Best Practicable Means (BPM) as stipulated in the Control of Pollution Act 1974. A full explanation of measures to control construction noise will be incorporated within a Construction Environmental Management Plan (CEMP) and detailed in all demolition and construction method statements. An outline CEMP will be provided with the DNS application which will set out the types of measures that will be employed to reduce noise impacts during the construction period.

8.3.9 The scheme will be designed such that all operational sound generating plant is optimally located and distributed throughout the Site, such that acoustic effects at NSRs are minimised.

8.4 Assessment Methodology

Surveys

8.4.1 A baseline noise survey has been carried out to determine the existing acoustic environment at the nearest NSRs. The baseline noise survey includes a typical weekend and weekday period. The measured noise levels will be used to inform each of the assessments set out below where appropriate.

8.4.2 Noise monitoring locations (MP1-MP8) are shown on Image 8.1, Image 8.2 and Image 8.3 for the western, central and eastern arrays respectively. The nearest identified NSRs are also shown for reference.

Image 8.1 – Noise Monitoring Locations and NSRs – Western Array Area

Image 8.2 – Noise Monitoring Locations and NSRs – Central Array Area

Image 8.3 – Noise Monitoring Locations and NSRs – Eastern Array Area

Assessment Methodology

8.4.3 The Noise and Vibration Chapter would provide details on the nature of the local noise environment, and an assessment of the potential impacts and effects associated with noise and vibration from the Proposed Development.

8.4.4 As part of the assessment, the following will be undertaken:

i) Establish location of representative NSR;
ii) Baseline assessment at NSR;
iii) Review of Policies, Guidance and Standards;
iv) Analysis of construction and decommissioning effects including road traffic impacts; and
v) Analysis of operational effects including plant noise and road traffic impacts.

8.4.5 The effects of noise during the construction and decommissioning phases will be assessed in accordance with the British Standard 5228-1:2009+A1:2014 *'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise*'. The focus will be on mitigation measures to be included in a CEMP.

8.4.6 The change in noise levels resulting from additional traffic flows associated with the construction of the Proposed Development will be assessed in accordance with

guidance contained in Design Manual for Roads and Bridges '*LA 111 Noise and vibration*' for the key stages of construction.

8.4.7 The effects of sound during the operation of the Proposed Development will be assessed in accordance with British Standard 4142:2014+A1: 2019 '*Methods for rating and assessing industrial and commercial sound*'. This standard requires an assessment of operational sound against prevailing the background sound level, and will inform the acoustic specifications and locations of the sound-generating plant items to be included, such that the amenity of existing receptors in the area will not be adversely impacted. Where very low background sound environments occur, consideration would also be given to absolute sound level limits to comply with sleep disturbance criteria within bedrooms (i.e. BS8233: 2014 and WHO guidelines).

9.0 HISTORIC ENVIRONMENT

9.1 Introduction

9.1.1 This section of the Scoping Report has been prepared by AOC Archaeology Group and outlines the baseline archaeological and cultural heritage conditions at the Site and the methodology that will be utilised for the identification and assessment of effects on heritage assets within the ES.

9.1.2 The historic environment assessment will consider the potential effects of the Proposed Development on archaeology, built heritage and the historic landscape.

9.2 Baseline Environment and Proposed Study Area

Introduction

9.2.1 This baseline has been informed by data obtained from Cadw, Heneb: The Trust for Welsh Archaeology Historic Environment Record (HER), LANDMAP, and a review of various historic maps for Wales held and published online by the National Library of Scotland (NLS)[22].

9.2.2 Each asset identified in the existing historic baseline has been assigned an Asset Number unique to this Scoping Report, and the Gazetteers of Heritage Assets and Events (Appendix 9.1 and 9.2) include information regarding the type, period, grid reference, reference number, protective designation, and other descriptive information, as derived from the consulted sources.

Baseline Environment

9.2.3 LANDMAP Historic Landscape Character Area data records the Site and study area as being within various Historic Landscape areas comprised of the rural landscape composed of irregular agricultural fields and the built environment of Ruabon-Rhosllaner.

[22]*The National Library for Scotland hold Ordnance Survey maps for England, Scotland and Wales. National Library of Scotland (2024) Ordnance Survey Maps - Six-inch England and Wales, 1842-1952 [online] Available: https://maps.nls.uk/os/6inch-england-and-wales/*

9.2.4 The following heritage assets have been identified within the Site boundary (Figure 9.1):

i) The line of Wat's Dyke (Asset 693) crosses the Site, running north-south across the connection route east of the WAA (which is also the B5426). Sections of this monument are Scheduled, including the Section extending from Middle Sontley to Black Brook Bridge (Asset 35), which extends c. 4m into the Site boundary on the northern side of the connection route (noting that development in this location would be limited to being located within the existing highway). Wat's Dyke is considered to be an 8th-century boundary marker, which possibly separated the Kingdom of Mercia and the kingdoms of Wales. The varied survival of the asset along its length potentially reflects differences in preservation and original scale of construction.

ii) The line of Offa's Dyke (Asset 535) also crosses the Site, running north-south across the western end of the connection route, again coincident with the existing road. This earthwork is also considered to be early medieval and survives as a substantial bank and ditch along much of its length. No surface remains of the dyke are recorded within the Site itself, although the Pentre-Bychan Hall Section, extending 540m South from Bron-Wylfa (Asset 9) is Scheduled and extends to within c. 9m of the Site boundary.

iii) The Crash Site of a Republic P-47C Thunderbolt 41-660 aeroplane (Asset 625) that crashed in 1944 is recorded in the eastern part of the EAA.

iv) Linear Crop Marks (Asset 342) are recorded within the southern part of the EAA. The cropmarks were initially identified from aerial photographs and interpreted as a possible prehistoric cursus monument. However, evaluation work carried out in 2011 (Event 742) found no evidence of archaeological remains. It was concluded that the cropmarks were probably caused by modern vehicle tracks and are not of archaeological interest.

v) Four ponds, probably former marl pits, are recorded within the EAA: Gerwyn-Fechan Pond (Asset 346), Gerwyn-Fechan, The Belt, Pond (Asset 348), Maelor Saesneg, Pond 344 (Asset 459) and Maelor Saesneg Pond 345 (Asset 460). These features are shown on historical maps and may be of post-medieval or

medieval date. 19th-century OS maps show approximately eight similar features within the CAA and at least one in the WAA[23].

vi) Two parcels of ridge and furrow (the remains of medieval or post-medieval cultivation) are recorded within the CAA, although current satellite imagery suggests the remains may be more extensive than those included in the HER dataset.

vii) The western end of the Site connection road runs along the line of the former Mill Race at Legacy Mill (Asset 387). The race is no longer visible, but historical maps show it to have followed the modern roadway between Legacy Mill (Asset 320) and a weir west of the Site (Asset 334).

9.2.5 No designated assets are located within the Site other than part of the Scheduled area associated with the section of Wat's Dyke (Asset 35) as noted in the preceding paragraph.

9.2.6 Additional heritage assets identified within the study areas (Figures 9.2 to 9.4) include:

i) 47 designated and 438 non-designated assets within the 1 km study area, which include:
   a. 14 Scheduled Monuments dating from the prehistoric to modern periods and including a further two sections of Wat's Dyke (Assets 3, 35 & 42) and six sections of Offa's Dyke (Assets 9, 13, 31, 34, 46 & 51), considered to reflect two attempts to define the extent of early medieval kingdoms.
   b. 31 Listed Buildings: Four Grade II* Listed Buildings (Assets 65, 75, 90 & 152); and 27 Grade II Listed Buildings (Assets 66, 74, 76-77, 79, 89, 112, 121, 151, 135-136, 153-158, 162, 164-167, 176-177 and 207-209).
   c. One Grade I Registered Historic Park & Garden: Erddig (Asset 253).
   d. The north-western edge of Maelor Historic Landscape (Asset 255).

ii) 438 non-designated assets, ranging in date from neolithic to modern and including findspots, buried archaeology and standing remains. The post-medieval landscape is particularly well-represented within this group of assets;

[23] *National Library of Scotland (2024) Ordnance Survey Maps - Six inch England and Wales, 1842-1952 [online] Available at: https://maps.nls.uk/os/6inch-england-and-wales/*

however, this reflects both preservation and a bias created by the thorough recording of features (e.g. ponds, farm buildings) shown on 19th-century maps.

iii) An additional 168 designated assets within the 3 km study area, which include:
   a. 17 Scheduled Monuments;
   b. 133 Listed Buildings:
      i. One Grade I Listed Building;
      ii. 17 Grade II* Listed Buildings; and
      iii. 116 Grade II Listed Buildings.
   c. Seven Conservation Areas (including Listed Buildings therein);
   d. Four Registered Historic Parks and Gardens; and
   e. Seven Gardens and/or Kitchen Gardens.

iv) A further 46 designated assets of national importance within the 5 km study area, which include:
   v) 25 Scheduled Monuments;
   vi) 20 Listed Buildings;
      a. Four Grade I Listed Buildings;
      b. 16 Grade II* Listed Buildings; and
   vii) The south-eastern edge of the Vale of Llangollen and Eglwyseg Historic Landscape.

9.2.7 Review of the Tithe Apportionment maps[24,25,26,27] of the 1840s indicates that the WAA was largely occupied by mixed agricultural land, composed of arable and pasture land in the mid-19th century. The CAA is also documented as mixed arable and pasture land. The extent of the CAA avoids historically depicted buildings, two of which are labelled as ‘Street y bwch’ and ‘Groves’ (Asset 79 or 208). The extent of the EAA is illustrated as wrapping around the southern edge of “Gerwenfawr” which

[24] The Parish of Esclusham Below, Wrexham, 1844. Accessed via The Genealogist website (2024), Tithe Apportionments, 1836-1929.
[25] Map of the townships of Moreton Below, Bodylltyn, Rhyddallt, Belan, Hafod, Moreton Anglicorum and Dinhunlle Issa in the parish of Ruabon; Map of the townships of Moreton Above, Dinhunlle Ucha and Coed Christionydd in the parish of Ruabon in the County of Denbigh, 1845. Accessed via The Genealogist website.
[26] Map of Marchwiel parish in the County of Denbigh, 1840. Accessed via The Genealogist website.
[27] Plan of the parish of Bangor in the Counties of Flint and Denbigh, 1840. Accessed via The Genealogist website.

appears to be a substantial, courtyard farm (Asset 343) associated with large ponds. The EAA is also recorded as mixed agricultural land at this date.

9.2.8 The Ordnance Survey (OS) maps published in 1879[28, 29] depict the Site, and the land boundaries therein, similarly to the tithe maps. In general, the OS maps show the Site within an agricultural landscape, with a pattern of dispersed farmsteads and roadside residential dwellings, and with limited evidence of industrial development.

Study Area

9.2.9 In order to assess the potential for significant effects on cultural heritage assets resulting from the Proposed Development, the following study areas have been identified:

i) A core study area, which includes all land within the Site and will be subject to assessment for potential direct effects. This Site will be subject to detailed walkover survey, which will be used to identify any cultural heritage assets that may be directly affected by the Proposed Development.
ii) A 1 km study area around the Site, for the identification of all known heritage assets and known previous archaeological interventions in order to help predict whether any similar hitherto unknown archaeological remains are likely to survive within the Site and thus be impacted by the Proposed Development.
iii) A 3 km study area around the Site, for the assessment of potential effects on the settings of all designated heritage assets including World Heritage Sites (WHS), Scheduled Monuments, all Listed Buildings, Registered Parks & Gardens, Historic Landscapes and Conservation Areas; and
iv) A 5 km study area around the Site, for the assessment of potential effects on the settings of all nationally important designated heritage assets including WHS, Scheduled Monuments, Grade I and II* Listed Buildings, Historic Landscapes and Grade I and II* Registered Parks & Gardens.

[28] *Denbighshire Sheet XXXV Surveyed: 1872 to 1873, Published: 1879. Accessed via the NLS website.*
[29] *Flintshire Sheet XXII Surveyed: 1872 to 1873, Published: 1879. Accessed via the NLS website.*

9.3 Potential Effects

Construction and Decommissioning

9.3.1 The construction of the Proposed Development has the potential to directly impact the known heritage assets within the Site as a result of the establishment of compounds and hardstanding, construction of internal access roads, piling, cable trenching etc.

9.3.2 Assets that are located within the Array Areas and could, therefore, be directly impacted include: the crash site of a Republic P-47C Thunderbolt 41-660 (Asset 625), a number of ponds (probably former marl pits) (Assets 346, 348, 459 and 460, along with other examples present on historical maps) and remains of ridge and furrow cultivation. Non-scheduled sections of Wat's Dyke (Asset 693) and Offa's Dyke (Asset 535) (i.e. potential remains that may survive below ground level), and the Legacy Mill Race (Asset 387) are also recorded within the Site boundary and could be impacted by the construction of the Proposed Development. However, these assets cross or follow the proposed connection routes, and it is likely that the modern roads that the connection routes follow have already damaged or disturbed any earlier archaeological remains.

9.3.3 Where possible, the Proposed Development would be designed to preserve heritage assets in situ and thus direct impacts would be avoided by design. However, where this is not feasible and heritage assets cannot be avoided by design, a robust programme of mitigation will be required.

9.3.4 There is the potential for hitherto unknown archaeological deposits and remains to survive on the Site. As such, the Proposed Development may have the potential to directly impact hitherto unknown archaeological remains.

9.3.5 A detailed assessment of the cultural heritage impacts of decommissioning the Proposed Development will be scoped out of the EIA because: (i) the future baseline conditions (environmental and other developments) cannot be predicted accurately at this stage; (ii) the detailed proposals for decommissioning are not known at this stage, and (iii) the best practice decommissioning guidance methods will likely change during the lifetime of the Proposed Development. Furthermore, the removal of the infrastructure at the Site is unlikely to result in any disturbance of any additional below ground heritage resources to those which would have been potentially affected

during construction. Also, the removal of above ground infrastructure and restoration to similar conditions to that which prevail at present is unlikely to result in any adverse heritage setting impacts as it will be a return to the current baseline.

Operational

9.3.6 The Proposed Development has the potential to impact upon the settings of heritage assets that are intervisible or where the Proposed Development can be seen in key views towards assets across the landscape. There is also a potential for cumulative impacts on the settings of heritage assets with other proposed developments in the area.

9.3.7 A Zone of Theoretical Visibility (ZTV) will be used to identify designated heritage assets with theoretical intervisibility with the Proposed Development. A review of designated heritage assets within the study areas will also be undertaken to identify assets with key views in which the Proposed Development may appear. Designated heritage assets within the defined study areas not within the ZTV and not identified as having key views which may include the Proposed Development will be scoped out of further assessment.

9.3.8 The impact of the Proposed Development on heritage assets within the ZTV will be considered as part of the ES Chapter as will the impact of cumulative developments.

Potential Mitigation / Enhancement

9.3.9 National planning policies and planning guidance as well as the local planning policies require that account is taken of potential effects upon heritage assets by proposed developments and that where possible such effects are avoided. Where avoidance is not possible these policies require that any significant effects are minimised or offset.

9.3.10 The Proposed Development will be designed, wherever possible, to avoid direct impacts upon known heritage assets, including those identified by Cadw, the RCAHMW and the HER and those identified during desk-based assessment and the walkover survey.

Archaeological Mitigation

9.3.11 Desk-based assessment indicated potential for previously unrecorded archaeological remains to be present within the Site. Any such remains may be related to prehistoric settlement and/or the early medieval monuments of Wat's Dyke and Offa's Dyke, possible medieval clay extraction pits associated with the wider industrialisation of the landscape during this period. Several pre-existing field boundaries, pond features and ridge and furrow have also been identified within the Site.

9.3.12 Geophysical survey of the Site, undertaken to inform the Scoping Report, identified a concentration of anomalies of archaeological origin in the western portion of the Site which potentially date from later prehistory through to the medieval period, on the basis of their spatial arrangement and characteristics. Other features of possible archaeological origin including a possible ring ditch, and rectilinear features were also identified in the east of the Site. The geophysical survey also revealed evidence for historic ridge and furrow cultivation.

9.3.13 The geophysical survey conducted across the Site successfully identified a range of natural and possible archaeological features. Responses within the west and centre of the application area were clear, likely reflecting the clear contrast between the soils and underlying geology across approximately two-thirds of the Site. Within these responses the geophysicists were able to pick out some potential archaeological features, which provide confidence that the data is of good quality and reflects clearly the below-ground conditions.

9.3.14 In the east of the Site the survey detected some anomalies of likely archaeological origin. In this area, there was also variation in data clarity which may have occurred as a consequence of agricultural response/approach to land management, when compared to the land to the west and therefore may be masking archaeological signal.

9.3.15 Given the potential for archaeological remains that appear on the evidence of both the preliminary desk-based assessment and geophysical survey to be present on the Site, further consultation will be required to be undertaken with Heneb: the Trust for Welsh Archaeology as archaeological advisors to Wrexham County Borough Council. Following on from this a draft mitigation strategy will be set out in detail in

the Environmental Statement and will be supported by a Written Scheme of Investigation (WSI).

9.3.16 The mitigation strategy will include provision for the further investigation of the identified possible archaeological anomalies within the Site. It is envisaged that this would constitute a targeted trial trench evaluation targeting the identified geophysical anomalies (possible enclosure, ring ditch and rectilinear features) to ascertain if they are archaeological in nature and if so, provide further evidence in relation to their possible date and form. Trial trenching investigation would also be undertaken across a proportion of those areas where the geophysical survey contrasts were less clear to better understand the archaeological potential. Finally the undertaking of a trial trench evaluation across a representative proportion of the remainder of the Site would also be undertaken to confirm the results of the geophysical survey.

9.3.17 In view of the extensive survey work undertaken on this Site, it is envisaged that the trial trench evaluation can be undertaken post-determination with the proviso that should significant remains be identified then further requirements for mitigation, either by preservation in situ or by record as appropriate, may be required.

Other Potential Mitigation / Enhancement

9.3.18 The extent of a Scheduled section of Wat's Dyke: Section extending from Middle Sontley to Black Brook Bridge (Asset 35), which extends into the Site boundary to the east of the WAA, will be avoided by design. In the case that direct impacts are anticipated, Scheduled Monument Consent (SMC) would be required to be obtained from Cadw prior to any development.

9.3.19 The Public Services (Social) Act 2012[30] states that development proposals should provide positive benefits to communities through developments. The Levelling-up and Regeneration Act 2023[31] notes that where heritage assets are to be impacted a consideration should be given to "*enhancing*" heritage assets. Paragraph 6.1.8 of Planning Policy Wales notes that "*The protection, conservation and enhancement of historic assets is most effective when it is considered at the earliest stage of plan*

[30] *Public Services (Social Value) Act 2012. [online] UK Government. Available at: https://www.legislation.gov.uk/ukpga/2012/3/enacted.*
[31] *Levelling Up and Regeneration Act 2023. (c.3). [online]. London: The Stationery Office. Available from: https://www.legislation.gov.uk/ukpga/2023/55/enacted*

preparation or when designing new proposals"[32]. CIfA[33, 34], The Association of Local Government Archaeological Officers[35] (ALGAO), and the Chief Executive Officer and Chair advertisements for Heneb: the Trust for Welsh Archaeology[3637] have also recently noted the need for public benefit and enhancement in archaeology. In this case, if a programme of public engagement and/or enhancement were to be considered, engagement could include onsite and off-site training in archaeological techniques to a variety of local, regional and national audiences. This could occur prior to, during and following construction works, and include legacy programmes of dissemination in the local area and online, aimed at a range of audiences. It could be based on known heritage assets in the landscape and any archaeological assets identified during any further archaeological works. Integrated, holistic packages can also include elements relating to the historic environment, for example any proposed public access into the Site could include information about the general historic landscape and be designed in tandem with other disciplines.

9.3.20 The Proposed Development will be designed where possible, to minimise impacts on the settings of designated heritage assets. Scheduled sections of Offa's Dyke and Wat's Dyke are located within the vicinity of the western half of the Proposed Development. The Grade II* Listed Esclusham Hall (Asset 65); and the Grade II Listed Barn Range at Esclusham Hall (Asset 157), Eddystone House (Asset 66), War Memorial (Aset 167), Hafod House (Asset 76), Hafod House Farmhouse (Asset 77), The Groves (Asset 79) and the Former House at The Groves (Asset 208) are located within 50m of the Proposed Development. If significant effects are still predicted, despite minimisation through design, appropriate additional compensatory mitigation, designed to provide public benefit, may be proposed.

[32] *Welsh Government. 2018- Last Updated 2024. Planning Policy Wales. Available at: https://www.gov.wales/planning-policy-wales*
[33] *CIfA. (2021a). Public Benefit Information Sheet. Available at: https://www.archaeologists.net/sites/default/files/Public%20benefit%20leaflet.pdf*
[34] *CIfA (2021b). Professional Practice Paper: Delivering Public Benefit. Available at: https://www.archaeologists.net/sites/default/files/Delivering_public_benefit.pdf*
[35] *Mann, B. (2023). Delivery of Public Benefit and Social Value Guidance for Archaeology in the Planning Process. Available at:https://www.algao.org.uk/sites/default/files/documents/ALGAO_Delivery_of_Public_Benefit_and_SocialValueGuidance.pdf*
[36] *https://www.peridotpartners.co.uk/wp-content/uploads/2023/11/Heneb_Chair_RDPS_Nov-23.pdf*
[37] *https://www.peridotpartners.co.uk/wp-content/uploads/2023/11/Heneb_CEO_JDPS_23.11.pdf*

9.4 Assessment Methodology

Introduction

9.4.1 The following outlines the assessment methodology which will be used in the EIA Chapter.

Legislation and Guidance

9.4.2 The statutory framework for heritage in Wales is outlined in the Ancient Monuments and Archaeological Areas Act 1979[38], Planning (Listed Buildings and Conservation Areas) Act 1990[39], the Historic Environment (Wales) Act 2016[40], the Levelling Up and Regeneration Act 2023[41] and the Public Services (Social Value) Act, 2012[42]. It is expected that the Historic Environment (Wales) Act 2023[43] will come into force in the latter part of 2024.

9.4.3 The implications of these Acts with regard to government planning policy are described within:

i) Planning Policy Wales (PPW) (2018, updated 2024[44]) – Chapter 6: Distinctive and Natural Places – The Historic Environment; and
ii) TAN 24: The Historic Environment (2017)[45].

9.4.4 Local planning policy is contained within:

[38] *Ancient Monuments and Archaeological Areas Act, 1979 (c46). [Online]. London. UK Government. Available at: http://www.legislation.gov.uk/ukpga/1979/46/pdfs/ukpga_19790046_en.pdf*
[39] *Planning (Listed Buildings and Conservation Areas) Act, 1990 (c9) [Online] London. UK Government. Available at: http://www.legislation.gov.uk/ukpga/1990/9/contents*
[40] *Historic Environment (Wales) Act 2016 [Online] National Assembly for Wales. Available at: https://www.legislation.gov.uk/anaw/2016/4/introduction*
[41] *Levelling Up and Regeneration Act 2023. (c.3). [online]. London: The Stationery Office. Available from: https://www.legislation.gov.uk/ukpga/2023/55/enacted*
[42] *Public Services (Social Value) Act 2012 (as enacted). [online] UK Government. Available at: https://www.legislation.gov.uk/ukpga/2012/3/enacted.*
[43] *Welsh Government 2023 Historic Environment (Wales) Act 2023 Available at: https://www.legislation.gov.uk/asc/2023/3/contents/enacted*
[44] *Welsh Government. 2018, Last Updated 2024. Planning Policy Wales. Available at: https://www.gov.wales/planning-policy-wales*
[45] *Welsh Government, 2017. Technical Advice Note 24: The Historic Environment. Available at: https://www.gov.wales/sites/default/files/publications/2018-09/tan24-historic-environment.pdf*

i) Wrexham Local Development Plan 2013-2028[46], which was adopted on the 20th December 2023:
ii) Policy SP15: Historic and Cultural Environment

9.4.5 Local planning guidance notes relevant to this assessment includes those on:

i) Conservation Areas[47]

9.4.6 The following guidance documents issued by Cadw will be consulted during the assessment to assist in the determination of potential effects on cultural heritage assets:

i) Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process (Revised 2nd Edition)[48];
ii) Conservation Principles for the sustainable management of the historic environment in Wales[49];
iii) Historic Environment Records in Wales: Compilation and Use[50];
iv) Managing Change to Listed Buildings in Wales[51];
v) Managing Change to Registered Parks and Gardens in Wales[52];
vi) Managing Conservation Areas in Wales[53];
vii) Managing Historic Character in Wales[54];
viii) Setting of Historic Assets in Wales[55];
ix) Heritage Impact Assessment in Wales[56];
x) Managing Scheduled Monuments in Wales[57];
xi) Understanding Listing in Wales[58]; and

[46] *Wrexham Borough Council. 2023. Adopted Wrexham Local Development Plan. Available at: https://wrexham-consult.objective.co.uk/portal/adopted_wrexham_local_development_plan*
[47] *Wrexham Borough Council. 1993, Updated 2009. Conservation Areas - Local Planning Guidance Note No.4. Available at: https://www.wrexham.gov.uk/service/development-plans-and-other-planning-policy/local-planning-guidance-notes*
[48] *Cadw, 2007. Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process.*
[49] *Cadw, 2011. Conservation Principles for the sustainable management of the historic environment in Wales.*
[50] *Cadw, 2017a. Historic Environment Records in Wales: Compilation and Use.*
[51] *Cadw, 2017b. Managing Change to Listed Buildings in Wales.*
[52] *Cadw, 2017c. Managing Change to Registered Parks and Gardens in Wales.*
[53] *Cadw, 2017d. Managing Conservation Areas in Wales.*
[54] *Cadw, 2017d. Managing Historic Character in Wales.*
[55] *Cadw, 2017e. Setting of Historic Assets in Wales.*
[56] *Cadw, 2017f. Heritage Impact Assessment in Wales.*
[57] *Cadw, 2018a. Managing Scheduled Monuments in Wales.*
[58] *Cadw, 2018b. Understanding Listing in Wales.*

xii) Understanding Scheduling in Wales[59].

Scope of the Assessment

9.4.7 Given the baseline conditions, it is proposed that the following potentially significant effects will be assessed:

i) Settings impacts on designated assets with theoretical visibility within the 3 km and 5 km study areas (as identified using the Zone of Theoretical Visibility (ZTV)) or with identified sensitivity to setting change at greater distances;
ii) Settings impacts on non-designated assets with theoretical visibility within the 1 km study area identified as being of high sensitivity to setting change;
iii) Direct impacts on designated and non-designated assets within the Site;
iv) Settings impacts on all designated assets within the Site and selected non-designated assets with theoretical visibility within the Site that have been identified as having high sensitivity to setting change; and
v) Cumulative effects.

9.4.8 Given the nature of the Proposed Development, direct impacts on cultural heritage assets located outside the Site will be scoped out of the assessment.

9.4.9 Impacts on the settings of non-designated cultural heritage assets and features beyond the 1 km study area will be scoped out of the assessment as these assets are generally considered less sensitive to changes in their settings and are judged to be unlikely to be subject to significant settings effects.

9.4.10 Impacts on the settings of heritage assets located outside of the ZTV will be scoped out as these assets are unlikely to be adversely impacted by the Proposed Development. However, where appropriate, consideration will be given to the potential for views of assets which include the Proposed Development, even where the asset itself lies outside of the ZTV.

[59] *Cadw, 2019. Understanding Scheduling in Wales.*

9.4.11 Impacts on the settings of heritage assets beyond the 5 km study area will be scoped out, as most assets beyond this distance will be too far distant to have their settings significantly adversely affected by the Proposed Development.

Baseline Creation

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

i) Cadw and Historic Wales for:
   a. designated asset data.
   b. Heneb: The Trust for Welsh Archaeology for Historic Environment Record (HER) data, which includes;
   c. non-designated asset data;
   d. records of previous archaeological investigations (Events);
   e. Historic Landscape Characterisation (HLC); and
   f. the location of Ancient Woodland.

ii) Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) via Coflein for:
   a. online accessible historic aerial photographs and reference aerial photographs available for copying.
   b. British Geological Survey (BGS[60, 61]) for:
   c. bedrock and superficial deposit data; and
   d. historic boreholes information.

iii) Natural Resources Wales for:
   a. pseudocolour combined hillshade images of Digital Surface Model (DSM) derived from 1m composite LiDAR data collected over the 2020-22 winter seasons.
   b. LANDMAP for:
   c. historic landscape characterisation; and
   d. modern landscape information.

[60] *British Geological Survey. 2024. Geology Viewer. Available at: https://geologyviewer.bgs.ac.uk/?*
[61] *BGS. 2024. Boreholes-GeoIndex. Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html?layer=BGSBoreholes&_ga=2.28151039.2124436474.1660643893-2119384456.1660643893*

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

i) The Wrexham Archives for:
   a. Archival records associated with the Site; and
   b. Historical maps depicting the Site.
ii) The National Library of Scotland for:
   a. OS historical mapping depicting the Site; and
   b. Pre-OS survey historical mapping depicting the Site.
iii) National Library of Wales for:
   a. Documentary, pictorial and cartographic sources (including tithe maps) for the Site.
iv) The Genealogist Website[62] for:
   a. Tithe maps and apportionments for the Site.
v) The Portable Antiquities Scheme for:
   a. Details of finds within the study areas.
vi) Welsh Government Air Photos Online[63] for:
   a. online accessible historic aerial photography of the Site.

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

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

[62] The Genealogist. 2023. Tithe Apportionments, 1836-1929. Available at: https://www.thegenealogist.co.uk/subscription/ via AOC Archaeology Group's subscription.
[63] Welsh Government. 2024. DataMap Wales. Digital Aerial Photography - Historical Sortie Information. Available at: https://datamap.gov.wales/maps/digital-aerial-photography-historical-sortie-infor/

9.4.16 A geophysical cart-based magnetometer survey of the Site is also being undertaken. Parts of the Site free from arable crops were surveyed in August 2024, with remaining areas to be surveyed post harvest in autumn 2024.

9.4.17 The walkover survey and results of the geophysical survey will identify any areas of potential archaeological interest within the Site that may require mitigation via design or further archaeological works in advance of any future development.

9.4.18 Designated heritage assets within the 3 km and 5 km study areas that have been identified as particular sensitive to change in the wider landscape, or those with key views in the direction of the Proposed Development, will be visited as part of the field survey, insofar as they are publicly accessible, to establish their current settings and how this contributes to their significance.

9.4.19 The Wrexham Archives will be visited in order to view and record any relevant archival records and historic maps associated with the Site.

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

Consultation

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

i) Heneb: The Trust for Welsh Archaeology
ii) Cadw, the Welsh Government's historic environment service; and
iii) The Heritage & Archives Lead of Wrexham Borough Council.

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

Additional Surveys

9.4.23 At present no further surveys are proposed.

Assessment Methodology

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

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

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

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

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

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

9.4.29 Buried archaeological evidence is, by its very nature, an unknown quantity which can never be 100% identified during a desk-based assessment. The assessed potential

will be based on available evidence, however the physical nature and extent of any archaeological resource surviving within the Site cannot be confirmed without detailed information on the below ground deposits or results of on-site fieldwork.

9.4.30 Where known heritage assets are identified, the importance of such assets will be determined by reference to existing designations where available (Table 9.1). For assets where no designation has been assigned, an informed assessment will be made of the likely historic, artistic, or archaeological importance of that resource based on professional knowledge and judgement. Adjustments to the classification are occasionally made, where appropriate; for some types of finds or assets where there is no consistent value, and the importance may vary. Levels of importance for any such areas are generally assigned on an individual basis, based on professional judgement and advice.

Table 9.1: Defining the Importance of Heritage Assets

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

9.4.31 PPW[64] includes the setting of the heritage asset with its physical remains, and both PPW and TAN 24[65] note that the setting of a heritage asset is as important as the physical remains. Setting is noted as extending beyond property boundaries, and both intangible and physical factors can be important to the understanding of a historic asset. While PPW does not differentiate between the importance of the asset itself and the importance of the asset's setting, Cadw guidance states that the settings of heritage assets is not fixed and changes[66].

9.4.32 The importance of an asset is not the same as its sensitivity to changes to its setting. Elements of setting may make a positive, neutral, or negative contribution to the significance of an asset[67]. Thus, in determining the nature and level of effects upon assets and their settings by the Proposed Development, the contribution that setting makes to an asset's significance and thus its sensitivity to changes to setting will be considered.

9.4.33 This approach recognises that setting is key to the understanding and appreciation of some, but by no means all, assets. Indeed, assets of High or Very High importance do not necessarily have high sensitivity to changes to their settings (e.g. do not necessarily have a high relative sensitivity). An asset's relative sensitivity to alterations to its setting refers to its capacity to retain its ability to contribute to our understanding and appreciation of the past in the face of changes to its setting. The ability of an asset's setting to contribute to an understanding, appreciation and experience of it and its significance also has a bearing on the sensitivity of that asset to changes to its setting. While heritage assets of High or Very High importance are likely to be sensitive to direct effects, not all will have a similar sensitivity to effects on their setting; this would be true where setting does not appreciably contribute to their significance. Assets with Very High or High relative sensitivity to settings effects may be vulnerable to any changes that affect their settings, and even slight changes may erode their key characteristics or the ability of their settings to contribute to the understanding, appreciation, and experience of them. Assets whose relative

[64] *Welsh Government. 2018, Last Updated 2024. Planning Policy Wales. Available at: https://www.gov.wales/planning-policy-wales*
[65] *Welsh Government, 2017. Technical Advice Note 24: The Historic Environment. Available at: https://www.gov.wales/sites/default/files/publications/2018-09/tan24-historic-environment.pdf*
[66] *Cadw, 2017. Setting of Historic Assets in Wales.*
[67] *Cadw, 2017. Setting of Historic Assets in Wales.*

sensitivity to changes to their setting is lower may be able to accommodate greater changes to their settings without having key characteristics eroded.

9.4.34 The criteria that will be used for establishing an asset's relative sensitivity to changes to its setting is detailed in Table 9.2. This table has been developed based on AOC's professional judgement and experience in assessing setting effects. It has been developed with reference to the policy and guidance noted above including PPW, TAN 24, the Xi'an Declaration[68], and Cadw's Conservation Principles[69] and guidance on the setting of heritage assets[70].

Table 9.2: Criteria for Establishing Relative Sensitivity of a Heritage Asset to Changes to its Setting

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

9.4.35 The determination of a heritage asset's relative sensitivity to changes to its setting is first and foremost reliant upon the determination of its setting and the key characteristics of setting which contribute to its cultural significance and an understanding and appreciation of that cultural significance. This aligns with Stage 2 of the Cadw guidance on setting. The criteria set out in Table 9.2 are intended as a guide. Assessment of individual heritage assets will be informed by knowledge of the

[68] *ICOMOS. 2005. Xi'an Declaration. Available at: https://www.icomos.org/charters/xian-declaration.pdf*
[69] *Cadw, 2011. Conservation Principles for the sustainable management of the historic environment in Wales.*
[70] *Cadw, 2017f. Heritage Impact Assessment in Wales.*

asset itself; of the asset type if applicable and by site visits to establish the current setting of the assets. This will allow for the use of professional judgement and each asset will be assessed on an individual basis.

9.4.36 The likely magnitude of the impact of the Proposed Development will be determined by identifying the level of change from the Proposed Development upon the 'baseline' conditions and the heritage resource identified in the assessment. This effect can be either adverse (negative), beneficial (positive) or neutral (Table 9.3).

Table 9.3: Criteria for Determining Magnitude of Impact

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

High	Substantial positive changes to an asset and key elements of its setting which would greatly enhance its significance and the ability to appreciate that significance; this might result from the removal of adverse or considerably distracting features from the setting of an asset; significant decrease in noise or changes in sound quality; changes to use or access.

9.4.37 The predicted level of effect on each heritage asset will be determined by considering the asset's importance and/or relative sensitivity in conjunction with the predicted magnitude of the impact. The method of deriving the level of effect is provided in Table 9.4.

Table 9.4: Level of Effect based on Inter-Relationship between the Importance and/or Sensitivity of a Heritage Asset and/or its setting and the Magnitude of Impact

Magnitude of Impact	Importance and/or Sensitivity				
	Negligible	Low	Medium	High	Very High
High	Minor	Moderate	Moderate	Major	Major
Medium	Negligible/Neutral	Minor	Moderate	Moderate	Major
Low	Negligible/ Neutral	Negligible/ Neutral	Minor	Minor	Moderate
Negligible	Negligible/Neutral	Negligible/ Neutral	Negligible/ Neutral	Minor	Minor

9.4.38 The level of effect is judged to be the interaction of the asset's importance and/or relative sensitivity (Table 9.1 and/or Table 9.2) and the magnitude of the impact (Table 9.3). In order to provide a level of consistency, the assessment of importance and relative sensitivity, the magnitude of impact and the assessment of level of effect will be guided by pre-defined criteria. However, a qualitative descriptive narrative will also be provided for each asset to summarise and explain each of the professional value judgements that have been made.

9.4.39 Using professional judgment and with reference to the Guidelines for Environmental Impact Assessment (2017, as updated)[71], the assessment will consider moderate and greater effects to be significant, while minor and lesser effects will be considered not significant.

9.4.40 There are no Historic Landscapes which extend within the Site, therefore no direct impacts on Historic Landscapes are anticipated and as such it is not proposed to undertake an Assessment of the Significance of the Impact of Development on

[71] *IEMA. 2017. Guidelines for Environmental Impact Assessment*

Historic Landscape areas on the Register[72]. The assessment of the potential impact of the Proposed Development on the two Historic Landscapes within the 10 km study area will be undertaken in line with the assessment for designated assets as described above.

Cumulative Effects

9.4.41 The assessment of cumulative effects on heritage assets will be based upon consideration of the effects of the Proposed Development on the settings of heritages assets, in addition to the likely effects of other cumulative schemes.

9.4.42 Cumulative effects will be considered for designated assets identified within the 3 km and 5 km study areas. Only those assets which are judged to have the potential to be subject to significant cumulative effects will be included in the detailed cumulative assessment.

9.4.43 In determining the degree to which a cumulative effect may occur as a result of the addition of the Proposed Development into the cumulative baseline a number of factors will be taken into consideration including:

i) the distance between the schemes;
ii) the interrelationship between their ZTV;
iii) the overall character of the asset and its sensitivity to large scale development;
iv) the siting, scale and design of the cumulative schemes themselves;
v) the way in which the asset is experienced;
vi) the placing of the cumulative scheme(s) in relation to both the individual proposal being assessed and the heritage asset under consideration; and
vii) the contribution of the cumulative baseline schemes to the significance of the effect, excluding the individual proposal being assessed, upon the setting of the heritage asset under consideration.

9.4.44 Cumulative wirelines from those assets most likely to experience significant cumulative impacts on their settings will be provided, if appropriate.

[72] *Cadw, 2007. Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process.*

10.0 PROPOSED CONTENTS OF THE ENVIRONMENTAL STATEMENT

10.1.1 The ES will consist of three volumes and a Non-Technical Summary (NTS). This section provides a summary of each document that will form the ES.

10.1.2 **ES Volume 1: ES Non-Technical Summary (NTS)** – The NTS will be presented in a separate document and provides a concise description of the Proposed Development, the considered alternatives, baseline, assessment methodology, potential environmental effects and mitigation measures. The NTS will be designed to provide information on the Proposed Development in an accessible format which can be understood by a wide audience and to assist interested parties with their familiarisation of the Proposed Development.

10.1.3 **ES Volume 2: Main Report** – this will form the main body of the ES, detailing the results of the environmental assessment, likely significant effects arising from the Proposed Development, and the proposed mitigation measures. The ES will also identify opportunities for social and economic benefits and environmental enhancement. The ES is divided into a number of background and technical chapters, each being supported with figures and tabular information. ES Volume 1 will consider the environmental effects associated with a number of identified topics, which may receive significant environmental effects. Each topic will be assigned a separate technical chapter in the ES. Based on the conclusions of this Scoping Report the proposed structure of the ES is as follows:

i) Chapter 1: Introduction
ii) Chapter 2: The Proposed Development;
iii) Chapter 3: Alternatives and Design Evolution;
iv) Chapter 4: Consultation;
v) Chapter 5: Environmental Impact Assessment Methodology;
vi) Chapter 6: Landscape and Visual Impact;
vii) Chapter 7: Ecology and Nature Conservation;
viii) Chapter 8: Historic Environment;
ix) Chapter 9: Noise; and
x) Chapter 10: Summary of Environmental Effects

10.1.4 **ES Volume 3: Technical Appendices** – A complete set of appendices will be provided for reference. These comprise of background data, technical reports, tables, figures and surveys which support the assessments in ES Volume 1.

10.1.5 **ES Volume 4**: **Figures** – A complete set of figures referenced within the ES.