Alton Estate Regeneration
Hybrid Application

VERIFIED VIEW PHOTOMONTAGES METHODOLOGY AND SUPPORTING EVIDENCE

Realm Communications
March 2020

ALTON GREEN

ROEHAMPTON SW15

REDROW

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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 at the site at Alton Estate, Roehampton. 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. In this document, you will be guided through a step-by-step description of how Realm has produced an accurate representation of the proposed built form, as based on the model of the current proposals 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.

The viewpoint locations used for the photomontages in this document have been identified by the client and Barton Willmore. The entities responsible for the preparation of the views that are set out in the following pages comprise:

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

Redrow Homes Limited
1st Floor Unex Tower
7 Station Street
London
E15 1AZ

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 models, spot height and associated information
Hawkins Brown
159 St John Street
London
EC1V 4QJ
Phone: 0207 336 8030

Tate Hindle
1 Lindsey Street
Smithfield
London
EC1A 9HP
Phone: 0207 332 4850

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

Supply of landscape CAD and planting information
Gillespies
1 St John's Square
London
EC1M 4DH
Phone: 0207 253 2929

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 April 2018 and February 2019 that form the pictorial basis for visual impact assessment photomontages for 22 views for the site at the Alton Estate, Roehampton site.

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 Alton Estate, Roehampton. Digital files of the 22 views together with camera point locations were provided by the photographer.

Date of surveys April 2018 and February 2019.

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 models

The building models were supplied by Hawkins Brown, Tate Hindle and Barton Willmore.

2.4 3D landscape

The landscape was modelled by Realm from CAD supplied by Gillespies.

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

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).

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.

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 images are printed to a size that creates a comfortable viewing distance between 300 to 500mm. The recommended viewing distance for each image is specified within Section 4.0 of this document.

2.9 Caveats

None.

3.0 Supporting evidence

Ordance survey co-ordinates			
View Ref	Eastings	Northings	AOD Height
1	522597.264	174241.343	45.361
2	522650.618	173852.964	43.748
3	522536.328	173693.690	34.525
4	522407.012	173767.301	31.383
5	522420.163	173835.113	36.637
6	522319.497	173676.362	34.742
7	522040.985	173599.383	36.927
8	522327.505	173800.520	33.534
9	522310.058	173897.258	37.702
10	522157.250	173960.618	36.047
11	522127.681	174107.610	38.217
12	522091.919	173921.894	28.221
13	521999.117	173821.871	24.672
14	522004.732	174108.910	32.244
15	521854.780	173946.979	20.051
16	521780.788	173875.690	22.603
17	521791.41	174097.94	19.971
18	521642.335	174000.452	23.279
19	521670.015	174184.593	19.847
20	520499.411	173914.454	13.446
21	520895.017	173116.894	39.336
22	520944.070	172488.857	16.633



View 1

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
101	522597.299	174240.493	45.222
102	522597.302	174240.486	45.214
103	522382.251	174179.633	55.387
104	522388.109	174173.416	51.549
105	522388.669	174169.038	54.092
106	522409.797	174168.876	46.042
107	522392.873	174156.567	51.415
108	522393.601	174150.543	51.399
109	522429.469	174149.071	45.399
110	522426.277	174145.362	48.857
111	522375.543	174117.351	54.897
112	522376.980	174105.911	54.886
113	522397.163	174119.798	51.410
114	522395.502	174110.581	54.056
115	522436.632	174140.940	45.758
116	522451.913	174123.679	52.123
117	522452.358	174122.862	45.870
118	522468.029	174085.722	45.645
119	522590.874	174226.547	49.603
120	522591.755	174228.758	49.762
121	522592.187	174227.967	50.862

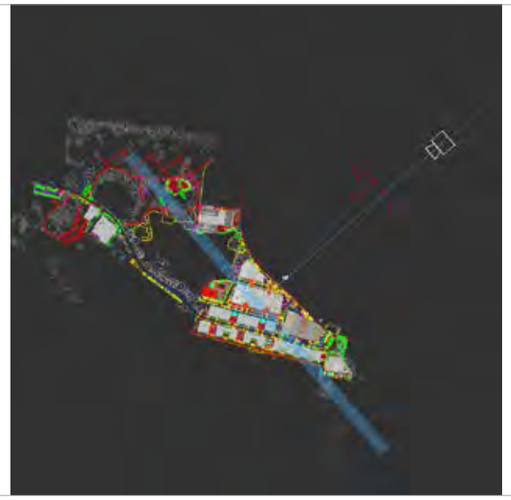




3.2 OS survey points marked on base photograph

3.3 View 1 camera location

Eastings	522597.264m
Northings	174241.343m
AOD height	43.361m
Approx distance to centre of site	649m
Approx bearing from North	229°



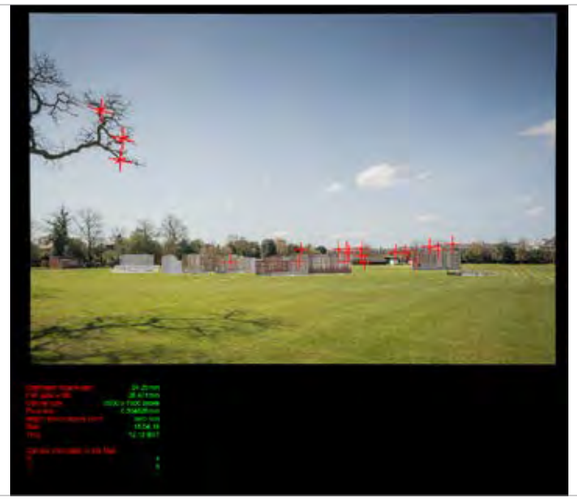
3.4 Screen grab of camera location in 3DS Max software



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 2

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
201	522575.491	173762.156	41.676
202	522628.478	173841.501	44.402
203	522634.112	173848.682	41.247
204	522637.595	173854.576	42.419
205	522540.057	173801.339	41.318
206	522445.597	173770.212	37.324
207	522403.173	173742.454	46.546
208	522286.337	173698.666	47.540
209	522257.884	173705.862	47.065
210	522560.596	173833.356	44.643
211	522553.996	173831.224	46.871
212	522612.468	173858.853	45.899
213	522628.391	173851.647	40.993
214	522628.371	173841.452	49.620
215	522554.764	173778.436	41.019

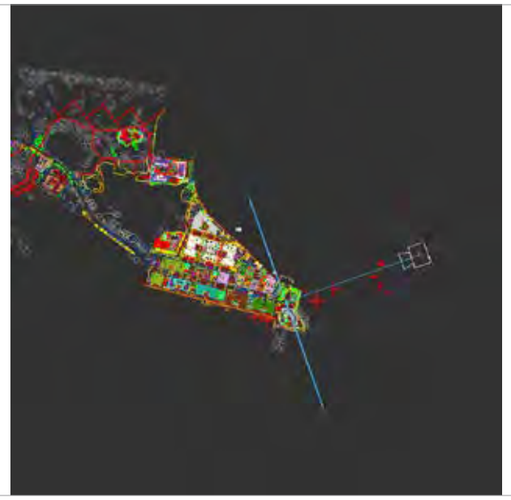




3.2 OS survey points marked on base photograph

3.3 View 2 camera location

Eastings	522650.618m
Northings	173852.964m
AOD height	43.748m
Approx distance to centre of site	604m
Approx bearing from North	251°



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
301	522520.402	173710.332	39.162
302	522524.700	173705.318	34.839
303	522513.950	173708.483	42.786
304	522259.039	173811.560	59.972
305	522451.894	173718.729	43.413
306	522519.543	173696.229	33.968
307	522507.279	173692.721	43.512
308	522510.848	173687.665	35.703
309	522494.620	173678.559	47.889
310	522500.344	173678.125	38.342
311	522522.192	173691.071	34.015
312	522532.175	173697.115	35.610
313	522512.906	173706.719	33.836
314	522248.721	173792.518	63.054
315	522452.315	173746.624	39.157

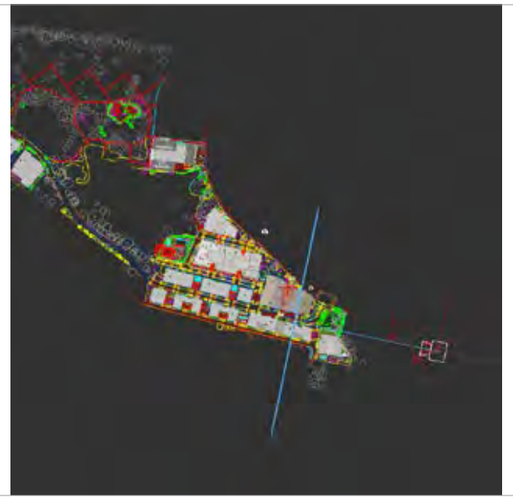




3.2 OS survey points marked on base photograph

3.3 View 3 camera location

Eastings	522536.328m
Northings	173693.690m
AOD height	34.525m
Approx distance to centre of site	529m
Approx bearing from North	282°



3.4 Screen grab of camera location in 3DS Max software



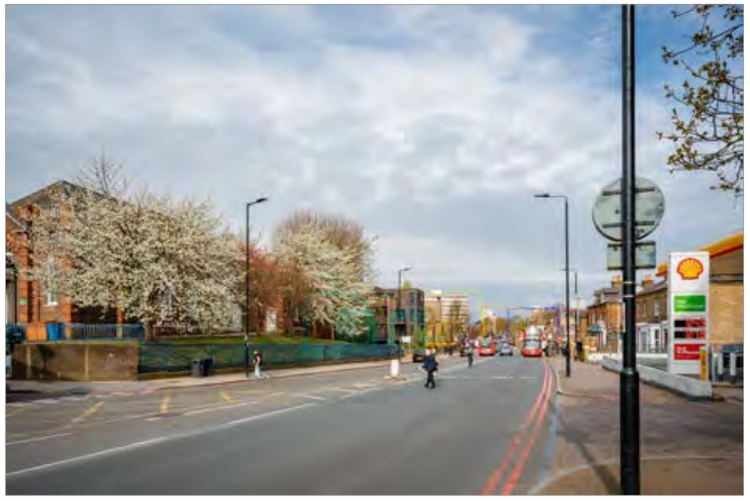
3.5 Screen grab of calculated horizon line



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 4

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
401	522393.505	173753.603	33.827
402	522293.591	173685.627	47.109
403	522326.934	173732.796	46.450
404	522320.097	173720.055	38.813
405	522340.647	173763.807	43.765
406	522360.174	173759.889	35.420
407	522323.845	173769.809	35.271
408	522248.424	173770.000	59.975
409	522259.114	173811.611	59.949
410	522353.822	173787.809	39.893
411	522387.941	173771.595	30.986
412	522397.654	173761.703	31.094
413	522250.349	173798.709	63.059
414	522264.618	173817.073	34.199
415	522248.791	173792.557	63.028





3.2 OS survey points marked on base photograph

3.3 View 4 camera location

Eastings	522407.012m
Northings	173767.301m
AOD height	31.383m
Approx distance to centre of site	382m
Approx bearing from North	258°



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 5

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
501	522408.755	173813.580	44.701
502	522410.077	173819.881	40.188
503	522408.662	173824.293	42.997
504	522404.030	173823.068	38.628
505	522307.793	173784.251	33.642
506	522161.712	173697.622	51.614
507	522248.406	173770.012	59.917
508	522390.397	173825.923	41.542
509	522391.003	173830.125	47.660
510	522400.425	173837.196	47.542
511	522400.416	173834.156	43.015
512	522409.663	173834.640	38.303
513	522391.972	173830.077	39.195
514	522414.196	173833.844	36.404
515	522229.085	173755.338	46.398

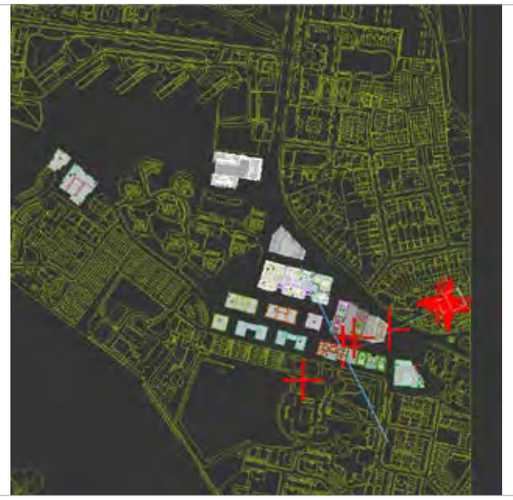




3.2 OS survey points marked on base photograph

3.3 View 5 camera location

Eastings	522420.163m
Northings	173835.113m
AOD height	36.637m
Approx distance to centre of site	377m
Approx bearing from North	244°



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 6

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
601	522295.725	173695.145	49.545
602	522310.676	173683.242	35.801
603	522312.241	173685.910	34.042
604	522313.048	173691.521	33.982
605	522322.880	173692.560	35.918
606	522320.952	173692.748	38.561
607	522315.514	173694.714	40.348
608	522298.866	173717.623	34.173
609	522281.855	173722.057	34.388
610	522233.347	173754.200	46.461
611	522238.832	173772.397	59.959
612	522259.087	173811.604	59.966
613	522250.324	173798.680	63.060
614	522248.755	173792.527	63.045
615	522244.297	173793.649	63.045
616	522285.993	173733.032	43.738
617	522302.151	173728.902	43.746
618	522268.355	173739.234	43.127

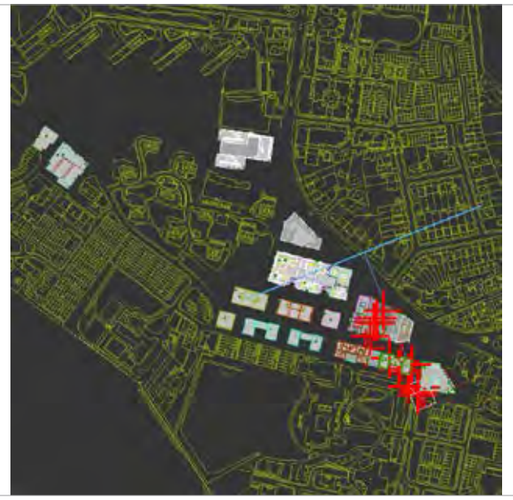




3.2 OS survey points marked on base photograph

3.3 View 6 camera location

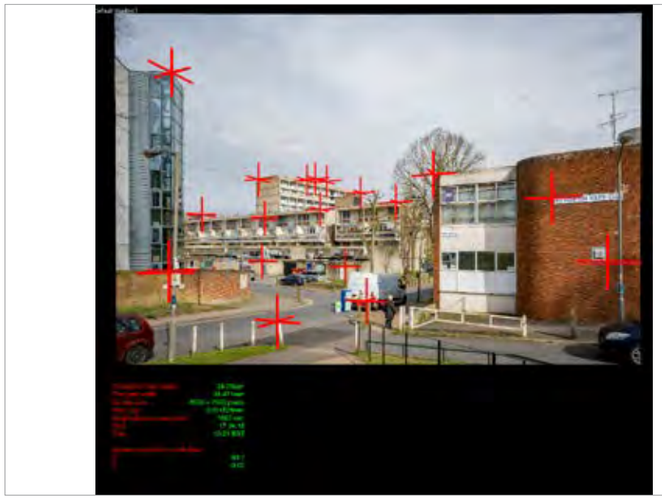
Eastings	522319.497m
Northings	173676.362m
AOD height	34.742m
Approx distance to centre of site	350m
Approx bearing from North	338°



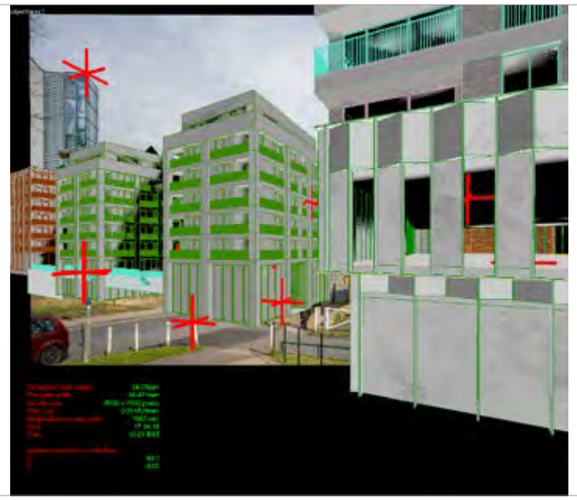
3.4 Screen grab of camera location in 3DS Max software



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 7

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
701	522147.776	173684.896	40.110
702	522161.730	173697.615	51.699
703	522238.906	173772.413	59.961
704	522249.561	173813.983	59.952
705	522248.820	173792.530	63.014
706	522146.824	173697.090	44.278
707	522199.518	173765.706	43.740
708	522111.337	173670.671	39.427
709	522336.433	173921.030	49.395
710	522077.311	173667.871	38.011
711	522052.336	173628.503	36.516
712	522051.043	173667.050	37.675
713	522047.528	173918.646	61.234
714	522091.180	173952.166	60.996
715	522039.978	173916.684	57.312
716	522068.179	173783.813	41.078
717	522090.299	173714.493	44.373

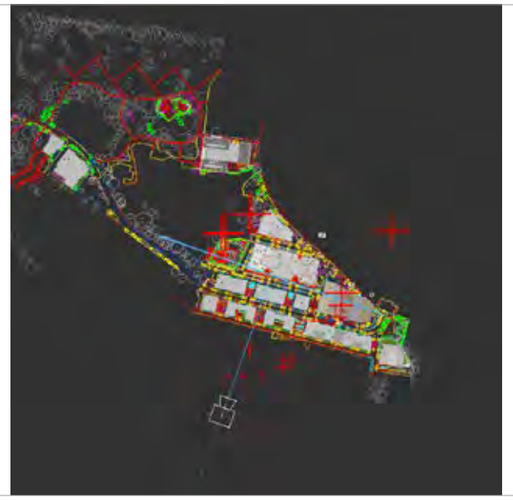




3.2 OS survey points marked on base photograph

3.3 View 7 camera location

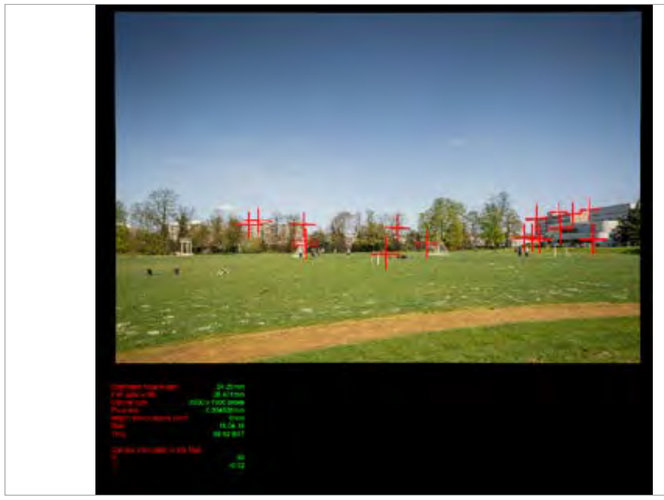
Eastings	522040.985m
Northings	173599.383m
AOD height	36.927m
Approx distance to centre of site	297m
Approx bearing from North	19°



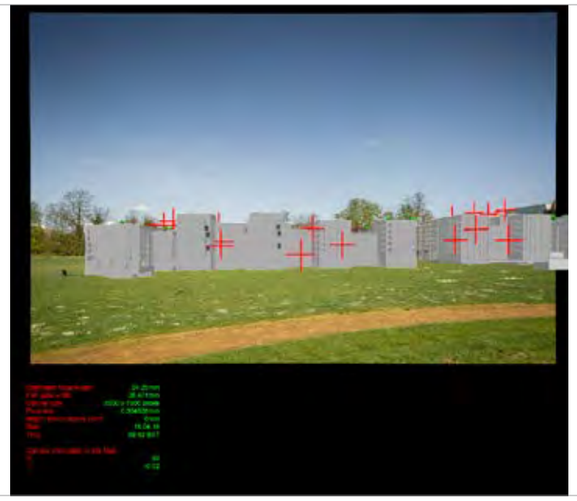
3.4 Screen grab of camera location in 3DS Max software



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 8

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
801	522340.632	173763.817	43.777
802	522330.959	173767.199	43.801
803	522323.853	173769.793	35.267
804	522328.344	173787.807	31.832
805	522335.616	173765.587	34.765
806	522300.251	173697.956	34.446
807	522321.493	173784.074	32.651
808	522301.684	173737.943	43.101
809	522292.763	173740.261	40.349
810	522302.764	173766.623	33.904
811	522283.689	173742.545	40.337
812	522294.470	173740.084	33.478
813	522320.700	173737.683	43.145
814	522307.808	173784.221	33.669
815	522274.484	173745.019	33.117
816	522302.662	173737.892	33.877
817	522313.116	173691.625	33.991

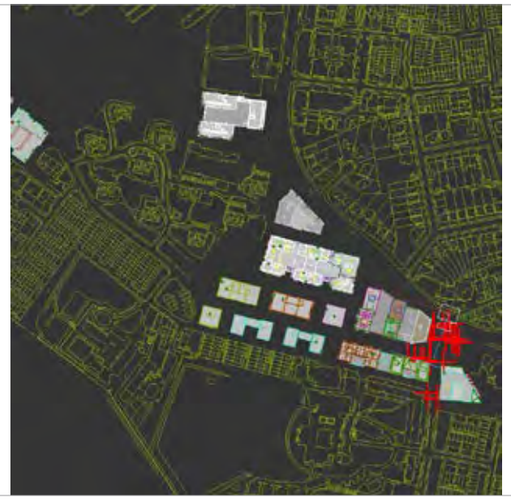




3.2 OS survey points marked on base photograph

3.3 View 8 camera location

Eastings	522327.505m
Northings	173800.520m
AOD height	33.534m
Approx distance to centre of site	296m
Approx bearing from North	198°



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 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
901	522307.522	173878.998	43.354
902	522305.910	173876.828	46.313
903	522302.821	173875.668	46.326
904	522301.940	173883.960	37.982
905	522295.479	173878.668	42.178
906	522248.293	173814.503	58.925
907	522188.118	173762.199	41.717
908	522297.458	173886.218	36.814
909	522270.909	173861.122	37.800
910	522309.427	173893.441	38.295
911	522288.750	173886.831	38.708
912	522299.809	173893.808	37.165
913	522201.307	173763.908	33.048
914	522173.368	173765.819	41.074
915	522275.806	173871.188	38.857





3.2 OS survey points marked on base photograph

3.3 View 9 camera location

Eastings	522310.058m
Northings	173897.258m
AOD height	37.702m
Approx distance to centre of site	262m
Approx bearing from North	223°



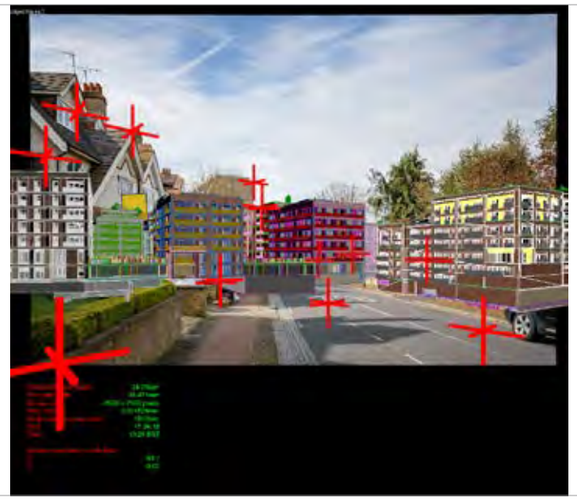
3.4 Screen grab of camera location in 3DS Max software



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 10

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
1001	522167.135	173948.431	35.861
1002	522179.185	173937.255	44.797
1003	522331.011	173767.118	43.221
1004	522245.901	173799.817	63.056
1005	522244.321	173793.648	63.063
1006	522238.834	173772.410	59.971
1007	522170.247	173936.701	36.076
1008	522155.419	173953.075	36.106
1009	522152.362	173942.332	38.292
1010	522164.565	173926.840	37.926
1011	522170.685	173924.448	45.067
1012	522146.626	173926.393	42.129
1013	522131.880	173776.502	41.088
1014	522082.123	173539.976	69.408
1015	522158.942	173948.313	36.113





3.2 OS survey points marked on base photograph

3.3 View 10 camera location

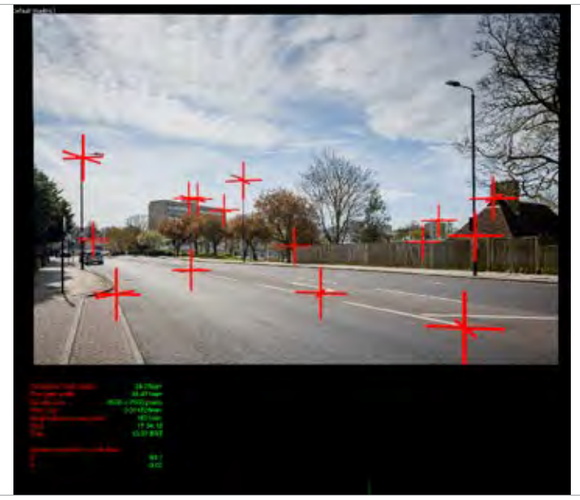
Eastings	522157.250m
Northings	173960.618m
AOD height	36.047m
Approx distance to centre of site	127m
Approx bearing from North	168°



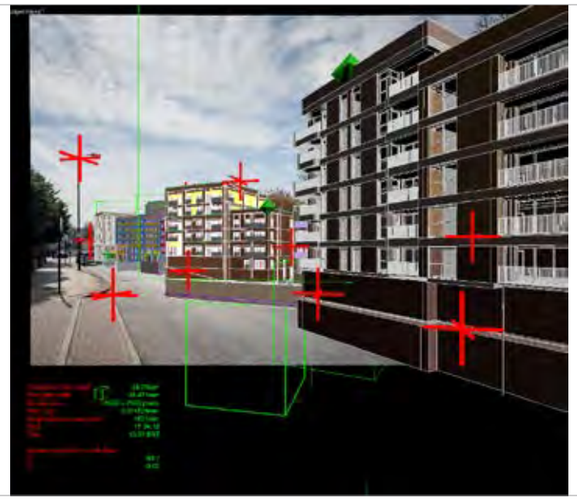
3.4 Screen grab of camera location in 3DS Max software



3.5 Screen grab of calculated horizon line



3.6 Screen grab of camera matching to survey data



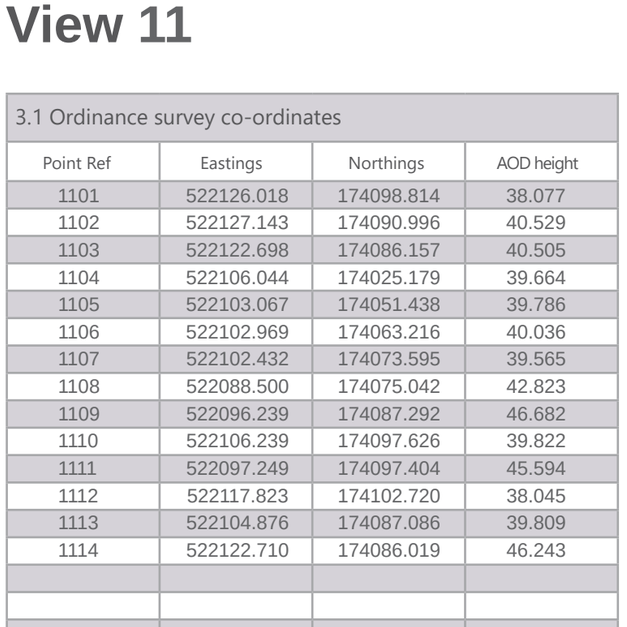
3.7 Screen grab of model matched to photograph



3.8 Final camera matched photomontage

View 11

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
1101	522126.018	174098.814	38.077
1102	522127.143	174090.996	40.529
1103	522122.698	174086.157	40.505
1104	522106.044	174025.179	39.664
1105	522103.067	174051.438	39.786
1106	522102.969	174063.216	40.036
1107	522102.432	174073.595	39.565
1108	522088.500	174075.042	42.823
1109	522096.239	174087.292	46.682
1110	522106.239	174097.626	39.822
1111	522097.249	174097.404	45.594
1112	522117.823	174102.720	38.045
1113	522104.876	174087.086	39.809
1114	522122.710	174086.019	46.243

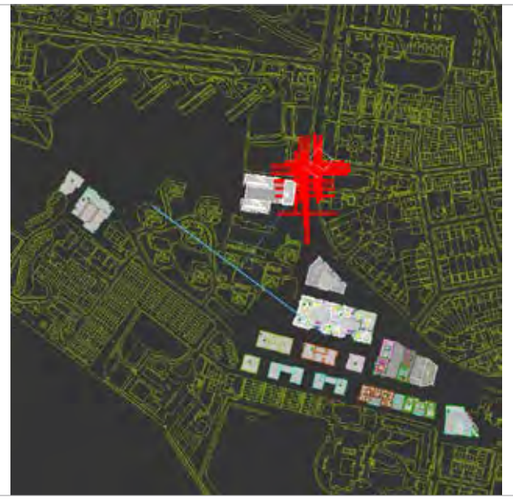




3.2 OS survey points marked on base photograph

3.3 View 11 camera location

Eastings	522127.681m
Northings	174107.610m
AOD height	38.217m
Approx distance to centre of site	225m
Approx bearing from North	217°



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 12

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
1201	522105.693	173887.507	35.505
1202	522099.964	173906.274	28.686
1203	522091.140	173917.530	28.630
1204	522091.671	173911.470	30.970
1205	522082.124	173867.931	36.930
1206	522075.689	173856.138	27.055
1207	522110.802	173860.344	36.234
1208	522093.255	173915.144	28.126
1209	522063.188	173794.360	41.723
1210	522041.447	173843.743	35.662
1211	522060.516	173838.794	35.607
1212	522086.429	173914.228	29.352
1213	522077.228	173905.637	29.948
1214	522089.609	173906.040	28.376
1215	522102.761	173862.443	30.922





3.2 OS survey points marked on base photograph

3.3 View 12 camera location

Eastings	522091.919m
Northings	173921.894m
AOD height	28.221m
Approx distance to centre of site	51m
Approx bearing from North	186°



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 13

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
1301	522011.855	173828.260	25.379
1302	522006.894	173821.688	24.457
1303	522034.010	173836.452	35.727
1304	522058.787	173830.012	36.315
1305	522072.670	173831.114	26.943
1306	522238.884	173772.483	59.924
1307	522014.698	173815.970	27.609
1308	522039.998	173818.618	26.509
1309	522098.534	173819.935	33.738
1310	522063.141	173794.389	41.705
1311	522062.912	173793.202	31.022
1312	522025.116	173804.025	28.863
1313	522325.069	173745.208	43.122
1314	522003.022	173819.190	25.588
1315	522038.777	173835.308	30.189

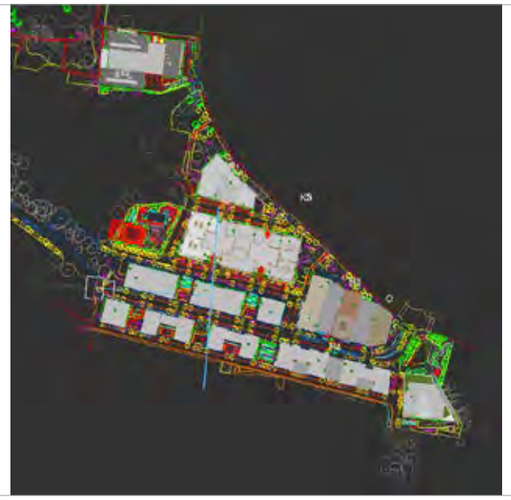




3.2 OS survey points marked on base photograph

3.3 View 13 camera location

Eastings	521999.117m
Northings	173821.871m
AOD height	24.672m
Approx distance to centre of site	89m
Approx bearing from North	94°



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
1401	521918.061	174057.852	28.468
1402	521902.780	174067.549	25.724
1403	521907.157	174066.657	52.106
1404	521904.093	174061.913	59.584
1405	521905.596	174100.087	26.311
1406	521898.211	174103.200	26.233
1407	521915.435	174114.221	26.607
1408	521984.020	174113.192	34.331
1409	521948.445	174120.002	29.590
1410	521976.709	174125.168	31.126
1411	521969.758	174122.941	31.497
1412	521859.567	174191.590	38.324
1413	521871.092	174200.583	38.323
1414	521987.624	174110.405	40.864

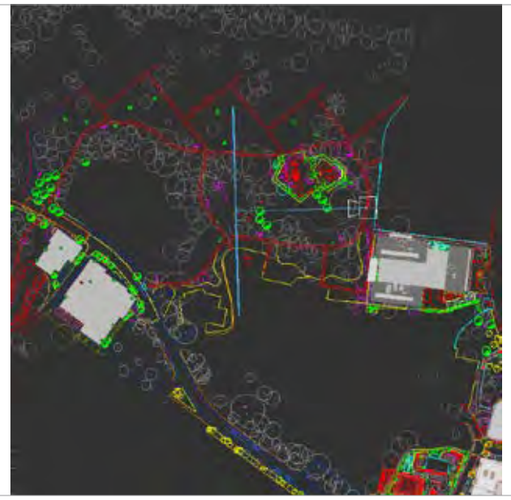




3.2 OS survey points marked on base photograph

3.3 View 14 camera location

Eastings	522004.732m
Northings	174108.910m
AOD height	32.244m
Approx distance to centre of site	217m
Approx bearing from North	268°



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
1501	521842.474	173949.681	20.812
1502	521832.852	173959.544	19.908
1503	521839.540	173965.278	19.936
1504	521851.298	173956.265	20.090
1505	521853.538	173956.868	20.622
1506	521848.345	173975.632	19.992
1507	521824.122	174038.457	21.721
1508	521827.767	173984.852	26.349
1509	521776.156	174019.150	25.877
1510	521737.371	174030.180	20.847
1511	521609.098	174057.438	53.707
1512	521742.320	174225.424	62.827
1513	521775.650	174200.540	58.742
1514	521781.864	174192.684	58.756
1515	521788.826	173973.232	20.945

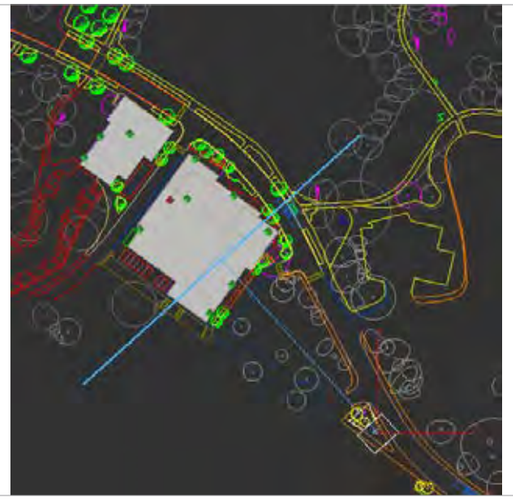




3.2 OS survey points marked on base photograph

3.3 View 15 camera location

Eastings	521854.780m
Northings	173946.979m
AOD height	20.051m
Approx distance to centre of site	89m
Approx bearing from North	318°



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 16

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
1601	521777.398	173890.302	24.256
1602	521779.355	173893.058	26.818
1603	521785.076	173918.928	25.110
1604	521796.247	173917.985	22.398
1605	521814.241	173941.470	23.008
1606	521942.515	174200.574	69.138
1607	521867.690	174014.362	45.835
1608	521784.122	173879.898	23.398
1609	521784.645	173880.802	25.127
1610	521807.434	173911.752	23.548
1611	521872.613	174013.424	21.492
1612	521787.983	173882.697	22.634
1613	521786.111	173880.248	28.275
1614	521844.103	174193.210	59.874
1615	521780.386	173887.174	22.342
1616	521866.061	174029.271	51.804

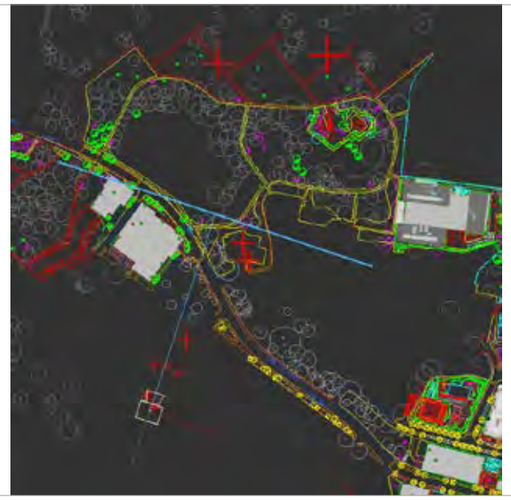




3.2 OS survey points marked on base photograph

3.3 View 16 camera location

Eastings	521780.788m
Northings	173875.690m
AOD height	22.603m
Approx distance to centre of site	268m
Approx bearing from North	18°



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 17

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
1701	521843.963	174029.122	19.722
1702	521808.904	174061.446	26.768
1703	521824.878	173994.367	26.347
1704	521835.090	173988.483	27.765
1705	521804.204	174003.950	23.727
1706	521795.032	174051.190	22.735
1707	521787.025	174059.548	23.534
1708	521785.835	174067.548	18.745
1709	521784.737	174079.278	18.726
1710	521784.117	174081.806	26.509
1711	521774.608	174068.220	21.265
1712	521767.138	174057.379	20.125
1713	521744.947	174030.199	19.105
1714	521774.789	174052.065	19.706
1715	521886.540	173911.695	24.057

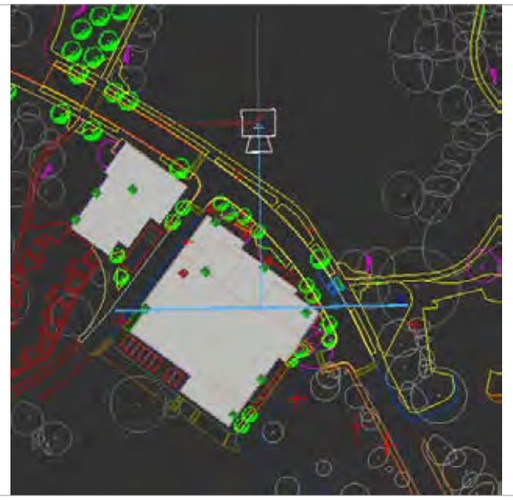




3.2 OS survey points marked on base photograph

3.3 View 17 camera location

Eastings	521791.41m
Northings	174097.94m
AOD height	19.971m
Approx distance to centre of site	326m
Approx bearing from North	179°



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 18

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
1801	521651.979	174002.534	22.798
1802	521654.750	174013.489	22.962
1803	521649.194	174001.806	22.934
1804	521655.809	173997.059	23.431
1805	521682.445	174002.437	23.383
1806	521736.748	174100.348	18.190
1807	521775.640	174200.519	58.732
1808	521732.083	174066.041	20.135
1809	521709.918	174031.308	20.587
1810	521763.772	174017.208	25.942
1811	521735.339	173979.632	23.983
1812	521883.088	173963.056	55.628
1813	521928.400	173984.857	58.927
1814	521870.655	174017.153	55.864
1815	521903.049	174056.297	59.504
1816	521655.898	173997.034	29.880

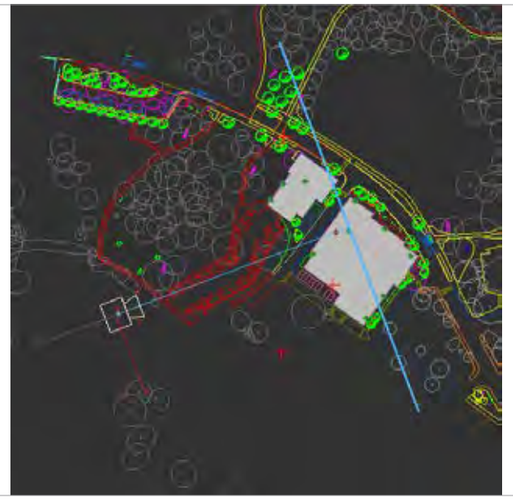




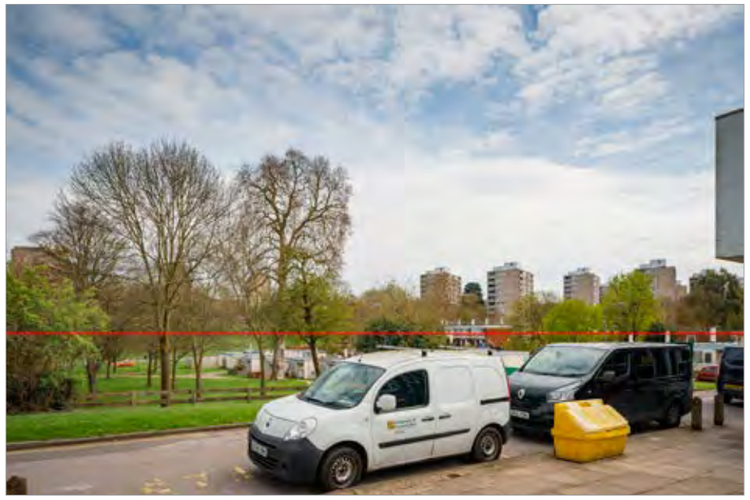
3.2 OS survey points marked on base photograph

3.3 View 18 camera location

Eastings	521642.335m
Northings	174000.452m
AOD height	23.279m
Approx distance to centre of site	419m
Approx bearing from North	69°



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 19

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
1901	521678.938	174184.318	20.126
1902	521683.479	174184.213	22.515
1903	521850.774	174184.271	60.960
1904	521707.991	174179.658	23.950
1905	521711.384	174171.363	22.975
1906	521682.876	174173.970	25.825
1907	521676.492	174169.092	30.224
1908	521672.825	174177.565	19.646
1909	521681.575	174170.307	24.934
1910	521683.119	174174.173	22.585
1911	521719.655	174107.064	18.450
1912	521677.496	174182.172	19.918
1913	521677.693	174176.191	19.828
1914	521700.027	174164.835	24.821
1915	521741.891	174072.654	19.137

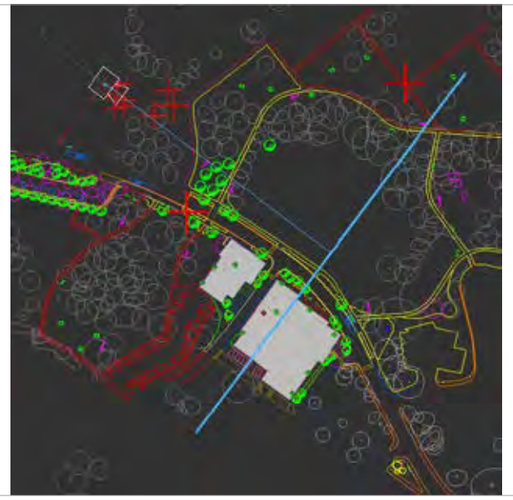




3.2 OS survey points marked on base photograph

3.3 View 19 camera location

Eastings	521670.015m
Northings	174184.593m
AOD height	19.847m
Approx distance to centre of site	475m
Approx bearing from North	127°



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 20

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
2001	520505.841	173918.499	12.290
2002	520534.096	173925.901	12.802
2003	520518.696	173918.492	12.382
2004	520537.825	173918.997	12.561
2005	520508.141	173914.692	12.270
2006	520506.914	173910.653	12.207
2007	520516.873	173911.216	12.037
2008	520527.839	173911.247	12.295
2009	520539.013	173908.211	12.239
2010	520562.192	173915.058	14.871
2011	520629.968	173929.583	21.225
2012	520648.137	173946.236	12.620
2013	520777.074	173961.283	11.908

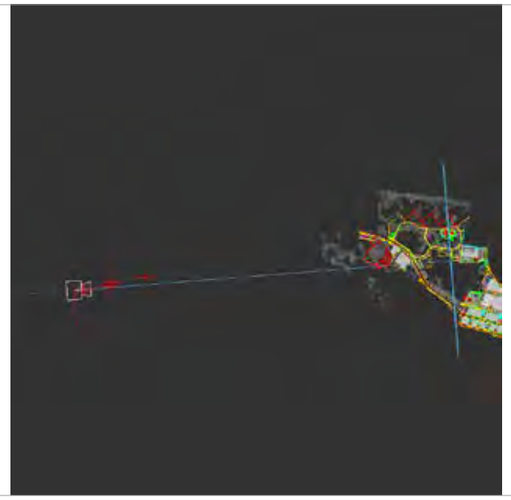




3.2 OS survey points marked on base photograph

3.3 View 20 camera location

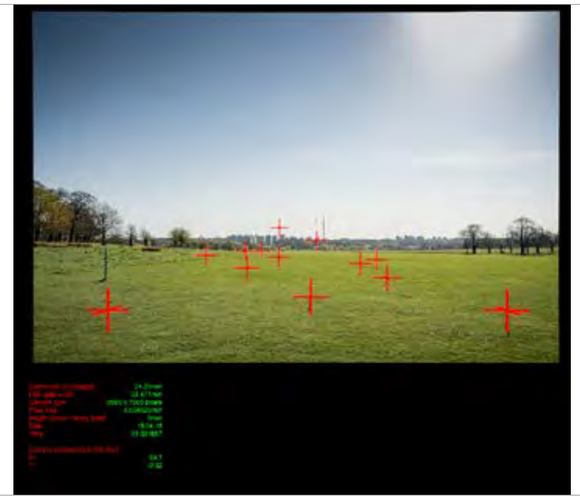
Eastings	520499.411m
Northings	173914.454m
AOD height	13.446m
Approx distance to centre of site	1549m
Approx bearing from North	85°



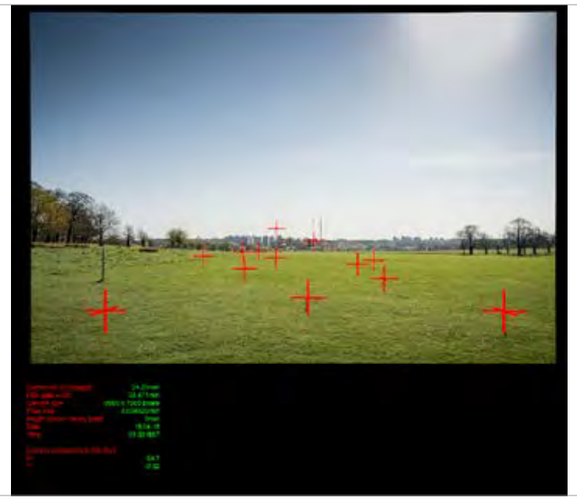
3.4 Screen grab of camera location in 3DS Max software



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 21

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
2101	520897.783	173124.231	38.094
2102	520905.667	173137.949	37.792
2103	520915.399	173151.811	37.487
2104	520918.779	173141.114	37.684
2105	520910.188	173132.047	37.875
2106	520901.496	173122.611	37.899
2107	520902.888	173118.531	38.103
2108	520915.121	173126.270	37.696
2109	520922.433	173134.058	37.674
2110	521079.000	173309.216	32.988
2111	521076.504	173326.862	29.117
2112	521105.078	173177.915	31.083

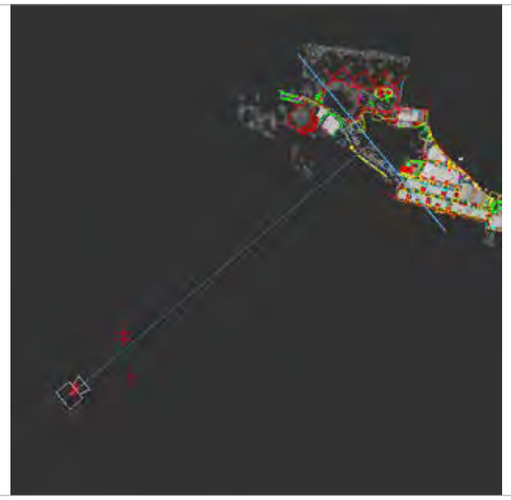




3.2 OS survey points marked on base photograph

3.3 View 21 camera location

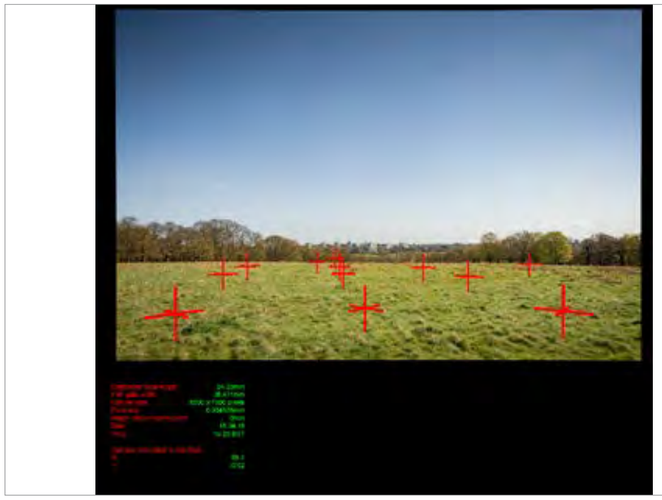
Eastings	520895.017m
Northings	173116.894m
AOD height	39.336m
Approx distance to centre of site	1392m
Approx bearing from North	50°



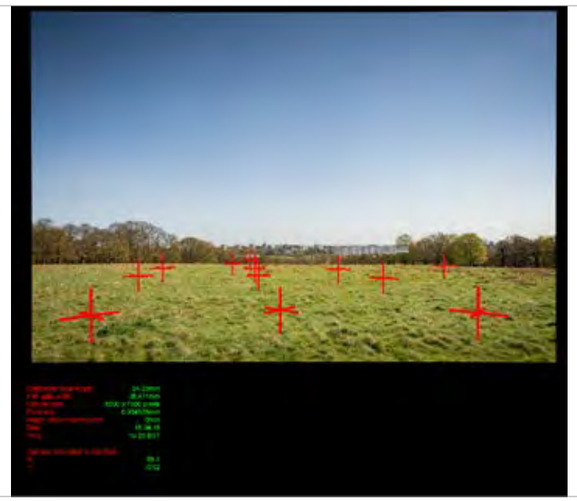
3.4 Screen grab of camera location in 3DS Max software



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 22

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
2201	520946.537	172495.971	15.393
2202	520952.895	172509.064	15.442
2203	520959.752	172522.719	15.499
2204	520969.633	172516.743	15.260
2205	520961.088	172501.724	15.255
2206	520950.141	172493.107	15.318
2207	520953.056	172491.105	15.278
2208	520965.283	172497.843	15.298
2209	520975.537	172510.067	15.115
2210	521197.986	172671.571	12.545

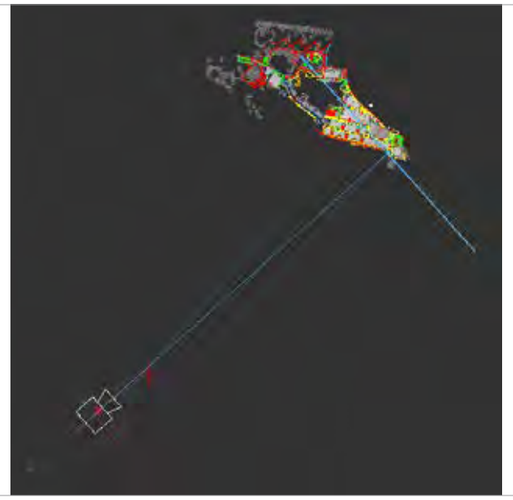




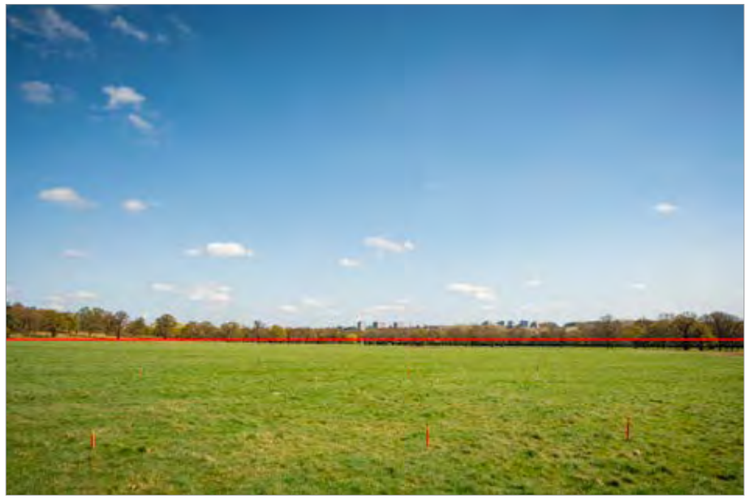
3.2 OS survey points marked on base photograph

3.3 View 22 camera location

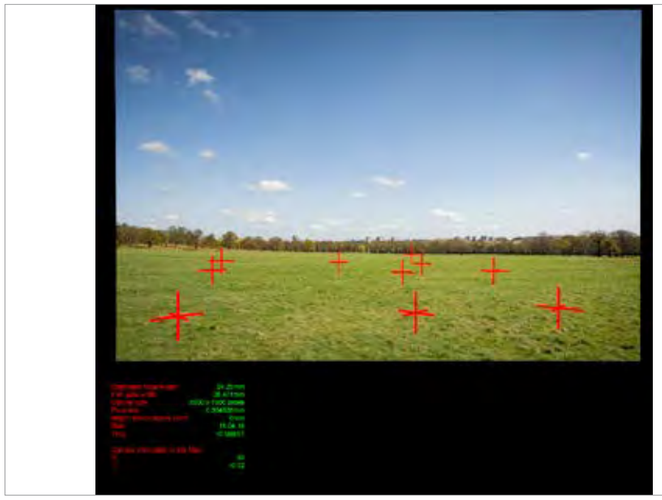
Eastings	520944.070m
Northings	172488.857m
AOD height	16.633m
Approx distance to centre of site	1876m
Approx bearing from North	48°



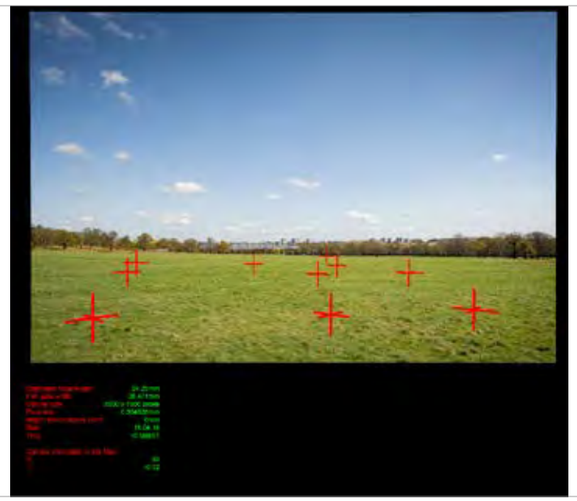
3.4 Screen grab of camera location in 3DS Max software



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

4.0 Final verified photomontages

View 01 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1650mm | Nominal lens rise 0mm | Date 18.04.18 | Time 12:12



View 01 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 02 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1650mm | Nominal lens rise 0mm | Date 17.04.18 | Time 09:42



View 02 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 03 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1619mm | Nominal lens rise 0mm | Date 17.04.18 | Time 09:50



View 03 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 04 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1624mm | Nominal lens rise 0mm | Date 17.04.18 | Time 09:50



View 04 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 05 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1650mm | Nominal lens rise 0mm | Date 17.04.18 | Time 10:06



View 05 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 06 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1682mm | Nominal lens rise 0mm | Date 17.04.18 | Time 10:21



View 06 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 07 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1650mm | Nominal lens rise 0mm | Date 18.04.18 | Time 09:42



View 07 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 08 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1654mm | Nominal lens rise 0mm | Date 21.02.19 | Time 14:00



View 08 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 09 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1642mm | Nominal lens rise 0mm | Date 17.04.18 | Time 10:29



View 09 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 10 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1621mm | Nominal lens rise 0mm | Date 17.04.18 | Time 10:37



View 10 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 11 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1628mm | Nominal lens rise 0mm | Date 17.04.18 | Time 12:14



View 11 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 12 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1625mm | Nominal lens rise 0mm | Date 17.04.18 | Time 10:44



View 12 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 13 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1579mm | Nominal lens rise 0mm | Date 18.04.18 | Time 10:52



View 13 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 14 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1622mm | Nominal lens rise 0mm | Date 17.04.18 | Time 12:03



View 14 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 15 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1574mm | Nominal lens rise 0mm | Date 17.04.18 | Time 10:59



View 15 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 16 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1620mm | Nominal lens rise 0mm | Date 17.04.18 | Time 11:06



View 16 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 17 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1650mm | Nominal lens rise 0mm | Date 17.04.18 | Time 11:55



View 17 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 18 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1628mm | Nominal lens rise 0mm | Date 17.04.18 | Time 11:15



View 18 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 19 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1642mm | Nominal lens rise 0mm | Date 18.04.18 | Time 11:44



View 19 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 368mm. Please refer to section 2.8 on page 4 of this document for further information.

View 20 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1650mm | Nominal lens rise 0mm | Date 18.04.18 | Time 09:33



View 20 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 399mm. Please refer to section 2.8 on page 4 of this document for further information.

View 21 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1650mm | Nominal lens rise 0mm | Date 18.04.18 | Time 10:25



View 21 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 399mm. Please refer to section 2.8 on page 4 of this document for further information.

View 22 existing

Single frame image | Focal length 24.25mm | Camera height above survey point 1650mm | Nominal lens rise 0mm | Date 18.04.18 | Time 10:59



View 22 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 399mm. Please refer to section 2.8 on page 4 of this document for further information.

