Mallard Pass
Solar Farm

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Environmental Statement Volume 2 Appendix 6.2: Landscape and Visual - Assessment Methodology

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Appendix 6.2: LVIA Methodology

Introduction

1.1.1. This appendix sets out the methodology for the Landscape and Visual Impact Assessment (LVIA) for the construction, operational and decommissioning stages of the Proposed Development. The Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA 3, April 2013 [Ref 1]) advises in paragraph 1.1 that:

"*Landscape and Visual Impact Assessment is a tool used to identify and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and people's views and visual amenity*."

1.1.2. Paras. 2.20 - 2.22 of GLVIA3 indicates that there are two main components of LVIA including an assessment of landscape effects (1) and an assessment of visual effects (2). These two components are two "*related but very different considerations.*"

1.1.3. The assessment method for this Landscape and Visual Impact Assessment (LVIA) chapter of the Environmental Statement (ES) is based upon the following industry standards and best practice guidance including:

a. The Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, Landscape Institute with the Institute of Environmental Management and Assessment, 2013 [Ref 1]

b. An Approach to Landscape Character Assessment, Natural England, 2014 [Ref 2]

c. Landscape Institute, Technical Guidance Note 06/19, Visual Representation of Development Proposals [Ref 3]

d. Landscape Institute, Technical Note 06/17, Townscape Character Assessment [Ref 4].

e. Landscape Institute, Technical Guidance Note 02/19, Residential Visual Amenity Assessment [Ref 5].

f. Landscape Institute, Technical Guidance Notes 02/21, Assessing landscape value outside national designations [Ref 6].

1.1.4. The LVIA methodology has the following key stages, which are described in more detail in the subsequent sections, as follows:

a. Baseline – includes the gathering of documented information; agreement of the scope of the assessment with PINS and other consultees; field surveys and liaison with the design team that may need to be addressed as part of overall design iteration process;

b. Design – input into the design process including the landscape and visual analysis of initial design layouts, options and mitigation measures; and

c. Assessment – of the Proposed Development on the baseline condition including desk based and fieldwork to determine any significant or not significant effects.

Baseline

1.1.5. The baseline study establishes the planning policy context, the scope of the assessment and the key landscape and visual receptors. It typically includes the following activities:

a. A desk-based study of the relevant national and local planning policies in respect of landscape and visual matters for the Order limits and surrounding areas;
b. Agreement of the study area with the relevant local planning authorities (LPA's);
c. A desk study of nationally and locally designated landscapes for the Order limits and surrounding areas;
d. A desk study of the published Landscape Character Assessments (LCA's) undertaken for the Order limits and surrounding areas; and

e. A desk study of Historic Landscape Character Assessments (where available) and other information required to gain an understanding of the contribution of heritage assets to the present day landscape;
f. Collation and evaluation of other indicators of local landscape value such as references in Landscape Character Assessments (LCA's), Conservation Area appraisals, parish plans, tourist information, local walking and cycling guides, references in art and literature;
g. The identification of any landscape features within the Order limits and surroundings considered to be of value;
h. Exchanging information with other consultants working on other assessment topics of the ES to inform the assessment;
i. Zone of Theoretical Visibility (ZTV) mapping studies to assist in identifying representative and illustrative viewpoints which may be affected by the Proposed Development;
j. The identification and agreement of representative and illustrative viewpoints within the study through consultation with the LPA;
k. The identification of the range of other visual receptors within the study area such as the surrounding settlements, highways, PRoW and recreation areas, etc;
l. Fieldwork and surveys for familiarisation, document the baseline landscape condition and to undertake viewpoint photography (discussed further in section 1.12); and
m. Input to the design process.

1.1.6. The information gathered has been summarised within the baseline section of the LVIA and reasoned judgements are made as to which of the identified receptors are likely to be significantly affected and requires further assessment within the LVIA as recommended within paragraph 3.19 of GLVIA3. Further justification is provided as why a particular receptor is scoped in or out from further assessment within the LVIA.

Design

1.1.7. The design and assessment stages are iterative with the findings of LVIA considered as part of a consultation process to help inform and shape the layout for the Proposed Development. Details of any embedded landscape mitigation and enhancement measures as part of the design are illustrated on the Green Infrastructure Strategy Plan within the Outline Landscape and Ecological Management Plan (oLEMP) and within the LVIA.

Assessment

1.1.8. The assessment of landscape and visual effects section considers the Proposed Development during the construction, operation and decommissioning stages of the Proposed Development. These effects would be temporary and short term in duration and would likely arise through traffic movements including HGV's, plant and machinery, temporary lighting and passing places, etc.

1.1.9. The construction and decommissioning stages would not result in any landscape and visual effects of greater significance than those identified for the operational stages of the Proposed Development. Due to the transient and intermittent nature of these effects which would only be visible at specific points in time, an overall summary of the construction and decommissioning effects has been provided within the LVIA and for each individual receptor within Table 6.4.

1.1.10. During the operational phase, the Proposed Development would result in permanent effects as there is no fixed operational timescale for the Solar PV Site and Onsite Substation to be decommissioned. During the early part of this operational phase, the effects are likely to be at their greatest. Over time, the scale of effects would generally reduce as the proposed vegetation establishes to gradually screen or filter views of the Solar PV Site and Onsite Substation in the long term by year 15. The

landscape features within the Order limits will be subject to ongoing management to ensure the amenity and/or screening effects of this vegetation are achieved in the long term. The effects during operation are therefore assessed at year 1 and 15 of operation to allow for the screening effects provided by the existing and proposed vegetation over time.

1.1.11. The assessment of effects section within the LVIA includes the following key activities:

a. The preparation of a ZTV mapping study based upon the agreed or frozen design for the Proposed Development;
b. An assessment to identify the sensitivity of landscape and visual receptors within the study area;
c. An assessment to identify the magnitude of change and significance of effects arising from the Proposed Development on the identified landscape and visual receptors;
d. An informed professional judgement regarding the nature of the change and whether it is positive, neutral or adverse;
e. A clear description of the effects identified, with supporting information setting out the rationale for the judgements;
f. Identification of which effects are judged to be significant or not significant in terms of the EIA Regs; and
g. The production of visualisations from the agreed viewpoints to illustrate the post construction visual effects arising from the Proposed Development during operation year 1 and 15.

Assessment Terminology and Judgements

1.1.12. A full glossary of terminology is provided at the end of this LVIA methodology. The key terms used within this assessment are:

a. Susceptibility and Value – which contribute to the Sensitivity of the receptor;

b. Scale, Duration and Extent – which contribute to the Magnitude of effect; and
c. Significance.

1.1.13. These terms are described in more detail below.

Sensitivity of the Receptor

1.1.14. **Susceptibility** indicates the ability of a landscape or visual receptor 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*." (GLVIA3, para 5.40).

Table 1: Susceptibility

High	Undue consequences are likely to arise from the Proposed Development.
Medium	Undue consequences may arise from the Proposed Development.
Low	Undue consequences are unlikely to arise from the Proposed Development.

1.1.15. Susceptibility of landscape character areas is influenced by their characteristics and is frequently considered (though often recorded as 'sensitivity' rather than 'susceptibility') within documented landscape character assessments and capacity studies.

1.1.16. Susceptibility of designated landscapes is influenced by the nature of the special qualities and purposes of designation and/or the valued elements, qualities or characteristics, indicating the degree to which these may be unduly affected by the Proposed Development.

1.1.17. Susceptibility of accessible or recreational landscapes is influenced by the nature of the landscape involved; the likely activities and

expectations of people within that landscape and the degree to which those activities and expectations may be unduly affected by the Proposed Development.

1.1.18. Susceptibility of visual receptors is primarily a function of the expectations and occupation or activity of the receptors (GLVIA3, para 6.32).

1.1.19. **Landscape Value** is "*the relative value that is attached to different landscapes by society*" (GLVIA3, page 157).

Table 2: Landscape Value

National / International	Designated landscapes which are nationally or internationally designated for their landscape value.
Local / District	Locally or regionally designated landscapes identified through the baseline assessment; also areas which documentary evidence and/or observations indicate as being more valued than the surrounding area.
Community	'Everyday' landscape which is appreciated by the local community but has little or no wider recognition of its value.
Limited	Despoiled or degraded landscape with little or no evidence of being valued by the community.

1.1.20. **Sensitivity** is assessed by combining the considerations of susceptibility and value described above. The differences in the tables below reflect a slightly greater emphasis on value when considering landscape receptors, and a greater emphasis on susceptibility when considering visual receptors.

Table 3: Landscape Sensitivity

Landscape Sensitivity		Susceptibility		
		High	**Medium**	**Low**
Value	**National / International**	High	High-Medium	Medium
	Local / District	High-Medium	Medium	Medium-Low
	Community	Medium	Medium-Low	Low
	Limited	Low	Low-Negligible	Negligible

Table 4: Visual Receptor Sensitivity

Visual Receptor Sensitivity		Susceptibility		
		High	**Medium**	**Low**
Value	**National / International**	High	High-Medium	Medium
	Local / District	High-Medium	High-Medium	Medium
	Community	High-Medium	Medium	Medium - Low
	Limited	Medium	Medium - Low	Low

1.1.21. For visual receptors, susceptibility and value are closely linked – the most valued views are also likely to be those where viewer's expectations will be highest. The value attributed relates to the value of the view, e.g. a National Trail is nationally valued for access, not necessarily for the available views. Typical examples of visual receptor

sensitivity are described further in Table 8: Visual Receptor Sensitivity – typical examples 'Visual Receptor Sensitivity' of this appendix.

Magnitude of Effect

1.1.22. **Scale** of effect is assessed for all landscape and visual receptors and identifies the degree of change which would arise from the development.

Table 5: Scale of Effect

Large	Total or major alteration to key elements, features, qualities or characteristics, such that post development the baseline will be fundamentally changed.
Medium	Partial alteration to key elements, features, qualities or characteristics, such that post development the baseline will be noticeably changed.
Small	Minor alteration to key elements, features, qualities or characteristics, such that post development the baseline will be largely unchanged despite discernible differences.
Negligible	Very minor alteration to key elements, features, qualities or characteristics, such that post development the baseline will be fundamentally unchanged with barely perceptible differences.

1.1.23. **Duration** of effect is assessed for all landscape and visual receptors and identifies the time period over which the change to the receptor as a result of the development would arise.

Table 6: Duration of Effect

Permanent	The change is expected to be permanent and there is no intention for it to be reversed.
Long-term	The change is expected to be in place for 10-40 years and will be reversed, fully mitigated or no longer occurring beyond that timeframe.
Medium-term	The change is expected to be in place for 2-10 years and will be reversed, fully mitigated or no longer occurring beyond that timeframe.
Short-term	The change is expected to be in place for 0-2 years and will be reversed, fully mitigated or no longer occurring beyond that timeframe.

1.1.24. Most effects will be long-term or permanent; however, medium-term or short-term effects may be identified where mitigation planting is proposed or local factors will result in a reduced duration of effect (for example where maturing woodland will screen views in future). In this case, the operational effects at year 1 and 15 have been assessed as permanent effects as there is no defined timescale for the operational lifespan of the Proposed Development. The effects arising from the Proposed Development during the construction and decommissioning stages will usually be short-term in duration.

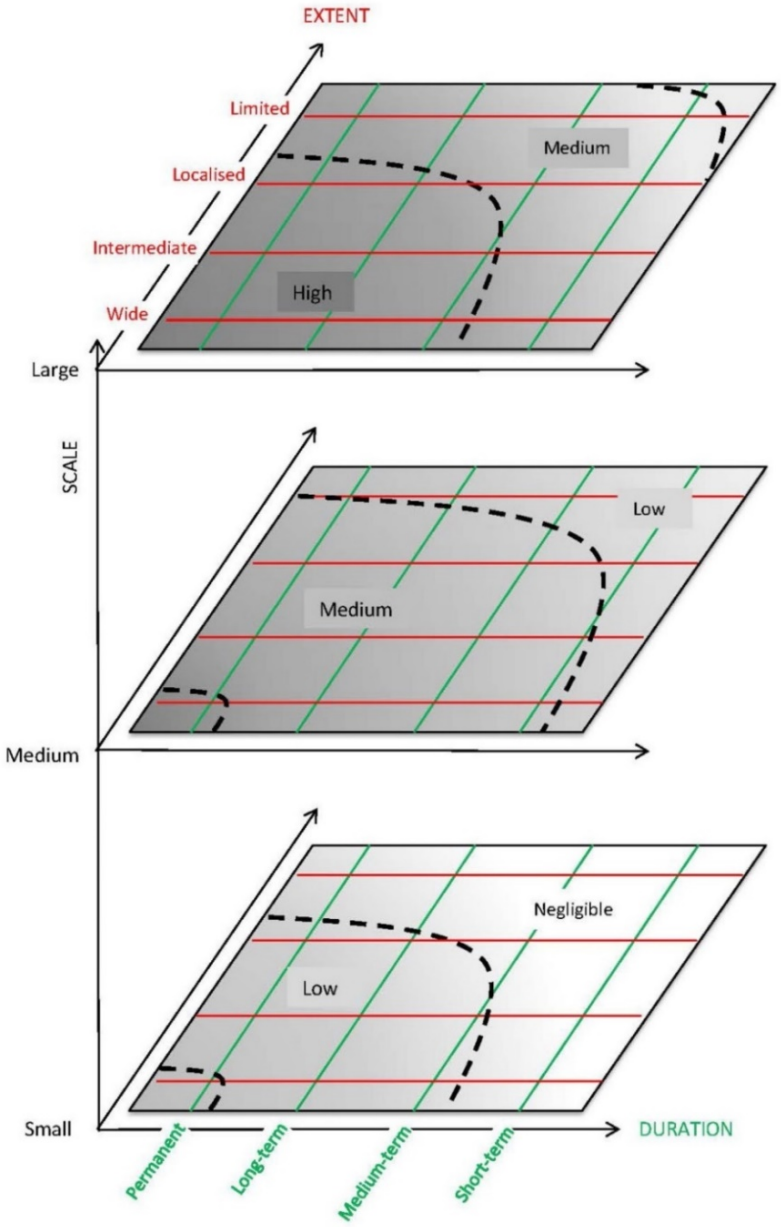
1.1.25. **Extent** of effects is assessed for all receptors and indicates the geographic area over which the effects would be experienced.

Table 7: Extent of Effect

Wide	Beyond 4km, or more than half of receptor.
Intermediate	Up to approx. 2-4km, or around half of receptor area.
Localised	Site and surroundings up to 2km, or part of receptor area (up to approximately 25%).
Limited	Site, or part of the Site, or small part of a receptor area (< approximately 10%).

1.1.26. The **Magnitude** of effect is informed by combining the Scale, Duration and Extent of effect. **Diagram 1** below illustrates the judgement process:

Diagram 1: Magnitude of Effect



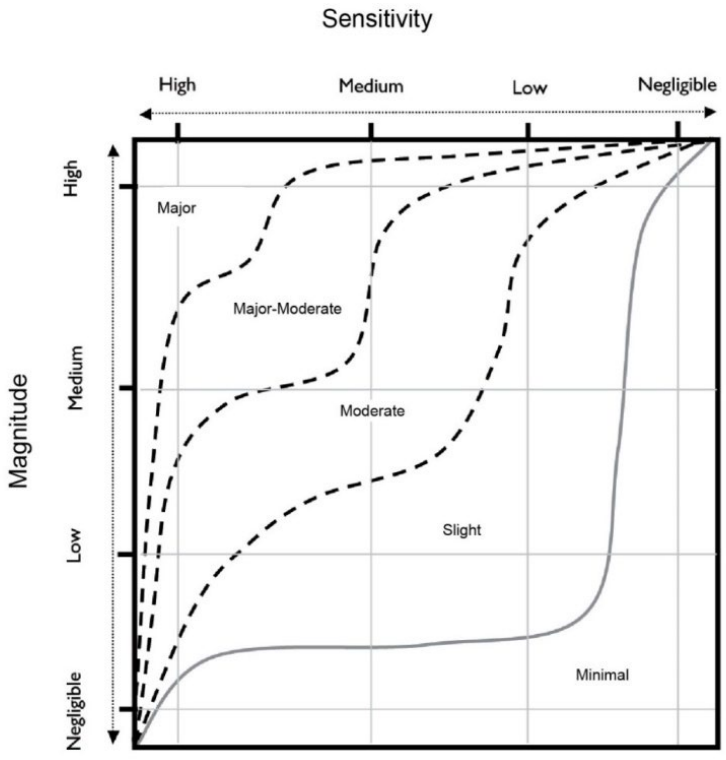
1.1.27. As can be seen from the illustration above, scale (shown as the layers of the diagram) is the primary factor in determining magnitude; most of each layer indicates that magnitude will typically be judged to be the same as scale, but may be higher if the effect is particularly widespread and long lasting, or lower if it is constrained in geographic extent or timescale. Where the scale of effect is judged to be Negligible the

magnitude is also assumed to be Negligible and no further judgement is required.

Significance

1.1.28. Significance indicates the importance or gravity of the effect. The process of forming a judgement as to the degree of significance of the effect is based upon the assessments of magnitude of effects and sensitivity of the receptor to come to a professional judgement of how important this effect is. This judgement is illustrated by **Diagram 2** below:

Diagram 2: Significance



1.1.29. The significance ratings indicate a 'sliding scale' of the relative importance of the effect, with Major being the most important and Minimal being the least. Effects that are Major-Moderate or Major are considered to be significant. Effects of Moderate significance or less are

"*of lesser concern*" (GLVIA3, para 3.35) and not significant. It should also be noted that whilst an effect may be significant, that does not necessarily mean that such an impact would be unacceptable, or should necessarily be regarded as an "*undue consequence*" (GLVIA3, para 5.40) and would be considered within the planning balance by the decision maker.

1.1.30. Where intermediate ratings are given, e.g. 'Moderate-Slight', this indicates an effect that is both less than Moderate and more than Slight, rather than one which varies across the range. In such cases, the higher rating will always be given first; this does not mean that the impact is closer to the higher rating but is done to facilitate the identification of the more significant effects (i.e. worse case) within tables. Intermediate judgements may also be used for judgements of Magnitude.

Positive / Adverse / Neutral Effects

1.1.31. GLVIA3 includes an entry that states *"effects can be described as positive or negative (or in some cases neutral) in their consequences for views and visual amenity."*[1] GLVIA3 does not, however, state how positive, neutral and negative effects should be assessed and this therefore becomes a matter of professional judgement rather than reasoned criteria.

1.1.32. Effects are defined within this LVIA as positive, neutral or negative. Neutral effects are those which overall are neither positive or adverse but may incorporate a combination of both. The decision regarding the significance of effect and whether an effect is positive, neutral or negative are entirely separate. For example, a rating of Major and

[1] Para 6.29, Page 113, GLVIA 3rd Edition

Positive would indicate an effect that was of great significance and on balance positive, but not necessarily one that was extremely beneficial.

1.1.33. Third party representations often refer to the industrial character of a proposed solar PV development. Whilst local objectors would undoubtedly view the proposals in this way, equally, other people would simply view the development as essential infrastructure that should be delivered as a matter of urgency to tackle climate change. This disparity of opinion or public attitudes from negative to positive is known within LVIA as valency. Due to inconsistencies with the assessment of negative or positive effects a precautionary approach is applied which assumes that all the effects are considered to be negative or adverse unless otherwise stated. Notwithstanding, this precautionary approach there are many beneficial effects that would arise through the Green Infrastructure Strategy Plan and the oLEMP.

Landscape Character Considerations

1.1.34. The European Landscape Convention (2000) [Ref 8] provides the following definition which states "*landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*."

1.1.35. The ELC also notes in Article 2 that landscape includes "*natural, rural, urban and peri-urban areas. It includes land, inland water and marine areas*."

1.1.36. Th Natural England guidance, An Approach to Landscape Character Assessment (2014) defines landscape character as:

"*A distinct and recognisable pattern of elements, or characteristics, in the landscape that make one landscape different from another, rather than better or worse*."

1.1.37. The susceptibility of landscape character areas is a judgement based on both the attributes of the receiving environment and the characteristics of the Proposed Development as discussed under 'susceptibility' within the methodology section of this LVIA. Thus, the key characteristics of the relevant Landscape Character Type (LCT) or Landscape Character Area (LCA) are considered along with scale, openness, topography; the absence or presence of existing development; settlement; landcover; aesthetic and perceptual qualities; the contribution of heritage assets and historic patterns and land uses in forming the character of a particular landscape.

1.1.38. The condition of the receiving landscape i.e. the intactness of the existing character and fabric will also be relevant in determining the susceptibility to change. The likely significance of effects on landscape character can be judged on the scale and layout of the Proposed Development and how this relates to the characteristics of the receiving landscape.

1.1.39. The introduction of any development into a landscape adds a new feature which can affect the key characteristics within a particular site or Order limits and its immediate context although these effects are likely to reduce with greater distances from Proposed Development, such that the prevailing characteristics would remain in place.

1.1.40. The baseline study has been informed by the published Landscape Character Assessments (LCA) and fieldwork. It is specifically noted within Natural England's, An Approach to Landscape Character Assessment (2014) that:

"*Our landscapes have evolved over time and they will continue to evolve – change is a constant but outcomes vary. The management of change is essential to ensure that we achieve sustainable outcomes – social,*

environmental and economic. Decision makers need to understand the baseline and the implications of their decisions for that baseline."

1.1.41. Page 51 of this report describes the function of key characteristics within LVIA as follows:

"*Key characteristics are those combinations of elements which help to give an area its distinctive sense of place. If these characteristics change, or are lost, there would be significant consequences for the current character of the landscape. Key characteristics are particularly important in the development of planning and management policies. They are important for monitoring change and can provide a useful reference point against which landscape change can be assessed. They can be used as indicators to inform thinking about whether and how the landscape is changing and whether, or not, particular policies – for example - are effective and having the desired effect on landscape character*."

1.1.42. It follows from the above that in order to assess whether landscape character is significantly affected by a Proposed Development, it should be determined how each of the key characteristics would be affected. The judgement of magnitude therefore reflects the degree to which the key characteristics and elements which form those characteristics will be altered by the Proposed Development.

Landscape Value Considerations

1.1.43. Paragraph 5.19 of GLVIA3 states that "*A review of existing landscape designations is usually the starting point in understanding landscape value, but the value attached to undesignated landscapes also needs to be carefully considered and individual elements of the landscape - such as trees, buildings or hedgerows -may also have value. All need to be considered where relevant*."

1.1.44. Paragraph 5.20 of GLVIA3 outlines the criteria which might indicate landscape value, such as:

a. *"Information about areas recognised by statute including National Parks and Areas of Outstanding Natural Beauty (AONB);*
b. *Information about Heritage Coasts, where relevant;*
c. *Local planning documents for local landscape designations;*
d. *Information on features such as Conservation Areas, listed buildings, historic or cultural sites;*
e. *Art and literature, identifying value attached to particular areas or views; and*
f. *Material on landscapes of local or community interest, such as local green spaces, village greens or allotments."*

1.1.45. An assessment of landscape value is made based upon the following factors outlined in Table 1 of the Landscape Institute's 'Technical Guidance Notes 02/21: Assessing landscape value outside national designations' including natural heritage; cultural heritage; landscape condition; associations; distinctiveness; recreational; perceptual (scenic); perceptual (wildness and tranquillity); and functional considerations.

1.1.46. In addition to the above list, consideration is given to any evidence that indicates whether the landscape has particular value to people that would suggest that it is of greater than Community value.

Viewpoints and Visual Receptor Considerations

1.1.47. A wide variety of visual receptors can reasonably be anticipated to be affected by the Proposed Development to varying degrees. Within the baseline assessment, the ZTV mapping and fieldwork informed which visual receptors are likely to be significantly affected and therefore merits further assessment. In line with GLVIA3, both representative and illustrative viewpoints have been identified to inform the LVIA in consultation with the LPA's landscape officer.

1.1.48. In general, the majority of viewpoints will be representative of people at different distances and directions from the Order limits. The representative viewpoints have been selected in locations and 'micro-sited' where significant effects are likely to be experienced. However, some representative viewpoints have been provided to demonstrate that the Proposed Development would not affect a particular receptor.

1.1.49. The types of visual receptors likely to be included within the assessment includes:

a. Walkers on Public Rights of Way (PRoW), National and Regional Trails and other long-distance routes, Common Land, Open Access Land, permissive paths, land held in trust (e.g. Woodland Trust, National Trust) offering free public access, and other regularly used, permitted walking routes;
b. Visitors to and residents of settlements;
c. Visitors to specific valued viewpoints;
d. Visitors to attractions or heritage assets for which landscape and views contribute to the overall experience; and
e. Users of roads or identified scenic routes.

1.1.50. Visual Receptor Groups (VRG's) have been identified where the visual effects are likely to be similar on those particular receptors. The VRG's might include:

a. Individual settlements such as towns, villages and hamlets;
b. Areas of open countryside encompassing a number of public highways, PRoW and individual farmsteads;
c. Accessible landscapes such as country parks, nature reserves, open access or common land.

1.1.51. With the exception of specific viewpoints, each route, settlement or location will encompass a range of possible views, which might vary from no view to very clear and close proximity views of a Proposed

Development. Therefore, the visual effects are described in such a way as to identify where views towards the Proposed Development. In some cases, this will be further informed by a nearby viewpoint and in others it will be informed with reference to the ZTV, aerial photography and field surveys. Each of these individual effects are then considered together in order to reach an overall judgement of the effects on the visual receptors along that route, or in that place.

1.1.52. The representative viewpoints are used as ‘samples’ on which to base judgements of the scale of effects on the Visual Receptor Groups (VRG’s). The representative and illustrative viewpoints may represent multiple visual receptors in some cases. For specific viewpoints (key and sometimes promoted viewpoints within the landscape), the duration and extent are assessed, with extent reflecting the extent to which the development affects the valued qualities of the view from that specific viewpoint.

Table 8: Visual Receptor Sensitivity – typical examples

Visual Receptor Sensitivity	Susceptibility		
	High	Medium	Low
National / International	1	4	8
Local / District	2	5	8
Community	3	6	9
Limited		7	10

1) Visitors to valued viewpoints or routes which people might visit purely to experience the view, e.g. promoted or well-known viewpoints, routes from which views that form part of the special qualities of a designated landscape can be well appreciated; key designed views; panoramic viewpoints marked on maps.
2) People in locations where they are likely to pause to appreciate the view, such as from local waypoints such as benches; or at key views to/from local landmarks. Visitors to local attractions, heritage assets or public parks where views are an important contributor to the experience, or key views into/out of Conservation Areas.
3) People in the streets around their home, or using public rights of way, navigable waterways or accessible open space (public parks, open access land).
4) Users of promoted scenic rail routes.
5) Users of promoted scenic local road routes.
6) Users of cycle routes, local roads and railways.
7) Outdoor workers.
8) Users of A-roads which are nationally or locally promoted scenic routes.
9) Users of sports facilities such as cricket grounds and golf courses.
10) Users of Motorways and A-roads; shoppers at retail parks, people at their (indoor) places of work.

Preparation of Zone of Theoretical Visibility (ZTV) mapping and Visualisations

1.1.53. ZTV studies are prepared using the ESRI ArcGIS Viewshed routine. This creates a raster image that indicates the visibility (or not) of the points modelled. LDA Design undertake a ZTV that is designed to include visual barriers from settlements and woodlands (with heights derived from NEXTMAP25 surface mapping data). If significant deviations from these assumed heights are noted during field surveys, for example young or felled areas of woodland, or recent changes to built form, the features concerned will be adjusted within the model or the adoption of a digital surface model will be used to obtain actual heights for these barriers. In this instance 2m resolution LiDAR data combined with National Tree Map data has been used to include buildings and vegetation in the ZTV model data.

1.1.54. The model is also designed to take into account both the curvature of the earth and light refraction, informed by the Scottish Natural Heritage (SNH) guidance. LDA Design undertake all ZTV studies with observer heights of 2m above ground level (agl).

1.1.55. The ZTV analysis begins at 1m from the observation feature and will work outwards in a grid of the set resolution until it reaches the end of the terrain map for the project. For all plan production, LDA Design produce a ZTV that has a base and overlay of the 1:50,000 Ordnance Survey Raster mapping or better. The ZTV will be reproduced at a suitable scale on an A3 template to encompass the study area.

Ground Model Accuracy

1.1.56. Depending on the project and level of detail required, different height datasets may be used. The different ground modelling data products and specifications are listed below:

Table 9: Ground Modelling Products and Specifications

Product	Distance Between Points	Vertical RMSE Error
LiDAR	50cm – 2m	up to +/- 5cm
Photogrammetrically Derived Heights	2m – 5m	up to +/- 1.5m
Ordnance Survey OS terrain 5	5 m	up to +/- 2.5m
NextMap25 DTM	25 m	+/- 2.06m
Ordnance Survey OS terrain 50	50 m	+/- 4m

Photomontages and Photowires

1.1.57. Verified / verifiable photomontages are produced in seven stages. Photowires are produced using the same overall approach, but only require some of the steps outlined below:

1) Photography is undertaken using a full frame digital SLR camera and 50mm lens. A tripod is used to take overlapping photographs which are joined together using an industry standard application to create a single panoramic image for each viewpoint. These are then saved at a fixed height and resolution to enable correct sizing when reproduced in the final images. The photographer also notes the GPS location of the viewpoint and takes bearings to visible landmarks whilst at the viewpoint.

2) Creation of a ground model and 3D mesh to illustrate that model. This is created using NextMap25 DTM point data (or occasionally other terrain datasets where required, such as site-specific topographical data or Photogrammetrically Derived Heights) and ground modelling software.

3) The addition of the proposed development to the 3D model. The main components of the proposed development are accurately

modelled in CAD and are then inserted into the 3D model at the proposed locations and elevations.

4) Wireline generation - The viewpoints are added within the 3D CAD model with each observer point being inserted at 1.5m above the modelled ground plane. The location of the landmarks identified by the photographer may also be included in the model. The view from the viewpoint is then replicated using virtual cameras to create a series of single frame images, which also include bearing markers. As with the photographs, these single frame images are joined together using an industry standard application to create a single panoramic image for each viewpoint. These are then saved at a fixed height and resolution to ensure that they are the same size as the photographs.

5) Wireline matching - The photographs are matched to the wirelines using a combination of the visible topography, bearing markers and the landmarks that have been included in the 3D model.

6) For the photomontage, an industry standard 3D rendering application is used to produce a rendered 3D view of the Proposed Development from the viewpoint. The rendering uses materials to match the intended surface finishes of the development and lighting conditions according to the date and time of the viewpoint photograph.

7) The rendered development is then added to the photograph in the position identified by the wireline (using an image processing application) to ensure accuracy. The images are then layered to ensure that the development appears in front of and behind the correct elements visible within the photograph. Where vegetation is proposed as part of the development, this is then added to the final photomontage.

1.1.58. In accordance with the Landscape Institute's Technical Guidance Note 06/19 *Visual representation of development proposals*, the visualisations have been prepared in accordance with the technical methodology below. The photomontages in support of this LVIA adhere to the Type 3 visualisation specification as surveyed locational accuracy is not generally necessary but image enlargement, to illustrate perceived scale, would be appropriate.

Table 10: *Technical Methodology*

Information	Technical Response
Photography	
Method used to establish the camera location	Aerial photography in ESRI ArcGIS along with GPS readings
Likely level of accuracy of location	Better than 1m
If lenses other than 50mm have been used, explain why a different lens is appropriate	N/A
Written description of procedures for image capture and processing	See paragraph above
Make and type of Panoramic head and equipment used to level head	Manfrotto Levelling Head 338 and Manfrotto Panoramic Head MH057A5
If working outside the UK, geographic co-ordinate system (GCS) used	N/A
3D Model/Visualisation	
Source of topographic height data and its resolution	TBC
How have the model and the camera locations been placed in the software?	Georeferenced model supplied by engineers/architects. Camera locations taken from LVIA viewpoint locations.
Elements in the view used as target points to check the horizontal alignment	Existing buildings, infrastructure/road alignments, telegraph poles/street lighting/signage, field boundaries, DSM

Information	Technical Response
Elements in the view used as target points to check the vertical alignment	Topography, roads and existing buildings.
3D Modelling / Rendering Software	Civil 3D / AutoCAD / 3DS Max / Rhino / V-Ray

Cumulative Assessment

1.1.59. Cumulative assessment relates to the assessment of the effects of more than one development. Developments that are subject to a valid planning application are included where specific circumstances indicate there is potential for cumulative effects to occur, with progressively decreasing emphasis placed on those which are less certain to proceed.

1.1.60. Typically, operational and consented solar PV developments are treated as being part of the landscape and visual baseline. i.e. it is assumed that consented schemes will be built except for occasional exceptions where there is good reason to assume that they will not be constructed.

1.1.61. A cumulative assessment examines the same groups of landscape and visual receptors as for the Proposed Development, though different viewpoints may be used if necessary (although it was not needed for the Proposed Scheme) in order to better represent the likely range of effects arising from the combination of other schemes with the study area.

1.1.62. In addition, the cumulative effects on users of key transport routes and PRoW may assessed to determine whether any sequential views of the Proposed Development and then another solar PV development are likely to occur within the study area. This assessment is based on the desk study of ZTVs and aerial photography, and field surveys along the routes being assessed.

1.1.63. In relation to cumulative assessment, it is important to note that it is the 'additionality' of the Proposed Development which is being assessed

and not the effects arising from the other developments themselves. The cumulative effects consider:

a. For each assessed receptor, in-combination effects may be the same as for the application scheme, or greater where the influence of the in-planning schemes would increase the effects, or lesser where the in-planning schemes would have the predominant effects;

b. For each receptor, incremental cumulative effects may be the same as for the application scheme or reduced where the influence of the other in planning schemes would result in limited incremental change; and

c. Subject to the distance and degree of intervening landform, vegetation and structures there may be no cumulative effects due to restricted visibility between the application scheme and the in planning schemes.

1.1.64. The way in which the assessment is described and presented is varied depending on the number of in planning scenarios which may arise for the cumulative developments under consideration. This variation is needed in order to convey to the reader the key points of each cumulative assessment.

References

Ref 1 The Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, Landscape Institute with the Institute of Environmental Management and Assessment, April 2013.

Ref 2 An Approach to Landscape Character Assessment, Natural England, 2014.

Ref 3 Landscape Institute, Technical Guidance Note 06/19 – Visual Representation of Development Proposals.

Ref 4 Landscape Institute, Technical Note 06/17 – Townscape Character Assessment.

Ref 5 Landscape Institute, Technical Guidance Note 02/19 – Residential Visual Amenity Assessment.

Ref 6 Landscape Institute, Technical Guidance Note 02/21 – Assessing landscape value outside national designations.

Ref 7 European Landscape Convention, 2000.

Glossary

***Cumulative effects*:** The additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments, taken together.

Illustrative Viewpoint: A viewpoint chosen specifically to demonstrate a particular effect or specific issues, which might, for example, be the restricted visibility at certain locations.

Landscape Character Areas: These are single unique areas which are the discrete geographical areas of a particular landscape type.

Landscape Character Type: These are distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation, and historical land use, and settlement pattern, and perceptual and aesthetic attributes.

Landscape effects: Effects on the landscape as a resource in its own right.

Landscape character: A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.

Landscape quality (or condition): A measure of the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.

Landscape receptors: Defined aspects of the landscape resource that have the potential to be affected by a proposal.

Landscape value: The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons.

Magnitude: A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term, in duration.

Mitigation: Measures which are proposed to prevent, reduce and where possible offset any significant adverse effects (or to avoid, reduce and if possible, remedy identified effects).

Representative Viewpoint: A viewpoint selected to represent the experience of different types of visual receptor, where larger numbers of viewpoints cannot all be included individually and where the significant effects are unlikely to differ.

Sensitivity: A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor.

Specific Viewpoint: A viewpoint because it is key and sometimes a promoted viewpoint within the landscape, including for example specific local visitor attractions, viewpoints in areas of particularly noteworthy visual and/or recreational amenity such as landscapes with statutory landscape designations, or viewpoints with particular cultural landscape associations.

Susceptibility: The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences.

Visual amenity: The overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of people living, working, recreating, visiting or travelling through an area.

Visual effect: Effects on specific views and on the general visual amenity experienced by people.

Visual receptor: Individuals and/or defined groups of people who have the potential to be affected by a proposal.

Zone of Theoretical Visibility (ZTV): A map, usually digitally produced, showing areas of land in which a development is theoretically visible.

Definitions from Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, Landscape Institute with the Institute of Environmental Management and Assessment, 2013