designhive

STRATEGIC VISUAL COMMUNICATION

Lincolns Inn Fields, London

Verified Photomontages:
Methodology and Supporting Evidence

March 2015

Contents

1.0 Overview

This document has been prepared by Designhive Media Ltd to explain the methodology used to create accurate visual representations (AVRs) of the proposed development of Lincolns Inn Fields, London. The visual assessment of the proposed development reflects current best practice in relation to the verification of images, a process which is constantly being refined and improved with advances in technology and industry experience.

The purpose of the photomontages is to present an accurate overview of the proposed development which enables its effect on the landscape and views to be objectively evaluated. Every image contained within this document is verified unless otherwise stated. Final images should not be used as a standalone tool to assess the suitability of a development, but should be used in conjunction with a site visit.

In this document, you will be guided through a step-by-step description of how Designhive has produced an accurate representation of the maximum envelope of built form in accordance with development parameters, in pictorial form, to explain the processes used (including statements from the photographer and survey team). The methodologies described in this document are based on current best practice and follow recommendations from The Landscape Institute's "Guidelines for Landscape and Visual Impact Assessment" (3rd Edition 2013) and their supplementary Advice Note "Photography and Photomontage in Landscape and Visual Impact Assessment" (Jan 2011).

This document includes an audit trail to demonstrate the key stages of production (see Section 3.0) that can, if required, be checked by a third party. This document sets out the methodologies used for the photography, surveying, 3D modelling and camera matching processes - all critical to ensuring the accuracy of the final photomontages.

Montagu Evans have selected the viewpoints in consultation with Designhive and a comprehensive review of the surrounding area in relation to heritage receptors and townscape considerations. These have been agreed with the London Borough of Camden. The following criteria have been used to inform the selection:

- Conservation Areas; and/or
- Listed Buildings; and/or
- Any other heritage receptor; and/or
- Where the development may be prominent; and/or
- Be visible from concentrations of residential uses; and/or
- Open spaces (parkland, publicly accessible) including the River Thames);
- Potentially sensitive receptors (e.g. schools); and/or
- Townscape and Transport nodes.

The shortlist discussed with the Camden has confirmed the selected viewpoints. These were defined during pre-application discussions. The selected views are photographed professionally and surveyed and a Visually Verified Model (VVM) overlaid onto them to create the images.

The AVR's provide the basis for an assessment of the proposed development and its effect on the agreed key views.

The entities responsible for the preparation of the views that are set out in the following pages comprise:

Photography
Arcminute Ltd
62 Grove Park Terrace
London W4 3QE
Phone: 07774 857627

Survey of existing views and camera locations
Datum Survey Services Ltd
Brickfield Business Centre, Brickfield House
High Road, Thornwood, Epping CM16 6TH
Phone: 07977 111935

Production and checking of verified images
Designhive Media Ltd
The Workshop, Old Barn Cottage, Down Lane
Compton, Guildford GU3 1DQ
Phone: 01483 813888

Supply of building/landscape CAD and material textures
James Taylor Construction
James Taylor House, St Albans Road East
Hatfield AL10 0HE
Phone: 01707 244040

2.0 Methodology

2.1 Photography

The professional architectural photographer employed on this project was briefed by Designhive to work to a methodology which conforms to the principles specified in section 1.0 Overview.

The following methodology statement has been supplied by Arcminute:

Photography brief The following methodology applies to the production of photographic images originated in March 2015 which form the pictorial basis for visual impact assessment photomontages for 3 views for Lincolns Inn Fields, London.

Equipment Images are captured on a 36mm x 24mm 21 megapixel digital sensor in combination with the following shift lenses:

- Focal length 24mm | Horizontal FOV 74° (for close views in built-up streetscapes)
- Focal length 35mm | Horizontal FOV 55° (for close views requiring selective framing)
- Focal length 50mm | Horizontal FOV 40° (for long distance views)

Lenses outside these parameters are also available for use in certain circumstances but these 3 lenses have been found to cover the vast majority of situations required in this type of work.

Choice of lens We prefer to replicate (as far as possible) what may have already been provided in terms of preliminary view studies as typically these would have been generated using pre-considered factors as to what each view would need to illustrate e.g. context, key visual receptors etc. In the absence of a definitive steer, we will generally use a 74° HFOV lens for medium to close views in an urban environment and a 40° HFOV lens for long distance views. However, the actual size and nature of a scheme (single building or large multibuilding development) and its location will also be considered before lens selection. The Landscape Institute's latest guidelines have been relaxed with regard to lens choice and they are no longer insistent that a 'standard' lens be used wherever possible.

Photography The camera is mounted on a tripod at eye level which on level ground is 1.65m within a +/- 100mm tolerance. The camera is then levelled in roll and pitch to a tolerance of 30mm per 100m using a precision spirit level. The point on the lens which coincides with the virtual render camera is horizontally referenced to a survey mark (nail or paint) to +/- 2mm using a survey standard procedure and the height above this is measured using a steel tape measure to the same tolerance. A photograph is taken of the tripod in its location, the survey point on the ground and the tape measure reading against a reference point on the camera mount. During image capture particular emphasis is placed on the following:

- Rendering all points in the scene as sharply as possible to avoid any sense of selective focus.
- Capturing all tonal detail in the scene and avoiding 'blown out' highlights and 'blocked up' shadows.

Where a scene's brightness range exceeds that of the sensors dynamic capture range it may be necessary to combine two or more different exposures to create a final image to overcome this limitation and to maintain a realistic tonal rendering closer to that of the human eye.

Post production The camera images are captured using a native camera or 'RAW' format and a software application is used to turn these into universally accessible RGB raster images. At this conversion stage colour and tonal adjustments are made to recreate as honestly as possible the scene as was presented to the photographer at the time of capture. RGB images are corrected using specialist software to remove non-perspectival optical distortion in order to create a geometrically accurate 2D projection which can be precisely aligned with CGI renderings and survey data. The image is then placed in a standard sized image template and the calibrated lens axis position is aligned with the documents centre. This accounts for both deliberate offset through lens shift and manufacturing tolerances in lens to camera body alignment. A text file in the image document records camera height above the survey point, lens focal length, film gate, date and time, nominal lens offset and document pixel dimensions. All images are also accompanied with photographic evidence of camera location, survey point location and height above survey point.

2.2 Survey

All of the baseline photographs were taken by a professional architectural photographer. Each viewpoint location is surveyed and identified by

Ordnance Survey co-ordinates. The heights and distances of significant points within each view that are easily distinguishable have also been recorded as Ordnance Survey grid and level datum and their accuracy has been checked relative to the fixed camera position. The survey points for each view provide an effective check for ensuring that the 3D model and existing views are accurately merged together.

The following methodology statement has been supplied by Datum Survey Services:

Survey brief We were commissioned to survey and record co-ordinates (Eastings, Northings and AOD Height) of known points of detail located around the study site known as Lincolns Inn Fields, London. Digital files of the 3 views together with camera point locations were provided by the photographer.

Date of surveys March 2015.

Camera point positioning Network RTK solutions were established using a Leica GPS + GLONASS SmartRover receiver. The equipment was set-up directly over the camera position (survey nail) and multiple observations were recorded. A second (reference) point was taken approximately 100m away from the camera position using the same method.

Data capture Traditional survey techniques were employed to record the points of detail within each view. A Leica TCRA TS15 Total Station with long range reflector-less distance measurement capabilities was set-up directly over the camera point and orientated to Ordnance Survey National Grid using the two sets of co-ordinates determined by the SmartRover receiver.

Deliverables The completed survey data was issued as follows:

- Microsoft Excel Spreadsheet comprising point numbers, coordinate data and descriptions
- PDF copies of each photo with point locations and view specific point numbers clearly marked
- AutoCAD DWG file containing 3D survey points with view specific point numbers.

2.3 3D building model

The 3D computer model of the proposed development which is superimposed upon the existing views is based upon CAD supplied by James Taylor Construction. The 2D drawings of the proposed development are supplied by the architect and initially imported into 3DS Max. The drawings are then traced over using snap tools within this program to create an accurate 1:1 scale model of the proposed development. A manual cross check of heights is then carried out by Designhive across all buildings working with a range of spot height information as supplied by the architect. Once the 3D model has been approved by the architect, a corresponding issue number is recorded.

The 3D digital model has textures applied to accurately represent the proposed material schedule. This is done with the aid of real life photo references supplied by the architects. To better match the rendered image into each view's base photograph, similar materials within the photograph are examined to help establish how the new building should be represented. Adjustments such as hue, saturation and brightness might be used to match each material within the scheme, adopting guidance from the architect.

The images are ultimately signed off by the architect and design team to confirm their satisfaction that it's visually representative.

2.4 3D landscape

Working from CAD supplied by James Taylor Construction, a new fence and gate were modelled and added to the views.

2.5 Camera matching

The verification process confirms the accuracy of the 3D model in relation to each view. The camera matching process involves accurately matching the position of the virtual camera with the real world camera in OS space, and the location of the 3D model of the proposed development within each (existing) view. This is achieved through aligning the imported 3D cloud of survey points within the base photo and 3D environment, creating a virtual camera that replicates the exact position and height of the real world camera to produce an image where the rendered survey points match in visual location those recorded by the survey team and photographer.

The specifications of the lens type relating to each existing view is also entered into 3DS Max to help guide with alignment. An alignment is deemed correct only when all survey points sit exactly over the pixel in the photo that corresponds with the marked-up survey photo. If all points match, the virtual camera must therefore be correctly aligned.

For each view we measure the distance from camera to target and apply respective equations to establish the potential adjustment necessary to compensate for both curvature of the earth and light refraction. Typically, when the real world camera is positioned within 1.5km from the target, the effects of curvature of the earth and light refraction are deemed to be negligible in terms of their visual impact and therefore no adjustment is made to the Z axis of the building model within the view.

2.6 Lighting and rendering

To accurately light the 3D model, 3DS Max's 'daylight system' is set to replicate the solar time, date and geographic location (longitude and latitude) as recorded in the base photograph. The settings used for each base photograph (F stop, shutter speed etc) are replicated in both this 'daylight system' and the virtual camera set-up. This process mimics the virtual sun so that the lighting falls upon the 3D model as it would in real life at the point when the photograph was captured. Fine tuning is sometimes necessary to better match the resultant lighting and shadows to the base photograph.

Once the camera matching and lighting processes are complete, the render of the 3D model is output to the same pixel resolution as per each respective base photograph.

2.7 Post production

The render of the 3D models is superimposed on the existing still view in Photoshop. The foreground of the existing views i.e. trees, lamp posts, cars, buildings etc, are then copied and placed over the rendered model in order to ensure that the depth is accurate within the photomontage view between the foreground, background and the rendered model. At this stage, the textured models can be further adjusted to match the resolution, colouring and saturation of the photograph taken to create a close impression of what the textures of the building would look like. This is a qualitative exercise and requires interpretation and guidance by the architect on how the building will look. A final qualitative check of all of the photomontage images has been carried out to ensure that they provide objectively accurate views of the proposed development.

2.8 Recommended viewing distances

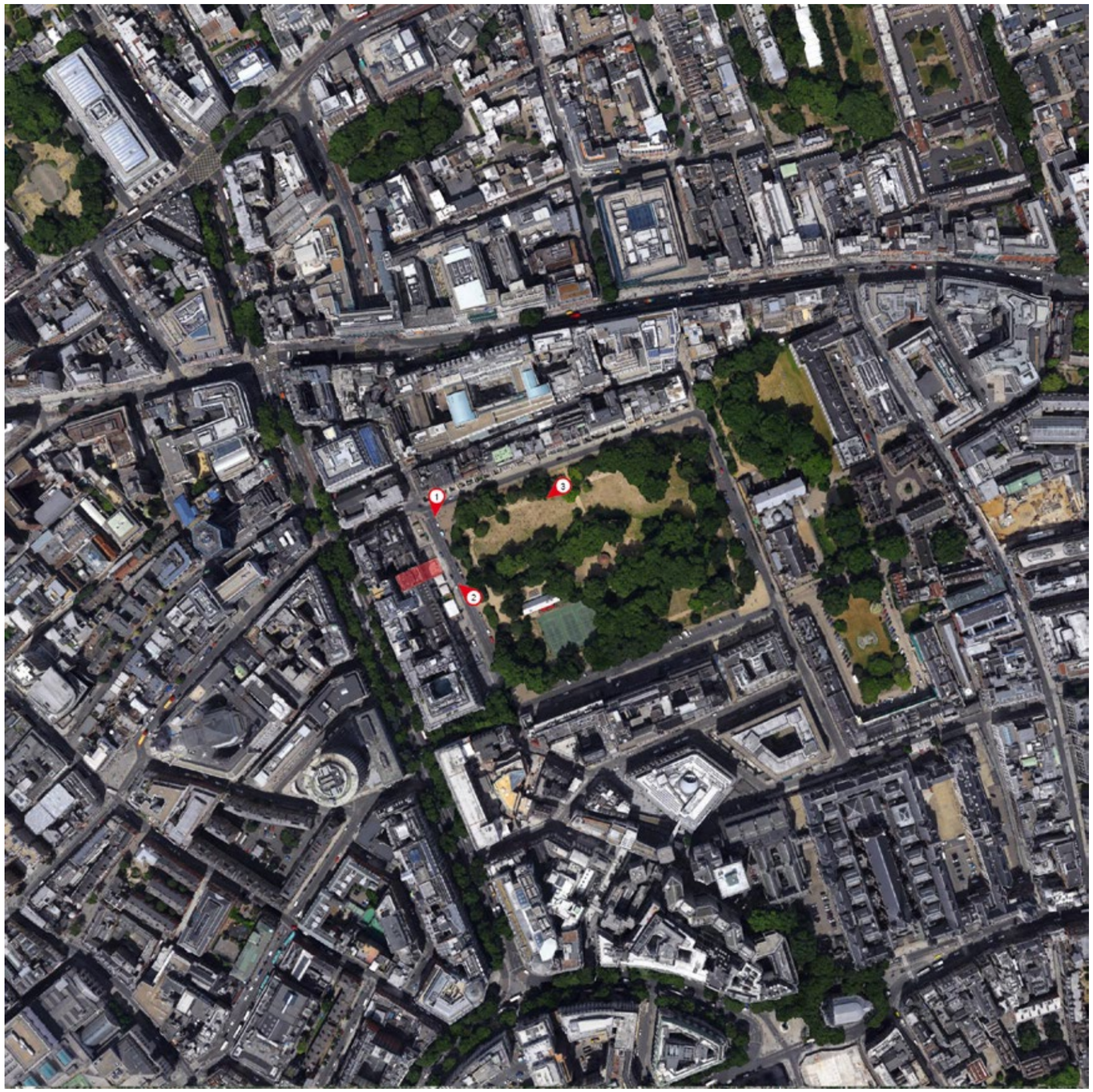
It is recommended that final images are viewed at an optimum viewing distance (in relation to the size of printed photomontage) to give a correct sense of scale. We recommend that images are printed to a size that creates a comfortable viewing distance of between 300 to 500mm. The recommended viewing distance for each image is specified within Section 4.0 of this document.

2.9 Caveats

The front elevation and sections of the CAD supplied did not accurately align so we worked from verbal instructions given to us by the architect to correct the height of the building and the appearance of the balustrade.

3.0 Supporting evidence

Ordance survey co-ordinates			
View Ref	Eastings	Northings	AOD Height
1	530653.360	181427.958	22.620
2	530682.910	181349.324	21.679
3	530751.282	181438.160	22.193



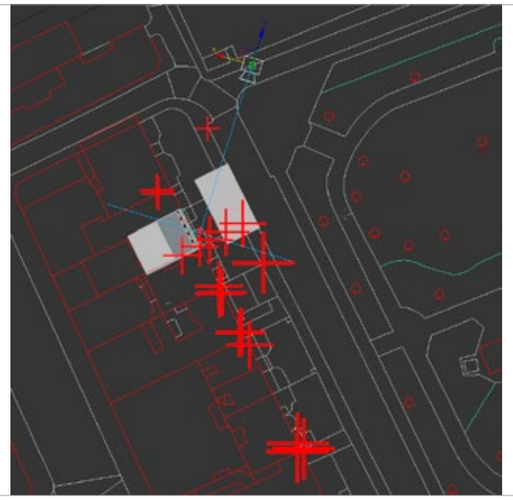
View 1

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
1.1	530666.303	181317.779	51.745
1.2	530668.125	181318.577	41.165
1.3	530666.391	181320.093	31.698
1.4	530656.620	181371.630	24.557
1.5	530652.682	181348.226	31.784
1.6	530649.696	181351.606	38.749
1.7	530644.078	181362.914	38.760
1.8	530650.393	181351.980	28.683
1.9	530644.933	181363.232	28.679
1.10	530650.759	181382.883	24.751
1.11	530645.977	181380.418	24.719
1.12	530643.947	181365.040	45.485
1.13	530638.397	181376.261	45.488
1.14	530633.490	181373.771	45.508
1.15	530638.455	181376.248	37.758
1.16	530638.185	181376.794	36.524
1.17	530637.701	181377.786	36.530
1.18	530635.060	181383.143	36.524
1.19	530634.564	181384.120	36.530
1.20	530634.555	181384.122	34.344
1.21	530635.048	181383.139	34.347
1.22	530637.695	181377.774	34.349
1.23	530638.175	181376.801	34.348
1.24	530638.123	181376.716	32.678
1.25	530637.611	181377.857	30.359
1.26	530634.988	181383.083	32.630
1.27	530634.452	181384.159	32.629
1.28	530634.447	181384.129	29.452
1.29	530634.978	181383.050	29.452
1.30	530637.584	181377.773	29.475
1.31	530638.131	181376.704	29.475
1.32	530641.313	181378.161	24.717
1.33	530640.654	181409.967	23.577
1.34	530626.657	181391.360	45.476
1.35	530626.225	181392.259	45.451

3.2 OS survey points marked on photograph

3.3 View 1 camera location

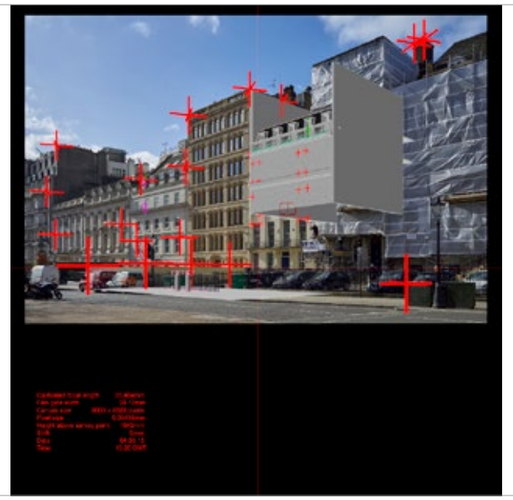
Eastings	530653.360m
Northings	181427.958m
AOD height	22.620m
Approx distance to site	46m
Approx bearing from North	197°



3.4 Screen grab of camera location in 3D Studio Max software

3.5 Screen grab of calculated horizon line

3.6 Screen grab of camera matching to OS data

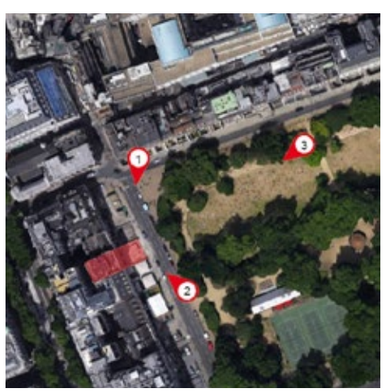


3.7 Screen grab of wireline model matched to photograph

3.8 Final camera matched photomontage (illustrative only)

View 2

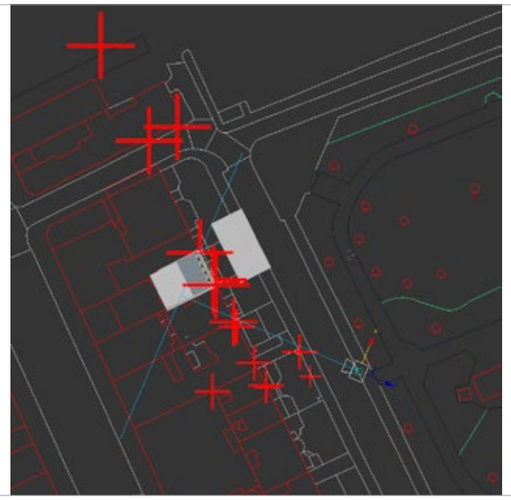
3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
2.1	530654.232	181344.400	34.007
2.2	530650.385	181352.010	34.959
2.3	530644.943	181363.266	34.964
2.4	530650.394	181351.993	28.668
2.5	530654.099	181344.977	25.878
2.6	530667.756	181347.808	23.414
2.7	530664.512	181355.400	22.164
2.8	530643.970	181364.763	45.473
2.9	530637.429	181343.088	54.502
2.10	530638.423	181376.229	45.472
2.11	530602.664	181450.655	53.056
2.12	530626.495	181425.394	27.462
2.13	530617.673	181421.108	31.462
2.14	530637.716	181377.839	26.001
2.15	530633.503	181386.236	36.529



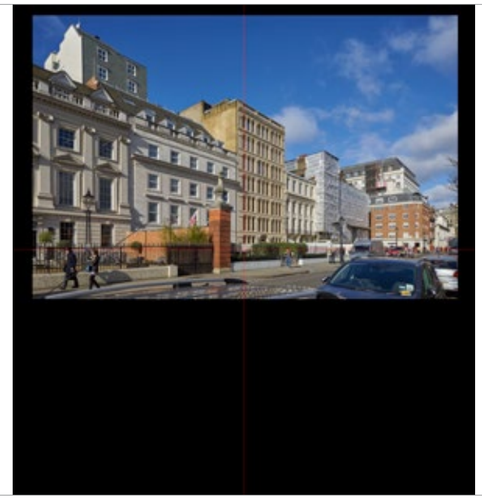
3.2 OS survey points marked on photograph

3.3 View 2 camera location

Eastings	530682.910m
Northings	181349.324m
AOD height	21.679m
Approx distance to site	52m
Approx bearing from North	293°



3.4 Screen grab of camera location in 3D Studio Max software



3.5 Screen grab of calculated horizon line

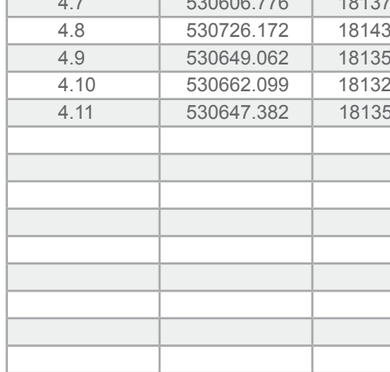
3.6 Screen grab of camera matching to OS data

3.7 Screen grab of wireline model matched to photograph

3.8 Final camera matched photomontage (illustrative only)

View 3

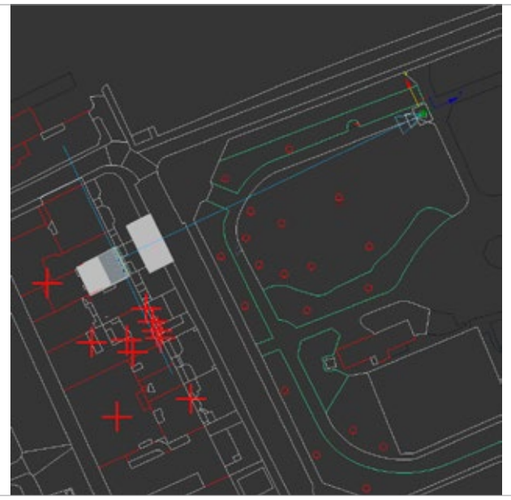
3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
4.1	530650.381	181352.006	34.966
4.2	530644.926	181363.284	34.969
4.3	530639.652	181346.474	50.590
4.4	530637.340	181351.137	50.599
4.5	530633.685	181321.673	48.984
4.6	530623.943	181350.386	50.496
4.7	530606.776	181373.128	51.381
4.8	530726.172	181434.283	24.115
4.9	530649.062	181354.599	31.602
4.10	530662.099	181328.491	31.704
4.11	530647.382	181358.211	34.968



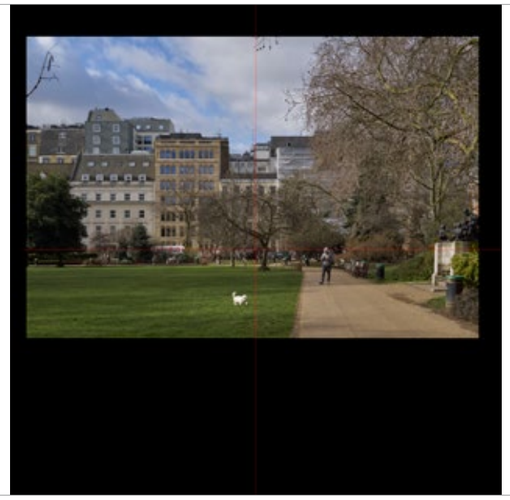
3.2 OS survey points marked on photograph

3.3 View 3 camera location

Eastings	530751.282m
Northings	181438.160m
AOD height	22.193m
Approx distance to site	129m
Approx bearing from North	244°



3.4 Screen grab of camera location in 3D Studio Max software



3.5 Screen grab of calculated horizon line

3.6 Screen grab of camera matching to OS data

3.7 Screen grab of wireline model matched to photograph

3.8 Final camera matched photomontage (illustrative only)

4.0 Final verified photomontages

View 1 existing

Single frame image | Focal length 35.484mm | Camera height above survey point 1645mm | Nominal lens rise 8mm | Date 04.03.15 | Time 10:20

View 1 proposed

To achieve the optimum viewing distance of between 300-500mm (as per The Landscape Institute's guidelines), we recommend printing this image edge to edge on A3 landscape and viewing it on site from a distance of 316mm. Please refer to section 2.8 on page 5 of this document for further information.

View 2 existing

Single frame image | Focal length 24.286mm | Camera height above survey point 1735mm | Nominal lens rise 8mm | Date 04.03.15 | Time 09:57

View 2 proposed

To achieve the optimum viewing distance of between 300-500mm (as per The Landscape Institute's guidelines), we recommend printing this image edge to edge on A2 landscape and viewing it on site from a distance of 306mm. Please refer to section 2.8 on page 5 of this document for further information.

View 3 existing

Single frame image | Focal length 52.149mm | Camera height above survey point 1646mm | Nominal lens rise 5mm | Date 04.03.15 | Time 10:38

View 3 proposed

To achieve the optimum viewing distance of between 300-500mm (as per The Landscape Institute's guidelines), we recommend printing this image edge to edge on A4 landscape and viewing it on site from a distance of 328mm. Please refer to section 2.8 on page 5 of this document for further information.