

February 2023

# London Luton Airport Expansion

Planning Inspectorate Scheme Ref: TR020001

Volume 5 Environmental Statement and Related Documents

## **5.02 Appendix 14.1 LVIA Methodology**

Application Document Ref: TR020001/APP/5.02

APFP Regulation: 5(2)(a)

**The Planning Act 2008**

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure)  
Regulations 2009**

**London Luton Airport Expansion Development Consent  
Order 202x**

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**5.02 ENVIRONMENTAL STATEMENT APPENDIX 14.1 LVIA  
METHODOLOGY**

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| <b>Regulation number:</b>                      | Regulation 5(2)(a) |
| <b>Planning Inspectorate Scheme Reference:</b> | TR020001           |
| <b>Document Reference:</b>                     | TR020001/APP/5.02  |
| <b>Author:</b>                                 | Luton Rising       |

| <b>Version</b> | <b>Date</b>   | <b>Status of Version</b> |
|----------------|---------------|--------------------------|
| Issue 01       | February 2023 | Application issue        |
|                |               |                          |
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# 1 INTRODUCTION

- 1.1.1 The assessment methodology adopted for the Landscape and Visual Impact Assessment (LVIA) follows the principles and approaches set out in the third edition of the Guidelines for Landscape and Visual Impact Assessment (GLVIA3) (Ref. 1) and associated clarifications published by the GLVIA Panel.
- 1.1.2 The LVIA also reflects the guidance set out in ‘CAP1616: Airspace change: Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information’ (CAP1616) (Ref. 2) with regard to impacts upon tranquillity from changes to routes and/or traffic patterns that may affect an Area of Outstanding Natural Beauty (AONB).
- 1.1.3 LVIA 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 on people’s views and visual amenity*” (Ref. 3).
- 1.1.4 The purpose of LVIA with reference to Environmental Impact Assessment (EIA) development, is to identify ‘likely significant’ environmental effects on:
- a. the elements that make up the landscape;
  - b. the specific aesthetic or perceptual qualities of the landscape;
  - c. the character of the landscape; and
  - d. people who would be affected by changes in views or visual amenity.
- 1.1.5 In LVIA ‘likely significant’ environmental effects are determined by:
- a. identifying potential landscape and visual receptors to an environmental effect;
  - b. considering the value and susceptibility, or sensitivity, of those receptors to the type of change proposed;
  - c. determining the magnitude of change that would be experienced by those or at those receptors; and
  - d. applying professional judgement to advise the significance that should be attributed to that effect.
- 1.1.6 Landscape and visual assessments are separate, although linked procedures. The landscape baseline, its analysis and the assessment of landscape effects all contribute to the baseline for visual assessment studies.
- 1.1.7 The assessment methodology also reflects:
- a. specific guidance of relevance to the assessment of airport related development, identified at **Table 14.4** in **Chapter 14** of the Environmental Statement (ES) [TR020001/APP/5.01]; and
  - b. specific regulations or local policies that are of relevance to the location of the Proposed Development, identified in **Table 14.2** in **Chapter 14** of the ES [TR020001/APP/5.01].

1.1.8 **Chapter 14** of the ES [TR020001/APP/5.01] is referred to as a landscape and visual impact assessment however as the Proposed Development lies on the urban fringe of Luton the term townscape would be more applicable when describing landscape elements within the urban context. Therefore, the terms landscape and townscape are used interchangeably within this LVIA.

1.1.9 For clarity townscape is described in the GLVIA3 as:

*“the landscape within the built-up area, including the buildings, the relationships between them, the different types of urban open spaces, including green spaces, and the relationships between them, the different types of urban open spaces, including green spaces, and the relationship between buildings and open spaces.”*(Ref. 4)

## 2 PROFESSIONAL JUDGEMENT

2.1.1 LVIAs differ from other specialist studies because they are generally undertaken by professionals who are also involved in the design of the landscape and the preparation of subsequent management proposals. This can allow the assessment to proceed as an integral part of the overall scheme design rather than a discrete study carried out once the proposals have been finalised.

2.1.2 Professional judgement is a very important part of LVIA. While there is some scope for quantitative measurement of some relatively objective matters (e.g. the loss of a number of trees), much of the assessment relies on qualitative judgements that involve a degree of subjective opinion (e.g. the assessment of landscape values or what effect a development would have on visual amenity).

2.1.3 Professional judgements must be based on both training and experience and be supported by clear evidence and reasoned argument. Accordingly, it is recommended that suitably qualified and experienced professionals carry out LVIAs.

2.1.4 The assessment of landscape and visual effects is based on the consensus professional judgement of two individual assessors, both of whom have considerable experience of undertaking LVIAs as follows:

- a. A qualified Urban Designer and Member of the Royal Town Planning Institute with over 18 years' experience of LVIA.
- b. A Chartered Member of the Landscape Institute with over 18 years' experience of LVIA.

## 3 STUDY AREA

3.1.1 The Study Area for assessing the landscape and visual effects of the Proposed Development extends 5km from the perimeter of the Main Application Site (as defined in **Chapter 2** of the ES [TR020001/APP/5.01]). It also includes the full extent of any character areas that may be affected within that envelope; land in

Hitchin within 250m of Work Nos. 6e(k), 6e(l) and 6e(m); and, for considering effects on tranquillity, additionally land within the Chilterns AONB where aircraft would be below 7,000 ft above mean sea level (AMSL).

- 3.1.2 The Study Area is defined through a survey of the pattern of existing land use, landform and land cover within the landscape surrounding the airport and through field survey activities. Bare earth Zone of Theoretical Visibility (ZTV) mapping was also prepared to assist in defining the Study Area.
- 3.1.3 It is important to note that the boundary of the Study Area does not define the area beyond which there would be no effect, rather it contains the area within which the likely significant landscape and visual effects are predicted to occur.

## 4 ZONE OF THEORETICAL VISIBILITY METHODOLOGY

- 4.1.1 The ZTV was created using software designed by KTF Software. A terrain of the Study Area (a minimum radius of 7km centred around the site) was produced using xyz Lidar data purchased from Ordnance Survey. Targets were then introduced by selecting key points of the proposal (typically locations at maximum building height parameter levels) agreed with the LVIA Working Group.
- 4.1.2 The software then calculates hundreds or thousands of section lines across the terrain from an observer height of 1.6m to the target points. The outcome of the exercise is represented by a colour map indicating visibility as a shade or unshaded where it has been interrupted by visual barriers.
- 4.1.3 The ZTV reflects the parameters at the year of maximum aircraft movement capacity and is based on reference points that have been agreed with the LVIA Working Group within the Main Application Site, on the Airport Access Road and at the Off-Site Car Parks. None of the reference points are associated with Off-Site Highway Interventions.

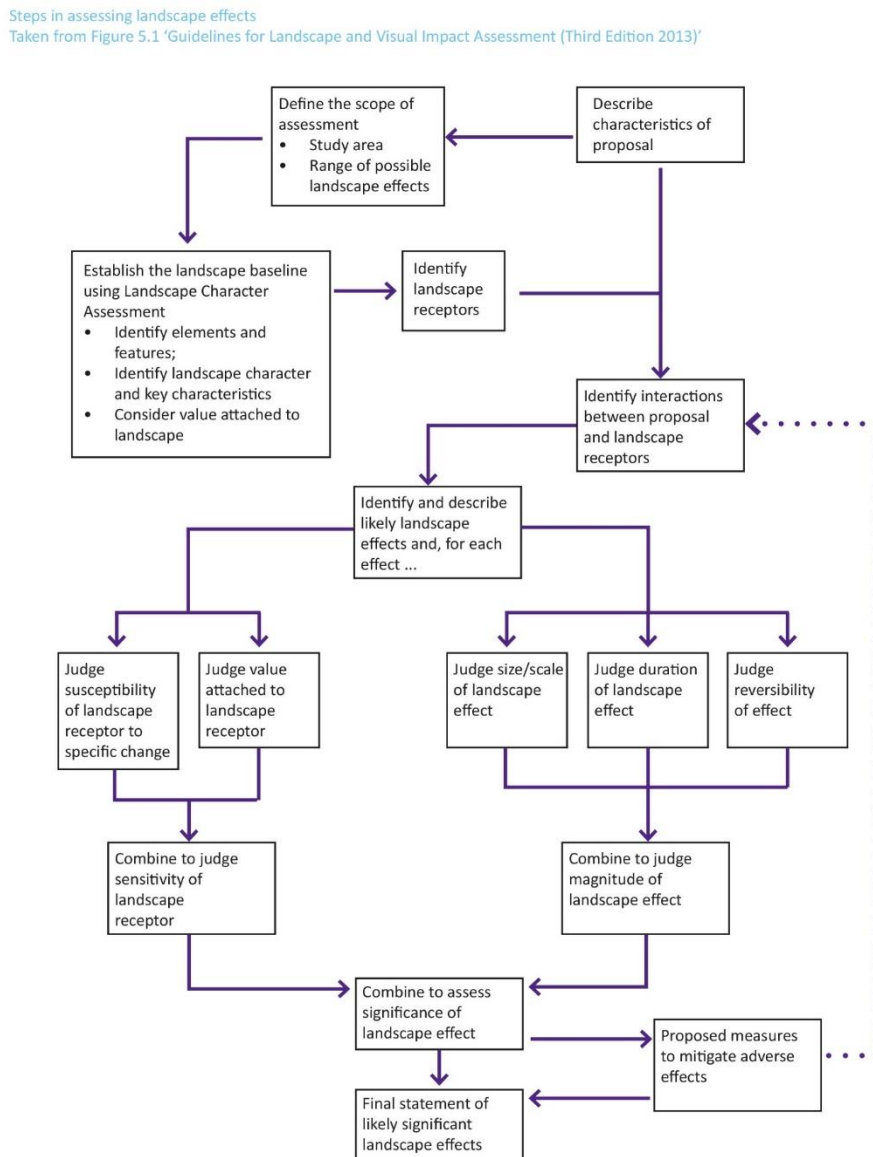
## 5 LANDSCAPE ASSESSMENT

- 5.1.1 The landscape assessment considers the potential effect of the Proposed Development on:
- a. the constituent elements of the landscape;
  - b. the specific aesthetic or perceptual qualities of the landscape; and
  - c. the character of the landscape.
- 5.1.2 The process of assessing the landscape effects is shown on **Inset 1** and is described within this section.

5.1.3 The significance of a landscape effect is assessed through professional judgement, combining the sensitivity of the receptor with the magnitude of impact. To understand the effectiveness of proposed landscape-based mitigation measures and changes to land management objectives, the LVIA considers effects of construction during each assessment phase up to design capacity; at the year of maximum aircraft movement capacity; and at the design year for the purposes of landscape-based mitigation, 15 years beyond maximum aircraft movement capacity.

5.1.4 Major and moderate landscape effects are considered ‘significant’ for the purposes of EIA, whilst minor and negligible environmental effects are considered ‘not significant’ for the purposes of EIA. It should be noted that, in line with clause 3.34 of GLVIA3 effects not considered to be significant have not been totally disregarded.

Inset 1: Process of Assessing Landscape Effects (Ref. 2)



## 5.2 Landscape Baseline

- 5.2.1 The initial step in the landscape assessment once the Study Area has been defined is to establish the baseline landscape conditions which involves the following:
- a. The review of published Landscape Character Assessments (National and Local Authority Character Assessments) followed by verification in the field to determine the character of the Application Site and Study Area.
  - b. Describing the existing landscape elements that contribute to landscape character (landscape elements include geology, soils, landform, drainage and waterbodies, existing vegetation and land/field patterns, settlements and buildings, Public Rights of Way (PRoW), land use and other characteristic elements of the existing local landscape).
- 5.2.2 Tranquillity is a particular consideration when undertaking LVIA for airport related development. The Airports National Policy Statement (ANPS) advises that *'(the assessment of) landscape and visual effects (should) also include tranquillity effects.'* (Ref. 5).
- 5.2.3 It is the assessor's interpretation of this ANPS policy that tranquillity should be regarded when undertaking the assessment of effects on landscape receptors (specifically where identifying the value of a landscape receptor and when considering the magnitude of landscape impacts on that receptor) and not assessed as a separate topic area alongside the assessment of landscape and visual effects.
- 5.2.4 Tranquillity is defined in GLVIA3 and in the Landscape Institute's Technical Information Note 01/2017 (TIN 01/17) (Ref. 6) as being *'a state of calm and quietude associated with peace, considered to be a significant asset of the landscape'*. (Ref. 7).
- 5.2.5 Tranquillity is considered through:
- a. analysing tranquillity mapping prepared by the Council for the Protection of Rural England;
  - b. reviewing noise assessment mapping;
  - c. identifying references to tranquillity in published character assessments;
  - d. audible observations in the field – Noting down any disturbances such as road traffic, rail, aircraft noise, schools, built up areas etc. (NB: sounds may be positive such as sounds of nature helping to make a positive contribution to the tranquillity of an area); and
  - e. visual observations in the field – Noting down any visual detractors or visual qualities (NB: unity, level of activity or enclosure can impact on tranquillity).
- 5.2.6 The LVIA also considers the comprehensive list of positive and negative factors to tranquillity advised in Appendix 2 of the South Downs National Park Tranquillity Study (Ref. 8).



## 5.3 Identification of receptors

5.3.1 Once the baseline information about the landscape has been collated this can be combined with an understanding of the details of the proposed change or development that is to be introduced into the landscape to identify and describe the landscape effects.

5.3.2 The first step is to identify the components of the landscape that are likely to be affected by the Proposed Development referred to as landscape receptors. Potentially sensitive landscape receptors may include:

- a. physical influences on the constituent elements of the landscape (e.g. geology, soils, landform, drainage and waterbodies);
- b. land cover of the landscape (e.g. the different types of vegetation and patterns and types of tree cover);
- c. influences of human activity on the landscape (e.g. the land use and its management, the character of settings and buildings and the patterns and types of fields and enclosures);
- d. aesthetic or perceptual qualities of the landscape (e.g. its scale, its complexity, its openness, its tranquillity or its wildness); and/or
- e. the character of the landscape (i.e. any distinctive landscape character types or areas that can be identified), which may include published character assessment reports and/or defined character areas identified as part of the assessment process.

## 5.4 Identification of likely landscape effects

5.4.1 The second step is to identify interactions between the landscape receptors and the different components of the development at all its different stages, including construction and operational stages.

5.4.2 Potential landscape effects that could occur during the construction and operational periods may include, but are not restricted to, the following:

- a. changes to landscape elements: the addition of new elements or the removal of existing landscape elements;
- b. changes to landscape qualities: degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of defined landscape character types or areas, or contribute to the landscape value; and
- c. changes to landscape character: landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities and the cumulative addition of new features, the magnitude of which is sufficient to alter the overall landscape character of a particular area.

## 5.5 Sensitivity of receptor likely to be affected

- 5.5.1 For each of the landscape effects identified the susceptibility of the landscape receptor to a specific change is to be judged as too is the value attached to the landscape receptor. These two judgements are combined to determine the sensitivity of the landscape receptor. The sensitivity and the judgements on susceptibility and value are fully described for each of the receptors within **Appendices 14.4** and **14.5** of the ES [TR020001/APP/5.02] and summarised within the **Chapter 14** of the ES [TR020001/APP/5.01].
- 5.5.2 Susceptibility to change means the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular area, or individual element and/or feature) to accommodate the Proposed Development without undue consequences for the maintenance of the baseline situation and/or the achievement of the landscape planning policies and strategies.
- 5.5.3 Judgements about the susceptibility of a landscape receptor to change are recorded as being high, medium or low, based on the criteria set out in **Table 5.1**.

Table 5.1: Landscape Susceptibility to Change

| Classification | Typical Criteria   |
|----------------|--|
| High           | Receptors with an inability to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and / or the achievement of the landscape planning policies and strategies. |
| Medium         | Receptors with some ability to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and / or the achievement of the landscape planning policies and strategies. |
| Low            | Receptors with an ability to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and / or the achievement of the landscape planning policies and strategies.   |

- 5.5.4 Judgements about the value of a landscape receptor are recorded as being high, medium, or low based on the information gathered in the landscape baseline (such as landscape quality (condition), scenic quality, rarity, representativeness, conservation interests, recreation value, perceptual aspects and associations). **Table 5.2** provides some examples which help to distinguish between the different value thresholds.

Table 5.2: Landscape Value

| <b>Classification</b> | <b>Typical Criteria</b>  | <b>Typical Scale</b>           | <b>Typical Examples</b>  |
|-----------------------|--|--------------------------------|--|
| Very High             | High Importance (or Quality) and Rarity. No or limited potential for substitution. | International, National, Local | World Heritage Site, National Park, AONB.  |
| High                  | High Importance (or Quality) and Rarity. Limited potential for substitution.       | National, Local                | Areas of Great Landscape Value, Conservation Area.   |
| Medium                | Medium Importance (or Quality) and Rarity. Limited potential for substitution      | Regional, Local                | Local designations such as Area of Local Landscape Value (ALLV) or undesignated but value perhaps expressed through non-official publications or demonstrable use. |
| Low                   | Low Importance (or Quality) and Rarity.  | Local                          | Areas identified as having some redeeming feature or features and possibly identified for improvement or areas identified for recovery.                            |
| Very Low              | Low or no Importance (or Quality) and Rarity.                                      | Local                          | Areas identified for recovery.   |

5.5.5 The landscape sensitivity is dependent on the development being considered and the ability of the existing landscape to accommodate the perceived changes. Landscapes vary in their capacity to accommodate different forms of development. In general terms, a landscape of very high sensitivity would have low ability to accommodate change of the type proposed and a landscape of low sensitivity would have some ability or likelihood to accommodate change of the type proposed.

## 5.6 Evaluating the Magnitude of Impact

5.6.1 GLVIA3 recognises a clear distinction between the 'impact,' as the action that is being taken, and the 'effect,' as the change resulting from that action, and advises that the term 'impact' should not be used to mean a combination of several effects. For consistency with other chapters of the ES, this LVIA varies from this advice and refers to 'magnitude of impact,' even when describing a combination of several effects. This variance does not however compromise the assessment which remains robust and follows required principles to assess significance of effects.

5.6.2 The magnitude of impact on a landscape receptor has been assessed in terms of its:

- a. size or scale - extent to which the removal or addition of landscape features alters the existing landscape character;
- b. geographical extent - of the area over which the effect is evident;
- c. duration of the effect - (short 0-5yrs/ medium 5-10yrs / long term 10-25yrs); and
- d. reversibility – (i.e. temporary or permanent).

5.6.3 With regard to reversibility, Paragraph 5.52 of GLVIA 3 explains that where developments have a limited life and could eventually be removed and/or the land reinstated the effects could be considered reversible. The reversibility and consideration of temporary effects is however linked to the duration of that effect such as short term (0-5yrs), medium term (5-10yrs) and long term (10-25yrs).

5.6.4 For the purpose of this LVIA of the Proposed Development, impacts that would be considered permanent are those typically occurring over the long term, such as the construction of buildings and reprofiling of land as these cannot practicably be reversed. Vegetation removal is also considered to be permanent where it cannot be planted in the same location and reach maturity over the short or medium term. Mitigation planting has the potential to compensate for the loss of existing vegetation if similar types and species are planted and could provide similar benefits over the medium to long term. There are instances where mitigation planting could not compensate for the loss of existing vegetation such as the removal of Ancient Woodland or instances where there are rare species which form a unique habitat.

5.6.5 Temporary effects typically occur over a short to medium term duration and mainly occur during the construction period. Development that may result in

temporary effects would typically include the introduction of temporary site security fencing, temporary hard standing areas, construction machinery, temporary buildings and compounds, haul roads, earthmoving and stockpiles, lighting for example.

5.6.6 Impacts on tranquillity with reference to the Chilterns AONB are determined through a qualitative assessment in accordance with guidance set out in CAP 1616. (Ref. 9).

5.6.7 Judgements about the magnitude of impact on landscape receptors identify whether the impact would be negative (adverse) or positive (beneficial) and are recorded as being high, medium, low, very low or no change, based on the criteria set out in **Table 5.3**.

Table 5.3: Magnitude of Landscape Impact

| Magnitude of Impact | Typical Criteria Descriptors   |
|---------------------|--|
| High adverse        | Total loss or large-scale damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic conspicuous features and elements                                   |
| Medium adverse      | Partial loss or noticeable damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic noticeable features and elements                                   |
| Low adverse         | Slight loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.   |
| Very Low adverse    | Barely noticeable loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.  |
| No change           | No noticeable loss, damage or alteration to character or features or elements.   |
| Very Low beneficial | Barely noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements |
| Low beneficial      | Slight improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.           |

| Magnitude of Impact | Typical Criteria Descriptors   |
|---------------------|--|
| Medium beneficial   | Partial or noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic and noticeable features and elements, or by the addition of new characteristic feature |
| High beneficial     | Large scale improvement of character by the restoration of features and elements, and/or the removal of uncharacteristic and conspicuous features and elements, or by the addition of new distinctive features.                    |

## 5.7 Evaluating the Significance of Impact

5.7.1 The significance of a landscape effect is assessed through professional judgement, combining the sensitivity of the receptor with the magnitude of impact. Judgements typically follow the rationale and criteria set out in **Table 5.4**.

Table 5.4: Significance of Landscape Effect

|                                |        | MAGNITUDE OF VISUAL IMPACT |                   |                   |                 |                  |
|--------------------------------|--------|----------------------------|-------------------|-------------------|-----------------|------------------|
|                                |        | No Change                  | Very Low          | Low               | Medium          | High             |
| SENSITIVITY OF VISUAL RECEPTOR | High   | No Effect                  | Minor             | Minor / Moderate  | Moderate/ Major | Major            |
|                                | Medium | No Effect                  | Negligible/ Minor | Minor             | Moderate        | Moderate/ Major  |
|                                | Low    | No Effect                  | Negligible/ Minor | Negligible/ Minor | Minor           | Minor / Moderate |

5.7.2 **Table 5.5** below summarises the rationale for judgments for each significance criteria that could be applied to the proposals.

Table 5.5: Significance of Landscape Effect Typical Criteria Descriptors

| Significance  | Typical Criteria Descriptors  |
|---------------|---|
| Major adverse | The development would be at considerable variance with the character (including quality and value) of the landscape and substantially degrade or diminish the integrity of a range of |

| Significance                   | Typical Criteria Descriptors   |
|--------------------------------|--|
|                                | characteristic features and elements and their setting and are likely to damage a sense of place. Such effects would be incapable of full mitigation and would degrade the integrity of a high-quality landscape.  |
| Moderate adverse               | The development would conflict with the character (including quality and value) of the landscape and have an adverse impact on characteristic features or elements and their setting and are likely to diminish a sense of place. Proposals are likely to be out of scale with the existing topography, grain, scale and pattern of the landscape.   |
| Minor adverse                  | The development would not quite fit the character (including quality and value) of the landscape and is at variance with characteristic features and elements and their setting and are likely to detract from a sense of place. Effects may temporarily damage or does not logically complement the existing topography, grain, scale and pattern of the landscape to constitute an unsympathetic outcome.  |
| Negligible adverse/ beneficial | The proposals would affect minor landscape features which have no or limited value.  |
| No effect                      | The development would maintain the character (including quality and value) of the landscape. The proposals would blend in with characteristic features and elements, enabling a sense of place to be retained.   |
| Minor beneficial               | The development would complement the character (including quality and value) of the landscape and maintain or enhance characteristic features and elements and their setting enabling some sense of place to be restored. The proposals would enable moderate and / or short-term restoration of degraded landscape character, features and their setting.   |
| Moderate beneficial            | The development would improve the character (including quality and value) of the landscape and enable the restoration of characteristic features and elements partially lost or diminished as a result of changes from inappropriate management or development and thus enabling a sense of place to be restored. Such effects may be capable of further mitigation so as to maximize the benefits of the proposal.  |
| Major beneficial               | The development would substantially enhance the character (including quality and value) of the landscape and enable the restoration of characteristic features and elements lost as a result of changes from inappropriate management or development thus enabling a sense of place to be enhanced. The proposals would fundamentally improve on previous condition through the introduction of integrated features and landscape design which would result in a more harmonious and distinctive landscape |

| <b>Significance</b> | <b>Typical Criteria Descriptors</b>  |
|---------------------|--|
|                     | character. Such effects may be capable of further mitigation to maximize the benefits of the proposal. |



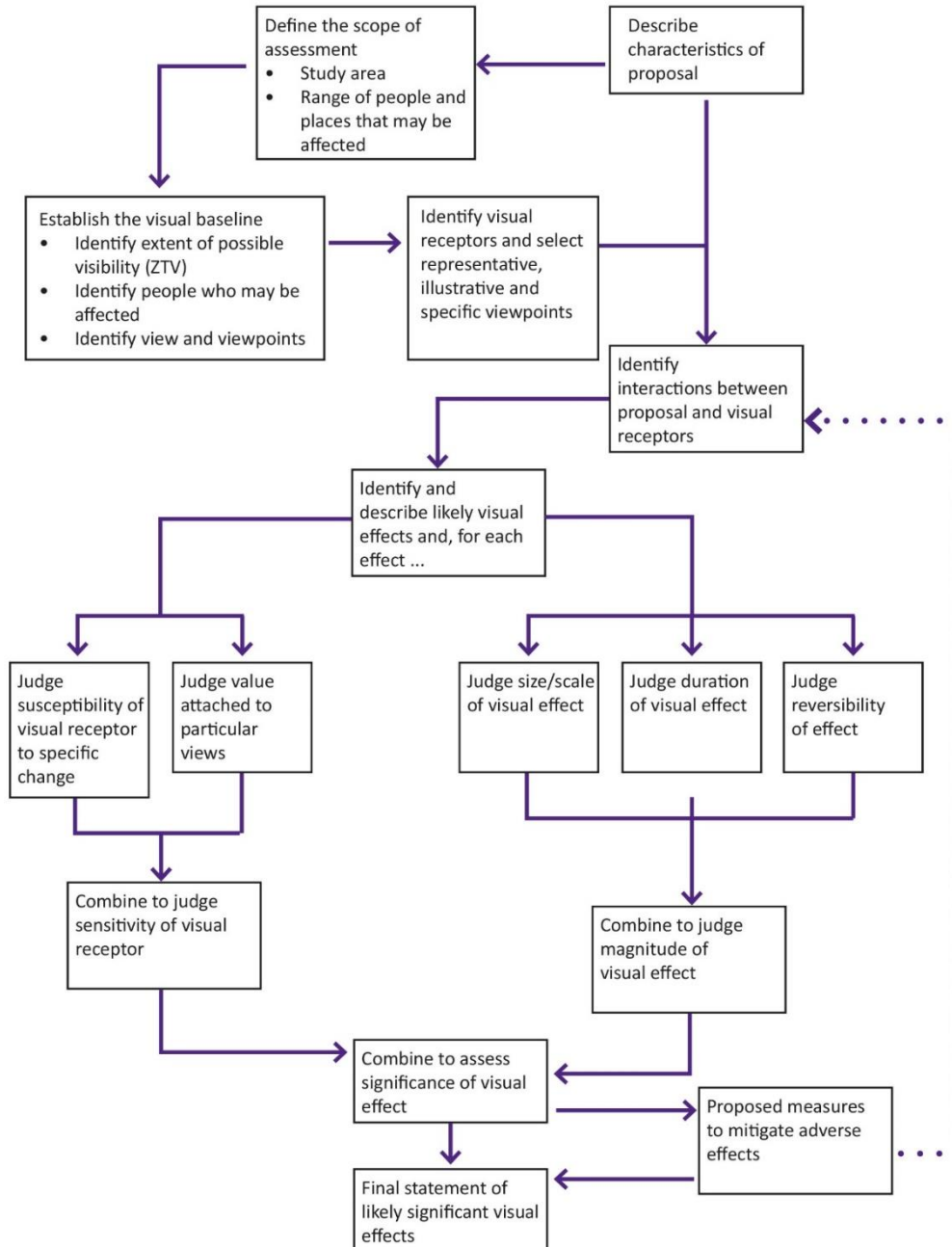
## 6 VISUAL ASSESSMENT

- 6.1.1 The visual assessment considers the potential effect of the Proposed Development on visual amenity; as experienced by people within the Study Area. They relate to changes that arise in the composition of available views as a result of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity.
- 6.1.2 The effects on visual amenity is assessed through the consideration of potential effects on receptors. Visual receptors include people in their homes, at work, undertaking recreational activities or when travelling through an area i.e. using roads, railways, footpaths etc., where they would be likely to experience a change in the existing view as a result of the construction and operation of the Proposed Development.
- 6.1.3 The visual effects may include a change to an existing view, sequential views, or wider visual amenity as a result of development or the loss of particular elements or features already present in the view. Cumulative visual effects may result when receptors gain views of other developments, which combine to have a cumulative visual effect.
- 6.1.4 The assessment of the visual baseline within the Study Area takes into consideration the following:
- the area within which the Proposed Development may be visible;
  - the different groups of people within the Study Area who may experience views of the Proposed Development;
  - the identification of specific viewpoints; and
  - the nature of views at the viewpoints.
- 6.1.5 To understand the effectiveness of proposed landscape-based mitigation measures and changes to land management objectives in screening impacts from development on visual receptors, the LVIA considers effects of construction during each assessment phase to design capacity; at the year of maximum aircraft movement capacity; and at the design year for the purposes of landscape-based mitigation, 15 years beyond maximum aircraft movement capacity.
- 6.1.6 Major and moderate visual effects are considered 'significant' for the purposes of EIA, whilst minor and negligible environmental effects are considered 'not significant' for the purposes of EIA. It should be noted that, in line with clause 3.34 of GLVIA3 effects not considered to be significant have not been totally disregarded.
- 6.1.7 The visual assessment draws on judgements contained in the Light Obtrusion Assessment provided as **Appendix 5.2** of the ES [TR020001/APP/5.02] when considering the impact on receptors from night-time views to proposed lighting.
- 6.1.8 The process of assessing the visual effects is shown on **Inset 2** and described within this section.

## Inset 2: Process of Assessing Visual Effects (Ref. 10)

### Steps in assessing visual effects

Taken from Figure 6.1 'Guidelines for Landscape and Visual Impact Assessment (Third Edition 2013)'



## 6.2 Viewpoints

6.2.1 Viewpoints are selected within the Zone of Visual Influence of the Study Area to demonstrate the relative visibility of the Proposed Development and its relationship with the surrounding landscape and built form. The selection of viewpoints is based on the following criteria:

- a. The requirement to provide an even spread of representative viewpoints within the visual envelope, and around all sides of the Proposed Development.
- b. From locations which represent a range of near, middle and long distance views.
- c. Whilst private views are relevant, public viewpoints i.e. from roads and public rights of way and other area of open public access, have been selected since they are the most significant in term of the number of receptors affected.
- d. Views from sensitive receptors within designated landscapes.

6.2.2 In accordance with the GLVIA3, the viewpoints are selected to take account of:

- a. the potential number and sensitivity of viewers who may be affected;
- b. the viewing direction, distance (i.e. short, medium and long distance views) and elevation;
- c. the nature of the viewing experience (for example static views, views from settlements and views from sequential points along routes);
- d. the view type (for example panoramas, vistas, glimpses); and
- e. the potential for cumulative views of the Proposed Development in conjunction with other developments.

6.2.3 Viewpoints also take account of the accessibility to the public (with the exception of Luton Hoo House all viewpoints used for the assessment of visual effects are carried out from publicly accessible locations).

6.2.4 GLVIA3 states that in some instances it may be appropriate to consider private viewpoints, mainly from residential properties. As it is impractical to visit all properties that may be affected professional judgement must be used so that an assessment can be made about the likely views based on the views from the nearest public vantage point to each property during the field assessment.

6.2.5 For the purposes of the baseline assessment the distance of the viewpoint towards the Main Application Site has been measured to the nearest proposed visible feature.

6.2.6 The findings and conclusion of this LVIA assume that:

- a. all existing vegetation located outside the site would be retained unless otherwise identified for removal; and
- b. the application of good site construction practice. In particular, nearby retained trees are afforded protection in accordance with the recommendations provided in British Standard 5837(Ref. 11).

## **6.3 Methodology for recording the Visual Baseline**

6.3.1 Representative photographs are taken from each of the viewpoints as a record of the baseline visual conditions. The baseline conditions (i.e. the existing view

and the potential receptors to that view) are then described for each of the recorded viewpoints.

## 6.4 Sensitivity of Visual Receptor

- 6.4.1 The sensitivity of a visual receptor is considered by combining judgements about the value attached to a particular view and the susceptibility of the visual receptor to changes in that view. For example, the inhabitants of a residential dwelling are generally considered more sensitive than occupiers of a factory unit. The value of the changed view to the receptor also contributes to an understanding of sensitivity to change. Therefore, orientation, nature of use, scenic quality and receptors expectations of the change view in respect of existing context are all considered part of the evaluation.
- 6.4.2 As identified within GLVIA3, susceptibility is mainly a function of:
- a. the occupation or activity of people experiencing the view at particular locations; and
  - b. the extent to which their attention or interest may be focussed on views and the visual amenity they experience at particular locations.
- 6.4.3 Judgements about the susceptibility of a visual receptor have been recorded as being high, medium or low, typically reflecting the criteria set out in **Table 6.6**. Judgements may vary however depending on the nature of the receptor that would be affected and the extent to which their attention is likely to be focused on views or visual amenity.

Table 6.6: Visual Susceptibility to Change

| Value  | Typical Criteria   |
|--------|--|
| High   | <p>Residents at home, although this depends on the rooms occupied during waking hours.</p> <p>People, whether residents or visitors, who are engaged in outdoor recreation, including users of public rights of way.</p> <p>Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience.</p> <p>Communities where views contribute to the landscape setting enjoyed by residents in the area.</p> <p>Where travel involves recognised scenic routes awareness of views is likely to be particularly high.</p> |
| Medium | <p>Communities where views partly contribute to the landscape setting experienced by residents in the area.</p> <p>Travellers on road, rail and other transport routes where awareness of views is limited.</p>  |

| Value | Typical Criteria   |
|-------|--|
| Low   | <p>Communities where views do not contribute to the landscape setting experienced residents in the area.</p> <p>People engaged in outdoor sport and recreation which does not involve or depend upon appreciation of views of the landscape.</p> <p>People at their place of work whose attention may be focused on their work or activity, not on their surroundings, and where the setting is not important to the quality of their working.</p> |

6.4.4 Judgements about the value attached to views experienced by a visual receptor are recorded as being high, medium or low, based on the criteria set out in the **Table 6.7**.

Table 6.7: Visual Importance/ Value

| Value  | Typical Criteria  |
|--------|---|
| High   | <p>Unique or identified view (e.g. shown as such on an Ordnance Survey map, guidebook or tourist map) or one noted in literature or art.</p> <p>A view where a landscape and/or heritage asset makes an important contribution to the view (e.g. open views of landscapes in sensitive or unspoilt areas which contribute to the visual amenity experienced by people).</p> |
| Medium | <p>A view where a landscape and/or heritage asset makes some contribution to the view (e.g. partial/interrupted views of landscapes in sensitive or unspoilt areas which contribute to the visual amenity experienced by people or open views over moderately sensitive/unspoilt landscapes).</p>   |
| Low    | <p>Undistinguished or unremarkable view (the view may contain detracting features which spoil the overall quality of the view and detract from the visual amenity experienced by people).</p>   |

## 6.5 Magnitude of Visual Impact

6.5.1 The magnitude of visual impact experienced by visual receptors as a result of the Proposed Development are described by reference to the:

- a. Scale of change in the view in respect of the loss or addition of features and changes in the visual composition, including the proportion of view occupied by the Proposed Development.
- b. Geographical extent – this is likely to reflect the orientation/angle of view in relation to the main activity of the receptor, the distance of the viewpoint from the Main Application Site, and the extent of the area over which the changes would be visible.
- c. Duration of the effect - (short 0-5yrs/ medium 5-10yrs/ long term 10-25yrs, temporary, permanent, intermittent/ continuous and whether the views would be full, partial or glimpses).

d. Reversibility - the ability of the Proposed Development to be reversed.

6.5.2 Judgements about the magnitude of a visual impact experienced by visual receptors as a result of the Proposed Development are recorded as being high, medium or low, very low or no change. The criteria that is used to guide the assessment of the magnitude of impact is outlined in **Table 6.8**.

Table 6.8: Magnitude of Visual Impact

| Magnitude of Visual Impact | Typical Criteria Descriptors  |
|----------------------------|---|
| High adverse               | The proposals would form a significant and immediately apparent deterioration to the scene that is likely to damage its overall character.  |
| Medium adverse             | The proposals would form a visible and recognisable new element that would deteriorate the overall scene to some extent and would be readily noticed by the observer.   |
| Low adverse                | The proposals would be perceptible but would not alter overall balance of features and elements that comprise the existing view or markedly deteriorate the overall quality of the scene.   |
| Very Low adverse           | Only a very small part of the proposals would be discernible, and / or the proposals would be at such a distance that it would form a barely noticeable feature or element of the view and consequently would result in very little deterioration to the scene. |
| No change                  | No part of the project, or work or activity associated with it, would be discernible.   |
| Very Low beneficial        | Only a very small part of the proposals would be discernible, and / or the proposals would be at such a distance that it would form a barely noticeable feature or element of the view and consequently would result in very little improvement to the scene.   |
| Low beneficial             | The proposals would be perceptible but would not alter overall balance of features and elements that comprise the existing view or markedly improve the overall quality of the scene.   |
| Medium beneficial          | The proposals would form a visible and recognisable new element that would improve the overall scene to some extent and would be readily noticed by the observer.   |
| High beneficial            | The proposals would form a significant and immediately apparent improvement to the scene that is likely to enhance its overall character.   |

## 6.6 Significance of Visual Effects

6.6.1 The significance of a visual effect is assessed through professional judgement, combining the sensitivity of the receptor with the magnitude of impact. Judgements typically follow the rationale and criteria set out in **Table 6.9**.

Table 6.9: Significance of Visual Effect

|                                |        | MAGNITUDE OF VISUAL IMPACT |                   |                   |                 |                  |
|--------------------------------|--------|----------------------------|-------------------|-------------------|-----------------|------------------|
|                                |        | No Change                  | Very Low          | Low               | Medium          | High             |
| SENSITIVITY OF VISUAL RECEPTOR | High   | No Effect                  | Minor             | Minor / Moderate  | Moderate/ Major | Major            |
|                                | Medium | No Effect                  | Negligible/ Minor | Minor             | Moderate        | Moderate/ Major  |
|                                | Low    | No Effect                  | Negligible/ Minor | Negligible/ Minor | Minor           | Minor / Moderate |

6.6.2 **Table 6.10** below summarises the rationale for judgments for each significance criteria that could be applied to the proposals.

Table 6.10: Significance of Visual Effects Typical Criteria Descriptors

| Significance                   | Typical Criteria Descriptors   |
|--------------------------------|--|
| Major adverse                  | The proposals would cause major deterioration to a view experienced by a highly sensitive receptor and would constitute a major discordant element in the view.                              |
| Moderate adverse               | The proposals would cause obvious deterioration to a view experienced by a moderately sensitive receptor or perceptible damage to a view experienced by a more sensitive receptor.           |
| Minor adverse                  | The proposals would cause limited deterioration to a view experienced by a moderately sensitive receptor or cause greater deterioration to a view experienced by a low sensitivity receptor. |
| Negligible adverse/ beneficial | Only a very small part of the proposal would be discernible and / or would be at such a distance that it would be scarcely appreciated.  |
| No effect                      | No perceptible change to the view.   |



| Significance        | Typical Criteria Descriptors   |
|---------------------|--|
| Minor beneficial    | The proposals would cause limited improvement to a view experienced by a receptor of medium sensitivity or would cause greater improvement to a view experienced by a receptor of low sensitivity. |
| Moderate beneficial | The proposals would cause obvious improvement to a view experienced by a moderately sensitive receptor or perceptible improvement to a view experienced by a more sensitive receptor.              |
| Major beneficial    | The proposals would lead to a major improvement to a view experienced by a highly sensitive receptor.  |

## 7 CUMULATIVE EFFECTS

- 7.1.1 A cumulative landscape and visual impact assessment (CLVIA) to determine the likely significant cumulative landscape and visual effects arising during either the construction or operation of the Proposed Development is provided in **Chapter 21** of the ES [TR020001/APP/5.01].
- 7.1.2 The CLVIA adopts a two-stage process, assessing first ‘total effects’ (i.e. the combined effects of past, present and future proposals together with the Proposed Development against the existing baseline) and secondly ‘additional effects’ (i.e. the effects of the Proposed Development assuming past, present and future proposals are already present within the existing baseline). Where no ‘total effects’ (stage 1) are considered likely, the subsequent ‘additional effects’ (stage 2) assessment - to recognise the contribution that the Proposed Development makes to the total effects - are not carried out.
- 7.1.3 The CLVIA Study Area is the same as the LVIA Study Area. The CLVIA assessors used professional judgement to determine that an extension to the CLVIA Study Area was unnecessary to ensure all likely significant cumulative landscape and visual effects are identified.

## 8 MATTERS SCOPED OUT

- 8.1.1 No matters have been scoped out of this LVIA.

## 9 MITIGATION

- 9.1.1 The purpose of the mitigation is to prevent/avoid, reduce and where possible remedy or offset, any significant, negative (adverse) effect on the environment arising from the Proposed Development. Mitigation is not solely concerned with ‘damage limitation’ but may also consider measures that could compensate for



unavoidable residual effects. Mitigation measures are now generally considered to fall into three categories:

- a. Primary measures, developed through the iterative design process, which have become integrated or embedded in to the project design.
- b. Standard construction and operational management practices for avoiding and reducing environmental effects.
- c. Secondary measures designed to address any residual adverse remaining after primary measures and standard construction practices have been incorporated into the Proposed Development.

9.1.2 Strategies to address likely negative (adverse) effects include:

- a. avoiding the impact by changing the form of development;
- b. reducing the impact by changing the form of development;
- c. remedying the impact, e.g. by screen planting;
- d. compensating for the impact e.g. by replacing felled trees with new trees; or
- e. enhancement e.g. by creation of new landscape or habitat.

9.1.3 Guidelines for mitigation:

- a. All negative (adverse) landscape and visual effects that are likely to occur throughout the project life cycle should be considered for mitigation, although the statutory requirement is limited to significant effects (Major and Moderate adverse effects).
- b. Consultation with local community and special interest groups on the proposed mitigation measures is important.
- c. Landscape mitigation measures should be designed to suit the existing landscape character and needs of the locality, respecting and building on local landscape distinctiveness and helping to address any relevant existing issues in the landscape.
- d. It must be recognised that many mitigation measures, especially planting, are not immediately effective. Where planting is intended to provide a visual screen for a development, it may also be appropriate to assess the effects for different seasons and periods of time, such as day of opening and Year 15 and potentially other periods in line with phasing. In such projections the assumptions made about growth rates should be clearly stated on the proposed landscape plans.
- e. The developer should demonstrate a commitment to the implementation of mitigation measures to be agreed programme and budget.
- f. The proposed mitigation measures should address specific issues and performance standards should be identified for the establishment, management, maintenance and monitoring of new landscape features.

- g. A programme of appropriate monitoring may be agreed with the regulatory authority, so that compliance and effectiveness can be readily monitored and evaluated.

9.1.4 Common mitigation measures that may help to reduce potentially negative landscape and visual effects may include:

- a. sensitive location and siting;
- b. site layout;
- c. adjustment of site levels;
- d. use of appropriate form, material and design of buildings. It is not always practical or desirable to screen buildings and associated development. In these cases, the scale, design, colour and texture of buildings/ structures should be carefully considered to aid integration with the surroundings;
- e. alterations to landforms (including creation of bunds or mounds) together with structure planting and/ or off-site planting;
- f. minimising light pollution and avoiding or reducing obtrusive light; or
- g. planting: structural planting can help to integrate and 'soften' development as well as being of potential value as a wildlife habitat. Offsite planting should also be considered where it could be of benefit to screen the proposed development from sensitive landscape and visual receptors.

9.1.5 Proposed mitigation measures are included within each of the chapters specific to each discipline. Mitigation measures, specific to landscape and visual matters, are described in **Sections 14.8** and **14.10** in **Chapter 14** of the ES [TR020001/APP/5.01].

## 10 ENHANCEMENT

10.1.1 While mitigation is linked to significant landscape and visual effects, enhancement is not a requirement of the EIA regulations (Ref 12). It means proposals that seek to improve the landscape resource and the visual amenity of a proposed development site and its wider setting, over and above its baseline condition. Enhancement may take many forms, including improved land management or creation of new landscape, habitat and recreational features. Through such measures environmental enhancement can make a very real contribution to sustainable development and the overall quality of the environment.

10.1.2 Enhancement proposals should be based on a sound baseline assessment of the landscape and visual amenity of the area and of any trends likely to bring about future change. The following questions could be usefully considered:

- a. Can the development help to improve the visual amenity of the area?

- b. Can it help restore, reconstruct or provide new local character and local distinctiveness?
- c. Can it assist in meeting the landscape management objectives for the area?
- d. Can it help address the specific issues and/or opportunities, for example restoration of damaged or derelict land, opportunities for habitat improvement and the scape for cultural heritage benefit?

## 11 PHOTOGRAPHIC METHODOLOGY

### 11.1 Verified View/ Accurate Visual Representation

- 11.1.1 A Verified View (VV) or Accurate Visual Representation (AVR) is “*a still image, or animated sequence of images, intended to convey reliable visual information about a proposed development to assist the process of visual assessment*”. (Ref. 13).
- 11.1.2 This document applies current good practice in preparing verified views of the Proposed Development. Views are from what is considered to be the most representative viewpoints in the area surrounding the site.
- 11.1.3 The current practice guides that this process is informed by include:
- a. GLVIA3.
  - b. The Landscape Institute’s Technical Guidance Note 06/19 (Ref. 14)
  - c. ‘London View Management Framework’ (March 2012) (Ref. 15)
- 11.1.4 It is suggested within the Landscape Institute’s Technical Guidance Note 06/19 that the horizontal field of view (HFOV) should be 39.6° when presented at A3. This is to allow viewers to experience a true representation at a viewing distance (distance from eye to paper) of 500mm.
- 11.1.5 Due to the nature of the proposals only a small portion of the Proposed Development would be visible should an HFOV of 39.6° have been used. For the purposes of this assessment viewpoint photography has accordingly been presented at A3 with a HFOV of 75° and with a viewing distance of 300mm. In order to show sufficient context, some images are spread across two pages, leading to a HFOV of 150°.
- 11.1.6 Selective photomontages have been presented with a HFOV of 39.6° where it is determined that an additional level of detail would be beneficial (e.g. from more distant viewpoints).

### 11.2 Methodology Overview

- 11.2.1 In preparing the verified views/photomontages, accurate photography is required, with survey information recorded, and an accurate model of the application parameters prepared. In simple terms, this allows a ‘virtual’ viewpoint to be constructed that accurately reflects an actual photograph, which

in turn allows a wireline (representing the outline of the Proposed Development form) or fully rendered image of the proposed development to be accurately superimposed on the existing photograph.

### 11.3 Photography

- 11.3.1 In accordance with current guidance, on-site photography records the position (as a grid reference), height of camera lens, camera used, lens type and focal length, field of view, date and time. Photographs were recorded at 1.6 metres above ground level to reflect the pedestrian eye height. Photographs are taken with a fixed 50mm focal length lens attached to a SLR camera (Canon EOS 5D MKII).
- 11.3.2 In assessing the impact of development on the landscape it is often necessary to record a panoramic view. A panorama made up from planar photographs is not strictly a 'true panorama' due to distortion encountered from the rectilinear projection of the lens. This is best described by looking through the viewfinder as you rotate the camera, the objects near the centre get larger as they approach the edge of the frame. Accurate 'stitching software' overcomes this effect by distorting each image into a cylindrical projection before aligning and blending, to reflect as accurately as possible the experience of the human eye. In taking a panoramic photograph it is important to ensure the camera position is set horizontally level.

### 11.4 Survey Information

- 11.4.1 On site surveying is carried out at the same time that the photographs are taken to record the position and height (Above Ordnance Datum) of the camera and its tripod alongside a range of 6 to 10 physical reference points per viewpoint (such as telegraph poles, road signs, or in the absence of sufficient existing reference points, ranging poles). To ensure the accuracy, the surveyed data was cross-referenced against OS information as well as the topographical site survey. This data is subsequently transferred into computer modelling software to produce an accurate 'virtual' view reflecting the actual panoramic photograph. Reference points are captured by a Total Station (the surveyor's on-site equipment) with an electronic distance meter (EDM) which reads slope distances from the instrument to a particular point. These points are used to align the computer image against the photography.

### 11.5 Proposed Development Parameters Modelling

- 11.5.1 Parameter information identifying the maximum extent and height for Proposed Development was provided in December 2022 and was used to inform the 3D model on which the AVRs are based.
- 11.5.2 Following the production of the AVRs, the maximum height for the new Terminal 2 (Work No. 3b(01)) and Terminal 2 extension (Work No. (3b(02))) was changed from 23.7m to the final height of 26.5m, as described in **Chapter 4** of the ES [TR020001/APP/5.01] and stated in the draft Development Consent Order [TR020001/APP/2.01]. The change in these parameters would not materially

alter the AVRs and does not alter the findings and conclusions of **Chapter 14** of the ES [TR020001/APP/5.01].

- 11.5.3 The parameters information is drawn in 3D with AutoCAD software using the maximum building height measured to roof ridge/highest point and then extruded down to existing ground. This is then transferred into another 3D software where cameras are introduced that replicate the onsite photography locations. Site survey data is then drawn to assist in the camera matching process.
- 11.5.4 For the purposes of the ES, proposed site planting has also been added to the 3D environment for three selected viewpoints, with growth rates/heights applied using specialist landscape software (Quickscape). The three locations where landscape mitigation has been portrayed were selected because of their ability to demonstrate the effectiveness of these measures and because they are representative of views experienced by potentially sensitive visual receptors.

## 11.6 Camera Matching

- 11.6.1 Having accurately modelled the Proposed Development, a series of computer-generated images are constructed from the exact viewpoint locations and have cylindrical projection applied before photo-stitching to match the panoramic photographs, thus creating a 'virtual' panorama of the Proposed Development. With the virtual and photographic images overlaid with each other, common (surveyed) reference points are used to align both the virtual and photographic image and the wireline/ foreground clipping applied.

## REFERENCES

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- Ref. 1 Landscape Institute and Institute for Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment (GLVIA3) – Third Edition
- Ref. 2 Civil Aviation Authority (2021) CAP1616 - Airspace Change, Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information’.
- Ref. 3 GLVIA3 Clause 1.1
- Ref. 4 GLVIA3 Clause 2.7
- Ref. 5 Department for Transport (2018) Airport National Policy Statement: new runway capacity and infrastructure at airports in the south-east of England (ANPS) Clause 5.213
- Ref. 6 Landscape Institute (2017) Technical Information Note 01/17 ‘Tranquillity – An Overview’,
- Ref. 7 Landscape Institute (2017) Technical Note 01/17 Clause 2.4
- Ref. 8 South Downs National Park Authority (2017) South Downs National Park Authority: Tranquillity Study
- Ref. 9 CAP1616 Clauses B76 – B78.
- Ref. 10 GLVIA3 Figure 6.1 Steps in assessing visual effects
- Ref. 11 British Standard "Trees in Relation to Design, Demolition and Construction to Construction - Recommendations" (BS 5837) (2012)
- Ref. 12 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (SI.572)
- Ref. 13 Greater London Authority (2012) London View Management Framework Supplementary Planning Guidance, Appendix A: Glossary
- Ref. 14 Landscape Institute (2019) Technical Guidance Note 06/19 Visual Representation of Development Proposals
- Ref. 15 Greater London Authority (2012) London View Management Framework Supplementary Planning Guidance