



Fitzalan Road, Arundel

**Photomontage methodology
and supporting evidence**

February 2018

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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 Fitzalan Road Arundel. 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 Renaissance Group.

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

Selection of viewpoints:

Renaissance Retirement Ltd
Unit 12 Headlands Business Park
Ringwood
Hants
BH24 3PB
Phone: 01425 474674

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 building model, spot height and landscape information

David James Architects
5 Wooterton Road
Poole
Dorset BH12 1LR
Phone: 01202 755633

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 February 2018 which form the pictorial basis for visual impact assessment photomontages for 3 views for the site at Fitzalan Road, Arundel.

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 at Fitzalan Road Digital files of the 3 views together with camera point locations were provided by the photographer.

Date of surveys February 2018.

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 3D building model was supplied by the architect and additional detail was added by Realm where required from CAD supplied. The model height was derived from the supplied FFLs of the ground floor.

2.4 3D landscape

The topographical survey was supplied by the architect. Realm built the hard-landscaping surface for planting.

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.

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

We carried out tree removal in all three views as instructed by Renaissance. Please note that in View 1 we had to rebuild the building background behind the tree removed from view.

3.0 Supporting evidence

[illegible]

View 01

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
101	502138.542	106755.034	6.630
102	502101.394	106801.980	13.573
103	502056.578	106862.820	12.779
104	501950.535	106951.915	17.922
105	502165.582	106601.651	2.208
106	502160.604	106596.765	2.194
107	502068.421	106683.747	4.233
108	501981.203	106829.493	6.152
109	501902.854	106815.984	5.495
110	501837.312	106839.123	9.942
111	501782.661	107052.935	15.934
112	501834.334	106860.355	10.748
113	502076.302	106701.047	2.770
114	502042.637	106685.016	2.684
115	502062.519	106794.597	2.566
116	502074.013	106691.173	7.531

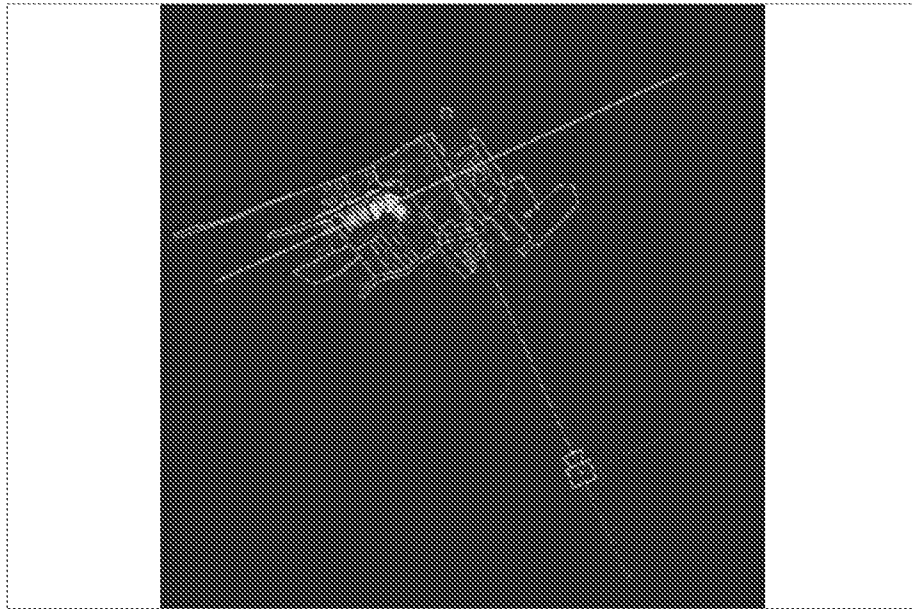


3.2 OS survey points marked on base photograph



3.3 View 1 camera location

Eastings 502163.308m
Northings 106591.935m
AOD height 3.849m
Approx distance to centre of site 390m
Approx bearing from North 336°



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 02

3.1 Ordinance survey co-ordinates			
Point Ref	Eastings	Northings	AOD height
201	501884.537	106934.342	8.013
202	501877.223	106930.527	8.004
203	501872.982	106930.004	8.018
204	501866.320	106932.304	8.047
205	501861.902	106927.872	7.960
206	501855.046	106926.446	8.021
207	501845.243	106926.634	9.491
208	501845.670	106926.653	5.214
209	501837.493	106921.055	7.484
210	501901.957	106936.180	5.437
211	501891.755	106957.727	3.989
212	501878.059	106932.643	5.362
213	501864.016	106931.512	5.402
214	501859.086	106875.774	10.291

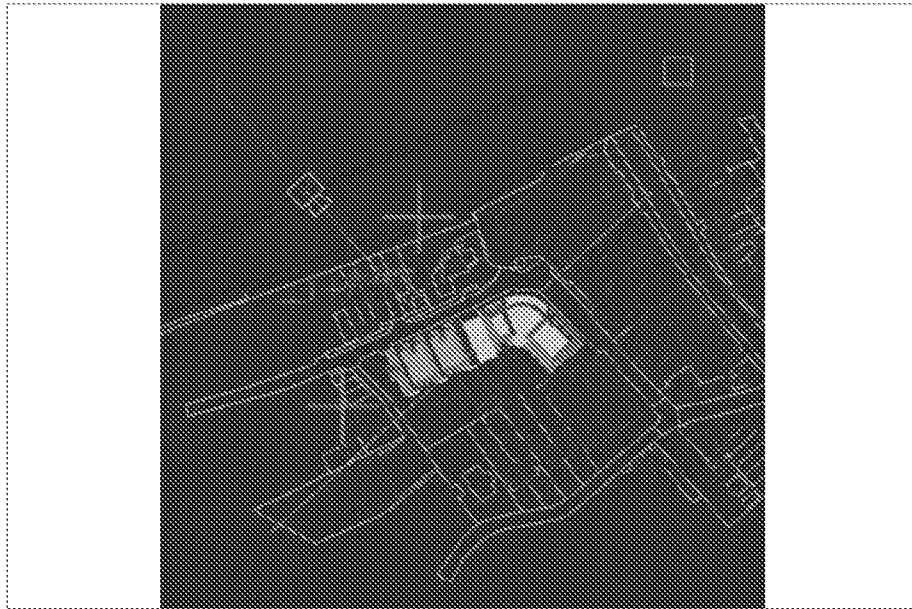


3.2 OS survey points marked on base photograph



3.3 View 2 camera location

Eastings 501843.020m
Northings 106969.397m
AOD height 4.891m
Approx distance to centre of site 106m
Approx bearing from North 138°



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 03

3.1 Ordinance survey co-ordinates

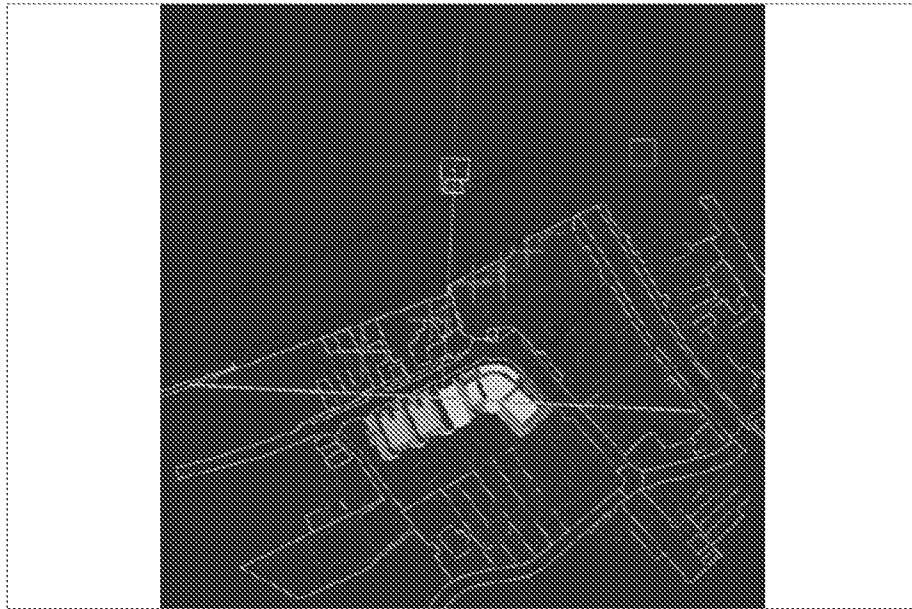
[illegible]

3.2 OS survey points marked on base photograph

3.3 View 3 camera location

Eastings	501917.945m
Northings	107012.874m
AOD height	5.108m
Approx distance to centre of site	115m
Approx bearing from North	183°





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 24.249mm | Camera height above survey point 0mm | Nominal lens rise 0mm | Date 15.02.18 | Time 12:33



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 370mm. Please refer to section 2.8 on page 4 of this document for further information.

View 02 existing

Single frame image | Focal length 17.345mm | Camera height above survey point 0mm | Nominal lens rise 0mm | Date 15.02.18 | Time 14:02



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 370mm. Please refer to section 2.8 on page 4 of this document for further information.

View 03 existing

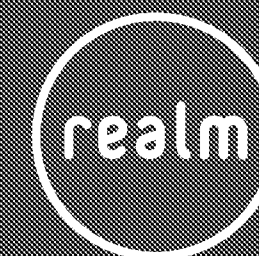
Single frame image | Focal length 17.379mm | Camera height above survey point 0mm | Nominal lens rise 0mm | Date 15.02.18 | Time 14:22



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 370mm. Please refer to section 2.8 on page 4 of this document for further information.



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