Heathrow

EASTERLY ALTERNATION INFRASTRUCTURE PROJECT

Environmental Impact Assessment Environmental Statement, Volume III Appendix 10.1: LVIA Methodology

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1.1 Overview

1.1.1 The project-wide approach to the assessment methodology is set out in **Section 5.8** of **Chapter 5: Approach to the EIA, Volume II** of the Environmental Statement. This Appendix describes the methodology used within the landscape and visual impact assessment (LVIA) of the Proposed Development.

1.1.2 The only element of the Proposed Development that has been assessed in the LVIA is the proposed noise barrier to the south of the village of Longford. All remaining components of the Proposed Development would have no significant effects on the existing landscape resource and visual amenity.

1.1.3 The time period for the assessment covers the construction phase of the noise barrier which will include the implementation and establishment of embedded environmental measures (e.g., landscape planting). The operational phase is indefinite.

1.1.4 This Appendix has been structured as follows:

- **Section 1.2: Overview of LVIA methodology**;
- **Section 1.3: Iterative assessment and design**;
- **Section 1.4: Guidance, data sources and site surveys**;
- **Section 1.5: Assessing landscape effects**;
- **Section 1.6: Assessing visual effects**;
- **Section 1.7: Assessing cumulative landscape and visual effects**;
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1.2 Overview of the LVIA methodology

Introduction

1.1.1 The LVIA has been undertaken in accordance with the Landscape Institute and Institute of Environmental Management and Assessment's (IEMA) 2013 Guidelines for Landscape and Visual Impact Assessment (GLVIA3)[1], and other best practice guidance listed in **Chapter 10: Landscape and Visual Impact Assessment, Volume II** of the Environmental Statement. An overview or summary of the LVIA process is provided here and illustrated, diagrammatically in **Graphic 1.1**.

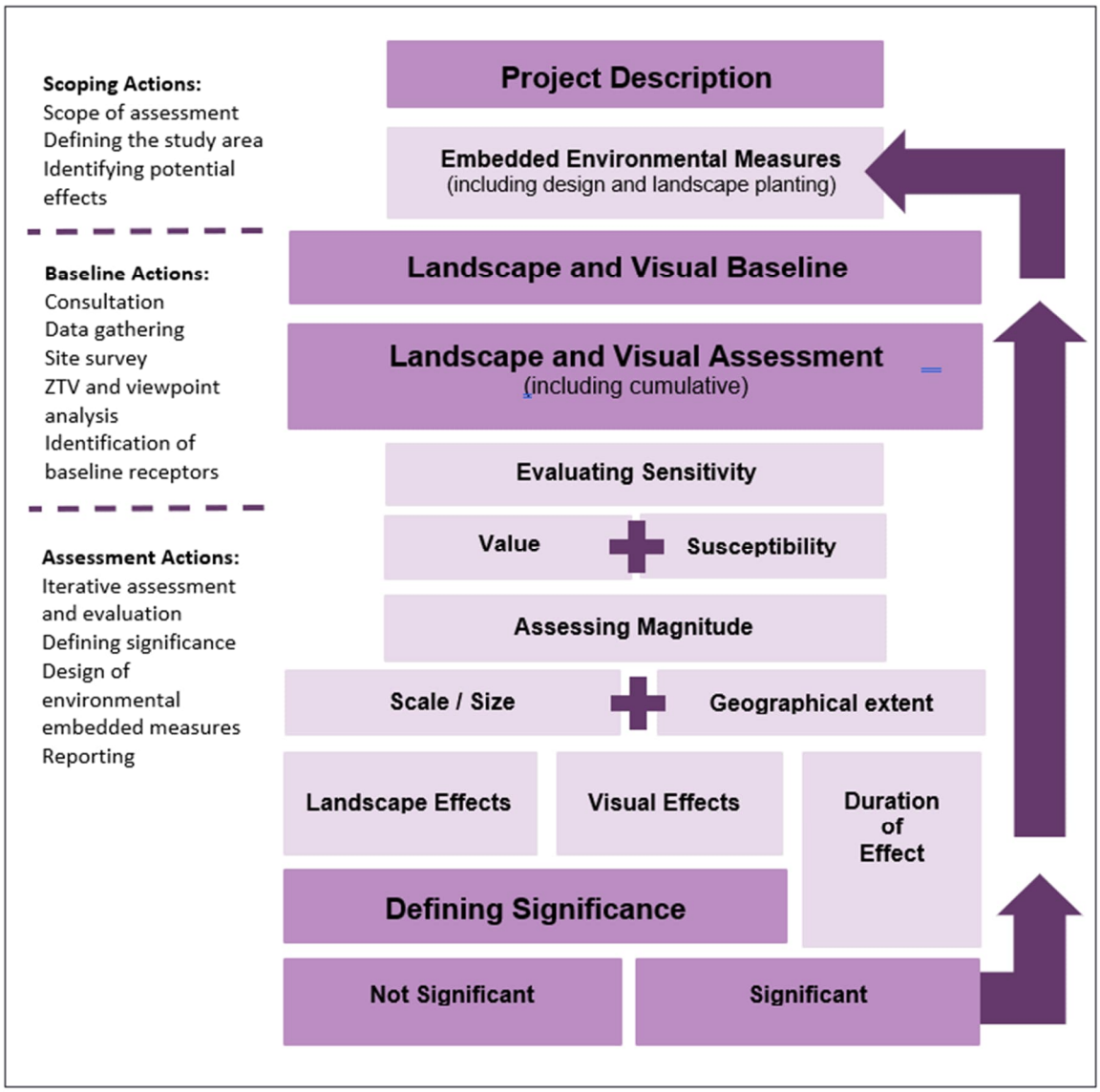
[1] Landscape Institute and Institute of Environmental Management and Assessment (2013) *Guidelines for Landscape and Visual Impact Assessment, Third Edition*.

1.1.2 The LVIA assesses the likely effects of the Proposed Development on the landscape and visual resource, encompassing effects on landscape elements, characteristics and landscape character, designated landscapes, visual effects and cumulative effects.

1.1.3 Essentially, the landscape and visual effects (and whether they are significant) are determined by an assessment of the nature or 'sensitivity' of each receptor or group of receptors and the nature of the effect or 'magnitude of change' that would result from the noise barrier of the Proposed Development. The evaluation of sensitivity takes account of the value and susceptibility of the receptor to the noise barrier component of the Proposed Development. This is combined with an assessment of the magnitude of change which takes account of factors such as the size and scale of the proposed change and the geographical extent. Other factors regarding the nature of the effect such as the duration of change and whether the effect is cumulative are also noted. By combining assessments of sensitivity and magnitude of change, a level of landscape or visual effect as well as the nature of that effect can be evaluated and the significance of the effect determined.

1.1.4 The resulting level of effect is described in terms of whether it is significant or not significant and the type or nature of effect is described as either direct or indirect; temporary or permanent (reversible); cumulative; and positive, neutral or negative. The assessment has also considered the cumulative effects resulting from the Proposed Development in combination with committed developments at the planning.

Graphic 1.1 Overview of approach to Landscape and Visual Impact Assessment



1.1.5 The assessment has also considered the cumulative effects likely to result from the Proposed Development and other similar committed developments.

1.1.6 In each case, an appropriate and proportionate level of assessment has been undertaken and agreed through consultation at the scoping stage. The level of assessment may be 'simple' (requiring desk-based data analysis) or 'detailed' (requiring site surveys and investigations in addition to desk-based analysis). Due to the nature of the LVIA, the LVIA will be subject to detailed assessment, with the runway alternation works of the Proposed Development scoped out. The LVIA unavoidably involves a combination of quantitative and qualitative assessment and wherever possible a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach.

Defining the Study Area

1.1.7 The Study Area for the LVIA is illustrated in **Figure 10.1** in **Appendix 10.3: LVIA Figures** and extends to a 2km buffer beyond the noise barrier and is supported by a number of viewpoint locations within Longford.

1.1.8 IEMA Guidance[2,3] recommends a proportionate assessment focused on the likely significant effects of a development, and a proportionate technical aspect chapter. The LVIA Study Area must therefore be large enough to capture all likely significant effects. However, an overly large LVIA Study Area may be considered disproportionate if it makes understanding the key impacts of the development more difficult by including extraneous baseline information, and hence receptors which are unlikely to be significantly affected by the Proposed Development.

1.1.9 This is supported by the GLVIA3 (paragraph 3.16) which recommends that "*The level of detail provided should be that which is reasonably required to assess the likely significant effects*". Paragraph 5.2 also states that "*The study area should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner*".

1.1.10 The LVIA Study Area therefore defines a limit, based on professional judgement, beyond which it is considered unlikely for significant effects to arise. This judgement of up to 2km is based on a detailed analysis of the Zone of Theoretical Visibility (ZTV) (**Figure 10.1** in **Appendix 10.3: LVIA Figures**) and site surveys to establish an understanding of the local landscape character and the scale of the construction and development proposed.

1.1.11 Viewpoint analysis is used to assist the assessment and is conducted from selected viewpoints within the Study Area. The purpose of this is to assess the level of visual effect for particular receptors. A summary table is provided in **Table 10.8** in **Chapter 10: Landscape and Visual Impact Assessment, Volume II** of the Environmental Statement, which will assist in defining the direction, elevation, geographical spread and nature of the potential effects and identify areas where significant effects are likely to occur. This approach seeks to provide clarity and confidence to consultees and decision makers by allowing the detailed judgements on the magnitude of visual change to be more readily scrutinised and understood.

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[2] Institute of Environmental Management and Assessment (2015) *Environmental Impact Assessment Guidance to Shaping Quality Development.* [Online] Available at: https://www.bing.com/ck/a?!&&p=9fd810d1019466bfJmltdHM9MTcyNTQwODAwMCZpZ3VpZD0xMTE3MjE4MC1iMDcwLTY2Y2EtMmU3Zi0zNTVjYjEwYzY3ZTQmaW5zaWQ9NTIwOQ&ptn=3&ver=2&hsh=3&fclid=11172180-b070-66ca-2e7f-355cb10c67e4&psq=Environmental+Impact+Assessment+Guidance+to+Shaping+Quality+Development.&u=a1aHR0cHM6Ly93d3cuaWVtYS5uZXQvZG93bmxvYWQtZG9jdW1lbnQvNzAxOA&ntb=1 [Accessed 04 September 2024].

[3] Institute of Environmental Management and Assessment (2017) *Delivering Proportionate EIA. A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice.* [online] Available at: https://www.iema.net/download-document/33945 [Accessed: 04 September 2024].

1.3 Iterative assessment and design

Overview

1.2.1 The LVIA is part of an iterative Environmental Impact Assessment (EIA) process which aims to 'design out' significant effects via a range of embedded environmental measures including avoidance and design that aim to reduce or eliminate significant effects. Design is an integrated part of the LVIA process and embedded environmental measures related to landscape design and management can be an important tool to mitigate significant effects. The EIA process can also call on a range of environmental and technical specialists that contribute other forms of mitigation that may also bring a range of benefits to the Proposed Development. Likely significant landscape and visual effects and the constraints and opportunities connected with their resolution are identified through the LVIA process. Where possible, embedded environmental measures such as design modification or landscape planting schemes are incorporated into the noise barrier component of the Proposed Development in order to mitigate landscape and visual effects.

1.2.2 Embedded environmental measures are outlined in **Chapter 3: Description of the Proposed Development** in **Section 3.4**, which details how the measures will be secured as well as documenting the design evolution of the noise barrier. Measures relating specifically to the LVIA are reported in **Table 10.7** in **Chapter 10: Landscape and Visual Impact Assessment**.

Potential effects during the construction phase

1.2.3 A range of potential effects on the landscape and visual resource are likely during the construction of the noise barrier component of the Proposed Development. This appraisal of the potential effects helps define the scope and nature of the LVIA methodology. The potential effects likely to result from construction are described below.

- Landscape effects:
  - Effects on landscape elements, features, and patterns (including, but not limited to soils, landform, ground vegetation, hedgerows/field boundaries, trees, woodland and buildings) as a result of land preparation including site clearance and earthworks;
  - Effects on landscape character and key characteristics, including perceptual characteristics and qualities as a result of construction activities. The construction activities are likely to include the presence of construction staff and machinery, cranes, vehicle movements, contractors' facilities, including task lighting and site access associated with the noise barrier; and
  - Effects on the special landscape qualities and integrity of designated landscapes as a result of the above construction activities.
- Visual effects:

- Effects on the views and visual amenity experienced by people undertaking various activities at various locations, distances and directions from the proposed land preparation and construction activities. These visual effects could be experienced from one location or sequentially as part of a route through the landscape such as a National Trail or long-distance footpath.

Potential effects during the operational phase

1.2.4 The potential effects during the operational phase relate principally to the presence of the noise barrier. The operational phase of the noise barrier is indefinite, resulting in a permanent (reversible) effect on landscape and visual receptors.

1.2.5 The potential effects during the operational phase are assessed in **Chapter 10: Landscape and Visual Impact Assessment**.

1.4 Guidance data sources and site surveys

Guidance on methodology

1.3.1 This methodology accords with the guidance set out in the GLVIA3[1]. Where it clarifies or diverges from specific aspects of the guidance, in a small number of areas, reasoned professional justification for this is provided as follows.

- GLVIA3[1] sets out an approach to the assessment of magnitude of change in which three separate considerations are combined within the magnitude of change rating. These are the size or scale of the effect, its geographical extent and its duration and reversibility. This approach is to be applied in respect of both landscape and visual receptors. The assessors consider that the process of combining all three considerations in one rating can distort the aim of identifying significant effects of development. For example, a high magnitude of change, based on size or scale, may be reduced to a lower rating if it occurred in a localised geographical area and for a short duration. This might mean that a likely significant effect will be overlooked if effects are diluted down due to their limited geographical extents and/or duration or reversibility.
- The assessors have chosen to keep the consideration of the size or scale of the effect, its geographical extent and its duration and reversibility separate, by basing the magnitude of change on size or scale to determine where significant and non-significant effects occur, and then describing the geographical extents of these effects and their duration and reversibility separately. Duration and reversibility are stated separately in relation to the assessed effects (as short/medium/long-term and temporary/permanent) and are considered as part of drawing together conclusions about significance and combining with other judgements on sensitivity and magnitude, to allow a final judgement to be made on whether an effect is significant or not significant.
- The assessment methodology utilises six word scales to describe the magnitude of change – high, medium-high, medium, medium-low, low and negligible-zero; which are preferred to the ‘maximum of five categories’

suggested in the GLVIA3[1] (paragraph 3.27), as a means of clearly defining and summarising magnitude of change judgements.

Data sources

1.3.2 A list of the data sources used for this assessment is provided in **Chapter 10: Landscape and Visual Impact Assessment**.

Desk-based and site survey work

1.3.3 The LVIA undertaken as part of the Environmental Statement is informed by desk-based studies and site and field survey work undertaken for the noise barrier component of the Proposed Development and LVIA Study Area.

1.3.4 A desk-based assessment has been undertaken of landscape and visual receptors using a range of map-based data and related computer and digital analysis including ZTV, digital and/or surface terrain modelling and wireframe and street view software. This information is used to inform initial assessments and focus the site survey work and likely locations for viewpoint photography and sequential route assessment.

1.3.5 A series of site surveys have been undertaken to verify the initial desk-based assessments which may only require simple assessment techniques to complete. This may be due to receptors falling outside the ZTV or confirmation of screening from vegetation and/or built form that means there would be no view of the noise barrier component of the Proposed Development.

1.3.6 Site and field survey activities include:

- Field survey verification of landscape elements of the Proposed Development and recommendations for embedded environmental measures where likely significant effects are identified;
- Field survey verification of the ZTV from landscape and visual receptor locations and transport and recreational routes through the LVIA Study Area; and
- Micro-siting of viewpoint locations and recording of panoramic baseline photography and subsequent visual assessment from the assessment viewpoints.

1.3.7 All site survey work was undertaken in fair weather conditions with good to excellent visibility.

1.5 Assessing landscape effects

Overview

1.4.1 Landscape effects are defined in the GLVIA3[1] within paragraphs 5.1 and 5.2 as follows:

> "*An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the*

proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character".

1.4.2 In accordance with the GLVIA3[1], the term 'landscape' encompasses areas of 'townscape'. Areas of landscape are relevant to this assessment and are described in the following sections.

Landscape character

1.4.3 The GLVIA3[1] within paragraph 5.4 advises that the Landscape Character Assessment should be regarded as the main source for baseline studies and identifies the following factors which combine to create areas of distinct landscape character:

- "*the elements that make up the landscape in the study area including:*
  - *physical influences – geology, soils, landform, drainage and water bodies;*
  - *landcover, including different types of vegetation and patterns and types of tree cover; and*
  - *the influence of human activity, including landuse and management, the character of settlements and buildings, and pattern and type of fields and enclosure.*
- *The aesthetic and perceptual aspects of the landscape – such as, for example, its scale, complexity, openness, tranquillity or wildness;*
- *The overall character of the landscape in the study area, including any distinctive Landscape Character Types or Areas that can be identified, and the particular combinations of elements and aesthetic and perceptual aspects that make each distinctive, usually by identification as key characteristics of the landscape*".

Landscape effects

1.4.4 The potential landscape effects, occurring during the construction and operational phases of the Proposed Development may therefore include, but are not restricted to the following:

- Changes to landscape elements: the addition of new elements (noise barrier) or the removal of existing elements such as trees, vegetation and buildings and other characteristic elements or valued features of the landscape character;
- Changes to landscape qualities: degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of the landscape character or contribute to the landscape value;
- Changes to landscape character: landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the addition of new

features, the magnitude of which is sufficient to alter the overall landscape character within a particular area;

- Changes to designated landscapes that would affect the special landscape qualities underpinning the designation and its integrity; and
- Cumulative landscape effects: where more than one development of a similar type may lead to a cumulative landscape effect.

1.4.5 Development may have a direct effect on the landscape as well as an indirect effect which would be perceived from the wider landscape, outside the immediate Site area and its associated landscape character.

1.5 Evaluating landscape sensitivity to change

Overview

1.5.1 The assessment of sensitivity takes account of the landscape value and the susceptibility of the receptor to the noise barrier component of the Proposed Development.

1.5.2 Landscape sensitivity often varies in response to both the type and phase of the development proposed and its location, such that landscape sensitivity needs to be considered on a case-by-case basis. It should not be confused with 'inherent sensitivity' where areas of the landscape may be referred to as inherently of 'high' or 'low' sensitivity. For example, a National Park may be described as inherently of high sensitivity on account of its designation and value, although it may prove to be less sensitive or susceptible to particular development, and of variable sensitivity across its geographical area. Alternatively, an undesignated landscape may be of high sensitivity to a particular development regardless of the lack of local or national designation.

Value of the landscape receptor

1.5.3 The value of a landscape receptor is a reflection of the value that society attaches to that landscape. The assessment of the landscape value is classified as high, high-medium, medium, medium-low or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following range of factors:

- Landscape designations – A receptor that lies within the boundary of a recognised landscape related planning designation will be of increased value, depending on the proportion of the receptor that is affected and the level of importance of the designation which may be international, national, regional or local. The absence of designation does not however preclude value, as an undesignated landscape receptor may be valued as a resource in the local or immediate environment;
- Landscape quality – The quality of a landscape receptor is a reflection of its attributes, such as scenic quality, sense of place, rarity and representativeness and the extent to which its valued attributes have remained intact. A landscape with consistent, intact, well-defined and

distinctive attributes is considered to be of higher quality and, in turn, higher value, than a landscape where the introduction of elements has detracted from its character; and

- Landscape experience – The experiential qualities that can be evoked by a landscape receptor can add to its value. These responses relate to a number of factors including cultural associations that may exist in art, literature or history; the recreational value of the landscape, or the iconic status of the landscape in its own right; and its contribution of other values such as nature conservation or archaeology.

Landscape susceptibility to change

1.5.4 The susceptibility of a landscape receptor to change is a reflection of its ability to accommodate the changes that will occur as a result of the addition of the noise barrier component of the Proposed Development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. Some landscape receptors are better able to accommodate development than others due to certain characteristics that are indicative of capacity to accommodate change. These characteristics may or not also be special landscape qualities that underpin designated landscapes.

1.5.5 The assessment of the susceptibility of the landscape receptor to change is classified as high, high-medium, medium, medium-low or low and the basis for this assessment will be made clear using evidence and professional judgement.

1.5.6 Indicators of landscape susceptibility to the type of development proposed (construction and operation of the noise barrier) are based on the following criteria:

- Overall strength and robustness – Collectively the overall characteristics and qualities of a particular landscape result in a strong and robust landscape that is capable of reasonably accommodating the noise barrier component of the Proposed Development without undue adverse effects on the special landscape qualities (in the case of a designated landscape) or the key characteristics for which an area of landscape character or a particular element it is valued;

- Landscape scale and topography – The scale and topography are large enough to physically accommodate the development footprint without the requirement of invasive earthworks or drainage. Topographical features such as narrow valleys or more complex and small-scale landforms such as drumlins, incised river valleys/gorges, cliffs or rock outcrops are likely to be more susceptible to this type of development than broad, homogenous topography;

- Openness in the landscape may increase susceptibility to change because it can result in wider visibility of the Proposed Development, however open landscape may also be larger scale and simple which would decrease susceptibility. Conversely enclosed landscapes can offer more screening potential, limiting visibility to a smaller area, however they may also be smaller scale and more complex which would increase susceptibility. In general,

landscapes with greater enclosure are likely to be less susceptible to the noise barrier component of the Proposed Development, than more open landscapes which may be less able to accommodate the noise barrier and landscape mitigation in the form of planting schemes;

- Land cover pattern – Ancient and mature or long-established vegetation such as mature trees, woodland and protected hedgerows are likely to be more susceptible to the noise barrier component of the Proposed Development, particularly where these elements form part of a valued characteristic landscape pattern or feature. Conversely grassland or arable crops and field boundaries comprising post and wire fencing, small, gappy hedges or young pioneer trees are likely to be less susceptible because they can be readily reinstated in the case of the noise barrier and are likely to be of lower landscape value;
- Skyline – Prominent and distinctive skylines and horizons with important landmark features that are identified in the landscape character assessment, are generally considered to be more susceptible to development in comparison to broad, simple skylines which lack landmark features or contain other infrastructure features;
- Relationship with other development and landmarks – Contemporary landscapes where there are existing similar developments (noise barriers) or other forms of development (industry, mineral extraction, masts urban fringe/large settlement, major transport routes) that already have a characterising influence result in a lower susceptibility to development in comparison to areas characterised by smaller scale, historic development and landmarks (historic villages with dense settlement patterns and associated buildings such as church towers);
- Rationale – Some site locations have an obvious visual rationale for the noise barrier component of the Proposed Development in terms of the available space, access, simplicity and relationship to other similar forms of development. The design quality and embedded environmental measures will be high. Conversely a site may appear overly constrained and require greater engineering or additional construction activity to accommodate the noise barrier component of the Proposed Development with lower design quality and few embedded environmental measures;
- Remoteness, naturalness, wildness/tranquillity – Notably landscapes that are acknowledged to be particularly scenic, wild or tranquil are generally considered to be more susceptible to development in comparison to ordinary, cultivated or farmed/developed landscapes where perceptions of ‘wildness’ and tranquillity are less tangible. Landscapes which are either remote or appear natural may vary in their susceptibility to development; and
- Landscape context and adjacent landscapes – The extent to which the noise barrier component of the Proposed Development will influence landscape receptors across the Study Area relates to the associations that exist between the landscape receptor within which the Proposed Development is located

and the landscape receptor from which the noise barrier component of the Proposed Development are being experienced. In some situations, this association will be strong, where the landscapes are directly related. For example, adjacent areas of landscape character may share or 'borrow' a high number of common characteristics. Landscape elements may be linked to or associated with wider landscape patterns such as individual trees forming part of an avenue or pattern of woodland copses, for example. In other situations, the association between adjacent landscapes will be weak. The context and visual connection to areas of adjacent landscape character or designations has a bearing on the susceptibility to development.

Landscape sensitivity rating

1.5.7 An overall sensitivity assessment of the landscape receptor is made by combining the assessment of the value of the landscape character receptor and its susceptibility to change. The evaluation of landscape sensitivity is described as 'High', 'Medium-high' 'Medium' 'Medium-low' or 'Low' and is drawn from the consideration of a range of criteria that indicate landscape value and susceptibility. The basis for the assessment is made clear using evidence and professional judgement in the evaluation of sensitivity for each receptor. Criteria that tend towards higher or lower sensitivity are set out in **Table 1.1**.

Table 1.1 Landscape sensitivity to change

Value/Susceptibility criteria	Level of value / susceptibility ranging from 'High' to 'Medium' to 'Low' High ⟷ Medium ⟷ Low	
Value – Landscape Value is determined by consideration a range of indicators/criteria with examples as follows:		
Designation	Designated landscapes/elements with national policy level protection or defined for their natural beauty. Evidence that the landscape/element is valued or used substantially for recreational activity.	Landscapes without formal designation. Despoiled or degraded landscape with little or no evidence of being valued by the community. Elements that are uncharacteristic such as non-natives or self-seeded vegetation that may need to be cleared.
Quality	Higher quality landscapes/elements with consistent, intact and well-defined, distinctive attributes.	Lower quality and indistinct landscapes/elements or features that detract from its inherent attributes.
Rarity	Rare or unique landscape character types, features or elements.	Widespread or 'common' landscape character types, features or elements.
Aesthetic/scenic	Aesthetic/scenic or perceptual aspects of designated wildlife, ecological or cultural heritage features that contribute to landscape character.	Limited wildlife, ecological or cultural heritage features, or limited contribution to landscape character.
Perceptual qualities	Landscape with perceptual qualities of wildness, remoteness or tranquillity.	Limited or no evidence that the landscape is used for recreational activity.

Value/Susceptibility criteria	Level of value / susceptibility ranging from 'High' to 'Medium' to 'Low' High ⟷ Medium ⟷ Low	
Cultural associations	Landscape with strong cultural associations that contributes to scenic quality.	Landscape with few cultural associations.
Susceptibility – Landscape Susceptibility is determined by consideration a range of indicators/criteria with examples as follows:		
Strength and robustness	Fragile landscape vulnerable and lacking the ability to accommodate change.	Robust landscape, able to accommodate change or loss of features without undue adverse effects.
Landscape Scale	A smaller scale landscape that may require further engineering to accommodate the noise barrier of the Proposed Development.	A landscape of a suitably large enough scale to accommodate the noise barrier of the Proposed Development.
Openness/Enclosure	An open landscape with limited screening and higher susceptibility to the noise barrier of the Proposed Development.	An enclosed landscape with screening and lower susceptibility to the noise barrier of the Proposed Development.
Reinstatement	Higher value, characteristic landcover and elements that cannot be easily reinstated or replaced.	Lower value, non-characteristic landcover and elements capable of rapid reinstatement or replacement.
Skyline	Distinctive undeveloped skylines with landmark features.	Developed, nondistinctive skylines.
Association	Weak and indirect association. Other development may be of a smaller scale or historic.	Strong or direct association other similar contemporary developments/landscape character.
Rationale	Landscape with numerous environmental and technical constraints and fewer environmental measures.	Strong landscape rationale and opportunity with high degree of design quality and/or environmental measures.
Perceptual Qualities	Perceptual qualities associated with particular scenic qualities, wildness or tranquillity.	Contemporary, cultivated/settled or developed landscapes are likely to have a lower susceptibility.
Landscape Context	Adjacent landscape character context connected by borrowed character and views.	Host landscape character is separate from surrounding/adjacent landscape character
Sensitivity	**Sensitivity drawn from consideration of the above Value and Susceptibility criteria with the final conclusion on the level of Sensitivity ranging from 'High' to 'Medium' to 'Low'.**	

1.6 Landscape magnitude of change

Overview

1.6.1 The magnitude of change affecting landscape receptors is an expression of the scale of change that would result from the noise barrier component of the Proposed Development. In assessing the magnitude of change the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (as short/medium/long-term and temporary/permanent).

Size or scale of change

1.6.2 This criterion relates to the size or scale of change to the landscape that would arise as a result of the noise barrier component of the Proposed Development, based on the following factors:

- Landscape elements – The degree to which the landscape elements or pattern of elements that makes up the landscape character would be altered by the noise barrier component of the Proposed Development, through the loss, alteration or addition of elements in the landscape. The magnitude of change would generally be higher if the features that make up the landscape character are extensively removed or altered, and/or if many new components are added to the landscape;
- Landscape characteristics – The extent to which the effect of the noise barrier component of the Proposed Development change (physically or perceptually) the key characteristics of the landscape which may be important to its distinctive character. This may include, for example, the scale of the landform, its relative simplicity, complexity or irregularity, seasonal changes, the nature of the landscape context, the grain or orientation of the landscape, the degree to which the receptor is influenced by external features and the juxtaposition of the noise barrier component of the Proposed Development in relation to these key characteristics;
- Landscape character/designation – The degree to which landscape character receptors would be changed by the addition of the noise barrier component of the Proposed Development. If the noise barrier component of the Proposed Development are located in a landscape receptor that has similar development/activities present within its character. This may for example reduce the magnitude of change if there is a high level of integration and the developments form a unified and cohesive feature in the landscape. In the case of designated landscapes, the degree of change is considered in light of the effects on the special landscape qualities which underpin the designation and the effect on the integrity of the designation;
- All landscapes change over time and much of that change is managed or planned or may be seasonal/natural. Often landscapes will have management objectives for ‘protection’ or ‘accommodation’ of development. The scale of change may be localised, or occurring over parts of an area, or more widespread affecting whole landscape character areas and their overall integrity; and
- Distance – The size and scale of change is also strongly influenced by the proximity of the noise barrier component of the Proposed Development to the receptor and the extent to which the development can be seen as a characterising influence on the landscape. Consequently, the scale or magnitude of change is likely to be lower in respect of landscape receptors that are distant from the noise barrier component of the Proposed Development and/or screened by intervening landform, vegetation and built form to the extent that the scale of their influence on landscape receptors is

small or limited. Conversely, landscapes closest to the noise barrier component of the Proposed Development are likely to be most affected. Host landscapes (where the development is located within a 'host' landscape character unit) would be directly affected whilst adjacent areas of landscape character would be indirectly affected.

Geographical extent

1.6.3 Landscape effects are described in terms of the geographical extent or physical area that would be affected (described as a linear or area measurement which could also be described as local, medium or large scale). This should not be confused with the scale of the development or its physical footprint. The manner in which the geographical extent of the landscape effect is described for different landscape receptors is explained as follows:

- Landscape elements – The geographical extent of landscape elements may be objectively measured in terms of numbers, area or linear measurement. For example, the number of trees, area of woodland or length of hedgerow affected may be recorded;
- Landscape character/characteristics – The extent of the effects on landscape character will vary depending on the specific nature of the noise barrier component of the Proposed Development. This is not simply an expression of visibility or the extent of the ZTV. It is a specific assessment of the extent of landscape character that would be changed by the noise barrier component of the Proposed Development in terms of its character, key characteristics and elements. The geographical extent may be described as local (within the local vicinity of the noise barrier component of the Proposed Development or field unit within which it is located) medium, or large/wide scale (affecting areas beyond the local vicinity or field unit); and
- Landscape designations – In the case of a designated landscape, this refers to the extent the special landscape qualities of the designation are affected and whether this can be defined in terms of area or linear measurements, or subjectively (with the support of panel and/or peer review) and whether the integrity of the designation is affected. As with the landscape character the geographical extent may be described as local (within the local vicinity of the noise barrier component of the Proposed Development or field unit within which it is located) medium, or large/wide scale (affecting areas beyond the local vicinity or field unit).

Duration and reversibility

1.6.4 The duration or time period over which a landscape effect is likely to occur is judged on a scale of 'short', 'medium' or 'long' term and is assessed for the noise barrier of the Proposed Development as follows:

- Long-term – more than 10 years;
- Medium-term – 6 to 10 years; and

- Short-term – 1 to 5 years.

1.6.5 In addition, the nature or type of effect may also be described as temporary or permanent.

1.6.6 Reversibility is a separate, but linked consideration concerning the prospects and practicality of a particular effect being reversed. Some forms of development, such as housing can be considered as permanent, whereas other forms of development can be considered as reversable because they have a limited operational life and after their removal the land would be restored. Mineral workings for example may be partially reversible with the landscape restored, although not completed the same as the original.

Landscape magnitude of change rating

1.6.7 The 'magnitude' or 'degree of change' resulting from the noise barrier component of the Proposed Development is described as 'High', 'Medium-high', 'Medium', 'Medium-low' 'Low' or 'Negligible-Zero'. In assessing the magnitude of change, the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (as short/medium/long-term and temporary/permanent). The basis for the assessment of magnitude of change for each receptor will be made clear using evidence and professional judgement.

1.6.8 The levels of magnitude of change that can occur are defined in **Table 1.2**.

Table 1.2 Landscape magnitude of change ratings

Magnitude of landscape change	Examples of Landscape Magnitude
High	• Size/Scale – A large-scale change and major loss of key landscape elements/characteristics or the addition of large scale or numerous new and uncharacteristic features or elements that would affect the landscape character and the special landscape qualities/integrity of a landscape designation Directly affecting a host landscape receptor or indirectly affecting a nearby receptor • Geographical extent – The size or scale of change would typically, but not always affect a large geographical extent or area and may be close to the noise barrier component of the Proposed Development.
Medium-high	• Intermediate rating with combination of criteria from high or medium magnitude.
Medium	• Size/ Scale – A medium scale change and moderate loss of some key landscape elements/characteristics or the addition of some new medium scale uncharacteristic features or elements that could partially affect the landscape character and the special landscape qualities/integrity of a landscape designation Directly affecting a host landscape receptor or indirectly affecting a nearby receptor

Magnitude of landscape change	Examples of Landscape Magnitude
	• Geographical extent – The size or scale of landscape change would typically, but not always affect a more localised geographical extent at an intermediate distance from the noise barrier component of the Proposed Development.
Medium-low	• Intermediate rating with combination of criteria from medium or low magnitude.
Low	• Size/Scale – A small-scale change and minor loss of a few landscape elements/non key characteristics, or the addition of some new small-scale features or elements of limited characterising influence on landscape character/designations • Geographical extent – There may be a small partial change in landscape character, typically, but not always affecting a localised geographical extent at some distance from the noise barrier component of the Proposed Development.
Negligible - Zero	• Size/Scale – A very small-scale change that may include the loss or addition of some landscape elements of limited characterising influence. The landscape characteristics and character would be unaffected • Geographical extent – Typically affecting a very small geographical extent at greater distance from the noise barrier component of the Proposed Development.

1.7 Evaluating landscape effects and significance

Overview

1.7.1 The level of landscape effect is evaluated through the combination of landscape sensitivity and magnitude of change. Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'Significant' or 'Not Significant' as required by the Infrastructure Planning Environmental Impact Assessment) Regulations 2017[4]. This process is assisted by the matrix in

1.7.2 **Table** 1.5**,** which is used to guide the assessment. The factors considered in the evaluation of the sensitivity and the magnitude of the change resulting from the noise barrier component of the Proposed Development and their conclusion, will be presented in a comprehensive, clear and transparent manner.

1.7.3 Further information is also provided about the nature of the effects (whether these would be direct/indirect; temporary/permanent/reversible; beneficial/neutral/adverse and/or cumulative).

[4] HM Government (2017) *The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017*. [online] Available at: https://www.legislation.gov.uk/uksi/2017/572/contents [Accessed: 06 September 2024].

Significant landscape effects

1.7.4 A significant effect would occur where the combination of the variables results in the noise barrier component of the Proposed Development having a defining effect on the landscape receptor, or where changes of a lower magnitude affect a landscape receptor that is of particularly high sensitivity. A major loss or irreversible effect over an extensive area or landscape character, affecting landscape elements, characteristics and/or perceptual aspects that are key to a nationally valued landscape are likely to be significant.

Not Significant landscape effects

1.7.5 A not significant effect would occur where the effect of the noise barrier component of the Proposed Development is not defining, and the landscape character of the receptor continues to be characterised principally by its baseline characteristics. Equally a small-scale change experienced by a receptor of high sensitivity may not significantly affect the special landscape quality or integrity of a designation. Reversible effects, on elements, characteristics and character that are of small-scale or affecting lower value receptors are unlikely to be significant.

1.6 Assessing visual effects

Overview

1.8.1 Visual effects are concerned wholly with the effect of the development on views, and the general visual amenity and are defined in the GLVIA3[1], paragraph 6.1 as follows:

> "*An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views*".

1.8.2 Visual effects are identified for different receptors (people) who would experience the view at their place of residence, within their community, during recreational activities, at work, or when travelling through the area. The visual effects may include the following:

- Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view; and
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

1.8.3 The level of visual effect (and whether this is significant) is determined through consideration of the sensitivity of each visual receptor (or range of sensitivities for receptor groups) and the magnitude of change that would be brought about by the construction and operation of the noise barrier component of the Proposed Development.

Zone of Theoretical Visibility (ZTV)

1.8.4 Plans mapping the ZTV are used to analyse the extent of theoretical visibility of development or part of a development, across the Study Area and to assist with viewpoint selection. The ZTV does not however, take account of the screening effects of buildings, localised landform and vegetation, unless specifically noted (see individual figures in **Appendix 10.3: LVIA Figures**). As a result, there may be roads, tracks and footpaths within the Study Area which, although shown as falling within the ZTV, are screened or filtered by built form and vegetation, which would otherwise preclude visibility.

1.8.5 The ZTVs provide a starting point in the assessment process and accordingly tend towards giving a 'worst case' or greatest calculation of the theoretical visibility.

Viewpoint analysis

1.8.6 Viewpoint analysis is used to assist the assessment and is conducted from selected viewpoints within the Study Area. The purpose of this is to assess both the level of visual effect for particular receptors and to help guide the design process and focus the assessment. A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect would occur. By arranging the viewpoints in order of distance it is possible to define a threshold or outer geographical limit, beyond which significant effects would be unlikely.

1.8.7 The assessment involves visiting the viewpoint location and viewing wirelines and photomontages prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather with good visibility and considers seasonal changes such as reduced leaf cover or hedgerow maintenance.

1.8.8 Viewpoint analysis prepared for each viewpoint is presented as supporting evidence in **Appendix 10.2: Viewpoint Analysis**. A summary table of the findings will also be provided in order of distance from the proposed noise barrier. This summary table will assist in defining the direction, elevation, geographical spread and nature of the potential visual effects and identify areas where significant effects are likely to occur. This approach seeks to provide clarity and confidence to consultees and decision makers by allowing the detailed judgements on the magnitude of visual change to be more readily scrutinised and understood.

1.9 Evaluating visual sensitivity to change

Overview

1.9.1 In accordance with paragraphs 6.31 to 6.37 of the GLVIA3[1], the sensitivity of visual receptors is determined by a combination of the value of the view and the susceptibility of the visual receptors to the change likely to result from the noise barrier component of the Proposed Development on the view and visual amenity.

Value of the view

1.9.2 The value of a view or series of views reflects the recognition and importance attached either formally through identification on mapping or being subject to planning designations, or informally through the value which society attaches to the view(s). The value of a view is classified as high, high-medium, medium, medium-low or low and the basis for this assessment will be made clear using evidence and professional judgement, based on the following criteria:

- Formal recognition – The value of views can be formally recognised through their identification on Ordnance Survey (OS) or tourist maps as formal viewpoints, sign-posted and with facilities provided to add to the enjoyment of the viewpoint such as parking, seating and interpretation boards. Specific views may be afforded protection in local planning policy and recognised as valued views. Specific views can also be cited as being of importance in relation to landscape or heritage planning designations, for example the value of a view would be increased if it presents an important vista from a designed landscape or lies within or overlooks a designated area, which implies a greater value to the visible landscape; and
- Informal recognition – Views that are well-known at a local level and/or have particular scenic qualities can have an increased value, even if there is no formal recognition or designation. Views or viewpoints are sometimes informally recognised through references in art or literature, and this can also add to their value. A viewpoint that is visited and appreciated by a large number of people would generally have greater importance than one gained by very few people.

Susceptibility to change

1.9.3 Susceptibility relates to the nature of the viewer experiencing the view and how susceptible they are to the potential effects of the noise barrier component of the Proposed Development. A judgement to determine the level of susceptibility therefore relates to the nature of the viewer and their experience from that particular viewpoint or series of viewpoints, classified as high, high-medium, medium, medium-low or low and based on the following criteria:

- Nature of the viewer – The nature of the viewer is defined by the occupation or activity of the viewer at the viewpoint or series of viewpoints. The most common groups of viewers considered in the visual assessment include residents, motorists, and people taking part in recreational activity or working. Viewers, whose attention is focused on the landscape, or with static long-term views, are likely to have a higher sensitivity. Viewers travelling in cars or on trains would tend to have a lower sensitivity as their view is transient and moving. The least sensitive viewers are usually people at their place of work as they are generally less sensitive to changes in views; and
- Experience of the viewer – The experience of the visual receptor relates to the extent to which the viewer's attention or interest may be focused on the view and the visual amenity they experience at a particular location. The

susceptibility of the viewer to change arising from the noise barrier component of the Proposed Development may be influenced by the viewer's attention or interest in the view, which may be focused in a particular direction, from a static or transitory position, over a long or short duration, and with high or low clarity. For example, if the principal outlook from a settlement is aligned directly towards the noise barrier component of the Proposed Development, the experience of the visual receptor would be altered more notably than if the experience relates to a glimpsed view seen at an oblique angle from a car travelling at high speed. The visual amenity experienced by the viewer varies depending on the presence and relationship of visible elements, features or patterns experienced in the view and the degree to which the landscape in the view may accommodate the influence of the noise barrier component of the Proposed Development.

Visual sensitivity rating

1.9.4 An overall level of sensitivity is applied for each visual receptor or view – High, Medium-high, Medium, Medium-low, or Low – by combining individual assessments of the value of the view and the susceptibility of the visual receptor to change. Each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, is assessed in terms of their sensitivity. The basis for the assessments is made clear using evidence and professional judgement in the evaluation of each receptor. Criteria that tend towards higher or lower sensitivity are set out in

1.9.5 **Table** 1.3.

Table 1.3 Visual sensitivity to change

Value / Susceptibility criteria	Level of value/susceptibility ranging from 'High' to 'Medium' to 'Low' High ⟷ Medium ⟷ Low	
Value – is determined by consideration a range of indicators/criteria with examples as follows:		
Map/tourist information	Specific viewpoint identified in OS maps and/or tourist information and signage.	Viewpoint not identified in OS maps or tourist information and signage.
Facilities	Facilities provided at viewpoint to aid the enjoyment of the view.	No facilities provided at viewpoint to aid enjoyment of the view.
Planning recognition	View afforded protection in planning policy.	View is not afforded protection in planning policy.
Landscape value	View is within or overlooks a designated landscape, which implies a higher value to the visible landscape.	View is not within, nor does it overlook, a designated landscape.
Recognition	View has informal recognition and well-known at a local level, as having particular scenic qualities.	View has no informal recognition and is not known as having particular scenic qualities.
Art/Literature	View or viewpoint is recognised through references in art or literature.	View or viewpoint is not recognised in references in art or literature.
Scenic Quality	View has high scenic qualities relating to the content and composition of the visible landscape.	View has low scenic qualities relating to the content and composition of the visible landscape.
Susceptibility – is determined by consideration of a range of indicators/criteria with examples as follows:		
Activity of the viewer	Viewer who is likely or liable to be influenced by the noise barrier of the Proposed Development such as residents, walkers, or tourists, whose main attention and interest may be on their surroundings.	Viewer who is unlikely or less likely to be influenced by the noise barrier of the Proposed Development such as viewers whose attention is not focused on their surroundings (e.g., people at work, or team sports).
Nature of the View	Residents that gain static, long-term views of the development in their principal outlook.	Mobile viewers whose views are transient and dynamic (e.g., travelling in cars or on trains with glimpsed views).
Numbers of Viewers	Viewpoint is visited or used by a large number of people.	View is visited or gained by relatively very few people. An exception may be wild land.
Direction/Field of View	A view that is focused in a specific directional vista, with notable features of interest in a particular part of the view.	Open views with no specific point of interest.
Visual Amenity	Viewers are focused on the experience of a high level of visual amenity at the location due to its overall pleasantness as an attractive visual setting or backdrop to activities.	The visual amenity experienced at the location by viewers is less pleasant or attractive than might otherwise be the case.
Sensitivity	**Sensitivity drawn from consideration of the above Value and Susceptibility criteria with the final conclusion on the level of Sensitivity ranging from 'High' to 'Medium' to 'Low'.**	

1.10 Visual magnitude of change

Overview

1.10.1 The visual magnitude of change is an expression of the scale of change that would result from the visibility of the noise barrier component of the Proposed Development. In assessing the magnitude of change, the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e., as short/medium/long-term and temporary/permanent).

Size or scale of change

1.10.2 An assessment is made of the size or scale of change in the view that is likely to be experienced as a result of the noise barrier component of the Proposed Development, based on the following criteria:

- Distance – The distance between the visual receptor/viewpoint and the noise barrier component of the Proposed Development. Generally, the greater the distance, the lower the magnitude of change, as the noise barrier component of the Proposed Development would constitute a smaller-scale component of the view;
- Size – The amount and size of the noise barrier component of the Proposed Development that would be seen. Visibility may range from a small or partial visibility of the noise barrier component of the Proposed Development to all of the noise barrier component of the Proposed Development being visible. Generally, the larger and greater number of the noise barrier component of the Proposed Development that appear in the view, the higher the magnitude of change. This is also related to the degree to which development may be wholly or partly screened by landform, vegetation (seasonal) and/or built form. Conversely open views are likely to reveal more of a development, particularly where this is a key characteristic of the landscape;
- Scale – The scale of the change in the view, with respect to the loss or addition of features in the view and changes in its composition. The scale of the noise barrier component of the Proposed Development may appear larger or smaller relative to the scale of the receiving landscape;
- Field of View – The vertical/horizontal field of view (FoV) and the proportion of view that is affected by the noise barrier component of the Proposed Development. Generally, the more of the proportion of a view that is affected, the higher the magnitude of change would be. If the noise barrier component of the Proposed Development extend across the whole of the open outlook, the magnitude of change would generally be higher as the full view would be affected. Conversely, if the noise barrier component of the Proposed Development extend over a narrow part of an open view, the magnitude of change is likely to be reduced as the noise barrier component of the Proposed Development would not affect the whole view or outlook. This can in part be

described objectively by reference to the horizontal/vertical FoV affected, relative to the extent and proportion of the available view;

- Contrast – The character and context within which the noise barrier component of the Proposed Development would be seen and the degree of contrast or integration of any new features with existing landscape elements, in terms of scale, form, mass, line, height, colour, luminance and motion. Developments which contrast or appear incongruous in terms of colour, scale and form are likely to be more visible and have a higher magnitude of change;
- Consistency of image – The consistency of image of the noise barrier component of the Proposed Development in relation to other developments. The magnitude of change for the noise barrier component of the Proposed Development is likely to be lower if it appears broadly similar to other developments in the landscape in terms of its scale, form and general appearance. New development is more likely to appear as logical components of the landscape with a strong rationale for their location;
- Skyline/Background – Whether the noise barrier component of the Proposed Development would be viewed against the skyline or a background landscape may affect the level of contrast and magnitude. For example, skyline developments may appear more noticeable, particularly where they affect open and uninterrupted or undeveloped horizons. Conversely, development may also appear more noticeable when viewed against a darker background landscape, such as forestry. In these cases, the magnitude of change would tend to be higher;
- If the noise barrier component of the Proposed Development add to an already developed skyline the magnitude of change would tend to be lower;
- Number – Generally, the greater the number of separate development components seen simultaneously or sequentially, the higher the magnitude of change and this may lead to whole Proposed Development effect. Further cumulative effects would occur in the case of separate developments and their spatial relationship to each other would affect the magnitude of change. For example, development that appears as an extension to an existing development would tend to result in a lower magnitude of change than a separate, new development; and
- Nature of visibility – The nature of visibility is a further factor for consideration. The noise barrier component of the Proposed Development may be subject to various phases of development change and the manner in which the development may be viewed could be intermittent or continuous and/or seasonally, due to periodic management or leaf fall.

Geographical extent

1.10.3 The geographic extent over which the visual effects would be experienced is also assessed. This is distinct from the size or scale of effect and is described in terms of the physical area or location over which it would be experienced (described as a

linear or area measurement). The extent of the effects would vary according to the specific nature of the noise barrier component of the Proposed Development and is principally assessed through ZTV, field survey and viewpoint analysis of the extent of visibility likely to be experienced by visual receptors. The geographical extent of visual effects is described as per the following examples:

- The geographical extent can be described as an area measurement or proportion of the total receptor affected. For example, effects on people within a particular area such as a golf course or area of common land can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people within that area. The geographical extent of that visual effect can be expressed as approximately '5 hectares' or '10%' of the common land or a golf course area;
- The geographical extent can be described as a linear measurement (m or km) according to the length of route affected. For example, effects on people travelling on a route through the landscape such as a road or footpath can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people along that route. The geographical extent of that visual effect can be expressed as approximately '2km' or '10%' of the total length of the route; and
- The geographical extent of a visual effect experienced from a specific viewpoint may be limited to that location alone. (An example of a 'specific viewpoint' is a public viewpoint recommended in tourist literature such as a well visited hill summit. An example of an 'illustrative viewpoint' is a particular location within a built up or well vegetated area where an uncharacteristically open view exists).

Duration and reversibility

1.10.4 The duration or time period over which a visual effect is likely to occur is judged on a scale of 'short', 'medium' or 'long' term and is assessed for the noise barrier component of the Proposed Development as per the method set out in **paragraph 1.6.4**.

1.10.5 Reversibility is a separate, but linked consideration, also assessed for the noise barrier component of the Proposed Development as per the method set out in **paragraph 1.6.4**.

Visual magnitude of change rating

1.10.6 The 'magnitude' or 'degree of change' resulting from the noise barrier component of the Proposed Development is described as 'High', 'Medium-high', 'Medium', 'Medium-low' 'Low' and 'Negligible-Zero'. In assessing the magnitude of change, the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e., as short/medium/long-term and temporary/permanent). The basis for the assessment of magnitude for each receptor will be made clear using evidence and

professional judgement and some examples of the levels of magnitude of change that can occur on views are defined in **Table 1.4**.

Visual magnitude of change rating

1.10.7 The 'magnitude' or 'degree of change' resulting from the noise barrier component of the Proposed Development is described as 'High', 'Medium-high', 'Medium', 'Medium-low', 'Low' and 'Negligible-Zero'. In assessing the magnitude of change, the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e., as short/medium/long-term and temporary/permanent). The basis for the assessment of magnitude for each receptor will be made clear using evidence and professional judgement and some examples of the levels of magnitude of change that can occur on views are defined in **Table 1.4**.

Table 1.4 Visual magnitude of change

Magnitude of visual change	Examples of visual magnitude
High	• Size and scale – A very large - large and dominant change to the view. • Number – Involving the loss/addition of a large number of features/elements • Distance – Typically appearing closer to the viewer in the fore to middle ground • FoV – Affecting a large vertical and wide horizontal FoV • Nature of visibility – Multiple phase development, continuously and sequentially visible • Contrast – Strong degree of contrast with surroundings with little or no screening • Skyline – Visible on the skyline as a new feature • Consistency of image – Contrasting with other developments, lacking in visual rationale. Typically experienced from representative viewpoints illustrating a visual effect likely to be experienced by larger numbers of people, relative to the activity, affecting a large area or length/proportion of route. May also be experienced from a specific viewpoint.
Medium-high	Intermediate rating with combination of criteria from high or medium magnitude of change category.
Medium	• Size and scale – A medium and prominent change to the view • Number – Involving the loss / addition of a number of features / elements. • Distance – Typically appearing in the middle ground • FoV – Affecting a medium vertical and a medium horizontal FoV • Nature of visibility – Multiple phase development, intermittently and sequentially visible • Contrast – Contrast with surroundings and may benefit from some screening • Skyline – Visible on the skyline along with other features • Consistency of image – Different from other developments, some visual rationale. Typically experienced from representative viewpoints illustrating a visual effect likely to be experienced by a medium number of people, relative to the

Magnitude of visual change	Examples of visual magnitude
	activity, affecting a medium area or length/proportion of route. May also be experienced from a specific viewpoint.
Medium-low	Intermediate rating with combination of criteria from medium or low magnitude of change category.
Low	• Size and scale – A small and noticeable change, could being missed by the casual observer • Number – Involving the loss/addition of a small number of features/elements • Distance – Typically appearing in the background • FoV – Affecting a small vertical and a narrow horizontal FoV • Nature of visibility – Simple, single development, intermittently and infrequently visible • Contrast – Some parity/'fits' with surroundings and may benefit from screening • Skyline – Partly visible on a developed skyline or not visible on the skyline • Consistency of image – Similar from other developments with visual rationale, appearing reasonably well accommodated within its surroundings. Typically experienced from illustrative viewpoints likely to be experienced by low numbers of people, relative to the activity, affecting a smaller area or length / proportion of route. May also be experienced from a specific viewpoint.
Negligible - Zero	• Size and scale – A small or negligible change, need to 'look for it' • Number – Involving the loss/addition of a small number of features/elements • Distance – Typically appearing in the far distance • FoV – Affecting a small vertical and a very narrow horizontal FoV • Nature of visibility – Simple, single development, intermittently and infrequently visible • Contrast – Blends with surroundings and/or is well screened • Skyline – Partly visible on a developed skyline or not visible on the skyline • Consistency of image – Similar from other developments with strong visual rationale, appearing well accommodated within its surroundings. Typically experienced from illustrative viewpoints likely to be experienced by low numbers of people, relative to the activity, affecting a smaller area or length/proportion of route. May also be experienced from a specific viewpoint.

1.11 Evaluating visual effects and significance

Overview

1.11.1 The level of visual effect is evaluated through the combination of visual sensitivity and magnitude of change. Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'Significant' or 'Not Significant' as required by the relevant The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017[4]. This process is assisted by the matrix in

1.11.2 **Table** 1.5 which is used to guide the assessment. The factors considered in the evaluation of the sensitivity and the magnitude of the change resulting from the noise

barrier component of the Proposed Development and their conclusion, is presented in a comprehensive, clear and transparent manner.

1.11.3 Further information is also provided about the nature of the effects (whether these would be direct/indirect; temporary/permanent/reversible; beneficial/neutral/ adverse and/or cumulative).

Significant visual effects

1.11.4 A significant effect is more likely to occur where a combination of the variables results in the noise barrier component of the Proposed Development having a defining effect on the view or visual amenity or where changes affect a visual receptor that is of high sensitivity.

Not Significant visual effects

1.11.5 A not significant effect is more likely to occur where a combination of the variables results in the noise barrier component of the Proposed Development having a non-defining effect on the view or visual amenity or where changes affect a visual receptor that is of low sensitivity.

Weather conditions

1.11.6 The assessment of visual effects is undertaken in clear weather with good to excellent visibility. This means that the viewpoint assessment represents a maximum or fair assessment of the likely visual effects. The same viewpoint may be experienced under less optimal viewing conditions resulting in a significant effect appearing as not significant, due to the change in the variable weather conditions. Due to the conditions of the assessment the reverse (a not significant effect appearing as significant) is unlikely to occur.

1.7 Assessing cumulative effects

1.12.1 Existing cumulative developments are included as part of the baseline. There are no consented developments or those in the application or scoping phases of development within the Study Area. Therefore, there would be no cumulative effects.

1.8 Evaluation of significance

1.13.1 The matrix presented in

1.13.2 **Table** 1.5 is used as a guide to illustrate the LVIA process. In line with the emphasis placed in GLVIA3[1] upon the application of professional judgement, an overly mechanistic reliance upon a matrix is avoided through the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor. Such narrative assessments provide a level of detail over and above the outline assessment provided by use of the matrix alone.

1.13.3 The landscape and visual assessment unavoidably, involves a combination of quantitative and qualitative assessment and wherever possible cross references will

be made to objective evidence, baseline figures and/or to photomontage visualisations to support the assessment conclusions. Often a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach. Importantly each effect results from its own unique set of circumstances and have been assessed on a case-by-case basis. The matrix as presented in

1.13.4 **Table** 1.5 should therefore be considered as a guide and any deviation from this guide will be clearly explained in the assessment.

1.13.5 Significant landscape and visual effects are highlighted in bold and shaded dark purple in

1.13.6 **Table** 1.5. They relate to all those effects that result in a '**Major**' or a '**Major/Moderate**' level of effect. In some circumstances, '**Moderate**' levels of effect (shaded light purple) also have the potential, subject to the assessor's opinion, to be considered as significant and these exceptions are also highlighted in bold in the text and will be explained as part of the assessment, where they occur. White or un-shaded boxes in

1.13.7 **Table** 1.5 indicate a not-significant effect.

1.13.8 In those instances where there would be no effect, the magnitude of change has been recorded as '**Zero**' and the level of effect as '**No Effect**'.

Table 1.5 Evaluation of landscape and visual effects

Sensitivity	Magnitude of change					
	High	**Medium-high**	**Medium**	**Medium-low**	**Low**	**Negligible-Zero**
High	**Major (Significant)**	**Major (Significant)**	**Major/Moderate (Significant)**	**Moderate***	**Moderate***	Minor
Medium-high	**Major (Significant)**	**Major/Moderate (Significant)**	**Moderate***	**Moderate***	Moderate/Minor	Minor
Medium	**Major/Moderate (Significant)**	**Moderate***	**Moderate***	Moderate/Minor	Minor	Minor/Negligible
Medium-low	**Moderate***	**Moderate***	Moderate/Minor	Minor	Minor/Negligible	Negligible
Low	Moderate/Minor	Moderate/Minor	Minor	Minor/Negligible	Negligible	Negligible

*Note: Moderate levels of effect may/may not be significant subject to the assessor's professional opinion which shall be clearly explained.

1.9 Nature of effects

Overview

1.14.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017[4] state that the Environmental Statement should define "*the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development*".

1.14.2 Cumulative effects have been described in **Section 1.7**, and 'short-term, medium-term and long-term, permanent and temporary' are described in **Sections 1.5** and **1.6** under the heading 'Duration of effect'.

1.14.3 The definition of the remaining terms used in this assessment is provided in this Section.

Direct and indirect effects

1.14.4 Direct landscape effects relate to the host landscape and concern both physical and perceptual effects on the receptor.

1.14.5 Indirect landscape effects relate to those landscapes and receptors which separated by distance or remote from the development and therefore are only affected in terms of perceptual effects. The Landscape Institute[1] also defines indirect effects as those which are not a direct result of the development but are often produced away from it or as a result of a complex pathway.

1.14.6 Visual effects are generally all considered as direct effects. An indirect visual effect may however be used to define a visual effect on a view that is not in the direction of the main view of the viewer as described by the following examples:

- Road users generally face the road directly ahead in the direction of travel and visual effects affecting those views may be described as direct effects. Where the visual effect is experienced in views oblique to the direction of travel they may be described as indirect.
- Designed landscapes and vistas/viewpoints may be orientated in a particular direction and visual effects affecting those views may be described as direct effects. Where the visual effect is experienced in views oblique to the direction of the designed or main/primary view they may be described as indirect.

1.14.7 Secondary effects (or effects subsequent to an initial effect) are covered in this assessment by indirect effects.

Positive and negative effects

1.14.8 Guidance provided by the GLVIA3[1] on the nature of effect (i.e. beneficial or adverse) states *that* "*in the LVIA, thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity*", but it does not provide guidance as to how that may be established in practice. The nature

of effect is therefore one that requires interpretation and, where applied, this involves reasoned professional opinion.

1.14.9 In this assessment, the nature of effects refers to whether the landscape and/or visual effect of the noise barrier of the Proposed Development is positive or negative (herein referred to as 'beneficial'/'neutral' or 'adverse').

1.14.10 In relation to many forms of development, the LVIA will identify 'beneficial' and 'adverse' effects by assessing these under the term 'Nature of effect'. The landscape and visual effects of large-scale infrastructure are difficult to categorise in either of these brackets as, unlike other disciplines, there are no definitive criteria by which the effects can be measured as being categorically 'beneficial' or 'adverse'. In other technical aspects, such as noise or terrestrial ecology, it is possible to quantify the effect in numeric terms, by objectively identifying or quantifying the proportion of a receptor that is affected and assessing the nature of that effect in justifiable terms. However, this is not the case in relation to landscape and visual effects where the approach combines quantitative and qualitative assessment.

1.14.11 As a starting point, unless stated otherwise, the effects assessed in the LVIA are considered to be adverse/negative. This may alter subject to mitigation proposals which are adopted as part of the noise barrier component of the Proposed Development. Beneficial/positive or neutral effects may, however, arise in certain situations and are stated in the assessment where relevant, based on the following definitions:

- Beneficial effects contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The development contributes to the landscape by virtue of good design or the introduction of new landscape planting. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components;
- Neutral effects occur where the development fits with the existing landscape character or visual amenity. The development neither contributes to or detracts from the landscape and visual resource and can be accommodated with neither beneficial or adverse effects, or where the effects are so limited that the change is hardly noticeable. A change to the landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation; and
- Adverse effects are those that detract from the landscape character or quality of visual attributes experienced, through the introduction of elements that contrast, in a detrimental way, with the existing characteristics of the landscape and visual resource, or through the removal of elements that are key in its characterisation.

1.10 Visual representations

1.15.1 ZTVs and visualisations are graphical images produced to assist and illustrate the LVIA and the cumulative effects assessment. The methodology use for viewpoint

photography and photomontages has been produced in accordance with GLVIA3[1] and the Landscape Institute Technical Guidance Note on Visual Representation of Development Proposals[5].

Methodology for production of ZTVs

1.15.2 The ZTVs have been calculated using computer software to generate a ZTV of the noise barrier component of the Proposed Development, to demonstrate the theoretical extent of visibility from any point in the Study Area.

1.15.3 A 3D computer model has been developed of the existing landscape and key reference using digital terrain data as follows:

- OS Terrain 50: Used to produce the main or standard ZTV plot and wirelines, these tiles provide a digital record of the existing landform of Great Britain, or Digital Terrain Model at 10m elevation intervals based on 50m grid squares and models representing the specified geometry and position of the noise barrier. The computer model includes the entire Study Area and takes account of the effects caused by atmospheric refraction and the Earth's curvature; and
- OS Light Detection and Ranging (LIDAR) Composite 2m: Used to produce a more detailed ZTV plots using 2m grid squares with surface features. It therefore takes into account the screening effects of vegetation, buildings or other surface features that may prevent or reduce visibility (insofar as they are represented in the LIDAR data). The computer model includes the entire Study Area and takes account of atmospheric refraction and the Earth's curvature.

1.15.4 The resulting ZTV plots are overlaid on OS mapping at an appropriate scale and presented as figures using desktop publishing or graphic design software.

1.15.5 Cumulative ZTV plots based on the intervisibility of the noise barrier component of the Proposed Development and other relevant developments within the Study Area are also produced.

1.15.6 There are limitations in this theoretical production, and these should be considered in the interpretation and use of the ZTV:

- Where the ZTV has been calculated using OS Terrain 50 this will not account for vegetation or built form unless added in the form of OS Vectormap data or digitally added and stated on **Figure 10.1** of **Appendix 10.3: LVIA Figures**;
- Where the ZTV has been calculated using OS LIDAR Composite 2m only those surface features picked up by LIDAR data will be represented;
- The ZTVs are based on theoretical visibility from 1.5m above ground level;
- The ZTV shows higher to lower visibility based on the amount of the noise barrier component of the Proposed Development visible as represented by a

[5] Landscape Institute (2019) *Visual Representation of Development Proposals.* [online] Available at: https://www.landscapeinstitute.org/wp-content/uploads/2019/09/LI_TGN-06-19_Visual_Representation-1.pdf [Accessed: 04 September 2024].

grid of data points representing the 3D envelope, model or annotation of the noise barrier component of the Proposed Development; and

- The ZTV does not indicate the decrease in visibility that occurs with increased distance from the noise barrier component of the Proposed Development. The nature of what is visible from 2km away will differ markedly from what is visible from 500m away, although both could be indicated in the ZTV as having the same level of visibility.

1.15.7 These limitations mean that while the ZTV is used as a starting point in the assessment, providing an indication of where the noise barrier of the Proposed Development would be theoretically visible and tending to present a 'worst case' or overestimate of the theoretical visibility. The information drawn from the ZTV is checked by field survey observation.

1.16 Methodology for baseline photography

Overview

1.16.1 Once a view has been selected, the location is visited, confirmed, and assessed with the aid of a wireline or similar visualisation in the field. A photographic record is taken to record the view and the details of the viewpoint location and associated data are recorded to assist in the production of visualisations and to validate their accuracy.

1.16.2 The following photographic information is recorded:

- Date, time, weather conditions and visual range;
- GPS recorded 12 figure grid reference accurate to ~5-10m;
- GPS recorded Above Ordnance Datum height data;
- Use of a fixed 50mm focal length lens is confirmed;
- Horizontal field of view (in degrees); and
- Bearing to Target Site.

1.16.3 The photographs used to produce the photomontages have been taken with a digital single lens reflex (SLR) camera set to produce photographs equivalent to that of a manual 35mm SLR camera with a fixed 50mm focal length lens. The photographs are taken on a tripod with a pano-head at a height of approximately 1.5m above ground.

1.16.4 Whilst no two-dimensional image can fully represent the real viewing experience, the visualisation aims to provide a realistic representation of the noise barrier component, based on current information and photomontage methodology.

Weather conditions

1.16.5 GLVIA3[1] paragraph 8.22 states:

"*In preparing photomontages, weather conditions shown in the photographs should (with justification provided for the choice) be either:*

- *representative of those generally prevailing in the area; or*
- *taken in good visibility, seeking to represent a maximum visibility scenario when the development may be highly visible*".

1.16.6 In preparing photomontages for the LVIA, photographs will be taken in favourable weather conditions. Weather conditions shown in the photographs for all viewpoints have, where possible, will be taken during periods of 'very good' or 'excellent' visibility conditions, seeking to represent a maximum visibility scenario when the developments may be highly visible.

1.17 Methodology for production of visualisations

Baseline Photograph Production

1.17.1 Photographs are then taken using a digital SLR camera in combination with a panoramic head equipped tripod. Detailed information is then recorded on site to enable the accurate alignment of the photographs with the wireline model (data such as: GPS grid co-ordinates; ground level information; compass bearings; and any other known references and viewpoint information).

1.17.2 To create the baseline panorama, the photographs from the viewpoint are then digitally joined using Adobe Photoshop or PTGui software to form a planar or cylindrical projection image or panorama using computer software to remove 'barrel distortion' caused by the camera lens. There are practical limitations to shooting viewpoint photographs only in very good or excellent visibility and at particular times of day or from location that avoid foreground clutter or other vertical features such as telegraph poles, particularly where this is a true representation of the view from that viewpoint area.

Photomontage Production

1.17.3 The photomontages aim to provide a more image of the Proposed Development. 3D model representations are combined with the baseline view photographs to create a rendered photomontage image of the Proposed Development. The photomontages are produced using a range of computer software including Resoft WindFarm© True View, 3D AutoCAD, and Studio Max.

1.17.4 The photomontage is produced by digitally combining or superimposing the wireline/wireframe or computer-generated 3D model and the Proposed Development onto the baseline photograph. The resulting image is then rendered to add colour, texture and lighting effects that account the date and time the photography was taken and the weather conditions occurring on the day.

1.17.5 The completed panoramas, wirelines, photomontages and accompanying data are then presented as figures using desktop publishing/graphic design software.

Limitations of visualisations

1.17.6 The visualisations used in the LVIA are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what will be apparent to the human eye. The assessments are carried out from observations in the field and therefore may include elements that are not visible in the photographs.

1.17.7 The visualisations of the noise barrier (and any development proposal) have a number of limitations when using them to form a judgement on visual effect. These include:

- A visualisation can never show exactly what a development will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image;
- The images provided give a reasonable impression of the scale and the distance to the noise barrier component of the Proposed Development but can never be 100% accurate to the as constructed effect;
- A static image cannot convey movement or reflection from the sun;
- The viewpoints illustrated are representative of views in the area but cannot represent visibility at all locations;
- To form the best impression of the effects, these images are best viewed at the viewpoint location shown;
- The images must be printed and viewed at the correct size (841mm x 297mm);
- Images should be held flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, stand at arm's length from the image presented to gain the best impression;
- It is preferable to view printed images rather than view images on screen. Images on screen should be viewed using a normal personal computer screen with the image enlarged to the full screen height to give a realistic impression; and
- There are practical limitations to shooting viewpoint photographs only in very good or excellent visibility and at particular times of day.

Printing of maps and visualisations

1.17.8 All electronic visualisations and maps should be printed out and viewed at the correct scale as noted on the document.