

wardell-armstrong.com

ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT



Land at Francis Lane, Wrexham

Landscape and Visual Impact Appraisal

June 2014

your earth our world



DATE ISSUED: June 2014
JOB NUMBER: NT11742
ELECTRONIC REFERENCE: NT11742-REP-005
REPORT NUMBER: 005D

TGC RENEWABLES

Land at Francis Lane, Wrexham

Landscape and Visual Impact Appraisal

June 2014

PREPARED BY:

Graeme Rosser Senior Landscape
Architect



APPROVED BY:

Helen Kennedy Technical Director

Helen Kennedy

This report has been prepared by Wardell Armstrong LLP with all reasonable skill, care and diligence, within the terms of the Contract with the Client. The report is confidential to the Client and Wardell Armstrong LLP accepts no responsibility of whatever nature to third parties to whom this report may be made known.

No part of this document may be reproduced without the prior written approval of Wardell Armstrong LLP.



Wardell Armstrong is the trading name of Wardell Armstrong LLP, Registered in England No. OC307138.

Registered office: Sir Henry Doulton House, Forge Lane, Etruria, Stoke-on-Trent, ST1 5BD, United Kingdom

UK Offices: Stoke-on-Trent, Birmingham, Cardiff, Carlisle, Edinburgh, Greater Manchester, London, Newcastle upon Tyne, Penryn, Sheffield, Truro, West Bromwich. International Offices: Almaty, Moscow

ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES AND QUARRYING
WASTE RESOURCE MANAGEMENT

CONTENTS

1	INTRODUCTION	1
1.1	General Introduction.....	1
1.2	Description of the development	1
1.3	Consultations.....	2
2	METHODOLOGY.....	2
2.1	General approach.....	2
2.2	The study area.....	4
2.3	Thresholds and criteria.....	4
2.4	Methodology for the appraisal of landscape effects	4
2.5	Methodology for the appraisal of visual effects	9
2.6	Software and hardware tools.....	13
2.7	Zones of Theoretical Visibility diagrams (ZTVs)	13
2.8	Selection of viewpoints	13
2.9	Photomontages and wirelines	16
2.10	Limitations of study.....	16
3	LANDSCAPE CHARACTER BASELINE	16
3.2	Character of the study area	16
3.3	Valued areas and sensitive receptors	21
3.4	The character of the site and its immediate vicinity.....	22
4	BASELINE VISIBILITY	25
4.1	Visibility of the existing site.....	25
5	APPRAISAL OF LANDSCAPE EFFECTS	25
5.1	Summary of potential effects of aspects of the development	25
5.2	Appraisal of landscape effects	26
6	APPRAISAL OF VISUAL EFFECTS	31
7	MITIGATION MEASURES.....	34
8	RESIDUAL EFFECTS.....	35
9	CUMULATIVE EFFECTS.....	36
10	SUMMARY AND CONCLUSIONS	36
10.1	Landscape effects.....	36
10.2	Visual effects	36
10.3	Cumulative effects	37
10.4	Overall conclusions	37

TABLES

Table 1	LANDMAP and GLVIA 3 Criteria for the Appraisal of Landscape Value
Table 2	Criteria for the appraisal of magnitude of landscape effects
Table 3	Criteria for determining level of landscape effects
Table 4	Criteria for the appraisal of sensitivity of visual receptors
Table 5	Criteria for the appraisal of magnitude of visual effects
Table 6	Criteria for determining the overall level of visual effects
Table 7	Key Characteristics of the CCW Regional Landscape Character Area
Table 8	LANDMAP Aspect Areas
Table 9	Summary of potential effects of aspects of the development
Table 10	Potential effects of the Development on the Aspect Areas of the published LANDMAP data

APPENDICES

Appendix 1	TGC Drawing No. PV 1.00 Site Design
Appendix 2	Correspondence
Appendix 3	TGC Photomontages
Appendix 4	Visual appraisal
Appendix 5	Landscape character appraisal, wider study area

DRAWINGS

Figure 1	Zone of Theoretical Visibility and VP locations	1:50,000 @ A3
Figure 2	Sensitive Receptors	1:50,000 @ A3
Figure 3	Designated Areas	1:50,000 @ A3
Figure 4	Access Network	1:50,000 @ A3
Figure 5A	England Landscape Character Areas	1:50,000 @ A3
Figure 5B	LANDMAP Geological Landscape	1:50,000 @ A3
Figure 5C	LANDMAP Cultural Landscape	1:50,000 @ A3
Figure 5D	LANDMAP Historic Landscape	1:50,000 @ A3
Figure 5E	LANDMAP Landscape Habitats	1:50,000 @ A3
Figure 5F	LANDMAP Visual and Sensory Landscape	1:50,000 @ A3
Figure 6	Topography	1:50,000 @ A3
Figure 7	Viewpoint 1A	As Shown @ A3
Figure 8	Viewpoint 1B	As Shown @ A3
Figure 9	Viewpoint 2	As Shown @ A3

Figure 10	Viewpoint 3	As Shown @ A3
Figure 11	Viewpoint 4	As Shown @ A3
Figure 12	Viewpoint 5	As Shown @ A3
Figure 13	Viewpoint 6	As Shown @ A3

1 INTRODUCTION

1.1 General Introduction

1.1.1 This Landscape and Visual Impact Appraisal (LVIA) identifies and assesses the likely landscape and visual effects of the proposed development of a Solar PV installation on land to the south of Francis Lane, near Wrexham Industrial Park, east of Wrexham, upon the site and surrounding area. The methodology used in this study conforms to current best practice and guidance, as set out in para. 2.1.5, below.

1.1.2 With relation to this development, a screening and scoping exercise was carried out by TGC Renewables, commencing in November 2013. This was in order to ascertain from Wrexham County Borough Council (WCBC) in the first instance whether Environmental Impact Assessment (EIA) was required and second to try and identify the key issues which would need to be covered by any subsequent planning application supporting statement. Minor changes have been made to the site layout to accommodate comments and the most recent screening opinion was received in June 2014.

1.2 Description of the development

1.2.1 The site covers approximately 23.4 hectares and is located within five agricultural fields between Francis Lane to the north and Bryn Lane and Ridley Wood lane to the south, immediately to the north east of the Wrexham Industrial Estate. Llan-y-pwll is the closest residential area at just over 1km to the north-west of the proposed development. The site location is shown on the ZTV and photographic viewpoint location plan Figure 1.

1.2.2 The proposed development comprises a solar PV array of total installed capacity of 13.1MW. PV arrays would be ground mounted and erected in multiple rows. They are not expected to exceed 3m in height. The site layout is illustrated by the Client's Site Design Plan within Appendix 1.

1.2.3 Site access will utilise the existing field accesses, primarily from Bryn Lane as well as from Francis Lane and the development will require the installation of a number of inverter cabinets and a power transformer cabin. The site will be secured by the erection of 2.0m high deer fencing, within the field boundary.

1.2.4 The development is expected to be operational for 25 years. At the end of this period, the development would be dismantled and the site restored or an application would be submitted to extend the life of the development. For the purposes of this report, it has been assumed that the development would be dismantled and the site restored.

1.3 Consultations

Screening

1.3.1 The Screening Opinions provided by WCBC, dated 25th April and 10th June 2014, concluded that Environmental Impact Assessment (EIA) was not required for the proposed development.

1.3.2 A dialogue was commenced between Wardell Armstrong and WCBC in May 2014 in order to agree viewpoints for use within the LVIA and planning application. However, the timescale for the preparation of the report has required site assessment prior to any response from WCBC. This LVIA has also been guided by feedback from the community engagement programme and the comments made at the event held at Isycoed, to the south-east of the site, on June 10th 2014.

2 METHODOLOGY

2.1 General approach

2.1.1 Landscape effects associated with a development relate to changes to the fabric, character and quality of the landscape as a resource and how it is experienced. This requires consideration of the character of the landscape, the elements and features that it contains, and any value attached to the landscape (whether formally or informally).

2.1.2 Landscape appraisal studies:

- direct effects upon specific landscape elements, especially prominent and eye catching features;
- change in character, which is the distinct, recognisable and consistent pattern of elements that creates distinctiveness and a sense of place;

- subtle effects that contribute towards the experience of intangible characteristics such as tranquillity, wildness and cultural associations; and,
- effects on designated landscapes, conservation sites, and other acknowledged special areas of interest.

2.1.3 Visual effects relate closely to landscape effects, but they concern changes in views and visual amenity. Visual appraisal concerns people's perception and response to changes in visual amenity. Effects may result from new landscape elements that cause visual intrusion or new features that obstruct views across the landscape.

2.1.4 Both landscape and visual effects can be adverse, beneficial or neutral, short, medium or long term, permanent or temporary, reversible or irreversible, direct (an effect that is directly attributable to the proposed development) or indirect (effects resulting indirectly from the development as a consequence of the direct effects), and cumulative, relating to additional changes that may arise when the proposed development is considered in conjunction with other similar developments (see Section 9).

2.1.5 The methodology for this Landscape and Visual Impact Appraisal (LVIA) follows the recommendations and guidance set out in the following reports:

- Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA 3)¹; and,
- Landscape Character Assessment Guidance².

2.1.6 GLVIA 3 and the Statement of Clarification 1/13 on the use of GLVIA 3 which was issued by the Landscape Institute, make clear that for non-EIA developments the landscape and visual impact appraisal should consider all types of effects: adverse and beneficial, direct and indirect, and long and short term, as well as cumulative effects. However, none of these effects should be given a judgement involving the terms 'significant' or 'significance'. The GLVIA 3 also stresses that the approach to the appraisal or assessment needs to be proportionate to the scale of the project being assessed and the nature of the likely effects.

¹ Guidelines for Landscape and Visual Impact Assessment, Third Edition, by the Landscape Institute and Institute of Environmental Management and Assessment (2013)

² Landscape Character Assessment Guidance for England and Scotland (2002), Countryside Agency in conjunction with Scottish Natural Heritage

2.1.7 The Landscape Institute produced Advice Note 01/11³ to advise its members on the use of photography and photomontage in landscape and visual assessment; the photographs and photomontages in this LVIA have been produced and presented in accordance with this advice.

2.2 The study area

2.2.1 This landscape and visual appraisal considers the site and its surroundings, focusing on a radius of approximately 5km from the boundary of the site. In visual assessment it is generally considered that observers beyond this distance are unable to perceive detail, although, the effect of certain changes, particularly changes to skylines at greater distances may still be perceptible.

2.2.2 The appraisal has been carried out by means of a process of desk and site survey and analysis of this 5km study area.

2.3 Thresholds and criteria

2.3.1 GLVIA 3 (paragraph 1.20) states that the guidance is “*not intended to be prescriptive, in that it does not provide a ‘recipe’ that can be followed in every situation. It is always the primary responsibility of any landscape professional carrying out an assessment to ensure that the approach and methodology adopted are appropriate to the particular circumstances.*” This appraisal has therefore defined a set of typical criteria to assess the potential landscape and visual effects of the proposed development.

2.4 Methodology for the appraisal of landscape effects

2.4.1 The level of the landscape effects identified is determined by a consideration of the sensitivity of the landscape receptors and the magnitude of the effects on the landscape.

2.4.2 The nature or sensitivity of a landscape receptor combines judgements of their susceptibility to the type of change or development proposed and the value attached to the landscape, as defined in the GLVIA glossary and in paragraph 5.39 of

³ The use of photography and photomontage in landscape and visual assessment, Landscape Institute Advice Note 01/11 (March 2011)

GLVIA 3. Paragraph 5.39 of GLVIA 3 also states that LVIA sensitivity is similar to the concept of landscape sensitivity used in landscape planning, but is not the same as it is specific to the particular project or development proposed and the location in question. Thus assessment of sensitivity is not strictly part of the initial baseline study of landscape character; it is considered as part of the assessment of impacts of the development.

2.4.3 The nature or magnitude of the effects on the landscape receptors depends upon the size or scale of the changes, the geographical extent of the area influenced, and the duration and reversibility of the effects.

2.4.4 The landscape receptors include the landscape character of the site, the Landscape Character Area (LCA) the site is within, the surrounding LCAs and the designated landscapes within the 5km study area; this includes the impact on the landscape character of the Registered Historic Parks and Gardens within the study area, conservation areas, listed buildings and scheduled monuments. The impacts on the visual amenity of visitors to Historic Parks and Gardens which are open to the public, are addressed in the visual impact appraisal section of this chapter.

Susceptibility to change

2.4.5 This is defined as the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular landscape type or area, or an individual element and/or feature, or particular aesthetic and perceptual aspects) to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies (see paragraph 5.40 of GLVIA 3).

Landscape value

2.4.6 Assessment of value is concerned with the relative value attached to different landscapes by society. A consideration of value at the baseline stage informs judgements of the significance of effects. Landscapes can be valued by different people for different reasons connected to a range of factors including landscape quality (condition), scenic quality, rarity, representativeness, conservation interests, recreation value, perceptual aspects and associations (see GLVIA 3 Box 5.1 for definitions). This consensus can be recognised at a local, regional or national or international scale. Table 1 explains how criteria are applied to arrive at an

understanding of landscape value in this appraisal. It is derived from LANDMAP and GLVIA 3.

Table 1 LANDMAP and GLVIA 3 Criteria for the Appraisal of Landscape Value			
Value	Typical criteria	Typical scale	Examples
Outstanding	High importance and rarity No or very limited potential for substitution	International, National	World Heritage Site, National Park, Area of Outstanding Natural Beauty (AONB).
High	Medium importance and rarity Limited potential for substitution Some or good potential for substitution	Regional, county	Registered Historic Parks and Gardens, Historic Landscapes, Special Landscape Areas
Moderate	Low importance and rarity	Regional, local authority, local community	Undesignated but value expressed for instance in demonstrable use
Low	Low or no importance and rarity	Local, little or no importance	Areas identified as having some redeeming feature or features and possibly identified for improvement. Areas identified for recovery

2.4.7 The EIA Regulations do not require study of whether a development complies with planning policy, this is also the case for a non-EIA LVIA. Planning policy is, however, important and relevant to LVIA when it is a recognition or reflection of the value placed upon a particular landscape or its attributes by society. Thus designations like National Parks and AONB have relevance since they identify a consensus about this aforesaid value. Reference to planning policy can therefore assist the assessor in identifying sensitive receptors.

Sensitivity of the landscape receptors to solar energy development and landscape capacity

2.4.8 Paragraphs 5.41 - 5.43 of GLVIA 3 recognise that assessments / appraisals may take place in situations where there are existing sensitivity and capacity studies to particular types of development, and these may provide useful preliminary background information. However GLVIA 3 confirms that as landscape effects in LVIA are particular to both the specific landscape in question and the specific nature

of the proposed development, the assessment / appraisal must be tailored to the project.

- 2.4.9 At present there are no studies which look at the capacity of the landscape in the County Borough of Wrexham to accommodate solar PV farm development. Landscape capacity has therefore been considered as part of this appraisal, through a combination of desk study and site work.

Magnitude of landscape effects

- 2.4.10 Table 2 explains how criteria are applied to determine levels of magnitude and is derived from GLVIA 3.

Table 2 Criteria for the appraisal of magnitude of landscape effects	
Level	Typical Criteria
High	Total loss of or major alteration to key features or perceptual aspects of the baseline and/or the addition of new features considered to be totally uncharacteristic when set within the attributes of the receiving landscape The effects would be of a large scale influencing several landscape character types/areas The effects would be long term and/or irreversible
Medium	Partial loss of or alteration to key features or perceptual aspects of the baseline and/or the addition of new features that may be prominent but may not necessarily be considered to be substantially uncharacteristic when set within the attributes of the receiving landscape The effects would be at the scale of the landscape character type/area within which the proposal lies The effects would be medium term and/or partially reversible
Low	Minor loss of or alteration to key features or perceptual aspects of the baseline and/or the addition of new features that may not necessarily be considered to be uncharacteristic when set within the attributes of the receiving landscape The effects would be at the level of the immediate setting of the site The effects would be short term and/or reversible
Negligible	Very minor loss of or alteration to key features or perceptual aspects of the baseline and/or the addition of new features that are not uncharacteristic with the surrounding landscape - approximating the 'no change' situation The effects would be at the site level, within the development site itself The effects would be very short term and/or reversible

Overall level of the landscape effects

- 2.4.11 A consideration of the sensitivity of the landscape receptors to the development and the magnitude of the change resulting from the development, determines the level of the predicted impact. The relationship between sensitivity and magnitude to

reach the level of effect is sometimes presented in the form of a matrix. However, such a matrix may lead to the same weighting of each criteria, which might not always be appropriate and may lead to a formulaic approach, therefore descriptions of how overall effects have been determined are provided (see paragraphs 3.34 and 3.35 of GLVIA 3).

2.4.12 Overall, effects may be adverse, neutral or beneficial, and are assigned a level on the scale: Imperceptible-Slight-Moderate-Substantial-Severe, taking into account mitigation measures, and different stages of the project lifecycle. Table 3 assigns typical criteria to each level, as applied in this appraisal, however it should be noted that various different scenarios of susceptibility to change, landscape value, the size or scale, geographical extent and/or duration and reversibility of effects could apply to result in the overall level of effects as described in the appraisal; therefore the criteria in Table 3 are provided as typical examples. Intermediate levels, such as 'slight to moderate' and 'moderate to substantial', may also apply.

Table 3 Criteria for determining level of landscape effects	
Level	Typical criteria
Severe	The proposals are wholly out of character with the existing situation, both locally and on the wider scale, and/or the landscape receptors are of high sensitivity
Substantial	The proposals have a large effect within the context of the wider area, and/or the landscape receptors are of high sensitivity
Moderate	The proposals have a noticeable effect within the context of the wider area, and/or the landscape receptors are of medium sensitivity
Slight	The proposals have some, but only a limited effect within the mainly local context, and/or the landscape receptors are of low sensitivity
Imperceptible	The degree of change is so small as to have little or no effect, and/or the landscape receptors are of low sensitivity

2.4.13 Whilst adverse effects may be identified in connection with a proposed development, this does not imply necessarily that the development taken as a whole would be unacceptable in environmental terms.

LANDMAP

2.4.14 LANDMAP is the national landscape information system for Wales. It gathers, organises and evaluates information about the landscape into a nationally consistent data set. LANDMAP separates this information into five aspects, as follows:

- Geological landscape: this is the study of the geology, geomorphology and hydrology of the area.
- Landscape habitats: looks at the distribution of vegetation and habitats and the basis for landscape ecology.
- Visual & sensory: this aspect identifies those landscape qualities that are perceived through the senses. It deals with the individual physical attributes of landform and land cover, as well as their visual patterns of distribution and sensory characteristics, and the relationships between them in a particular area.
- Historic landscape: focuses on how archaeological and historical sites relate to each other and to the surrounding landscape.
- Cultural landscape: this considers the relationship that exists between people and places; how people have given meaning to places, how the landscape has shaped their actions and their actions have shaped the landscape.

2.4.15 For each aspect area an evaluation is provided which is an assessment of intrinsic value, condition and trend, which are defined below:

- Outstanding: of international or national importance
- High: of regional or county importance
- Moderate: of local importance
- Low: of little or no importance.

2.5 Methodology for the appraisal of visual effects

2.5.1 As with landscape effects, a consideration of the sensitivity of visual receptors (people) and the magnitude of the change determines the level of the predicted effect on views and visual amenity.

2.5.2 The nature or sensitivity of visual receptor considers their susceptibility to the type of change or development proposed and the value people attach to the affected views (GLVIA 3, paragraph 6.31).

2.5.3 The nature or magnitude of the effects on visual receptors depends upon the size or scale of the changes, the geographical extent of the area influenced, and the duration and reversibility of the effects. In visual assessment / appraisal, magnitude is also determined by the distance from the viewer, the extent of change in the field

of vision, the proportion or number of viewers affected and the duration of activity apparent from each viewpoint, or a sequence of points that may have transient views, for instance along a road. Greater weight is given to the visual impacts upon public viewpoints than upon views from private properties; this does not however affect the sensitivity of the receptors experiencing views.

Sensitivity of visual receptors

- 2.5.4 Visual receptors include the public or community at large, residents, visitors, workers and people travelling through the landscape. The types of viewers, the numbers, the duration of the view and the importance of the view or views of and from valued areas define the sensitivity of a visual receptor.
- 2.5.5 In the context of this development, the scale of the sensitivity of the visual receptors is as outlined in Table 4 and is derived from GLVIA 3.

Table 4 Criteria for the appraisal of sensitivity of visual receptors	
Level	Typical criteria
High	Public views within areas of protected landscapes such as National Park, National Scenic Area and AONB Users of outdoor recreational facilities including public rights of way, or visitors to heritage assets or other attractions whose attention or interest is focused on the landscape and where tolerance to change is likely to be low Communities where the development results in changes in the landscape setting or valued views enjoyed by the community Occupiers of residential properties with views affected by the development Tourists travelling through or past the affected landscape in cars, on trains or other transport routes whose attention or interest is focused on the landscape and where tolerance to change is likely to be low
Medium	People, such as commuters and hauliers (not tourists) travelling through or past the affected landscape in cars, on trains or other transport routes
Low	People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape People at their place of work, or engaged in similar activities, whose attention may be focused on their work or activity, not their surroundings, and where setting is not important to the quality of working life Views from urban roads, footways, railways and industrial areas whose attention may be focused away from the landscape and where tolerance to change is likely to be high

Magnitude of visual effects

2.5.6 Table 5 explains how criteria are applied to determine levels of magnitude and is derived from GLVIA 3.

Table 5 Criteria for the appraisal of magnitude of visual effects	
Level	Typical Criteria
High	Total loss of or major alteration to views and/or the addition of new features that would be very prominent, and/or would greatly contrast with the existing view Full, open views, experienced for the majority of a journey or full duration of an activity The views would be close, direct and/or totally occupied by the proposed development The effects would be long term and/or irreversible
Medium	Partial loss of or alteration to views and/or the addition of new features that would be prominent, and/or would contrast with the existing view Partial views, experienced for part of a journey or activity The views would be middle distance, partially oblique and/or partially occupied by the proposed development The effects would be medium term and/or partially reversible
Low	Minor loss of or alteration to views and/or the addition of new features that would not be prominent, and/or would not contrast with the existing view Glimpsed views, experienced for a small part of a journey or activity The views would be distant, oblique and/or only a small part of the view would be occupied by the proposed development The effects would be short term and/or reversible
Negligible	Very minor loss of or alteration to views and/or the addition of new features that would be almost imperceptible - approximating the 'no change' situation Very brief glimpsed views The views would be very distant, very oblique and/or only a tiny part of the view would be occupied by the proposed development The effects would be very short term and/or reversible

2.5.7 Magnitude is influenced by the effects of distance which can influence how a solar PV farm is perceived, but the number and proportion of panels seen is also important. The angle and direction of view also influences the degree of change, i.e. whether the panels are seen from the front, side or rear, and the extent to which a solar farm occupies the view is also a factor affecting its prominence.

2.5.8 Magnitude can vary greatly in differing weather conditions. Direction of light and relative position of the viewer at different times of day also alters magnitude of change in a view at some viewpoint positions, so whether the development is seen

against the background of the sky or the landscape makes a difference. The LVIA has to take into account a worst case scenario and the time duration it is experienced.

Overall level of visual effects

2.5.9 As with landscape effects, a consideration of the sensitivity of the visual receptors to the development and the magnitude of the change resulting from the development, determines the overall level of the predicted impact. Again a matrix is not used, descriptions of how significance has been determined are provided.

2.5.10 Table 6 assigns typical criteria to each level for visual effects, as applied in this appraisal; however it should be noted that various different scenarios of susceptibility to change, the value of views, the size or scale, geographical extent and/or duration and reversibility of effects could apply to result in the overall level of effects as described in the appraisal; therefore the criteria in Table 6 are provided as typical examples. Intermediate levels, such as 'slight to moderate' and 'moderate to substantial', may also apply.

Table 6 Criteria for determining the overall level of visual effects	
Level	Typical criteria
Severe	The proposals would dominate views and would be wholly out of character with the existing situation, the changes would be experienced by a very large number of people, and/or the visual receptors would be of high sensitivity to the changes.
Substantial	The proposals would be prominent and contrasting with the existing views, the changes would be experienced by a large number of people, and/or the visual receptors would be of high sensitivity to the changes.
Moderate	The proposals would be noticeable in views but not dominating, the changes would be experienced by a medium number of people, and/or the visual receptors would be of medium sensitivity to the changes.
Slight	The proposals would result in small changes to the views, the changes would be experienced by a small number of people, and/or the visual receptors would be of low sensitivity to the changes.
Imperceptible	The proposals would be imperceptible in views, the changes would be experienced by a very small number of people, and/or the visual receptors would be of low sensitivity to the changes.

2.5.11 Again, whilst adverse effects may be identified in connection with a proposed development, this does not imply necessarily that the development taken as a whole would be unacceptable in environmental terms.

2.6 Software and hardware tools

2.6.1 ZTV and photomontages were produced by TGC Renewables. In addition, Wardell Armstrong used the following computer programmes in the preparation of this LVIA:

- AutoCAD software, and
- MapInfo, a Geographical Information system (GIS).

2.6.2 Hardware included:

- an accurate Global Positioning System (GPS) to position the photo viewpoints; and
- a digital SLR camera with an equivalent of a 50mm lens, mounted on a stable, levelled tripod with a professional panoramic head attached.

2.7 Zones of Theoretical Visibility diagrams (ZTVs)

2.7.1 Zones of Theoretical Visibility (ZTVs) are also referred to as Zones of Visual Influence diagrams (ZVIs) or visual envelope maps (VEMs); however, ZTV is the preferred term as it emphasises the key factors of the plans – that they are theoretical and that they indicate potential visibility by coloured shading overlain on an Ordnance Survey background, from the areas in the surrounding landscape in which the Development is theoretically visible. As they are based upon computer modelling of inter-visibility based upon bare ground topography, they do not show the effects of screening of buildings, trees, other man-made features such as railway cuttings and embankments, or of localised changes in the topography that may not be included in the Digital Terrain Model (DTM), and are thus a worst case scenario. They do not convey the nature or significance of effects.

2.7.2 For the purposes of this appraisal a stand-alone ZTV diagram (Figure 1) was produced by TGC Renewables, based on the maximum height of a photovoltaic panel of 3.0m and a viewing height of 1.6m. It extends to 5km from the centre of the site. As described above, the ZTV does not include screening from built development, trees or hedgerow cover.

2.8 Selection of viewpoints

2.8.1 Viewpoints are chosen to study the potential visual effects of a scheme. The principal criterion is that they must be representative of the range of views and

viewer types likely to experience the development (paragraphs 6.19 and 6.20 of GLVIA 3). Specific points may also be chosen because they are important existing viewpoints in the landscape.

2.8.2 The first stage in the viewpoint selection for the development was a desk study including analysis of the ZTV drawing, which defines the potential visibility of the development. Within this ZTV defined area, a range of viewpoints at different elevations, giving coverage from all compass directions and for the range of viewer types, was selected. Following this, each chosen point was explored on the ground to ensure that it actually illustrated the most open view of the site area and was not, for instance, behind a building or hedge. Equally, foreground detail that distracts from the middle or background of the view or screening may be characteristic of a viewpoint. Therefore a balance has had to be struck in the final positioning of the viewpoints.

2.8.3 View types can include:

- areas of high value such as designated landscapes and access routes etc;
- viewpoints that may have wide panoramic views or by contrast focused views;
- viewpoints at different distances;
- viewpoints at different elevations;
- viewpoints from different aspects; and
- viewpoints from which there would only be partial views of the development.

2.8.4 Viewer types can include:

- views from residences, roads or recreational points where visitors may experience the landscape; and
- viewpoints where viewers would be likely to be stationary or moving through a landscape.

2.8.5 To aid in identifying and selecting the most open views of the development, a layer shading exercise was carried out using GIS. The result of this exercise is shown in Figure 6 which shows ranges in topography. This meant that when representing views from a road, positions at the higher elevation vantage points, likely to have more or most open views, could be chosen.

- 2.8.6 To establish a rationale for selection of worst case scenario viewpoints, GIS analysis was used. Sensitive landscape and visual receptors were mapped for the 5km study area. These included features such as historic parks and gardens, visitor attractions and long distance routes. These are mapped on Figures 2, 3 and 4.
- 2.8.7 WCBC was consulted regarding viewpoint selection before fieldwork commenced with an initial proposal for seven viewpoints and a series of representative plates (see Appendix 4.4). However, timescales were such that fieldwork was undertaken prior to response from the LPA. A list of viewpoints was created along with a record of why each was selected (see Appendix 4.3). During the site assessment, some viewpoints were added and some rejected or relocated. Once the site assessments had been carried out the viewpoints were finalised and agreed with WCBC. Correspondence documenting this process appears in Appendix 2. The locations of the viewpoints and plate locations are indicated on Figure 1.
- 2.8.8 A series of photographs were taken during a site visit in May 2014. The photographs were taken with a digital SLR camera with an equivalent of a 50mm lens, mounted on a stable, levelled tripod with a professional panoramic head attached. This positions the focal centre of the camera lens above the pivot of the tripod and allows the photographs to be stitched together accurately using software. Viewpoints 1 to 6 (Figures 7 to 13), illustrate the site in its context of the surrounding landscape and settlements. The Figures include the following:
- a description of the location (receptor);
 - the distance to the location of the proposed solar PV farm;
 - the approximate height above sea level of the viewpoint;
 - a location map of the viewpoint;
 - a description of the existing view, and those during construction and operation;
 - descriptions of magnitude of impact and the sensitivity of the visual receptors;
 - mitigation measures; and
 - a summary of the potential effect.
- 2.8.9 Viewpoints were chosen initially to represent views in which the development would in theory be visible, at least in part. However, due to the extensive screening by

existing tree cover a number of representative receptors were included where the development would not be visible, these are included as photographic plates.

2.9 Photomontages and wirelines

2.9.1 Photomontages were produced by TGC Renewables and are included in Appendix 3 to this LVIA. The specific viewpoints were chosen because they were considered to be representative of an important/ sensitive viewpoint and locations where some visual effects from the development were anticipated.

2.9.2 Three photomontages have been produced, following consultation with the planning authority, these are for:

- Viewpoint 1A (Photomontage) looking south from Francis Lane and RoW No. 26 on the northern boundary of the site (X, Y: 338828, 351518);
- Viewpoint 2 (Photomontage) looking north from the junction of Ridleywood Road and Bryn Lane, south of the site (X, Y:338890, 350818); and
- Viewpoint 3 (Photomontage) looking east from the shared cycleway and footpath some 300m west of the western site boundary (formerly Hugmore Lane), west of the site (X, Y: 338013, 351024).

2.10 Limitations of study

2.10.1 It is not possible to enter the curtilage of private residential properties, therefore the appraisal of potential effects on the visual amenity of residents has been carried out from nearby roads and footpaths.

3 LANDSCAPE CHARACTER BASELINE

3.1.1 This section firstly reviews the published landscape character studies relevant to the 5km study area. The on-site assessment has then informed a description of the existing baseline condition of the area within the vicinity of the site.

3.2 Character of the study area

3.2.1 The study area for the Francis Lane site extends into England, within the eastern edge of the area. Reference has been made to published characterisation studies relevant to both Wales and England, therefore, to describe this regional variation in more detail.

Published strategic landscape character studies

3.2.2 The following landscape character studies provide a strategic assessment of the study area at different levels:

- Countryside Council for Wales, Regional Landscape Character Areas⁴;
- Countryside Council for Wales, LANDMAP Aspect Areas⁵ see Figures 005B to 005F;
- A national study developed as part of the Character of England project and published by the then Countryside Agency in 1999, now Natural England, which characterises England into a number of National Character Areas (NCAs); and
- Cheshire Landscape Character Assessment⁶, a county level study, see figure 005A.

Regional Landscape Character Assessment (rLCA)

3.2.3 The site is within and the 5km study area overlaps the rLCA, 14: *Maelor Saesneg/Maelor*.

3.2.4 The key characteristics of relevance to the study area are summarised in Table 7 below:

Table 7 Key Characteristics of the CCW Regional Landscape Character Area	
LCA	Key characteristics
14: Maelor Saesneg/Maelor	<i>"A bedrock geology of sandstone and siltstone/mudstone is overlain in places by glacial till and river alluvium/glaciofluvial drift (e.g. the course of the River Dee), giving rise to a gently undulating landform;</i> <i>Soils overlaying this geology include seasonally wet deep red loams and clays associated with the glacial till deposits and deep loams associated with glaciofluvial and river terrace drift material;</i> <i>Predominant land cover is pastoral agriculture, interspersed with mixed native enclosure field boundary hedgerows with hedgerow oaks, forming a geometric field pattern of medium scale.</i> <i>Fields are interspersed with occasional blocks of small scale deciduous farm woodland. A</i>

⁴ Countryside Council for Wales, Regional Landscape Character Areas (rLCAs) in Wales (DRAFT), 1 February 2011

⁵ Countryside Council for Wales, LANDMAP Aspect Areas (data collected July 2013).

⁶ Cheshire County Council, November 2008.

Table 7 Key Characteristics of the CCW Regional Landscape Character Area	
LCA	Key characteristics
	<i>larger scale arable field pattern persists in parts of the character area to the east;</i> <i>Localised land cover variation is provided by the hydrology, including seasonally wet/groundwater dependant meres and mosses, and the course of the River Dee;</i> <i>Much of the pastoral landscape to the west of the character area incorporates relics of the medieval open field system and earthworks, in addition to early, relatively small scale Parliamentary Enclosure;</i> <i>A unified agricultural landscape of simple composition, with texture provided by a variety of land cover elements including pasture, rush/marsh, woodland and meres;</i> <i>Settlement is defined primarily by compact nucleated villages often of medieval formation, e.g. Bangor on Dee / Overton, with sandstone, red brick and grey slate frequently evident;</i> <i>A small part of Wrexham, including the industrial estate, which lies on a bedrock geology of sandstone has been included within Maelor on geological grounds."</i>

3.2.5 Cheshire Landscape Character Types 6, West Lowland Plain, WLP4 and LCT 13, River Valley, R4 are located to the far east of the study area. Key characteristics are summarised within Appendix 5B.

LANDMAP

3.2.6 The site lies within aspect areas: WRXHMGL077: Isycoed-Parkside; WRXHMCL013: Maelor Gymraeg (North); WRXHMHL018: Commonwood; WRXHMLH029: Eyton Grassland; and WRXHMS054: Dee Terraces. The descriptions of these can be found in Table 8. Adjacent aspect areas within the wider study area and their descriptions can be found in Appendix 5A.

Table 8 LANDMAP Aspect Areas			
Area Name/ Area ID	Description	Overall Evaluation (taken from LANDMAP)	Guidelines
Geological landscape			
Isycoed-Parkside/ WRXHMGL077	Broad, low area very slightly inclined towards the Dee floodplain system, falling from around 30m below the "Wrexham Delta Terrace" to the W to around 10m above sea-level. Surface smooth to N becoming slightly irregular centrally; characterised throughout by many small ponds. Dominated by glacial clays (Quaternary,	Moderate - No regionally significant sites/ landforms noted during present survey and geology/ geomorphology considered to be typical of feature/ process and is either widespread, better exposed elsewhere or not currently known to be exceptional.	Long Term (Ensure that no significant geological or geomorphological features are lost or damaged (e.g. due to development, forestry, etc))

Table 8 LANDMAP Aspect Areas			
Area Name/ Area ID	Description	Overall Evaluation (taken from LANDMAP)	Guidelines
	Pleistocene), but includes some marginal areas of river terrace deposits as around Trevalyn Hall to the N and S of Holt (Quaternary, Holocene).		
Landscape habitats			
Eyton Grassland/ WRXHMLH029	A very large area, mainly of grassland, west of the River Dee and south of Wrexham itself. The area comprises a patchwork of small both permanent pasture and fields cut for hay and silage, bounded by hedges with scattered trees, together with a number of small woods, many ponds, and two areas of parkland at Pen Y Lan and Erbistock. There are a number of areas of local wildlife significance, together with many bat records and records of great crested newts.	High - This is a rich traditional agricultural area, on wet land in the valley of the River Dee, with many wet habitats remaining suitable for great crested newts, and many other more common species. This is reflected in the number of local wildlife sites, and merits a high classification.	Immediate (Increase number of ponds) Medium Term (Where hedges are gappy, replant and lay.) Medium Term (Retain potential green networks and develop green networks.)
Visual & sensory			
Dee Terraces/ WRXHMVS054	The area is characterised by a clearly defined and well maintained arable farming landscape with narrow lanes, roadside and field ditches and ponds.. Sensory perceptions include tranquillity, peacefulness, an efficient and industrious farming landscape, settled and feeling of being relatively remote from population and industry. generally, due to the relative openness of the landscape there is an overwhelming sense of space and distance, with views usually far reaching and stretching to the far horizons. Settlements are typified by traditional red brick buildings and are often small in scale, some light pollution is evident from the adjacent settlements and in particular from	Moderate - Although attractive there is little which gives this area an element of rarity or importance as a valuable landscape type or area. Attractive and comfortable with a domestic almost suburban feel to its western extremities. The area appears well maintained and managed with a diverse and attractive vegetation pattern. The area is unspoilt by large scale visually intrusive development. However there is pressure for farm diversification which has led to some unsympathetic	Medium Term (Resist "suburbanisation" of farmsteads through economic pressure to diversify, especially to minimise and mitigate visual impact of new large scale farm buildings) Medium Term (Maintain field pattern and vegetation distribution, with a view to enhancing/improving species diversity and focusing on British Native species) Immediate (Re-establish/encourage

Table 8 LANDMAP Aspect Areas			
Area Name/ Area ID	Description	Overall Evaluation (taken from LANDMAP)	Guidelines
	industrial development at Wrexham Industrial Estate but this quickly diminishes with distance. There is a greater influence from roads and transport in this area as the area contains some of the main roads leading towards Whitchurch, Nantwich and Crewe their noise and activity further emphasised by the use by heavy lorries leaving and entering Wrexham Industrial Estate.	developments. The area is a pleasant farming rural area both for the traveller and resident but is relatively unremarkable in its lack of strong defining or unique landscape features. It benefits from the lack of large scale or visually intrusive development but although attractive lacks the unique or unusual features that might make it of High or Outstanding value.	traditional land management techniques such as hedge laying and encourage less intensive farming practices where possible.) Long Term (Ensure phased replacement of maturing vegetation especially hedgerow trees and woodlands)
Historic landscape			
Commonwood/ WRXMHML018	An area of mixed sized but predominantly regular fields occupying part of the western river terrace of the Dee... The fields divide roughly equally into groups of smaller residual medieval strip fields, adjoining medieval settlements such as Holt, and blocks of larger fields representing areas of 18th or 19th enclosure - possible once areas of common... The area is characterised by numerous water-filled marl pits, land drains running east towards the river and a significant number of small farm complexes, probably of later medieval or post medieval origin... The areas only significant settlement is the relatively modern Cross Lanes... Several park fieldnames survive across the area that may hint at former landuse. There are also a number of small areas of deciduous woodland... A scatter of Bronze Age barrows and standing stones are the sole representatives of the areas	Outstanding - A large and uniformly patterned area with excellent distribution and survival of post medieval and medieval ridge and furrow field systems.	-

Table 8 LANDMAP Aspect Areas			
Area Name/ Area ID	Description	Overall Evaluation (taken from LANDMAP)	Guidelines
	prehistoric past		
Cultural landscape			
Maelor Gymraeg (North)/ WRXHMCL013	An area which contains a variety of features (small settlements, large traditional farms) within a distinct landscape. The very traditional appearance of this area belies fundamental social changes, in which farming practices are moving away from the traditional tenant-farmer and associated labourers to the employment of contractors, and where villages are becoming Liverpool or Manchester dormitories.	Moderate - as an area undergoing significant change which may be leading to loss of cultural cohesion.	Immediate (Monitoring for social and agricultural change.) Medium Term (Encouragement to mixture of "dormitory" and "non-dormitory" occupation and employment patterns.) Long Term (Consideration to long-term place of agriculture in regional economy.)

3.3 Valued areas and sensitive receptors

3.3.1 Valued areas reflected in designations often cross character area boundaries; therefore to assess the overall effects the total area of the designation needs to be considered as a whole. Figure 3, Designated Areas indicates the location of any national, regional or local landscape designations, whilst Figure 2 indicates the location of sensitive receptors, including registered parks and gardens, scheduled monuments and listed buildings.

3.3.2 WCBC has designated Special Landscape Areas within its area; the closest of these is at Borrass Woods, to the north of the A534, some 1.4km to the north-north-west of the site. Two other SLAs are either just within or on the edge of the 2km buffer: to the west, East of Wrexham Town SLA, which extends from Cefn Park to Big Wood; and to the south, south of Wrexham Industrial Estate SLA, which covers land to either side of the River Clywedog.

- 3.3.3 One site within the study area, and within the ZTV, is of National Importance and listed on the English Heritage Register of Historic Parks and Gardens. This is located at Horsley Hall at c. 4km to the north-west of the site.
- 3.3.4 The registered landscape and National Trust property of Erddig at 5km to the south-west, is indicated as being outwith the ZTV.
- 3.3.5 The Area of Historic Landscape indicated on the southern edge of the 5km study area is located outwith the ZTV and is therefore not considered further within this appraisal.
- 3.3.6 Figure 3 also illustrates areas of Ancient Woodland within the study area. None are located within the boundary of the site; the closest is some 1.5km distance, within the Wrexham Industrial Estate, south-west of the site.

3.4 The character of the site and its immediate vicinity

Settlements and individual properties

- 3.4.1 The nearest settlement consisting of more than communities of individual properties around farms is Lan-y-pwll, located 880m to the north-west of the site. Abenbury is located on the southern edge of the Wrexham Industrial Estate at 1.5km to the south-west of the site. The village of Holt is located 2.6km to the north-east of the site. The eastern edge of the town of Wrexham is located at approximately 2.5km to the west of the site. To the south-east of the site is the small settlement of Isycoed, which is centred on the local road network east of the B5130 and includes a church and a mix of one and two storey properties.
- 3.4.2 There are numerous scattered private dwellings, farms and smaller communities within the area. The closest to the site, Nos. 2, 4 and 6 Bryn Lane, are located approximately 50m from the southern boundary on the north-eastern edge of the Wrexham Industrial Estate. Honeysuckle Cottage on Francis Lane is located approximately 100m to the west of the site.
- 3.4.3 Single properties on either side of Ridley Wood Lane (Harcourt and Whitefield Cottage) are located at approximately 550m to the east of the site. Numerous properties are spaced along the B5130, with Marshley Farm located at 850m to the south-east of the site. Spring Grove and Holt Lodge Farm are located at the junction

of Francis Lane and Hugmore Lane/cycleway at approximately 470m to the west of the site and Aldersey Farm and Cornish Farm are located to either side of Francis Lane at approximately 570m from the north-east corner of the site.

Landform and drainage

3.4.4 The landform of the study area is shown on Figure 6 Topography. The site is within agricultural land at approximately 30m above ordnance datum (AOD). Land gently falls from the south-west corner of the site at approximately 32m AOD down to approximately 26m AOD at the north-eastern corner.

3.4.5 There are two small ponds located within the site.

3.4.6 The River Dee flows northwards along the eastern edge of the study area and is fed by the River Clywedog located south of the Wrexham Industrial Estate and a number of lesser streams that cross the study area falling from west to east.

Land cover and land use

3.4.7 The site for the proposed solar PV development is typical of the land in the vicinity of the Industrial Estate and consists of five adjoining parcels of agricultural land, primarily used as pasture for grazing, chiefly by sheep, and adjoins other agricultural land. These fields are divided by low (ranging from 1.5m to 2m height), well managed hedgerows, reinforced where gaps occur with post and wire fencing. There are numerous hedgerow trees within and on the boundaries of the site. The agricultural landscape of the wider study area is similarly divided with hedgerow and trees.

3.4.8 Wrexham Industrial Estate is located adjacent to the south of the site and includes a variety of warehousing, small industrial units and large scale manufacturing factory buildings. Two chimneys associated with the power generation for the factories are located in the north-east corner of the estate and are highly visible within the surrounding area. Traffic associated with the industrial estate is a feature of Bryn Lane, to the immediate south of the site. A CCTV camera is a prominent feature in the landscape, located on the northern side of the Industrial Estate, within the fields in the southern part of the proposed development site.

Transport corridors and rights of way

- 3.4.9 The site is bounded to the north by Francis Lane and to the south by Bryn Lane, which also provides access to the industrial estate, and Ridley Wood Road. The A534 runs west to east further to the north and parallel with Francis Lane. Hugmore Lane runs north to south to the west of the site and joins the A534 at Llan-y-pwll.
- 3.4.10 Within the past year, the A534 to the west of Llan-y-pwll has been upgraded and re-aligned, and a new access road from the new roundabout on the A534 links to Wrexham Industrial Estate, running parallel with Hugmore Lane (see Plate A).



Plate A – New road layout to west end of A534

- 3.4.11 The B5130, running through the study area from north-east to south-west links the A534 at Holt with the eastern end of Francis Lane and Bryn Lane and continues southwards, linking to the A525 approximately 4km to the south of the site.
- 3.4.12 A number of minor rural roads link the numerous farms and individual properties located to the west of the River Dee floodplain, with the main river crossing within the study area located at Holt.
- 3.4.13 Figure 4 illustrates the extent of the Rights of Way network within the study area. PRow No. 26 passes through the northern extent of the site, with PRow No.6 forming a continuation of this PRow and located adjacent to the eastern boundary of the southern half on the site. PRow No.25 approaches the centre of the northern boundary of the site, linking between the A534 and Francis Lane.
- 3.4.14 Further Rights of Way within the wider study area (see Figure 4) are separated from the site by the existing field network.

3.4.15 A new cycle route has been developed following the completion of the Wrexham Industrial Estate access road, following the line of Hugmore Lane and linking to the existing local network.

4 BASELINE VISIBILITY

4.1 Visibility of the existing site

4.1.1 The land in which the solar PV development would be sited has limited visibility. Though the ZTV (Figure 1) includes much of the land within 2km of the site, and covers the north and eastern extent of land within 5km of the site, the reality is that the industrial estate screens all views to its south and south-west and the dense network of hedgerows with large numbers of trees provides an effective visual screen from the vast majority of potential public and residential viewpoints. This is illustrated by Viewpoints 1A / 1B to 6 (Figures 7 to 13).

4.1.2 Rights of Way crossing the site and adjacent fields will have open views of the site. This diminishes as the number of field boundaries between the visual receptor and the site increases.

5 APPRAISAL OF LANDSCAPE EFFECTS

5.1 Summary of potential effects of aspects of the development

5.1.1 Table 9 summarises the potential effects of elements of the development.

Table 9 Summary of potential effects of aspects of the development	
Aspect of the development	Potential change
Construction phase	
Construction vehicle movement	Physical characteristics: not affected
	Perceptual characteristics: Increase in activity for short time leading to some localised loss of tranquillity
Construction of access track and installation of solar panels, inverter cabins and associated development	Physical characteristics: loss of small amount of land and introduction of new elements in pattern but existing field patterns retained
	Perceptual characteristics: potential loss of naturalness
Storage areas including compound with stockpiles of materials	Physical characteristics: new incongruous elements contained within existing pattern
	Perceptual characteristics: potential effect upon rural character

Table 9 Summary of potential effects of aspects of the development	
Aspect of the development	Potential change
Construction of the grid connection	Physical characteristics: temporary change of linear routes of land while installing underground cables
	Perceptual characteristics: potential effect upon industrial fringe character
Operational phase	
Operational solar PV panels	Physical characteristics: introduction of a new static structures making a new strong pattern
	Perceptual characteristics: potential localised effect upon naturalness
Land use change to solar PV site	Physical characteristics: small loss of elements and no change to existing pattern, scale not affected
	Perceptual characteristics: small effect upon naturalness
Operational use of access track	Physical characteristics: no loss of elements and existing pattern, scale not affected. New access tracks which would be locally apparent
	Perceptual characteristics: barely perceptible effect upon naturalness of local area
Grid connection	Physical characteristics: the cables would be underground and therefore once the ground cover is restored there would be no impacts
	Perceptual characteristics: the cables would be underground and therefore once the ground cover is restored there would be no impacts
Decommissioning phase	
Decommissioning vehicle movement	Physical characteristics: not affected
	Perceptual characteristics: the increase in activity for short time leading to some localised loss of tranquillity
Removal of solar PV panels	Physical characteristics: restoration of small amount of land and removal of elements in pattern but existing patterns retained
	Perceptual characteristics: potential restoration of naturalness

5.1.2 The appraisal of the operational effects principally addresses the potential effects of the solar panels themselves as these would be the most prominent and significant features of the proposed development, with the most potential to result in adverse effects.

5.2 Appraisal of landscape effects

Potential landscape effects during construction

5.2.1 The anticipated construction period for the proposed development would be approximately three months (short term). The construction would affect both the physical characteristics of the site, such as the land use, land cover and pattern of

the site, and the perceptual characteristics of the local area. The proximity of the site to the industrial estate means that changes in character associated with construction works will be reduced.

5.2.2 Some indirect impacts on the wider area would arise from the visual impacts associated with the construction works. However during this time, most impacts of the construction activities on the landscape character of the site and the surrounding area would be of a highly localised nature and therefore have been determined as slight adverse.

5.2.3 Once the construction elements are removed, the additional temporary disturbance would cease.

Potential landscape effects during operation

5.2.4 Landscape effects during operation would result from the presence of the PV panels in the landscape, and indirect effects on the wider area arising from the perceptibility of the solar PV development. Such effects arise in the main from potential contrasts in colour of the development when viewed against a landscape backdrop, and the addition of the strong pattern created by the rows of panels. The proposals are however low level and are not expected to 'skyline' (other than in near distance views), or create a strong contrast between the panels and the sky.

Approach

5.2.5 To analyse the potential impacts on landscape character, the sensitivity of the area with respect to solar energy development was considered. The results are presented in Table 10. The appraisal considers whether the key physical and perceptual characteristics included within the LANDMAP classifications could be materially affected by this development. Sensitivity to a solar farm constructed within the Aspect Area depends on the defining characteristics. The defining characteristics of an Aspect Area which is not the host area can only be predominantly affected if one of their defining characteristics is views of the host aspect area.

5.2.6 The extent of the potential effects over the wider aspect area was assessed spatially, by considering how much of the aspect area would be influenced. How much of the solar PV development would potentially be viewed and distances were factored in to arrive at a level of effect. This is inevitably linked to the extent of direct inter-visibility of the area in question with the development.

- 5.2.7 However, sequential experience of change could also amount to a change of the experience of parts of an Aspect Area outside the immediate ZTV of the development. If a large proportion of an Aspect Area were to be adversely affected, then this would be likely to lead to loss of character over the whole of the Area. The converse is also true.
- 5.2.8 The impacts on each Aspect Area were assessed by consideration of the sensitivity of the area to the proposed development, the perceptibility within the Aspect Area (not to be confused with inter-visibility) and the value, all taken together.
- 5.2.9 Appraisal of impacts upon landscape character in general cannot therefore just be carried out by considering discrete viewpoints alone, however representative they may be.

Character of the site

- 5.2.10 The potential effects of the development are summarised earlier in this report in Table 9. The site is considered to be Low to Medium in value as, while it is in reasonably good condition, it is undesignated and located within close proximity to the adjacent Industrial estate, which has the effect of reducing any tranquillity, and its visual qualities are similarly reduced. Susceptibility to change of the site is also Low to Medium as the relative scale of the Aspect Areas within which the site is located and the potential for substitution of the site within these areas would result in limited impact upon the baseline of each aspect area. It is therefore considered to be of Low to Medium sensitivity to the proposed development.
- 5.2.11 The magnitude of effects on the character of the site is considered to be low as the introduction of the solar PV Farm would be barely perceptible outside the site and therefore prominent only within the immediate locality of the site itself. The retention and enhancement of the trees and hedgerows within, around and adjacent to the site would mean that the key perceptual characteristics of the site would remain. The overall effect of the introduction of the solar PV farm on the landscape character of the site is considered to be **slight to moderate adverse** within the immediate area of the site, only; effects would reduce rapidly with increased distance from the site.
- 5.2.12 Table 10 summarises the potential effects upon the key characteristics of the LANDMAP Aspect Areas within which the site is located.

Table 10 Potential effects of the Development on the Aspect Areas of the published LANDMAP data	
Key Characteristic	Effect of the proposed solar PV development
Geological WRXHMGL077	
Broad low area very slightly inclined towards the Dee floodplain system	No alteration to landform - No change
Characterised throughout by small ponds	Ponds retained within development - No change
Landscape habitats WRXHMLH029	
Area comprises of a patchwork of small both permanent pasture and fields cut for hay and silage, bounded by hedges with scattered trees	Minor loss due to loss of managed hay/silage fields.
Visual & Sensory WRXHMOV054	
The area is characterised by a clearly defined and well maintained arable farming landscape with narrow lanes, roadside and field ditches and ponds	No change – field system, ponds and boundary treatments retained
Sensory perceptions include tranquillity, peacefulness, an efficient and industrious farming landscape, settled and feeling of being relatively remote from population and industry	Generally unchanged – established boundary hedgerow retained. Users of PRow crossing the site would experience some localised loss of ‘tranquillity’, although less so for southbound users of the path who currently experience views of the existing industrial estate
.....due to the relative openness of the landscape there is an overwhelming sense of space and distance, with views usually far reaching and stretching to the far horizons.	No change: beyond those experienced from PRow crossing site (as above) – All trees and hedgerows to be retained and enhanced. Limited scope for long distance views from within the site
Settlements are typified by traditional red brick buildings and are often small in scale, some light pollution is evident from the adjacent settlements and in particular from industrial development at Wrexham Industrial Estate but this quickly diminishes with distance	No change: no lighting on site – proposed built structures would be small scale and screened from wider views by intervening vegetation
Historic landscape WRXHMLH018	
An area of mixed sized but predominantly regular fields occupying part of the western river terrace of the Dee	No change: field structure retained and use of existing field access points
The area is characterised by numerous water-filled marl pits, land drains running east towards the river and a significant number of small farm complexes, probably of later medieval or post medieval origin...	No change: ponds/marl pits retained. No effect upon existing farms
Cultural Landscape WRXHMCL013	
An area which contains a variety of features (small settlements, large traditional farms) within a distinct landscape. The very traditional appearance of this area belies fundamental social changes, in which farming practices are moving away from the traditional tenant-farmer and associated labourers to	Land will remain in agricultural use throughout the operation of the proposed development (grazing by sheep). This traditional farming practice will therefore be preserved for at least 25 years. The land would be returned to full pastoral agricultural use following decommissioning

Table 10 Potential effects of the Development on the Aspect Areas of the published LANDMAP data		
the employment of contractors, and where villages are becoming Liverpool or Manchester dormitories.		
Sensitivity to the Development	Magnitude of effects	Overall level of effects
Low to medium	Negligible to low	Slight adverse

5.2.13 In summary, the proposed development would result in some highly localised landscape effects only and so would not predominantly affect the whole of the landscape character of the various LANDMAP Aspect Areas it is within.

Character of the setting

5.2.14 With only localised effects resulting from impacts upon the site, and with none of the defining characteristics of the aspect areas of the surrounding study area relating to views towards the site, the overall level of effect upon the landscape character of the study area is considered to be Imperceptible.

Valued areas and sensitive receptors

5.2.15 The site is not within any National, Regional or locally designated landscape. The closest designated area to the site is the Special Landscape Area at Borrás Woods, to the north-north-west. The existing visual screening and proposed retention of perimeter tree and hedgerow belts, would limit the extent to which the proposed development would be perceptible from the wider landscape. There would be no adverse indirect effects upon any of the valued areas identified within the 5km study area (see Figures 2 and 3). The proposed development would result in better land management and biodiversity enhancement with the site subject to the requirements of landscape and ecology management plans.

Potential landscape effects after decommissioning

5.2.16 The removal of the solar PV panels and the associated above ground structures and infrastructural facilities at decommissioning would result in some temporary localised impacts, similar to the construction phase. However, once this is complete, the only residual impacts would be the effects of the land management changes introduced as part of the scheme, which would not result in prominent adverse residual impacts on the landscape character. The landscape effects of the scheme are reversible.

6 APPRAISAL OF VISUAL EFFECTS

Approach

- 6.1.1 Following a desk based study, a series of field investigations has verified the main settlements, dwellings, roads, footpaths, and cycle routes (visual receptors) from which the site can be seen within the study area. Though the ZTV indicates that the proposed development would be visible in theory over a wide area, fieldwork has verified that the site is effectively screened from all but a few receptors by surrounding vegetation and built development.
- 6.1.2 The process of selecting representative viewpoints to illustrate visual effects of the proposed development has already been explained within section 2.8 of this report. Predicted visual effects are detailed below.
- 6.1.3 Some of the visual effects upon key sensitive and representative receptors are illustrated by photographs and text on the viewpoint figures (Figures 7 to 13). Photomontages were used to draw conclusions on the visibility and likely prominence of the solar PV farm at three significant viewpoints (see Appendix 3). The viewpoint figures provide an analysis of sensitivity of the viewpoint, magnitude of the effect and thus the overall effect upon the viewpoint receptors.

Potential visual impacts during construction

- 6.1.4 Table 9 identifies the possible source of construction impacts. Visual impacts are assumed to be adverse during the construction phase, but would be temporary. This is illustrated on the photographic viewpoint drawings, Figures 7 to 13 and within the photomontages within Appendix 3.

Potential visual impacts during operation

Residential receptors

- 6.1.5 These comprise individual properties and settlements, all of which are considered high sensitivity receptors. The settlements within 5km of the site which are also within the ZTV are considered in Appendix 4.1. The views from the individual properties and small groups of properties within 1km of the site have been addressed (beyond this, views if any would be imperceptible due to limited variation

within the local topography and intervening vegetation). These are summarised within Appendix 4.2.

- 6.1.6 There would be limited visual effects upon settlements within the study area (see plates B and C for representative views). A number of properties within Llan-y-pwll would have views of the site from first floor windows, these are visible in Plate D. Levels of effects would not exceed **slight adverse** where the site would be glimpsed through intervening hedgerow trees.



Plates B and C – Views from outskirts of Gresford (left) and Holt (right)

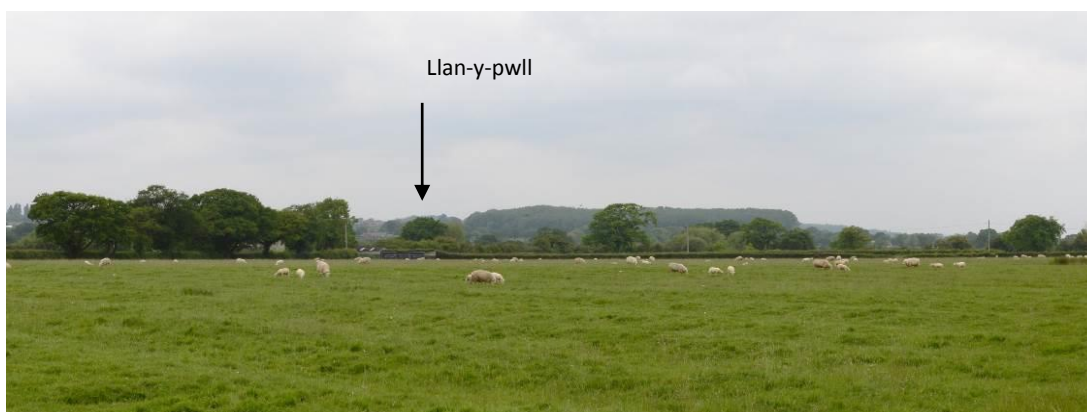


Plate D – View of properties within Llan-y-Pwll visible from the site

- 6.1.7 A limited number of individual properties in close proximity to the site would experience adverse effects:
- Honeysuckle Cottage at 100m to the west of the site would have views from first floor windows (visible in Plate E) looking over the existing hedging that otherwise screens the development. The dwelling is however, oriented more to the north – south with some mature planting within the garden areas. There would however be some scope for views of the northern extent of the development, particularly

from more open external areas of the property. Effects on visual amenity would be **Moderate to Substantial adverse**; and

- 3 no. properties including and adjacent to Spring Grove at c. 500m to the west of the site would experience views (including, where there is no garden boundary trees or hedging, from ground floor windows) towards the site, resulting in **Moderate adverse and Moderate to Substantial adverse** effects. There are a number of hedgerows dividing the fields between the site and these properties; however, there are few trees to screen the view in these sections.



Plate E – Properties at Spring Grove and Honeysuckle Cottage visible from the centre of the development site

- 6.1.8 Where views of the site occur from other nearby properties within the study area, effects would not exceed **slight to moderate adverse**, primarily due to the limited changes in terrain and intervening vegetation. For properties at distances greater than 700m from the site, effects would be no greater than imperceptible to slight adverse.

Transport network and recreational receptors

- 6.1.9 Visibility from the transport network within the 5km study area is limited by the visual screening provided by roadside hedges and associated trees.
- 6.1.10 Proximity to the site boundary would result in **moderate adverse** effects for road users (on the relevant sections of Francis Lane, Ridley Wood Road and Bryn Lane) where the perimeter fencing and tops of the PV panels would be visible. Alignment of local roads towards the site, such as occurs at Francis Lane to the north-east of the site and at the corner of Bryn Lane and Ridley Wood Road (Viewpoint 2) would

result in **slight adverse effects**, rising to **moderate adverse** in close proximity to the site.

6.1.11 Potential adverse effects upon users of the Public Rights of Way within the study area are limited to the following routes:

- PRoW No. 6 (Viewpoint 1B): users would experience **moderate to severe adverse** effects over the section of the path that runs parallel to the development site at its south-eastern corner;
- PRoW No. 26 (Viewpoint 1A): users would experience substantial to **severe adverse** effects for the section of the route that runs within the development boundary; the route would be enclosed to both sides by PV panels and deer fencing; and
- PRoW No. 25: southbound users would experience **moderate to substantial adverse** effects at the southern end of the route at its junction with Francis Lane, where the proposed scheme would be visible above the boundary hedgerow.

6.1.12 Effects upon PRoW in the wider study area would not exceed **slight adverse** where there is the potential for glimpsed views across established hedgerows and through intervening vegetation (Viewpoints 4, 5 and 6).

6.1.13 The newly created cycle route linking Hugmore Lane with the new industrial estate access road would experience glimpsed oblique views (Viewpoint 3), which would not exceed **slight adverse**.

Potential visual effects after decommissioning

6.1.14 The removal of the solar PV panels and the associated above ground structures and infrastructural facilities at decommissioning would result in some temporary localised impacts, similar to the construction phase. However, once this is complete, the only residual impacts would be the effects of the land management changes introduced as part of the scheme, which would not result in prominent adverse residual impacts on visual amenity. The visual effects of the scheme are reversible.

7 MITIGATION MEASURES

7.1.1 Mitigation measures are required in order to avoid, reduce, remedy or compensate for any adverse effects of the development. The principal of mitigation commences

with the design of the development and is an iterative process, in that measures are taken, wherever possible, to adjust the design to minimise adverse effects. This has already been undertaken by locating the solar PV development within an area of flat topography which in turn reduces the potential visibility of the site. The large number of hedgerows and hedgerow trees present throughout the study area further minimises visibility.

- 7.1.2 Visual screening in the immediate environs of the site would be maintained and improved by retaining the trees and hedging, and by managing existing hedgerows at c. 2.5 – 3.0m height around the perimeter of the site. A detailed landscape management plan would be put in place to ensure the landscaping of the site is improved, minimising views as well as enhancing the local landscape character.
- 7.1.3 Within the site, where gaps occur and are currently reinforced with post and wire fencing, additional hedgerow planting would be undertaken to reduce the potential impacts upon the public footpath passing through the site. The full extent of the proposed landscaping is shown on the landscape masterplan that accompanies the planning application (see Appendix 1).

8 RESIDUAL EFFECTS

- 8.1.1 Mitigation for the potential landscape and visual effects of the development has to some extent been incorporated into the design of the development, from its location within an area of limited sensitive receptors.
- 8.1.2 There would be beneficial residual effects in the medium to longer term for users of PRow Nos. 6 and 26 as a result of planting of additional hedgerow to 'gap up' internal hedges. Effects would be reduced to slight to moderate adverse once planting is established (after 8-10 years).
- 8.1.3 In addition, the proposed additional landscaping of the site would assist in reducing the scope for adverse effects on the visual amenity of nearby residential properties, particularly those to the west of the site. Effects would be reduced to slight and slight to moderate adverse once planting is established (as above).

9 CUMULATIVE EFFECTS

9.1.1 The WCBC screening determination letter dated 10th June 2014 stated that there are no cumulative impacts of any significance that need to be taken into account. There are no solar PV farm developments within the 5km study area and therefore there would not be any cumulative landscape or visual effects arising from the proposed solar PV development on land south of Francis Lane.

10 SUMMARY AND CONCLUSIONS

10.1 Landscape effects

10.1.1 The relatively gentle topography and screening afforded by the extensive vegetation cover in and around the site as well as throughout the wider study area is such that the proposed development would only result in some, highly localised, landscape effects and so would not notably affect the LANDMAP Aspect Areas the site is within.

10.1.2 The site is not within any National, Regional or locally designated landscape area, and because of the existing screening and proposed retention of perimeter tree and hedgerow belts, would not result in any adverse indirect effects upon any of the valued areas identified within the 5km study area.

10.2 Visual effects

10.2.1 The visual screening afforded by the extensive vegetation cover in the study area ensure that the proposed development would result in very few adverse effects on visual receptors. The proposed landscaping of the site would, once planting is established, also restrict the extent to which the site would be seen in views from nearby properties. There would be no prominent visual effects on any settlement within the 5km study area and only the nearby residential properties, Honeysuckle Cottage, Spring Grove and adjacent properties would experience some views of the development in the short to medium term. These views would be mainly from first floor windows, although Spring Grove could experience some views from ground floor windows to the rear of the properties, where these are open views. In due course the proposed landscaping would screen the site from view, from these properties.

10.2.2 There would be adverse visual impacts upon users of the Public Rights of Way that abut or run through the development site. Adverse effects in such close proximity would be unavoidable and severe, in the short to medium term. The proposed landscaping of the site, including internal planting of hedgerows, would reduce effects on visual amenity in the longer term. Users of the wider Right of Way network would not be affected by the proposals.

10.3 Cumulative effects

10.3.1 There would be no cumulative landscape or visual effects arising from the proposed solar PV development at Francis Lane, Wrexham. The site is located in close proximity to the existing industrial estate and this has the effect of reducing the scope for the proposed solar PV development to adversely affect landscape character and visual amenity over a wide area.

10.4 Overall conclusions

10.4.1 The proposed solar PV farm development within the land to the south of Francis Lane would result in very few adverse landscape or visual effects and no adverse cumulative landscape or visual effects. Where the predicted landscape or visual effects are prominent, they are limited and localised and would be reduced, in due course, with the establishment of additional planting within and on the boundaries of the site.

STOKE-ON-TRENT
Sir Henry Doulton House
Forge Lane
Etruria
Stoke-on-Trent
ST1 5BD
Tel: +44 (0)845 111 7777

CARDIFF
22 Windsor Place
Cardiff
CF10 3BY
Tel: +44 (0)29 2072 9191

EDINBURGH
Suite 2/3, Great Michael House
14 Links Place
Edinburgh
EH6 7EZ
Tel: +44 (0)131 555 3311

GREATER MANCHESTER
2 The Avenue
Leigh
Greater Manchester
WN7 1ES
Tel: +44 (0)1942 260101

LONDON
Third Floor
46 Chancery Lane
London
WC2A 1JE
Tel: +44 (0)20 7242 3243

NEWCASTLE UPON TYNE
City Quadrant
11 Waterloo Square
Newcastle upon Tyne
NE1 4DP
Tel: +44 (0)191 232 0943

PENRYN
Tremough Innovation Centre
Tremough Campus
Penryn
Cornwall
TR10 9TA
Tel: +44 (0)1872 560738

SHEFFIELD
Unit 5
Newton Business Centre
Newton Chambers Road
Thornccliffe Park
Chapelton
Sheffield
S35 2PH
Tel: +44 (0)114 245 6244

TRURO
Wheal Jane
Baldhu
Truro
Cornwall
TR3 6EH
Tel: +44 (0)1872 560738

WEST BROMWICH
Thynne Court
Thynne Street
West Bromwich
West Midlands
B70 6PH
Tel: +44 (0)121 580 0909

International offices:

ALMATY
29/6 Satpaev Avenue
Rakhat Palace Hotel
Office Tower, 7th Floor
Almaty
050040
Kazakhstan
Tel : +7-727-3341310

MOSCOW
Suite 2, Block 10,
Letnikovskaya St.
Moscow, Russia
115114
Tel: +7(495) 980 07 67

Wardell Armstrong Archaeology:

CUMBRIA
Cocklakes Yard
Carlisle
Cumbria
CA4 0BQ
Tel: +44 (0)1228 564820