Environmental Statement Volume 2: Appendices

St Asaph Solar Farm

April 2025

Prepared for:
Anesco Ltd

Prepared by:
Lucy Baker and Christina Dawkins

Project Number:
333101373

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
0	DRAFT	LB	March 25	CD	April 25	KH	April 25
1							

The conclusions in the Report titled **ENVIRONMENTAL STATEMENT VOLUME 2: APPENDICES** are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Anesco Ltd (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided by the Client to applicable authorities having jurisdiction and to other third parties in connection with the project, Stantec disclaims any legal duty based upon warranty, reliance or any other theory to any third party, and will not be liable to such third party for any damages or losses of any kind that may result.

Prepared by: _____
Signature

_____
Lucy Baker

Reviewed by: _____
Signature

_____
Christina Dawkins

Approved by: _____
Signature

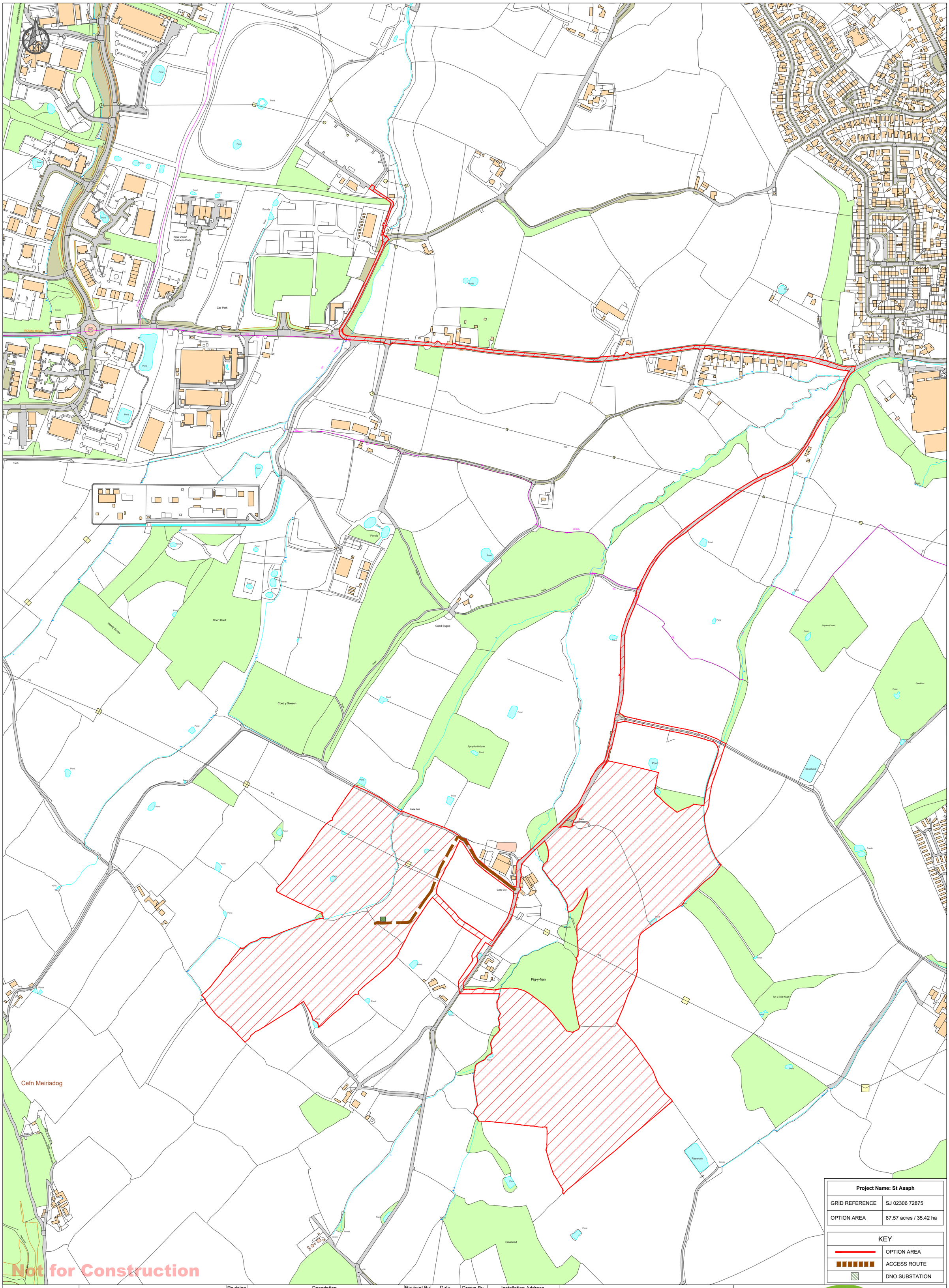
_____
Kevin Herman

Contents

Appendices

Appendix A.1 Site Location Plan
Appendix A.2 Plans
Appendix A.3 Environmental Impact Assessment Screening Direction
Appendix A.4 Construction Traffic Management Plan
Appendix A.5 Ecological Impact Assessment
Appendix A.6 Flood Consequences Assessment and Drainage Strategy
Appendix A.7 Cumulative Developments List
Appendix 7.1 Planning Policy and Guidance Extracts
Appendix 7.2 Published Evidence Extracts
Appendix 7.3 LVIA Methodology
Appendix 7.4 Site Appraisal Photographs
Appendix 7.5 Site Context Photographs
Appendix 7.6 Landscape Effects
Appendix 7.7 Visual Effects
Appendix 7.8 Cumulative Effects
Appendix 7.9 LEMP
Appendix 7.10 Glint and Glare
Appendix 7.11 Figures

Appendix A.1 Site Location Plan



Project Name: St Asaph	
GRID REFERENCE	SJ 02306 72875
OPTION AREA	87.57 acres / 35.42 ha

KEY	
	OPTION AREA
	ACCESS ROUTE
	DNO SUBSTATION

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

0 50 100 150 200

Ordnance Survey, (c) Crown Copyright 2020.
All rights reserved. Licence number 100022432

Revision	Description	Revised By	Date
A	Issued for comment	MS	20/10/2020
B	Land reduced from the North and extended to the South	MS	05/03/2021
C	Area of Land has been altered and the DNO substation moved	MS	04/05/2021
D	Area of Land has been altered and the DNO substation moved	MS	12/05/2021
E	Site area amended	JH	22/11/2023
F	Red Line Boundary amended & access track added in the North	JH	12/12/2023
G	Red Line Boundary amended	MS	10/06/2024
H	Red Line Boundary amended	MS	13/11/2024
J	Red Line Boundary amended	RD	26/03/2025

Drawn By: RD

Scale: 1:5000@ A2

Sheet Size A2

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

Project: St Asaph

Title: Location Plan

Drawing No.: C0002452_01

Rev.: J

Anesco™ AMAZING ENERGY

Appendix A.2 Plans

Not for Construction

New Vision Business Park

Car Park

Coed Cord

Hendy Gorse

Coed y Saeson

Coed Esgob

Tyn-y-ffordd Gorse

Pig-y-fran

Square Covert

Tyn-y-coed Rough

Reservoir

Glascoed

Ponds

Pond

Track

Drain

Issues

FB

Silo

Slurry Pit

Sub Sta

FS

LB

GUARDED ROAD

LOW CROSS ROAD

34.1m

36.0m

41.4m

47.2m

65.9m

LEGEND

	SITE BOUNDARY
	SECURITY FENCE
HV HV	OVERHEAD ELECTRICAL CABLES (24m/14m OVERALL EASEMENT)
	DNO ACCESS ROUTE
	HV CABLE ROUTE - TRENCH
	LV CABLE ROUTE - TRAY
	PRIVATE HV CABLE ROUTE - TRENCH
BT BT	BT OVERHEAD CABLE
W W	UNDERGROUND WATER TRUNK MAIN
	UTILITY EASEMENT
	HARDSTANDING AREA
	PROPOSED CULVERT CROSSING
	PROPOSED HEDGE REMOVAL FOR TRACK WIDENING
	FENCE PLACEMENT & HEDGE REGROWTH AREA
	PROPOSED TREE REMOVAL
	PV ARRAY
	INVERTER (SUN2000-330KTL)
	SMART TRANSFORMER STATION (JUPITER-6000K/JUPITER3000K)
	DNO SUBSTATION
	CUSTOMER SUBSTATION (PV)

PROJECT NAME: ST ASAPH	
GRID REFERENCE :	SJ 02300 72873
SITE AREA:	87.57Acres / 35.42 ha
TOTAL INSTALLED CAPACITY:	18.44MWp
MAX INVERTER AC POWER:	18.304MW

0 10 20 40 60 80 100

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

Revision	Description	Revised By	Date
A	Issued for comment	MS	19/11/2020
B	Land reduced from the North and extended to the South	MS	05/03/2021
C	Boundary Line Extended	MS	05/05/2021
D	Boundary Line Extended and site maximised	MS	12/05/2021
E	Planning Site Layout	JH	10/11/2021
F	Module Wattage Changed	MS	07/12/2021
G	Site resign to 215KTL & Bifacial Modules	JH	02/03/2022
H	Site redesigned due to tree shading implications	MS	16/06/2022
J	Red Line Boundary amended to include Private HV	JH	03/08/2022
K	Site redesign	JH	15/05/2023
L	Site redesign using new modules and new private HV cable	JH	06/07/2023
M	Site area amended and module redesign	JH	22/11/2023
N	DNO Track Added	LD	28/11/2023
P	Red Line Boundary amended & access track added in the North	JH	12/12/2023
Q	Redesign due to array relocation	JS	19/03/2024
R	Redesign	MS	01/08/2024
S	Access Altered	MS	20/09/2024
T	Hedgerow added and panel locations amended	MS	11/11/2024
U	Inverters added	RD	20/01/2024
V4	Topo and service searches added	RD	31/03/2025

Drawn By: JH

Scale: 1:3000@ A1

Sheet Size A1

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

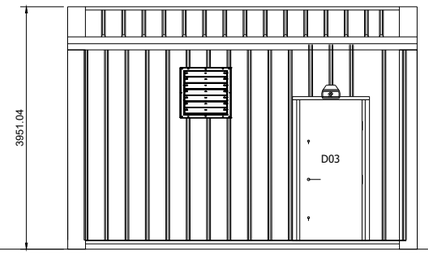
Project: St Asaph

Title: Site layout planning

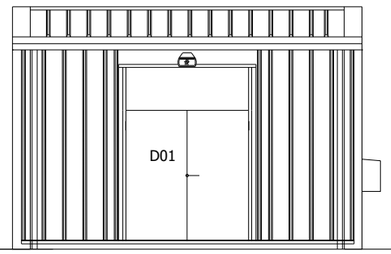
Drawing No.: C0002452_02

Rev.: V4

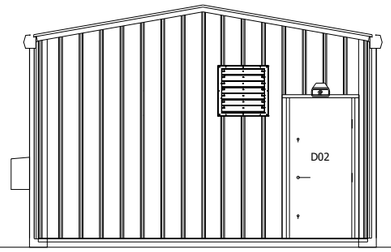
Anesco™ AMAZING ENERGY



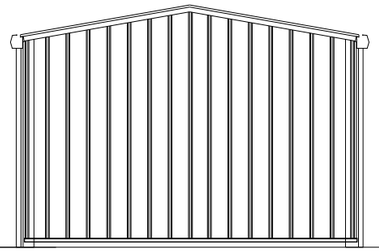
REAR ELEVATION



FRONT ELEVATION



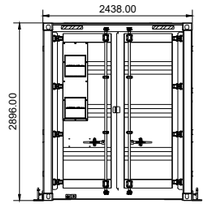
SIDE ELEVATION



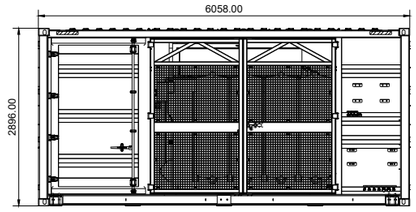
SIDE ELEVATION

PLAN VIEW

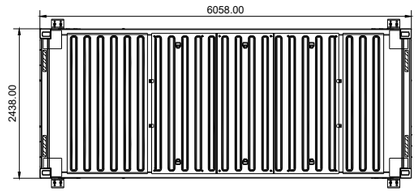
DNO SUBSTATION ENCLOSURE
(1 No') SCALE 1:100



SIDE ELEVATION

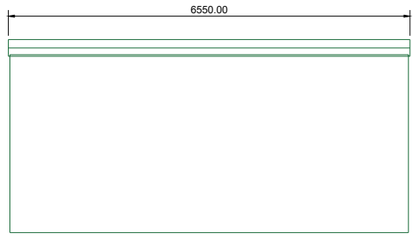


FRONT VIEW

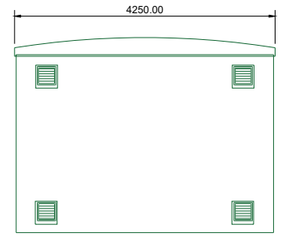


PLAN VIEW

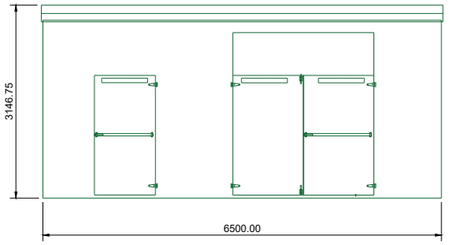
MV STATION
SCALE 1:100



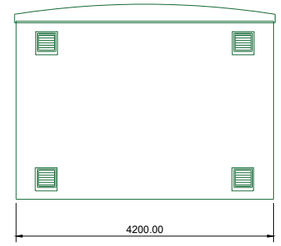
REAR VIEW



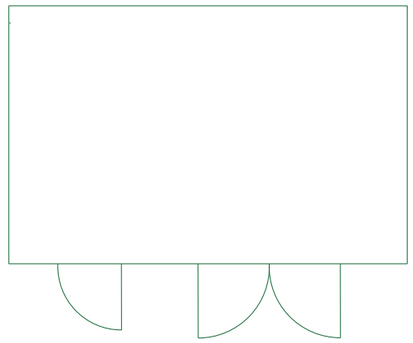
LEFT SIDE WALL VIEW



FRONT VIEW



RIGHT SIDE WALL VIEW



CUSTOMER SUBSTATION
(1 No')
SCALE 1:100

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

0 500 1000 1500 2000 2500 3000 mm

Revision	Description	Revised By	Date	Drawn By
A	Issued for comment	MS	10/11/2021	JH
B	Buildings Updated	JH	16/05/2023	
C	MV Station Updated	RD	28/03/2025	
D	MV Station Renamed	RD	07/04/2025	

Scale: SEE DWG

Sheet Size: A3

Installation Address

CEFNMEIRIADOG,
ST ASAPH,
DENBIGHSHIRE,
WALES,
LL17 0HF

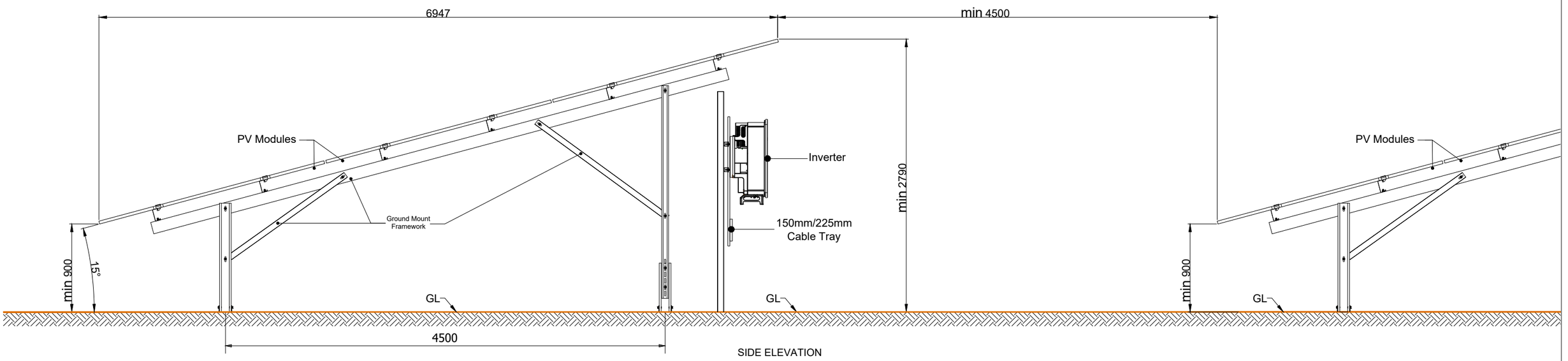
Project: ST ASAPH

Title: TYPICAL BUILDINGS PLANS AND ELEVATIONS

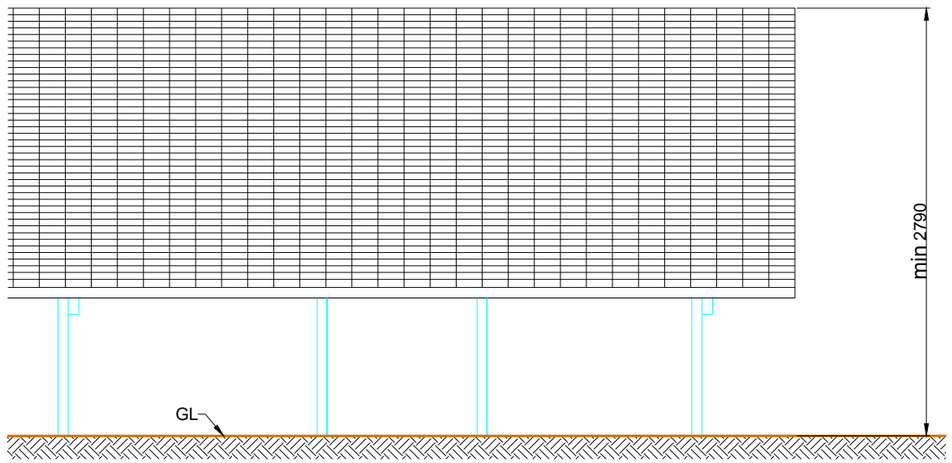
Drawing No.: C0002452_04

Rev.: D

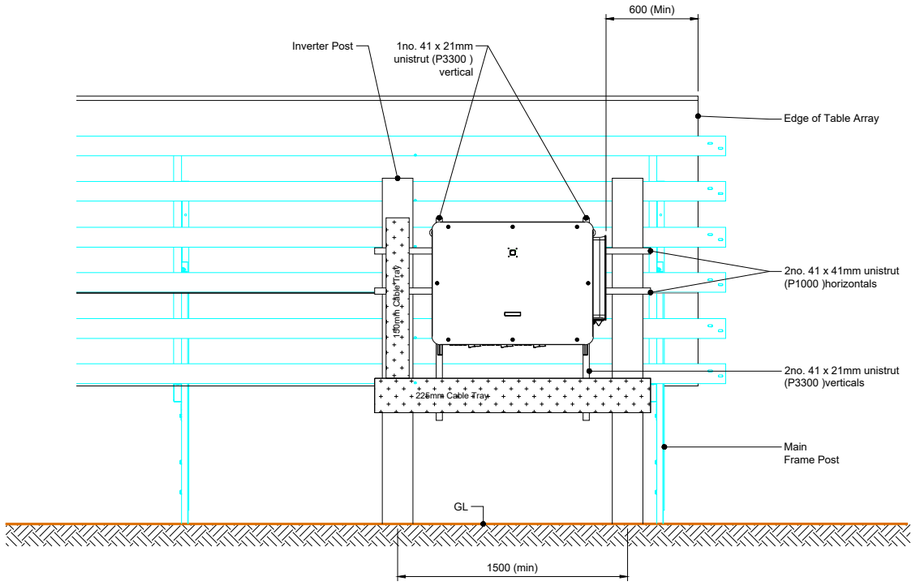
Anesco™ AMAZING ENERGY



SIDE ELEVATION



FRONT ELEVATION



Installer Details	Comments
Anesco Ltd. The Green, Easter Park, Benyon Road, Reading, RG7 2PQ Tel: 0845 894 4444	

Revision	Description	Revised By	Date	Drawn By
A	Issued for comment	JH	10/11/2021	JH
B	Site redesigned to 215KTL & Bifacial Modules	MS	19/04/2022	
C	Site redesigned new modules and inverters	JH	11/05/2023	
D	Site redesigned new modules	JH	06/07/2023	
E	Site updated with new technology, cable ladder removed	RD	07/04/2025	

Scale: 1:40@ A3

Sheet Size: A3

Installation Address: Cefnmeiriadog, St Asaph, Denbighshire, Wales, LL17 0HF

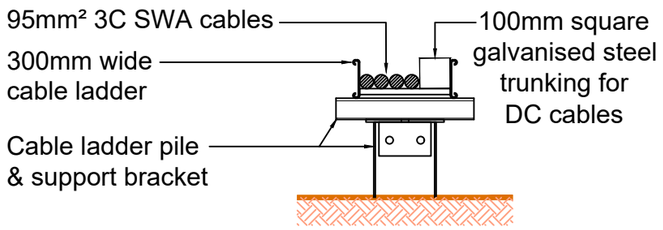
Project: ST ASAPH

Title: TYPICAL SECTION THROUGH ARRAY

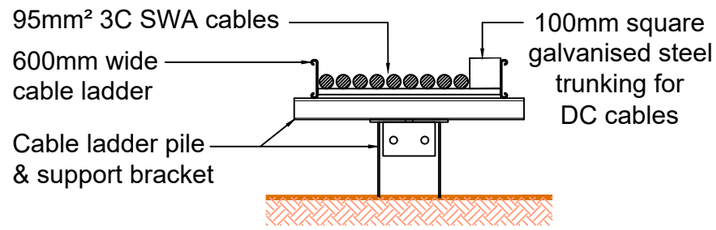
Drawing No.: C0002452_08

Rev.: E

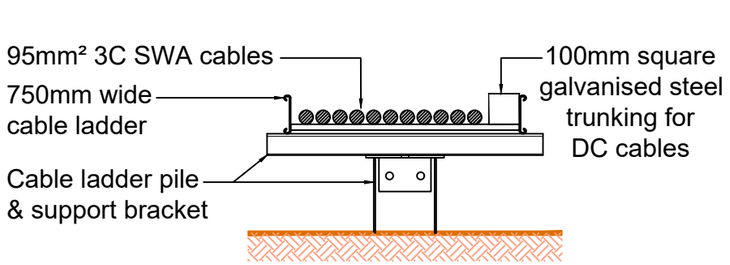
Anesco™ AMAZING ENERGY



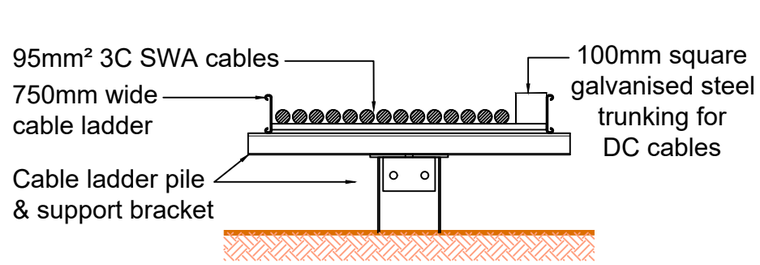
300mm WIDE LADDER
(MAX 4 X 95mm² CABLE)



600mm WIDE LADDER
(MAX 9 x 95mm² CABLE)



750mm WIDE LADDER
(MAX 11 x 95mm² CABLE)



900mm WIDE LADDER
(MAX 14 x 95mm² CABLE)

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

Revision	Description	Revised By	Approved By	Date
A	Issued for comment	JH		10/11/2021

Scale	Drawn By	Checked By	Signed by PM	Date Checked	Page	Sheet
1:20 @ A3	JH				1 of 1	A3

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

Project: ST ASAPH

Title: TYPICAL CABLE LADDER DETAILS

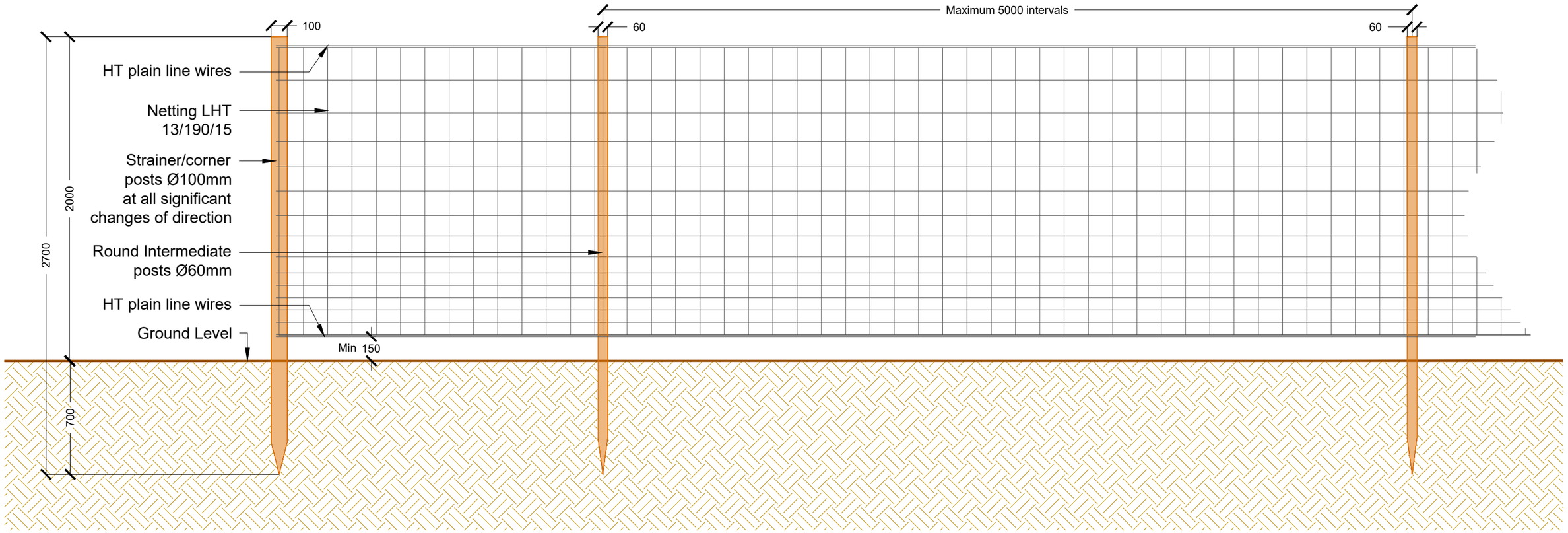
Drawing No.: C0002452_09

Rev.: A

Anesco™ AMAZING ENERGY

Notes:

1. Galvanised Deer Fence: 1900mm height, 17 line wires, 150mm distance between vertical wires, 2.5mm alu/zinc coated high tensile wire.
2. All dimensions are in millimeters(mm)) expect the layout clearances which are in meters (m).
3. Any foundations formed at less than 1.0m below ground will experience a degree of seasonal movement.



Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

Not for Construction

0 1:25 1250

Revision	Description	Revised By	Date	Drawn By
A	Issued for comment	JH	23/07/2021	JH
B	Barbed wire removed	JH	25/04/2025	

Scale 1:25@ A3

Sheet Size A3

Installation Address

Cefnmeiriadog,
St Asaph, Denbighshire,
Wales,
LL17 0HF

Project: ST ASAPH

Title: DEER FENCE DETAIL

Drawing No.: C0002452_10

Rev.: B

Anesco™ AMAZING ENERGY

Not for Consent Issue

WELFARE AREA

SCALE @ 1:8000

Overhead Cable
Overhead Cable
Overhead Cable
Top of Bank
Ht=64
Electric
Ht=70
Top of Ditch
Ditch
Live Hedge
3 no. Waste Skips
TURNING AREA
FP
Fire Assembly Point
Ht=69
Ditch
Top of Ditch
Sub. Con. Office/Canteen
Drying room
WC
Generator, Water & Diesel Bowser
Stores (3 Containers)
PARKING AREA
LOADING / UNLOADING & STORAGE AREA
Undergrowth
Sp=8
Tr=0.5
Ht=65
Sp=18
Tr=0.6
Ht=72
Sp=18
Tr=0.6
Ht=75
Ht=73
Ht=67
Ht=67

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

Revision	Description	Revised By	Date	Drawn By
A	Issued for comment	JS	12/08/2022	JS
B	Red Line Boundary amended	JH	17/05/2023	
C	Red Line Boundary amended and welfare area relocated	RD	08/04/2025	

Scale: 1:250@ A1

Sheet Size: A1

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

Project: St Asaph

Title: Welfare Area

Drawing No.: C0002452_12

Rev.: C

Anesco™ AMAZING ENERGY

Appendix A.3 Environmental Impact Assessment Screening Direction

Adeilad y Goron,
Parc Cathays, Caerdydd,
CF10 3NQ

Crown Buildings,
Cathays Park,
Cardiff, CF10 3NQ
Ffôn / tel: 0300 123 1590
Ebost / email: PEDW.Infrastructure@gov.wales

PCAC PEDW
Penderfyniadau Cynllunio ac Amgylchedd Cymru
Planning & Environment Decisions Wales

Ein Cyf / Our Ref: DNS CAS-01392-D2T3F3

Dyddiad / Date: 21/02/2025

Dear Christina Dawkins

Town and Country Planning Act 1990
The Developments of National Significance (Procedure) (Wales) Order 2016
Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017

Potential DNS Application
Site Address: Land at Cefn Meiriadog, St Asaph
Proposed Development: Proposed development of a Solar PV array and ancillary infrastructure

On the 19 December 2024 Planning and Environment Decisions Wales (PEDW) received a request made under regulation 31(1) of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 ("the Regulations"), for the Welsh Ministers to make a screening direction as to whether or not the development proposed is "EIA Development" within the meaning of the Regulations.

PEDW is authorised by the Welsh Ministers to provide that screening direction.

The project, as described above, falls within the description at paragraph 3(a) '*industrial installations for the production of electricity, steam and not water (unless included in Schedule 1)*' in column 1 of the table in Schedule 2 to the Regulations.

As the proposal is a potential Development of National Significance (DNS) application, the attached screening assessment identifies the key areas which have been considered. Having taken into account the selection criteria in Schedule 3 to the Regulations and the advice in Welsh Office Circular 11/99: Environmental Impact Assessment on establishing whether EIA is required, the assessment concludes that:

> The proposed solar farm will lead to effects on a number of aspects of the environment. However, due to the nature of the proposed development, most effects are unlikely to be significant. In terms of biodiversity, Great Crested Newt (GCN) have been confirmed within the site. NRW are satisfied with the proposed mitigation measures and habitat enhancement, and therefore impacts on GCN and other species would not be significant.
>
> On the basis of the information available in the Screening Report and the consultation responses by Denbighshire County Council and NRW, I consider that significant effects

Rydym yn croesawu gohebiaeth Gymraeg. Cewch ateb Cymraeg i bob gohebiaeth Gymraeg ac ni fydd gohebu yn Gymraeg yn arwain at oedi.

We welcome correspondence in Welsh. Correspondence received in Welsh will be answered in Welsh and corresponding in Welsh will not involve any delay.

are likely in relation to landscape character and visual amenity, particularly on the Clwydian Range and Dee Valley Area of Outstanding Natural Beauty / National Landscape. In addition, due to the concentration of renewable energy infrastructure within the immediate area, significant cumulative landscape and visual effects are also considered likely. As such, the proposed development represents EIA development, and an ES is required to accompany any future DNS application.

Therefore, in exercise of the powers conferred by the Regulations and the authority referred to above, the Welsh Ministers hereby direct that the development subject of this application **is EIA development** within the meaning of the Regulations.

Consequently, this application must be accompanied by an Environmental Statement. Under regulation 17(1) of the Regulations an Environmental Statement must contain, for the purpose of assessing the likely impact on the environment, the information specified in that regulation. It is recommended that you refer to the Regulations and the accompanying Circular, Welsh Office Circular 11/99, before and during the preparation of the Environmental Statement. In the meantime, you may wish to have regard to the particular environmental topics identified in the attached screening assessment.

This letter will be copied to Denbighshire County Council so that this screening direction is placed on Part 1 of the Planning Register in relation to the application in question, in accordance with the Regulations.

Yn gywir / Yours sincerely

T Leck

Tanya Leck
Swyddog Cynllunio | Planning Officer
Penderfyniadau Cynllunio ac Amgylchedd Cymru | Planning and Environment Decisions Wales
Llywodraeth Cymru | Welsh Government

Rydym yn croesawu gohebiaeth Gymraeg. Cewch ateb Cymraeg i bob gohebiaeth Gymraeg ac ni fydd gohebu yn Gymraeg yn arwain at oedi.

We welcome correspondence in Welsh. Correspondence received in Welsh will be answered in Welsh and corresponding in Welsh will not involve any delay.

STAGE 1 – INITIAL EIA SCREENING ASSESSMENT

1	**Case Details**	
A	Case reference	
	DNS CAS-01392-D2T3F3 - St Asaph Solar	
B	Brief description of development	
	Proposed development of a Solar PV array and ancillary infrastructure.	
2	**EIA Screening Details**	
2A	**Schedule 1**	
	Is the project Schedule 1 development as described in Schedule 1 of the EIA Regulations?	No
	If Yes, under which description of development? If No, consider whether project is 'Schedule 2' development below in part 2(B).	
2B	**Schedule 2**	
(i)	Is the project listed as a description of development under Column 1 of Schedule 2 of the EIA Regulations?	Yes
	If Yes, under which description of development? If No, EIA is not required.	
	Schedule 2(3)(a) 'industrial installations for the production of electricity, steam and not water (unless included in Schedule 1)'	
(ii)	Does the project change or extend development described in paragraphs 1 to 12 of Column 1 of schedule 2, where the change or extension may have SIGNIFICANT* adverse effects on the environment?	No
	*If Yes, provide reasons for your answer below. *If unsure, discuss with PET. Proceed to point (iii).*	
	N/A - not a change or extension	
(iii)	Is the project located wholly or partly within a 'Sensitive Area' as defined by Regulation 2 of the EIA Regulations?	No
	*If Yes, **state which area** and more to Question 3. If No, proceed to point (iv) below.*	
(iv)	Are the applicable thresholds/criteria in Column 2 exceeded / met?	Yes
	If Yes, note which applicable threshold/criteria. If No, EIA is not required.	
	Yes – the site exceeds 0.5 ha in area.	
3	**LPA / Welsh Ministers' Screening**	
(i)	Has the LPA issued a Screening Opinion (SO)?	No
(ii)	Have the Welsh Ministers issued a Screening Direction (SD)?	Yes
4	**Environmental Statement (ES)**	
	Has the applicant/appellant supplied an ES for the current or previous (if reserved matters or conditions) application?	No

Is a detailed screening assessment (Section 5) required?

If Yes has been answered in response to either 2B(iii) or 2B(iv), send to relevant team to undertake detailed screening assessment.

If No has been answered for both questions, or the questions are not applicable, start appeal.

Sign-off	
Signature	Tanya Leck
Date	17/02/2025

STAGE 2 – DETAILED EIA SCREENING ASSESSMENT

As per Schedule 3, Para 3: When considering the potential impact, take into account; (a) magnitude / spatial extent / population likely to be affected; (b) nature of impact; (c) transboundary nature; (d) intensity & complexity; (e) probability; (f) expected onset / duration / frequency & reversibility; (g) cumulation with existing and / or approved development; (h) the possibility of effectively reducing the impact.

5	Detailed Screening Questions	
Questions to be considered	**Yes/No/Unknown – provide description**	**For 'Yes/Unknown', are effects <u>likely</u> to be <u>significant</u>?** *Include consideration of features or measures to avoid or prevent what might otherwise be significant effects*
CRITERION 1. CHARACTERISTICS OF DEVELOPMENT		
Question 1(a) Size and design of the Development		
Will construction, operation or decommissioning of the Project involve actions which will cause physical changes in the locality (topography, land use, changes in waterbodies, etc.)?	The proposal is for the installation of a solar farm with ancillary infrastructure. The site is approximately 33.54 ha (previously 37.5 ha), split over two blocks 250 m apart. The land use will change from agricultural land to host the solar arrays. However, the Screening Report (SR) confirms that much of the land can continue to be used for low intensity grazing during the lifetime of the development. Agricultural land quality surveys have confirmed the site to be grade 3b, therefore does not qualify as Best and Most Versatile agricultural land. The development does not involve any topographic changes, nor does it propose removal of trees or hedgerows. The lifespan of the scheme is 40 years, after which the site would be restored. Therefore, whilst there would be physical change during the lifetime of the development, grazing could continue on the site and the site would be restored in the future. Therefore, I do not consider there to be significant effects in EIA terms.	Significant effects **unlikely.**
Question 1(b) Cumulation with Existing and/or Approved Development		
Are there any other factors which should be considered such as: • consequential development which could lead to environmental effects?	Yes. Denbighshire and NRW highlight the significant amount of energy infrastructure development centred around St Asaph business park and the Bodelwyddan area due to availability	Significant effects **likely.**

5	Detailed Screening Questions	
Questions to be considered	**Yes/No/Unknown – provide description**	**For 'Yes/Unknown', are effects <u>likely</u> to be <u>significant</u>?**
• the potential for cumulative impacts with other existing or planned activities in the locality? • any plans for future land uses on or around the location which could be affected by the project? • transfrontier impacts?	of a grid connection. The following schemes are relevant to consider cumulative impacts: • DNS CAS-03950-F9K3T4 - Bodelwyddan BESS and Solar Farm (to the north and northwest of the site) • Awel y Môr offshore wind farm and Mona Offshore Wind Farm • Kinmel Solar Farm located immediately north of the A547 Rhuddlan Road • Burbo Bank Substation, Bodelwyddan Substation, Gwynt y Mor Substation • Solar farms located on land adjacent to the proposal (both east and west of Squirrels Lodge) I am satisfied that construction impacts can be mitigated through the submission of a CEMP and CTMP. Given my conclusion below regarding biodiversity, I am also satisfied that cumulative biodiversity impacts would not be significant. In terms of landscape and visual impacts, Denbighshire and NRW state that cumulative effects are likely during operation, particularly on sensitive receptors. Within the SR, the above schemes are listed but scoped out. Due to the number of renewable energy schemes within the immediate area, there is the potential for simultaneous and/or sequential visibility, particularly from elevated areas such as within the Clwydian Range and Dee Valley Area of Outstanding Natural Beauty (AONB) / National Landscape (NL). There is the potential for significant cumulative landscape and visual impacts.	
Question 1(c) Use of Natural Resources, in particular land, soil, water and biodiversity		

5	Detailed Screening Questions	
Questions to be considered	**Yes/No/Unknown – provide description**	**For 'Yes/Unknown', are effects <u>likely</u> to be <u>significant</u>?**
Will construction or operation of the Project use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or in short supply?	Yes, the proposal will require a degree of land take and use of natural resources during construction and operation. However, the land is only of moderate agricultural quality (3b) and there is the potential for infrastructure to be recycled. Therefore, whilst the development will use resources, none of them are in short supply. I am therefore satisfied no significant effects are likely.	Significant effects **unlikely.**
Will the Project produce solid wastes during construction or operation or decommissioning?	Yes, some solid waste would be produced during construction and for any parts that cannot be recycled at the decommissioning stage. However, operational waste is proposed to be managed in accordance with a CEMP to be submitted with the application. Given the scale and nature of the development, I do not consider that significant effects are likely in terms of waste generation.	Significant effects **unlikely.**
Question 1(e) Pollution and Nuisances		
Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?	Yes, dust generation is possible during construction. However, I am satisfied that standard good practice and mitigation measures to be incorporated into a CEMP would prevent any significant impacts.	Significant effects **unlikely.**
Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?	Yes, the construction phase is likely to result in noise and vibration. These impacts would be localised and time limited, these impacts would also be managed through measures outlined in a CEMP. During operation, there is potential for glint and glare from the panels alongside a minimal amount of noise. A glint and glare assessment submitted by the applicant concludes no impact for most nearby dwellings and road users, with low impact on three dwellings. Whilst I note that the scope of the assessment only extends to 1 km, thereby omitting the AONB/NL, significant effects are unlikely due to the distance from the site. Due to the nature of the development, significant operational noise is unlikely. I am therefore	Significant effects **unlikely.**

5	Detailed Screening Questions	
Questions to be considered	**Yes/No/Unknown – provide description**	**For 'Yes/Unknown', are effects <u>likely</u> to be <u>significant</u>?**
	satisfied that significant effects are unlikely during construction and operation.	
Will the Project release pollutants or any hazardous, toxic or noxious substances to **air**, or lead to risks of contamination of **land** or **water** (including surface waters, groundwater, coastal wasters or the sea)?	The SR states that surface water run-off will be managed on-site during the construction and operational phases. NRW and LPA's Drainage Officer confirm that the proposed mitigation would prevent any significant effect on the receiving water environment.	Significant effects **unlikely.**
Question 1(f) Risk of major accidents and/or disasters relevant to the development concerned, including those caused by climate change, in accordance with scientific knowledge		
Will there be any risk of accidents during construction or operation of the Project which could affect human health or the environment?	Yes, there is a small risk of accident during construction, operation or decommissioning. Given the scale and nature of the works, alongside construction best practice measures, such risks are unlikely to be significant.	Significant effects **unlikely.**
Question 1(g) Risks to Human Health (for example due to water contamination or air pollution)		
Will there be any risk to human health during the construction and/or operation of the development	Yes, there is potential risk to air quality or water contamination during construction and decommissioning. However, mitigation measures including a CEMP, drainage scheme and a Traffic Management Plan would prevent any significant impacts.	Significant effects **unlikely.**
CRITERION 2. LOCATION OF DEVELOPMENT		
Question 2(a) Existing and Approved Land Use		
Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?	Yes, the construction phase would result in some short term employment opportunities. The impacts are not considered significant in EIA terms.	Significant effects **unlikely.**
Are there any routes or facilities on or around the location, which are used by the public for access to recreation or other facilities, which could be affected by the project?	Yes. The SR states that the PRoW network will not be directly impacted as a result of the scheme. I am satisfied that routes and facilities would not be significantly impacted. Users of footpaths within and adjacent to the site would experience visual impacts from the scheme, which would be cumulative in combination with other schemes. Landscape and visual impacts are considered below.	Significant effects **unlikely.**

5	Detailed Screening Questions	
Questions to be considered	**Yes/No/Unknown – provide description**	**For 'Yes/Unknown', are effects <u>likely</u> to be <u>significant</u>?**
Are there any transport routes which are susceptible to congestion or which cause environmental problems, which could be affected by the project?	Yes. Some impacts would occur during the construction phase. However, these impacts would be temporary and could be managed via a CEMP and CTMP. I therefore do not consider that significant effects are likely.	Significant effects **unlikely.**
Is the project located in a previously undeveloped area where there will be loss of greenfield land?	Yes. The site will change from greenfield agricultural land to host the solar farm. However, the SR states that much of the land can continue to be used for low intensity grazing during the lifetime of the development. Agricultural land quality surveys have confirmed the site to be grade 3b, therefore does not qualify as Best and Most Versatile agricultural land. The land is proposed to be largely restored at the at the end of the solar farm's lifespan. I therefore do not consider that significant effects are likely.	Significant effects **unlikely.**
Are there any areas on or around the location occupied by land uses which could be affected by the project, particularly sensitive land uses e.g. hospitals, schools, places of worship, community facilities?	No.	N/A
Question 2(b) Relative Abundance, Availability Quality and Regenerative Capacity of Natural Resources in the Area and its Underground		
Are there any areas on or around the location which contain important, high quality or scarce resources e.g. groundwater, surface waters, forestry, agriculture, fisheries, tourism, minerals, which could be affected by the project?	Yes. There is a watercourse along the eastern boundary of the site, with a small reservoir to the south of the eastern parcel. The SR confirms that NRW's Development Advice Map indicates the site is within Flood Zone A and at low risk of flooding. Notwithstanding the applicant intends to submit an FCA with the forthcoming application. The scheme has been amended to distance the solar arrays from areas of ancient woodland. No tree or woodland removal is planned at the site. Given the scale and nature of the development, I do not consider that significant effects are likely.	Significant effects **unlikely.**
Question 2(c) Absorption Capacity of the Natural Environment		

5	Detailed Screening Questions	
Questions to be considered	**Yes/No/Unknown – provide description**	**For 'Yes/Unknown', are effects <u>likely</u> to be <u>significant</u>?**
Are there any other areas on or around the location which are important or sensitive for reasons of their ecology, or are used by protected, important or sensitive species of fauna or flora, which could be affected by the project?	The site is also within 1 km of the Coed Ac Ogofau Elwy a Meirchion SSSI and Coedwigoedd Dyffryn Elwy SAC. The SR states that the site is not connected hydrologically or via habitat corridors to the designated sites. NRW are satisfied that based on the implementation of routine mitigation measures, significant environmental effects on statutory nature designations are unlikely. Great crested newt (GCN) have been confirmed as present within the site, with seven ponds within 250-500 m buffer distance found to be positive for GCN eDNA. The SR confirms that all ponds will be retained through the development. Mitigation measures and habitat enhancement are proposed as part of the scheme. Mitigation measures and habitat enhancements are also proposed for badger, bats and dormice. NRW are satisfied that, based on appropriate mitigation, the development is not likely to be detrimental to the maintenance of the favourable conservation status of GCN. For the foregoing reasons, I therefore do not consider that significant effects are likely.	Significant effects **unlikely.**
Are there any inland, coastal, marine or underground waters on or around the location which could be affected by the project?	No	N/A
Are there any areas or features of high landscape or scenic value on or around the location which could be affected by the project?	The Clwydian Range and Dee Valley AONB/NL is located approximately 5 km to the east. The AONB/NL is a highly sensitive receptor and is also subject to consultation as the site of a new National Park. The ZTV shows visibility beyond the 5 km study area, particularly from areas of higher ground within the AONB/NL. NRW note this area has far reaching views looking down-upon, and across the Vale of Clwyd from the Clwydian Range.	Significant effects **likely.**

5	Detailed Screening Questions	
Questions to be considered	**Yes/No/Unknown – provide description**	**For 'Yes/Unknown', are effects <u>likely</u> to be <u>significant</u>?**
	NRW note their previous screening advice that the presence of woodland, trees and hedgerows in areas of low-lying topography would help integrate the solar farm into the rural landscape. However, the alteration of field arrangements away from these tree enclosed fields to more open land parcels increases the risk of intrusive views of the site from the AONB/NL. Due to the more exposed visibility of the site from elevated viewpoints, there is the potential for significant landscape and visual effects on the AONB/NL. The SR states that due to the distance from the site, the local topography, and existing screening, any effect on the AONB/NL would not be significant. However, no evidence has been provided to substantiate this assessment. The ZTV indicates a high level of visibility from the areas of the AONB/NL shown on the plan. The SR refers to mitigation screening, but no detail is provided. I am therefore unable to conclude that mitigation measures would prevent any significant impact. Having considered all matters before me, there is potential for significant landscape and visual impacts on the Clwydian Range and Dee Valley AONB/NL. Given the sensitive nature of this receptor, EIA is warranted.	
Is the project in a location where it is likely to be highly visible to many people?	Views from outside the 5 km include the Clwydian Range and Dee Valley AONB/NL as noted above.	Significant effects **unlikely.**
Are there any areas on or around the location which are densely populated or built-up, which could be affected by the project?	The ZTV indicates visibility within 5 km which appears to be mainly on rural areas.	Significant effects **unlikely.**
Are there any areas or features of historic or cultural importance on or around the location which could be affected by the project?	Yes, there are a number of listed buildings and scheduled monuments within 3 km of the site. The submitted historic environment desk-based assessment states that the proposed development	Significant effects **unlikely.**

5	Detailed Screening Questions	
Questions to be considered	**Yes/No/Unknown – provide description**	**For 'Yes/Unknown', are effects <u>likely</u> to be <u>significant</u>?**
	will not have a significant impact on the historic environment. Cadw concur with this assessment. I therefore do not consider that significant effects are likely.	
Are there any areas on or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?	No	N/A
Is the project location susceptible to subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions, which could cause the project to present environmental problems?	No. The SR confirms the site to be at low risk of flooring and there is no Air Quality Management Area within or adjacent to the site.	Significant effects **unlikely.**
Has there already been a failure to meet environmental quality standards that is relevant to the project?	No.	N/A

Statement of reasons – insert into Screening Direction

The proposed solar farm will lead to effects on a number of aspects of the environment. However due to the nature of the proposed development, most effects are unlikely to be significant. In terms of biodiversity, Great Crested Newt have been confirmed within the site. NRW are satisfied with the proposed mitigation measures and habitat enhancement, and therefore impacts on GCN and other species would not be significant.

On the basis of the information available in the Screening Report the consultation responses by Denbighshire Council and NRW I consider that significant effects are likely in relation to landscape character and visual amenity, particularly on the Clwydian Range and Dee Valley AONB/NL. In addition, due to the concentration of renewable energy infrastructure within the immediate area, significant cumulative landscape and visual effects are also considered likely. As such, the proposed development represents EIA development, and an ES is required to accompany any future DNS application.

6	Outcome of assessment	
(ii)	If a SO/SD has been provided do you agree with it?	N/A
(iii)	Is EIA required?	Yes

Outcome	Action	✓
Schedule 2 development – threshold exceeded/ criterion met or Sensitive Area **and likely** to have significant effects	Issue direction stating EIA Required **(Letter 2)**	✓

Name and Job Title of Assessor	Tanya Leck

Date of Assessment	20/02/2025

Eich cyf / Your ref: CAS-01392-D2TSF3

Ein cyf / Our ref : 31/2024/1574/EIA-SCR

Dyddiad / Date : 23/01/2025

PEDW
Crown Buildings
Cathays Park
Cardiff
CF10 3NQ

Dear Sir / Madam

CYNNIG / PROPOSAL:	**EIA Screening for proposed development of a Solar PV array and ancillary infrastructure**
LLEOLIAD / LOCATION:	**St. Asaph Solar Farm Land at, Cefn Meiriadog, St. Asaph**

Introduction:

An EIA Screening Request has previously been submitted (reference: CAS-01392-D2TSF3), which was determined to be non EIA as outlined in the attached Screening Direction. Since that determination the Applicant has revised the red line boundary. The changes to the development are summarised as:

- A reduction in site area from 37.5ha to 33.54
- Alternative fields selected for solar arrays

The council consider the proposal falls within the description of paragraph 3(a) Industrial installations for the production of electricity, steam and hot water (unless included in Schedule 1).

Your letter dated 20th December 2024 requests the council provide advice regarding any environmental effects the development may have and whether you consider that any of those effects would be **likely to be significant.** The council consider that the matters raised in our letter dated 16th June 2022 responding to the first consultation for screening of this project are still of relevance to this altered application.

In response to your letter dated 20th December 2024, Denbighshire County Council would like to make the following observations on the above EIA Screening Opinion Request.

Landscape:

By virtue of the scale of the proposed development and the topography of the area, there is potential for significant impacts upon the local landscape. The Clwydian Range and Dee Valley National Landscape is located circa 5km east of the site. The National Landscape hosts many views towards the site from higher ground and therefore the proposal has potential to impact the setting of the designated area.

The new fields selected for solar arrays are not enclosed by natural landscape features (including the ancient woodlands) in the same manner as previously selected fields were. Whilst it is accepted that mitigation measures (including vegetative screening) may help reduce impacts, there may be increased short-medium term impacts as vegetation grows in.

Cumulative effects:

Denbighshire hosts a number of renewable energy developments of varying scales, including offshore and onshore windfarms, solar farms, and energy infrastructure developments (overhead lines and substations). There is a significant amount of energy infrastructure development centred around the Bodelwyddan area due to availability of a grid connection. The applicant has identified a number of developments in proximity to the site.

In addition to those identified by the applicant the council would draw PEDW's attention to the following:

- DNS Ref: CAS-03950-F9K3T4 - Bodelwyddan BESS and Solar Farm
- The solar farm located immediately north of the A547 Rhuddlan Road (Kinmel Solar).
- Burbo Bank Substation, Bodelwyddan Substation, Gwynt y Mor Substation
- Solar farms located on land adjacent to the proposal (both east and west of Squirrels Lodge).

The likely cumulative effects of the proposal would relate to impacts on landscape character and visual amenity, and on the setting of heritage assets.

Eich cyf/Your ref: 31/2024/1574/EIA-SCR
Dyddiad/Date: 10/02/2025
Rhif Uniongyrchol/Direct dial: [redacted]

LLFA Consultation Response

Pre-Planning Application Reference: 31/2024/1574/EIA-SCR – EIA Screening Request for the proposed development of a solar PV array and ancillary infrastructure (PEDW Ref - CAS-01392-D2T3F3).

The Lead Local Flood Authority (LLFA) have reviewed the following documentation as part of the Environmental Impact Assessment Scoping Report consultation request.

- 971429171735337887__-__EIA-Screening-Request-to-PEDW-Cover-Letter-Final.pdf
- 531675531735337885__-__DNS-EIA-Screening-Consultation-Letter-DNS-CAS-01392-D2T3F3-St-Asaph-Solar.pdf
- 91380641735337889__-__EIA-Screening-Request-00-Covering-Email.pdf
- 444829821735337892__-__EIA-Screening-Request-01-Screening-Report.pdf
- 33101795181735337929__-__EIA-Screening-Request-02-Appendix-A-D.pdf
- 51169386271735337987__-__EIA-Screening-Request-03-Appendix-E.pdf
- 7747080011735338011__-__EIA-Screening-Request-04-Appendix-F.pdf
- 444829821735337892__-__EIA-Screening-Request-01-Screening-Report.pdf
- 353806671735338135__-__EIA-Screening-Report.pdf
- 85293302061735338183__-__EIA-Screening-Report-APPENDICES-1-6.pdf
- 75212942571735338261__-__EIA-Screening-Report-APPENDIX-7.pdf
- 7364598951735338286__-__EIA-Screening-Report-APPENDIX-8.pdf
- 6580451735338364__-__EIA-Screening-Report-Additional-Information-GCNR-Design-Info-and-Covering-Letter.pdf
- 5532584301735338400__-__EIA-Screening-Direction-w_-Appendix.pdf
- 22171130951735338463__-__Additional-information-from-Agent.pdf
- 5156359571735338387__-__EIA-Screening-Report-Additional-Information-Great-Crested-Newt-Report-GCNR.pdf

Priffyrdd a Gwasanaethau Amgylcheddol,
Cyngor Sir Ddinbych,
Blwch Post 62, Rhuthun, LL15 9AZ

Highways and Environmental Services,
Denbighshire County Council,
PO Box 62, Ruthin LL15 9AZ

The following Consultation Response is limited to flood risk, surface water drainage and water quality.

Flood Risk

The NRW 'Flood Map for Planning – Surface Water and Small Watercourses' shows that limited areas of the site are within Flood Zones 2 and 3.

Provided that the flood risk is mitigated appropriately, and all essential equipment remains operational in times of flood, the development is not considered to have a significant effect on flood risk and the wider water environment.

Surface Water Drainage

Paragraph 8.4.18 of the Welsh Government 'Practice Guidance – Planning Implications of Renewable and Low Carbon Energy' (Date: February 2011) states *"the potential effects of solar arrays on hydrology and flood risk should be considered. In general, these are unlikely to be significant because the presence of solar arrays will not greatly increase the time for rainwater to reach the ground where it can infiltrate in the usual way"*.

Whilst runoff from the solar arrays will continue to infiltrate as per the existing situation, the runoff will be concentrated at the base of the solar arrays which could lead to soil erosion. Whilst a formal drainage system is not required for runoff from the solar arrays, the Applicant should consider features such as swales or filter drains placed at regular intervals between rows of panels (every 10 -15 rows) as a means of erosion control.

Providing that the proposed DNO substation area is appropriately drained, with the surface water drainage system designed in accordance with the guidance set out in the Welsh Government 'Statutory Standards for Sustainable Drainage Systems', the development is not considered to have a significant effect on the receiving water environment. The drainage system for the DNO substation should be designed to accommodate the 1 in 100 year plus 30% climate change event and appropriate treatment provided.

Water Quality

Any measures to mitigate any identified adverse impacts to the surrounding watercourses during the construction and operational phases should be detailed within a Water Framework Directive (WFD) Report and Construction Environmental Management Plan.

Providing that appropriate water quality treatment measures are undertaken; the development is not considered to have a significant effect on the receiving water environment.

If the Applicant wishes to discuss the LLFA's comments further, please contact the LLFA via landdrainage.consultations@denbighshire.gov.uk.

Cyfoeth Naturiol Cymru
Natural Resources Wales

Via email to: PEDW.Infrastructure@gov.wales

Ein cyf/Our ref: CAS-273621-D1F1
Eich cyf/Your ref: CAS-01392-D2T3F3

Dyddiad/Date: 10 February 2025

Annwyl Syr/Madam/Dear Sir/Madam,

TOWN AND COUNTRY PLANNING ACT 1990 THE DEVELOPMENTS OF NATIONAL SIGNIFICANCE (PROCEDURE) (WALES) ORDER 2016 (as amended)

TOWN AND COUNTRY PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT (WALES) REGULATIONS 2017 (as amended

BWRIAD/PROPOSAL: Proposed development of a Solar PV array and ancillary infrastructure.

LLEOLIAD/LOCATION: Land at Cefn Meiriadog, St Asaph

Thank you for your letter dated 20th of December 2024 requesting Natural Resources Wales' views on whether the above proposed development is likely to have a significant environmental effect

We understand that the works will comprise of the construction, operation and decommissioning of a solar farm, along with 1127 string inverters, 31,556 x W585 modules and nine transformers with underground cable link to the St Asaph substation approximately 1km to the north.

We consider that the proposed development is likely to have adverse effects on the environment. However, in light of the information available to us we cannot confirm the significance of these effects.

Reasons

Our view on the likelihood of significant effect on each of the environmental interests which are within NRW's remit is set out below.

We note the submission of the following reports:

- Environmental Impact Assessment Screening Report, for St Asaph Solar Farm Land at Cefn Meiriadog, St Asaph (Project Ref 33010 Rev 01) by Stantec dated January 2025
- Oliver, G, M. (2022). Letter dated 23/11/2022, Re: St Asaph Great Crested Newt Enhancement Strategy.

We have taken the mitigation measures identified in these documents into account when considering the significance of any impact.

Designated Landscape

Our advice relates to the landscape character and visual amenity of the Clwydian Range and Dee Valley National Landscape/Area of Outstanding Natural Beauty (CRDVNL) and the statutory purpose of the designation to conserve and enhance its natural beauty.

We have reviewed the St Asaph Solar Farm Environmental Impact Assessment Screening Report Rev01 (Stantec UK Ltd) 29 January 2025 together with the following:

- *Chapter 2 EIA 'Landscape and Visual' baseline, Stantec Jan '25*
- *Chapter 3 Screening Assessment, EIA Stantec, Jan '25 including Cumulative Effects*
- *Zone of Theoretical Visibility (ZTV) Plan, Stantec, Dwg LN-LP04 Rev C, Dec 2024*
- *Visual Appraisal Plan, Stantec Dwg LN-LP05, Oct 24*
- *Glint and Glare Report, Pagepower Urban & Renewables, Nov 24*
- *PEDW screening opinion of previous site Jan 2023*
- *NRW screening advice of previous site CAS-204048-Y5J8 Dec 2022*
- *LANDMAP*

Baseline

The proposal is for a Solar PV Array and associated infrastructure extending to approximately 33.5ha across 4 field parcels located some 5.3km west of CDVNL.

The changes to the site from the previous screening represent an intensification of the array in the existing field parcel to the west; removal of fields in the northwest and east (which were adjacent established woodlands); addition of fields in the northeast and northwest; and overall reduction in footprint of the site from 37.5ha to 33.54ha.

Our previous screening advice identified the presence of woodland, trees and hedgerows in areas of low-lying topography that would help integrate the solar farm into the rural landscape. However, the alteration of field arrangements away from these tree enclosed fields to more open land parcels increases the risk of intrusive views of the site from the National Landscape.

ZTV

The ZTV (Drawing No LN-LP04 Rev C) shows potential visibility beyond the 5km study area particularly from areas of higher ground which have far reaching views looking down-upon, and across the Vale of Clwyd from the Clwydian Range. This intervening landscape setting has a high visual evaluation for its pastoral agricultural landscape with attractive views throughout.

The screening assessment with regards to CDVNL (page 26 and 27) confirms that long distance views are available from elevated areas within the National Landscape but considers that due to distance, the site is not readily identifiable, and visual effects are unlikely to be significant from this location. In the absence of the local landscape features previously relied upon for mitigation (woodland and trees surrounding fields now omitted), and without a detailed Landscape and Visual Impact Assessment (LVIA) confirming views, we are unable to gauge the extent to which effects of the development will now be exposed and therefore if there are significant effects to the National Landscape.

Glint and Glare

The Glint and Glare assessment focuses wholly on receptors within 1km of the site and thus omits assessment of potential effects from elevated roads and receptors within the National Landscape.

LVIA

Due to the high landscape value and sensitivity of the landscape setting of the site together with the outstanding special qualities and unspoilt views from inside the National Landscape across the Clwydian Slopes South of Rhuallt and Clwyd Valley, where receptors are more sensitive we advise that there may be potential for significant effects from the National Landscape by virtue of more exposed visibility of the site from elevated viewpoints and location of the development within fields without surrounding woodland mitigation.

Our advice is consistent with that provided on existing and proposed PV sites locally e.g. approximately 1km west beyond Cefn Meiriadog, at Bodelwyddan and Rhuddlan Rd with these being 6km+ from the CDVNL. In these more distant schemes both EIA and LVIA have been provided to confirm the scale and significance of effects of development and potential for cumulative impacts on the National Landscape.

An LVIA, including landscape mitigation plan should be submitted in support of the planning application. We advise adherence to NRW Guidance Note 46 *Using LANDMAP in Landscape and Visual Impact Assessments* together with site-based experience of likely impacts to confirm the search and study areas and selection of an asymmetric study area as necessary to include the National Landscape and elevated viewpoints as highlighted by the ZTV.

Viewpoint photography from within CDVNL should include viewpoints that look down and across the lowland setting of the site from the western fringes of the Clwydian Range.

There are a number of Public Rights of Way that descend into the Vale of Clwyd and have a direct line of sight towards the proposed solar farm. We would expect views from PROW within the National Landscape to be included to identify effects and mitigation proposals.

Cumulative Effects

On cumulative effects we note that our previous screening position followed consideration of Elwy Solar Farm at St Asaph which has now been dismissed by Welsh Ministers.

Cumulative effects at Table 1 (page 15) identifies the operational PV site on land immediately north of A547 Rhuddlan Road (Kinmel Solar Conwy Ref 0/40999) is out of scope. This lies approximately 6km to the north west of Cefn Meiriadog. The proposed 153ha PV expansion proposed at Bodelwyddan approx. 5km away is similarly scoped out. However, Bodelwyddan also includes a remote 6.5ha Battery Storage Site (BESS) site within close proximity to Cefn Meiriadog. These Solar PV sites and the BESS site have all been subject to Environmental Impact Assessment and LVIA which identify some effects in relation to CDVNL even though they are more distant than the proposals at Cefn Meiriadog. We advise it would be helpful to include both PV sites and the BESS site within the cumulative zone of influence for Cefn Meiriadog in line with the good practice set out in

Advice on Cumulative Sites Assessment (Planning Inspectorate Sept 2024). In the absence of any assessment the potential for significant cumulative effects cannot be ruled out.

Protected Species

The EIA Screening Report has identified that Great Crested Newts (GCN) are material to the application site and confirmed to be present on site.

Based on appropriate mitigation we consider that the development is not likely to be detrimental to the maintenance of the favourable conservation status of GCN.

In terms of terrestrial habitat provision, we advise the provision of additional terrestrial habitat within a dedicated GCN conservation area. If the proposal involves off site habitat provision, we advise that a planning obligation such as a Section 106 would be required.

In terms of long-term management, we note the outline in the letter (Oliver, G, M. (2022). Letter dated 23/11/2022, Re: St Asaph Great Crested Newt Enhancement Strategy) and welcome that measures will be detailed in a long-term management plan, such as a Landscape and Ecological Management Plan, to be secured via an appropriately worded planning condition. With reference to an Ecological Compliance Audit, monitoring and biosecurity risk assessment, we note the principles set out in the letter.

We advise that any planning submission includes further details regarding a long term GCN conservation plan. We refer you to Annex 1 which includes a description of the type of information that would be required as part of a long term GCN conservation plan.

We also note that part of the application site is also included within the redline boundary for the Mona Offshore Wind project and is proposed to contain ponds as part of the GCN mitigation for that scheme. This should be fully considered as part of any planning submission.

Protected Sites

The EIA Screening Report identified the following European protected site within the surrounding area:

- Coedwigoedd Dyffryn Elwy / Elwy Valley Woods SAC – approximately 850m to the south of the Site;

The proposed site is also located within 850m of the Coedydd ac Ogofau Elwy a Meirchion Site of Special Scientific Interest (SSSI).

Based on the information available to us and taking into account the implementation of routine mitigation measures (see section on pollution prevention), we consider significant environmental effects on statutory nature designations are unlikely.

Pollution Prevention

Based on the information available to us and with the implementation of standard pollution prevention measures, we consider potential significant environmental effects on the water environment to be unlikely. We refer you to Annex 1 which includes detailed advice on good practice/guidance in relation to pollution prevention which the developer should follow.

Other Matters

We have considered the likelihood of significant effects from the scheme on environmental interests listed on our consultation topics list: Development planning advisory service, consultation topics. Our advice is focused on the likelihood of significant impacts to environmental receptors identified on this list.

Our advice does not rule out the potential for the proposed development to affect other interests, including environmental interests of local importance, or human health. You may wish to consult other bodies for their expert advice on those effects.

Our advice is made without prejudice to comments we may subsequently wish to make when consulted on any planning application, any environmental permit, the submission of more detailed information, or an Environmental Statement.

Yn gywir / Yours faithfully,

Sara Thomas
Cynghorydd - Cynllunio Datblygu/Advisor - Development Planning
Cyfoeth Naturiol Cymru/Natural Resources Wales

E-bost/E-mail: northplanning@cyfoethnaturiolcymru.gov.uk

Croesewir gohebiaeth yn Gymraeg a byddwn yn ymateb yn Gymraeg, heb i hynny arwain at oedi./Correspondence in Welsh is welcomed, and we will respond in Welsh without it leading to a delay.

ANNEX 1

A) Protected Species

We advise that any planning application includes the following:

1. Submission of details and associated plans concerning GCN avoidance and mitigation measures including: fence design, specifications and proposed locations; consideration of access issues across fence lines (including PROW if applicable); fence monitoring and maintenance requirements; and supervised removal of barrier fences. Submission to include proposed timescales and reporting requirements.

2. Submission of further details concerning on-site and/or off-site compensatory proposals including plans, extent, access, current and proposed tenure. Details shall identify areas of terrestrial and aquatic habitat to be retained, enhanced and created. Submission to include timescales and reporting requirements.

3. Submission of a long term site management plan (for the duration of construction, operation and de-commissioning phases of the scheme that includes defined aims and objectives; habitat management prescriptions; contingency measures if fish or invasive non-native species (INNS) are detected; proposals that are capable of being implemented in the event of failure to undertake or to appropriately implement identified or contingency actions; site liaison and wardening; licensing requirements for undertaking habitat management and surveillance; current and any proposed changes to tenure of the compensation area;(freehold) tenure of the compensation area to be approved by the LPA in consultation with NRW; persons or bodies responsible for undertaking management and surveillance together with required skills and competencies; reporting requirements; and proposed dates for updating or revising the management plan.

4. Submission of measures designed to prevent the accidental capture/killing of newts (amphibians) during construction, operational and decommissioning phases of the scheme in respect of post development, this is essentially the installation and maintenance of an amphibian friendly surface water management system that does not include gully pots (or other similar features).

5. Details of timing, phasing and duration of construction activities and conservation measures.

6. Timetable for implementation demonstrating that works are aligned with the proposed development.

B) Pollution Prevention

During the construction phase the applicant should take every precaution to prevent contamination of surface water drains and local watercourses. Oils and chemicals should be stored in bunded areas and spill kits should be readily available in case of accidental spillages.

Use and design of oil separators in surface water drainage systems: PPG 3 should be adhered to ensure surface water drainage is passed through a Class 1 Fuel Interceptor
For further guidance please refer to PPG 3, GPP 5 and PPG 6 at the following link: http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/

Cadw

Llywodraeth Cymru
Parc Busnes Rhydycar
Merthyr Tudful
CF48 1UZ
cadw.llyw.cymru

Welsh Government
Rhydycar Business Park
Merthyr Tydfil
CF48 1UZ
cadw.gov.wales

Planning and Environment Decisions Wales

Sent by email:
PEDW.Infrastructure@gov.wales

Eich cyfeirnod Your reference	DNS CAS-01392-D2T3F3
Ein cyfeirnod Our reference	
Dyddiad Date	22 January 2025
Llinell uniongyrchol Direct line	0300 025 6007
Ebost Email:	Cadwplanning@gov.wales

Dear Sir / Madam,

Screening - St Asaph Solar DNS CAS-01392-D2T3F3

Thank you for your letter asking for Cadw's view on the above.

Cadw, as the Welsh Government's historic environment service, has assessed the characteristics of this proposed development and its location within the historic environment. In particular, the likely impact on designated or registered historic assets of national importance. In assessing if the likely impact of the development is significant Cadw has considered the extent to which the proposals affect those nationally important historic assets that form the historic environment, including scheduled ancient monuments, listed buildings, registered historic parks, gardens and landscapes.

These views are provided without prejudice to the Welsh Government's consideration of the matter, should it come before it formally for determination.

Advice

This advice is given in response to a request for a screening opinion as to the need or not for an Environmental Impact Assessment (EIA) to be prepared for the construction, operation and decommissioning of a solar farm on land at Cefn Meiriadog, St Asaph

A screening report prepared by Santec has been submitted with the application and includes appendix 8 a historic environment desk-based assessment produced by SLR. This considers the impact of the proposed development on the designated historic assets, listed on Annex A, that are inside 3km of the application area. This work concludes that the proposed solar farm will not have a significant impact on these designated historic assets.

The historic environment desk-based assessment also considers the likelihood that unrecorded archaeological features are located inside the proposed development area and includes the results of a geophysical survey of the area. The geophysical survey has shown that apart from post-medieval agricultural features there are no indications that archaeological features are located in the proposed development area.

It is clear from the submitted historic environment desk-based assessment that the proposed development will not have a significant impact on the historic environment and therefore an EIA is not required to be submitted with any application for this proposed development.

Yours sincerely

Nichola Smith
Historic Environment Branch

Annex A

Designated Historic Assets

Our records show that the following historic assets are potentially affected by the proposal.

Within the developer 3km ZTV:

Scheduled Monuments

DE037 Bedd-y-Cawr Hillfort
DE038 Ffynnon Fair (Well), Cefn
DE200 Pysgodlan Moated Site
FL026 St Asaph Bridge
FL027 Pont Dafydd (old)
FL186 First World War Practice Trenches at Bodelwyddan Park

Registered Parks and Gardens:
PGW(C)28(DEN) Plas Heaton
PGW(C)41(DEN) Llannerch Hall
PGW(Gd)54(CON) Kinmel Park

Registered Historic Landscape
HLW (C) 1 Vale of Clwyd
HLW (C) 4 Lower Elwy Valley

Listed Buildings:

154	Plas-yn-Cefn	II
155	Bont Newydd (partly in Cefnmeiriadog community)	II
174	Former Laundry Block at Plas-yn-Cefn	II
175	Wigfair Isaf	II
176	Dolbelidr	II*
278	Bridge over Former Railway Line at Llannerch Park	II
1065	Plas Heaton	II*
1066	C-shaped Agricultural Complex at Plas Heaton	II
1377	Church of St Margaret (The Marble Church)	II*
1378	Barn to NW of Faenol-broper Farmhouse	II
1381	Gwernigron Farmhouse	II
1382	Gwernigron Dovecote	II*
1383	Bodelwyddan Castle	II*
1431	The Court House	II
1436	St. Asaph Auction Rooms	II
1437	House at St. Asaph Auction Rooms	II
1441	Rose Hill House	II
1442	Southcroft including North Cottage	II
1443	Staverton	II
1444	Former Coach House,Stables & Outbuildings to Staverton & Southcroft	II
1446	Mary Short Memorial Drinking Fountain	II
1447	St. Kentigern & St. Asaph Parish Church	II*
1448	Railings & Boundary Walls to St. Kentigern & St. Asaph Parish Church	II
1449	Sundial in the Churchyard to St .Kentigern & St .Asaph Parish Church	II
1451	Greengrocer's Shop	II
1459	Sundial at Kentigern Hall	II
1460	Cathedral Church of St. Asaph	I
1461	Translator's Memorial	II
1469	The Old Palace	II*
1470	Lodge & Gatepiers at driveway to the Old Palace	II
1471	Tithe Barn House	II

1472	Palace Gardens	II
1473	Glan Elwy	II
1474	The old China Shop, including China House	II
1475	Roe Gau	II
1482	Plas Coch Rest Home (main block only)	II
1483	St. Asaph V.P. School	II
1484	Rosslyn	II
1485	H.M.Stanley Hospital (front range plus attached cross-plan ranges & Chapel only)	II
1487	Esgobty Farmhouse	II*
1489	Dovecote at Esgonty Farm	II
1490	Garden Wall at Esgobty Farm	II
1491	Bryn Asaph including Gate House Range	II
1505	Rhyllon Farmhouse	II
1506	Stable Range at Rhyllon Farmhouse	II
19204	Milestone	II
19211	Middle Lodge	II
19215	Milestone	II
19859	Primary Barn and adjoining Cart Bays to NE of Plas Buckley	II
19860	Tal-y-Bryn	II
19924	Church of St Mary	II
19925	Wigfair Hall	II*
19926	Terraces and Forecourt Walls at Wigfair Hall	II
19927	Bont Newydd (partly in Llannefydd community)	II
19928	Telephone Call-box	II
19929	Pentre Meredydd	II
19931	Barn at Pen-ucha-roe-bach	II
19934	Former Stable Block at Plas-yn-Cefn	II
19935	Stable and Coachhouse Range at Plas-yn-Cefn	II
19936	Former Carthouse Block at Plas-yn-Cefn	II
19937	Agricultural Range and adjoining Garden Walls at Plas-yn-Cefn	II
19938	L-shaped Barn Range at Plas-yn-Cefn	II
19939	Former Smithy Range at Plas-yn-Cefn	II
19941	Groesffordd Marli Chapel	II
20897	Glascoed Lodge on Bodelwyddan Park Boundary	II
23514	Sundial at Plas Heaton	II
23515	Carthouse Range at Plas Heaton (with incorporated flat to first floor)	II
23516	Stable and Carthouse Range at Plas Heaton	II
23517	Ice House at Plas Heaton	II
23518	Kitchen Garden Walls including associated Lean-to Sheds and adjoining Melon House at Plas Heaton	II
80737	Bodelwyddan Village Hall (former School)	II
80738	Bryn Celyn Lodge on Bodelwyddan Park Boundary	II
80739	Churchyard Wall of St Margaret's	II
80745	Bodelwyddan Vicarage	II
80747	Garden Shelter in Bodelwyddan Castle Garden	II
80752	Obelisk in Bodelwyddan Castle Garden	II
80754	Play House in Bodelwyddan Castle Garden	II
80756	Sundial in Bodelwyddan Castle Walled Garden	II
80757	Terrace wall of main front of Bodelwyddan Castle.	II
80758	Tyddyn-isaf	II
80759	Wall of Bodelwyddan Castle Garden with Bothy at W and Gateway at E	II
87542	Fountain near Marble Church	II

From: [redacted]
To: PEDW – Seilwaith / Infrastructure
Subject: Cadw - Screening - 2025-01-29 - DNS CAS-01392-D2T3F3 - St Asaph Solar - Response to amended screening report
Date: 29 January 2025 12:39:52
Attachments: Cadw - Screening - 2025-01-22 - DNS CAS-01392-D2T3F3 - St Asaph Solar - Response.obr
image001.png
image002.png
image003.png

Hi Tanya

Thank you for your email.

I can confirm the amended information does not alter our previous advice given in our response letter dated 22 January.

Kind regards

Nichola

Cadw
Nichola Smith
Rheolwr Gwaith Achos/ Casework Manager, Cadw
Llywodraeth Cymru / Welsh Government
FFôn / Tel: [redacted]
E-bost/ Email: [redacted]
Cadw— er lles pawb.
For us all, to keep.

Ymunwch â CadwJoin Cadw

From: PEDW – Seilwaith / Infrastructure <PEDW.Infrastructure@gov.wales>
Sent: 29 January 2025 11:28
To: Smith, Nichola [redacted]
Cc: Cadw Planning <CadwPlanning@gov.wales>
Subject: FW: Cadw - Screening - 2025-01-22 - DNS CAS-01392-D2T3F3 - St Asaph Solar - Response (A56522935)

Good morning Nicola,

I hope this email finds you well. I wanted to bring to your attention a few errors identified by NRW in the Screening Report. Firstly, Section 3.5 mistakenly refers to sites in Caerphilly instead of Denbighshire, and there is no mention of ongoing schemes in and around this site. Additionally, in the Screening Assessment table under section 3.6 - 1(b), Accumulation with other development, there is a reference to the Elwy Solar Farm development which was refused.

As a result, we sought further information from the applicant regarding the cumulative

Appendix A.4 Construction Traffic Management Plan

St Asaph Solar Farm

At

Cefnmeiriadog,

St Asaph,

Denbighshire,

Wales,

LL17 0HF

Operational Delivery Director	Paul Leonard	
Issue number:	04	Date: 28/04/2023
Produced by:	Liam Leadbetter	
Approved by:		
Issued to:	Sharon Thomas	

Review record

This plan will be reviewed against the construction works and at least monthly to ensure its relevance.

Date	Revision / section	Signature
11.05.2022	Initial plan	Liam Leadbetter
22.12.2022	Review	Laura Murphy
28.04.2023	Site layout figures amended	Laura Murphy
16.04.2025	Update to multiple details	Josh OHanlon
28.04.2025	Review and Site Layout figures amended	Sharon Thomas

Contents

1. Introduction 3
2. Scope of works 3
3. Planning conditions 5
Pic 1 – Location Plan 6
Pic 2 – Traffic Route Plan 7
Pic 3 - Site Plan 8
4. Site Access 9
5. Vehicle movements (construction deliveries) 9
Pic 4 - Typical HGV – Carrying Solar PV System 9
6. Heavy Goods Vehicle Movements – Construction Period 10
7. Vehicle movements (construction site staff) 11
8. Car Parking for Construction and Maintenance Staff 11
Pic 5 –Welfare set up 12
9. Directions to site 13
Pic 6a Road Access route 15
10. Delivery restrictions 15
11. Directions on site 16
12. Safe use of vehicles and plant on site 16
13. Site access and segregation for vehicles and pedestrians 17
14. Construction Process 18
15. Waste 18
16. Security and Safety 19
17. Storage 19
18. Noise Management 20
19. Incident & Pollution Prevention and Emergency Response 20
20. Archaeological Importance 20
21. Management and Protection of Ecological Resources 20
22. Operational Phase 21

1. Introduction

- The site currently comprises two plots of land circa 35.42 hectares in area. This planning application seeks permission for the construction, operation and decommissioning of a ground mounted photovoltaic (PV) solar farm, together with associated equipment, infrastructure and ancillary works (the 'Development') on land at Cefn Meiriadog, St Asaph, Denbighshire (the 'Site')

- This document has been prepared to support in the mobilisation and subsequent vehicular and pedestrian traffic to, from and on the site throughout the entire project.

- A detailed description of the proposed Solar Farm has been provided in the accompanying Planning, Design and Access Statement.

2. Scope of works

- The project will consist of an 18.44MW (megawatt) ground mounted photovoltaic solar farm. The ground mounted solar will comprise of PV modules and associated framework including bases and associated cabling and infrastructure, Inverters, Transformers, customer substations and DNO substation. The site is located within the administrative boundary of Denbighshire County Council (DCC).

- The solar panels, frames and other site construction materials would be transported to the application site on articulated lorries up to 16.5m in length.

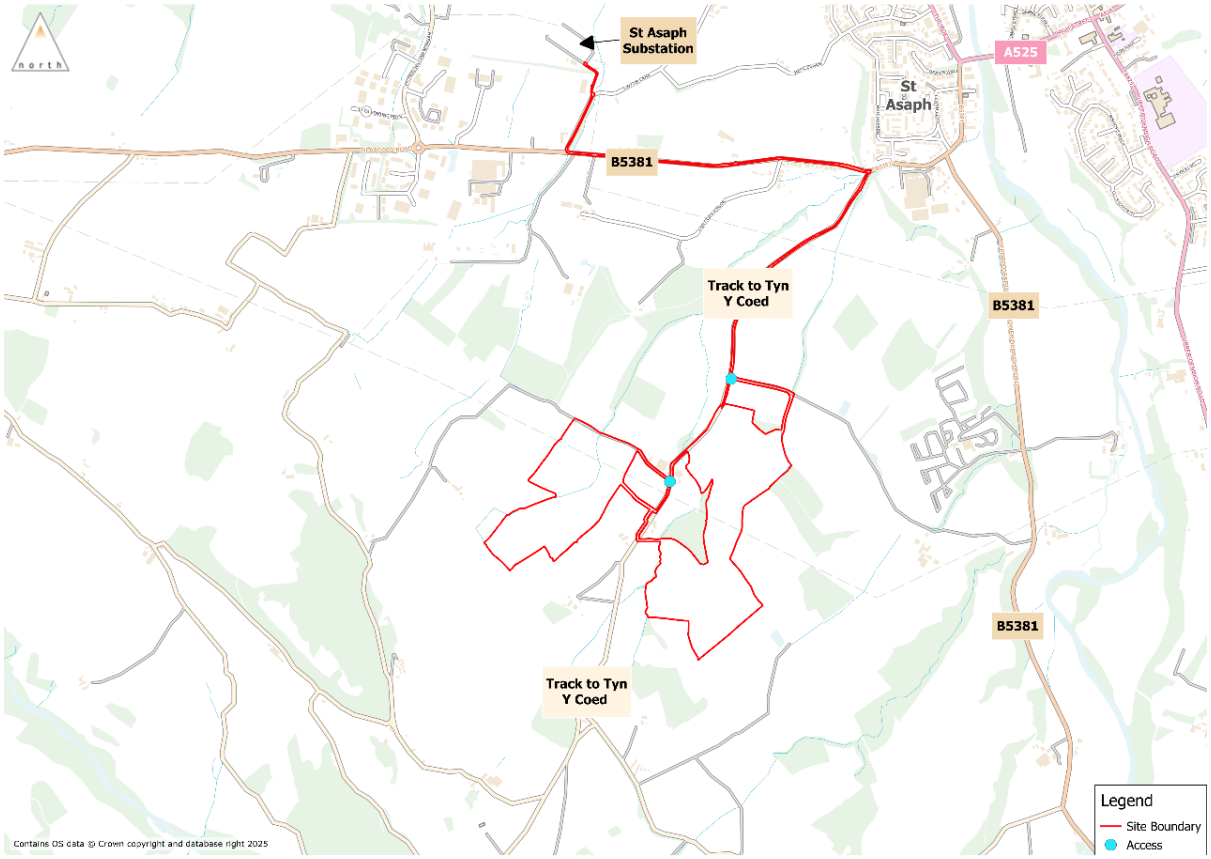


Figure 1 - Site Location, Cefnmeiriadog, St Asaph, Denbighshire, Wales, LL17 0HF

- There will be enabling works so that construction can be undertaken safely and with minimal effect on the surrounding environment and infrastructure.

- Through the use of service searches, the following apparatus and/or underground assets are known to exist on site, or in the vicinity of the site, and will be suitably controlled throughout the construction and operation phases:
    - Western Power Distribution – Decommissioned 11kV underground cable
    - LV navigation Light Power supply and underground cable
    - Overhead Power lines

- The welfare, car parking and turning areas will be on temporary, stabilised ground. These stabilised areas are created using terra firma matting and stone where required.

- The point of connection to the grid will be the St Asaph substation which is located north of the site. The cabling between the point of connection and the point of supply will be buried underground within the highway.

- The cable will run under the track to Tyn Y Coed, Glascoed Road and Cwttir Lane from the Site to St Asaph Substation and will require temporary roadworks. All road works will be undertaken in accordance with "Traffic Signs Manual – Chapter 8 - Traffic Safety Measures and Signs for Road Works and Temporary Situations – Part 1 Design – 2009".

- Site landscaping and planting will be carried out in accordance with the recommendations of the Landscape Plan. Biodiversity will be controlled as per the Landscape and Ecological Management Plan.

- All construction works will be undertaken between the hours of Mon-Fri 07:00 to 18:00 and Sat 08:00-14:00 only unless otherwise specified in writing by the Local Planning Authority. There will be no working on Sundays or Bank Holidays.

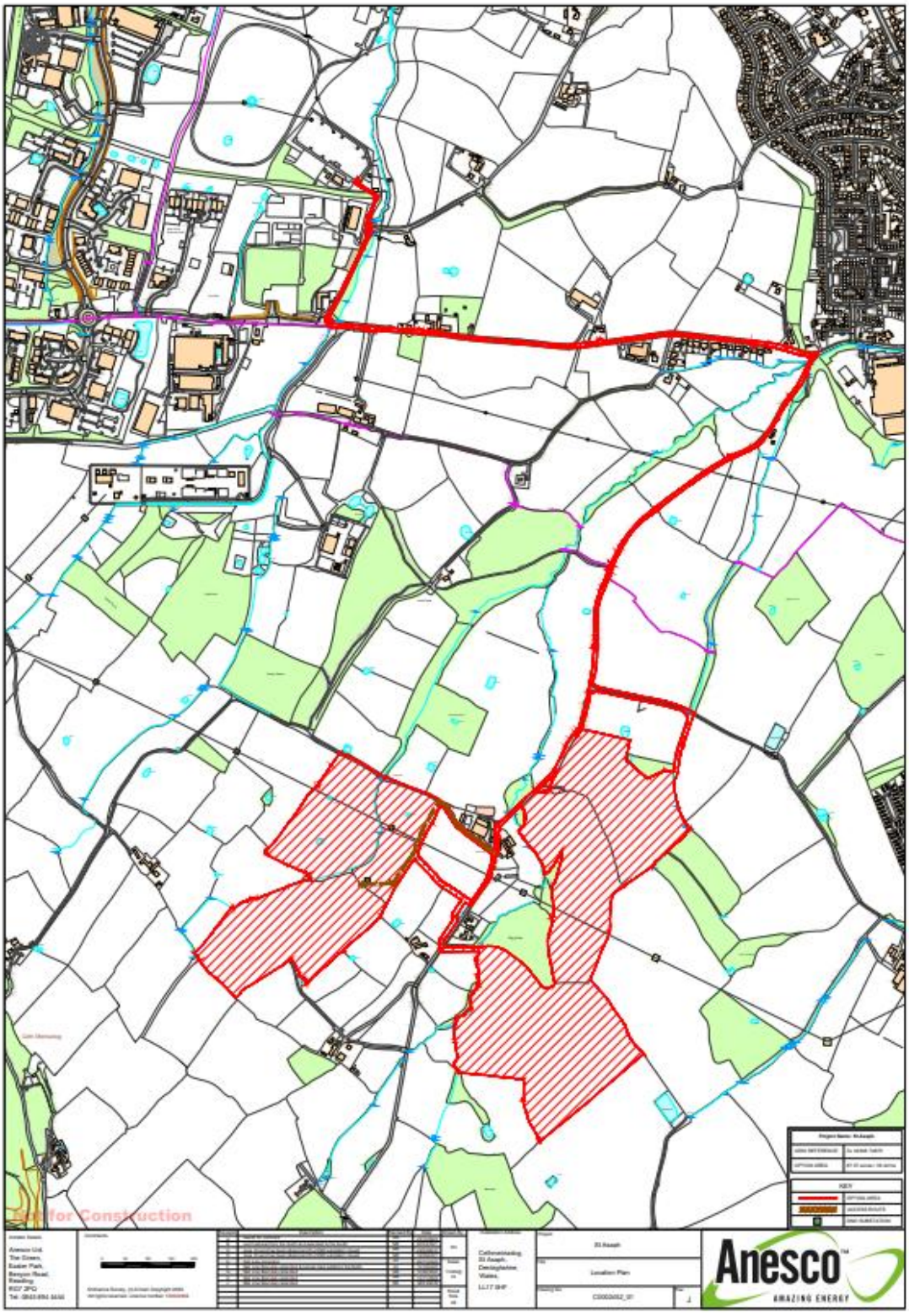
- Personal Injury Collision (PIC) data was obtained from CrashMap for the adjoining highway network for the most recent five year period available, up to 2023 No PIC's were identified in the road network adjacent to the application site.

3. Planning conditions

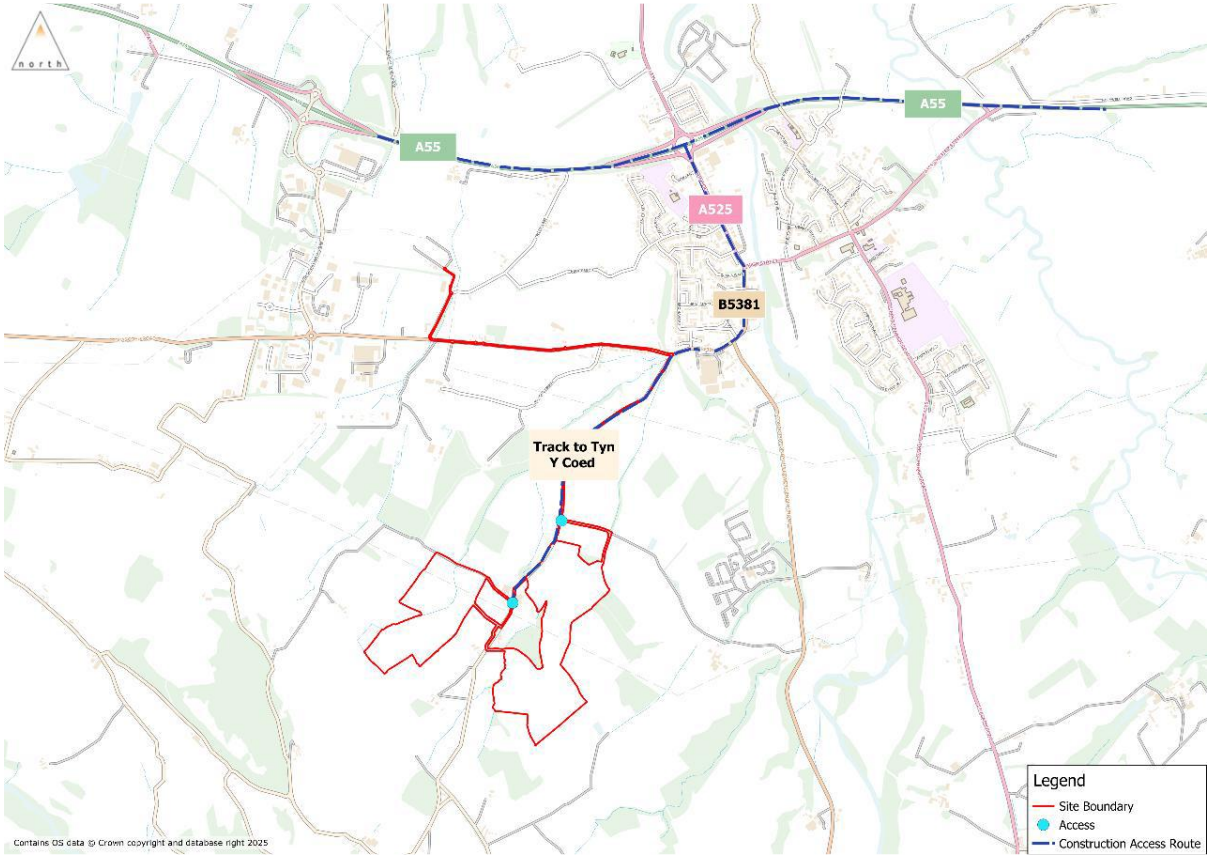
- There are no planning conditions at this stage.

- Any traffic related conditions should they arise will be discharged with the use of this plan when revised.

Pic 1 – Location Plan



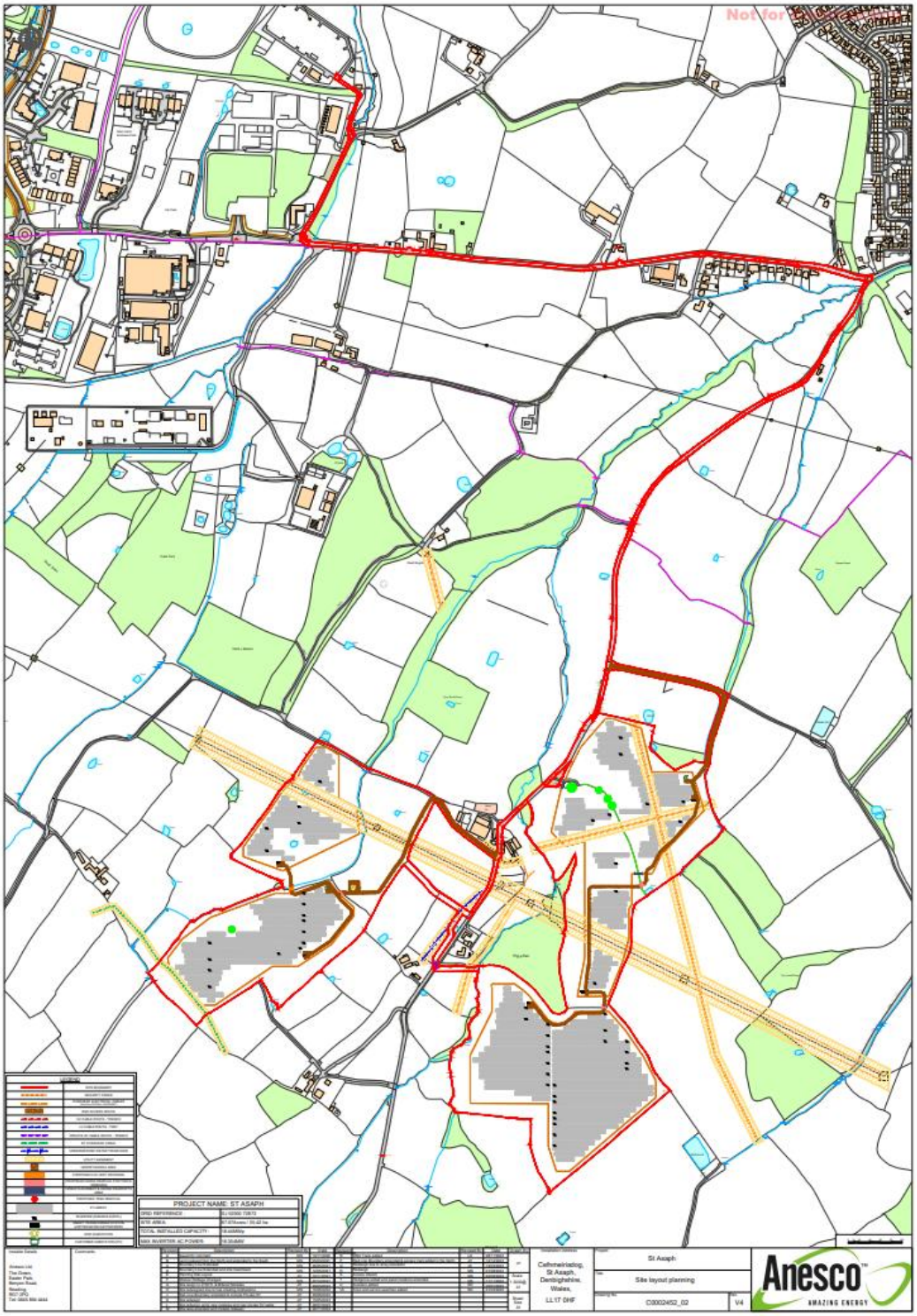
Pic 2 – Traffic Route Plan



- Access to site entrance from A55 exiting at exit 27, approximately 1.77 miles.

- The Local Highway network is centred around Cerfn Meiriadog, this connects to the north to the B5381 and to the southeast to the B5381 as well. Cerfn Meiriadog is a single carriageway with one lane. Cerfn Meiriadog has no footway, no street lighting and an unrestricted speed limit.

Pic 3 - Site Plan



4. Site Access

- The application site can be reached via taking the A525 south off the A55. Follow the A525 south until the roundabout with the B5381 then follow the B5381 southwest until Cerfn Meiriadog is reached. Travel south down this road until the application site is reached. No vehicle parking, loading or unloading will take place within the public highway or along the access route. All routes will be kept free of obstacles and trip hazards during the period of installation.

5. Vehicle movements (construction deliveries)

- Deliveries will be on 40t HGVs. All HGV deliveries will be coordinated to be "Just in Time" to control traffic flow. They will be asked to pull up away from the site where they will be required to call ahead to ensure that the way is clear and that no other vehicles are present that may create a traffic issue.

- The modules will be delivered on HVGs which are typically carried to the site on a 16.5m long articulated vehicle. Typical dimensions for a 16.5m long articulated vehicle are:

  (i) 16.5m long;
  (ii) 2.5m wide;
  (iii) 3.65m high; and
  (iv) approx. 11.2 tonnes unladen.

- The proposed deliveries will therefore not weigh the maximum legal limit of 40 tonnes.

Pic 4 - Typical HGV – Carrying Solar PV System



6. Heavy Goods Vehicle Movements – Construction Period

- The Proposed Development comprises two phases: construction and operation. Forecast average daily two-way traffic movements associated with both phases is presented in the Table below.

Phase	Duration	Average daily two-way traffic movements
Construction	36 weeks	4 two-way HGV movements per day
Operation	Permanent	4 two-way movements each month

Table 1: Forecast Development Average Two-way Traffic Movements

- Table.1 above demonstrates that there will be up approximately 4 deliveries per day on average over the 36-week. During peak construction activities we will expect up to 19 deliveries per day over an 8-week period (Monday to Saturday). This will vary in line with the build process.
- In addition to the HGV movements identified in the table, there will also be a small number of construction movements associated with smaller vehicles such as the transport of construction workers and sub-contractors.
- Reversing will not need to be undertaken as HGVs will drive on to site in forward gear and turn within the turning area and then leave in forward gear.
- No excavated materials will require removal from the site. Any excavated soil will be reused for backfilling or in the creation of banks.
- There will be no contact with muddy/dirty ground as all delivery vehicles traverse the hard standing and therefore none or very little debris should be tracked out on to the road outside, with no field plant tracking on to road outside. There will be road sweeping and wheel washing services available should the need arise, which will depend on the prevailing weather conditions.
- Delivery of the components shall be made directly to the construction compound area. A new access track will be utilised during construction, future maintenance and subsequent decommissioning of the proposed solar farm.
- There are no abnormal loads proposed in relation to the Proposed Development.

7. Vehicle movements (construction site staff)

- There will be up to twenty operatives on site at the busiest time therefore to reduce traffic onto site all operatives are encouraged to share vehicles.

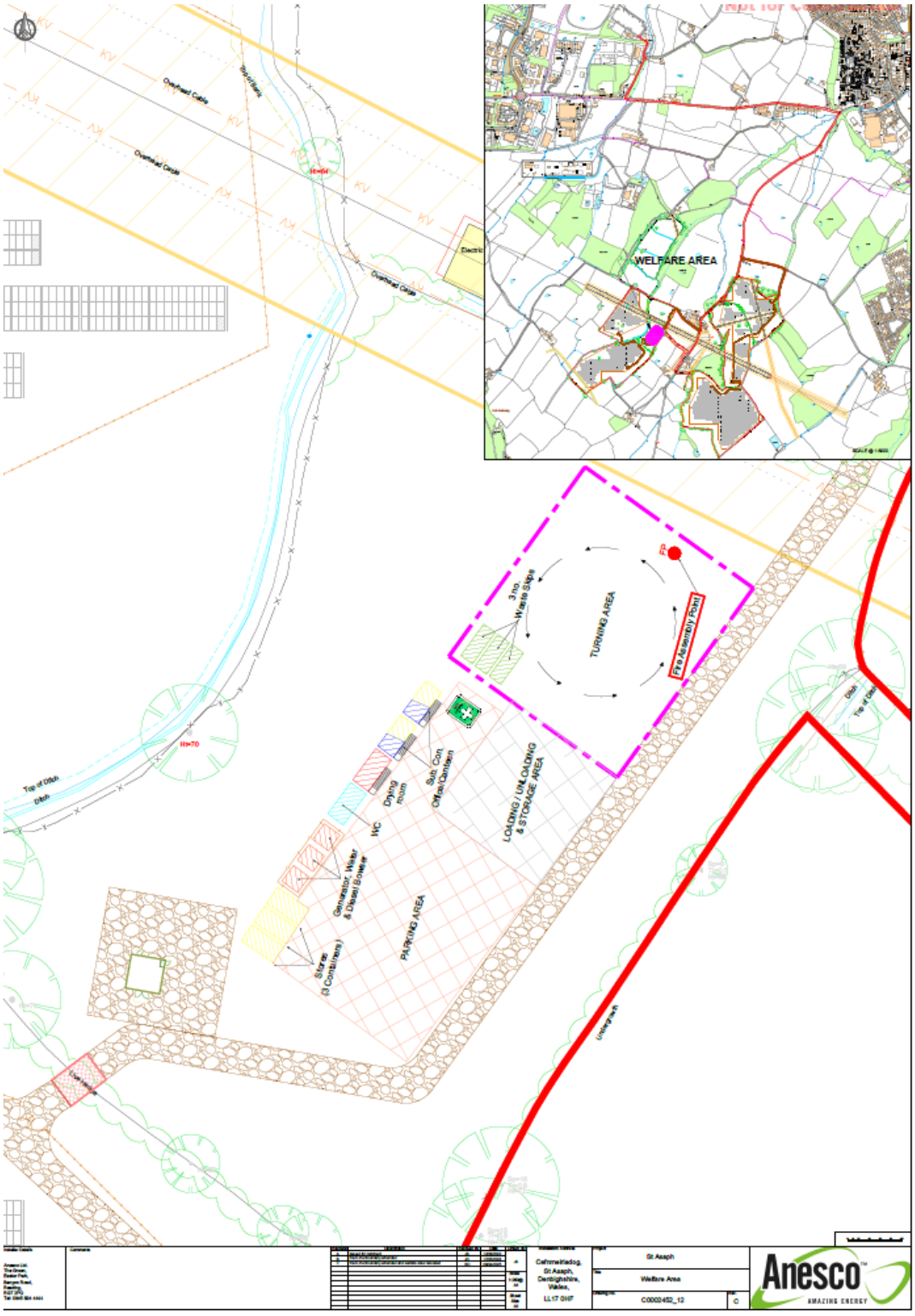
- A Banksman will be used to aid HGV deliveries arriving and leaving the site where required.

- Where possible labour will be resourced locally.

8. Car Parking for Construction and Maintenance Staff

- The parking of vehicles is permissible only within the welfare area during construction of the site. There may be some space made available elsewhere on site for vans if there is a requirement but the project manager will decide this.

Pic 5 –Welfare set up (Subject to change)



9. Directions to site

- HGV construction traffic will route to the application site via taking the A525 south off the A55. Follow the A525 south until the roundabout with the B5381 then follow the B5381 south west until Cerfn Meiriadog is reached. Traveling south down this road until the application site is reached.

- The development is connected to the national highways network, which enables straightforward transport of materials, equipment and labour.

- A banksman will be used to aid HGV deliveries arriving and leaving the site. Traffic Marshal/Banksman will only act for off highway operations.

- Where appropriate, Anesco will make reasonable endeavours to contact residents and businesses in the area and reach an agreement to keep the access routes as free of traffic as is possible during the hours of operation, in order to maintain safe and efficient access to and from the site.

- The surrounding roads are already subject to use by agricultural and industrial vehicles. Therefore it is considered suitable for use by the anticipated number of HGVs that will be associated with the temporary construction period. The likelihood of background traffic being delayed significantly is low.

- Anesco will put in place measures to minimise the likelihood of background traffic meeting an HGV associated with the construction phase on this route (see Pic.6). This would comprise:
    - Supplying this document and/or the access/egress routes to those who are to deliver to site
    - Signs noting the site and access/egress
    - All HGV deliveries will be coordinated to be “Just in Time” to control traffic flow. They will be asked to pull up away from the site. They will be required to call ahead to ensure that the way is clear and that no other vehicles are present that may create a traffic issue.

- The Application Site consists of two separate parcels, all being accessed off Cerfn Meriadog road. This road runs north to south.

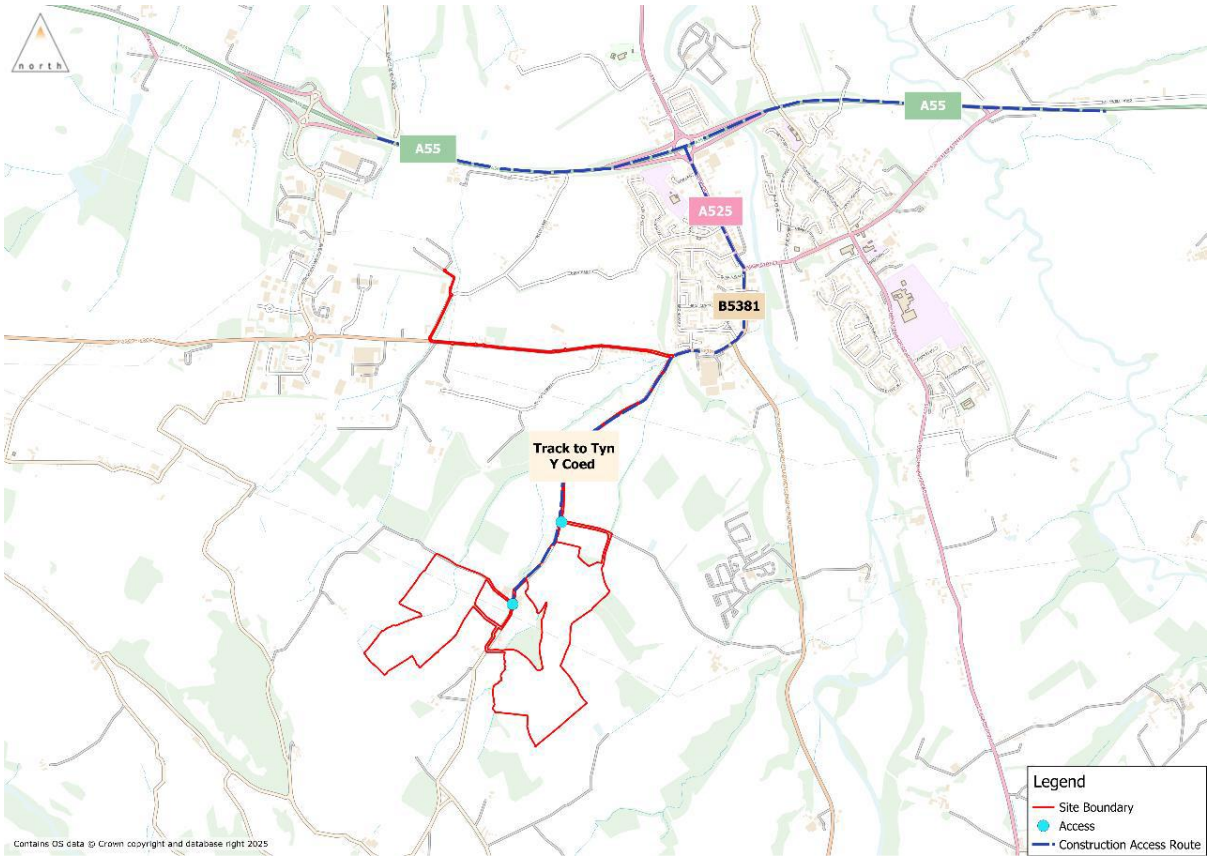
- There is an existing large access on the eastern side of the track to Tyn Y Coed, this track provides access to Tyn-y-Coed Farm as well as the surrounding agricultural fields. This track will provide access to the areas within the Site that are on the eastern side of the track to Tyn Y Coed.

- There is an existing access on the western side of the track to Tyn Y Coed, this track provides access to Tyn-y-ffordd-bach as well as the surrounding agricultural fields. This track will provide access to the areas within the Site that are on the western side of the track to Tyn Y Coed.

- The provision of an area of hardstanding within the application site for vehicles to manoeuvre in and over which they would drive prior to accessing the public road network would reduce the risk of mud being trafficked onto the public road network and the ensuing nuisance this can cause.

- Each of these accesses will be provided with an area of hardstanding for vehicles to manoeuvre in and over which they would drive prior to accessing the public road network would reduce the risk of mud being trafficked onto the public road network and the ensuing nuisance this can cause. Each parcel will be provided with an area of hardstanding to allow large articulated vehicles to turn, park as well as car parking for workers.

Pic 6a Road Access route



Access to site entrance from A55 exiting exit 27, approximately 1.77 miles

10. Delivery restrictions

- During the construction phase of the development construction deliveries and contractors will arrive at or leave the site between Mon-Fri 07:00 to 18:00 and Sat 08:00-14:00.

- There is a strict 5mph speed limit on site

- Only one HGV is allowed on site at any one time and these will enter in forward gear and exit the site in forward gear

- Articulated vehicles coming to site are call ahead for authorisation on to site.

- Once through the entrance drivers are to pull up to the turning area and report to the site office.

11.Directions on site

- All vehicles are to follow the Anesco site and road management signs and stay within the 5-mph speed limit
- Signs and barriers are to be installed to help manage the track users with all on site having this covered during induction
- HGV's are to come to site and proceed to the turning/unloading area with the use of a banksman before being off loaded by use of the excavators with fork attachments where stock will be placed on the put down area
- Mobile cranes under contract will unload larger items.
- Whilst unloading is taking place no personnel will be permitted to work in the area
- Skips are placed next to the turning/unloading area where waste carriers can easily access them, this will be done with a banks man present
- The welfare area will have pedestrian and vehicular routes leading to and from it and have signs noting this
- Depending on what phase the build is in will determine the pedestrian and vehicular routes, but they will be signed
- Pedestrian areas within the welfare area are separated from plant with the use of heras fencing and the line of welfare cabins
- When crane lifts are being undertaken then the project manager will advise all on site of routes

12.Safe use of vehicles and plant on site

- Only tracked vehicles are allowed to traverse the grassed areas or per Project Manager authorisation
- All vehicles are to be legally parked and operated by trained, competent, authorised, licensed and insured personnel

- Reversing will be kept to a minimum as one-way routes are in effect. Where this is necessary a vehicle banksman will be in attendance. Pedestrians not associated with the unloading will not be within lay down areas.
- The vehicles will be serviced and kept to a road/work worthy state through regular inspections
- The Safe Working Load of any given vehicle will be adhered to
- The service road has a maximum speed limit of 5mph
- Whilst not on the service road the maximum speed limit is 5mph
- Traffic management signs will be displayed throughout and outside of the site
- No muddy/dirty plant that would deposit material on adjacent highway is to traverse outside of the site before being washed down
- All plant is to be stored safely in the compound and left locked when not in use
- Fuels are to be stored within the fuelling area/diesel bowser where they must be stored in double skinned bunded tanks with drip trays and spill kits. Fuelling is prohibited elsewhere on site.
- All excavations to be guarded against
- All crane lifts will be done as per lift plan and permit to lift system.
- Overhead power lines will only be crossed at designated points (goalposts) and safety areas will not be encroached unless under permit to dig.

13.Site access and segregation for vehicles and pedestrians

- Vehicle parking is only permissible only within the welfare area.
- Keep the road accessible for the safe egress/access of pedestrians and road users
- All pedestrians and vehicle users are to be extra vigilant around any cross over areas
- Segregation will be by suitable barriers e.g Heras panelling.
- Vehicles and pedestrians to use designated routes

14.Construction Process

- During the construction period the following activities will be undertaken:

    - Site preparation
    - Creating the access track and compound area
    - Erecting the security fence;
    - Excavating the site for the earthing and foundations;
    - Pouring the concrete base;
    - Pilling of PV framing (concrete ballast foundation for archaeological area)
    - Installation of PV modules and associated equipment
    - Installation of LV equipment;
    - Installation of the HV electrical equipment
    - Installation of cables to the St Asaph Substation
    - Connecting all the cables up and backfilling the cable trenches (where required);
    - Commissioning and Energisation

- The construction phase of the Proposed Development would lead to a temporary increase in traffic on the road network surrounding the application site. This would be for a temporary 36-week period. On average during this 36 week period, it is expected that the Proposed Development would lead to an increase in traffic movements of 34 two-way vehicle movements per day. Changes of this magnitude would have a de minimis impact on road capacity.

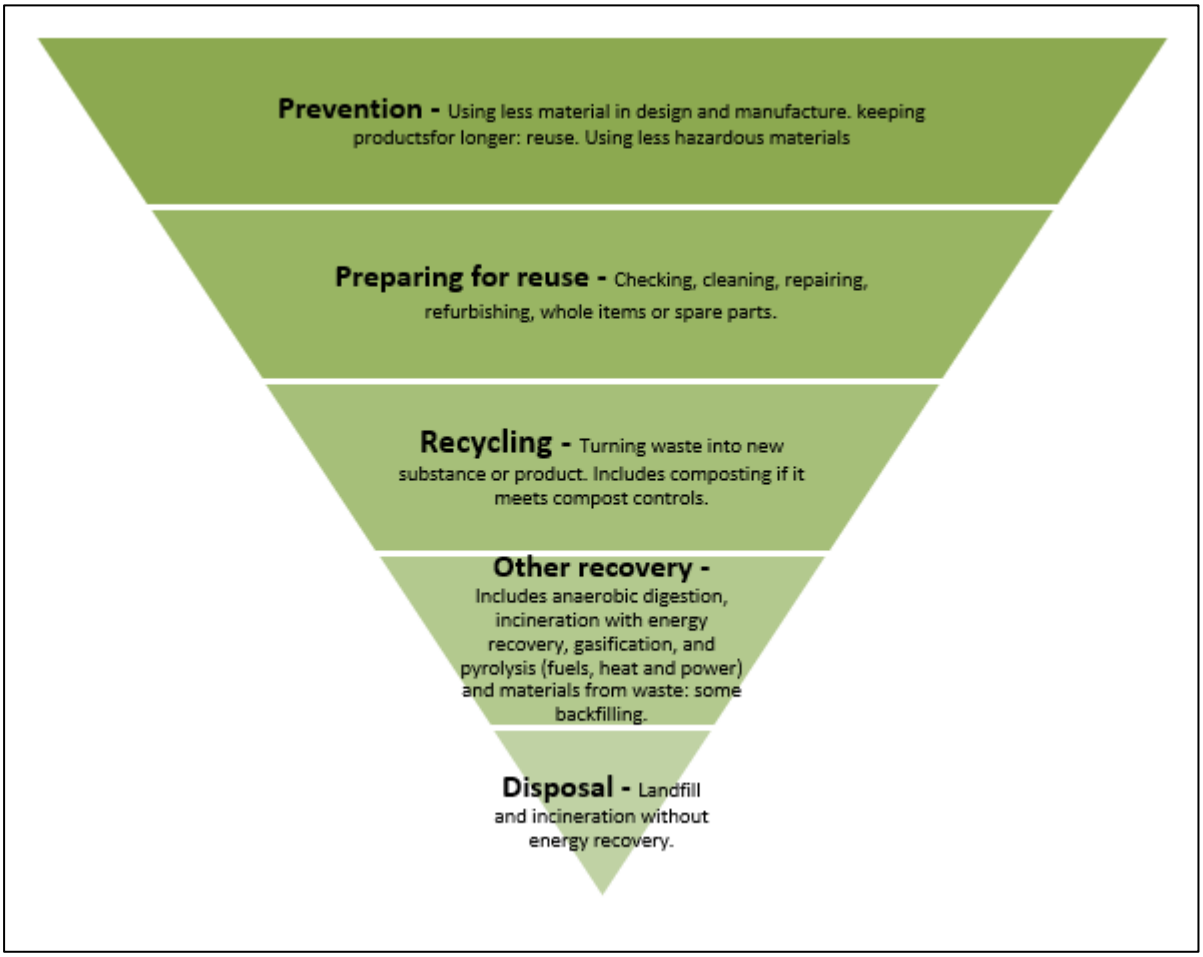
- Due to the proximity of the site to the Strategic Road Network it is likely that commercial vehicle movements in the vicinity of the site are sufficiently high that an increase of four two-way daily vehicle movements is unlikely to cause a disturbance to other users.

- The temporary increase in traffic volumes and especially the heavy vehicle component of the traffic volume has the potential to lead to adverse highway safety impacts. However, as concluded in the TS, The changes associated with the construction of the Development are considered to be minimal and would have an imperceptible impact on the operation of the local highway network.

15.Waste

- All waste is disposed of responsibly from the site and will be undertake by a local registered waste collection contractor.

- Waste will be disposed of using the Waste hierarchy shown below:



16.Security and Safety

- It is intended that the security fence that will surround the site for the duration of its life will be erected prior to the main construction phase, thus ensuring the site is secure during this phase.

- A Health and Safety board identifying potential hazards will be updated daily with all visitors required to sign in and adhere to on-site Health and Safety practices. All personnel working on site will be required to wear a high visibility vest or jacket, steel cap boots, and safety helmet, safety googles and safety gloves as well as any other activity-specific safety wear.

17.Storage

- No long-term on-site storage is required as the HGVs will provide the materials at regular intervals throughout the construction period as construction progresses, rather than being delivered all in one go.

18.Noise Management

- Contractors will be required to conform to the construction noise code of practice BS 5228.

- All construction and decommissioning works will be undertaken between the hours of Mon-Fri 07:00 to 18:00 and Sat 08:00-14:00 only unless otherwise specified in writing by the local planning authority. There will be no working on Sundays or Bank Holidays. No works to be undertaken outside of those hours.

19.Air Quality and Dust Management

- Given the nature of the site, we do not anticipate any significant dust issues to arise.

20.Incident & Pollution Prevention and Emergency Response

- If an incident occurs, notification shall be made by the Site Manager to the Project Manager within 30 minutes of the incident occurring. Thereafter an incident report shall be submitted in line with Anesco's Incident Reporting procedure.

- Near miss and hazard identification is to be recorded on Iauditor and appropriate parties informed.

- All incidents will be recorded on weekly reports and discussed in progress meeting.

- An appropriate number of spill kits will be located on the site with at least one within the fuelling area and one in the office with others placed where required. It is the responsibility of the site management to ensure all spill kits are fully stocked at all times.

21.Archaeological Importance

- No further Archaeological investigations, or excavation works are required to be undertaken for this development.

22.Management and Protection of Ecological Resources

- A Landscape and Ecological Management Plan has been developed, which includes a detailed description of ecological enhancement measures and management practices which will deliver a net gain to biodiversity on the Site and any mitigating actions to be undertaken during the construction and operational phase.

23.Operational Phase

- Once operational, there would be a minimal increase in traffic volumes with operational traffic (one van) expected to access the site on two occasions per month at the most. This maintenance will be carried out by Anesco.

- Whilst Anesco's compound will have been removed, the turning/unloading area will be left for vehicles to access the compound and be able to turn around to ensure that reversing will not occur on the track way. Any damage that was caused during the construction phase at the site entrance will be made good, although this is thought unlikely to occur at this site.

Appendix A.5 Ecological Impact Assessment

Ecological Impact Assessment

St Asaph Solar Farm

Anesco Limited

The Green, Easter Park, Benyon Road,
Reading, Berkshire, RG7 2PQ

Prepared by:

SLR Consulting Limited

2nd Floor, Hermes House, Holsworth Park, Oxon
Business Park, Shrewsbury, SY3 5HJ

SLR Project No.: 406.065274.00001

29 April 2025

Revision: 01

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
01	29 April 2025	Emma Clarke	Gary Oliver	Gary Oliver

Basis of Report

This document has been prepared by SLR Consulting Limited (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with Anesco Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

Table of Contents

Basis of Report ..... **ii**
Acronyms and Abbreviations ..... **vi**
1.0 Introduction **1**
1.1 Background 1
1.2 Site Description 1
1.3 Details of the Proposed Development 1
1.4 Purpose of this Report 2
1.5 Evidence of Technical Competence and Experience 2
1.6 Relevant Legislation and Policy 3
1.6.1 National Planning Policy 3
1.6.2 Denbighshire Local Plan 3
2.0 Methodology **4**
2.1 Scope 4
2.2 Baseline Data Collection 4
2.2.1 Desk Study 4
2.2.2 Field Survey(s) 5
2.2.3 Limitations 7
2.3 Assessment Approach 8
2.3.1 Important Ecological Features 8
2.3.2 Impact Assessment 9
2.3.3 Significant Effects 10
2.3.4 Avoidance, Mitigation, Compensation and Enhancement 10
3.0 Baseline Ecological Conditions **12**
3.1 Statutory Designated Sites 12
3.2 Non-Statutory Designated Sites 15
3.2.1 Ancient Woodland 17
3.2.2 Priority Habitats (Section 7 Environment (Wales) Act) 17
3.3 Habitats 18
3.4 Species 20
3.4.1 Plants 20
3.4.2 Invertebrates 23
3.4.3 Fish 23
3.4.4 Amphibians including Great Crested Newt 24
3.4.5 Reptiles 24
3.4.6 Birds 25

3.4.7 Mammals....27
3.5 Summary of Important Ecological Features....29
4.0 Assessment of Effects and Mitigation Measures....33
4.1 Embedded Mitigation, including Mitigation and Enhancement Measures....33
4.2 Cable Connection Route Temporary Impacts....34
4.3 Designated Sites....34
4.3.1 Ty'n y Coed Rough LWS, Glascoed LWS, Pig-y-fran Ancient Woodland, Ty'n y Coed Rough Ancient Woodland....34
4.4 Habitats....35
4.4.1 Other Lowland Mixed Deciduous Woodland and Other Rivers and Streams....35
4.4.2 Native hedgerows (with ditches)....35
4.4.3 Ponds....36
4.5 Species....37
4.5.1 Great Crested Newt....37
4.5.2 Breeding Birds....37
4.5.3 Bats....38
4.5.4 Badger....39
4.5.5 Water Vole....39
4.5.6 Hazel Dormouse....40
4.5.7 Hedgehog....40
4.6 Summary of Effects....41
5.0 Conclusion....45

Tables in Text

Table 2-1 Habitat Suitability for Bats....6
Table 3-1 Statutory Designated Site Descriptions....12
Table 3-2 Non-Statutory Designated Sites within 2km of Site....15
Table 3-3 Notable Plant Species Recorded within 2km of the Solar Site....20
Table 3-4 Bird Species within 2km of the Solar Site....25
Table 3-5: Summary of Important Ecological Features Subject to Detailed Assessment....30
Table 4-1: Summary of Potential Impacts, Proposed Mitigation and Compensation Measures and Residual Effects....42

Appendices

Appendix A **Drawing C0002452_01 Site Location and Drawing C0002452_02 Site Layout**

Appendix B **Landscape Strategy Plan**

Appendix C **National Legislation and Policy**

Appendix D **GCN Report**

Appendix E **Winter Bird Survey Report**

Appendix F **Badger Report**

Appendix G **Habitat Report**

Acronyms and Abbreviations

AWI	Ancient Woodland Inventory
AWS	Ancient Woodland Site
BCT	Bat Conservation Trust
BoCC	Birds of Conservation Concern
CIEEM	Chartered Institute of Ecology and Environmental Management
CITES-B	Convention on International Trade in Endangered Species
COFNOD	North Wales Local Environmental Records Centre
CSZ	Core Sustenance Zone
ECoW	Ecological Clerk of Works
EcIA	Ecological Impact Assessment
eDNA	Environmental DNA
GCN	Great Crested Newt
GLTA	Ground Level Tree Assessment
HDir5	Habitats Directive Annex 5
LBAP	Local Biodiversity Action Plan
LEMP	Landscape and Ecology Management Plan
LWS	Local Wildlife Site
NBW	Night-time Bat Walkover
NERC	Natural Environment Research Council
NGR	National Grid Reference
NRW	Natural Resources Wales
RPA	Root Protection Zone
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest
UKBAP	UK Biodiversity Action Plan
UKHab	UK Habitat Classification Survey
WCA	Wildlife and Countryside Act 1981

1.0 Introduction

SLR Consulting Limited (SLR) was commissioned by Anesco Limited to undertake an Ecological Impact Assessment (EcIA) for the construction, operation and decommissioning of a ground mounted photovoltaic (PV) solar farm, together with associated equipment, infrastructure and ancillary works on land at Cefn Meiriadog, St Asaph, Denbighshire, broadly centred on National Grid Reference (NGR) SJ 02443 72771, hereafter referred to as the 'Site'.

1.1 Background

SLR Consulting Limited were previously instructed to provide ecological support in relation to the proposed solar farm at St Asaph in December 2021. Since that date, extensive ecological surveys have been undertaken which have fed into the Site design and final layout, which is assessed in this report.

1.2 Site Description

The Site is situated in Denbighshire, approximately 1km to the south-west of St Asaph, and approximately 8km south of Rhyl.

The location of the Site is shown in Drawing C0002452_01 and the Site boundary is shown in Drawing C0002452_02 (both provided as Appendix A). The Site consists of the main Solar Site and the Cable Route, connecting to the St Asaph Substation.

The Solar Site is approximately 35.42ha in extent and is divided into two areas approximately 250m apart. The Western Parcel is a set of four fields approximately centred on NGR SJ 02123 72727 and the Eastern Parcel is a set of three fields approximately centred on NGR SJ 02644 72614. The fields consist of modified grassland, of a short to medium sward length used for cattle and sheep grazing. The boundaries of the fields consist of flailed hedgerows, some containing mature trees, and of semi-natural, lowland mixed deciduous woodland.

The Cable Route is limited to highways that connect the Solar Site to St Asaph Substation. This includes the track to Tyn Y Coed, Glascoed Road, and Cwttir Lane.

The wider landscape is generally farmland used for grazing or arable crops, there are also several woodlands, some of which are ancient.

1.3 Details of the Proposed Development

The proposed development consists of a:

"Ground mounted photovoltaic solar farm, together with associated equipment, infrastructure and ancillary works".

The proposed layout and Site boundary changed significantly in 2024, compared to the original, avoiding impacts on ancient woodland to the north of the Solar Site.

Habitats within the Solar Site would be enhanced significantly compared to the baseline (refer to Appendix B: Landscape Strategy Plan).

Proposed enhancements include a total of 1.19ha of new native tree planting, 0.65ha of native scrub planting, improvement to two existing on-Site ponds and the creation of seven new ponds, 2.8km of existing hedgerow is to be reinforced, 173m of new hedgerow is to be created, 5.73ha of existing short-sward grassland to be maintained as long grassland, 1.98ha of existing short sward grassland to be maintained as tussocky grassland and planted with low density tree planting in a field in the Western Parcel with no solar panels,

and a wildflower meadow will be created in and around panels within the two northern fields of the Eastern Parcel with various cutting regimes, for diversity, totalling 9.61ha.

Access for wildlife would be retained throughout the Solar Site with the outside security fencing maintaining a minimum 150mm gap at the base of the fence for its entire length.

1.4 Purpose of this Report

The purpose of this report is to:

- To describe the baseline data collection and assessment methods used;
- To summarise the baseline ecological conditions;
- To identify and describe all potentially significant ecological effects associated with the proposed development;
- To set out the design, mitigation and compensation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- To identify how mitigation and compensation measures will/could be delivered;
- To provide an assessment of the significance of any residual effects in relation to the effects on biodiversity and the legal and policy implications, if relevant; and
- To identify appropriate enhancement measures and how these will/could be delivered.

1.5 Evidence of Technical Competence and Experience

This report has been authored by Emma Clarke, BSc, Senior Ecologist at SLR and Qualifying member of the Chartered institute of Ecology and Environmental Management (CIEEEM), holding Natural England (NE) GCN Level 1 Class Licence (2019-43874-CLS-CLS), NE Bat Level 2 Class Licence (2023-10986-CL18-BAT) and holding a NPTC Level 2 Award Tree Climbing and Rescue (units 206, 306) with 6 years' experience as a professional Ecologist.

This report has been subject to review by SLR Consulting Principal Ecologist, Mr Gary Oliver. Gary is a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM) and is a Chartered Environmentalist (SocEnv), with over 28 years' relevant experience within ecological consultancy. He is a competent ornithologist and botanist, holds a Class 2 survey licence for great crested newt (also a Registered Consultant under the Low Impact GCN Class Licence), as well as a Class 2 survey licence for bats.

Evidence of technical competence and experience of SLR staff undertaking the field surveys and reporting for baseline data collection are provided in the relevant species reports as appended to this report.

1.6 Relevant Legislation and Policy

1.6.1 National Planning Policy

A summary of relevant National Legislation[1] and Policy text is included in Appendix C.

Relevant extracts from local Policy have been provided below:

1.6.2 Denbighshire Local Plan

Denbighshire County Council Adopted Local Development Plan 2006 – 2021[2] is the current local plan for Denbighshire.

Relevant policies from the plan are as follows:

"*Policy VOE 1 – Key Areas of Importance*

> *The following areas will be protected from development that would adversely affect them. Development proposals should maintain and, wherever possible, enhance these areas for their characteristics, local distinctiveness, and value to local communities in Denbighshire:*
>
> *• Statutory designated sites for nature conservation;*
>
> *• Local areas designated or identified because of their natural landscape or biodiversity value;*
>
> *• Sites of built heritage; and*
>
> *• Historic Landscape, Parks and Gardens."*

"Policy VOE 5 – Conservation of Natural Resources.

> *Development proposals that may have an impact on protected species or designated sites of nature conservation will be required to be supported by a biodiversity statement which must have regard to the County biodiversity aspiration for conservation, enhancement and restoration of habitats and species. Where the overall benefits of a development outweigh the conservation interest of a locally protected nature site, mitigation and enhancement measures in or adjacent to these sites should be an integral part of the scheme.*
>
> *If necessary, measures required to mitigate likely adverse effects on the qualifying features of statutory designated sites should be put in place prior to the commencement of development. Measures required to offset any likely adverse effects will be secured by planning conditions and/ or planning obligations. Planning permission will not be granted for development proposals that are likely to cause significant harm to the qualifying features of internationally and nationally designated sites of nature conservation, priority habitats, priority species, regionally important geodiversity sites, or to species that are under threat."*

[1] SLR is not a legal practice, and the summary is provided as a reference only.

[2] Adopted Local Development Plan 2006-2021 accessed on 18th February 2025, at which stage a replacement development plan had not been made publicly available.

2.0 Methodology

2.1 Scope

The baseline ecological data was collated by a combination of desk-based study and field survey consistent with all current standard methodologies and published good practice guidelines unless stated otherwise. The EcIA follows guidelines set out by the Chartered Institute of Ecology and Environmental Management (CIEEM) and references therein[3].

The baseline ecological field surveys encompassed all of the land within the Solar Site boundary shown in Drawing C0002452_02 (Appendix A).

It should be noted that the substation connection cable route (the Cable Route), which follows existing roads to the north of the main Solar Site, and which shall involve works entirely within the road surface itself is referred to in the habitat survey and badger survey only. The Cable Route is not considered further within this EcIA as there will be no impact to habitats or protected or notable species associated with the Cable Route itself, as it is restricted entirely to road surfaces.

The 'Survey Area' was extended (where possible) for certain ecological features/species, as described in Section 2.2.2.

The baseline desk study was extended to 2km from the Solar Site boundary to gather contextual information for the Site, this will be referred to in this report as the 'Search Area'.

Ecological surveys have been based upon the relevant guidance for each species or habitat feature concerned as described below and in the species reports appended.

2.2 Baseline Data Collection

2.2.1 Desk Study

The local environmental record centre for North Wales (Cofnod) was commissioned to conduct a search of statutory and non-statutory designated sites for nature conservation as well as protected, notable, priority, and non-native species records, priority habitats, phase 1 habitat survey data, ancient woodland and ancient tree records for the Solar Site and land within a 2km radius of its boundary. The search was extended to 10km for Sites of Special Scientific Interest (SSSI) and Special Areas of Conservation (SACs) which list bats as a qualifying feature. The data was obtained on 12th February 2025.

The Natural Resources Wales designated sites website[4] was consulted for information pertaining to Special Protection Areas (SPA) and Ramsar sites, within 20km of the Solar Site boundary, Sites of Special Scientific Interest (SSSI) with cited ornithological features and RSPB reserves, within 2km of the Solar Site boundary.

The results of the data search have been summarised in this report. A copy can be provided to statutory consultees if required.

[3] CIEEM (2024) Guidelines for Ecological Impact Assessment in the UK and Ireland. Version 1.3. Available at: EcIA-Guidelines-v1.3-Sept-2024.pdf

[4] Natural Resources Wales / Find protected areas of land and sea

2.2.2 Field Survey(s)

2.2.2.1 UK Habitat Classification Survey

The Solar Site was surveyed to identify the broad habitat types present in accordance with the UK Habitat Classification methodology (UKHab version 2.0)[5].

The UKHab system comprises a principal hierarchy (the Primary Habitats) which involves the identification of broad habitats and Priority habitats, as well as the use of non-hierarchical Secondary codes.

Habitats were classified up to Level 5 of the Primary Hierarchy where possible, and all mandatory secondary codes were used, along with optional secondary codes where relevant.

A Minimum Mapping Unit (MMU) of 25m^2 or 5m length was used for mapping habitat polygons and lines.

Plant species listed in Schedule 9 of the Wildlife and Countryside Act (WCA) 1981 (as amended), such as Japanese knotweed (*Fallopia japonica)*, Himalayan balsam (*Impatiens glandulifera)* and giant hogweed (*Heracleum mantegazzianum)* were searched for.

The habitat survey was extended to include an assessment of the potential of the Solar Site to support legally protected or notable species, and a search for field signs of such species, including, badger (*Meles meles*), bats, breeding birds, reptiles, water vole (*Arvicola amphibius*), otter (*Lutra lutra*) and hazel dormouse (*Muscardinus avellanarius*). Land adjacent to the Cable Route, and within 30 metres of it, where accessible, was also searched for evidence of badger, primarily as badgers can sometimes excavate setts directly beneath road surfaces.

The main UKHab survey was undertaken on 13th and 14th February 2025. A further survey was undertaken on 23rd April 2025 of the woodland, stream and ditch habitats to add to species lists, and a targeted search for bluebells and other valuable ground flora was carried out at hedgerow sections due for removal. Prior to this, several visits involving habitat recording had been undertaken as described above, encompassing some parts of the current Solar Site, and as well as surrounding habitats present within previous iterations of the Site boundary.

Previous botanical surveys were undertaken on:

- 21st January 2022;
- 15th September 2022 (central cable route joining Eastern and Western Parcel);
- 15th December 2023; and
- 11th April 2024 (northeastern areas of the Eastern Parcel)

Notes and photographs from previous surveys have been used alongside the most recent survey to accurately classify habitats within the Solar Site boundary as per Figure 1 – Baseline Habitats (Appendix G: Appendix C).

2.2.2.2 Amphibians including Great Crested Newt

The Site was assessed to gauge its suitability for amphibians including a search for the presence of waterbodies which could be used for breeding by great crested newt (GCN) (*Triturus cristatus*).

[5] UKHab Ltd (2023) UK Habitat Classification System Version 2.0. Available at: https://www.ukhab.org

A suite of surveys was conducted during 2022 and 2024 to establish the presence or likely absence of GCN in ponds within the Site and up to 500m from the Site boundary.

In 2022 the survey approach and extent were scoped and agreed with Senior Species Advisor for Natural Resources Wales (NRW), prior to commencement of survey work, with continued collaboration occurring throughout the process.

In 2022, the survey area encompassed parts of the current Site boundary and other fields which are no longer included within the current application Site; however, all of the information gathered has been presented, for context, and to show the known distribution of GCN ponds in the wider landscape.

A combination of traditional GCN surveys (torching/ bottle trapping) and environmental DNA (eDNA) surveys of the then on-site ponds and ponds within a 500m buffer of the 2022 site boundary were undertaken in 2022. The eDNA surveys were updated in 2024 in case of change.

Further details on methods for these surveys is provided in Appendix D.

2.2.2.3 Birds

Wintering bird surveys were conducted at the Solar Site in 2024 and 2025, a four-hour long survey carried out per month between October 2024 and March 2025 inclusive. Each survey was timed to take place two hours either side of high tide at Rhyl, with the intention of establishing whether or not there is a functional link with the Liverpool Bay SPA and/ or the Dee Estuary SPA or Ramsar Site, and the Site itself. Further details of methods for these surveys are provided in Appendix E.

2.2.2.4 Bats

Habitat Assessment

A UK Habitat Survey (UKHab) was undertaken on 13th and 14th February 2025, during which broad habitat types were recorded.

Habitats within the Solar Site were categorised in accordance with the habitat survey results and information set out in Table 2-1, following Bat Conservation Trust (BCT) (2023) guidelines [6].

Table 2-1 Habitat Suitability for Bats

Suitability	Potential Flight Paths and Foraging Habitats
None	No habitat features on site are likely to be used by any commuting or foraging bats at any time of year (i.e. no habitats that provide continuous lines of shade/protection for flightlines or generate/shelter insect populations available to foraging bats).
Negligible	No obvious habitat features on site are likely to be used as flightpaths or by foraging bats; however, a small element of uncertainty remains in order to account for non-standard bat behaviour.
Low	Habitat that could be used by small numbers of bats as flightpaths such as gappy hedgerows or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.

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

Suitability	Potential Flight Paths and Foraging Habitats
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for flightpaths such as lines of trees and scrub or linked back gardens. Habitat is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland and water.
High	Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flight paths such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broad-leaved woodland, tree lined watercourses and grazed parkland. Site is close to and connected to known roosts.

Roost Assessment

There are no buildings, or other structures present on Site that may be used by roosting bats.

No impacts on trees are predicted as part of the proposals, therefore Ground Level Tree Assessment (GLTA) or further roost surveys for bats have not been undertaken.

2.2.2.5 Badger

Several surveys have been undertaken since 2021 to check for the presence of badger at the Site. The most recent survey of the main Solar Site was undertaken on 14th January 2025 with a further survey on the 23rd April 2025 along the proposed Cable Route and its margins. The Cable Route is entirely restricted to road surfaces between the main Solar Site and the St Asaph Substation, including the track to Tyn Y Coed, Glascoed Road, and Cwttir Lane.

The survey area, and buffer of 30m where accessible, was systematically searched for signs of badgers including setts, foraging signs, dung pits/ latrines, snuffle holes, scratching posts, hairs, prints, day nests and mammal paths. The survey was undertaken in line with standard badger surveying procedures.

Further details on methods for these surveys is provided in Confidential Appendix F. However, it should be noted that this report contains sensitive information on the location of badger setts and therefore this appendix should not be released into the Public Domain unless this information is fully redacted.

2.2.2.6 Water Vole

Suitability of watercourses were assessed, and field signs of water vole were searched for during the extended UK habitat surveys carried out on the Solar Site. On 23rd April 2025, a targeted search for water vole field signs and burrows was undertaken of two ditches within the Site. These ditches will be intersected by access tracks as part of the Proposed Development.

2.2.3 Limitations

2.2.3.1 Desk Study

Desk study data is intended mainly to set a context for the study. It is therefore possible that important habitats or protected species not identified during the data search do in fact occur within the vicinity of the Site. Interpretation of maps and aerial photography has been conducted in good faith, using recent imagery, but it has not been possible to verify the

accuracy of any statements relating to land use and habitat context outside of the field study area.

2.2.3.2 Field Survey(s)

Overall, the survey effort was extensive, and it is considered that the survey methods carried out are sufficient to meet the aims of the survey

All areas of the Site were accessible for the purposes of the UKHab survey. The timing of the survey in February 2025 was outside the main plant growing season and certain species may not have been evident. This could have resulted in ground flora and invasive plant species being under-recorded at woodlands and hedgerow bases and in ditches and streams. The survey of these habitats was therefore updated on 23rd April to account for this. The main habitat recorded within the Site, modified grassland, is unlikely to support any rare or notable species due to intensive grazing and other management practices, therefore no survey limitations are considered to apply.

Appendix D, details limitations encountered during the GCN surveys, relating to access or conditions impacting the ability to implement certain survey techniques or influencing their effectiveness. Overall, the survey effort was extensive, and it is considered that the survey methods carried out are sufficient to undertaken a robust assessment.

No part of the main Solar Site and 30m buffer (Confidential Appendix F: Appendix C) were inaccessible for the badger survey and a full search for signs of badger could be undertaken. Access, however, was not possible at the time of survey to the field sides of part of the grid connection Cable Route (refer to Drawing C0002452_02) associated with the Glascoed Road. The bases of the hedgerows and immediately adjacent land were inspected from the roadside only, and efforts were made to search for badger paths passing beneath hedgerows here. Dependant on the final positioning of the cable route and method of works, access may need to be sought to the fields in order to compete a thorough check for badger setts up to 30m either side of the road.

All other surveys were conducted at optimal times of year for survey and in appropriate weather conditions; therefore, no further limitations were identified.

2.3 Assessment Approach

The ecological evaluation and impact assessment approach used in this report is based on Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland (“CIEEM guidelines”) (CIEEM, 2018).

2.3.1 Important Ecological Features

Ecological features can be important for a variety of reasons and the rationale used to identify them is explained in the text. Importance may relate, for example, to the quality or extent of the site or habitats therein; habitat and/ or species rarity; the extent to which such habitats and/ or species are threatened throughout their range, or to their rate of decline.

2.3.1.1 Determining Importance

The importance of an ecological feature should be considered within a defined geographical context. The following frame of reference has been used in this case, relying on known/ published accounts of distribution and rarity where available, and professional experience:

- International;
- National (i.e. UK);
- Regional (i.e. North Wales);

- County (i.e. Denbighshire); and
- Local (i.e. within circa 5km).

The above frame of reference is applied to the ecological features identified during the desk study and surveys to inform this report.

The value of habitats has been measured against published selection criteria where available. Examples of relevant criteria include: descriptions of habitats listed on Annex 1 of the Habitats Directive, and descriptions of habitats of principle importance for biodiversity under Section 7 of the Environment (Wales) Act 2016.

It is worth noting here that the Local Biodiversity Action Plan (LBAP) was sought for Denbighshire but appears to no longer be available online, or elsewhere, having been archived in 2017.

In assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Reference has therefore been made to published lists and criteria where available. Examples of relevant lists and criteria include: species of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive or Annex 1 of the Birds Directive), and species of principal importance for biodiversity under Section 7 of the Environment (Wales) Act 2016 and Birds of Conservation Concern[7].

For the purposes of this report ecological features of local importance or greater and/or subject to legal protection have been subject to detailed assessment. Effects on other ecological features are considered unlikely to be significant in legal or policy terms.

2.3.2 Impact Assessment

The impact assessment process involves the following steps:

- identifying and characterising potential impacts;
- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects (if required); and
- identifying opportunities for ecological enhancement.

When describing impacts, reference has been made to the following characteristics, as appropriate:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

[7] Eaton, M.A., Aebischer, N.J., Brown, A., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A., & Gregory, R.D. (2015). Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds, 108: 708-746.

The impact assessment process considers both direct and indirect impacts: direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or feature, e.g. the creation of roads which cause hydrological changes, which, in the absence of mitigation, could lead to the drying out of wet grassland.

Consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area; and
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

2.3.3 Significant Effects

The concept of ecological significance is addressed in paragraphs 5.24 through to 5.28 of CIEEM guidelines. Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of EcIA, a ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local and the scale of significance of an effect may or may not be the same as the geographic context in which the feature is considered important.

2.3.4 Avoidance, Mitigation, Compensation and Enhancement

When seeking mitigation or compensation solutions, efforts should be consistent with the geographical scale at which an effect is significant. For example, mitigation and compensation for effects on a species population that is significant at a county scale should ensure no net loss of the population at a county scale. The relative geographical scale at which the effect is significant will have a bearing on the required outcome which must be achieved.

Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM Guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of impacts where possible, the application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement.

It is important for the EcIA to clearly differentiate between avoidance mitigation, compensation and enhancement and these terms are defined here as follows:

- Avoidance is used where an impact has been avoided, e.g. through changes in scheme design;
- Mitigation is used to refer to measures to reduce or remedy a specific negative impact *in situ;*
- Compensation describes measures taken to offset residual effects, i.e. where mitigation *in situ* is not possible; and

- Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

3.0 Baseline Ecological Conditions

3.1 Statutory Designated Sites

The Site itself is not designated as a statutory ecological site, however, there are two sites within 2km of the Solar Site boundary whose boundaries are coincident; Coedydd ac Ogofau Elwy a Meirchion Site of Special Scientific Interest (SSSI) and Coedwigoedd Dyffryn Elwy / Elwy Valley Woods Special Area of Conservation (SAC) , which are situated 865m to the south-west of the Site at their nearest points.

The SAC is designated for its Annex 1 habitat 'Tilio-Acerion forests on slopes, screes and ravines'. No Annex II species are listed as a primary reason for site selection, or as a qualifying feature, though lesser horseshoe bat (*Rhinolophus hipposideros*) is reported to occur.

Further details are provided in Table 3-1.

Additionally, there is one Special Protection Area (SPA) within 10km of the Site boundary, namely the Liverpool Bay / Bae Lerpwl (Wales) SPA, and three SSSIs which list bats as a qualifying feature. The Dee Estuary SPA and Ramsar Site is within 15km of the Site boundary. Further details on these statutory designated sites are provided in Table 3-1.

Table 3-1 Statutory Designated Site Descriptions

Distance from Site	Site and Designation	Description	Reason for Scoping In/ Out
*c.*865m southwest of Site	Coedwigoedd Dyffryn Elwy / Elwy Valley Woods (82.7 ha) SAC Coedydd ac Ogofau Elwy a Meirchion (83.01) SSSI (bats)	"*One of three sites selected to represent Tilio-Acerion forest across its geographic range on the Carboniferous limestone of north Wales, and is an example of the habitat with an outstanding lower-plant flora. The canopy is quite varied: ash (Fraxinus excelsior) is the commonest tree, but there is also occasional small-leaved lime and wild service-tree. There is a rich, calcicolous understorey and ground flora, and rare bryophytes include Bryum anariense, Cololejeunea rossettiana, Plagiochila britannica, Platydictya confervoides and Isothecium striatulum. The woods have developed along steep valley-sides and ravines that are also important for their cave systems and Pleistocene fossil mammal assemblages*."[8] *"The site is of special interest for its semi-natural broadleaved woodland, its rare flowering plant assemblage, its scarce bryophyte assemblage and the geological and palaeontological interest*	The SAC and SSSI are more than 500m from the proposed development and are not hydrologically linked. The SAC is not designated for its bat population. As such, no impact on the SAC, or its qualifying features, is predicted, and it is not taken forward for detailed assessment. The SSSI citation notes the caves to support various species of bat, although the Sites are within the Core Sustenance Zones (CSZ)[10] for all species mentioned, the proposed development retains commuting routes ie. woodlands

[8] Coedwigoedd Dyffryn Elwy/ Elwy Valley Woods - Special Areas of Conservation

[10] Bat-Species-Core-Sustenance-Zones-and-Habitats-for-Biodiversity-Net-Gain.pdf

Distance from Site	Site and Designation	Description	Reason for Scoping In/ Out
		of Galltfaenan, Cefn and Pontnewydd Caves… *The well-wooded and sheltered watercourses afford lying-up sites for otter Lutra lutra…* *Natterer's Myotis nattereri, brown long-eared Plecotus auritus, pipistrelle Pipistrellus pipistrellus and lesser horseshoe bats are recorded in the caves."*[9]	and has an overall gain in hedgerow, scrub, and pond habitats, which will improve the overall foraging and commuting resource for bats. The Coedydd ac Ogofau Elwy a Meirchion SSSI is therefore not predicted to be directly or indirectly impacted by the scheme, and therefore it is not considered further in this report.
c.5.7km east of Site	Ffynnon Beuno and Cae Gwyn Caves SSSI (bats)	"*The site comprises two small caves which shelter a winter roost (hibernaculum) of lesser horseshoe bat. This is the third largest winter roost for this species in Clwyd, with annual counts exceeding 50 bats. Two other species of bat have also used these caves, Natterer's bat and brown long-eared bat*."[11]	The SSSI is outside of a 5km radius of the proposed development and is not hydrologically linked. No direct impacts are predicted. CSZs for the species of bat cited are less than the distance to the proposed development. No indirect impacts are therefore predicted, and the SSSI is not considered further in this report.
c.7.5km northeast of Site	Graig Fawr SSSI (bats)	"*Graig Fawr is of special interest for its range of limestone (calcicolous) grassland communities as well as its populations of vascular plants and lepidoptera…* *There is a hibernaculum supporting a small number of lesser horseshoe bats."*[12]	The SSSI is outside of a 7km radius of the proposed development and is not hydrologically linked. No direct impacts are predicted. The CSZ for lesser horseshoe bats is 2km (less than the distance to the proposed development). No indirect impacts are therefore predicted, the SSSI is not considered further in this report.

[9] SSSI NOTIFICATION/RENOTIFICATION CITATIONS - FORMAT

[11] NJOFFYNNONETC. [PERM]

[12] CYNGOR CEFN GWLAD CYMRU

Distance from Site	Site and Designation	Description	Reason for Scoping In/ Out
*c.*8.4km north of Site	Liverpool Bay / Bae Lerpwl (Wales) SPA	*Designated for its assemblages of common scoter Melanitta nigra, common tern Sterna hirundo, little gull Hydrocoloeus minutus, little tern, Sterna albifrons, red-throated diver Gavia stellata), red-breasted merganser Mergus serrator and great cormorant Phalacrocorax carbo.*[13]	Wintering bird surveys were undertaken in 2024 and 2025. No functional link was found between the proposed Site and the SPA, and no impacts are therefore predicted. The SPA is not considered further in this report.
c.9km northwest of Site	Coed y Gopa SSSI (bats)	*"This site is notified for its species interest, a winter roost of lesser horseshoe bat.* *The many natural cave and underground mine workings provide ample opportunities for bat roosting areas.* *The site shelters Clwyd's second largest hibernaculum of lesser horseshoe bat. Annual counts are well in excess of 50 bats with a maximum of 130 recorded in December 1993. Two other species of bat are also present in small numbers, Natterer's bat and Daubentons bat.."*[14]	The SSSI is outside of an 8km radius of the proposed development and is not hydrologically linked. No direct impacts are predicted. CSZs for the species of bat cited are less than the distance to the proposed development. No indirect impacts are therefore predicted, and the SSSI is not considered further in this report.
c.14.42km northeast of Site	The Dee Estuary SPA and Ramsar Site	*Designated for its assemblages of wintering bar-tailed godwit Limosa lapponica, shelduck Tadorna tadorna, teal Anas crecca, pintail Anas acuta, oystercatcher Haematopus ostralegus, grey plover Pluvialis squatarola, knot Calidris canutus, dunlin Calidris alpina, black-tailed godwit Limosa limosa, curlew Numenius arquata, redshank Tringa tetanus, and great crested grebe Podiceps cristatus.*[15]	Wintering bird surveys were undertaken in 2024 and 2025. No functional link was found between the proposed Site and the SPA/Ramsar site, and no impacts are therefore predicted. The SPA and Ramsar site are therefore not considered further in this report.

As summarised in Table 3-1, no direct or indirect impacts are predicted on any of the statutory designed sites in relation to the proposed development, there they have therefore not been considered further in this report.

[13] v2 Liv Bay SPA draft RES entry

[14] SSSI NOTIFICATION/RENOTIFICATION CITATIONS - FORMAT

[15] European Site Conservation Objectives for Dee Estuary SPA - UK9013011

3.2 Non-Statutory Designated Sites

There are several non-statutory sites within 2km of the Solar Site boundary, as detailed in Table 3-2, and illustrated in Appendix G: Appendix D.

Table 3-2 Non-Statutory Designated Sites within 2km of Site.

Distance from Solar Site	Site Name	Description
Partly adjacent to the east of the Eastern Area of the Site.	Ty'n-y-Coed Rough (2 areas) Wildlife Sites for Denbighshire	Flat, lowland broadleaved woodland
Partly adjacent to the south of the Eastern Area of the Site	Glascoed (2 areas) Wildlife Sites for Denbighshire	Lowland, ancient broadleaved woodland
123m northwest of the of the Site	Coed Cord / Coed y Saeson Wildlife Sites for Denbighshire	Flat, low lying, ancient woodland including Alder, Ash, Oak and Birch communities. Hazel forms an extensive herb layer with Hawthorn and Ash and Elm saplings. The herb-layer is varied with Dog's Mercury, Sanicle, Giant Fescue, False Brome and Early Dog-violet.
322m northeast of the of the Site	Coed Fron and Eryl Hall Wood Wildlife Sites for Denbighshire	Ancient woodland with Alder, Ash, Oak and Birch communities.
416m northwest of the Site	Gwynt-y-Mor Wild Ground Nature Reserve	Not given
431m west of the Site	Bryn Meiriadog Wildlife Sites for Denbighshire	Ancient woodland including Alder, Ash and Oak communities, Blackthorn and Hazel scrub and calcareous grassland . The latter occurs on rocky outcrops within the wood. Ancient woodland flora includes Black Bryony, Bluebell, Wild Strawberry, Wood Avens, Common Cow-wheat and Wood Melick. The limestone grassland flora in rocky areas includes Sheep's Fescue, Meadow Oat-grass, Musk Thistle, Common Rock-rose, Common Stork's-bill and Wild Thyme. On deeper soils it is quite rank but species rich with Sweet Vernal-grass, False Oat-grass, Meadow Oat-grass, Creeping Thistle, Pignut, Bird's-foot-trefoil, Salad Burnet, Goat's-beard and the uncommon Dropwort.

Distance from Solar Site	Site Name	Description
		This area is part of Cefn Estate, which supports a large population of Fallow Deer.
631m south of the Site	Coed Kendrick Wildlife Sites for Denbighshire	Ancient broadleaved woodland on a gentle, south facing slope.
737m southwest of the Site	Coed yr Accar (2 areas) Wildlife Sites for Denbighshire	Ancient broadleaved woodland.
1,028m southeast of the Site	Chapel Wood/Coed Mawr Wildlife Sites for Denbighshire	South facing ancient broadleaved woodland
1,267m northwest of the Site	Glascoed Wild Ground Nature Reserve	A mosaic of 14 ponds, improved grasslands, ditch and 2 planted woodland compartments, some mature trees in pre-existing hedgerows, especially along the northern boundary.
1,329m southeast of the Site	Rickfield Wood/Coed Ddol Fawr/Coed Llanddol/Maes Elwy Covert (R Elwy Woods) Wildlife Sites for Denbighshire	Ancient broadleaved and replanted woodland along the Elwy Valley
1,556m southwest of the Site	Coed Bont Newydd Wildlife Sites for Conwy	Broadleaved woodland.
1,614m southwest of the Site	Coed Nant-y-graig Wildlife Sites for Conwy	Broadleaved woodland.
1,649m west of the Site	Coed y Ddol/Coed y Fadir Wildlife Sites for Denbighshire	A south facing lowland ancient woodland on the valley side of the River Elwy. Wet, Alder woodland occurs on lower slopes, Ash woodland where it is drier, and Silver Birch woodland where soils are more acid.
1,653m southwest of the Site	Pwllau Graig Wildlife Sites for Conwy	Standing water.
1,774m northeast of the Site	Mount Road Churchyard, St Asaph Wildlife Sites for Denbighshire	This cemetery has neutral grassland, which has been left uncut during the summer. Species include Cock's-foot, Common Knapweed, Pepper Saxifrage and Stinking Iris. Trees around the site include Ash, Oak, Yew and Wild Cherry. Various butterflies occur such as Orange Tip, Meadow Brown, Small Tortoiseshell and Peacock and a large population of Slow worm has been recorded.
1,916m south of the Site	Coed Pont y Trap Wildlife Sites for Conwy	Broadleaved woodland.
1,973m southwest of the Site	Pwllau Coed y Dafarn Wildlife Sites for Conwy	Standing water.

Distance from Solar Site	Site Name	Description
1,976m south of the Site	Nany Meirchion field Wildlife Sites for Denbighshire	Species rich neutral grassland on a valley side. Species include Crested Dog's-tail, Yorkshire-fog, Common Bent, Common Knapweed, Cat's-ear, Primrose, Common Century, Bird's-foot-trefoil and Early-purple Orchid. Wetter parts have Greater Bird's-foot-trefoil, Meadowsweet and Creeping Buttercup.

Two of the Local Wildlife Sites (LWS) in Table 3-2, namely, Ty'n-y-Coed Rough and Glascoed Wildlife Sites for Denbighshire, lie immediately adjacent to Site, and as such they will be considered further in this assessment.

Considering the nature of the proposed development and distances of the other LWSs from the Site, it is considered highly unlikely that any negative impacts would occur, and therefore all other non-statutory sites have been omitted from further assessment.

3.2.1 Ancient Woodland

Areas of ancient woodland occur within 2km of the Solar Site, including two adjacent to the boundary, namely:

- Pig-y-fran (Plantation on Ancient Woodland Site) – is adjacent to the mid-section of the Eastern Parcel, on its western side; and
- Tyn-y-coed Rough (Restored Ancient Woodland Site) – is adjacent to the Eastern Parcel, for a section on its northeastern side.

The location, and extent, of these woodlands is illustrated in Appendix G: Appendix D.

As previously mentioned, the updated site layout specifically excludes four small fields to the north which were surrounded by ancient woodlands (Coed Esgob, Coed yr Esgob and ancient woodland connected to Tyn-y-ffordd Gorse); these now lie approximately 70-90m to the north of the Eastern Parcel's boundary at their closest point.

The two Ancient Woodland Sites (AWS) adjacent to the Site will be taken forward in this assessment. The other areas of ancient woodland are sufficiently distant not to be impacted, and these have therefore been excluded from further assessment.

3.2.2 Priority Habitats (Section 7 Environment (Wales) Act)

The Section 7 list is used to guide authorities in implementing their duty to have regard to maintaining and enhancing of biodiversity.

The data received by Cofnod found no priority habitats recorded within the Site itself. The closest priority habitats to the Site are two small i.e. less than 0.1ha each, traditional orchards, lying between the Eastern and Western Parcels, approximately 135m distant from Site at their closest point Several other small traditional orchards occur within the 2km search area, further away from Site. Approximately 430m to the south of Solar Site, is a larger area of wood pasture and parkland (420ha), also containing two small areas of lowland calcareous grassland. Further wood pasture and parkland is present at Bodelwyddan Park approximately 1.75km to the northwest of Site. To the southeast limestone pavements occur approximately 641m away from the Site boundary. Areas to the

east and south of Site, associated with the River Elwy /Afon Elwy are recorded as coastal floodplain and grazing marsh.

Due to the nature of the proposed development and distance of these sites from the development, it is thought very unlikely that any negative impacts will occur and these areas will therefore not be taken forward in this assessment.

The UK Habitat Classification survey, however, did record priority habitats within the Solar Site, as listed under Section 7 of the Environment (Wales) Act 2016[16], namely:

- Native Hedgerow;
- Other Lowland Mixed Woodland;
- Other Standing Water – Ponds; and
- Other Rivers and Streams

These priority habitats are considered to be of local importance and have therefore been subject to further assessment.

3.3 Habitats

A plan showing the habitats present within the Solar Site is provided as Figure 1 – Baseline Habitats (Appendix G: Appendix C). Full details of the habitats recorded on Site is provided in Appendix G.

A summary of the habitats within the Solar Site is provided below:

- Other Lowland Mixed Deciduous Woodland (w1f7) - Separating two of the northerly fields in the Western Parcel, over a silty, shallow stream, is a narrow area of lowland mixed deciduous woodland. The Eastern Parcel is also bordered on its west boundary by narrow mixed deciduous woodland over a small brook or stream. 'Lowland Mixed Deciduous Woodland' is a priority habitat as listed on Section 7 of the Environment (Wales) Act, the 'Other Lowland Deciduous Mixed Woodland' habitats recorded on Site are an example of this priority habitat and this habitat has therefore been taken forward in this assessment.
- Other Rivers and Streams (r2b) – There is a brook bordering the Eastern Parcel which was found to be shallow with gradually sloping earth banks with a silty base, the stream is heavily shaded and little vegetation is present. Similarly, the Western Parcel contains a boundary stream, which was sinuous, suggesting flow at times but was found to be standing water at the time of the survey. The stream continues beyond the boundary of the woodland, south, and runs alongside the hedgerow here becoming a ditch. The streams within the Site fit the broad habitat description for 'Rivers and Streams' as listed on Section 7 of the Environment (Wales) Act and are therefore Priority Habitats. They are taken forward in this assessment.
- Other Standing Water (r1g) - Ponds (priority habitat) (secondary code 40) - There are six ponds present within the Solar Site boundary. Generally, the ponds are shallow and utilised by cattle with poached banks. During surveys undertaken by SLR from 2022 onwards, three of the six ponds were found to support GCN, there is a known population in the area, the ponds therefore qualify as Priority Habitat and will be taken forward in this assessment.
- Modified Grassland (g4) – All fields making up the Solar Site comprise modified grassland with low species diversity, used as pasture. This is a common and

[16] masterss7habitatslistmay 2016.pdf

widespread habitat, which is not a priority habitat, and is of less than local importance, it is therefore not taken forward in this assessment.

- Mature Trees (secondary code 203) – Five individual mature oak trees occur within the modified grassland habitats within the Solar Site. Mature oak trees, especially when close to connecting features such as hedgerow, can be an important foraging resource for bats, provide nesting opportunities for breeding birds and support invertebrates. All individual trees are to be retained as part of the proposed development, they are therefore not taken forward in this assessment.
- Other Neutral Grassland (g3c) – The Solar Site boundary includes a narrow area which provides a cable route between the Western and Eastern Parcels, this includes the edges of several horse grazed fields of slightly more species diverse neutral grassland than found over much of the Solar Site. This however is a common and widespread habitat, which is not a priority habitat, and is of less than local importance. Therefore, it has been excluded from further assessment.
- Native Hedgerow (h2a) - The fields in both the Western and Eastern Parcels are bordered by native hedgerows, managed by flailing. Many of the hedgerows contain mature oak standards, and rarely ash. Most were intact along their length, but some contained gaps of up to 12m. Native hedgerows are a priority habitat and have therefore been included for further assessment.
- Ditches (secondary code 50) - Some of the hedgerows were associated with ditches. Ditches on Site were generally in a poor condition, holding small amounts of water. They are a common and widespread habitat, which is not a priority habitat, however species were recorded during habitat survey, including grey sedge (*Carex divulsa*) and watercress (*Rorippa nasturtium-aquaticum*), which are included on local rare plant registers or occurring on the Wales Red List, they are considered of local importance as integral part of the feature concerned (for example, as part of the ditch they occur within). Therefore, ditches have been brought forward in this assessment alongside hedgerows.
- Line of trees (w1, 33) - A line of native mature trees is present to the southern boundary of the Eastern Parcel. Next to it is a dry ditch on the opposing side to the Site boundary. Line of trees whilst not listed as a priority habitat are of value to commuting and foraging bats, to birds and other protected species. The line of trees will be retained as part of the proposed development and is therefore not therefore considered further in this report.
- Urban - Other Developed Land (u1b6) 839 track, or 800 road - A concrete farm track forms the northern boundary of the Western Parcel and the substation Cable Route to the north of the Solar Site follows roads for its entire length. This urban habitat type is not of ecological value and is therefore not taken forward in this assessment.
- Urban - Artificial Unvegetated – Unsealed Surface (u1c) 839 track - A further gravel/hardcore track is found to the north of the Eastern Parcel. This urban habitat type is not of ecological value and is therefore not taken forward in this assessment.
- Built Linear Features (u1e) 612 fence - Boundary fences are found across the Solar Site, associated with hedgerows or lines of trees. To the northern boundary of the most north eastly field of the Eastern Parcel, a wire fence forms the boundary between the field and farm track. This urban habitat type is of insignificant ecological value and is therefore not taken forward in this assessment.



3.4 Species

3.4.1 Plants

Cofnod returned records of numerous notable plant species occurring within 2km of the Solar Site, although, none of these relate to land within the Solar Site boundary (Table 3-3).

In addition to those listed in Table 3-3, further records of plant species of local importance[17] were provided, as detailed within (Appendix G: Appendix E).

Table 3-3 Notable Plant Species Recorded within 2km of the Solar Site.

Scientific Name	English Name	Most Recent Record	Nearest record to Solar Site (m)	Status*
Silene vulgaris	Bladder Campion	2016	300	Wales Red List - Near Threatened
Juniperus communis subsp. communis	Common Juniper	1970	394	UK BAP, Section 7
Pinus sylvestris	Scots Pine	2024	406	Red Data Book - Nationally Scarce, Rare Plant Register Denbighshire - Locally Rare
Carex pseudocyperus	Cyperus Sedge	2016	431	Wales Red List - Near Threatened, Rare Plant Register Denbighshire - Locally Rare
Hypericum montanum	Pale St John's-wort	2017	844	Red List - Near Threatened
Anacamptis morio	Green-winged Orchid	2021	884	Red List - Near Threatened, CITES-B, Rare Plant Register Denbighshire - Locally Rare
Ctenidium molluscum	Chalk Comb-moss	2009	949	Wales Red List - Data Deficient
Verbascum nigrum	Dark Mullein	2023	954	Wales Red List - Near Threatened
Hyacinthoides non-scripta	Bluebell	2021	978	WCA 8
Sagittaria sagittifolia	Arrowhead	1999	996	Wales Red List - Vulnerable
Veronica spicata	Spiked Speedwell	2011	1,030	WCA 8
Euphorbia lathyris	Caper Spurge	2024	1,030	CITES-B, Rare Plant Register Denbighshire - Locally Scarce
Scabiosa columbaria	Small Scabious	2021	1,030	Wales Red List - Vulnerable
Helleborus foetidus	Stinking Hellebore	2011	1,030	Red Data Book - Nationally Scarce

[17] As defined within the Denbighshire (VC50) Country Rare Plants Register

Scientific Name	English Name	Most Recent Record	Nearest record to Solar Site (m)	Status*
Sesleria caerulea	Blue Moor-grass	1982	1,145	Red Data Book - Nationally Scarce, Wales Red List - Regionally Extinct
Buxus sempervirens	Box	1985	1,383	Red Data Book - Nationally Rare, Rare Plant Register Denbighshire - Locally Rare
Ophrys apifera	Bee Orchid	2024	1,384	CITES-B
Veronica spicata subsp. hybrida	Western Spiked Speedwell	1999	1,444	WCA 8, Rare Plant Register Denbighshire - Locally Rare
Butomus umbellatus	Flowering-rush	2012	1,449	Wales Red List - Vulnerable
Physcia tenella		1972	1,556	Wales Red List - Data Deficient
Xanthoria ucrainica		1972	1,556	Red Data Book - Near Threatened, Rare Plant Register Denbighshire - Locally Scarce
Ruscus aculeatus	Butcher's-broom	1926	1,556	HDir 5, Wales Red List - Vulnerable, Rare Plant Register Denbighshire - Locally Rare
Mentha arvensis	Corn Mint	2024	1,556	Wales Red List - Vulnerable, Rare Plant Register Denbighshire - Locally Near Scarce
Centaurea cyanus	Cornflower	1850	1,556	UK BAP, Section 7, Wales Red List - Critically Endangered
Potentilla tabernaemontani	Spring Cinquefoil	1999	1,604	Red Data Book - Nationally Scarce
Entosthodon pulchellus	Pretty Cord-moss	2005	1,637	UK BAP, Red Data Book - Near Threatened, Rare Plant Register Denbighshire - Locally Near Scarce
Euphorbia amygdaloides	Wood Spurge	2000	1,641	CITES-B, Rare Plant Register Denbighshire - Locally Scarce
Hippuris vulgaris	Mare's-tail	1978	1,699	Wales Red List - Near Threatened
Vicia bithynica	Bithynian Vetch	2020	1,835	Red Data Book - Nationally Scarce, IUCN Red List - Vulnerable, Wales Red List - Endangered, Rare Plant Register Denbighshire - Locally Rare
Spergula arvensis	Corn Spurrey	2011	2,296	Red List - Vulnerable, Wales Red List - Near Threatened, Rare Plant Register Denbighshire - Locally Near Scarce

*HDir5 - Habitats Directive, Annex V - Species where population management is decided by individual countries, UK BAP - UK Biodiversity Action Plan Priority Species, CITES-B - Convention on International Trade in Endangered Species, Annex B - Species that may become extinct unless trade is closely controlled, Red Data Book - Red Data Book listing (not based on IUCN guidelines), Red List - IUCN Red List of Threatened Species, WCA 8 - Wildlife & Countryside Act 1981 Schedule 8 - Plants which are protected, Wales Red List - Red Data List for Wales

The majority of the Solar Site supports modified grassland; protected or notable plant species are not usually associated with this habitat type, due to its management regime.

Bluebells were noted to occur occasionally within the understorey of hedgerows, especially where they adjoin ancient woodland. The survey in April 2025 found no bluebells within areas of hedgerow to be affected by the scheme. Bluebells are protected under the Wildlife and Countryside Act 1981, Schedule 8 (Section 2) and are protected from uprooting or picking for the purpose of sale only. Grey sedge (*Carex divulsa)*, watercress (*Rorippa nasturtium-aquaticum*) and bitter vetch (*Lathyrus linifolius*) were also returned by the data search as occurring on local rare plant registers.

All notable species found within the Site are associated with Priority Habitat types, i.e. woodland, hedgerow, streams and in the case of ditches, these are all associated with an adjoining hedgerow. All of these habitat types are taken forward in this assessment and protected or notable species will be considered alongside the wider habitat type.

Invasive Non-Native Species (INNS)

There were 52 records returned of invasive non-native plant species returned by the data search listed as such under Schedule 9 of the WCA 1981:

- 36 records of Himalayan balsam (*Impatiens glandulifera)* also an Invasive Alien Species (IAS), with the nearest being 754m from the Solar Site;
- Three records of montbretia (*Crocosmia pottsii x aurea = C. x crocosmiiflora)* with the nearest being 1278m from the Solar Site;
- Two records of wall cotoneaster (*Cotoneaster horizontalis*) with the nearest being 1030m from the Solar Site;
- Two records of American skunk cabbage (*Lysichiton americanus*) also an IAS with the nearest being 1027m from the Solar Site;
- One record of few flowered garlic (*Allium paradoxum*) with the nearest being 2000m from the Solar Site;
- One record of giant hogweed (*Heracleum mantegazzianum*) also an IAS, with the nearest being 1906m from the Solar Site;
- One record of Himalayan cotoneaster *(Cotoneaster simonsii)* with the nearest being 1676m from the Solar Site;
- One record of Himalayan honeysuckle (*Leycesteria formosa)* with the nearest being 1556m from the Solar Site;
- One record of Japanese knotweed (*Fallopia japonica*) with the nearest being 1152m from the Solar Site;
- One record of Japanese rose (*Rosa rugosa*) with the nearest being 1152m from the Solar Site;
- One record of New Zealand Pygmy weed (*Crassula helmsii)* with the nearest being 1270m from the Site;
- One record of small leaved cotoneaster (*Cotoneaster microphyllus*) with the nearest being 1030m from the Solar Site; and
- One record of Variegated Yellow Archangel (*Lamiastrum galeobdolon subsp. argentatum)* with the nearest being 1944m from the Solar Site.

Given that these records do not relate to the Site itself, and that no non-native invasive species were recorded within the Site during surveys, they have been scoped out of further assessment.

3.4.2 Invertebrates

Cofnod returned 46 records of invertebrates these pertained to:

- 11 records of common darter dragonfly (*Sympetrum striolatum)* from 2005-2023, with the nearest being 893m from the Solar Site;
- Five records of wall butterfly (*Lasiommata megera)* from 1987-2014, with the nearest being 582m from the Solar Site;
- Four records of small heath butterfly (*Coenonympha pamphilus)* BAP species, from 1987-2019 with the nearest being 582m from the Solar Site;
- Three records of white letter hair-streak butterfly *(Satyrium w-album)* BAP species, between 1988-2018 with the nearest being 582m from the Solar Site;
- Three records of dingy skipper butterfly (*Erynnis tages)* BAP species between 2021-2022, with the nearest being 1194m from the Solar Site;
- Two records of alder beetle (*Agelastica alni)* between 2020-2021 with the nearest being 1260m from the Solar Site;
- One record of small pearl broad fritillary (*Boloria selene)* BAP species in 1988, 582m from the Solar Site;
- One record of dusky thorn moth (*Ennomos fuscantaria)* in 2022, with the nearest being 1773 from the Solar Site;
- One record of grayling butterfly (*Hipparchia Semele)* BAP species, in 1987, with the nearest being 582m from the Solar Site;
- One record of shaded broad-bar moth (*Scotopteryx chenopodiata*) in 2022, with the nearest being 1530m from the Solar Site;
- One record of brooklime gall weevil (*Gymnetron veronicae)* in 1899, 1641m away from the Solar Site;
- One record of buff ermine (*Spilosoma lutea*) BAP species in 2022, 1773m away from Solar Site;
- One record of centre-barred sallow moth (*Atethmia centrago)* BAP species, in 2023, 1773m from the Solar Site; and
- One record of cinnabar moth (*Tyria jacobaeae)* BAP species in 2020, 1399m from the Solar Site.

The habitats within the Site are unlikely to support a locally significant population for invertebrate species, due to predominantly comprising habitats that are commonly occurring and species poor, ostensibly the areas of modified grassland.

Given this, and fact that none of the above records relate to the Site itself, invertebrates have not been considered further in this assessment.

3.4.3 Fish

Cofnod returned 11 records of bony fish these pertained to:

- Four records of Atlantic salmon (*Salmo salar*), BAP species, between 1997-2009 with the nearest being 1357m from the Solar Site;
- Four records of brown/sea trout (*Salmo trutta*) BAP species, IUCN Red List of Threatened Species – Critically endangered and Natural Environment and Rural Communities Act 2006 (Section 41) between 1985-2009 with the nearest being 1343m from the Solar Site; and
- Three record of eel (*Anguilla Anguilla*), BAP species, IUCN Red List of Threatened Species – Critically endangered and Natural Environment and Rural Communities Act 2006 (Section 41), between 1997-2003 with the nearest being 1419m from the Solar Site.

Freshwater habitats within the Site are unlikely to support any notable fish species, they have therefore not been taken forward further in this assessment.

3.4.4 Amphibians including Great Crested Newt

Cofnod returned 157 records of great crested newt (GCN) (*Triturus cristatus*) with three records being within 100m of the current Solar Site boundary, these included two records associated with Pond 24, located just outside the Eastern Parcel, and one record 65m outside of the Western Parcel (Pond 19). All the records date from between 2003-2020. There were another five GCN records provided for ponds located within 500m of the Solar Site.

Additionally, Cofnod returned the following records of other amphibians within 2km of the Solar Site boundary:

- 95 records of smooth newt (*Lissotriton vulgaris*), between 1993-2024, with the nearest being 313m northwest from the Solar Site;
- 61 records of common toad (*Bufo bufo*), between 1993-2020, with the nearest being 434m northwest from the Solar Site;
- 44 records of palmate newt (*Lissotriton helveticus*), between 2002-2024, with the nearest being 422m north from the Solar Site; and
- 44 records of common frog (*Rana temporaria)*, between 1968-2024, with the nearest being 11m northeast from the Solar Site.

Surveys for GCN were carried out in 2022 and 2024. The results of these surveys are provided in Appendix D.

Of the six ponds within the current Site boundary, three were found to be completely dry in 2024, two have tested positive for GCN eDNA previously, and one was found to have GCN presence using traditional survey. Five further ponds in the 250m buffer zone have tested positive for GCN eDNA and six ponds were found to support GCN during traditional surveys, with peak counts of between 1 and 4 individuals. Within the 250-500m buffer seven further ponds have tested positive for GCN eDNA.

At individual ponds the population of GCN in considered to be 'small' as per the mitigation guidelines[18] i.e. less than 10 individual GCN recorded on one survey. The highest peak count for the whole survey area (all ponds within Site and 250m buffer) was 11 GCN recorded on the 19th- 20th April 2022, indicating a 'medium' population, i.e. between 11-100, albeit at the lower end of this scale.

The surveys undertaken by SLR also confirmed the presence of smooth newt, common frog and common toad within the survey area. Based on the data search results, palmate newt may also be present but was not recorded.

Native amphibians, including GCN are therefore taken forward for further assessment.

3.4.5 Reptiles

Cofnod returned 33 records of reptiles within 2km of the Solar Site, pertaining to:

- 17 records of slow worm *(Anguis fragilis), between* 1999-2022, with the nearest being 582m southwest of the Site;
- Nine records of grass snake (*Natrix Helvetica)*, between 1968-2022, with the nearest being 965m northeast of the Site;
- Six records of common lizard (*Zootoca vivipara)* between 1903-2021 with the nearest being 1556m northeast of Site; and

[18] Great crested newt mitigation guidelines

- One record of adder *(Vipera berus),* in 1907, 1556m northeast of the Site.

The dominant habitat within the core of the Solar Site, namely short sward modified grassland, lacking in well-structured field margins, is generally unsuitable for reptiles, and this group is considered unlikely to occur.

Therefore, this species group has been scoped out of further assessment.

3.4.6 Birds

Cofnod returned 551 records of birds within 2km of the Solar Site boundary, including 47 'notable species' that occur in the UK between the months of September and March inclusive ('notable' here referring to those species that have any of the following conservation status'- Annex 1 of the Birds Directive, WCA 1981 Schedule 1, NERC Section 41, Birds of Conservation Concern (BoCC) Red List or BoCC Amber List).

These are summarised in Table 3-4.

Table 3-4 Bird Species within 2km of the Solar Site

Bird Species	No. of Records	Closest to Site (m)	Lists
Rook (*Corvus frugilegus)*	22	1	BoCC Amber list
Swift (*Apus apus)*	24	26	BoCC Red list
Mallard (*Anas platyrhynchos)*	13	169	BoCC Amber list
Mistle thrush (*Turdus viscivorus)*	17	169	BoCC Red list
Redstart (*Phoenicurus phoenicurus)*	5	169	BoCC Amber list
Song thrush *(Turdus philomelus)*	15	169	Section 41, BoCC Amber list
Tawny owl (*Strix aluco)*	7	169	BoCC Amber list
Black headed gull (*Chroicocephalus ridibundus)*	13	394	BoCC Amber list
Bullfinch (*Pyrrhula pyrrhula)*	16	394	Section 41, BoCC Amber list
Common gull (*Larus canus)*	11	394	BoCC Amber list
Greenfinch (*Chloris chloris)*	16	394	BoCC Red list
Herring gull *(Larus argentatus)*	14	394	Section 41, BoCC Red list
House martin *(Delichon urbicum)*	16	394	BoCC Red list
House sparrow (*Passer domesticus)*	19	394	Section 41, BoCC Red list
Lesser black-backed gull (*Larus fuscus)*	9	394	BoCC Amber list
Red kite (*Milvus milvus)*	7	394	Annex 1, Schedule 1.1
Redwing (*Turdus iliacus)*	15	394	Schedule 1.1, BoCC Amber list
Reed bunting (*Emberiza schoeniclus)*	5	394	Section 41, BoCC Amber list
Shellduck *(Tadorna tadorna)*	4	394	BoCC Amber list
Sparrowhawk (*Accipiter nisus)*	12	394	BoCC Amber list
Starling (*Sturnus vulgaris)*	14	394	Section 41, BoCC Red list
Whitethroat (*Curruca communis)*	6	394	BoCC Amber list
Willow warbler (*Phylloscopus trochilus)*	9	394	BoCC Amber list
Moorhen *(Gallinula chloropus)*	10	422	BoCC Amber list
Grey wagtail (*Motacilla cinerea)*	17	708	BoCC Amber list

Bird Species	No. of Records	Closest to Site (m)	Lists
Marsh tit (*Poecile palustris)*	3	708	Section 41
Brambling (*Fringilla montifringilla)*	1	754	Schedule 1.1
Dipper (*Cinclus cinclus)*	14	754	BoCC Amber list
Fieldfare *(Turdus pilaris)*	12	754	Schedule 1.1, BoCC Red list
Linnet (*Linaria cannabina)*	7	754	Section 41, BoCC Red list
Meadow pipit (*Anthus pratensis)*	9	754	BoCC Amber list
Peregrine falcon (*Falco peregrinus)*	10	754	Annex 1, Schedule 1.1
Skylark (*Alauda arvensis)*	4	754	Section 41, BoCC Red list
Cuckoo (*Cuculus canorus)*	7	799	BoCC Red list, Section 41
Hobby (*Falco Subbuteo)*	4	799	Schedule 1.1
Kestrel (*Falco tinnuculus)*	11	799	BoCC Amber list
Kingfisher (*Alcedo atthis)*	8	799	Annex 1, Schedule 1.1, BoCC Amber list
Lesser redpoll (*Acanthis cabaret)*	3	799	Section 41, BoCC Red list
Snipe (*Gallinago gallinago)*	11	799	BoCC Amber list
Common sandpiper (*Actitis hypoleucos)*	6	1027	BoCC Amber list
Barn owl (*Tyto alba)*	7	1147	Schedule 1.1
Hawfinch (*Coccothraustes coccothraustes*)	1	1169	Section 41, BoCC Red list
Tree sparrow (*Passer montanus)*	2	1297	Section 41, BoCC Red list
Short eared owl (*Asio flammeus)*	1	1309	Annex 1, BoCC Amber list
Goshawak (*Accipter gentilis)*	3	1349	Schedule 1.1
Lapwing *(Vanellus Vanellus)*	3	1372	Section 41, BoCC Red list
Mediterranean gull (*Ichthyaetus melanocephalus)*	2	1372	Annex 1, Schedule 1.1, BoCC Amber list
Spotted flycatcher (*Muscicapa striata)*	2	1372	Section 41, BoCC Red list
Wheatear (*Oenanthe oenanthe)*	2	1372	BoCC Amber list
Grasshopper warbler (*Locustella naevia)*	2	1379	BoCC Red list, Section 41
Little ringed plover (*Charadrius dubius*)	3	1472	Schedule 1.1
Great black-backed gull (*Larus marinus)*	2	1556	BoCC Amber list
Green sandpiper (*Tringa ochropus)*	1	1556	Schedule 1.1, BoCC Amber list
Merlin (*Falco columbarius)*	1	1556	Annex 1, Schedule 1.1, BoCC Red list
Oystercatcher (*Haematopus ostslegus)*	1	1556	BoCC Amber list
Golden plover (P*luvialis apricaria)*	1	1634	Annex 1
Osprey (*Pandion haliaetus)*	1	1634	Annex 1, Schedule 1.1, BoCC Amber list
Pied flycatcher (*Ficedula hypoleuca)*	1	1641	BoCC Red list
Black redstart (*Phoenicurus ochruros)*	2	1676	Schedule 1.1, BoCC Amber list
Curlew *(Numenius trochilus)*	1	1786	BoCC Red list, Section 41
Ring ouzel (*Turdus torquatus)*	1	1944	Section 41, BoCC Red list

3.4.6.1 Wintering Birds

Surveys were undertaken in the 2024/2025 winter bird season, recording target species (Annex I, Schedule 1, NERC Section 41, BoCC Red or Amber) and secondary species (species of regional or local conservation concern) and were timed to take place two hours either side of high tide at Rhyl, with the intention of detecting a potential functional link with the Liverpool Bay SPA and Dee Estuary SPA and Ramsar site.

One qualifying species for the Liverpool Bay SPA (cormorant) was recorded over-flying the Site but not on Site per se during the surveys, and as such there is no linked functionality for this species.

Additionally, two qualifying species for the Dee Estuary SPA (teal and cormorant) were recorded during the surveys, but cormorant was recorded in flight over the Site only, and the numbers of teal recorded (a peak count of five birds) do not meet the threshold stated for a "significant" number of birds, being well below 0.5% of the GB population, or 1% of the estimated SPA population..

Of the 30 target species recorded within the Solar Site, the vast majority were using habitats around the perimeter of the fields such as hedgerows, woodland, scrub, and pools, with very little usage of the field interiors by feeding birds being recorded.

The population of wintering birds within the Site is considered to be of less than local importance and therefore wintering birds are not taken forward for further assessment.

3.4.6.2 Breeding Birds

The majority of habitat with suitability for nesting birds is restricted to hedgerows and trees on field boundaries, the majority of which shall remain unaffected; however, the Site does have some potential to support ground nesting birds such as skylark.

Due to the presence of suitable habitat, and the legal protection afforded to nesting birds while nesting, under the Wildlife and Countryside Act 1981 (as amended), breeding birds have been included for further assessment.

3.4.7 Mammals

3.4.7.1 Bats

Cofnod returned 122 records of bats within 2km of the Solar Site, specifically:

- 32 records of pipistrelle bat species (*pipistrellus sp.)* between 1983-2021 with the nearest being 777m from the Solar Site;
- 20 records of lesser horseshoe bat (*Rhinolophus hipposideros*), between 1996-2024 with the nearest being 348m from the Solar Site;
- 14 records of soprano pipistrelle (*Pipistrellus pygmaeus)* between 1998-2023, with the nearest being 348m from the Solar Site;
- 13 records of common pipistrelle bat (*Pipistrellus pipistrellus)*, between 1995-2023, with the nearest being 348 m from the Solar Site;
- 11 records of natterers bat species (*Myotis nattereri)*, between 1957 and 2011 with the nearest being 420m from the Solar Site;
- Nine records of noctule bat (*Nyctalus noctule), between* 1998-2023, with the nearest being 348m from the Solar Site;
- Nine records of whiskered/brandts bat (*Myotis mystacinus/brandtii*) between 1958-2019 with the nearest being 348m from the Solar Site.

- 10 records of brown-long eared bats (*Plecotus auritus*), between 1968 -2018, with the nearest being 777m from the Solar Site;
- Eight records of Myotis bat species (*Myotis sp.)*, between 1999 and 2018 with the nearest being 1107m from the Solar Site;
- Four records of daubentons bat (*Myotis daubentoniid), between* 1990-2020, with the nearest being 1498m from the Solar Site; and
- Two records of greater horseshoe bat (*Rhinolophus ferrumequinum)*, in 2018, with the nearest being 1736m from the Solar Site.

Boundary hedgerow, lines of trees, woodland and watercourse features within the Solar Site are likely to be of importance to foraging and commuting bats and are considered to have 'high' suitability as per BCT guidance. The core of the Solar Site, comprising species poor and short sward modified grassland is likely to be less important to bats, having 'low' suitability.

There are known hibernation roosts for Natterer's, brown long-eared, common pipistrelle and lesser horseshoe bats at Coedydd ac Ogofau Elwy a Meirchion SSSI, *c.*865m southwest of Solar Site and they may use the Site to commute to and from the caves.

Overall, the Site is considered to have 'moderate' suitability for foraging and commuting bats. Bats have been taken forward in this assessment.

3.4.7.2 Badger

Cofnod returned 99 records of badger (*Meles meles)* within 2km of the Solar Site between 1971-2024. The closest record was 185m from the Solar Site.

Full results of the badger survey are provided in Confidential Appendix F.

The survey found that there is one active Main sett within the Site. Due to the sensitive nature of this data the location is not disclosed within this report but has been communicated to the client. Due to the sensitivity of the information Appendix F has not been released into the Public Domain, but a copy has been provided to the local planning authority.

Due to the presence of a badger sett on Site, this species has been taken forward for further assessment.

3.4.7.3 Otter

Cofnod returned 12 records of otter (*Lutra lutra)* within 2km of the Solar Site between 1991-2023. The closest record of otter was 1065m northeast from the Solar Site.

Due to the low levels of water and narrow channels, the on-Site watercourses are considered unsuitable for foraging otter. There is a possibility they would be used for commuting purposes on occasion, though this is considered unlikely.

No significant direct impacts on the watercourses are proposed and no increased human pressures or adverse impacts on water quality shall arise as a result of the development. Measures detailed in Section 4.0 include provision of a minimum 150mm gap at the base of the perimeter fencing which will enable mammals, including otter, access throughout the Site.

Given the low likelihood of otters being present, this species has been excluded from further assessment.

3.4.7.4 Water Vole

Cofnod returned one record of water vole (*Arvicola amphibius*) within 2km of the Solar Site in 2016, 1604m northwest from the Solar Site.



The drainage ditches within the Site are considered to be poor suitability for water vole, due to the very low water levels, lack of sufficient aquatic vegetation, and sub-optimal bank sides and bank top habitats, consisting of grazed modified grassland.

It is therefore thought very unlikely that water voles occur within the Site. Furthermore, ditches are being retained as part of the proposals, and positive effects on the bank top habitats are predicted, through the creation of rough tussocky grassland.

Two sections of ditch, one in the Eastern Parcel where the proposed northern access joins the main site and another in the Western Parcel where an access track is proposed from the northwestern field to the southwestern field, will be impacted by the scheme. The length of the ditches were inspected alongside a habitat survey on 23rd April 2025, for burrows of an appropriate size for water vole, none were found, and no other field signs of water vole were recorded.

Water vole is taken forward in this assessment on a precautionary basis.

3.4.7.5 Hazel Dormouse

Cofnod returned four records of hazel dormouse (*Muscardinus avellanarius*) within 2km of the Solar Site between 2000-2013, with the closest record being 1404m southwest from the Solar Site.

Modified grassland habitats present in the core of the Solar Site are considered unsuitable for dormice. Boundary hedgerows, although often species poor, do contain species suitable for foraging dormouse, i.e. hazel and oak, some of these hedgerows are also connected to woodland, of which some is ancient.

Hazel dormouse is therefore taken forward in this assessment.

3.4.7.6 Other Mammals

Cofnod retuned 23 records of west European hedgehog (*Erinaceus europaeus)* between 1965-2023 with the nearest pertaining to the Solar Site in 2018. Hedgehogs are species of principle importance under Section 7 of the Environment (Wales) Act.

Grassland habitats and boundary hedgerows are considered highly suitable for hedgehog, they have therefore been brought forward in this assessment.

There were three records of polecat (*Mustela putorius)* between 1991-2021, with the nearest being 1440m north of the Solar Site, two records of stoat *(Mustela erminea*), between 1966-1967, with the nearest being 708m east of the Solar Site, one record of red deer (*Cervus elaphus)* in 1996, 1622m northeast of the Solar Site, one record of brown hare (*Lepus europaeus*) in 2004, 324m northeast of the Solar Site and one record of weasel *(Mustela nivalis*) in 1966, 1030m southwest of the Solar Site.

The Site is not considered to be of value to these species, and/ or impacts upon them are not considered to be significant, and therefore the remaining species have been omitted from further assessment

3.5 Summary of Important Ecological Features

Designated sites and/ or habitats and species which are present on Site, or occur locally, which have been assessed as having local ecological importance or greater, or which are afforded legal protection, and which could potentially be affected by an unmitigated scheme are summarised in Table 3-5. Where features have been omitted from detailed assessment (due to no potential impacts arising or their less than local ecological importance), a rationale has been provided within earlier sections of this report.

Table 3-5: Summary of Important Ecological Features Subject to Detailed Assessment

Ecological Feature	Scale at which Feature is Important	Comments on Legal Status and/or Importance
Ty'n-y-coed Rough Local Wildlife Site for Denbighshire	Local	Woodland habitat, recognized as of value with Denbighshire, designated as LWS and protected through local planning policies. Likely to support other important invertebrate, amphibian, bird, mammal and plant species.
Glascoed Local Wildlife Site for Denbighshire	Local	Woodland habitat, recognized as of value with Denbighshire, designated as LWS and protected through local planning policies. Likely to support other important invertebrate, amphibian, bird, mammal and plant species.
Pig-y-fran Ancient Woodland	Local	As listed in the Ancient Woodland Inventory and retaining some ancient woodland indicator species. Irreplaceable resource, protected under local, national and UK planning policies. Likely to support other important invertebrate, amphibian, bird, mammal and plant species.
Ty'n-y-coed Rough Ancient Woodland	Local	As listed in the Ancient Woodland Inventory and retaining some ancient woodland indicator species. Irreplaceable resource, protected under local, national and UK planning policies. Likely to support other important invertebrate, amphibian, bird, mammal and plant species.
Other Lowland Mixed Deciduous Woodland	Local	These woodlands on site meet the S7 definition: "*Lowland mixed deciduous woodland includes woodland growing on the full range of soil conditions, from very acidic to base-rich, and takes in most semi-natural woodland in southern and eastern England, and in parts of lowland Wales and Scotland. It thus complements the ranges of upland oak and upland ash types. It occurs largely within enclosed landscapes, usually on sites with well-defined boundaries, at relatively low altitudes, although altitude is not a defining feature…* *The woods tend to be small, less than 20ha. Often there is evidence of past coppicing, particularly on moderately acid to base-rich soils; on very acid sands the type may be represented by former wood-pastures of oak and birch*." They are likely to support other important invertebrate, amphibian, bird, mammal and plant species.

Ecological Feature	Scale at which Feature is Important	Comments on Legal Status and/or Importance
Native Hedgerows (with ditches)	Local	All hedgerows on Site meet the S7 definition: "*A hedgerow is defined as any boundary line of trees or shrubs over 20m long and less than 5m wide, and where any gaps between the trees or shrub species are less that 20m wide (Bickmore, 2002). Any bank, wall, ditch or tree within 2m of the centre of the hedgerow is considered to be part of the hedgerow habitat, as is the herbaceous vegetation within 2m of the centre of the hedgerow. All hedgerows consisting predominantly (i.e. 80% or more cover) of at least one woody UK native species are covered by this priority habitat, where each UK country can define the list of woody species native to their respective country*." They are likely to support other important invertebrate, amphibian, bird, mammal. They support protected plant species such as bluebell, notable plants such as watercress and grey sedge occur in the ditches associated with the hedgerows.
Ponds	County	Most ponds in the area are likely to meet the S7 definition by supporting GCN and/or other S7 or Red Data Book species. The number of ponds within the survey area is relatively large and together they are therefore considered to be of County value. The value of relevant species populations (e.g. GCN) within these ponds is assessed separately below.
Rivers and Streams	Local	The streams on Site meet the broad S7 definition: "*Description This habitat type includes a very wide range of types, encompassing all natural and near-natural running waters in the UK (i.e. with features and processes that resemble those in 'natural' systems).*" They are likely to support other important invertebrate and plant species.
GCN	County	GCN is protected through its inclusion in Schedule 5 of the Wildlife and Countryside Act and in Schedule 2 of the Conservation of Habitats and Species Regulations 2017, it is also a S7 species. Surveying in 2022 found a small population of GCN at individual ponds and medium population of GCN overall within c.250m of the Site.
Breeding birds	Local	All birds and their nests are protected while nesting under Wildlife and Countryside Act 1981 (as amended).

Ecological Feature	Scale at which Feature is Important	Comments on Legal Status and/or Importance
		The boundary habitats (woodlands and hedgerows) are likely to be of importance to foraging and nesting birds, and the Site has potential to support low numbers of ground nesting species.
Bats	Up to County	All UK bat species are protected under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017. Barbastelle bat, Bechstein's bat, noctule, common pipistrelle, soprano pipistrelle, brown long-eared bat, greater horseshoe bat and lesser horseshoe bat are also S7 species. The boundary habitats and ponds within he Site are likely to be of importance to bats for foraging, commuting and roosting.
Badger	Local	Badgers are protected under Protection of Badger Act 1992 for welfare reasons. One main sett was found to be present within the Site boundary.
Water Vole	Less than local	Water vole is protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), it is also a S7 species. A population of water vole is considered unlikely to be present within the survey area at the current time. However, it is possible that this species may recolonise the most suitable watercourses within the survey area in the future.
Hazel Dormouse	Less than local	Dormice are protected under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017. They are also S7 species of principle importance. A population of dormice is considered unlikely to be present within the survey area at the current time. However, it is possible that this species may recolonise within the survey area in the future.
Hedgehog	Local	Section 7 species of principle importance.

4.0 Assessment of Effects and Mitigation Measures

4.1 Embedded Mitigation, including Mitigation and Enhancement Measures

The following design principles and "designed-in" mitigation have informed the assessment of impacts.

- Within the design of the proposal good practice environmental and pollution control measures are employed with regard to current best practice guidance such as, but not limited to, the following:
    - CIRIA C532, 'Control of water pollution from construction sites: guidance for consultants and contractors' (2001).
    - CIRIA C741, 'Environmental good practice on site guide' (2015 4th Ed.).
- Precautionary measures to be employed during construction, include:
    - Any excavations to be in-filled within the same day, or if not possible, excavations should be covered or provided with a sloping side (>45%) or ramp to allow wildlife to escape; and
    - Exclusion zones to be maintained around Root Protection Areas (RPA) of retained trees and hedgerows.
- Landscaping measures are proposed within the design of the development to minimise loss of biodiversity on-site.
    - Hedgerows will be retained wherever possible, new hedgerow is proposed (173m) and reinforcement of existing hedgerow (2.8km), repairing any gaps larger than 0.5m wide. Planting will include native species such as, field maple (*Acer campestre*), hazel, hawthorn, holly, blackthorn and bird cherry (*Prunus padus*).
    - Buffer planting of native scrub (0.65ha) around the Site boundary is proposed, the species mix will be agreed with Denbighshire Borough Council and ideally sourced from those grown at the council's tree nursery at St Asaph.
    - Areas of native tree planting (1.19ha) will extend existing woodlands adjacent to the Site boundary, the species mix will be agreed with Denbighshire Borough Council and ideally sourced from those grown at the council's tree nursery at St Asaph.
    - Ponds on Site will be retained and two will undergo re-instatement/ improvement, a further seven will be created, having a minimum surface area of 100m^2 and be of a sufficient depth to hold water in at least one in three summers. Spoil generated from the reinstatement or forming of ponds shall be used to create a series of hibernacula, each measuring at least 2 metres in length, 1 metre in width and 1m in height.
    - The proposals include the creation of wildflower meadow and tussocky grassland suitable for great crested newt and supporting invertebrates and pollinators.
    - Landscaping during operation will include aftercare as detailed in a Landscape and Ecology Management Plan (LEMP).

Taking the above into account, the principal potential impacts of the proposed development are outlined in the following sections.

4.2 Cable Connection Route Temporary Impacts

The two parcels within the Site would be connected through an underground cable. A further underground cable is proposed utilising existing highway routes from the Solar Site to the St Asaph substation to the northwest.

Cable route to connect the parcels

Habitats within this cable route corridor include horse grazed neutral grassland and a road, it will also cross under three hedgerows (two of which are bordering a road) and the 'other lowland mixed deciduous woodland', with stream, to the southwestern boundary of the Eastern Parcel.

Following burying of the cable all grassland habitats (g3c, other neutral grassland) will be re-instated within two years, therefore the impacts on this habitat type are considered temporary. The footprint of the cable is small, and the habitat type is not considered important, as it is common and widespread. The sward is short in this area and is considered of moderate suitability for commuting or foraging GCN, mitigation measures regarding GCN are discussed in Section 4.5.1.

Where the cable passes through hedgerow or woodland, directional drilling will be used at a minimum depth of 1m underground, to avoid impacting the roots of trees and hedgerows. Directional drilling will also avoid any direct impacts to sensitive ground flora. The impact on these habitats is therefore predicted to be negligible.

Substation cable route

The substation Cable Route follows existing roads to the north of the Solar Site and will be restricted to the road surface itself. The route is not predicted to have an ecological impact, nevertheless for completeness a badger survey was undertaken on 23rd April, finding no setts within 30m of the Cable Route corridor. An updated survey should be undertaken within three months of the start of works to identify if any new setts have become established, in accordance with standard practice.

4.3 Designated Sites

4.3.1 Ty'n y Coed Rough LWS, Glascoed LWS, Pig-y-fran Ancient Woodland, Ty'n y Coed Rough Ancient Woodland

4.3.1.1 Potential Impacts

The local wildlife sites and areas of ancient woodland all lie outside of the Site, although two lie immediately adjacent. No direct impacts are predicted, however indirect impacts could occur if good practice environmental and pollution control measures are not followed during the construction phase. Negative impacts could also arise if any non-sensitive lighting is proposed. Nocturnal species such as bats may be disturbed.

4.3.1.2 Proposed mitigation and enhancement measures

A minimum 15m buffer has been included within the Site design, between any of the Site infrastructure and the designated sites or areas of ancient woodland, accounting for Root Protection Areas. Where Ty'n y Coed Rough adjoins the Site, a semi-natural transitional habitat is proposed comprising a rough tussocky grassland with native trees in the transitional area between the woodland and grassland, which will provide an improved and more natural 'edge habitat', resulting in a minor positive impact on the woodland as a result of the proposals. Rough tussocky grassland is also proposed at the eastern edge of Pig-y-fran ancient woodland. Native buffer planting of trees and scrub is also proposed to widen

the woodland habitat along the western boundary of the Eastern Parcel, improving habitat connectivity between Glascoed LWS and Pig-y-fran ancient woodland.

There shall be no lighting of the designated sites arising from the proposed project. Work during the construction phase will be undertaken in the daytime to avoid the need for lighting at night. During the operation phase, there shall be no light directed at the designated woodlands.

4.3.1.3 Significance of residual effects

No significant residual direct or indirect effects of the development on designated sites is predicted.

4.4 Habitats

4.4.1 Other Lowland Mixed Deciduous Woodland and Other Rivers and Streams

4.4.1.1 Potential Impacts

Both habitat types are to be retained as part of the proposals. No direct impacts are therefore proposed, however indirect impacts could occur if good practice environmental and pollution control measures are not followed through the construction phase. Negative impacts could also arise if any non-sensitive lighting is proposed. Nocturnal species such as bats may be disturbed.

4.4.1.2 Proposed mitigation and enhancement measures

Good practice environmental and pollution control measures will be followed throughout the construction and operational phases.

There shall be no lighting of the designated sites arising from the proposed project. Work during the construction phase will be undertaken in the daytime to avoid the need for lighting at night. During the operation phase, there will be no light directed at the designated woodlands.

4.4.1.3 Significance of residual effects

No significant residual direct or indirect effects of the proposed development on deciduous woodland and/ or streams is predicted.

4.4.2 Native hedgerows (with ditches)

4.4.2.1 Potential Impacts

The majority of existing hedgerows within the Site are to be retained, with the exception of small sections where access points are required. Loss of hedgerow habitat would cause a reduction of this priority habitat type and could break commuting routes for protected or notable species.

Two short sections of ditch (one in the Eastern Parcel where the proposed northern access joins the main site and another in the Western Parcel, where an access track is proposed from the northwestern field to the southwestern field) will be impacted by the scheme.

4.4.2.2 Proposed mitigation and enhancement measures

Where possible existing gaps (gateways) have been used for the positioning of the access tracks. Removal of hedgerow habitat, where necessary, shall involve only short sections,

and this will be undertaken outside of the nesting bird season (March – August), further details on mitigation measures if this cannot be achieved is provided in Section 4.5.2.

Hedgerow is considered of high suitability for foraging and commuting GCN, mitigation measures regarding GCN are discussed in Section 4.5.1.

Hedgerow has the potential to support dormouse, mitigation measures regarding this species are discussed in Section 4.5.6.

A new native hedgerow totalling 173m will be planted along the northern boundary of the Eastern Parcel. All gaps over 0.5m in hedgerow will be planted with native hedgerow species to repair and enhance existing hedgerow.

Ditches associated with hedgerow on the Site would be protected by the implementation of good practice pollution prevention measures and the implementation of a 5m buffer from the ditches. Small lengths of this habitat type are due to be impacted by the scheme, however, it is a widespread habitat and not a priority habitat; furthermore, bank top habitats are due to be improved as part of the proposals with creation of improved rough tussocky and wildflower grasslands.

Ditches have the potential to support water vole, mitigation measures regarding this species are discussed in Section 4.5.5.

4.4.2.3 Significance of residual effects

Planting of a new species rich hedgerow would increase the overall abundance of this priority habitat within the Site and improve the connectivity across the Site and provide additional nesting and foraging resource for a range of species. Retention of the majority of existing hedgerows would maintain existing habitat. Overall, the impact on hedgerow habitat within the development is expected to be positive at Local level.

4.4.3 Ponds

4.4.3.1 Potential Impacts

None of ponds on Site will be removed as part of the proposals. Ponds on Site are generally in poor condition, with few aquatic plants and not holding optimal amounts of water for anything above small populations of breeding GCN. Current management means that they are regularly visited by cattle, and the resulting compaction of the pond base and disturbance to the banks, is most likely slowing the process of plant succession, which eventually infills ponds. The potential reduction in visits to the ponds by cattle, post-development, and in the absence of the mitigation and enhancement described below, would likely mean that natural succession of the ponds would occur at a faster rate, and ponds may be lost over a shorter time period.

4.4.3.2 Proposed Mitigation and Enhancement Measures

Two of the Site's ponds will undergo re-instatement/ improvement, deepening and widening them as appropriate, a further seven will be created, having a minimum surface area of 100m^2 and with sufficient depth to hold water in at least one in three summers. Spoil generated from the reinstatement or forming of ponds shall be used to create a series of hibernacula, each measuring at least 2 metres in length, 1 metre in width and 1m in height.

Sensitive Maintenance of the ponds shall be included in the LEMP associated with the development; monitoring should be carried out to ensure that ponds remain in a favourable condition.

4.4.3.3 Significance of Residual Effects

No significant residual effects are predicted for pond habitats, if re-instatement and enhancement measures are carried out. Improvements to existing ponds and creation of new ponds will increase the overall abundance of this priority habitat within the Site, increasing invertebrate diversity and improving foraging resources for protected species such as bats and providing increased opportunities for breeding GCN.

The net effect is therefore predicted to be positive at County level.

4.5 Species

4.5.1 Great Crested Newt

4.5.1.1 Potential Impacts

GCN could be impacted by the scheme during their terrestrial phase. During construction, newts may be harmed or killed if appropriate precautionary methods are not followed.

GCN could be impacted when in their aquatic phase, if pond improvement measures are not undertaken at the correct time of year.

4.5.1.2 Proposed Mitigation and Enhancement Measures

The majority of works are proposed within sub-optimal habitat for GCN i.e. grazed modified grassland, however some work is proposed which impacts hedgerows, which are considered highly suitable for foraging and commuting great crested newt. Moreover, the 2022 survey found that there is a population of GCN, which uses the Site ponds to breed, GCN would use the modified grassland habitats to move to and from their breeding ponds.

Dependant on the final construction programme and site design, it may be possible to avoid impacts on GCN through the careful timing of the works and precautionary methods of working. If this is not possible a European Protected Species Licence (EPSL) would need to be sought from NRW ahead of the proposed works. The conditions of the EPSL would be specified to ensure that construction and continued presence of the solar farm does not result in significant adverse impacts to the local population of GCN. The EPSL Method Statement will include the measures that will be implemented and will be submitted to NRW once surveys for GCN are completed.

The proposals include the creation of wildflower meadow and tussocky grassland suitable for GCN, re-instatement of two on-site ponds and creation of seven new ponds.

4.5.1.3 Significance of Residual Effects

Tussocky grassland and pond creation and enhancements would improve and expand the availability of suitable habitat for great crested newt. Additionally, increases in invertebrate abundance would provide greater food availability for terrestrial newts/ amphibians. Therefore, the overall impact of the development on great crested newt, and other amphibians, in their terrestrial and aquatic life stage is predicted to be positive at County level.

4.5.2 Breeding Birds

4.5.2.1 Potential Impacts

Potential damage/ destruction of active nests during Site clearance works. Reduction in habitat for ground nesting birds. Loss of suitable habitat, such as hedgerow and trees, could reduce the nesting and foraging provision available to birds.

4.5.2.2 Proposed Mitigation and Enhancement Measures

All trees within the Site are to be retained. Although small sections of hedgerow will need to be removed for access tracks, overall, there is a net gain in hedgerow habitat proposed for the Site.

Vegetation clearance during bird nesting season (March - August) would be avoided, or if clearance is required during nesting season, this would commence following a check for nesting birds by a suitably qualified ecologist. If nests are found, these would be protected by an exclusion buffer zone until young have fledged.

The planting of an additional species rich hedgerow, as well as new trees and scrub, would improve the availability of nesting sites for breeding birds, as well as providing enhanced foraging opportunities.

Sowing of tall, species rich grasslands, would provide ideal foraging habitat for a range of bird species, as well as nesting opportunities for some ground nesting bird species. Additionally, these grasslands could increase numbers of small mammals which provide feeding opportunities for birds of prey such as owls and kestrel.

4.5.2.3 Significance of Residual Effects

Overall, the effect of the proposals on tree and scrub nesting species is predicted to be positive, although a minor negative impact on habitat availability for ground nesting bird species could occur, albeit the Site currently only has potential to support low numbers of ground nesting species. The provision of longer grassland within the Site has scope to support these species, including skylark, either by offering foraging habitat for birds nesting off-Site, or potentially nesting habitat.

Overall, the impact upon breeding and foraging birds in general, is likely to be positive and no contravention of wildlife legislation is predicted to occur.

4.5.3 Bats

4.5.3.1 Potential Impacts

Lighting can interrupt the natural behaviour of bats and prevent them from using the affected area for foraging, commuting or roosting.

Potential loss of foraging resource through replacement of suitable habitat with Site infrastructure.

4.5.3.2 Proposed Mitigation and Enhancement Measures

Habitats assessed as being important for bats i.e. hedgerow, woodland and ponds, shall not be subject to any artificial lighting during the construction or operational phase.

Although small losses of the current foraging resource for bats are proposed (i.e. short sections of hedgerow removal), overall, the scheme will increase the connectivity between hedgerows, result in the creation of 173m of new hedgerow, and is proposing buffer planting to extend habitats suitable for foraging bats. Wildflowers in the rough grassland to be created and the additional ponds will increase foraging opportunities.

4.5.3.3 Significance of Residual Effects

The creation of, and extension of habitat suitable for bats including suitable invertebrate overwintering tussocky grassland habitat, additional hedgerow, ponds and improved woodland edge habitat, is predicted to improve the Site for commuting and foraging bats.

Overall, the effect on bats as a result of the proposed scheme is predicted to be positive at up to County level.

4.5.4 Badger

4.5.4.1 Potential Impacts

Installation of fencing could restrict ability of badgers to cross the Site and prevent access to habitats used for commuting, foraging and sett building such as hedgerows and grassland.

Construction work within 30m of setts could disturb badgers and be in breach of the Protection of Badgers Act 1992.

Excavations on Site could lead to badgers becoming entrapped.

4.5.4.2 Proposed Mitigation and Enhancement Measures

Badgers are a mobile species and can dig new setts at any time, including via the enlargement of rabbit burrows or fox earths. A pre-commencement badger check would be undertaken by an Ecological Clerk of Works (ECoW) prior to the start of each phase of construction, to check for any new badger setts and signs. If new setts are identified during the pre-commencement checks, appropriate protection zones would be established to ensure no damage or disturbance to the sett would occur, or appropriate licences would be secured for closure/ disturbance if deemed necessary by the attending ECoW. As such no contravention of wildlife legislation is predicted.

A 30m protection zone should be established around the main sett identified within the Site boundary, this should be in place for the construction phase so that no heavy machinery or works likely to cause disturbance are carried out within the protection area. No solar farm infrastructure is currently proposed whose construction or maintenance could conflict with the sett's retention and protection from disturbance. An update badger survey will be caried out prior to the commencement of Site works, and if additional entrances are present within 30 metres of the proposed line of the security fence, the precise alignment of the fence will be altered to maintain a sufficient buffer.

All perimeter fencing surrounding the solar farm would have a minimum 150mm gap at the base, to allow badgers to dig a scrape and to permit unrestricted access throughout the solar farm for badger.

Any excavations created during construction to be in-filled within the same day, or if not possible, excavations should be covered or provided with a sloping side (>45%) or ramp to allow wildlife to escape

The improved diversity of vegetation and resulting predicted increase in invertebrate abundance would provide an improved foraging habitat for badger.

4.5.4.3 Significance of residual effects

Overall, the effect of the proposals on badger, is predicted to be positive at the Local level.

4.5.5 Water Vole

4.5.5.1 Potential Impacts

Retained ditches if supporting water vole, could be negatively impacted by pollution created during the construction phase.

Two short sections of ditch one in the Eastern Parcel where the proposed northern access joins the main site and another in the Western Parcel, where an access track is proposed from the northwestern field to the southwestern field will be impacted by the scheme.

The ditches were assessed as being of poor suitability for water vole, due to the very low water levels, lack of sufficient aquatic vegetation and sub-optimal bank top habitats of grazed modified grassland, and no burrows suitable for water vole were found.

In the unlikely case that water vole are present in the impacted area, water vole could be disturbed or their resting places damaged, this would be in breach of wildlife legislation.

4.5.5.2 Proposed Mitigation and Enhancement Measures

Water vole, should they occur within the ditches on-Site, would be protected by the implementation of good practice pollution prevention measures and the implementation of a 5m buffer from the ditches.

A pre-commencement water vole survey shall be carried out by an ECoW, as a precaution. If evidence of water vole is found, a sensitive method of working will be devised to ensure that no significant impacts arise. In the unlikely event that impacts cannot be avoided, appropriate mitigation and a licence would be obtained from NRW.

Bank top habitats are due to be improved as part of the proposals with creation of improved rough tussocky and wildflower grasslands.

4.5.5.3 Significance of Residual Effects

No contravention of wildlife legislation is predicted if the appropriate further standard pre-commencement checks are carried out. Overall, there is no significant residual effect predicted for water vole.

4.5.6 Hazel Dormouse

4.5.6.1 Potential Impacts

Permanent loss of suitable habitat and habitat connections for dormouse (if present), via the removal of short sections of hedgerow.

4.5.6.2 Proposed Mitigation and Enhancement Measures

A Precautionary Working Method Statement shall be implemented for the removal of the sections of hedgerow, including details on appropriate timing of the works, requirement for pre-commencement checks or ECoW supervision.

Overall, the scheme is to increase connections between hedgerow and woodland suitable for dormice, with 173m of new hedgerow to be created, and all gaps in existing hedgerow, over 0.5m in length to be filled with native planting. The species mix will be suitable for dormice.

4.5.6.3 Significance of Residual Effects

No contravention of wildlife legislation is predicted, if an appropriate Precautionary Working Method Statement is followed. The effect of the proposals on hazel dormouse is predicted to be no net change, or positive, overall, at the Local level, as appreciably more habitat is due to be created than is being lost.

4.5.7 Hedgehog

4.5.7.1 Potential Impacts

Installation of fencing could restrict ability of hedgehogs to cross the Site and prevent access to habitats used for commuting, foraging and sheltering such as hedgerows and grassland.

4.5.7.2 Proposed Mitigation and Enhancement Measures

All perimeter fencing surrounding the solar farm would have a minimum 150mm gap at the base, to permit unrestricted access throughout the solar farm for hedgehog.

The improved diversity of vegetation and resulting predicted increase in invertebrate abundance would provide an improved foraging habitat for hedgehog.

4.5.7.3 Significance of residual effects

Overall, the effect of the proposals on hedgehog, is predicted to be positive at Local level.

4.6 Summary of Effects

A summary of potential impacts, proposed mitigation and compensation measures and residual effects is provided in Table 4-1.

Table 4-1: Summary of Potential Impacts, Proposed Mitigation and Compensation Measures and Residual Effects.

Ecological Feature	Potential Impacts	Proposed Mitigation and Compensation	Means of Delivering Mitigation and Compensation	Residual Effects
Designated Sites: Ty'n y Coed Rough LWS, Glascoed LWS, Pig-y-fran AW, Ty'n y Coed Rough AW	- Indirect impact if good practice environmental and pollution control measures are not followed through construction phase - negative impact of additional artificial light spillage -improvement of edge habitat and connectivity between woodland habitats, by creating rough grassland, scrub habitats, and planting native trees.	- A minimum 15m buffer, accounting for Root Protection Areas between sites and development infrastructure. - Avoid lighting in sensitive areas	- CEMP -Root Protection Plan - No lighting of woodland habitat during construction or operation	Not Significant
Other Lowland Mixed Deciduous Woodland and Other Rivers and Streams	-Indirect impact if good practice environmental and pollution control measures are not followed through construction phase - negative impact of additional artificial light spillage	- Retention of habitats - Avoid lighting in sensitive areas	- CEMP -No lighting of woodland habitat during construction or operation	Not Significant
Native hedgerow	-Reduction in hedgerow habitat	-Retention of the majority of hedgerow by using existing gaps where possible -Planting of new hedgerow (173m) -improvement of existing hedgerow through planting any gaps over 0.5m wide	-Landscape Plan -LEMP	Positive Effect at Local Level
Ponds	-Natural succession occurring at a faster rate due to absence of cattle, loss of pond habitats over time.	- Two on-Site ponds will be widened/deepened - Seven ponds to be created	-Landscape Plan -LEMP	Positive Effect at County Level

Ecological Feature	Potential Impacts	Proposed Mitigation and Compensation	Means of Delivering Mitigation and Compensation	Residual Effects
GCN	-Potential harm or killing of GCN during their terrestrial or aquatic phase	-Precautionary methods of work during construction - Creation of wildflower meadow and tussocky grassland suitable for GCN - Two on-Site ponds will be widened/deepened - Seven ponds to be created	- Precautionary Working Method Statement (PWMS) - NRW EPSL GCN Licence -Landscape Plan -LEMP	Positive Effect at County Level
Breeding Birds	- Potential damage/ destruction of active nests during Site clearance works - Reduction in habitat for ground nesting birds. - Loss of suitable habitat, such as hedgerow and trees, could reduce the nesting and foraging provision available to birds.	- Vegetation clearance during bird nesting season (March - August) to be avoided -Sowing of tall, species rich grassland -Planting of an additional species rich hedgerow, as well as new trees and scrub.	-CEMP -Landscape Plan -LEMP	Positive Effect at Local Level
Bats	- Negative impact of additional artificial light spillage into commuting and foraging areas - Potential loss for foraging resource in place of Site infrastructure	- No lighting of sensitive areas - Net increase in connectivity between hedgerows, proposed buffer planting, creation of rough grassland and pond creation will improve foraging and committing routes for bats	- No lighting of woodland or other high quality bat foraging habitats - Landscape Plan	Positive Effect at up to County Level
Badger	-Restricted access to suitable habitat within the Site -Disturbance of setts, breach of laws protecting badgers and their setts - Badgers becoming entrapped in open excavations during construction phase.	- Perimeter fencing to have a 150mm gap beneath it to permit unrestricted access throughout the solar farm for badger - 30m protection zone established around setts - Pre-commencement badger check by ECoW	- CEMP - Employment of an ECoW	Positive Effect at Local Level

Ecological Feature	Potential Impacts	Proposed Mitigation and Compensation	Means of Delivering Mitigation and Compensation	Residual Effects
		- Excavations created during construction to be in-filled within the same day, or excavations should be covered or provided with a sloping side (>45%).		
Water Vole	- Retained ditches if supporting water vole, could be negatively impacted by pollution created during the construction phase. - Small areas of sub-optimal water vole habitat lost by two proposed ditch crossings - If present water vole could be disturbed or their resting places damaged, this would be in breach of wildlife legislation	- 5m buffer zone from ditches where crossing not required - Good practice pollution prevention measures followed - Retention of the majority of ditches - Pre-commencement check for Water Vole by ECoW - Improvement to bank top habitats will occur through creation of long grassland and rough tussocky grassland.	-CEMP -Landscape Plan -Employment of an ECoW to oversee works if necessary	Not Significant
Hazel Dormouse	- Minor reduction in habitat suitable for dormice during construction	-Precautionary Working Method Statement should be implemented for the removal of the section of hedge, including details on appropriate timing of the works, requirement for pre-commencement checks or ECoW supervision - 173m new hedgerow created all gaps in hedgerows >0.5m to be filled with native species suitable for dormice.	- PWMS - CEMP -Landscape Plan -Employment of an ECoW	Positive Effect at Local Level
Hedgehog	-Restricted access to suitable habitat within the site -Improvement to habitat diversity and invertebrate densities over time	-Perimeter fencing to have a 150mm gap beneath it to permit unrestricted access throughout the solar farm	-Landscape Plan -LEMP	Not Significant

5.0 Conclusion

Overall, the St Asaph Solar Farm scheme is predicted to have no significant residual effects in relation to any important ecological receptors.

The mitigation and enhancement measures, as discussed in this report are predicted to have a positive effect at Local level on abundance of hedgerow habitat and positive effect of up-to County level on pond habitats. Protected species, including GCN, breeding birds, bats, badgers and hazel dormouse are also predicted to benefit from the biodiversity enhancements incorporated into the Site design.

Appendix A Drawing C0002452_01 Site Location and Drawing C0002452_02 Site Layout

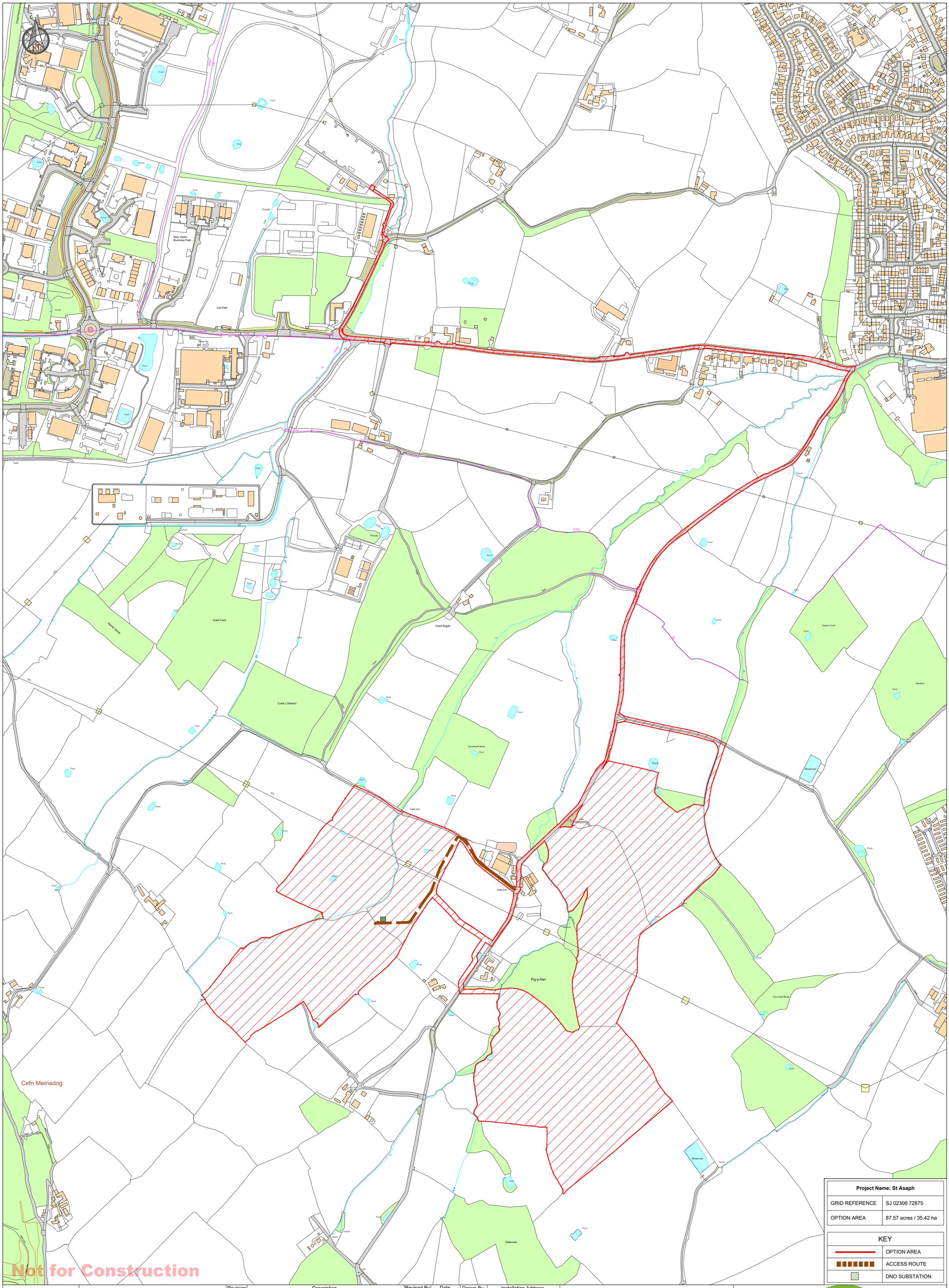
Ecological Impact Assessment

St Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

29 April 2025



Project Name: St Asaph	
GRID REFERENCE	SJ 02306 72875
OPTION AREA	87.57 acres / 35.42 ha

KEY	
	OPTION AREA
	ACCESS ROUTE
	DNO SUBSTATION

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

0 50 100 150 200

Ordnance Survey, (c) Crown Copyright 2020.
All rights reserved. Licence number 100022432

Revision	Description	Revised By	Date
A	Issued for comment	MS	20/10/2020
B	Land reduced from the North and extended to the South	MS	05/03/2021
C	Area of Land has been altered and the DNO substation moved	MS	04/05/2021
D	Area of Land has been altered and the DNO substation moved	MS	12/05/2021
E	Site area amended	JH	22/11/2023
F	Red Line Boundary amended & access track added in the North	JH	12/12/2023
G	Red Line Boundary amended	MS	10/06/2024
H	Red Line Boundary amended	MS	13/11/2024
J	Red Line Boundary amended	RD	26/03/2025

Drawn By: RD

Scale: 1:5000@ A2

Sheet Size A2

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

Project: St Asaph

Title: Location Plan

Drawing No.: C0002452_01

Rev.: J

Anesco™ AMAZING ENERGY

Not for Construction

New Vision Business Park

Car Park

Coed Cord

Hendy Gorse

Coed y Saeson

Coed Esgob

Tyn-y-ffordd Gorse

Pig-y-fran

Square Covert

Tyn-y-coed Rough

Reservoir

Glascoed

Ponds

Pond

Track

Drain

Issues

FB

Silo

Slurry Pit

Sub Sta

FS

LB

GUARDED ROAD

LOW CROSS ROAD

34.1m

36.0m

41.4m

47.2m

65.9m

LEGEND

	SITE BOUNDARY
	SECURITY FENCE
HV HV	OVERHEAD ELECTRICAL CABLES (24m/14m OVERALL EASEMENT)
	DNO ACCESS ROUTE
	HV CABLE ROUTE - TRENCH
	LV CABLE ROUTE - TRAY
	PRIVATE HV CABLE ROUTE - TRENCH
BT BT	BT OVERHEAD CABLE
W W	UNDERGROUND WATER TRUNK MAIN
	UTILITY EASEMENT
	HARDSTANDING AREA
	PROPOSED CULVERT CROSSING
	PROPOSED HEDGE REMOVAL FOR TRACK WIDENING
	FENCE PLACEMENT & HEDGE REGROWTH AREA
	PROPOSED TREE REMOVAL
	PV ARRAY
	INVERTER (SUN2000-330KTL)
	SMART TRANSFORMER STATION (JUPITER-6000K/JUPITER3000K)
	DNO SUBSTATION
	CUSTOMER SUBSTATION (PV)

PROJECT NAME: ST ASAPH	
GRID REFERENCE :	SJ 02300 72873
SITE AREA:	87.57Acres / 35.42 ha
TOTAL INSTALLED CAPACITY:	18.44MWp
MAX INVERTER AC POWER:	18.304MW

0 10 20 40 60 80 100

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

Revision	Description	Revised By	Date
A	Issued for comment	MS	19/11/2020
B	Land reduced from the North and extended to the South	MS	05/03/2021
C	Boundary Line Extended	MS	05/05/2021
D	Boundary Line Extended and site maximised	MS	12/05/2021
E	Planning Site Layout	JH	10/11/2021
F	Module Wattage Changed	MS	07/12/2021
G	Site resign to 215KTL & Bifacial Modules	JH	02/03/2022
H	Site redesigned due to tree shading implications	MS	16/06/2022
J	Red Line Boundary amended to include Private HV	JH	03/08/2022
K	Site redesign	JH	15/05/2023
L	Site redesign using new modules and new private HV cable	JH	06/07/2023
M	Site area amended and module redesign	JH	22/11/2023
N	DNO Track Added	LD	28/11/2023
P	Red Line Boundary amended & access track added in the North	JH	12/12/2023
Q	Redesign due to array relocation	JS	19/03/2024
R	Redesign	MS	01/08/2024
S	Access Altered	MS	20/09/2024
T	Hedgerow added and panel locations amended	MS	11/11/2024
U	Inverters added	RD	20/01/2024
V4	Topo and service searches added	RD	31/03/2025

Drawn By: JH

Scale: 1:3000@ A1

Sheet Size A1

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

Project: St Asaph

Title: Site layout planning

Drawing No.: C0002452_02

Rev.: V4

Anesco™ AMAZING ENERGY

Appendix B Landscape Strategy Plan

Ecological Impact Assessment

St Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

29 April 2025

The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-

LEGEND

- Site Boundary
- Existing Woodlands, Copses and Tree Belts ^
- Existing Water Courses and Features ^
  Wildflower meadow wetland seeding across 10m buffers to the ponds, streams and ditches within and adjacent to the Site
- Contours/Spot Heights (Metres AOD) ^
- Existing Surveyed Trees and Vegetation to be Retained
- Existing Surveyed Trees Removed Since Survey and Photographs Captured
- Proposed Trees
  To be managed to a maximum height 4.5-5m to prevent overshading
- Proposed Trees
  To be allowed to grow to their natural height
- Existing Hedgerow to be Maintained and Reinforced
  Assume approximately 25% infill for overall length (to a minimum height of 2.5 - 3m)
- Proposed Hedgerow to be Maintained
  (to a minimum height of 2.5 - 3m)
- Native Shrub Planting
  (Maintained to 10m maximum height) where it is 35m-60m from panels
- Native Tree Planting
  (No woody species 0-15m from panels)
  (Maintained to 15m maximum height) where it is 60m+ from panels
  Translocate small amounts of soil/seed bank from areas of tree removal to the native woodland planting area. Translocate smaller saplings from areas of tree removal to the native woodland planting area. Grow saplings using berries and nuts gathered from mature trees to be removed, and plant these saplings within the native woodland planting area.
- Native Shrub Planting
  (Maintained to 4m maximum height) where it is 15-35m from panels
- Proposed new pond; the pond shall have a wet surface area of at least 100m^2 and be of sufficient depth to hold water in at least one in three summers; spoil generated from the excavation of the pond will be used to create a series of 2m x 1m x 1m high hibernacula; the pond will be planted with a range of aquatic and marginal plants, and the banks seeded with Emorsgate Seeds EP1 'Pond Edge Mix' or similar.
- Currently dry pond or pond not supporting GCN to be reinstated; the pond shall have a wet surface area of at least 100m^2 and be of sufficient depth to hold water in at least one in three summers; spoil generated from the excavation of the pond will be used to create a series of 2m x 1m x 1m high hibernacula; the pond will be planted with a range of aquatic and marginal plants, and the banks seeded with Emorsgate Seeds EP1 'Pond Edge Mix' or similar.
- Existing grassland to be maintained as long grassland for great crested newt habitat/migration.
- Existing grassland to be maintained as tussocky grassland with Low Density Native Mix trees, no trees to be planted under OHL easement and to be maintained to 15m maximum height where planted at 60m+ from panels.
- Proposed Wildflower Meadow Tussock Mixture Emorsgate EM10 and maintained as long grassland for great crested newt habitat/migration.
- Existing grassland within perimeter fence to be retained as grazing pasture or mown no more than once a year, within autumn, to a height of no less than 10cm.
- Proposed Wildflower Meadow Tussock Mixture Emorsgate EM10 (cut every 3 years).
- Proposed Wildflower Meadow Hedgerow Mixture Emorsgate EH1 (cut annually or more frequently to prevent shading as required).
- Proposed Security Fence
- Proposed Access Route
- Proposed Solar Panels
- Solar Panel 15m Buffer
- Solar Panel 35m Buffer
- Solar Panel 60m Buffer

Reproduced from the Ordnance Survey Map with the permission of the Controller of HMSO. Crown Copyright Reserved. Licence No. EMS - 928549.

J:\33000\33010 - St Asaph Solar Farm\A4 - Drawings & Registers\Landscape\33010 LN-LP Landscape Strategy Plan.dwg - LN-LP-12-A1

FIGURE 7

Project
St Asaph Solar Farm

Drawing Title
Landscape Strategy Plan
Sheet 1 of 2

Date	Scale	Drawn by	Check by
20.12.2024	1:2,500 @A1 1:5,000 @A3	OF/ML	DP
Project No	**Drawing No**		**Revision**
33010	LN-LP-12		G

0 200 400 600 800 100mm

Stantec
Stantec UK Limited
7 Soho Square
London
W1D 3QB
T: 020 7446 6888
stantec.com\uk

Proposed and Reinforcement Hedgerow Mix (plant at 0.5m centres in single species groups of 3-7 plants)						
Abbrev	Species Name	Common Name	Height	General Specification	Percentage	Quantity
Ac ca	Acer campestre	Field Maple	80-100cm	1+1: Transplant - seed raised: B	5%	156
Co av	Corylus avellana	Common Hazel	80-100cm	1+2: Transplant - seed raised: Branched: 4 brks: B	20%	624
Cr mo	Crataegus monogyna	Common Hawthorn	80-100cm	1+2: Transplant - seed raised: 4 brks: B	35%	1094
Il aq	Ilex aquifolium	Common Holly	40-60cm	Leader with Laterals: 2L	10%	314
Pr sp	Prunus spinosa	Blackthorn	80-100cm	1+2: Transplant - seed raised: Branched: 3 brks: B	25%	780
Pr pa	Prunus padus	Bird Cherry	80-100cm	1+1: Transplant - seed raised: B	5%	156
Native Shrub Planting Mix - Maintained to 4m maximum height (plant at 0.5 plants/m^2 in single species groups of 3-5 plants)						
Abbrev	Species Name	Common Name	Height	General Specification	Percentage	Quantity
Po ni	Populus nigra	Black Poplar	60-80cm	1+1: Transplant - seed raised: B	5%	162
Co av	Corylus avellana	Common Hazel	60-80cm	1+2: Transplant - seed raised: Branched: 3 brks: B	20%	648
Cr mo	Crataegus monogyna	Common Hawthorn	60-80cm	1+1: Transplant - seed raised: B	35%	1135
Il aq	Ilex aquifolium	Common Holly	40-60cm	Leader with Laterals: 2L	10%	324
Sa ca	Salix caprea	Goat Willow	60-80cm	1+1: Transplant - seed raised: Branched: 2 brks: B	25%	810
Pr pa	Prunus padus	Bird Cherry	60-80cm	1+1: Transplant - seed raised: B	5%	162
Native Shrub Planting Mix - Maintained to 10m maximum height (plant at 0.5 plants/m^2 in single species groups of 3-5 plants)						
Abbrev	Species Name	Common Name	Height	General Specification	Percentage	Quantity
Ul gl	Ulmus glabra	Wych Elm	80-100cm	1+1: Transplant - seed raised: B	10%	435
Be pu	Betula pubescens	Downy Birch	80-100cm	1+1: Transplant - seed raised: B	10%	435
Ti eu	Tilia x europea	Common Lime	80-100cm	1+1: Transplant - seed raised: B	10%	435
So to	Sorbus torminalis	Service Tree	80-100cm	1+1: Transplant - seed raised: B	10%	435
Qu pe	Quercus petraea	Sessile Oak	80-100cm	1+2: Transplant - seed raised: B	10%	435
Understorey planting						
Co sa	Cornus sanguinea	Common Dogwood	60-80cm	1+1: Transplant - seed raised: Branched: 3 brks: B	10%	435
Co av	Corylus avellana	Common Hazel	60-80cm	1+2: Transplant - seed raised: Branched: 3 brks: B	10%	435
Co mo	Crataegus monogyna	Common Hawthorn	80-100cm	1+2: Transplant - seed raised: B	10%	435
Ma sy	Malus sylvestris	Crab Apple	60-80cm	0/2; Cutting; branched; 3 breaks	10%	435
Sa ni	Sambucus nigra	Elder	60-80cm	1+2: Transplant - seed raised: Branched: 4 brks: B	10%	435
Native Tree Planting Mix - Maintained to 15m maximum height (plant at 0.25 plants/m^2 in single species groups of 3-5 plants)						
Abbrev	Species Name	Common Name	Height	General Specification	Percentage	Quantity
Ac ca	Acer campestre	Field Maple	80-100cm	1+1: Transplant - seed raised: B	5%	41
Be pu	Betula pubescens	Downy Birch	80-100cm	1+1: Transplant - seed raised: B	5%	41
Il aq	Ilex aquifolium	Common Holly	60-80cm	Leader with Laterals: 5L	5%	41
So au	Sorbus aucuparia	Rowan	80-100cm	1+1: Transplant - seed raised: B	5%	41
Qu pe	Quercus petraea	Sessile Oak	80-100cm	1+2: Transplant - seed raised: B	5%	41
Understorey planting						
Co sa	Cornus sanguinea	Common Dogwood	60-80cm	1+1: Transplant - seed raised: Branched: 3 brks: B	15%	123
Co av	Corylus avellana	Common Hazel	60-80cm	1+2: Transplant - seed raised: Branched: 3 brks: B	15%	123
Co mo	Crataegus monogyna	Common Hawthorn	80-100cm	1+2: Transplant - seed raised: B	15%	123
Li vu	Ligustrum vulgare	Common Privet	60-80cm	0/2; Cutting; branched; 3 breaks	15%	123
Vi op	Viburnum opulus	Guelder Rose	60-80cm	1+2: Transplant - seed raised: Branched: 4 brks: B	15%	123
Low Density Native Tree Planting Mix - Maintained to 15m maximum height (plant at 10 m centres in single species groups of 3-5 plants)						
Abbrev	Species Name	Common Name	Height	General Specification	Percentage	Quantity
Ac ca	Acer campestre	Field Maple	80-100cm	1+1: Transplant - seed raised: B	5%	8
Be pu	Betula pubescens	Downy Birch	80-100cm	1+1: Transplant - seed raised: B	5%	8
Il aq	Ilex aquifolium	Common Holly	60-80cm	Leader with Laterals: 5L	5%	8
So au	Sorbus aucuparia	Rowan	80-100cm	1+1: Transplant - seed raised: B	5%	8
Qu pe	Quercus petraea	Sessile Oak	80-100cm	1+2: Transplant - seed raised: B	5%	8
Understorey planting						
Co sa	Cornus sanguinea	Common Dogwood	60-80cm	1+1: Transplant - seed raised: Branched: 3 brks: B	15%	23
Co av	Corylus avellana	Common Hazel	60-80cm	1+2: Transplant - seed raised: Branched: 3 brks: B	15%	23
Co mo	Crataegus monogyna	Common Hawthorn	80-100cm	1+2: Transplant - seed raised: B	15%	23
Li vu	Ligustrum vulgare	Common Privet	60-80cm	0/2; Cutting; branched; 3 breaks	15%	23
Vi op	Viburnum opulus	Guelder Rose	60-80cm	1+2: Transplant - seed raised: Branched: 4 brks: B	15%	23
Trees						
Abbrev	Species Name	Common Name	Height	Girth	General Specification	Quantity
Ac ca	Acer campestre	Field Maple	350-425cm	12-14cm	Heavy Standard: 5 brks: 3x: Clear Stem minimum 200cm: B	16
Qu pe	Quercus petraea	Sessile Oak	350-425cm	12-14cm	Heavy Standard: 5 brks: 3x: Clear Stem 175-200cm: RB	14
Ta ba	Taxus baccata	Yew	350-425cm	12-14cm	Heavy Standard: 5 brks: 3x: Clear Stem 175-200cm: RB	15

Long Term Management Plan

Pruning generally

1. All dead, damaged or diseased tree branches shall be removed and arisings removed from site. Shrubs shall be pruned in the appropriate season (see hedgerows, below) to maintain health and vigour and encroachment on access route/storage areas, etc. Avoid cutting operations from March to August (inclusive) to prevent disturbance of breeding birds.

Hedgerows

2. Hedgerows shall be pruned on one side per year, alternating on a 2 or 3 year rotation in February, and maintained a minimum height of 2.5 - 3m (otherwise stated on the plan) to promote bushy growth while providing continued habitat and foraging opportunities for wildlife. Hedgerow trees shall be encouraged to develop to full maturity.

Retained Grazing Pasture

3. Retained grassland to be sheep-grazed or mown as required to prevent shading of the panels or security features. Areas outside perimeter fence to be mown no more than once annually.

Wildflower Meadow Grassland

4. Meadow grassland within the inner section of the fields (under and around the solar arrays) to be cut as frequently; areas away from the solar panels to be cut annually, in September; and the boundaries of the field to be cut on a rotational three-year cycle.

Scrub

5. Areas to be thinned and trimmed to a height of between 1 and 3 meters on a 3 year rotational basis.

Woodland

6. Carry out selective thinning and coppicing of approximately 30% of plants in Year 5. Leave deadwood and brush piles in situr.

General

7. All soft and hard landscaping shall be inspected annually by the Landscape Contractor and an approved arboriculturist and tree works carried out as necessary to ensure the continued health and safety of the trees. Regular weed control and litter picking operations will be required.

Reproduced from the Ordnance Survey Map with the permission of the Controller of HMSO. Crown Copyright Reserved. Licence No. EMS - 928549.

PLANTING NOTES

General

1. Plant material to conform to the National Plant Specification. Plant handling and planting operations to be in accordance with HTA 'Handling and Establishing Landscape Plants', Parts I-III.
2. Imported topsoil (if required) to BS 3882 Low Fertility Grade and from an approved source. Existing topsoil shall have a maximum 35% clay content and minimum 5% organic content, pH 5.5-8.5 and be free of perennial weeds, weed seeds and contamination. Maximum stone content 20% (>20mm particle size), maximum size of stones 50mm in any direction. Existing topsoil to be ameliorated and/or screened if necessary to achieve this specification.
3. Soil conditioner: Sanitized and stabilised compost to BSI PAS 100. Apply 75mm depth even coverage and incorporate into topsoil during cultivation operations, to a minimum depth of 150mm. Compost to be Compost Association certified, or conforming to the specification from an approved supplier.
4. Mulch planting beds with matured coniferous bark, with an even particle size between 5-35mm, to 75mm minimum depth over weed-free soil after completion of planting and watering operations.

Existing Grazing Pasture

5. Retained grassland - any bare patches arising from installation works to be seeded with an agricultural grassland seed mix.

Wildflower Meadow Grassland

6. Existing arable land to be harrowed in areas indicated for meadow grassland. Do not cultivate within tree root protection areas or within the existing hedgerow but cut manually to 30-50mm during autumn preceding and following seeding. Sow meadow grassland seed mixes into newly harrowed soil in areas indicated, in accordance with supplier's recommendations, in autumn to reduce competition.
7. Extra attention is required in terms of seed bed preparation to encourage good establishment and to cultivate when soil moisture allows breakdown of the soil aggregates into a medium tilth.

Hedgerows

12. Prepare a 0.5m wide x 0.3m deep weed-free trench (or larger if necessary, in order to take the full spread of the roots); the sides and bottom of the trench will be forked over and 'ripped' to facilitate proper drainage, prior to back-filling. The trench to be excavated on the same day as planting and to be back-filled with an appropriate excavated topsoil/ compost mix. Compost will only be used if necessary; should compost be deemed necessary, it to be Compost Association certified, or obtained from a supplier conforming to this specification. Hedgerow to be cultivated by hand only in proximity to existing trees/hedgerow. No herbicide.
13. For existing hedgerows, plant bare root transplants and container-grown shrubs at 0.5m centres on the back of the existing hedgerows and fill any gaps larger than 0.5m. Hand dig with care in proximity to existing hedgerows and do not sever any roots larger than 2.5cm in diameter.
14. For new hedgerows, plant shrubs at 0.5m centres.
15. Transplants to be notch planted and container-grown shrubs to be pit planted (in pits 150mm wider than root spread) ensuring the original root collar is at ground level after backfilling and firming in.
16. Hedgerow plants to be installed with rabbit protection, as follows:

- Transplants, cuttings and seedlings: PP photodegradable tube guards 0.6m high x 50mm diameter or greater to suit girth of shrub/tree, supported by 900mm bamboo cane inserted 300mm below ground level.
- Container-grown shrubs: recycled HDPE photodegradable mesh guards 0.6m high x 150-180mm diameter or greater to suit diameter of shrub, supported by 900mm timber stake inserted 300mm below ground level.
  Ensure protection methods do not restrict natural movement or growth.

Tree and Shrub Planting

17. Plants to be installed with rabbit protection, in the same method as hedgerow plants.
18. Notch plant bare root transplants in rows on a 2.0m grid. Hand dig with care in proximity to existing trees and do not sever any roots larger than 2.5cm in diameter.
19. Tree and shrub species should be agreed with Denbighshire Borough Council and sourced from those grown at the council's tree nursery at St Asaph. With regard to both the proposed native buffer planting and the proposed native scrub planting, species mixes suitable for dormice should be used, which may include species such as hazel (Corylus avellana), oak (Quercus petraea), black poplar (Populus nigra), service tree (Sorbus torminalis), wych elm (Ulmus glabra) (for white letter hairstreak butterfly which may be locally present), lime (Tilia sp.), honeysuckle (Lonicera periclymenum), elder (Sambucus nigra), goat willow (Salix caprea), birch (Betula pendula and/or Betula pubescens), blackthorn (Prunus spinosa), hawthorn (Crataegus monogyna), crab apple (Malus sylvestris) and holly (Ilex aquifolium).
20. No woody species to be planted within 15m from panels.

Planting seasons

21. Planting seasons:

- Deciduous trees and shrubs: Late October to late March
- Conifers and evergreens: September/October or April/May
- Container grown plants: At any time if ground and weather conditions are favourable
- Grass seeding: August/September

LANDSCAPE & BIODIVERSITY MANAGEMENT PLAN
Establishment and Maintenance Period (Years 1-5)

Pruning generally

1. All dead, damaged or diseased tree branches shall be removed and arisings removed from site. Trees and shrubs shall be pruned in the appropriate season to maintain health and vigour and to prevent encroachment on access route/storage areas, etc. The removal of vegetation will be timed for outside of the bird nesting season (March to August inclusive) to prevent disturbance of breeding birds. If this is not possible, a check for active nests will first be undertaken by an ecologist. If a nest is found, an appropriate buffer will be left undisturbed until any chicks have fledged, as confirmed by an ecologist.

Existing & Proposed Hedgerows

2. Hedgerows shall be pruned on one side per year alternating on a 2 or 3 year rotation in February, aiming to maintain a minimum height of 2.5 - 3m to promote bushy growth while providing continued habitat and foraging opportunities for wildlife. Hedgerow trees shall be retained and encouraged to develop to full maturity where not likely to cause overshading of panels.

Shrub

3. Areas to be thinned and trimmed to a height of between 1 and 3 meters on a 3 year rotational basis.
4. Shrub planting to be maintained to 4m maximum height where it is 15-35m from panels.
5. Shrub planting to be maintained to 10m maximum height where it is 35m-60m from panels.
6. Shrub planting areas to be planted with glades/rides for maintenance.

Trees

7. Tree panting to be maintained to 15m maximum height where it is 60m+ from panels.
8. Tree planting areas to be planted with glades/rides for maintenance.

Woodland

9. Re-mulch planting area during years 1-3 to minimise competition from weeds and grasses.

Retained Grazing Pasture

10. Retained grassland inside perimeter fence to be sheep-grazed or mown on a regular basis as required to prevent shading of the panels or security features.
11. Retained grassland outside perimeter fence to be mown no more than once annually to encourage the establishment of a tall sward.

Wildflower Meadow Grassland

12. Meadow grassland within the inner section of the fields (under and around the solar arrays) to be cut as frequently as is required to prevent shading and to provide access; areas away from the solar panels to be cut annually, in September, once established; and the boundaries of the field to be cut on a rotational three-year cycle, once established.
13. Areas outside proposed fencing to be cut on a 3 year rotation.
14. Mowing or strimming of grassland to a height of no less then 15cm shall occur on land located within 250 metres of ponds known to support GCN, as well as the seven reinstated/new ponds proposed.
15. Herbicides or other chemicals shall not be used to control vegetation beneath panels, or elsewhere on site.

Ponds

16. Reinstated or new ponds to have a minimum surface area of 100m2 and be of sufficient depth to hold water in at least one in three summers; they will contain substantial submerged and marginal vegetation to provide cover and egg-laying opportunities, but also have open areas required for courtship and display.
17. Spoil generated from the reinstatement or forming of ponds shall be used to create a series of hibernacula, each measuring at least 2 metres in length, 1 metre in width and 1m in height.

General

18. All areas of planting and grass shall be maintained, to include:
    - Ample irrigation
    - Weed control (herbicide application or hand weeding)
    - Litter picking
    - Topping up of mulch
    - Checking condition of tree stakes and ties

14. All stakes and ties shall be inspected during the growing season and adjusted as necessary to ensure that they are secure and firm and that the ties are not chaffing the stem of the trees. Stakes and ties shall be removed and disposed of when plants become self supporting or at the end of the 5 year establishment period.

15. Planting which fails to thrive or dies during the 5-year establishment period shall be replaced within the next suitable planting season.

The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-

Areas of Landscape Elements	
Landscape Elements	Area (ha) / Length km)
Proposed Native Tree Planting	1.19ha
Proposed Native Shrub Planting	0.65ha
Reinforced Habitat Ponds	0.02ha
Proposed Habitat Ponds	0.07ha
Proposed Aquatic Planting and Emorsgate EP1 or similar	0.09ha
Existing Hedgerow to be Reinforced	2.8km
Proposed Hedgerow	173m
Existing grassland to be maintained as long grassland	5.73ha
Existing grassland within perimeter fence to be retained as grazing pasture or mown	9.43ha
Existing grassland outside perimeter fence to be maintained as tussocky grass with low density tree planting	1.98ha
Proposed Wildflower Meadow EM10 maintained as long grassland	3.58ha
Proposed Wildflower Meadow EM10 (cut every 3 years)	3.76ha
Proposed Wildflower Meadow EH1 (cut annually or more regularly)	2.27ha

Project
St Asaph Solar Farm

Drawing Title
Landscape Strategy Plan: Planting Schedule and Notes Sheet 2 of 2

Date	Scale	Drawn by	Check by
20.12.2024	N/A	OF/ML	DP

Project No	Drawing No	Revision
33010	LN-LP-13	D

Stantec
Stantec UK Limited
7 Soho Square
London
W1D 3QB
T: 020 7446 6888
stantec.com\uk

Appendix C National Legislation and Policy

Ecological Impact Assessment

St Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

29 April 2025

Relevant Legislation and Planning Policy

Legislation

A summary of legislation relevant to (onshore) biodiversity in England and Wales is provided below. Note that the summary provided here is intended for general guidance only and the original legislation should be consulted for definitive information.

Environment Act (2021)

The Environment Act has wide ranging provisions including those around:

- Environmental governance;
- Environmental regulation;
- Waste and resource efficiency;
- Air quality and environmental recall;
- Water;
- Nature and biodiversity;
- Conservation covenants.

Of particular relevance is Part 6 of the Act which introduces "biodiversity gain in planning" and will apply in England to planning applications under the Town & Countryside Act and the Planning Act. Schedule 14 now requires that biodiversity gain be a condition of planning permission in England. These changes will be enacted through subsequent secondary legislation or regulations. This part of the Act also changes the responsibilities that Government or public bodies have by strengthening the existing NERC Act biodiversity duty. Public authorities are now required to seek to conserve and enhance biodiversity in the exercise of their functions.

Conservation of Habitats and Species Regulations 2017 (as amended)

The Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations) consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments. The Regulations transpose Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive), into national law. Under the Habitats Regulations it is an offence to deliberately capture, kill or disturb[1] wild animals listed under Schedule 2 of the Regulations as well as damage or destroy a breeding site or resting place of such an animal (even if the animal is not present at the time). European Sites, including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), are also protected under the Habitat Regulations, and any proposal that could affect them will require a Habitats Regulations Assessment (HRA).

[1] Disturbance, as defined by the Conservation of Habitats and Species Regulations 2010, includes in particular any action which impairs the ability of animals to survive, breed, rear their young, hibernate or migrate (where relevant); or which affects significantly the local distribution or abundance of the species.

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

Part 3 of the regulations provide for the protection of areas of habitats or species where maintenance of the status of water is an important factor. Under the regulations additional consideration may need to be given to sites in the form of a Water Framework Directive (WFD) assessment where a project lies in proximity to a water body or to linked water bodies which could be affected. This includes consideration of whether water bodies are WFD receptors in particular those of high status or have high status morphology.

Environment (Wales) Act 2016

The Environment (Wales) Act puts in place the legislation needed to plan and manage Wales' natural resources in a more proactive, sustainable and joined-up way. Part 1 Section 6 of the Act introduces a new biodiversity duty, which replaces and enhances the biodiversity duties set out in the NERC Act 2006 and requires public authorities to seek to maintain and enhance biodiversity in the exercise of their functions and in so doing promote the resilience of ecosystems.

Section 7 of the Act lists living organisms and types of habitat in Wales, considered to be of key significance to sustain and improve biodiversity in relation to Wales.

Natural Environment & Rural Communities (NERC) Act 2006

Section 40 of the NERC Act 2006 places a duty on public authorities to have regard to the purpose of conserving biodiversity in the exercise of their functions. Public authorities include government departments, local authorities and statutory undertakers.

Section 41 of the Act (Section 42 in Wales) requires the publication of a list of habitats and species publish which are of principal importance for the purpose of conserving biodiversity. The Section 41 list is used to guide authorities in implementing their duty to have regard to the conservation of biodiversity.

Note that Sections 40 and 42 were superseded in Wales by the Environment (Wales) Act 2016 (see below).

Protection of Badgers Act 1992

The Protection of Badgers Act 1992 makes it illegal to kill, injure or take a badger or to intentionally or recklessly interfere with a badger sett. Sett interference includes disturbing badgers whilst they are occupying a sett or obstructing access to it.

Wildlife & Countryside Act 1981

The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way (CRoW) Act 2000 and the Natural Environment and Rural Communities (NERC) Act 2006, consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive), making it an offence to:

- Intentionally kill, injure or take any wild bird or their eggs or nests (with certain exceptions) and disturb any bird species listed under Schedule 1 to the Act, or its dependent young while it is nesting;
- Intentionally kill, injure or take any wild animal listed under Schedule 5 to the Act;

- intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act;
- intentionally or recklessly disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection;
- Pick or uproot any wild plant listed under Schedule 8 of the Act; or
- Plant or cause to grow in the wild any plant species listed under Schedule 9 of the Act.

Planning Policy

A summary of national planning policy relevant to (onshore) biodiversity in England and Wales is provided below. Note that the summary provided here is intended for general guidance only and the original policy documents should be consulted for definitive information. For local planning policy relevant to biodiversity the relevant local plans should be consulted.

National Planning Policy Framework December 2024(England)

The National Planning Policy Framework (NPPF)[2] sets out guidance for local planning authorities and decision-makers in how to apply planning policies when drawing up plans and making decisions about planning applications. Along with Government Circular 06/052, the broad policy objectives in relation to the protection of biodiversity and geological conservation in England through the planning system are set out. Specific policies relating to habitats and biodiversity are set out in paragraphs 187 to 195 of the NPPF.

Paragraph 187 states that:
"Planning policies and decisions should contribute to and enhance the natural and local environment by:

a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development f) should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate".

[2] Ministry of Housing, Communities & Local Government (December 2024). https://assets.publishing.service.gov.uk/media/675abd214cbda57cacd3476e/NPPF-December-2024.pdf

Paragraph 192 states that:
"To protect and enhance biodiversity and geodiversity, plans should:

a) *Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and*
b) *promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity."*

Paragraph 193 of the NPPF states that:
"When determining planning applications, local planning authorities should apply the following principles:

a) *if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
b) *development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;*
c) *development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and*
d) *development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this* is appropriate."

Paragraphs 194 - 195 relate to European sites (referred to as habitats sites) and state:
"The following should be given the same protection as habitats sites:

a) *potential Special Protection Areas and possible Special Areas of Conservation;*
b) *listed or proposed Ramsar sites; and*
c) *sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.*

The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site."

National Planning Policy (Wales)

Planning Policy Wales (PPW)[3] sets out the land use planning policies of the Welsh Government. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic,

[3] Welsh Government. 2018. Planning Policy Wales. Edition 10, December 2018.

environmental and cultural well-being of Wales. Section 6.4 of PPW relates to biodiversity and ecological networks.

Paragraph 6.4.3 of PPW states that:

"The planning system has a key role to play in helping to reverse the decline in biodiversity and increasing the resilience of ecosystems, at various scales, by ensuring appropriate mechanisms are in place to both protect against loss and to secure enhancement."

It goes on to state that:

"Development plan strategies, policies and development proposals must consider the need to:

- *support the conservation of biodiversity, in particular the conservation of wildlife and habitats;*
- *ensure action in Wales contributes to meeting international responsibilities and obligations for biodiversity and habitats;*
- *ensure statutorily and non-statutorily designated sites are properly protected and managed;*
- *safeguard protected and priority species and existing biodiversity assets from impacts which directly affect their nature conservation interests and compromise the resilience of ecological networks and the components which underpin them, such as water and soil, including peat; and*
- *secure enhancement of and improvements to ecosystem resilience by improving diversity, condition, extent and connectivity of ecological networks."*

Section 6.4 goes on to set out policy in respect of:

- The Biodiversity and Resilience of Ecosystems Duty, as set out in Section 6 of the Environment (Wales) Act 2016;
- Designated Sites, including:
  - Sites of Special Scientific Interest;
  - Special Protection Areas, Special Areas of Conservation and Ramsar Sites;
  - Proposed Special Areas of Conservation, Special Protection Areas and Ramsar sites; and
  - Non-statutory Designations.
- Protected Species; and
- Trees, Woodlands and Hedgerows.

PPW is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. TAN 5[4] deals with Nature Conservation and Planning and states in paragraph 2.4:

"When considering policies and proposals in local development plans and when deciding planning applications that may affect nature conservation, local planning authorities should:

- *Pay particular attention to the principles of sustainable development, including respect for environmental limits, applying the precautionary principle, using scientific*

[4] Welsh Assembly Government. 2009. Planning Policy Wales Technical Advice Note 5: Nature Conservation and Planning. September 2009.

knowledge to aid decision making and taking account of the full range of costs and benefits in a long term perspective;

- *Contribute to the protection and improvement of the environment, so as to improve the quality of life and protect local and global ecosystems, seeking to avoid irreversible harmful effects on the natural environment;*
- *Promote the conservation and enhancement of statutorily designated areas and undeveloped coast;*
- *Ensure that appropriate weight is attached to designated sites of international, national and local importance;*
- *Protect wildlife and natural features in the wider environment, with appropriate weight attached to priority habitats and species in Biodiversity Action Plans;*
- *Ensure that all material considerations are taken into account and decisions are informed by adequate information about the potential effects of development on nature conservation;*
- *Ensure that the range and population of protected species is sustained;*
- *Adopt a step-wise approach to avoid harm to nature conservation, minimise unavoidable harm by mitigation measures, offset residual harm by compensation measures and look for new opportunities to enhance nature conservation; where there may be significant harmful effects local planning authorities will need to be satisfied that any reasonable alternative sites that would result in less or no harm have been fully considered."*

Appendix D GCN Report

Ecological Impact Assessment

St Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

29 April 2025

Results of Great Crested Newt Surveys 2022 - 2024

St Asaph Solar Farm

Anesco

The Green, Easter Park, Benyon Road,
Reading, Berkshire, RG7 2PQ

Prepared by:

SLR Consulting Limited

2nd Floor, Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury, SY3 5HJ

SLR Project No.: 406.065274.00001

29 April 2025

Revision 01

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
01	29 April 2025	Amy Gill	Emma Clarke	Gary Oliver

Basis of Report

This document has been prepared by SLR Consulting Ltd (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with Anesco Ltd (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

Table of Contents

Basis of Report i
1.0 Introduction 1
1.1 Background and Context 1
1.2 Site Description 1
1.3 Legislation 2
2.0 Methods 3
2.1 Desk study 3
2.2 Field Survey 3
2.2.1 Context for 2022 Survey 3
2.2.2 Habitat Suitability Index (HSI) Assessment 3
2.2.3 Great Crested Newt eDNA Survey 4
2.2.4 Traditional Survey Methods 5
2.3 Limitations 5
2.4 Quality Assurance and SLR Personnel 6
3.0 Results 7
3.1 Desk Study 7
3.1.1 2022 7
3.1.2 2025 7
3.2 Field Survey 7
4.0 Discussions 16

Tables in Text

Table 2-1 HSI Categories 4
Table 2-2 Summary of Survey Timings and Weather Conditions 5
Table 3-1 Summary of 2022 Survey Results 8

Appendices

Appendix A **Drawing C0002452_01 Site Location**
Appendix B **Drawing C0002452_02 Site Layout**
Appendix C **Figure 3 GCN Survey Results**
Appendix D **Results of Habitat Suitability Index Assessments**
Appendix E **Full Survey Results 2022**
Appendix F **Great Crested Newt eDNA Survey Results 2022**
Appendix G **Great Crested Newt eDNA Survey Results 2024**

1.0 Introduction

SLR Consulting Ltd were appointed by Anesco Ltd in 2022 to undertake great crested newt (GCN) (*Triturus cristatus*) surveys for the proposed solar farm at St Asaph, Denbighshire. The currently application site boundary is broadly centred on National Grid Reference (NGR) SJ 02443 72771 (hereafter referred to as the 'Site'). However, this report contains information pertaining to earlier site boundaries, and clarification has therefore been provided throughout this report as to which application site is being referred to.

This report presents the findings of the traditional surveys and environmental DNA (eDNA) surveys carried out in 2022, and the update eDNA surveys undertaken in 2024.

The assessment of impacts resulting from the proposed development and the identification of mitigation measures are beyond the scope of this report and will be covered in a separate Ecological Impact Assessment (EcIA) report.

1.1 Background and Context

SLR Consulting Limited were first instructed to provide ecological support in relation to the proposed solar farm at St Asaph in December 2021. Since that date, extensive ecological surveys have been undertaken which have fed into the Site design and final layout.

In 2022, the survey area encompassed parts of the current Site boundary and other fields which are excluded from the current application site; however, all of the information gathered has been presented here, for context, and to show the distribution of GCN ponds in the wider landscape. For the avoidance of doubt Figure 3 – GCN Survey Results (Appendix C) shows the current Site boundary, and all ponds which were surveyed during 2022/2024.

In 2022, surveys were carried out over an extensive area, which encompassed the application site which applied at the time, and land up to 500 metres from this boundary.

The survey approach and extent were scoped and agreed with Senior Species Advisor for Natural Resources Wales (NRW), prior to commencement of survey work, with continued collaboration occurring throughout the process.

1.2 Site Description

The Site is situated in Denbighshire, approximately 1km to the southwest of the settlement of St Asaph, and approximately 8km south of the seaside town of Rhyl. The location of the Site is shown in Drawing C0002452_01 (Appendix A) and the Site boundary is shown in Drawing C0002452_02 (Appendix B). The Site consists of the main Solar Site and the Cable Route, connecting to the St Asaph Substation.

The Solar Site is approximately 35.42ha in extent and is divided into two areas approximately 250m apart. The Western Parcel is a set of four fields approximately centred on NGR SJ 02123 72727 and the Eastern Parcel is a set of three fields approximately centred on NGR SJ 02644 72614. The fields consist of modified grassland, of a short to medium sward length used for cattle and sheep grazing. The boundaries of the fields consist of flailed hedgerows, some containing mature trees, and of semi-natural, lowland mixed deciduous woodland.

The Cable Route is limited to highways that connect the Solar Site to St Asaph Substation. This includes the track to Tyn Y Coed, Glascoed Road, and Cwttir Lane.

The wider landscape is generally farmland used for grazing or arable crops, there are also several woodlands, some of which are ancient.

1.3 Legislation

The great crested newt is fully protected through inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2019 (The Habitats Regulations). In brief, this legislation makes it offence to:

- deliberately kill, injure, or take a great crested newt;
- deliberately disturb a great crested newt in such a way as to be likely to impair their ability to survive, breed or reproduce, or rear or nurture their young; to hibernate or migrate; or to affect significantly the
- local distribution or abundance of that species;
- deliberately take or destroy the eggs of great crested newt;
- damage or destroy the breeding or resting place of a great crested newt;
- intentionally or recklessly obstruct access to a place that great crested newt use for shelter or protection; and
- intentionally or recklessly disturb a great crested newt whilst it is occupying a place which it uses for shelter or protection.

They are also listed on Section 7 of the Environment Act (Wales) as species of principle importance for the purpose of maintaining and enhancing biodiversity in relation to Wales.

2.0 Methods

2.1 Desk study

In 2021, Cofnod the local environmental record centre for North Wales was contacted for pre-existing biological records of protected or otherwise notable species, including great crested newt, for land within a 2km radius of the 2022 Site boundary; this was updated in 2025 to cover all land within 2km of the updated Solar Site boundary; this additional data was obtained on the 12th February 2025.

2.2 Field Survey

2.2.1 Context for 2022 Survey

In agreement with NRW, ponds which lay within the 2022 site boundary, were subjected to 'traditional' survey over the course of three survey visits (refer to Section 2.4 for a description of the methods used), then an eDNA survey was undertaken (if a positive result had not already been determined through traditional methods). If great crested newt were recorded or a positive eDNA result was derived during these surveys, the pond concerned was subject to six survey visits in total, in order to establish its 'population size class'. However, if after three visits no GCN had been recorded and the eDNA test yielded a negative result (i.e. no traces of GCN DNA present), the pond concerned was not subject to further survey.

Ponds which lie outside of but within 250m of the 2022 site boundary were subject to a Habitat Suitability Index (HSI) assessment, one traditional survey and one eDNA survey initially. If the pond scored higher than 'Average' on the HSI survey or returned a positive result in either of the other two surveys initially carried out, two additional surveys using traditional survey methods were undertaken. If the pond scored 'Average' or lower on the HSI survey, one additional survey was carried out. However, if both initial surveys concluded a negative result, the pond was not subject to further survey.

Evident and accessible ponds within 500 metres of the 2022 site boundary, but further than 250m from its boundary were subject to a single eDNA survey.

2.2.2 Habitat Suitability Index (HSI) Assessment

All ponds within the 2022 site boundary and within a 250m buffer, where accessible, were subject to a HSI assessment on the 23rd March 2022. All additional ponds within 500m of the 2022 site boundary, where accessible, were subject to a HSI assessment on the 29th June 2022.

Great crested newt HSI scores are calculated using ten parameters: location; pond area; frequency of pond drying; water quality; shade; waterfowl; fish; presence of other ponds in the area; terrestrial habitat; and macrophyte communities. Each parameter scores a value of between 0.01 and 1. These scores are then multiplied and 'rooted' to produce a geometric mean score, of between 0 and 1.

The categorical scale shown in Table 2-1 was then used to estimate the overall suitability of the water body concerned, for breeding GCN.

Table 2-1 HSI Categories

HSI Score	Pond Suitability for GCN
<0.5	Poor
0.5 – 0.59	Below Average
0.6 – 0.69	Average
0.7 – 0.79	Good
>0.8	Excellent

2.2.3 Great Crested Newt eDNA Survey

All eDNA sampling was carried out in accordance with the Natural Resources Wales approved technical advice note[1]. As such twenty samples were collected from each pond using sterile equipment provided by ADAS, at points evenly spread out along the pond perimeters, such that a minimum of 80% of the margins were sampled, where this was safe to do so. The water at each sampling area was gently stirred using a sterile ladle before samples were taken, to mix up DNA which tends to sink, whilst ensuring that sediment on the pond bottom was not disturbed, where historical DNA can persist.

The samples were then fixed in an ethanol preserving solution, and sent to ADAS laboratory for analysis, using the Natural Resources Wales approved method[1]. According to Biggs *et al.* (2014)[1] GCN DNA can be detected within the pond water for up to 21 days after a GCN (including efts) has left the water; a 99.3 % detection rate is achieved when 80 – 90 % of the waterbody margin is sampled.

In order to avoid contamination, the surveyors avoided entering the water. Latex gloves were worn when sampling and only sterile equipment came into contact with the water.

2.2.3.1 2022

All ponds within the 2022 site boundary and those within 250m of it which had not already concluded a positive result using traditional methods on the first two visits (i.e. Ponds 1, 2, 4, 5, 6, 7, 8, 16, 22, 25, 28, 29, 30, 31, and 34) were sampled on 19th and 20th April 2022 (refer to Figure 3 – GCN Survey Results (Appendix C) for pond locations).

The four evident and accessible ponds located within 500m of the 2022 site boundary but beyond 250m of it (Ponds 23, 36, 50 and 51) were subject to eDNA survey on the 29th of June 2022.

Pond 29 returned an ‘indeterminate’ eDNA result, therefore this pond was subject to an additional survey using traditional methods.

2.2.3.2 2024

In 2024 a further eDNA survey was conducted of ponds within an interim application site boundary (2024 site boundary), and up to 500m of it. This included ponds within the new

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

buffer zones, ponds where access was not possible in 2022, dry ponds from 2022 if they held water in 2024, and of ponds which has previously tested negative for GCN DNA in 2022, in case of change.

This work updated previous surveys, sampling was carried out on 24th June 2024.

2.2.4 Traditional Survey Methods

Traditional survey methods were carried out between the 23rd of March and the 30th of May 2022, during appropriate weather conditions. A summary of survey timings and weather conditions is provided in Table 2-2 below.

Table 2-2 Summary of Survey Timings and Weather Conditions

Date	Temperature (°C)	Wind (Beaufort scale)	Rain	Wind (0-8)
23/03/22	9	0	None	0
05/04/22	10	3	Light showers	8
19/04/22	9	0	None	5
18/05/22	14	3	Drizzle	6
23/05/22	11	3	Drizzle	7
30/05/22	10	1	None	3

2.2.4.1 Torchlight Counts

The surveyors walked slowly around the perimeter of each pond after dark and scanned the water's edge with a powerful torch, recording the number of great crested newts, additionally making a note of the presence of other amphibian species, if present.

2.2.4.2 Bottle Trapping

In cases where the water had sufficient depth and bottle trapping was considered to be an ineffective or sub-optimal survey technique, newt traps, comprising of open 2 litre plastic drink bottles attached to a bamboo cane, were deployed after sunset around the perimeter of each pond, at 2 metre intervals. Each trap was submerged in the water at an angle, leaving a small air pocket in the bottle (to avoid potentially suffocating any captured newts, or other amphibians). The traps were then checked for newts early the following morning, before being released. and the traps removed from the pond.

2.2.4.3 Egg Search

The surveyors checked the leaves of water plants within each pond for great crested newt eggs (which can be distinguished from the eggs of other newt species by their size and colour). This can be an effective survey technique, as the female folds the leaf over each egg, which can result in giving the leaf a characteristic 'concertina' appearance when multiple eggs are laid.

2.3 Limitations

Several of the ponds were dry or too shallow to survey on all, or a proportion of the visits, as detailed within Section 3.2.

A relatively small number of ponds had restricted access due to either dense marginal vegetation and/or deep, soft sediment at the base of the pond, making them unsafe to enter. Ponds with restricted access from the margin were Ponds 1, 4, 8, 16, 18, 21, 24, 25, 28, 29, and 30. All ponds received either eDNA testing and/or traditional methods of survey where accessible, with GCN presence found in five of the ponds.

A number of ponds were too shallow and/ or had livestock within the field at the time of survey, making it potentially unsafe to bottle trap at risk of the livestock knocking over the traps during the night; specifically this relates to Ponds 2, 5, 7, 16, 17, 19, 22, 28, 31, and 33. Five of these tested negative for GCN eDNA (2, 16, 22, 28, 31) and in Ponds 17, 19 and 33, GCN were found via torching.

A small number of ponds were found to have high levels of aquatic vegetation, obscuring the view into them, these include Ponds 6 and 34. Presence of GCN was found in both. For Pond 6, on three of the survey occasions vegetation cover (duckweed in this case) covered at least 50% of the pond's surface, making torching less effective, however, egg searching and bottle trapping were carried out each time. For Pond 34, on the first survey in April, the pond was chocked with vegetation and by the second survey in May the pond was dry; eDNA testing carried out on 20th April was positive, showing that GCN were present at that time, however any eggs would not have survived the season, due to it drying out shortly afterwards. The pond in its current state is extremely shallow, and not capable of supporting a viable GCN breeding population (see photograph in Table 3-1).

SLR did not have permission to access twelve of the ponds (37 ,38, 41, 42, 54, 55, 56, 57, 58, 59, 60, 61) within the 2022 survey season. Due to changes in the application site boundary, ponds 41, 42, 55, 56, 57 and 58 now lie further than 500m from the current Site boundary. Ponds 54, 59, 60 and 61 were accessed for eDNA survey in 2024. These ponds lie to the northwest of the Western Parcel and are associated with the Gwynt y Mor Offshore Windfarm Substation and have recent records of GCN presence as provided by Cofnod, details provided in Table 3-1.

The locations of all above-mentioned ponds are provided in Figure 3 – GCN Survey Results (Appendix C).

2.4 Quality Assurance and SLR Personnel

All survey work was undertaken by Accredited Agents under the NRW GCN survey licence S090015/1.

All ecologists employed by SLR Consulting Ltd follow the Chartered Institute of Ecology and Environmental Management's (CIEEM) code of professional conduct when undertaking ecological work. All work is subject to internal review as part of SLR's Quality Assurance procedure. This report has been written by Senior Field Ecologist, Amy Gill, qualifying member of CIEEM, and reviewed by Senior Ecologist, Emma Clarke qualifying member of CIEEM, and approved by Principal Ecologist, Mr Gary Oliver, MCIEEM CEnv.

3.0 Results

3.1 Desk Study

3.1.1 2022

The Cofnod data search identified 146 records of GCN within the 2km search area, although no records were supplied for the 2022 application site. Most of the records relate to ponds within the St Asaph Business Park, located approximately 950m to the north-west of the current Site boundary (central OS grid ref: SJ 01567 73930), with the closest of these ponds lying 600m metres from the Site boundary.

The Cofnod data included historic records of GCN from ponds that were included in the 2022 surveys undertaken by SLR, specifically for Ponds 19 and 24, the details of which are included within Table 3-1.

GCN records were also provided for ten further ponds, which were not surveyed by SLR Consulting during 2022, which have been included in Table 3-1 as Ponds 42, and 54 to 61 and illustrated in Figure 3 – GCN Survey Results (Appendix C).

3.1.2 2025

The data search was updated in 2025, Cofnod returned 157 records of great crested newt (GCN) (*Triturus cristatus*) with three records being within 100m of the current Solar Site, these included two records associated with Pond 24, located just outside the Eastern Parcel, and one record 65m outside of the Western Parcel (Pond 19). All the records date from between 2003-2020. There were another five GCN records provided for ponds located within 500m of the Solar Site.

Additionally, Cofnod returned the following records of other amphibians within 2km of the Solar Site boundary:

- 95 records of smooth newt (*Lissotriton vulgaris*), between 1993-2024, with the nearest being 313m northwest from the current Site;
- 61 records of common toad (*Bufo bufo*), between 1993-2020, with the nearest being 434m northwest from the current Site;
- 44 records of palmate newt (*Lissotriton helveticus*), between 2002-2024, with the nearest being 422m north from the current Site; and
- 44 records of common frog (*Rana temporaria)*, between 1968-2024, with the nearest being 11m northeast from the current Site.

3.2 Field Survey

Table 3-1 provides summary details for each pond, including a photograph if it held water, its HSI assessment score and value, along with the peak count of GCN recorded in any of the survey visits.

Full HSI data is provided in Appendix D, whilst Appendix E contains the results for each pond during each of the separate surveys. Appendix F contains the results of the eDNA analysis carried out in 2022 and Appendix G the results of the eDNA analysis carried out in 2024.

Table 3-1 Summary of 2022 Survey Results

Pond Nº	Easting	Northing	Plate	HSI	GCN eDNA	Peak count
1	302383	373469		0.74 - Good	Negative	0
2	302259	373336		0.68 - Average	Negative	0
3	302228	373273	Dry pond			
4	302166	373164		0.61 - Average	Negative	0
5	302085	373142		0.66 – Average	Positive	0

Pond Nº	Easting	Northing	Plate	HSI	GCN eDNA	Peak count
6	302131	372994		0.82 - Excellent	Positive	1
7	302088	372891		0.75 - Good	Positive	0
8	301954	372888		0.72 - Good	Positive	0
9	301828	372819	Dry pond			
10	301841	372729	Dry pond			
11	301681	372501	Dry pond			
12	301750	372349	Dry pond			
13	301745	372318	Dry pond			
14	301904	372327	Dry pond			
15	302177	372095	Dry pond			
16	302207	372669		0.42 - Poor	Negative	0

Pond Nº	Easting	Northing	Plate	HSI	GCN eDNA	Peak count
17	302231	372620		0.66 - Average	N/A	1
18	302259	372855		0.59 - Below Average	N/A	1
19	302313	372955		0.70 - Good	N/A	2 3 positive records from desk study results between 1993 and 2004. No specific numbers provided.
20	302373	373058	Dry pond			
21	302440	373139		0.72 - Good	N/A	2
22	302362	372632		0.64 - Average	Negative	0

Pond Nº	Easting	Northing	Plate	HSI	GCN eDNA	Peak count
23	302645	373296		0.74 - Good	Positive	N/a
24	302730	373036		0.81 - Excellent	N/A	3 3 positive records from desk study results between 1993 and 2004. No specific numbers provided.
25	302740	372972		0.82 - Excellent	Negative	0
26	302591	372806	Dry pond			
27	302727	372701	Dry pond			

Pond Nº	Easting	Northing	Plate	HSI	GCN eDNA	Peak count
28	302953	372526		0.67 - Average	Negative	0
29	303016	372412		0.61 - Average	Indeterminate	0
30	302572	372058		0.66 - Average	Positive	0
31	302433	372163		0.7 - Good	Negative	0
32	302485	372580	Dry Pond			

Pond Nº	Easting	Northing	Plate	HSI	GCN eDNA	Peak count
33	302896	372673		0.67 - Average	N/A	4
34	302068	372795		0.63 - Average	Positive	0
36	303154	372856		0.56 – Below average	Positive	N/A
37	302438	371895	No Access			
38	302362	371908	No Access			
39	302719	372205	Dry Pond			
40	301741	373354	Dry Pond			
41	301728	373488	No Access			
42	301786	373492	No Access Desk study search revealed 8 records within this pond between 2015 and 2019. This a peak count of 2 males and 1 female GCN.			

Pond Nº	Easting	Northing	Plate	HSI	GCN eDNA	Peak count
43	302855	373332	Dry Pond			
44	301774	372185	Dry Pond			
45	301856	371972	Dry Pond			
46	301638	372318	Dry Pond			
47	301457	372563	Two Dry Ponds			
48	301691	372946	Dry Pond			
49	301763	372998	Dry Pond			
50	301782	373101		0.68 - Average	Positive	N/A
51	302839	373489		0.61 - Average	Negative	N/A
52	302931	371766	Dry Pond			
53	302708	373448	Dry Pond			

Pond Nº	Easting	Northing	Plate	HSI	GCN eDNA	Peak count
54	301900	373408	Cofnod data refers to pond as Substation P2 Records between 23/05/18 and 14/05/20 had a peak count of 3x female and 1 x male GCN.			
55	301909	373475	Cofnod data refer to pond as Substation P3 Records between 07/05/15 and 15/05/19 had a peak count of 1x male and 1 x female GCN.			
56	302176	373512	Cofnod data refers to pond as Substation Pond BB9 Records between 14/05/20 and 16/05/2020 had a peak count of 4x male and 3 x female GCN.			
57	302143	373533	Cofnod data refers to pond as Substation Pond BB8 Records between 19/06/18 and 14/05/21 had a peak count of 1x male and 2 x female GCN.			
58	301913	373639	Cofnod data refers to ponds a Substation P4 Records between 07/05/15 and 13/05/16 had a peak count of 5x male and 2x female GCN.			
59	301938	373383	Records between 16/04/20 and 14/05/21 had a peak count of 1 x male and 1 x female GCN.			
60	301945	373407	Record of 1 x male GCN on 16/04/2020.			
61	301948	373426	Peak count of 1 x male and 3 x female GCN between 25/04/2019 and 14/05/2020.			

4.0 Discussions

Of the six ponds found within the final Site boundary, three have been found to support GCN. Of these, GCN were confirmed within two ponds (P34 and P7) via eDNA analysis, with no GCN being detected using traditional survey methods. The remaining pond (P18) had a peak count of one GCN. Ponds 16, 26 and 27 were found to be dry. Within a 250m radius of the main Solar Site boundary an additional eleven ponds have been found to support GCN, of these five (P5, P8, P23, P25 and P30) were confirmed via eDNA analysis. Ponds 5, 8 and 30, were surveyed in 2022 and found to support no GCN via traditional survey. Six ponds (P6, P17, P19, P21, P24, P33) were found to support GCN during traditional survey, with peak counts of between 1 and 4 individuals.

At individual ponds the population of GCN in considered to be 'small' as per the mitigation guidelines[2] i.e. less than 10 individual GCN recorded on one survey. The highest peak count for the whole survey area (all ponds within Site and 250m buffer) was 11 recorded on the 19th- 20th April 2022, indicating a 'medium' population, i.e. between 11-100, albeit at the lower end of this scale.

The surveys undertaken by SLR also confirmed the presence of smooth newt, common frog and common toad within the survey area. Based on the data search results, palmate newt may also be present but was not recorded.

[2] Great crested newt mitigation guidelines

Appendix A Drawing C0002452_01 Site Location

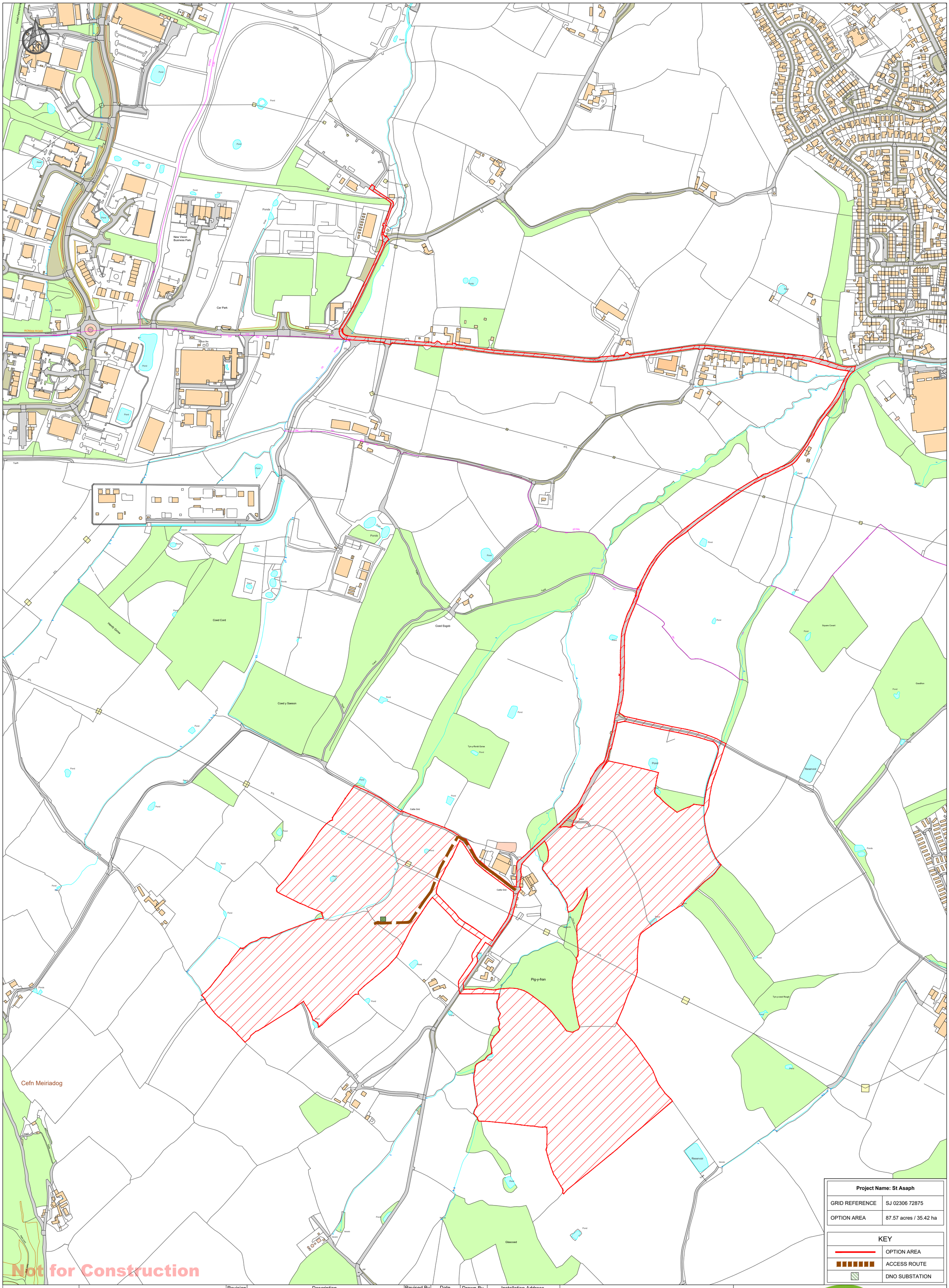
Results of Great Crested Newt Surveys 2022 - 2024

St Asaph Solar Farm

Anesco

SLR Project No.: 406.065274.00001

29 April 2025



Project Name: St Asaph	
GRID REFERENCE	SJ 02306 72875
OPTION AREA	87.57 acres / 35.42 ha

KEY	
	OPTION AREA
	ACCESS ROUTE
	DNO SUBSTATION

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

0 50 100 150 200

Ordnance Survey, (c) Crown Copyright 2020.
All rights reserved. Licence number 100022432

Revision	Description	Revised By	Date
A	Issued for comment	MS	20/10/2020
B	Land reduced from the North and extended to the South	MS	05/03/2021
C	Area of Land has been altered and the DNO substation moved	MS	04/05/2021
D	Area of Land has been altered and the DNO substation moved	MS	12/05/2021
E	Site area amended	JH	22/11/2023
F	Red Line Boundary amended & access track added in the North	JH	12/12/2023
G	Red Line Boundary amended	MS	10/06/2024
H	Red Line Boundary amended	MS	13/11/2024
J	Red Line Boundary amended	RD	26/03/2025

Drawn By: RD

Scale: 1:5000@ A2

Sheet Size A2

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

Project: St Asaph

Title: Location Plan

Drawing No.: C0002452_01

Rev.: J

Anesco™ AMAZING ENERGY

Appendix B Drawing C0002452_02 Site Layout

Results of Great Crested Newt Surveys 2022 - 2024

St Asaph Solar Farm

Anesco

SLR Project No.: 406.065274.00001

29 April 2025

Not for Construction

New Vision Business Park

Car Park

Coed Cord

Hendy Gorse

Coed y Saeson

Coed Esgob

Tyn-y-ffordd Gorse

Pig-y-fran

Square Covert

Tyn-y-coed Rough

Reservoir

Glascoed

Ponds

Pond

Track

Drain

Issues

FB

Silo

Slurry Pit

Sub Sta

FS

LB

GUARDED ROAD

LOW CROSS ROAD

34.1m

36.0m

41.4m

47.2m

65.9m

LEGEND

	SITE BOUNDARY
	SECURITY FENCE
HV HV	OVERHEAD ELECTRICAL CABLES (24m/14m OVERALL EASEMENT)
	DNO ACCESS ROUTE
	HV CABLE ROUTE - TRENCH
	LV CABLE ROUTE - TRAY
	PRIVATE HV CABLE ROUTE - TRENCH
BT BT	BT OVERHEAD CABLE
W W	UNDERGROUND WATER TRUNK MAIN
	UTILITY EASEMENT
	HARDSTANDING AREA
	PROPOSED CULVERT CROSSING
	PROPOSED HEDGE REMOVAL FOR TRACK WIDENING
	FENCE PLACEMENT & HEDGE REGROWTH AREA
	PROPOSED TREE REMOVAL
	PV ARRAY
	INVERTER (SUN2000-330KTL)
	SMART TRANSFORMER STATION (JUPITER-6000K/JUPITER3000K)
	DNO SUBSTATION
	CUSTOMER SUBSTATION (PV)

PROJECT NAME: ST ASAPH	
GRID REFERENCE :	SJ 02300 72873
SITE AREA:	87.57Acres / 35.42 ha
TOTAL INSTALLED CAPACITY:	18.44MWp
MAX INVERTER AC POWER:	18.304MW

0 10 20 40 60 80 100

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

Revision	Description	Revised By	Date
A	Issued for comment	MS	19/11/2020
B	Land reduced from the North and extended to the South	MS	05/03/2021
C	Boundary Line Extended	MS	05/05/2021
D	Boundary Line Extended and site maximised	MS	12/05/2021
E	Planning Site Layout	JH	10/11/2021
F	Module Wattage Changed	MS	07/12/2021
G	Site resign to 215KTL & Bifacial Modules	JH	02/03/2022
H	Site redesigned due to tree shading implications	MS	16/06/2022
J	Red Line Boundary amended to include Private HV	JH	03/08/2022
K	Site redesign	JH	15/05/2023
L	Site redesign using new modules and new private HV cable	JH	06/07/2023
M	Site area amended and module redesign	JH	22/11/2023
N	DNO Track Added	LD	28/11/2023
P	Red Line Boundary amended & access track added in the North	JH	12/12/2023
Q	Redesign due to array relocation	JS	19/03/2024
R	Redesign	MS	01/08/2024
S	Access Altered	MS	20/09/2024
T	Hedgerow added and panel locations amended	MS	11/11/2024
U	Inverters added	RD	20/01/2024
V4	Topo and service searches added	RD	31/03/2025

Drawn By: JH

Scale: 1:3000@ A1

Sheet Size A1

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

Project: St Asaph

Title: Site layout planning

Drawing No.: C0002452_02

Rev.: V4

Anesco™ AMAZING ENERGY

Appendix C Figure 3 GCN Survey Results

Results of Great Crested Newt Surveys 2022 - 2024

St Asaph Solar Farm

Anesco

SLR Project No.: 406.065274.00001

29 April 2025

301200 301600 302000 302400 302800 303200 303600

373600 373200 372800 372400

N

P58 P57 P56 P41 P42 P55 P61 P54 P60 P59 P40 P1 P53 P51 P64 P43 P67 P23 P2 P3 P4 P5 P21 (2) P20 P50 P68 P49 P48 P69 P6 (1) P19 (2) P24 (3) P25 P63 P66 P65 P36 P8 P7 P9 P18 (1) P34 P26 P10 P27 P16 P17 (1) P22 P32 P33 (4) P28 P47 P11 P29 P12 P46 P13 P14 P44 P39 P31 P15 P30 P45 P38 P37 P52

0 200 400

Metres

LEGEND

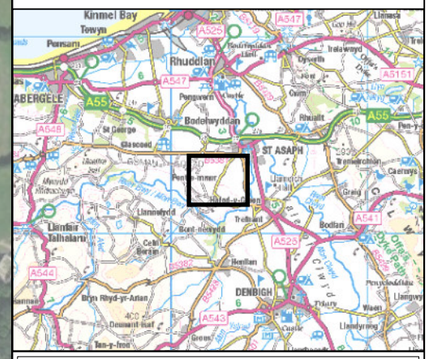
- Site Boundary
- Site Boundary 250m and 500m Buffers

Surveyed Pond 2024

- Dry
- eDNA Negative
- eDNA Positive

Surveyed Pond 2022

- GCN recorded by traditional methods (peak count in brackets)
- eDNA positive but GCN not recorded during traditional survey methods
- eDNA indeterminate, but GCN not recorded using traditional survey methods
- eDNA negative i.e. GCN absent
- Pond dry
- eDNA positive but pond located more than 250m from site boundary, and therefore not subject to population size class counts
- GCN present in Cofnod desk study data, but inaccessible at time of 2022 survey
- No access to survey



Anesco™

SLR

ST ASAPH

406.065274.00001

GCN SURVEY RESULTS

FIGURE 3

Scale	Date
1:9,000 @ A3	APRIL 2025

406.065274.00001.0005.0 GCN Survey Results

© Crown copyright [and database rights] (2025) AC0000808122 OS OpenData.
Aerial Imagery (2019) Source: Maxar, Microsoft

© This drawing and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.

Appendix D Results of Habitat Suitability Index Assessments

Results of Great Crested Newt Surveys 2022 - 2024

St Asaph Solar Farm

Anesco

SLR Project No.: 406.065274.00001

29 April 2025

Pond #	Easting	Northing	Date of HSI	Location	Area	Permanence	Water quality	Shade	Waterfowl effect	Fish	Pond density	Terrestrial habitat	Macrophyte cover	HSI score	HSI rating
1	302383	373469	24/01/22	1	1	0.9	0.67	1	0.67	0.67	1	0.33	0.5	0.73	Good
2	302259	373336	24/01/22	1	0.1	0.5	0.67	0.6	1	1	1	1	1	0.68	Average
4	302166	373164	24/01/22	1	0.1	0.5	0.67	0.6	1	1	1	0.33	1	0.61	Average
5	302085	373142	24/01/22	1	0.1	0.9	0.67	0.8	0.67	0.67	1	1	0.7	0.66	Average
6	302131	372994	24/01/22	1	0.1	0.9	0.67	0.6	1	1	1	1	1	0.82	Excellent
7	302088	372891	24/01/22	1	1	0.5	0.33	1	1	1	1	0.33	1	0.75	Good
8	301954	372888	24/01/22	1	0.2	0.9	0.67	1	1	1	1	0.33	1	0.72	Good
16	302207	372669	24/01/22	1	0.1	0.1	0.33	0.4	1	1	1	0.33	0.4	0.42	Poor
17	302231	372620	24/01/22	1	0.1	0.5	0.67	1	1	1	1	0.67	0.7	0.66	Average
18	302259	372855	24/01/22	1	0.1	0.5	0.33	1	1	1	1	0.33	1	0.59	Below average
19	302313	372955	24/01/22	1	0.4	0.9	0.67	0.8	0.67	0.67	1	0.33	1	0.7	Good
21	302440	373139	24/01/22	1	0.7	0.9	0.33	1	0.67	1	1	0.33	0.8	0.72	Good
22	302362	372632	24/01/22	1	0.3	0.9	0.67	1	0.67	1	1	0.33	0.3	0.64	Average
23	302645	373296	29/06/22	1	0.2	0.9	0.67	1	1	1	1	0.67	0.6	0.74	Good
24	302730	373036	24/01/22	1	0.8	0.9	0.67	1	1	1	1	0.67	0.4	0.81	Excellent
25	302740	372972	24/01/22	1	0.2	1	0.67	1	1	1	1	1	1	0.82	Excellent
28	302953	372526	24/01/22	1	0.07	1	0.67	0.4	1	1	1	1	1	0.67	Average
29	303016	372412	24/01/22	1	0.1	0.1	0.67	1	1	1	1	1	1	0.61	Average
30	302572	372058	24/01/22	1	0.1	0.9	0.67	1	1	1	1	0.67	0.4	0.66	Average
31	302433	372163	24/01/22	1	0.6	0.9	0.67	0.6	0.67	1	0.7	0.67	0.4	0.7	Good
33	302896	372673	24/01/22	1	0.2	1	0.67	0.4	1	1	1	1	0.35	0.67	Average
34	302068	372795	24/01/22	1	0.2	0.5	0.33	1	1	1	1	0.33	0.9	0.63	Average
36	303151	372857	29/06/22	1	0.3	0.5	0.33	0.6	1	1	1	0.33	0.3	0.56	Below average
50	301779	373101	29/06/22	1	0.2	1	0.33	1	1	1	1	0.67	0.5	0.68	Average
51	302833	373490	29/06/22	1	0.2	0.5	0.33	0.6	1	1	1	0.67	0.5	0.61	Average

Appendix E Full Survey Results 2022

Results of Great Crested Newt Surveys 2022 - 2024

St Asaph Solar Farm

Anesco

SLR Project No.: 406.065274.00001

29 April 2025

Pond #	Easting	Northing	Visit #	Date	Vegetation cover	Turbidity (0-5)	GCN torching			GCN bottle trap			GCN egg (+/-)	Other amphibians	Comments
							Male	Female	Juvenile	Male	Female	Juvenile			
1	302383	373469	1	19/04/22	1	3	0	0	0	N/A	N/A	N/A	-	None.	Steep sided pond
2	302259	373336	1	19/04/22	2	2	0	0	0	N/A	N/A	N/A	-	3x smooth newt, 2x undetermined small newt (female palmate or smooth newt).	Too shallow to trap
4	302166	373164	1	23/03/22	3	1	0	0	0	N/A	N/A	N/A	-	None.	Unable to bottle trap due to boggy area around pond edge.
	302166	373164	2	05/04/22	2	0	0	0	0	N/A	N/A	N/A	-	1x common toad.	Light showers throughout survey. Edges drying, grass encroaching.
	302166	373164	3	19/04/22	3	1	0	0	0	N/A	N/A	N/A	-	None.	Difficult to access pond perimeter due to boggy edge.
5	302085	373142	1	19/04/22	2	2	0	0	0	N/A	N/A	N/A	-	None.	Too shallow to bottle trap.
	302085	373142	2	23/05/22	2	1	0	0	0	N/A	N/A	N/A	-	None.	Drizzle rain throughout.
6	302131	372994	1	23/03/22	5	N/A	N/A	N/A	N/A	0	0	0	-	1x smooth newt, 1x common toad.	Duckweed covering >90% of the pond surface so unable to torch and determine turbidity
	302131	372994	2	05/04/22	1	3	0	0	0	0	0	0	-	11x common toad.	Water boatmen, larger beetles present.
	302131	372994	3	19/04/22	5	N/A	N/A	N/A	N/A	0	0	0	-	None.	Duckweed covering >95% of the pond surface so unable to torch and determine turbidity
	302131	372994	4	18/05/22	3	2	1	0	0	0	0	0	-	6x smooth newt.	Very light rain. Duckweed covering 50% of pond. Veg cover score includes this
	302131	372994	5	23/05/22	4	3	0	0	0	0	0	0	-	2x smooth newt, 1x common frog.	-
	302131	372994	6	30/05/22	3	3	0	0	0	1	0	0	-	3x smooth newt, 1x undetermined small newt (female palmate or smooth newt).	-
7	302088	372891	1	19/04/22	2	4	0	0	0	N/A	N/A	N/A	-	None.	Pond quite turbid therefore difficult to survey, unable to bottle trap due to boggy water edge.
	302088	372891	2	23/05/22	3	4	0	0	0	N/A	N/A	N/A	-	None.	Unable to bottle trap due to shallow pond and cattle.
	302088	372891	3	30/05/22	4	4	0	0	0	N/A	N/A	N/A	-	None.	Unable to bottle trap due to shallow pond and cattle.
8	301954	372888	1	19/04/22	2	1	0	0	0	N/A	N/A	N/A	-	1x smooth newt, 1x undetermined small newt (female palmate or smooth newt).	Unable to bottle trap due to boggy area around waters edge
	301954	372888	2	23/05/22	3	1	0	0	0	N/A	N/A	N/A	-	1x undetermined small newt female	Unable to bottle trap due to boggy area around waters edge

Pond #	Easting	Northing	Visit #	Date	Vegetation cover	Turbidity (0-5)	GCN torching			GCN bottle trap			GCN egg (+/-)	Other amphibians	Comments
							Male	Female	Juvenile	Male	Female	Juvenile			
														palmate or smooth newt).	
	301954	372888	3	30/05/22	4	0	0	0	0	N/A	N/A	N/A	-	1x undetermined small newt (female palmate or smooth newt).	-
16	302207	372669	1	23/03/22	1	1	0	0	0	N/A	N/A	N/A	-	None.	Unable to bottle trap due to boggy area around water's edge.
	302207	372669	2	05/04/22	2	2	0	0	0	N/A	N/A	N/A	-	None.	Small pond, very shallow – couldn't bottle trap.
	302207	372669	3	19/04/22	2	2	0	0	0	N/A	N/A	N/A	-	None.	Pond small now, not holding much water.
17	302231	372620	1	19/04/22	2	2	1	0	0	N/A	N/A	N/A	-	None.	-
	302231	372620	2	23/05/22	2	3	0	0	0	N/A	N/A	N/A	-	1x undetermined small newt (female palmate or smooth newt).	Too shallow and boggy at edges to bottle trap.
18	302259	372855	1	23/03/22	2	2	1	0	0	N/A	N/A	N/A	-	2x smooth newt.	Unable to bottle trap due to boggy area around waters edge
	302259	372855	2	05/04/22	2	2	0	0	0	N/A	N/A	N/A	-	None.	Turbid in middle, boggy / grassy at edges.
	302259	372855	3	19/04/22	2	3	0	0	0	N/A	N/A	N/A	-	None.	Boggy around pond but could still get a good view for torching.
	302259	372855	4	18/05/22	3	2	0	0	0	N/A	N/A	N/A	-	1x smooth newt.	Boggy around pond but could still get a good view for torching.
	302259	372855	5	23/05/22	2	3	0	0	0	N/A	N/A	N/A	-	None.	Too shallow and boggy at edges to bottle trap.
	302259	372855	6	30/05/22	3	3	0	0	0	N/A	N/A	N/A	-	1x undetermined small newt (female palmate or smooth newt).	Too shallow and boggy at edges to bottle trap.
19	302313	372955	1	19/04/22	1	3	1	0	0	N/A	N/A	N/A	-	1x smooth newt, 1x undetermined small newt (female palmate or smooth newt).	Too shallow and boggy at edges to bottle trap.
	302313	372955	2	23/05/22	3	1	0	0	0	N/A	N/A	N/A	-	3x smooth newt, 1x undetermined small newt (female palmate or smooth newt), 1x common frog.	Too shallow and boggy at edges to bottle trap.
	302313	372955	3	30/05/22	3	1	0	2	0	N/A	N/A	N/A	-	None.	-
21	302440	373139	1	19/04/22	4	2	2	0	0	N/A	N/A	N/A	-	1x common frog.	-
	302440	373139	2	23/05/22	4	1	0	0	0	N/A	N/A	N/A	-	1x smooth newt, 4x undetermined small newt	Margins clear. Steep sided pond.

Pond #	Easting	Northing	Visit #	Date	Vegetation cover	Turbidity (0-5)	GCN torching			GCN bottle trap			GCN egg (+/-)	Other amphibians	Comments
							Male	Female	Juvenile	Male	Female	Juvenile			
														(female palmate or smooth newt), 2x common frog.	
	302440	373139	3	30/05/22	4	1	0	0	0	N/A	N/A	N/A	-	1x smooth newt, 9x undetermined small newt (female palmate or smooth newt), 3x common frog (+ tadpoles).	-
22	302362	372632	1	19/04/22	0	2	0	0	0	N/A	N/A	N/A	-	5x smooth newt, 19x undetermined small newt (female palmate or smooth newt).	Unable to bottle trap due to livestock.
24	302730	373036	1	20/04/22	3	0	2	1	0	N/A	N/A	N/A	-	1x common frog.	Too boggy at edges to bottle trap
	302730	373036	2	23/05/22	3	3	0	0	0	N/A	N/A	N/A	-	Common frog tadpoles.	-
	302730	373036	3	30/05/22	4	1	0	0	0	N/A	N/A	N/A		None.	-
25	302740	372972	1	20/04/22	4	0	0	0	0	N/A	N/A	N/A	-	None.	Too boggy at edges to bottle trap
28	302953	372526	1	20/04/22	0	3	0	0	0	N/A	N/A	N/A	-	2x smooth newt, 6x undetermined small newt (female palmate or smooth newt), 1x common frog.	Pond perimeter densely vegetated, only 75% accessible in shallower parts of pond
29	303016	372412	1	20/04/22	5	1	0	0	0	N/A	N/A	N/A	-	None.	Pond very inaccessible (95%) due to very densely vegetation.
	303016	372412	2	23/05/22	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Water level too low and vegetation cover too high – unable to survey.
30	302572	372058	1	20/04/22	1	3	0	0	0	N/A	N/A	N/A	-	1x smooth newt, 4x undetermined small newt (female palmate or smooth newt).	-
	302572	372058	2	23/05/22	2	3	0	0	0	N/A	N/A	N/A	-	None.	Too boggy at edges to bottle trap
31	302433	372163	1	20/04/22	0	2	0	0	0	N/A	N/A	N/A	-	1x smooth newt, 5x palmate newt, 6x undetermined small newt (female palmate or smooth newt).	Too shallow to trap
33	302896	372673	1	20/04/22	4	2	1	3	0	N/A	N/A	N/A	-	4x smooth newt, 9x smooth newt.	Too shallow to trap
	302896	372673	2	23/05/22	1	1	0	0	0	N/A	N/A	N/A	-	7x undetermined small newt	-

Pond #	Easting	Northing	Visit #	Date	Vegetation cover	Turbidity (0-5)	GCN torching			GCN bottle trap			GCN egg (+/-)	Other amphibians	Comments
							Male	Female	Juvenile	Male	Female	Juvenile			
														(female palmate or smooth newt).	
34	302068	372795	1	20/04/22	5	N/A	N/A	N/A	N/A	0	0	0	-	None.	Unable to torch due to vegetation. Water level has reduced, perimeter very boggy in places
	302068	372795	2	23/05/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Pond dry.

Appendix F Great Crested Newt eDNA Survey Results 2022

Results of Great Crested Newt Surveys 2022 - 2024

St Asaph Solar Farm

Anesco

SLR Project No.: 406.065274.00001

29 April 2025

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3057	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: Pond 31 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3061	Condition on Receipt: Medium Sediment	Volume: Passed
Client Identifier: Pond 6 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	8 of 12 (GCN positive)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3062	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: Pond 30 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	11 of 12 (GCN positive)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3063	Condition on Receipt: Medium Sediment	Volume: Passed
Client Identifier: Pond 28 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	0 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3065	Condition on Receipt: Medium Sediment	Volume: Passed
Client Identifier: Pond 2 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	0 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3066	Condition on Receipt: Medium Sediment	Volume: Passed
Client Identifier: Pond 5 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	0 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	2 of 12 (GCN positive)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3067	Condition on Receipt: Medium Sediment	Volume: Passed
Client Identifier: Pond 29 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Evidence of degradation	Real Time PCR	27/04/2022
Great Crested Newt*	Indeterminate	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3069	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: Pond 34 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	2 of 12 (GCN positive)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3070	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: Pond 7 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	1 of 12 (GCN positive)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3071	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: Pond 1 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3072	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: Pond 25 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	28/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	28/04/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	28/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Gemma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3073	Condition on Receipt: Medium Sediment	Volume: Passed
Client Identifier: Pond 22 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3073	Condition on Receipt: Medium Sediment	Volume: Passed
Client Identifier: Pond 4 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3075	Condition on Receipt: Medium Sediment	Volume: Passed
Client Identifier: Pond 16 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clark,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-3076	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: Pond 8 St Asaph, 424.05075.00154 Phase 0003	Description: pond water samples in preservative	
Date of Receipt: 25/04/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	27/04/2022
Degradation Control[§]	Within Limits	Real Time PCR	27/04/2022
Great Crested Newt*	1 of 12 (GCN positive)	Real Time PCR	27/04/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	29/04/2022	Date of issue:	29/04/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Appendix 1: Interpretation of results

Sample Condition

Upon sample receipt we score your samples according to quality: good, low sediment, medium sediment, high sediment, white precipitate, and presence of algae.

There are three reasons as to why sediment should be avoided:

1. It is possible for DNA to persist within the sediment for longer than it would if it was floating in the water which could lead to a false positive result i.e. in this case GCN not recently present but present a long time ago
2. In some cases sediment can cause inhibition of the PCR analysis used to detect GCN eDNA within samples which could lead to an indeterminate result.
3. In some cases sediment can interfere with the DNA extraction procedure resulting in poor recovery of the eDNA which in turn can lead to an indeterminate result.

Algae can make the DNA extraction more difficult to perform so if it can be avoided then this is helpful.

Sometimes samples contain a white precipitate which we have found makes the recovery of eDNA very difficult. This precipitate can be present in such high amounts that it interferes with the eDNA extraction process meaning that we cannot recover the degradation control (nor most likely the eDNA itself) at sufficient levels for the control to be within the acceptable limits for the assay, therefore we have to classify these type of samples as indeterminate.

What do my results mean?

A positive result means that great crested newts are present in the water or have been present in the water in the recent past (eDNA degrades over around 7-21 days).

A negative result means that DNA from the great crested newt has not been detected in your sample.

On occasion an inconclusive result will be issued. This occurs where the DNA from the great crested newt has not been detected but the controls have indicated that either: the sample has been degraded and/or the eDNA was not fully extracted (poor recovery); or the PCR inhibited in some way. This may be due to the water chemistry or may be due to the presence of high levels of sediment in samples which can interfere with the DNA extraction process. A re-test could be performed but a fresh sample would need to be obtained. We have successfully performed re-tests on samples which have had high sediment content on the first collection and low sediment content (through improved sample collection) on the re-test. If water chemistry was the cause of the indeterminate then a re-test would most likely also return an inconclusive result.

The results will be recorded as indeterminate if the GCN result is negative and the degradation result is recorded as:

1. evidence of decay - meaning that the degradation control was outside of accepted limits
2. evidence of degradation or residual inhibition - meaning that the degradation control was outside of accepted limits but that this could have been due to inhibitors not being removed sufficiently by the dilution of inhibited samples (according to the technical advice note)

Client: Gary Oliver,
SLR Consulting Ltd.

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-5883	Condition on Receipt: Good	Volume: Passed
Client Identifier: P36, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 04/07/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	08/07/2022
Degradation Control[§]	Within Limits	Real Time PCR	08/07/2022
Great Crested Newt*	9 of 12 (GCN positive)	Real Time PCR	08/07/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	11/07/2022	Date of issue:	11/07/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Gary Oliver,
SLR Consulting Ltd.

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-5884	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: P51, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 04/07/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	07/07/2022
Degradation Control[§]	Within Limits	Real Time PCR	07/07/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	07/07/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	11/07/2022	Date of issue:	11/07/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Gary Oliver,
SLR Consulting Ltd.

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-5893	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: P50, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 04/07/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	0 of 2	Real Time PCR	08/07/2022
Degradation Control[§]	Within Limits	Real Time PCR	08/07/2022
Great Crested Newt*	12 of 12 (GCN positive)	Real Time PCR	08/07/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	11/07/2022	Date of issue:	11/07/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Gary Oliver,
SLR Consulting Ltd.

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-5882	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: P23, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 04/07/2022	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	08/07/2022
Degradation Control[§]	Within Limits	Real Time PCR	08/07/2022
Great Crested Newt*	3 of 12 (GCN positive)	Real Time PCR	08/07/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	11/07/2022	Date of issue:	11/07/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Appendix 1: Interpretation of results

Sample Condition

Upon sample receipt we score your samples according to quality: good, low sediment, medium sediment, high sediment, white precipitate, and presence of algae.

There are three reasons as to why sediment should be avoided:

1. It is possible for DNA to persist within the sediment for longer than it would if it was floating in the water which could lead to a false positive result i.e. in this case GCN not recently present but present a long time ago
2. In some cases sediment can cause inhibition of the PCR analysis used to detect GCN eDNA within samples which could lead to an indeterminate result.
3. In some cases sediment can interfere with the DNA extraction procedure resulting in poor recovery of the eDNA which in turn can lead to an indeterminate result.

Algae can make the DNA extraction more difficult to perform so if it can be avoided then this is helpful.

Sometimes samples contain a white precipitate which we have found makes the recovery of eDNA very difficult. This precipitate can be present in such high amounts that it interferes with the eDNA extraction process meaning that we cannot recover the degradation control (nor most likely the eDNA itself) at sufficient levels for the control to be within the acceptable limits for the assay, therefore we have to classify these type of samples as indeterminate.

What do my results mean?

A positive result means that great crested newts are present in the water or have been present in the water in the recent past (eDNA degrades over around 7-21 days).

A negative result means that DNA from the great crested newt has not been detected in your sample.

On occasion an inconclusive result will be issued. This occurs where the DNA from the great crested newt has not been detected but the controls have indicated that either: the sample has been degraded and/or the eDNA was not fully extracted (poor recovery); or the PCR inhibited in some way. This may be due to the water chemistry or may be due to the presence of high levels of sediment in samples which can interfere with the DNA extraction process. A re-test could be performed but a fresh sample would need to be obtained. We have successfully performed re-tests on samples which have had high sediment content on the first collection and low sediment content (through improved sample collection) on the re-test. If water chemistry was the cause of the indeterminate then a re-test would most likely also return an inconclusive result.

The results will be recorded as indeterminate if the GCN result is negative and the degradation result is recorded as:

1. evidence of decay - meaning that the degradation control was outside of accepted limits
2. evidence of degradation or residual inhibition - meaning that the degradation control was outside of accepted limits but that this could have been due to inhibitors not being removed sufficiently by the dilution of inhibited samples (according to the technical advice note)

Appendix G Great Crested Newt eDNA Survey Results 2024

Results of Great Crested Newt Surveys 2022 - 2024

St Asaph Solar Farm

Anesco

SLR Project No.: 406.065274.00001

29 April 2025

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6345	Condition on Receipt: Good	Volume: Passed
Client Identifier: P60, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6347	Condition on Receipt: Algae Present	Volume: Passed
Client Identifier: P63, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	0 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6348	Condition on Receipt: Medium Sediment	Volume: Passed
Client Identifier: P48, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6349	Condition on Receipt: Good	Volume: Passed
Client Identifier: P59, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	1 of 12 (GCN positive)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6350	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: P54, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6351	Condition on Receipt: Algae Present	Volume: Passed
Client Identifier: P69, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	11/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	11/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	11/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6352	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: P68, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6353	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: P67, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	12 of 12 (GCN positive)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6354	Condition on Receipt: White Precipitate	Volume: Passed
Client Identifier: P65, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	0 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6356	Condition on Receipt: Good	Volume: Passed
Client Identifier: P66, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	11 of 12 (GCN positive)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6357	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: P32, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6360	Condition on Receipt: Good	Volume: Passed
Client Identifier: P61, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	6 of 12 (GCN positive)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6361	Condition on Receipt: Algae Present	Volume: Passed
Client Identifier: P2, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	1 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6366	Condition on Receipt: Algae Present	Volume: Passed
Client Identifier: P20, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	0 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6368	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: P31, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	12/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	12/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	12/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	16/07/2024	Date of issue:	16/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Appendix 1: Interpretation of results

Sample Condition

Upon sample receipt we score your samples according to quality: good, low sediment, medium sediment, high sediment, white precipitate, and presence of algae.

There are three reasons as to why sediment should be avoided:

1. It is possible for DNA to persist within the sediment for longer than it would if it was floating in the water which could lead to a false positive result i.e. in this case GCN not recently present but present a long time ago
2. In some cases sediment can cause inhibition of the PCR analysis used to detect GCN eDNA within samples which could lead to an indeterminate result.
3. In some cases sediment can interfere with the DNA extraction procedure resulting in poor recovery of the eDNA which in turn can lead to an indeterminate result.

Algae can make the DNA extraction more difficult to perform so if it can be avoided then this is helpful.

Sometimes samples contain a white precipitate which we have found makes the recovery of eDNA very difficult. This precipitate can be present in such high amounts that it interferes with the eDNA extraction process meaning that we cannot recover the degradation control (nor most likely the eDNA itself) at sufficient levels for the control to be within the acceptable limits for the assay, therefore we have to classify these type of samples as indeterminate.

What do my results mean?

A positive result means that great crested newts are present in the water or have been present in the water in the recent past (eDNA degrades over around 7-21 days).

A negative result means that DNA from the great crested newt has not been detected in your sample.

On occasion an inconclusive result will be issued. This occurs where the DNA from the great crested newt has not been detected but the controls have indicated that either: the sample has been degraded and/or the eDNA was not fully extracted (poor recovery); or the PCR inhibited in some way. This may be due to the water chemistry or may be due to the presence of high levels of sediment in samples which can interfere with the DNA extraction process. A re-test could be performed but a fresh sample would need to be obtained. We have successfully performed re-tests on samples which have had high sediment content on the first collection and low sediment content (through improved sample collection) on the re-test. If water chemistry was the cause of the indeterminate then a re-test would most likely also return an inconclusive result.

The results will be recorded as indeterminate if the GCN result is negative and the degradation result is recorded as:

1. evidence of decay - meaning that the degradation control was outside of accepted limits
2. evidence of degradation or residual inhibition - meaning that the degradation control was outside of accepted limits but that this could have been due to inhibitors not being removed sufficiently by the dilution of inhibited samples (according to the technical advice note)

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6355	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: P23, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	17/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	17/07/2024
Great Crested Newt*	2 of 12 (GCN positive)	Real Time PCR	17/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	17/07/2024	Date of issue:	17/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6358	Condition on Receipt: Algae Present	Volume: Passed
Client Identifier: P29, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	17/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	17/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	17/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	17/07/2024	Date of issue:	17/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6359	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: P25, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	17/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	17/07/2024
Great Crested Newt*	1 of 12 (GCN positive)	Real Time PCR	17/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	17/07/2024	Date of issue:	17/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6362	Condition on Receipt: Algae Present	Volume: Passed
Client Identifier: P4, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	17/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	17/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	17/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	17/07/2024	Date of issue:	17/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6363	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: P22, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	17/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	17/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	17/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	17/07/2024	Date of issue:	17/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6364	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: P43, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	17/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	17/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	17/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	17/07/2024	Date of issue:	17/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Client: Emma Clarke,
SLR Consulting

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-6367	Condition on Receipt: Medium Sediment	Volume: Passed
Client Identifier: P28, St Asaph	Description: pond water samples in preservative	
Date of Receipt: 02/07/2024	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	17/07/2024
Degradation Control[§]	Within Limits	Real Time PCR	17/07/2024
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	17/07/2024
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	17/07/2024	Date of issue:	17/07/2024

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Appendix 1: Interpretation of results

Sample Condition

Upon sample receipt we score your samples according to quality: good, low sediment, medium sediment, high sediment, white precipitate, and presence of algae.

There are three reasons as to why sediment should be avoided:

1. It is possible for DNA to persist within the sediment for longer than it would if it was floating in the water which could lead to a false positive result i.e. in this case GCN not recently present but present a long time ago
2. In some cases sediment can cause inhibition of the PCR analysis used to detect GCN eDNA within samples which could lead to an indeterminate result.
3. In some cases sediment can interfere with the DNA extraction procedure resulting in poor recovery of the eDNA which in turn can lead to an indeterminate result.

Algae can make the DNA extraction more difficult to perform so if it can be avoided then this is helpful.

Sometimes samples contain a white precipitate which we have found makes the recovery of eDNA very difficult. This precipitate can be present in such high amounts that it interferes with the eDNA extraction process meaning that we cannot recover the degradation control (nor most likely the eDNA itself) at sufficient levels for the control to be within the acceptable limits for the assay, therefore we have to classify these type of samples as indeterminate.

What do my results mean?

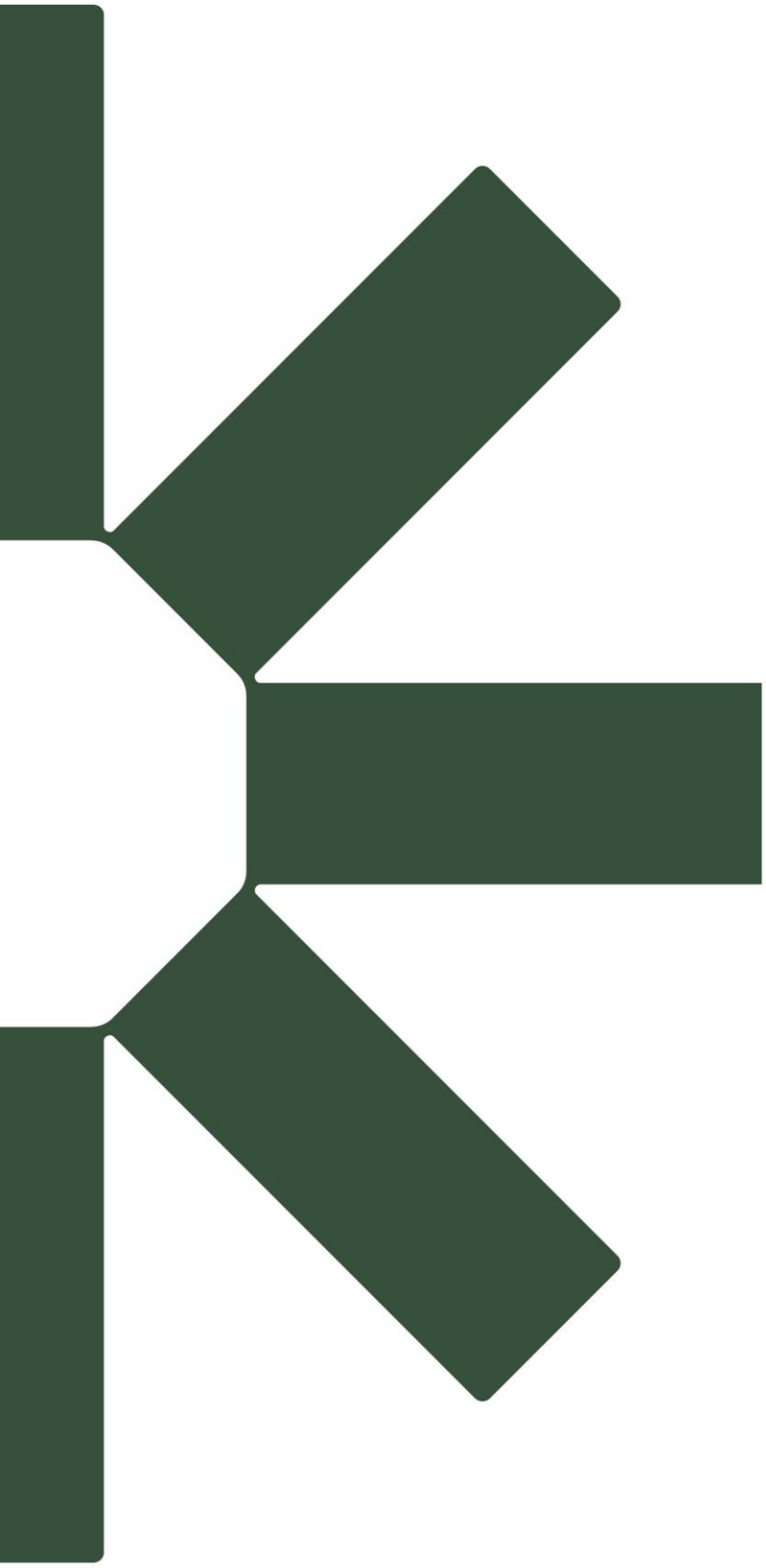
A positive result means that great crested newts are present in the water or have been present in the water in the recent past (eDNA degrades over around 7-21 days).

A negative result means that DNA from the great crested newt has not been detected in your sample.

On occasion an inconclusive result will be issued. This occurs where the DNA from the great crested newt has not been detected but the controls have indicated that either: the sample has been degraded and/or the eDNA was not fully extracted (poor recovery); or the PCR inhibited in some way. This may be due to the water chemistry or may be due to the presence of high levels of sediment in samples which can interfere with the DNA extraction process. A re-test could be performed but a fresh sample would need to be obtained. We have successfully performed re-tests on samples which have had high sediment content on the first collection and low sediment content (through improved sample collection) on the re-test. If water chemistry was the cause of the indeterminate then a re-test would most likely also return an inconclusive result.

The results will be recorded as indeterminate if the GCN result is negative and the degradation result is recorded as:

1. evidence of decay - meaning that the degradation control was outside of accepted limits
2. evidence of degradation or residual inhibition - meaning that the degradation control was outside of accepted limits but that this could have been due to inhibitors not being removed sufficiently by the dilution of inhibited samples (according to the technical advice note)



Making Sustainability Happen

Appendix E Winter Bird Survey Report

Ecological Impact Assessment

St Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

29 April 2025

Wintering Bird Survey Report 2024/2025

St. Asaph Solar Farm

Anesco Limited

The Green, Easter Park, Benyon Road,
Reading, Berkshire, RG7 2PQ

Prepared by:

SLR Consulting Limited

2nd Floor, Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury, SY3 5HJ

SLR Project No.: 406.065274.00001

25 April 2025

Revision: 01

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
01	25 April 2025	Guy Ostler	Andy Law	Gary Oliver

Basis of Report

This document has been prepared by SLR Consulting Limited (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with Anesco Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

Table of Contents

Basis of Report ..... **i**
Acronyms and Abbreviations ..... **iv**
1.0 Introduction **5**
1.1 Background 5
1.2 Site Description 5
1.3 Purpose of this Report / Objectives of Survey 5
1.4 Evidence of Technical Competence and Experience 5
1.5 Nomenclature 6
1.6 Legislative background 6
1.6.1 Environment (Wales) Act 2016 6
1.6.2 Wildlife & Countryside Act 1981 (as amended) 6
1.7 Conservation Frameworks 6
2.0 Methods **7**
2.1 Desk study 7
2.1.1 Designated sites 7
2.1.2 Bird records 7
2.2 Field survey 7
2.3 Limitations 9
2.3.1 Desk study 9
2.3.2 Field Survey 9
3.0 Results **10**
3.1 Desk study 10
3.1.1 Designated sites 10
3.1.2 Bird records 11
3.2 Field survey 13
4.0 Summary **15**
4.1 Legal and conservation status of target species recorded 15
4.2 Conclusion 20

Tables in Text

Table 2-1 Birds of Conservation Concern (BoCC) criteria 9
Table 3-1 Details of designated ornithological sites within the search area 10
Table 3-2 Bird Species within 2km of the Solar Site 11
Table 3-3 Peak flock counts and frequency of records from each survey visit 13
Table 4-1 Summary of target species results and legal/conservation status 15

Table 4-2 Survey timings and weather data C-1
Table 4-3 Full list of species recorded and conservation status.....D-1

Appendices

Appendix A **Drawing C0002452_01 Site Location**
Appendix B **Drawing C0002452_02 Site Layout**
Appendix C **Survey Metadata**
Appendix D **Full Species List**

Acronyms and Abbreviations

BoCC	Birds of Conservation Concern
BOU	British Ornithologists' Union
BTO	British Trust for Ornithology
CIEEM	Chartered Institute of Ecology and Environmental Management
COFNOD	North Wales Environmental Information Service
EC	European Council
EIA	Environmental Impact Assessment
FLL	Functionally Linked Land
IRZ	Impact Risk Zone
LNR	Local Nature Reserve
MAGIC	Multi-Agency Geographic Information for the Countryside
NERC	Natural Environment and Rural Communities
RSPB	Royal Society for the Protection of Birds
SLR	SLR Consulting Limited
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
VP	Vantage Point
WeBS	Wetland Bird Survey
WCA	Wildlife and Countryside Act

1.0 Introduction

In October 2024, SLR Consulting Limited (SLR) was commissioned by Anesco Limited to undertake a series of winter bird surveys for the proposed solar farm at St Asaph, Denbighshire, broadly centred on National Grid Reference (NGR) SJ 02443 72771, hereafter referred to as the 'Site'.

This report presents the findings of the wintering bird survey undertaken at the Site.

1.1 Background

SLR were previously instructed to provide ecological support in relation to the proposed solar farm at St Asaph in December 2021. Since that date, extensive ecological surveys have been undertaken which have fed into the Site design and final layout.

1.2 Site Description

The Site is situated in Denbighshire, approximately 1km to the southwest of the settlement of St Asaph, and approximately 8km south of the seaside town of Rhyl. The location of the Site is shown in Drawing C0002452_01 (Appendix A) and the Site boundary is shown in Drawing C0002452_02 (Appendix B). The Site consists of the main Solar Site and the Cable Route, connecting to the St Asaph Substation.

The Solar Site is approximately 35.42ha in extent and is divided into two areas approximately 250m apart. The Western Parcel is a set of four fields approximately centred on NGR SJ 02123 72727 and the Eastern Parcel is a set of three fields approximately centred on NGR SJ 02644 72614. The fields consist of modified grassland, of a short to medium sward length used for cattle and sheep grazing. The boundaries of the fields consist of flailed hedgerows, some containing mature trees, and of semi-natural, lowland mixed deciduous woodland.

The Cable Route is limited to highways that connect the Solar Site to St Asaph Substation. This includes the track to Tyn Y Coed, Glascoed Road, and Cwttir Lane.

The wider landscape is generally farmland used for grazing or arable crops, there are also several woodlands, some of which are ancient.

1.3 Purpose of this Report / Objectives of Survey

The objective of the surveys was to assess the overall value of the Site for wintering birds and establish whether or not there could be a 'functional link' between the Site and relevant designated ornithological sites, namely the Liverpool Bay SPA and the Dee Estuary SPA and/ or Ramsar Site.

This report documents the methods and results of those surveys and evaluates the overall importance of the Site for wintering birds. The assessment of impacts resulting from the proposed development and the identification of mitigation measures are beyond the scope of this report and are covered in a separate Ecological Impact Assessment (EcIA).

1.4 Evidence of Technical Competence and Experience

Surveys were undertaken by Guy Ostler Bsc, Toby Bell Msc, Joseph Pass Msc, Peter Wigglesworth MSc, and Charlotte Baldwin MBiolSci.

Guy Ostler is a Senior Field Ecologist at SLR, specialising in Ornithology, with over 3 years of professional survey experience, and is a Qualifying member of CIEEM. This report was also authored by Guy.

Toby Bell is a Project Ecologist at SLR, with 2 years professional survey experience, including ornithology surveys, and is a Qualifying member of CIEEM.

Joseph Pass is a Graduate Ornithologist at SLR with over a year of professional survey experience.

Peter Wigglesworth is a Project Consultant at SLR with five years of professional survey experience, and a special interest in Ornithology.

Charlotte Baldwin is a Graduate Ecologist with SLR Consulting with two years ecological surveying experience.

Technical review was conducted by Andy Law CEcol MCIEEM, a Principal Consultant at SLR with 34 years of ecological consulting experience, and by Gary Oliver MCIEEM, a Principal Consultant at SLR with over 29 years relevant experience; Gary is also a highly competent ornithologist.

1.5 Nomenclature

The phylogenetic order and nomenclature throughout this report follows The British List (10th Edition)[1], updated by the British Ornithologists' Union (BOU) Records Committee. A full list of the species referred to in this report, including scientific names, is provided in Appendix D.

1.6 Legislative background

1.6.1 Environment (Wales) Act 2016

Section 7 of the Environment (Wales) Act 2016 requires the publication of a list of habitats and species which are of principal importance for the purpose of conserving biodiversity. The Section 7 list is used to guide authorities in implementing their duty to have regard to the conservation of biodiversity.

1.6.2 Wildlife & Countryside Act 1981 (as amended)

Section 1, Part I of the WCA 1981 (as amended) makes it an offence (with certain limited exceptions and in the absence of a licence) to intentionally:

- kill, injure, or take any wild bird;
- damage, take or destroy its nest while that nest is in use or being built; or
- take or destroy its eggs.

A person shall also be guilty of an offence if they possess or control any live or dead wild bird or any part of, or anything derived, from such a bird, or an egg of a wild bird or any part of such an egg.

1.7 Conservation Frameworks

Birds of Conservation Concern (BoCC) identifies species which are declining, or appear to be in need of conservation action- see Table 2-1 Birds of Conservation Concern (BoCC) criteria in section 2.2 for BoCC criteria.

[1] British Ornithologists' Union. 2022. The British List: A Checklist of Birds of Britain (10th edition), Ibis 164: pp.860 – 910.

2.0 Methods

2.1 Desk study

2.1.1 Designated sites

The Natural Resources Wales designated sites website[2] was consulted and a data search requested from Cofnod, the local environmental record centre North Wales, to provide information on:

- Special Protection Areas (SPA) and Ramsar sites within 20km of the Solar Site boundary; and
- Sites of Special Scientific Interest (SSSI) and Local Nature Reserves (LNR) with ornithological interest features, and RSPB reserves, within 2km of the Solar Site boundary.

2.1.2 Bird records

Data searches were undertaken for records of protected and conservation priority species, which are those listed on:

- Annex I of European Council (EC) directive 2009/147/EC ('the Birds Directive');
- Schedule 1 of the Wildlife and Countryside Act (WCA) 1981 (as amended);
- Section 7 of the Environment (Wales) Act 2016;
- Birds of Conservation Concern UK (BoCCUK)[3] Red and Amber; and
- Birds of Conservation Concern Wales (BoCCW)[4] Red and Amber.

Searches were undertaken with the following organisations:

- COFNOD, for records from within 2km of the Solar Site boundary.

2.2 Field survey

A four-hour long survey was carried out per month between October 2024 and March 2025 inclusive. On each occasion the survey was undertaken by a team of two ecologists, with one ecologist covering the Western Parcel, and one the Eastern Parcel of the Solar Site. Both ecologists extended their survey to include all surrounding fields/ land in their visual envelope, including the proposed cable route between the Eastern and Western Parcels. The survey area did not include the substation connection Cable Route, which follows existing roads, and which shall involve trenching entirely within the road surface itself.

[2] Natural Resources Wales / Find protected areas of land and sea

[3] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. 2021. The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723-747. Available online at https://britishbirds.co.uk/content/status-our-bird-populations.

[4] Johnstone, I.G., Hughes, J., Balmer, D.E., Brenchley, A., Facey, R.J., Lindley, P.J., Noble, D.G. and Taylor, R.C. Online First. Birds of Conservation Concern Wales 4: the population status of birds in Wales. Milvus: the Journal of the Welsh Ornithological Society. Consolidated list available online at BoCCW4-consolidated-list-September-2024.pdf.

Each survey was timed to take place two hours either side of high tide at Rhyl, with the intention of establishing whether or not there is a functional link with the Liverpool Bay SPA and/ or the Dee Estuary SPA or Ramsar Site, and the Site itself.

The methodology for non-breeding walkover survey, as detailed in the Bird Survey Guidelines[5], was followed. Surveys sought to qualify the diversity of birds interacting with the Site, or adjacent land, in the context of their specific ecology and population status.

The method involved walking a transect, with frequent stops to scan for target species. The route enabled visual coverage of the full survey area, which encompassed the Solar Site plus a 100m buffer. This excluded the substation connection Cable Route, which follows existing roads, and which shall involve trenching entirely within the road surface itself.

Target species were all species named within the citation for the Liverpool Bay SPA or Dee Estuary SPA or Ramsar Site, listed on Annex I, Schedule 1, NERC Section 41, and BoCC Red or Amber. All species observations were recorded onto a map of the survey area, using BTO notation to record behaviour, with target species prioritised over non-target species.

Surveys were undertaken on the following dates:

- Visit 1 – 29th October 2024;
- Visit 2 – 14th November 2024;
- Visit 3 – 16th December 2024;
- Visit 4 – 14th January 2025;
- Visit 5 – 11th February 2025; and
- Visit 6 – 3rd March 2025.

The dates, times and corresponding weather conditions for each survey are provided in Appendix C. Surveys were undertaken in suitable weather conditions, avoiding heavy rain and low visibility (e.g. fog). Surveys were completed within daylight hours.

Results have been presented for each target species as peak flock counts and frequency of observation. Peak flock count refers to the highest count obtained for a certain species within the survey area on a single visit. Frequency refers to the number of visits on which a certain species was recorded within the survey area.

In assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Reference has therefore been made to published lists and criteria where available. Examples of relevant lists and criteria include: species named in the Liverpool Bay SPA or Dee Estuary SPA or Ramsar site citations; species of European conservation importance (Annex 1 of the Birds Directive); species of principal importance for biodiversity under Section 7 of the Environment (Wales) Act and BoCC Red and Amber lists. BoCC identifies species which are declining, or which appear to be in need of conservation action. Specific criteria are used to place birds on a Red, Amber or Green list, as outlined in Table 2-1 Birds of Conservation Concern (BoCC) criteria, overleaf.

[5] https://birdsurveyguidelines.org/non-breeding-walkover-survey/ [Accessed September 2024]

Table 2-1 Birds of Conservation Concern (BoCC) criteria

Red criteria	Amber criteria
Species that are globally threatened according to the International Union for the Conservation of Nature (IUCN) criteria.	Species of European Conservation Concern.
Species with an historical decline in breeding population which have not shown a substantial recent recovery.	Species whose population has declined historically but which have made a substantial recent recovery.
Species that have shown a severe breeding decline over the last 25 years or longer term.	Species whose breeding population has declined moderately over the last 25 years or longer term.
Species that have shown a severe breeding range decline over the last 25 years or longer term.	Species that have shown a moderate breeding range decline over the last 25 years or longer term.
Species whose non-breeding population has declined over the last 25 years or longer term.	Species whose non-breeding population has declined moderately over the last 25 years or longer term.
	Rare breeders or non-breeding rarity species with internationally important or localised populations.
Green list criteria	
Species that fulfil none of the Red or Amber criteria detailed above at the publication of the most recent edition of BoCCUK, currently 2021, and BoCCW, currently 2022.	

2.3 Limitations

2.3.1 Desk study

Desk study data is unlikely to be exhaustive, especially in respect of species, and is intended mainly to set a context for the study. It is therefore possible that important species not identified during the data search do in fact occur within the vicinity of the Site. Interpretation of maps and aerial photography has been conducted in good faith, using recent imagery, but it has not been possible to verify the accuracy of any statements relating to land use and habitat context outside of the field study area.

2.3.2 Field Survey

Lack of evidence of a species does not necessarily preclude it from being present at a later date. Due to the nature of the subjects of ecological surveys it is feasible that species that use the Site may not have been recorded by virtue of their seasonality, cryptic behaviour, habit, or random chance.

3.0 Results

3.1 Desk study

3.1.1 Designated sites

Table 3-1 documents those designated ornithological sites identified within the search area. No RSPB reserves, SSSI's with ornithological interest features or LNR's with ornithological interest features were identified within the search area.

Table 3-1 Details of designated ornithological sites within the search area

Designated site	Distance from the Solar Site at closest point	Qualifying or notified features
Liverpool Bay SPA	8.5km	**Qualifying species:** *Red throated diver- 6.89% of GB non-breeding population, little gull (non-breeding), common scoter- 10.31% of NW European non-breeding population, little tern- 6.84% of GB breeding population, common tern- 1.80% of GB breeding population, non-breeding season assemblage species include red-breasted merganser- exceeds 1% of GB population, cormorant- exceeds 1% of GB population.*[6]
The Dee Estuary SPA, and Ramsar Site	14.42km	**Qualifying species**: *Bar-tailed godwit (wintering)- 2.2% of GB population, redshank (passage)- 5.9% of Eastern Atlantic wintering population, shelduck (wintering)- 2.6% of Northwestern Europe population, teal (wintering)- 1.3% of Northwestern Europe population, pintail (wintering)- 9.0% of Northwestern Europe population, oystercatcher (wintering)- 2.5% of Europe & N/W Africa wintering population, grey plover (wintering)- 1.1% of Eastern Atlantic wintering population, Knot (wintering)- 3.5% of NE Can/Grl/Iceland/NW Eur population, dunlin (wintering)- 2.0% of N Siberia/Europe/W Africa population, black-tailed godwit (Icelandic race, wintering)- 3.5% of Eastern Atlantic wintering population, curlew (wintering)- 1.1% of Europe breeding population, redshank (wintering)- 3.5% of Eastern Atlantic wintering population, great crested grebe (as part of non-breeding waterbird assemblage), cormorant (as part of non-breeding waterbird assemblage), wigeon (as part of non-breeding waterbird assemblage), lapwing (as part of a non-breeding waterbird assemblage, sanderling (as part of non-breeding waterbird assemblage, common tern (breeding)- 3.2% of GB population, little tern (breeding)- 2.9% of GB population. Sandwich tern (breeding)- 2.3% of GB population.* **Non-qualifying (less than 1% of GB population) species of interest:** *Leach's Petrel (Oceonodroma leucorhoa), little egret, bewicks swan, whooper swan, smew, hen harrier, merlin, peregrine, golden plover, ruff, wood sandpiper, short-eared owl, and kingfisher*[7]

[6] Liverpool Bay SPA | JNCC - Adviser to Government on Nature Conservation

[7] European Site Conservation Objectives for Dee Estuary SPA - UK9013011

3.1.2 Bird records

3.1.2.1 Local Records Centre

Cofnod returned 551 records of birds within 2km of the Solar Site boundary, including 47 'notable species' that occur in the UK between the months of September and March inclusive ('notable' here referring to those species that have any of the following conservation status'- Annex 1 of the Birds Directive, WCA 1981 Schedule 1, NERC Section 41, Birds of Conservation Concern (BoCC) Red List or BoCC Amber List). These can be found in **Table 3-2** Bird Species within 2km of the Solar Site**.**

Table 3-2 Bird Species within 2km of the Solar Site

Species	No. of Records	Closest to Solar Site boundary (m)	Lists
Rook (*Corvus frugilegus)*	22	1	BoCC Amber list
Mallard (*Anas platyrhynchos)*	13	169	BoCC Amber list
Mistle thrush (*Turdus viscivorus)*	17	169	BoCC Red list
Song thrush *(Turdus philomelus)*	15	169	Section 41, BoCC Amber list
Tawny owl (*Strix aluco)*	7	169	BoCC Amber list
Black headed gull (*Chroicocephalus ridibundus)*	13	394	BoCC Amber list
Bullfinch (*Pyrrhula pyrrhula)*	16	394	Section 41, BoCC Amber list
Common gull (*Larus canus)*	11	394	BoCC Amber list
Greenfinch (*Chloris chloris)*	16	394	BoCC Red list
Herring gull *(Larus argentatus)*	14	394	Section 41, BoCC Red list
House sparrow (*Passer domesticus)*	19	394	Section 41, BoCC Red list
Lesser black-backed gull (*Larus fuscus)*	9	394	BoCC Amber list
Red kite (*Milvus milvus)*	7	394	Annex 1, Schedule 1.1
Redwing (*Turdus iliacus)*	15	394	Schedule 1.1, BoCC Amber list
Reed bunting (*Emberiza schoeniclus)*	5	394	Section 41, BoCC Amber list
Shelduck *(Tadorna tadorna)*	4	394	BoCC Amber list
Sparrowhawk (*Accipiter nisus)*	12	394	BoCC Amber list
Starling (*Sturnus vulgaris)*	14	394	Section 41, BoCC Red list
Moorhen *(Gallinula chloropus)*	10	422	BoCC Amber list
Grey wagtail (*Motacilla cinerea)*	17	708	BoCC Amber list
Marsh tit (*Poecile palustris)*	3	708	Section 41
Brambling (*Fringilla montifringilla)*	1	754	Schedule 1.1
Dipper (*Cinclus cinclus)*	14	754	BoCC Amber list
Fieldfare *(Turdus pilaris)*	12	754	Schedule 1.1, BoCC Red list
Linnet (*Linaria cannabina)*	7	754	Section 41, BoCC Red list

Species	No. of Records	Closest to Solar Site boundary (m)	Lists
Meadow pipit (*Anthus pratensis)*	9	754	BoCC Amber list
Peregrine falcon (*Falco peregrinus)*	10	754	Annex 1, Schedule 1.1
Skylark (*Alauda arvensis)*	4	754	Section 41, BoCC Red list
Kestrel (*Falco tinnuculus)*	11	799	BoCC Amber list
Kingfisher (*Alcedo atthis)*	8	799	Annex 1, Schedule 1.1, BoCC Amber list
Lesser redpoll (*Acanthis cabaret)*	3	799	Section 41, BoCC Red list
Snipe (*Gallinago gallinago)*	11	799	BoCC Amber list
Common sandpiper (*Actitis hypoleucos)*	6	1027	BoCC Amber list
Barn owl (*Tyto alba)*	7	1147	Schedule 1.1
Hawfinch (*Coccothraustes coccothraustes*)	1	1169	Section 41, BoCC Red list
Tree sparrow (*Passer montanus)*	2	1297	Section 41, BoCC Red list
Short eared owl (*Asio flammeus)*	1	1309	Annex 1, BoCC Amber list
Goshawk (*Accipter gentilis)*	3	1349	Schedule 1.1
Lapwing *(Vanellus Vanellus)*	3	1372	Section 41, BoCC Red list
Mediterranean gull (*Ichthyaetus melanocephalus)*	2	1372	Annex 1, Schedule 1.1, BoCC Amber list
Great black-backed gull (*Larus marinus)*	2	1556	BoCC Amber list
Green sandpiper (*Tringa ochropus)*	1	1556	Schedule 1.1, BoCC Amber list
Merlin (*Falco columbarius)*	1	1556	Annex 1, Schedule 1.1, BoCC Red list
Oystercatcher (*Haematopus ostslegus)*	1	1556	BoCC Amber list
Golden plover (P*luvialis apricaria)*	1	1634	Annex 1
Osprey (*Pandion haliaetus)*	1	1634	Annex 1, Schedule 1.1, BoCC Amber list
Curlew *(Numenius trochilus)*	1	1786	BoCC Red list, Section 41

3.2 Field survey

Target species

A total of 30 target species were recorded during the winter walkover surveys. Table 3-3 Peak flock counts and frequency of records from each survey visit presents the peak flock counts and frequency of observation from each survey visit.

Table 3-3 Peak flock counts and frequency of records from each survey visit

Target species	Total number of records	Number of visits in which species recorded	Peak flock count[8] on each visit Number of records[9] per visit					
			Visit No.					
			1	2	3	4	5	6
Greylag goose	1	1	2[1]	-	-	-	-	-
Mute swan	1	1	-	2[1]	-	-	-	-
Mallard	10	3	18[4]	-	-	-	3[5]	1[1]
Teal	6	5	1[1]	3[1]	5[1]	2[1]	2[2]	-
Stock dove	1	1	-	-	-	2[1]	-	-
Woodpigeon	81	6	60[22]	62[15]	19[22]	13[10]	20[9]	2[3]
Woodcock	1	1	-	-	1[1]	-	-	-
Snipe	3	3	-	1[1]	-	1[1]	1[1]	-
Herring gull	16	5	12[6]	5[2]	6[6]	5[1]	-	32[1]
Lesser black-backed gull	5	2	2[2]	-	5[3]	-	-	-
Cormorant	1	1	2[1]	-	-	-	-	-

[8] 'Peak flock count' refers to the highest count of a single flock in a defined period (e.g. a single visit). It is considered inappropriate to sum the counts within the survey area on each visit, as the large survey area and survey methodology do not allow for simultaneous/instantaneous counts of the whole area and birds are likely to move between areas/fields, and therefore there would be a risk of repeat counting of birds. It is acknowledged that it is therefore not an estimate of the peak number of birds within the survey area at any one time and therefore the frequency of observations and the peak counts from individual fields/land parcels are also presented in the relevant figures.

[9] Frequency relates to the total number of flocks recorded on a single visit.

Target species	Total number of records	Number of visits in which species recorded	Peak flock count[8] on each visit Number of records[9] per visit					
			Visit No.					
			1	2	3	4	5	6
Sparrowhawk	2	1	-	-	1[2]	-	-	-
Red kite	2	1	-	-	-	-	1[2]	-
Kestrel	1	1	-	-	-	-	1[1]	-
Magpie	12	5	1[2]	-	1[2]	1[3]	2[3]	1[2]
Rook	13	5	32[4]	18[4]	1[1]	50[1]	18[3]	-
Coal tit	3	2	-	-	-	1[1]	-	1[2]
Wren	83	6	2[23]	2[21]	1[13]	1[8]	1[12]	2[6]
Starling	20	5	3[1]	49[6]	22[4]	58[4]	150[5]	-
Song thrush	20	5	5[4]	-	1[5]	1[2]	4[8]	1[1]
Mistle thrush	11	4	2[2]	-	2[6]	1[1]	-	2[2]
Redwing	39	6	3[3]	8[11]	25[10]	30[8]	12[3]	6[4]
Fieldfare	7	3	-	134[2]	14[2]	10[3]	-	-
House sparrow	2	2	-	1[1]	4[1]	-	-	-
Dunnock	33	6	2[11]	2[12]	1[2]	1[3]	1[3]	2[2]
Meadow pipit	9	4	1[1]	1[2]	12[5]	-	-	40[1]
Chaffinch	24	6	12[8]	2[6]	1[2]	1[3]	1[1]	1[4]
Bullfinch	7	4	-	-	4[4]	1[1]	1[1]	1[1]
Greenfinch	2	2	-	-	-	1[1]	1[1]	-
Linnet	1	1	32[1]	-	-	-	-	-

Non-Target species

Eighteen non-target species were also observed within the survey area: pheasant, feral pigeon, buzzard, great spotted woodpecker, jay, jackdaw, carrion crow, raven, blue tit, great tit, long-tailed tit, nuthatch, treecreeper, blackbird, robin, pied wagtail, goldfinch, and siskin.

4.0 Summary

4.1 Legal and conservation status of target species recorded

Table 4-1 provides a summary of the target species recorded during the baseline surveys, their activity within the survey area, as well as their legal and conservation status.

Table 4-1 Summary of target species results and legal/conservation status

Target species	Legal and conservation status	Qualifying or notified species for nearby designated site	Summary of observations within the survey area
Greylag goose	BoCCUK: Amber BoccW: Not assessed	No	Greylag goose were observed on Visit 1, with 2 observed flying south-east over the Western area.
Mute swan	BoccUK Amber BoCCW: Green	No	Mute Swan were observed on Visit 2, with 2 observed flying south-west over the northern part of the Eastern area.
Mallard	BoCCUK: Amber BoCCW: Green	No	Mallard were observed on visits 1, 5, and 6 ,with most observations being of birds taking off from pools on or close to the Site boundary in both the Eastern and Western areas, as well as two observations of 2 and 3 birds flying over the Site, on Visits 1 and 5, respectively. The largest peak flock count was of 18 birds flushed from a pool on the southwestern boundary of the Eastern area, on Visit 1.
Teal	BoCCUK: Amber BoCCW: Amber	The Dee Estuary SPA and Ramsar Site qualifying species (wintering)	Teal were observed on all survey visits except Visit 6, with all observations coming from the northern and south-west boundaries of the Eastern area, with most of these being of birds flushed from pools around the Site perimeter The largest peak flock count was of 5 birds flushed from a pool on the Northern boundary of the Eastern area, on Visit 3.
Stock Dove	BoCCUK: Amber BoCCW: Green	No	Stock dove were observed on Visit 4 with two seen landing in a tree on the Eastern area's western boundary.
Woodpigeon	BoCCUK: Amber BoCCW: Green	No	Woodpigeon were observed on all visits, with the species being abundant across the Site, mainly in trees around the Site boundary, and the peak flock count being of 62 birds on Visit 2.

Target species	Legal and conservation status	Qualifying or notified species for nearby designated site	Summary of observations within the survey area
Woodcock	BoCCUK: Red BoCCW: Red	No	A single observation of woodcock was made on Visit 3, with one taking off from the ground, just outside the Western area's northwest boundary.
Snipe	BoCCUK: Amber BoCCW: Amber	No	Snipe were observed on Visits 2, 4, and 5. All observations were of a single bird flushed from the ground by the surveyor, at the southern end of the Western area.
Herring gull	Section 7 BoCCUK: Red BoCCW: Red	No	Herring gull were observed on Visits 1-4, and Visit 6, from locations across the Site, in both the Eastern and Western areas, but with all observations being of birds in flight passing over, rather than using the Site. The peak flock count was of 32 birds in flight, in between the Eastern and Western areas, on Visit 6,
Lesser black-backed gull	BoCCUK: Amber BoCCW: Red	No	Lesser black-backed dull were observed on Visits 1 and 3, with all but one observation being in the Western area, and one observation in the Eastern area. All observations were of birds in flight passing over, rather than using the Site.
Cormorant	BoCCUK: Green BoCCW: Green	Liverpool Bay SPA Qualifying species; The Dee Estuary SPA Qualifying species (as part of non-breeding waterbird assemblage)	Cormorant were observed on Visit 1, with a single observation of 2 birds flying south-west over the Western Area, passing over, rather than using the Site.
Sparrowhawk	BoCCUK: Amber BoCCW: Green	No	Sparrowhawk were observed on Visit 3, with two separate registrations of a single bird in flight passing though, with one observation being close to the Western areas North-west boundary, and the other being outside the Site boundary, but in between the Eastern and Western areas, close to farm buildings.
Red Kite	Annex 1 Schedule 1 BoCCUK: Green BoCCW: Green	No	Red Kite were observed on Visit 2, with two observations of one bird, circling and foraging over fields, with one observation in the Eastern area and the other observation in the Western area. The timings of these observations suggest that both are likely to have been of the same bird.

Target species	Legal and conservation status	Qualifying or notified species for nearby designated site	Summary of observations within the survey area
Kestrel	Section 7 BoCCUK: Amber BoCCW: Red	No	Kestrel were observed on Visit 2, with a single sighting of one bird flying North-west over the Eastern area, from the direction of the Western area.
Magpie	BoCCUK: Green BoCCW: Amber	No	Magpie were observed on Visit 1 and Visits 3-6, with observations being made across the Site, in both the Eastern and Western areas, often of birds flying across the Site or sitting in trees on the Site boundary.
Rook	BoCCUK: Amber BoCCW: Red	No	Rook were observed on all survey visits except Visit 6, with observations being made across the Site, in both the Eastern and Western areas, with a peak flock of 50 in flight over the Western area on Visit 4. Most observations were of birds in flight, but some were of flocks feeding on the ground. A flock of 18 was observed feeding on grassland in the southernmost field within the Eastern area on Visit 5, and a flock of 32 was observed feeding on the large arable field (winter stubble at the time) adjacent to the Eastern area's eastern boundary, on Visit 1.
Coal tit	BoCCUK: Green BoCCW: Amber	No	Coal tit were observed on Visit 4 and Visit 6 with three observations of singing birds in woodland adjacent to the Eastern area's northern boundary.
Wren	BoCCUK: Amber BoCCW: Green	No	Wren were observed during all survey visits, and were abundant in hedgerows, woodland and scrub across the whole Site.
Starling	Section 7 BoCCUK: Red BoCCW: Red	No	Starling were observed on all visits except Visit 6, across the Site, with most observations being of flocks in flight. On Visit 4, two observations were made of a flock feeding on grassland just outside the Eastern area's north-eastern boundary, with one observation being of 40 birds, and the other being of 58 birds. The peak flock count was of at least 150 birds in a communal roost in trees just outside the Eastern area's North-west boundary, on Visit 5.
Song thrush	Section 7 BoCCUK: Amber BoCCW: Green	No	Song thrush were observed on all visits except Visit 2, with a peak flock count of 5 on Visit 1, although most records were of single birds. Observations were made in both the Eastern and Western areas, of mostly singing or feeding birds in trees and scrub around the site perimeter, and along the stream in the Western area.

Target species	Legal and conservation status	Qualifying or notified species for nearby designated site	Summary of observations within the survey area
Mistle thrush	BoCCUK: Red BoCCW: Amber	No	Mistle thrush were observed on Visits 1, 3, 4, and 6, with the highest peak flock count being of 2 birds, on multiple visits. All observations came from trees, scrub and woodland around the site perimeter.
Redwing	Schedule 1 BoCCUK: Amber BoCCW: Green	No	Redwing were observed on all visits, across the site, with a peak flock count of 30 recorded on Visit 4. Most observations were of flocks feeding in or calling from trees around the Site perimeter.
Fieldfare	Schedule 1 BoCCUK: Red BoCCW: Amber	No	Fieldfare were observed on Visits 2-4, with all observations coming from around the Site perimeter, and a peak flock count of 134 on Visit 2, of a flock flying south-west over the northern part of the Eastern area. Most observations were of birds calling from trees and scrub,
House sparrow	Section7 BoCCUK: Red BoCCW: Amber	No	House sparrow were observed on Visits 2 and 3. One was heard calling on Visit 2 close to farm buildings just outside the north-eastern part of the Western area, and a flock of 4 was observed on Visit 3 in a hedge where the two southernmost access routes meet.
Dunnock	Section7 BoCCUK: Amber BoCCW: Amber	No	Dunnock were observed on all visits and were abundant in hedgerows and scrub across the Site.
Meadow pipit	BoCCUK: Amber BoCCW: Red	No	Meadow pipits were observed on Visits 1-3, and Visit 6, with a peak flock count of 40 on Visit 6, of birds feeding on grassland either side of the northern-most access route. The majority of observations were of single birds around the perimeter of the Eastern area, but a flock of 12 was observed feeding on grassland in the south-eastern part of the Western area, on Visit 3.
Chaffinch	BoCCUK: Green BoCCW: Amber	No	Chaffinch were observed on all visits, with a peak flock count of 12 birds feeding on grassland on Visit 1. Most other observations were of calling or singing birds in trees, scrub and woodland around the Site perimeter, across the Site.
Bullfinch	Section 7 BoCCUK: Amber BoCCW: Amber	No	Bullfinch were observed on Visits 3-6, with most observations being of calling or feeding birds in trees and scrub around the Site perimeter, and along the stream in the Western area.

Target species	Legal and conservation status	Qualifying or notified species for nearby designated site	Summary of observations within the survey area
Greenfinch	BoCCUK: Red BoCCW: Red	No	Greenfinch were observed on Visits 4 and 5. One observation, on visit 4 was of a calling bird in scrub along the Western area's Wwstern boundary, and the other observation, on Visit 5, was of a calling bird in a hedgerow where the two southernmost access routes meet.
Linnet	Section 7 BoCCUK: Red BoCCW: Red	No	Linnet were observed on Visit 1, with a flock of 32 birds feeding on stubble in an arable field outside the Eastern area's southeast boundary and periodically flying into the Site boundary, and then back onto the arable field.

4.2 Conclusion

The surveys undertaken by SLR covered the Solar Site plus a 100m buffer to assess how and to what extent the Site is used by wintering birds. The survey area did not include the substation connection Cable Route, which follows existing roads, and which shall involve trenching entirely within the road surface itself, but it did include the proposed cable route connecting the Eastern and Western Parcels.

Of the target species recorded on Site, the vast majority were using habitats around the perimeter of the Site such as hedgerows, woodland, scrub, and pools, with little usage of the field interiors by feeding birds (see Table 4-1 Summary of target species results and legal/conservation status). In conclusion, these perimeter habitats, which are used for foraging and roosting by a wide range of priority species and a relatively large number of individual birds, are clearly of higher importance to wintering birds than the field interiors, which support a relatively small range of foraging priority species and a relatively low number of individual birds, and so, in their current form (as modified grassland in use as pasture) are of relatively low importance for wintering birds.

The surveys were also timed to take place two hours either side of high tide at Rhyl, with the intention of detecting a potential functional link with the Liverpool Bay SPA., and Dee Estuary SPA and Ramsar site.

Natural England (Natural Resources Wales do not have a published definition of FLL (Functionally Linked Land), so the Natural England definition is used here) defines FLL as "*areas of land occurring within 20km of an SPA, that are regularly used by significant numbers of qualifying bird species"*[10]*.* To qualify as 'Regular Usage' a site must be "*used by significant numbers of birds for 7 or more years since 2010".* Natural England also state that *"A 'significant' number of birds has been defined as 0.5% of the GB population or 1000 individuals".* Natural England use the definition by Stroud *et al.* (2001) of 'regular' as "*When a threshold is met in two thirds of the season for which adequate data are available".*

One qualifying species for the Liverpool Bay SPA (cormorant) was recorded over-flying the Site but not on Site per se during the surveys, and as such there is no linked functionality for this species.

Two qualifying species for the Dee Estuary SPA (teal and cormorant) were recorded during the surveys, but as stated above cormorant was only recorded in flight over the Site and the numbers of teal recorded (peak count of five birds) clearly do not meet the threshold stated above for a "significant" number of birds, being well below both 0.5% of the GB population (the UK wintering population for Teal is listed by the BTO as 435,000[11]), and 1000 individuals (see Table 3-1 Details of designated ornithological sites within the search area). Furthermore, the Dee Estuary SPA and Ramsar site citations state that 5,251 teal occur within the estuary during the winter; as such the Site supports less than 0.01% of the SPA/ Ramsar population of this particular species.

Therefore, no functionally linked land to the Liverpool Bay SPA, or the Dee Estuary SPA/ Ramsar site has been identified within, or adjacent to, the Site, and there is no scope to affect the integrity of either designated site.

[10] Identification of Functionally Linked Land supporting Special Protection Areas (SPAs) waterbirds in the North West of England - NECR361

[11] Teal | BTO - British Trust for Ornithology

Appendix A Drawing C0002452_01 Site Location

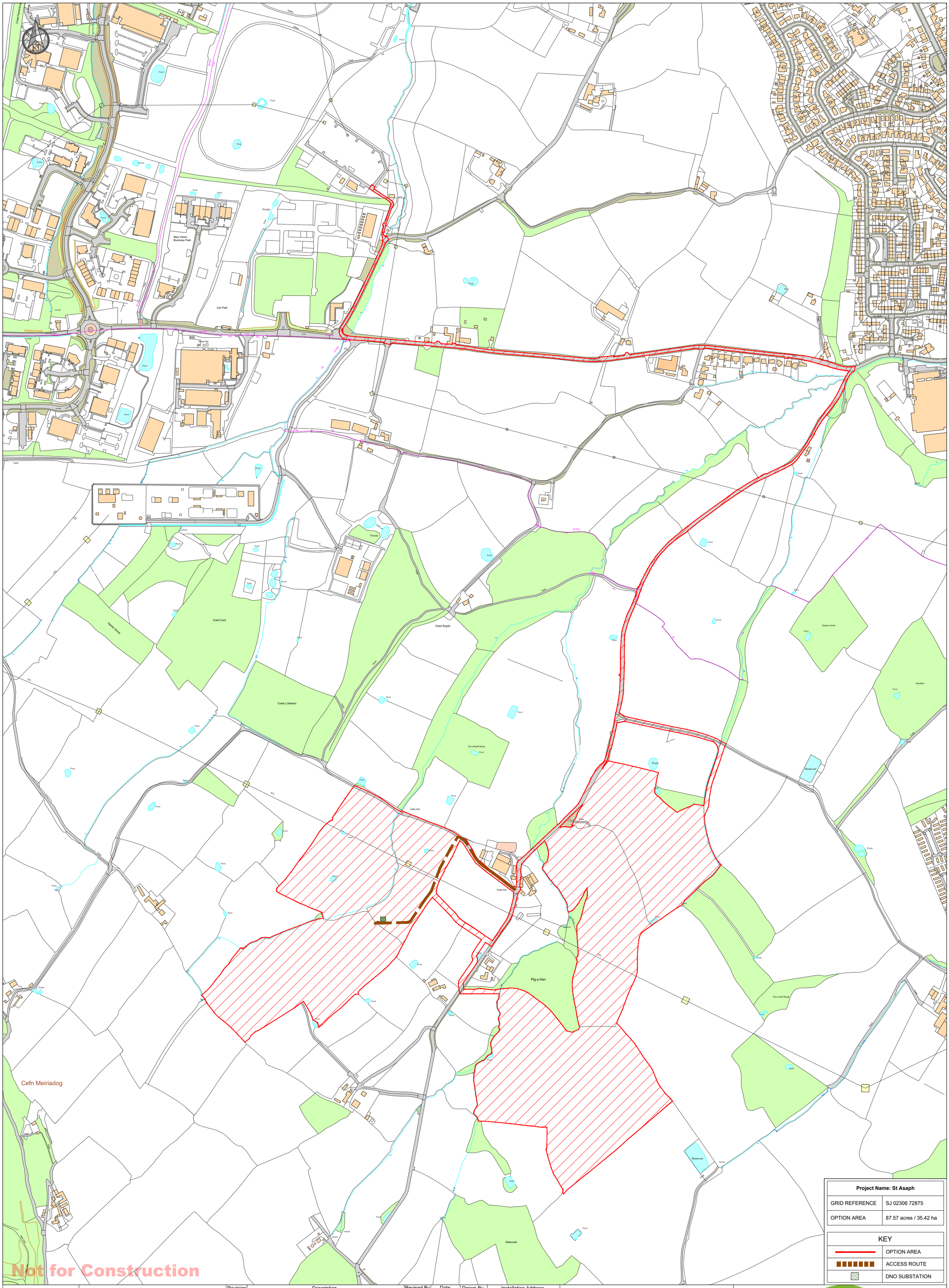
Wintering Bird Survey Report 2024-2025

St. Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

25 April 2025



Project Name: St Asaph	
GRID REFERENCE	SJ 02306 72875
OPTION AREA	87.57 acres / 35.42 ha

KEY

	OPTION AREA
	ACCESS ROUTE
	DNO SUBSTATION

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

0 50 100 150 200

Ordnance Survey, (c) Crown Copyright 2020.
All rights reserved. Licence number 100022432

Revision	Description	Revised By	Date
A	Issued for comment	MS	20/10/2020
B	Land reduced from the North and extended to the South	MS	05/03/2021
C	Area of Land has been altered and the DNO substation moved	MS	04/05/2021
D	Area of Land has been altered and the DNO substation moved	MS	12/05/2021
E	Site area amended	JH	22/11/2023
F	Red Line Boundary amended & access track added in the North	JH	12/12/2023
G	Red Line Boundary amended	MS	10/06/2024
H	Red Line Boundary amended	MS	13/11/2024
J	Red Line Boundary amended	RD	26/03/2025

Drawn By: RD

Scale: 1:5000@ A2

Sheet Size A2

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

Project: St Asaph

Title: Location Plan

Drawing No.: C0002452_01

Rev.: J

Anesco™ AMAZING ENERGY

Appendix B Drawing C0002452_02 Site Layout

Wintering Bird Survey Report 2024-2025

St. Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

25 April 2025

Not for Construction

New Vision Business Park

Car Park

Coed Cord

Hendy Gorse

Coed y Saeson

Coed Esgob

Tyn-y-ffordd Gorse

Pig-y-fran

Square Covert

Tyn-y-coed Rough

Reservoir

Glascoed

Ponds

Pond

Track

Drain

FB

Issues

Silo

Slurry Pit

Sub Sta

FS

LB

GRADED ROAD

LOW CROSS ROAD

34.1m

36.0m

41.4m

47.2m

65.9m

LEGEND

	SITE BOUNDARY
	SECURITY FENCE
HV HV	OVERHEAD ELECTRICAL CABLES (24m/14m OVERALL EASEMENT)
	DNO ACCESS ROUTE
	HV CABLE ROUTE - TRENCH
	LV CABLE ROUTE - TRAY
	PRIVATE HV CABLE ROUTE - TRENCH
BT BT	BT OVERHEAD CABLE
W W	UNDERGROUND WATER TRUNK MAIN
	UTILITY EASEMENT
	HARDSTANDING AREA
	PROPOSED CULVERT CROSSING
	PROPOSED HEDGE REMOVAL FOR TRACK WIDENING
	FENCE PLACEMENT & HEDGE REGROWTH AREA
	PROPOSED TREE REMOVAL
	PV ARRAY
	INVERTER (SUN2000-330KTL)
	SMART TRANSFORMER STATION (JUPITER-6000K/JUPITER3000K)
	DNO SUBSTATION
	CUSTOMER SUBSTATION (PV)

PROJECT NAME: ST ASAPH	
GRID REFERENCE :	SJ 02300 72873
SITE AREA:	87.57Acres / 35.42 ha
TOTAL INSTALLED CAPACITY:	18.44MWp
MAX INVERTER AC POWER:	18.304MW

0 10 20 40 60 80 100

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

Revision	Description	Revised By	Date
A	Issued for comment	MS	19/11/2020
B	Land reduced from the North and extended to the South	MS	05/03/2021
C	Boundary Line Extended	MS	05/05/2021
D	Boundary Line Extended and site maximised	MS	12/05/2021
E	Planning Site Layout	JH	10/11/2021
F	Module Wattage Changed	MS	07/12/2021
G	Site resign to 215KTL & Bifacial Modules	JH	02/03/2022
H	Site redesigned due to tree shading implications	MS	16/06/2022
J	Red Line Boundary amended to include Private HV	JH	03/08/2022
K	Site redesign	JH	15/05/2023
L	Site redesign using new modules and new private HV cable	JH	06/07/2023
M	Site area amended and module redesign	JH	22/11/2023
N	DNO Track Added	LD	28/11/2023
P	Red Line Boundary amended & access track added in the North	JH	12/12/2023
Q	Redesign due to array relocation	JS	19/03/2024
R	Redesign	MS	01/08/2024
S	Access Altered	MS	20/09/2024
T	Hedgerow added and panel locations amended	MS	11/11/2024
U	Inverters added	RD	20/01/2024
V4	Topo and service searches added	RD	31/03/2025

Drawn By: JH

Scale: 1:3000@ A1

Sheet Size: A1

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

Project: St Asaph

Title: Site layout planning

Drawing No.: C0002452_02

Rev.: V4

Anesco™ AMAZING ENERGY

Appendix C Survey Metadata

Wintering Bird Survey Report 2024-2025

St. Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

25 April 2025

Table 4-2 Survey timings and weather data

Visit	Date	Surveyor initials	Start	End	Cloud cover (Okta)	Cloud height (0- <150m, 1- 150-500m, 2- >500m)	Rainfall	Wind (Beaufort scale)	Visibility (Poor= <1km, Moderate= 1-3km, Good= >3km)	Frost	Temperature
1	29/10/2024	GO, TB	6:58	10:58	Start- 8/8 End- 7/8	Start- 150-500m End-150-500m	Start- None End- None	Start-1, SW End- 1, NW	Start- Good End- Good	Start- 0 End- 0	Start- 12° End- 14°
2	14/11/2024	GO, TB	7:01	11:01	Start- 3/8 End- 6/8	Start- >500m End->500m	Start- None End- None	Start-1, N End-1, SE	Start- Moderate End- Good	Start- 0 End- 0	Start- 11° End- 12°
3	16/12/2024	GO, JP	9:02	13:02	Start- 6/8 End- 8/8	Start- >500m End->500m	Start- None End- None	Start-3, SW End-3, SW	Start- Good End- Good	Start- 0 End- 0	Start- 10° End- 11°
4	14/01/2025	GO, TB	9:00	13:00	Start- 2/8 End- 5/8	Start- 150-500m End-150-500m	Start- None End- None	Start-1, SW End-1, SW	Start- Good End- Good	Start- 0 End- 0	Start-10 ° End- 12°
5	11/02/2025	GO, TB	8:06	12:06	Start- 8/8 End- 8/8	Start- 150-500m End-150-500m	Start- None End- None	Start-1, NE End-1, NE	Start- Good End- Moderate	Start- 0 End- 0	Start- 4° End- 5°
6	03/03/2025	PW, CB	11:08	15:08	Start- 5/8 End- 7/8	Start- 150-500m End-150-500m	Start- None End- None	Start-1, W End-1, W	Start- Moderate End- good	Start- 0 End- 0	Start- 10° End- 11°

Appendix D Full Species List

Wintering Bird Survey Report 2024-2025

St. Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

25 April 2025

Table 4-3 Full list of species recorded and conservation status

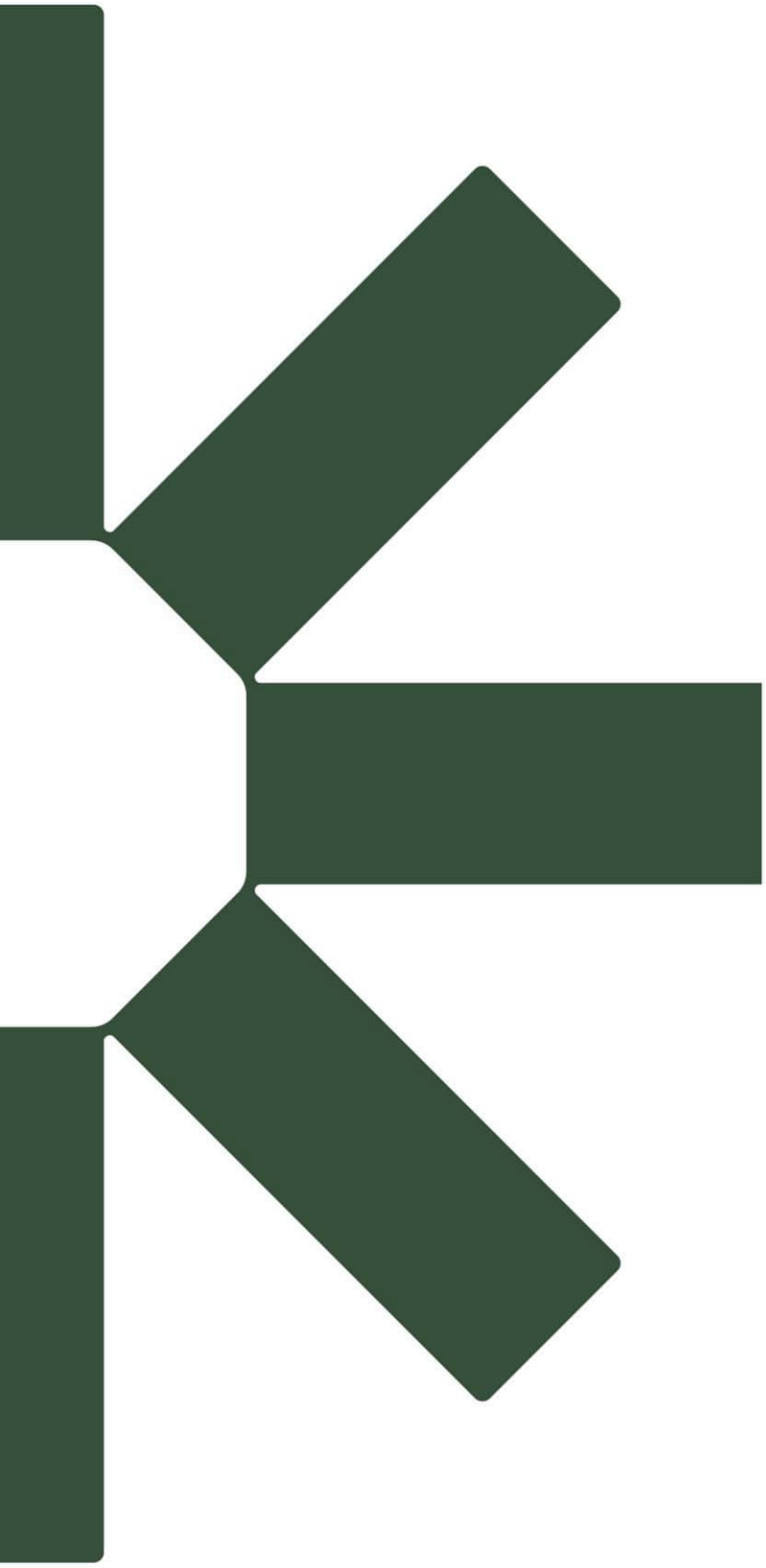
Species	*Scientific name*	Peak Flock Count[12] (across all visits)	BoCC status	Protection Status		
				Annex 1	Sch 1	Sec 7
Greylag Goose	*Anser anser*	2	BoCCUK: Amber BoCCW: Not assessed	-	-	-
Mute Swan	*Cygnus olor*	2	BoCCUK: Amber BoCCW: Green	-	-	-
Mallard	*Anas platyrhynchos*	18	BoCCUK: Amber BoCCW: Green	-	-	-
Teal	*Anas crecca*	5	BoCCUK: Amber BoCCW: Amber	-	-	-
Pheasant	*Phasianus colchicus*	1	BoCCUK: Not Assessed BoCCW: Not Assessed	-	-	-
Feral Pigeon	*Columba livia*	3	BoCCUK: Green BoCCW: Not Assessed	-	-	-
Stock Dove	*Columba oenas*	2	BoCCUK: Amber BoCCW: Green	-	-	-
Woodpigeon	*Columba palumbus*	62	BoCCUK: Amber BoCCW: Green	-	-	-
Woodcock	*Scolopax rusticola*	1	BoCCUK: Red BoCCW: Red	-	-	-
Snipe	*Gallinago gallinago*	1	BoCCUK: Amber BoCCW: Amber	-	-	-

[12] 'Peak flock count' refers to the highest count of a single flock in a defined period (e.g. a single visit). It is considered inappropriate to sum the counts within the survey area on each visit, as the large survey area and survey methodology do not allow for simultaneous/instantaneous counts of the whole area and birds are likely to move between areas/fields, and therefore there would be a risk of repeat counting of birds. It is acknowledged that it is therefore not an estimate of the peak number of birds within the survey area at any one time and therefore the frequency of observations and the peak counts from individual fields/land parcels are also presented in the relevant figures.

Species	*Scientific name*	Peak Flock Count[12] (across all visits)	BoCC status	Protection Status		
				Annex 1	Sch 1	Sec 7
Herring Gull	*Larus argentatus*	32	BoCCUK: Red BoCCW: Red	-	-	Yes
Lesser Black-backed Gull	*Larus fuscus*	5	BoCCUK: Amber BoCCW: Red	-	-	-
Cormorant	*Phalacrocorax carbo*	2	BoCCUK: Green BoCCW: Green	-	-	-
Sparrowhawk	*Accipiter nisus*	1	BoCCUK: Amber BoCCW: Green	-	-	-
Red Kite	*Milvus milvus*	1	BoCCUK: Green BoCCW: Green	Yes	Yes	-
Buzzard	*Buteo buteo*	1	BoCCUK: Green BoCCW: Green	-	-	-
Great Spotted Woodpecker	*Dendrocopos major*	1	BoCCUK: Green BoCCW: Green	-	-	-
Kestrel	*Falco tinnunculus*	1	BoCCUK: Amber BoCCW: Red	-	-	Yes
Jay	*Garrulus glandarius*	2	BoCCUK: Green BoCCW: Green	-	-	-
Magpie	*Pica pica*	2	BoCCUK: Green BoCCW: Amber	-	-	-
Jackdaw	*Corvus monedula*	47	BoCCUK: Green BoCCW: Green	-	-	-
Rook	*Corvus frugilegus*	50	BoCCUK: Amber BoCCW: Red	-	-	-
Carrion Crow	*Corvus corone*	33	BoCCUK: Green BoCCW: Green	-	-	-

Species	*Scientific name*	Peak Flock Count[12] (across all visits)	BoCC status	Protection Status		
				Annex 1	Sch 1	Sec 7
Raven	*Corvus corax*	2	BoCCUK: Green BoCCW: Green	-	-	-
Coal Tit	*Periparus ater*	1	BoCCUK: Green BoCCW: Amber	-	-	-
Blue Tit	*Cyanistes caeruleus*	4	BoCCUK: Green BoCCW: Green	-	-	-
Great Tit	*Parus major*	5	BoCCUK: Green BoCCW: Green	-	-	-
Long-tailed Tit	*Aegithalos caudatus*	14	BoCCUK: Green BoCCW: Green	-	-	-
Goldcrest	*Regulus regulus*	8	BoCCUK: Green BoCCW: Red	-	-	-
Wren	*Troglodytes troglodytes*	2	BoCCUK: Amber BoCCW: Green	-	-	-
Nuthatch	*Sitta europaea*	3	BoCCUK: Green BoCCW: Green	-	-	-
Treecreeper	*Certhia familiaris*	1	BoCCUK: Green BoCCW: Green	-	-	-
Starling	*Sturnus vulgaris*	150	BoCCUK: Red BoCCW: Red	-	-	Yes
Song Thrush	*Turdus philomelos*	5	BoCCUK: Amber BoCCW: Green	-	-	Yes
Mistle Thrush	*Turdus viscivorus*	2	BoCCUK: Red BoCCW: Amber	-	-	-
Redwing	*Turdus iliacus*	30	BoCCUK: Amber BoCCW: Green	-	Yes	-

Species	*Scientific name*	Peak Flock Count[12] (across all visits)	BoCC status	Protection Status		
				Annex 1	Sch 1	Sec 7
Blackbird	*Turdus merula*	4	BoCCUK: Green BoCCW: Green	-	-	-
Fieldfare	*Turdus pilaris*	134	BoCCUK: Red BoCCW: Amber	-	Yes	-
Robin	*Erithacus rubecula*	2	BoCCUK: Green BoCCW: Green	-	-	-
House Sparrow	*Passer domesticus*	4	BoCCUK: Red BoCCW: Amber	-	-	Yes
Dunnock	*Prunella modularis*	2	BoCCUK: Amber BoCCW: Amber	-	-	Yes
Pied Wagtail	*Motacilla alba ssp. yarellii*	9	BoCCUK: Green BoCCW: Green	-	-	-
Meadow Pipit	*Anthus pratensis*	40	BoCCUK: Amber BoCCW: Red	-	-	-
Chaffinch	*Fringilla coelebs*	12	BoCCUK: Green BoCCW: Amber	-	-	-
Bullfinch	*Pyrrhula pyrrhula*	4	BoCCUK: Amber BoCCW: Amber	-	-	Yes
Greenfinch	*Chloris chloris*	1	BoCCUK: Red BoCCW: Red	-	-	-
Linnet	*Linaria cannabina*	32	BoCCUK: Red BoCCW: Red	-	-	Yes
Goldfinch	*Carduelis carduelis*	8	BoCCUK: Green BoCCW: Green	-	-	-
Siskin	*Spinus spinus*	1	BoCCUK: Green BoCCW: Green	-	-	-



Making Sustainability Happen

Appendix F Badger Report

Ecological Impact Assessment

St Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

29 April 2025

This report is confidential and has not been released into the Public Domain for animal welfare reasons.

Appendix G Habitat Report

Ecological Impact Assessment

St Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

29 April 2025

Habitat Survey

St Asaph Solar Farm

Anesco Limited

The Green, Easter Park, Benyon Road,
Reading, Berkshire, RG7 2PQ

Prepared by:

SLR Consulting Limited

2nd Floor, Hermes House, Holsworth Park, Oxon
Business Park, Shrewsbury, SY3 5HJ

SLR Project No.: 406.065274.00001

25 April 2025

Revision: 01

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
01	25 April 2025	Emma Clarke	Andy Law	Gary Oliver

Basis of Report

This document has been prepared by SLR Consulting Limited (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with Anesco Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

Table of Contents

Basis of Report ..... **i**
1.0 Introduction **1**
1.1 Background 1
1.2 Site Description 1
1.3 Purpose of this Report 1
1.4 Evidence of Technical Competence and Experience 1
2.0 Methods **3**
2.1 Desk Study 3
2.2 Field Survey 3
2.3 Limitations 3
2.3.1 Desk Study 3
2.3.2 Field Survey 4
3.0 Results **5**
3.1 Desk Study 5
3.1.1 Statutory Designated Sites 5
3.1.2 Non-Statutory Designated Sites 6
3.1.3 Ancient Woodland 8
3.1.4 Priority Habitats 8
3.1.5 Plant Species 8
4.0 Field Survey **11**
4.1.1 Modified Grassland (g4) 11
4.1.2 Other Neutral Grassland (g3c) 12
4.1.3 Native Hedgerow (h2a) 13
4.1.4 Other Lowland Mixed Deciduous Woodland (w1f7) 15
4.1.5 Other Rivers and Streams (r2b) 17
4.1.6 Urban 17
4.1.7 Line of trees (w1, 33) 19
4.1.8 Other Standing Water (r1g) 20
4.1.9 Species 21
5.0 Discussion **22**

Tables in Text

Table 3-1 Statutory Designated Site Descriptions 5
Table 3-2 Non-Statutory Designated Sites within 2km of the Solar Site 6
Table 3-3 Notable Plant Species Recorded within 2km of the Solar Site boundary. 8

Plates

Plate 4-1 Modified Grassland - Western Parcel..... 11
Plate 4-2 Modified Grassland - Eastern Parcel..... 12
Plate 4-3 Mature Tree - Eastern Parcel..... 12
Plate 4-4 Other Neutral Grassland at the Site. 13
Plate 4-5 Native hedgerow with the Site..... 14
Plate 4-6 Ditch Associated with Hedgerow within the Site. 15
Plate 4-7 Other Lowland Mixed Deciduous Woodland within the Western Parcel..... 16
Plate 4-8 Other Lowland Deciduous Mixed Woodland within the Eastern Parcel..... 16
Plate 4-9 Brook /Stream within the Site. 17
Plate 4-10 Other Developed Land - Track within the Site. 18
Plate 4-11 Other Developed Land – Glascoed Road. 18
Plate 4-12 Artificial Unvegetated - Unsealed Surface - Track within the Site. 19
Plate 4-13 Line of Trees within the Site. 20
Plate 4-14 Typical Pond within the Site. 20
Plate 4-15 Shallow Ephemeral Pond with the Site. 21

Appendices

Appendix A **Drawing C0002452_01 Site Location**
Appendix B **Drawing C0002452_02 Site Layout**
Appendix C **Figure 1 Baseline Habitats**
Appendix D **Locations of Non-Statutory Designated Sites**
Appendix E **Records of Notable Plant Species**

1.0 Introduction

In November 2024, SLR Consulting Limited (SLR) was commissioned by Anesco Limited to undertake habitat survey of a proposed solar farm located at St Asaph, Denbighshire, Wales and broadly centred on National Grid Reference (NGR) SJ 02443 72771, hereafter referred to as the 'Site'.

This report presents the findings of the UK Habitat Classification survey undertaken at the Site.

1.1 Background

SLR Consulting Limited were previously instructed to provide ecological support in relation to the proposed solar farm at St Asaph in December 2021. Since that date, extensive ecological surveys have been undertaken which have fed into the Site design and final layout.

1.2 Site Description

The Site is situated in Denbighshire, approximately 1km to the south-west of the settlement of St Asaph, and approximately 8km south of the seaside town of Rhyl. The location of the Site is shown in Drawing C0002452_01 (Appendix A) and the Site boundary is shown in Drawing C0002452_02 (Appendix B). The Site consists of the main Solar Site and the Cable Route, connecting to the St Asaph Substation.

The Solar Site is approximately 35.42ha in extent and is divided into two areas approximately 250m apart. the Western Parcel is a set of four fields approximately centred on NGR SJ 02123 72727 and the Eastern Parcel is a set of three fields approximately centred on NGR SJ 02644 72614. The fields consist of modified grassland, of a short to medium sward length used for cattle and sheep grazing. The boundaries of the fields consist of flailed hedgerows, some containing mature trees, and of semi-natural, lowland mixed deciduous woodland.

The Cable Route is limited to highways that connect the Solar Site to St Asaph Substation. This includes the track to Tyn Y Coed, Glascoed Road, and Cwttir Lane.

The wider landscape is generally farmland used for grazing or arable crops, there are also several woodlands, some of which are ancient.

1.3 Purpose of this Report

This report presents the findings of the habitat survey. The report seeks to establish baseline conditions and identify habitats that are important ecological features (irrespective of any specific faunal species they may support). The assessment of impacts resulting from the proposals is beyond the scope of this report however and will be covered in the Ecological Impact Assessment (EcIA).

1.4 Evidence of Technical Competence and Experience

The survey work was undertaken by Emma Clarke, BSc, Senior Ecologist at SLR and Qualifying member of the Chartered institute of Ecology and Environmental Management (CIEEEM), with 6 years' experience as a professional Ecologist and skilled in UK habitat classification, also holding Natural England (NE) GCN Level 1 Class Licence (2019-43874-CLS-CLS), NE Bat Level 2 Class Licence (2023-10986-CL18-BAT) and holding a NPTC Level 2 Award Tree Climbing and Rescue (units 206, 306). The report was authored by Emma.

This report has been subject to review by Andy Law CEcol, MCIEEM, a Principal Ecologist with SLR, and has been approved by Gary Oliver MCIEEM, also a Principal Ecologist with SLR.

2.0 Methods

2.1 Desk Study

Cofnod the local environmental record centre North Wales, was commissioned to conduct a search of statutory and non-statutory designated sites for nature conservation, priority habitats, phase 1 habitat survey data, ancient woodland, ancient tree and protected and notable plant species within the Solar Site and within a 2km radius of the Solar Site boundary. The data was obtained on 12th February 2025.

2.2 Field Survey

The Site was surveyed to identify the broad habitat types present in accordance with the UK Habitat Classification methodology (UKHab version 2.0)[1].

The UKHab system comprises a principal hierarchy (the Primary Habitats) which involves the identification of broad habitats and Priority habitats, as well as the use of non-hierarchical Secondary codes.

Habitats were classified up to Level 5 of the Primary Hierarchy where possible, and all mandatory secondary codes were used, along with optional secondary codes where relevant.

A Minimum Mapping Unit (MMU) of 25m^2 or 5m length was used for mapping habitat polygons and lines.

Plant species listed in Schedule 9 of the Wildlife and Countryside Act (WCA) 1981 (as amended), such as Japanese knotweed (*Fallopia japonica)*, Himalayan balsam (*Impatiens glandulifera)* and giant hogweed (*Heracleum mantegazzianum)* were also searched for.

The survey was undertaken on 13th and 14th February 2025. A further survey was undertaken on 23rd April 2025, of the woodland, stream and ditch habitats to add to species lists, and a targeted search for bluebells and other valuable ground flora was carried out at hedgerow sections due for removal. Prior to this, several visits involving habitat recording had been undertaken as described above, encompassing some parts of the current Site, as well as surrounding habitats present within previous iterations of the Site boundary.

Previous surveys were undertaken on:

- 21st January 2022;
- 15th September 2022 (central cable route joining Eastern and Western Parcels);
- 15th December 2023; and
- 11th April 2024 (northeastern areas of the Eastern Parcel)

Notes and photographs from previous surveys have been used alongside the most recent survey to accurately classify habitats within the Site boundary as per Figure 1 – Baseline Habitats (Appendix C).

2.3 Limitations

2.3.1 Desk Study

Desk study data is unlikely to be exhaustive, especially in respect of species, and is intended mainly to set a context for the study. It is therefore possible that important habitats or

[1] UKHab Ltd (2023) UK Habitat Classification System Version 2.0. Available at: https://www.ukhab.org

protected species not identified during the data search do in fact occur within the vicinity of the Site. Interpretation of maps and aerial photography has been conducted in good faith, using recent imagery, but it has not been possible to verify the accuracy of any statements relating to land use and habitat context outside of the field study area.

2.3.2 Field Survey

All areas of the Site were accessible for the purposes of the UKHab survey. The timing of the survey in February 2025 was outside the main plant growing season and certain species may not have been evident. Therefore, the timing of the survey could have resulted in ground flora and invasive plant species being under-recorded within woodlands and hedgerow bases and in ditches and streams, therefore the survey was updated on 23rd April to account for this.

The main habitat recorded on Site and due to be impacted by the scheme, modified grassland, is unlikely to support any rare or notable species due to intensive grazing and other management practices, therefore no survey limitations are considered to apply.

3.0 Results

3.1 Desk Study

3.1.1 Statutory Designated Sites

The Site itself is not designated as a statutory ecological site, however, there are two sites within 2km of the main Solar Site boundary whose boundaries are coincident; Coedydd ac Ogofau Elwy a Meirchion Site of Special Scientific Interest (SSSI) and Coedwigoedd Dyffryn Elwy / Elwy Valley Woods Special Area of Conservation (SAC) and are situated 865m south-west of the Site at their nearest point. Further details are provided in Table 3-1.

Table 3-1 Statutory Designated Site Descriptions

Distance from Solar Site	Site Name, Size and Designation	Description
*c.*865m southwest of Site	Coedwigoedd Dyffryn Elwy / Elwy Valley Woods (82.7 ha) SAC	"*One of three sites selected to represent Tilio-Acerion forest across its geographic range on the carboniferous limestone of north Wales, and is an example of the habitat with an outstanding lower-plant flora. The canopy is quite varied: ash (Fraxinus excelsior) is the commonest tree, but there is also occasional small-leaved lime Tilia cordata and wild service-tree Sorbus torminalis. There is a rich, calcicolous understorey and ground flora, and rare bryophytes include Bryum canariense, Cololejeunea rossettiana, Plagiochila britannica, Platydictya confervoides and Isothecium striatulum. The woods have developed along steep valley-sides and ravines that are also important for their cave systems and Pleistocene fossil mammal assemblages*."[2]
	Coedydd ac Ogofau Elwy a Meirchion (83.01 ha) SSSI	*"The site is of special interest for its semi-natural broadleaved woodland, its rare flowering plant assemblage, its scarce bryophyte assemblage and the geological and palaeontological interest of Galltfaenan, Cefn and Pontnewydd Caves…* *The woodlands consist largely of ash and oak Quercus petraea high forest, with other woodland communities occasionally assuming local prominence…* *Of particular interest are the uncommon wild service tree and small-leaved lime, both of which occur east of the River Meirchion…* *The diverse understorey, within which hazel Corylus avellana is dominant, is a rich mixture of species such as hawthorn Crataegus monogyna, holly Ilex aquifolium, spindle Eunonymus europaeus, privet Ligustrum vulgare, dogwood Cornus sanguinea and on the especially thin, basic soils, the uncommon spurge laurel Daphne laureola. Yew Taxus baccata also occurs frequently…* *In the ash-dominated woodland the herb layer is varied, with dog's mercury Mercurialis perennis and ivy Hedera helix being conspicuous components and with sanicle Sanicula europaea, enchanter's nightshade Circaea lutetiana and woodruff Galium*

[2] Coedwigoedd Dyffryn Elwy/ Elwy Valley Woods - Special Areas of Conservation

Distance from Solar Site	Site Name, Size and Designation	Description
		odoratum also present. More uncommon species include broadleaved helleborine Epipactis helleborine, columbine Aquilegia vulgaris and herb paris Paris quadrifolia. In the oak woodland, where the soil is base-poor, heather Calluna vulgaris, greater woodrush Luzula sylvatica, bell-heather Erica cinerea, wavy hair-grass Deschampsia flexuosa and golden-rod Solidago virgaurea can be found… *Calcicolous grassland occurs north of the River Elwy which together with the vegetated limestone cliffs, forms a very species-rich part of the site. Important plants to be found in the cliff-top grassland, among the more usual salad burnet Sanguisorba minor and common rockrose Helianthemum nummularium, include the nationally scarce spiked speedwell Veronica spicata subsp. hybrida, spring cinquefoil Potentilla neumanniana, bloody cranesbill Geranium sanguineum and dark mullein Verbascum nigrum."*[3]

3.1.2 Non-Statutory Designated Sites

There are several non-statutory sites within 2km of the Solar Site boundary, they are detailed in Table 3-2, and illustrated in Appendix D.

Table 3-2 Non-Statutory Designated Sites within 2km of the Solar Site

Distance from the Solar Site	Site Name	Description
Partly adjacent to the east of the Eastern Parcel.	Ty'n-y-Coed Rough (2 areas) Wildlife Sites for Denbighshire	Flat, lowland broadleaved woodland
Partly adjacent to the south of the Eastern Parcel	Glascoed (2 areas) Wildlife Sites for Denbighshire	Lowland, ancient broadleaved woodland
123m northwest of the Western Parcel	Coed Cord / Coed y Saeson Wildlife Sites for Denbighshire	Flat, low lying, ancient woodland including alder, ash, oak and birch communities. Hazel forms an extensive herb layer with hawthorn and ash and elm saplings. The herb-layer is varied with dog's mercury, sanicle, giant fescue, False brome and early dog-violet.
322m northeast of the Eastern Parcel	Coed Fron and Eryl Hall Wood Wildlife Sites for Denbighshire	Ancient woodland with alder, ash, oak and birch communities.
416m northwest of Site	Gwynt-y-Mor Wild Ground Nature Reserve	No details provided.
431m west of Site	Bryn Meiriadog Wildlife Sites for Denbighshire	Ancient woodland including alder, ash and oak communities, blackthorn and hazel scrub and calcareous grassland . The latter occurs on rocky outcrops within the wood. Ancient woodland flora includes black bryony, bluebell, wild strawberry, wood avens, common cow-wheat and wood melick. The limestone grassland flora in rocky areas includes sheep's fescue,

[3] SSSI NOTIFICATION/RENOTIFICATION CITATIONS - FORMAT

Distance from the Solar Site	Site Name	Description
		meadow oat-grass, musk thistle, common Rock-rose, common stork's-bill and wild thyme. On deeper soils it is quite rank but species rich with sweet vernal-grass, false oat-grass, meadow oat-grass, creeping thistle, pignut, bird's-foot-trefoil, salad burnet, goat's-beard and the uncommon dropwort. This area is part of Cefn Estate, which supports a large population of fallow deer.
631m south of Site	Coed Kendrick Wildlife Sites for Denbighshire	Ancient broadleaved woodland on a gentle, south facing slope.
737m southwest of Site	Coed yr Accar (2 areas) Wildlife Sites for Denbighshire	Ancient broadleaved woodland.
1028m southeast of Site	Chapel Wood/Coed Mawr Wildlife Sites for Denbighshire	South facing ancient broadleaved woodland
1267m northwest of Site	Glascoed Wild Ground Nature Reserve	A mosaic of 14 ponds, improved grasslands, ditch and 2 planted woodland compartments, some mature trees in pre-existing hedgerows, especially along the northern boundary.
1329m southeast of Site	Rickfield Wood/Coed Ddol Fawr/Coed Llanddol/Maes Elwy Covert (R Elwy Woods) Wildlife Sites for Denbighshire	Ancient broadleaved and replanted woodland along the Elwy Valley
1556m southwest of Site	Coed Bont Newydd Wildlife Sites for Conwy	Broadleaved woodland.
1614m southwest of Site	Coed Nant-y-graig Wildlife Sites for Conwy	Broadleaved woodland.
1649m west of Site	Coed y Ddol/Coed y Fadir Wildlife Sites for Denbighshire	A south facing lowland ancient woodland on the valley side of the River Elwy. Wet, alder woodland occurs on lower slopes, ash woodland where it is drier, and silver birch woodland where soils are more acid.
1653m southwest of Site	Pwllau Graig Wildlife Sites for Conwy	Standing water.
1774m northeast of Site	Mount Road Churchyard, St Asaph Wildlife Sites for Denbighshire	This cemetery has neutral grassland, which has been left uncut during the summer. Species include cock's-foot, common knapweed, pepper saxifrage and stinking Iris. Trees around the site include ash, oak, yew and wild cherry. Various butterflies occur such as orange tip, meadow brown, small tortoiseshell and peacock and a large population of slow worm has been recorded.
1916m south of Site	Coed Pont y Trap Wildlife Sites for Conwy	Broadleaved woodland.
1973m southwest of Site	Pwllau Coed y Dafarn Wildlife Sites for Conwy	Standing water.
1976m south of Site	Nany Meirchion field Wildlife Sites for Denbighshire	Species rich neutral grassland on a valley side. Species include crested dog's-tail, Yorkshire-fog, common bent, common knapweed, cat's-ear, primrose, common century, bird's-foot-trefoil and early-purple orchid. Wetter parts have greater bird's-foot-trefoil, meadowsweet and creeping buttercup.

3.1.3 Ancient Woodland

The data received by Cofnod revealed multiple ancient woodlands within 2km of the Solar Site. Two of these ancient woodlands are adjacent to the site boundary:

- Pig-y-fran (Plantation on Ancient Woodland Site) – is adjacent to the mid-section of the Eastern Area, on its western side; and
- Tyn-y-coed Rough (Restored Ancient Woodland Site) – is adjacent to the Eastern Area, for a section on its northeastern side.

The location, and extent, of these woodlands is illustrated in Appendix D.

3.1.4 Priority Habitats

The data received by Cofnod found no priority habitats recorded within the Solar Site boundary. The closest priority habitats to the Site are two small i.e. less than 0.1ha each, traditional orchards, lying between the Eastern and Western Parcels, approximately 135m from the Solar Site at their closest point, several other small traditional orchards are found within the 2km search area further away from Site. Approximately 430m to the south of Solar Site, is a larger area of wood pasture and parkland (420ha), also containing two small areas of lowland calcareous grassland. Further wood pasture and parkland is present at Bodelwyddan Park approximately 1.75km to the northwest of the Solar Site. To the southeast limestone pavements are recorded approximately 641m away from the Site boundary. Areas to the east and south of Site, associated with the River Elwy /Afon Elwy are recorded as coastal floodplain and grazing marsh.

3.1.5 Plant Species

Cofnod returned records of numerous notable plant species occurring within 2km of the proposed development. None of these were recorded within the Solar Site boundary. Table 3-3 shows notable species within a 2km radius of the Solar Site. In addition to those listed in Table 3-3, further plant species of local importance[4] occur and are provided in Appendix E.

Table 3-3 Notable Plant Species Recorded within 2km of the Solar Site boundary.

Scientific Name	English Name	Most Recent Record	Nearest record to the Solar Site	Status*
Silene vulgaris	Bladder Campion	2016	300m	Wales Red List - Near Threatened
Juniperus communis subsp. communis	Common Juniper	1970	394m	UK BAP, Section 7
Pinus sylvestris	Scots Pine	2024	406m	Red Data Book - Nationally Scarce, Rare Plant Register Denbighshire - Locally Rare
Carex pseudocyperus	Cyperus Sedge	2016	431m	Wales Red List - Near Threatened, Rare Plant Register Denbighshire - Locally Rare
Hypericum montanum	Pale St John's-wort	2017	844m	Red List - Near Threatened

[4] As defined within the Denbighshire (VC50) Country Rare Plants Register

Scientific Name	English Name	Most Recent Record	Nearest record to the Solar Site	Status*
Anacamptis morio	Green-winged Orchid	2021	884m	Red List - Near Threatened, CITES-B, Rare Plant Register Denbighshire - Locally Rare
Ctenidium molluscum	Chalk Comb-moss	2009	949m	Wales Red List - Data Deficient
Verbascum nigrum	Dark Mullein	2023	954m	Wales Red List - Near Threatened
Hyacinthoides non-scripta	Bluebell	2021	978m	WCA 8
Sagittaria sagittifolia	Arrowhead	1999	996m	Wales Red List - Vulnerable
Veronica spicata	Spiked Speedwell	2011	1030m	WCA 8
Euphorbia lathyris	Caper Spurge	2024	1030m	CITES-B, Rare Plant Register Denbighshire - Locally Scarce
Scabiosa columbaria	Small Scabious	2021	1030m	Wales Red List - Vulnerable
Helleborus foetidus	Stinking Hellebore	2011	1030m	Red Data Book - Nationally Scarce
Sesleria caerulea	Blue Moor-grass	1982	1145m	Red Data Book - Nationally Scarce, Wales Red List - Regionally Extinct
Buxus sempervirens	Box	1985	1383m	Red Data Book - Nationally Rare, Rare Plant Register Denbighshire - Locally Rare
Ophrys apifera	Bee Orchid	2024	1384m	CITES-B
Veronica spicata subsp. hybrida	Western Spiked Speedwell	1999	1444m	WCA 8, Rare Plant Register Denbighshire - Locally Rare
Butomus umbellatus	Flowering-rush	2012	1449m	Wales Red List - Vulnerable
Physcia tenella	a lichen	1972	1556m	Wales Red List - Data Deficient
Xanthoria ucrainica	a lichen	1972	1556m	Red Data Book - Near Threatened, Rare Plant Register Denbighshire - Locally Scarce
Ruscus aculeatus	Butcher's-broom	1926	1556m	HDir 5, Wales Red List - Vulnerable, Rare Plant Register Denbighshire - Locally Rare
Mentha arvensis	Corn Mint	2024	1556m	Wales Red List - Vulnerable, Rare Plant Register Denbighshire - Locally Near Scarce
Centaurea cyanus	Cornflower	1850	1556m	UK BAP, Section 7, Wales Red List - Critically Endangered
Potentilla tabernaemontani	Spring Cinquefoil	1999	1604m	Red Data Book - Nationally Scarce
Entosthodon pulchellus	Pretty Cord-moss	2005	1637m	UK BAP, Red Data Book - Near Threatened, Rare Plant Register Denbighshire - Locally Near Scarce
Euphorbia amygdaloides	Wood Spurge	2000	1641m	CITES-B, Rare Plant Register Denbighshire - Locally Scarce

Scientific Name	English Name	Most Recent Record	Nearest record to the Solar Site	Status*
Hippuris vulgaris	Mare's-tail	1978	1699m	Wales Red List - Near Threatened
Vicia bithynica	Bithynian Vetch	2020	1835m	Red Data Book - Nationally Scarce, IUCN Red List - Vulnerable, Wales Red List - Endangered, Rare Plant Register Denbighshire - Locally Rare
Spergula arvensis	Corn Spurrey	2011	2296m	Red List - Vulnerable, Wales Red List - Near Threatened, Rare Plant Register Denbighshire - Locally Near Scarce

*HDir5 - Habitats Directive, Annex V - Species where population management is decided by individual countries, UK BAP - UK Biodiversity Action Plan Priority Species, CITES-B - Convention on International Trade in Endangered Species, Annex B - Species that may become extinct unless trade is closely controlled, Red Data Book - Red Data Book listing (not based on IUCN guidelines), Red List - IUCN Red List of Threatened Species, WCA 8 - Wildlife & Countryside Act 1981 Schedule 8 - Plants which are protected, Wales Red List - Red Data List for Wales

Invasive non-native (INNS)

There were 52 records of invasive non-native plant species returned by the data search listed as such under Schedule 9 of the WCA 1981:

- 36 records of Himalayan balsam (*Impatiens glandulifera)* also an Invasive Alien Species (IAS), with the nearest being 754m from the Solar Site;
- Three records of montbretia (*Crocosmia pottsii x aurea = C. x crocosmiiflora)* with the nearest being 1278m from the Solar Site;
- Two records of wall cotoneaster (*Cotoneaster horizontalis*) with the nearest being 1030m from the Solar Site;
- Two records of American skunk cabbage (*Lysichiton americanus*) also an IAS with the nearest being 1027m from the Solar Site;
- One record of few flowered garlic (*Allium paradoxum*) with the nearest being 2000m from the Solar Site;
- One record of giant hogweed (*Heracleum mantegazzianum*) also an IAS, with the nearest being 1906m from the Solar Site;
- One record of Himalayan cotoneaster *(Cotoneaster simonsii)* with the nearest being 1676m from the Solar Site;
- One record of Himalayan honeysuckle (*Leycesteria formosa)* with the nearest being 1556m from the Solar Site;
- One record of Japanese knotweed (*Fallopia japonica*) with the nearest being 1152m from the Solar Site;
- One record of Japanese rose (*Rosa rugosa*) with the nearest being 1152m from Site;
- One record of New Zealand Pygmy weed (*Crassula helmsii)* with the nearest being 1270m from the Solar Site;
- One record of small leaved cotoneaster (*Cotoneaster microphyllus*) with the nearest being 1030m from the Solar Site; and
- One record of Variegated Yellow Archangel (*Lamiastrum galeobdolon subsp. argentatum)* with the nearest being 1944m from the Solar Site.

4.0 Field Survey

A summary of the habitats within the Site is provided below. A plan showing the habitats present within the Site boundary is provided as Figure 1 - Baseline Habitats (Appendix C).

4.1.1 Modified Grassland (g4)

The Western Parcel encompasses four fields comprised of cattle grazed (secondary code 101) modified grassland (Plate 4-1). Diversity of plant species was poor, with perennial rye grass (*Lolium perenne*) dominating the sward. Other grasses occurred occasionally including, cock's-foot (*Dactylis glomerata*), which was more prevalent at field edges, creeping bent (*Agrostis stolonifera*) and annual meadow grass (*Poa annua*).

Broadleaved plants occurred occasionally including, creeping buttercup (*Ranunculus repens)*, dandelion (*Taraxacum officinale agg*.), white clover (*Trifolium repens)* and mouse-ear chickweed (*Cerastium fontanum*). Broad-leaved dock (*Rumex obtusifolius*) occurred rarely.



Plate 4-1 Modified Grassland - Western Parcel

The Eastern Parcel encompasses three fields, all of which comprised sheep grazed (secondary code 102) or cattle grazed (secondary code 101) modified grassland (Plate 4-2), species composition was similar to that of the Western Parcel with mouse-ear chickweed (*Cerastium fontanum*) occurring frequently. Meadow foxtail (*Alopecurus pratensis*) and Yorkshire fog grass (*Holcus lanatus*) were also recorded. Lesser celandine (*Ficaria verna*) was locally abundant at field edges in the northern field.



Plate 4-2 Modified Grassland - Eastern Parcel

4.1.1.1 Mature Trees (secondary code 203)

Four individual mature trees occur within the modified grassland habitats of the Eastern Parcel. These were all pedunculate oak (*Quercus robur*) trees, three of which had been subject to heavy pruning of limbs, as per Plate 4-3. One mature oak occurred within the modified grassland of the Western Parcel.



Plate 4-3 Mature Tree - Eastern Parcel

4.1.2 Other Neutral Grassland (g3c)

The Site includes a narrow strip of land between the Western and Eastern Parcels which is due to provide a cable route between them, this includes the edges of several horse grazed fields of 'Other Neutral Grassland' (Plate 4-4). The sward here was of a short to medium length, containing perennial rye grass, annual meadow grass, red fescue (*Festuca rubra*),

Yorkshire fog, locally abundant knapweed (*Centaurea nigra*), creeping buttercup, common sorrel (*Rumex acetosa*) and yarrow (*Achillea millefolium*).



Plate 4-4 Other Neutral Grassland at the Site.

4.1.3 Native Hedgerow (h2a)

The fields in both the Western and Eastern Parcels are bordered by native hedgerows (Plate 4-5). All are managed by flailing (secondary code 116), to a height usually below 2m, and generally comprised of a dominance of either hawthorn (*Crataegus monogyna*) or blackthorn (*Prunus spinosa).* Also occasionally present was bramble (*Rubus fruticosus*), hazel (*Corylus avellana*), gorse (*Ulex europaeus*), field maple (*Acer campestre*), dog rose (*Rosa canina*), and rarely holly (*Ilex aquifolium*), elder (*Sambucus nigra*), willow (*Salix sp*.) and honeysuckle (*Lonicera periclymenum*).

Many of the hedgerows contain mature oak (Quercus sp.) standards, and rarely ash (*Fraxinus excelsior*). Most were intact along their length, but some contained gaps of up to 12m.

Ground flora was generally in keeping with the modified grassland habitats adjacent to the hedgerow bases, and grazing occurred all the way up to the field boundaries. Ivy (*Hedera helix*) was abundant within the hedgerows, lords-and-ladies (*Arum maculatum*) occurred frequently along with nettle (*Urtica dioica*), jack by the hedge (*Alliaria petiolata*) and cleavers (*Galium aparine*); greater stitchwort (*Rabelera holostea*) occurred occasionally; primrose (*Primula vulgaris*) occurred rarely along with dog's mercury (*Mercurialis perennis*) and bluebell (*Hyacinthoides non-scripta*) in close proximity to the ancient woodland bordering the Eastern Parcel.



Plate 4-5 Native hedgerow with the Site.

Native hedgerows are a priority habitat as listed on Section 7 of the Environment (Wales) Act.

4.1.3.1 Ditches (secondary code 50)

Some of the hedgerows were associated with ditches (secondary code 50) (Plate 4-6). Ditches on Site were generally in a poor condition, holding small amounts of water. Bankside species included grasses in keeping with the modified grassland habitats adjacent, as well as broadleaved plants such as great willowherb (*Epilobium hirsutrum*), nettle, creeping buttercup, wavy bittercress (*Cardamine flexuosa*), lesser celandine, primrose, bluebell, meadowsweet (*Filipendula ulmaria*), hairy St John's wort (*Hypericum hirutum*), germander speedwell (*Veronica chamaedrys*), cleavers and bitter vetch (*Lathyrus linifolius*).

Within the channels horsetail (*Equiseyum sp.*) was locally abundant, soft rush (*Juncus effusus*) occurred occasionally, and grey sedge (*Carex divulsa*) was also found. In wetter areas brooklime (*Veronica beccabunga*) and common reed (*Phragmites australis*) were locally abundant and watercress (*Rorippa nasturtium-aquaticum*) occurred occasionally.



Plate 4-6 Ditch Associated with Hedgerow within the Site.

4.1.4 Other Lowland Mixed Deciduous Woodland (w1f7)

Separating two of the northerly fields in the Western Parcel, over a silty, shallow stream, is a narrow area of lowland mixed deciduous woodland (Plate 4-7). Tree species within the woodland included frequent oak, hawthorn and ash. Hazel, holly and dog rose were also present occasionally in the understorey. Ground flora included abundant nettle and cleavers, frequent lesser celandine and ivy, occasional lords and ladies, broadleaved dock (*Rumex obtusifolius*) and jack by the hedge. Also, occurring rarely, was common vetch (*Vicia sativa*) and greater stitchwort. Ancient woodland indicator species occurred occasionally, such as bluebell and wood anemone (*Anemone nemorosa*), which were locally abundant where they did occur, and moschatel (*Adoxa moschatellina*) was found in a single small area. Some waste materials such as old fencing and plastic has been discarded within the woodland.



Plate 4-7 Other Lowland Mixed Deciduous Woodland within the Western Parcel.

The Eastern Parcel is bordered on its west boundary by narrow mixed deciduous woodland over a small brook or stream (Plate 4-8). Tree species include ash, oak, hawthorn, hazel and willow. Ground flora included lesser celandine and several ancient woodland indicator species such as wood anemone, primrose, woodruff (*Galium odoratum*), bluebell, wood speedwell (*Veronica montana*), dog's mercury, scaly male fern (*Dyopteris affinis agg*.), hart's tongue fern (*Asplenium scolopendrium*) and barren strawberry (*Potentilla sterilis*).



Plate 4-8 Other Lowland Deciduous Mixed Woodland within the Eastern Parcel.

'Lowland Mixed Deciduous Woodland' is a priority habitat as listed on Section 7 of the Environment (Wales) Act, the 'Other Lowland Deciduous Mixed Woodland' habitats recorded on Site are an example of this priority habitat.

4.1.5 Other Rivers and Streams (r2b)

The brook bordering the Eastern Parcel (Plate 4-9) was shallow with gradually sloping earth banks with a silty base, the stream is heavily shaded and little vegetation is present, although horsetail was found occasionally and brooklime rarely.



Plate 4-9 Brook /Stream within the Site.

The boundary stream present in the Western Parcel was slightly sinuous, suggesting that the water might flow at times but was found at the time of the 2025 survey as standing water; the stream continues beyond the boundary of the woodland, south and runs alongside the hedgerow here, becoming much more modified and ditch-like.

Like the stream in the Eastern Parcel, aquatic plants in the channel only occurred rarely and comprised mostly of brooklime and horsetail.

Both streams within the Site join further upstream within Coed Esgob Woodland, located to the north of Site, before joining the River Elwy / Afon Elwy which flows through the settlement of St Asaph, located to the north-west of the Site.

The streams within the Site fit the broad habitat description for ‘Rivers and Streams’ as listed on Section 7 of the Environment (Wales) Act and are therefore Priority Habitats.

4.1.6 Urban

4.1.6.1 Other Developed Land (u1b6) 839 track, 800 road

A concrete farm track forms the northern boundary of the Western Parcel (Plate 4-10).



Plate 4-10 Other Developed Land - Track within the Site.

Connecting the Solar Site to the substation in the north, a connection Cable Route is proposed and follows roads for its entire length. Plate 4-11 shows the Glascoed Road section of the Cable Route.



Plate 4-11 Other Developed Land – Glascoed Road.

4.1.6.2 Artificial Unvegetated – Unsealed Surface (u1c) 839 track

A further gravel/hardcore track (Plate 4-12) is found to the north of the Eastern Parcel.



Plate 4-12 Artificial Unvegetated - Unsealed Surface - Track within the Site.

4.1.6.3 Built Linear Features (u1e) 612 fence

Boundary fences are found across the Site, associated with hedgerows or lines of trees. To the northern boundary of the most north eastly field of the Eastern Parcel, a wire fence forms the boundary between the field and farm track.

4.1.7 Line of trees (w1, 33)

A line of trees (Plate 4-13) is present to the southern boundary of the Eastern Parcel. Next to it is a dry ditch on the opposing side to the Site boundary. Species included oak, ash and hawthorn.



Plate 4-13 Line of Trees within the Site.

4.1.8 Other Standing Water (r1g)

4.1.8.1 Ponds (priority habitat) (secondary code 40)

There are six ponds present within the Site boundary. Generally, ponds are shallow, utilised by cattle with poached banks (Plate 4-14), floating sweet grass (*Glyceria fluitans*) and pond weed (*Potamogeton natans*) were present in some the ponds along with duckweed in others.



Plate 4-14 Typical Pond within the Site.

One of these ponds (Plate 4-15) is very small/shallow and found to be dry during each Great Crested Newt (GCN) (*Triturus cristatus*) survey season (March – June 2022 and 2024).



Plate 4-15 Shallow Ephemeral Pond with the Site.

During surveys undertaken by SLR from 2022 onwards, three of the six ponds were found to support GCN; the ponds therefore qualify as Priority Habitat.

4.1.9 Species

The majority of the Solar Site supports modified grassland; protected or notable plant species are not usually associated with this habitat type, due to its typically high levels of nutrient enrichment, and ongoing management regime.

Bluebells were noted to occur occasionally within the understorey of hedgerows, especially where they adjoin ancient woodland. The survey in April 2025 found no bluebells within areas of hedgerow to be impacted by the scheme. Bluebells are protected under the Wildlife and Countryside Act 1981, Schedule 8 (Section 2) and are protected from uprooting or picking for the purpose of sale only. Grey sedge, watercress and bitter vetch were found during the habitat survey, the Cofnod data search lists these species as occurring on local rare plant registers (see Appendix A for further detail on relevant lists). These plants were all associated with ditches and bankside habitats on Site.

No non-native invasive species were recorded within the Site.

5.0 Discussion

Of the habitats described above, the following are considered priority habitats, as listed on Section 7 of the Environment (Wales) Act:

- Native Hedgerow;
- Other Lowland Mixed Woodland;
- Other Standing Water – Ponds; and
- Other Rivers and Streams

Additionally, there are several Ancient Woodland and Local Wildlife Sites adjacent to the Site boundary, which are of ecological importance, including:

- Pig-y-fran (Plantation on Ancient Woodland Site);
- Tyn-y-coed Rough (Restored Ancient Woodland Site);
- Ty'n-y-Coed Rough (Wildlife Sites for Denbighshire); and
- Glascoed (Wildlife Sites for Denbighshire).

The priority habitats, ancient woodlands and local wildlife sites are considered to be of local ecological importance.

Several species associated with ditches on Site are included on local rare plant registers, they are considered of local importance, as an integral part of the feature concerned.

Bluebells occur in woodland and hedgerows within the Solar Site and together with other ancient woodland indicator species are considered to be of local importance, again, as an integral part of the feature concerned (for example, as part of the hedgerow they occur along).

Individual mature trees and trees found within the boundary hedgerows have intrinsic ecological importance and are likely to support nesting birds and be used as a foraging resource for protected species such as bats. They are considered to be of local importance.

Much of the Solar Site however is made up of modified grassland with low species diversity used as pasture and with little to no ecological significance.

Appendix A Drawing C0002452_01 Site Location

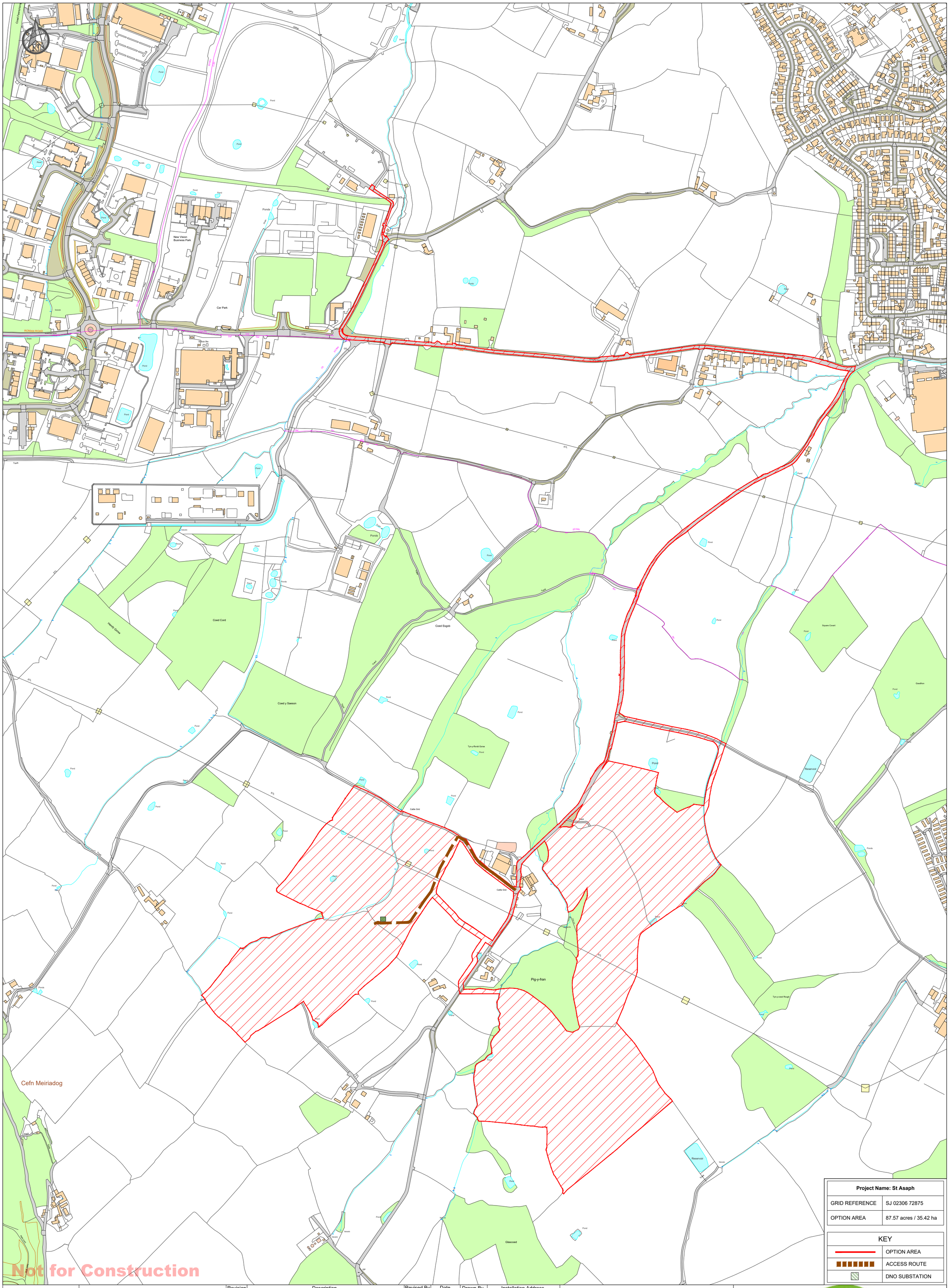
Habitat Survey

St Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

25 April 2025



Project Name: St Asaph	
GRID REFERENCE	SJ 02306 72875
OPTION AREA	87.57 acres / 35.42 ha

KEY

	OPTION AREA
	ACCESS ROUTE
	DNO SUBSTATION

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

0 50 100 150 200

Ordnance Survey, (c) Crown Copyright 2020.
All rights reserved. Licence number 100022432

Revision	Description	Revised By	Date
A	Issued for comment	MS	20/10/2020
B	Land reduced from the North and extended to the South	MS	05/03/2021
C	Area of Land has been altered and the DNO substation moved	MS	04/05/2021
D	Area of Land has been altered and the DNO substation moved	MS	12/05/2021
E	Site area amended	JH	22/11/2023
F	Red Line Boundary amended & access track added in the North	JH	12/12/2023
G	Red Line Boundary amended	MS	10/06/2024
H	Red Line Boundary amended	MS	13/11/2024
J	Red Line Boundary amended	RD	26/03/2025

Drawn By: RD

Scale: 1:5000@ A2

Sheet Size A2

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

Project: St Asaph

Title: Location Plan

Drawing No.: C0002452_01

Rev.: J

Anesco™ AMAZING ENERGY

Appendix B Drawing C0002452_02 Site Layout

Habitat Survey

St Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

25 April 2025

Not for Construction

New Vision Business Park

Car Park

Coed Cord

Hendy Gorse

Coed y Saeson

Coed Esgob

Tyn-y-ffordd Gorse

Pig-y-fran

Square Covert

Tyn-y-coed Rough

Reservoir

Glascoed

Ponds

Pond

Track

Drain

FB

Issues

Silo

Slurry Pit

Sub Sta

FS

LB

GRADED ROAD

LOW CROSS ROAD

34.1m

36.0m

41.4m

47.2m

65.9m

LEGEND

	SITE BOUNDARY
	SECURITY FENCE
HV HV	OVERHEAD ELECTRICAL CABLES (24m/14m OVERALL EASEMENT)
	DNO ACCESS ROUTE
	HV CABLE ROUTE - TRENCH
	LV CABLE ROUTE - TRAY
	PRIVATE HV CABLE ROUTE - TRENCH
BT BT	BT OVERHEAD CABLE
W W	UNDERGROUND WATER TRUNK MAIN
	UTILITY EASEMENT
	HARDSTANDING AREA
	PROPOSED CULVERT CROSSING
	PROPOSED HEDGE REMOVAL FOR TRACK WIDENING
	FENCE PLACEMENT & HEDGE REGROWTH AREA
	PROPOSED TREE REMOVAL
	PV ARRAY
	INVERTER (SUN2000-330KTL)
	SMART TRANSFORMER STATION (JUPITER-6000K/JUPITER3000K)
	DNO SUBSTATION
	CUSTOMER SUBSTATION (PV)

PROJECT NAME: ST ASAPH	
GRID REFERENCE :	SJ 02300 72873
SITE AREA:	87.57Acres / 35.42 ha
TOTAL INSTALLED CAPACITY:	18.44MWp
MAX INVERTER AC POWER:	18.304MW

0 10 20 40 60 80 100

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

Revision	Description	Revised By	Date
A	Issued for comment	MS	19/11/2020
B	Land reduced from the North and extended to the South	MS	05/03/2021
C	Boundary Line Extended	MS	05/05/2021
D	Boundary Line Extended and site maximised	MS	12/05/2021
E	Planning Site Layout	JH	10/11/2021
F	Module Wattage Changed	MS	07/12/2021
G	Site resign to 215KTL & Bifacial Modules	JH	02/03/2022
H	Site redesigned due to tree shading implications	MS	16/06/2022
J	Red Line Boundary amended to include Private HV	JH	03/08/2022
K	Site redesign	JH	15/05/2023
L	Site redesign using new modules and new private HV cable	JH	06/07/2023
M	Site area amended and module redesign	JH	22/11/2023
N	DNO Track Added	LD	28/11/2023
P	Red Line Boundary amended & access track added in the North	JH	12/12/2023
Q	Redesign due to array relocation	JS	19/03/2024
R	Redesign	MS	01/08/2024
S	Access Altered	MS	20/09/2024
T	Hedgerow added and panel locations amended	MS	11/11/2024
U	Inverters added	RD	20/01/2024
V4	Topo and service searches added	RD	31/03/2025

Drawn By: JH

Scale: 1:3000@ A1

Sheet Size: A1

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

Project: St Asaph

Title: Site layout planning

Drawing No.: C0002452_02

Rev.: V4

Anesco™ AMAZING ENERGY

Appendix C Figure 1 Baseline Habitats

Habitat Survey

St Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

25 April 2025

302000
302400
302800
372800
372400

N

B20: u1c 839
LB20: h2a 11 116
T4: w1 203
LB21: h2a 11 116
LB19: h2a 11 50 116
B19: g4 101
B22: u1b6 800
B16: w1f7 206
LB18: h2a 11 50 116
B21: g4 101 102
LB14: h2a 116
LB15: h2a 11 116
B17: w1f7 30
T3: w1 203
T1: w1 203
T2: w1 203
WB3: r2b 47
B18: g4 102
LB17: h2a 116
LB16: h2a 116
LB2: h2a 116
LB7: h2a 50 116
B4: g4 102
LB1: h2a 50 116
LB12: u1e 612
LB9: h2a 50 116
B12: r1g 40
B6: w1f7 30
WB2: r2b 48
B1: g4 101
B9: r1g 40
B7: u1b6 839
B15: g4 101
B14: r1g 40
B13: r1g 40
LB5: h2a 116
LB11: h2a 11 50 116
LB8: h2a 50 116
B2: g4
B10: g3c 103
LB10: h2a 11 50 116
LB4: h2a 11 116
LB22: h2a 11 116
LB23: h2a 11 116
B5: r1g 40
LB13: h2a 11 50 116
T5: w1 203
B3: g4 101
LB3: h2a 11 50 116
LB6: h2a 11 50 116
LB24: h2a 11 116
B23: u1b6 800
B8: w1f7 30
LB25: h2a 11 116
B11: g3c 103
WB1: r2b 47

0 100 200 300 400
Metres

LEGEND

Site Boundary
w1 - Broadleaved and Mixed Woodland

Primary Habitat Classification

Urban - Built-up Areas and Gardens
u1e - Built Linear Feature

Heathland and Shrub - Hedgerows
h2a - Hedgerow Priority Habitat

Rivers and Lakes - Rivers and Streams
r2b - Other Rivers and Streams

Grassland - Neutral Grassland
g3c - Other Neutral Grassland

Grassland - Modified Grassland
g4 - Modified Grassland

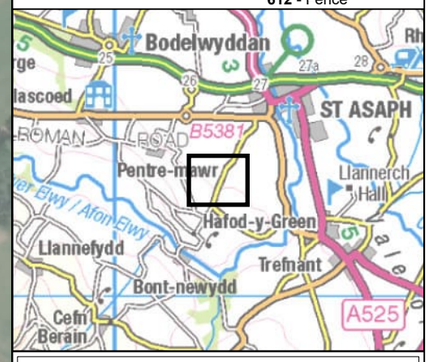
Rivers and Lakes - Standing Open Water and Canals
r1g - Other Standing Water

Urban - Built-up Areas and Gardens
u1b6 - Other Developed Land
u1c - Artificial Unvegetated, Unsealed Surface

Woodland and Forest - Broadleaved Mixed and Yew Woodland
w1f7 - Other Lowland Mixed Deciduous Woodland

Secondary Codes:

11 - Hedgerows with trees
30 - Semi-natural woodland
40 - Ponds (priority habitat)
47 - Freshwater -natural
48 - Freshwater - heavily modified
50 - Ditch
101 - Cattle grazed
102 - Sheep grazed
103 - Horse grazed
116 - Failed hedgerow
203 - Mature tree
206 - Felled
839 - Road
839 - Track
612 - Fence



Anesco™

SLR

ST ASAPH

406.065274.00001

BASELINE HABITATS

FIGURE 1

Scale 1:4,000 @ A3

Date APRIL 2025

406.065274.00001.0002.0 Baseline Habitats

© Crown copyright [and database rights] (2025) AC0000808122 OS OpenData.
Aerial Imagery (2019) Source: Maxar, Microsoft

© This drawing and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.

Appendix D Locations of Non-Statutory Designated Sites

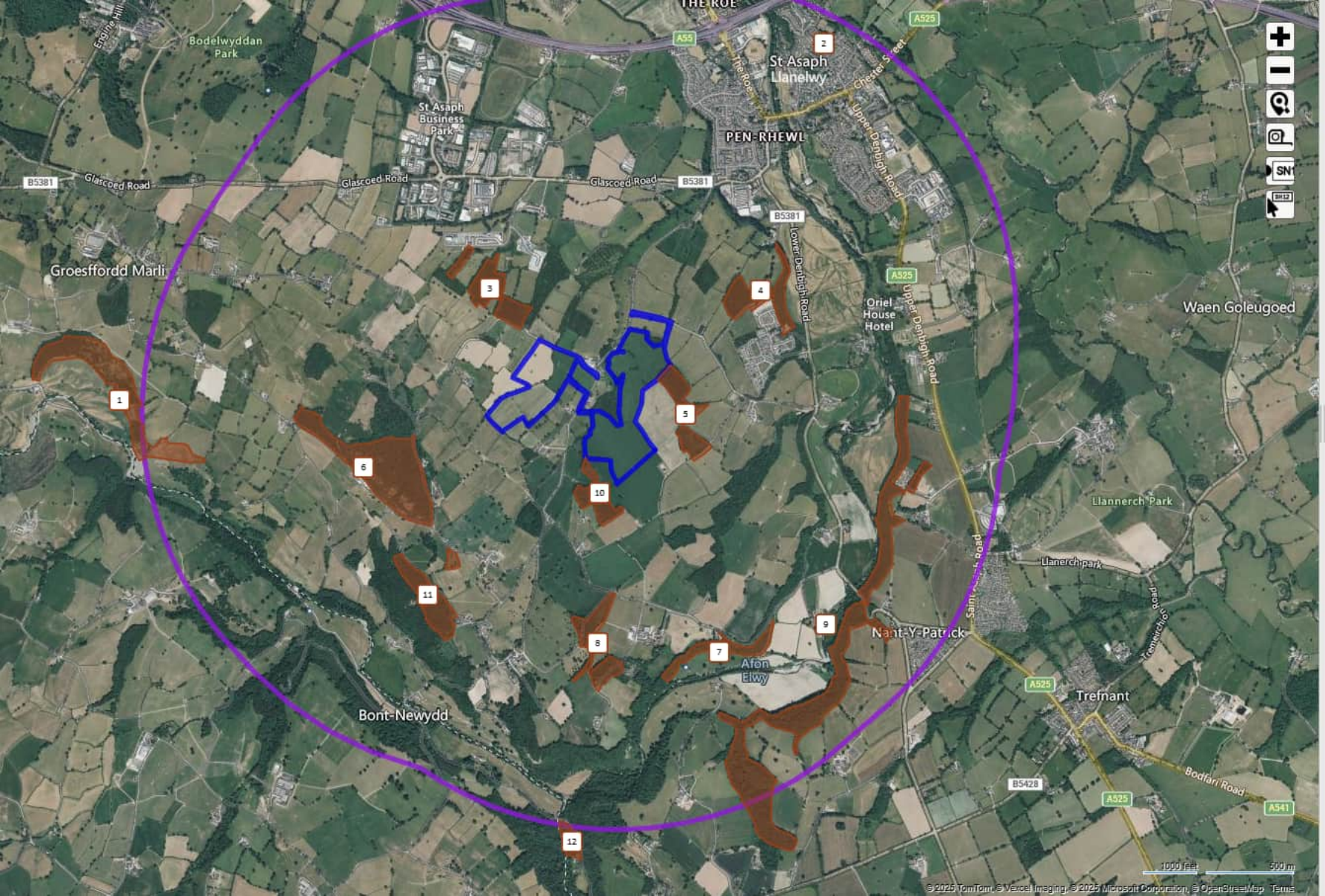
Habitat Survey

St Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

25 April 2025



Powered by Cofnod

Viewing Mode

Confidential | Public

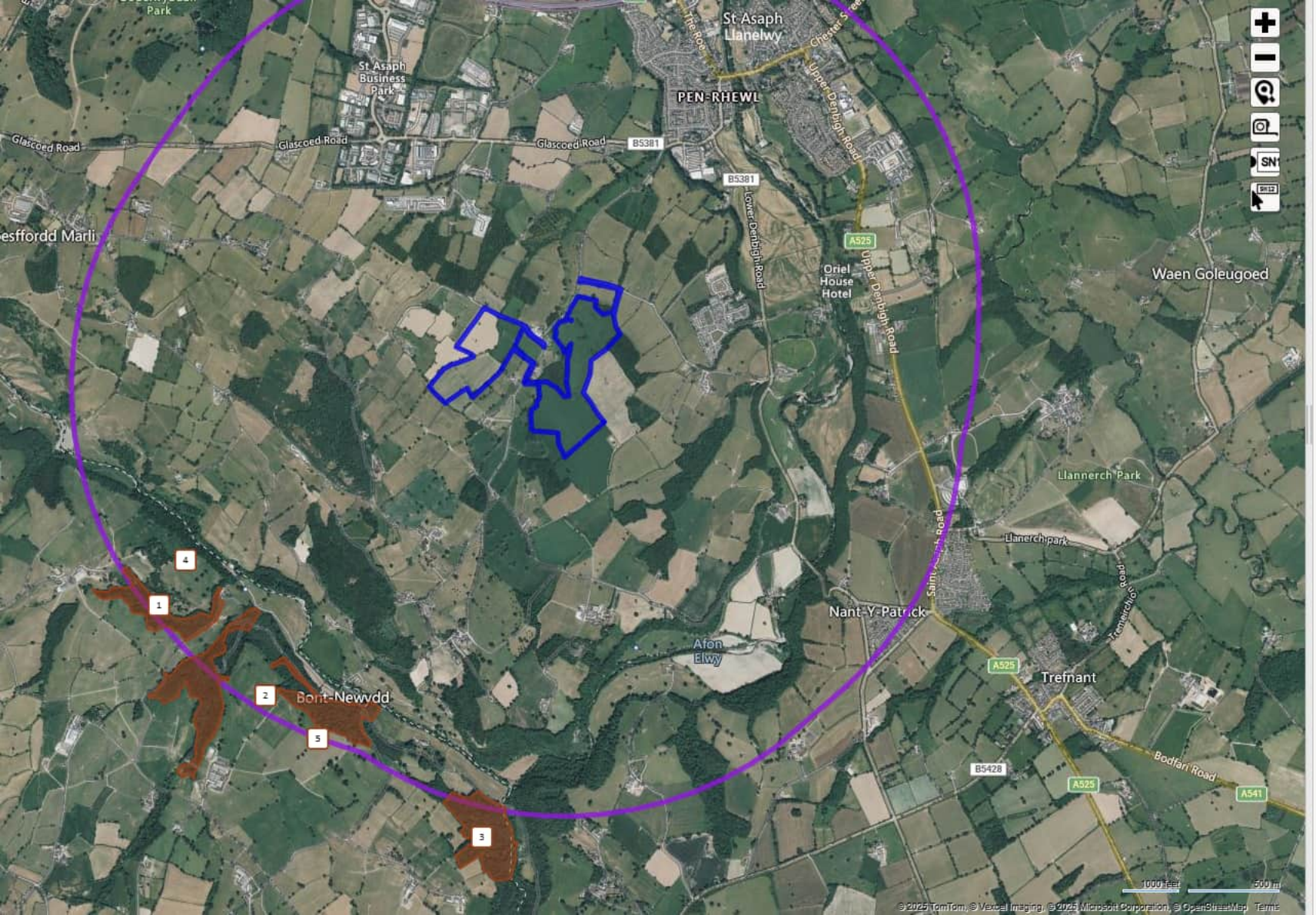
- Key
- Species
- Sites — Filters

Show All | Hide All | Collapse Menu | Options

- Historic Landscapes
- Wild Ground Reserves
- NEW RIGS
- Wildlife Sites for Denbighshire
  - 1: D003 - Coed y Ddol/Coed y Fadir
  - 2: D031 - Mount Road Churchyard, St Asaph
  - 3: D032 - Coed Cord / Coed y Saeson
  - 4: D033 - Coed Fron and Eryl Hall Wood
  - 5: D034 - Ty'n-y-Coed Rough (2 areas)
  - 6: D035 - Bryn Meiriadog
  - 7: D036 - Chapel Wood/Coed Mawr
  - 8: D037 - Coed Kendrick
  - 9: D038 - Rickfield Wood/Coed Ddol Fawr/C...
  - 10: D040 - Glascoed (2 areas)
  - 11: D041 - Coed yr Accar (2 areas)
  - 12: D042 - Nany Meirchion field
- Wildlife Sites for Conwy
- SSSI Bats

View Site Records

- Habitats
- Documents



Powered by Cofnod

Viewing Mode

Confidential | Public

- **Key**
- **Species**
- **Sites** Filters

Show All | Hide All | Collapse Menu | Options

- Sites of Special Scientific Interest
- Special Areas of Conservation
- Scheduled Ancient Monuments
- Listed Buildings
- Historic Landscapes
- Wild Ground Reserves
- NEW RIGS
- Wildlife Sites for Denbighshire
- Wildlife Sites for Conwy
  - 1: SJ07/1 - Coed Nant-y-graig
  - 2: SJ07/3 - Coed Bont Newydd
  - 3: SJ07/4 - Coed Pont y Trap
  - 4: SJ07/6 - Pwllau Graig
  - 5: SJ07/7 - Pwllau Coed y Dafarn
- SSSI Bats

View Site Records

- **Habitats**
- **Documents**



Powered by Cofnod

Viewing Mode

Confidential | Public

Key

Species

Sites Filters

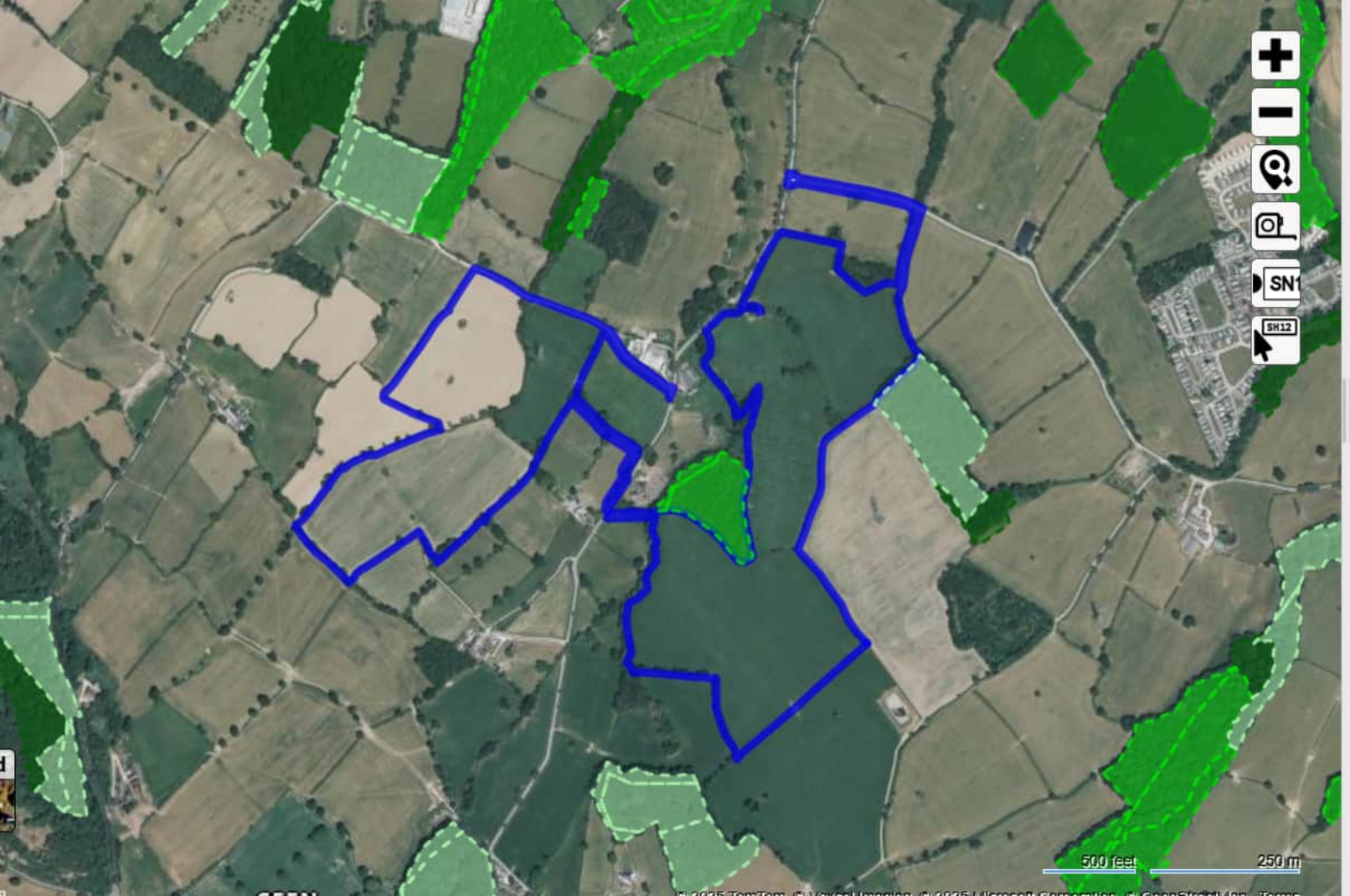
Show All | Hide All | Collapse Menu | Options

- Sites of Special Scientific Interest
- Special Areas of Conservation
- Scheduled Ancient Monuments
- Listed Buildings
- Historic Landscapes
- Wild Ground Reserves
  - 1: Glascoed
  - 2: Gwynt-y-Mor
- NEW RIGS
- Wildlife Sites for Denbighshire
- Wildlife Sites for Conwy
- SSSI Bats

View Site Records

Habitats

Documents



Powered by Cofnod

Viewing Mode

Confidential | Public

Key

- Search Location
- LERC Boundary
- Search Buffer (10000m)
- Search Buffer (2000m)

Species

Sites

Habitats

- Ancient Woodland
  - Ancient Semi Natural Woodland
  - Ancient Woodland Site of Unknown Category
  - Plantation on Ancient Woodland Site
  - Restored Ancient Woodland Site
- Phase 1 Habitat Survey
- Ancient Tree Inventory
- Priority Ecological Networks
- Section 7 Habitats of Principal Importance

View Habitat Records

Documents

Appendix E Records of Notable Plant Species

Habitat Survey

St Asaph Solar Farm

Anesco Limited

SLR Project No.: 406.065274.00001

25 April 2025

Notable plant species returned by COFNOD within 2km of the Solar Site, including those of Local Importance[5]:

Scientific Name	English Name	Distance (m)	Lists
Persicaria amphibia	Amphibious Bistort	11	LI-VP-48
Campanula latifolia	Giant Bellflower	294	LI-VP-48[LR], LI-VP-50[LNS]
Polystichum aculeatum	Hard Shield-fern	294	LI-VP-48, LI-VP-49[LS]
Carduus nutans	Musk Thistle	300	LI-VP-48[LS], LI-VP-49[LS]
Polystichum setiferum	Soft Shield-fern	300	LI-VP-48
Silene vulgaris	Bladder Campion	300	WRL-VP[NT]
Smyrnium olusatrum	Alexanders	300	GBNNSIP, LI-VP-48[LS]
Kickxia elatine	Sharp-leaved Fluellen	367	GBNNSIP, LI-VP-48[LR], LI-VP-49[LR], LI-VP-50[LS], LI-VP-52[LS]
Blackstonia perfoliata	Yellow-wort	394	LI-VP-48[LR], LI-VP-49[LS], LI-VP-52[LS]
Calamagrostis epigejos	Wood Small-reed	394	LI-VP-48[LR], LI-VP-49[LR], LI-VP-50[LR], LI-VP-51[LR]
Epilobium parviflorum	Hoary Willowherb	394	LI-VP-48
Glyceria notata	Plicate Sweet-grass	394	LI-VP-48[LR], LI-VP-49[LS], LI-VP-50[LNS]
Jacobaea erucifolia	Hoary Ragwort	394	LI-VP-48[LR], LI-VP-49[LS], LI-VP-52[LS]
Juniperus communis subsp. communis	Common Juniper	394	BAP, LI-VP-48[LNS], LI-VP-50[LR], LI-VP-51, LI-VP-52[LR], S7
Sparganium emersum	Unbranched Bur-reed	394	LI-VP-49[LS], LI-VP-51[LR]
Acer campestre	Field Maple	406	LI-VP-48[LS], LI-VP-49[LS]
Bromopsis ramosa	Hairy-brome	406	LI-VP-48[LS]
Elymus caninus	Bearded Couch	406	LI-VP-52[LR]
Pinus sylvestris	Scots Pine	406	RDB-NS
Hypericum hirsutum	Hairy St John's-wort	426	LI-VP-48[LR], LI-VP-49[LR], LI-VP-51[LS], LI-VP-52[LR]
Rorippa microphylla	Narrow-fruited Water-cress	426	LI-VP-50[LS], LI-VP-51[LS]
Ulmus procera	English Elm	426	LI-VP-48[LS]
Carex pseudocyperus	Cyperus Sedge	431	LI-VP-48[LR], LI-VP-49[LR], LI-VP-51[LS], LI-VP-52[LS], WRL-VP[NT]
Sedum telephium	Orpine	580	LI-VP-51[LS]
Genista tinctoria	Dyer's Greenweed	622	LI-VP-49[LR], LI-VP-50[LR], LI-VP-51[LR], LI-VP-52[PX]
Serratula tinctoria	Saw-wort	646	LI-VP-48, LI-VP-50[LR], LI-VP-51[LR]
Veronica scutellata	Marsh Speedwell	646	LI-VP-51
Galium mollugo subsp. erectum	Upright Hedge Bedstraw	658	LI-VP-48[LS]
Arenaria serpyllifolia	Thyme-leaved Sandwort	736	LI-VP-50[LNS]
Helianthemum nummularium	Common Rock-rose	736	LI-VP-48[LR], LI-VP-49[LS], LI-VP-50[LNS]

[5] As defined within the Denbighshire (VC50) Country Rare Plants Register

Scientific Name	English Name	Distance (m)	Lists
Helictotrichon pratense	Meadow Oat-grass	736	LI-VP-49[LS], LI-VP-50[LS], LI-VP-51[LS], LI-VP-52[LR]
Primula veris	Cowslip	736	LI-VP-48[LS]
Stellaria neglecta	Greater Chickweed	736	LI-VP-48[LS], LI-VP-51[LR]
Tragopogon pratensis	Goat's-beard	736	LI-VP-48[LS]
Atriplex littoralis	Grass-leaved Orache	742	LI-VP-48[LR], LI-VP-49[LR], LI-VP-50[LNS]
Orobanche hederae	Ivy Broomrape	742	LI-VP-48[LR], LI-VP-52[LS]
Aethusa cynapium	Fool's Parsley	754	LI-VP-48[LR]
Barbarea vulgaris	Winter-cress	754	LI-VP-48[LS]
Carex spicata	Spiked Sedge	754	LI-VP-48[LR], LI-VP-49[LS], LI-VP-52[PX]
Cruciata laevipes	Crosswort	754	LI-VP-49[LS], LI-VP-52[LS]
Lepidium heterophyllum	Smith's Pepperwort	754	LI-VP-51[LS]
Populus tremula	Aspen	754	LI-VP-52[LS]
Reseda luteola	Weld	754	GBNNSIP, LI-VP-48[LS]
Saponaria officinalis	Soapwort	754	GBNNSIP, LI-VP-50[LS], LI-VP-51[LS]
Inula conyzae	Ploughman's-spikenard	792	LI-VP-48[LR], LI-VP-49[LS]
Juncus inflexus	Hard Rush	799	LI-VP-48[LR]
Matricaria chamomilla	Scented Mayweed	799	GBNNSIP, LI-VP-48[LS]
Papaver dubium	Long Smooth-headed Poppy	799	GBNNSIP, LI-VP-52
Pulicaria dysenterica	Common Fleabane	799	LI-VP-48[LS]
Rorippa nasturtium-aquaticum	Water-cress	799	LI-VP-48
Sagina apetala subsp. apetala	-	799	LI-VP-51[LR]
Salix cinerea subsp. oleifolia	Rusty Willow	799	LI-VP-52
Tripleurospermum inodorum	Scentless Mayweed	799	GBNNSIP, LI-VP-48[LS]
Populus nigra subsp. betulifolia	Black-poplar	834	GBNNSIP, LI-VP-48[LS], LI-VP-52[LR]
Hypericum montanum	Pale St John's-wort	844	LI-VP-49[LS], LI-VP-50[LNS], LI-VP-51[LS], LI-VP-52[LS], RL-NT
Sherardia arvensis	Field Madder	873	LI-VP-48[LS]
Urtica urens	Small Nettle	873	GBNNSIP, LI-VP-48[LS]
Anacamptis morio	Green-winged Orchid	884	CITES-B, LI-VP-48[LR], LI-VP-49[LS], LI-VP-50[LS], LI-VP-51[LS], LI-VP-52[LS], RL-NT
Primula veris x vulgaris = P. x polyantha	False Oxlip	893	LI-VP-49[LS], LI-VP-51
Cerastium diffusum	Sea Mouse-ear	904	LI-VP-50[LNS]
Ctenidium molluscum	Chalk Comb-moss	949	WRL-BR[DD]
Verbascum nigrum	Dark Mullein	954	WRL-VP[NT]
Lemna trisulca	Ivy-leaved Duckweed	956	LI-VP-49[LR]



Scientific Name	English Name	Distance (m)	Lists
Hyacinthoides non-scripta	Bluebell	978	WCA8
Ranunculus sceleratus	Celery-leaved Buttercup	978	LI-VP-48[LS]
Populus nigra	Black-poplar	984	GBNNSIP, LI-VP-52
Viburnum opulus	Guelder-rose	985	LI-VP-48, LI-VP-52[LS]
Geranium columbinum	Long-stalked Crane's-bill	986	LI-VP-48[LR], LI-VP-49[LS], LI-VP-50[LNS], LI-VP-51[LR]
Sagittaria sagittifolia	Arrowhead	996	LI-VP-50[LR], LI-VP-51[LS], LI-VP-52[PX], WRL-VP[VU]
Rumex crispus x obtusifolius = R. x pratensis	-	1007	LI-VP-48[LS], LI-VP-49[LR]
Anomodon viticulosus	Rambling Tail-moss	1026	LI-BR-48[LR]
Porella platyphylla	Wall Scalewort	1026	LI-BR-49[LR]
Arabis hirsuta	Hairy Rock-cress	1030	LI-VP-48[LR], LI-VP-50[LNS], LI-VP-51[LR], LI-VP-52[LS]
Arenaria serpyllifolia subsp. serpyllifolia	Thyme-leaved Sandwort	1030	LI-VP-50[LNS]
Cerastium semidecandrum	Little Mouse-ear	1030	LI-VP-50[LNS]
Clinopodium vulgare	Wild Basil	1030	LI-VP-48[LS]
Daphne laureola	Spurge-laurel	1030	LI-VP-49[LS], LI-VP-50[LNS]
Dipsacus fullonum	Wild Teasel	1030	LI-VP-48[LR]
Epipactis helleborine	Broad-leaved Helleborine	1030	LI-VP-48[LS], LI-VP-49[LS], LI-VP-52[LS]
Equisetum telmateia	Great Horsetail	1030	LI-VP-48[LS]
Euphorbia lathyris	Caper Spurge	1030	CITES-B, GBNNSIP, LI-VP-49[LS]
Geranium sanguineum	Bloody Crane's-bill	1030	LI-VP-48[LR], LI-VP-50[LS], LI-VP-51[LS]
Helleborus foetidus	Stinking Hellebore	1030	LI-VP-51[LS], RDB-NS
Lathyrus linifolius	Bitter-vetch	1030	LI-VP-52[LS]
Myosotis ramosissima	Early Forget-me-not	1030	LI-VP-48[LS]
Orchis mascula	Early-purple Orchid	1030	LI-VP-48[LS]
Rubia peregrina	Wild Madder	1030	LI-VP-48[LR], LI-VP-51[LS], LI-VP-52[LS]
Scabiosa columbaria	Small Scabious	1030	LI-VP-49[LS], LI-VP-50[LNS], LI-VP-51[LR], LI-VP-52[EX], WRL-VP[VU]
Sorbus aria agg.	Common Whitebeam	1030	LI-VP-48[LR]
Stellaria pallida	Lesser Chickweed	1030	LI-VP-48[LS]
Veronica spicata	Spiked Speedwell	1030	LI-VP-48, LI-VP-49[LS], LI-VP-50[LR], LI-VP-51, WCA8
Knautia arvensis	Field Scabious	1042	LI-VP-48[LS]
Hygroamblystegium fluviatile	Brook-side Feather-moss	1047	LI-BR-52[EX]
Ranunculus penicillatus subsp. pseudofluitans	-	1047	LI-VP-48[LR], LI-VP-49[LR], LI-VP-51[LS]
Silaum silaus	Pepper-saxifrage	1093	LI-VP-50[LS], LI-VP-51[LS]

Scientific Name	English Name	Distance (m)	Lists
Rorippa sylvestris	Creeping Yellow-cress	1095	LI-VP-48[LS], LI-VP-49[LR], LI-VP-51[LS], LI-VP-52[LR]
Viola arvensis	Field Pansy	1095	GBNNSIP, LI-VP-48[LS]
Milium effusum	Wood Millet	1098	LI-VP-48[LS], LI-VP-49[LS], LI-VP-52[LR]
Lathraea squamaria	Toothwort	1104	LI-VP-48[LR], LI-VP-49[LR], LI-VP-51[LS]
Tanacetum parthenium	Feverfew	1106	GBNNSIP, LI-VP-48
Verbena officinalis	Vervain	1106	GBNNSIP, LI-VP-49[LS], LI-VP-50[LR], LI-VP-51, LI-VP-52[LR]
Bryum donianum	Don's Thread-moss	1109	LI-BR-49[LR], LI-BR-50[LR], LI-BR-52[LR]
Carex pendula	Pendulous Sedge	1109	LI-VP-48
Mnium marginatum var. marginatum	-	1109	LI-BR-48[LR], LI-BR-49[LR], LI-BR-50[LR], LI-BR-52[EX]
Oxyrrhynchium schleicheri	Twist-tip Feather-moss	1109	LI-BR-50[LR]
Trisetum flavescens	Yellow Oat-grass	1109	LI-VP-48[LS]
Prunus padus	Bird Cherry	1112	LI-VP-49[LS]
Nitella flexilis	-	1130	LI-VP-48[LS], WRL-SW[DD]
Petasites hybridus	Butterbur	1135	LI-VP-48[LS]
Sesleria caerulea	Blue Moor-grass	1145	RDB-NS, WRL-VP[RE]
Plagiochila britannica	British Featherwort	1146	LI-BR-49[LR], LI-BR-50[LR], LI-BR-52[LR]
Persicaria lapathifolia	Pale Persicaria	1161	LI-VP-48[LS]
Carex divulsa subsp. divulsa	Grey Sedge	1163	LI-VP-48[LE], LI-VP-49[LR]
Geranium pusillum	Small-flowered Crane's-bill	1163	LI-VP-48[LR], LI-VP-49[LS], LI-VP-52[LS]
Hennediella stanfordensis	Stanford Screw-moss	1279	LI-BR-50[LR]
Lathyrus nissolia	Grass Vetchling	1293	LI-VP-49[LR], LI-VP-51[LS]
Marchesinia mackaii	MacKay's Pouncewort	1297	LI-BR-51[LR]
Arctium nemorosum	Wood Burdock	1372	LI-VP-51[LS]
Avena fatua	Wild-oat	1372	GBNNSIP, LI-VP-49[LR]
Fumaria bastardii	Tall Ramping-fumitory	1372	LI-VP-48[LS]
Salix viminalis x caprea = S. x smithiana	Broad-leaved Osier	1372	GBNNSIP, LI-VP-49[LR]
Sinapis arvensis	Charlock	1372	GBNNSIP, WRL-VP[VU]
Buxus sempervirens	Box	1383	RDB-NR, RL-DD
Centaurea scabiosa	Greater Knapweed	1383	LI-VP-48[LR], LI-VP-49[LR], LI-VP-50[LNS]
Vinca minor	Lesser Periwinkle	1383	GBNNSIP, INNS-W, LI-VP-49[LS], LI-VP-51
Ophrys apifera	Bee Orchid	1384	CITES-B, LI-VP-48[LR], LI-VP-49[LS]
Schistidium rivulare	River Grimmia	1396	LI-BR-52[LR]
Mesoptychia badensis	Scarce Notchwort	1408	LI-BR-48[EX], LI-BR-49[LR], LI-BR-50[LR], LI-BR-51[LR], LI-BR-52[LR]
Saxifraga granulata	Meadow Saxifrage	1408	LI-VP-48[LR], LI-VP-49[LR], LI-VP-50[LS], LI-VP-52[LS]

Scientific Name	English Name	Distance (m)	Lists
Grimmia orbicularis	Round-fruited Grimmia	1426	LI-BR-48[EX], LI-BR-49[LR], LI-BR-50[LR], LI-BR-52[LR]
Tortella squarrosa	Side-fruited Crisp-moss	1426	LI-BR-49[LR], LI-BR-50[LR], LI-BR-51[LR]
Salix cinerea subsp. cinerea	Grey Willow	1436	LI-VP-52
Carlina vulgaris	Carline Thistle	1439	LI-VP-50[LNS]
Plasteurhynchium striatulum	Lesser Striated Feather-moss	1439	LI-BR-49[LR], LI-BR-50[LR], LI-BR-52[LR]
Allium vineale	Wild Onion	1444	LI-VP-48[LR], LI-VP-50[LNS]
Veronica spicata subsp. hybrida	Western Spiked Speedwell	1444	LI-VP-48[LR], LI-VP-49[LS], LI-VP-50[LR], LI-VP-51, RDB-NS, WCA8
Butomus umbellatus	Flowering-rush	1449	LI-VP-49[LE], LI-VP-50[LS], LI-VP-51[LR], WRL-VP[VU]
Ranunculus auricomus	Goldilocks Buttercup	1477	LI-VP-48[LR], LI-VP-49[LS], LI-VP-52[LS]
Narcissus pseudonarcissus	Daffodil	1508	LI-VP-51[LS]
Onopordum acanthium	Cotton Thistle	1527	GBNNSIP, LI-VP-49[LR], LI-VP-50[LR], LI-VP-51[LS]
Galium mollugo	Hedge Bedstraw	1530	LI-VP-48[LS]
Anagallis tenella	Bog Pimpernel	1556	LI-VP-51[LS]
Arctium lappa	Greater Burdock	1556	GBNNSIP, LI-VP-50[LNS], LI-VP-51[LS]
Callitriche stagnalis	Common Water-starwort	1556	LI-VP-51
Centaurea cyanus	Cornflower	1556	BAP, GBNNSIP, LI-VP-48[LE], LI-VP-49[LR], LI-VP-50[LR], LI-VP-51[LR], S7, WRL-VP[CR]
Epilobium tetragonum	Square-stalked Willowherb	1556	LI-VP-48[LR], LI-VP-49[LR], LI-VP-50[LNS]
Lithospermum officinale	Common Gromwell	1556	LI-VP-49[LR], LI-VP-50[LS], LI-VP-51[LR]
Medicago arabica	Spotted Medick	1556	LI-VP-48[LE], LI-VP-49[LS], LI-VP-51[LR], LI-VP-52[LS]
Melilotus altissimus	Tall Melilot	1556	GBNNSIP, LI-VP-49[LR]
Mentha arvensis	Corn Mint	1556	LI-VP-51[LR], WRL-VP[VU]
Persicaria hydropiper	Water-pepper	1556	LI-VP-51[LS]
Physcia tenella	-	1556	WRL-LI[DD]
Ruscus aculeatus	Butcher's-broom	1556	HDir5, WRL-VP[VU]
Spergularia marina	Lesser Sea-spurrey	1556	LI-VP-49[LS]
Stachys sylvatica x palustris = S. x ambigua	Hybrid Woundwort	1556	LI-VP-48[LS], LI-VP-49[LS], LI-VP-51
Tanacetum vulgare	Tansy	1556	LI-VP-48[LS]
Vicia sylvatica	Wood Vetch	1556	LI-VP-49[LR], LI-VP-52[PX]
Vicia tetrasperma	Smooth Tare	1556	LI-VP-48[LS], LI-VP-49[LR], LI-VP-51, LI-VP-52[LS]
Xanthoria ucrainica	-	1556	RDB-NS

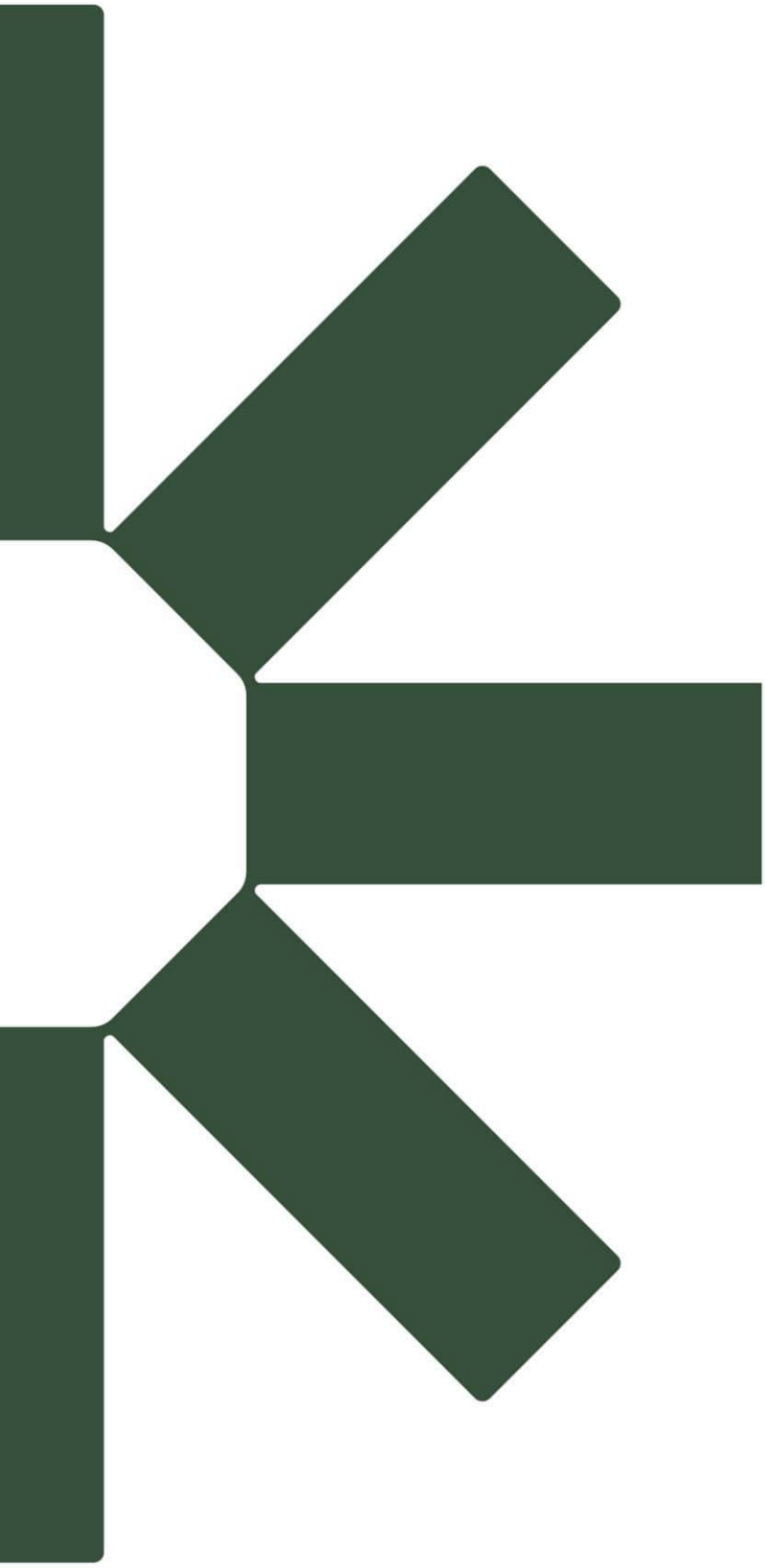
Scientific Name	English Name	Distance (m)	Lists
Potentilla tabernaemontani	Spring Cinquefoil	1604	LI-VP-49[LS], LI-VP-50[LS], LI-VP-51[LR], LI-VP-52[LR], RDB-NS
Hypericum perforatum x maculatum = H. x desetangsii	Des Etangs' St John's-wort	1605	LI-VP-48[LS], LI-VP-49[LR], LI-VP-51
Lysimachia nummularia	Creeping-Jenny	1605	LI-VP-48, LI-VP-49[LS]
Malva arborea	Tree-mallow	1605	LI-VP-50[LS], LI-VP-51[LR]
Dactylorhiza fuchsii	Common Spotted-orchid	1617	LI-VP-48
Sorbus torminalis	Wild Service-tree	1617	LI-VP-48[LR], LI-VP-49[LR], LI-VP-50[LS], LI-VP-51[LR]
Populus nigra	Black-poplar	1619	GBNNSIP, LI-VP-52
Entosthodon pulchellus	Pretty Cord-moss	1637	BAP, LI-BR-49[LR], LI-BR-51[LR], LI-BR-52[LR], RDB-NR, RL-NT, S7
Bryum canariense	Canary Thread-moss	1641	LI-BR-49[LR], LI-BR-50[LR], LI-BR-52[LR]
Euphorbia amygdaloides	Wood Spurge	1641	CITES-B, LI-VP-48, LI-VP-50[LNS], LI-VP-51
Hypericum humifusum	Trailing St John's-wort	1641	LI-VP-51[LR]
Plantago media	Hoary Plantain	1641	LI-VP-48[LR], LI-VP-49[LR], LI-VP-52[LR]
Taxiphyllum wissgrillii	Depressed Feather-moss	1641	LI-BR-48[LR], LI-BR-49[LR], LI-BR-52[LR]
Thuidium delicatulum	Delicate Tamarisk-moss	1641	LI-BR-52[LR]
Tilia cordata	Small-leaved Lime	1641	LI-VP-48, LI-VP-49[LR], LI-VP-51[LR]
Weissia controversa var. crispata	-	1652	LI-BR-49[LR], LI-BR-50[LR], LI-BR-52[LR]
Anacamptis pyramidalis	Pyramidal Orchid	1664	LI-VP-48[LS], LI-VP-50[LNS]
Helictotrichon pubescens	Downy Oat-grass	1665	LI-VP-50[LNS]
Koeleria macrantha	Crested Hair-grass	1665	LI-VP-48[LR], LI-VP-50[LS]
Scleropodium touretii	Glass-wort Feather-moss	1672	LI-BR-48[LR], LI-BR-50[LR], LI-BR-51[LR]
Carex divulsa subsp. leersii	Many-leaved Sedge	1676	LI-VP-49[LS], LI-VP-50[LS]
Chenopodium ficifolium	Fig-leaved Goosefoot	1676	GBNNSIP, LI-VP-49[LR]
Orthotrichum rivulare	River Bristle-moss	1676	LI-BR-49[LR]
Sedum anglicum	English Stonecrop	1680	LI-VP-51[LS]
Hippuris vulgaris	Mare's-tail	1699	LI-VP-48[LS], LI-VP-49[LR], LI-VP-50[LR], LI-VP-51[LS], LI-VP-52[LS], WRL-VP[NT]
Polypodium cambricum	Southern Polypody	1712	LI-VP-48[LR], LI-VP-49[LS], LI-VP-50[LS], LI-VP-51[LR], LI-VP-52[LS]
Hygroamblystegium tenax	Fountain Feather-moss	1726	LI-BR-49[LR], LI-BR-52[LR]
Rhamnus cathartica	Buckthorn	1765	LI-VP-51[LS]

Scientific Name	English Name	Distance (m)	Lists
Neottia ovata	Common Twayblade	1793	LI-VP-48[LS]
Persicaria bistorta	Common Bistort	1793	LI-VP-48[LR], LI-VP-49[LR], LI-VP-50[LNS], LI-VP-51[LS]
Ficaria verna subsp. verna	-	1832	LI-VP-49[LS]
Vicia bithynica	Bithynian Vetch	1835	LI-VP-49[LE], LI-VP-50[LR], LI-VP-51, RDB-NS, RL-VU, WRL-VP[EN]
Sison amomum	Stone Parsley	1900	LI-VP-49[LS], LI-VP-51[LR]
Echium vulgare	Viper's-bugloss	1941	LI-VP-48[LS], LI-VP-49[LS], LI-VP-50[LNS], LI-VP-51[LS], LI-VP-52[LS]
Carex strigosa	Thin-spiked Wood-sedge	1967	LI-VP-50[LS], LI-VP-51[LR]
Cystopteris fragilis	Brittle Bladder-fern	1967	LI-VP-48[LS], LI-VP-50[LNS], LI-VP-51[LS], LI-VP-52[PX]
Hordeum secalinum	Meadow Barley	2025	LI-VP-49[LS], LI-VP-51[LS]
Bryum violaceum	Pill Bryum	2160	LI-BR-48[LR], LI-BR-49[LR], LI-BR-50[LR]
Physcomitrium patens	Spreading Earth-moss	2160	LI-BR-48[LR], LI-BR-50[LR], LI-BR-51[LR]
Rosa rubiginosa	Sweet-briar	2160	LI-VP-49[LS], LI-VP-50[LR]
Salix alba	White Willow	2160	GBNNSIP, LI-VP-49[LR]
Callitriche platycarpa	Various-leaved Water-starwort	2212	LI-VP-48[LS], LI-VP-49[LS], LI-VP-50[LR], LI-VP-51[LR], LI-VP-52[LR]
Cichorium intybus	Chicory	2212	GBNNSIP, LI-VP-49[LR], LI-VP-50[LNS], LI-VP-51[LS]
Nuphar lutea	Yellow Water-lily	2212	LI-VP-49[LR], LI-VP-51[LS]
Sparganium natans	Least Bur-reed	2212	LI-VP-49[LR], LI-VP-52[LS]
Meconopsis cambrica	Welsh Poppy	2296	LI-VP-48[LS], LI-VP-49[LS], RDB-NS
Ranunculus penicillatus	Stream Water-crowfoot	2296	LI-VP-48[LR], LI-VP-49[LR], LI-VP-51[LS], LI-VP-52
Spergula arvensis	Corn Spurrey	2296	LI-VP-48[LNS], LI-VP-49[NLS], RL-VU, WRL-VP[NT]
Bromus racemosus	Smooth Brome	2369	LI-VP-49[LR], LI-VP-50[LS], LI-VP-51[LR], LI-VP-52[LR]
Silene latifolia	White Campion	2369	GBNNSIP, LI-VP-48[LS]
Salix cinerea x aurita = S. x multinervis	-	2396	LI-VP-51
Trifolium medium	Zigzag Clover	2396	LI-VP-48[LS]
Brassica nigra	Black Mustard	2498	LI-VP-48[LR], LI-VP-50[LNS]
Convolvulus arvensis	Field Bindweed	2498	LI-VP-48
Vulpia myuros	Rat's-tail Fescue	2498	GBNNSIP, LI-VP-49[LS]
Raphanus raphanistrum	Radish	2588	LI-VP-49
Salix caprea x cinerea = S. x reichardtii	-	2588	LI-VP-52[LS]

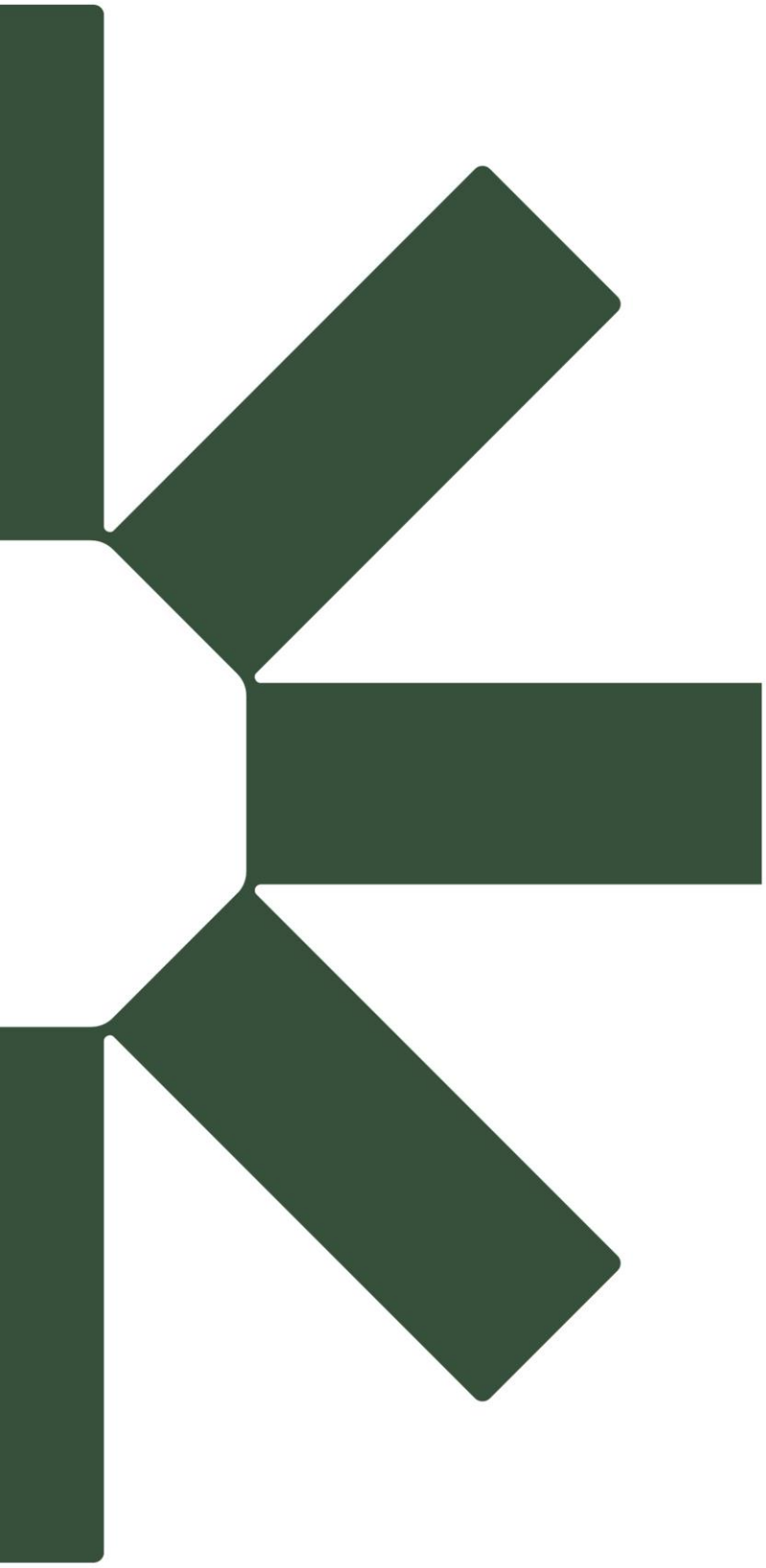
*__Abbreviations in table__

BAP: UK: Biodiversity Action Plan Priority Species
CITES-B: Convention on International Trade in Endangered Species, Annex B - Species that may become extinct unless trade is closely controlled
GBNNSIP: Great Britain Non-native Species Inventory Portal Checklist of Non-native Species

LI-BR-48: Bryophyte Rarity List for Vice-County 48: Merionethshire **[EX]** Locally extinct, **[LR]** Locally rare.
LI-BR-49: Bryophyte Rarity List for Vice-County 49: Caernarvonshire **[LR]** Locally rare
LI-BR-50: Bryophyte Rarity List for Vice-County 50: Denbighshire **[LR]** Locally rare
LI-BR-51: Bryophyte Rarity List for Vice-County 51: Flintshire **[LR]** Locally rare
LI-BR-52: Bryophyte Rarity List for Vice-County 52: Anglesey **[LR]** Locally rare **[LE]** Locally extinct
LI-VP-48: Rare Plant Register for Vice-County 48: Merionethshire **[LNS]** Locally Not Scarce **[LR]** Locally Rare **[LS]** Locally Scarce **[LE]** Locally extinct
LI-VP-49: Rare Plant Register for Vice-County 49: Caernarvonshire **[LE]** Locally Extinct **[LR]** Locally Rare **[LS]** Locally Scarce **[NLS]** (Not Locally Scarce)
LI-VP-50: Rare Plant Register for Vice-County 50: Denbighshire **[LNS]** Locally near scarce **[LR]** Locally Rare **[LS]** Locally Scarce
LI-VP-51: Rare Plant Register for Vice-County 51: Flintshire **[LR]** Locally Rare **[LS]** Locally Scarce
LI-VP-52: Rare Plant Register for Vice-County 52: Anglesey **[EX]** Extinct **[LR]** Locally Rare **[LS]** Locally Scarce **[PX]** Possibly or Probably Extinct
RDB: Red Data Book listing (not based on IUCN guidelines) – **N** Notable **NR** Nationally rare **NS** Nationally Scarce
RL-VU: IUCN Red List of Threatened Species – **VU** Vulnerable **DD** Data Deficient EN Endangered **NT** Near Threatened **PX** Possibly Extinct
WCA8: Wildlife & Countryside Act 1981 Schedule 8 - Plants which are protected
WRL-BR[DD]: Bryophyte Red Data List for Wales (Data Deficient)
WRL-LI[DD]: Lichen Red Data List for Wales (Data Deficient)
WRL-SW[DD]: A Red List of Stoneworts in Wales (Data Deficient)
WRL-VP: Vascular Plant Red Data List for Wales **[CR]** Critically Endangered **[EN]** Endangered **[NT]** Near Threatened **[RE]** Regionally Extinct **[VU]** Vulnerable



Making Sustainability Happen



Making Sustainability Happen

Appendix A.6 Flood Consequences Assessment and Drainage Strategy

St Asaph PV Farm - Flood Consequence Assessment & Surface Water Drainage Strategy

Anesco Ltd

Prepared by:

SLR Consulting Limited

Treenwood House, Rowden Lane, Bradford on Avon,
BA15 2AU

SLR Project No.: 402.065546.00001

Client Reference No: 050750

29 April 2025

Revision: 03

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
01	22 March 2024	Karen Paez	Helena Preston	Andrew Dannatt
02	14 March 2025	Karen Paez	Helena Preston	Andrew Dannatt
03	29 April 2025	Karen Paez	Chris Middleton	Andrew Dannatt

Basis of Report

This document has been prepared by SLR Consulting Limited (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with Anesco Ltd (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

Executive Summary

SLR Consulting Limited (SLR) has prepared this Flood Consequence Assessment and Surface Water Drainage Strategy on behalf of Anesco Ltd to support a pre-application submission for a proposed construction, operation and decommissioning of a ground mounted photovoltaic solar farm, together with associated equipment, infrastructure and ancillary works at St Asaph, Cefnmeiriadog, Denbighshire, Wales, LL17 0HF (the site). A summary of key findings from this report are provided below.

Subject	Element	Findings
Site Flood Risk	Tidal	The site is remote from the coast and tidal flooding is not considered to pose a risk to the site.
	Fluvial	The Flood Maps for Planning indicates the site lies wholly in Flood Zone 1.
	Groundwater	Groundwater levels are not expected above approximately 3m below ground level and are considered unlikely to emerge at the surface. The flood risk at the site is considered very low.
	Surface Water	There are three un-named three watercourses in the vicinity of the site. Flood risk from surface water and small watercourses indicates no areas of elevated flood risk at the site except for some small flow paths intersecting with access tracks and the cable route. This risk to the development is therefore low.
	Sewers and Artificial Sources	Welsh Water do not have any mains or sewerage assets within the vicinity of the site. Therefore, the flood risk at the site is considered very low.
Site Details	Topography	Topographic survey has confirmed LiDAR for the site that indicates that the wider topography is dominated by the presence of local watercourses, with steep slopes rising towards the southwestern of the site.
	Hydrology	No existing drainage systems were observed across the site. Other surface water features observed included; a slurry pond at the southern access point into the fields, a pond along the watercourse at the northwestern boundary of the western field and a pond within Tyn-y-Coed forest to the east.
	Geology	British Geology Survey (BGS) mapping indicates that the site is underlain by Diamicton deposits. Diamicton is described as 'A type of siliciclastic sediment and sedimentary rock.' Diamicton has a low infiltration rate, which at this site is considered to preclude the use of infiltration SuDS.
Planning Requirements	Acceptability Criteria	As the site lies wholly in Flood Zone 1, the acceptability criteria is considered passed.
Mitigation measures	Design Flood Event	The design flood event (DFE) is the 1 % AEP event. A climate change allowance has been considered for peak rainfall intensity (30%) at the development site with no anticipated adverse impact.
	Finished Floor Levels	The site is at low risk of tidal, fluvial, and surface water flooding and there is no necessity to raise finished floor levels from the original design.

Subject	Element	Findings
	Safe access and egress	Safe access and egress to the site under adverse conditions may be provided with attendance with a 4x4 vehicle.
	Floodplain compensation	Not Required.
	Surface water drainage strategy	Runoff from the hardstanding area will be collected, treated and conveyed towards an attenuation swale through a conveyance swale. Discharge of surface water runoff from the swale will be controlled using a hydrobrake to a maximum rate of 1l/s. Flows from the hydrobrake will outfall into a watercourse. This method successfully offset the pollution hazard indices to satisfy the Simple Index Method.
	Residual Risk	Exceedance flood events in excess of the design standard indicates runoff will revert to the pre-existing regime with flows overtopping the swale and flowing to the watercourse.
Conclusion		This Flood Consequence Assessment and Surface Water Drainage Strategy concludes that the requirements of national, regional, and local planning policy can be achieved at the site given the nature of development proposed.

Table of Contents

Basis of Report ..... **i**
Executive Summary ..... **ii**
Acronyms and Abbreviations ..... **viii**
1.0 Introduction **1**
1.1 Terms of Reference 1
1.2 Site Location 1
1.3 Background and Aims 2
1.4 Administrative Context 3
1.5 Best Practice 3
2.0 Project Description **4**
3.0 Site Details **5**
3.1 Existing Site Description 5
3.1.1 Area 1 5
3.1.2 Area 2 5
3.1.3 Cable Route 6
3.2 Topography 6
3.3 Hydrology 7
3.3.1 Area 1 8
3.3.2 Area 2 8
3.3.3 Overall Site 8
3.4 Drainage Regime 9
3.5 Geological and Hydrogeological Context 9
3.5.1 Geology 9
3.5.2 Hydrogeology 9
4.0 Policy Status for the Proposed Development **10**
4.1 Flood Risk Vulnerability 10
4.2 Anticipated Lifetime of Development 10
4.3 Planning Policy 10
4.3.1 Denbighshire County Council 10
4.3.2 Development Category 11
4.3.3 Development Acceptability 11
5.0 Assessment of Flood Risk **12**
5.1 Potential Sources of Flooding 12
5.1.1 Flooding from Rivers or Fluvial Flooding and from Sea or Tidal Flooding 12
5.1.2 Flooding from Surface Water or Pluvial Flooding 12

5.1.3 Flooding from Groundwater 13
5.1.4 Flooding from Sewers 14
5.1.5 Flooding from Reservoirs, Canals and Other Artificial Sources 14
5.1.6 Flooding from Infrastructure Failure 14
5.2 Flood Risk Summary 14
5.3 Flood Risk Classification 14
6.0 Climate Change 1
6.1 Peak Rainfall Intensity Allowance 1
6.2 Sea Level Rise Allowances 2
6.3 Peak River Flow Allowances 2
7.0 Surface Water Drainage Strategy 4
7.1 Sustainable Drainage Systems 4
7.2 Drained Area 6
7.3 Proposed Discharge Arrangement 6
7.4 Proposed Outline SuDS Strategy 7
7.5 Water Quantity Design Standard 9
7.5.1 Control of Runoff Volume 9
7.5.2 Control of Peak Runoff Rate 10
7.6 Water Quantity Design Standard 11
7.7 Water Quality Design Standard 12
7.8 Design Exceedance Arrangement 13
7.9 Amenity 13
7.10 Biodiversity 13
8.0 Principal Operation and Maintenance Requirements 14
8.1 Swale and Hydrobrake 14
8.2 Underground Pipe Network 16
9.0 Acceptability Criteria 17
10.0 Conclusions 19

Tables in Text

Table 5-1: Potential Sources of Flooding 14
Table 5-2: Definition of Flood Map for Planning Flood Zones 14
Table 6-1: Change to Extreme Rainfall Intensity (Compared to 1961-90 baseline) 1
Table 6-2 Estimated mean sea level rise (in metres) for relevant local authority areas by 2100 and 2120. Allowances are based on RCP8.5 70th and 95th percentiles 2

Table 6-3 Table 1: Peak River Flow Allowances by River Basin District (using 1961 to 1990 baseline) 3
Table 7-1: Drained Areas 6
Table 7-2: Suitability of Surface Water Disposal Methods 7
Table 7-3: Summary of Surface Water Management Strategy SuDS Options 8
Table 7-4: Greenfield Runoff Rate 10
Table 7-5: Drainage Performance and Sizing 12
Table 7-6: Pollution Hazard Potential of the Proposed Development 12
Table 7-7: SuDS Mitigation Indices for Discharge to Surface Water 12
Table 7-8: SuDS Performance: Water Quality Indices Assessment (Discharge to Surface Water) 12
Table 8-1: Typical Swale and Hydrobrake Maintenance and Operation Requirements 14
Table 8-2: Typical Pipe System Operation and Maintenance Requirements 16

Figures in Text

Figure 1-1: Site Location Plan 2
Figure 1-2: Extract of the Flood Maps for Planning from Rivers and Sea 3
Figure 3-1: Satellite Imagery of the Site 5
Figure 3-2: 2m DTM LiDAR plot of the site 7
Figure 3-3: Water Features of the site 8
Figure 5-1: Extract of the NRW Surface Water Flood Map 13
Figure 7-1: Four Pillars of SuDS (after CIRIA Report C753) 4
Figure 7-2: SuDS Management Train 5
Figure 7-3: Swale: Conceptual Design Details 8

Appendices

Drawings

Drawing 01: Conceptual Surface Water Drainage Layout

Appendix 01 Development Masterplan

Appendix 02 Greenfield Runoff Rates

Appendix 03 Hydraulic Performance

Acronyms and Abbreviations

AOD	Above Ordnance Datum
BGL	Below Ground Level
FCA	Flood Consequence Assessment
NGR	National Grid Reference
NPPF	National Planning Policy Framework
PPG	Planning Practice Guidance
PV	Photo Voltaic
SAB	Sustainable Drainage Approving Body
SWDS	Surface Water Drainage Strategy
TAN15	Technical Advice Note 15

1.0 Introduction

1.1 Terms of Reference

SLR Consulting Limited (SLR) has been appointed by Anesco Ltd (the client) to produce a Flood Consequence Assessment (FCA) & Surface Water Drainage Strategy (SWDS) for the proposed St Asaph Photo Voltaic (PV) Farm at Cefnmeiriadog, Denbighshire, Wales, LL17 0HF (the site).

This document, an FCA & SWDS, has been prepared in support of a Full Planning Application for the Proposed Development of a PV Farm at the site and records the findings of a site walkover and assessment carried out in January 2022.

This FCA & SWDS has been prepared in accordance with guidance presented within the Planning Policy Wales (PPW)[1], Technical Advice Note 15[2] (TAN15) and taking due account of current best practice documents relating to assessment of flood risk published by the British Standards Institution BS8533[3] under the direction of a Technical Director of SLR who specialises in flood risk and associated planning matters.

1.2 Site Location

The site is centred on National Grid Reference (NGR) SJ02300 72873 and covers a total area of 33.54 ha. Situated to the southwest of St Asaph, Denbighshire, the site comprises two parcels of land (Area 1 and 2) separated by the Llwyn Penwyn Road.

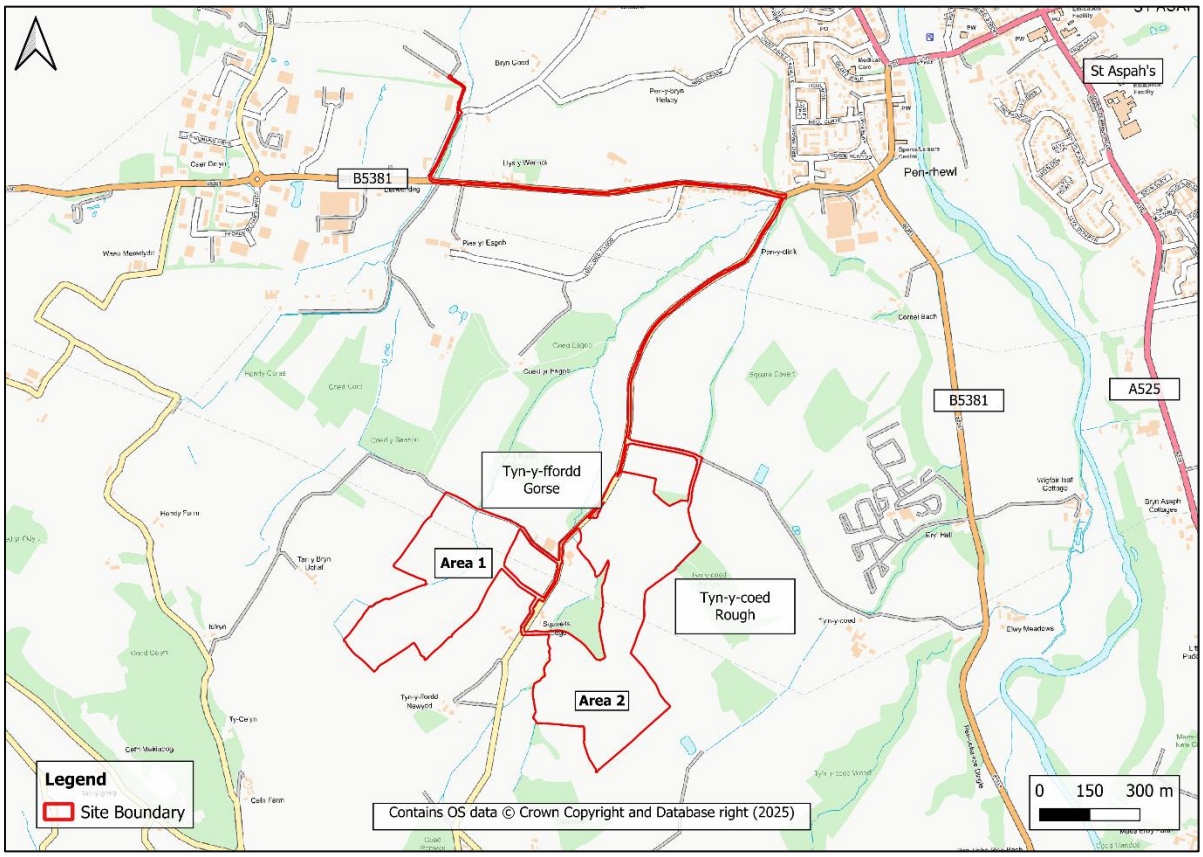
A site location plan is included below in Figure 1-1.

1 Planning Policy Wales, Edition 12. (February 2024)

2 Technical Advice Note 15: Development and Flood Risk to Planning Policy Wales (March 2025)

3 BS8533:2017, Assessing and managing flood risk in development: Code of Practice (December 2017)

Figure 1-1: Site Location Plan



As shown on Figure 1-1, Area 1 is located west of Llwyn Penwyn Road and is currently undeveloped. It is bound on the north by three forests; namely the Coed y Saeson to the north-west, the Coed Esgob to the north and, to the north east, the Tyn-y-ffordd Gorse. Area 1 is generally bounded to the west, south and east by arable land and is accessed from the east off Llwyn Penwyn.

Area 2, as shown on Figure 1-1, is located to the east of Llwyn Penwyn Road and is currently undeveloped. This area is delimited by the Pig-y-fran on the west and by the Tyn-y-coed Rough on the east. This area is accessed to the north by Llwyn Road.

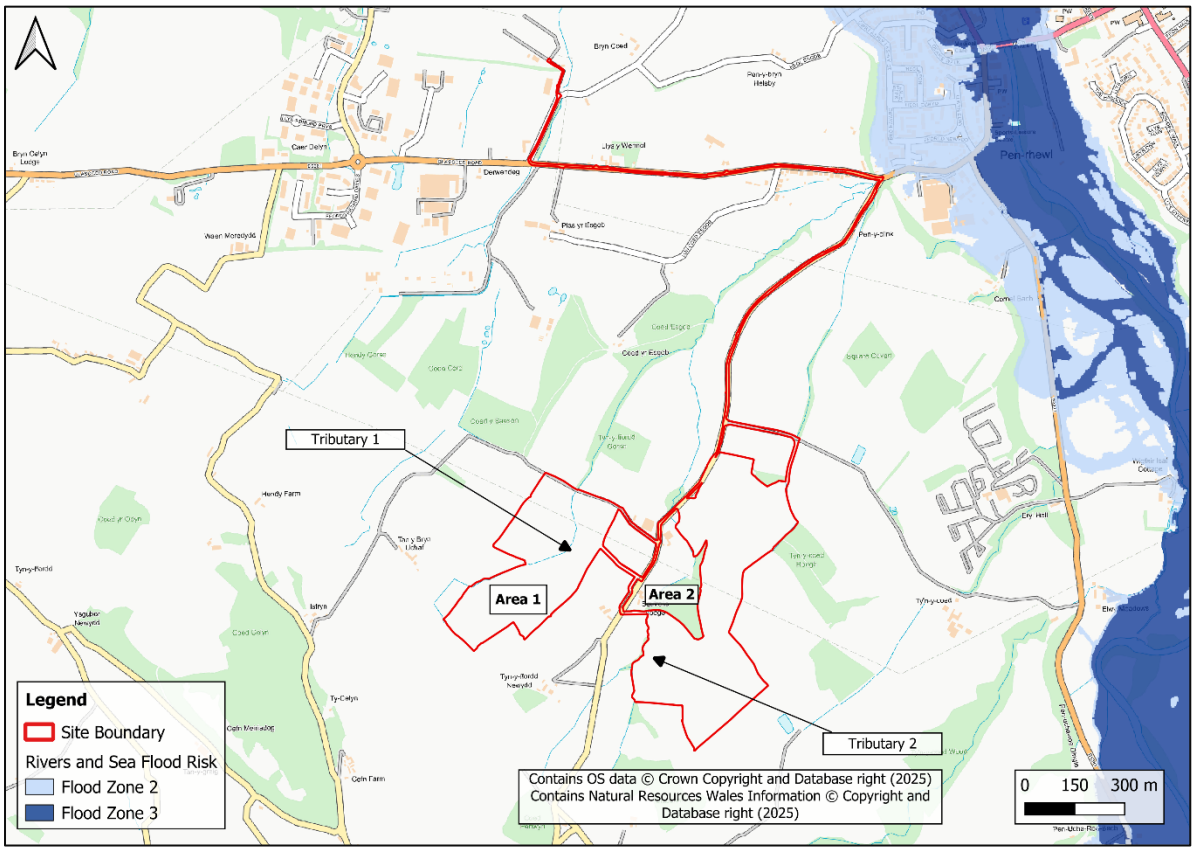
1.3 Background and Aims

With reference to Natural Resources Wales (NRW) Flood Maps for Planning[4], the site lies entirely within an area with Less than 1 in 1000 (0.1%) (plus climate change) chance of fluvial or coastal/tidal flooding in a given year (Flood Zone 1).

An extract of the Flood Maps for Planning is provided in Figure 1-2.

4 Natural Resources Wales (2025) Flood map for planning (April 2025). Natural Resources Wales / Flood map for planning

Figure 1-2: Extract of the Flood Maps for Planning from Rivers and Sea



With reference to the Planning Policy Wales[5] and its associated Technical Advice Note 15[2] (TAN15), the Justification Test is not applicable and there is no need to consider flood risk further.

TAN15 states that developments, change of use or conversions are acceptable in principle when located in Flood Zone 1. However, developments that may affect the course of surface water must be accompanied by an FCA as outlined in Sections 6 TAN15.

1.4 Administrative Context

The site is under the planning jurisdiction of Denbighshire County Council, who are responsible for the outcome of this application. Denbighshire County Council are also the Sustainable Drainage Systems (SuDS) Approving Body (SAB) for the area who deal with issues relating to localised flood risk and drainage.

1.5 Best Practice

This report has been prepared in accordance with the advice and requirements prescribed in the current version of TAN15[2] relating to the management of flood risk in development published by the Construction Industry Research and Information Association (CIRIA)[6] and the Welsh Government Statutory National Standards for Sustainable Drainage Systems.

5 Planning Policy Wales (Edition 11, February 2021)

6 CIRIA Report C624, Development and flood risk – guidance for the construction industry (October 2004)

2.0 Project Description

This FCA has been prepared in support of the proposal for the construction, operation and decommissioning of a ground mounted photovoltaic solar farm, together with associated equipment, infrastructure and ancillary works.

The Proposed Development comprises the installation of solar PV panels and construction of associated infrastructure, including feeder pillars and transformers; customer and Distribution Network Operator (DNO) substation; and ancillary equipment including security fencing and cable routes.

The development masterplan is enclosed as **Appendix 01.**

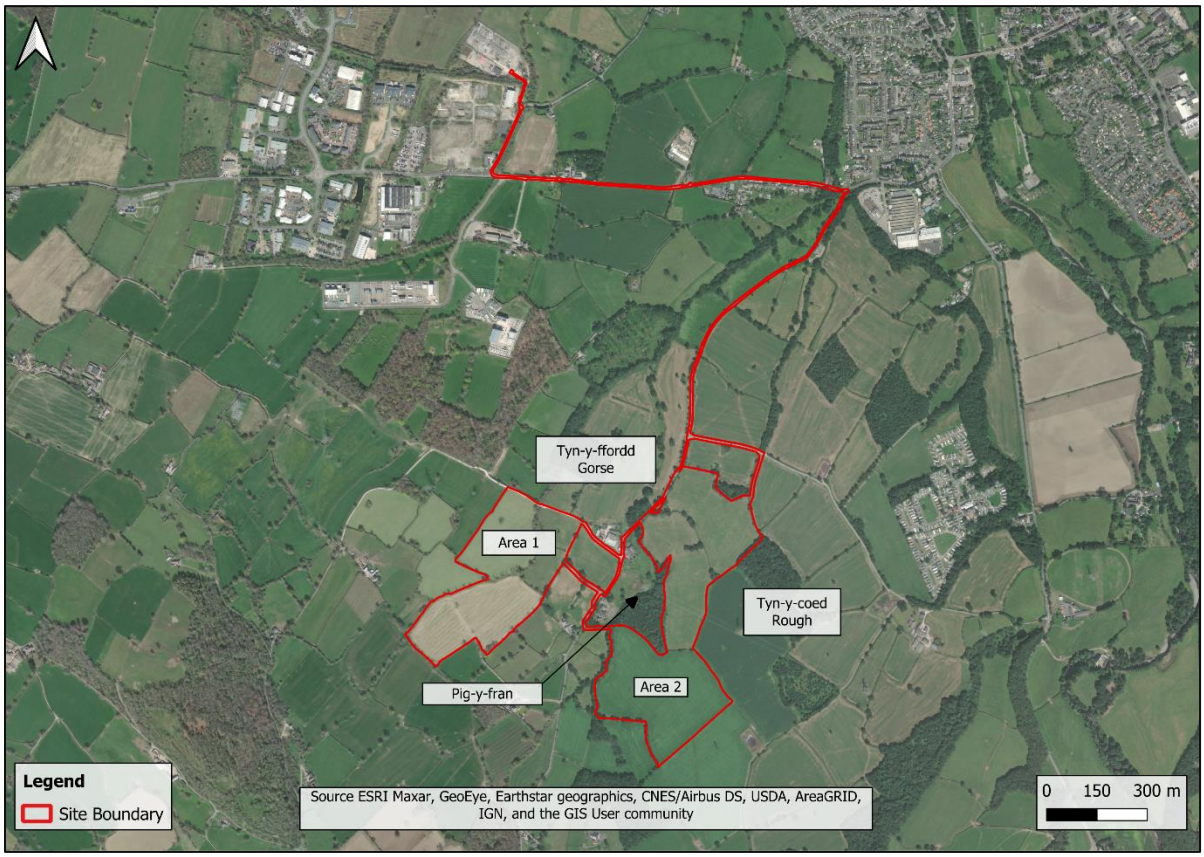
3.0 Site Details

3.1 Existing Site Description

A site walkover was carried out on 06/01/2022 to assess hydrological features across the site and to identify any potential hydrological and drainage issues prior to development. As a result of intermittent rainfall prior to and during the visit, hydrological features were helpfully more clearly defined.

For clarity, the land comprising the site is divided in Area 1 and Area 2 as shown in Figure 3-1 below.

Figure 3-1: Satellite Imagery of the Site



3.1.1 Area 1

Land comprising the site to the west of Llwyn Penwyn Road, as shown in Figure 3-1, is designated as Area 1.

Area 1 is estimated to be c.13.21ha of land and consists of adjacent grassland areas, grouped as a series of three adjacent fields to. These areas are served by a concrete access track, that runs west from the road allowing for easy access.

3.1.2 Area 2

Land defined in Figure 3-1 as Area 2 (east of Llwyn Penwyn Road) comprised three adjacent agricultural fields, measuring c.20.33 hectares (ha). Access to Area 2 is via the northernmost end of the eastern field.

3.1.3 Cable Route

The entire proposed cable route extends approximately 1.6 km north from Areas 1 and 2 along Llwyn Penwyn Road. The route then turns west, continuing for 1.1 km along Glascoed Road, before heading north again under Cwttir Lane for 0.4 km to reach St. Asaph's substation.

The cable route follows an existing highway from the main site to St. Asaph's substation.

3.2 Topography

Aerial photogrammetric data (LiDAR) topographic data for the site and immediate locality has been downloaded from the National Resources Wales (NRW) open data website[7] and is contained in Figure 3-2. Figure 3-2 provides bare earth elevation data using a Digital Terrain Model (DTM) and thus excludes built features and vegetation.

The LiDAR presented in Figure 3-2 indicates that the wider topography is dominated by the presence of local watercourses, with steep slopes rising towards the southwestern of the site. Figure 3-2 presents the data for the two areas of the site.

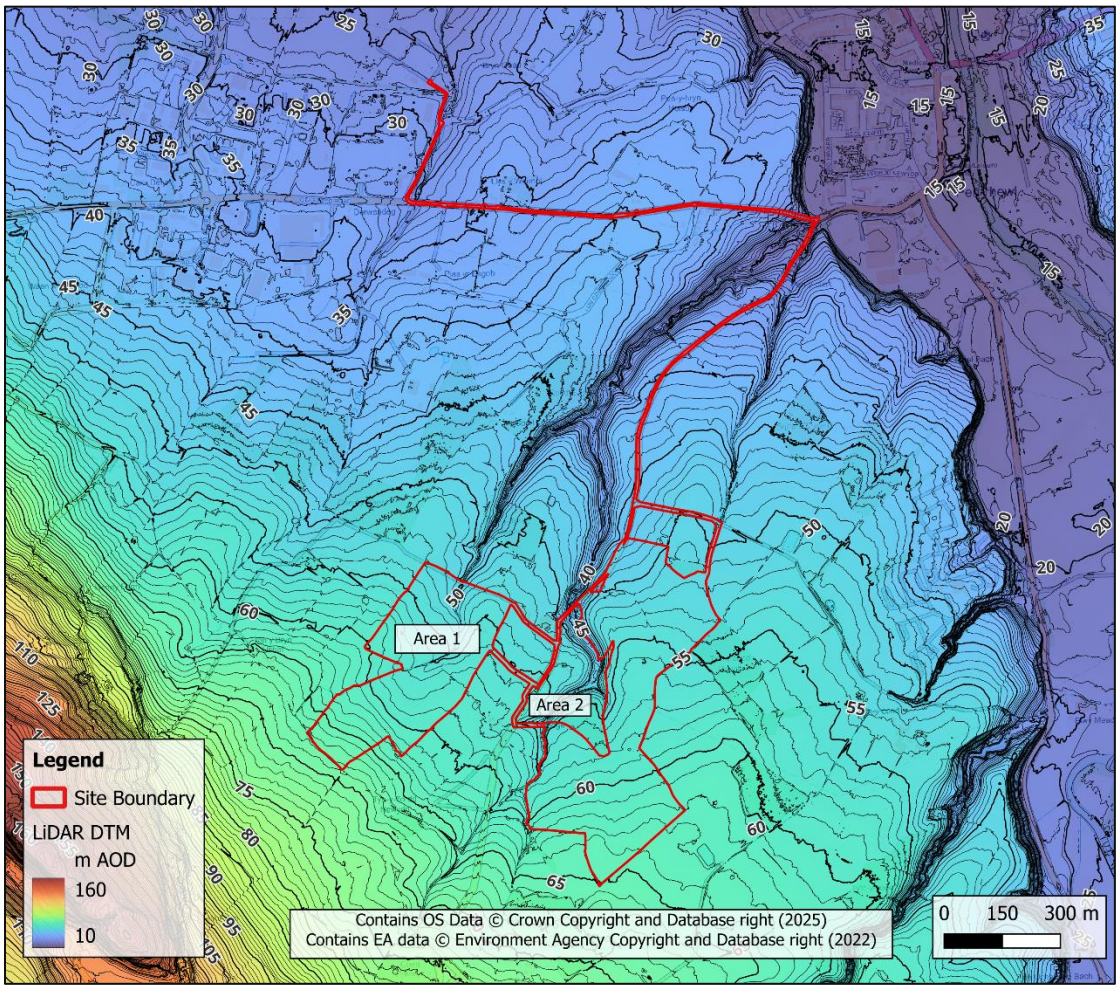
LiDAR shows that ground elevations across Area 1 generally fall towards Tributary 1 (Figure 3-3) from approximately 68.32m Above Ordnance Datum (AOD) in the south west to 50.38m AOD along the northernmost end of Tributary 1.

Excluding the access road, across Area 2, ground elevations generally fall towards Tributary 2 (Figure 3-3) from approximately 65.08m AOD to 46.39m AOD at the northernmost corner of the site. Ground elevations along the access road of Area 2 falls from 51.85m AOD to 46.15 m AOD in a general northerly direction.

The proposed cable route elevations fall generally in a north easterly direction from around 56.68 m AOD from the main site (Area 1 and 2). The route descends to a minimum elevation of 17.93 metres AOD when reaching Glascoed Road. From this point, the elevation rises to approximately 31.09 metres AOD before the route realigns northward along Cwttir Lane, terminating at St. Asaph's substation at an elevation of 25.79 metres AOD.

7 Natural Resources Wales, Lle geoportal, http://lle.gov.wales/Catalogue/Item/LidarCompositeDataset/?lang=en

Figure 3-2: 2m DTM LiDAR plot of the site



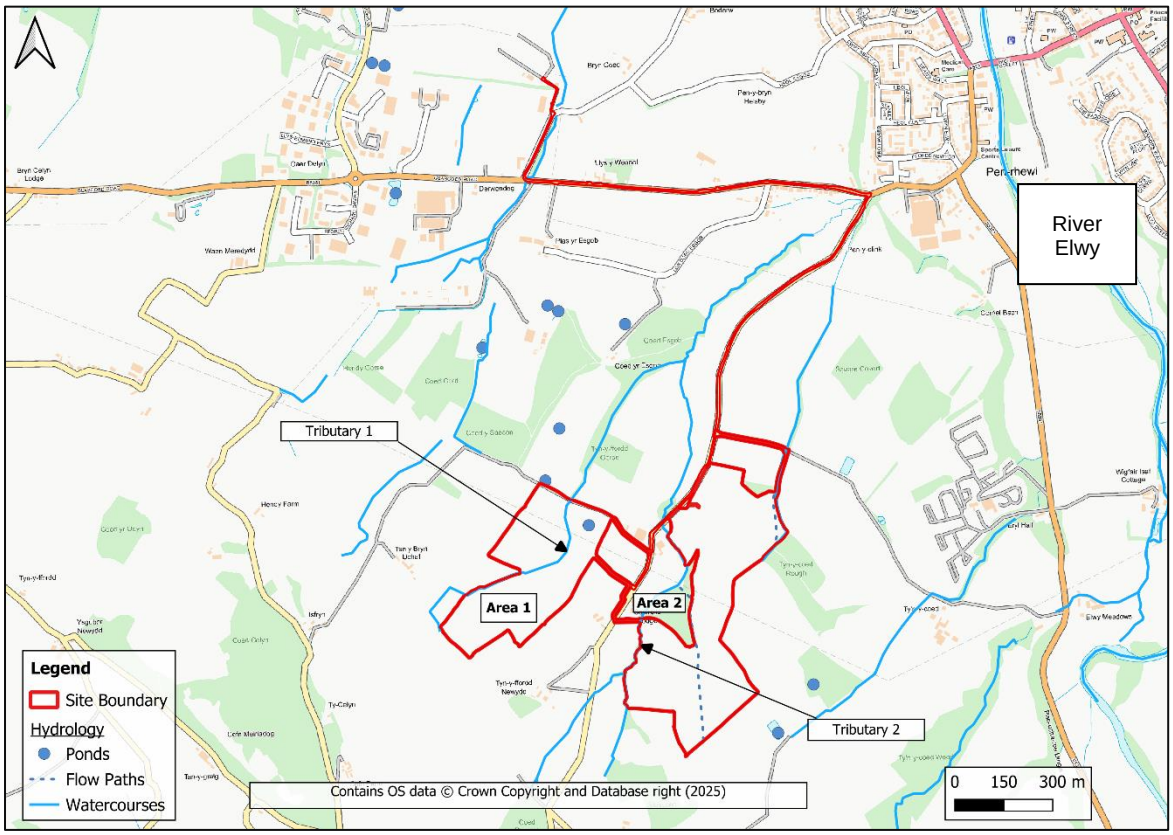
3.3 Hydrology

The River Elwy is situated approximately 750m east of the site at its closest point. River depths are recorded at St Asaph Station, located 2.5km north east, and fluctuate annually between 0.98m to 3.90m[8].

LiDAR[6] data indicates that St Asaph Station is set at an elevation of 10.33m above Ordnance Datum (AOD). The river at its maximum annual recorded level will be, consequently, at 14.23 m AOD, significantly below the elevation of the site. Other small watercourses present in the vicinity of the site are considered to outfall northwards into the Elwy.

8 River levels, rainfall and sea data, Natural Resources Wales, https://rivers-and-seas.naturalresources.wales/Station/4188?

Figure 3-3: Water Features of the site



3.3.1 Area 1

Some drainage ditches were present along the field boundaries during the site walkover. However, as local gradients fall west towards the watercourse (Tributary 1), most incidental rainfall would flow overland towards this regardless. Refer to Figure 3-3: Water Features of the site. Soils were slightly waterlogged at the time of the site visit due to rainfall.

Other surface water features across these areas included; a pond at the southernmost field within the northern area and a pond at the northeastern field within Area 1. No existing drainage systems were observed across either field.

3.3.2 Area 2

Land at these fields were observed to gently undulate across some areas (see Figure 3-3: Water Features of the site), which occasionally creates shallow sumps for surface water to collect within (Flow Path1 and Flow Path 2). Soils at the site however appeared very loamy and were heavily saturated.

A drainage ditch was present at around the eastern border of the two northern field of Area 2 and were observed to be in good condition, holding flowing water. This was similar for the western field, but no clear ditches were observed at the northern border, where ground was heavily saturated. However, at the northwestern boundary of the western field, topography declined at a much steeper rate towards an un-named watercourse, Tributary 2, which flowed along the field boundary to the northeast.

3.3.3 Overall Site

No existing drainage systems were observed across either area of the main site (Area 1 and 2); however, potential underground utilities were observed at a concrete structure at the

northern side of the boundary between the two fields. Other surface water features observed included; a slurry pond at the southern access point into the fields, a pond along the watercourse at the north western boundary of the western field and a pond within Tyn-y-Coed forest to the east as shown in Figure 3-3: Water Features of the site.

3.4 Drainage Regime

As the existing site comprises of undeveloped greenfield land and lacks any formal drainage, runoff will therefore 'drain' via a combination of infiltration into the subsoil with any excess flow conveyed overland following local topographic gradients.

3.5 Geological and Hydrogeological Context

3.5.1 Geology

British Geology Survey (BGS) mapping[9] indicates that the site is underlain by Diamicton deposits. Diamicton is described[10] as '*A type of siliciclastic sediment and sedimentary rock. Sediments that are poorly sorted and contain a wide range of clast sizes can be given this root name. The strict descriptive definition relates to range of particle size and not to relative abundance of any or all size classes.'*

The BGS mapping shows a series of private boreholes in the vicinity of the site but no access to their records is available. However, there is a series of boreholes in Diamicton along the A55, approximately 2 km north of the Site. Boreholes SJ07NW90 and SJ07SW222 logs[11] describe the soil as '*stiff brown silty clay*'.

Diamicton is underlain by the Warwickshire Group (Bedrock). The Warwickshire Group is defined by the BGS[12] as '*Predominantly red, brown or purple-grey sandstone, siltstone and mudstone, some grey strata, coals not common, local conglomerates, localised beds of Spirorbis limestone.*'

3.5.2 Hydrogeology

The Warwickshire Group beneath the site has been designated as a *'Secondary A'* Aquifer[13], defined as *''permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers".* Aquifer designation for superficial deposits was not available for the area.

Boreholes SJ07NW90 and SJ07SW22[14] extended to 3.75 and 4.7 m below ground level (bgl) and recorded no groundwater. It is considered that groundwater level at the site would also be no higher than 3.75m bgl. The infiltration rate for the soil described in these boreholes is expected to vary between $1x10^{-8}$ to $3x10^{-6}$ m/s.

9 BGS Geology of Britain Viewer, available at http://mapapps.bgs.ac.uk/geologyofbritain/home.html

10 BGS Geology of Britain: Rock Classification Scheme, available at https://webapps.bgs.ac.uk/bgsrcs/rcs_details.cfm?code=DMTN

11 BGS Geology of Britain: Borehole Records, available at, https://www.bgs.ac.uk/information-hub/borehole-records/

12 BGS Geology of Britain: Rock Classification Scheme, available at, https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=WAWK

13 Magic Map, DEFRA, https://magic.defra.gov.uk/MagicMap.aspx

14 BGS Geology of Britain: Borehole Records, available at, https://www.bgs.ac.uk/information-hub/borehole-records/

4.0 Policy Status for the Proposed Development

4.1 Flood Risk Vulnerability

In line with TAN15 Figure 4, the site proposals are classified as 'Renewable energy generation facilities' and is therefore a *'less vulnerable development'*.

4.2 Anticipated Lifetime of Development

In lieu of further information, a 40-year development lifetime is applied unless there is specific justification for considering a shorter period.

4.3 Planning Policy

The Planning Policy Wales[5] ensures that flood risk is taken into account at all stages in the planning process and that development is sustainable.

This document has been prepared using best practice principals using The SuDS Manual[6], TAN15[2] and Statutory standards for Sustainable Drainage Systems[15].

Technical Advice Note 8 (TAN8): Planning for Renewable Energy[16] was published in July 2005 and sets out the Welsh Government planning policy on renewable energy systems. In accordance with TAN8, the Welsh Government in February 2011 additionally published Planning Guidance - Planning Implications of Renewable and Low Carbon Energy[17] which considers the role of solar PV arrays on hydrology and flood risk.

Paragraph 8.4.18 states:

> *The potential effects of a solar PV array on hydrology and flood risk should be considered. In general, these are unlikely to be significant because the presence of solar arrays will not greatly increase the time for rainwater to reach the ground where it can infiltrate in the usual way and because the panels will typically cover no more than one third of the site area. The effects of the panels, in combination with access tracks, earth works, buildings for inverters, cable trenches and site drainage works will nevertheless need to be assessed. An assessment of existing flood risk at the site should also be undertaken to consider the need for electrical equipment to be raised off the ground and to ensure that any on site works do not exacerbate flooding elsewhere.*

This report, an FCA & SWDS, provides both an assessment of existing flood risk, and where necessary future flood risk, as well as a supportive drainage strategy which covers the fundamental requirements set out in Paragraph 8.4.18.

4.3.1 Denbighshire County Council

The Local Development Plan (2006–2021)[18] (LDP) was adopted in June 2013 and is the development plan for Denbighshire County Council. It provides the basis for decisions, objectives, spatial strategy and vision for the county.

15 Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems, Welsh Government, 2018

16 Technical Advice Note 8: Planning for Renewable Energy to Planning Policy Wales (2005)

17 Planning Guidance- Planning Implications of Renewable and Low Carbon Energy, Welsh Assembly Government, February 2011

18 Denbighshire County Council Local Development Plan (2006-2021) Adopted June 2013 (Accessed: 29 April 2025)

Relevant policies relating to flood risk, drainage matters and in relation to the development context are outlined in Objective 12 and, 14 of the annual monitoring process and covered accordingly below:

Overarching Polices

Policy VOE 1 - Key Areas of importance

The policy designates statutory areas requiring protection from development that would adversely affect them. The aims to address flood risk by monitoring development compatibility under this policy by:

"Directing inappropriate development away from the flood plain"

Sustainable Drainage Systems

Policy VOE 6, Water Management

Water management in this context refers to the water consumption conservation; however, the policy explicitly address the requirement for Sustainable Drainage Systems:

"*The use of Sustainable Drainage Systems (SuDS) to manage surface water flows can also be an important tool in minimising flood risk by increasing permeable surfaces in an area which allows water to seep into the ground rather than running off into the drainage system. The effective use of permeable surfaces, soakaways and water storage areas should be incorporated in all new development where technically possible. SuDS can also reduce the impact of diffuse pollution from runoff and flooding securing environmental, biodiversity and aesthetic benefits. Early consideration of SuDS is required in order that a range of techniques can be considered and developers are encouraged to enter into early discussions with the Council."*

This assessment will demonstrate how the development complies the with the LDP in so far as it relates to flood risk and drainage matters.

4.3.2 Development Category

With reference to Section 4.2, the proposed solar farm is considered a 'less vulnerable development'.

With reference to Section 10 of TAN15, all developments in Zone 1 are considered to be acceptable.

4.3.3 Development Acceptability

With reference to Section 11 of TAN15, all new development in Wales should ensure that the following conditions are met;

- No increase in flooding elsewhere
- Occupiers aware of flood risk
- Escape/evacuation routes present
- Flood emergency plans and procedures agreed and in place
- Flood resistant and resilient design
- Acceptable consequences for type of use (*less vulnerable*)

These acceptability criteria are reviewed in Section 5.0.

5.0 Assessment of Flood Risk

5.1 Potential Sources of Flooding

There are a number of potential sources of flooding and these include:

- Flooding from rivers or fluvial flooding;
- Flooding from the sea or tidal flooding;
- Flooding from surface water or pluvial flooding;
- Flooding from groundwater;
- Flooding from sewers; and
- Flooding from reservoirs, canals, and other artificial sources.

The flood risk from each of these potential sources is discussed below.

5.1.1 Flooding from Rivers or Fluvial Flooding and from Sea or Tidal Flooding

With reference to the Flood Maps for Planning (Figure 1-2), the site and proposed cable route length lies wholly within Flood Zone 1 and is therefore outside an area having less than 0.1% Annual Exceedance Probability (AEP) or less than 1 in 1,000-year annual probability of flooding from fluvial and tidal sources.

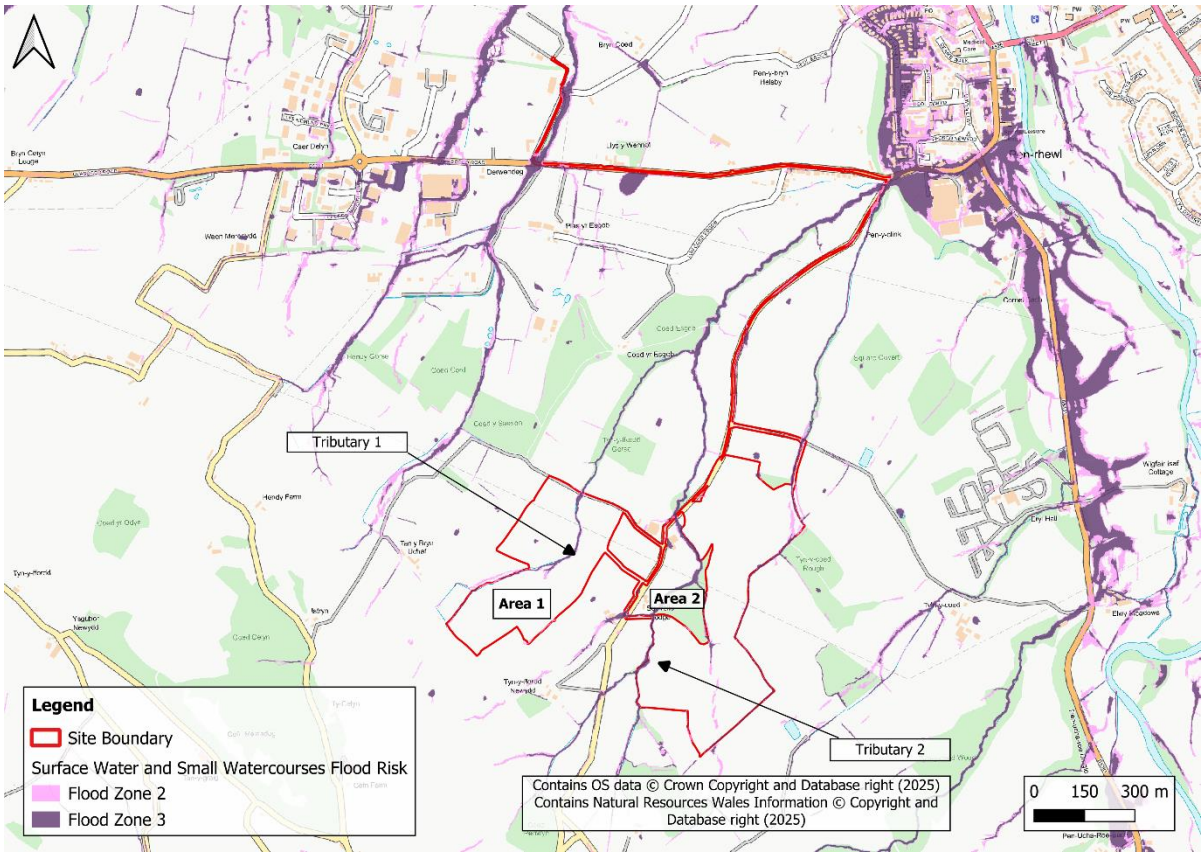
Flooding from these sources is very low and not considered further.

5.1.2 Flooding from Surface Water or Pluvial Flooding

The detailed surface water flood risk maps published by NRW[4], shows areas potentially at risk of flooding from surface water. The surface water flood risk categories are defined as:

- Low: less than 1 in 100 (1% AEP) but greater than or equal to 1 in 1,000 (0.1% AEP) chance of flooding in any given year;
- Medium: between 1 in 100 (1% AEP) and 1 in 30 (3.3% AEP) chance of flooding in any given year; and
- High: greater than 1 in 30 (3.3% AEP) chance of flooding in any given year.

Figure 5-1: Extract of the NRW Surface Water Flood Map



With reference to Figure 5-1, the areas at risk of flooding within the site are shown to be linear and often extend beyond the site boundary. A comparison of these areas against LiDAR shows flood flow pathways aligning with topographical valleys.

These areas at risk of flooding are therefore considered to be flow paths. As these flow paths have relatively small upstream catchments, the resulting overland flow and associated flood extent is expected to be limited to no greater than that shown on Figure 5-1.

The risk of flooding from this source is therefore considered low and not considered further. It should be noted that these conveyance routes will nonetheless be retained as part of the proposed development, thereby maintaining the existing hydrological and hydraulic regime.

During the construction phase, there is a possibility that excavations for the proposed cable may be affected by surface water flooding. However, excavations and installation of the cable is anticipated to be completed within a few months and therefore is not at significant long term flood risk.

5.1.3 Flooding from Groundwater

Groundwater flooding generally occurs during intense, long-duration rainfall events, when infiltration of rainwater into the ground raises the level of the water table until it exceeds ground levels. It is most common in low-lying areas overlain by permeable soils and permeable geology, or in areas with a naturally high-water table.

Groundwater levels are not expected above approximately 3m bgl as discussed at Section 3.3.2, and given the low permeability of the superficial deposits, would be highly unlikely to emerge at the ground surface.

Flooding from this source is not considered to be significant and therefore not assessed further.

5.1.4 Flooding from Sewers

No mains water pipes or wastewater sewers were recorded in the vicinity of the site during the site visit. Flood risk from sewers is therefore nil.

5.1.5 Flooding from Reservoirs, Canals and Other Artificial Sources

There are no reservoirs upgradient of the site and therefore flooding from this source is nil.

Flooding from Reservoirs, Canals and Other Artificial Sources is negligible and not considered further.

5.1.6 Flooding from Infrastructure Failure

The site is not afforded protection from flood defences, nor are there any sewerage pumping stations or other significant infrastructure within the vicinity of the site which may pose a flood risk.

Flooding from Infrastructure Failure is therefore very low and not considered further.

5.2 Flood Risk Summary

A summary of the potential sources of flooding and the flood risk arising from them is presented in Table 5-1.

Table 5-1: Potential Sources of Flooding

Potential Source of flooding	Significant Flood Risk at the Site (Y/N)
Rivers or Fluvial Flooding	N
Sea or Tidal Flooding	N
Surface Water or Pluvial Flooding	N
Groundwater	N
Sewers	N
Reservoirs, Canals and other Artificial Sources	N
Infrastructure Failure	N

The flood screening assessment indicates that the site is not a significant risk of flooding.

5.3 Flood Risk Classification

The description of the flood Zones to control and manage development is described in TAN15 Figure 1 and is summarised below:

Table 5-2: Definition of Flood Map for Planning Flood Zones

Zone	Flooding from river	Flooding from sea	Flooding from surface water and small watercourses
1	Less than 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year		

Zone	Flooding from river	Flooding from sea	Flooding from surface water and small watercourses
2	Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.	Less than 1 in 200 (0.5%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.	Less than 1 in 100 (0.5%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.
3	A greater than 1 in 100 (1%) chance of flooding in a given year, including climate change	A greater than 1 in 200 (1%) chance of flooding in a given year, including climate change.	A greater than 1 in 100 (1%) chance of flooding in a given year, including climate change.
TAN15 Defended Zones	Areas where flood risk management infrastructure provides a minimum standard of protection against flooding from rivers of 1:100 (plus climate change and freeboard).	Areas where flood risk management infrastructure provides a minimum standard of protection against flooding from the sea of 1:200 (plus climate change and freeboard)	Not applicable

Based on the screening study, the entire site lies within Flood Zone 1 and is therefore at very low risk of flooding from any potential sources.

6.0 Climate Change

In September 2021, NRW[19] issued updated guidance on the impacts of climate change on flood risk, to be used in flood consequence assessments in support of relevant planning applications. This guidance sets out peak rainfall intensity, sea level, peak river flow, and extreme wave heights are all expected to increase in the future as a result of climate change.

The guidance acknowledges that in relation to certain factors there is considerable uncertainty with respect to the absolute level of change that is likely to occur. As such, in these instances, the guidance provides estimates of possible changes that reflect a range of different emission scenarios.

Concerns relating to offshore wind speed and wave height a are only of relevance in contexts that are in direct proximity to the open coast or other large open bodies of water. There are also no associated risks of fluvial flooding from nearby reservoirs or small watercourses. The climate change allowances applicable to the site therefore relate to peak rainfall intensity.

6.1 Peak Rainfall Intensity Allowance

An extract of *Table 2: Change to Extreme Rainfall Intensity* is reproduced as Table 6-1.

Both the central and upper estimates should be assessed to understand the range of impact. The central estimate should be used to inform design levels, whereas where the assessment indicates a significant flood risk for the upper end estimate, the flood consequences assessment will need to provide mitigation measures.

Table 6-1: Change to Extreme Rainfall Intensity (Compared to 1961-90 baseline)

Allowance Category	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper End	25%	40%	75%
Central	15%	25%	30%

Having reviewed the Upper End and Central Allowances and in line with Table 6-1, the Surface Water Drainage Strategy has been developed to take into account increases in rainfall intensity of 30% over the lifetime of the entire development.

This aligns with the consultation response dated 25/02/2025 from the Lead Local Flood Authority (LLFA) which stated that *"the applicant should provide details of the surface water drainage proposals which should be designed to accommodate the 1 in 100 year plus 30% climate change event with any discharge, for example to a watercourse, restricted to the existing greenfield runoff rates."*

19 Flood Consequences Assessments: Climate Change allowance. Natural Resources Wales, September 2021

6.2 Sea Level Rise Allowances

An extract of *Table 3: Estimated mean sea level rise (in metres) for relevant local authority areas* is reproduced as Table 6-2.

Development proposals should be assessed against the relevant regional 70th percentile presented in Table 3 to inform design levels. The 70th percentile should also be assessed inform mitigation measures, access and egress routes and emergency evacuation plans.

Table 6-2 Estimated mean sea level rise (in metres) for relevant local authority areas by 2100 and 2120. Allowances are based on RCP8.5 70th and 95th percentiles

Local Authority Area	Allowance Percentile	Mean Sea Level Rise (metres) by 2100 *(UKCP18 baseline 1981-2000)	Mean Sea Level Rise (metres) by 2120 *(UKCP18 baseline 1981-2000)
Denbighshire	70th	0.75	0.90
	95th	0.95	1.15

The review of tidal flooding at the site will therefore consider the 1.10m uplift associated with the 95th percentile up until 2100. In reality, the anticipated lifetime of development is 40 years (to 2051), and therefore a 0.95m rise is a precautionary approach to assessing tidal flood risk at the site.

The site is located about 10 km south of the coast. Extreme tidal levels from Flood Zone B (past evidence of flooding / 0.1% AEP) have been extrapolated from the flood outline using LiDAR datum. The extrapolation indicates an extreme tidal flood level would be at 21.43m AOD and therefore, at least 30m lower than the site.

It is therefore impractical to consider the effects of sea level rise associated with climate change further with regards to flood risk at the site. It is also confirmed the site will remain in Zone A (c*onsidered to be at little or no risk of fluvial or coastal/tidal flooding)* throughout the lifetime of development.

6.3 Peak River Flow Allowances

An extract of *: Change to Extreme Rainfall Intensity* is reproduced as **Table 6-3.**

Both the central and upper estimates should be assessed to understand the range of impact. The central estimate should be used to inform design levels, whereas where the assessment indicates a significant flood risk for the upper end estimate, the flood consequences assessment will need to provide mitigation measures.

Table 6-3 Table 1: Peak River Flow Allowances by River Basin District (using 1961 to 1990 baseline)

River Basin District	Total Potential Change Anticipated by the 2020s	Total Potential Change Anticipated by the 2050s	Total Potential Change Anticipated by the 2080s
Upper End Estimate	25%	40%	75%
Central Estimate	15%	25%	30%

As discussed in Sections 3.1.3 and 3.1.3, the catchment of the flow paths and tributaries are relatively small, and the topography falls to c.47m (AOD) towards these features. Consequently, any increase in peak river flow is not expected to have a significant impact on flood risk at the site.

7.0 Surface Water Drainage Strategy

7.1 Sustainable Drainage Systems

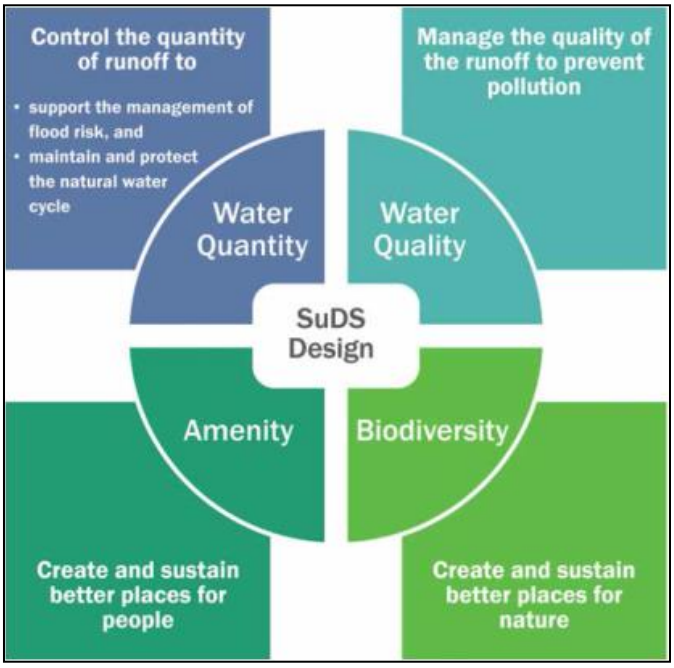
Sustainable drainage systems (SuDS) are required to manage both the rate and volume of runoff and importantly surface water quality.

Surface water drainage provision for new development is subject both to the planning process and, following implementation of Schedule 3 to the Flood and Water Management Act 2010, approval by the SAB.

The current best practice guidance document, The SuDS Manual[20], promotes sustainable water management through the use of SuDS and is required by the Welsh Government Statutory standards for sustainable drainage systems[21]. These systems must be approved by Denbighshire County Council acting in its SAB role before construction work begins. The SAB will have a duty to adopt compliant systems so long as it is built and functions in accordance with the approved proposals, including any SAB conditions of approval.

There are four main categories which are referred to as the '*four pillars of SuDS*' as summarised in Figure 7-1.

Figure 7-1: Four Pillars of SuDS (after CIRIA Report C753)



The SuDS Manual identifies a hierarchy of SuDS for managing runoff, which is commonly referred to as a 'management train' and is depicted in Figure 7-2:

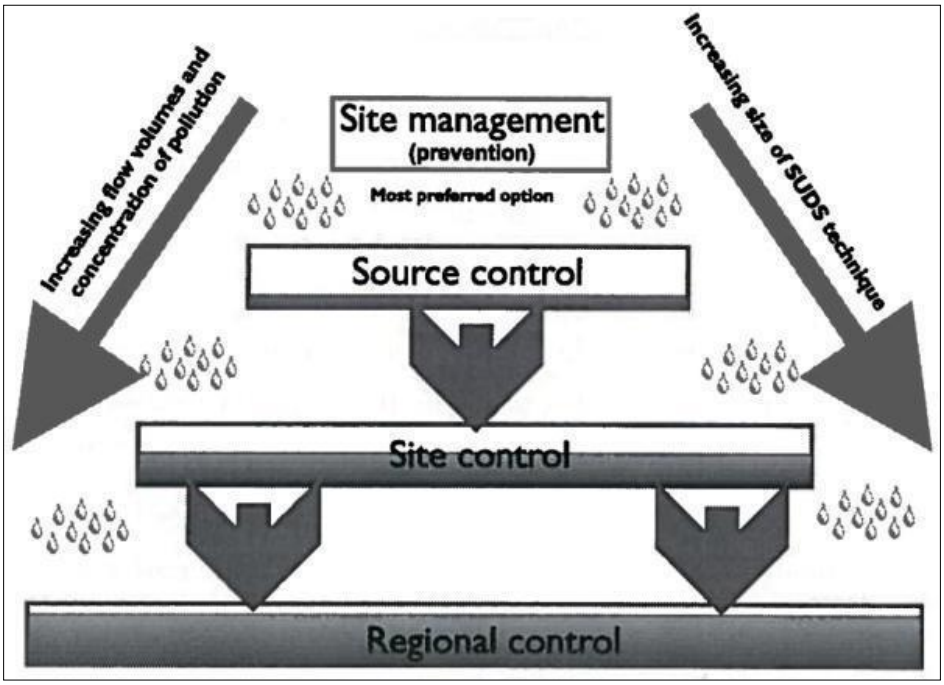
- **Prevention** – the use of good site design and housekeeping measures on individual sites to prevent runoff and pollution (e.g. minimise areas of hard standing).
- **Source Control** – control of runoff at or very near its source (such as the use of rainwater harvesting).

20 CIRIA (2015). Report C753, The SuDS Manual

21 Statutory National Standards for Sustainable Drainage Systems, published on October 2018

- **Site Control** – management of water from several sub-catchments (including routing water from roofs and car parks to one/several large soakaways for the whole site).
- **Regional Control** – management of runoff from several sites, typically in a retention pond or wetland.

Figure 7-2: SuDS Management Train



It is generally accepted that the implementation of SuDS, as opposed to conventional drainage systems, provides a number of benefits by:

- Reducing peak flows to watercourses or sewers and potentially reducing the risk of flooding downstream;
- Reducing the volumes and frequency of water flowing directly to watercourses or sewers from developed sites;
- Improving water quality over conventional surface water sewers by removing pollutants from diffuse pollutant sources;
- Reducing potable water demand through rainwater harvesting; and
- Improving amenity through the provision of public open spaces and wildlife habitat; and replicating natural drainage patterns, including the recharge of groundwater so that base flows are maintained.

In addition to the above, Denbighshire County Council, as the (LLFA) and SAB, promote the use of SuDS as set out in the SuDS Pre-Application.

The SAB requirements are extracted from the Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems[1515] which have six key themes:

- S1. Surface water runoff destination
- S2. Surface water runoff hydraulic control
- S3. Water Quality

- S4. Amenity
- S5. Biodiversity
- S6. Design of drainage for construction, operation and maintenance

These themes will be used to adopt an achievable drainage strategy at the site.

7.2 Drained Area

The proposed solar panels will intercept precipitation and shed this onto the ground along the lower edge of each array (the 'drip-line'). However, runoff from each solar panel will continue to infiltrate into the underlying soils in much the same way as existing conditions.

Additionally, the grass vegetation that will be permanently maintained between and beneath the solar panel arrays will also ensure that the runoff generated will continue to drain diffusely across the site following the general topography.

Although there will be a small increase in impermeable surface area due to the construction of the substations, inverters and ancillary buildings, the total increase in effective impermeable surface from these elements of the proposed development is not considered to be significant. The runoff from the roofs of these elements will simply be shed to adjacent ground and as such, there would be no material increase in surface water runoff when compared to existing conditions.

However, it is proposed that the proposed hardstanding area within Area 1 as shown on Drawing No. C0002452_02 Rev. V4 enclosed at **Appendix 01** will be positively drained.

Section 3.2.7 of The SuDS Manual recommends that the potential increase in the *'impermeability of the contributing catchment through the design life of the drainage system should (…) be taken into account.'*

Section 24.7.2 of The SuDS Manual defines urban creep as:

> *'any increase in impervious area that is drained to an existing drainage system without planning permission being required, and therefore without any consideration of whether the capacity of the receiving sewerage system can accommodate the increased flow.'*

The SuDS Manual recommends that an allowance of 10% is made in respect of urban creep. However, as the proposed development is non-residential, the application of urban creep does not apply.

Based on the proposed development masterplan enclosed within **Appendix 01**, the drained impermeable areas are summarised in Table 7-1.

Table 7-1: Drained Areas

Impermeable Land Use Type	Area (m^2)
	Proposed
Hardstanding Area	400
Total	**400**

7.3 Proposed Discharge Arrangement

With reference to The SuDS Manual, the hierarchy of preferred disposal options for surface water runoff from development sites in decreasing order of sustainability is as follows:

1. Infiltration to Ground;
2. Discharge to Surface Waters; or
3. Discharge to Sewer.

Table 7-2 summarises the suitability of these disposal methods in the context of the site and the proposed development.

Table 7-2: Suitability of Surface Water Disposal Methods

Surface Water Disposal Method (in Order of Preference)	Suitability Description	Method Suitable? (Y / N)
Infiltration to Ground	With reference to Section 3.5.1, the superficial deposit at the site comprises Diamicton which based on literature review[22], has a low infiltration rate of $3x10^{-6}$ m/s which is unlikely to provide a sufficient degree of infiltration. No infiltration testing has been undertaken to date. This SWDS has assumed that infiltration is not feasible on site.	N
Discharge to Surface Waters	As discussed in Section 3.4, ground elevations across Area 1 generally fall towards Tributary 1. Surface water runoff from the hardstanding area within Area 1 would therefore discharge to this tributary under gravity. In line with the drainage hierarchy, this method of surface water disposal could be adopted either: (i) as a primary means of discharge should infiltration to ground not be viable; or (ii) as a secondary means of discharge if infiltration rate is insufficient to effectively discharge surface water runoff resulting from the proposed development.	Y
Discharge to Sewer	There is no sewerage infrastructure in the vicinity of the site and therefore this method of surface water disposal is not possible.	N

7.4 Proposed Outline SuDS Strategy

It is proposed to manage surface water runoff from the development via the following 'Source Control', 'Conveyance', and 'Site Control' options as summarised in Table 7-3.

[22] CIRIA (2015). Report C753, The SuDS Manual: Table 25.1

Table 7-3: Summary of Surface Water Management Strategy SuDS Options

SuDS Management Train Mechanism	Application	Potential Suitable SuDS Features
Source Control	For the interception of surface water runoff at the source such as rainfall shedding from the roof areas.	• Swale
Conveyance	To convey surface water runoff from 'Source Control' mechanisms to 'Site Control'.	• Swale
Site Control	Provides the required surface water attenuation / storage prior to controlled discharge to the water environment.	• Swale

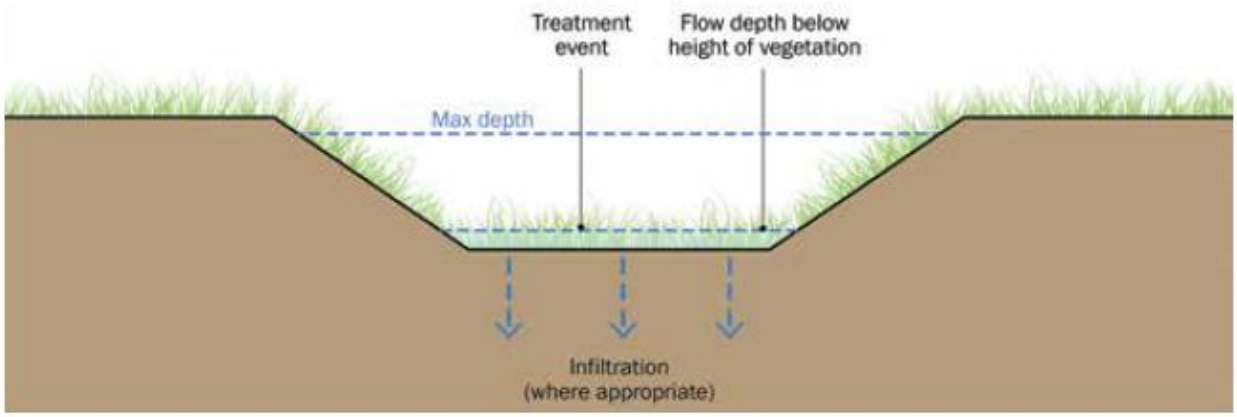
'Source Control', 'Conveyance' and 'Site Control' in the form of a piped network and swale are considered to be viable and beneficial (in terms of attenuation requirements and water quality enhancements) and therefore have been integrated into this SWDS.

A conveyance swale, used to provide 'Source Control' and 'Conveyance', will intercept and convey runoff into a swale. The Attenuation swale will act as the 'Site Control' by providing the required attenuation prior to discharge to ground and/or surface water. The swale has been designed to provide sufficient attenuation of runoff within the site boundary for all events up to and including the 1% AEP plus 30% climate change allowance.

Irrespective of the means of discharge of runoff, the swale will be unlined to promote infiltration to ground..

A typical swale detail is provided below in **Figure 7-3**. Whilst not demonstrated in the diagram, the swale with be lined with gravel to encourage infiltration and pollutant filtration. The banks of the swale will be grassed. A 1:3 side slope is adopted to allow for mowing.

Figure 7-3: Swale: Conceptual Design Details



Indicative locations of the proposed swales serving the proposed development are shown in **Drawing 01.**

7.5 Water Quantity Design Standard

7.5.1 Control of Runoff Volume

Section 3.3.1 of The SuDS Manual sets out volume control criteria for:

- Frequent Rainfall Events
- Extreme Rainfall Events

7.5.1.1 Frequent Rainfall Events

The SuDS Manual requires *'the prevention of runoff from the [site] for the majority of small (frequent) rainfall events (or for the initial depth of rainfall for larger events)'*. This is known as interception. The SuDS Manual states that '*Interception of about 5mm is normally achievable.'*

With reference to Section 24.8 of The SuDS Manual:

'Interception can be delivered using one or a combination of processes:

- *Rainwater harvesting*
- *Infiltration*
- *Evapotranspiration using temporary shallow ponding or storage within the soil or upper aggregate layers.'*

As discussed at Section 7.4, the swale will be unlined to promote infiltration to ground. Additionally, Section 17.4.2 of The SuDS Manual states that swales *'deliver Interception because there is usually no runoff from them for the majority of small rainfall events'.*

The SWDS is therefore deemed to provide the necessary interception of the first 5mm of rainfall.

7.5.1.2 Extreme Rainfall Events

For extreme rainfall events, the drainage system should be designed such that *'the volume of runoff from the site (or development) area [does] not exceed the volume of runoff from the equivalent area in its natural undeveloped or "greenfield" state'.*

As summarised in Table 7-2, if infiltration to ground is not feasible or infiltration rate is insufficient to effectively manage runoff, discharge to surface waters will be used.

In line with Section 3.3.1 of The SuDS Manual, it is proposed that '*all the runoff from the site for the 1:100 year [1% AEP] event [to] be discharged at either a rate of 2ls^{-1}ha^{-1} or the average annual peak flow rate (i.e. the mean annual flood, QBAR), whichever is greater.'*

Table 24.1 Summary of runoff estimation methods of The SuDS Manual recommends the application of the Revitalised Rainfall-Runoff Method (ReFH2) to estimate greenfield runoff rates.

ReFH2 has therefore been used to estimate greenfield runoff rate for the 50% AEP (1 in 2 year) rainfall event as summarised within Table 7-4. It should be noted that QBAR has a return period of approximately 1 in 2.3 years, however, only integers can be inputted into ReFH2. A conservative QBAR peak runoff rate has been estimated assuming a 1 in 2-year return period.

The descriptors for the site extracted from the Flood Estimation Handbook (FEH)[23] Web Service were used in the ReFH2 analysis with the AREA set to 1.00ha.

As discussed in Section 7.2, the proposed hardstanding area is 400m^2, or 0.04ha.

The greenfield runoff rate has therefore been estimated based on the proposed impermeable area of 400m^2, or 0.04ha, as summarised within Table 7-4.

Full modelled results from ReFH2 are included as **Appendix 02**.

Table 7-4: Greenfield Runoff Rate

AEP (%)	Estimated Greenfield Runoff Rate	
	l/s/ha	l/s/0.04ha
50	5.2	0.2

The discharge rate of 0.2l/s would require a significantly small orifice (c.11mm diameter) that would not be attainable at the site. As discussed in Section 7.3, the site will adopt a swale feature which, naturally, would have some deposition of sediment, vegetation (i.e., leaves) which inherently would regularly cause blockage to an orifice of such a size. The flood risk associated with a blockage occurrence at the site would be significantly greater than a small increase in discharge rate.

In accordance with Section 20.4 of The SuDS Manual, even for below ground (closed) structures, the absolute minimum size should be 20mm. For open attenuation structures such as a swale, where the presence of debris and therefore blockage is likely, a minimum outflow control diameter of 50mm is recommended. The most effective means of controlling flow while reducing the likelihood of blockage is using a Hydrobrake.

Using a Hydrobrake with a diameter of 54mm would control off site discharge to 1ls^{-1}.

7.5.2 Control of Peak Runoff Rate

Section 3.3.2 of The SuDS Manual sets out the peak rate of runoff criteria for:

- Events likely to impact on morphology, ecology or capacity of the receiving surface waters, or the capacity of receiving sewers.
- Extreme events.

7.5.2.1 Events likely to impact on morphology, ecology or capacity of the receiving surface waters, or the capacity of receiving sewers

As discussed in Section 7.5.1, there will be a small but controlled increase (1l/s) in runoff rate to the receiving watercourse associated with the new impermeable area. Significant changes to the hydrological regime, such as an impoundment or uncontrolled / unmanaged impermeable development, would essentially impact the existing morphology and ecology of the receiving surface waters. It is not considered that a relatively small increase in discharge into the receiving ditch would result in any detrimental impacts to the channel.

An assessment of the capacity of Tributary 1 to receive the small increase in discharge would require further investigation. At this stage, it is considered the dimensions of the

23 Flood Estimation Handbook (Centre for Ecology & Hydrology, 1999)

channel, which from LiDAR indicates a depth of 1.8m, is sufficient to accommodate the extra flows.

7.5.2.2 Extreme Events

In line with Section 3.3.2 of The SuDS Manual, the SWDS *'should be designed so that peak runoff rates for extreme rainfall events (…) are constrained to the greenfield runoff rates for the same event'*.

As discussed above at Section 7.5.1, discharge from the site will be restricted to 1l/s as this is the smallest, viable discharge rate possible.

7.6 Water Quantity Design Standard

Both strategies are based on a total contributing area of 0.04ha. Temporary storage volumes were estimated using the Causeway Flow software, an appropriate methodology for planning and master planning purposes. The attenuation volumes required for the proposed development in response to a range of AEP rainfall events up to and including the 1% AEP storm event +30% have been estimated for both strategies.

The analysis indicates that a 75 mm diameter Hydrobrake flow control device would be required to limit the discharge from the attenuation swale to the maximum allowable discharge rate of $1ls^{-1}$.

Calculations were made on the assumption that no infiltration is possible on a 'worst case scenario' basis, to demonstrate that the drainage feature can manage the surface water generated by the proposed development. When the site-specific infiltration rate of the soil is confirmed, infiltration to the soil will be encouraged resulting in a possible reduction of the size of the swales.

The conveyance swale will therefore have the following parameters:

- Basal Width: 0.4m
- Top Width: 3.4m
- Depth: 0.5m
- Side Slope: 1:3
- Length: 20m
- Estimated Required Total Volume: 19 m^3

The attenuation swale will therefore have the following parameters:

- Basal Width: 1.8m
- Top Width: 4.8m
- Depth: 0.5m
- Side Slope: 1:3
- Length: 6m
- Estimated Required Total Volume: 9.9m^3

Details of the analysis are enclosed in **Appendix 03** and summarised in Table 7-5.

Table 7-5: Drainage Performance and Sizing

AEP (%)	Maximum Discharge Achieved (ls^{-1})	Maximum Water Depth (m)	Maximum Attenuation Storage Required (m^3)
1 + 30%	1	0.488	19.9

7.7 Water Quality Design Standard

The drainage of built development has the potential to reduce water quality through increases in suspended solids, metals and hydrocarbons in the surface water runoff. The risks associated with a number of typically drained surfaces (land uses) are assessed in Section 26 of The SuDS Manual and expressed in Table 26.2 as a potential 'Pollution hazard level'. A review of each of the land uses has been completed with reference to Table 26.2 of the SuDS Manual, to determine the appropriate Pollution Hazard Levels.

It is anticipated that the proposed hardstanding area will be used to site a DNO station and provide vehicular access to this element of the proposed development. As such, with reference to The SuDS Manual, post development surface water runoff generated from the hardstanding area is considered to have a 'Low' Pollution Hazard Level as set out within Table 7-6.

Table 7-6: Pollution Hazard Potential of the Proposed Development

Land Use	Pollution Hazard Level	Pollution Hazard Indices		
		Total Suspended Solids (TSS)	Metals	Hydrocarbons
Low traffic area	Low	0.5	0.4	0.4

As discussed in Table 7-2, surface water runoff from the site will likely discharge to surface waters if future soakage testing indicates that there is no infiltration potential at the site. The indicative SuDS Mitigation Indices for discharge to surface water are summarised in Table 26.3 of The SuDS Manual and included below in Table 7-7 with respect to the proposed SuDS features at the site.

Table 7-7: SuDS Mitigation Indices for Discharge to Surface Water

SuDS Arrangement	Indicative SuDS Mitigation Indices		
	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Swale	0.5	0.6	0.6

A comparison of the *Pollution Hazard Indices* and *Mitigation Indices* for the proposed 'Source Control', 'Conveyance', and 'Site Control' measures are provided in Table 7-8.

Table 7-8: SuDS Performance: Water Quality Indices Assessment (Discharge to Surface Water)

Land Use	Index	SuDS Mitigation Indices Comparison		
		Total Suspended Solids (TSS)	Metals	Hydrocarbons
Low traffic area	Hazard	0.5	0.4	0.4

Land Use	Index	SuDS Mitigation Indices Comparison		
		Total Suspended Solids (TSS)	Metals	Hydrocarbons
	Mitigation	0.5	0.6	0.6
	Water Quality Requirement Met? (Y/N)	**Y**	**Y**	**Y**

Table 7-8 shows that the *Mitigation Indices* are greater than the *Pollution Hazard Indices*, and therefore the water quality requirements are considered met.

7.8 Design Exceedance Arrangement

The proposed SWDS also considers residual events, i.e., those in excess of the design rainfall event (1% AEP + 30% climate change).

As discussed in Section 3.1.1, topography across the Area 1 falls to the south towards Tributary 1. Any excess flow from the hardstanding area which cannot be accommodated within the swale would propagate overland following local topography. I.e. excess flow would be directed to Tributary 1. This is depicted on Drawing 01.

7.9 Amenity

The Proposed Development will generate renewable electricity from the proposed solar panels when operational, which will reduce climate impacts from fossil fuel use. The Site is not open to the public; however, the Proposed Development will be designed to minimise visual impacts. To do this, the existing hedgerows and field patterns will be retained as far as possible, and native tree and woodland planting will be introduced post development, to enhance site amenity.

7.10 Biodiversity

The proposed solar panels will be located within existing fields. The existing ecologically valuable habitats within the Site comprise of grassland, hedgerows, trees and small watercourses. The existing hedgerows and watercourses will be retained and maintained post development to improve biodiversity, via a Landscape and Ecological Management Plan.

The proposed swale shall incorporate planting of native grasses, wildflowers, and shrubs, which will create diverse habitats for local wildlife. This vegetation will provide food and shelter for insects, birds, and small mammals, enhancing the ecological value of the site.

8.0 Principal Operation and Maintenance Requirements

At this time, it is assumed that all surface water drainage and pollution control features (swale, hydrobrake and piped network) associated with the site will remain private and be managed by the site operator.

The following section outlines recommended maintenance requirements for the swale, outflow control (Hydrobrake), and piped network of the drainage system for the development.

8.1 Swale and Hydrobrake

The recommended operation and maintenance plan of the swale and hydrobrake is summarised below in Table 8-1.

Table 8-1: Typical Swale and Hydrobrake Maintenance and Operation Requirements

Maintenance Schedule	Required Action	Minimum Frequency
Regular Maintenance	Remove litter and debris	Monthly, or as required
	Cut grass- to retain grass height within specified design range	Monthly (during growing season), or as required.
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding > 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly.
	Inspect inlets and facility surface for silt accumulation, establish appropriate slit removal frequencies.	As required or if bare soil is exposed over 10% or more of the swale treatment area
	Remove sedimentation that has become entrained into the hydrobrake outflow	Every 6 months
Occasional Maintenance	Reseed areas of poor vegetation growth, alter plan types to better suit conditions, if required	Annually
	Periodic measuring of the hydrobrake bore size	Every 3 years
	Checking of the hydrobrake for leakage issues	Annually
Remedial Actions	Repair erosion or other damage by re-turfing or reseeding	As required.
	Relevel uneven surfaces and reinstate design levels	As required.
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required.

Maintenance Schedule	Required Action	Minimum Frequency
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required.
	Remove and dispose of oils or petrol residues using safe standard practices.	As required.

8.2 Underground Pipe Network

A recommended operation and maintenance plan for the piped drainage network is summarised in Table 8-2.

Table 8-2: Typical Pipe System Operation and Maintenance Requirements

Maintenance Schedule	Required Action	Minimum Frequency
Regular Maintenance	Ensuring drainage intakes are clear of debris / silt	Monthly, or as required
Occasional Maintenance	Clear Gully Pots	6 monthly
	Jet clean sewer lines, gully tails and kerb channels to remove grease, grit, sediment and other debris to ensure conveyance capacity is not compromised.	Every 2 years
Intermittent Maintenance	CCTV survey of sewer lines to identify any defects/signs of performance degradation such as: • Cracked / deteriorating pipes; • Leaking joints/seals at manholes; • High water lines showing regular high stage in pipes (sign of lack of capacity or downstream constraint); and • Suspected infiltration or exfiltration.	Every 2-5 years
Remedial Actions	Repair defects using suitable methods. Effective temporary repairs may be sufficient in short term until scheduled/capital improvements can be made	As required
Monitoring	Record areas of surface ponding / intake bypassing / surcharging (photos, inundated areas, depths) during extreme storm events and investigate the reasoning for this post-storm	As required

9.0 Acceptability Criteria

TAN15 Section 11 summarises the acceptability critical for flooding consequences. As discussed in Section 4.3.3 for this development these are as follows:

- ***No increase in flooding elsewhere***

The site is located in Flood Zone 1 from Rivers and Sea and thus has a flood risk less than 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year.

As identified in Section 5.1.2, there is a flood risk from surface water and small watercourses along the length of the cable route and that there is a possibility that excavations for the proposed cable may be affected by surface water flooding.

A Construction Surface Water Management Plan will therefore be provided to monitoring for weather alerts, dewatering of excavations for safe disposal. When appointed, these measures will be the responsibility of the contractor to ensure that no increase of flood risk occurs during implementation of the cable route.

Ground levels shall be restored following installation to avoid risk of flood risk arising from alterations to the greenfield runoff regime.

- ***Occupiers aware of flood risk***

The development will not be permanently occupied.

- ***Escape/evacuation routes present***

The development will not be occupied; however, the site is almost entirely located in Flood Zone 1 and will be free of flood risk for maintenance crews to during routine inspections.

- ***Flood emergency plans and procedures agreed and in place***

The development will not be occupied. Maintenance activities shall be covered under standard Risk Assessment Method Statements should flood warnings be issued for the local area.

- ***Flood resistant and resilient design***

The development will be supported by a Construction Surface Water Management Plan to ensure flood resistance and resilience measures during construction phases. Management of runoff generated from impermeable areas or intercepted surface water flow paths have been considered under Section 0.

- ***Acceptable consequences for type of use***

The ‘less vulnerable development’ is located in Flood Zone 1 and is therefore suitable for development.

- ***The scheme will be flood free for the 1 in 100 annual probability flood event with an appropriate allowance for climate change***

The flood risk screening completed in Section 5.0 concludes that the Site lies within Flood Zone 1 meaning that the flood risk probability is less than 0.1% plus allowances for climate change.

- ***That in extreme flood condition the depth of flooding will not exceed 600mm or the velocity of flood water 0.3m/s***

It has been concluded that flood risk to the Site is low and that extreme flood conditions may only occur from Surface Water and Small Water Courses along

access roads. No sensitive infrastructure has been located within these extents and will remain flood free for the lifetime of the development.

The steep regional topography confines these flow pathways to narrow channels or fast moving surface water flows. Should access to the site be necessary, attendance with a 4x4 vehicle shall ensure that personnel are safe from significant hazard.

10.0 Conclusions

SLR Consulting Limited (SLR) has been appointed by Anesco Ltd (the client) to produce a Flood Consequence Assessment (FCA) and Drainage Strategy (SWDS) for the proposed St. Asaph's Photo Voltaic (PV) Farm at Cefnmeiriadog, Denbighshire, Wales, LL17 0HF.

With reference to the indicative *Flood Maps for Planning*[4] the site lies entirely within an area considered to be at 'little or no risk of fluvial or coastal/tidal flooding' (Flood Zone 1). With reference to the Planning Policy Wales[1] and its associated Technical Advice Note 15[2] (TAN15), the 'less vulnerable development' is suitable and acceptable to be located at the site.

The site is under the planning jurisdiction of Denbighshire County Council, who are responsible for the outcome of this application and as the SuDS Approving Body (SAB) for the area, they deal with issues relating to localised flood risk and drainage.

This report has been prepared in accordance with the advice and requirements prescribed in current best practice documents relating to the management of flood risk in development published by the Construction Industry Research and Information Association (CIRIA)[6] and the Welsh Government Statutory National Standards for Sustainable Drainage Systems[15].

Technical information provided in this report on behalf of the Client seeks to demonstrate that a robust and sustainable drainage strategy has been prepared for the site, including residual events. This report has proposed for surface water drainage to discharge to surface waters.

The swales provide all attenuation within a 28.9m^3 of storage. A hydrobrake will be used to restrict flows to the smallest viable discharge rate that can be suitably engineered (1l/s) to surface waters.

Modelling of the swale has been developed to a design standard of the 1% AEP plus a 30% allowance for climate change.

The pollution mitigation effects of the vegetated swale for both groundwater and surface water discharge are sufficient to satisfy the criteria of the Simple Index Method for runoff draining from the proposed hardstanding area.

Residual flood events in excess of the design standard have also been considered, and all events greater than the 1% AEP plus 30% climate change will revert to the pre-existing runoff regime discharging towards Tributary 1.

The surface water drainage strategy presented in this report demonstrates that adequate SuDS space provision is afforded within the development and that the proposed scheme is feasible and compliant to appropriate best practice and regulatory requirements and can be maintained in accordance with best practise.

Drawings

Drawing 01: Conceptual Surface Water Drainage Layout

St Asaph PV Farm - Flood Consequence Assessment & Surface Water Drainage Strategy

Anesco Ltd

SLR Project No.: 402.065546.00001

29 April 2025

N

Pond

Pond

Pond

G160

H163

H104

H87

G151

H101

Attenuation Swale:

Depth:	0.5m
Basal Width:	1.8m
Top Width:	4.8m
Side Slope:	1:3
Length:	6m
Total Volume:	9.9m³
Discharge Rate:	1 l/s

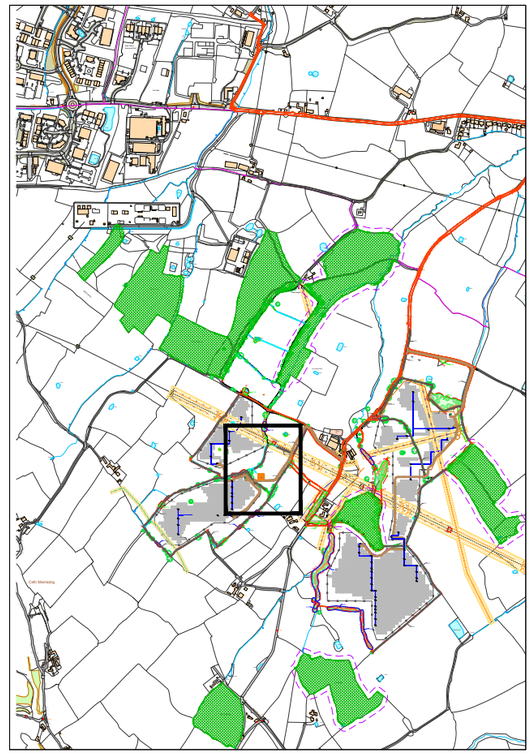
75 mm Hydro-Brake Manhole

Conveyance Swale:

Depth:	0.5m
Basal Width:	0.4m
Top Width:	3.4m
Side Slope:	1:3
Length:	20m
Total Volume:	19m³

0 10 20 30 40 50 60 70 80 90 100m

Scale 1:1,000



Location of Detail Within Wider Site

Notes:

1. Drawing is based on client supplied Site Layout Planning drawing, ref: C0002452-02 Rev V4, dated: 31/03/2025.
2. Drawing to be read in conjunction with all relevant documents.
3. All levels are shown in meters above Ordnance Datum.
4. All dimensions are in meters.
5. Drainage strategy design attenuates surface water runoff for the 1 in 100 year event plus 30 % climate change.
6. Layout is preliminary only and subject to refinement / additional detail during future design stages.
7. Pipes and linear drainage channels have not been modelled or sized-subject to detailed design.
8. Swale has not been 3D modelled based on existing topography.

Legend:

- Site Boundary
- DNO Substation Hardstanding
- Attenuation Swale
- Exceedance Route
- Conveyance Swale

Rev	Amendments	Date	By	Chk	Auth
3	Site layout altered	28.04.25	TS	KP	AD

SLR

www.slrconsulting.com

Client: Anesco Ltd

Project: St Asaph
Flood Consequence Assessment

Figure Title: Conceptual Surface Water Drainage Strategy

Scale	SLR Project No.
1:1000 @ A3	402.065221.00001

Designed	Drawn	Checked	Authorised
KP	CT	KP	
Date: Mar 2025	Date: Mar 2025	Date: Mar 2025	Date

Figure Number: **01** Rev.: **3**

28/04/2025

\\slr.local\eu\Offices\UK\Cambridge\Admin\New Projects\0402_BOA\402.065546.00001_St_Asaph_Drainage_Update\Tech\HYDI\dwgs\Working\402.065546.00001_Drainage_Strategy_V3.dwg

© Crown copyright and database rights [2024] Ordnance Survey Licence number AL0100031673

© This figure and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.

Appendix 01 Development Masterplan

St Asaph PV Farm - Flood Consequence Assessment & Surface Water Drainage Strategy

Anesco Ltd

SLR Project No.: 402.065546.00001

29 April 2025

Not for Construction

New Vision Business Park

Car Park

Coed Cord

Hendy Gorse

Coed y Saeson

Coed Esgob

Tyn-y-ffordd Gorse

Pig-y-fran

Square Covert

Tyn-y-coed Rough

Reservoir

Glascoed

Ponds

Pond

Track

Drain

Issues

FB

Silo

Slurry Pit

Sub Sta

FS

LB

GUARDED ROAD

LOW CROSS ROAD

34.1m

36.0m

41.4m

47.2m

65.9m

LEGEND

	SITE BOUNDARY
	SECURITY FENCE
HV HV	OVERHEAD ELECTRICAL CABLES (24m/14m OVERALL EASEMENT)
	DNO ACCESS ROUTE
	HV CABLE ROUTE - TRENCH
	LV CABLE ROUTE - TRAY
	PRIVATE HV CABLE ROUTE - TRENCH
BT BT	BT OVERHEAD CABLE
W W	UNDERGROUND WATER TRUNK MAIN
	UTILITY EASEMENT
	HARDSTANDING AREA
	PROPOSED CULVERT CROSSING
	PROPOSED HEDGE REMOVAL FOR TRACK WIDENING
	FENCE PLACEMENT & HEDGE REGROWTH AREA
	PROPOSED TREE REMOVAL
	PV ARRAY
	INVERTER (SUN2000-330KTL)
	SMART TRANSFORMER STATION (JUPITER-6000K/JUPITER3000K)
	DNO SUBSTATION
	CUSTOMER SUBSTATION (PV)

PROJECT NAME: ST ASAPH	
GRID REFERENCE :	SJ 02300 72873
SITE AREA:	87.57Acres / 35.42 ha
TOTAL INSTALLED CAPACITY:	18.44MWp
MAX INVERTER AC POWER:	18.304MW

0 10 20 40 60 80 100

Installer Details

Anesco Ltd.
The Green,
Easter Park,
Benyon Road,
Reading,
RG7 2PQ
Tel: 0845 894 4444

Comments

Revision	Description	Revised By	Date
A	Issued for comment	MS	19/11/2020
B	Land reduced from the North and extended to the South	MS	05/03/2021
C	Boundary Line Extended	MS	05/05/2021
D	Boundary Line Extended and site maximised	MS	12/05/2021
E	Planning Site Layout	JH	10/11/2021
F	Module Wattage Changed	MS	07/12/2021
G	Site resign to 215KTL & Bifacial Modules	JH	02/03/2022
H	Site redesigned due to tree shading implications	MS	16/06/2022
J	Red Line Boundary amended to include Private HV	JH	03/08/2022
K	Site redesign	JH	15/05/2023
L	Site redesign using new modules and new private HV cable	JH	06/07/2023
M	Site area amended and module redesign	JH	22/11/2023
N	DNO Track Added	LD	28/11/2023
P	Red Line Boundary amended & access track added in the North	JH	12/12/2023
Q	Redesign due to array relocation	JS	19/03/2024
R	Redesign	MS	01/08/2024
S	Access Altered	MS	20/09/2024
T	Hedgerow added and panel locations amended	MS	11/11/2024
U	Inverters added	RD	20/01/2024
V4	Topo and service searches added	RD	31/03/2025

Drawn By: JH

Scale: 1:3000@ A1

Sheet Size A1

Installation Address

Cefnmeiriadog,
St Asaph,
Denbighshire,
Wales,

LL17 0HF

Project: St Asaph

Title: Site layout planning

Drawing No.: C0002452_02

Rev.: V4

Anesco™ AMAZING ENERGY

Appendix 02 Greenfield Runoff Rates

St Asaph PV Farm - Flood Consequence Assessment & Surface Water Drainage Strategy

Anesco Ltd

SLR Project No.: 402.065546.00001

29 April 2025

SLR Consulting Limited

Anesco Limited

St Asaph's PV Farm

SLR Project No.: 402.065221.00001

21 February 2024

Revision: 01

Standard Operating Procedure and Summary of Results

ReFH2 Greenfield Runoff Analysis

1.0 Introduction and Background

1.1 This document sets out the Hydrology and Hydrogeology team's standard procedure for Greenfield Runoff Rate and Greenfield Runoff Volume analysis using the ReFH2 methodology.

1.2 References and further reading materials that may help determine which is the most suitable method for each site are outlined at the end of the document.

1.3 This document is designed to provide a step-by-step procedure to undertake any greenfield analysis using ReFH2. A summary of the results specific to the project is provided in Section 3.0 and Appended to this report.

2.0 ReFH2 Methodology

2.1 Data Import

2.1.1 Import the data file from the FEH Webservice[1]. If using Catchment Descriptors, select plot scale equations in ReFH2. However, for greenfield runoff calculations typically

[1] Flood Estimation Handbook Web Service, UK Centre for Ecology & Hydrology, https://fehweb.ceh.ac.uk/Map

Point Descriptors are used. Plot scale equations are automatically selected for Point Descriptors.

2.1.2 Review if the FEH descriptors are representative of the site, paying particular attention to the underlying geology. If the site is underlain by variable geology, please discuss with the hydrology technical team.

Table 2-1: FEH Descriptors

Descriptor	Value
Point Descriptor	E: 302464 N: 372970
SAAR (mm)	747
PROPWET	0.38
BFIHOST19	0.368
Catchment Description: The catchment is underlain by the Warwickshire group (sandstone, siltstone and mudstone) which has a moderate to low permeability overlain by Diamicton (low permeability deposits). This is reflected in the BFIHOST19 value of 0.368, indicating that the catchment has low permeability.	

2.2 Catchment Area

2.2.1 If the catchment area is less than 0.5km^2 (50ha), in line with SuDS guidance, greenfield runoff calculations should be estimated using an area of 0.5km^2 and rescaled to the size of the catchment (see Section 2.4). For catchment areas greater than 0.5km^2, the default catchment area can be used, as no catchment rescaling is required.

Table 2-2: Catchment Scaling Requirements

Catchment / Drained Area	ReFH2 Input
<0.5km^2	0.5km^2
≥0.5km^2	Default catchment area (km^2)

2.3 Rainfall Parameters

2.3.1 On the design rainfall event tab, accept all of the initial defaults. Add the required design rainfall events. It recommended that the 1yr, 2yr, 30yr, 100yr and 100yr + climate change events are assessed. Check the Local Lead Flood Authority (LLFA)

guidance on what events are required. Note a 40% climate change allowance is applied by adding a 1.4 climate change factor.

2.3.2 Set the areal reduction factor to 1.0 and accept the default seasonality of a winter storm.

Table 2-3: ARF Adjustments

Initial ARF	Adjusted ARF
0.979	1

2.3.3 ReFH2 will then adjust the Time to Peak (Tp) and the Baseflow Lag (BL) parameters in accordance with the catchment area of 0.5km^2 and ARF of 1.0. These model parameters are recorded below.

Table 2-4: Tp and BL for 0.5km^2 Catchment

Tp (hr)	BL
1.637	30.89

2.4 Rescaling

2.4.1 Reconfigure ReFH2 for the actual extent of the development area (<0.5km^2) or 0.01km^2 if the development area is <0.01km^2. In doing so, the ARF, Tp and BL parameters will automatically be readjusted. Therefore manually overwrite ARF to remain as 1.0 and the Tp and BL parameters to those of the 0.5km^2 catchment area recorded in Table 2-3.

2.5 Extracting Greenfield Runoff Rates

2.5.1 Export peak flows for all return periods to derive greenfield runoff rates and print of the relevant PDF reports for the required rainfall events. Note that this step of the audit trail relates solely to greenfield runoff rates.

2.5.2 It is recommended that the project file is saved at this stage and resaved under a different file name for greenfield runoff volume calculations.

2.6 Extracting Greenfield Runoff Volumes

2.6.1 The next step is to estimate the allowance greenfield runoff volume that can be discharged (at greenfield rates) during an event. Typically, volumetric control for a development site is assessed using the 1 in 100-year 6-hour duration event. Check the LLFA guidance on which events should be assessed.

2.6.2 Reset the recommended duration on the rainfall page to 6 hours and set the timestep to 8mins (45 timesteps). Export the peak flows and direct runoff volumes for all return

periods. This provides greenfield volumes in ML which can be converted to m^3 by multiplying by a factor of 1000. Please ensure that the Tp and BL parameters are those for a 0.5km^2 catchment area recorded in Table 2-4 and ARF is still set to 1.0 once the rainfall parameters have been updated.

3.0 Summary of Results

3.1.1 The following tables summarise the greenfield runoff rates and greenfield runoff volumes results of the ReFH2 analysis. These values will corroborate what is provided within the ReFH2 output reports.

Table 3-1: Greenfield Runoff Rates for 1ha Area

Annual Exceedance Probability	Greenfield Rates (l/s)
100% (1 in 1 year)	4.6
50% (1 in 2 year)	5.2
3.3% (1 in 30 year)	10.8
1.0% (1 in 100 year)	14.1
1.0% + 40 % Climate Change	20.4

Table 3-2: 6-Hour Greenfield Runoff Volumes for 1ha Area

Annual Exceedance Probability	Greenfield Runoff Volume (m^3)
100% (1 in 1 year)	71.6
50% (1 in 2 year)	79.9
3.3% (1 in 30 year)	163.1
1.0% (1 in 100 year)	216.9
1.0% + 40 % Climate Change	322.2

4.0 References and Guidance Documents

- https://refhdocs.hydrosolutions.co.uk/Drainage-Design-Applications/Greenfield-Runoff-Rates-and-Volumes/
- CIRIA C753 The SuDS Manual, 2015

5.0 Closure

This document has been prepared by SLR Consulting Limited (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with **Error! Use the Home tab to apply Cover Client Name to the text that you want to appear here.**the Client as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

SLR's standard procedure for Greenfield Runoff Rate and Greenfield Runoff Volume analysis using the ReFH2 methodology has been developed using the latest SuDS and ReFH2 guidance.

This report details the methodology applied and results of the Greenfield Runoff Rate and Volume calculations.

Regards,

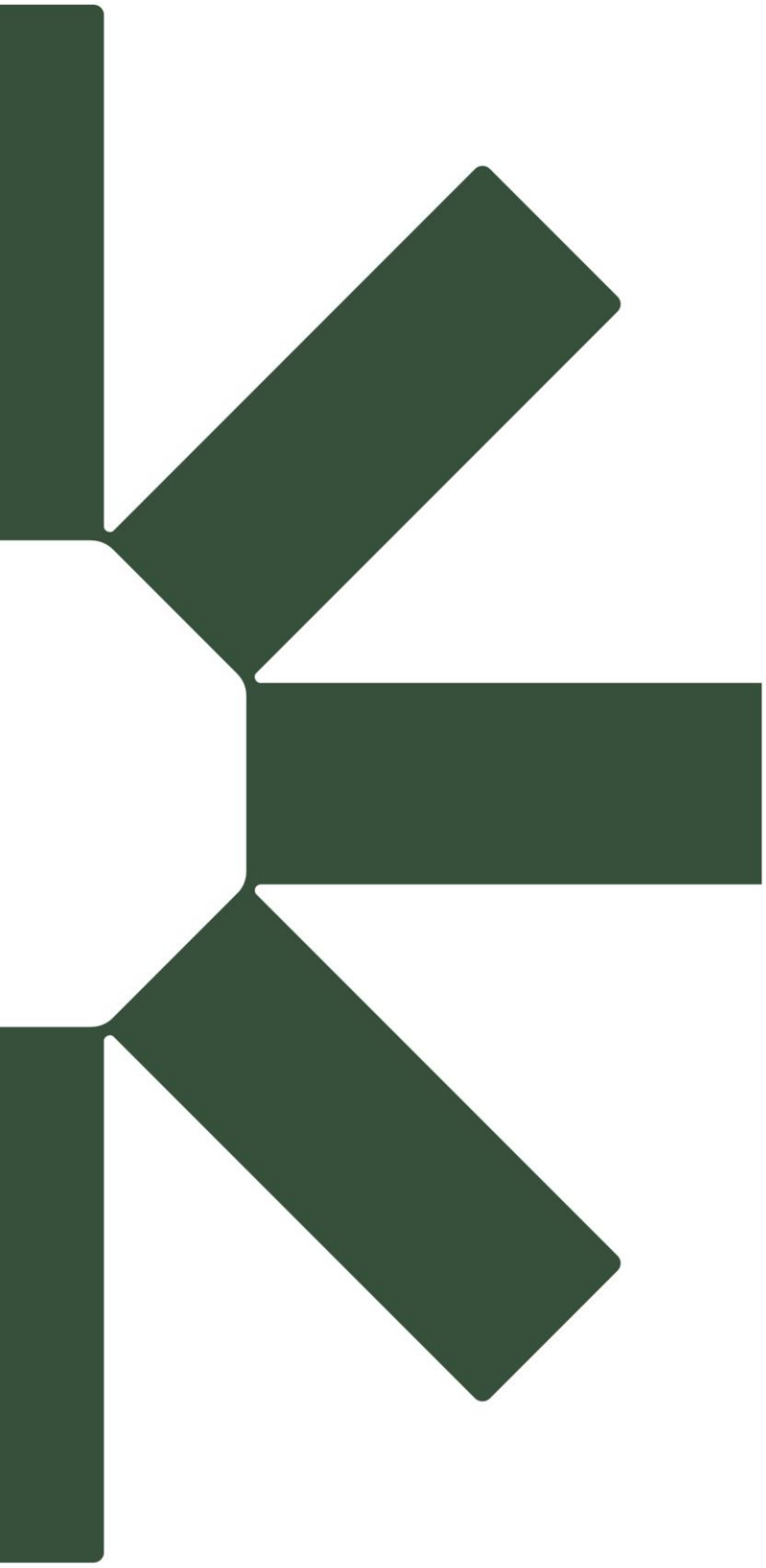
SLR Consulting Limited

Prepared by:

Karen Paez, MSc, BSc
Senior Hydrologist

Approved by:

Chloe Nelson, MSc, BSc
Senior Hydrologist



Making Sustainability Happen

Appendix 03 Hydraulic Performance

St Asaph PV Farm - Flood Consequence Assessment & Surface Water Drainage Strategy

Anesco Ltd

SLR Project No.: 402.065546.00001

29 April 2025

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	5.00	55.843		17.995	66.410	0.500
2		55.608		34.800	66.410	0.500
3		55.460		54.776	66.410	0.500
4		55.460	1200	64.684	66.331	0.533

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	20.000	0.013	55.343	55.108	0.235	85.1	500	5.10	50.0
1.001	2	3	6.000	0.030	55.108	54.960	0.148	40.5	500	5.14	50.0
1.002	3	4	5.000	0.030	54.960	54.927	0.033	151.5	150	5.41	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	3.455	3281.9	0.0	0.000	0.000	0.000	0.0	0	0.000
1.001	2.513	4145.9	0.0	0.000	0.000	0.000	0.0	0	0.000
1.002	0.303	5.4	0.0	0.350	0.383	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	20.000	85.1	500	Ditch_CC	55.843	55.343	0.000	55.608	55.108	0.000
1.001	6.000	40.5	500	1:3 Swale	55.608	55.108	0.000	55.460	54.960	0.000
1.002	5.000	151.5	150	Circular	55.460	54.960	0.350	55.460	54.927	0.383

Link	US Node	Node Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	Junction	2		Junction	
1.001	2	Junction	3		Junction	
1.002	3	Junction	4	1200	Manhole	Adoptable

Flow+ v12.0 Copyright © 1988-2025 Causeway Technologies Ltd

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	17.995	66.410	55.843	0.500		0	1.000	55.343	500
2	34.800	66.410	55.608	0.500		1 0	1.000 1.001	55.108 55.108	500 500
3	54.776	66.410	55.460	0.500		1 0	1.001 1.002	54.960 54.960	500 150
4	64.684	66.331	55.460	0.533	1200	1 	1.002	54.927	150

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.750	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	0.840	Additional Storage (m³/ha)	0.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
30	30	0	0
100	0	0	0
100	30	0	0

Node 4 Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node		Sump Available	✓
Invert Level (m)	54.927	Product Number	CTL-SHE-0054-1000-0500-1000
Design Depth (m)	0.500	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.0	Min Node Diameter (mm)	1200

Flow+ v12.0 Copyright © 1988-2025 Causeway Technologies Ltd

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	55.366	0.023	5.7	0.0000	0.0000	OK
30 minute winter	2	26	55.140	0.032	4.3	0.0000	0.0000	OK
30 minute winter	3	26	55.140	0.180	4.2	0.0000	0.0000	SURCHARGED
30 minute winter	4	26	55.139	0.212	1.5	0.2394	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	5.7	0.730	0.002	0.1581	
15 minute winter	2	1.001	3	5.7	0.100	0.001	1.3389	
15 minute summer	3	1.002	4	2.6	0.290	0.478	0.0880	
15 minute summer	4	Hydro-Brake®		1.0				2.2

Flow+ v12.0 Copyright © 1988-2025 Causeway Technologies Ltd

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	9	55.380	0.037	13.5	0.0000	0.0000	OK
60 minute winter	2	59	55.306	0.198	6.8	0.0000	0.0000	OK
60 minute winter	3	60	55.306	0.346	4.4	0.0000	0.0000	FLOOD RISK
60 minute winter	4	60	55.305	0.378	1.4	0.4278	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	2	13.6	0.917	0.004	1.2184	
15 minute winter	2	1.001	3	12.2	0.141	0.003	3.2827	
15 minute winter	3	1.002	4	2.9	0.309	0.539	0.0880	
15 minute summer	4	Hydro-Brake®		1.0				5.2

Flow+ v12.0 Copyright © 1988-2025 Causeway Technologies Ltd

Results for 30 year +30% CC Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	55.383	0.040	17.6	0.0000	0.0000	OK
120 minute winter	2	112	55.377	0.269	5.6	0.0000	0.0000	OK
120 minute winter	3	112	55.377	0.417	2.9	0.0000	0.0000	FLOOD RISK
120 minute winter	4	112	55.376	0.449	1.2	0.5076	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	17.6	0.985	0.005	1.5892	
15 minute winter	2	1.001	3	15.7	0.145	0.004	4.2760	
15 minute winter	3	1.002	4	2.9	0.326	0.534	0.0880	
15 minute summer	4	Hydro-Brake®		1.0				6.8

Flow+ v12.0 Copyright © 1988-2025 Causeway Technologies Ltd

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	9	55.383	0.040	17.2	0.0000	0.0000	OK
120 minute winter	2	110	55.373	0.265	5.5	0.0000	0.0000	OK
120 minute winter	3	110	55.373	0.413	2.9	0.0000	0.0000	FLOOD RISK
120 minute winter	4	110	55.372	0.445	1.2	0.5034	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	17.2	0.979	0.005	1.5433	
15 minute winter	2	1.001	3	15.3	0.144	0.004	4.1896	
15 minute winter	3	1.002	4	2.8	0.327	0.513	0.0880	
15 minute summer	4	Hydro-Brake®		1.0				6.7

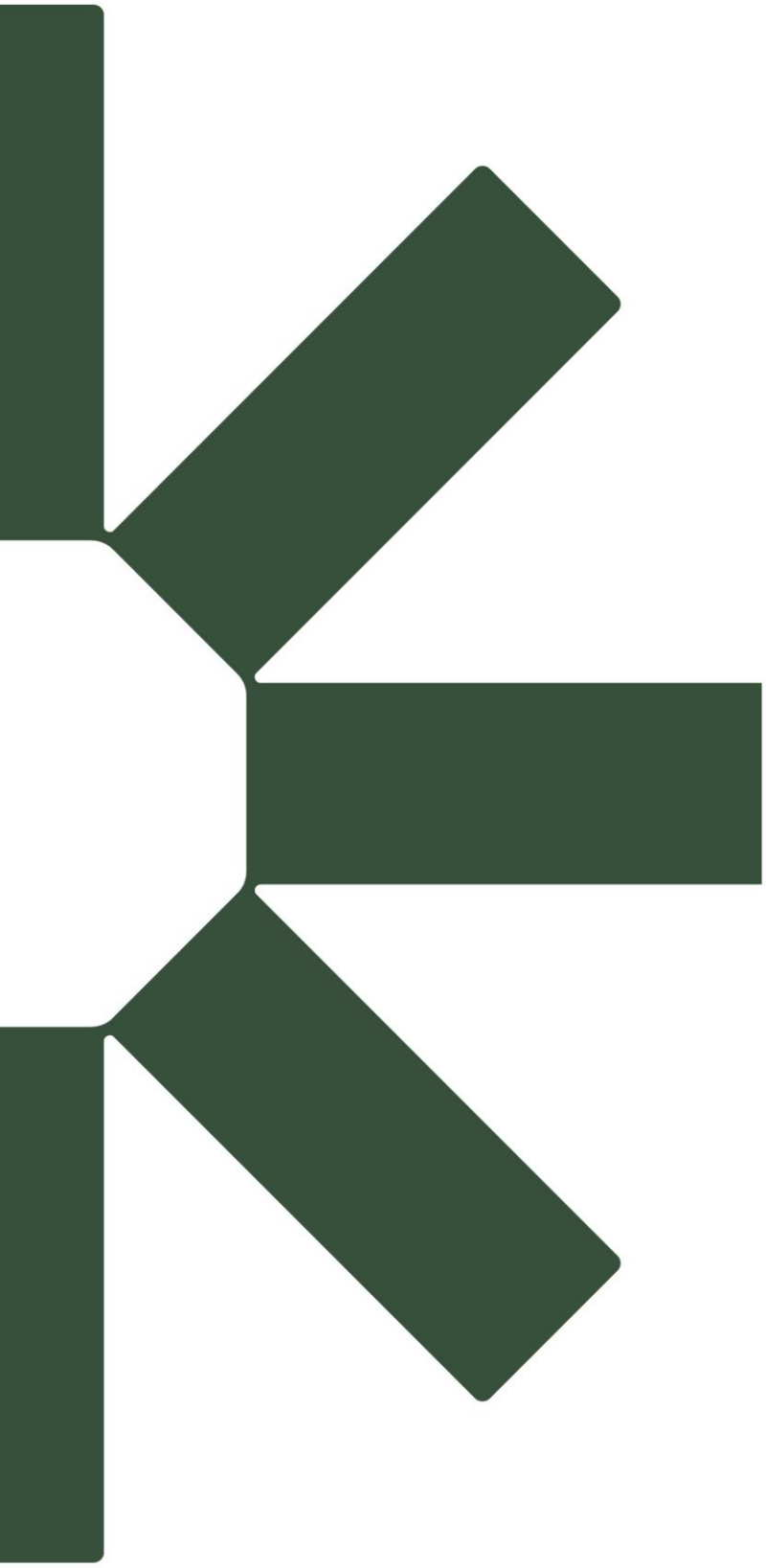
Flow+ v12.0 Copyright © 1988-2025 Causeway Technologies Ltd

Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	1	108	55.450	0.107	7.2	0.0000	0.0000	OK
120 minute winter	2	118	55.448	0.340	7.7	0.0000	0.0000	OK
120 minute winter	3	118	55.448	0.488	3.3	0.0000	0.0000	FLOOD RISK
120 minute winter	4	116	55.447	0.520	1.2	0.5882	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	22.3	0.987	0.007	2.3565	
15 minute summer	2	1.001	3	18.3	0.132	0.004	4.8364	
15 minute winter	3	1.002	4	3.3	0.322	0.613	0.0880	
120 minute winter	4	Hydro-Brake®		1.0				19.9

Flow+ v12.0 Copyright © 1988-2025 Causeway Technologies Ltd



Making Sustainability Happen

Appendix A.7 Cumulative Developments List

Location and Planning Ref	Description	Planning Status
Bodelwyddan BESS and Solar Farm 40/2024/1575/EIA-SCO	EIA Scoping Opinion for the construction, operation and maintenance of proposed solar photovoltaic electricity generating system and Battery Energy Storage System	Scoping completed. Application not yet submitted
Awel y Mor Offshore Wind Farm EN010112	Wind farm and associated development	Approved with conditions
Mona Offshore Wind Farm EN010137	Wind farm and associated development	Currently under consideration
Kinmel Solar 0/40999	5MW Solar scheme	Operational
Burbo Bank Extension offshore wind farm	Burbo Bank Extension offshore wind farm covering an area of 40 km and with an estimated generating capacity of up to 250 MW. The project is located west of the operational Burbo Bank offshore wind farm in Liverpool Bay, around 7 km north of the North Wirral coast, 8.5 km from Crosby beach, and 12.2 km from the Point of Ayr on the Welsh coast	Operational. Planning consent granted 2014.
Bodelwyddan Substation Extension 31/2023/0525	Extension to the existing Bodelwyddan electricity substation (EIA Screening Opinion request)	Bodelwyddan Substation operational. EIA screening undertaken, but application yet to be submitted for the substation extension.
Gwynt y Mor wind farm	576 MW offshore windfarm located 15km off the north coast of Wales	Operational. Planning consent granted 2008.
Land at, Bryn Morfa, Bodelwyddan, Rhyl 40/2023/0627	Demolition of dwelling and erection of 31 new affordable dwellings including new vehicular access, internal access road and associated works	Granted Nov 2024
Land opposite, Glan Clwyd Hospital, Rhuddlan Road,	Erection of 108 dwellings, construction of a new vehicular access and associated works	Granted Feb 2023

Location and Planning Ref	Description	Planning Status
Bodelwyddan, Rhyl, 40/2021/0825		
Plot C7, , St Asaph Business Park, St Asaph, LL17 0JB 40/2021/0309	Erection of a 198 bed Registered Care Home (Use Class C2), landscaping, parking facilities and associated works (Resubmission)	Granted Nov 2021
Glan Clwyd Hospital, Rhuddlan Road, Bodelwyddan, Rhyl, LL18 5UJ 40/2023/0473	Erection of new hospital unit (Use Class C2) including associated landscaping, car parking and site vehicular access and the erection of a multi-storey car park and associated works	Granted Nov 2023
Land at, Cil Y Coed, Henllan, Denbigh 28/2023/0851	Erection of 22 dwellings including the formation internal estate roads, landscaping and associated works	Under consideration
Former, Welsh Ambulance Service, Upper Denbigh Road, St. Asaph, LL17 0RS 46/2023/0480	Erection of 28 dwellings internal estate road, landscaping and associated works	Granted March 2024
Vista Site, Glascoed Road, , St Asaph, LL17 0LL 46/2021/0159	Hybrid planning application (full details and outline) for the redevelopment of 6.9ha of land incorporating the following elements: Full Details: - Erection of a commercial vehicles sales unit (sui generis) - Formation of associated parking area, landscaping and associated works Outline: - Outline Planning application for the erection of 5 No. business buildings (Use Class B1 and B2) with all other matters reserved for further approval.	Granted march 2022
Land off, Upper Denbigh Road, , St. Asaph, LL17 0LW 46/2021/1161	Erection of 113 dwellings, construction of a new vehicular access, landscaping and associated works	Granted September 2022

Location and Planning Ref	Description	Planning Status
46/2025/0047/PR Bod Haulog The Roe, St Asaph, Denbighshire, LL17 0LY	Details of the appearance, landscaping, scale and layout of 28 no. affordable dwellings and use of existing dwelling as a single residential unit submitted in accordance with condition no. 1 of outline planning permission code no. 46/2019/0806 (reserved matters application)	Under consideration
47/2024/1557/MD Sewage Disposal Works, Tremeirchion, St Asaph, Denbighshire,	Change of use of land and construction of an Integrated Constructed Treatment Wetland (ICTW) including the installation of 2 no. underground septic tanks, creation of 3 no. wetland cells with planting, welfare facility, new internal access roads, fencing, & nbsp; landscaping and associated works	Granted Feb 2025
46/2024/1200/PF Green Gates Cwttir Lane, St Asaph, Denbighshire, LL17 0LE	Demolition of existing buildings, change of use of land from agricultural land to a new nature reserve and habitat creation comprising of the restoration of existing ponds, the creation of new ponds, the creation of a wetland area adjacent to two small watercourses and creation of woodland and grassland habitat areas, construction of a permissive pathway and engineering works to create a raised viewing area together with associated works	Granted Oct 2024
46/2024/1084/MD Green Gates Cwttir Lane, St Asaph, Denbighshire, LL17 0LE	Change of use of land from agricultural to form a nature reserve, erection of associated wildlife barn, reconfiguration of access off Cwttir Lane and associated works	Granted Aug 2024
40/2024/1079/PF Land Adjacent To Maes Owen Abergele Road, Bodelwyddan, Rhyl, Denbighshire,	Erection of 49 no. affordable dwellings and associated infrastructure works including roads and footpaths, public open space, landscaping and drainage including a new pumping station	Granted

Appendix 7.1 Planning Policy and Guidance Extracts

Appendix 7.1 Policy and Guidance Extracts

National Policy

Future Wales: The National Plan 2040

7.1.1 Future Wales is a national development framework, setting the direction for development in Wales to 2040, providing a framework for planning the change and development needed in Wales to address key national priorities. Future Wales is a spatial plan, focussed on solutions to national issues and challenges at a national scale. The Spatial Strategy Diagram identifies Cardiff, Newport and the Valleys as one of three National Growth Areas where there will be *"growth in employment and housing opportunities and investment in infrastructure"*.

7.1.2 Future Wales presents the Welsh Government's strategy for addressing key national priorities through the planning system, including sustaining and developing a vibrant economy, and achieving decarbonisation and climate resilience.

7.1.3 Future Wales was adopted on 24th February 2021 and recognises that Wales can become a world leader in renewable energy technologies. The Welsh Government recognises Wales' potential for solar generation and supports both large and community scaled projects and commits to ensuring the planning system in Wales provides a strong lead for renewable energy development.

7.1.4 Policy 17 sets out that the Welsh Government strongly supports the principle of renewable and low carbon energy development from all technologies and at all scales to meet our future energy needs. Furthermore, it states that decision makers must give significant weight to the need to meet Wales' international commitments and the target to generate 70% of consumed electricity by renewable means by 2030.

7.1.5 Policy 18 provides the criteria for assessing large scale proposals for renewable and low carbon energy and is required to be read together with Policy 17. The criteria set out in Policy 18 require that proposed development:

- does not have an unacceptable adverse impact on the surrounding landscape, with particular reference to the setting of National Parks and Areas of Outstanding Natural Beauty;
- has no unacceptable adverse visual impacts on nearby communities and individual dwellings;
- has no unacceptable adverse impacts on national statutory designated sites for nature conservation, protected habitats and species;
- includes biodiversity enhancement measures to provide a net benefit for biodiversity;
- has no unacceptable adverse impacts on statutorily protected built heritage assets; and
- has no unacceptable adverse impacts by way of shadow flicker, noise, reflected light, air quality or electromagnetic disturbance.

7.1.6 Policy 18 also states that the *"cumulative impacts of existing and consented renewable energy schemes should also be considered"*.

7.1.7 The supporting text to both policies states that Policy 17 demonstrates the Welsh Government's support in principle for all renewable energy projects and technologies.

Planning Policy Wales

7.1.8 Edition 12 of Planning Policy Wales (PPW) was published in February 2024. PPW sets out the land use planning policies of the Welsh Government and is supported by a series of Technical Advice Notes (TANs), Welsh Government Circulars and policy clarification letters.

7.1.9 Theme 5 of PPW addresses Productive and Enterprising Places. Sub-section 5.9 addresses renewable and low-carbon energy.

7.1.10 Paragraph 5.9.1 states:

> *"Local authorities should facilitate all forms of renewable and low carbon energy development".*

7.1.11 Paragraphs 5.9.14-15 state:

> *"There should be a presumption in favour of development in identified areas, including an acceptance of landscape change…*
>
> *Outside identified areas, planning applications for renewable and low carbon energy developments should be determined based on the merits of the individual proposal."*

7.1.12 Paragraph 5.9.20 states:

> *"Planning authorities should also identify and require suitable ways to avoid, mitigate or compensate adverse impacts of renewable and low carbon energy development. The construction, operation, decommissioning, remediation and aftercare of proposals should take into account… the impact on the natural and historic environment…; [and] cumulative impact".*

7.1.13 Paragraph 5.9.21 states:

> *"Prior to an application being submitted, developers for renewable and low carbon energy developments should, wherever possible, consider how to avoid, or otherwise minimise, adverse impacts through careful consideration of location, scale, design and other measures."*

7.1.14 Theme 6 of PPW addresses Distinctive and Natural Placemaking and Well-being, and includes protecting and enhancing landscapes, habitats, biodiversity, geodiversity and the historic environment in their own right, as well as other components of the natural world. PPW recognises the fundamental role played by Green Infrastructure in shaping places and our sense of well-being. Sub-section 6.3 addresses landscape.

7.1.15 Paragraph 6.3.3 states:

> *"All the landscapes of Wales are valued for their intrinsic contribution to a sense of place, and local authorities should protect and enhance their special characteristics, whilst paying due regard to the social, economic, environmental and cultural benefits they provide, and to their role in creating valued places."*

7.1.16 Paragraph 6.3.5 states:

> *Planning authorities have a statutory duty to have regard to National Parks and AONB purposes. This duty applies in relation to all activities affecting National Parks and AONBs, whether those activities lie within, or in the setting of, the designated areas.*

Local Policy and Guidance

Denbighshire County Council Local Development Plan 2006-2021

7.1.17 The Denbighshire County Council Local Development Plan was adopted in 2013, and contains local planning policies designed to take forward the Local Development Plan objectives, spatial strategy and vision for the county. The plan expired in December 2021, though adoption of the replacement plan has been delayed and as such it is to be expected that weight would still be given to the latest plan. The polices that are considered relevant to the Site and the Proposed Development are set out below.

7.1.18 Policy RD 1 Sustainable Development and Good Standard Design states:

> *"Development proposals will be supported within development boundaries provided that all the following criteria are met:*
>
> *i) Respects the site and surroundings in terms of the siting, layout, scale, form, character, design, materials, aspect, micro-climate and intensity of use of land/buildings and spaces around and between buildings;*
>
> *iii) Protects and where possible enhances the local natural and historic environment;*
>
> *iv) Does not unacceptably affect prominent public views into, out of, or across any settlement or area of open countryside;*
>
> *v) Incorporates existing landscape or other features, takes account of site contours and changes in levels and prominent skylines;*
>
> *vi) Does not unacceptably affect the amenity of local residents, other land and property users or characteristics of the locality by virtue of increased activity, disturbance, noise, dust, fumes, litter, drainage, light pollution etc., and provides satisfactory amenity standards itself;*
>
> *vii) Provides safe and convenient access for disabled people, pedestrians, cyclists, vehicles and emergency vehicles together with adequate parking, services and manoeuvring space. Proposals should also consider impacts on the wider Rights of Way network surrounding the site; [and]*
>
> *xiii) Incorporates suitable landscaping measures, including where appropriate hard and soft landscaping treatment, the creation and/or protection of green and blue corridors, mature landscaping, and arrangements for subsequent maintenance. Landscaping should create a visually pleasant, sustainable and biodiversity rich environment that protects and enhances existing landscape features and also creates new features and areas of open space that reflect local character and sense of place."*

7.1.19 Policy VOE 2 Area of Outstanding Natural Beauty and Area of Outstanding Beauty states:

> *"In determining development proposals within or affecting the Area of Outstanding Natural Beauty (AONB) and Area of Outstanding Beauty (AOB), development that would cause unacceptable harm to the character and appearance of the landscape and the reasons for designation will not be permitted."*

7.1.20 Policy VOE 10 Renewable Energy Technologies states:

> *"Development proposals which promote the provision of renewable energy technologies may be supported providing they are located so as to minimise visual, noise and amenity impacts and demonstrate no unacceptable impact upon the interests of nature conservation, wildlife, natural and cultural heritage, landscape, public health and residential amenity. In areas that are visually sensitive, including*

the AONB, Conservation Areas, World Heritage Site and Buffer Zone and in close proximity to historic buildings, visually intrusive technologies will not be permitted unless it can be demonstrated that there is no negative impact on the designation or there is an overriding public need for the development."

Clwydian Range and Dee Valley AONB Supplementary Planning Guidance Note

7.1.21 The Clwydian Range and Dee Valley AONB Supplementary Planning Guidance Note was published in 2018 and forms part of the adopted planning guidance supplementing the Local Development Plan. It is primarily targeted at individuals proposing new development and for decision makers involved in the management of the National Landscape, to raise the standard of new development and landscape design. It provides some general design principles which should be followed as part of new development proposals.

7.1.22 Section 4 addresses the Special Qualities of the National Landscape. The table within this section lists National Landscape management policies relevant to planning, including:

"Safeguard the panoramic views, tranquillity and environmental quality of the AONB for the generations of today and the future…;

Restore, reconnect and expand key habitats and species at a landscape scale in order to increase resilience to environmental change…; [and]

Ensure that new development adopts the highest standards of design and is sympathetic to the character and appearance of the AONB."

7.1.23 Paragraph 7.5, Renewable Energy and Climate Change, states:

"Larger renewable energy proposals outside the AONB can be highly visible and impact on its setting. On and off-shore wind farms are redefining the outlook, sense of space and visual focus of views from the AONB. This can affect perceptions of tranquillity, space and freedom. There may be some pressure in the future for smaller turbines and solar panels. The influence of climate change will not be immediately obvious, but increases in temperature will lead to habitat loss and change. More intense rainfall will cause further footpath and soil erosion in up-land areas."

7.1.24 Section 8 addresses Key Design Considerations. Paragraph 8.01 states:

7.1.25 New development should firstly seek to avoid any adverse impacts on the AONB before investigating mitigation measures.

7.1.26 Sub-section 8.4 addresses Setting. Paragraph 8.41 states:

"Any new development should be assessed against its immediate environment and within its wider landscape setting. This is especially true in a protected landscape where long distance views are important and need to be protected. Higher ground opens wider vistas over the surrounding countryside allowing the eye to scan greater distances. Very often the visibility of development from greater distances is overlooked and although scale is diminished by distance, from certain viewpoints, development can look out of place and prominent…Care should therefore be taken to steer development away from the skyline, open elevated ground or sites overlooked from higher ground. The visible impact of new development will be minimised if sited in more enclosed landscapes, hidden by existing landforms and a screen of hedgerows, trees and woodland…Whilst elements of the landscape may be locally changed to accommodate development, the prevailing character of the landscape should remain intact. Visual prominence is when development forms a new focal point in the landscape which detracts from the general scene, visual focus and sense of place."

7.1.27 Paragraph 8.42 states:

> *"New development outside the AONB but close to the boundary can impact on the setting of the AONB and its natural beauty. Consideration should therefore also be given…to development outside the AONB which can have an impact on the designated area. The extent of the impact is likely to depend on scale and proximity to the boundary. In some instances, the accumulation of development can, over time, begin to have an adverse impact on setting…Although a proposal by itself might not be significant, in combination with similar proposals in the vicinity, it has passed the threshold of acceptability."*

7.1.28 Paragraph 8.43 states:

> *"Long distance landscape views are important and new development should avoid intruding on the focus and appreciation of these views."*

7.1.29 Sub-section 8.5 addresses Landscaping. Paragraph 8.51 states:

> *"Where possible such features which make up the existing landscape fabric should be retained or enhanced. Trees and plants soften the outline of buildings, add to biodiversity and a modest landscaping scheme can quickly assimilate new development into the countryside. The way a site is enclosed should also be part and parcel of the initial design process and should not be an afterthought. Existing stone walls and hedges should be retained and restored where possible and protected from building activity. However, landscaping will not by itself, make a poor development acceptable."*

7.1.30 Paragraph 8.52 states:

> *"The type of shrubs, trees and permanent materials used for landscaping should reflect what is in the immediate vicinity. Where possible, it is best to choose indigenous species of local provenance and avoid more exotic or alien plants."*

Renewable Energy Supplementary Planning Guide

7.1.31 The Renewable Energy Supplementary Planning Guide was published in 2016 and forms part of the adopted planning guidance supplementing the Local Development Plan. Its main objective is to assist the consideration of Policies VOE 9 and VOE 10 of the Denbighshire Local Development Plan, which outline the primary objectives for assessing renewable energy developments under 50MW.

7.1.32 Paragraph 6.3.5 states:

> *"Sensitive landscapes include National Parks, AONBs, Historic Landscapes, Parks & Gardens, World Heritage Sites and non-designated areas which are particularly distinctive for their character, scenic quality, rarity, intactness, sense of place, wildness/tranquillity (identified by LANDMAP and/or site assessment). The ~~visual~~ settings of National Parks, AONBs, Historic Landscapes, Parks & Gardens, World Heritage Sites, Conservation Areas, Listed Buildings and Schedule Ancient Monuments are also important to conserve and are sensitive areas."*

7.1.33 Section 8 addresses Land Use Planning Considerations in Relation to Solar Energy Schemes, and sub-section 8.2 addresses Landscape and Visual Impact. Paragraph 8.2.1 states:

> *"Because solar arrays often need direct sun locations to operate, they have the potential to be visible from numerous points and can sometimes be seen from great distances. Indeed, the landscape impact of an array is likely to be one of the most significant issues applicants will need to deal with. Indeed a solar array can introduce many new industrial elements into the landscape and create an increased urban and industrial influence on the countryside."*

7.1.34 Paragraph 8.2.3 states:

> *"Development of the array will also need to be considered in terms of its design, the layout and future maintenance. Whilst it is important to ensure that the array is not shaded, it is important that existing hedge lines and trees are not removed, and if they must be, these losses will need to be mitigated."*

7.1.35 Paragraph 8.2.5 states:

> *"It will be important to consider views to the site, including widely recognised iconic views and acknowledged important views to, from, or between heritage assets."*

7.1.36 Paragraph 8.2.7 states:

> *"Due to arrays needing to be near a grid connection point, when siting a scheme it is important to consider not only the impact this development will have but also the potential cumulative effects with similar proposals and other forms of development. Transformer housing, security fencing, cameras are all associated works which will require consideration in terms of their landscape impact."*

7.1.37 Sub-section 8.3 addresses Land Management. Paragraph 8.3.1 states:

> *"In setting out the design for a solar array consideration should be given to the post construction and post development land management. Details of management/maintenance programme for the lifetime of the development will also be a factor in determination. The Council is keen to ensure that the post construction site is maintained to avoid the spread of non-native plant species and native weeds. In addition, post construction, when access is more infrequent and by smaller plant, the reinstatement of small field entrances and gateways would both help reduce views of the development and maintain traditional roadside rural characteristics."*

7.1.38 Sub-section 8.5 addresses Ecology. Paragraph 8.5.1 states:

> *"Along with landscape sensitivity, the ecological sensitivity of the development site will be a key factor in determining acceptability. In finding a site, intensively managed agricultural land is likely to be of least ecological value and possibly more suitable in ecological terms for solar PV."*

7.1.39 Paragraph 8.5.4 states:

> *"Opportunities for ecological enhancement are promoted and may include planting of native wildflowers, beneath, between or around field margins to increase habitat connectivity. Low density grazing by smaller livestock may not risk damage to the solar arrays. Supporting and enhancing biodiversity on schemes is promoted."*

Trees & Landscaping Supplementary Planning Guidance Note

7.1.40 The Trees & Landscaping Supplementary Planning Guidance Note was published in 2016 and forms part of the adopted planning guidance supplementing the Local Development Plan. It aims to amplify the development plan policies and other issues in a clear and concise format with the aim of improving the design and quality of new development, and to assist officers in handling and members in determining planning applications.

7.1.41 Paragraph 3.1 states:

> *"Trees contribute considerably to the amenity of the landscape and streetscene, add maturity to new developments, make places more attractive, and help soften the built environment by enhancing pleasant views, by breaking up view lines and by screening unattractive buildings and undesirable views. They can mitigate landscape*

impacts, notably in relation to developments in or within the setting of protected landscapes such as the Clwydian Range and Dee Valley AONB".

7.1.42 Section 5 addresses Guidance. Paragraph 5.1 states:

"Development which would result in damage and/or inappropriate felling of significant trees (i.e. British Standard (BS) 5837: Category A & B trees) and hedgerows will not normally be permitted…Development proposed near to existing trees, woodlands or hedgerows must be in accordance with the design and protection principles set out in this Local Planning Guidance Note and BS 5837: 2012 "Trees in relation to design, demolition and construction - Recommendations" (or any subsequent revisions)."

7.1.43 Section 6 addresses Design. Paragraph 6.1 states:

"The planting of new trees, including the choice of species, planting locations and future maintenance needs and the integration of good quality existing trees and hedgerows is an integral part of the design process. Plant stock should normally comprise native local species, which should ideally be locally grown to ensure continuity of the local gene pool and reduce plant failures. Development must be planned around significant trees and hedgerows and where appropriate, to increase tree cover with new planting, thereby enhancing local amenity. For example, trees and hedgerows of considerable age, visual amenity, and ecological or historical value are not easily replaced and should be retained and safeguarded. Where development results in the loss of trees and hedgerows, new planting of at least an equal number or canopy cover to those lost will usually be required to mitigate for the loss."

7.1.44 Paragraph 6.2 states:

Where space permits, the use of large canopy trees will be required in order to provide structure to the development and surrounding landscape and streetscene. The use of mature planting to provide immediate screening and landscaping should be used whenever possible. On large development sites the use of advance structural planting should be considered to provide appropriate screening.

7.1.45 Sub-section 6.8 addresses Planting. Paragraph 6.9 states:

"Appropriate new tree and hedgerow planting, amongst other landscaping proposals, will be required on development sites to enhance amenity and to mitigate for any loss of canopy cover from tree felling."

7.1.46 Paragraphs 6.10-11 state:

"The choice of trees to be planted should take into account the layout and design of the site, future use, soil and climatic conditions, local landscape character and contextual surroundings and sufficient space must be planned within the layout to allow trees to reach their mature size. Planted trees should be of a species that at maturity achieve a size and form compatible with the scale and structure of the development."

7.1.47 Sub-section 7.6 addresses The Design Stage. Paragraph 7.7 states:

"Development design should take into account the constraints and opportunities posed by existing quality trees, woodland and hedgerows and provide adequate space for new planting."

Appendix 7.2 Published Evidence Extracts



Appendix 7.2 Published Evidence Extracts

National Landscape Character Areas

NLCA11: Vale of Clwyd

7.1.1 Key characteristics of NLCA11 that are of relevance to the Site's context include:

- A broad agricultural vale between adjacent upland areas;
- Broad, flat flood plain with river alluvium marking its extents;
- Distinctive line of hills forming the eastern boundary, also forming an upland-lowland boundary;
- Undulating fringe either side of vale;
- Arable and pasture, well managed hedges;
- Many hedgerow and parkland trees and some woodland blocks, and of ecological importance, some Alder woodland, swamp and rush pasture and some ash-wych elm dominated woodland; and
- Rural landscape with dispersed, scattered farms, and settlement confined to small villages and hamlets and the three towns.

7.1.2 With respect to the visual and sensory profile of NLCA11, the assessment notes:

> *"The gentle, open bowl of the Vale of Clwyd contrasts distinctively with the steep hillsides and ridge of the adjacent Clwydian Range of hills to the east. Their line of smooth, rounded heather-clad summits forms a distinctive setting for the Vale, providing a strong sense of visual containment and separation from other lowland areas…further east. For the most part, the vale itself is rural, lowland, and a farmed landscape with a patchwork mix of arable and pasture…There is a strong field pattern formed by numerous hedgerows. Many are well managed and include numerous hedgerow trees and occasionally parkland trees…*
>
> *Fields rise up the lower slopes of the Clwydian Range, where there are many small farms and villages, and where open views across the Vale are common".*

7.1.3 Under the landscape habitats influences of NLCA11, the assessment notes:

> *"The more productive parts of this fertile area are distinguished by large fields and well trimmed hedges…Some of the landed estates are associated with woodland plantings, often in regular geometric blocks as shelterbelts and game cover, giving a generally wooded feel to an otherwise open and productive agricultural landscape".*

NLCA09: Rhos

7.1.4 Key characteristics of NLCA09 that are of relevance to the Site's context include:

- Rural inland foothills and valleys that rise to the adjacent Denbigh Moors to the south;
- River valleys and flood plains are present;
- An undulating land form comprising a series of ridges and valleys associated with the river catchment, and a range in grades of slope;
- Sheep grazed pasture is the predominant land cover;
- Occasional woodlands, often occurring on the river valley slopes;
- Mixed field patterns, often geometric but varying widely in scale, from small to large size fields, with a denser network of mixed hedgerows with more trees in sheltered valleys, running up to sparse, windswept hedges and fences occupying areas of former moorland; and
- Sparsely settled, affording rural peace and tranquillity, with wide views from the higher points and a sense of intimacy and enclosure in the valleys close by.

7.1.5 With respect to the visual and sensory profile of NLCA11, the assessment describes a:

> *"quiet pastoral landscape of rolling hills and valleys…The land rises gradually to the south with the Denbigh Moors acting as a bleak southern skyline from the higher vantage points.*
>
> *The river valleys…form enclosed and intimate landscapes… Fringing some of the valleys…are a series of distinctive rounded, open hills…[with] moorland heath on the tops…*
>
> *The general settlement pattern…is of widely scattered, small rural farmsteads…[and] occasional parklands…*
>
> *Deciduous woodland clothes the steep valley sides in many places…There are also occasional small copses…[and] rectilinear coniferous forestry plantations…"*

7.1.6 Under the landscape habitats influences of NLCA09, the assessment notes that the landscape is:

> *"now limited to small remnants of heath and moor on the hills and in patches of wetter land. Areas of wet land and small natural lakes remain…[It is an] agricultural landscape of small fields and woods…[with] predominantly sheep-grazed pastures, set in a network of small fields, bounded by mature hedges and individual trees. Steeper slopes…[are] often covered in gorse or bracken…[and] the landscape is well wooded".*

Clwydian Range and Dee Valley National Landscape

7.1.7 The Special Qualities of the National Landscape are set out in Table 1 of the Management Plan:

- Tranquillity, an atmosphere of calm and stillness; peace and quiet; and with dark night skies;
- Remoteness and wildness, space and freedom, access to the landscape and the uninterrupted and extensive views from the high places within it;
- Heather moorland and rolling ridges, including the dramatic moorland ridges of the central Clwydian Range, expansive Llandegla and Ruabon Moors, Llantysilio and North Berwyn;
- Broadleaved woodlands and veteran trees, including Bishops Wood, Cwm and Wheeler Valley. Ash-dominated Alyn Valley woods and the small copses of the upper Alyn and upland oak woods of the Dee Valley;
- River valleys and the River Dee – the dramatic and powerful River Dee contrasted with the smaller twisting and winding River Alyn and River Wheeler';
- Limestone grasslands, cliffs and screes, including Graig Fawr, Loggerheads and Bryn Alyn – Llanarmon yn lal and the spectacular Eglwyseg escarpment;
- Historic settlement and archaeology, including the diverse patterns and features in the landscape left by previous generations;
- Industrial features and the World Heritage Site – limestone quarrying and lead mining, slate quarries and associated tramways and working, the Pontcysyllte Aqueduct and Canal, Horseshoe Falls;
- Historic defence features, including the dramatic chain of Iron Age hillforts of the Clwydian Range, Castell Dinas Bran and Chirk Castle and medieval motte and baileys at Tomen y Rhodwydd, Tomen y Fadre and Glyndwr's Mount, Carrog;
- Small historic features – often unlisted or scheduled a rich mixture of small historic features that are an important part of the rich cultural layer of the landscape, including wells, village pumps, boundary stones, waymarkers, milk stands and K6 telephone boxes;
- Traditional boundaries, including drystone walls and hedges reflecting traditional skills and craftsmanship and often reflecting local styles and geology;
- Iconic visitor and cultural attractions – sites that have helped to shape the identity of the National Landscape as a visitor destination, including Loggerheads, Moel Famau, Castel Dinas Bran, Valle Crucis Abbey, the Horseshoe Pass and Pontcysyllte Aqueduct and Horseshoe Falls;
- The Offa's Dyke National Trail and Promoted Routes – stretching from Prestatyn Hillside in the north to Llangollen in the South, the National Trail makes the AONB particularly accessible. The Dee Valley Way, North Berwyn Way and a network of community paths. Together with extensive areas of Access Land the landscape of the National Landscape is particularly accessible;
- The built environment, including the villages and towns, hamlets and scattered settlements; and
- People and communities – a rich mix of culture and strong sense of community; the facilities and services that are essential to sustaining rural life.

7.1.8 Policies relating to Landscape Quality and Character include:

> *"PolSQ1 – Conserve and enhance the special qualities and distinctive character of the AONB's landscape and associated features including the historical built form; [and]*
>
> *PolSQ2 – Safeguard the panoramic views, tranquillity and environmental quality of the AONB for the generations of today and the future."*

7.1.9 Objectives relating to Landscape Quality and Character include:

> *"LQCO1 – Ensure that the natural resources and special qualities of the AONB are recognised and valued…;*
>
> *LQCO3 – Minimise the cumulative impacts of small-scale change that may erode the special character of the AONB;*
>
> *LQCO4 – Protect the tranquillity of the AONB and take steps where possible to reduce noise and light pollution; [and]*
>
> *LQCO5 – Where possible reduce visual intrusion by screening or removing eyesores."*

7.1.10 Policies relating to Access, Recreation and Tourism include:

> *"PolART2 – Ensure that the attractiveness of the AONB's landscape and views as a primary basis for the area's tourism are retained".*

7.1.11 Policies relating to Culture and People include:

> *BEO1 – Ensure new development in and around the AONB is sympathetically located in the landscape, and is well designed to complement the character and appearance of the area and its setting, particularly in respect of visual impact, scale, materials and landscaping".*

Local Landscape Character Areas

LCA D/LC/6: Vale of Clwyd North

7.1.12 The key characteristics of LCA D/LC/6: Vale of Clwyd North are:

> *"A wide, fault bounded valley…[which] runs in a north-south direction and is bounded by the Clwydian Range on the east and by the Denbigh Hills and foothills to the west;*
>
> *The northern more wooded end of the Vale is distinguished from the more open southern section;*
>
> *High quality agricultural land is intensively farmed, with mostly improved grassland with some arable locally, and contains numerous scattered farms;*
>
> *Although the Vale appears largely as a flat farmland landscape, glacial deposition has created a more distinct undulating valley floor;*
>
> *Local variation is provided by more distinct river valleys with partly wooded slopes south of St Asaph…formed by the river Elwy;*
>
> *A high quality landscape which is enhanced by the overall wooded character produced by the abundance of hedgerow trees and the wooded estates;*

Important views of the Vale are seen especially from the adjoining Clwydian Hills;

Farmland is characterised by a strong pattern of hedgerows and an especially high density of hedgerow trees, predominantly of oak. The nationally scarce black poplar occurs in this area;

Although the Vale consists mostly of improved grassland and has an overall moderate biodiversity value, broadleaved woodland…, riverside corridors, remnant marshy grassland and numerous field ponds are of significance to wildlife conservation;

The Vale is an important road…corridor containing both the north-south A525 Rhyl-Wrexham road and the east-west A55(T) expressway. There are other classified roads and many minor ones also; and

The area is well populated with main towns at Rhuddlan and St Asaph and several villages as well as many farms and other dwellings".

7.1.13 Management Objectives set out within the Strategy include:

"Maintain and enhance tree and woodland cover, protect and manage broadleaved woodland and encourage new planting, particularly of oak and occasional black poplar, to eventually replace mature and ageing hedgerow trees;

Encourage maintenance of hedgerow boundaries;

Promote their [ponds] conservation…[and] give consideration to establishment of new ponds; [and]

Protect and encourage creation of a diversity of habitat features, including linear wetland and riverside trees within farmland landscape".

LANDMAP Aspect Areas

Geological Landscape

7.1.14 All Geological Landscape AAs overlapping with or adjacent to the Site have been retained for assessment irrespective of their evaluation:

- Bodelwyddan (DNBGHGL016). This AA is evaluated as Moderate for Rarity/Uniqueness (Q31) and Overall Evaluation (33). The entry describes a *"gentle, north-facing slope of Westphalian Coal Measures with undulating topography, blanketed with Quaternary till. The slope is down from the limestone ridge in the south to the coastal plain and the alluvial Clwyd estuary".*

7.1.15 All Geological Landscape AAs adjacent to the Site have been retained for assessment irrespective of their evaluation:

- Cefn Meiriadog (DNBGHGL031). This AA is evaluated as High for Rarity/Uniqueness and Overall Evaluation. The entry describes a *"north west-south east trending limestone ridge with limestone exposed at several localities. There are several caves in the limestone and a wooded limestone pavement at the southern end".*

7.1.16 All Geological Landscape AAs recording a special relationship with those Geological Landscape AAs that overlap or are adjacent to the Site have been retained for assessment irrespective of their evaluation:

- Tytywyrch (DNBGHGL015). This AA is evaluated as High for Rarity/Uniqueness and Overall Evaluation. The entry describes a *"low-lying, flat, alluvial plain on the western-side of the River Clwyd. Reclaimed, farmed land".*

- The Roe (DNBGHGL017). This AA is evaluated as Moderate for Rarity/Uniqueness and Overall Evaluation. The entry describes a *"gently undulating flood plain on the western side of the Elwy and Clwyd rivers. This AA is draped with alluvium with some river terraces".*

- Elwy Gorge (DNBGHGL032). This AA is evaluated as Outstanding for Rarity/Uniqueness and Overall Evaluation. The entry describes a *"northwest-southeast trending river gorge through limestone with a narrow, flat, valley bottom and steep sides with land slips".*

7.1.17 All Geological Landscape AAs within the 5km study area, which are also indicated on the Zone of Theoretical Visibility (ZTV – see below) to have intervisibility with the Site, and which are also evaluated as Outstanding or High for Rarity/Uniqueness (Q31) and/or Overall Evaluation (Q33) have been retained for assessment:

- Henllan (DNBGHGL035). This AA is evaluated as Outstanding for Rarity/Uniqueness and Overall Evaluation. The entry describes a *"northwest-southeast trending limestone ridge, in places draped with till. Drumlins are present in the north of this AA".*

- Waen Gloeugoed (DNBGHGL019). This AA is evaluated as High for Rarity/Uniqueness and Overall Evaluation. The entry describes an *"extensive till covering the undulating and gently westward-sloping sides of the eastern side of the half-graben and glacially-widened U-shaped Vale of Clwyd. A glacial terminal moraine is cut by the River Clwyd and streams".*

Landscape Habitats

7.1.18 All Landscape Habitats AAs overlapping with the Site have been retained for assessment irrespective of their evaluation:

- Cefn Improved Grassland (DNBGHLH023). This AA is evaluated as High for Connectivity/Cohesion (Q42) and Moderate for Overall Evaluation (Q45). The entry describes *"an intensively farmed improved grassland landscape with some arable, and a good network of hedges containing many mature trees, many small blocks of semi-natural broadleaved and planted mixed woodland, and some parkland".*

7.1.19 No Landscape Habitats AAs are adjacent to the Site.

7.1.20 All Landscape Habitats AAs within the 5km study area, which are also indicated on the ZTV to have intervisibility with the Site, and which are also evaluated as Outstanding or High for Connectivity/Cohesion and/or Overall Evaluation have been retained for assessment:

- Bodelwyddan Lowland Parkland (DNBGHLH021). This AA is evaluated as High for Connectivity/Cohesion and Moderate for Overall Evaluation. The entry describes *"a lowland parkland landscape of improved grassland, amenity grassland and some arable with a mix of veteran trees, semi-natural broadleaved and planted mixed woodland and ponds".*

- Vale of Clwyd North Improved Grassland (DNBGHLH017). This AA is evaluated as High for Connectivity/Cohesion and Moderate for Overall Evaluation. The entry describes a *"largely improved grassland landscape with some arable, and a good network of hedges containing numerous mature hedgerow trees mainly of Oak, pond clusters supporting great crested newt, and scattered pockets of broadleaved and conifer woodland. A major river and network of tributaries are a feature of the area".*

Cultural Landscape Services

7.1.21 All Cultural Landscape Services AAs overlapping with the Site have been retained for assessment irrespective of their evaluation:

- Cefn Estate (DNBGHCLS030). This AA is classified as mosaic rolling lowland and with tranquillity levels being a mosaic of significant disturbance, some disturbance and undisturbed. It is noted that there are attractive views into the AA. The visual and sensory landscape evaluation is Moderate, with a Moderate sense of place / local distinctiveness, High scenic quality and Moderate character.

7.1.22 No Cultural Landscape Services AAs are adjacent to the Site.

7.1.23 All Cultural Landscape Services AAs within the 5km study area, which are also indicated on the ZTV to have intervisibility with the Site have been retained for assessment:

- Limestone Valley-Cefn (DNBGHCLS035). This AA is classified as wooded lowland valleys and with tranquillity levels being a mosaic of significant disturbance, some disturbance and undisturbed. It is noted that there are attractive views into the AA. The visual and sensory landscape evaluation is High, with a Moderate sense of place / local distinctiveness, High scenic quality and High character.

- Wooded Parkland and Parkland Remnants (DNBGHCLS033). This AA is classified as mosaic rolling lowland and with tranquillity levels being over 75% of significant disturbance. It is noted that there are attractive views into the AA. The visual and sensory landscape evaluation is High, with a Strong sense of place / local distinctiveness, High scenic quality and High character.

- Limestone Plateau-Denbigh/Henllan (DNBGHCLS037). This AA is classified as mosaic rolling lowland and with tranquillity levels being a mosaic of significant disturbance, some disturbance, undisturbed and urban. It is noted that there are attractive views into the AA. The visual and sensory landscape evaluation is Moderate, with a Moderate sense of place / local distinctiveness, Moderate scenic quality and Moderate character.

- Vale of Clwyd-North of Denbigh (DNBGHCLS029). This AA is classified as flat lowland mosaic and with tranquillity levels being a mosaic of significant disturbance, some disturbance and undisturbed. It is noted that there are attractive views both into and out of the AA. The visual and sensory landscape evaluation is High, with a Strong sense of place / local distinctiveness, High scenic quality and High character.

- Vale Wooded Estate-South of Dyserth (DNBGHCLS017). This AA is classified as flat lowland mosaic and with tranquillity levels being a mosaic of significant disturbance, some disturbance and undisturbed. It is noted that there are attractive views both into and out of the AA. The visual and sensory landscape evaluation is High, with a Strong sense of place / local distinctiveness, High scenic quality and High character.

Historic Landscapes

7.1.24 All Historic Landscape AAs overlapping with the Site have been retained for assessment irrespective of their evaluation:

7.1.25 Pentre-mawr (DNBGHHL041). This AA is evaluated as Moderate for Overall Evaluation (Q40). The entry describes *“organic enclosures south and west of St Asaph, fieldscapes which have grown up over time, a predominantly rural environment”.*

7.1.26 All Historic Landscape AAs adjacent to the Site have been retained for assessment irrespective of their evaluation:

- Bont-newydd (DNBGHHL021). This AA is evaluated as Outstanding for Overall Evaluation. The entry describes an *"area of limestone grassland and woodland which contains an important hillfort and Internationally important cave sites with early human occupation".*

7.1.27 All Historic Landscape AAs within the 5km study area, which are also indicated on the ZTV to have intervisibility with the Site, and which are also evaluated as Outstanding or High for Overall Evaluation have been retained for assessment:

- Plas Heaton (DNBGHHL039). This AA is evaluated as High for Overall Evaluation. The entry describes an *"extensive area of parkland, designed landscape, links to the picturesque".*

- Brynbella (DNBGHHL026). This AA is evaluated as High for Overall Evaluation. The entry describes the *"Bryn Bella designed garden built by Mrs Piozzi".*

- Bodelwyddan Park (DNBGHHL005). This AA is evaluated as High for Overall Evaluation. The entry describes a *"well preserved 18th and 19th century landscape park with 19th century arts and crafts accretions, Arts and Crafts Garden by Thomas Mawson".*

Visual and Sensory

7.1.28 All Visual and Sensory AAs overlapping with the Site have been retained for assessment irrespective of their evaluation:

- Cefn Estate (DNBGHVS033). This AA is evaluated as High for Scenic Quality and Moderate for Character and Overall Evaluation. The entry describes a *"wooded former estate landscape lying on the edge of St Asaph and the industrial areas surrounding Bodelwyddan. The area displays a fine array of woodland blocks and a well defined field pattern delineated by hedgerow with a high incidence of mature hedgerow trees. Settlements are limited to small hamlets/villages and scattered farmsteads although the more urban influence of St Asaph forms a definite boundary to the north and east, the area still has a relatively enclosed nature".*

7.1.29 No Visual and Sensory AAs are adjacent to the Site.

7.1.30 All Visual and Sensory AAs within the 5km study area, which are also indicated on the ZTV to have intervisibility with the Site, and which are also evaluated as Outstanding or High for Overall Evaluation (Q50), or Moderate for Overall Evaluation but Outstanding or High for Scenic Quality (46) and/or Character (Q48), have been retained for assessment:

- Vale of Clwyd-North of Denbigh (DNBGHVS031). This AA is evaluated as High for Scenic Quality, Character and Overall Evaluation. The entry describes a *"Vale of Clwyd landscape but here displays a more wooded and stronger estate wooded character on the gently undulating flat valley floor. Hedgerow trees give the area a strong wooded effect character and provide good visual containment for views into and out of the area. A small to medium intimate field pattern gives the area a very rural agrarian appearance with the emphasis increasing on livestock rather than arable farming to the south of the area. Settlements are limited to a few small village/market towns settlements. Transport links through the area are largely relatively quiet rural roads with mature hedgerow and tree lined boundaries reinforcing the rural character, generally an attractive and settled area".*

- Vale Wooded Estate-South of Dyserth (DNBGHVS016). This AA is evaluated as High for Scenic Quality, Character and Overall Evaluation. The entry describes an *"agriculturally improved pastoral and estate wooded landscape. Hedgerow trees give the area a strong wooded effect character and provide good visual containment for views into and out of the area. A small to medium intimate field pattern gives the area a very rural agrarian appearance with the emphasis increasing on livestock rather than arable farming to the south of the area. Settlements are isolated and limited in the main to scattered farmsteads and small hamlets/clusters of houses. Transport links through the area are largely relatively quiet rural roads with mature hedgerow and tree lined boundaries reinforcing the rural character, generally an attractive and settled area".*

Appendix 7.3 LVIA Methodology



Appendix 7.3 LVIA Methodology

Introduction

7.3.1 The methodology employed in carrying out the Landscape and Visual Impact Assessment (LVIA) of the Proposed Development is in accordance with the Guidelines for Landscape and Visual Impact Assessment, Third Edition (2013) devised by the Landscape Institute and the Institute of Environmental Management and Assessment. The methodology is further informed by the Landscape Institute GLVIA3 Statements of Clarification 01-13 and the Technical Information Note (TIN) 01-21.

7.3.2 The purpose of an LVIA is to identity the likely effects of change resulting from the Proposed Development, which can be used as a tool to optimise the design of a scheme to minimise the potential for adverse changes to arise and to maximize the benefit of positive changes. Landscape and visual assessments are separate processes, with a distinction made between:

- Landscape - landscape character and the elements and features that contribute to the sense of place (landscape receptors); and
- Visual - people who experience views within the landscape (visual receptors).

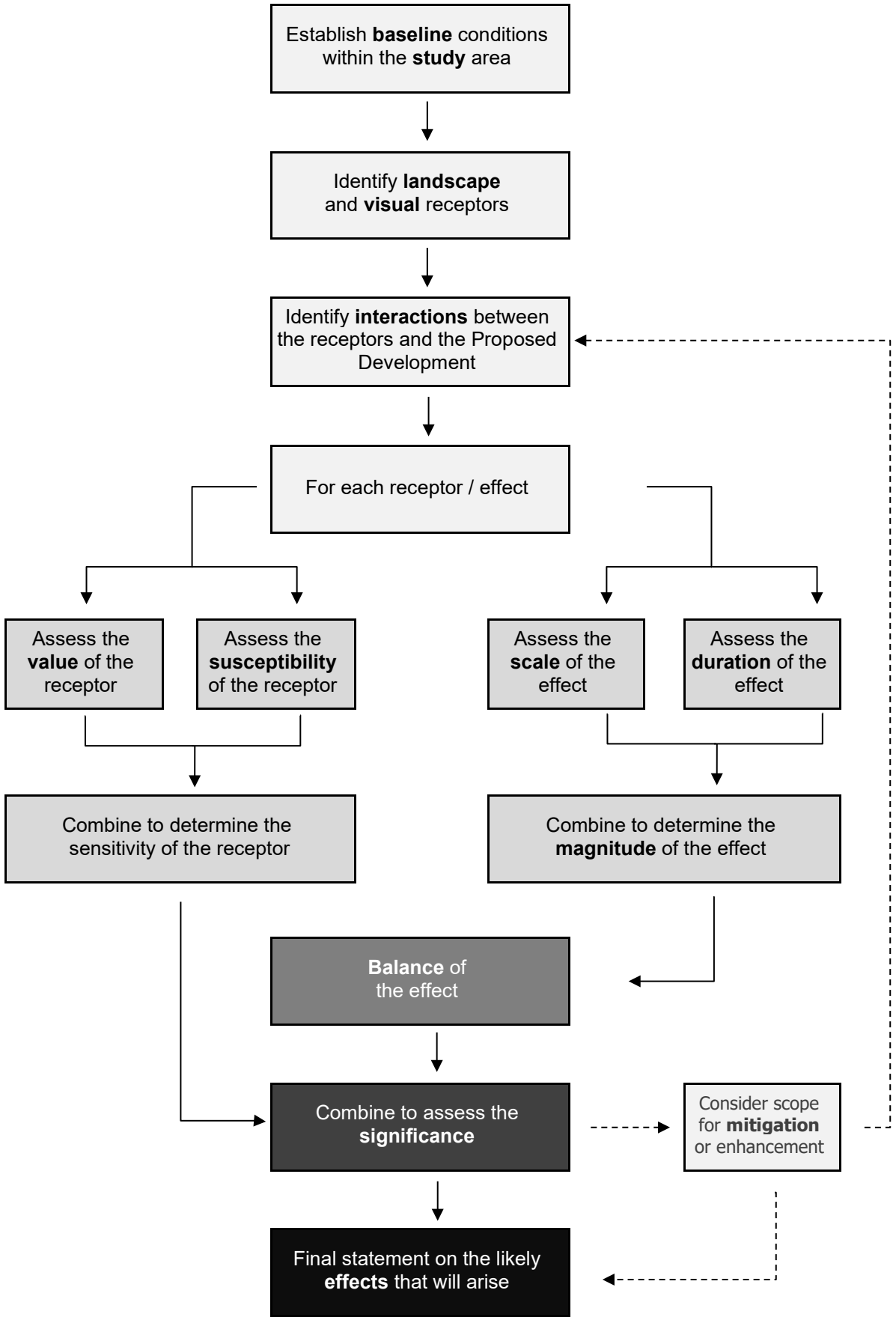
7.3.3 Accordingly, landscape effects occur as a result of changes in the physical landscape elements that may give rise to changes in its character and how this is experienced, while visual effects occur as a result of changes to the composition of available views and people's response to such changes.

7.3.4 Subject to the nature of the Proposed Development and the landscape and visual context, there are typically three key stages to the LVIA process, with a further two optional stages carried out as required:

- Baseline Appraisal;
- Iterative Design;
- Assessment of Landscape and Visual Effects;
- Cumulative Assessment (optional); and
- Night-Time Assessment (optional).

7.3.5 An overview of the assessment process is set out in **Diagram 1** overleaf. The assessment of landscape and visual effects relies on identifying the interactions between the Proposed Development and the identified receptors, linking judgements between the sensitivity of receptors and the magnitude of effect experienced. The sensitivity of a receptor is determined by combining judgements on the value attached to the receptor alongside its susceptibility, while the magnitude of an effect is determined by combining judgements on scale and duration.

Diagram 1: Overview of the LVIA Process



Baseline Appraisal

7.3.6 The purpose of the baseline appraisal stage is to record the existing landscape features, characteristics and ascertain the area from which the existing Site and Proposed Development may be visible to analyse the way in which the landscape is experienced. The following aspects typically comprise the baseline appraisal stage:

- Definition and refinement of an appropriate study area based on professional judgement of factors including likely extent of visibility or character influence of the Site or Proposed Development and fieldwork;
- Zone of Theoretical Visibility (ZTV) modelling where appropriate;
- Identification of the patterns and scale of landform, vegetation, land use and built development, alongside relevant planning policy (including landscape designations) and published landscape characterisations; and
- Identification of representative viewpoints within the study area.

7.3.7 Where pertinent, a localised character assessment will be undertaken to supplement the published characterisation material, with consideration of 'natural', 'cultural and social' and 'perceptual and aesthetic' factors. These may include (non-exhaustive list):

- Landform and hydrology;
- Land use and settlement;
- Pattern/texture/line;
- Scale and enclosure;
- Historical development/time-depth;
- Activities and cultural associations;
- Spatial structure and built form;
- Infrastructure;
- Movement, connectivity and accessibility;
- Tranquillity and remoteness; and
- Aesthetic visual quality.

7.3.8 In order to assess the effects on visual receptors, a selection of publicly accessible viewpoints is made. This typically includes representative viewpoints (e.g. representing sequential views from users of a particular footpath) and specific viewpoints (e.g. a key view from a specific visitor attraction).

7.3.9 Views may be categorised as either near distance, medium distance or long distance with the relevant distances' dependent on the size and nature of the development, based on professional judgement.

7.3.10 The type of view is typically described as transient/sequential (i.e. experienced when moving) or fixed (i.e. from a static location). It is also described in terms of the degree of screening or openness (e.g. open or uninterrupted; partial - including where partially screened or filtered by vegetation or other structures; or curtailed/screened by intervening land form, built form or vegetation) and the angle of view (e.g. frontal or oblique).

7.3.11 Photographs of representative viewpoints are taken at eye level, using a digital SLR camera, and presented in line with the Landscape Institute Technical Guidance Note (TGN) 06-19.

7.3.12 Where relevant, the future baseline of the landscape context may also be considered, in order to account for ongoing change in the landscape where the landscape context will likely be altered by the time the Proposed Development will commence, such as through forestry or quarrying activities, or the construction of new developments that will not overlap with the construction phase of the Proposed Development.

7.3.13 For the avoidance of doubt, the future baseline context should not be confused with cumulative effects, which are addressed differently and assessed separately.

Assessing the Value of the Receptor

Landscape Value

7.3.14 The assessment of landscape value is based on a combination of the importance of landscape-related planning designations and the following attributes (drawn from the Landscape Institute TGN 02-21 and Box 5.1 of the Guidelines for Landscape and Visual Impact Assessment):

- Natural Heritage;
- Cultural Heritage;
- Condition;
- Associations;
- Distinctiveness;
- Rarity and Representativeness;
- Recreational;
- Perceptual and Scenic Quality; and
- Functional.

7.3.15 As a matter of principle, all landscapes are considered to be of value, as enshrined within the European Landscape Convention (ELC) 2004. The overall value of each landscape receptor is categorised as Very Low, Low, Medium, High or Very High as set out in **Table 7.3.1**, reflecting the UK hierarchy of ‘valued landscapes’.

Table 7.3.1: Landscape Value Criteria

Value	Criteria
Very Low	Landscape area or feature that is undesignated and in a poor condition and state of disrepair that detracts from the landscape quality.
Low	Landscape area or feature of inconsequential components and characteristics, undesignated and with little or no wider recognition of value, although potentially of importance to the local community.
Medium	Landscape area of common components and characteristics that may be designated at local or borough level for its landscape and visual qualities. A landscape feature that makes a recognisable positive contribution to landscape character.
High	Landscape area of rare or distinctive components and characteristics that may also be nationally designated for scenic beauty. A landscape feature that makes a strong and multifaceted positive contribution to landscape character.
Very High	Landscape area of rare or distinctive components and characteristics that may also be internationally acknowledged. A landscape feature that makes a unique positive contribution to landscape character.

Visual Value

7.3.16 The assessment of visual value is based on a combination of any cultural/historical associations the view may have, along with any designation or policy protection.

7.3.17 The overall value for each visual receptor is categorised as Very Low, Low, Medium, High or Very High as set out in **Table 7.3.2**.

Table 7.3.2: Visual Value Criteria

Value	Criteria
Very Low	View from a location that is not designated and with no notable cultural associations attached to the view.
Low	View from a location that is not designated and with limited cultural associations attached to the view.
Medium	View from a location that is within a designated landscape or with notable cultural associations attached to the view.
High	View from a location that is within a designated and with notable cultural associations attached to the view, or a view from an expressly recognised viewpoint location (i.e. identified within tourism guides or the Local Plan).
Very High	View from a celebrated location that is likely to be of international importance, either designated or with exceptional international cultural associations.

Iterative Design

7.3.18 LVIAs are undertaken by professionals who are typically involved in the design of the landscape, site design, and/or the preparation of subsequent management proposals. The design and assessment stages are iterative, with the stages overlapping in part.

7.3.19 Mitigation measures embedded within the design of the Proposed Development are termed 'Primary Mitigation' and typically include aspects such as building layout, massing and height, and the arrangement of open spaces and new structural planting. These aspects are included within the initial assessment of effects.

7.3.20 Additional mitigation measures, termed 'Secondary Mitigation' are those aspects that are not necessarily embedded within the design of the Proposed Development; or the benefit of the mitigation is not immediately realised, such as the growth of planting proposals over time or the illustrative design of built form and landscape as accompanying an outline application. These aspects are typically factored into an assessment of residual effects (i.e. an assessment of effects that will remain following the implementation of additional mitigation measures).

7.3.21 For the assessment of residual effects, the growth of planting is assumed to follow an approximate rate of 1m every 3 years (albeit noting that this may be subject to variations according to a range of factors).

Assessment of Effects

7.3.22 As set out previously, the assessment of landscape and visual effects relies on linking judgements between the sensitivity of receptors and the magnitude of effect experienced.

Landscape Effects

7.3.23 Landscape effects occur as a result of changes to the physical fabric of the landscape that may give rise to alterations to its overriding character and how this character is experienced.

Landscape Sensitivity - Value

7.3.24 The value of a landscape receptor is established during the baseline stage and is categorised as Very Low, Low, Medium, High or Very High as set out in **Table 7.3.1**.

Landscape Sensitivity - Susceptibility

7.3.25 The susceptibility of the landscape is a measure of its vulnerability to the type of development proposed, without undue consequences for the maintenance of the baseline situation. The following criteria are taken into consideration in the assessment of landscape susceptibility, although not all criteria are equally applicable or important for each landscape receptor:

- Landform;
- Pattern/Complexity;
- Composition;
- Landcover;
- Relationship of a given landscape area or feature to the surrounding context; and
- Potential for appropriate mitigation within the context of existing character and guidelines.

7.3.26 The overall susceptibility for each landscape receptor is categorised as Very Low, Low, Medium, High or Very High as set out in **Table 7.3.3**.

Table 7.3.3: Landscape Susceptibility Criteria

Susceptibility	Criteria
Very Low	The receptor may exhibit no overriding structure with no relationship to the surrounding context and key characteristics of the area, with the type of development proposed very unlikely to alter the overall integrity of the receptor. It is very likely that published guidelines for development can be readily applied given the nature of the receptor and the type of development proposed.
Low	The receptor may exhibit an incoherent structure with minimal relationship to the surrounding context and key characteristics of the area, with the type of development proposed unlikely to alter the overall integrity of the receptor. It is likely that published guidelines for development can be readily applied given the nature of the receptor and the type of development proposed.
Medium	The receptor may exhibit a varied structure with a tangible relationship to the surrounding context and key characteristics of the area, while the type of development proposed may potentially alter the overall integrity of the receptor. There is a reasonable potential that the published guidelines for development can be applied given the nature of the receptor and the type of development proposed.
High	The receptor may exhibit an establish structure with a direct relationship to the surrounding context and key characteristics of the area, with the type of development proposed likely to alter the overall integrity of the receptor. It is unlikely that published guidelines for development can be readily applied given the nature of the receptor and the type of development proposed.
Very High	The receptor may exhibit a clearly defined structure with a symbiotic relationship to the surrounding context and key characteristics of the area, with the type of development proposed very likely to alter the overall integrity of the receptor. It is very unlikely that published guidelines for development can be applied given the nature of the receptor and the type of development proposed.

Landscape Magnitude of Effect (Change) - Scale

7.3.27 Factors contributing to the scale of landscape change, as defined in **Table 7.3.4**, include:

- The extent/proportion of the physical landscape elements that will be altered with reference to their wider contribution to the landscape;
- The degree to which aesthetic and/or perceptual aspects will be altered; and
- The geographical area that will be directly and indirectly altered.

Table 7.3.4: Landscape Scale Criteria

Scale	Criteria
None	No change to the landscape receptor.
Compact	There will likely be change to a limited proportion of the landscape receptor, which will likely not be discernible or have no effect on the integrity of the landscape or the key characteristics of a very localised geographic area.
Modest	There will likely be change to a moderate proportion of the landscape receptor, which will likely result in a perceptible change in the integrity of the landscape or the key characteristics of a discrete geographic area.
Ample	There will likely be change to a high proportion of the landscape receptor, which will likely result in a noticeable change in the integrity of the landscape or the key characteristics of an extended geographic area.
Extensive	There will likely be a wholesale change to the landscape receptor, which will likely result in a fundamental change to the integrity of the landscape or key characteristics of a very wide geographic area.

Landscape Magnitude of Effect (Change) – Duration and Reversibility

7.3.28 Factors contributing to the duration the change is experienced in the landscape (including consideration of management plans as appropriate), as defined in **Table 7.3.5**, include:

- Whether the change is wholly reversible or permanent; and
- Whether the change is temporary (and if so, for what period of time).

Table 7.3.5: Landscape Duration and Reversibility Criteria

Duration	Criteria
None	No change.
Very Short	Likely to be temporary (up to 5 years) and readily reinstated / reversible.
Short	Likely to be temporary but for a longer term (up to 10 years), which can be reinstated / reversible.
Medium	Likely to be of permanence or for an extended temporary period over a generation (i.e. up to 40 years), and/or less readily reinstated / reversible.
Long	Likely to be of permanence with limited prospect of being reinstated / reversed.

Visual Effects

7.3.29 Visual effects occur as a result of changes to the composition of available views and people's response to such changes.

Visual Sensitivity - Value

7.3.30 The value of a visual receptor is established during the baseline stage and is categorised as Very Low, Low, Medium, High or Very High as set out in **Table 7.3.2**.

Visual Sensitivity - Susceptibility

7.3.31 The susceptibility of each visual receptor is a measure of their vulnerability to the type of development proposed, without undue consequences for the maintenance of the baseline situation. The following criteria are taken into consideration in the assessment of visual susceptibility:

- The extent to which the viewers' attention is focussed on the landscape;
- The extent to which the view contributes to the viewers' amenity experience; and
- The nature of the activity the viewer is involved in (or otherwise).

7.3.32 The overall susceptibility for each visual receptor is categorised as Very Low, Low, Medium, Heigh or Very High as set out in **Table 7.3.6**.

Table 7.3.6: Visual Susceptibility Criteria

Susceptibility	Criteria
Very Low	People engaged in an activity and/or at a location where their visual setting is of minimal importance and little or no attention is focussed on the landscape.
Low	People engaged in an activity and/or at a location where their visual setting is unlikely to be important and limited attention is focussed on the landscape.
Medium	People engaged in an activity and/or at a location where their visual setting is incidental to their enjoyment and attention is partly focussed on the landscape.
High	People engaged in an activity and/or at a location where their visual setting is important and the landscape is likely an important focus of their attention.
Very High	People engaged in an activity and/or at a location where their visual setting is of utmost importance and the landscape is the main focus of their attention.

Visual Magnitude of Effect (Change) - Scale

7.3.33 Factors contributing to the scale of visual change, as defined in **Table 7.3.7**, include:

- The angle of view in relation to the main activity of the receptor;
- The distance of the viewer from the Proposed Development;
- The extent of the area over which the changes will be visible; and
- The degree of visual intrusion of the Proposed Development in the view.

Table 7.3.7: Visual Scale Criteria

Scale	Criteria
None	No change discernible in the composition of the view.
Compact	There will likely be a barely perceptible change in the composition of the view, which is likely to be at considerable distance from the viewer and only glimpsed and/or occupying a limited extent of the view.
Modest	There will likely be a perceptible change in the composition of the view, which may be at some distance from the viewer, or nearby but only glimpsed and/or occupying a discrete extent of the view.
Ample	There will likely be noticeable change in the composition of the view, which may be close to the viewer and/or occupying a sizeable extent of the view.
Extensive	There will likely be a pronounced change in the composition of the view, close to the viewer and occupying a wide extent of the view.

Visual Magnitude of Effect (Change) - Duration and Reversibility

7.3.34 Factors contributing to the duration the change is experienced visually (including consideration of management plans as appropriate), as defined in **Table 7.3.8**, include:

- Whether or not the view is experienced in fixed or transient views and, in the latter, whether it is intermittent/glimpsed or continuous; and
- Whether the change is temporary (and for what period of time) or permanent.

Table 7.3.8: Visual Duration and Reversibility Criteria

Duration	Criteria
None	Not visible.
Very Short	Likely to be temporary and only intermittently visible.
Short	Likely to be temporary but visible for a continuous period.
Medium	Likely to be of permanence or for an extended temporary period, and/or likely to be only intermittently visible.
Long	Likely to be of permanence and/or visible for a continuous period.

Combination of Judgements

Sensitivity Judgements

7.3.35 The matrix set out in **Table 7.3.9** is applied, utilising professional judgement, to assess the sensitivity of a receptor, which is defined as Very Low, Low, Medium, High or Very High. Detailed criteria on how value and susceptibility are determined in relation to landscape and visual receptors is set out in each relevant section of this methodology.

Table 7.3.9: Sensitivity Matrix

		Susceptibility				
		Very Low	**Low**	**Medium**	**High**	**Very High**
Value	**Very Low**	Very Low	Low	Low	Medium	Medium
	Low	Low	Low	Medium	Medium	High
	Medium	Low	Medium	Medium	High	High
	High	Medium	Medium	High	High	Very High
	Very High	Medium	High	High	Very High	Very High

Magnitude of Effect (Change) Judgements

7.3.36 The matrix set out in **Table 7.3.10** is applied to assess the magnitude of an effect, which is defined as None, Very Small, Small, Medium or Large. Detailed criteria on how scale and duration are determined in relation to landscape and visual receptors is set out in each relevant section of this methodology. Where it is considered that there is potential for both adverse and beneficial changes to occur, there are described comprehensively.

Table 7.3.10: Magnitude Matrix

		Duration				
		None	**Very Short**	**Short**	**Medium**	**Long**
Scale	**None**	None	None	None	None	None
	Compact	None	Very Small	Very Small	Very Small	Very Small
	Modest	None	Very Small	Small	Small	Small
	Ample	None	Very Small	Small	Medium	Medium
	Extensive	None	Very Small	Small	Medium	Large

Balance of Effects

7.3.37 Effects are defined as beneficial, adverse, or neutral, as defined in **Table 7.3.11**. This consideration is termed the 'balance of effects', factoring in both the potentially beneficial and adverse aspects associated with a given change and its resultant effect.

Table 7.3.11: Balance of Effects Criteria

Nature	Definition
Beneficial	An effect that will on balance result in an improvement to the condition, integrity or key characteristics/composition of the landscape receptor or viewing experience.
Adverse	An effect that will on balance result in damage to the condition, integrity or key characteristics/composition of the landscape receptor or viewing experience.
No Effect	An effect that will on balance maintain the condition, integrity or key characteristics/composition of the landscape receptor or viewing experience and may incorporate a combination of positive and negative aspects.

Significance of Effects

7.3.38 To draw conclusions on the significance of landscape and visual effects, the sensitivity of the receptor and the magnitude of effect experienced is considered alongside one another in line with the matrix set out in **Table 7.3.12**. Depending on the nature of the Proposed Development, the significance of effects may be considered at different stages of the project lifecycle (e.g. during construction; at Year 1 of operation; at Year 15 of operation; and/or on decommission).

Table 7.3.12: Significance Matrix

		Magnitude				
		None	Very Small	Small	Medium	Large
Sensitivity	Very Low	No Effect	Negligible	Negligible	Negligible	Minor
	Low	No Effect	Negligible	Negligible	Minor	Moderate
	Medium	No Effect	Negligible	Minor	Moderate	Moderate
	High	No Effect	Minor	Moderate	Moderate	Major
	Very High	No Effect	Minor	Moderate	Major	Substantial

7.3.39 The assessment of significance is subject to professional judgement and is rated on a scale of No Effect to Substantial, as defined in **Table 7.3.13**. Intermediate ratings may be identified, where the effect is considered to vary across the range, using professional judgement. In essence, the reported significance indicates how important the effect is likely to be from a landscape and visual perspective.

7.3.40 For schemes subject to Environmental Impact Assessment, effects of Substantial, Major or Moderate significance are deemed ‘significant’.

Table 7.3.13: Significance Criteria

	Significance
Substantial	These effects are assigned this level of significance as they represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites and features of national or regional importance. A change at a borough scale site or feature may also enter this category.
Major	These effects are likely to be important considerations at a local scale and may become key factors in the decision-making process.
Moderate	These effects, while important at a local scale, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.
Minor	These effects may be raised as local issues but are unlikely to be of importance in the decision-making process. Nevertheless, they are of relevance in enhancing the subsequent design of the project and consideration of mitigation or compensation measures.
Negligible or No Effect	Either no effect or effect which is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error. Such effects should not be considered by the decision-maker.

Cumulative Assessment

7.3.41 The assessment of cumulative landscape and visual effects considers the effects that will arise as a result of additional changes to the landscape resource or visual amenity caused by the Proposed Development in combination with other emerging schemes.

7.3.42 The Guidelines for Landscape and Visual Impact Assessment emphasise that cumulative impact assessment should be reasonable and proportionate to the nature of the Proposed Development and local environment, focussing on likely significant effects rather than providing a comprehensive catalogue of every conceivable cumulative effect that may occur.

7.3.43 The cumulative assessment takes into consideration:

- The extent the emerging schemes and the Proposed Development extend or intensify the landscape and/or visual effects of each scheme;
- The extent the landscape resource is altered due to the modifications in land use and pattern;
- The interrelations between the different types of built forms;
- The incremental changes as a result of successive developments being introduced;
- The temporal effects arising due to simultaneous or successive construction activities over an extended period of time; and
- The indirect effects arising from the enabling works of each emerging scheme and/or the consequences of the removal of elements of the landscape.

7.3.44 Cumulative landscape effects relate to the loss and/or addition of features as a result of the Proposed Development and other emerging schemes that alter the physical fabric and character of a landscape.

7.3.45 Cumulative visual effects may arise as a result of combined visibility and/or sequential effects and are principally concerned with the change in the composition of available views and the visual amenity experience. Cumulative visual effects are categorised as follows:

- Combined: the influence of more than one scheme is experienced in a single view by a visual receptor;

- Successive: where two or more schemes are visible from the same location but not within the same view. i.e. an observer at a given location would need to look in distinctly different directions to view more than one scheme; and

- Sequential: occurs when an observer moves through a landscape, e.g. where the presence of the emerging schemes and the Proposed Development are visible from different locations along a recognised route of travel. The schemes do not need to be intervisible for sequential effects to arise.

Appendix 7.4 Site Appraisal Photographs

Appendix 7.4 Site Appraisal Photographs



Site Appraisal Photograph A



Site Appraisal Photograph B



Site Appraisal Photograph C



Site Appraisal Photograph D

Project number: 333101373
Project Name: St Asaph

Site Appraisal Photographs
Photograph A - D

Date Taken: April & July 2024
Visualisation Type: Baseline

Stantec



Site Appraisal Photograph E



Site Appraisal Photograph F



Site Appraisal Photograph G

Site Appraisal Photograph H

Project number:	**333101373**	**Site Appraisal Photographs**	**Date Taken:**	**April & July 2024**	Stantec
Project Name:	**St Asaph**	**Photograph E - H**	**Visualisation Type:**	**Baseline**	



Site Appraisal Photograph I



Site Appraisal Photograph J



Site Appraisal Photograph K



Site Appraisal Photograph L

Project number: 333101373
Project Name: St Asaph

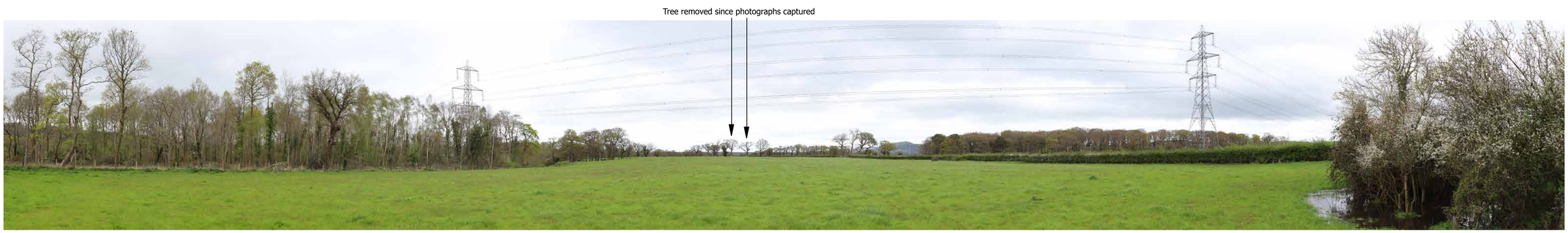
Site Appraisal Photographs Photograph I - L

Date Taken: April & July 2024
Visualisation Type: Baseline

Stantec



Site Appraisal Photograph M



Site Appraisal Photograph N



Site Appraisal Photograph O



Site Appraisal Photograph P

Project number:	**333101373**	**Site Appraisal Photographs**	**Date Taken:**	**April & July 2024**	
Project Name:	**St Asaph**	**Photograph M - P**	**Visualisation Type:**	**Baseline**	

Stantec

Appendix 7.5 Site Context Photographs

Appendix 7.5 Site Context Photographs

Approximate extent of the Site



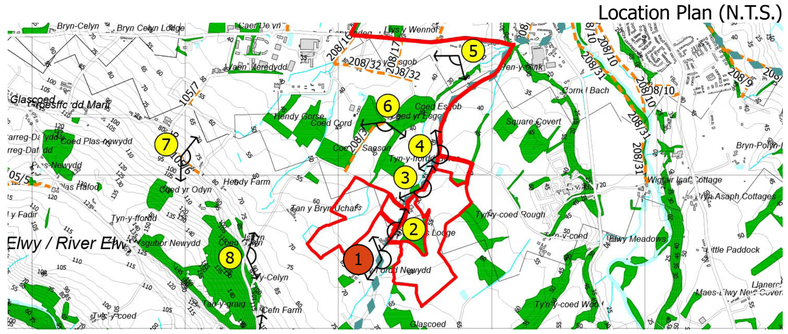
Site Context Photograph 1: View east from road in the vicnity of Tyn-y-ffordd Newydd

This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Location Plan (N.T.S.)



Easting / Longitude:	302283 / 53.240051°	Date Taken:	11/04/2024
Northing / Latitude:	372447 / -3.465659°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	59.2 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	88m		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec

Approximate extent of the Site



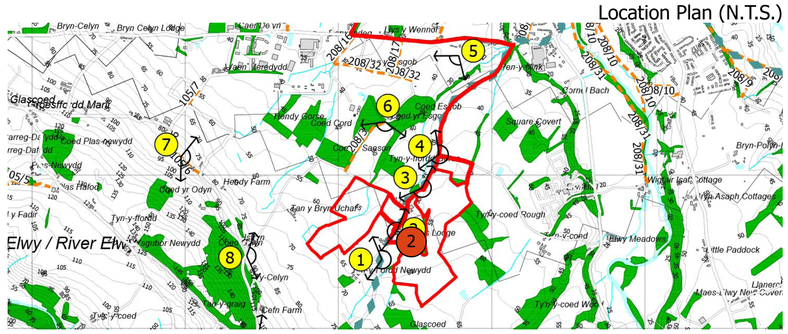
Site Context Photograph 2: View west from the vicinity of Pig-y-fran/Squirells Lodge

This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Location Plan (N.T.S.)



Easting / Longitude:	302379 / 53.241714°	Date Taken:	11/04/2024
Northing / Latitude:	372631 / -3.464281°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	56.0 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	14m		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec

Approximate extent of the Site



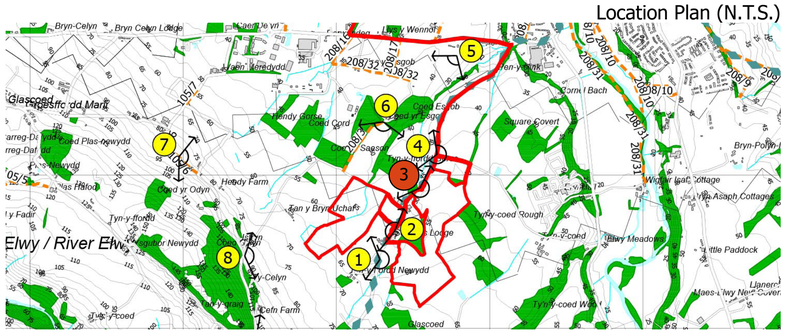
Site Context Photograph 3: View east from the vicnity of Tyn-y-ffordd-fawr

This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Location Plan (N.T.S.)



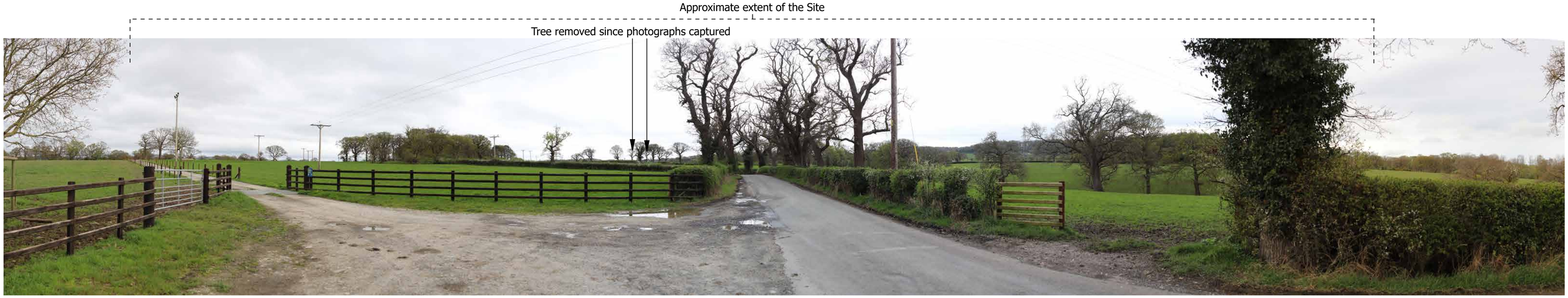
Easting / Longitude:	302545 / 53.244290°	Date Taken:	11/04/2024
Northing / Latitude:	372914 / -3.461882°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	46.4 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	14m		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec



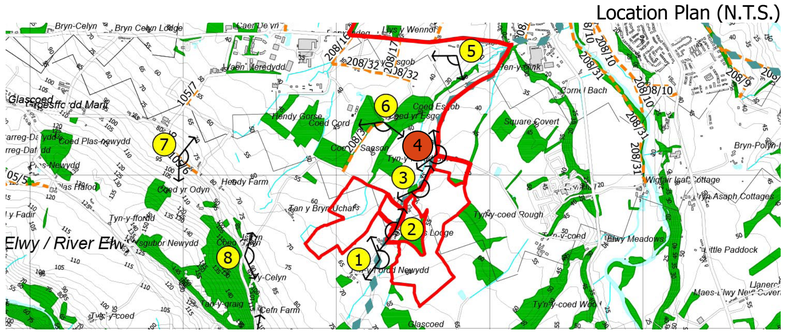
Site Context Photograph 4: View east from road in the vicinity of Tyn-y-ffordd Gorse

This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Location Plan (N.T.S.)



Easting / Longitude:	302656 / 53.246281°	Date Taken:	11/04/2024
Northing / Latitude:	373133 / -3.460280°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	45.4 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	2m		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec

Approximate extent of the Site



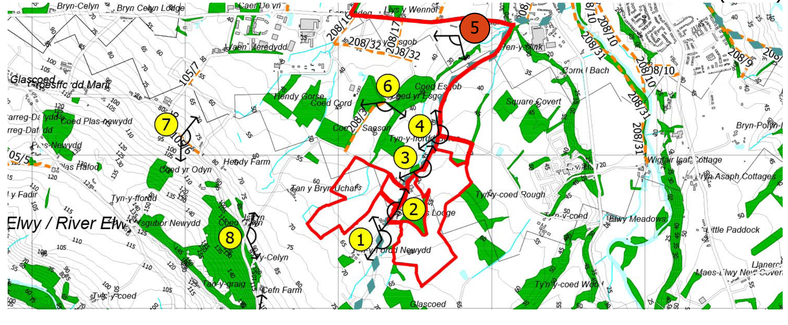
Site Context Photograph 5: View south-west from Lon Coed Esgob in the vicnity of Glascoed Road (B5381)

This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Location Plan (N.T.S.)



Easting / Longitude:	302785 / 53.252087°	Date Taken:	12/04/2024
Northing / Latitude:	373777 / -3.458558°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	37.9 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	0.65km		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec

Approximate extent of the Site



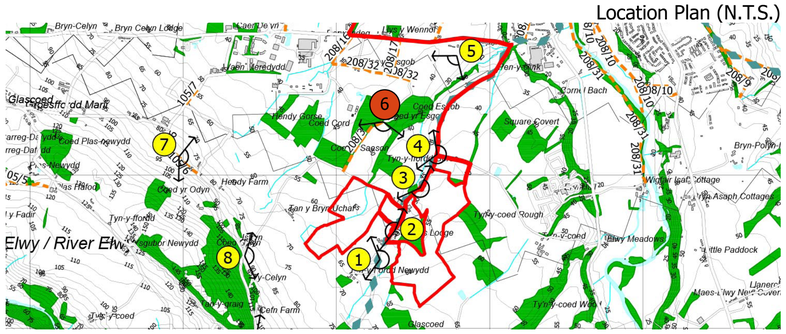
Site Context Photograph 6: View south from PRoW 208/3

This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Location Plan (N.T.S.)



Easting / Longitude:	302306 / 53.248117°	Date Taken:	11/04/2024
Northing / Latitude:	373345 / -3.465590°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	46.4 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	403m		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec



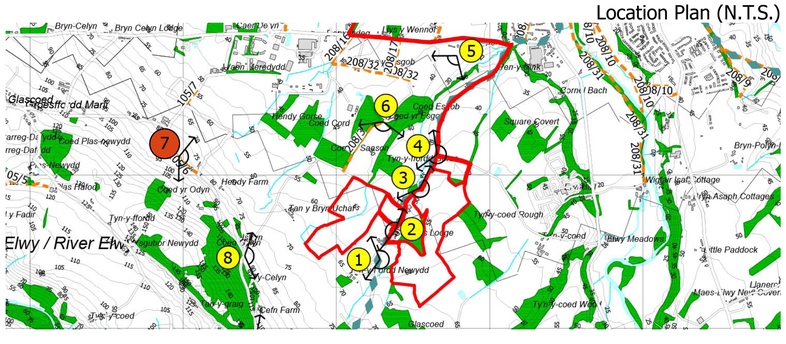
Site Context Photograph 7: View south-east from PRoW 105/6

This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Location Plan (N.T.S.)



Easting / Longitude:	300973 / 53.245842°	Date Taken:	11/04/2024
Northing / Latitude:	373119 / -3.485495°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	84.9 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	1.00km		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec

Approximate extent of the Site



Site Context Photograph 8: View east from path in the vicinity of Isfryn

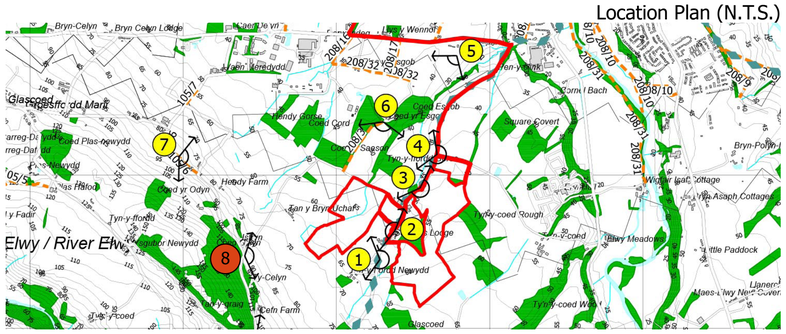
This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Easting / Longitude:	301401 / 53.240097°	Date Taken:	11/04/2024
Northing / Latitude:	372471 / -3.478883°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	91.4 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	403m		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Location Plan (N.T.S.)



Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec



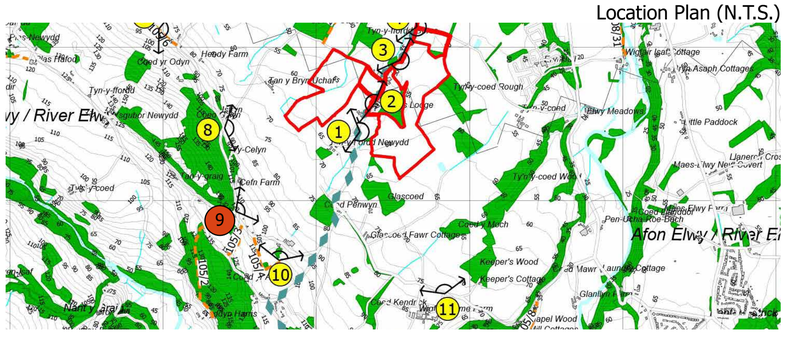
Site Context Photograph 9: View north-east from path in the vicinity of Cefn Meiriadog

This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Location Plan (N.T.S.)



Easting / Longitude:	301474 / 53.235241°	Date Taken:	11/04/2024
Northing / Latitude:	371929 / -3.477624°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	120.8 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	0.67km		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec



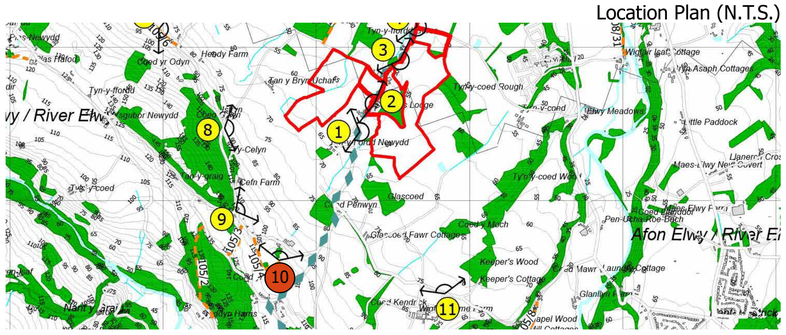
Site Context Photograph 10: View north-east from PRoW 105/4 in the vicnity of Saint Mary's Church

This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Location Plan (N.T.S.)



Easting / Longitude:	301757 / 53.232428°	Date Taken:	11/04/2024
Northing / Latitude:	371610 / -3.473288°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	106.2 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	0.85km		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec

Approximate extent of the Site



Site Context Photograph 11: View north from road in the vicinity of Wigfair Home Farm

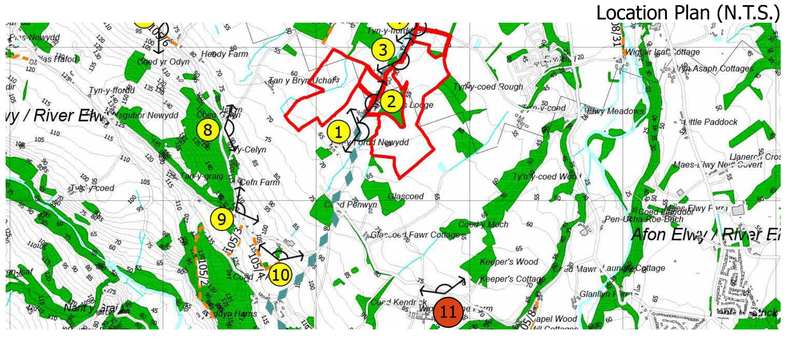
This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Easting / Longitude:	302838 / 53.230668°	Date Taken:	11/04/2024
Northing / Latitude:	371392 / -3.457033°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	75.5 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	0.80km		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Location Plan (N.T.S.)



Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec

Approximate extent of the Site



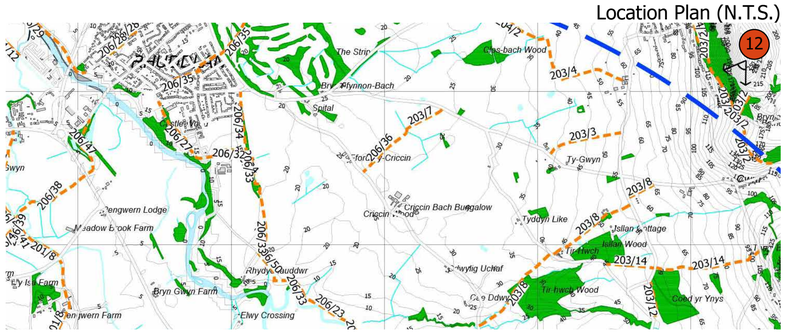
Site Context Photograph 12: View south-west from Moel Hiraddug

This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Location Plan (N.T.S.)



Easting / Longitude:	306360 / 53.292494°	Date Taken:	24/06/2022
Northing / Latitude:	378202 / -3.406287°	Camera:	Nikon D5100 (Full Frame Sensor)
Elevation:	256.3 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	6.20km		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec

Approximate extent of the Site



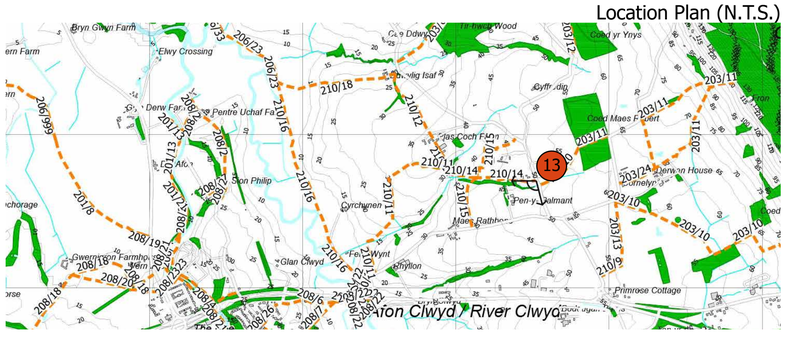
Site Context Photograph 13: View south-west from B5429 Road

This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Location Plan (N.T.S.)



Easting / Longitude:	305525 / 53.269832°	Date Taken:	11/04/2024
Northing / Latitude:	375696 / -3.418060°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	48.5 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	3.73km		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec

Approximate extent of the Site



Site Context Photograph 14: View west from Heol-Y-Brenin

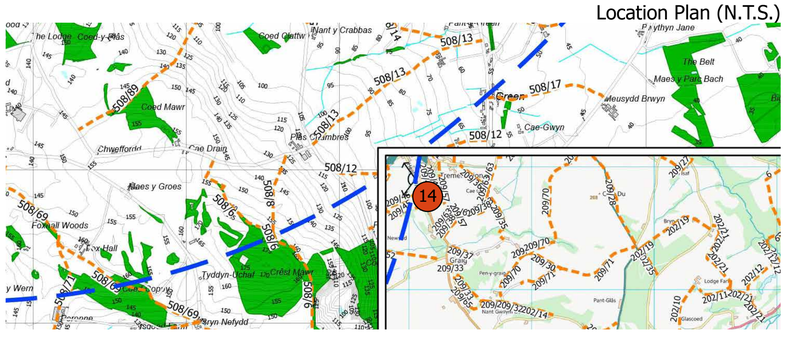
This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Easting / Longitude:	308054 / 53.245169°	Date Taken:	12/04/2024
Northing / Latitude:	372902 / -3.379349°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	97.4 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	5.18km		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Location Plan (N.T.S.)



Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec

Approximate extent of the Site



Site Context Photograph 15: View north-west from Moel y Parc Bwythyn

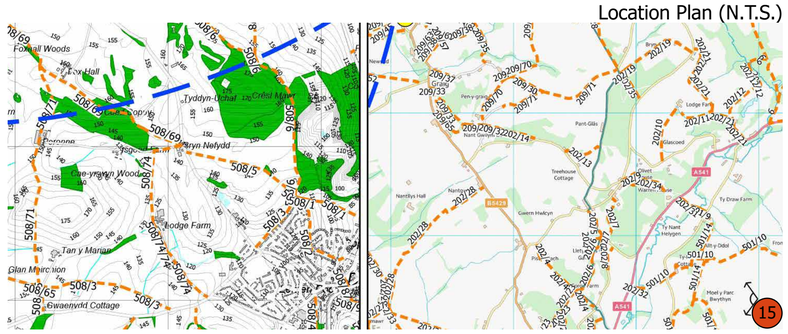
This panorama is not to scale. For contextual information only

90° Horizontal field of view extract



Easting / Longitude:	310994 / 53.223967°	Date Taken:	12/04/2024
Northing / Latitude:	370487 / -3.334637°	Camera:	Canon 6D (Full Frame Sensor)
Elevation:	313.4 (AOD)	Lens:	50mm fixed lens
Distance to the Site:	8.43km		
Visualisation Type:	Type 1 Annotated Viewpoint Photograph	Drawn By:	OF
Enlargement Factor:	100%	Checked By:	DP
Projection:	Cylindrical	Approved By:	MDC

Location Plan (N.T.S.)



Project Number: 333101373
Project Name: St Asaph

Site Context Photographs

View at a comfortable arm's length @A1

Stantec

Appendix 7.6 Landscape Effects



Appendix 7.6: Landscape Effects Table

Landscape Receptor				Landscape Effects									
Name	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Landscape Character														
Clwydian Range and Dee Valley National Landscape	Very High	High	Very High	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The National Landscape is at a considerable distance from the Solar Site (5km). There is a high level of theoretical visibility of the Proposed Development from the elevated escarpment of the National Landscape, and as such it will have an indirect impact on the National Landscape as it forms part of its setting. However, the Proposed Development will be barely perceptible from the National Landscape. As such, it has very little potential to affect the key characteristics of the National Landscape or its setting. There will be change to at most a very limited proportion of the setting of the National Landscape, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will have minimal significance from a landscape and visual perspective. On balance, the effects will not change the condition, integrity, composition or key characteristics of the National Landscape or its setting. Whilst the establishment of the landscape mitigation strategy will lead to beneficial effects, due to the distance of the National Landscape from the Solar Site, these effects at Year 15 will not change the overall significance or balance of effect. The planting will have become established and whilst there will be a change to at most a very limited proportion of the setting of the National Landscape, it will not be readily discernible and will have very little effect on the integrity of the landscape or its key characteristics. The effects will have minimal significance from a landscape and visual perspective, and the condition, integrity, composition and key characteristics of the National Landscape will not be changed.
	The National Landscape is national designated for landscape and scenic beauty. It features a diverse range of characteristics, including tranquil and remote environments with heather moorlands and rolling ridges. The area is marked by historical remnants, including Iron Age hillforts and industrial sites related to limestone quarrying, which contribute to its heritage and cultural significance. Prominent landmarks, such as Moel Famau and the Pontcysyllte Aqueduct, serve as visitor attractions. Open access land, PRoW networks and the Offa's Dyke National Trail contribute to recreation. Overall, the National Landscape features rare and distinctive components and characteristics, and the makes a unique positive contribution to landscape character. The National Landscape has strong intervisibility between the escarpment and much of the vale to the west, although energy infrastructure development is already present within its setting. The National Landscape exhibits an established structure with a direct relationship to its surrounding context and key characteristics of the area. The type of development proposed is likely to alter its overall integrity. It is unlikely that published guidelines can be readily applied given the nature of the receptor and the type of development proposed.												
LCA D/LC/6: Vale of Clwyd North	Medium	Low	Medium	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The LCA will be subject to direct adverse effects due to the introduction of solar panels within the Solar Site and an increased influence of infrastructure, albeit reversible. However, due to the location of the Proposed Development in the lower lying and well-wooded landscape, the extent of these effects is localised, and will be perceived in the context of existing infrastructure, notably the pylons both on the Solar Site and nearby. At the scale of landscape encompassed by the LCA, the Proposed Development will affect a limited area. There will be change to a limited proportion of the LCA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and the at Year 1 the planting will have yet to establish, the effects will have minimal significance from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the LCA. The Proposed Development includes a landscape mitigation strategy that will introduce and reinforce characteristic features in accordance with the landscape management objectives of the LCA. However, whilst the establishment of such proposals will lead to beneficial effects, due to the scale of the LCA, these effects at Year 15 will not change the overall level of significance or balance of effect. The planting will have become established and there will be a change to a limited proportion of the LCA, which will not be readily discernible and will have little effect on the integrity of the landscape or its key characteristics. The effects will have minimal significance from a landscape and visual perspective, although they will result in damage to the key characteristics of the LCA.
	The LCA is in mixed condition with intensively farmed rural landscapes, predominantly of improved grassland, somewhat influenced by urban settlement and several small villages. There is a moderate level of fragmentation caused by transport corridors, although it has a strong relationship to the Clwydian Hills to the east, and associated varying levels of scenic beauty. There is a moderate level of biodiversity value, and a distinct sense of enclosure as a result of the strong pattern of hedgerows and many hedgerow trees. Overall, the LCA features common components and characteristics that are in some cases designated at local or borough level for their landscape and visual qualities, and the LCA makes a recognisable positive contribution to landscape character. The LCA is influenced by industrial development, particularly in the form of existing energy infrastructure. The landform is gently undulating, which contributes to the enclosure provided by the hedgerow vegetation and the density of hedgerow trees. Whilst the LCA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the LCA and the type of development proposed.												

Landscape Receptor				Landscape Effects										
Name	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
The character of the Solar Site	Medium	Medium	Medium	Ample	Medium	Medium	**Moderate**	**Adverse**	Ample	Medium	Medium	**Minor**	**Adverse**	The Proposed Development will result in an increased perception of infrastructure on the Solar Site, which will be experienced from limited locations in the local landscape. The facility will have a restricted height and a visually permeable appearance. The Proposed Development includes the almost wholesale retention of the existing structure of the landscape, with reinforcement and improvement of the landscape features that contribute to the rural aspects of the Solar Site's overall character. The Proposed Development will be perceived in the context of existing infrastructure (notably the pylons that cross the Solar Site and its landscape context). There will be change to a high proportion of the Solar Site, which will result in a noticeable change in its integrity and key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years), at Year 1 the planting will have yet to establish, and as such the effects will be significant from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the Solar Site. At Year 15, the proposed landscape strategy will result in the establishment of positive characteristic features throughout the Solar Site, mitigating to an extent the effects relating to the installation of the Proposed Development. The planting will have become established and whilst there will be change to a high proportion of the character of the Solar Site, the balance of positive and negative effects is such that they will not be significant from a landscape and visual perspective, although they will result in damage to the key characteristics of the Solar Site.
	The Solar Site is not designated for scenic beauty and comprises relatively common components and characteristics. The condition of the Solar Site is somewhat fragmented, with weak definition of field boundaries in places and a somewhat sparse character. There are some positive perceptual aspects, particularly with respect to open views to the Cefn Meiriadog ridge landscape to the south and the Clwydian Range and Dee Valley National Landscape to the north-east and east. However, these positive aspects are sometimes overridden by negative influences resulting from the views as well as the encroachment of pylons and overhead power lines within the Solar Site. The Solar Site is not publicly accessible, and as such it provides no contribution to recreation. The wider network of PRoW within the immediate vicinity landscape is relatively limited and somewhat fragmented. The perception of tranquillity experienced within the Solar Site is limited due to the proximity and number of pylons within and near to the Solar Site. Overall the Solar Site comprises common components and characteristics, and although these are undesignated they are potentially of importance to the local community and make a recognisable positive contribution to landscape character. The Solar Site lies within an agricultural landscape with a strong relationship with existing industrial uses, particularly the pylons that cross the landscape and connect to other energy infrastructure including the nearby electricity distribution stations. The Solar Site interior is not strongly vegetated, although much of the boundary and immediate context is. However, there is high potential for the improvement of the landscape through mitigation as part of the Proposed Development. It has a simple, somewhat sparse and fragmented landscape character influenced by existing infrastructure (particularly the many pylons within and near to the Solar Site) exerting urbanising influences. The Solar Site exhibits a varied structure with a tangible relationship to the surrounding context and key characteristics of the area, and the type of development proposed is likely to alter their overall integrity. However, it is very likely that the published guidelines for development can be readily applied given the nature of the Solar Site and the type of development proposed.												
Geological Landscape AA Bodelwyddan (DNBGHGL016)	Medium	Low	Medium	Modest	Medium	Small	**Minor**	**Adverse**	Modest	Medium	Small	**Negligible**	**Adverse**	The Solar Site is located wholly within this AA, and makes up a small proportion of its total area. The Proposed Development will have a direct effect on the AA, although due to its relative scale, the extent of the effects will be localised. The Proposed Development has limited potential to affect the key characteristics of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a notable proportion of the AA. There will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. However, the balance of positive and negative effects is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The value of the AA is given as Moderate by the LANDMAP record, given that it is a classic glacial terrain transition from limestone upland to estuarine/floodplain with extensive drift cover. There are no SSSI/GCR, geological SINC, 2nd tier sites or RIGS in the area. Overall the AA features common components and characteristics, and it makes a recognisable positive contribution to the character of the geological landscape. The condition of the AA is described as Fair, as development has altered some of the glacial terrain, and its trend is described as Constant, noting that the A55 and industrial development has altered the glacial geomorphology. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.												
Geological Landscape AA Cefn Meiriadog (DNBGHGL031)	High	Medium	High	Modest	Medium	Small	**Moderate**	**Adverse**	Modest	Medium	Small	**Minor**	**Adverse**	The Solar Site is adjacent to this AA, and as such the Proposed Development will have an indirect effect on the AA, although due to its relative scale, the extent of the effects will be localised. The Proposed Development has limited potential to affect the key characteristics or designated components (the RIGS) of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a notable proportion of the AA. There will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. The Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, such that the effects will be significant from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. However, the balance of positive and negative effects is such that they will not be significant from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The value of the AA is given as High by the LANDMAP record, given that it contains one RIGS for limestone pavement. However, there has been mineral extraction in the past and there are no SSSI/GCR sites in the area. Overall the AA features some rare and distinctive components and characteristics, and it makes a strong and multifaceted positive contribution to the character of the geological landscape. The condition of the AA is described as Good, as it is a rural area with no development, and its trend is described as Constant, also noting that there is no development. Whilst the AA exhibits an established structure with a direct relationship to the surrounding context and key characteristics of the area, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.												

Landscape Receptor				Landscape Effects										
Name	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Geological Landscape AA Tytywyrch (DNBGHGL015)	Medium	Low	Medium	Compact	Medium	Very Small	**No Effect**	**No Effect**	Compact	Medium	Very Small	**No Effect**	**No Effect**	Whilst this AA records a special relationship with the AA within which the Solar Site is located, it is at a considerable distance from the Solar Site (2.7km) and no theoretical visibility of the Proposed Development is identified for this AA. As such, the Proposed Development has very little potential to affect the key characteristics of the AA, and any effects will be indirect. There will be change to at most a very limited proportion of the AA, which will not be discernible and have no effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will have minimal significance from a landscape and visual perspective. On balance, the effects will not change the condition, integrity, composition or key characteristics of the AA. Whilst the establishment of the landscape mitigation strategy will lead to beneficial effects, due to the distance of the AA from the Solar Site and the lack of theoretical visibility of the Proposed Development from this AA, these effects at Year 15 will not change the overall significance or balance of effect. The planting will have become established and whilst there will be a change to at most a very limited proportion of the AA, which will not be discernible and will have no effect on the integrity of the landscape or its key characteristics, the effects will have minimal significance from a landscape and visual perspective, and the condition, integrity, composition and key characteristics of the AA will not be changed.
	The value of the AA is given as Moderate by the LANDMAP record, given that it is an ancient alluvial fan with extensive alluvial cover. There are no SSSI/GCR, geological SINC, 2nd tier sites or RIGS in the area. Overall the AA features common components and characteristics, and it makes a recognisable positive contribution to the character of the geological landscape. The condition of the AA is described as Fair and the trend is described as Constant, as the ancient alluvial fan has been damaged by land reclamation. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Geological Landscape AA The Roe (DNBGHGL017)	Medium	Low	Medium	Compact	Medium	Very Small	**No Effect**	**No Effect**	Compact	Medium	Very Small	**No Effect**	**No Effect**	Whilst this AA records a special relationship with the AA within which the Solar Site is located, it is at some distance from the Solar Site (660m) and no theoretical visibility of the Proposed Development is identified for this AA. As such, the Proposed Development will have very little potential to affect the key characteristics of the AA, and any effects will be indirect. There will be change to at most a limited proportion of the AA, which will not be discernible and have no effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will have minimal significance from a landscape and visual perspective. On balance, the effects will not change the condition, integrity, composition or key characteristics of the AA. Whilst the establishment of the landscape mitigation strategy will lead to beneficial effects, due to the distance of the AA from the Solar Site and the lack of theoretical visibility of the Proposed Development from this AA, these effects at Year 15 will not change the overall significance or balance of effect identified at Year 1. The planting will have become established and there will be a change to at most a very limited proportion of the AA, which will not be discernible and will have no effect on the integrity of the landscape or its key characteristics. The effects will have minimal significance from a landscape and visual perspective, and will not change the condition, integrity, composition or key characteristics of the AA.
	The value of the AA is given as Moderate by the LANDMAP record, given that it is formed of river terraces from active fluvial processes on an ancient alluvial fan. There are no SSSI/GCR, geological SINC, 2nd tier sites or RIGS in the area. Overall the AA features common components and characteristics, and it makes a recognisable positive contribution to the character of the geological landscape. The condition of the AA is described as Fair since road building has reduced fluvial processes, and the trend is described as Constant, as it is a predominantly rural area with localised urban and industrial development. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Geological Landscape AA Elwy Gorge (DNBGHGL032)	Very High	Low	High	Compact	Medium	Very Small	**No Effect**	**No Effect**	Compact	Medium	Very Small	**No Effect**	**No Effect**	Whilst this AA records a special relationship with the AA within which the Solar Site is located, it is at some distance from the Solar Site (780m) and no theoretical visibility of the Proposed Development is identified for this AA. As such, the Proposed Development has very little potential to affect the key characteristics or designated components (the GCR sites and RIGS) of the AA, and any effects will be indirect. There will be change to at most a very limited proportion of the AA, which will not be discernible and have no effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will not change the condition, integrity, composition or key characteristics of the AA. Whilst the establishment of the landscape mitigation strategy will lead to beneficial effects, due to the distance of the AA from the Solar Site and the lack of theoretical visibility of the Proposed Development from this AA, these effects at Year 15 will not change the overall significance or balance of effect. The planting will have become established and there will be a change to at most a very limited proportion of the AA, which will not be discernible and will have no effect on the integrity of the landscape or its key characteristics. The effects will not be significant from a landscape and visual perspective, and will not change the condition, integrity, composition or key characteristics of the AA.
	The value of the AA is given as Outstanding by the LANDMAP record, given that it contains GCR sites for Quaternary of Wales, two GCR sites for Pleistocene vertebrates and one RIGS for limestone pavement and glacial outflow channel. There has been no mineral extraction in the past. Overall the AA features rare and distinctive components and characteristics, and it makes a unique positive contribution to the character of the geological landscape. The condition of the AA is described as Fair since the valley sides are unstable, and the trend is described as Constant, as it is a rural area where farming dominates. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed													

Landscape Receptor				Landscape Effects										
Name	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Geological Landscape AA Henllan (DNBGHGL035)	Very High	Low	High	Compact	Medium	Very Small	**No Effect**	**No Effect**	Compact	Medium	Very Small	**No Effect**	**No Effect**	The Solar Site is at a notable distance from this AA (1.9km), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics or designated components (the GCR sites and potential RIGS) of the AA, particularly given the existing context of industrial development. The theoretical visibility of the Proposed Development covers a minimal proportion of the AA. Overall the extent of the effects will be very localised. There will be change to at most a very limited proportion of the AA, which will not be discernible and have no effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will not change the condition, integrity, composition or key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the already minimal proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to at most a very limited proportion of the AA, which will not be discernible and have no effect on the integrity of the landscape or its key characteristics and designated components. The balance of positive and negative effects will be such that they will not be significant from a landscape and visual perspective, and will not change the condition, integrity, composition or key characteristics of the AA.
	The value of the AA is given as Outstanding by the LANDMAP record, given that it contains two GCR sites, for Quaternary of Wales and for Pleistocene vertebrates and additional potential RIGS for Quaternary caves. However, there has been mineral extraction in the past, and there are no geological SINC, 2nd tier sites or RIGS in the area. Overall the AA features rare and distinctive components and characteristics, and it makes a unique positive contribution to the character of the geological landscape. The condition of the AA is described as Fair and the trend is described as Constant, since it is a predominantly rural area with localised urban and industrial development. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Geological Landscape AA Waen Gloeugoed (DNBGHGL019)	High	Medium	High	Compact	Medium	Very Small	**Minor**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The Solar Site is at a considerable distance from this AA (2.3km), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have little potential to affect the key characteristics of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a moderate proportion of the AA. Overall the extent of the effects will be localised. There will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape and its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape and its key characteristics and designated components. However, the balance of positive and negative effects are such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The value of the AA is given as High by the LANDMAP record. There has been no mineral extraction in the past. However, there are no SSSI/GCR, geological SINC, 2nd tier sites or RIGS in the area. Overall the AA features some rare and distinctive components and characteristics, and it makes a strong and multifaceted positive contribution to the character of the geological landscape. The condition of the AA is described as Good, as it is a rural area with little development, and its trend is described as Constant, also noting that the area is rural. Whilst the AA exhibits an established structure with a direct relationship to the surrounding context and key characteristics of the area, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Landscape Habitats AA Cefn Improved Grassland (DNBGHLH023)	Medium	Low	Medium	Modest	Medium	Small	**Minor**	**Adverse**	Modest	Medium	Small	**Minor**	**Beneficial**	The Solar Site is located wholly within this AA, although makes up a relatively small proportion of its total area. The Proposed Development will have a direct effect on the AA, although due to its relative scale, the extent of the effects will be relatively localised. The Proposed Development has limited potential to affect the key characteristics or designated components (the BAP habitats, SAC, SSSI and LWSs) of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a considerable proportion of the AA. There will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship, as well as improving the quality, extent and connectivity of various habitats within the AA. At Year 15 there will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. Whilst the effects will not be significant from a landscape and visual perspective, the balance of positive and negative effects will result in an improvement to the condition, integrity, composition and key characteristics of the AA.
	The value of the AA is given as Moderate by the LANDMAP record, as although it is formed predominantly of improved grassland, there is a good network of hedges with many mature trees, some parkland and plentiful cover of broadleaved woodland, including semi-natural woodland with a high biodiversity value. The AA does not contain habitats of international importance, but does contain BAP habitats and other protected sites, including SAC, SSSI and LWSs. Overall the AA features common components and characteristics, and it makes a recognisable positive contribution to the character of the landscape habitats within the landscape. The main land management activities taking place in the AA are cultivation and stock grazing, and these appear to have some appreciable negative impact on biodiversity, since the intensive farming reduces the biodiversity potential. The biodiversity in the AA is threatened, since in the long term there is no replacement for ageing hedgerow trees, and intensive grazing pressures reduces the ability of biodiversity to recover. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													

Landscape Receptor				Landscape Effects										
Name	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Landscape Habitats AA Bodelwyddan Lowland Parkland (DNBGHLH021)	Medium	Low	Medium	Compact	Medium	Very Small	**No Effect**	**No Effect**	Compact	Medium	Very Small	**No Effect**	**No Effect**	The Solar Site is at a notable distance from this AA (1.1km), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics or designated components (the BAP habitats and LWSs) of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a moderate proportion of the AA. Overall the extent of the effects will be localised. There will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will not change the condition, integrity, composition or key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a limited proportion of the AA, which will not be discernible and have no effect on the integrity of the landscape or its key characteristics and designated components. The effects will not be significant from a landscape and visual perspective, and will not change the condition, integrity, composition or key characteristics of the AA.
	The value of the AA is given as Moderate by the LANDMAP record, as although it is predominantly a lowland parkland, it contains characteristic features such as veteran trees and woodland, including a semi-natural broadleaved woodland Wildlife Site. The AA does not contain habitats of international importance, but does contain BAP habitats and LWSs. However, it is dominated by improved or amenity grassland. Overall the AA features common components and characteristics, and it makes a recognisable positive contribution to the character of the landscape habitats within the landscape. The main land management activities taking place in the AA are cultivation, stock grazing and tree felling, though these do not appear to have any appreciable negative impact on biodiversity. The biodiversity in the AA is threatened, through lack of pond restoration and woodland management, and lack of planting to replace ageing parkland trees long term. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Landscape Habitats AA Vale of Clwyd North Improved Grassland (DNBGHLH017)	Medium	Low	Medium	Compact	Medium	Very Small	**No Effect**	**No Effect**	Compact	Medium	Very Small	**No Effect**	**No Effect**	The Solar Site is at a notable distance from this AA (1.2km), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics or designated components (the habitats of international importance, BAP habitats and LWSs) of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a moderate proportion of the AA. Overall the extent of the effects will be localised. There will be change to a limited proportion of the AA, which will not be discernible and have no effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will not change the condition, integrity, composition or key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a limited proportion of the AA, which will not be discernible and have no effect on the integrity of the landscape or its key characteristics and designated components. The effects will not be significant from a landscape and visual perspective, and will not change the condition, integrity, composition or key characteristics of the AA.
	The value of the AA is given as Moderate by the LANDMAP record, as whilst there is a significant area of improved grassland, it contains important watercourse, pond and woodland features, and numerous hedgerow oak trees. The AA contains habitats of international importance, notably alder woodland on floodplains, as well as BAP habitats and LWSs. Overall the AA features common components and characteristics, and it makes a recognisable positive contribution to the character of the landscape habitats within the landscape. The main land management activities taking place in the AA are cultivation, flooding and stock grazing, and these appear to have some appreciable negative impact on biodiversity, since intensive grazing right up to hedge banks, ponds and field corners reduces biodiversity and reduces the suitability of habitat for ground nesting birds. The biodiversity in the AA is threatened, since heavy poaching of ponds, river edges and marshland, overgrown and silted up ponds, the ageing and decline of hedgerow trees, intensive management of hedges, and intensive land management reduces biodiversity. The increasing occurrence of Himalayan balsam threatens important riverside habitats. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Cultural Landscape Services AA Cefn Estate (DNBGHCLS030)	Medium	Low	Medium	Modest	Medium	Small	**Minor**	**Adverse**	Modest	Medium	Small	**Negligible**	**Adverse**	The Solar Site is located wholly within this AA, and makes up a relatively small proportion of its total area. The Proposed Development will have a direct effect on the AA, although due to its relative scale, the extent of the effects will be relatively localised. The Proposed Development will have little potential to affect the key characteristics of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a considerable proportion of the AA. There will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship, as well as improving the landscape structure of the AA and providing an increase in the quantity and quality of positive characteristic elements within the AA. At Year 15 there will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. However, the balance of positive and negative effects is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The AA is largely rural, although it contains some small areas of settlement and some industrial facilities. There are no associated artistic expressions, folklore/legends or events/traditions noted against the LANDMAP record and as such it is not considered to have highly valued cultural associations. The sense of place / local distinctiveness and character are evaluated as Moderate, whilst its scenic quality is evaluated as High. Overall the AA features common components and characteristics, and it makes a recognisable positive contribution to the character of the cultural landscape services. The AA has a simple, rural character comprising agricultural fields with hedgerows on gently undulating ground, with some woodland cover. Parts of the area are strongly influenced by industrial development and settlements that lie adjacent, including St Asaph and the business park. The tranquillity levels are evaluated as being a mosaic of significant disturbance, some disturbance and undisturbed. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													

Landscape Receptor				Landscape Effects										
Name	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Cultural Landscape Services AA Limestone Valley-Cefn (DNBGHCLS035)	Medium	Low	Medium	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The Solar Site is at some distance from the AA (400m), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics of the AA, particularly given the existing context of industrial development. The theoretical visibility of the Proposed Development covers a limited proportion of the AA. Overall the extent of the effects will be localised. There will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will be of minimal significance from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the already limited proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. The effects will be of minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The AA is largely rural, although it contains some small areas of settlement and some agricultural development. There are no associated artistic expressions, folklore/legends or events/traditions noted against the LANDMAP record and as such it is not considered to have highly valued cultural associations. The sense of place / local distinctiveness is evaluated as Moderate, whilst its scenic quality and character are evaluated as High. Overall the AA features common components and characteristics, and it makes a recognisable positive contribution to the character of the cultural landscape services. The AA has a simple, rural character comprising agricultural fields with hedgerows on gently undulating ground, with some larger areas of woodland cover. Parts of the area are strongly influenced by settlements that lie adjacent, particularly St Asaph and Henllan. The tranquillity levels are evaluated as being a mosaic of significant disturbance, some disturbance and undisturbed. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Cultural Landscape Services AA Wooded Parkland and Parkland Remnants (DNBGHCLS033)	High	Low	Medium	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The Solar Site is at a notable distance from the AA (1.7km), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a moderate proportion of the AA. Overall the extent of the effects will be localised. There will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will be of minimal significance from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. The effects will be of minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The AA is largely rural, although it contains the Warner Hotel at Bodelwyddan Castle. There are no associated artistic expressions, folklore/legends or events/traditions noted against the LANDMAP record and as such it is not considered to have highly valued cultural associations. The sense of place / local distinctiveness is evaluated as Strong, whilst its scenic quality and character are evaluated as High. Overall the AA features some rare and distinctive components and characteristics, and it makes a strong and multifaceted positive contribution to the character of the cultural landscape services. The AA has a simple, parkland character comprising grassland with woodland blocks and many scattered parkland trees on gently sloping ground. The northern extents of the area are strongly influenced by industrial development at Kinmel Park Industrial Estate, the A55, and residential built form in Bodelwyddan. The tranquillity levels are evaluated as being tranquillity levels being over 75% of significant disturbance. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Cultural Landscape Services AA Limestone Plateau-Denbigh/Henllan (DNBGHCLS037)	Medium	Low	Medium	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The Solar Site is at a notable distance from the AA (1.4km), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics of the AA, particularly given the existing context of industrial development. The theoretical visibility of the Proposed Development covers a minimal proportion of the AA. Overall the extent of the effects will be very localised. There will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will be of minimal significance from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the already minimal proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. The effects will be of minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The AA is largely rural, although it contains some small areas of settlement, several isolated farmsteads and Denbigh Golf Club. There are no associated artistic expressions, folklore/legends or events/traditions noted against the LANDMAP record and as such it is not considered to have highly valued cultural associations. The sense of place / local distinctiveness, scenic quality and character are evaluated as Moderate. Overall the AA features common components and characteristics, and it makes a recognisable positive contribution to the character of the cultural landscape services. The AA has a simple, rural character comprising agricultural fields with hedgerows on gently undulating ground, with some larger areas of woodland cover. Parts of the area are strongly influenced by settlements that lie adjacent, particularly Denbigh and Henllan. The tranquillity levels are evaluated as being a mosaic of significant disturbance, some disturbance, undisturbed and urban. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													

Landscape Receptor				Landscape Effects										
Name	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Cultural Landscape Services AA Vale of Clwyd-North of Denbigh (DNBGHCLS029)	High	Low	Medium	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The Solar Site is at a notable distance from the AA (1.2km), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics of the AA, particularly given the existing context of industrial development. The theoretical visibility of the Proposed Development covers a limited proportion of the AA. Overall the extent of the effects will be very localised. There will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will be of minimal significance from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the already limited proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. The effects will be of minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The AA is largely rural, although it contains some areas of settlement, including Trefnant and parts of St Asaph. There are no associated artistic expressions, folklore/legends or events/traditions noted against the LANDMAP record and as such it is not considered to have highly valued cultural associations. The sense of place / local distinctiveness is evaluated as Strong, whilst its scenic quality and character are evaluated as High. Overall the AA features some rare and distinctive components and characteristics, and it makes a strong and multifaceted positive contribution to the character of the cultural landscape services. The AA has a simple, rural character comprising agricultural fields with hedgerows on undulating ground, with some areas of woodland cover. Parts of the area are strongly influenced by the A55 and settlements that lie adjacent, particularly Denbigh and St Asaph. The tranquillity levels are evaluated as being a mosaic of significant disturbance, some disturbance and undisturbed. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Cultural Landscape Services AA Vale Wooded Estate-South of Dyserth (DNBGHCLS017)	High	Low	Medium	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The Solar Site is at a considerable distance from the AA (2.5km), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a considerable proportion of the AA. Overall the extent of the effects will be localised. There will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects be of minimal significance from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. The effects will be of minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The AA is largely rural, although it contains isolated agricultural and industrial development, Rhuddlan Golf Club and some areas of settlement, including part of Rhuallt. There are no associated artistic expressions, folklore/legends or events/traditions noted against the LANDMAP record and as such it is not considered to have highly valued cultural associations. The sense of place / local distinctiveness is evaluated as Strong, whilst its scenic quality and character are evaluated as High. Overall the AA features some rare and distinctive components and characteristics, and it makes a strong and multifaceted positive contribution to the character of the cultural landscape services. The AA has a simple, rural character comprising agricultural fields with hedgerows on undulating ground, with some areas of woodland cover. Parts of the area are strongly influenced by the A55 and settlements that lie adjacent, particularly Rhuddlan and Dyserth. The tranquillity levels are evaluated as being a mosaic of significant disturbance, some disturbance and undisturbed. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Historic Landscape AA Pentre-mawr (DNBGHHL041)	Medium	Low	Medium	Modest	Medium	Small	**Minor**	**Adverse**	Modest	Medium	Small	**Negligible**	**Adverse**	The Solar Site is located wholly within this AA, and makes up a small proportion of its total area. The Proposed Development will have a direct effect on the AA, although due to its relative scale, the extent of the effects will be localised. The Proposed Development will have limited potential to affect the key characteristics and designated components (the listed buildings) of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a notable proportion of the AA. There will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship, as well as providing an increase in the quantity and quality of positive characteristic elements within the AA. At Year 15 there will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics and designated components. However, the balance of positive and negative effects is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The value of the AA is given as Moderate by the LANDMAP record, given that it is a historic landscape of local value, which has time depth to it and contains some interesting and important buildings. Listed buildings are present within the AA, but there are no conservation areas, registered historic parks and gardens or World Heritage Sites. Overall the AA features common components and characteristics, and it makes a recognisable positive contribution to the character of the historic landscape. The character of the northern extents of the AA is strongly influenced by industrial and commercial development within the area, including the St Asaph Business Park, as well as by adjacent settlement, in particular St Asaph. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													

Landscape Receptor				Landscape Effects										
Name	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Historic Landscape AA Bont-newydd (DNBGHHL021)	Very High	Medium	High	Modest	Medium	Small	**Moderate**	**Adverse**	Modest	Medium	Small	**Minor**	**Adverse**	The Solar Site is adjacent to this AA, and as such the Proposed Development will have an indirect effect on the AA, although due to its relative scale, the extent of the effects will be localised. The Proposed Development will have limited potential to affect the key characteristics or designated components (the internationally important scheduled sites and listed buildings) of the AA, particularly given the existing context of industrial development. The theoretical visibility of the Proposed Development covers a limited proportion of the AA. There will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. The Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, such that the effects will be significant from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the already limited proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics and designated components. However, the balance of positive and negative effects is such that they will not be significant from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The value of the AA is given as Outstanding by the LANDMAP record, given that it contains internationally important scheduled sites Pontnewydd and Cefn caves with evidence for early human occupation going back 225,000 years. Listed buildings are present within the AA, but there are no conservation areas, registered historic parks and gardens or World Heritage Sites. Overall the AA features rare and distinctive components and characteristics, and it makes a unique positive contribution to the character of the historic landscape. The character of the AA is predominantly rural, comprising agricultural fields and a high level of woodland cover. Residential and agricultural built form within the area is limited to the village of Cefn and several isolated farmsteads. Whilst the AA exhibits an established structure with a direct relationship to the surrounding context and key characteristics of the area, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Historic Landscape AA Plas Heaton (DNBGHHL039)	High	Low	Medium	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The Solar Site is at a notable distance from the AA (1.8km), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics and designated components (the Registered Parks and Gardens and listed buildings) of the AA, particularly given the existing context of industrial development. The theoretical visibility of the Proposed Development covers a minimal proportion of the AA. Overall the extent of the effects will be very localised. There will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will be of minimal significance from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the already minimal proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics and designated components. The effects will be of minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The value of the AA is given as High by the LANDMAP record, given that it is an area of designed parkland that contains two Grade II registered parks, being of regional importance. Listed buildings are present within the AA, but there are no conservation areas or World Heritage Sites. Overall the AA features some rare and distinctive components and characteristics, and it makes a strong and multifaceted positive contribution to the character of the historic landscape. The character of the AA is predominantly rural, comprising agricultural fields and some woodland cover. A few isolated residential properties are present within the area, and it is influenced by the adjacent settlement of Henllan. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Historic Landscape AA Brynbella (DNBGHHL026)	High	Low	Medium	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The Solar Site is at a considerable distance from the AA (4km), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics and designated components (the Registered Park and Garden and listed buildings) of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a notable proportion of the AA. Overall the extent of the effects will be localised. There will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will be of minimal significance from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics and designated components. The effects will be of minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The value of the AA is given as High by the LANDMAP record, given that it contains a park and garden listed on the Historic Park and Garden Register. Listed buildings are present within the AA, but there are no conservation areas or World Heritage Sites. Overall the AA features some rare and distinctive components and characteristics, and it makes a strong and multifaceted positive contribution to the character of the historic landscape. The character of the AA is predominantly rural, comprising parkland, agricultural fields, some woodland cover and parkland trees. It is partly influenced by existing built form within the area and adjacent to it, in particular the settlement of Tremeirchion. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													

Landscape Receptor				Landscape Effects										
Name	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Historic Landscape AA Bodelwyddan Park (DNBGHHL005)	High	Low	Medium	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The Solar Site is at a notable distance from the AA (1.2km), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics and designated components (the Registered Parks and Gardens and listed buildings) of the AA, particularly given the existing context of industrial development. The theoretical visibility of the Proposed Development covers a minimal proportion of the AA. Overall the extent of the effects will be very localised. There will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will be of minimal significance from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the already minimal proportion of the AA with which it will have a visual relationship. At Year 15 there will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics and designated components. The effects will be of minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The value of the AA is given as High by the LANDMAP record, given that it contains a park and garden listed on the Historic Park and Garden Register. Listed buildings are also present within the AA. Overall the AA features some rare and distinctive components and characteristics, and it makes a strong and multifaceted positive contribution to the character of the historic landscape. The character of the AA is predominantly rural, comprising parkland, agricultural fields, some woodland cover and many parkland trees. The northern and eastern extents of the area are particularly influenced by adjacent built form and infrastructure, including the St Asaph Business Park, the Kinmel Park Industrial Estate, the A55 and the settlement of Bodelwyddan. Whilst the AA exhibits a varied structure, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Visual and Sensory AA Cefn Estate (DNBGHVS033)	Medium	Medium	Medium	Modest	Medium	Small	**Minor**	**Adverse**	Modest	Medium	Small	**Negligible**	**Adverse**	The Solar Site is located wholly within this AA, and makes up a small proportion of its total area. The Proposed Development will have a direct effect on the AA, although due to its relative scale, the extent of the effects will be localised. The Proposed Development will have little potential to affect the key characteristics of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a considerable proportion of the AA. There will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship, as well as providing an improvement in the landscape structure and an increase in the quantity and quality of positive characteristic elements within the AA. At Year 15 there will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. However, the balance of positive and negative effects is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The value of the AA is given as Moderate by the LANDMAP record, since whilst it is locally of interest due to the cultural and landscape associations with Cefn Estate, the management and current extensive arable agriculture in use does not elevate this area to a high value. It is a relatively well defined area with a strong/moderate sense of place due to the distribution of field patterns and hedgerows with tree lined boundaries. Overall the AA features common components and characteristics, and it makes a recognisable positive contribution to the character of the visual and sensory landscape. The trend of the AA is described as declining and the level of human access is frequent. Its perceptual and other sensory qualities are described as attractive, safe and settled. There are attractive views into the area from surrounding areas, especially St Asaph and the area around Bodelwyddan into a remnant estate and parkland landscape. There are detractive views out, including some shorter range local views which are less attractive towards the north of the AA and Bodelwyddan. Whilst the AA exhibits an established structure with a direct relationship to the surrounding context and key characteristics of the area, the type of development proposed is unlikely to alter its overall integrity. It is very likely that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed.													
Visual and Sensory AA Vale of Clwyd-North of Denbigh (DNBGHVS031)	High	High	High	Compact	Medium	Very Small	**Minor**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The Solar Site is at a notable distance from the AA (780m), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics of the AA, particularly given the existing context of industrial development. The theoretical visibility of the Proposed Development covers a limited proportion of the AA. Overall the extent of the effects will be very localised. There will be change to a limited proportion of the AA, which will not be readily discernible and have very little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship, as well as providing an improvement in the landscape structure and an increase in the quantity and quality of positive characteristic elements within the AA. At Year 15 there will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. However, the balance of positive and negative effects is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The value of the AA is given as High by the LANDMAP record, since it is a well defined and vegetated pastoral agricultural landscape with attractive views throughout the area often framed by mature intervening vegetation and woodland blocks. It has a strong sense of place/local distinctiveness as it is a well defined and vegetated pastoral agricultural landscape that remains relatively intact and unspoilt. Overall the AA features some rare and distinctive components and characteristics, and it makes a strong and multifaceted positive contribution to the character of the historic landscape. The condition of the AA is described as Fair, as the field definition and proportion of woodland to open agricultural land appears balanced and in relatively good condition. The trend of the AA is described as constant and the level of human access is infrequent. Its perceptual and other sensory qualities are described as attractive, tranquil, safe and settled. There are attractive views both into and out of the area, including attractive views available throughout the AA of the rolling pastoral landscape, with a well defined field pattern comprising hedgerows with hedgerow trees and small areas of mixed woodland. There are no detractive views either in or out. The type of development proposed may potentially alter the overall integrity of the AA, though there is a reasonable potential that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed. However, the AA exhibits an established structure with a direct relationship to the surrounding context and key characteristics of the area.													

Landscape Receptor				Landscape Effects										
Name	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Visual and Sensory AA Vale Wooded Estate-South of Dyserth (DNBGHVS016)	High	High	High	Compact	Medium	Very Small	**Minor**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	The Solar Site is at a considerable distance from the AA (2.5km), and as such the Proposed Development will have only an indirect effect on the AA. The Proposed Development will have very little potential to affect the key characteristics of the AA, particularly given the existing context of industrial development, although the theoretical visibility of the Proposed Development covers a considerable proportion of the AA. Overall the extent of the effects will be localised. There will be change to a limited proportion of the AA, which will not be readily discernible and have little effect on the integrity of the landscape or its key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will result in damage to the key characteristics of the AA. The establishment of the landscape mitigation strategy will lead to benefits including further screening and softening of the Proposed Development, reducing the proportion of the AA with which it will have a visual relationship, as well as providing an improvement in the landscape structure and an increase in the quantity and quality of positive characteristic elements within the AA. At Year 15 there will be change to a moderate proportion of the AA, which will result in a perceptible change in the integrity of the landscape and its key characteristics. However, the balance of positive and negative effects is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the AA.
	The value of the AA is given as High by the LANDMAP record, since it is a well defined and vegetated pastoral agricultural landscape that remains relatively intact and unspoilt considering its proximity to the large settlement spread of the northern study area, which also contributes to its strong sense of place/local distinctiveness. Overall the AA features some rare and distinctive components and characteristics, and it makes a strong and multifaceted positive contribution to the character of the historic landscape. The condition of the AA is described as Fair, as the field definition and proportion of woodland to open agricultural land appears balanced and in relatively good condition. The trend of the AA is described as constant. and the level of human access is infrequent. Its perceptual and other sensory qualities are described as attractive, safe, settled and pastoral. There are attractive views both into and out of the area, including attractive views available throughout the AA of the rolling pastoral landscape, with a well defined field pattern comprising hedgerows with hedgerow trees and small areas of mixed woodland. There are no detractive views either in or out. The type of development proposed may potentially alter the overall integrity of the AA, though there is a reasonable potential that the published guidelines for development can be readily applied given the nature of the AA and the type of development proposed. However, the AA exhibits an established structure with a direct relationship to the surrounding context and key characteristics of the area.													
Landscape Features														
Open Fields	Low	Medium	Medium	Ample	Medium	Medium	**Moderate**	**Adverse**	Ample	Medium	Medium	**Minor**	**Adverse**	The introduction of solar panels will reduce the physical and perceived openness of the fields and increase the influence of electrical infrastructure on their character. However, in physical terms the fields themselves will not be fundamentally changed. The Proposed Development in itself does not appear as a solid mass of built form, as it has an unsubstantial massing that allows filtered views between and underneath panels and fences. The physical changes to the fields are readily reversible on decommissioning of the Proposed Development after 40 years. Furthermore, the panels do not cover the full extent of the fields, with landscape buffers to existing and proposed hedgerows, waterbodies and the easements of existing utilities. There will be change to a high proportion of the open fields, which will result in a noticeable change in their integrity and key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years), at Year 1 the planting will have yet to establish, and as such the effects will be significant from a landscape and visual perspective. On balance, the effects will result in damage to the integrity and key characteristics of the open fields. As set out in the landscape strategy, the buffer areas to the hedgerows, waterbodies and easements will be improved through native planting such that parts of the open fields will be subject to benefits in landscape terms. At Year 15, the establishment of the planting and the altered management regime of existing arable and pastoral land will lead to more tangible beneficial impacts on this receptor. There will be change to a high proportion of the open fields, which will result in a noticeable change in their integrity and key characteristics. However, the planting will have become established, with the reinforced hedgerows improving the legibility of the fields, and the introduced native shrubs, trees and various types of grassland will improve their biodiversity value and character. The balance of positive and negative effects is such that they will not be significant from a landscape and visual perspective, although they will result in damage to the integrity and key characteristics of the open fields.
	The open fields are not designated and are common features in the wider landscape, however they do exhibit some limited scenic qualities as their openness can be perceived from very limited locations within the local landscape, including from lanes and PRoW within the wider landscape. This landscape feature makes some positive contribution to the character of the landscape. Overall the fields are of inconsequential components and characteristics, undesignated and with little or no wider recognition of value, although potentially of importance to the local community. It is very likely that published guidelines for development can be readily applied given the nature of the fields and the type of development proposed. However, the open fields exhibit a varied structure with a tangible relationship to the surrounding context and key characteristics of the area, and the type of development proposed may potentially alter their overall integrity, since this type of development is unlikely to alter the legibility and physical condition of the fields but is likely to reduce their openness. However, the fields and their openness are readily reinstated following decommissioning of this type of development.													

Landscape Receptor				Landscape Effects										
Name	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Native hedgerow	Low	Low	Low	Modest	Medium	Small	**Negligible**	**Beneficial**	Ample	Medium	Medium	**Minor**	**Beneficial**	The Proposed Development will require the removal of three very short sections of existing hedgerow to allow access between the fields. The proposed mitigation strategy includes hedgerow improvement with 173 linear metres of new hedgerow and 2.8 linear kilometres of reinforcement of existing hedgerow. Whilst the contribution of new planting to the overall value of the hedgerow will not have reached its full effect at Year 1, there will still be a measurable improvement due to the extent of planting and the immediate effects of infilling. As such, there will be change to a moderate proportion of the hedgerows, which will result in a perceptible change in their integrity and key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years), at Year 1 the hedgerow planting will have yet to establish and as such the effects will have minimal significance from a landscape and visual perspective. On balance, the effects will result in an improvement to the condition, integrity and key characteristics of the native hedgerow. Following establishment by Year 15 of the proposed hedgerow reinforcement planting throughout the Solar Site, there will be a resultant marked improvement to their overall structure and cohesiveness. The planting will have become established and as such there will be change to a high proportion of the native hedgerows, which will result in a noticeable change in their integrity and key characteristics. The effects will not be significant from a landscape and visual perspective. On balance, the effects will result in an improvement to the condition, integrity and key characteristics of the native hedgerow.
	The hedgerows on the Solar Site are neither designated nor rare and are unlikely to have any wider recognition of value. Their condition varies as a result of some fragmentation and gaps. Overall the hedgerows are of inconsequential components and characteristics, undesignated and with little or no wider recognition of value, although potentially of importance to the local community. In general hedgerows are considered to have high potential for retention and enhancement as part of development of the type proposed, and are readily replaced. Whilst the hedgerows exhibit a tangible relationship to the surrounding context and key characteristics of the area, the type of development proposed is very unlikely to alter their overall integrity, and it is very likely that published guidelines for development can be readily applied given the nature of the hedgerows and the type of development proposed.													
Canopy trees	High	Low	Medium	Compact	Medium	Very Small	**No Effect**	**No Effect**	Modest	Medium	Small	**Minor**	**Beneficial**	The Proposed Development will not require the removal of any of the canopy trees on the Solar Site, and all retained trees will be protected in accordance with British Standards. 1.19ha of native tree planting is proposed within the Solar Site, which will have biodiversity benefits and provide further softening and filtering effects on views and a positive contribution to local landscape character. However, newly planted trees have limited potential for beneficial effects due to their relatively small size (albeit some large stock will be planted). There will be change to a limited proportion of the canopy trees, which will have no effect on their integrity or key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years), at Year 1 the tree planting will have yet to establish and as such the effects are will not be significant from a landscape and visual perspective. On balance, the effects will not affect the condition or key characteristics of the canopy trees. The establishment of a number of canopy trees, all of which will be native species, will lead to an increase in the extent and quality of this landscape resource on the Solar Site, leading to beneficial effects once these trees have matured and established. Enhanced management and maintenance of existing canopy trees will also lead to beneficial effects. By Year 15 there will be change to a moderate proportion of the canopy trees, which will result in a perceptible change in their integrity and key characteristics. Whilst the proposed tree planting will have become established, the effects will not be significant from a landscape and visual perspective. On balance, the effects will result in an improvement to the condition and key characteristics of the canopy trees.
	Many of the trees within the Solar Site and on its boundary are overgrown hedgerow plants, although parts of the boundary are formed of the edges of mature woodland blocks. These woodland blocks are predominantly Plantation on Ancient Woodland, with some Ancient Semi Natural Woodland and some Restored Ancient Woodland. The trees are not rare within their landscape context but they do exhibit notable scenic qualities and habitat value. Overall, whilst the trees are undesignated, they are in many cases of distinctive components and make a strong and multifaceted positive contribution to landscape character. There is a high potential for the retention of the existing trees as part of development of the type proposed. However, should any trees be removed, their replacement would take considerable time. Whilst the trees exhibit a varied structure with a tangible relationship to the surrounding context and key characteristics of the area, the type of development proposed is very unlikely to alter the overall integrity of the receptor, and it is very likely that published guidelines for development can be readily applied given the nature of the trees and the type of development proposed.													
Waterbodies	Medium	Low	Medium	Compact	Medium	Very Small	**Negligible**	**Beneficial**	Modest	Medium	Small	**Minor**	**Beneficial**	The Proposed Development largely leaves the existing waterbodies (ponds, streams and ditches) untouched, although 10m buffer zones to each waterbody will be sown with wet meadow seed mixes and managed accordingly, leading to landscape and habitat enhancements, which will begin to take effect at Year 1. There will be change to a limited proportion of the waterbodies, which will not be readily discernible and have very little effect on their integrity and key characteristics. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years), at Year 1 the new habitat provided by the buffer zones to the waterbodies will have yet to establish and as such the effects will have minimal significance from a landscape and visual perspective. On balance, the effects will result in an improvement to the condition, integrity and key characteristics of the waterbodies. By Year 15, the habitat provided by the buffer zones to the waterbodies will have become fully established, providing marked biodiversity enhancements. The change will affect a moderate proportion of the waterbodies, which will result in a perceptible change in their integrity and key characteristics. The effects will not be significant from a landscape and visual perspective. On balance, the effects will result in an improvement to the condition, integrity and key characteristics of the waterbodies.
	The existing waterbodies within and on the boundary of the Solar Site (ditches, streams and small ponds) are not designated. They are considered to be of low aesthetic and biodiversity importance due to their modest sizes. Overall the waterbodies are of common components and characteristics that make a recognisable positive contribution to landscape character. The waterbodies have a high potential for retention as part of development of the type proposed. Whilst they exhibit a varied structure with a tangible relationship to the surrounding context and key characteristics of the area, the type of development proposed is very unlikely to alter their overall integrity. It is very likely that published guidelines for development can be readily applied given the nature of the waterbodies and the type of development proposed.													

Value of the receptor: Very Low, Low, Medium, High or Very High
Susceptibility of the receptor: Very Low, Low, Medium, High or Very High
Sensitivity of the receptor: Very Low, Low, Medium, High or Very High
Scale of the effect: None, Compact, Modest, Ample or Extensive
Duration of the effect: None, Very Short, Short, Medium or Long
Magnitude of the effect: None, Very Small, Small, Medium or Large
Significance of the effect: No Effect, Negligible, Minor, Moderate, Major or Substantial
Balance of the effect: Adverse, No Effect or Beneficial

Appendix 7.7 Visual Effects



Appendix 7.7: Visual Effects Table

Visual Receptor				Visual Effects										
Name (Ref)	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Users of the bridleway PRoW 208/3 (Site Context Photograph 6)	Very Low	Medium	Low	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**No Effect**	**No Effect**	Users of the bridleway will have near distance, transient views of the Proposed Development within the western parcel. These will be predominantly glimpsed at best, as they will be heavily filtered by the intervening hedgerow along the boundary and its mature hedgerow trees, as well as other intervening hedgerows and hedgerow trees. These glimpsed views will be available in very few places where the hedgerow is somewhat gappy and at the northern end of the route where there is a farm access opening. Where it is visible at all, there will likely be a barely perceptible change in the composition of the view, nearby but only glimpsed and occupying a discrete extent of the view, although the Proposed Development will be only intermittently visible along this bridleway. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will have minimal significance from a landscape and visual perspective. On balance, the effects will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established, and the proposed hedgerow along the northern boundary of the western parcel will soften, filter and screen views of the panels and ancillary structures from this bridleway. There will be a barely perceptible change in the composition of the view, although by Year 15 some of this change will result from the established planting. The change will be nearby but only glimpsed and occupying a discrete extent of the view, and only intermittently visible along this bridleway. The effects will not be significant from a landscape and visual perspective. The proposed planting will have become established and as such the positive and negative effects will on balance maintain the composition of the viewing experience.
	Views are from a location that is not designated and has no notable cultural associations attached to the view. Receptors are people using a bridleway for recreational purposes and are therefore engaged in an activity to which their visual setting is of utmost importance and the landscape is the main focus of their attention. However, since PRoW 208/3 appears to be a remnant PRoW that is not connected to any other publicly accessible routes or locations, as such it is unlikely that receptors will be present to experience views from this route. Therefore the susceptibility of the receptors is reduced.													
Residents at Coed yr Esgob (Site Context Photograph 6)	Very Low	High	Medium	Modest	Medium	Small	**Minor**	**Adverse**	Modest	Medium	Small	**Negligible**	**Adverse**	Residents will have near distance, fixed views of the Proposed Development within the western parcel. These will be glimpsed to partial views, filtered by intervening vegetation. There will be a perceptible change in the composition of the view, close the viewer but only glimpsed and occupying a discrete extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective. On balance, the effects will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established. There will remain a perceptible change in the composition of the view, although by Year 15 some of this change will result from the established planting The change will be close to the viewer but only glimpsed and occupying a discrete extent of the view. The effects will have minimal significance from a landscape and visual perspective, but will result in damage to the composition of the viewing experience.
	Views are from a location that is not designated and has no notable cultural associations attached to the view. Receptors are people at their place of residence. They are at a location where their visual setting is important and the landscape is likely an important focus of their attention.													
Users of the north/south lane that runs between the parcels (Site Context Photographs 1 to 4)	High	Very High	Very High	Modest	Medium	Small	**Moderate**	**Adverse**	Modest	Medium	Small	**Minor**	**Adverse**	Users of the lane will have near distance, transient views of the Proposed Development within the eastern and western parcels. These will be heavily filtered and screened by the intervening field boundary vegetation, and glimpses will be limited to a few discrete locations along this route. Views of energy infrastructure are not uncharacteristic for receptors along this route. There will be a perceptible change in the composition of the view, nearby but only glimpsed and occupying a limited extent of the view, and the Proposed Development will be only intermittently visible along this lane. The Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish. The effects will be significant from a landscape and visual perspective, and they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established, and the reinforced hedgerows and tree and shrub planting along the boundaries of the eastern and western parcels will soften, filter and screen views of the panels and ancillary structures in views from this lane. There will be a perceptible change in the composition of the view, although by Year 15 some of this change will result from the established planting. The change will be nearby but only glimpsed and occupying a limited extent of the view, and only intermittently visible along this lane. The effects will not be significant from a landscape and visual perspective, but they will result in damage to the composition of the viewing experience.
	Views are from a location that is not designated as a long distance recreational route, and as such there are some cultural associations attached to the view. Whilst the route is a lane, its designation as a long distance recreational route suggests that the most susceptible users will be pedestrians using it for recreational purposes. They are therefore engaged in an activity to which their visual setting is of utmost importance and the landscape is the main focus of their attention.													
Residents at Tyn y Fford Fawr, Squirrels Lodge, Tyn y Ffordd Bach, Tyn y Fford Newydd and Rhos Aber (Near Site Context Photographs 1 to 4)	Very Low	High	Medium	Modest	Medium	Small	**Minor**	**Adverse**	Modest	Medium	Small	**Negligible**	**Adverse**	Residents will have near distance, fixed views of the Proposed Development within the eastern and western parcels. These will be heavily filtered and screened by the intervening field boundary vegetation. Views of energy infrastructure are not uncharacteristic for receptors in these locations. There will be a perceptible change in the composition of the view, nearby but only glimpsed or occupying a discrete extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established, and the reinforced hedgerows and tree and shrub planting along the boundaries of the eastern and western parcels will soften, filter and screen views of the panels and ancillary structures in views from these locations. There will be a perceptible change in the composition of the view, although by Year 15 some of this change will result from the established planting. The change will be nearby but only glimpsed or occupying a discrete extent of the view. However, the proposed planting will have become established and as such the balance of positive and negative effects is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience.
	Views are from a location that is not designated and has no notable cultural associations attached to the view. Receptors are people at their place of residence. They are at a location where their visual setting is important and the landscape is likely an important focus of their attention.													

Visual Receptor				Visual Effects										
Name (Ref)	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Users of the east/west lane that runs to the south of the eastern parcel (Site Context Photograph 11)	Very Low	Medium	Low	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**No Effect**	**No Effect**	Users of the lane will have near and medium distance, transient views of the Proposed Development within the eastern parcel. These will be filtered and screened by intervening field boundary vegetation, and will be limited to a small proportion of the length of the lane in places where the hedgerow along the lane's verge is occasionally lower in height. Views of energy infrastructure are not uncharacteristic for receptors along this route. From these places there will be a barely perceptible change in the composition of the view, at some distance from the viewer and only glimpsed and occupying a limited extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will have minimal significance from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established, and the reinforced hedgerows along the southern boundary of the eastern parcel will further soften, filter and screen views of the panels and ancillary structures in views from this lane. There will be a barely perceptible change in the composition of the view, from only a small proportion of the length of the lane, although by Year 15 more of this change will result from the established planting than from the introduction of the panels. The change will be at some distance from the viewer and only glimpsed or occupying a limited extent of the view. The effects will not be significant from a landscape and visual perspective. The proposed planting will have become established and as such the positive and negative effects will on balance maintain the composition of the viewing experience.
	Views are from a location that is not designated and has no notable cultural associations attached to the view. Receptors are people travelling along a lane, and are therefore engaged in an activity to which their visual setting is likely to be incidental to their enjoyment and their attention is partly focussed on the landscape.													
Residents at Greystones, The Paddock, Glascoed Fawr, Glascoed Fawr Cottage and Wigfair Home Farm (Near Site Context Photograph 11)	Very Low	High	Medium	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**No Effect**	**No Effect**	Residents will have near to medium distance, fixed views of a very small proportion of the Proposed Development within the south-eastern extents of the eastern parcel. These will be filtered and screened by intervening field boundary and woodland vegetation. Views of energy infrastructure are not uncharacteristic for receptors in these locations. There will be a barely perceptible change in the composition of the view, at some distance from the viewer and only glimpsed or occupying a limited extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will have minimal significance from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established, and the reinforced hedgerows along the southern boundary of the eastern parcel will further soften, filter and screen views of the panels and ancillary structures in views from these locations. There will be a barely perceptible change in the composition of the view, although by Year 15 more of this change will result from the established planting than from the introduction of the panels. The change will be at some distance from the viewer and only glimpsed or occupying a limited extent of the view. The effects will not be significant from a landscape and visual perspective. The proposed planting will have become established and as such the positive and negative effects will on balance maintain the composition of the viewing experience.
	Views are from a location that is not designated and has no notable cultural associations attached to the view. Receptors are people at their place of residence. They are at a location where their visual setting is important and the landscape is likely an important focus of their attention.													
Users of Wigfair Hall (Near Site Context Photograph 11)	Medium	High	High	Compact	Medium	Very Small	**Minor**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	Users of Wigfair Hall will have medium distance, fixed views of the Proposed Development within the eastern parcel. These will be filtered and screened by intervening field boundary and woodland vegetation. Views of energy infrastructure are not uncharacteristic for receptors in this location. There will be a barely perceptible change in the composition of the view, at some distance from the viewer and only glimpsed or occupying a limited extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established, and the reinforced hedgerows along the southern boundary of the eastern parcel will further soften, filter and screen views of the panels and ancillary structures in views from this location. There will be a barely perceptible change in the composition of the view, although by Year 15 more of this change will result from the established planting than from the introduction of the panels. The change will be at some distance from the viewer and only glimpsed or occupying a limited extent of the view. However, the proposed planting will have become established. The balance of positive and negative effects is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience.
	Views are from the setting of a location that is designated as a Grade II* listed building and as such has notable cultural associations attached to the view. Receptors are people using a venue for weddings and other important events and are therefore engaged in an activity in which their visual setting is important and the landscape is likely an important focus of their attention.													
Users of the lane that runs along the eastern slopes of the Cefn Meiriadog ridge (Site Context Photographs 8 and 9)	Very Low	Very High	Medium	Modest	Medium	Small	**Minor**	**Adverse**	Modest	Medium	Small	**Negligible**	**Adverse**	Users of the lane will have near and medium distance, transient views of the Proposed Development within the eastern and western parcels. These will be partial views, often heavily filtered by intervening tree belts, woodland blocks and hedgerows with frequent mature hedgerow trees, and will be limited to relatively short sections of the route. Solar reflectivity is likely to be experienced for more than three months a year but less than 60 minutes per day. Views of energy infrastructure are not uncharacteristic for receptors along this route. From these places there will be a perceptible change in the composition of the view, at some distance from the viewer and only glimpsed or occupying a discrete extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established, and the reinforced hedgerows and tree planting along the southern boundaries of the eastern and western parcels will further soften, filter and screen views of the panels and ancillary structures in views from this lane. The likelihood of experiencing solar reflections will also decrease. There will be a perceptible change in the composition of the view, which will be limited to relatively short sections of the route. The change will remain at some distance from the viewer and only glimpsed or occupying a discrete extent of the view. However, the proposed planting will have become established. The balance of positive and negative effects is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience.
	Views are from a location that is not designated and has no notable cultural associations attached to the view. Whilst the route is a lane, its scale and form is not suited to vehicular use other than for access to the residences along it, and it appears to be used primarily for recreation by pedestrians and cyclists. As such, receptors are most likely to be people using it for recreational purposes and are therefore engaged in an activity to which their visual setting is of utmost importance and the landscape is the main focus of their attention.													

Visual Receptor				Visual Effects										
Name (Ref)	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Residents at Isfryn, Ty Celyn, Cefn Farm, Caubwll, 1 and 2 Camrau, 1 and 2 Church View and Rhewl (Near Site Context Photographs 8 and 9)	Very Low	High	Medium	Modest	Medium	Small	**Minor**	**Adverse**	Modest	Medium	Small	**Negligible**	**Adverse**	Residents will have near and medium distance, fixed views of the Proposed Development within the eastern and western parcels. These will be partial views, often heavily filtered by intervening tree belts, woodland blocks and hedgerows with frequent mature hedgerow trees. Solar reflectivity is likely to be experienced from some of these properties for more than three months a year but less than 60 minutes per day. Views of energy infrastructure are not uncharacteristic for receptors in these locations. From these places there will be a perceptible change in the composition of the view, at some distance from the viewer and only glimpsed or occupying a discrete extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established, and the reinforced hedgerows and tree and shrub planting along the boundaries of each parcel will further soften, filter and screen views of the panels and ancillary structures in views from these locations. The likelihood of experiencing solar reflections will also decrease. There will be a perceptible change in the composition of the view. The change will be at some distance from the viewer and only glimpsed or occupying a discrete extent of the view. However, the proposed planting will have become established. The balance of positive and negative effects is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience.
	Views are from a location that is not designated and has no notable cultural associations attached to the view. Receptors are people at their place of residence. They are at a location where their visual setting is important and the landscape is likely an important focus of their attention.													
Residents at Tan y Bryn and Tan y Bryn Uchaf (No Site Context Photograph)	Very Low	High	Medium	Modest	Medium	Small	**Minor**	**Adverse**	Modest	Medium	Small	**Negligible**	**Adverse**	Residents will have near distance, fixed views of the Proposed Development within the western parcel. These will be filtered by intervening field boundary vegetation. Views of energy infrastructure are not uncharacteristic for receptors in these locations. There will be a perceptible change in the composition of the view, only glimpsed or occupying a discrete extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established, and the reinforced hedgerows along the western boundary of the western parcel will further soften, filter and screen views of the panels and ancillary structures in views from these locations. There will be a perceptible change in the composition of the view, although by Year 15 more of this change will result from the established planting than from the introduction of the panels. The change will be only glimpsed or occupying a discreet extent of the view. However, the proposed planting will have become established. The balance of positive and negative effects is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience.
	Views are from a location that is not designated and has no notable cultural associations attached to the view. Receptors are people at their place of residence. They are at a location where their visual setting is important and the landscape is likely an important focus of their attention.													
Pedestrians on the short distance local footpaths PRoW 105/3, 105/4 and 105/6 (Site Context Photographs 7 and 10)	Very Low	Very High	Medium	Compact	Medium	Very Small	**Negligible**	**Adverse**	Compact	Medium	Very Small	**No Effect**	**No Effect**	Pedestrians on these footpaths will have medium distance, transient views of the Proposed Development within the eastern and western parcels. These will be glimpsed views, heavily filtered by intervening hedgerow vegetation. Views of energy infrastructure are not uncharacteristic for receptors along this route. Solar reflectivity is likely to be experienced for pedestrians on PRoW 105/3 and 105/4 for more than three months a year but less than 60 minutes per day. From these places there will be a barely perceptible change in the composition of the view, at some distance from the viewer and only glimpsed or occupying a limited extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will have minimal significance from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established, and the reinforced hedgerows and the tree and shrub planting along the Solar Site boundaries will further soften, filter and screen views of the panels and ancillary structures in views from these footpaths. The likelihood of experiencing solar reflections will also decrease. There will be a barely perceptible change in the composition of the view. The change will be at some distance from the viewer and only glimpsed or occupying a limited extent of the view. The effects will not be significant from a landscape and visual perspective. The proposed planting will have become established and as such the positive and negative effects will on balance maintain the composition of the viewing experience.
	Views are from a location that is not designated and has no notable cultural associations attached to the view. Receptors are people using a footpath for recreational purposes and are therefore engaged in an activity to which their visual setting is of utmost importance and the landscape is the main focus of their attention.													
Users of the churchyard of the Church of St Mary in Cefn Meiriadog (Near Site Context Photograph 10)	Medium	High	High	Compact	Medium	Very Small	**Minor**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	Users of the churchyard will have medium distance, fixed views of the Proposed Development within the western parcel. These will be glimpsed views, heavily filtered by intervening hedgerow and woodland vegetation. Solar reflectivity is likely to be experienced from this location for more than three months a year but less than 60 minutes per day. Views of energy infrastructure are not uncharacteristic for receptors in this location. There will be at most a barely perceptible change in the composition of the view, at some distance from the viewer and only glimpsed or occupying a very limited extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established, and the tree and shrub planting along the southern boundaries of the western parcel will further soften, filter and screen views of the panels and ancillary structures in views from this location. The likelihood of experiencing solar reflections will also decrease. There will be at most a barely perceptible change in the composition of the view. The change will be at some distance from the viewer and only glimpsed or occupying a very limited extent of the view. However, the proposed planting will have become established. The balance of positive and negative effects results is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience.
	Views are from the setting of a location that is designated as a Grade II listed building and as such has notable cultural associations attached to the view. Receptors are people using a religious or memorial space and are therefore engaged in an activity in which their visual setting is important and the landscape is likely an important focus of their attention.													

Visual Receptor				Visual Effects										
Name (Ref)	Sensitivity			Operational Phase – (Year 1)					Operational Phase – (Year 15 – Residual Effects)					Description of Effects
				Magnitude			Significance	Balance	Magnitude			Significance	Balance	
	Value	Susceptibility		Scale	Duration				Scale	Duration				
Residents at Tyddyn Meredydd (Near Site Context Photograph 7)	Medium	High	High	Compact	Medium	Very Small	**Minor**	**Adverse**	Compact	Medium	Very Small	**Negligible**	**Adverse**	Residents will have medium distance, fixed views of the Proposed Development within the eastern and western parcels. These will be glimpsed views, heavily filtered by intervening hedgerow and woodland vegetation. Views of energy infrastructure are not uncharacteristic for receptors in this location. There will be at most a barely perceptible change in the composition of the view, at some distance from the viewer and only glimpsed or occupying a very limited extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the effects will not be significant from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established, and the reinforced hedgerows and the tree and shrub planting along the Solar Site boundaries will further soften, filter and screen views of the panels and ancillary structures in views from this location. There will be at most a barely perceptible change in the composition of the view, although by Year 15 more of this change will result from the established planting than from the introduction of the panels. The change will be at some distance from the viewer and only glimpsed or occupying a very limited extent of the view. However, the proposed planting will have become established. The balance of positive and negative effects is such that they will have minimal significance from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience.
	Views are from the setting of a location that is designated as a Grade II* listed building and as such has notable cultural associations attached to the view. Receptors are people at their place of residence. They are at a location where their visual setting is important and the landscape is likely an important focus of their attention.													
Users of PRoW and lanes within and immediately adjacent to the Clwydian Range and Dee Valley National Landscape (Site Context Photographs 12, 14 and 15)	Very High	Very High	Very High	Compact	Medium	Very Small	**Minor**	**Adverse**	Compact	Medium	Very Small	**Minor**	**Adverse**	Users of PRoW and lanes within and adjacent to the National Landscape will have very long distance, transient views of the Proposed Development within the eastern and western parcels. These will be glimpsed views and from limited locations, very heavily filtered and screened by intervening hedgerow and woodland vegetation. Views of energy infrastructure are not uncharacteristic for receptors in this location. There will be at the very most a barely perceptible change in the composition of the view, at a very considerable distance from the viewer and only just glimpsed or occupying a very limited extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the very long distances involved mean that the overall level of significance of the effects is reduced, such that they will not be significant from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established. There will be at most a barely perceptible change in the composition of the view. The change will be at a very considerable distance from the viewer and only just glimpsed or occupying a very limited extent of the view. The effects will not be significant from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience.
	Views are from a location that is nationally designated and has notable cultural associations attached to the view. Receptors are people using lanes and PRoW often for recreational purposes and are therefore engaged in an activity to which their visual setting is of utmost importance and the landscape is the main focus of their attention.													
Residents of properties within and immediately adjacent to the Clwydian Range and Dee Valley National Landscape (Near Site Context Photographs 12, 14 and 15)	Very High	High	Very High	Compact	Medium	Very Small	**Minor**	**Adverse**	Compact	Medium	Very Small	**Minor**	**Adverse**	Residents will have very long distance, fixed views of the Proposed Development within the eastern and western parcels. These will be glimpsed views, very heavily filtered and screened by intervening hedgerow and woodland vegetation. Views of energy infrastructure are not uncharacteristic for receptors in this location. There will be at most a barely perceptible change in the composition of the view, at a very considerable distance from the viewer and only just glimpsed or occupying a very limited extent of the view. Whilst the Proposed Development is expected to remain in place for an extended temporary period (up to 40 years) and at Year 1 the planting will have yet to establish, the very long distances involved mean that the overall level of significance of the effects is reduced, such that they will not be significant from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience. By Year 15 the landscape strategy will have become established. There will be at most a barely perceptible change in the composition of the view. The change will be at a very considerable distance from the viewer and only just glimpsed or occupying a very limited extent of the view. The effects will not be significant from a landscape and visual perspective, although they will result in damage to the composition of the viewing experience.
	Views are from a location that is nationally designated and has notable cultural associations attached to the view. Receptors are people at their place of residence. They are at a location where their visual setting is important and the landscape is likely an important focus of their attention.													

Value of the receptor: Very Low, Low, Medium, High or Very High
Susceptibility of the receptor: Very Low, Low, Medium, High or Very High
Sensitivity of the receptor: Very Low, Low, Medium, High or Very High
Scale of the effect: None, Compact, Modest, Ample or Extensive
Duration of the effect: None, Very Short, Short, Medium or Long
Magnitude of the effect: None, Very Small, Small, Medium or Large
Significance of the effect: No Effect, Negligible, Minor, Moderate, Major or Substantial
Balance of the effect: Adverse, No Effect or Beneficial

Appendix 7.8 Cumulative Effects



Appendix 7.8: Cumulative Effects Table

Receptor		Effects								
		Operational Phase at Year 1		Operational Phase at Year 15		Operational Phase at Year 1 – Residual Effects		Operational Phase at Year 15 – Residual Effects		
Name	**Sensitivity**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Description of Effects**
Clwydian Range and Dee Valley National Landscape	Very High	Effects resulting from the Proposed Development Alone:								All 14 Cumulative Schemes are located within the setting of the Clwydian Range and Dee Valley National Landscape, and as such they will all have a direct effect on a very small proportion of its setting. Each of the Cumulative Schemes except for Cumulative Scheme I will have an indirect effect on the National Landscape itself as a result of their intervisibility with this receptor, albeit they will be seen at a very long distance (since the nearest Cumulative Scheme is 3.1km from the National Landscape) and from only a very small proportion of the area of the receptor. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a half-step (e.g., from "Very Small" to "Very Small to Small") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	
LCA D/LC/6: Vale of Clwyd North	Medium	Effects resulting from the Proposed Development Alone:								Cumulative Schemes A, B, C, D, G, J, K, L and M are located within LCA D/LC/6: Vale of Clwyd North, and as such they will have a direct effect on the very small proportion of this receptor that lies within their boundaries. However, these Cumulative Schemes, as well as Cumulative Schemes E, F, H and N, will also have an indirect effect on the LCA as a result of their intervisibility with this receptor. The ZTV indicates that half of the LCA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Scheme I will have neither a direct nor an indirect effect on the LCA, as it is outside the LCA and has no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by one and half steps (e.g., from "Very Small" to "Small to Medium") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small to Medium	**Minor to Moderate Adverse**	Small to Medium	**Minor to Moderate Adverse**	Small to Medium	**Minor to Moderate Adverse**	Small to Medium	**Minor to Moderate Adverse**	
The character of the Solar Site	Medium	Effects resulting from the Proposed Development Alone:								None of the Cumulative Schemes are located within the Solar Site, and as such they will not have a direct effect on this receptor. Cumulative Schemes A and C will have an indirect effect on the character of the Solar Site as a result of their intervisibility with this receptor. The ZTV indicates that less than a tenth of the Solar Site will not have intervisibility with at least one of these Cumulative Schemes. The ZTV indicates that Cumulative Schemes J and L will theoretically be visible from within the Solar Site, although the field work suggests that this will not be the case. The ZTV indicates that Cumulative Schemes B, D, E, F, G, H, I, K, M and N will have neither a direct nor an indirect effect on the character of the Solar Site, as they are outside the Solar Site and have no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a full step (e.g., from "Medium" to "Large") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Medium	Moderate Adverse	Medium	Minor Adverse	Medium	Moderate Adverse	Medium	Minor Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Large	**Major Adverse**	Large	**Moderate Adverse**	Large	**Major Adverse**	Large	**Moderate Adverse**	
Geological Landscape AA Bodelwyddan (DNBGHGL016)	High	Effects resulting from the Proposed Development Alone:								Cumulative Schemes A, B, C, D, E, F, G, H, K and N are located within Geological Landscape AA Bodelwyddan, and as such they will have a direct effect on the small proportion of this receptor that lies within their boundaries. However, these Cumulative Schemes, as well as Cumulative Schemes J, L and M, will also have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that less than a tenth of the AA will not have intervisibility with at least one of these Cumulative Schemes or the Proposed Development. Cumulative Scheme I will have neither a direct nor an indirect effect on the AA, as it is outside the AA and has no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by one and half steps (e.g., from "Small" to "Medium to Large") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Minor Adverse	Small	Negligible Adverse	Small	Minor Adverse	Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Medium to Large	**Moderate to Major Adverse**	Medium to Large	**Minor to Moderate Adverse**	Medium to Large	**Moderate to Major Adverse**	Medium to Large	**Minor to Moderate Adverse**	
Geological Landscape AA Cefn Meiriadog (DNBGHGL031)	High	Effects resulting from the Proposed Development Alone:								Cumulative Scheme A is located within Geological Landscape AA Cefn Meiriadog, and as such it will have a direct effect on the very small proportion of this receptor that lies within its boundary. However, this Cumulative Scheme, as well as each of the other Cumulative Schemes except for Cumulative Scheme I, will also have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that over two thirds of the AA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Scheme I will have neither a direct nor an indirect effect on the AA, as it is outside the AA and has no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a full step (e.g., from "Small" to "Medium") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Moderate Adverse	Small	Minor Adverse	Small	Moderate Adverse	Small	Minor Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Medium	**Major Adverse**	Medium	**Moderate Adverse**	Medium	**Major Adverse**	Medium	**Moderate Adverse**	
Geological Landscape AA		Scoped out of cumulative assessment								Scoped out as no effect resulting from the Proposed Development alone, and as such, no cumulative effects resulting from the Proposed Development in combination with any Cumulative Scheme can occur.

Receptor		Effects								
		Operational Phase at Year 1		Operational Phase at Year 15		Operational Phase at Year 1 – Residual Effects		Operational Phase at Year 15 – Residual Effects		
Name	**Sensitivity**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Description of Effects**
Tytywyrch (DNBGHGL015)										
Geological Landscape AA The Roe (DNBGHGL017)		Scoped out of cumulative assessment								Scoped out as no effect resulting from the Proposed Development alone, and as such, no cumulative effects resulting from the Proposed Development in combination with any Cumulative Scheme can occur.
Geological Landscape AA Elwy Gorge (DNBGHGL032)		Scoped out of cumulative assessment								Scoped out as no effect resulting from the Proposed Development alone, and as such, no cumulative effects resulting from the Proposed Development in combination with any Cumulative Scheme can occur.
Geological Landscape AA Henllan (DNBGHGL035)		Scoped out of cumulative assessment								Scoped out as no effect resulting from the Proposed Development alone, and as such, no cumulative effects resulting from the Proposed Development in combination with any Cumulative Scheme can occur.
Geological Landscape AA Waen Gloeugoed (DNBGHGL019)	High	Effects resulting from the Proposed Development Alone:								None of the Cumulative Schemes are located within Geological Landscape AA Waen Gloeugoed, and as such they will not have a direct effect on this receptor. Cumulative Schemes A, B, C, D, E, F, G, H, K and N will have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that Cumulative Schemes J and L may have a very small level of intervisibility with the AA, but that overall, over half of the AA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Schemes I and M will have neither a direct nor an indirect effect on the AA, as they are outside the AA and have no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a full step (e.g., from “Very Small” to “Small”) at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Minor Adverse	Very Small	Negligible Adverse	Very Small	Minor Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small	**Moderate Adverse**	Small	**Minor Adverse**	Small	**Moderate Adverse**	Small	**Minor Adverse**	
Landscape Habitats AA Cefn Improved Grassland (DNBGHLH023)	Medium	Effects resulting from the Proposed Development Alone:								Cumulative Schemes A, C and D are located within Landscape Habitats AA Cefn Improved Grassland, and as such they will have a direct effect on the small proportion of this receptor that lies within their boundaries. However, these Cumulative Schemes, as well as Cumulative Schemes B, E, F, G, H, J, K, L and M, will also have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that only a tenth of the AA will not have intervisibility with at least one Cumulative Scheme or the Proposed Development. Cumulative Schemes I and N will have neither a direct nor an indirect effect on the AA, as they are outside the AA and have no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by one and a half steps (e.g., from “Small” to “Medium to Large”) at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Minor Adverse	Small	Minor Beneficial	Small	Minor Adverse	Small	Minor Beneficial	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Medium to Large	**Moderate to Major Adverse**	Medium to Large	**No Effect to Negligible Beneficial**	Medium to Large	**Moderate to Major Adverse**	Medium to Large	**No Effect to Negligible Beneficial**	
Landscape Habitats AA Bodelwyddan Lowland Parkland (DNBGHLH021)		Scoped out of cumulative assessment								Scoped out as no effect resulting from the Proposed Development alone, and as such, no cumulative effects resulting from the Proposed Development in combination with any Cumulative Scheme can occur.
Landscape Habitats AA Vale of Clwyd North Improved Grassland (DNBGHLH017)		Scoped out of cumulative assessment								Scoped out as no effect resulting from the Proposed Development alone, and as such, no cumulative effects resulting from the Proposed Development in combination with any Cumulative Scheme can occur.
Cultural Landscape Services AA Cefn Estate (DNBGHCLS030)	Medium	Effects resulting from the Proposed Development Alone:								Cumulative Schemes A, C and D are located within Cultural Landscape Services AA Cefn Estate, and as such they will have a direct effect on the small proportion of this receptor that lies within their boundaries. However, these Cumulative Schemes, as well as Cumulative Schemes B, F, G, H, J, K, L and M, will also have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that Cumulative Scheme E may have a very small level of intervisibility with the AA, but that overall only a tenth of the AA will not have intervisibility with at least one Cumulative Scheme or the Proposed Development. Cumulative Schemes I and N will have neither a direct nor an indirect effect on the AA, as it is outside the AA and has no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by one and a half steps (e.g., from “Small” to “Medium to Large”) at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Minor Adverse	Small	Negligible Adverse	Small	Minor Adverse	Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Medium to Large	**Moderate to Major Adverse**	Medium to Large	**Minor to Moderate Adverse**	Medium to Large	**Moderate to Major**	Medium to Large	**Minor to Moderate**	

Receptor		Effects								
		Operational Phase at Year 1		Operational Phase at Year 15		Operational Phase at Year 1 – Residual Effects		Operational Phase at Year 15 – Residual Effects		
Name	Sensitivity	Magnitude	Significance	Magnitude	Significance	Magnitude	Significance	Magnitude	Significance	Description of Effects
Cultural Landscape Services AA Limestone Valley-Cefn (DNBGHCLS035)	Medium	Effects resulting from the Proposed Development Alone:								None of the Cumulative Schemes are located within Cultural Landscape Services AA Limestone Valley-Cefn, and as such they will not have a direct effect on this receptor. Each of the Cumulative Schemes except for Cumulative Scheme I will have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that a quarter of the AA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Scheme I will have neither a direct nor an indirect effect on the AA, as it is outside the AA and has no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a half-step (e.g., from "Very Small" to "Very Small to Small") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	
Cultural Landscape Services AA Wooded Parkland and Parkland Remnants (DNBGHCLS033)	Medium	Effects resulting from the Proposed Development Alone:								None of the Cumulative Schemes are located within Cultural Landscape Services AA Wooded Parkland and Parkland Remnants, and as such they will not have a direct effect on this receptor. Cumulative Schemes A, B, C, D, F, G, H, J, K, L and M will have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that Cumulative Schemes E and N may have a very small level of intervisibility with the AA, but that overall, half of the AA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Scheme I will have neither a direct nor an indirect effect on the AA, as it is outside the AA and has no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a full step (e.g., from "Very Small" to "Small") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small	**Minor Adverse**	Small	**Minor Adverse**	Small	**Minor Adverse**	Small	**Minor Adverse**	
Cultural Landscape Services AA Limestone Plateau-Denbigh/Henllan (DNBGHCLS037)	Medium	Effects resulting from the Proposed Development Alone:								None of the Cumulative Schemes are located within Cultural Landscape Services AA Limestone Plateau-Denbigh/Henllan, and as such they will not have a direct effect on this receptor. Cumulative Schemes B, C, D, F, G, H, I, J and L will have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that Cumulative Scheme M may have a very small level of intervisibility with the AA, but that overall, only a tenth of the AA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Schemes A, E, K and N will have neither a direct nor an indirect effect on the AA, as they are outside the AA and have no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a half-step (e.g., from "Very Small" to "Very Small to Small") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	
Cultural Landscape Services AA Vale of Clwyd-North of Denbigh (DNBGHCLS029)	Medium	Effects resulting from the Proposed Development Alone:								Cumulative Schemes J and L are located within Cultural Landscape Services AA Vale of Clwyd-North of Denbigh, and as such they will have a direct effect on the very small proportion of this receptor that lies within their boundaries. However, these Cumulative Schemes, as well as Cumulative Schemes A, B, C, D, E, F, G, H and N, will also have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that Cumulative Schemes K and M may have a very small level of intervisibility with the AA, but that overall, only a tenth of the AA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Scheme I will have neither a direct nor an indirect effect on the AA, as it is outside the AA and has no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a half-step (e.g., from "Very Small" to "Very Small to Small") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	
Cultural Landscape Services AA Vale Wooded Estate-South of Dyserth (DNBGHCLS017)	Medium	Effects resulting from the Proposed Development Alone:								None of the Cumulative Schemes are located within Cultural Landscape Services AA Vale Wooded Estate-South of Dyserth, and as such they will not have a direct effect on this receptor. Cumulative Schemes A, B, C, D, E, F, G, H, K and N will have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that Cumulative Schemes J and L may have a very small level of intervisibility with the AA, but that overall, only a tenth of the AA will not have intervisibility at least one Cumulative Scheme or the Proposed Development. Cumulative Schemes I and M will have neither a direct nor an indirect effect on the AA, as they are outside the AA and have no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a full step (e.g., from "Very Small" to "Small") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small	**Minor Adverse**	Small	**Minor Adverse**	Small	**Minor Adverse**	Small	**Minor Adverse**	

Receptor		Effects								
		Operational Phase at Year 1		Operational Phase at Year 15		Operational Phase at Year 1 – Residual Effects		Operational Phase at Year 15 – Residual Effects		
Name	**Sensitivity**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Description of Effects**
Historic Landscape AA Pentre-mawr (DNBGHHL041)	Medium	Effects resulting from the Proposed Development Alone:								Cumulative Schemes A, C, D, G, J, K and L are located within Historic Landscape AA Pentre-mawr, and as such they will have a direct effect on the very small proportion of this receptor that lies within their boundaries. However, these Cumulative Schemes, as well as Cumulative Schemes B, E, F, H, M and N, will also have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that two thirds of the AA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Scheme I will have neither a direct nor an indirect effect on the AA, as it is outside the AA and has no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by one and a half steps (e.g., from "Small" to "Medium to Large") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Minor Adverse	Small	Negligible Adverse	Small	Minor Adverse	Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Medium to Large	**Moderate to Major**	Medium to Large	**Minor to Moderate**	Medium to Large	**Moderate to Major**	Medium to Large	**Minor to Moderate**	
Historic Landscape AA Bont-newydd (DNBGHHL021)	High	Effects resulting from the Proposed Development Alone:								None of the Cumulative Schemes are located within Historic Landscape AA Bont-newydd, and as such they will not have a direct effect on this receptor. Each of the Cumulative Schemes except for Cumulative Schemes I and N will have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that half of the AA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Schemes I and N will have neither a direct nor an indirect effect on the AA, as they are outside the AA and have no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a full step (e.g., from "Small" to "Medium") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Moderate Adverse	Small	Minor Adverse	Small	Moderate Adverse	Small	Minor Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Medium	**Major Adverse**	Medium	**Moderate Adverse**	Medium	**Major Adverse**	Medium	**Moderate Adverse**	
Historic Landscape AA Plas Heaton (DNBGHHL039)	Medium	Effects resulting from the Proposed Development Alone:								None of the Cumulative Schemes are located within Historic Landscape AA Plas Heaton, and as such they will not have a direct effect on this receptor. Each of the Cumulative Schemes except for Cumulative Schemes A, E, K, M and N will have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that a quarter of the AA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Scheme A, E, K, M and N will have neither a direct nor an indirect effect on the AA, as they are outside the AA and have no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a half-step (e.g., from "Very Small" to "Very Small to Small") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	
Historic Landscape AA Brynbella (DNBGHHL026)	Medium	Effects resulting from the Proposed Development Alone:								None of the Cumulative Schemes are located within Historic Landscape AA Brynbella, and as such they will not have a direct effect on this receptor. Cumulative Schemes B, C, D and H will have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that Cumulative Schemes E, K, L and N may have a very small level of intervisibility with the AA, but that overall, half of the AA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Schemes A, F, G, I, J and M will have neither a direct nor an indirect effect on the AA, as they are outside the AA and have no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a half-step (e.g., from "Very Small" to "Very Small to Small") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Negligible to Minor Adverse**	
Historic Landscape AA Bodelwyddan Park (DNBGHHL005)	Medium	Effects resulting from the Proposed Development Alone:								Cumulative Scheme B is located within Historic Landscape AA Bodelwyddan Park, and as such it will have a direct effect on the very small proportion of this receptor that lies within its boundary. However, this Cumulative Scheme, as well as Cumulative Schemes A, C, D, F, G, H, J, K, L and M, will also have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that Cumulative Scheme E may have a very small level of intervisibility with the AA, but that overall, only a tenth of the AA will not have intervisibility with at least one Cumulative Scheme or the Proposed Development. Cumulative Schemes I and N will have neither a direct nor an indirect effect on the AA, as they are outside the AA and have no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a full step (e.g., from "Very Small" to "Small") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small	**Minor Adverse**	Small	**Minor Adverse**	Small	**Minor Adverse**	Small	**Minor Adverse**	

Receptor		Effects								
		Operational Phase at Year 1		Operational Phase at Year 15		Operational Phase at Year 1 – Residual Effects		Operational Phase at Year 15 – Residual Effects		
Name	**Sensitivity**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Description of Effects**
Visual and Sensory AA Cefn Estate (DNBGHVS033)	Medium	Effects resulting from the Proposed Development Alone:								Cumulative Schemes A, C and D are located within Visual and Sensory AA Cefn Estate, and as such they will have a direct effect on the small proportion of this receptor that lies within their boundaries. However, these Cumulative Schemes, as well as Cumulative Schemes B, F, G, H, J, K, L and M, will also have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that Cumulative Scheme E may have a very small level of intervisibility with the AA, but that overall, less than a tenth of the AA will not have intervisibility at least one Cumulative Scheme or the Proposed Development. Cumulative Schemes I and N will have neither a direct nor an indirect effect on the AA, as they are outside the AA and have no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by one and a half steps (e.g., from “Small” to “Medium to Large”) at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Minor Adverse	Small	Negligible Adverse	Small	Minor Adverse	Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Medium to Large	**Moderate to Major Adverse**	Medium to Large	**Minor to Moderate Adverse**	Medium to Large	**Moderate to Major Adverse**	Medium to Large	**Minor to Moderate Adverse**	
Visual and Sensory AA Vale of Clwyd-North of Denbigh (DNBGHVS031)	High	Effects resulting from the Proposed Development Alone:								Cumulative Schemes J and L are located within Visual and Sensory AA Vale of Clwyd-North of Denbigh, and as such they will have a direct effect on the very small proportion of this receptor that lies within their boundaries. However, these Cumulative Schemes, as well as Cumulative Schemes A, B, C, D, E, F, G, H and N, will also have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that Cumulative Schemes K and M may have a very small level of intervisibility with the AA, but that overall, only a fifth of the AA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Scheme I will have neither a direct nor an indirect effect on the AA, as it is outside the AA and has no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a half-step (e.g., from “Very Small” to “Very Small to Small”) at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Minor Adverse	Very Small	Negligible Adverse	Very Small	Minor Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Very Small to Small	**Minor to Moderate Adverse**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**Minor to Moderate Adverse**	Very Small to Small	**Negligible to Minor Adverse**	
Visual and Sensory AA Vale Wooded Estate-South of Dyserth (DNBGHVS016)	High	Effects resulting from the Proposed Development Alone:								None of the Cumulative Schemes are located within Visual and Sensory AA Vale Wooded Estate-South of Dyserth, and as such they will not have a direct effect on this receptor. Cumulative Schemes A, B, C, D, E, F, G, H, K and N will have an indirect effect on the AA as a result of their intervisibility with this receptor. The ZTV indicates that Cumulative Schemes J, L and M may have a very small level of intervisibility with the AA, but that overall, four fifths of the AA will have intervisibility with one or more Cumulative Schemes and the Proposed Development. Cumulative Scheme I will have neither a direct nor an indirect effect on the AA, as it is outside the AA and has no intervisibility with it. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a full step (e.g., from “Very Small” to “Small”) at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Minor Adverse	Very Small	Negligible Adverse	Very Small	Minor Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small	**Moderate Adverse**	Small	**Minor Adverse**	Small	**Moderate Adverse**	Small	**Minor Adverse**	
Open fields		Scoped out of cumulative assessment								These physical features present within the Site will not be affected by the Cumulative Schemes, and as such, no cumulative effects resulting from the Proposed Development in combination with any Cumulative Scheme can occur.
Native hedgerow		Scoped out of cumulative assessment								
Canopy trees		Scoped out of cumulative assessment								
Waterbodies		Scoped out of cumulative assessment								
Users of the bridleway PRoW 208/3 (Site Context Photograph 6)		Scoped out of cumulative assessment								Scoped out as no effect resulting from the Proposed Development alone, and as such, no cumulative effects resulting from the Proposed Development in combination with any Cumulative Scheme can occur.

Receptor		Effects								
		Operational Phase at Year 1		Operational Phase at Year 15		Operational Phase at Year 1 – Residual Effects		Operational Phase at Year 15 – Residual Effects		
Name	**Sensitivity**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Description of Effects**
Residents at Coed yr Esgob (Site Context Photograph 6)	Medium	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Schemes B, G, H and K may be concurrently visible to a very limited extent in views experienced by residents at Coed yr Esgob. Cumulative Schemes A, C, D, E, F, I, J, L, M and N will not be visible in views experienced by these receptors. There is no potential for residents to experience sequential cumulative effects as views are fixed. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a half-step (e.g., from "Very Small" to "Very Small to Small") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Minor Adverse	Small	Negligible Adverse	Small	Minor Adverse	Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small to Medium	**Minor to Moderate Adverse**	Small to Medium	**Negligible to Minor Adverse**	Small to Medium	**Minor to Moderate Adverse**	Small to Medium	**Negligible to Minor Adverse**	
Users of the north/south lane that runs between the parcels (Site Context Photographs 1 to 4)	Very High	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Scheme C, and to a lesser extent Cumulative Schemes A and L, may be concurrently visible in views experienced by users of the north/south lane that runs between the parcels, from a small proportion of the route. Sequential views will also be available to these receptors as they move along the route. Both concurrent and sequential views of the Proposed Development and Cumulative Scheme J may be available to these receptors to a very limited extent. Views of at least one Cumulative Scheme or the Proposed Development will be available from nine tenths of the route. Cumulative Schemes B, D, E, F, G, H, I, K, M and N will not be visible in views experienced by these receptors. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a full step (e.g., from "Small" to "Medium") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Moderate Adverse	Small	Minor Adverse	Small	Moderate Adverse	Small	Minor Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Medium	**Major Adverse**	Medium	**Moderate Adverse**	Medium	**Major Adverse**	Medium	**Moderate Adverse**	
Residents at Tyn y Fford Fawr, Squirrels Lodge, Tyn y Ffordd Bach, Tyn y Fford Newydd and Rhos Aber (Near Site Context Photographs 1 to 4)	Medium	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Scheme C may be concurrently visible to a moderate extent in views experienced by residents at Tyn y Fford Fawr, Squirrels Lodge, Tyn y Ffordd Bach, Tyn y Fford Newydd and Rhos Aber. The Proposed Development and Cumulative Scheme A may be concurrently visible to a very limited extent to residents of Squirrels Lodge. Cumulative Schemes B, D, E, F, G, H, I, J, K, L, M and N will not be visible in views experienced by these receptors. There is no potential for residents to experience sequential cumulative effects as views are fixed. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a half-step (e.g., from "Small" to "Small to Medium") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Minor Adverse	Small	Negligible Adverse	Small	Minor Adverse	Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small to Medium	**Minor to Moderate Adverse**	Small to Medium	**Negligible to Minor Adverse**	Small to Medium	**Minor to Moderate Adverse**	Small to Medium	**Negligible to Minor Adverse**	
Users of the east/west lane that runs to the south of the eastern parcel (Site Context Photograph 11)	Low	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Schemes C and L may be concurrently visible in views experienced by users of the east/west lane that runs to the south of the eastern parcel, from a moderate proportion of the route. Sequential views will also be available to these receptors as they move along the route. Both concurrent and sequential views of the Proposed Development and Cumulative Schemes B, H and J may be available to these receptors to a very limited extent. Views of at least one Cumulative Scheme or the Proposed Development will be available from four fifths of the route. Cumulative Schemes A, D, E, F, G, I, K, M and N will not be visible in views experienced by these receptors. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a half-step (e.g., from "Very Small" to "Very Small to Small") at Year 1, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone. As the Proposed Development alone results in No Effect at Year 15, no cumulative effects will result from the Proposed Development in combination with any Cumulative Scheme.
		Very Small	Negligible Adverse	Very Small	No Effect	Very Small	Negligible Adverse	Very Small	No Effect	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**No Effect**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**No Effect**	
Residents at Greystones, The Paddock, Glascoed Fawr, Glascoed Fawr Cottage and Wigfair Home Farm (Near Site Context Photograph 11)	Medium	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Schemes C and L may be concurrently visible to a moderate extent in views experienced by residents at Wigfair Home Farm, and to a very limited extent to residents at Greystones, The Paddock, Glascoed Fawr and Glascoed Fawr Cottage. The Proposed Development and Cumulative Scheme J may be concurrently visible to a very limited extent to residents of Wigfair Home Farm. Cumulative Schemes A, B, D, E, F, G, H, I, K, M and N will not be visible in views experienced by these receptors. There is no potential for residents to experience sequential cumulative effects as views are fixed. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a half-step (e.g., from "Very Small" to "Very Small to Small") at Year 1, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone. As the Proposed Development alone results in No Effect at Year 15, no cumulative effects will result from the Proposed Development in combination with any Cumulative Scheme.
		Very Small	Negligible Adverse	Very Small	No Effect	Very Small	Negligible Adverse	Very Small	No Effect	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**No Effect**	Very Small to Small	**Negligible to Minor Adverse**	Very Small to Small	**No Effect**	

Receptor		Effects								
		Operational Phase at Year 1		Operational Phase at Year 15		Operational Phase at Year 1 – Residual Effects		Operational Phase at Year 15 – Residual Effects		
Name	**Sensitivity**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Description of Effects**
Users of Wigfair Hall (Near Site Context Photograph 11)	High	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Schemes C and L may be concurrently visible to a moderate extent in views experienced by users of Wigfair Hall. The Proposed Development and Cumulative Scheme J may be concurrently visible to a very limited extent to residents of Wigfair Hall. Cumulative Schemes A, B, D, E, F, G, H, I, K, M and N will not be visible in views experienced by these receptors. There is no potential for residents to experience sequential cumulative effects as views are fixed. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a full step (e.g., from "Very Small" to "Small") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Minor Adverse	Very Small	Negligible Adverse	Very Small	Minor Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small	**Moderate Adverse**	Small	**Minor Adverse**	Small	**Moderate Adverse**	Small	**Minor Adverse**	
Users of the lane that runs along the eastern slopes of the Cefn Meiriadog ridge (Site Context Photographs 8 and 9)	Medium	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Scheme A, B, C, D, F, G, H, J, K, L and M may be concurrently visible in views experienced by users of the lane that runs along the eastern slopes of the Cefn Meiriadog ridge, from a large proportion of the route. Sequential views will also be available to these receptors as they move along the route. Both concurrent and sequential views of the Proposed Development and Cumulative Scheme E may be available to these receptors to a very limited extent. Views of at least one Cumulative Scheme or the Proposed Development will be available from the entirety of the route. Cumulative Schemes I and N will not be visible in views experienced by these receptors. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by one and a half steps (e.g., from "Small" to "Medium to Large") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Minor Adverse	Small	Negligible Adverse	Small	Minor Adverse	Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Medium to Large	**Moderate to Major Adverse**	Medium to Large	**Minor to Moderate Adverse**	Medium to Large	**Moderate to Major Adverse**	Medium to Large	**Minor to Moderate Adverse**	
Residents at Isfryn, Ty Celyn, Cefn Farm, Caubwll, 1 and 2 Camrau, 1 and 2 Church View and Rhewl (Near Site Context Photographs 8 and 9)	Medium	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Schemes A, B, C, D, F, G, H, J and L may be concurrently visible to a moderate extent in views experienced by residents at Isfryn, Ty Celyn, Cefn Farm, Caubwll, 1 and 2 Camrau, 1 and 2 Church View and Rhewl. The Proposed Development and Cumulative Scheme E may be concurrently visible to a very limited extent for these receptors. The Proposed Development and Cumulative Schemes K and M may be concurrently visible to a moderate extent to residents of each of these properties except for Rhewl. Cumulative Schemes I and N will not be visible in views experienced by these receptors. There is no potential for residents to experience sequential cumulative effects as views are fixed. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by one and a half steps (e.g., from "Small" to "Medium to Large") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Minor Adverse	Small	Negligible Adverse	Small	Minor Adverse	Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Medium to Large	**Moderate to Major Adverse**	Medium to Large	**Minor to Moderate Adverse**	Medium to Large	**Moderate to Major Adverse**	Medium to Large	**Minor to Moderate Adverse**	
Residents at Tan y Bryn and Tan y Bryn Uchaf (No Site Context Photograph)	Medium	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Schemes A, C, J and L may be concurrently visible to a moderate extent in views experienced by residents at Tan y Bryn and Tan y Bryn Uchaf. The Proposed Development and Cumulative Schemes B, D, G and H may be concurrently visible to a very limited extent for these receptors. Cumulative Schemes E, F, I, K, M and N will not be visible in views experienced by these receptors. There is no potential for residents to experience sequential cumulative effects as views are fixed. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a full step (e.g., from "Small" to "Medium") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Small	Minor Adverse	Small	Negligible Adverse	Small	Minor Adverse	Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Medium	**Moderate Adverse**	Medium	**Minor Adverse**	Medium	**Moderate Adverse**	Medium	**Minor Adverse**	
Pedestrians on the short distance local footpaths PRoW 105/3, 105/4 and 105/6	Medium	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Schemes C, D, G, J, K and L may be concurrently visible in views experienced by Pedestrians on the short distance local footpaths PRoW 105/3, 105/4 and 105/6, from a large proportion of each route. The Proposed Development and Cumulative Schemes A, B, F and H may be concurrently visible in views from PRoW 105/4 and 105/6. The Proposed Development and Cumulative Scheme M may be concurrently visible in views from PRoW 105/3 and 105/6. Sequential views of the above Cumulative Schemes will also be available to these receptors as they move along the routes. Both concurrent and sequential views of the Proposed Development and Cumulative Scheme E may be available from PRoW 105/6 to a very limited extent. Both concurrent and sequential views of the Proposed Development and Cumulative Scheme M may be available from PRoW 105/4 to a very limited
		Very Small	Negligible Adverse	Very Small	No Effect	Very Small	Negligible Adverse	Very Small	No Effect	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								

Receptor		Effects								
		Operational Phase at Year 1		Operational Phase at Year 15		Operational Phase at Year 1 – Residual Effects		Operational Phase at Year 15 – Residual Effects		
Name	**Sensitivity**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Description of Effects**
(Site Context Photographs 7 and 10)		Small to Medium	**Minor to Moderate Adverse**	Small to Medium	**No Effect**	Small to Medium	**Minor to Moderate Adverse**	Small to Medium	**No Effect**	extent. Views of at least one Cumulative Scheme or the Proposed Development will be available from the entirety of the routes. Cumulative Schemes I and N will not be visible in views experienced by these receptors. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by one and a half steps (e.g., from "Very Small" to "Small to Medium") at Year 1, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone. As the Proposed Development alone results in No Effect at Year 15, no cumulative effects will result from the Proposed Development in combination with any Cumulative Scheme.
Users of the churchyard of the Church of St Mary in Cefn Meiriadog (Near Site Context Photograph 10)	High	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Schemes B, C, G, H, J, K and L may be concurrently visible to a moderate extent in views experienced by users of the churchyard of the Church of St Mary in Cefn Meiriadog. The Proposed Development and Cumulative Schemes A, D and F may be concurrently visible to a very limited extent for these receptors. Cumulative Schemes E, I, M and N will not be visible in views experienced by these receptors. There is no potential for residents to experience sequential cumulative effects as views are fixed. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by a full step (e.g., from "Very Small" to "Small") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Minor Adverse	Very Small	Negligible Adverse	Very Small	Minor Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small	**Moderate Adverse**	Small	**Minor Adverse**	Small	**Moderate Adverse**	Small	**Minor Adverse**	
Residents at Tyddyn Meredydd (Near Site Context Photograph 7)	High	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Schemes A, B, C, D, F, G, H, J, K and L may be concurrently visible to a moderate extent in views experienced by residents at Tyddyn Meredydd. The Proposed Development and Cumulative Scheme E may be concurrently visible to a very limited extent for these receptors. Cumulative Schemes I, M and N will not be visible in views experienced by these receptors. There is no potential for residents to experience sequential cumulative effects as views are fixed. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by one and a half steps (e.g., from "Very Small" to "Small to Medium") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Minor Adverse	Very Small	Negligible Adverse	Very Small	Minor Adverse	Very Small	Negligible Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small to Medium	**Moderate to Major Adverse**	Small to Medium	**Minor to Moderate Adverse**	Small to Medium	**Moderate to Major Adverse**	Small to Medium	**Minor to Moderate Adverse**	
Users of PRoW and lanes within and immediately adjacent to the Clwydian Range and Dee Valley National Landscape (Site Context Photographs 12, 14 and 15)	Very High	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and Cumulative Schemes A, B, C, D, E, F, G, H, K and N, and to a lesser extent Cumulative Schemes J and L, may be concurrently visible in views experienced by users of PRoW and lanes within and immediately adjacent to the Clwydian Range and Dee Valley National Landscape, from a limited proportion of the National Landscape. Sequential views will also be available to these receptors as they move through the area. Both concurrent and sequential views of the Proposed Development and Cumulative Scheme M may be available to these receptors to a very limited extent. Views of at least one Cumulative Scheme or the Proposed Development will be available from a limited proportion of the National Landscape. Cumulative Scheme I will not be visible in views experienced by these receptors. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by one and a half steps (e.g., from "Very Small" to "Small to Medium") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Minor Adverse	Very Small	Minor Adverse	Very Small	Minor Adverse	Very Small	Minor Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small to Medium	**Moderate to Major Adverse**	Small to Medium	**Moderate to Major Adverse**	Small to Medium	**Moderate to Major Adverse**	Small to Medium	**Moderate to Major Adverse**	
Residents of properties within and immediately adjacent to the Clwydian Range and Dee Valley National Landscape (Near Site Context Photographs 12, 14 and 15)	Very High	Effects resulting from the Proposed Development Alone:								The ZTV indicates that the Proposed Development and each of the Cumulative Schemes except for Cumulative Scheme I may be concurrently visible to a moderate extent in views experienced by residents of properties within and immediately adjacent to the Clwydian Range and Dee Valley National Landscape. Cumulative Scheme I will not be visible in views experienced by these receptors. There is no potential for residents to experience sequential cumulative effects as views are fixed. In combination with the Proposed Development, the cumulative magnitude of change and significance of effect will increase by one and a half steps (e.g., from "Very Small" to "Minor Adverse") at both Years 1 and 15, in comparison to the magnitude of change and significance of effect resulting from the implementation of the Proposed Development alone.
		Very Small	Minor Adverse	Very Small	Minor Adverse	Very Small	Minor Adverse	Very Small	Minor Adverse	
		Cumulative Effects Resulting from the Proposed Development and Cumulative Schemes:								
		Small to Medium	**Moderate to Major Adverse**	Small to Medium	**Moderate to Major Adverse**	Small to Medium	**Moderate to Major Adverse**	Small to Medium	**Moderate to Major Adverse**	

Sensitivity of receptor: High, Medium or Low

Magnitude of change: Large, Medium to Large, Medium, Small to Medium, Small, Very Small to Small, Very Small, None to Very Small or None

Significance of effect: Substantial Beneficial, Major to Substantial Beneficial, Major Beneficial, Moderate to Major Beneficial, Moderate Beneficial, Minor to Moderate Beneficial, Minor Beneficial, Negligible to Minor Beneficial, Negligible Beneficial, No Effect to Negligible Beneficial, No Effect, No Effect to Negligible Adverse, Negligible Adverse, Negligible to Minor Adverse, Minor Adverse, Minor to Moderate Adverse, Moderate Adverse, Moderate to Major Adverse, Major Adverse, Major to Substantial Adverse, Substantial Adverse

Appendix 7.9 Landscape and Ecological Management Plan

Appendix 7.9 Landscape and Ecological Management Plan

7.9.1 Introduction

7.9.1.1 Stantec was commissioned by The Applicant to undertake a Landscape and Visual Impact Assessment (LVIA) as a technical chapter within an Environmental Statement to accompany a planning application for a proposed solar energy farm ('the Proposed Development') on land at Cefn Meiriadog, St Asaph ('the Site'), within the administrative area of Denbighshire County Council.

7.9.1.2 This Landscape and Ecological Management Plan (LEMP) has subsequently been prepared by Stantec, in collaboration with SLR Consulting, to provide a long-term landscape management and maintenance approach for the implementation and long-term after-care of landscape aspects for the Proposed Development, as well as to set out the measures that shall be taken to protect/safeguard ecological receptors during construction/installation.

7.9.1.3 The LVIA is supported by **Figure 6.7: Landscape Strategy Plan** (LSP). The LSP includes existing trees and hedgerows, and details of all proposed planting, including species, sizes and numbers.

7.9.1.4 This LEMP is accompanied by **Figure 6.9: Landscape Management Zones Plan** (LMZ Plan). The LMZ Plan sets out the broad management zones and components on which the structure of this document is based.

7.9.1.5 This LEMP is intended to satisfy the intent of Regulation 9 of The Conservation of Habitats and Species Regulations 2017 which were designed to seek the compliance with the relevant European Directives through the functions of an authority competent in habitats conservation management.

7.9.1.6 SLR Consulting (SLR) was commissioned to produce an Ecological Impact Assessment (EcIA), for the Proposed Development. In the production of this LEMP, input has been received from ecological consultancy SLR to ensure appropriate reference to existing species and habitats and mitigation measures has been included. The EcIA was completed in 2025 and accompanies the planning application.

7.9.1.7 In addition, reference has been made to the Natural Environment and Rural Communities (NERC) Act 2006, Section 41 Species and Habitats of Principal Importance and the Lowland Derbyshire Biodiversity Action Plan 2011 to 2020. UK BAP priority habitats and species are no longer accountable at a UK level following publication of the Natural Environment White Paper in 2011. However, the Biodiversity 2020 strategy (which succeeds the UK BAP in England) aims to achieve protection and enhancement of priority species and habitats (now referred to as species and habitats of principal importance) listed under Section 41 of the NERC Act.

7.9.1.8 Extracts from relevant planning policy and published evidence are set out in **Appendix 7.1: Policy and Guidance Extracts** and **Appendix 7.2: Published Evidence Extracts** of the ES **Chapter 7.**

7.9.2 Scope

7.9.2.1 The aim of this LEMP is to promote a sensitive management approach that protects, manages and enhances the Site for the benefit of habitats, landscape character and visual amenity in the long-term, and which protects/safeguards it during construction/installation works.

7.9.2.2 This document provides a strategy for overall management and maintenance of the landscape features of the Proposed Development, including existing features, hard and soft landscape

proposals and newly created habitats including native trees, shrubs, hedgerows, grassland and marginal planting.

7.9.2.3 The LEMP has been prepared to provide an integrated approach to the management of the landscape, ecology and amenities associated with the Proposed Development. It is a dynamic document that will be renewed on a regular basis to ensure it remains fit for purpose.

7.9.2.4 This LEMP has been prepared to cover a period of 20 years from the first year of operation of the Proposed Development.

7.9.2.5 The structure of this LEMP is as follows:

- **Section 7.9.3** describes the existing fauna and flora present in and around the Site, including key species;
- **Section 7.9.4** sets out the vision, aims and objectives;
- **Section 7.9.5** describes the Landscape Management Components and their associated maintenance tasks;
- **Section 7.9.6** describes the general maintenance and management tasks;
- **Section 7.9.7** outlines the arrangements for management responsibilities and the recommendations for the monitoring and review of the LEMP; and
- **Section 7.9.8** sets all maintenance tasks out in annual maintenance schedules for the plan period.

7.9.3 Existing Landscape and Ecology

7.9.3.1 The existing landscape of the Site is described in **Section 7.5 Baseline Conditions** of the **ES Chapter 7.**

7.9.3.2 This LEMP draws on ecological survey and desk study information set out in the EcIA prepared by SLR for the Proposed Development. The following section of the LEMP summarises the key information set out in the EcIA.

Statutory and Non-Statutory Ecological Designations

7.9.3.3 The Site itself does not include any statutory or non-statutory designated ecological sites, although there are two sites (covering the same geographical area) within 2km of the Solar Site, as set out in **Table 3.1**.

Table 3.1: Statutory Ecological Sites within 2km of the Solar Site

Site Name	Distance from Site
Coedwigoedd Dyffryn Elwy / Elwy Valley Woods Special Area of Conservation (SAC)	865m south-west
Coedydd ac Ogofau Elwy a Meirchion Site of Special Scientific Interest (SSSI)	865m south-west

7.9.3.4 The EcIA states that no direct or indirect impacts are predicted on any of the statutory designed sites in relation to the Proposed Development, and as such they are not considered further in the EcIA.

7.9.3.5 Several non-statutory designated ecological site have been identified within 2km of the Solar Site, as set out in **Table 3.2**.

Table 3.2: Non-Statutory Ecological Sites within 2km of the Solar Site

Site Name	Distance from Site
Ty'n-y-Coed Rough Wildlife Sites for Denbighshire	Partly adjacent to the eastern boundary of the eastern parcel
Glascoed Wildlife Sites for Denbighshire	Partly adjacent to the southern boundary of the eastern parcel
Coed Cord / Coed y Saeson Wildlife Sites for Denbighshire	123m north-west
Coed Fron and Eryl Hall Wood Wildlife Sites for Denbighshire	322m north-east
Gwynt-y-Mor Wild Ground Nature Reserve	416m north-west
Bryn Meiriadog Wildlife Sites for Denbighshire	431m west
Coed Kendrick Wildlife Sites for Denbighshire	631m south
Coed yr Accar Wildlife Sites for Denbighshire	737m south-west
Chapel Wood/Coed Mawr Wildlife Sites for Denbighshire	1028m south-east
Glascoed Wild Ground Nature Reserve	1267m north-west
Rickfield Wood/Coed Ddol Fawr/Coed Llanddol/Maes Elwy Covert (R Elwy Woods) Wildlife Sites for Denbighshire	1329m south-east
Coed Bont Newydd Wildlife Sites for Conwy	1556m south-west
Coed Nant-y-graig Wildlife Sites for Conwy	1614m south-west
Coed y Ddol/Coed y Fadir Wildlife Sites for Denbighshire	1649m west
Pwllau Graig Wildlife Sites for Conwy	1653m south-west
Mount Road Churchyard, St Asaph Wildlife Sites for Denbighshire	1774m north-east
Coed Pont y Trap Wildlife Sites for Conwy	1916m south
Pwllau Coed y Dafarn Wildlife Sites for Conwy	1973m south-west
Nany Meirchion Field Wildlife Sites for Denbighshire	1976m south

7.9.3.6 Of these, the EcIA states that the Ty'n-y-Coed Rough and Glascoed Wildlife Sites for Denbighshire lie immediately adjacent to Site, and as such they are considered further in the EcIA. None of the other non-statutory ecological sites are considered further in the EcIA, since their distances from the Site and the nature of the Proposed Development are such that it is highly unlikely that any negative impacts will occur.

Ancient Woodland

7.9.3.7 Several areas of ancient woodland occur within 2km of the Solar Site, including two which occur immediately adjacent to its boundary, as set out in **Table 3.3**.

Table 3.3: Ancient Woodland Adjacent to the Solar Site

Site Name	Distance from Site
Pig-y-fran Plantation on Ancient Woodland Site (AWS)	Partly adjacent to the western boundary of the eastern parcel
Tyn-y-coed Rough Restored AWS	Partly adjacent to the north-eastern boundary of the eastern parcel

7.9.3.8 Both AWSs adjacent to the Site are considered further in the EcIA. The other areas of ancient woodland are sufficiently distant not to be impacted, and as such they are not considered further in the EcIA.

Priority Habitats (Section 7 Environment (Wales) Act)

7.9.3.9 The data received by Cofnod found no priority habitats recorded within the Site itself. Several were listed within 2km of the Solar Site. None of these are considered further in the EcIA, since their distances from the Site and the nature of the Proposed Development are such that it is highly unlikely that any negative impacts will occur.

7.9.3.10 The UK Habitat Classification survey, however, did record priority habitats within the Solar Site, as listed under Section 7 of the Environment (Wales) Act 2016, as set out in **Table 3.4**.

Table 3.4: UK Habitat Classification Priority Habitats Within the Solar Site

UK Priority Habitat	Considered Further in the EcIA
Native Hedgerow	Yes
Other Lowland Mixed Woodland	Yes
Other Standing Water – Ponds	Yes
Other Rivers and Streams	Yes

Habitats

7.9.3.11 The location and extent of surveyed habitats and ecological features are indicated on Fi**gure 1: Baseline Habitats** within **Appendix H** of the EcIA. The habitats or ecological features found within or adjacent to the Site are set out in **Table 3.5**.

Table 3.5: Habitats Within and Adjacent to the Solar Site

Habitat Type	Considered Further in the EcIA
Other Lowland Mixed Deciduous Woodland (w1f7)	Yes
Other Rivers and Streams (r2b)	Yes
Other Standing Water (r1g)	Yes
Modified Grassland (g4)	No – common non-priority habitat of less than local importance
Mature Trees (secondary code 203)	No – all individual trees are to be retained as part of the Proposed Development

Habitat Type	Considered Further in the EcIA
Other Neutral Grassland (g3c)	No – common non-priority habitat of less than local importance
Native Hedgerow (h2a)	Yes
Ditches (secondary code 50)	Yes
Line of Trees (w1, 33)	No – the line of trees is to be retained as part of the Proposed Development
Urban – Other Developed Land (u1b6 839 track or 800 road)	No – not of ecological value
Urban – Artificial Unvegetated – Unsealed Surface (u1c)	No – not of ecological value
Built Linear Features (u1e 612 fence)	No – of insignificant ecological value

Protected and Notable Species

7.9.3.12 The species or species types recorded within 2km of the Site are set out in **Table 3.6**.

Table 3.6: Species or Species Type Within 2km of the Solar Site

Species or Species Type	Considered Further in the EcIA
Notable Plant Species	Considered alongside the wider priority habitat type
Invasive Non-Native Species	No – records no not relate to the Site itself and no non-native invasive species were recorded within the Site during surveys
Invertebrates	No – records do not relate to the Site itself and habitats within the Site are unlikely to support a locally significant population
Fish	No – freshwater habitats within the Site are unlikely to support any notable fish species
Amphibians including Great Crested Newt	Yes
Reptiles	No – the dominant habitat is generally unsuitable for reptiles and this group is considered unlikely to occur
Wintering Birds	No – the population of wintering birds with the Site is of less than local importance
Breeding Birds	Yes
Bats	Yes
Badgers	Yes
Otters	No – low likelihood of otters being presence
Water Voles	Yes
Hazel Dormouse	Yes

Species or Species Type	Considered Further in the EcIA
Other Mammals	No – the Site is not considered to be of value to these species, and/ or impacts upon them are not considered to be significant

EcIA Recommendations

7.9.3.13 The EcIA includes reference to the mitigation measures and proposed biodiversity enhancements set out below. These mitigation measures have informed the landscape strategy set out in the landscape and visual ES chapter and in **Figure 6.7: Landscape Strategy Plan**.

- Hedgerows will be retained wherever practicable. New hedgerow is proposed (173m) as well as reinforcement of existing hedgerow (2.8km), repairing any gaps larger than 0.5m wide. Planting will include native species such as field maple (Acer campestre), hazel (Corylus avellana), hawthorn (Crataegus monogyna), holly (Ilex aquifolium), blackthorn (Prunus spinosa) and bird cherry (Prunus padus).

- Buffer planting of native shrubs (0.65ha) around the Site boundary is proposed. The species mix will be agreed with Denbighshire Borough Council and ideally sourced from those grown at the council's tree nursery at St Asaph.

- Areas of native tree planting (1.19ha) will extend existing woodlands adjacent to the Site boundary. The species mix will be agreed with Denbighshire Borough Council and ideally sourced from those grown at the council's tree nursery at St Asaph.

- Ponds on Site will be retained and two will undergo reinstatement and improvement. A further seven will be created, having a minimum surface area of 100m^2 and will be of a sufficient depth to hold water in at least one in three summers. Spoil generated from the reinstatement or forming of ponds shall be used to create a series of hibernacula, each measuring at least 2m in length, 1m in width and 1m in height.

- The proposals include the creation of wildflower meadow and tussocky grassland suitable for great crested newt and supporting invertebrates and pollinators.

- Landscaping during operation will include aftercare as detailed in this LEMP.

7.9.4 Vision, Aims, Objectives and Future Trends

Vision

7.9.4.1 The landscape strategy seeks to provide a holistic landscape and ecological mitigation strategy for the Proposed Development and offers the opportunity to retain, enhance and create a variety of landscape features alongside the proposed built elements. These measures will assist in integrating the Proposed Development within the landscape, as well as complementing local landscape character and providing biodiversity opportunities.

Aims and Objectives

7.9.4.2 To achieve this vision, the key overarching aims and objectives of the LEMP are set out below:

Aim 1: To retain and enhance existing features

7.9.4.3 Objectives:

- Secure the current value of existing landscape features to be retained;
- Enhance those features that have potential for improvement; and
- Extend and connect isolated or fragmented habitats of value.

Aim 2: To establish new, high-quality landscape features within the Proposed Development

7.9.4.4 Objectives:

- Ensure new planting is healthy and of good form;
- Provide for the successful establishment of all proposed planting; and
- Ensure built elements and hard surfacing are maintained in good order.

Aim 3: To enhance biodiversity and ecological value

7.9.4.5 Objectives:

- Secure a healthy structure for trees, ponds, and grassland and encourage native shrub species and ground flora development;
- Extend and link habitat areas within and adjacent to the Site to create ecological corridors; and
- Provide additional foraging, shelter and commuting routes for wildlife.

Aim 4: To soften and integrate the Proposed Development within the surrounding landscape

7.9.4.6 Objectives:

- Maintain and enhance the healthy growth of trees, shrubs and grassland for landscape and visual amenity value;
- Ensure the successful establishment of screening planting to minimise impacts on visual amenity; and

- Enhance and reinforce structural landscape features and habitats which contribute towards a larger framework of green infrastructure throughout the Proposed Development.

Future Trends

7.9.4.7 This LEMP has been prepared to reflect the baseline conditions set out above with a view to ensuring the successful establishment of landscape proposals and ecological mitigation set out in the approved planning application.

7.9.4.8 However, landscape is dynamic and there will inevitably be changes to the Site and its features over the lifetime of the development and the period covered by this plan. The greatest source of pressure on the landscape is likely to be climate change.

7.9.4.9 Climate change is predicted to result in more extreme weather events across the UK, with heavier rainfall and more sustained periods of hot dry weather leading to increased flooding and droughts. These conditions are likely to result in a greater number of failed plants, particularly if these extreme events occur in the first two to three years after planting. Climate change is also known to be exacerbating bio-security issues, with native tree populations under attack by a number of pathogens and pests that have arrived in the UK in recent years.

7.9.4.10 Whilst the planting and maintenance specifications have been prepared with the changing climate in mind, it is not possible to predict climate change at the scale of the Site, and it is likely that changes to microclimate will favour some species at the expense of others. Continual monitoring of the establishing planting proposals and frequent review of the LEMP will assist in adapting to a dynamic landscape. Notwithstanding the above, the following measures will assist the scheme to adapt to changes in climate and biosecurity issues:

- Plant selection includes a range of species based on surveys of the local area;
- Plant species to be native stock wherever practicable;
- Planting pit ground preparation to maximise drainage;
- Mulching to minimise evaporation;
- Watering to be carried out during prolonged dry spells; and
- Monitoring of failed planting and adjustment of replacement species mixes where deemed appropriate.

7.9.5 Landscape Maintenance Components

Landscape Maintenance Component Definition

7.9.5.1 Critical to the management process is the identification of Landscape Maintenance Components. These are habitat and vegetative features with defined characteristics and qualities for which there are related user expectations, and which require distinct maintenance guidance.

7.9.5.2 The landscape features of the Proposed Development have been divided into a number of different Landscape Management Zones and Components, illustrated on **Figure 7.9: Landscape Management Zones Plan**. To achieve the overarching objectives for the LEMP, maintenance recommendations and tasks have been identified for each Landscape Management Component.

Landscape Zones and Components

7.9.5.3 The Landscape Components are outlined as follows.

Zone 1: Open Field

- Component 1: Grassland; and
- Component 2: Proposed Fencing and Hard Surfacing.

Zone 2: Structural Landscape

- Component 3: Trees and Woodland;
- Component 4: Hedgerows and Shrubs; and
- Component 5: Ponds and Ditches.

Component 1: Grassland

7.9.5.4 The proposals include the creation of wildflower meadow and tussocky grassland suitable for great crested newt and supporting invertebrates and pollinators.

7.9.5.5 Existing grassland will be retained and protected as far as practicable from construction activities, including through the use of ground protection mats where vehicle crossings cannot be avoided. Existing grassland communities will be over-seeded and where any damage does occur as result of construction operations, damage shall be remediated as follows: soil will be cultivated to a depth of 300mm in dry conditions, with existing topsoil firmed and levelled to a medium, even tilth and seeded with General-purpose Meadow Mixture (Emorsgate EM1), inside fences and Wildflower Meadow Hedgerow Mixture (Emorsgate EH1) to be seeded beneath panels, Wildflower Meadow Tussock Mixture (Emorsgate EM10) to be seeded outside fences. No cultivation is to be carried out in operational buffer zones established as part of BS 5837:2012 protection works. Seeding is to be carried out in strict accordance with supplier's recommendations, with rolling carried out to ensure good contact between seed and growing medium. Seeding is to be carried in March to April or September to October immediately following cultivation.

7.9.5.6 Grassland inside the perimeter fence is to be sheep-grazed or mown on a regular basis as required to prevent shading of the panels or security features.

7.9.5.7 Grassland outside perimeter fence is to be grazed/mown no more than once every three years to encourage the establishment of a tall sward. This grassland is to remain ungrazed/uncut and undisturbed (using stock-proof fencing if necessary) between March and August inclusive; and to be grazed/cut annually between September and February inclusive to prevent encroachment of scrub.

Maintenance Strategy

7.9.5.8 In the first two years after seeding, all remediated grassland areas will be grazed/cut regularly to a height of 50mm up to a maximum of three annual cuts to control weed growth, until no longer required to prevent undesirable annual weed growth.

7.9.5.9 Thereafter grassland will be grazed/cut in accordance with **Table 5.1**.

7.9.5.10 Water well during periods of prolonged periods of dry weather.

7.9.5.11 Undesirable herbaceous (ruderal) species will need to be controlled. These species include those which legally need to be controlled and those which suppress or otherwise inhibit the development of a species-rich sward. Remove any invasive or exotic species annually in autumn or winter, ideally by hand, to ensure growth of other species is not suppressed. Ideally, weeds will be removed by hand pulling, and weed wiping/spot spraying should not be necessary. Use of pesticides and fertilisers will be avoided; however, spot treatment may be

applied where pernicious or invasive weeds occur. Herbicides shall not be used within proximity of any watercourses.

Table 5.1: Maintenance Tasks – Meadow Grassland

Task	Frequency	Timing
Water any seeded areas during prolonged periods of dry weather	Year 1	As required
Mow regularly within proposed perimeter fence to control weed growth or allow sheep grazing	Years 1 to 2	April to September
Allow grassland outside perimeter fence to grow to a tall sward and graze/cut no more than once every three years between September and February inclusive	Every three years	September to February
Hand pull or spot treat weeds	Yearly	April to September
Cut areas remedially seeded	Years 1 to 2	As required, up to three times per year
Remove any litter or debris	Bi-annually	Any
Preparation of Annual Monitoring Report	Annually	n/a

Component 2: Proposed Fencing and Hard Surfacing

7.9.5.12 The Proposed Development includes post and wire stock-proof fencing around the perimeter of the proposed solar panels. Access routes are proposed throughout both parcels and a small compound is proposed within the eastern extents of the western parcel, which will comprise an area of compacted granular material.

Maintenance Strategy

7.9.5.13 In order to maintain security and a high standard of appearance, these proposed features will be maintained to a high standard throughout the lifetime of the Proposed Development, as set out in **Table 5.2**.

Table 5.2: Maintenance Tasks – Fencing and Hard Surfacing

Task	Frequency	Timing
Check and report and defects with fencing, with remedial works to be carried out at the earliest opportunity	Monthly	n/a
Strim back any weed growth on hard surfacing	Annually	September
Remove any litter or debris	Bi-annually	Any
Top up and recompact any granular fill to ensure no puddles or ruts form on areas of hard standing, and clean away any accumulated mud to prevent tracking onto adjacent roads	Every three years	September

Component 3: Trees and Woodland

7.9.5.14 Areas of native tree planting (1.19ha) will extend existing woodlands adjacent to the Site boundary. The species mix will be agreed with Denbighshire Borough Council and ideally sourced from those grown at the council's tree nursery at St Asaph.

7.9.5.15 The Proposed Development does not require the removal of any existing trees. However, the landscape strategy includes the establishment of a areas of new native tree planting along the Site's boundaries. This planting is intended to reinforce and extend the wooded character of the context and further contain the Solar Site, and to extend and link together existing woodland habitats within and around the Solar Site.

7.9.5.16 All existing trees and woodlands will be protected from damage during construction and decommissioning in accordance with BS 5837: 2012.

7.9.5.17 Tree planting is to be in accordance with BS 4428:1989. Planting of bare root stock shall take place in October to March in favourable planting conditions – soil shall be free from frost and waterlogging.

7.9.5.18 Individual trees will be between 350-425cm in height at the time of planting. Proposed grouped tree planting will be of bare root transplants notch planted at between 0.25 plants/m^2 and 10m centres in single species groups of three to five plants. Transplants are to be supported and protected by a PP photodegradable tube guard 0.6m high x 50mm diameter or greater to suit girth of shrub/tree, supported by 900mm bamboo canes inserted 300mm below ground level.

Maintenance Strategy

7.9.5.19 The retention of mature trees will be secured by the continued application of "minimal safety management" rules. If practicable, works should be undertaken outside the bird nesting season (nesting season is March to August inclusive). If this is not practicable, appropriate checks by a qualified ecologist should be undertaken and, if occupied nests are identified or suspected, works will need to be delayed until nestlings have fledged. If necessary, further surveys should be carried out and appropriate licences obtained to ensure legal compliance and/or to secure appropriate or necessary mitigation.

7.9.5.20 "Future veteran" trees and "old growth" features will be encouraged by retaining specific trees to mature and decline naturally. Small-scale selective felling shall be undertaken where desirable to improve stand composition and structure and to create opportunities for natural regeneration, enrichment planting, and occasional permanent glades.

7.9.5.21 Any timber arising from safety and regenerative works shall be piled in appropriate locations within woodland areas to break down naturally and provide food and habitat for invertebrates.

7.9.5.22 All staked trees shall be inspected on each maintenance visit, and any trees that have died or have suffered physical damage, such that they no longer provide any useful landscape function, shall be removed from Site, complete with the stake, and the ground reinstated.

7.9.5.23 Any trees that fail to establish within the first five years shall be replaced in the next available planting season in accordance with the original planting specification. Where a single species is failing in large numbers, the species mix may be revised in agreement with the Local Planning Authority.

7.9.5.24 Any dead, diseased or damaged branches shall be pruned back to the main stem or suitable side shoot or removed.

7.9.5.25 Mulched areas around proposed trees shall be maintained for the first five years to a minimum depth of 10cm.

7.9.5.26 Watering is to be undertaken as necessary to allow healthy establishment of plants, particularly during prolonged periods of hot, dry weather.

7.9.5.27 Trees and woodland, and all establishing planting shall be subject to annual monitoring by an appropriately experienced ecologist.

7.9.5.28 All existing and proposed trees are to be inspected by a qualified arboriculturist every three years with any recommended tree works carried out in accordance with BS 3998:2010 'Tree Works – Recommendations', Health and Safety legislation and relevant best practice.

7.9.5.29 At the beginning and end of each growing season plant protection shall be inspected. Any looseness, constriction or abrasion shall be corrected by adjustment or replacement as required. Where the support of a stake is no longer required the stake shall be removed from Site. All plant protection shall be removed from Site after three years, unless still required to ensure the successful establishment of planting (e.g. for newly planted trees to replace failures).

7.9.5.30 The height of planting is to be maintained to a maximum of 10m where it is 35-60m from panels, or 15m where it is at least 60m from panels, to prevent overshading of panels.

7.9.5.31 Maintenance tasks are summarised in **Table 5.3**.

Table 5.3: Maintenance Tasks – Trees and Woodland

Task	**Frequency**	**Timing**
Water all proposed planting to ground capacity to ensure successful establishment	As required	Years 1 to 3
Inspect and adjust plant protection including loosening to avoid damage	Annually	Years 1 to 3 October to April
Maintenance of a 1m diameter weed-free area to the base of each proposed tree through the application of a 10cm mulch	Annually	Years 1 to 5 March
Check for root firmness and upright alignment of tree after high winds, frost heave and in spring and autumn until trees are wind firm	Bi-annually	Years 1 to 3 April and October
Remove any litter or debris	Bi-annually	Any
Safety inspections and report on condition of trees by arboricultural advisor	Every three years	Any
Works recommended following inspection typically include the removal of fallen, diseased, dead, dying or dangerous trees and damaged or crossing branches	Every three years	As recommended by arboricultural advisor
Remove all plant protection once no longer required for establishment of proposed planting	After three years	n/a
Replace any planting that fails to establish within the next available planting season in accordance with the original specification	Annually	October to April
Selective felling and thinning to improve structural diversity of woodland	Every five years	n/a
Thin and reduce height of shrub planting to a maximum of 10m where it is 35-60m from panels, or 15m where it is at least 60m from panels, across half of Site on a two year rotational cycle	Annually	As recommended by arboricultural advisor

Task	Frequency	Timing
Remove timber and arisings from safety and regenerative work and use to create deadwood habitat and refugia in local areas	Immediately following any works	n/a
Inspection and preparation of Annual Monitoring Report	Annually	n/a

Component 4: Hedgerows and Shrubs

7.9.5.32 Hedgerows will be retained wherever practicable. New hedgerow is proposed (173m) as well as reinforcement of existing hedgerow (2.8km), repairing any gaps larger than 0.5m wide. Planting will include native species such as field maple (Acer campestre), hazel (Corylus avellana), hawthorn (Crataegus monogyna), holly (Ilex aquifolium), blackthorn (Prunus spinosa) and bird cherry (Prunus padus).

7.9.5.33 Buffer planting of native shrubs (0.65ha) around the Site boundary is proposed. The species mix will be agreed with Denbighshire Borough Council and ideally sourced from those grown at the council's tree nursery at St Asaph.

7.9.5.34 Existing hedgerows for retention will be protected in accordance with BS 5837:2012.

7.9.5.35 Existing native hedgerows should be positively managed to maximise landscape and wildlife value, favouring hedge-laying for restoration of hedgerow structure and an alternating management cycle of cutting one side of the hedgerow every two or three years. Proposed new hedgerow and reinforcement hedgerow planting will comprise native hedgerow species and will contribute to the mosaic of habitats within the Site and provide enhanced habitat connectivity. Both existing and proposed hedgerows will also contribute to the wider landscape setting of the Proposed Development, and to landscape character assessment objectives.

7.9.5.36 Hedgerows are to be pit planted in a 0.5m wide x 0.3m deep weed-free trench (or larger if necessary, in order to take the full spread of the roots). The sides and bottom of the trench will be forked over and ‘ripped’ to facilitate proper drainage, prior to back-filling. The trench shall be excavated on the same day as planting and back-filled with an appropriate excavated topsoil/compost mix.

7.9.5.37 Where existing hedgerow is to be gapped up or reinforced, this will be hand dug only, with care to avoid damaging existing planting, not severing any roots larger than 2.5cm in diameter. No herbicide is to be used in proximity to existing vegetation. Hedgerow reinforcement is to be planted at 0.5m centres to the back of existing vegetation wherever practicable. Any gaps in existing hedgerows larger than 0.5m wide are to be filled.

7.9.5.38 Transplants, cuttings and seedlings are to be protected with PP photodegradable tube guards 0.6m high x 50mm diameter or greater to suit the girth of the shrub or tree, supported by 900mm bamboo canes inserted 300mm below ground level.

7.9.5.39 Container-grown shrubs are to be protected by recycled HDPE photodegradable mesh guards 0.6m high x 150-180mm diameter or greater to suit the diameter of the shrub, supported by 900mm timber stakes inserted 300mm below ground level. Protection methods must not restrict natural movement or growth.

7.9.5.40 Shrub planting is to be installed with rabbit protection, in the same method as hedgerow plants. Bare root transplants are to be notch planted at 0.5 plants/m^2 in single species groups of three to five plants, hand dug with care in proximity to existing trees, not severing any roots larger than 2.5cm in diameter.

Maintenance Strategy

7.9.5.41 Best practice horticultural techniques should be used in the planting of native hedgerow vegetation to ensure rapid early growth. The ground below planting will be maintained as weed free through mulching for the first three years after planting.

7.9.5.42 Hedgerows shall be pruned on one side per year alternating on a two or three year rotation in February, aiming to maintain a minimum height of 2.5-3m to promote bushy growth while providing continued habitat and foraging opportunities for wildlife. Hedgerow trees shall be selected, retained and encouraged to develop to full maturity.

7.9.5.43 All shrub planting is to be thinned on a two-year rotational cycle to promote new growth. The height of planting is to be maintained to a maximum of 4m where it is 15-35m from panels, or 10m where it is 35-60m from panels, to prevent overshading of panels.

7.9.5.44 Maintenance tasks are summarised in **Table 5.4**.

Table 5.4: Maintenance Tasks – Hedgerow & Scrub

Task	**Frequency**	**Timing**
Water all proposed planting to ground capacity to ensure successful establishment	As required	Years 1 to 3
Inspect and adjust tree stakes, ties and plant protection including loosening to avoid damage	Annually	Years 1 to 3 October to April
Maintenance of a 1m diameter weed-free area to the base of each proposed plant for three years through the application of 10cm mulch	Annually	Years 1 to 3 March
Check for root firmness and upright alignment of plant after high winds, frost heave and in spring and autumn until trees are wind firm	Bi-annually	Years 1 to 3 April and October
Remove any litter or debris	Bi-annually	Any
Remove all stakes, ties and plant protection once no longer required for establishment of proposed planting	After three years	n/a
Replace any planting that fails to establish within the next available planting season in accordance with the original specification	Annually	October to April
Undertake routine maintenance visits identifying the existence and location of any hedgerow plants which are suffering from visible defects likely to cause danger, potential danger, obstruction or nuisance to users of adjoining properties, pathways and roadways	Annually	April
Non-desirable woody species should be removed during management operations and at other times as necessary, where this does not prejudice screening requirements	Annually	April
Thin and reduce height of shrub planting to a maximum of 4m where it is 15-35m from panels, or 10m where it is 35-60m from panels, across half of Site on a two year rotational cycle	Annually	March
Hedgerows shall be pruned on one side per year, alternating on a two or three year rotation in February, and maintained to a height of 2.5-3m to promote bushy growth	Annually	February

Task	Frequency	Timing
Hand weeding, where practicable, should take precedence over the use of herbicides in hedgerows. However, in certain instances, herbicide may be the most effective measure to take against unwanted species. Where herbicide application is needed this should be in small controlled areas around the tree base. Herbicides must be listed on the HSE Pesticides Register of UK Authorised Products, and herbicide application must conform to the 'Pesticides: Code of Practice for Using Plant Protection Products' (DEFRA, January 2006).	Annually	Hand weeding: As required by maintenance visits Herbicide application: July to August
Inspection and preparation of Annual Monitoring Report	Annually	n/a

Component 5: Ponds and Ditches

7.9.5.45 Ponds on Site will be retained and two will undergo reinstatement and improvement. A further seven will be created, having a minimum surface area of 100m2 and will be of a sufficient depth to hold water in at least one in three summers. Spoil generated from the reinstatement or forming of ponds shall be used to create a series of hibernacula, each measuring at least 2m in length, 1m in width and 1m in height.

Maintenance Strategy

7.9.5.46 Confine movement channels for maintenance to the minimum number of routes to avoid excessive trampling of existing habitat.

7.9.5.47 Remove any invasive or exotic species that may establish in the duration of the Proposed Development annually in autumn or winter, ideally by hand, to ensure growth of other species is not suppressed. Use of pesticides and fertilisers will be avoided. Herbicides shall not be used.

7.9.5.48 Works to all wet landscape features will be carried out during late autumn or winter months (ideally late September to October) to avoid harm to wildlife.

7.9.5.49 Maintenance tasks are summarised in **Table 5.5**.

Table 5.5: Maintenance Tasks – Ponds and Ditches

Task	Frequency	Timing
Monitor water quality and take appropriate preventative/remedial action	Annually	n/a
Manual removal of invasive/exotic species	Annually	October to April
Remove any litter or debris	Bi-annually	Any
Inspection and preparation of Annual Monitoring Report	Annually	n/a

7.9.6 General Maintenance and Management Tasks

7.9.6.1 All new planting shall be maintained by annual visits.

7.9.6.2 All plants shall be checked and if necessary, firmed up in the ground.

7.9.6.3 Any damaged shoots or branches shall be pruned off using secateurs.

7.9.6.4 The Contractor shall ensure that all new planting is maintained free of weed growth. This shall normally be achieved by the application of mulching and hand pulling of weeds, although appropriate contact herbicides are permitted where necessary. It remains the responsibility of the Contractor to adopt suitable methods for weed control based on training and accreditation.

7.9.6.5 The Contractor shall remove any dead, dying, or diseased plants that are evident during any maintenance visit. The Operations Manager shall be informed of the location, number and species of all material that has been removed. Any plants that have failed shall be replaced during the next planting season.

7.9.6.6 All replacement planting shall be with like species unless otherwise agreed with the Operations Manager. Plant failures shall be monitored, and alternative species may be agreed with the Local Planning Authority should any single species be subject to repeated or significant failures.

7.9.6.7 The Contractor shall clean and make good all hard standings, fencing, planting areas, highways and footways after each visit. No stockpiles are to be left on Site.

7.9.6.8 Plant material is to conform to the National Plant Specification. Plant handling and planting operations are to be in accordance with HTA 'Handling and Establishing Landscape Plants', Parts I-III.

The Use of Pesticides & Other Hazardous Substances

7.9.6.9 The Contractor’s attention is drawn to the following statutes and regulations:

- The Food and Environment Protection Act 1985;
- Plant Protection Products Regulations 2011;
- Plant Protection Products (Sustainable Use) Regulations 2012;
- The Control of Substances Hazardous to Health Regulations 2002; and
- The Environmental Protection Act 1990.

7.9.6.10 It is the Contractor’s responsibility to ensure that they are fully conversant with the requirements of the above legislation and other relevant Codes of Practice, British Standards, rules or guidelines that relate to the use of hazardous materials.

7.9.6.11 All manufacturers’ recommendations relating to application, storage, mixing and other safety precautions must be strictly adhered to, in the interests of health and safety.

Litter Removal

7.9.6.12 The Contractor shall ensure that the Site is kept free of litter and other debris through a regular programme of monitoring, collection and disposal, coinciding with visits to maintain grassed areas and planting.

7.9.6.13 Particular care shall be taken to remove all broken bottles, glass, tins, sharp objects and other items likely to constitute a hazard to people or wildlife.

7.9.6.14 The Contractor shall take particular care when carrying out litter collection to ensure that any discarded needles or syringes are removed as soon as they are discovered. Such items must be packaged separately from other litter, and be contained within appropriately labelled, puncture-proof sharps containers supplied by the Contractor.

7.9.6.15 All litter and debris shall be removed off Site to an authorised tip.

7.9.6.16 This shall be carried out in accordance with the Code of Practice on Litter and Refuse issued under Section 89 of the Environmental Protection Act (1990).

7.9.7 Implementation and Management Structure

7.9.7.1 This LEMP incorporates the objectives and prescriptions for the suggested approach to be adopted in the maintenance and management of the landscape features which are to be incorporated into the Proposed Development.

7.9.7.2 The aim is to promote a sensitive management approach, which protects and improves the landscape and visual amenity value interests of the Site, is compatible with the proposed uses of the Site and maximises the habitat and biodiversity potential of the landscape scheme.

7.9.7.3 This LEMP will be implemented fully and wholly by the Applicant. Anesco Ltd have an in-house Operations and Maintenance (O&M) division which specialises in installing and maintaining renewable energy schemes. The company has an exemplary safety record and is OHSAS 18001 and RoSPA Gold accredited for its approach to safety and the prevention of accidents. The company is also ISO 9001:2015 quality accredited and ISO 14001:2015 environmental accredited. Anesco O&M will have overall responsibility for the administration of the LEMP, and where necessary will appoint specialist contractors or professional consultants to work on their behalf.

7.9.7.4 Anesco O&M will be responsible for all proposed hard and soft landscape proposals, as well as the maintenance of proposed solar power infrastructure for the lifetime of the Proposed Development. Specialist landscape and ecological consultants and contractors will be appointed as necessary by Anesco O&M to carry out works on Site.

7.9.7.5 The LEMP will be reviewed every five years by the Operations Manager with input from a suitably qualified landscape architect and ecologist with a view to ensuring all maintenance objectives are being met, and that the management requirements set out in the LEMP continue to provide effective and appropriate measures to meet those aims.

7.9.7.6 These periodic reviews shall include analysis of monitoring of the condition of the landscape and biodiversity components at the start of the period, the work carried out, and how well the habitats and landscape have responded to maintenance measures. This review should assess the extent to which the measures undertaken have achieved the objectives and vision of the LEMP and should identify whether the same measures should continue, or different methods be introduced, to achieve the objectives.

7.9.8 Annual Maintenance Schedules

Table 8.1: Annual Maintenance & Management Schedule Years 1-5

Task	Number of Annual Operations				
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Remove any litter or debris from the Site	2	2	2	2	2
Check and report defects with fencing – remedial works carried out at the earliest opportunity	12	12	12	12	12
Meadow grassland areas	As required	-	-	-	-
Water all proposed hedgerow, shrubs and new planting to ground capacity	As required	As required	As required	-	-
Graze/cut proposed meadow grassland regularly	As required	As required	-	-	-
Hand pull or spot treat weeds in meadow grassland	1	1	1	1	1
Graze/cut areas proposed for seeding	1	1	1	1	1
Strim back any weed growth on hard surfacing	1	1	1	1	1
Replace any planting that fails to establish within the next available planting season	1	1	1	1	1
Undertake routine maintenance of hedgerows/shrubs	1	1	1	1	1
Removal of non-desirable woody species and weeds from hedgerow/shrub planting	1	1	1	1	1
Prune hedgerows on one side per year, alternating on a two or three year rotation	1	1	1	1	1
Thin and reduce height of trees and shrubs across half of Site on a two year rotational cycle	1	1	1	1	1
Monitor water quality and take appropriate preventative/remedial action, including removal of invasive exotic species	1	1	1	1	1
Maintain hard standing	-	-	1	-	-
Safety inspections and report on condition of trees by arboricultural advisor	-	-	1	-	-
Works to trees as recommended following inspection	-	-	1	-	-
Selective felling and thinning to improve structural diversity of woodland	-	-	-	-	1
Remove timber and arisings from safety and regenerative work and use to create deadwood habitat and refugia in local areas	-	-	-	-	-
Review of LEMP by Operations Manager and consultant Landscape Architect and Ecologist as appropriate for ongoing management of scheme	-	-	-	-	1

Table 8.2: Annual Maintenance & Management Schedule Years 6 - 20

Task	Number of Annual Operations														
	Year 6	**Year 7**	**Year 8**	**Year 9**	**Year 10**	**Year 11**	**Year 12**	**Year 13**	**Year 14**	**Year 15**	**Year 16**	**Year 17**	**Year 18**	**Year 19**	**Year 20**
Remove any litter or debris from the Site	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Check and report defects with fencing – remedial works carried out at the earliest opportunity	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Remove all stakes, ties and plant protection once no longer required for replacement planting	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Hand pull or spot treat weeds in meadow grassland	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Graze/cut areas proposed for seeding	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Strim back any weed growth on hard surfacing	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Undertake routine maintenance of hedgerows/shrubs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Removal of non-desirable woody species and weeds from hedgerow/shrub planting	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Prune hedgerows on one side per year, alternating on a two or three year rotation	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Thin and reduce height of trees and shrubs across half of Site on a two year rotational cycle	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Monitor water quality and take appropriate preventative/remedial action, including removal of invasive exotic species	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Preparation of Annual Ecological Monitoring Report	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Top up and recompact any granular fill to ensure no puddles or ruts form on areas of hard standing, and clean away any accumulated mud	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1
Safety inspections and report on condition of trees by arboricultural advisor	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1
Works recommended following inspection	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1
Drainage ditch clearance	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1
Selective felling and thinning to improve structural diversity of woodland	-	-	-	-	1	-	-	-	-	1	-	-	-	-	1
Remove timber and arisings from safety and regenerative work and use to create deadwood habitat and refugia in local areas	-	-	-	-	1	-	-	-	-	1	-	-	-	-	1
Review of LEMP by Operations Manager and consultant Landscape Architect and Ecologist as appropriate for ongoing management of scheme	-	-	-	-	1	-	-	-	-	1	-	-	-	-	1

Appendix 7.10 Glint and Glare

PAGERPOWER
Urban & Renewables

Solar Photovoltaic Glint and Glare Study

St Asaph

Anesco Limited

April 2025







PLANNING SOLUTIONS FOR:

- Solar
- Telecoms
- Railways
- Defence
- Buildings
- Wind
- Airports
- Radar
- Mitigation

www.pagerpower.com

ADMINISTRATION PAGE

Job reference:	10959D
Author:	Andrea Mariano (v1); Abdul Wadud (v2, v3, v4)
Email:	abdul@pagerpower.com

Reviewed By:	Hannah Lucey
Email:	hannah@pagerpower.com

Issue	Date	Detail of Changes
1	31st August 2023	Initial issue
2	26th February 2024	Remodelling of updated layout
3	November 2024	Remodelling of updated layout
4	7th April 2025	Remodelling of updated layout
5	22nd April 2025	Administrative revisions

Confidential: The contents of this document may not be disclosed to others without permission.

Copyright © 2025 Pager Power Limited

All aerial imagery (unless otherwise stated) is taken from Google Earth. Copyright © 2025 Google.

Stour Valley Business Centre, Sudbury, Suffolk, CO10 7GB

T: +44 (0)1787 319001 E: info@pagerpower.com W: www.pagerpower.com

EXECUTIVE SUMMARY

Report Purpose

Pager Power has been retained to assess the possible effects of glint and glare from a solar photovoltaic (PV) development located south of St Asaph in Denbighshire, Wales, UK. This assessment pertains to the possible impacts upon road safety and residential amenity.

Overall Conclusions

No significant impacts are predicted upon road safety and residential amenity. Mitigation is not recommended.

Guidance and Studies

There is no existing planning guidance for the assessment of solar reflections from solar panels towards roads and nearby dwellings. Pager Power has however produced guidance for glint and glare and solar photovoltaic developments, which was published in early 2017, with the fourth edition published in 2022[1]. The guidance document sets out the methodology for assessing roads and dwellings with respect to solar reflections from solar panels.

Pager Power's approach is to undertake geometric reflection calculations and, where a solar reflection is predicted, consider the screening (existing and/or proposed) between the receptor and the reflecting solar panels. The scenario in which a solar reflection can occur for all receptors is then identified and discussed, and a comparison is made against the available solar panel reflection studies to determine the overall impact.

The available studies have measured the intensity of reflections from solar panels with respect to other naturally occurring and manmade surfaces. The results show that the reflections produced are of intensity similar to or less than those produced from still water and significantly less than reflections from glass and steel[2].

Assessment Conclusions - Roads

Solar reflections towards the B5381 are predicted to be obstructed by existing vegetation and intervening terrain, such that no impact is predicted upon road users. No impact is predicted, and mitigation is not required.

[1]Pager Power Glint and Glare Guidance, Fourth Edition, September 2022.
[2]Source: SunPower, 2009, SunPower Solar Module Glare and Reflectance (appendix to Solargen Energy, 2010).

Assessment Conclusions - Dwellings

Solar reflections are geometrically possible towards 40 of 48 assessed dwellings. Screening in the form of existing vegetation, buildings and intervening terrain is predicted to significantly obstruct views of reflecting panels for 36 dwellings, such that no impact is predicted. Mitigation is not required for these dwellings.

For the remaining four dwellings, solar reflections are geometrically possible for more than three months per year but less than 60 minutes on any given day. Screening in the form of existing vegetation is predicted to partially obstruct views of reflecting panels, with marginal views from above ground level considered possible. The resultant duration of effects is predicted to be reduced to less than three months per year. A low impact is predicted for these three dwellings, and mitigation is not recommended in accordance with the assessment methodology (Appendix D).

LIST OF CONTENTS

Administration Page 2
Executive Summary 3
Report Purpose 3
Overall Conclusions 3
Guidance and Studies 3
Assessment Conclusions - Roads 3
Assessment Conclusions - Dwellings 4
List of Contents 5
List of Figures 7
List of Tables 7
About Pager Power 8
1 Introduction 9
1.1 Overview 9
1.2 Pager Power's Experience 9
1.3 Glint and Glare Definition 9
2 Proposed Development Location and Details 10
2.1 Proposed Development Site Layout 10
2.2 Solar Panel Details 13
3 Glint and Glare Assessment Methodology 14
3.1 Guidance and Studies 14
3.2 Background 14
3.3 Methodology 14
3.4 Assessment Limitations 15
4 Identification of Receptors 16
4.1 Dwellings 16
4.2 Road Receptors 18
5 Glint and Glare Assessment Results 20
5.1 Overview 20

5.2 Impact Significance Methodology – Dwelling Receptors 20
5.3 Geometric Calculation Results – Dwelling Receptors 21
5.4 Desk-Based Review of Available Imagery 24
6 Overall Conclusions 28
6.1 Assessment Conclusions – Roads 28
6.2 Assessment Conclusions – Dwellings 28
Appendix A – Overview of Glint and Glare Guidance 29
Overview 29
Welsh Planning Policy 29
UK Planning Policy 29
Assessment Process – Ground-Based Receptors 31
Appendix B – Overview of Glint and Glare Studies 33
Overview 33
Reflection Type from Solar Panels 33
Solar Reflection Studies 34
Appendix C – Overview of Sun Movements and Relative Reflections 37
Appendix D – Glint and Glare Impact Significance 38
Overview 38
Impact Significance Definition 38
Assessment Process for Road Receptors 39
Assessment Process for Dwelling Receptors 40
Appendix E – Reflection Calculations Methodology 41
Pager Power Methodology 41
Appendix F – Assessment Limitations and Assumptions 43
Pager Power's Model 43
Appendix G – Receptor and Reflector Area Details 45
Dwelling Receptors Details 45
Modelled Reflector Areas 46
Appendix G – Geometric Calculation Results 55
Dwellings 55

LIST OF FIGURES

Figure 1 – Proposed Development site layout 11
Figure 2 – Proposed Development: aerial image 12
Figure 3 – Solar panel cross section 13
Figure 4 – Assessed dwelling receptors 17
Figure 5 – B5381 relative to the Proposed Development 19
Figure 7 Screening for dwelling receptors 1 to 3 24
Figure 8 Screening for dwelling receptor 4 24
Figure 9 Screening for dwelling receptors 5 to 7 25
Figure 10 Screening for dwelling receptors 8 to 10 25
Figure 11 Screening for dwelling receptors 18 to 19 26
Figure 12 Screening for dwelling receptor 20 26
Figure 13 Screening for dwelling receptors 21 to 22 27
Figure 14 Screening for dwelling receptors 24 to 48 27

LIST OF TABLES

Table 1 – Solar panel details 13
Table 2 – Geometric analysis results for the identified dwelling receptors 23

ABOUT PAGER POWER

Pager Power is a dedicated consultancy company based in Suffolk, UK. The company has undertaken projects in 60 countries within South Africa, Europe, America, Asia and Australasia. The company comprises a team of experts to provide technical expertise and guidance on a range of planning issues for large and small developments.

Pager Power was established in 1997. Initially the company focus was on modelling the impact of wind turbines on radar systems. Over the years, the company has expanded into numerous fields including:

- Renewable energy projects.
- Building developments.
- Aviation and telecommunication systems.

Pager Power prides itself on providing comprehensive, understandable and accurate assessments of complex issues in line with national and international standards. This is underpinned by its custom software, longstanding relationships with stakeholders and active role in conferences and research efforts around the world.

Pager Power's assessments withstand legal scrutiny, and the company can provide support for a project at any stage.

1 INTRODUCTION

1.1 Overview

Pager Power has been retained to assess the possible effects of glint and glare from a solar photovoltaic (PV) development located south of St Asaph in Denbighshire, Wales, UK. This assessment pertains to the possible effects upon ground-based receptors (roads and dwellings). This report contains the following:

- Details of the proposed solar development;
- Explanation of glint and glare;
- Overview of relevant guidance;
- Overview of relevant studies;
- Identification of receptors;
- Assessment methodology;
- Glint and glare assessment for:
    - Roads;
    - Dwellings.
- Results discussion;
- Overall conclusions.

1.2 Pager Power's Experience

Pager Power has undertaken over 1,400 Glint and Glare assessments internationally. The studies have included assessment of civil and military aerodromes, railway infrastructure and other ground-based receptors including roads and dwellings.

1.3 Glint and Glare Definition

The definition of glint and glare is as follows[3]:

- Glint – a momentary flash of bright light typically received by moving receptors or from moving reflectors.
- Glare – a continuous source of bright light typically received by static receptors or from large reflective surfaces.

The term 'solar reflection' is used in this report to refer to both reflection types.

[3] These definitions are aligned with those presented within the National Policy Statement for Renewable Energy Infrastructure (EN-3) – published by the Department for Energy Security and Net Zero and the Federal Aviation Administration in the USA.

2 PROPOSED DEVELOPMENT LOCATION AND DETAILS

2.1 Proposed Development Site Layout

The Proposed Development site layout[4] is shown in Figure 1 on the following page.

The modelled reflector areas for this assessment are shown in Figure 2 on page 12. Further information regarding the modelled reflector areas is presented in Section 5.1.

[4] Source: Anesco, April 2025, 'C0002452_02 Site Layout PL_RevV4'

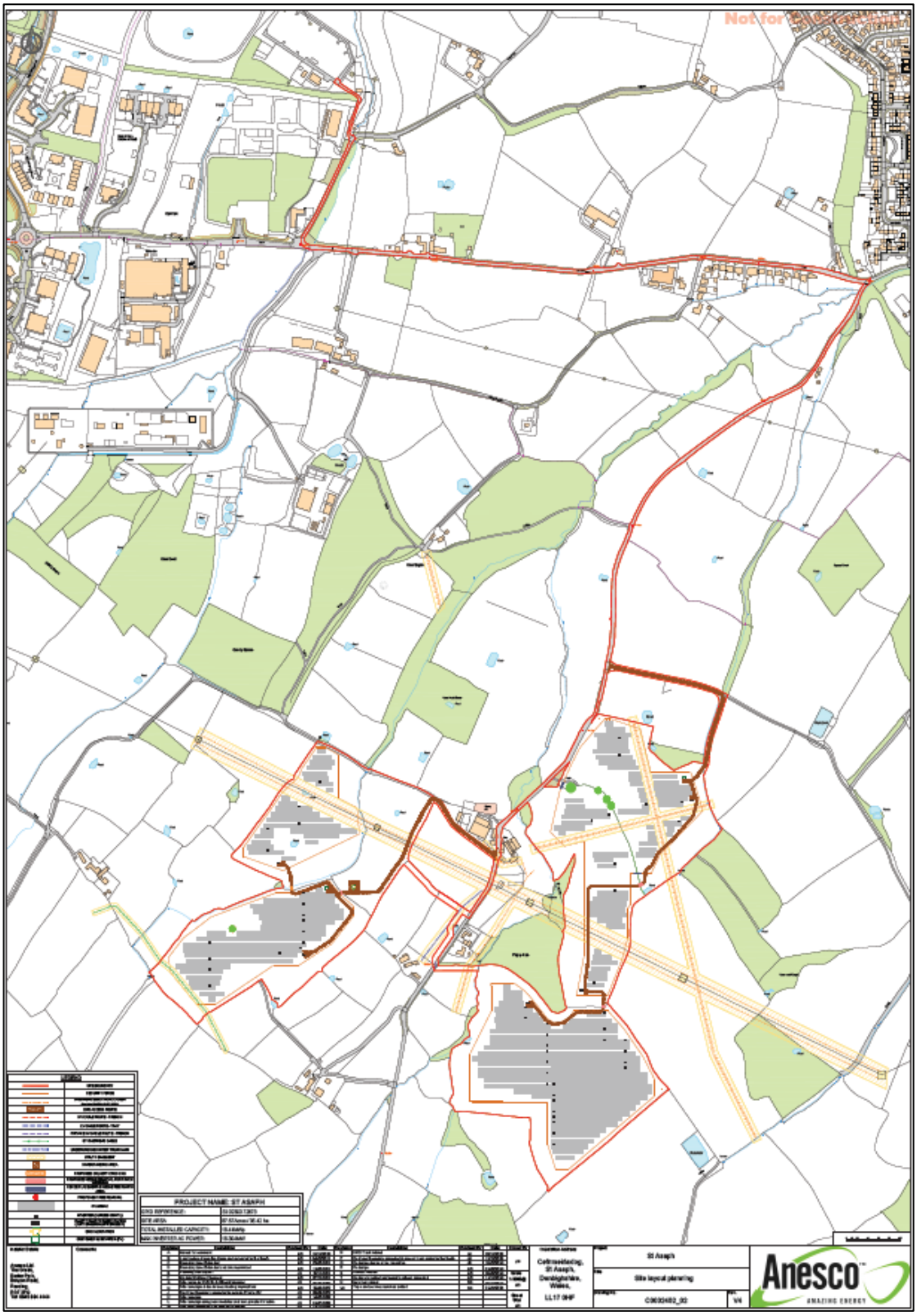


Figure 1 – Proposed Development site layout



Figure 2 – Proposed Development: aerial image

2.2 Solar Panel Details

The solar panel cross section[5] is shown in Figure 3 below.

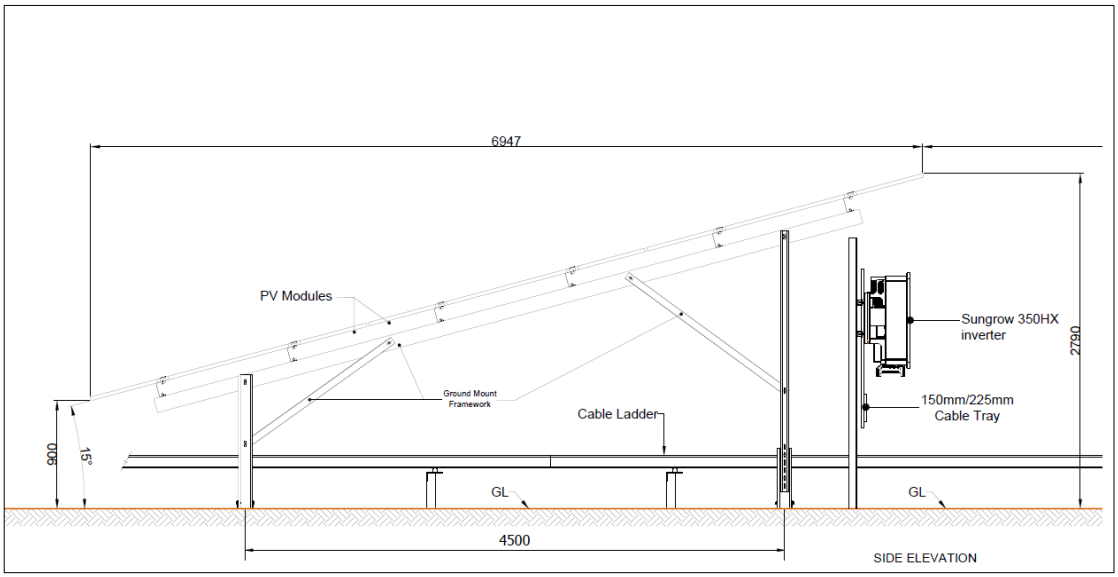


Figure 3 – Solar panel cross section

The solar panels as modelled in this assessment are presented in Table 1 below.

Panel Information	
Azimuth angle (°)	180
Tilt Angle (°)	15
Assessed panel height[6] (m agl[7])	1.845

Table 1 – Solar panel details

[5] Source: Typical Section Through Array, St Asaph, Anesco, date: 19/04/2022, Drawing No.: C0002452_08, (cropped).
[6] The assessed height is the midpoint of the panel.
[7] metres above ground level.

3 GLINT AND GLARE ASSESSMENT METHODOLOGY

3.1 Guidance and Studies

Appendices A and B present a review of relevant guidance and independent studies with regard to glint and glare issues from solar panels. The overall conclusions from the available studies are as follows:

- Specular reflections of the Sun from solar panels are possible.
- The measured intensity of a reflection from solar panels can vary from 2% to 30% depending on the angle of incidence.
- Published guidance shows that the intensity of solar reflections from solar panels are equal to or less than those from water. It also shows that reflections from solar panels are significantly less intense than many other reflective surfaces, which are common in an outdoor environment.

3.2 Background

Details of the Sun's movements and solar reflections are presented in Appendix C.

3.3 Methodology

The glint and glare assessment methodology has been derived from the information provided to Pager Power through consultation with stakeholders and by reviewing the available guidance and studies. The methodology for a glint and glare assessments is as follows:

- Identify receptors in the area surrounding the solar development.
- Consider direct solar reflections from the solar development towards the identified receptors by undertaking geometric calculations and intensity calculations where required.
- Consider the visibility of the panels from the receptor's location. If the panels are not visible from the receptor then no reflection can occur.
- Based on the results of the geometric calculations, determine whether a reflection can occur, and if so, at what time it will occur.
- Assess the glare intensity if applicable.
- Consider both the solar reflection from the solar development and the location of the direct sunlight with respect to the receptor's position.
- Consider the solar reflection with respect to the published studies and guidance.
- Determine whether a significant detrimental impact is expected in line with the process presented in Appendix D.

Within the Pager Power model, the solar development area is defined, as well as the relevant receptor locations. The result is a chart that states whether a reflection can occur, the duration and the panels that can produce the solar reflection towards the receptor.

3.4 Assessment Limitations

Further technical details regarding the methodology of the geometric calculations and limitations are presented in Appendix E and Appendix F.

4 IDENTIFICATION OF RECEPTORS

4.1 Overview

There is no formal guidance with regard to the maximum distance at which glint and glare should be assessed. From a technical perspective, there is no maximum distance for potential reflections. The significance of a reflection however decreases with distance because the proportion of an observer's field of vision that is taken up by the reflecting area diminishes as the separation distance increases. Terrain and shielding by vegetation are also more likely to obstruct an observer's view at longer distances.

The above parameters and industry experience over a significant number of glint and glare assessments undertaken, shows that a 1km assessment area from the proposed development is considered appropriate for glint and glare effects on road users and dwellings. The assessment area (white outlined area in the following figures) has been designed accordingly as 1km from the proposed development.

Potential receptors within the associated assessment area are identified based on mapping and aerial photography of the region. The initial judgement is made based on high-level consideration of aerial photography and mapping i.e. receptors are excluded if it is clear from the outset that no visibility would be possible. A more detailed assessment is made if the modelling reveals a reflection would be geometrically possible.

Glint and glare assessments for aviation receptors are typically undertaken for licensed aerodromes within 10km of a proposed solar development. Geometric modelling for general aviation unlicensed aerodromes is typically required within 5km of a Proposed Development. At ranges of 10-20km, the requirement for assessment is much less common for unlicensed aerodromes, with typically assessment only being undertaken for licensed aerodromes at these ranges. Assessment of any aviation effects for developments over 20km is not a usual requirement.

Considering the size of the Proposed Development, distance to the nearest licensed and unlicensed aerodromes, and Pager Power's industry experience, no significant aviation receptors are identified for geometric assessment.

4.2 Dwellings

Dwellings have been identified within approximately 1km of the proposed solar development that are most likely to have visual line of sight to the solar panels (based on an initial high-level review of aerial photography[8] plus local topography).

[8] The aerial and street view imagery may not provide the most up to date information of the surrounding area.

If visual line of sight exists between the proposed solar development and the dwellings, then a solar reflection could be experienced if it is geometrically possible. If there is no line of sight, then a reflection cannot be experienced.

In total, 48 dwelling receptors points[9] have been identified for the assessment. The assessed dwellings are shown in Figure 4 below. A height above ground level of 1.8 metres has been taken as the typical eye level for an observer on the ground floor of each dwelling[10].

In residential areas with multiple layers of dwellings, only the outer dwellings have been considered for assessment. This is because they will mostly obscure views of the solar panels to the dwellings behind them, which will therefore not be impacted by the Proposed Development because line of sight will be removed, or they will experience comparable effects to the closest assessed dwelling.

Additionally, in some cases, a single receptor point may be used to represent a small number of separate addresses. In such cases, the results for the receptor will be representative of the adjacent observer locations, such that the overall level of effect in each area is captured reliably.

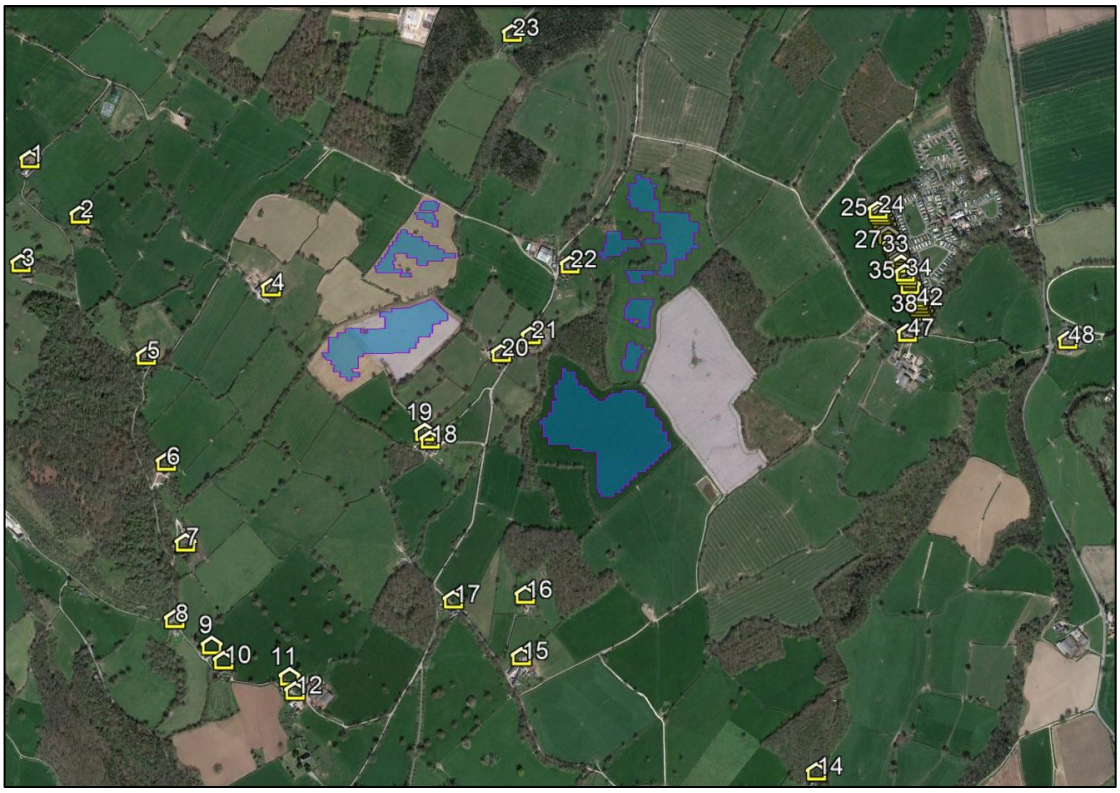


Figure 4 – Assessed dwelling receptors

[9] The co-ordinates of the dwelling receptor points are presented in Appendix G.

[10] In the results discussion the views from each floor have been considered. Glint and glare modelling results are not expected to change depending on the floor.

4.3 Road Receptors

Road types can generally be categorised as:

- Major National – Typically a road with a minimum of two carriageways with a maximum speed limit of up to 70mph. These roads typically have fast-moving vehicles with busy traffic;
- National – Typically a road with one or more carriageways with a maximum speed limit of up to 60mph or 70mph. These roads typically have fast-moving vehicles with moderate to busy traffic density;
- Regional – Typically a single carriageway with a maximum speed limit of up to 60mph. The speed of vehicles will vary with a typical traffic density of low to moderate; and
- Local – Typically roads and lanes with the lowest traffic densities. Speed limits vary.

Most of the roads surrounding the Proposed Development are considered local roads where traffic densities are likely to be relatively low. Local roads have not been taken forward for geometric modelling as any solar reflections from the Proposed Development that are experienced by a road user would be considered low impact in accordance with the guidance presented in Appendix D.

The analysis has therefore considered major national, national, and regional roads that:

- Are within the one kilometre assessment area (i.e. 1km from panel areas);
- Have a potential view of the panels.

A 900m-section of the B5381 is located within 1km of the Proposed Development; however, does not have potential views of the Proposed Development. Screening in the form of existing vegetation and terrain significantly obstruct views of any reflecting panels, such that no impact would be possible upon road users. No impact is predicted, and mitigation is not required.

Figure 5 on the following page shows the B5381 (orange line) and the identified vegetation (outlined green) obstructing views of the Proposed Development.



Figure 5 – B5381 relative to the Proposed Development

5 GLINT AND GLARE ASSESSMENT RESULTS

5.1 Overview

A number of representative panel locations are selected within the proposed reflector areas with the number of modelled points being determined by the size of the reflector area and the assessment resolution. The bounding coordinates for the proposed solar farm development have been extrapolated from the site plans. The data can be found in Appendix G.

A resolution of 10m has been chosen for this assessment. This means that a geometric calculation is undertaken for each identified receptor every 10m from within the defined areas. This resolution is sufficiently high to maximise the accuracy of the results – increasing the resolution further would not significantly change the modelling output. If a reflection is experienced from an assessed panel location, then it is likely that a reflection will be viewable from similarly located panels within the proposed solar farm development.

5.2 Impact Significance Methodology – Dwelling Receptors

The key considerations for residential dwellings are:

- Whether a reflection is predicted to be experienced in practice;
- The duration of the predicted effects, relative to thresholds of:
    - 3 months per year;
    - 60 minutes on any given day.

Where solar reflections are not geometrically possible or the reflecting panels are predicted to be significantly obstructed from view, no impact is predicted, and mitigation is not required.

Where solar reflections are experienced for less than three months per year and less than 60 minutes on any given day, or the closest reflecting panel is over 1km from the dwelling, the impact significance is low, and mitigation is not recommended.

Where reflections are predicted to be experienced for more than three months per year **and/or** for more than 60 minutes on any given day, expert assessment of the following factors is required to determine the impact significance and mitigation requirement:

- Whether visibility is likely from all storeys – the ground floor is typically considered the main living space and has a greater significance with respect to residential amenity;
- The separation distance to the panel area – larger separation distances reduce the proportion of an observer's field of view that is affected by glare;
- Whether the dwelling appears to have windows facing the reflecting area – factors that restrict potential views of a reflecting area reduce the level of impact;
- The position of the Sun – effects that coincide with direct sunlight appear less prominent than those that do not.

If following consideration of the relevant factors, the solar reflections is not deemed significant, the impact significance is low, and mitigation is not recommended. If following consideration of

the relevant factors, the solar reflections is deemed significant, then the impact significance is moderate, and mitigation is recommended.

If effects last for more than three months per year and for more than 60 minutes on any given day, and there are no mitigating factors, the impact significance is high, and mitigation is required.

5.3 Geometric Calculation Results – Dwelling Receptors

The results of the geometric calculations for the identified dwelling receptors are presented in Table 2 on the following page.

Dwelling Receptor	Geometric Modelling Results (screening not considered)	Identified Screening and Predicted Visibility (desk-based review)	Mitigating Factors	Predicted Impact Classification
1 – 3	Solar reflections are geometrically possible for **less** than three months per year and **less** than 60 minutes on any given day	Existing vegetation, buildings and intervening terrain are predicted to significantly obstruct views	N/A	No impact
4	Solar reflections are geometrically possible for **more** than three months per year but **less** than 60 minutes on any given day	Existing vegetation and intervening terrain are predicted to obstruct majority of views with marginal views considered possible	Duration of effects due to screening is predicted to decrease to less than three months per year Views limited to above ground floor levels Effects coincide with the sun	Low impact

Dwelling Receptor	Geometric Modelling Results (screening not considered)	Identified Screening and Predicted Visibility (desk-based review)	Mitigating Factors	Predicted Impact Classification
5 – 7	Solar reflections are geometrically possible for **more** than three months per year but **less** than 60 minutes on any given day	Existing vegetation, buildings and intervening terrain are predicted to significantly obstruct views	N/A	No impact
8 – 10	Solar reflections are geometrically possible for **less** than three months per year and **less** than 60 minutes on any given day	Existing vegetation is predicted to significantly obstruct views	N/A	No impact
11 – 17	Solar reflections are **not** geometrically possible	N/A	N/A	No impact
18 – 19	Solar reflections are geometrically possible for **more** than three months per year but **less** than 60 minutes on any given day	Existing vegetation is predicted to significantly obstruct views	N/A	No impact

Dwelling Receptor	Geometric Modelling Results (screening not considered)	Identified Screening and Predicted Visibility (desk-based review)	Mitigating Factors	Predicted Impact Classification
20 – 22	Solar reflections are geometrically possible for **more** than three months per year but **less** than 60 minutes on any given day	Existing vegetation and intervening terrain are predicted to obstruct majority of views with marginal views considered possible	Duration of effects due to screening is predicted to decrease to less than three months per year Effects coincide with the sun	Low impact
23	Solar reflections are **not** geometrically possible	N/A	N/A	No impact
24 – 40	Solar reflections are geometrically possible for **less** than three months per year and **less** than 60 minutes on any given day	Existing vegetation and intervening terrain are predicted to significantly obstruct views	N/A	No impact
41 – 48	Solar reflections are geometrically possible for **more** than three months per year but **less** than 60 minutes on any given day	Existing vegetation and intervening terrain are predicted to significantly obstruct views	N/A	No impact

Table 2 – Geometric analysis results for the identified dwelling receptors

5.4 Desk-Based Review of Available Imagery

A desk-based review of the available imagery is presented in Figures 6 to 13 below and on the following pages. The cumulative reflecting panel areas are indicated by regions of yellow (non-reflecting panels are shown in blue). The identified screening in the form of existing vegetation and buildings is outlined in pink and blue respectively.



Figure 6 Screening for dwelling receptors 1 to 3



Figure 7 Screening for dwelling receptor 4

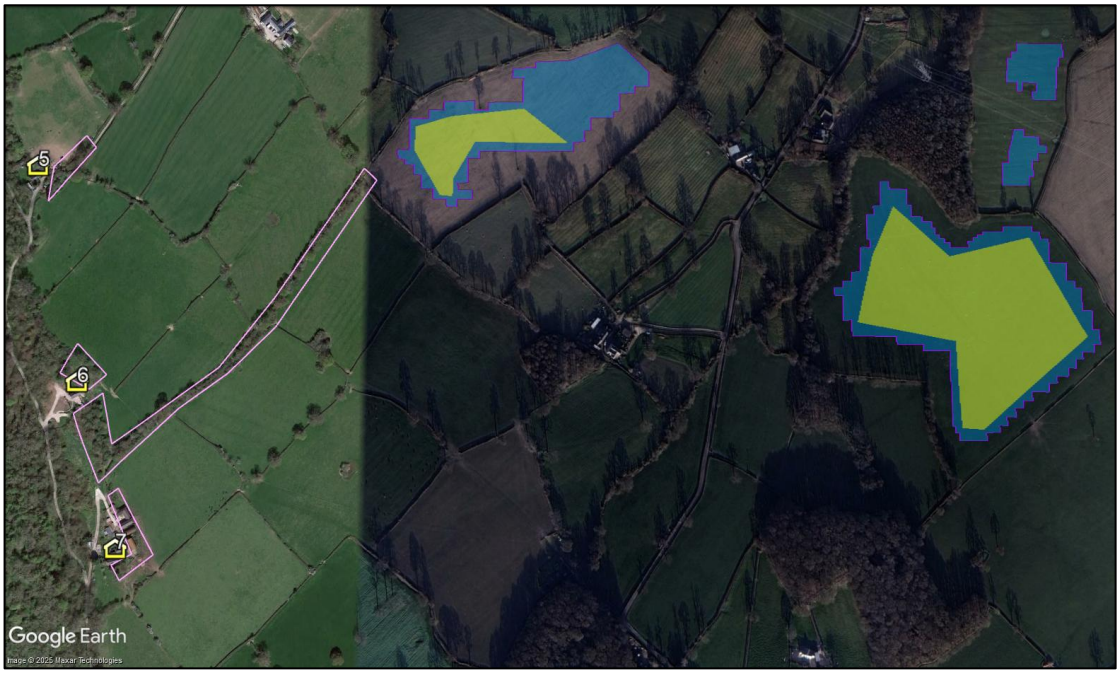


Figure 8 Screening for dwelling receptors 5 to 7



Figure 9 Screening for dwelling receptors 8 to 10



Figure 10 Screening for dwelling receptors 18 to 19



Figure 11 Screening for dwelling receptor 20



Figure 12 Screening for dwelling receptors 21 to 22



Figure 13 Screening for dwelling receptors 24 to 48

6 OVERALL CONCLUSIONS

6.1 Assessment Conclusions – Roads

Solar reflections towards the B5381 are predicted to be obstructed by existing vegetation and intervening terrain, such that no impact is predicted upon road users. No impact is predicted, and mitigation is not required.

6.2 Assessment Conclusions – Dwellings

Solar reflections are geometrically possible towards 40 of 48 assessed dwellings. Screening in the form of existing vegetation, buildings and intervening terrain is predicted to significantly obstruct views of reflecting panels for 36 dwellings, such that no impact is predicted. Mitigation is not required for these dwellings.

For the remaining four dwellings, solar reflections are geometrically possible for more than three months per year but less than 60 minutes on any given day. Screening in the form of existing vegetation is predicted to partially obstruct views of reflecting panels, with marginal views from above ground level considered possible. The resultant duration of effects is predicted to be reduced to less than three months per year. A low impact is predicted for these three dwellings, and mitigation is not recommended in accordance with the assessment methodology (Appendix D).

APPENDIX A – OVERVIEW OF GLINT AND GLARE GUIDANCE

Overview

This section presents details regarding the relevant guidance and studies with respect to the considerations and effects of solar reflections from solar panels, known as 'Glint and Glare'.

This is not a comprehensive review of the data sources, rather it is intended to give an overview of the important parameters and considerations that have informed this assessment.

Welsh Planning Policy

Future Wales

Future Wales Policies 17 and 18[11] are relevant in the context of potential glint and glare effects.

Policies 17 and 18 state:

'*All proposals should demonstrate that they will not have an unacceptable adverse impact on the environment*'

…

'*There are no unacceptable adverse impact by way of shadow flicker, noise, reflected light, air quality or electromagnetic disturbance'*.

UK Planning Policy

Renewable and Low Carbon Energy

The National Planning Policy Framework under the planning practice guidance for Renewable and Low Carbon Energy[12] (specifically regarding the consideration of solar farms, paragraph 013) states:

'What are the particular planning considerations that relate to large scale ground-mounted solar photovoltaic Farms?

The deployment of large-scale solar farms can have a negative impact on the rural environment, particularly in undulating landscapes. However, the visual impact of a well-planned and well-screened solar farm can be properly addressed within the landscape if planned sensitively.

Particular factors a local planning authority will need to consider include:

…

- the proposal's visual impact, the effect on landscape of glint and glare (see guidance on landscape assessment) and on **neighbouring uses and aircraft safety**;

[11] Future Wales: The National Plan 2040, Welsh Government, date: 21 February 2021, accessed on: 08/10/2024.
[12] Renewable and low carbon energy, Ministry of Housing, Communities & Local Government, date: 18 June 2015, accessed on: 01/11/2021

- the extent to which there may be additional impacts if solar arrays follow the daily movement of the sun;

…

The approach to assessing cumulative landscape and visual impact of large scale solar farms is likely to be the same as assessing the impact of wind turbines. However, in the case of ground-mounted solar panels it should be noted that with effective screening and appropriate land topography the area of a zone of visual influence could be zero.'

National Policy Statement for Renewable Energy Infrastructure

The National Policy Statement for Renewable Energy Infrastructure (EN-3)[13] sets out the primary policy for decisions by the Secretary of State for nationally significant renewable energy infrastructure. Sections 2.10.102-106 state:

'2.10.102 Solar panels are specifically designed to absorb, not reflect, irradiation.[14] However, solar panels may reflect the sun's rays at certain angles, causing glint and glare. Glint is defined as a momentary flash of light that may be produced as a direct reflection of the sun in the solar panel. Glare is a continuous source of excessive brightness experienced by a stationary observer located in the path of reflected sunlight from the face of the panel. The effect occurs when the solar panel is stationed between or at an angle of the sun and the receptor.

2.10.103 Applicants should map receptors to qualitatively identify potential glint and glare issues and determine if a glint and glare assessment is necessary as part of the application.

2.10.104 When a quantitative glint and glare assessment is necessary, applicants are expected to consider the geometric possibility of glint and glare affecting nearby receptors and provide an assessment of potential impact and impairment based on the angle and duration of incidence and the intensity of the reflection.

2.10.105 The extent of reflectivity analysis required to assess potential impacts will depend on the specific project site and design. This may need to account for 'tracking' panels if they are proposed as these may cause differential diurnal and/or seasonal impacts.

2.10.106 When a glint and glare assessment is undertaken, the potential for solar PV panels, frames and supports to have a combined reflective quality may need to be assessed, although the glint and glare of the frames and supports is likely to be significantly less than the panels.'

The EN-3 does not state which receptors should be considered as part of a quantitative glint and glare assessment. Based on Pager Power's extensive project experience, typical receptors include residential dwellings, road users, aviation infrastructure, and railway infrastructure.

Sections 2.10.134-136 state:

---

[13] National Policy Statement for Renewable Energy Infrastructure (EN-3), Department for Energy Security & Net Zero, date: Jan 2024, accessed on: 21/12/2023., 17/01/2024

[14] *'Most commercially available solar panels are designed with anti-reflective glass or are produced with anti-reflective coating and have a reflective capacity that is generally equal to or less hazardous than other objects typically found in the outdoor environment, such as bodies of water or glass buildings.'*

'2.10.134 Applicants should consider using, and in some cases the Secretary of State may require, solar panels to comprise of (or be covered with) anti-glare/anti-reflective coating with a specified angle of maximum reflection attenuation for the lifetime of the permission.

2.10.135 Applicants may consider using screening between potentially affected receptors and the reflecting panels to mitigate the effects.

2.10.136 Applicants may consider adjusting the azimuth alignment of or changing the elevation tilt angle of a solar panel, within the economically viable range, to alter the angle of incidence. In practice this is unlikely to remove the potential impact altogether but in marginal cases may contribute to a mitigation strategy.'

The mitigation strategies listed within the EN-3 are relevant strategies that are frequently utilised to eliminate or reduce glint and glare effects towards surrounding observers. The most common form of mitigation is the implementation of screening along the site boundary.

Sections 2.10.158-159 state:

2.10.158 Solar PV panels are designed to absorb, not reflect, irradiation. However, the Secretary of State should assess the potential impact of glint and glare on nearby homes, motorists, public rights of way, and aviation infrastructure (including aircraft departure and arrival flight paths).

2.10.159 Whilst there is some evidence that glint and glare from solar farms can be experienced by pilots and air traffic controllers in certain conditions, there is no evidence that glint and glare from solar farms results in significant impairment on aircraft safety. Therefore, unless a significant impairment can be demonstrated, the Secretary of State is unlikely to give any more than limited weight to claims of aviation interference because of glint and glare from solar farms.

The EN-3 goes some way in acknowledging that the issue is more complex than presented in the early draft issues; though, this is still unlikely to be welcomed by aviation stakeholders, who will still request a glint and glare assessment on the basis that glare may lead to a potentially significant impact upon aviation safety.

Finally, the EN-3 relates solely to nationally significant renewable energy infrastructure and therefore does not apply to all planning applications for solar farms.

Assessment Process – Ground-Based Receptors

No process for determining and contextualising the effects of glint and glare has been determined when assessing the impact of solar reflections upon surrounding roads and dwellings. Therefore, the Pager Power approach is to determine whether a reflection from the proposed solar development is geometrically possible and then to compare the results against the relevant guidance/studies to determine whether the reflection is significant.

The Pager Power approach has been informed by the policy presented above, current studies (presented in Appendix B) and stakeholder consultation. Further information can be found in

Pager Power's Glint and Glare Guidance document[15] which was produced due to the absence of existing guidance and a specific standardised assessment methodology.

[15] Solar Photovoltaic Development Glint and Glare Guidance, Fourth Edition, March 2022. Pager Power.

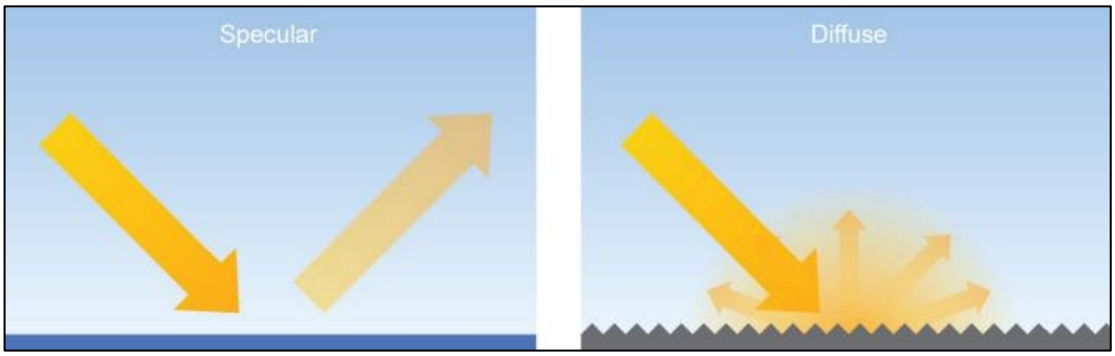
APPENDIX B – OVERVIEW OF GLINT AND GLARE STUDIES

Overview

Studies have been undertaken assessing the type and intensity of solar reflections from various surfaces including solar panels and glass. An overview of these studies is presented below.
The guidelines presented are related to aviation safety. The results are applicable for the purpose of this analysis.

Reflection Type from Solar Panels

Based on the surface conditions reflections from light can be specular and diffuse. A specular reflection has a reflection characteristic similar to that of a mirror; a diffuse will reflect the incoming light and scatter it in many directions. The figure below, taken from the FAA guidance[16], illustrates the difference between the two types of reflections. Because solar panels are flat and have a smooth surface most of the light reflected is specular, which means that incident light from a specific direction is reradiated in a specific direction.



Specular and diffuse reflections

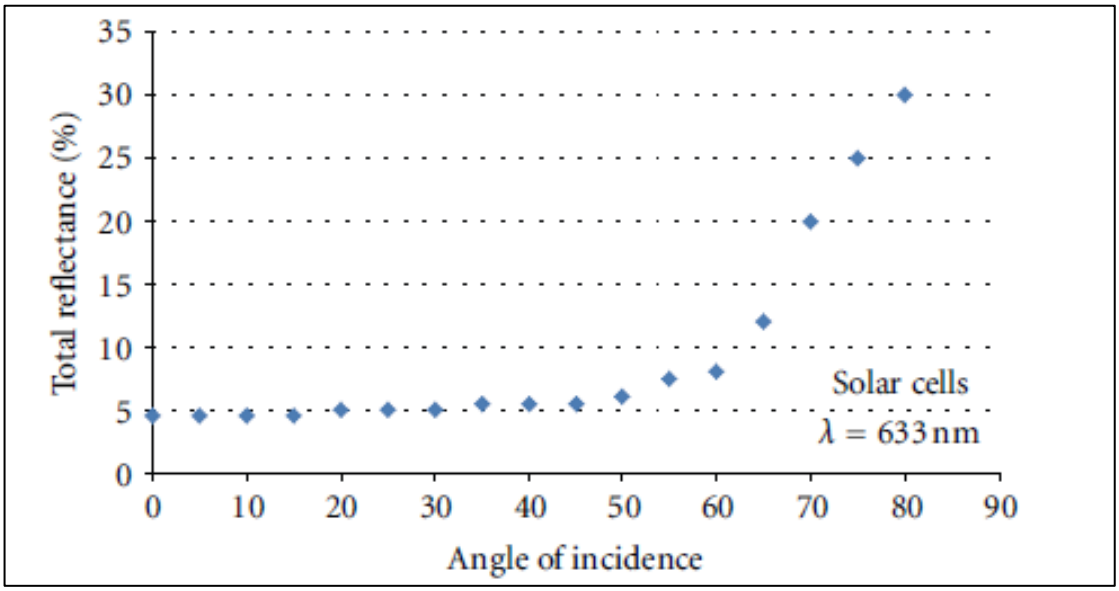
[16] Technical Guidance for Evaluating Selected Solar Technologies on Airports, Federal Aviation Administration (FAA), date: 04/2018, accessed on: 08/12/2021.

Solar Reflection Studies

An overview of content from identified solar panel reflectivity studies is presented in the subsections below.

Evan Riley and Scott Olson, "A Study of the Hazardous Glare Potential to Aviators from Utility-Scale Flat-Plate Photovoltaic Systems"

Evan Riley and Scott Olson published in 2011 their study titled: *A Study of the Hazardous Glare Potential to Aviators from Utility-Scale Flat-Plate Photovoltaic Systems*[17]". They researched the potential glare that a pilot could experience from a 25-degree fixed tilt PV system located outside of Las Vegas, Nevada. The theoretical glare was estimated using published ocular safety metrics which quantify the potential for a postflash glare after-image. This was then compared to the postflash glare after-image caused by smooth water. The study demonstrated that the reflectance of the solar cell varied with angle of incidence, with maximum values occurring at angles close to 90 degrees. The reflectance values varied from approximately 5% to 30%. This is shown on the figure below.



Total reflectance % when compared to angle of incidence

The conclusions of the research study were:

- The potential for hazardous glare from flat-plate PV systems is similar to that of smooth water;
- Portland white cement concrete (which is a common concrete for runways), snow, and structural glass all have a reflectivity greater than water and flat plate PV modules.

[17] Evan Riley and Scott Olson, "A Study of the Hazardous Glare Potential to Aviators from Utility-Scale Flat-Plate Photovoltaic Systems," ISRN Renewable Energy, vol. 2011, Article ID 651857, 6 pages, 2011. doi:10.5402/2011/651857

FAA Guidance – "Technical Guidance for Evaluating Selected Solar Technologies on Airports"[18]

The 2018 FAA Guidance included a diagram which illustrates the relative reflectance of solar panels compared to other surfaces. The figure shows the relative reflectance of solar panels compared to other surfaces. Surfaces in this figure produce reflections which are specular and diffuse. A specular reflection (those made by most solar panels) has a reflection characteristic similar to that of a mirror. A diffuse reflection will reflect the incoming light and scatter it in many directions. A table of reflectivity values, sourced from the figure within the FAA guidance, is presented below.

Surface	Approximate Percentage of Light Reflected[19]
Snow	80
White Concrete	77
Bare Aluminium	74
Vegetation	50
Bare Soil	30
Wood Shingle	17
Water	5
Solar Panels	5
Black Asphalt	2

Relative reflectivity of various surfaces

Note that the data above does not appear to consider the reflection type (specular or diffuse). An important comparison in this table is the reflectivity compared to water which will produce a reflection of very similar intensity when compared to that from a solar panel. The study by Riley and Olsen study (2011) also concludes that still water has a very similar reflectivity to solar panels.

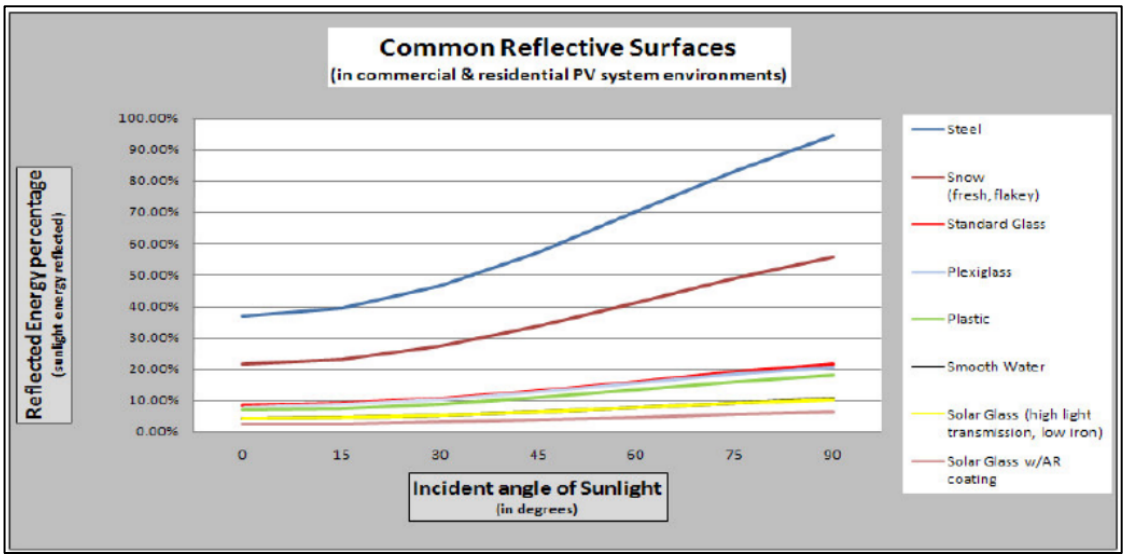
[18] Technical Guidance for Evaluating Selected Solar Technologies on Airports, Federal Aviation Administration (FAA), date: 04/2018, accessed on: 08/12/2021.

[19] Extrapolated data, baseline of 1,000 W/m^2 for incoming sunlight.

SunPower Technical Notification (2009)

SunPower published a technical notification[20] to '*increase awareness concerning the possible glare and reflectance impact of PV Systems on their surrounding environment*'.

The figure presented below shows the relative reflectivity of solar panels compared to other natural and manmade materials including smooth water, standard glass and steel.



Common reflective surfaces

The results, similarly to those from Riley and Olsen study (2011) and the FAA (2010), show that solar panels produce a reflection that is less intense than those of '*standard glass and other common reflective surfaces*'.

With respect to aviation and solar reflections observed from the air, SunPower has developed several large installations near airports or on Air Force bases. It is stated that these developments have all passed FAA or Air Force standards with all developments considered "No Hazard to Air Navigation". The note suggests that developers discuss any possible concerns with stakeholders near proposed solar farms.

[20] Source: Technical Support, 2009. SunPower Technical Notification – Solar Module Glare and Reflectance.

APPENDIX C – OVERVIEW OF SUN MOVEMENTS AND RELATIVE REFLECTIONS

The Sun's position in the sky can be accurately described by its azimuth and elevation. Azimuth is a direction relative to true north (horizontal angle i.e. from left to right) and elevation describes the Sun's angle relative to the horizon (vertical angle i.e. up and down).
The Sun's position can be accurately calculated for a specific location. The following data being used for the calculation:

- Time.
- Date.
- Latitude.
- Longitude.

The following is true at the location of the solar development:

- The Sun rises highest on 21 December (longest day).
- On 21 June, the maximum elevation reached by the Sun is at its lowest (shortest day).

APPENDIX D – GLINT AND GLARE IMPACT SIGNIFICANCE

Overview

The significance of glint and glare will vary for different receptors. The following section presents a general overview of the significance criteria with respect to experiencing a solar reflection.

Impact Significance Definition

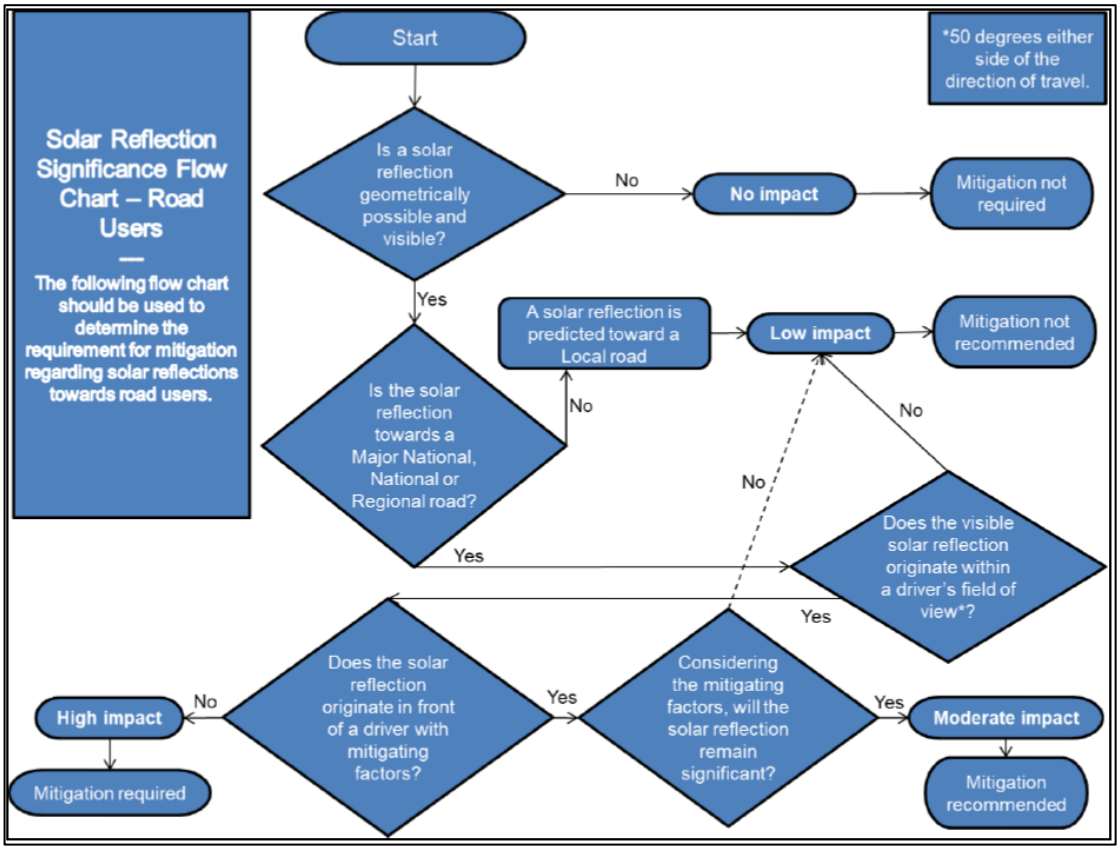
The table below presents the recommended definition of 'impact significance' in glint and glare terms and the requirement for mitigation under each.

Impact Significance	Definition	Mitigation Requirement
No Impact	A solar reflection is not geometrically possible or will not be visible from the assessed receptor.	No mitigation required.
Low	A solar reflection is geometrically possible however any impact is considered to be small such that mitigation is not required e.g. intervening screening will limit the view of the reflecting solar panels.	No mitigation required.
Moderate	A solar reflection is geometrically possible and visible however it occurs under conditions that do not represent a worst-case.	Whilst the impact may be acceptable, consultation and/or further analysis should be undertaken to determine the requirement for mitigation.
High	A solar reflection is geometrically possible and visible under conditions that will produce a significant impact. Mitigation and consultation is recommended.	Mitigation will be required if the proposed solar development is to proceed.

Impact significance definition

Assessment Process for Road Receptors

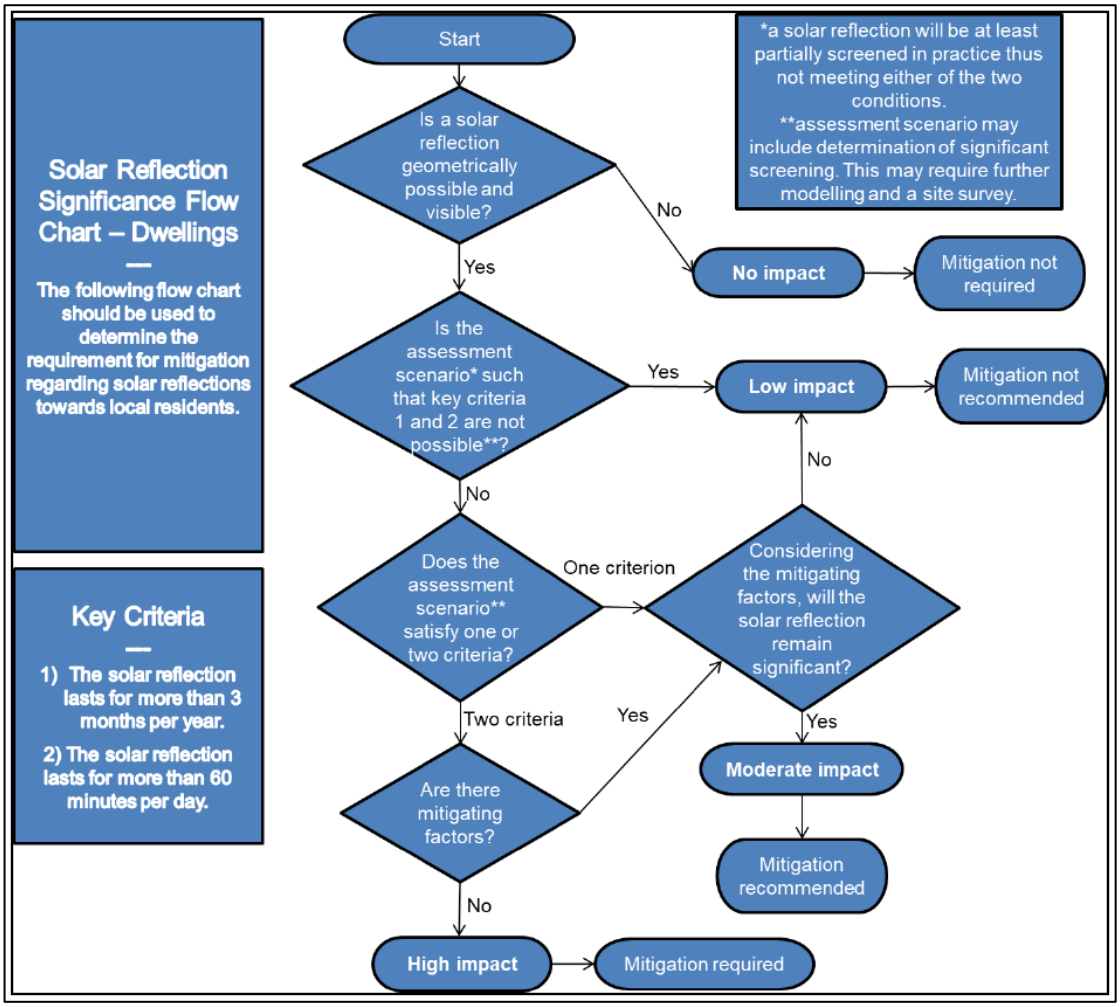
The flow chart presented below has been followed when determining the mitigation requirement for road receptors.



Road receptor mitigation requirement flow chart

Assessment Process for Dwelling Receptors

The flow chart presented below has been followed when determining the mitigation requirement for dwelling receptors.



Dwelling receptor mitigation requirement flow chart

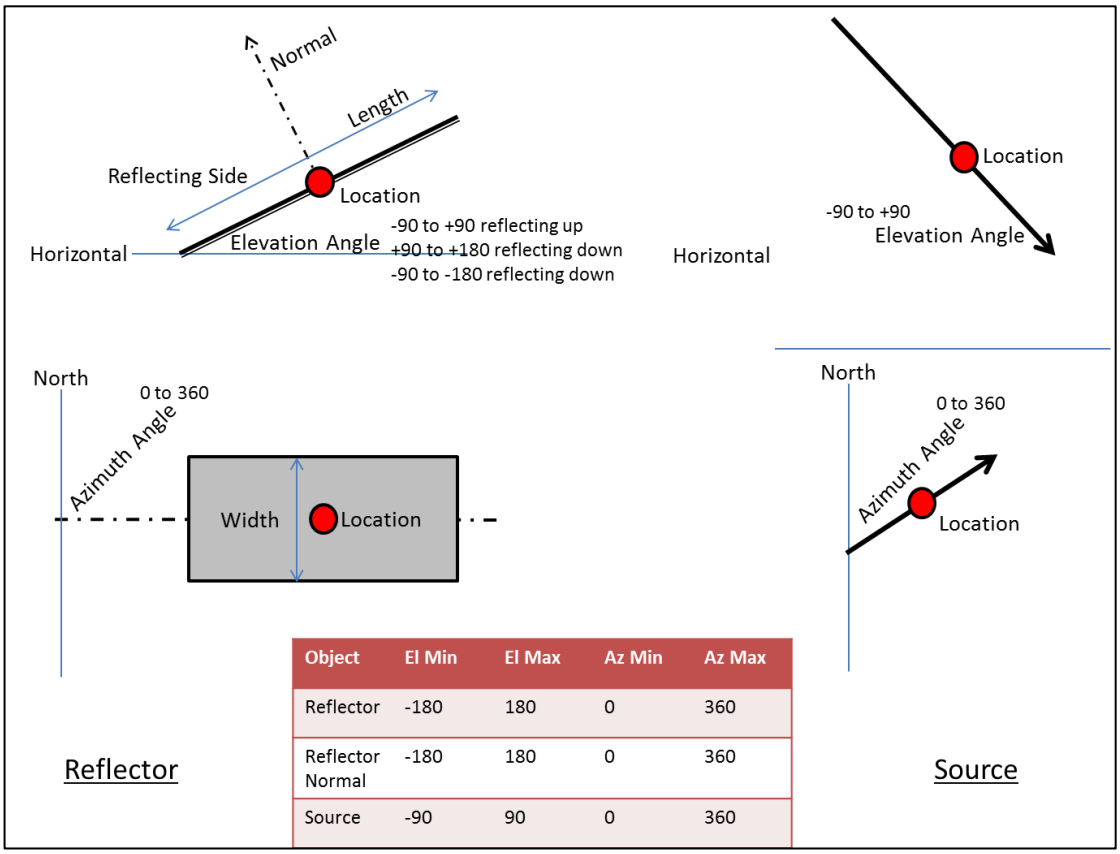
APPENDIX E – REFLECTION CALCULATIONS METHODOLOGY

Pager Power Methodology

The calculations are three dimensional and complex, accounting for:

- The Earth's orbit around the Sun;
- The Earth's rotation;
- The Earth's orientation;
- The reflector's location;
- The reflector's 3D Orientation.

Reflections from a flat reflector are calculated by considering the normal which is an imaginary line that is perpendicular to the reflective surface and originates from it. The diagram below may be used to aid understanding of the reflection calculation process.



Object	El Min	El Max	Az Min	Az Max
Reflector	-180	180	0	360
Reflector Normal	-180	180	0	360
Source	-90	90	0	360

Pager Power reflection calculation process

The following process is used to determine the 3D Azimuth and Elevation of a reflection:

- Use the Latitude and Longitude of reflector as the reference for calculation purposes;
- Calculate the Azimuth and Elevation of the normal to the reflector;
- Calculate the 3D angle between the source and the normal;
- If this angle is less than 90 degrees a reflection will occur. If it is greater than 90 degrees no reflection will occur because the source is behind the reflector;
- Calculate the Azimuth and Elevation of the reflection in accordance with the following:
    - The angle between source and normal is equal to angle between normal and reflection;

Source, Normal and Reflection are in the same plane.

APPENDIX F – ASSESSMENT LIMITATIONS AND ASSUMPTIONS

Pager Power's Model

The model considers 100% sunlight during daylight hours which is highly conservative.

The model does not account for terrain between the reflecting solar panels and the assessed receptor where a solar reflection is geometrically possible.

The model considers terrain between the reflecting solar panels and the visible horizon (where the sun may be obstructed from view of the panels)[21].

It is assumed that the panel elevation angle assessed represents the elevation angle for all of the panels within each solar panel area defined.

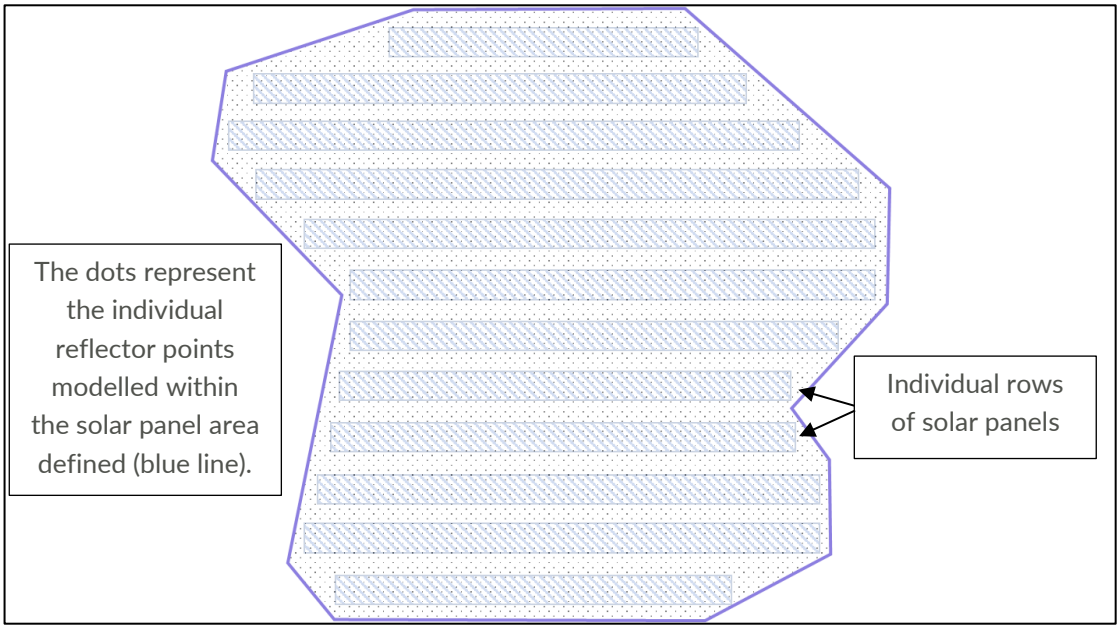
It is assumed that the panel azimuth angle assessed represents the azimuth angle for all of the panels within each solar panel area defined.

Only a reflection from the face of the panel has been considered. The frame or the reverse of the frame of the solar panel has not been considered.

The model assumes that a receptor can view the face of every panel (point, defined in the following paragraph) within the development area whilst in reality this, in the majority of cases, will not occur. Therefore, any predicted solar reflection from the face of a solar panel that is not visible to a receptor will not occur in practice.

A finite number of points within each solar panel area defined is chosen based on an assessment resolution so that a comprehensive understanding of the entire development can be formed. This determines whether a solar reflection could ever occur at a chosen receptor. The model does not consider the specific panel rows or the entire face of the solar panel within the development outline, rather a single point is defined every 'x' metres (based on the assessment resolution) with the geometric characteristics of the panel. A panel area is however defined to encapsulate all possible panel locations. See the figure below which illustrates this process.

[21] UK only.



Solar panel area modelling overview

A single reflection point is chosen for the geometric calculations. This suitably determines whether a solar reflection can be experienced at a receptor location and the time of year and duration of the solar reflection. Increased accuracy could be achieved by increasing the number of heights assessed however this would only marginally change the results and is not considered significant.

The available street view imagery, satellite mapping, terrain and any site imagery provided by the developer has been used to assess line of sight from the assessed receptors to the modelled solar panel area, unless stated otherwise. In some cases, this imagery may not be up to date and may not give the full perspective of the installation from the location of the assessed receptor.

Any screening in the form of trees, buildings etc. that may obstruct the Sun from view of the solar panels is not within the modelling unless stated otherwise. The terrain profile at the horizon is considered if stated.

APPENDIX G – RECEPTOR AND REFLECTOR AREA DETAILS

Dwelling Receptors Details

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
1	-3.48334	53.24534	25	-3.45091	53.24415
2	-3.4814	53.24407	26	-3.45084	53.24409
3	-3.48347	53.24294	27	-3.45077	53.244
4	-3.47418	53.24243	28	-3.45073	53.24395
5	-3.47888	53.24086	29	-3.45068	53.24386
6	-3.47805	53.23846	30	-3.45063	53.24378
7	-3.4773	53.23664	31	-3.45062	53.24371
8	-3.47762	53.23495	32	-3.45057	53.24364
9	-3.4763	53.23434	33	-3.45039	53.24342
10	-3.47585	53.23399	34	-3.45031	53.24336
11	-3.4734	53.23361	35	-3.45026	53.24329
12	-3.47318	53.23329	36	-3.45019	53.24323
13	-3.45887	53.22898	37	-3.45015	53.24313
14	-3.45341	53.23138	38	-3.45012	53.24306
15	-3.46465	53.23402	39	-3.45008	53.24298
16	-3.4645	53.23541	40	-3.44992	53.24277
17	-3.46723	53.23531	41	-3.44986	53.24271
18	-3.46813	53.23895	42	-3.44979	53.24262
19	-3.46834	53.23912	43	-3.44974	53.24255
20	-3.46541	53.24093	44	-3.44974	53.24249

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
21	-3.46427	53.24134	45	-3.44968	53.2424
22	-3.46277	53.24297	46	-3.44959	53.24234
23	-3.46498	53.2483	47	-3.44956	53.24227
24	-3.45095	53.24422	48	-3.44951	53.2422

Dwelling Receptors Details

Modelled Reflector Areas

Panel Area 1

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
1	-3.46838	53.24463	7	-3.46786	53.24456
2	-3.46848	53.24463	8	-3.46781	53.24456
3	-3.46848	53.24454	9	-3.46781	53.24463
4	-3.46857	53.24454	10	-3.46790	53.24463
5	-3.46856	53.24447	11	-3.46790	53.24468
6	-3.46785	53.24447	12	-3.46839	53.24469

Panel Area 1

Panel Area 2

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
1	-3.46871	53.24437	8	-3.46783	53.24409
2	-3.46865	53.24437	9	-3.46783	53.24425
3	-3.46865	53.24426	10	-3.46796	53.24426
4	-3.46833	53.24426	11	-3.46797	53.24436
5	-3.46832	53.24418	12	-3.46801	53.24436
6	-3.46804	53.24418	13	-3.46801	53.24443
7	-3.46804	53.24409	14	-3.46871	53.24442

Panel Area 2

Panel Area 3

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
1	-3.46927	53.24394	30	-3.46957	53.24322
2	-3.46935	53.24394	31	-3.46958	53.24331
3	-3.46935	53.24385	32	-3.46949	53.24331
4	-3.46944	53.24384	33	-3.46950	53.24348
5	-3.46944	53.24376	34	-3.46903	53.24348
6	-3.46958	53.24376	35	-3.46902	53.24338
7	-3.46958	53.24366	36	-3.46865	53.24338
8	-3.46970	53.24366	37	-3.46865	53.24330
9	-3.46970	53.24355	38	-3.46862	53.24330
10	-3.46978	53.24355	39	-3.46862	53.24321
11	-3.46978	53.24347	40	-3.46824	53.24321
12	-3.46986	53.24347	41	-3.46825	53.24330
13	-3.46987	53.24337	42	-3.46767	53.24330
14	-3.47002	53.24338	43	-3.46768	53.24339
15	-3.47001	53.24328	44	-3.46718	53.24338
16	-3.47011	53.24328	45	-3.46718	53.24348
17	-3.47011	53.24321	46	-3.46761	53.24349
18	-3.47024	53.24320	47	-3.46762	53.24358
19	-3.47024	53.24313	48	-3.46785	53.24358
20	-3.47019	53.24313	49	-3.46784	53.24366
21	-3.47018	53.24304	50	-3.46821	53.24366
22	-3.46928	53.24303	51	-3.46822	53.24376
23	-3.46927	53.24294	52	-3.46843	53.24376

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
24	-3.46886	53.24294	53	-3.46843	53.24386
25	-3.46887	53.24304	54	-3.46885	53.24387
26	-3.46922	53.24303	55	-3.46884	53.24394
27	-3.46922	53.24311	56	-3.46905	53.24394
28	-3.46950	53.24311	57	-3.46905	53.24402
29	-3.46951	53.24322	58	-3.46926	53.24402

Panel Area 3

Panel Area 4

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
1	-3.46964	53.24214	28	-3.47111	53.24056
2	-3.47006	53.24213	29	-3.47112	53.24064
3	-3.47007	53.24203	30	-3.47083	53.24064
4	-3.46986	53.24203	31	-3.47084	53.24075
5	-3.46987	53.24175	32	-3.47110	53.24075
6	-3.47052	53.24175	33	-3.47111	53.24083
7	-3.47053	53.24166	34	-3.47090	53.24083
8	-3.47079	53.24166	35	-3.47091	53.24111
9	-3.47080	53.24176	36	-3.47070	53.24111
10	-3.47136	53.24175	37	-3.47069	53.24119
11	-3.47137	53.24165	38	-3.46892	53.24120
12	-3.47165	53.24165	39	-3.46892	53.24130
13	-3.47165	53.24156	40	-3.46870	53.24131
14	-3.47200	53.24156	41	-3.46871	53.24143
15	-3.47202	53.24120	42	-3.46858	53.24143

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
16	-3.47223	53.24120	43	-3.46859	53.24157
17	-3.47222	53.24110	44	-3.46816	53.24157
18	-3.47209	53.24110	45	-3.46816	53.24164
19	-3.47210	53.24104	46	-3.46803	53.24165
20	-3.47193	53.24103	47	-3.46803	53.24185
21	-3.47193	53.24093	48	-3.46776	53.24186
22	-3.47179	53.24092	49	-3.46776	53.24193
23	-3.47179	53.24076	50	-3.46749	53.24193
24	-3.47156	53.24076	51	-3.46749	53.24210
25	-3.47157	53.24065	52	-3.46806	53.24243
26	-3.47132	53.24064	53	-3.46898	53.24223
27	-3.47131	53.24056	54	-3.46963	53.24221

Panel Area 4

Panel Area 5

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
1	-3.46023	53.24509	27	-3.45879	53.24311
2	-3.46056	53.24509	28	-3.45879	53.24334
3	-3.46056	53.24501	29	-3.45833	53.24334
4	-3.46049	53.24501	30	-3.45833	53.24350
5	-3.46047	53.24481	31	-3.45816	53.24351
6	-3.46060	53.24481	32	-3.45816	53.24361
7	-3.46060	53.24473	33	-3.45786	53.24360
8	-3.46051	53.24474	34	-3.45787	53.24367
9	-3.46051	53.24465	35	-3.45807	53.24368

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
10	-3.46043	53.24465	36	-3.45807	53.24397
11	-3.46042	53.24454	37	-3.45786	53.24397
12	-3.46015	53.24454	38	-3.45787	53.24420
13	-3.46016	53.24447	39	-3.45821	53.24421
14	-3.45957	53.24446	40	-3.45824	53.24441
15	-3.45956	53.24420	41	-3.45935	53.24442
16	-3.45933	53.24420	42	-3.45936	53.24455
17	-3.45929	53.24380	43	-3.45938	53.24471
18	-3.45988	53.24381	44	-3.45956	53.24471
19	-3.45990	53.24372	45	-3.45959	53.24499
20	-3.45911	53.24370	46	-3.45947	53.24499
21	-3.45908	53.24326	47	-3.45949	53.24509
22	-3.45933	53.24325	48	-3.45970	53.24508
23	-3.45931	53.24309	49	-3.45970	53.24520
24	-3.45940	53.24308	50	-3.46004	53.24521
25	-3.45939	53.24298	51	-3.46006	53.24529
26	-3.45880	53.24298	52	-3.46025	53.24529

Panel Area 5

Panel Area 6

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
1	-3.46137	53.24371	11	-3.46081	53.24353
2	-3.46147	53.24371	12	-3.46058	53.24354
3	-3.46147	53.24352	13	-3.46059	53.24362
4	-3.46167	53.24352	14	-3.46008	53.24362

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
5	-3.46167	53.24344	15	-3.46008	53.24372
6	-3.46156	53.24343	16	-3.46019	53.24372
7	-3.46155	53.24336	17	-3.46019	53.24380
8	-3.46135	53.24336	18	-3.46084	53.24380
9	-3.46135	53.24344	19	-3.46084	53.24399
10	-3.46081	53.24344	20	-3.46138	53.24399

Panel Area 6

Panel Area 7

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
1	-3.46061	53.24298	7	-3.45994	53.24287
2	-3.46054	53.24298	8	-3.46003	53.24287
3	-3.46054	53.24292	9	-3.46003	53.24300
4	-3.46048	53.24292	10	-3.45961	53.24299
5	-3.46047	53.24281	11	-3.45961	53.24308
6	-3.45994	53.24281	12	-3.46062	53.24308

Panel Area 7

Panel Area 8

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
1	-3.46048	53.24233	11	-3.46012	53.24188
2	-3.46059	53.24233	12	-3.46020	53.24188
3	-3.46059	53.24226	13	-3.46020	53.24178
4	-3.46067	53.24226	14	-3.45974	53.24178
5	-3.46068	53.24198	15	-3.45973	53.24216
6	-3.46048	53.24198	16	-3.45969	53.24216

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
7	-3.46048	53.24188	17	-3.45969	53.24226
8	-3.46038	53.24189	18	-3.45961	53.24226
9	-3.46039	53.24198	19	-3.45962	53.24242
10	-3.46013	53.24197	20	-3.46048	53.24242

Panel Area 8

Panel Area 9

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
1	-3.46064	53.24120	10	-3.46010	53.24118
2	-3.46064	53.24107	11	-3.45992	53.24118
3	-3.46077	53.24107	12	-3.45992	53.24126
4	-3.46076	53.24081	13	-3.46008	53.24127
5	-3.46025	53.24081	14	-3.46007	53.24136
6	-3.46027	53.24091	15	-3.46036	53.24137
7	-3.46017	53.24091	16	-3.46036	53.24144
8	-3.46020	53.24109	17	-3.46054	53.24145
9	-3.46008	53.24109			

Panel Area 9

Panel Area 10

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
1	-3.46310	53.24058	50	-3.45927	53.23883
2	-3.46322	53.24058	51	-3.45927	53.23892
3	-3.46322	53.24048	52	-3.45906	53.23891
4	-3.46335	53.24048	53	-3.45907	53.23901
5	-3.46336	53.24019	54	-3.45894	53.23900

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
6	-3.46331	53.24019	55	-3.45896	53.23917
7	-3.46329	53.24010	56	-3.45908	53.23917
8	-3.46347	53.24010	57	-3.45908	53.23938
9	-3.46348	53.23984	58	-3.45927	53.23939
10	-3.46364	53.23982	59	-3.45928	53.23964
11	-3.46363	53.23973	60	-3.45941	53.23965
12	-3.46380	53.23972	61	-3.45941	53.23972
13	-3.46380	53.23965	62	-3.45956	53.23973
14	-3.46396	53.23965	63	-3.45957	53.23993
15	-3.46395	53.23955	64	-3.45989	53.23993
16	-3.46380	53.23956	65	-3.45990	53.24020
17	-3.46380	53.23927	66	-3.46006	53.24020
18	-3.46364	53.23928	67	-3.46007	53.24028
19	-3.46363	53.23910	68	-3.46023	53.24028
20	-3.46280	53.23909	69	-3.46023	53.24034
21	-3.46279	53.23900	70	-3.46076	53.24034
22	-3.46229	53.23900	71	-3.46076	53.24029
23	-3.46229	53.23893	72	-3.46115	53.24028
24	-3.46178	53.23893	73	-3.46115	53.24025
25	-3.46177	53.23808	74	-3.46125	53.24025
26	-3.46170	53.23807	75	-3.46126	53.24022
27	-3.46170	53.23800	76	-3.46134	53.24022
28	-3.46162	53.23800	77	-3.46134	53.24018

ID	Longitude (°)	Latitude (°)	ID	Longitude (°)	Latitude (°)
29	-3.46162	53.23791	78	-3.46143	53.24017
30	-3.46110	53.23791	79	-3.46142	53.24010
31	-3.46111	53.23800	80	-3.46176	53.24010
32	-3.46085	53.23801	81	-3.46177	53.24016
33	-3.46086	53.23808	82	-3.46187	53.24016
34	-3.46071	53.23808	83	-3.46188	53.24021
35	-3.46072	53.23818	84	-3.46196	53.24021
36	-3.46055	53.23818	85	-3.46196	53.24025
37	-3.46056	53.23828	86	-3.46205	53.24025
38	-3.46039	53.23828	87	-3.46205	53.24032
39	-3.46040	53.23836	88	-3.46211	53.24032
40	-3.46022	53.23836	89	-3.46212	53.24040
41	-3.46024	53.23846	90	-3.46229	53.24040
42	-3.45991	53.23846	91	-3.46229	53.24045
43	-3.45991	53.23856	92	-3.46250	53.24046
44	-3.45976	53.23856	93	-3.46251	53.24059
45	-3.45976	53.23864	94	-3.46257	53.24059
46	-3.45956	53.23863	95	-3.46259	53.24076
47	-3.45955	53.23873	96	-3.46291	53.24077
48	-3.45939	53.23873	97	-3.46293	53.24085
49	-3.45940	53.23883	98	-3.46309	53.24086

Panel Area 10

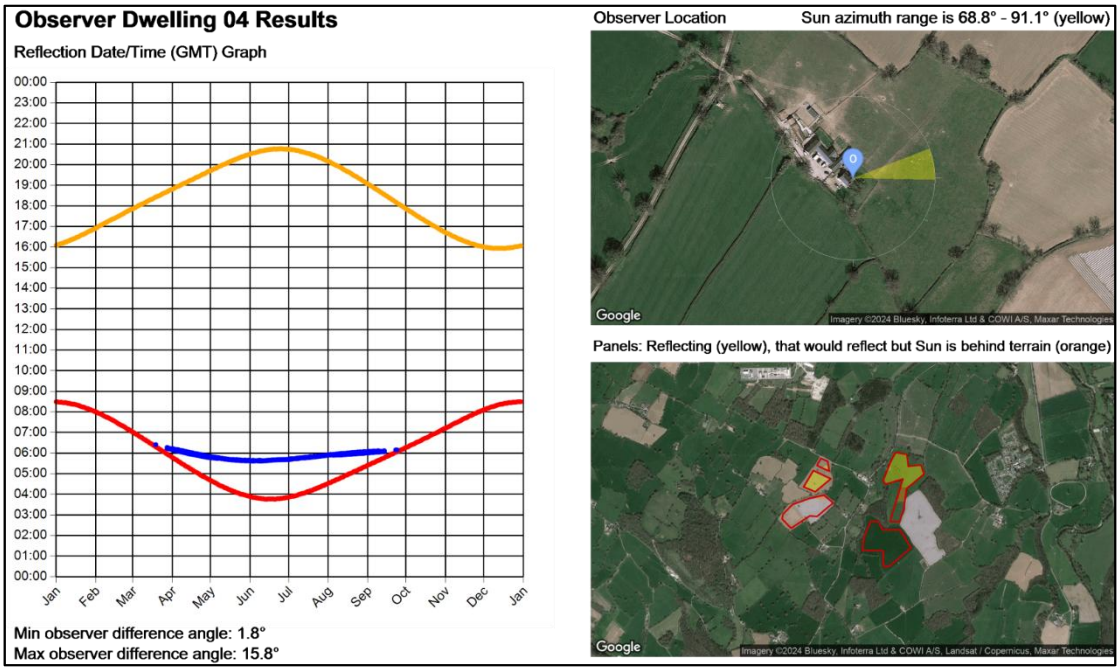
APPENDIX G – GEOMETRIC CALCULATION RESULTS

The charts for the receptors are shown on the following pages. Each chart shows:

- The receptor (observer) location – top right image. This also shows the azimuth range of the Sun itself at times when reflections are possible. If sunlight is experienced from the same direction as the reflecting panels, the overall impact of the reflection is reduced as discussed within the body of the report;
- The reflecting panels – bottom right image. The reflecting area is shown in yellow. If the yellow panels are not visible from the observer location, no issues will occur in practice. Areas shown in orange are those where the Sun is obscured by terrain at the visible horizon and therefore no solar reflection could occur. Additional obstructions which may obscure the panels from view are considered separately within the analysis;
- The reflection date/time graph – left hand side of the page. The blue line indicates the dates and times at which geometric reflections are possible. This relates to reflections from the yellow areas only;
- The yellow and red lines show sunrise and sunset times respectively.

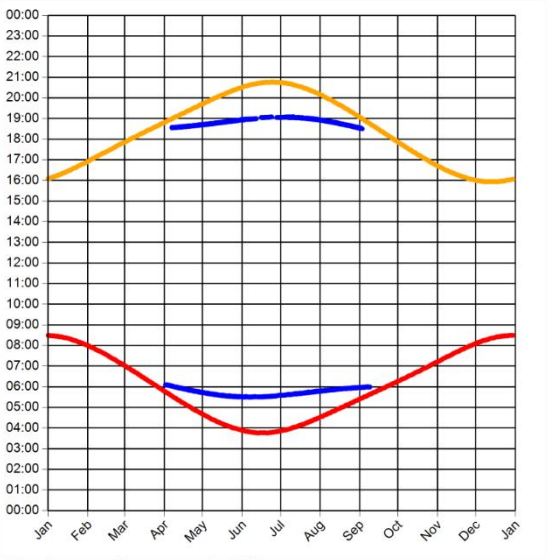
Dwellings

Modelling results for receptors where a low impact is predicted are presented. Full modelling results are available upon request.



Observer Dwelling 20 Results

Reflection Date/Time (GMT) Graph



Min observer difference angle: 2.1°
Max observer difference angle: 13°

Observer Location — Sun azimuth ranges (yellow)

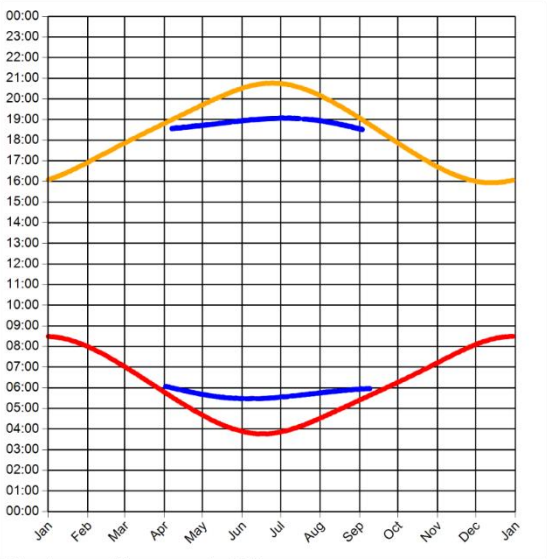


Panels: Reflecting (yellow), that would reflect but Sun is behind terrain (orange)



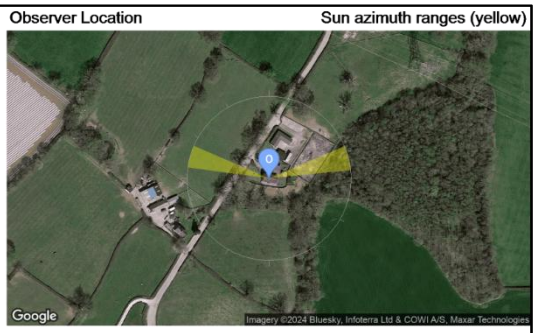
Observer Dwelling 21 Results

Reflection Date/Time (GMT) Graph



Min observer difference angle: 1.7°
Max observer difference angle: 12.2°

Observer Location — Sun azimuth ranges (yellow)

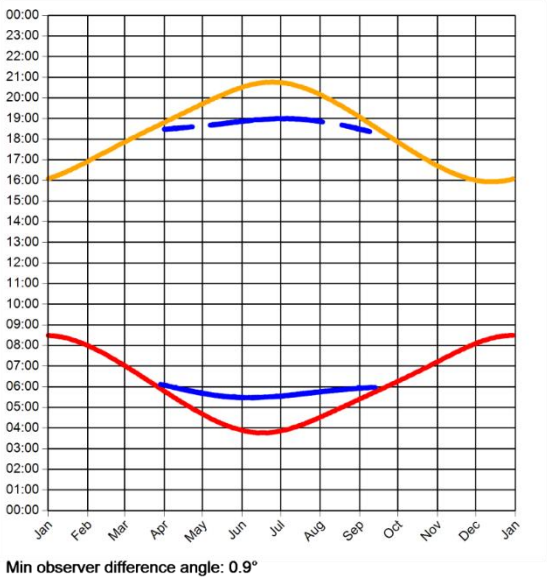


Panels: Reflecting (yellow), that would reflect but Sun is behind terrain (orange)



Observer Dwelling 22 Results

Reflection Date/Time (GMT) Graph



Min observer difference angle: 0.9°
Max observer difference angle: 13.1°

Observer Location — Sun azimuth ranges (yellow)



Panels: Reflecting (yellow), that would reflect but Sun is behind terrain (orange)





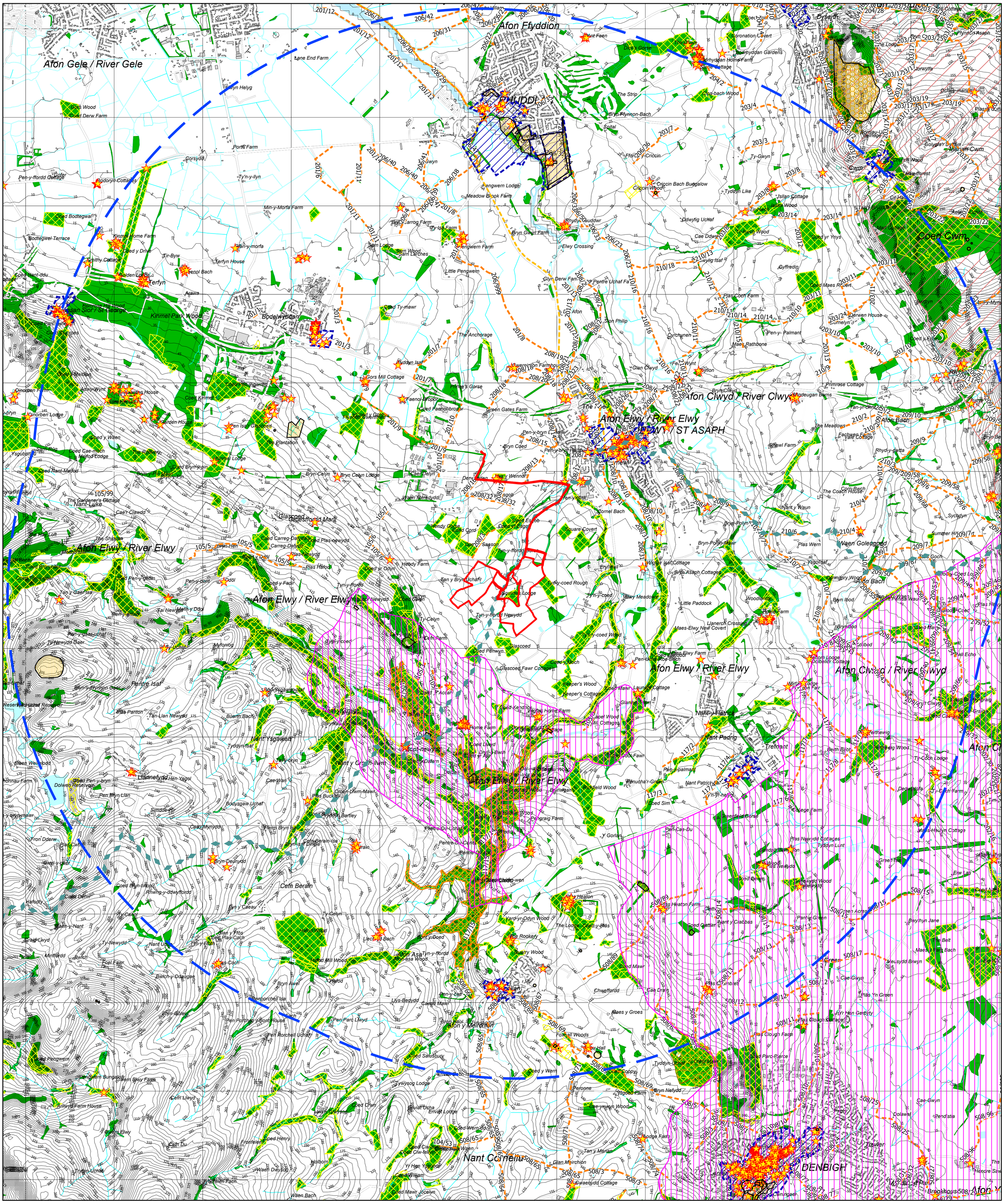
Pager Power Limited
Stour Valley Business Centre
Sudbury
Suffolk
CO10 7GB

Tel: +44 1787 319001 **Email:** info@pagerpower.com **Web:** www.pagerpower.com

Appendix 7.11 Figures

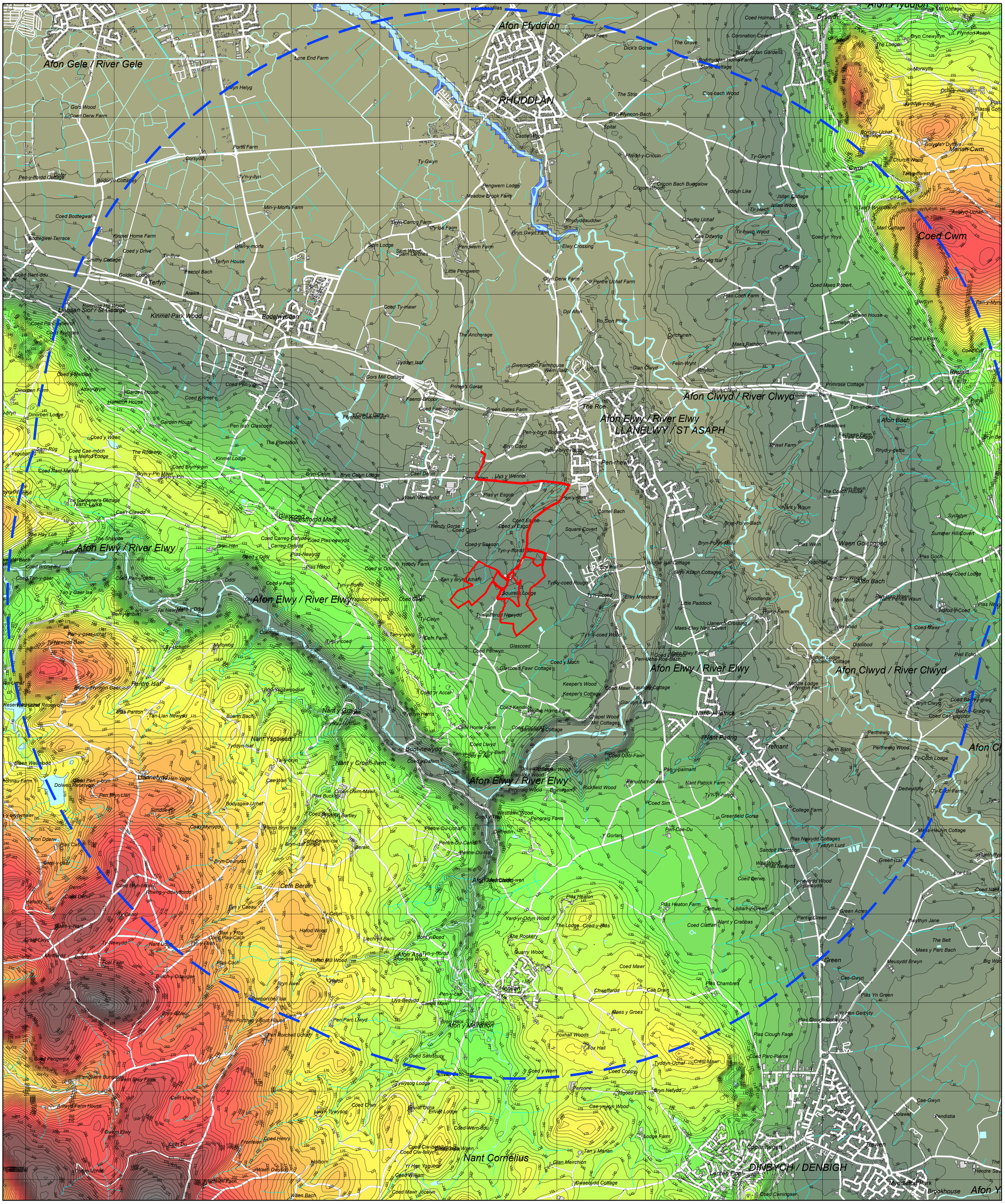
The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-


Afon Gele / River Gele
Afon Ffyddion
PWLLDDI
Afon Elwy / River Elwy
Afon Elwy / River Elwy
Afon Elwy / River Elwy
Afon Clwyd / River Clwyd
Afon Clwyd / River Clwyd
Afon Elwy / River Elwy
Afon Elwy / River Elwy
Afon Elwy / River Elwy
Nant Cornelio
DENBIGH
Coed Cwm
Kinmel Park Wood
Bodelwyddan
Glascoed
Glascoed
Cefn Berain
Cefn Llwyd
Pentre Isaf
Llannefydd
Nant Ysgawen
Nant y Cregin-llwyn
Nant Padrig
Trefnant
Afon Asa
Afon y Melin
Tyddyn Isaf
Tyddyn Isaf
Afon Bach
Afon Bach
Waen Goleugoed
Waen Goleugoed
Cwm
Cwm
Dysern
Coronation Covert
Boarhyddan Gardens
Boarhyddan Home Farm
Cae Cottage
Dina's Gorse
The Strip
Clos-bach Wood
Bryn Ffynnon-Bach
Spital
Ty-Gwyn
Ffordd y Criccin
Criccin Bach Bungalow
Criccin Wood
Tydyn Like
Islan Cottage
Tir-Mawr
Ddwylig Uchaf
Cae Ddwy
Tir-Mawr Wood
Coed yr Ynys
Ddwylig Isaf
Cyffredin
Coed Maes Rhosyn
Plas Coch Farm
Pen-y- Palmant
Maes Rathbone
Cyrchynen
Glan Clwyd
Fe'n Wynt
Sylfon
Primrose Cottage
Bryn-Clwyd
Rodeugan Barns
Ty'n-y-llyn
Porth Farm
Gorsydd
Min-y-Morfa Farm
Meadow Brook Farm
Bryn Carrog Farm
Ty-Isa Farm
Bryn Gwyn Farm
Elwy Crossing
Rhyd-y-Gauddwr
Pengwern Lodge
Pengwern Farm
Little Pengwern
Glyn Derw Farm
Pentre Uchaf Farm
Plas Coch Farm
Derwen House
Cornelyn
Pen-y- Palmant
Maes Rathbone
Cyrchynen
Fe'n Wynt
Sylfon
Glan Clwyd
Bryn-Clwyd
Primrose Cottage
Rodeugan Barns
Plas Coch Farm
Pen-y-bryn Farm
Pen-y-bryn Uchaf
Bryn Coed
Caer Delyn
Derwen Deg
Waen Meredydd
Bryn Celyn
Bryn Celyn Lodge
Gors Mill Cottage
Prince's Gorse
Faenol-bropor
Coed Faenol-bropor
Green Gates Farm
Coed Ty-mawr
The Anchorage
Sion Philip
Afon
Tyddyn Isaf
Gors Wood
Coed Derw Farm
Lane End Farm
Gwyn Helyg
Porth Farm
Gorsydd
Ty'n-y-llyn
Pen-y-ffordd Cottage
Rodoryn Cottages
Coed Bodtegwal
Bodtegwel Terrace
Kinmel Home Farm
Coed y Drive
Smithy Cottage
Tir-Byw
Ty'n-y-morfa
Terfyn House
Tenol Bach
Golden Lodge
Terfyn
Arawa
Primrose Hill Wood
Ffynnon Sior / St George
Kinmel Park Wood
Coed Parc-mawr
Cae Scrogos
Coed Nant-ddu Cottage
Coed y Meibion
Adwy-Wynt
Dinorben Farm
Kinmel Lodge
Dinorben Lodge
Garden House
Coed y Waen
Coed Cae-mach
Melford Lodge
Coed Nant-Melford
Coed Bryn-Ygwin
Bryn-y-Fin Mawr
Bryn-y-Fin
Ysgubor-fawr
The Rookery
Kinmel Lodge
Coed Kinmel
Coed Parc-mawr
Coed Nant-ddu
Dolwen Reservoir
Coed Pen-y-bryn
Llannefydd
Hen Ysgol
Cae-Wan
Bodysgaw Uchaf
Simdde-fer
Caer Mynydog
Fferm Bryn Isa
Fron Dderw
Plas-Cwtta
Bryn-Deunydd
Derw
Coed Derw
Coed Bryn-llinos
Rhwng-y-ddwyfordd
Halfodty
Ty Canol
Maen-y-Nant
Graig Llwyd
Ty-Newydd
Minffordd
Bwich
Foel Fawr
Bwich-y-Ddaugae
Bryn Awel
Penporchell Isa
Bryn-Golwen
Pen Porchell-y-Bont House
Pen Porchell Uchaf
Coed Pengwern
Pengwern Bungalow
Pengwern Elwy Farm
Arllwyd Farm House
Bryn-y-Elwy
Tryfan-Uchaf
Cefn Du
Cefn Llwyd
Fronfelen
Fronfelen Fach
Coed Henry
Waen Dwysog
Waen Bach
Holborn
Coed Wern-dd
Coed Ciw-felin
Coed William
Coed Mawr Jocelyn
Enwal Lodge
Enwal Ucha
Coed Crwn
Llwyn Llwysog
Tywysog Lodge
Ennion Cefn-isaf
Coed Salusbury
Coed Penwyn
Glascoed Fawr Cottage
Coed y Llech
Coed Llwyd
Coed Dafarn
Coed Ty'n-y-Cefn
Coed Pen-y-Gaer
Coed Pen-y-Gaer-uchaf
Ty Newydd Gaer
Pen-y-gaer
Tai Newydd
Melin y Ddol
Ty-Celyn
Coed Celyn
Tyn-y-ffordd
Tyn-y-ffordd Newydd
Tyn-y-coed
Tyn-y-coed Rough
Tyn-y-coed Wood
Coed Mawr
Coed Mawr
Coed Mawr
Coed Parc-Pierce
Coed Parc-mawr
Coed Mawr
Coed Mawr
Coed

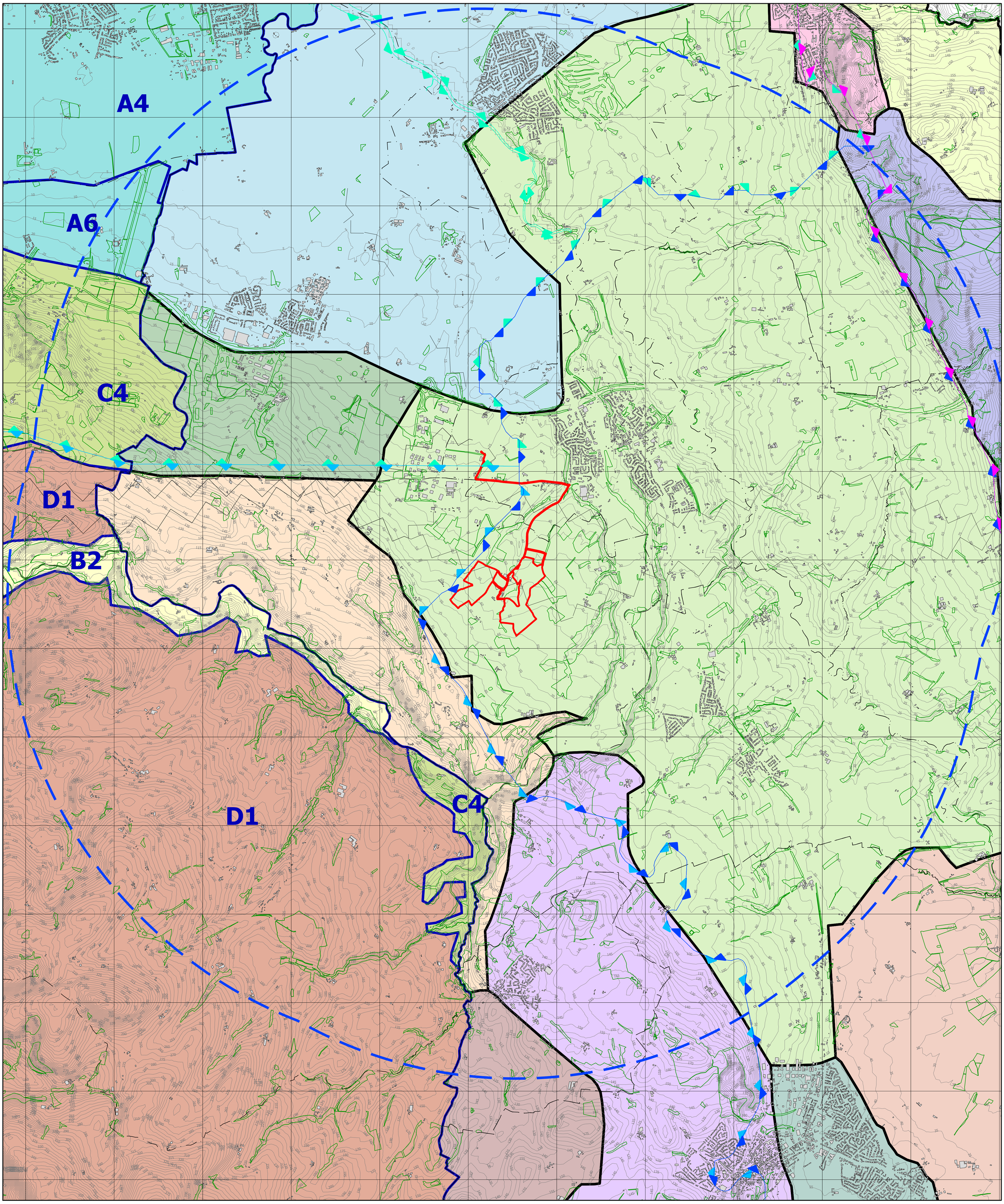
The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-


Afon Gele / River Gele
Afon Ffyddion
RHUDDLAN
Afon Tyddion
Afon Elwy / River Elwy
LLANELWY / ST ASAPH
Afon Clwyd / River Clwyd
Coed Cwm
Marian Cwm
Waen Goleugoed
Nant Cornelius
DINBYCH / DENBIGH
Llanasa Sior / St George
Kinmel Park Wood
Bodelwyddan
Terfyn
Pentre Isaf
Glascoed
Henllan
Afon y Melrchon
Afon Asa
Llannefydd
Cefn Berain
Nant Ysgawen
Nant y Croen-llwn
Nant-Lluke
Tremant
Nant-y-Patrick
Nant Padrig
Afon Elwy / River Elwy
Afon Clwyd / River Clwyd
Afon Elwy / River Elwy
Afon Elwy / River Elwy
Afon Elwy / River Elwy
Afon Clwyd / River Clwyd

The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-



LEGEND

- Site Boundary
- 5km Buffer from Site Boundary
- Existing Woodlands, Copses and Tree Belts ^
- Existing Water Courses and Features ^
- Contours/Spot Heights (Metres AOD) ^ (110m)

National Character Area (NCA) Profiles #

- WLCA 08 - Colwyn and Northern Coastline
- WLCA 09 - Rhos
- WLCA 11 - Dyffryn Clwyd, (Vale of Clwyd)
- WLCA 12 - Bryniau Clwyd, (Clwydian Range)

Conwy Landscape Areas ~~

Lowland Areas

- Ardaloedd Iseldir [A4: Gwastadedd Arfordirol a Morydol - Prestatyn i Abergele | Coastal and Estuarine Flats - Prestatyn to Abergele] [A6: Dyffryndir fferm - Dyffryn Clwyd | Vale Farmlands - Vale of Clwyd]

Lower Hills and Valleys

- Bryniau a Dyffrynnoedd Is [B2: Dyffrynnoedd Dwfn - Aled ac Elwy | Deep Valleys - Aled and Elwy]

Limestone Country

- Calchfaen Gwledig [C4: Ffermdir Calchfaen - Abergele i Arfordir Dinbych/Bryniau'r Dyffryn | Limestone Farmlands - Abergele to Denbigh Coastal/Vale Hills]

Marginal Upland

- Ucheldir Ymylol [D1: Bryniau Aled Hiraethog - Gorllewin | Aled Hiraethog Hills - West]

Denbighshire Landscape Character Areas **

- Bodelwyddan Kinmel Park Parklands
- Clwydian Hills North
- Coastal Limestone Hills
- Denbigh Plateau
- Limestone Ridges and Valleys Cefn
- Rhyl Prestatyn Coast
- Trelawnyd Plateau
- Vale of Clwyd East of Denbigh
- Vale of Clwyd North
- Vale of Clwyd South

Sources:
^ OS Mapping
# Natural England GIS Data Set
~~ Conwy County Council Landscape Sensitivity and Capacity Assessment for Onshore Wind Turbine Development, Landscape Areas Interactive Map
** Denbighshire District Council, Denbighshire Landscape Strategy 1999

Data collated for constraints and analysis mapping is based on publicly available sources at the time of preparation inserted using the British National Grid and may itself not be accurate. Stantec shall not be liable for the accuracy of data derived from external sources.

Reproduced from the Ordnance Survey Map with the permission of the Controller of HMSO. Crown Copyright Reserved. Licence No. EMS - 928549.

J:\33000\33010 - St Asaph Solar Farm\A4 - Drawings & Registers\Landscape\33010 LN-LP-09 Landscape Character Plan.dwg - A1

FIGURE 7.3

N

Project
St Asaph Solar Farm

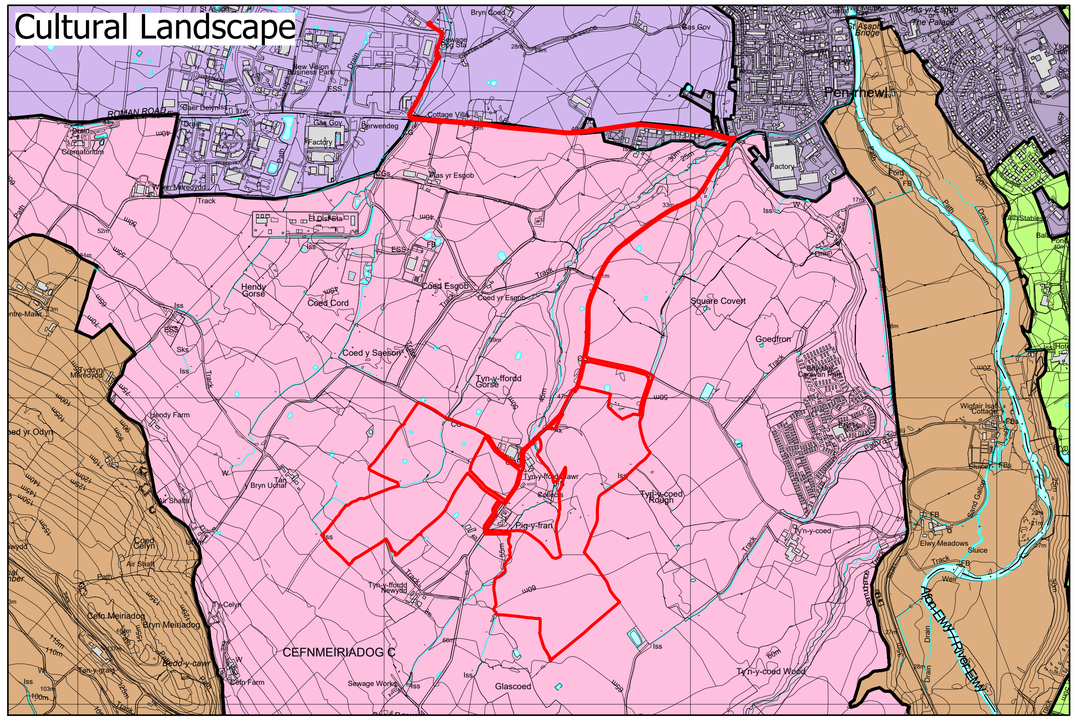
Drawing Title
Landscape Character Plan

Date	Scale	Drawn by	Check by
31.10.2024	1:20,000 @A1 1:40,000 @A3	OF	DP
Project No	**Drawing No**		**Revision**
333101373	LN-LP-09		D

200 600 1000m
0 400 800

Stantec
Stantec UK Limited
7 Soho Square
London
W1D 3QB
T: 020 7446 6888
ISO 9001 Quality Management
stantec.com\uk

Cultural Landscape



Aspect Area Classification
Development / Built Land / Urban /
Aspect Area Name
DNBGHCLS028 St Asaph

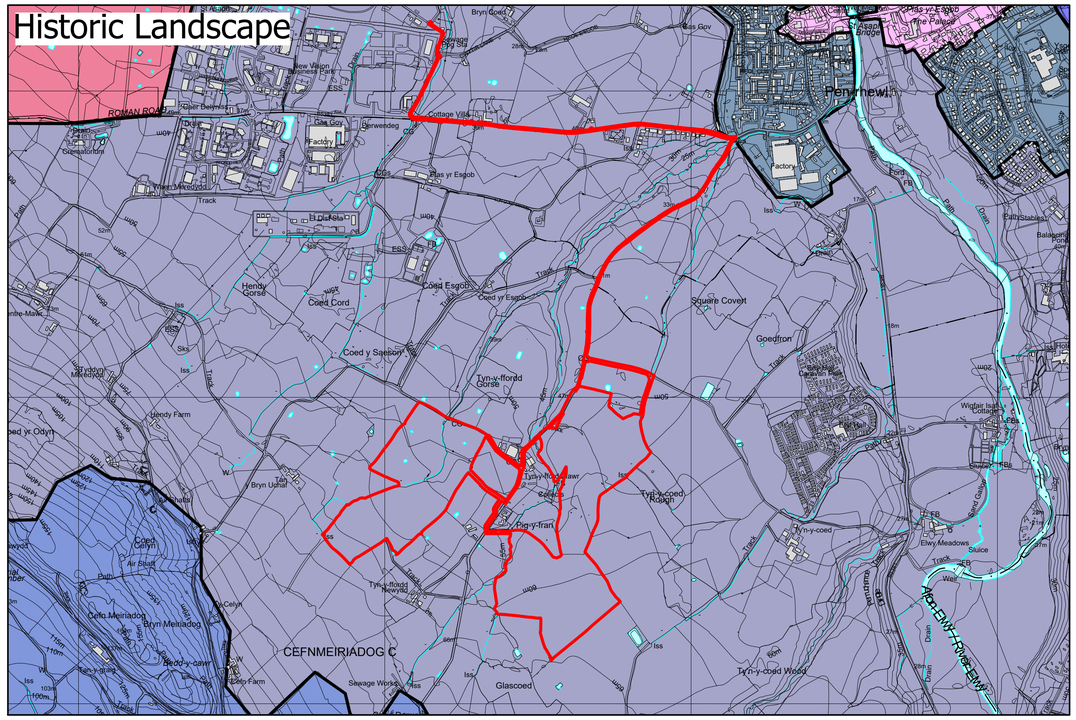
Aspect Area Classification
Lowland / Flat Lowland/Levels / Flat Lowland Mosaic /
Aspect Area Name
DNBGHCLS029 Vale of Clwyd-North of Denbigh

Aspect Area Classification
Lowland / Flat Lowland/Levels / Flat Open Lowland Farmland /
Aspect Area Name
DNBGHCLS015 Area North and East of Bodelwyddan

Aspect Area Classification
Lowland / Lowland Valleys / Wooded Lowland Valleys /
Aspect Area Name
DNBGHCLS035 Limestone Valley-Cefn

Aspect Area Classification
Lowland / Rolling Lowland / Mosaic Rolling Lowland /
Aspect Area Name
DNBGHCLS030 Cefn Estate

Historic Landscape



Aspect Area Classification
Built environment / Other built environment / Designed / Designed Parkland/Garden
Aspect Area Name
DNBGHHL005 Bodelwyddan Park

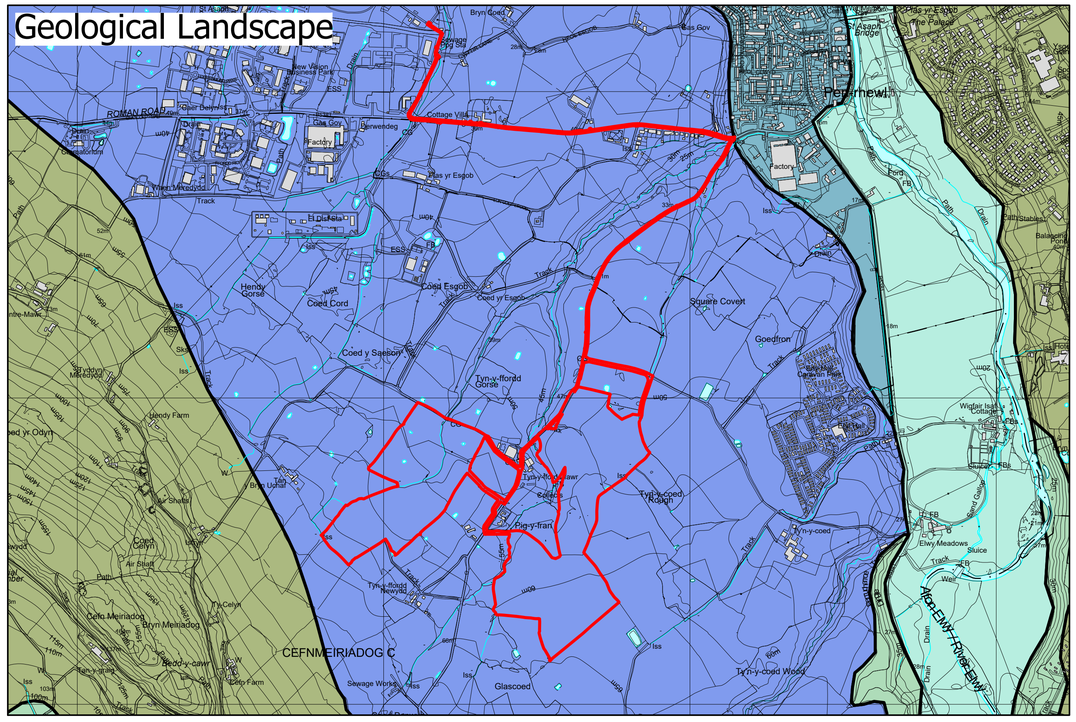
Aspect Area Classification
Built environment / Settlement / Nucleated Settlement / Clustered Settlement - C19th/20th
Aspect Area Name
DNBGHHL020 St Asaph

Aspect Area Classification
Rural environment / Agricultural / Irregular Fieldscapes /
Aspect Area Name
DNBGHHL041 Pentre-mawr

Aspect Area Classification
Rural environment / Agricultural / Irregular Fieldscapes / Evolved/Mixed Fieldscape
Aspect Area Name
DNBGHHL021 Bont-newydd

Reproduced from the Ordnance Survey Map with the permission of the Controller of HMSO. Crown Copyright Reserved. Licence No. EMS - 928549.

Geological Landscape



Aspect Area Classification
Lowland hills and valleys / Lowland river and drainage systems / Active lowland river-flood plain system /
Aspect Area Name
DNBGHGL018 Clwyd-Elwy Rivers

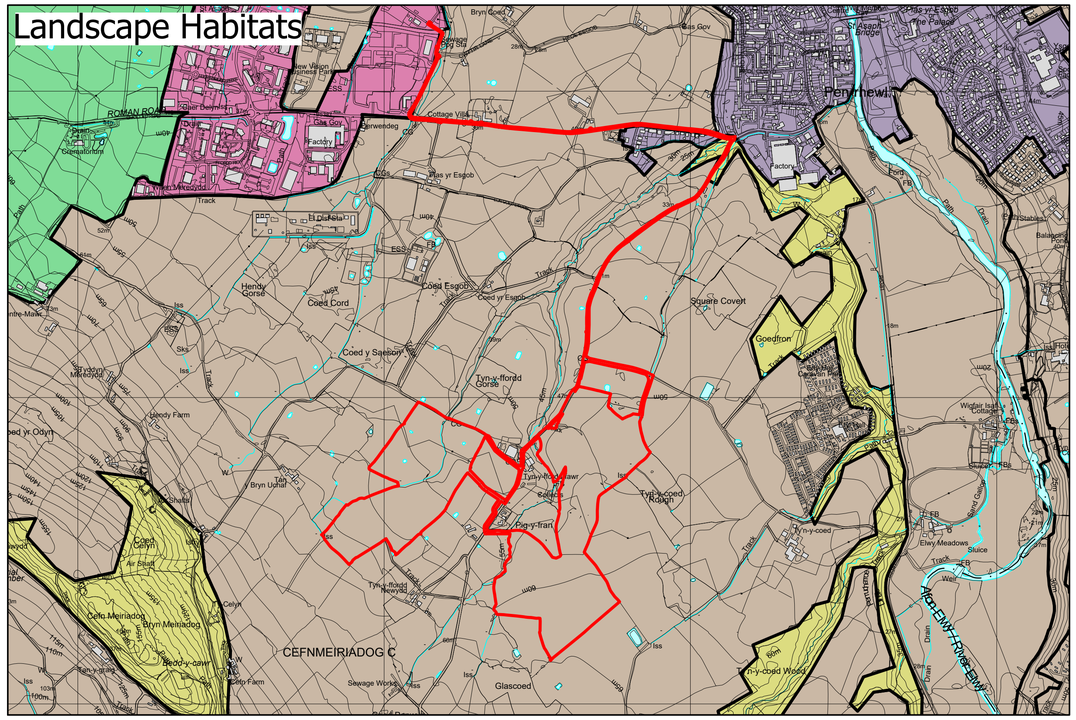
Aspect Area Classification
Lowland hills and valleys / Undulating lowland hill terrain / Undulating lowland hill terrain /
Aspect Area Name
DNBGHGL016 Bodelwyddan

Aspect Area Classification
Lowland hills and valleys / Lowland river and drainage systems / Ancient lowland river flood plain system /
Aspect Area Name
DNBGHGL017 The Roe

Aspect Area Classification
Lowland hills and valleys / Lowland river and drainage systems / Lowland river gorge /
Aspect Area Name
DNBGHGL032 Elwy Gorge
DNBGHGL033 Pencraig

Aspect Area Classification
Lowland hills and valleys / Undulating lowland hill terrain / Other /
Aspect Area Name
DNBGHGL031 Cefn Meiriadog

Landscape Habitats



Aspect Area Classification
Dry (Relatively) Terrestrial Habitats / Built Up Areas / Industrial /
Aspect Area Name:
DNBGHLH022 St Asaph Business Park

Aspect Area Classification
Dry (Relatively) Terrestrial Habitats / Woodland & Scrub / Mosaic /
Aspect Area Name:
DNBGHLH028 Elwy Valley Woodland Mosaic

Aspect Area Classification
Dry (Relatively) Terrestrial Habitats / Grassland & Marsh / Improved Grassland /
Aspect Area Name
DNBGHLH017 Vale of Clwyd North Improved Grassland
DNBGHLH023 Cefn Improved Grassland
DNBGHLH027 Elwy Hills Improved Grassland
DNBGHLH029 Elwy Floodplain Improved Grassland
DNBGHLH032 Clwyd Floodplain Improved Grassland

Aspect Area Classification
Dry (Relatively) Terrestrial Habitats / Grassland & Marsh / Mosaic /
Aspect Area Name
DNBGHLH021 Bodelwyddan Lowland Parkland

Aspect Area Classification
Dry (Relatively) Terrestrial Habitats / Mosaic / Mosaic /
Aspect Area Name
DNBGHLH024 St Asaph Urban Area

The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-

LEGEND

N

Site Boundary

Contours/Spot Heights (Metres AOD) ^

Existing Water Courses and Water Features ^

Sources:
^ OS Mapping
# Natural Resources Wales GIS Data Set

Data collated for constraints and analysis mapping is based on publicly available sources at the time of preparation inserted using the British National Grid and may itself not be accurate. Stantec shall not be liable for the accuracy of data derived from external sources.

FIGURE 7.4

Project
St Asaph Solar Farm

Drawing Title
LANDMAP - Aspect Areas Plan

Date	Scale	Drawn by	Check by
31.10.2024	1:10,000 @A1 1:20,000 @A3	OF	DP
Project No	Drawing No		Revision
333101373	LN-LP-08		D

0 100 200 300 400 500m

Stantec
Stantec UK Limited
7 Soho Square
London
W1D 3QB
T: 020 7446 6888
stantec.com\uk

J:\33000\33010 - St Asaph Solar Farm\A4 - Drawings & Registers\Landscape\33010 LN-LP-08 LANDMAP-Aspect Areas Plan.dwg - A1

The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-

LEGEND

- Site Boundary
- Public Rights of Way *
- Tree Removed Since Photographs Captured
- Location of Photographic Viewpoints (Site Appraisal Photographs: A-P)
- Ancient Woodland #
- Existing Water Courses and Features ^
- Contours/Spot Heights (Metres AOD) ^

Sources:
^ OS Mapping
# Natural Resources Wales GIS Data Set
* Denbighshire Council GIS Data

Data collated for constraints and analysis mapping is based on publicly available sources at the time of preparation inserted using the British National Grid and may itself not be accurate. Stantec shall not be liable for the accuracy of data derived from external sources.

Reproduced from the Ordnance Survey Map with the permission of the Controller of HMSO. Crown Copyright Reserved. Licence No. 100019279.

Aerial Photograph dated: 01/06/2020 © 2023 Microsoft Coporation © Maxar © CNES (2023) Distribution Airbus DS

J:\33000\33010 - St Asaph Solar Farm\A4 - Drawings & Registers\Landscape\33010 LN-LP-03 Site Appraisal Plan.dwg - A2

FIGURE 7.5

Project
St Asaph Solar Farm

Drawing Title
Site Appraisal Plan

Date	Scale	Drawn by	Check by
03.12.2024	1:5,000 @A2	OF	DP

Project No	Drawing No	Revision
333101373	LN-LP-03	D

Stantec
Stantec UK Limited
10th Floor
Bank House
8 Cherry Street
Birmingham
B2 5AL
T: 0121 633 2900
stantec.com\uk

The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-

LEGEND

- Site Boundary
- 5km Buffer from Site Boundary
- Existing Woodlands, Copses and Tree Belts ^
- Existing Water Courses and Features ^
- Contours/Spot Heights (Metres AOD) ^
- Public Rights of Way *
- Long Distance Walk
  North Wales Pilgrim's Way
- Location of Photographic Viewpoints
  (Site Context Photographs: 1-15)

Zone of Theoretical Visibility (ZTV)

Most Visible

Least Visible

Sources:
^ OS Mapping
# Natural Resources Wales GIS Data Set
+ Sustrans National Cycle Network GIS Data

Data collated for constraints and analysis mapping is based on publicly available sources at the time of preparation inserted using the British National Grid and may itself not be accurate. Stantec shall not be liable for the accuracy of data derived from external sources.

Notes:
The Zone of Theoretical Visibility (ZTV) provides an approximate portrayal of the greatest possible extent of visibility of the Proposed Development, on the basis of a digital ground model (DTM). The extent and nature of specific views towards the Proposed Development is to be verified through fieldwork to take account of other visual barriers, such as existing buildings, woodland, trees and infrastructure.

- The ZTV is produced using the specialised software package Key-Terra Firma which is an AutoCAD based application.
- The ZTV is produced by calculating the 'line of sight' from target points to analysis end.



Parameters:

- The study area for the ZTV is 11.2 x 14.1 km
- The ZTV accounts for ground topography on the basis of a model made from Natural Resources Wales Lidar data in the form of 3D points data on a 2m grid, re-interpolated to a 5m grid;
- The ZTV does not account for existing features, other than woodland blocks and existing buildings, derived from OS Mapping, with the following assumptions:
  Buildings: 8.5m high
  Woodland Blocks 12m high;
- The ZTV is based on 57 targets across the proposed panels at a height of 4m above existing ground level;
- The ZTV assumes an observer height of 1.7m above ground level; and
- The ZTV portrays the extent of visibility of the Proposed Development on the basis of if a target point is visible within a given 50m grid square.

FIGURE 7.6

Project
St Asaph Solar Farm

Drawing Title
Visual Appraisal Plan

Date	Scale	Drawn by	Check by
03.12.2024	1:20,000 @A1 1:40,000 @A3	OF/GS	DP
Project No	Drawing No		Revision
333101373	LN-LP-05		D

0 200 400 600 800 1000m

Stantec
Stantec UK Limited
7 Soho Square
London
W1D 3QB
T: 020 7446 6888
stantec.com\uk

Reproduced from the Ordnance Survey Map with the permission of the Controller of HMSO. Crown Copyright Reserved. Licence No. EMS - 928549.

J:\33000\33010 - St Asaph Solar Farm\A4 - Drawings & Registers\Landscape\33010 LN-LP-05 Visual Appraisal Plan.dwg - A1

The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-

Coed Cord
Coed y Saeson
Coed Esgob
Tyn-y-ffordd Gorse
Pig-y-fran
Glascoed
Square Covert
Tyn-y-coed Rough
Reservoir
Slurry Pit
Silo
Ponds
Pond
Track
Trees
Issues
Drain
FB
OHL
PWL
56.6m
65.9m
414m

LEGEND

- Site Boundary
- Existing Woodlands, Copses and Tree Belts ^
- Existing Water Courses and Features ^
  Wildflower meadow wetland seeding across 10m buffers to the ponds, streams and ditches within and adjacent to the Site
- Contours/Spot Heights (Metres AOD) ^
- Existing Surveyed Trees and Vegetation to be Retained
- Existing Surveyed Trees Removed Since Survey and Photographs Captured
- Proposed Trees
  To be managed to a maximum height 4m to prevent overshading
- Proposed Trees
  Too be managed to a maximum height 10m to prevent overshading
- Existing Hedgerow to be Maintained and Reinforced
  Assume approximately 25% infill for overall length (to a minimum height of 2.5 - 3m)
- Proposed Hedgerow to be Maintained
  (to a minimum height of 2.5 - 3m)
- Native Shrub Planting
  (Maintained to 10m maximum height) where it is 35m-60m from panels
- Native Tree Planting
  (No woody species 0-15m from panels)
  (Maintained to 15m maximum height) where it is 60m+ from panels
  Translocate small amounts of soil/seed bank from areas of tree removal to the native woodland planting area. Translocate smaller saplings from areas of tree removal to the native woodland planting area. Grow saplings using berries and nuts gathered from mature trees to be removed, and plant these saplings within the native woodland planting area.
- Native Shrub Planting
  (Maintained to 4m maximum height) where it is 15-35m from panels
- Proposed new pond; the pond shall have a wet surface area of at least 100m^2 and be of sufficient depth to hold water in at least one in three summers; spoil generated from the excavation of the pond will be used to create a series of 2m x 1m x 1m high hibernacula; the pond will be planted with a range of aquatic and marginal plants, and the banks seeded with Emorsgate Seeds EP1 'Pond Edge Mix' or similar.
- Currently dry pond or pond not supporting GCN to be reinstated; the pond shall have a wet surface area of at least 100m^2 and be of sufficient depth to hold water in at least one in three summers; spoil generated from the excavation of the pond will be used to create a series of 2m x 1m x 1m high hibernacula; the pond will be planted with a range of aquatic and marginal plants, and the banks seeded with Emorsgate Seeds EP1 'Pond Edge Mix' or similar.
- Existing grassland to be maintained as long grassland for great crested newt habitat/migration.
- Existing grassland to be maintained as tussocky grassland with Low Density Native Mix trees, no trees to be planted under OHL easement and to be maintained to 15m maximum height where planted at 60m+ from panels.
- Proposed Wildflower Meadow Tussock Mixture Emorsgate EM10 and maintained as long grassland for great crested newt habitat/migration.
- Existing grassland within perimeter fence to be retained as grazing pasture or mown no more than once a year, within autumn, to a height of no less than 10cm.
- Proposed Wildflower Meadow Tussock Mixture Emorsgate EM10 (cut every 3 years).
- Proposed Wildflower Meadow Hedgerow Mixture Emorsgate EH1 (cut annually or more frequently to prevent shading as required).
- Proposed Security Fence
- Proposed Access Route
- Proposed Solar Panels
- Solar Panel 15m Buffer
- Solar Panel 35m Buffer
- Solar Panel 60m Buffer

Reproduced from the Ordnance Survey Map with the permission of the Controller of HMSO. Crown Copyright Reserved. Licence No. EMS - 928549.

J:\33000\33010 - St Asaph Solar Farm\A4 - Drawings & Registers\Landscape\33010 LN-LP Landscape Strategy Plan.dwg - LN-LP-12-A1

FIGURE 7.7

Project
St Asaph Solar Farm

Drawing Title
Landscape Strategy Plan
Sheet 1 of 2

Date	Scale	Drawn by	Check by
20.12.2024	1:2,500 @A1 1:5,000 @A3	OF/ML	DP
Project No	**Drawing No**		**Revision**
333101373	LN-LP-12		G

0 20 40 60 80 100m

Stantec
Stantec UK Limited
7 Soho Square
London
W1D 3QB
T: 020 7446 6888
stantec.com\uk

Proposed and Reinforcement Hedgerow Mix (plant at 0.5m centres in single species groups of 3-7 plants)						
Abbrev	Species Name	Common Name	Height	General Specification	Percentage	Quantity
Ac ca	Acer campestre	Field Maple	80-100cm	1+1: Transplant - seed raised: B	5%	156
Co av	Corylus avellana	Common Hazel	80-100cm	1+2: Transplant - seed raised: Branched: 4 brks: B	20%	624
Cr mo	Crataegus monogyna	Common Hawthorn	80-100cm	1+2: Transplant - seed raised: 4 brks: B	35%	1094
Il aq	Ilex aquifolium	Common Holly	40-60cm	Leader with Laterals: 2L	10%	314
Pr sp	Prunus spinosa	Blackthorn	80-100cm	1+2: Transplant - seed raised: Branched: 3 brks: B	25%	780
Pr pa	Prunus padus	Bird Cherry	80-100cm	1+1: Transplant - seed raised: B	5%	156
Native Shrub Planting Mix - Maintained to 4m maximum height (plant at 0.5 plants/m^2 in single species groups of 3-5 plants)						
Abbrev	Species Name	Common Name	Height	General Specification	Percentage	Quantity
Po ni	Populus nigra	Black Poplar	60-80cm	1+1: Transplant - seed raised: B	5%	162
Co av	Corylus avellana	Common Hazel	60-80cm	1+2: Transplant - seed raised: Branched: 3 brks: B	20%	648
Cr mo	Crataegus monogyna	Common Hawthorn	60-80cm	1+1: Transplant - seed raised: B	35%	1135
Il aq	Ilex aquifolium	Common Holly	40-60cm	Leader with Laterals: 2L	10%	324
Sa ca	Salix caprea	Goat Willow	60-80cm	1+1: Transplant - seed raised: Branched: 2 brks: B	25%	810
Pr pa	Prunus padus	Bird Cherry	60-80cm	1+1: Transplant - seed raised: B	5%	162
Native Shrub Planting Mix - Maintained to 10m maximum height (plant at 0.5 plants/m^2 in single species groups of 3-5 plants)						
Abbrev	Species Name	Common Name	Height	General Specification	Percentage	Quantity
Ul gl	Ulmus glabra	Wych Elm	80-100cm	1+1: Transplant - seed raised: B	10%	435
Be pu	Betula pubescens	Downy Birch	80-100cm	1+1: Transplant - seed raised: B	10%	435
Ti eu	Tilia x europea	Common Lime	80-100cm	1+1: Transplant - seed raised: B	10%	435
So to	Sorbus torminalis	Service Tree	80-100cm	1+1: Transplant - seed raised: B	10%	435
Qu pe	Quercus petraea	Sessile Oak	80-100cm	1+2: Transplant - seed raised: B	10%	435
Understorey planting						
Co sa	Cornus sanguinea	Common Dogwood	60-80cm	1+1: Transplant - seed raised: Branched: 3 brks: B	10%	435
Co av	Corylus avellana	Common Hazel	60-80cm	1+2: Transplant - seed raised: Branched: 3 brks: B	10%	435
Co mo	Crataegus monogyna	Common Hawthorn	80-100cm	1+2: Transplant - seed raised: B	10%	435
Ma sy	Malus sylvestris	Crab Apple	60-80cm	0/2; Cutting; branched; 3 breaks	10%	435
Sa ni	Sambucus nigra	Elder	60-80cm	1+2: Transplant - seed raised: Branched: 4 brks: B	10%	435
Native Tree Planting Mix - Maintained to 15m maximum height (plant at 0.25 plants/m^2 in single species groups of 3-5 plants)						
Abbrev	Species Name	Common Name	Height	General Specification	Percentage	Quantity
Ac ca	Acer campestre	Field Maple	80-100cm	1+1: Transplant - seed raised: B	5%	41
Be pu	Betula pubescens	Downy Birch	80-100cm	1+1: Transplant - seed raised: B	5%	41
Il aq	Ilex aquifolium	Common Holly	60-80cm	Leader with Laterals: 5L	5%	41
So au	Sorbus aucuparia	Rowan	80-100cm	1+1: Transplant - seed raised: B	5%	41
Qu pe	Quercus petraea	Sessile Oak	80-100cm	1+2: Transplant - seed raised: B	5%	41
Understorey planting						
Co sa	Cornus sanguinea	Common Dogwood	60-80cm	1+1: Transplant - seed raised: Branched: 3 brks: B	15%	123
Co av	Corylus avellana	Common Hazel	60-80cm	1+2: Transplant - seed raised: Branched: 3 brks: B	15%	123
Co mo	Crataegus monogyna	Common Hawthorn	80-100cm	1+2: Transplant - seed raised: B	15%	123
Li vu	Ligustrum vulgare	Common Privet	60-80cm	0/2; Cutting; branched; 3 breaks	15%	123
Vi op	Viburnum opulus	Guelder Rose	60-80cm	1+2: Transplant - seed raised: Branched: 4 brks: B	15%	123
Low Density Native Tree Planting Mix - Maintained to 15m maximum height (plant at 10 m centres in single species groups of 3-5 plants)						
Abbrev	Species Name	Common Name	Height	General Specification	Percentage	Quantity
Ac ca	Acer campestre	Field Maple	80-100cm	1+1: Transplant - seed raised: B	5%	8
Be pu	Betula pubescens	Downy Birch	80-100cm	1+1: Transplant - seed raised: B	5%	8
Il aq	Ilex aquifolium	Common Holly	60-80cm	Leader with Laterals: 5L	5%	8
So au	Sorbus aucuparia	Rowan	80-100cm	1+1: Transplant - seed raised: B	5%	8
Qu pe	Quercus petraea	Sessile Oak	80-100cm	1+2: Transplant - seed raised: B	5%	8
Understorey planting						
Co sa	Cornus sanguinea	Common Dogwood	60-80cm	1+1: Transplant - seed raised: Branched: 3 brks: B	15%	23
Co av	Corylus avellana	Common Hazel	60-80cm	1+2: Transplant - seed raised: Branched: 3 brks: B	15%	23
Co mo	Crataegus monogyna	Common Hawthorn	80-100cm	1+2: Transplant - seed raised: B	15%	23
Li vu	Ligustrum vulgare	Common Privet	60-80cm	0/2; Cutting; branched; 3 breaks	15%	23
Vi op	Viburnum opulus	Guelder Rose	60-80cm	1+2: Transplant - seed raised: Branched: 4 brks: B	15%	23
Trees						
Abbrev	Species Name	Common Name	Height	Girth	General Specification	Quantity
Ac ca	Acer campestre	Field Maple	350-425cm	12-14cm	Heavy Standard: 5 brks: 3x: Clear Stem minimum 200cm: B	16
Qu pe	Quercus petraea	Sessile Oak	350-425cm	12-14cm	Heavy Standard: 5 brks: 3x: Clear Stem 175-200cm: RB	14
Ta ba	Taxus baccata	Yew	350-425cm	12-14cm	Heavy Standard: 5 brks: 3x: Clear Stem 175-200cm: RB	15

Long Term Management Plan

Pruning generally

1. All dead, damaged or diseased tree branches shall be removed and arisings removed from site. Shrubs shall be pruned in the appropriate season (see hedgerows, below) to maintain health and vigour and encroachment on access route/storage areas, etc. Avoid cutting operations from March to August (inclusive) to prevent disturbance of breeding birds.

Hedgerows

2. Hedgerows shall be pruned on one side per year, alternating on a 2 or 3 year rotation in February, and maintained a minimum height of 2.5 - 3m (otherwise stated on the plan) to promote bushy growth while providing continued habitat and foraging opportunities for wildlife. Hedgerow trees shall be encouraged to develop to full maturity.

Retained Grazing Pasture

3. Retained grassland to be sheep-grazed or mown as required to prevent shading of the panels or security features. Areas outside perimeter fence to be mown no more than once annually.

Wildflower Meadow Grassland

4. Meadow grassland within the inner section of the fields (under and around the solar arrays) to be cut as frequently; areas away from the solar panels to be cut annually, in September; and the boundaries of the field to be cut on a rotational three-year cycle.

Scrub

5. Areas to be thinned and trimmed to a height of between 1 and 3 meters on a 3 year rotational basis.

Woodland

6. Carry out selective thinning and coppicing of approximately 30% of plants in Year 5. Leave deadwood and brush piles in situr.

General

7. All soft and hard landscaping shall be inspected annually by the Landscape Contractor and an approved arboriculturist and tree works carried out as necessary to ensure the continued health and safety of the trees. Regular weed control and litter picking operations will be required.

Reproduced from the Ordnance Survey Map with the permission of the Controller of HMSO. Crown Copyright Reserved. Licence No. EMS - 928549.

PLANTING NOTES

General

1. Plant material to conform to the National Plant Specification. Plant handling and planting operations to be in accordance with HTA 'Handling and Establishing Landscape Plants', Parts I-III.
2. Imported topsoil (if required) to BS 3882 Low Fertility Grade and from an approved source. Existing topsoil shall have a maximum 35% clay content and minimum 5% organic content, pH 5.5-8.5 and be free of perennial weeds, weed seeds and contamination. Maximum stone content 20% (>20mm particle size), maximum size of stones 50mm in any direction. Existing topsoil to be ameliorated and/or screened if necessary to achieve this specification.
3. Soil conditioner: Sanitized and stabilised compost to BSI PAS 100. Apply 75mm depth even coverage and incorporate into topsoil during cultivation operations, to a minimum depth of 150mm. Compost to be Compost Association certified, or conforming to the specification from an approved supplier.
4. Mulch planting beds with matured coniferous bark, with an even particle size between 5-35mm, to 75mm minimum depth over weed-free soil after completion of planting and watering operations.

Existing Grazing Pasture

5. Retained grassland - any bare patches arising from installation works to be seeded with an agricultural grassland seed mix.

Wildflower Meadow Grassland

6. Existing arable land to be harrowed in areas indicated for meadow grassland. Do not cultivate within tree root protection areas or within the existing hedgerow but cut manually to 30-50mm during autumn preceding and following seeding. Sow meadow grassland seed mixes into newly harrowed soil in areas indicated, in accordance with supplier's recommendations, in autumn to reduce competition.
7. Extra attention is required in terms of seed bed preparation to encourage good establishment and to cultivate when soil moisture allows breakdown of the soil aggregates into a medium tilth.

Hedgerows

12. Prepare a 0.5m wide x 0.3m deep weed-free trench (or larger if necessary, in order to take the full spread of the roots); the sides and bottom of the trench will be forked over and 'ripped' to facilitate proper drainage, prior to back-filling. The trench to be excavated on the same day as planting and to be back-filled with an appropriate excavated topsoil/ compost mix. Compost will only be used if necessary; should compost be deemed necessary, it to be Compost Association certified, or obtained from a supplier conforming to this specification. Hedgerow to be cultivated by hand only in proximity to existing trees/hedgerow. No herbicide.
13. For existing hedgerows, plant bare root transplants and container-grown shrubs at 0.5m centres on the back of the existing hedgerows and fill any gaps larger than 0.5m. Hand dig with care in proximity to existing hedgerows and do not sever any roots larger than 2.5cm in diameter.
14. For new hedgerows, plant shrubs at 0.5m centres.
15. Transplants to be notch planted and container-grown shrubs to be pit planted (in pits 150mm wider than root spread) ensuring the original root collar is at ground level after backfilling and firming in.
16. Hedgerow plants to be installed with rabbit protection, as follows:

- Transplants, cuttings and seedlings: PP photodegradable tube guards 0.6m high x 50mm diameter or greater to suit girth of shrub/tree, supported by 900mm bamboo cane inserted 300mm below ground level.
- Container-grown shrubs: recycled HDPE photodegradable mesh guards 0.6m high x 150-180mm diameter or greater to suit diameter of shrub, supported by 900mm timber stake inserted 300mm below ground level.
  Ensure protection methods do not restrict natural movement or growth.

Tree and Shrub Planting

17. Plants to be installed with rabbit protection, in the same method as hedgerow plants.
18. Notch plant bare root transplants in rows on a 2.0m grid. Hand dig with care in proximity to existing trees and do not sever any roots larger than 2.5cm in diameter.
19. Tree and shrub species should be agreed with Denbighshire Borough Council and sourced from those grown at the council's tree nursery at St Asaph. With regard to both the proposed native buffer planting and the proposed native scrub planting, species mixes suitable for dormice should be used, which may include species such as hazel (Corylus avellana), oak (Quercus petraea), black poplar (Populus nigra), service tree (Sorbus torminalis), wych elm (Ulmus glabra) (for white letter hairstreak butterfly which may be locally present), lime (Tilia sp.), honeysuckle (Lonicera periclymenum), elder (Sambucus nigra), goat willow (Salix caprea), birch (Betula pendula and/or Betula pubescens), blackthorn (Prunus spinosa), hawthorn (Crataegus monogyna), crab apple (Malus sylvestris) and holly (Ilex aquifolium).
20. No woody species to be planted within 15m from panels.

Planting seasons

21. Planting seasons:

- Deciduous trees and shrubs: Late October to late March
- Conifers and evergreens: September/October or April/May
- Container grown plants: At any time if ground and weather conditions are favourable
- Grass seeding: August/September

LANDSCAPE & BIODIVERSITY MANAGEMENT PLAN
Establishment and Maintenance Period (Years 1-5)

Pruning generally

1. All dead, damaged or diseased tree branches shall be removed and arisings removed from site. Trees and shrubs shall be pruned in the appropriate season to maintain health and vigour and to prevent encroachment on access route/storage areas, etc. The removal of vegetation will be timed for outside of the bird nesting season (March to August inclusive) to prevent disturbance of breeding birds. If this is not possible, a check for active nests will first be undertaken by an ecologist. If a nest is found, an appropriate buffer will be left undisturbed until any chicks have fledged, as confirmed by an ecologist.

Existing & Proposed Hedgerows

2. Hedgerows shall be pruned on one side per year alternating on a 2 or 3 year rotation in February, aiming to maintain a minimum height of 2.5 - 3m to promote bushy growth while providing continued habitat and foraging opportunities for wildlife. Hedgerow trees shall be retained and encouraged to develop to full maturity where not likely to cause overshading of panels.

Shrub

3. Areas to be thinned and trimmed to a height of between 1 and 3 meters on a 3 year rotational basis.
4. Shrub planting to be maintained to 4m maximum height where it is 15-35m from panels.
5. Shrub planting to be maintained to 10m maximum height where it is 35m-60m from panels.
6. Shrub planting areas to be planted with glades/rides for maintenance.

Trees

7. Tree panting to be maintained to 15m maximum height where it is 60m+ from panels.
8. Tree planting areas to be planted with glades/rides for maintenance.

Woodland

9. Re-mulch planting area during years 1-3 to minimise competition from weeds and grasses.

Retained Grazing Pasture

10. Retained grassland inside perimeter fence to be sheep-grazed or mown on a regular basis as required to prevent shading of the panels or security features.
11. Retained grassland outside perimeter fence to be mown no more than once annually to encourage the establishment of a tall sward.

Wildflower Meadow Grassland

12. Meadow grassland within the inner section of the fields (under and around the solar arrays) to be cut as frequently as is required to prevent shading and to provide access; areas away from the solar panels to be cut annually, in September, once established; and the boundaries of the field to be cut on a rotational three-year cycle, once established.
13. Areas outside proposed fencing to be cut on a 3 year rotation.
14. Mowing or strimming of grassland to a height of no less then 15cm shall occur on land located within 250 metres of ponds known to support GCN, as well as the seven reinstated/new ponds proposed.
15. Herbicides or other chemicals shall not be used to control vegetation beneath panels, or elsewhere on site.

Ponds

16. Reinstated or new ponds to have a minimum surface area of 100m2 and be of sufficient depth to hold water in at least one in three summers; they will contain substantial submerged and marginal vegetation to provide cover and egg-laying opportunities, but also have open areas required for courtship and display.
17. Spoil generated from the reinstatement or forming of ponds shall be used to create a series of hibernacula, each measuring at least 2 metres in length, 1 metre in width and 1m in height.

General

18. All areas of planting and grass shall be maintained, to include:
    - Ample irrigation
    - Weed control (herbicide application or hand weeding)
    - Litter picking
    - Topping up of mulch
    - Checking condition of tree stakes and ties

14. All stakes and ties shall be inspected during the growing season and adjusted as necessary to ensure that they are secure and firm and that the ties are not chaffing the stem of the trees. Stakes and ties shall be removed and disposed of when plants become self supporting or at the end of the 5 year establishment period.

15. Planting which fails to thrive or dies during the 5-year establishment period shall be replaced within the next suitable planting season.

The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-

Areas of Landscape Elements	
Landscape Elements	Area (ha) / Length km)
Proposed Native Tree Planting	1.19ha
Proposed Native Shrub Planting	0.65ha
Reinforced Habitat Ponds	0.02ha
Proposed Habitat Ponds	0.07ha
Proposed Aquatic Planting and Emorsgate EP1 or similar	0.09ha
Existing Hedgerow to be Reinforced	2.8km
Proposed Hedgerow	173m
Existing grassland to be maintained as long grassland	5.73ha
Existing grassland within perimeter fence to be retained as grazing pasture or mown	9.43ha
Existing grassland outside perimeter fence to be maintained as tussocky grass with low density tree planting	1.98ha
Proposed Wildflower Meadow EM10 maintained as long grassland	3.58ha
Proposed Wildflower Meadow EM10 (cut every 3 years)	3.76ha
Proposed Wildflower Meadow EH1 (cut annually or more regularly)	2.27ha

Project
St Asaph Solar Farm

Drawing Title
Landscape Strategy Plan: Planting Schedule and Notes Sheet 2 of 2

Date	Scale	Drawn by	Check by
20.12.2024	N/A	OF/ML	DP

Project No	Drawing No	Revision
333101373	LN-LP-13	D

Stantec
Stantec UK Limited
7 Soho Square
London
W1D 3QB
T: 020 7446 6888
stantec.com\uk

The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-

LEGEND

- Site Boundary
- 5km Buffer from Site Boundary
- Existing Woodlands, Copses and Tree Belts ^
- Existing Water Courses and Features ^
- Contours/Spot Heights (Metres AOD) ^ (110m +)

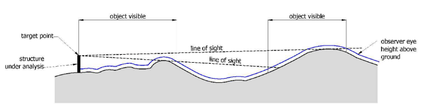
Zone of Theoretical Visibility (Site and Cumulative Schemes)

- Site and One or More Cumulative Schemes Potentially Visible
- Site Only Potentially Visible
- Site Not Visible, One or More Cumulative Schemes Potentially Visible

Notes:

The Zone of Theoretical Visibility (ZTV) provides an approximate portrayal of the greatest possible extent of visibility of the Proposed Development, on the basis of a digital ground model (DTM). The extent and nature of specific views towards the Proposed Development is to be verified through fieldwork to take account of other visual barriers, such as existing buildings, woodland, trees and infrastructure.

- The ZTV is produced using the specialised software package Key-Terra Firma which is an AutoCAD based application.
- The ZTV is produced by calculating the 'line of sight' from target points to analysis end.



Sources:

^ OS Mapping
\# Natural Resources Wales GIS Data Set
\+ Sustrans National Cycle Network GIS Data

Data collated for constraints and analysis mapping is based on publicly available sources at the time of preparation inserted using the British National Grid and may itself not be accurate. Stantec shall not be liable for the accuracy of data derived from external sources.

Parameters:

- The study area for the ZTV is 11.2 x 14.1 km
- The ZTV accounts for ground topography on the basis of a model made from Natural Resources Wales Lidar data in the form of 3D points data on a 2m grid, re-interpolated to a 5m grid;
- The ZTV does not account for existing features, other than woodland blocks and existing buildings, derived from OS Mapping, with the following assumptions:
  - Buildings: 8.5m high
  - Woodland Blocks 12m high;
- The ZTV of the Site is based on targets across the proposed panels at a height of 4m above existing ground level;
- The ZTV of the Cumulative schemes based on targets across each site at a height above existing ground level derived from the scheme description, refer to the Cumulative Scheme report for details;
- The ZTV assumes an observer height of 1.7m above ground level; and
- The ZTV portrays the extent of visibility of the Proposed Development on the basis of if a target point is visible within a given 50m grid square.

FIGURE 7.8

N

Project
St Asaph Solar Farm

Drawing Title
Cumulative Zone of Theoretical Visibility Plan

Date	Scale	Drawn by	Check by
23.04.2025	1:20,000 @A1 1:40,000 @A3	ML	DP

Project No	Drawing No	Revision
333101373	LN-LP-15	-

0 200 400 600 800 1000m

Stantec

Stantec UK Limited
7 Soho Square
London
W1D 3QB
T: 020 7446 6888

stantec.com\uk

Reproduced from the Ordnance Survey Map with the permission of the Controller of HMSO. Crown Copyright Reserved. Licence No. EMS - 928549.

J:\33000\33010 - St Asaph Solar Farm\A4 - Drawings & Registers\Landscape\33010 LN-LP-15 Cumulative ZTV Plan.dwg - A1

LEGEND

Site Boundary

Landscape Management Zones & Constituent Landscape Components

Zone 1 - Open Field
1. Meadow Grassland; and
2. Proposed Fencing and Hard Surfacing.

Zone 2 - Structural Landscape
3. Trees and Woodland;
4. Hedgerows and Shrubs; and
5. Ponds and Ditches.

Reproduced from the Ordnance Survey Map with the permission of the Controller of HMSO. Crown Copyright Reserved. Licence No. 100019279.

J:\33000\33010 - St Asaph Solar Farm\A4 - Drawings & Registers\Landscape\33010 LN-LP-13 LMZ Plan.dwg - A1

FIGURE 7.9

Project
St Asaph Solar Farm

Drawing Title
Landscape Management Zones Plan

Date	Scale	Drawn by	Check by
24.04.2025	1:2,500 @A1 1:5,000 @A3	AK	DP

Project No	Drawing No	Revision
333101373	LN-LP-14	

0 20 40 60 80 100m

Stantec
Stantec UK Limited
7 Soho Square
London
W1D 3QB
T: 020 7446 6888
stantec.com\uk