



Chapel Gate, Basildon

**Photomontage methodology
and supporting evidence**

April 2021

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1.0 Overview

This document has been prepared by Realm Communications to explain the methodology used to create accurate visual representations (AVRs) of the proposed development known as Chapel Gate, Basildon. 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.

This audit trail demonstrates the key stages of production (that can, if required, be checked by a third party) including photography, surveying, 3D modelling and camera matching processes - all critical to ensuring the accuracy of the final photomontages. These methodologies are in accordance with current best practice and follow recommendations from The Landscape Institute’s Technical Guidance Note (TGN 06/19) : Visual Representation of Development Proposals. The entities responsible for the preparation of the views set out in the following pages comprise:

Commissioning Practice

Barton Willmore
7 Soho Square
London
W1D 3QB
Phone: 0207 446 6888

Photography

Arcminute Ltd
25b Pall Mall Deposit
124-128 Barlby Road
Ladbroke Grove
London W10 6BL
Phone: 07774 857 627

Survey of existing views and camera locations

Datum Survey Services
Brickfield Business Centre, Brickfield House
High Road, Thornwood, Epping CM16 6TH
Phone: 07977 111 935

Production and checking of verified images

Realm Communications
The Workshop
Old Barn Cottage
Down Lane
Compton, Guildford GU3 1DQ
Phone: 01483 813 888

Supply of 3D building model, spot height, landscape and planting information

BPTW LLP
40 Norman Road
Greenwich
London SE10 9QX
Phone: 020 8293 5175

Matt Lee Landscape Architecture Ltd
9 The Street
Manuden, Bishop’s Stortford
Hertfordshire
CM23 1DD
Phone: 01279 819195

Tim Moya Associates
The Barn
Feltimores Park
Chalk Farm
Harlow
Essex CM17 0PF
Phone: 0845 094 3268

2.0 Methodology

2.1 Photography

The professional architectural photographer employed on this project was briefed by Realm 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 2021 which form the pictorial basis for visual impact assessment photomontages for 17 views for the site known as Chapel Gate, Basildon.

Overview The Arcminute system is designed to create geometrically accurate photography and verifiable data for all its associated parameters and is fully compliant with all guidelines covering images required to be aligned with survey data for use in planning applications.

Equipment Images are captured on a 36mm x 24mm 36 megapixel digital

sensor in combination with the following lenses: 17mm, 24mm, 35mm, 52mm and 80mm with shift capability (specially selected for best in class resolution and customised to conform to the high precision focal length and optical axis settings required in the process). Re camera mounts, custom made designs for both single frame and panoramic capture are used to obtain high precision camera positioning and orientation tolerances.

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 set up at eye level (1.55-1.75m) and orientated to within 0.02 deg of pitch and roll to the horizon. The point on the camera that coincides with the origin of perspective is positioned in relation to a survey marker to within 2mm in XYZ. The scene is then captured in a RAW format using standard high quality architectural photographic practice.

For panoramic images the camera is setup in portrait orientation and rotated around the camera coordinate capturing sequential frames with a 50% overlap. Each frame has the same orientation tolerance as a single frame capture.

For every view, a photographic record is made of the tripod location, the survey mark and the height reading of the camera above it.

Post production Standard image processing for dealing with RAW files is undertaken to create a TIFF image that honestly represents the scene in terms of tonality and colour. This image is then processed to remove lens distortion and identify the XY position on the image of the optical axis. Using an image that is fully corrected for distortion enables all the survey points in the image to be used for alignment and not just those confined to the so-called central ‘safe area’.

The following data is recorded on a text layer:

- Date and time
- Lens focal length (to nearest 0.005mm)
- Image size in pixels and mm
- Height above survey point (to nearest 0.001m)
- Lens shift (nominal figure to nearest mm)

The survey points are marked up on a separate layer by the survey team. This layer can be set in a blending mode so that the precise point on the image below the marked dot can be seen.

Issued files The following files were issued to Realm:

- A layered TIFF containing the image and all of the above data.

- A flattened JPEG showing the survey points for use in the alignment process
- A photo of the tripod setup
- Any other supporting evidence deemed relevant to the end user such as a KMZ file of camera locations and other supplementary photography.

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 Chapel Gate, Basildon. Digital files of the 17 views together with camerapoint locations were provided by the photographer.

Date of surveys March 2021.

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:

- 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 massing and detailed 3D models were supplied by the architect. A manual crosscheck of heights was then carried out by Realm across all buildings, using AOD spot heights as supplied.

2.4 3D landscape

The landscape CAD was supplied by the landscape architect.

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 are 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

Fully rendered views The render of the three-dimensional model was superimposed on the existing still views in Adobe Photoshop. The foreground of the existing views was 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, for the fully rendered photomontages, the textured model 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 buildings and structures would look like. This is a qualitative exercise and requires interpretation by the designer on how the structure 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.

Wireline views These photomontages show the outline of the maximum envelope of built form in accordance with development parameters as a red line for the building (a solid line where visible, a dotted line when obscured by foreground objects).

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 up to 525mm. The recommended viewing distance for each image is specified within Section 4.0 of this document.

2.9 Caveats

Extensive tree removal has been carried out across a number of the views. The background rebuild was created using information supplied and google earth. In some instances, where trees were retained, we have had to replace them with CG trees of the same species and heights shown in the supplied Arborcultural survey in order to give a good illustrative demonstration of the coverage.

View 1

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
C101	570025.399	188297.333	28.106
C102	569982.906	188360.106	30.708
C103	570015.719	188318.508	32.371
C104	570017.866	188318.850	32.367
C105	570014.650	188350.274	31.476
C106	570025.730	188367.968	28.878
C107	570033.740	188321.780	28.938
C108	570022.496	188387.296	32.250
C109	569977.253	188533.915	35.331
C110	569998.860	188372.836	30.027
C111	570026.271	188326.813	27.867
C112	570016.495	188318.628	30.675
C113	570029.251	188326.743	27.783

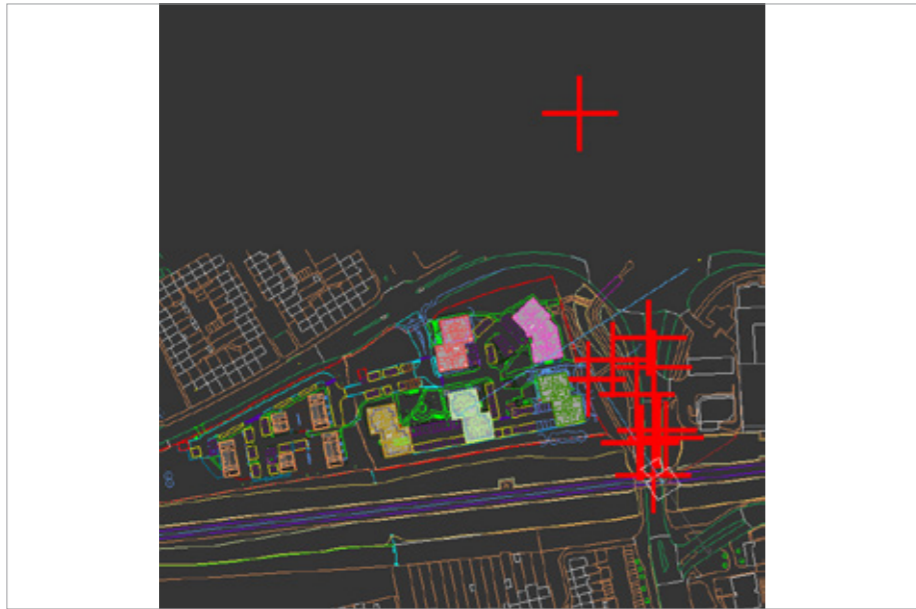


3.2 OS survey points marked on base photograph



3.3 View 1 camera location

Eastings 570031.994m
 Northings 188291.788m
 AOD height 29.84m
 Approx distance to centre of site 183m
 Approx bearing from North 328°



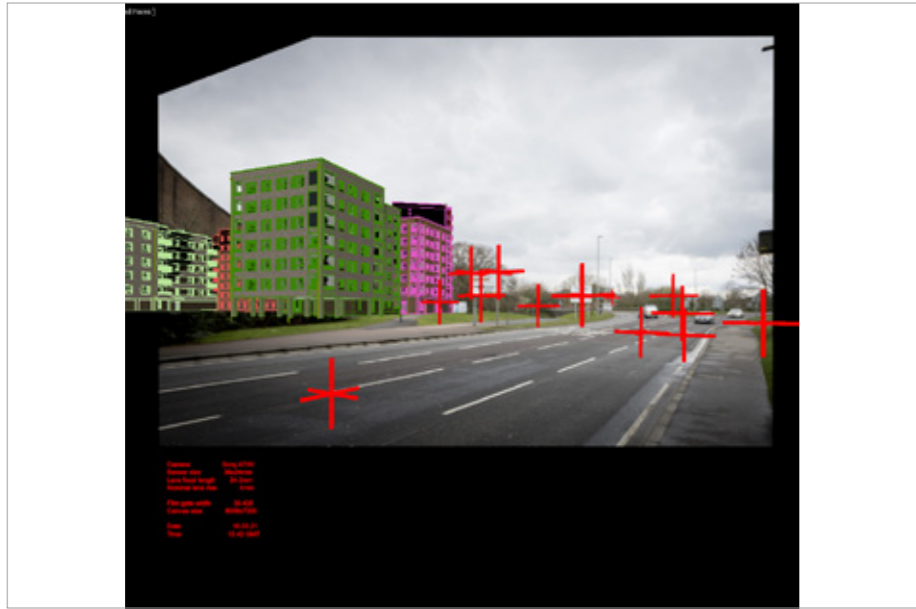
3.4 Screen grab of camera location in 3DS Max software



3.5 Screen grab of calculated horizon line



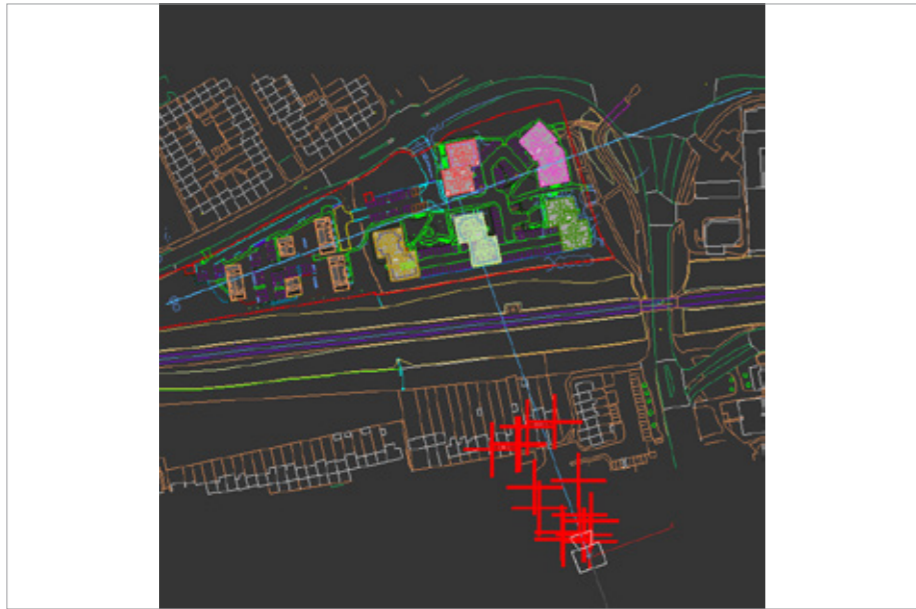
3.6 Screen grab of camera matching to survey data



3.7 Screen grab of model matched to photograph



3.8 Final camera matched photomontage



3.4 Screen grab of camera location in 3DS Max software



3.5 Screen grab of calculated horizon line



3.6 Screen grab of camera matching to survey data



3.7 Screen grab of model matched to photograph



3.8 Final camera matched photomontage

View 3

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
C301	569715.486	188336.112	30.983
C302	569742.644	188361.316	32.175
C303	569746.495	188362.852	34.582
C304	569789.922	188375.814	32.228
C305	569748.229	188350.935	33.084
C306	570179.153	188572.359	51.030
C307	569802.536	188367.040	31.205
C308	569735.963	188332.513	33.067
C309	569735.941	188332.498	40.532
C310	569710.182	188331.796	32.189
C311	569710.175	188331.737	31.317
C312	569708.361	188330.967	32.259
C313	569802.599	188367.150	38.735
C314	569790.545	188374.879	31.225



3.2 OS survey points marked on base photograph

3.3 View 3 camera location

Eastings 569704.153m
 Northings 188332.837m
 AOD height 32.853m
 Approx distance to centre of site 153m
 Approx bearing from North 88°

View 4

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
C401	569814.092	188498.643	27.942
C402	569825.948	188494.029	32.125
C403	569823.189	188480.187	30.333
C404	569836.956	188467.539	29.965
C405	569841.089	188454.131	35.050
C406	569850.474	188426.696	28.086
C407	569821.653	188462.098	34.954
C408	569824.587	188460.800	30.417
C409	569814.891	188461.109	32.706
C410	569804.615	188475.763	32.937
C411	569801.258	188473.869	35.824
C412	569799.834	188472.765	30.201
C413	569800.964	188494.085	27.081
C414	569801.719	188499.391	27.028
C415	569855.327	188474.254	29.413

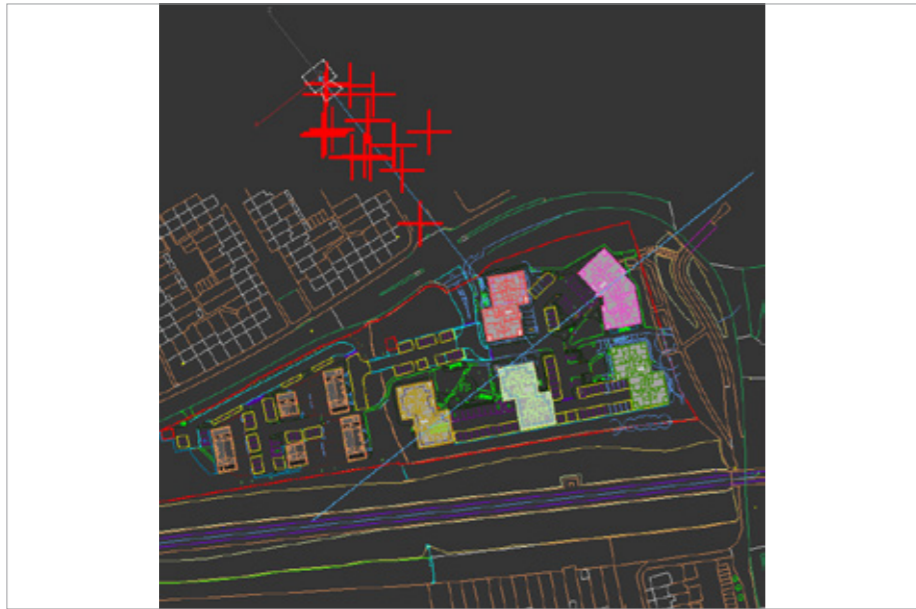


3.2 OS survey points marked on base photograph



3.3 View 4 camera location

Eastings 569797.7948m
 Northings 188503.4393m
 AOD height 28.7309m
 Approx distance to centre of site 170m
 Approx bearing from North 142°



3.4 Screen grab of camera location in 3DS Max software



3.5 Screen grab of calculated horizon line



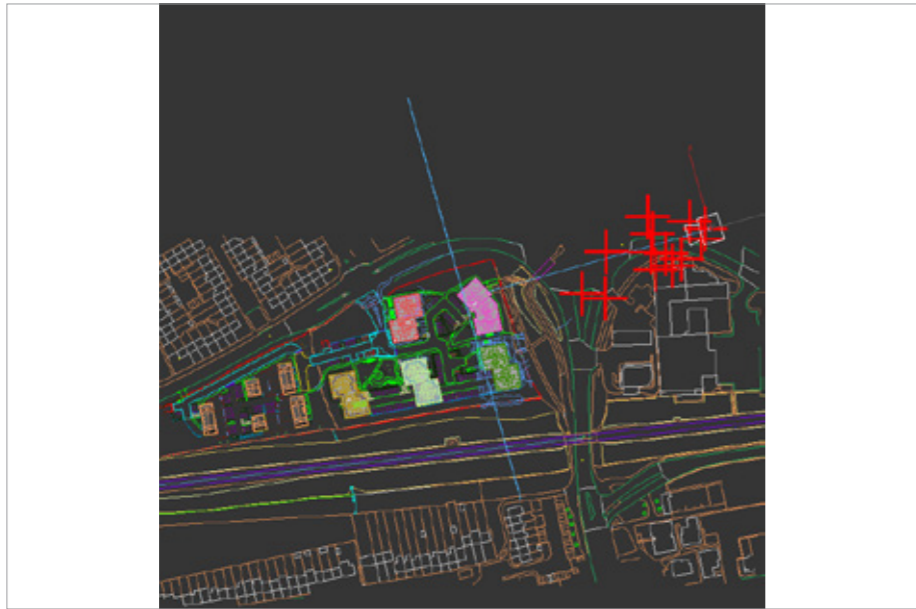
3.6 Screen grab of camera matching to survey data



3.7 Screen grab of model matched to photograph



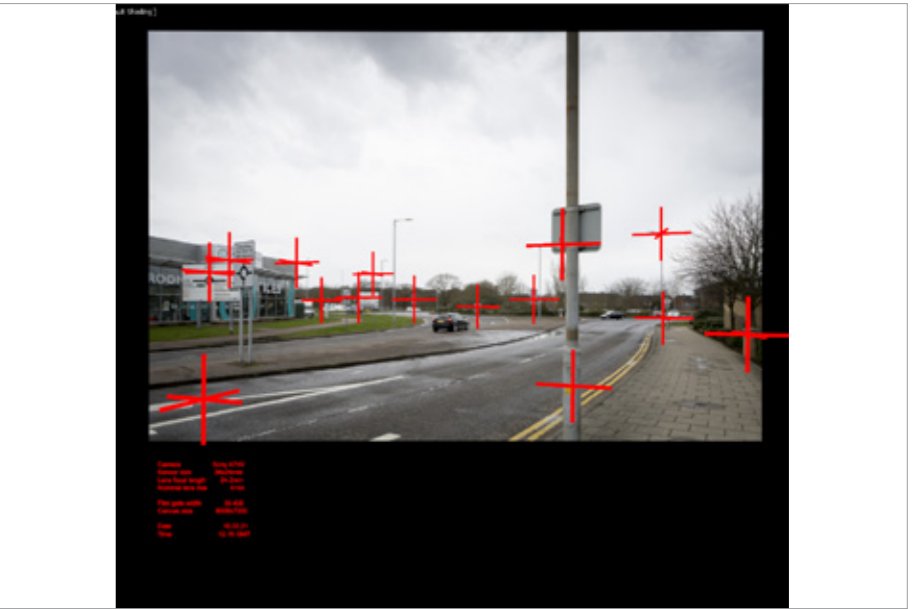
3.8 Final camera matched photomontage



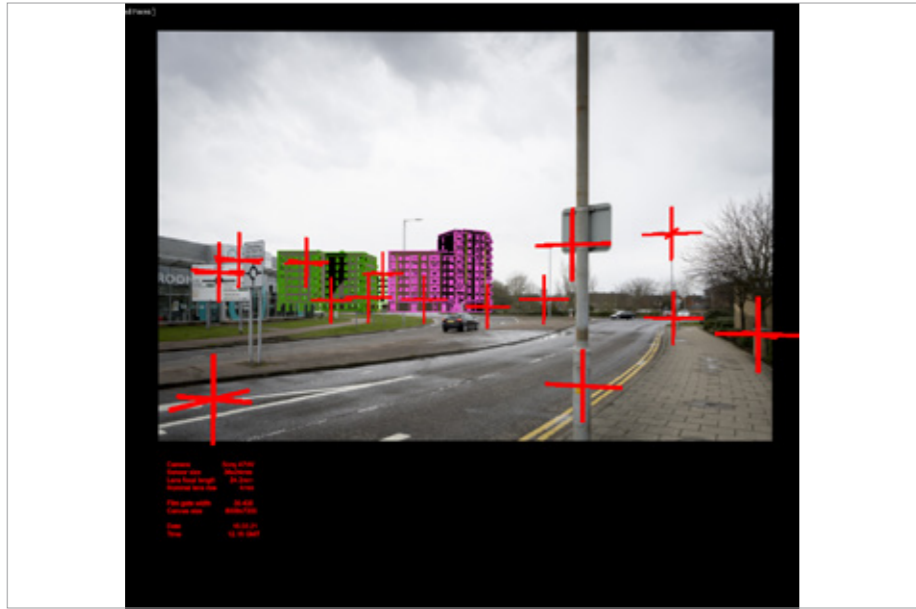
3.4 Screen grab of camera location in 3DS Max software



3.5 Screen grab of calculated horizon line



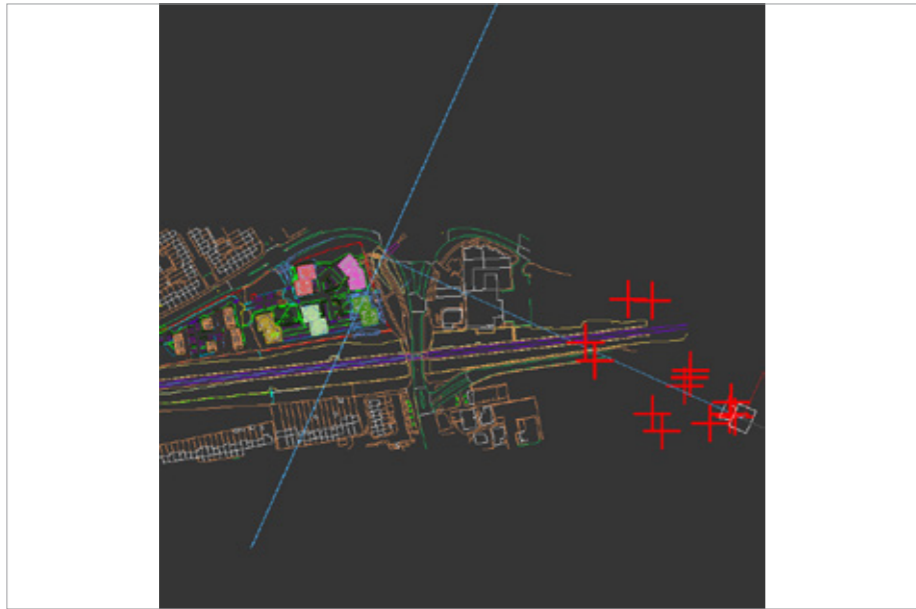
3.6 Screen grab of camera matching to survey data



3.7 Screen grab of model matched to photograph



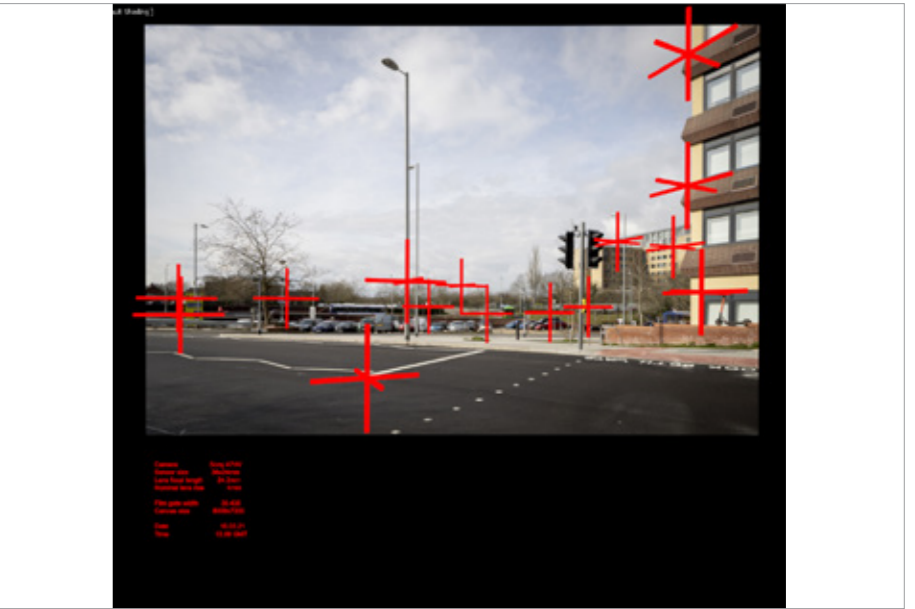
3.8 Final camera matched photomontage



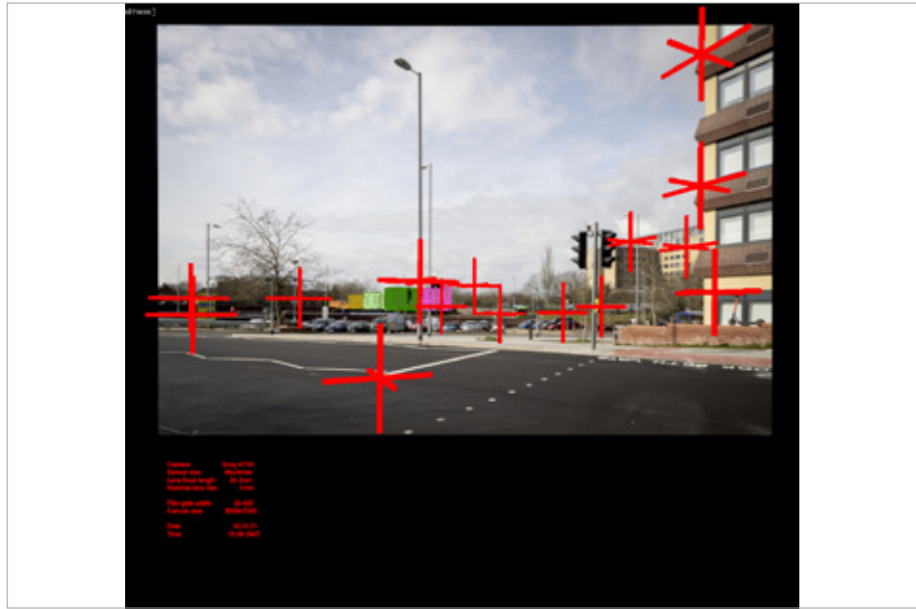
3.4 Screen grab of camera location in 3DS Max software



3.5 Screen grab of calculated horizon line



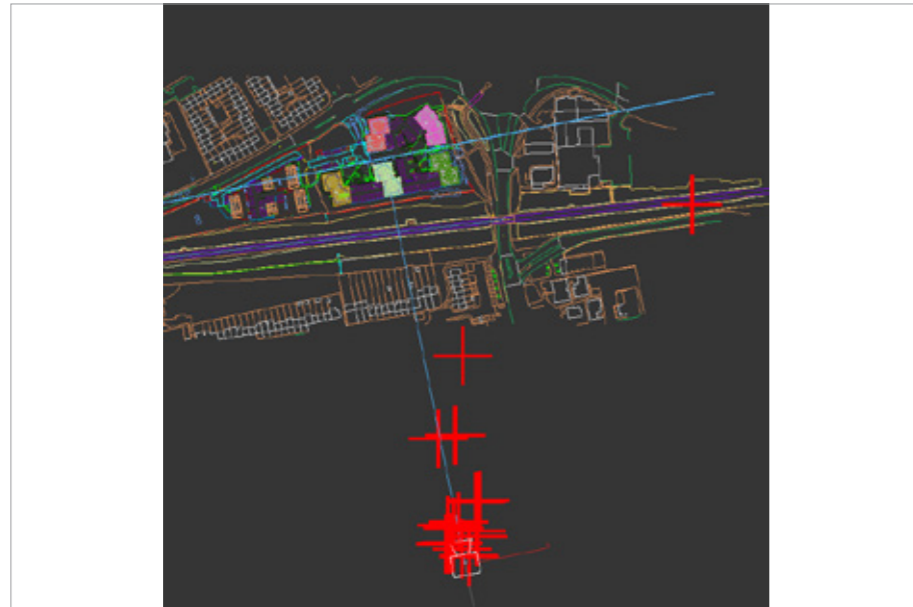
3.6 Screen grab of camera matching to survey data



3.7 Screen grab of model matched to photograph



3.8 Final camera matched photomontage



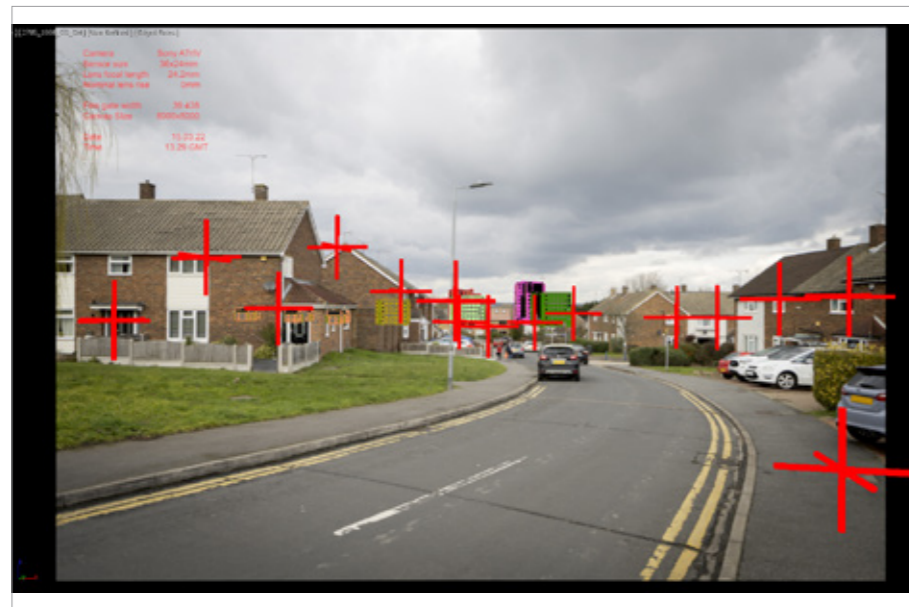
3.4 Screen grab of camera location in 3DS Max software



3.5 Screen grab of calculated horizon line



3.6 Screen grab of camera matching to survey data



3.7 Screen grab of model matched to photograph



3.8 Final camera matched photomontage

View 9

3.1 Ordnance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
C901	570138.297	187743.228	49.032
C902	570092.548	187778.869	59.126
C903	570096.822	187778.661	51.595
C904	570098.784	187785.488	51.641
C905	570109.444	187789.535	51.566
C906	570112.513	187789.929	56.889
C907	570120.621	187794.452	47.451
C908	570146.465	187745.832	47.242
C909	570151.171	187745.039	50.356
C910	570157.154	187745.930	49.362
C911	570167.670	187780.220	48.357
C912	570191.392	187892.080	46.307
C913	570147.888	187759.718	49.587
C914	570089.839	187918.403	40.744
C915	570078.014	187955.719	43.884



3.2 OS survey points marked on base photograph

3.3 View 9 camera location

Eastings 570151.3889m
 Northings 187727.8803m
 AOD height 50.4662m
 Approx distance to centre of site 683m
 Approx bearing from North 342°

View 10

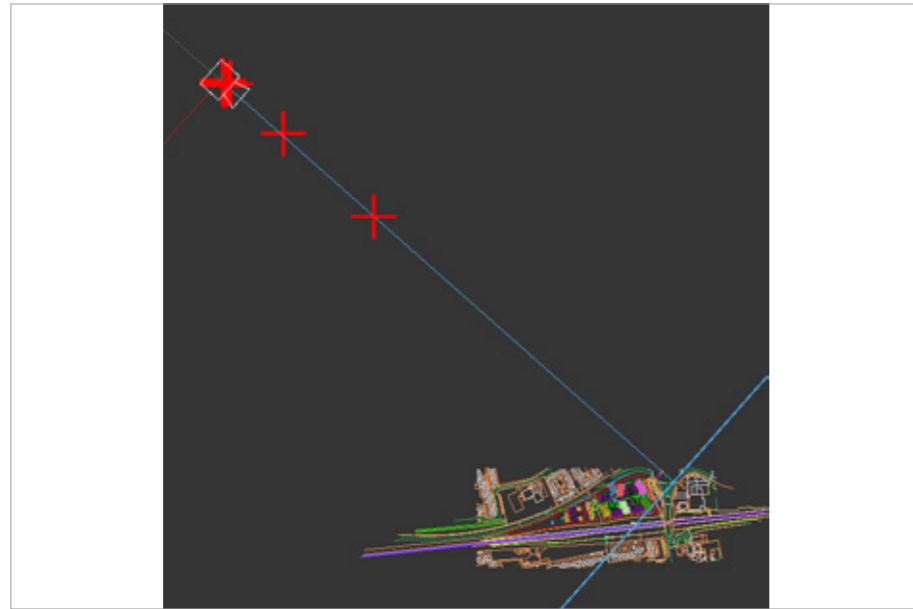
3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
C1001	568805.527	189506.134	59.707
C1002	568805.437	189505.385	59.647
C1003	568826.994	189497.447	62.887
C1004	568808.996	189492.308	56.243
C1005	568807.952	189491.213	56.862
C1006	568807.944	189491.109	58.197
C1007	568808.132	189490.830	63.878
C1008	568805.176	189498.785	61.210
C1009	568808.036	189504.590	58.645
C1010	568817.124	189494.737	57.918
C1011	569219.891	189133.690	35.817
C1012	568972.471	189360.832	47.015



3.2 OS survey points marked on base photograph

3.3 View 10 camera location

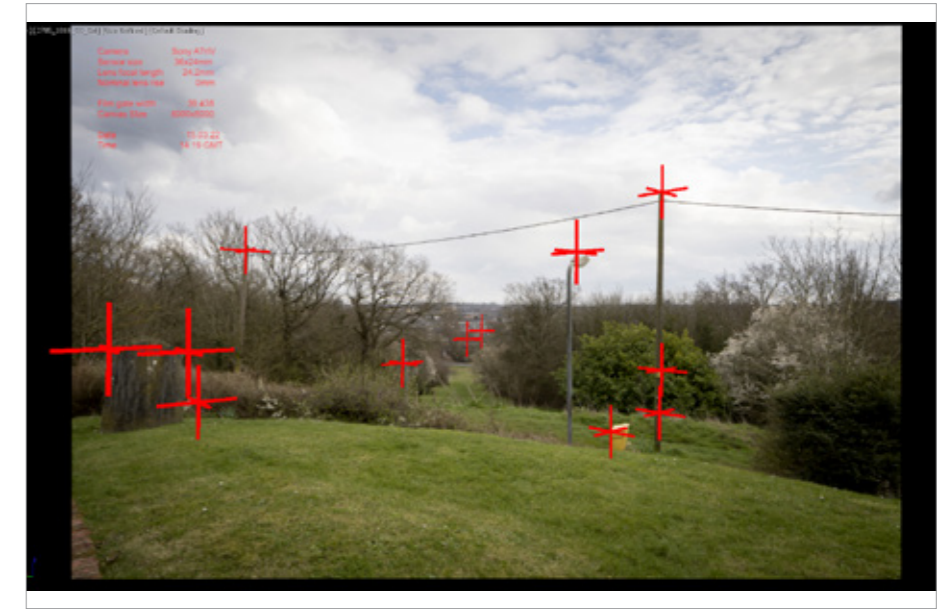
Eastings 568798.437m
 Northings 189507.127m
 AOD height 60.168m
 Approx distance to centre of site 1572m
 Approx bearing from North 132°



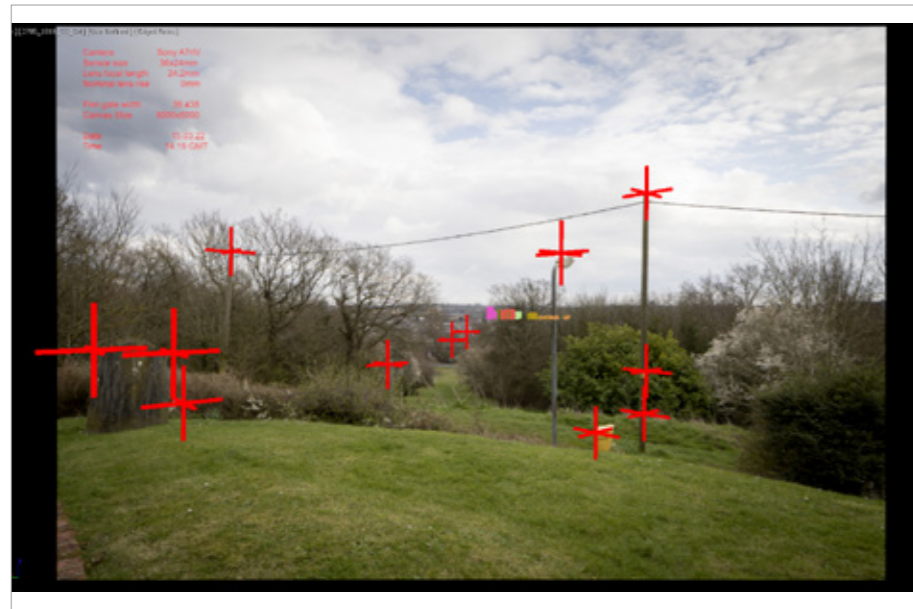
3.4 Screen grab of camera location in 3DS Max software



3.5 Screen grab of calculated horizon line



3.6 Screen grab of camera matching to survey data



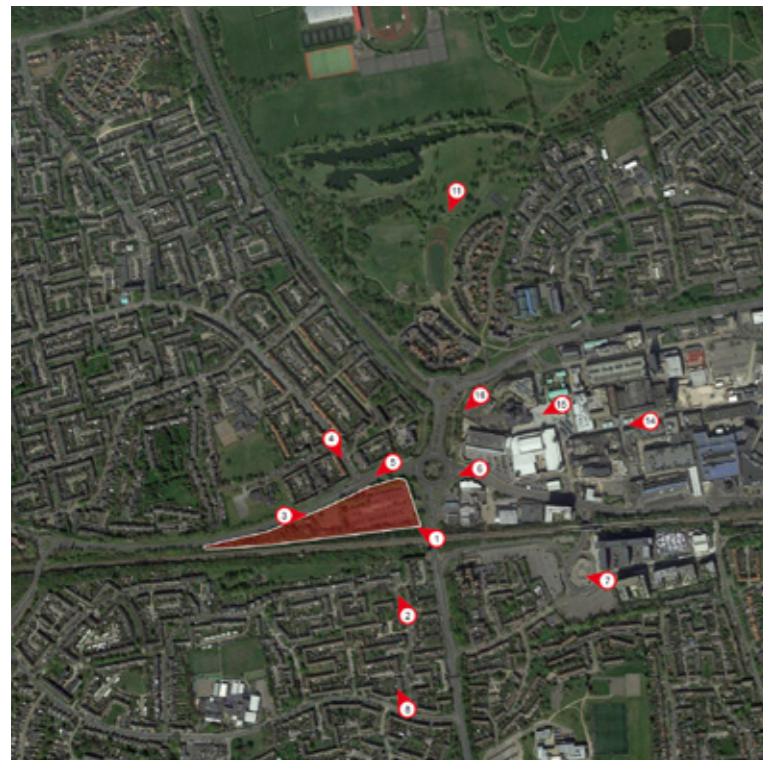
3.7 Screen grab of model matched to photograph



3.8 Final camera matched photomontage

View 11

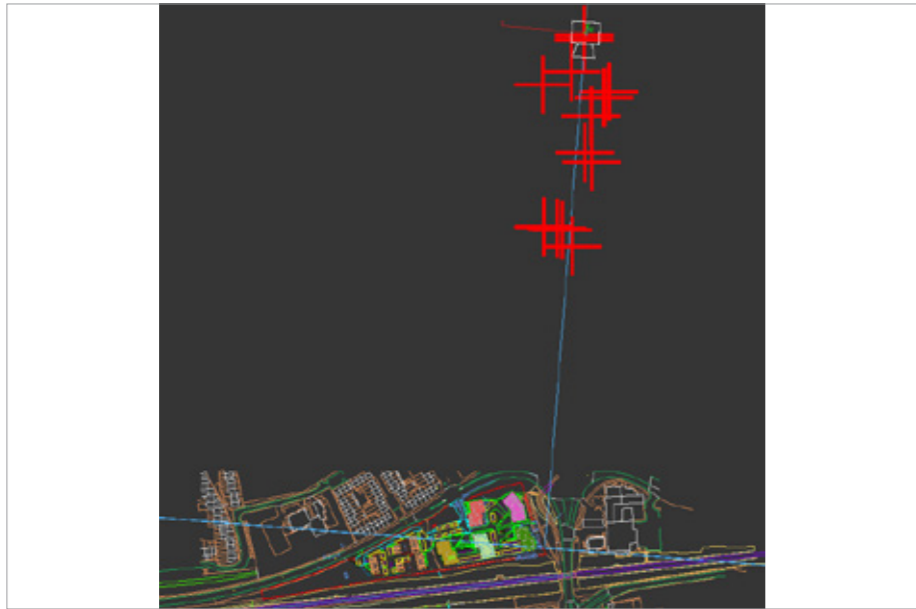
3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
C1101	570085.078	188986.474	26.015
C1102	570077.956	188978.545	26.018
C1103	570059.639	188951.817	30.118
C1104	570051.042	188899.543	39.552
C1105	570049.631	189060.409	32.858
C1106	570031.125	189015.028	33.489
C1107	569991.179	188996.688	27.343
C1108	569991.925	188792.985	33.884
C1109	570010.735	188790.686	33.920
C1110	570032.580	188765.262	37.108
C1111	570018.396	188788.777	28.246
C1112	570049.496	189067.385	31.780
C1113	570060.454	188886.067	39.548



3.2 OS survey points marked on base photograph

3.3 View 11 camera location

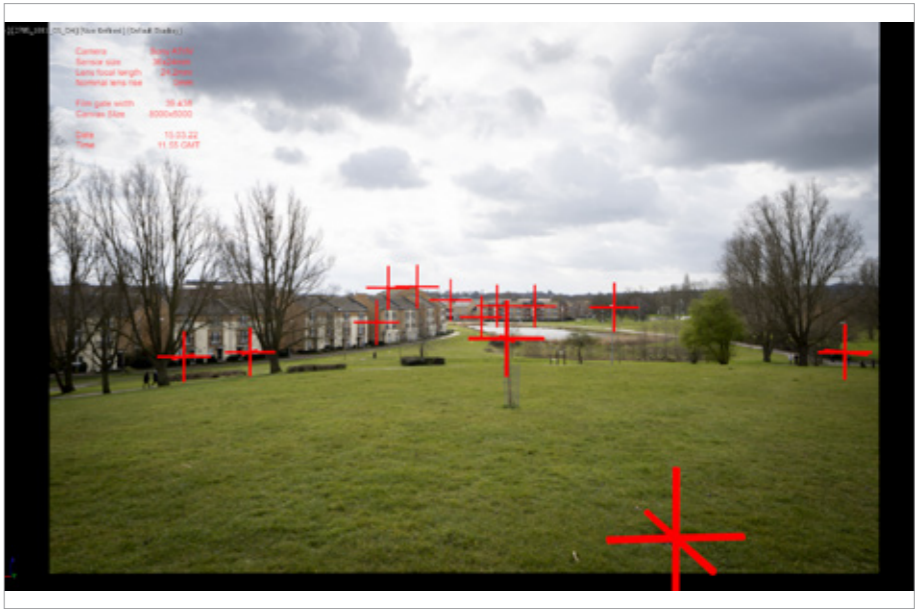
Eastings 570051.417m
 Northings 189071.397m
 AOD height 33.479m
 Approx distance to centre of site 752m
 Approx bearing from North 184°



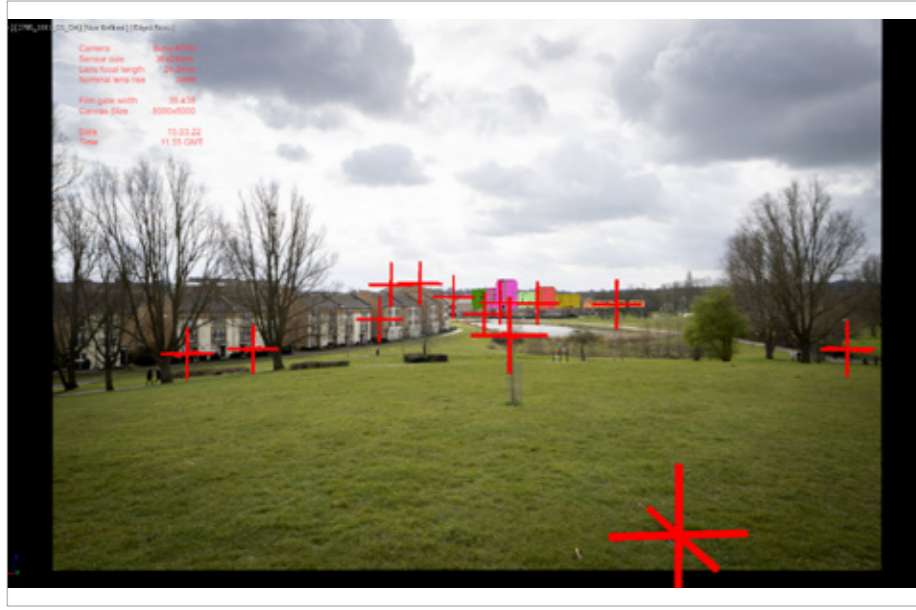
3.4 Screen grab of camera location in 3DS Max software



3.5 Screen grab of calculated horizon line



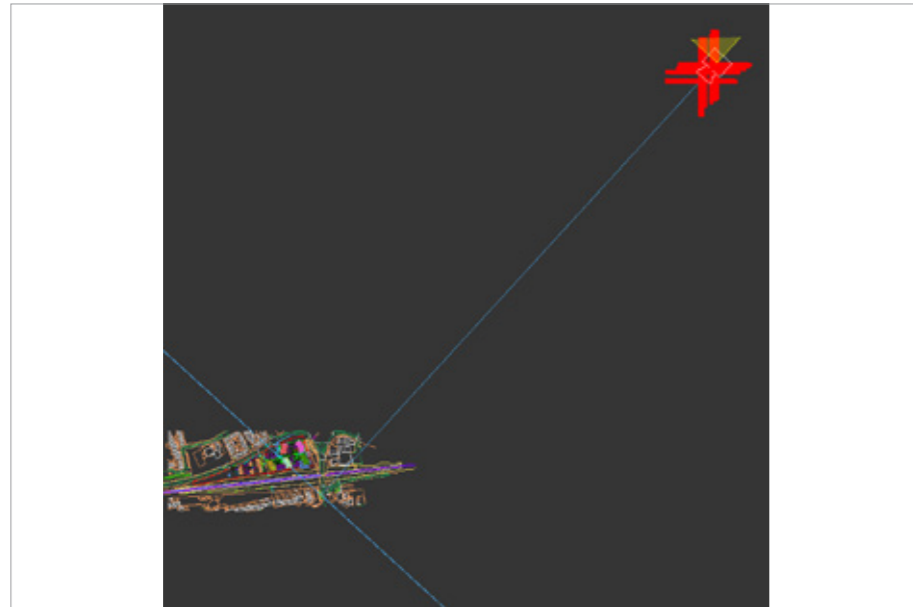
3.6 Screen grab of camera matching to survey data



3.7 Screen grab of model matched to photograph



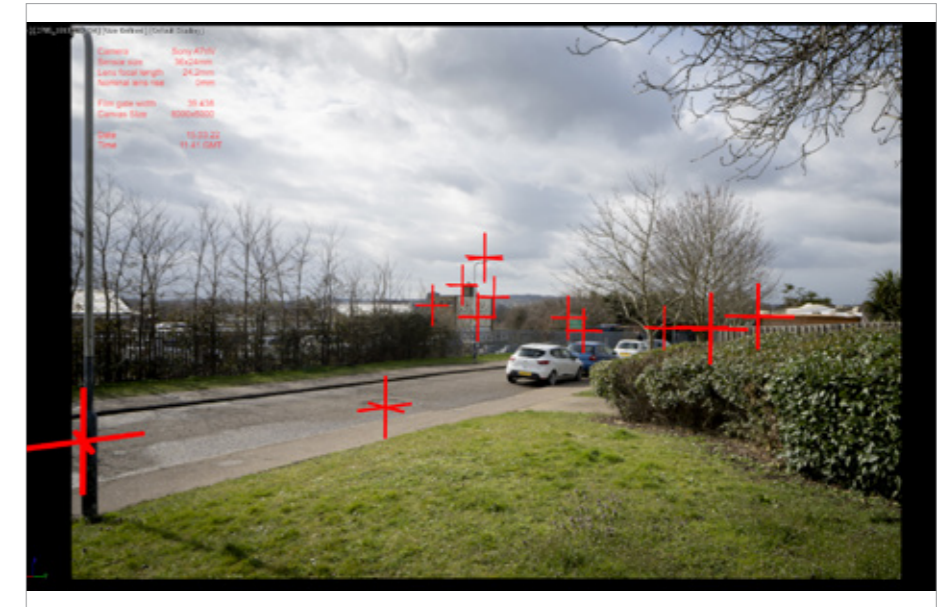
3.8 Final camera matched photomontage



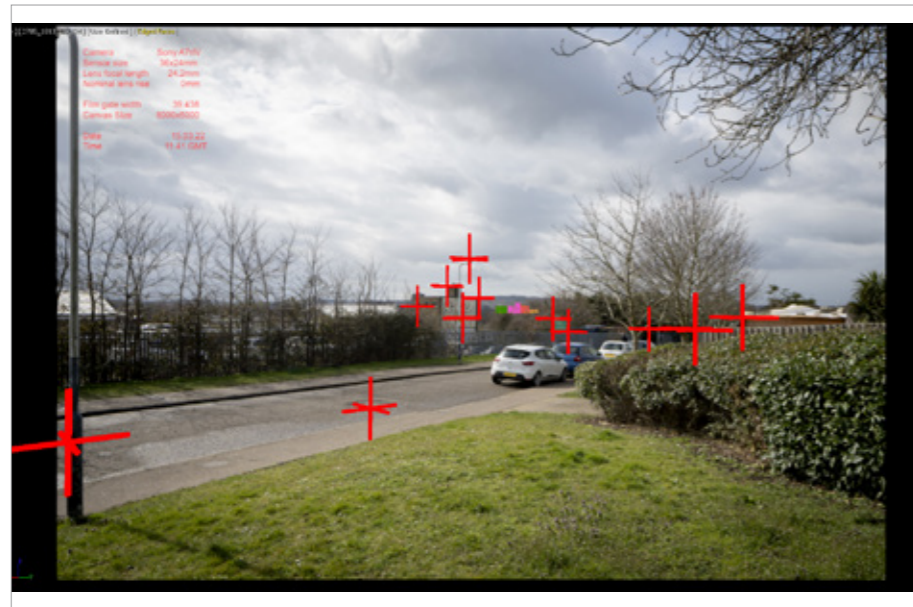
3.4 Screen grab of camera location in 3DS Max software



3.5 Screen grab of calculated horizon line



3.6 Screen grab of camera matching to survey data



3.7 Screen grab of model matched to photograph



3.8 Final camera matched photomontage

View 14

3.1 Ordinance survey co-ordinates

Point Ref	Eastings	Northings	AOD height
C1401	570480.224	188562.030	29.156
C1402	570470.557	188552.534	32.233
C1403	570474.693	188553.510	38.725
C1404	570466.594	188552.402	42.557
C1405	570453.818	188549.542	32.364
C1406	570419.251	188540.559	38.677
C1407	570384.850	188534.306	32.429
C1408	570290.550	188516.838	38.109
C1409	570450.974	188564.612	30.118
C1410	570445.818	188561.229	40.613
C1411	570406.350	188573.688	52.147
C1412	570397.913	188599.662	55.090
C1413	570442.704	188586.815	32.412
C1414	570406.128	188579.088	32.358
C1415	570406.150	188574.424	45.983

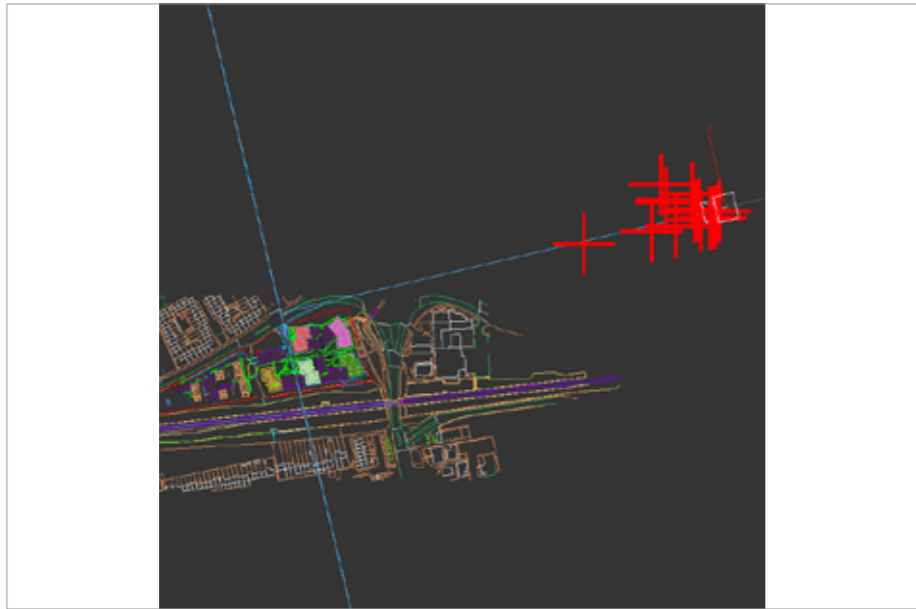


3.2 OS survey points marked on base photograph



3.3 View 14 camera location

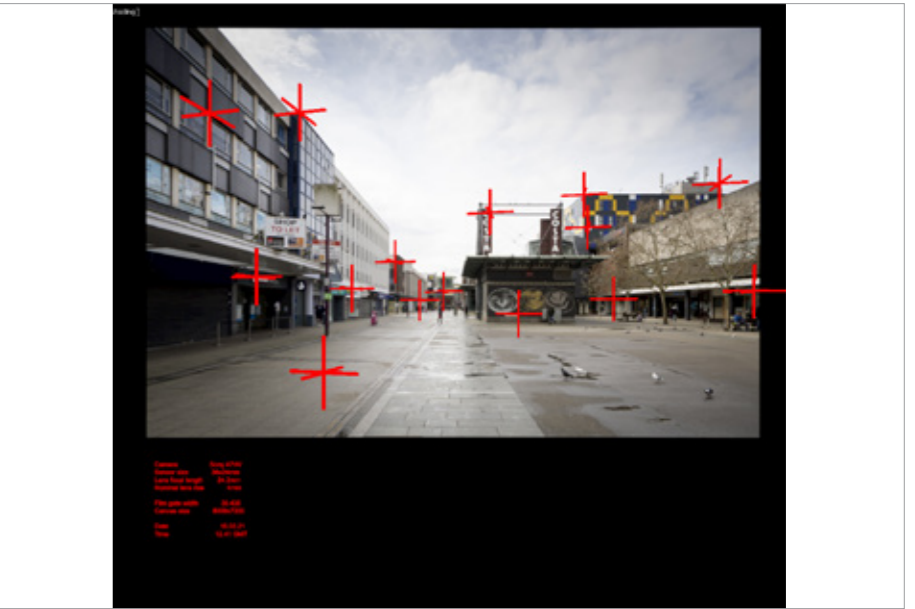
Eastings 570489.23m
 Northings 188567.258m
 AOD height 30.749m
 Approx distance to centre of site 671m
 Approx bearing from North 257°



3.4 Screen grab of camera location in 3DS Max software



3.5 Screen grab of calculated horizon line



3.6 Screen grab of camera matching to survey data



3.7 Screen grab of model matched to photograph



3.8 Final camera matched photomontage

View 15

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
C1501	570291.441	188591.959	28.386
C1502	570281.394	188543.227	39.158
C1503	570275.122	188539.892	33.546
C1504	570255.341	188535.244	50.682
C1505	570258.411	188536.348	32.498
C1506	570242.039	188532.470	34.541
C1507	570208.248	188525.161	34.584
C1508	570230.306	188564.448	35.445
C1509	570229.362	188566.556	31.720
C1510	570197.771	188555.675	50.975
C1511	570193.372	188575.621	50.987
C1512	570242.986	188591.144	37.885
C1513	570243.212	188590.087	30.449
C1514	570221.481	188582.047	38.566
C1515	570286.529	188595.768	28.292



3.2 OS survey points marked on base photograph



3.3 View 15 camera location

Eastings 570294.425m
 Northings 188598.173m
 AOD height 29.923m
 Approx distance to centre of site 506m
 Approx bearing from North 229°