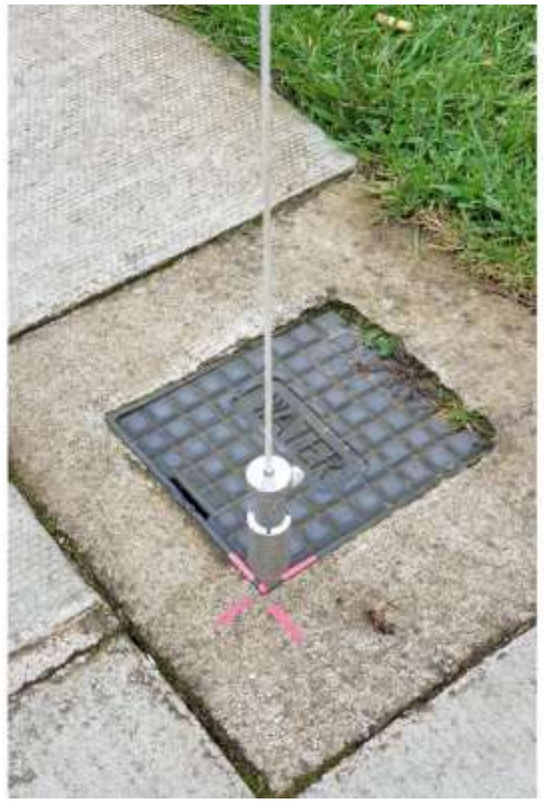
Viewpoint 04 Documentation Images & Location



The first three documentation images above show the tripod location and camera orientation from the junction of Hammond Court and Oldfield Road. The fourth image is of the survey marker and plumb line under the point of no parallax. The fifth image is of the sky above the camera location at the time of photography. The prevailing weather conditions were dry and overcast. The temperature was 13°C, the wind was blowing from the south west at 13 mph. Humidity was 77% and the pressure was 1012 hPa. This viewpoint is to the west of the Oldfield Road, Hampton.

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Viewpoint 04 Survey Point Information

Coordinate System	Value	Accuracy
X (Easting) , Y (Northing)	513009.004 E, 169716.432 N	+/- 1mm
Latitude / Longitude (Decimal)	51.415213 , -0.37632928	+/- 10cm
Latitude / Longitude (DMS)	51°24′55″N , 000°22′35″W	+/- 10cm
Grid Reference	TQ 13009 69716	+/- 10cm
What3Words	wasp.insect.brain	+/- 3m

Note: The What3Words location was calculated from the Easting and Northing and specifies a 3m x 3m square. When using a mobile phone to find the location in the real world, please be aware that the GPS accuracy of the phone varies and is around +/-10m depending on location and signal.

9.0 Optical Axis & Lens Rise Information

The planar photographs produced for this project made use of tilt-shift lenses. Tilt-shift lenses allow us to manipulate the position of image disk so that a higher or lower part of that image is displayed than is normally produced. This prevents keystoning, which happens when you pitch a camera up or down causing the lens axis to move away from the horizontal. However, it is necessary to show the original lens axis and horizon line for the images, so that comparisons can be made to images produced by other photographers using other methodologies.

The London View Management Framework 2012 suggests the following:

"The selection of an area of interest is defined by the choice of lens and any subsequent cropping of the image. To make clear the process that has been followed, an AVR should clearly indicate the original centre of view (more accurately the "Optical Axis") and the resulting field of view. This can be defined numerically by angular dimensions on each side of the Optical Axis or graphically by suitable annotations to the perimeter of the image."

- The red arrows show the horizon line and vertical centre of the original levelled image.
- The thicker black lines are at ten degree increments from the centre of the levelled image.
- The medium black lines are at five degree increments from the thicker black lines.
- The short black lines are at one degree increments.

The Landscape Institute Technical Guidance note 06/19 Appendix 13 also discusses the use of tilt-shift lenses. The three images shown on this page were created using the Canon 17mm f4.0L T-SE, Canon 24mm f3.5L T-SE Mk2 and the Canon 50mm f2.8L T-SE which have horizontal fields of view (HFOV) of 93.3°, 73.7° and 39.6° respectively.

Canon 24mm f3.5L T-SE Mk2 with 7mm of rise.

Canon 17mm f4.0L T-SE with 5mm of rise.

Canon 50mm f2.8L T-SE with 3mm of rise.

10.0 Lens Choice

The Landscape Institute Technical Guidance note 06/19 says of visualisations:

"1.2.9 Visualisations should provide the viewer with a fair representation of what would be likely to be seen if the proposed development is implemented and should portray the proposal in scale with its surroundings."

This means that the building/site is not viewed in isolation, but as a part of the existing fabric surrounding its proposed location. The LI TGN 06/19 Appendix 1 goes on to say:

"1.1.7 If a 50mm FL lens cannot capture the view in landscape or portrait orientation the use of wider-angled prime lenses should be considered… "

For this project the closest viewpoint was 35m from site and the furthest was 100m. After viewing the Field of View Study (FOV) it was decided that using the Canon TS-E 50mm f2.8L lens would not show the building in its full context from these close viewpoints. For these views it was decided to use a Canon TS-E 24mm f3.5L MK2 as its wider field of view would include the local context.

The overlays on the following maps show the horizontal FOV for various lenses or image projections.

White arcs are 10m apart
Black circle is 100m radius from viewpoint
Degree marks outside the black circle are 5° apart
Degree marks inside the black circle are 1° apart
Building footprint in blue

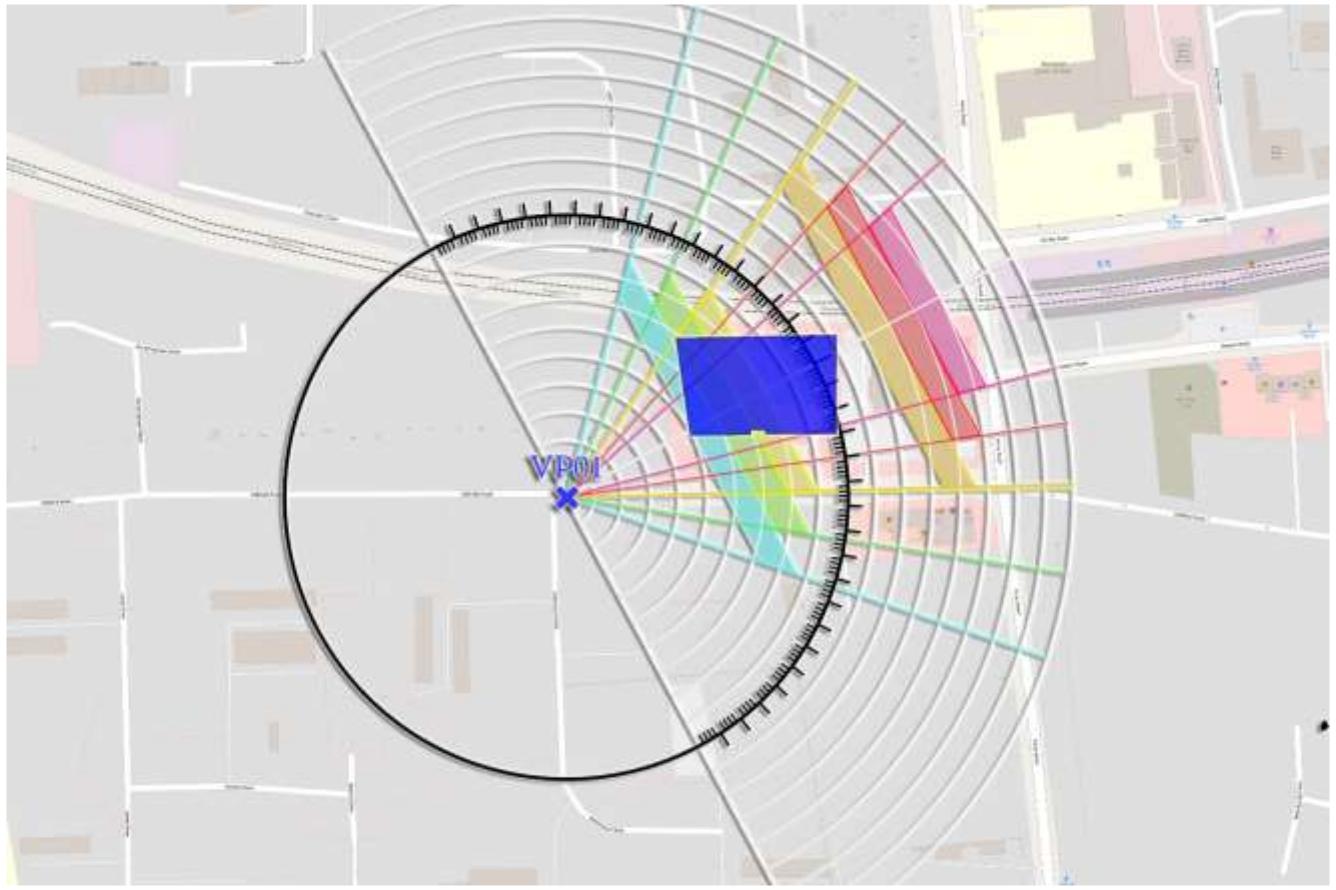
The Cyan bar and lines show the FOV for a 17mm planar lens and is 93.3° wide.
The Green bar and lines show the FOV for a 24mm planar lens and is 73.7° wide.
The Yellow bar and lines show the FOV for a 35mm planar lens and is 54.4° wide.

The Amber bar and lines show the FOV for a panoramic planar image that is 53.5° wide.
The Red bar and lines show the FOV for a 50mm planar lens and is 39.6° wide.
The Magenta bar and lines show the FOV for a 75mm planar lens and is 27.0° wide.

Please Note.

- The 17mm, 24mm and 50mm prime lenses are tilt shift lenses and therefore you can use the shift feature to position the horizon within the frame in a more natural position for people viewing the proposed project.
- The 17mm lens planar FOV is similar to the FOV created by a cylindrical projection 90° panorama.
- The 35mm lens is not a tilt shift lens and does not enable you to use movements.
- The 53.5° planar panorama is created by re-projecting a stitched cylindrical panorama onto a plane.
- The 27.0° FOV for a 75mm lens is created by cropping a 50mm lens down from 39.6° and is not an existing lens.

These are all listed as options for outputs for Type 4: Photomontage / Photowire (survey / scale verifiable) images from page 21 of the LI TGN 06/19.



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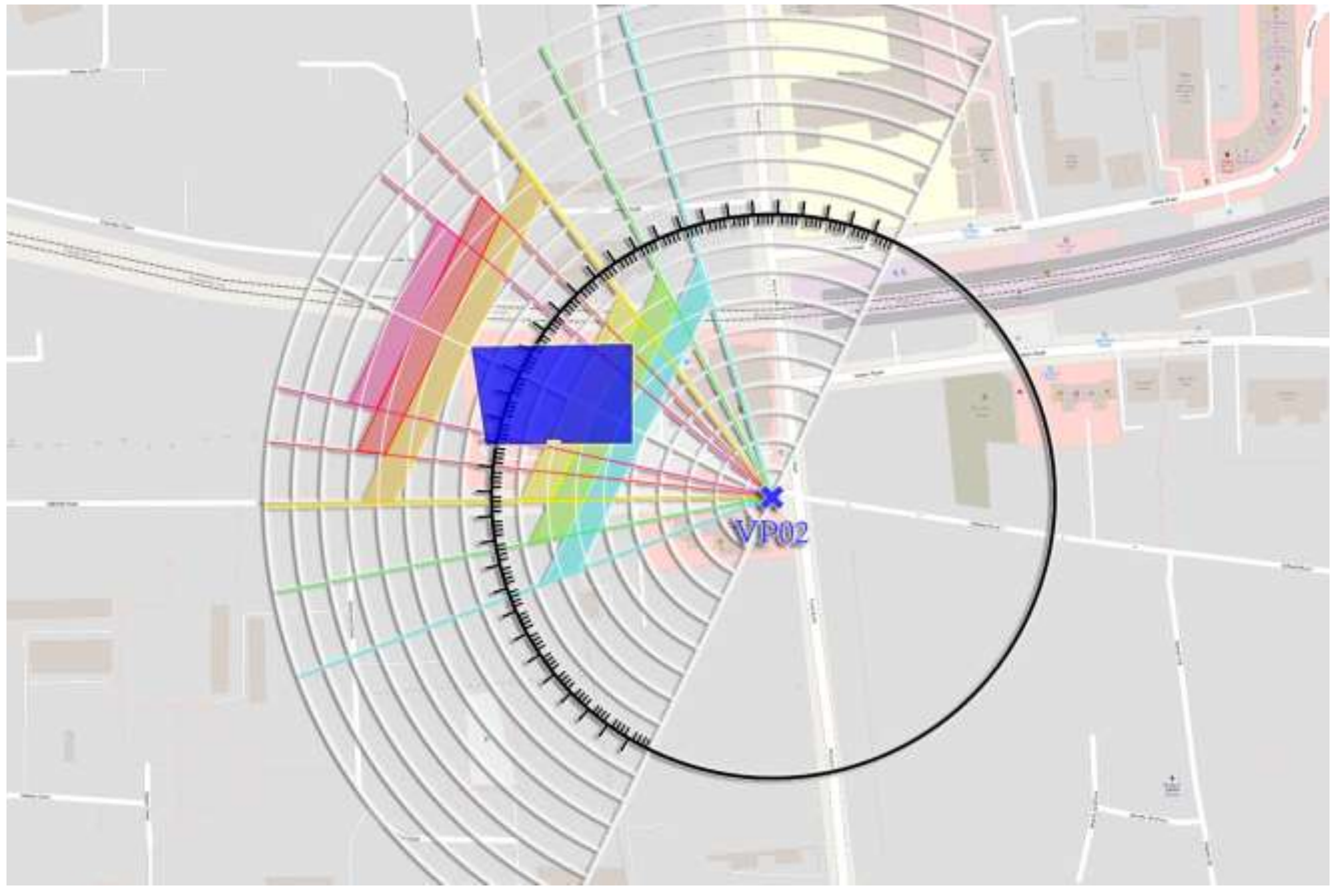

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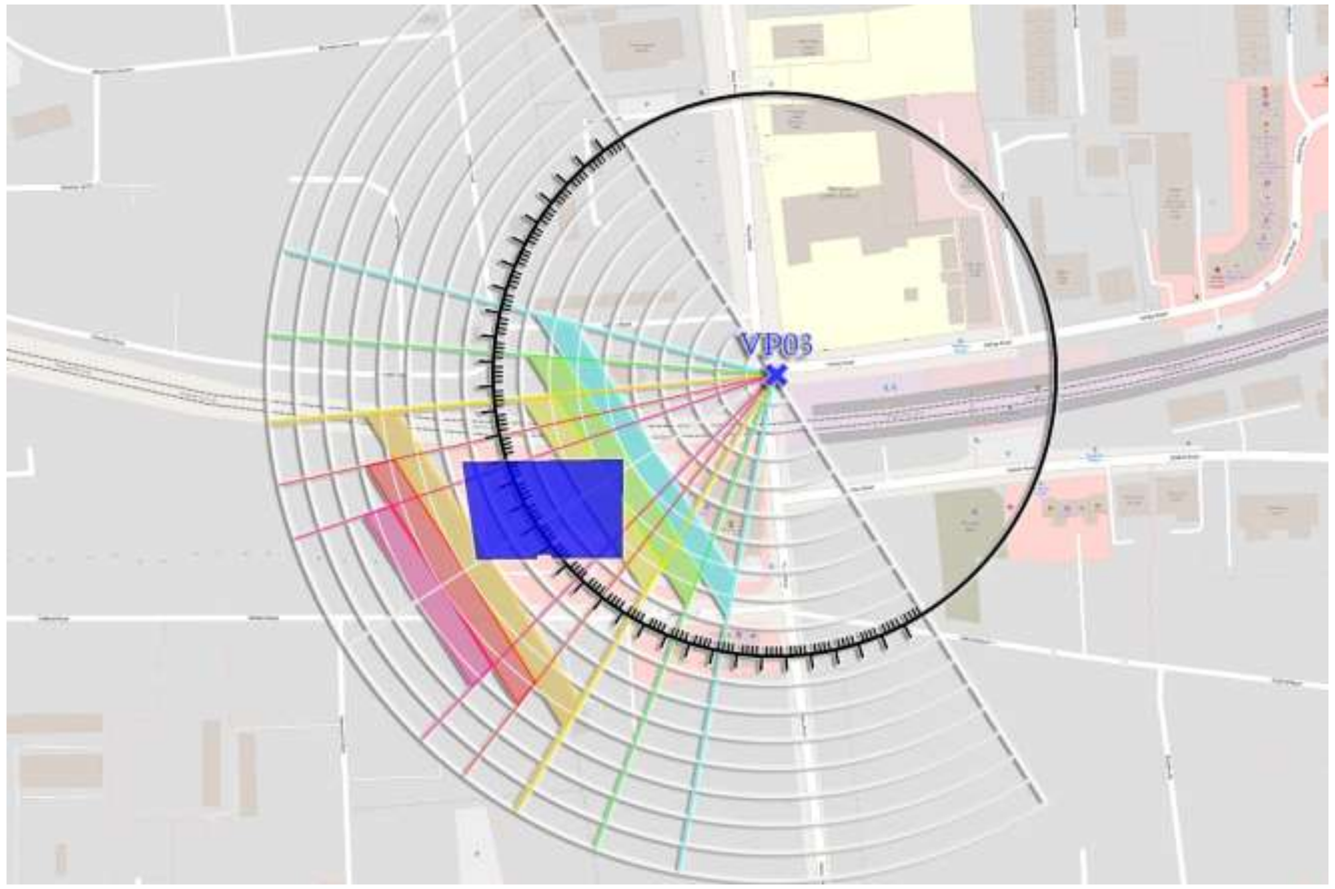

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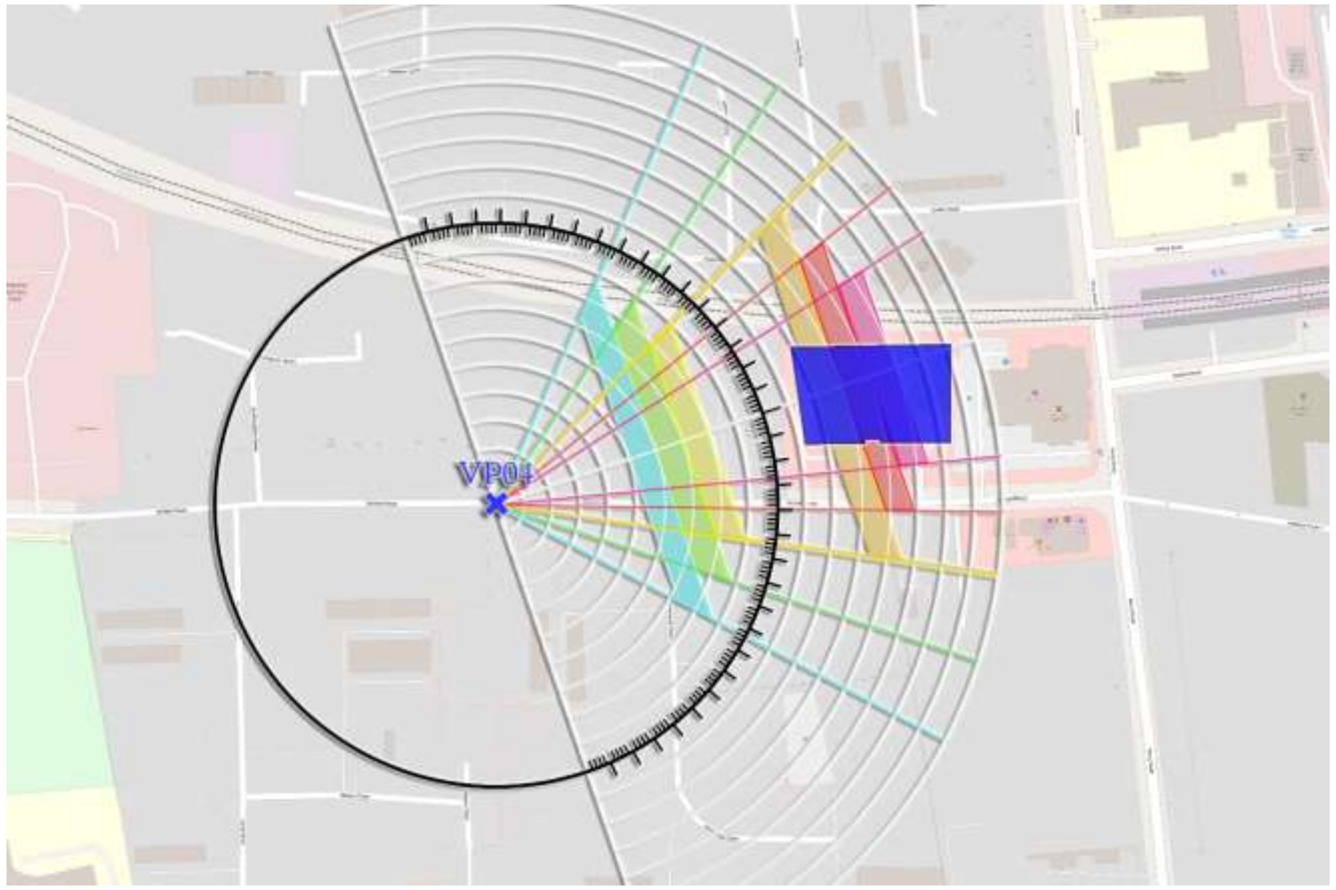

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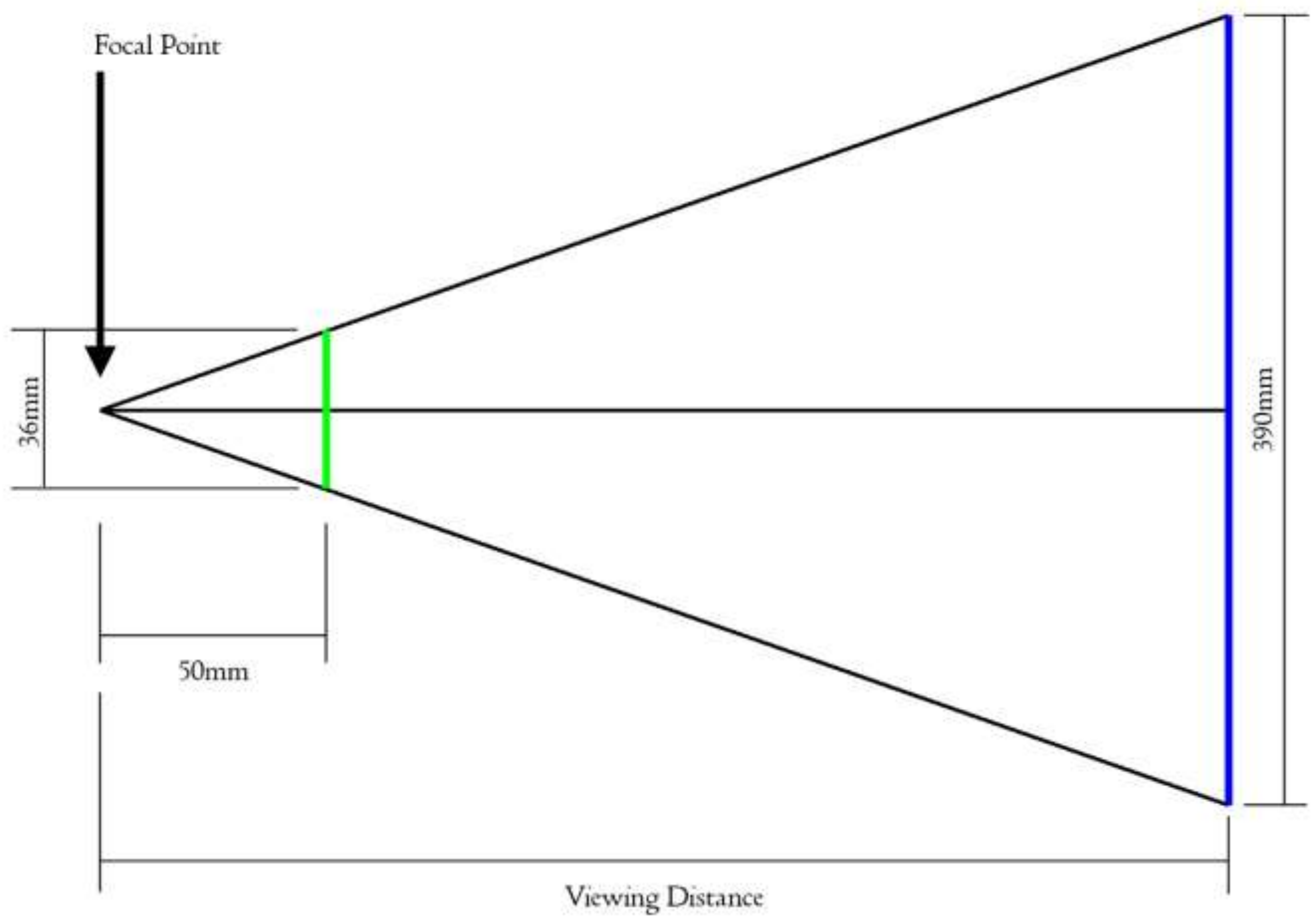
11.0 Viewing Distance

To accurately represent the angular size of real world objects when viewing photographic images they must be viewed from the correct distance. Images with different fields of view need to be viewed from different distances for the viewer to experience the same angular size of object within the image to that experienced at the viewpoint. When creating a Type 4 photomontage (LI TGN 06/19 Chapter 4.5), the recommended image size is 390mm x 260 mm when printed on an A3 sheet.

A 50mm lens has a horizontal field of view of 39.6° (Section 5.3), to match the same field of view when viewing the A3 sheet we can use similar triangles to calculate the correct viewing distance. The focal point of a 50mm lens is 50mm from the sensor which is 36mm wide (Green Line). Scaling up the sensor to be the same size as the print at 390mm wide (Blue Line) would mean that to maintain the viewing angle we would have to scale up the distance between the focal point and the image by the same amount. Shortened versions of these calculations can be found in LI TGN 06/19 Chapter 3.8.4.



Viewing distance (mm) = Focal Length (mm) x Print Width (mm) / Sensor Width (mm)

50mm lens viewing distance = 50mm x 390mm / 36mm
= 541mm

The same calculations can be performed for the other standard lens focal lengths, for example

35mm lens viewing distance = 35mm x 390mm / 36mm
= 379mm

24mm lens viewing distance = 24mm x 390mm / 36mm
= 260mm

17mm lens viewing distance = 17mm x 390mm / 36mm
= 184mm

If the image has been scaled up (LI TGN 06/19 Chapter 4.5) then the viewing distance should be increased by a similar amount.

For maximum accuracy when viewing the images, the viewer should be perpendicular to the image at a point on the Optical Axis (Section 9.0) which can be found by viewing the graticules associated with the image.

For non-standard print sizes if you know the lens focal length you can now calculate the approximate viewing distance for a full frame un-cropped image as a ratio of its width.

50mm lens images = 541mm / 390mm = 1.4 x image width
35mm lens images = 379mm / 390mm = 1.0 x image width
24mm lens images = 260mm / 390mm = 0.7 x image width
17mm lens images = 184mm / 390mm = 0.5 x image width

12.0 Glossary

Aperture: The lens aperture is controlled by a diaphragm which can be opened or closed to allow more or less light through the lens. The lens aperture is usually specified as an f-stop (f5.6, f8 etc.). Smaller numbered f-stops (f2.8-f4.0) relate to a larger aperture allowing more light through the lens. Higher f-stops (f16-f32) are smaller apertures allowing less light through the lens.

Aperture f8: A mid-range aperture which gives a reasonable depth of field whilst not suffering general image softness caused by small aperture diffraction.

CGI: Computer Generated Imagery.

Cylindrical Projection: If the world were viewed from inside a glass cylinder and the view sketched onto the cylinder, this would be a cylindrical projection of the 3D world. Unrolling the cylinder onto a flat surface would cause non-vertical straight lines to appear curved. The distortion would appear more pronounced the further from the horizon the objects appeared. Stitched panoramas are cylindrical or spherical projections.

Depth of Field / DOF: Is the amount of the image that appears to be in focus. The depth of field is controlled by the distance from the photographer to the object that is focussed on, the aperture (f-stop) of the lens, and the focal length of lens used. Lower f-stops (e.g. f2.8, f4 etc.) give smaller (shallower) depths of field. Higher f-stops (e.g. f16, f22 etc.) give larger (deeper) depths of field. However, large f-stops relate to a small aperture, and as the aperture decreases light diffraction becomes an issue.

Diffraction: Is the effect that occurs when a wave passes through a small gap. This causes the wave to spread and in photographic terms the image becomes uniformly softer.

EXIF: Exchangeable Image File Format, information that is saved with the file at the time it is created. It can include date and time information, camera settings (serial number, aperture, film speed, shutter speed, focal length etc.), descriptions and copyright information.

F-Stop: see Aperture.

Full Frame Digital SLR: Most consumer grade digital cameras have sensors that are smaller than a 35mm film negative (36x24mm). This is because the sensor is the most expensive part of the camera to produce. Full frame se

The Guidelines for Landscape & Visual Impact Assessment Third Edition 2013 defines itself as:
"Landscape and Visual Impact Assessment (LVIA) is a tool used to identify and assess the significance of and the effects of change resulting from change resulting from development on both the landscape as an environmental resource in its own right and on people's views and visual amenity."

Graticules: Graduated scales at the edges of images that show the location of the un-shifted Optical Axis and Horizontal and Vertical Field of View of the image measured in degrees.

Hyperfocal Distance: The focus point for a lens which has the largest Depth of Field.

HFOV / VFOV / DFOV: The Horizontal, Vertical and Diagonal field of view of a lens measured in degrees.

Image Disk: The circular image that is projected by the lens onto the sensor/film. The image disk for most lenses is only slightly larger than the sensor. Tilt-shift lenses create a much larger image disk and enable its movement so that different parts of it can be captured by the sensor.

Lens Axis: A line perpendicular to the sensor that passes through the centre of the optics that make up the lens. When a camera is correctly levelled the lens axis will be parallel to the ground.

The London View Management Framework (LVMF) introduction defines itself as:
"The London View Management Framework seeks to designate, protect and manage twenty-seven views of London and some of its major landmarks. The purpose of this document is to explain in greater detail this policy approach so that boroughs, applicants and other statutory authorities can assess a proposal's compliance with the London Plan."

Normal Lens: In photography and cinematography, a normal lens is a lens that reproduces a field of view that generally looks "natural" to a human observer under normal viewing conditions. For still photography, a lens with a focal length about equal to the diagonal size of the film or sensor format is considered to be a normal lens; its angle of view is similar to the angle subtended by a large-enough print viewed at a typical viewing distance equal to the print diagonal; this angle of view is about 53° diagonally.

Ordnance Survey: The national mapping agency for Great Britain, producing maps of Great Britain. It is one of the world's largest producers of maps.

Optical Axis: A line through the centre of the lens that marks the centre of the image disk and will fall in the middle of an un-shifted uncropped image.

Optical Axis Deviation: When applying shift (also called rise or fall depending upon direction) to a tilt-shift lens, the front of the lens moves relative to the camera. The amount of movement can be read from a calibrated scale on the side of the lens which is measured in mm.

Planar Projection: When viewing the world through a window, tracing the view onto the window produces a planar projection of the 3D world. Photographs are planar projections.

Plane of Focus: A plane that is usually parallel to the sensor that is in focus. Objects either side of the plane of focus will appear to be in focus if they fall within the depth of field for the image.

Plumb Line: A line with a weight on the end that shows what is directly below the point that the line is attached to.

Point of No Parallax / Entry Pupil: The point on the lens axis through which all light rays pass on their way to the sensor/film. Rotating the camera around this point causes no parallax movement to be observed in the image.

Prime Lens: A lens with a fixed focal length, i.e. one that does not zoom.

Raw: A raw file contains information from the camera sensor that has been minimally processed. It is the digital equivalent of the chemical process negative.

Roll, Pitch & Yaw: With reference to camera alignment, Roll is the rotation of the camera around the lens axis which would cause the horizon to not be level. Pitch is when the lens axis is not horizontal, causing the horizon to not be in the centre of the image. Yaw is the horizontal deviation of the lens axis from the subject.

Spherical Projection: Similar to a cylindrical projection except the projection is onto a sphere which cannot be unwrapped without significant distortion making these unusable for verified views. These are used for virtual tours.

Tilt-Shift: Encompasses two different types of movements, rotation of the lens plane relative to the image plane, called tilt, and movement of the lens parallel to the image plane, called shift. Tilt is used to control the orientation of the plane of focus, and hence the part of an image that appears sharp. Shift is used to adjust the position of the subject in the image area without moving the sensor. This is often helpful in avoiding the convergence of parallel lines, as when photographing tall buildings.

View Datum Point: The point above which the camera and lens are mounted so that the point of no parallax is directly above it. It is usually marked with either a surveyor's nail, paint mark, stake or a fixed ground point such as a drain cover or identifiable paving slab corner.

What3Words: A unique 3 word identifier for a 3m x 3m grid square, enabling mobile phone users to identify a general location accurately, useful when working in green field areas lacking in easily identifiable landmarks.


STATION ROAD
Hampton