Intermodal Logistics Park North Ltd

INTERMODAL LOGISTICS PARK NORTH (ILPN)

Intermodal Logistics Park North (ILPN) Strategic Rail Freight Interchange (SRFI)

Project reference TR510001

Preliminary Environmental Information Report (PEIR)

Appendix 10.2: ZTV and Visualisation Methodology

October 2025

Planning Act 2008

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

This document forms a part of a Preliminary Environmental Information Report (PEIR) for the Intermodal Logistics Park North (ILPN) project.

A PEIR presents environmental information to assist consultees to form an informed view of the likely significant environmental effects of a proposed development and provide feedback.

This PEIR has been prepared by the project promoter, Intermodal Logistics Park North Ltd. The Proposed Development is described in Chapter 3 of the PEIR and is the subject of a public consultation.

Details of how to respond to the public consultation are provided at the end of Chapter 1 of the PEIR and on the project website:

https://www.tritaxbigbox.co.uk/our-spaces/intermodal-logistics-park-north/

This feedback will be taken into account by Intermodal Logistics Park North Ltd in the preparation of its application for a Development Consent Order for the project.

Appendix 10.2 ◆ ZTV and Visualisation Methodology

INTRODUCTION

1.1 The purpose of this methodology is to provide an understanding of how visualisation material prepared has been produced at the PEIR stage of the Proposed Development, including Zone of Theoretical Visibility (ZTV) mapping and photo-realistic visualisations (or 'photomontages' from selected viewpoints.

1.2 It should be recognised that production of visualisations is only one component of a Landscape and Visual Impact Assessment (LVIA), which will consider a range of other factors when identifying and assessing changes to the landscape and to views. The use of visualisations is a useful aid when undertaking LVIA, but the assessment process is not dependent on them. LVIA may be undertaken without use of visualisation material, although for major developments the inclusion of visualisations is accepted practice.

1.3 Current good practice regarding the production of visualisations is set out in:

- Landscape Institute and Institute for Environmental Management and Assessment (3rd edition, 2013), Guidelines for Landscape and Visual Impact Assessment. This document is referred to hereafter as 'the GLVIA'; and
- Landscape Institute (2019), Visual Representation of Development Proposals. Technical Guidance Note 06/19. This document is referred to hereafter as 'TGN 06/19'.

ZONE OF THEORETICAL VISIBILITY

Data Source

1.4 The ZTVs are based on two different landform models:

- A DTM model, available from the Environment Agency, which is considered to be an absolute worst-case in terms of visibility. This is generated using LiDAR Composite digital terrain model (DTM) 2022 2m data. This data consists of a series of spot levels at 1 m intervals. The declared 'root-mean-square error' (RMSE) of this dataset is 15 cm, i.e. the degree of error between the actual on-the-ground height of any particular location and the height as indicated by the DSM is a maximum of 15 cm.
- A DSM model, available from the Environment Agency, which is considered to be a more accurate representation in terms of visibility. This is generated using LiDAR Composite digital terrain model (DTM) 2022 2m data. The DSM data takes account of screening features such as buildings and vegetation.

1.5 The LVIA focuses on the DSM ZTV as it provides a more realistic guide to where the Proposed Development would be visible from, particularly where there is a high level of built form in

urban areas. Whilst the DTM ZTV is less useful in a relatively flat study area such as this, it provides an important guide to where the Proposed Development would absolutely not be visible from due to topographic screening.

ZTV Creation

1.6 The ZTVs were calculated and created using QGIS. The ZTV calculation process takes account of the curvature of the earth's surface and light refraction. The eye height of the receptor in the computer model was set at 1.7 m above ground level in accordance with guidance set out in GLVIA.

1.7 The ZTVs illustrate the following:

- The theoretical visibility of the warehouse buildings is illustrated in PEIR Figure 10.4.1. The buildings would be a maximum of 30 m above the proposed ground levels (AGL), also referred to as finished floor levels (FFLs). With reference to the draft DCO Parameters Plan, the Maximum building height measured to roof ridge / highest point in metres above Ordnance Datum height (AGL) would be 64.0m AOD (Zone D).

- PEIR Figure 10.4.2 illustrates the visibility of the proposed rail infrastructure within the freight terminal. This focuses on the proposed gantries which would be 25m above the proposed rail line. The maximum height of a gantry above ground level (AGL) would be 59.0m AOD.

- PEIR Figure 10.4.3 illustrates the visibility of the proposed rail infrastructure within the Western Rail Chord. This focuses on the proposed OHLE (overhead line equipment) gantries which would be 7m above the proposed rail line. The maximum height of a gantry above ground level (AGL) would be 38.86m AOD.

1.8 To produce the ZTVs, points were taken at the outside perimeter of each object. In the case of buildings, points were set at each corner and in the case of gantries, points were set at the tallest component.

Limitations

1.9 A ZTV, as use of the word 'theoretical' indicates, is not an absolute indication of the extent of visibility but rather a computer-generated aid that utilises available relative data to indicate areas of inter-visibility and screening in relation to a specific modelled object. ZTVs are tools to assist the LVIA. The technique aims to give a better understanding of the areas where visibility is likely and unlikely but imperfections in data are such that it must only be seen as an aid to understanding. This limitation needs to be recognised when interpreting the ZTVs.

1.10 An additional caveat is that the ZTVs simply illustrate that at least part of a structure would be theoretically visible. As such, a ZTV typically makes no distinction between a clear view of all or most of a proposed feature and a view of a very small proportion of a feature, for example one corner of a warehouse building, or the top of a rail gantry. This is especially relevant in the case of the Proposed Development, where views from the surrounding area are sometimes restricted by existing buildings within towns.

1.11 The ZTVs produced using DSM data reflects the presence of screening features in the landscape. However, the DSM data reflects a single moment in time (i.e. when the underlying aerial photography was taken). In reality, the extent and/or height of vegetation cover is dynamic and changes as vegetation inevitably increases in stature over time and/or is planted, trimmed or removed. Similarly, there is potential for buildings to have been erected, demolished or modified, subsequent to the data being captured.

1.12 DSM data also tends to assume that vegetation captured forms a solid visual barrier, when in reality views can sometimes be available through leaves and branches, especially in winter when deciduous foliage is absent. As such, the real-world visibility of the Proposed Development could potentially be underestimated in places. This is taken into account by the assessor when on Site and when preparing the assessment.

1.13 Finally, the DSM does not distinguish between the ground surface and the surface of structures and vegetation. As a consequence, the ZTV output may indicate visibility from areas known to be occupied by woodland and buildings. Whilst in theory it may be possible for people to experience the views from such locations (by climbing onto roofs, or into the tops of trees), this is not representative of typical day to day visibility, and as such there is the potential to overstate the actual visibility of the Proposed Development. Ordnance Survey open mapping data (OS Zoomstack Woodland and OS Zoomstack Local Buildings) has been added to the ZTV figures (as a solid white hatch on top of the ZTV information (but beneath base mapping), to mask out mapped areas of tree cover, noting this is unlikely to be exhaustive but helps refine the ZTV.

PHOTOGRAPHY

Introduction

1.14 Photography at all 30 representative viewpoint locations was carried out for the PEIR stage of the Proposed Development during winter 2024 to 2025. Photography during winter months is considered to be a ‘worst-case’ in terms of visibility as deciduous trees have shed their leaves, reducing the screening provided by deciduous hedgerow and trees within the Study Area.

1.15 Photographs were taken from publicly accessible locations as no private access was considered necessary. Where viewpoint photography was required to represent a private property, such as a residential receptor, the nearest publicly accessible location was selected for the photography, such as a road or footpath.

1.16 Photographs of the tripod in position at each of the viewpoints locations is included subsequently in this appendix.

Equipment and Image Capture

1.17 A Canon 5D Mark IV full frame sensor camera was used for the viewpoints in conjunction with a 50mm prime lens (35mm format equivalent), which is within the ‘standard’ focal length range. The full frame sensor in the camera therefore, results in no magnification.

1.18 The camera was mounted on a tripod using a panoramic tripod head at 1.6m above ground level to simulate the view at eye level. The panoramic tripod head allows for the rotation of the camera at fixed intervals around a fixed point in vertical alignment with the camera lens, thereby eliminating parallax error.

1.19 The orientation of the camera was adjusted so that the optical axis and the horizontal axis were aligned with the horizon. This is the 'astronomical' horizon as set by a gravity governed bubble level.

1.20 All photographs were taken in landscape format. Photographs were typically taken over a full 360 degree sweep from each viewpoint location. Panoramas were deemed essential due to the proximity at certain viewpoints and the need to show the context of the Proposed Development and so frames were taken at 15-degree intervals to allow for overlap.

1.21 The precise location of each photograph was recorded. GPS readings were taken from the central tripod position that the camera was placed using an Emlid Reach RS2 GNSS Receiver, which achieved a high level of accuracy. The degree of tolerance has been recorded for each viewpoint position and surveyed points at all viewpoints selected for photomontage production have achieved a high level of accuracy level, often within 25mm.

1.22 The images were captured in the camera's RAW image mode to ensure maximum quality. Camera settings were chosen carefully for each viewpoint; the camera was set to aperture priority mode, a small aperture of f/11 was used and the focus distance selected specifically to render all parts of the scene in focus whilst retaining image quality.

Post Production

1.23 The panoramas were stitched together using PT Gui Pro specialist panorama creation software, with each photograph being cropped to take only the central portion of each image. These precautions minimise the small amount of optical distortion effect caused by the camera lens. Images were imported as jpeg files and minor tonal and colour adjustments were made which aim to replicate the scene as honestly as possible as it was perceived by the photographer at the time of capture. The stitched cylindrical panoramas were then cropped for use as baseline 'existing' views.

PHOTOMONTAGES

Introduction

1.24 Photomontages are computer generated images, showing images of the Proposed Development superimposed upon the existing photography, with the aim of producing a visualisation that should give a realistic impression of how the Proposed Development would appear within the landscape.

3D Model

1.25 A digital model of the Proposed Development was created based upon design information. This was imported into industry standard software (Autodesk 3DStudioMax), along with the

viewpoint survey data recorded in the field. This enables a series of 'camera' points to be created within the 3d model, reflecting the view from each viewpoint towards the Proposed Development.

1.26 A series of markers were added to the model, representing real-world locations such as topographic features, vegetation and buildings. The locations of these markers were determined via the use of aerial imagery (e.g. Google Earth), Environment Agency LIDAR data, and OS Mastermap.

1.27 The models were then lined up with the stitched panorama. The markers were used to ensure that the model lines up both horizontally and vertically as accurately as possible with the photograph (by matching the markers with the real-world equivalent), and to assist with identifying which features in the photograph would appear 'in front' of the Proposed Development, which would appear 'behind' and which, if any would be removed.

1.28 Once the models were lined up as accurately as possible, the Proposed Development was rendered, having regard to the particular materials and colours specific as part of the design, and to reflect light conditions typical of the time and date of the photography.

Photomontage Production

1.29 The resulting rendered image was imported into Adobe Photoshop. Any parts of the Proposed Development that would not be visible from an individual viewpoint due to the presence of intervening features were cropped out.

1.30 At this PEIR stage, photomontages have been produced at 7 of the 30 viewpoint locations at both Year 0 and Year 15 of the operational stage of the Proposed Development. Year 0 is a point at which mitigation planting will be implemented on the Site, however trees (individual and within woodland) and hedgerow trees will not have established. The Year 0 images therefore illustrate a 'worst-case' in terms of the visibility of the Proposed Development. Year 15 images illustrate a realistic view of the proposed mitigation planting, once it has reached a reasonable level of maturity.

Limitations

1.31 It should be understood that viewpoint visualisations can never provide an exact match to what is experienced in reality. Visualisations are tools in the assessment process but independent from it. They illustrate the view in the context of a specific date, time and weather conditions, that would be seen within a photograph and not as seen by the human eye. As such, visualisations need to be used in conjunction with site visits and should be considered in the context of the totality of views experienced from the viewpoint and not just focussed on the Proposed Development.

1.32 The software (3DStudioMax) used to produce the model of the Proposed Development from each Viewpoint does not take account of the curvature of the earth's surface, and assumes a flat horizon. The effects of the earth's curvature do influence what is visible, especially in longer range views. If a flat horizon is assumed, then a feature located approximately 5km away from any viewpoint would appear approximately 1.7m higher than in reality. As such the model slightly exaggerates the height that the Proposed Development would appear in

each view. However, as all of the viewpoints are located relatively close to the Proposed Development any discrepancies in the height of the proposed new structures would be negligible and this is not considered to be material to the presentation of photomontages.

Presentation & Viewing

1.33 Once the final viewpoint images have been produced, they are inserted into a figure template, which also includes information about the viewpoint, including the date and time of photography, and details of the camera used.

1.34 The images presented on each sheet are displayed at an enlargement factor in accordance with the guidance set out in TGN 06/19. The enlargement factor is stated on each sheet.

1.35 The field of view displayed for each Viewpoint has been determined in accordance with the guidance set out in TGN 06/19 and is stated on each sheet.

1.36 Each sheet should be printed at the size stated on it. All printed sheets should be viewed held flat at a comfortable arm's length.

TRIPOD PHOTOGRAPHS (WINTER 2024-25)

Viewpoint 1

- Date taken: 29.02.2024

Viewpoint 2

- Date taken: 29.02.2024

Viewpoint 3

- Date taken: 29.02.2024

Viewpoint 4

- Date taken: 05.03.2024

Viewpoint 5

- Date taken: 29.02.2024

Viewpoint 6

- Date taken: 29.02.2024

Viewpoint 7

- Date taken: 29.02.2024

Viewpoint 8

- Date taken: 29.02.2024

Viewpoint 9

- Date taken: 29.02.2024

Viewpoint 10

- Date taken: 29.02.2024

Viewpoint 11

- Date taken: 05.03.2024

Viewpoint 12

- Date taken: 05.03.2024

Viewpoint 13

- Date taken: 29.02.2024

Viewpoint 14

- Date taken: 29.02.2024

Viewpoint 15

- Date taken: 21.03.2025

Viewpoint 16

- Date taken: 21.03.2025

Viewpoint 17

- Date taken: 21.03.2025

Viewpoint 18

- Date taken: 21.03.2025

Viewpoint 19

- Date taken: 21.03.2025

Viewpoint 20

- Date taken: 21.03.2025

Viewpoint 21

- Date taken: 21.03.2025

Viewpoint 22

- Date taken: 21.03.2025

Viewpoint 23

- Date taken: 21.03.2025

Viewpoint 24

- Date taken: 21.03.2025

Viewpoint 25

- Date taken: 21.03.2025

Viewpoint 26

- Date taken: 21.03.2025

Viewpoint 27

- Date taken: 21.03.2025

Viewpoint 28

- Date taken: 21.03.2025

Viewpoint 29

- Date taken: 21.03.2025

Viewpoint 30

- Date taken: 21.03.2025