A. Appendix A8.2: Visual Aids

A.1 Guidance and Standards Used

A.1.1 All Visibility Maps (ZTVs), photography, visualisations (wirelines and photomontages) and their graphical presentation has been undertaken in line with the Landscape Institute's Technical Guidance Note 06/19, Visual Representation of Development Proposals.

A.2 The Computer Model

A.2.1 To generate ZTVs, wireline visualisations and photomontages, computer models of the proposed site and study area are produced. GIS software is used to create a 3D computer model of the proposed development representing the specified geometry and position of the proposed development, and the existing landform (terrain). The landform information is derived from 5m resolution terrain data.

A.2.2 The computer models include the entire study area and all calculations take account of the effects caused by atmospheric refraction and the Earth's curvature. The computer models do not take account of the screening effects of any intervening objects and forestry, so does not show any vegetation, buildings, woodland or other non-terrain features, unless expressly stated.

A.2.3 The computer models combine the existing landform with the model of the proposed development and detailed data collected in the field to enable the output of accurate visual and graphical information and associated data for presentation as finished figures.

A.3 Visibility Maps: Zone of Theoretical Visibility

A.3.1 Zone of Theoretical Visibility (ZTV) maps have been generated using GIS to assist in in identifying areas where visibility would not occur as well as viewpoint selection, illustrate areas from where part or all of the proposed development may be visible and to indicate its potential influence in the wider landscape.

A.3.2 Unless expressly stated, the visibility maps present the extent of potential visibility on the basis of a 'bare ground' scenario: They do not account for the effects of screening and filtering of views as a result of intervening features (e.g. buildings, trees, hedgerows, etc) and so tend to over-estimate visibility, both in terms of the land area from which the project can potentially be seen and potentially in terms of the extent of the development visible from a particular viewpoint.

A.3.3 ZTVs which take into account landform and buildings may use either real height information derived from standard DSM products such as LiDAR – this approach is typically used for smaller study areas and urban areas. For larger study areas assumed heights are used which are stated on the ZTV figure. The location and extent of woodland and buildings is derived from OS Open data, and assumed heights for these are added to the bare ground model. As a result, the ZTV study does not

take account of all above ground features – only those included as woodland and buildings in the OS mapping available at the time the ZTV was prepared. These ZTV studies present a more realistic visibility pattern than bare ground studies, but do not take account of the detail of felling cycles, tree growth, demolition or construction.

A.4 Visualisations: Annotated Photos (Type 1)

A.4.1 Baseline photography has been undertaken at each representative viewpoint location using a high-quality digital SLR camera with full frame sensor and a 50mm fixed focal length lens – in accordance with the relevant guidance identified above. The resulting photos are either presented as single frame images or combined into panoramas using PTGui photo stitching software and saved as planar projection images. Single frame and panoramic images are presented at either A3 or on wide format sheets, in accordance with Technical Guidance Note 06/19, and are annotated to indicate the extent of the proposed development and highlight any important features within the view.

A.5 Visualisations: Photomontages (Types 3 & 4)

A.5.1 Baseline photography has been undertaken at each agreed representative viewpoint location using a high-quality digital SLR camera with full frame sensor and a 50mm fixed focal length lens, in combination with a panoramic head equipped tripod at 1.5m height Above Ground Level (AGL) unless stated otherwise – in accordance with the relevant guidance identified above. The resulting photos are combined into panoramas using PTGui photo stitching software and saved as cylindrical and planar projection versions for use in visualisation production.

A.5.2 The Resoft WindFarm computer model is used to generate a perspective view from each viewpoint of the proposed development, using landform in the computer model and the specified geometry and position of the proposed development.

A.5.3 Using the computer model, a wireline diagram showing the proposed development (and any cumulative sites as required) is generated for each viewpoint to meet the relevant requirements of guidance (e.g. blades upwards, numbered, facing the viewpoints, etc).

A.5.4 To produce a photomontage, the above wireline is combined with the photographic panorama using Resoft WindFarm and/or Adobe Photoshop. Detailed viewpoint information as recorded on site (e.g. GPS grid co-ordinates; ground level information; compass bearings; and any other known references; etc) is used to enable the accurate alignment of the photographs with the computer model. A perspective match is achieved between the computer generated wireline and the photographs by iteratively adjusting the parameters until all the major features in the image are aligned satisfactorily. The proposed development is then rendered using Resoft WindFarm, POV-Ray or Autodesk 3DS Max taking into account the time and conditions occurring on the day of the photography to provide a realistic image. Elements such as proposed planting and some surface textures are added using Adobe Photoshop, guided by elements within the wireline model and information on growth rates.

A.5.5 Where provided, dusk/dawn visuals are prepared on the same basis as daytime visuals but there is a degree of judgement required to illustrate the brightness of the lighting compared to the background photography (which is more constrained than daytime photography) including exposure settings.

A.5.6 A minimal amount of image processing is undertaken. Where necessary, the contrast between the background photograph and the proposed development is increased to ensure that the development is apparent in the photomontage, as far as possible. It should be noted that there is an element of professional judgement inherent in the illustration of the changes represented by any photomontage.

A.5.7 The information shown on the visualisations and within the LVIA is generated via the computer model or from mathematical calculations.

A.5.8 The completed base photography, wirelines, photomontages and accompanying data are then presented as figures using desktop publishing/graphic design software to meet the relevant guidance requirements.

A.6 Image Verification

A.6.1 Technical details meeting TGN 06/19 requirements for type 4 visualisations as identified in Appendices 10 and 11 of the TGN are set out either in this methodology, or on the individual visualisations, with the exception of the make and model of panoramic head and elements used to check vertical and horizontal alignment. TGN 06/19 suggests that these will vary by project, but in practice these may vary by viewpoint (e.g. if photography is undertaken at separate times or by different photographers; or where viewpoints are sufficiently distant from each other that they do not share the same elements suitable for matching). These details and the 'additional imagery' requirements of a photograph of the tripod location and a 'composite view' showing the underlying construction of a photomontage are recorded for each viewpoint and can be provided if required for verification purposes.

A.7 Data Accuracy

A.7.1 The Ordnance Survey (OS) provides accuracy figures for the following terrain data products expressed statistically as root-mean-square error (RMSE) in metres:

- OS Terrain®50 (50m resolution): 4m RMSE.
- OS Terrain®5 (5m resolution): Urban and major communication routes 1.5m RMSE; Rural 2.5m RMSE; Mountain and moorland 2.5m RMSE.