A46 Coventry Junctions (Walsgrave) Scheme number: TR010066

6.~~1~~3 Environmental Statement Appendices

Appendix 7.1 ZTV and Verified Photomontage Methodology

APFP Regulations 5(2)(a)

Planning Act 2008

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

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

A46 Coventry Junctions (Walsgrave)
Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT APPENDICES
Appendix 7.1 ZTV and Photomontage

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Rev 0	November 2024	Application Issue
Rev 1	December 2024	Updated following Planning Inspectorate advice

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1. ZTV and verified photomontage methodology

1.1. Introduction

1.1.1. This document describes the methodology used for digital modelling of the Zone of Theoretical Visibility (ZTV) and verified photomontages for the Scheme.

1.1.2. The purpose of the ZTV is to provide an indication of the potential extent of area from which the Scheme may be visible. The purpose of the verified photomontages is to present an accurate representation of the Scheme to enable its potential visual effects to be evaluated, assessed, and reported in the Environmental Statement (ES) (**TR010066/APP/6.1**).

1.1.3. The methodology described in this document is based on current best practice and follow recommendations from:

- DMRB LA 107 Revision 2 Landscape and Visual Effects (Highways England, February 2020)
- Landscape Institute's Technical Guidance Note 06/19 - Visual Representation of Development Proposals (September 2019).
- Guidelines for Landscape and Visual Impact Assessment - 3rd edition (GLVIA3) – Landscape Institute and Institute of Environmental Management and Assessment

1.2. Zone of Theoretical Visibility (ZTV)

1.2.1. ES Figure 7.3 (Visual Context) (**TR010066/APP/6.2**) shows the ZTV prepared following finalisation of the Scheme; identifying the areas from which the Scheme is likely to be visible.

1.2.2. The ZTV for the Scheme was generated using 1m resolution Digital Surface Model (DSM) data which is made freely available by the Environment Agency (National LIDAR Programme, 2022)[1].. Use of this DSM data means that the ZTV allows for the effects of landcover and reflects the screening effects of vegetation, buildings, and other structures (this compares to Digital Terran Model (DTM) data which only shows 'bare earth' topography).

1.2.3. The ZTV comprises two layers of information:

[1] Environment Agency (National LIDAR Programme, 2022) (https://www.data.gov.uk/dataset/f0db0249-f17b-4036-9e65-309148c97ce4/national-lidar-programme). Accessed February 2023

- High-sided traffic movement (represented in blue): Assuming typical height, is based on points at 4m above the proposed carriageway level at 20m intervals along the carriageway.
- Proposed lighting columns (represented in pink): Based on points positioned 10m above the proposed carriageway level associated with the grade separated junction proposed roundabouts. This picks up potential areas of additional visibility associated with lighting around the proposed elevated junction.

1.2.4. The viewer height for each ZTV layer has been taken as 1.6m in accordance with GLVIA3 best practice guidance.

1.2.5. ZTVs are used as a working tool to inform the assessment. The actual visual effects of the Scheme have been assessed through a more detailed analysis of specific viewpoints, by field survey observations, and through the production and analysis of photomontage visualisations (ES Figures 7.4.1 to 7.4.13 (**TR010066/APP/6.2**)). The ZTV indicates the areas within the study area from which the Scheme may be seen but does not identify the variability in the nature or magnitude of the visual effects that may occur.

1.3. Verified photomontage

Approach to visualisation

1.3.1. The visual effects of the Scheme have been assessed in the field using computer generated visualisations ('photomontage') as prompts. Visualisations are illustrations that aim to represent the observer's view of the Scheme. To this end, a series of computer-generated photomontages were produced for agreed viewpoint locations within the study area. The photomontage illustrations presented within this ES, together with ZTVs and field surveys, were used to assist professional judgement in the assessment of the potential effects on the landscape and visual resources and their significance.

1.3.2. Photomontages combine a photograph of an existing view with a computer-generated image. They provide photo-realistic, rendered representations of how the Scheme may look in the context of the existing landscape and thereby inform the process by which assessment judgments are made. A photomontage can, however, only illustrate how the Scheme would appear in a photograph, as they can never exactly match what is experienced in the field. A combination of baseline and photomontage images have been used to illustrate the representative viewpoints shown in ES Figures 7.4.1 to 7.4.13 (**TR010066/APP/6.2**).

1.3.3. Photo visualisations included in the assessment represent a typical range of daytime lighting conditions and seasonal variation, including winter and summer views.

1.3.4. In recognition of the intention of the Landscape Institutes Technical Guidance Note 06/19 to provide an industry standard for visualisation, this methodology takes its lead on approach to visualisation from the 'typology' set out in Table 2 of the guidance note.

1.3.5. In this respect the methodology presents visualisation to a 'Type 4 – Photomontage/Scale Verifiable' standard with the guidance defined aim 'to represent scale, appearance, context, form, and extent of development'.

1.3.6. In compliance with the guidance note, viewpoint panorama images have been presented with a maximum single frame field of view of 90 degrees as 820mm x 240mm images on 841mm x 297mm sheets.

Photography

1.3.7. A Canon 5D (mark iv) full frame digital camera was used with a Canon Electro Focus 50mm 1.4 Ultra Sonic Motor lens. The camera was mounted in landscape format on a tripod with a panoramic head attached. The lens centre (its nodal point) was set at an eye level of 1.6m. The levelling plate was adjusted to level the camera in both its pitch and roll axes.

1.3.8. Use of the panoramic head allows the camera to rotate directly around the lens centre (its nodal point) to avoid parallax effects between incremental photos. In landscape orientation, the camera was rotated 20° between each photograph.

1.3.9. Using a plumb line, the camera position can accurately be located on the ground. The physical viewpoint location was marked with either a survey nail or peg hammered into the ground. Camera location coordinates were recorded using GPS receiver.

1.3.10. Supplementary photos were taken to record the camera setup and survey nail / peg position. These were used if additional photography at the viewpoint location was subsequently required.

Survey

1.3.11. A multi-band Global Navigation Satellite System (GNSS) receiver was used by the photographer to accurately record the camera position and also capture an array of selected survey reference points used to camera match and calibrate the photography. All survey points were captured in the British National Grid coordinate system recording an X, Y and Z co-ordinates using a GPS surveying receiver capable of 10mm accuracy.

1.3.12. An adequate number and spread of survey points was recorded per photo to verify the overall view alignment. Where a viewpoint did not contain sufficient fixed targets suitable for surveying, temporary targets such as ranging poles were set up to allow the survey to be completed at the same time as the photography.

1.3.13. The survey data was post-processed and exported to an Excel table for each set of viewpoint photography. Tables contain co-ordinates for the camera and surveyed reference points, which were used to align and verify viewpoint camera alignments.

Model creation

1.3.14. A full-scale site model was produced in house and positioned in its own 3D Studio Max file, the model was geo located and sized accurately. Further colour, material and finish detail was added to the model. One x-ref model was used for all viewpoints for consistency and ease of updating viewpoints with site design iterations. Year 1 & Year 15 mitigation shown based on Environmental Masterplan (ES Figure 2.4 (**TR010066/APP/6.2**) was also added to the model as required by the client.

Viewpoint alignment / verification

1.3.15. Using 3D Studio Max software, the viewpoints were recreated in a digital 3D environment. Each individual viewpoint was setup using verified survey points, camera and a lighting environment.

1.3.16. Surveyed X, Y, Z coordinates of reference points and the camera position were set up in 3D Studio Max. Survey points were represented by ‘renderable’ cross hairs. The camera was positioned and assigned again using the survey data and matched with settings taken from the photography Exchangeable Image File (EXIF) data, such as ISO and exposure.

1.3.17. Using a ‘daylight system’ in 3D Studio Max, a lighting environment was also accurately set up using settings related to EXIF material and global positioning, time of photography, date of photography, time zone and site longitude and latitude.

1.3.18. Once the viewpoint model, camera and positioned survey points were located the camera was set to the required field of view and view direction, aligned with the survey data.

Rendering and postproduction

1.3.19. Using 3D Studio Max plugin V-ray each viewpoint was rendered.

1.3.20. The rendered image was overlaid and positioned against the viewpoint photo. Once in position any parts of the render that would be obstructed by the foreground scene were masked from the render.

1.3.21. Images were then placed in a presentation figure layout template, with standard title block, alongside viewpoint description and information.