



Viewing Information

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This visualisation is a tool for assessment and is best used for comparison in the field from the viewpoint location shown. It cannot be considered a substitute for visiting the viewpoint location.

Technical Information

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This viewpoint visualisation is spread across a single sheet 841mm wide and 297mm high. To give the correct viewing distance the sheet should be printed at a scale of 1:1 on large format paper and cut to size. Do not print at A3



North West Cambridge
Viewpoint 29
Existing (Winter) View



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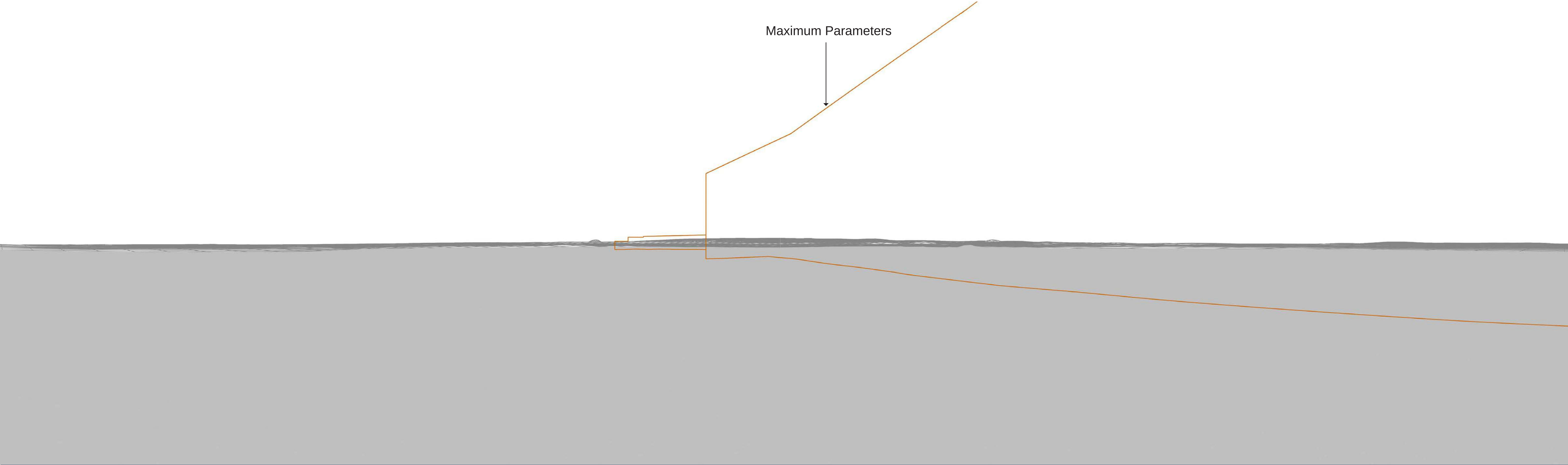
Technical Information

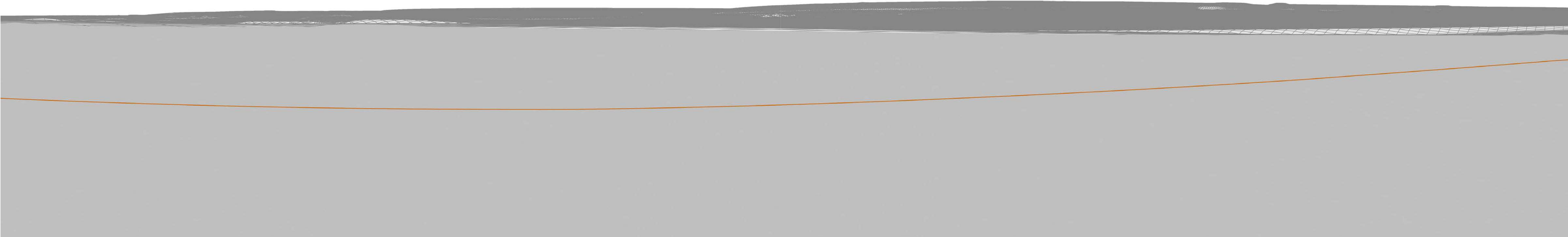
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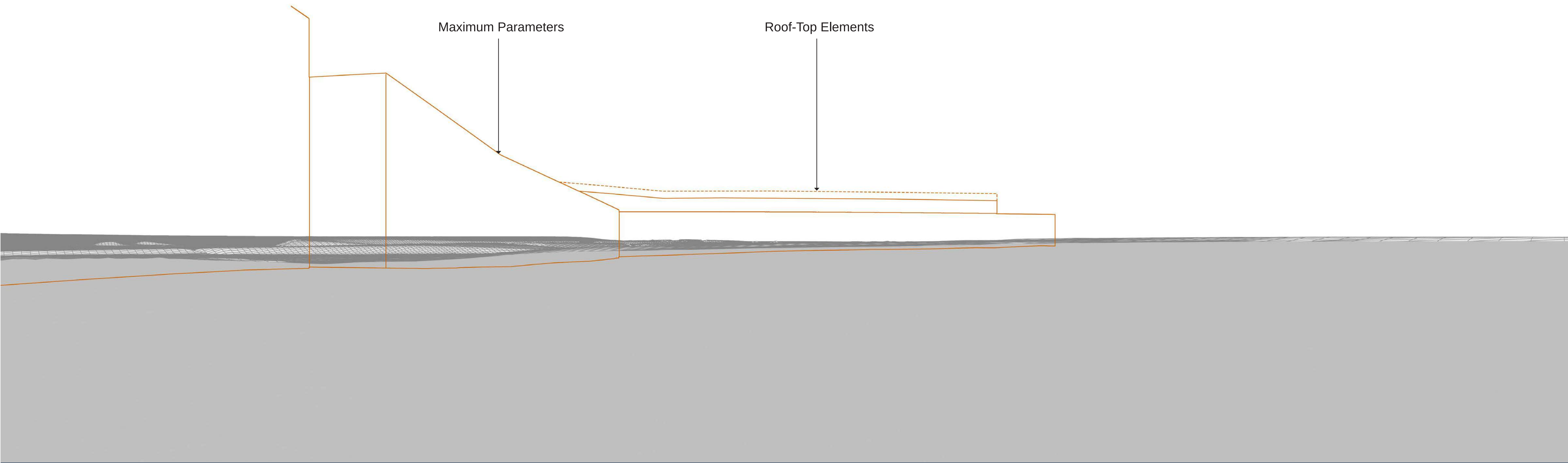
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North West Cambridge
Viewpoint 29
Maximum Parameters 3D Model View





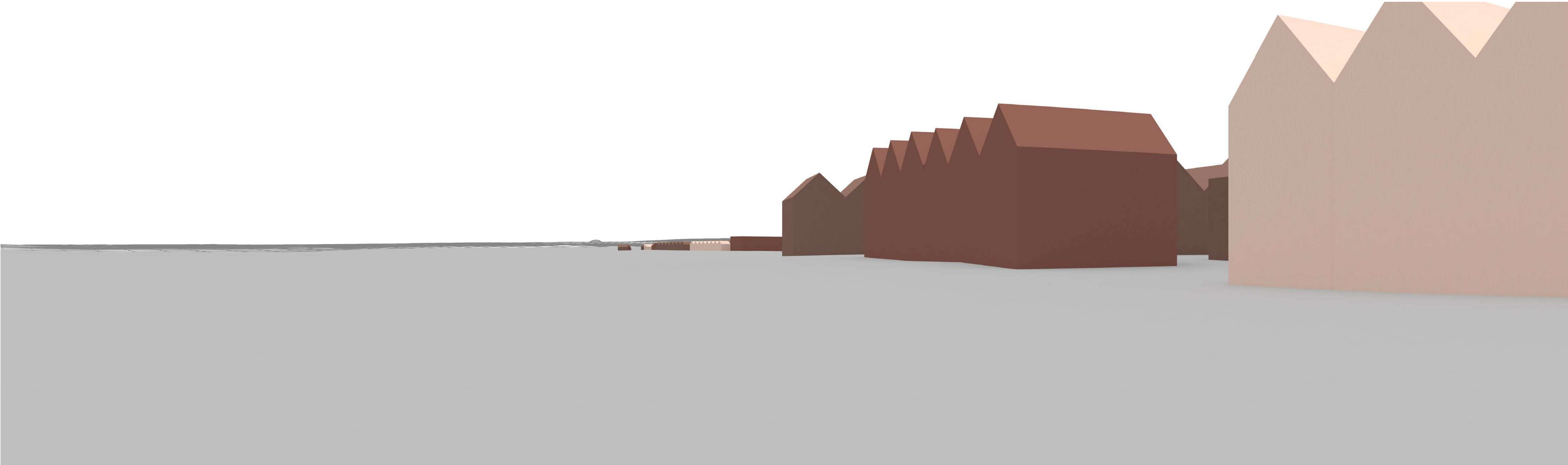


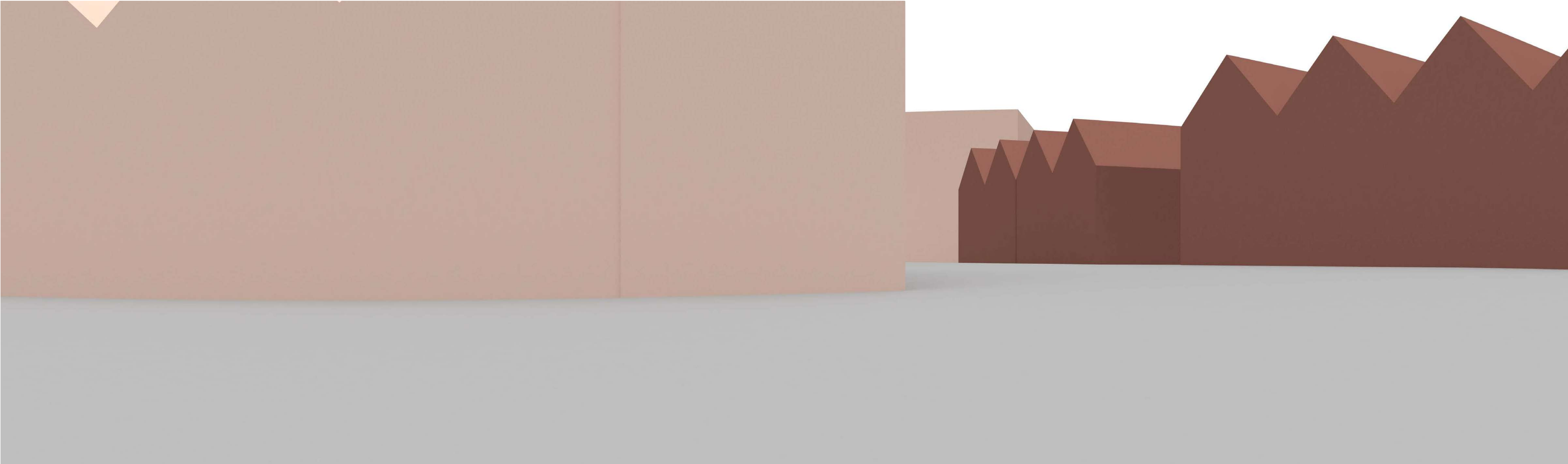


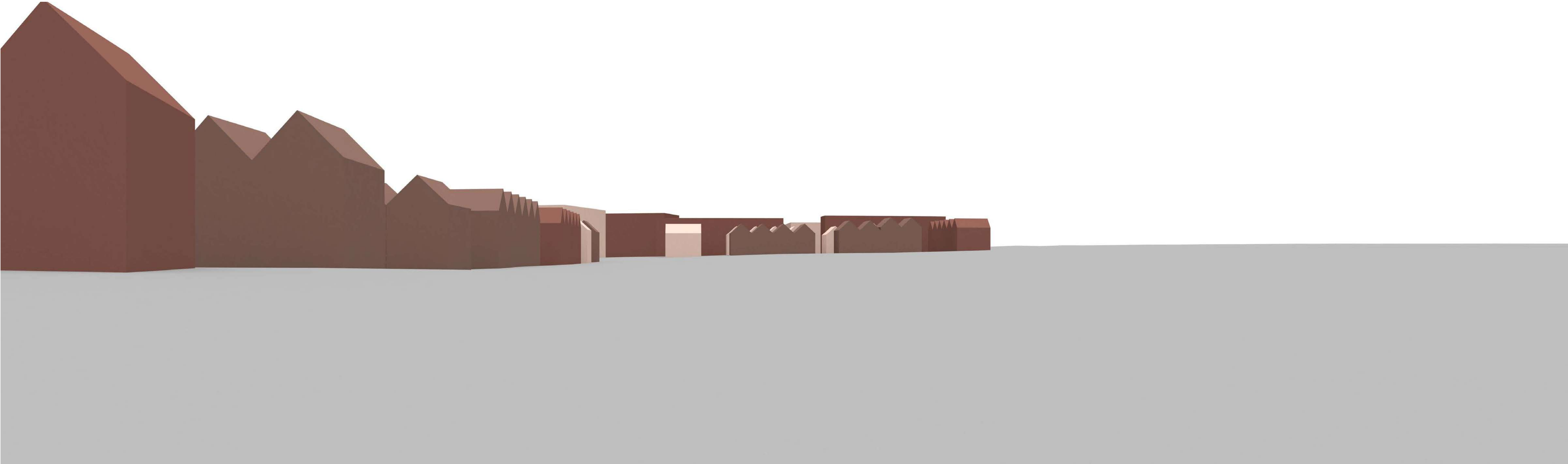




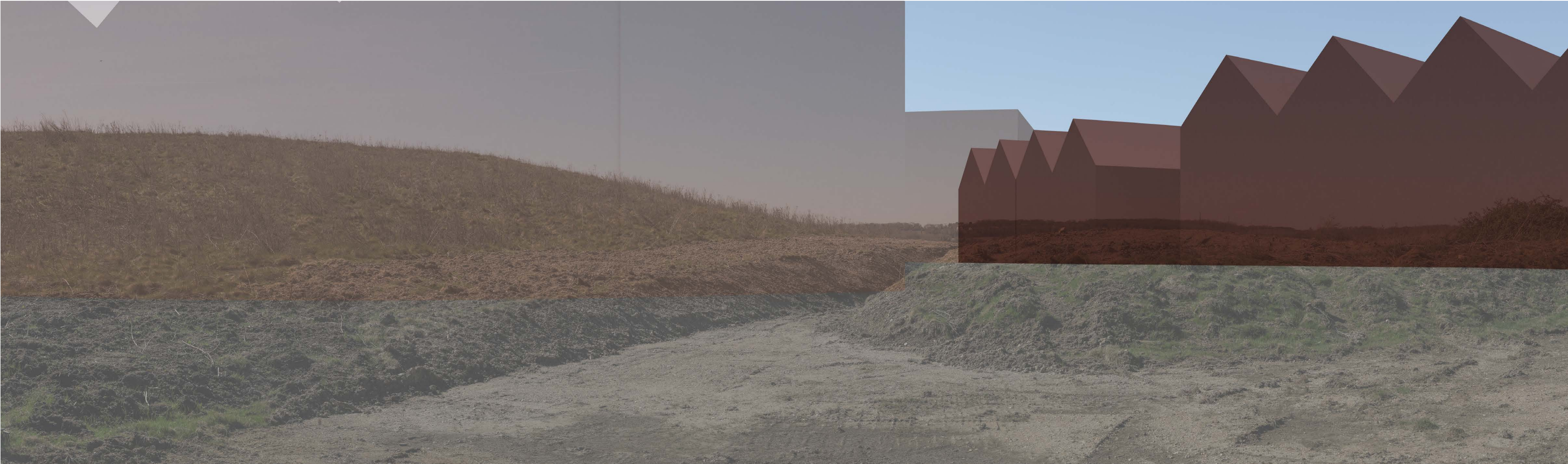






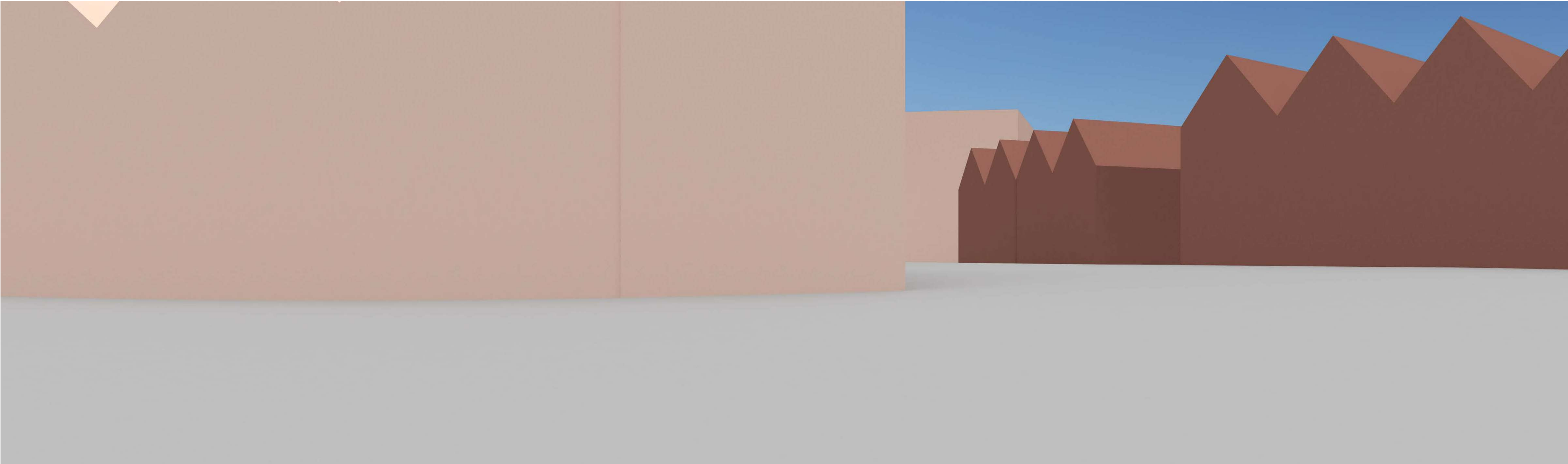














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North West Cambridge
Viewpoint 29

Illustrative Masterplan Photomontage View (AVR2)



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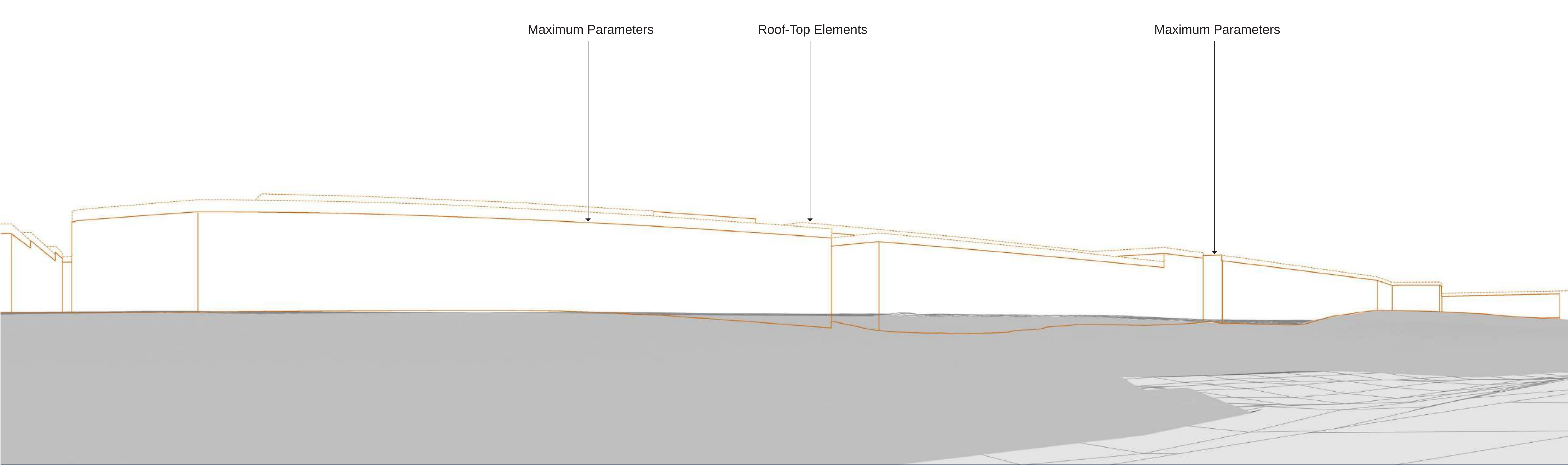
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North West Cambridge
Viewpoint 30
Existing (Winter) View





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North West Cambridge Viewpoint 30

Maximum Parameters 3D Model Composite View



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North West Cambridge
Viewpoint 30

Maximum Parameters Photomontage View (AVR1)



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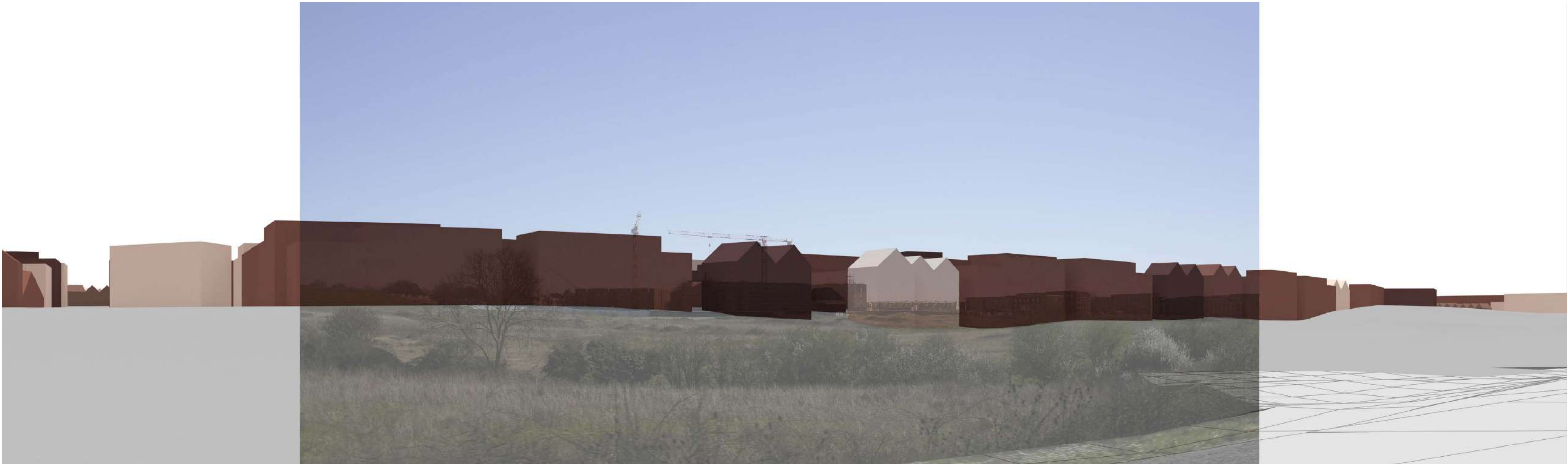
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North West Cambridge

Viewpoint 30

Illustrative Masterplan 3D Model View



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North West Cambridge
Viewpoint 30

Illustrative Masterplan 3D Model Composite View



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North West Cambridge
Viewpoint 30

Illustrative Masterplan Photomontage View (AVR2)



Viewing Information

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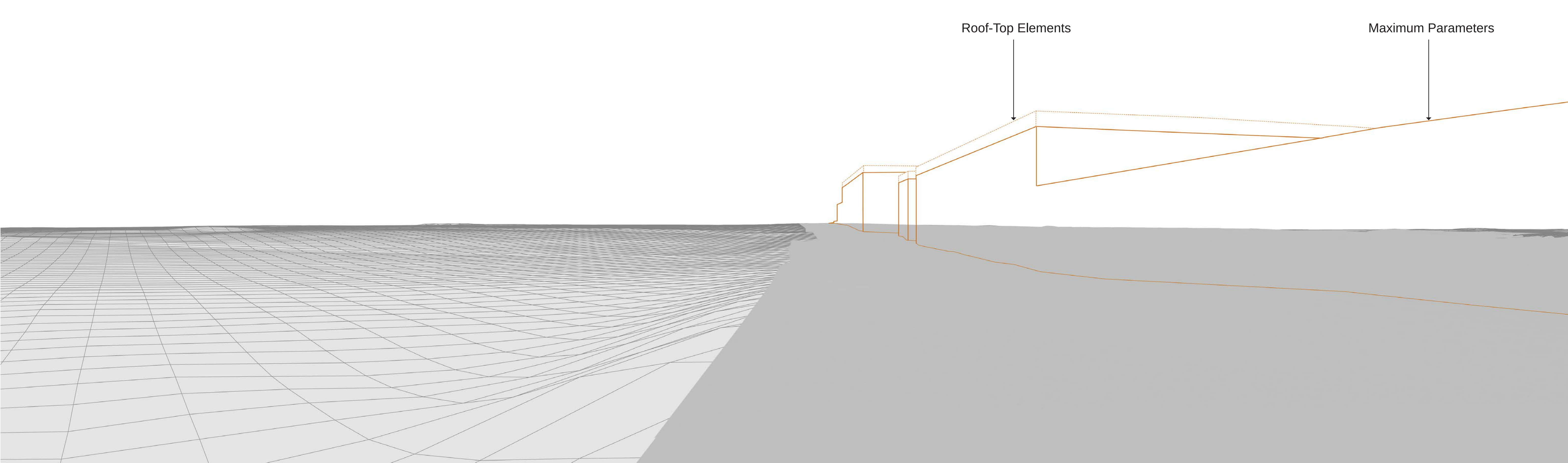
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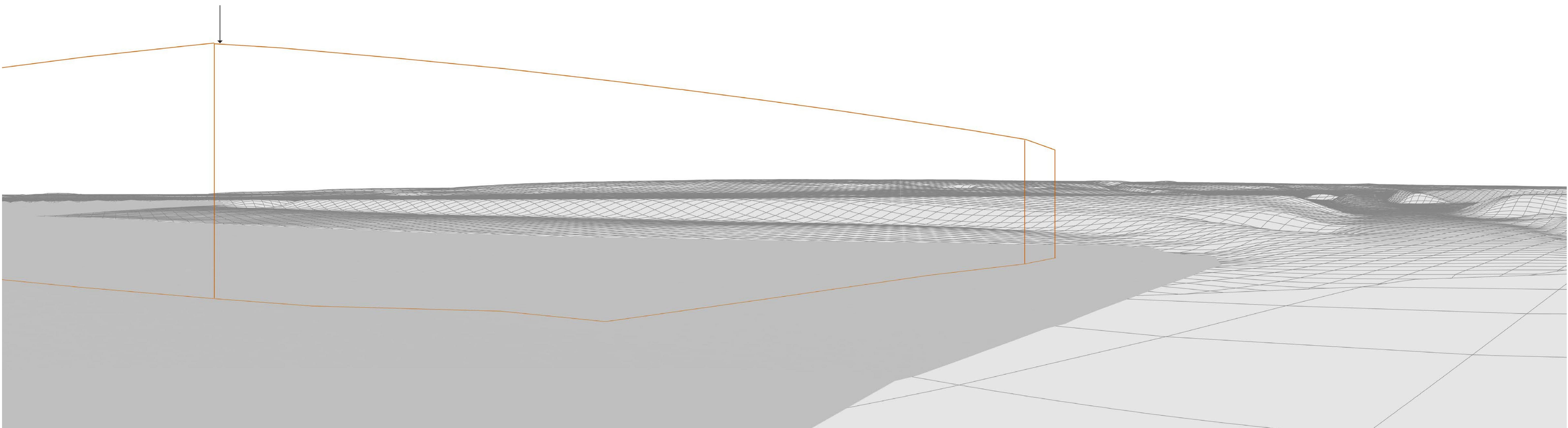


North West Cambridge
Viewpoint 31
Existing (Winter) View





Maximum Parameters



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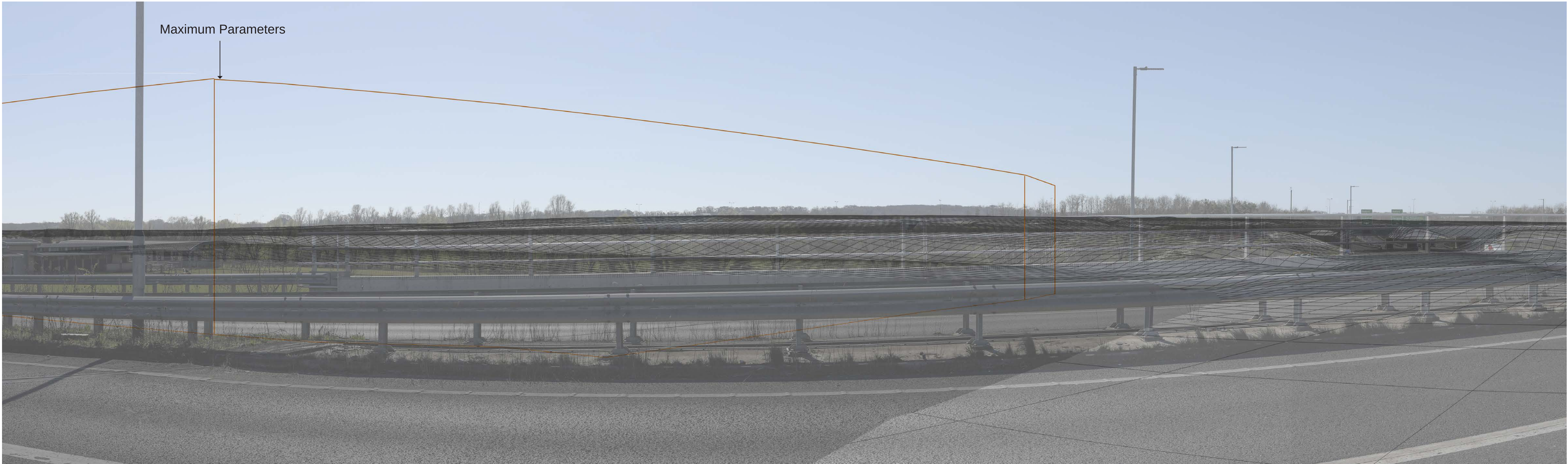
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Viewpoint 31
Maximum Parameters 3D Model View





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North West Cambridge Viewpoint 31

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Viewpoint 31
Maximum Parameters Photomontage View (AVR1)



Maximum Parameters



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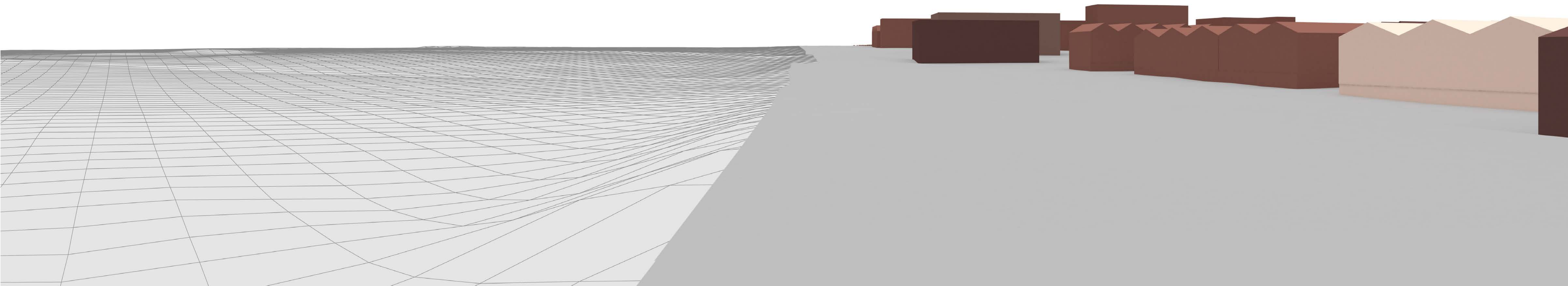
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Maximum Parameters Photomontage View (AVR1)



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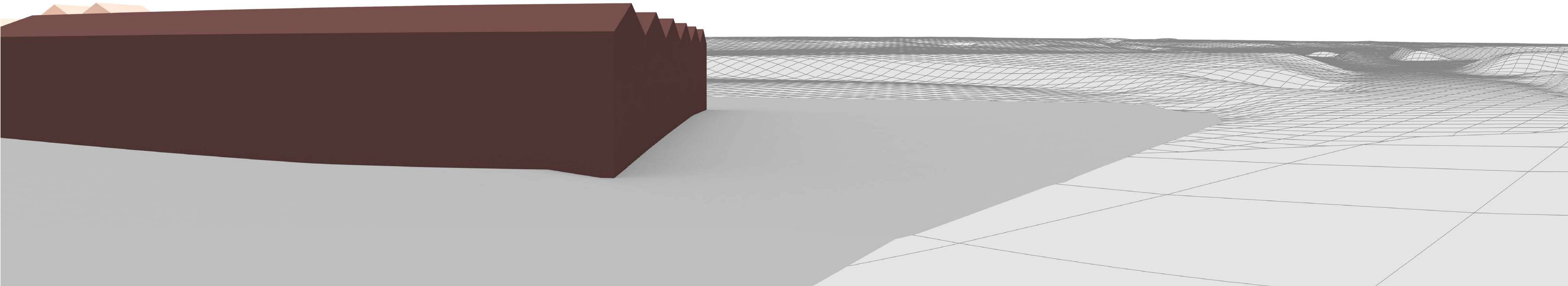
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North West Cambridge

Viewpoint 31

Illustrative Masterplan 3D Model View



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North West Cambridge

Viewpoint 31

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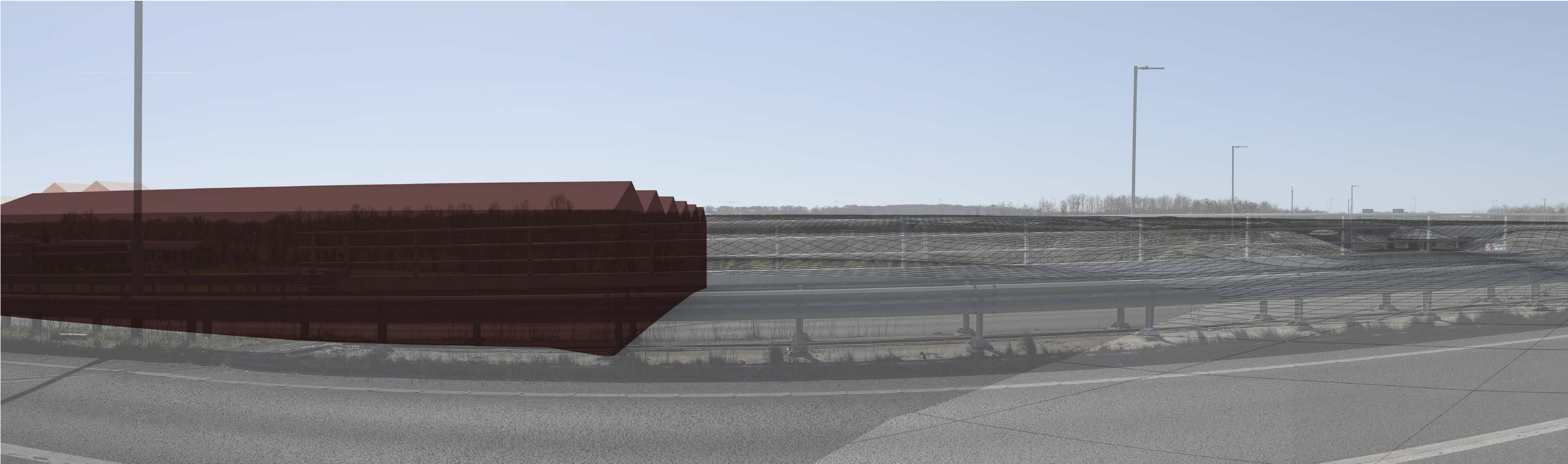
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North West Cambridge Viewpoint 31

Illustrative Masterplan 3D Model Composite View



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North West Cambridge Viewpoint 31

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North West Cambridge
Viewpoint 31

Illustrative Masterplan Photomontage View (AVR2)



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North West Cambridge
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Illustrative Masterplan Photomontage View (AVR2)



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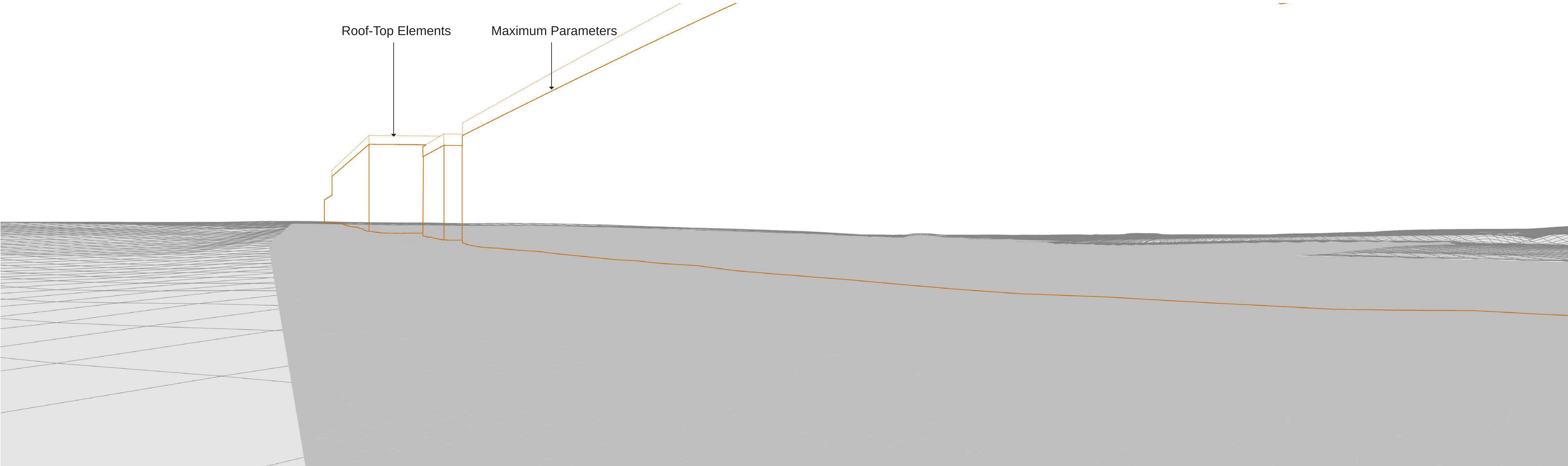
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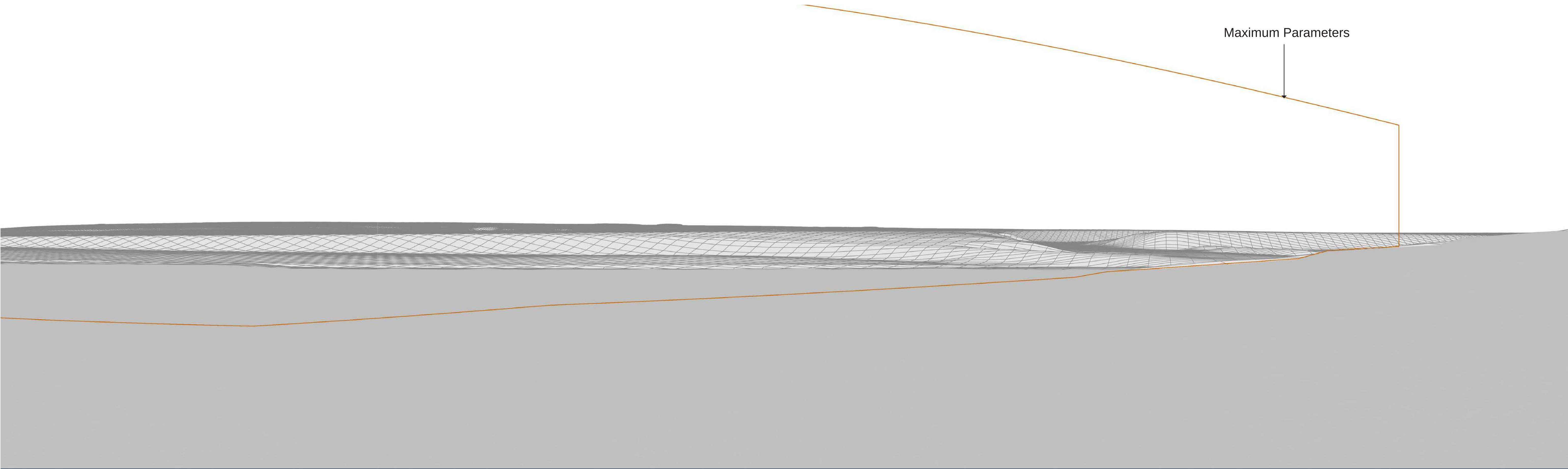
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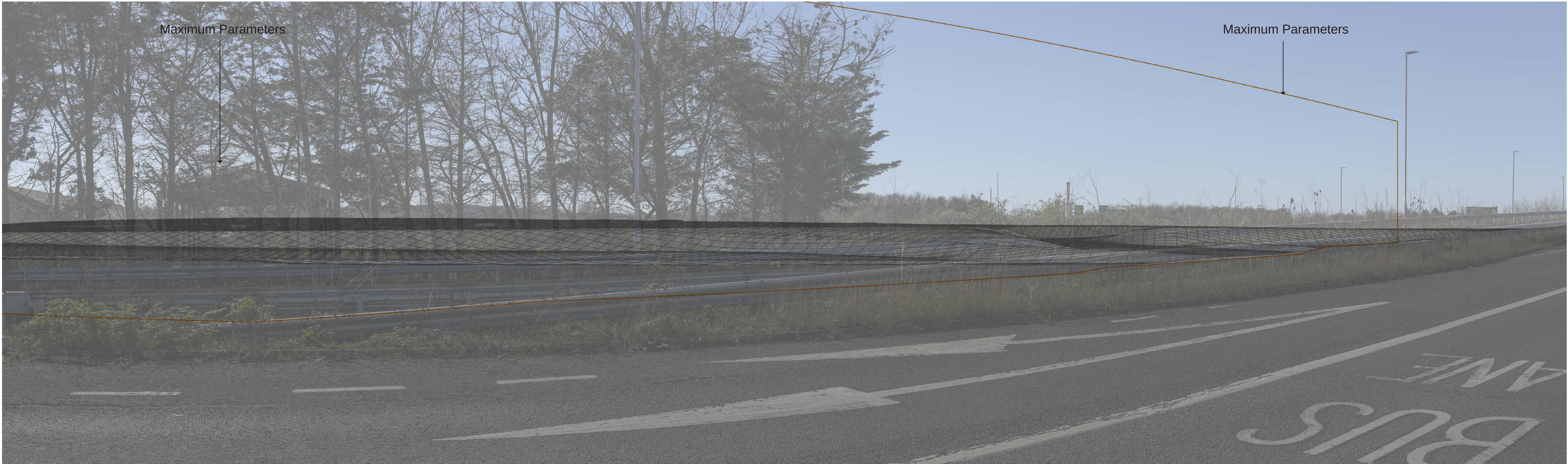
North West Cambridge
Viewpoint 32
Existing View





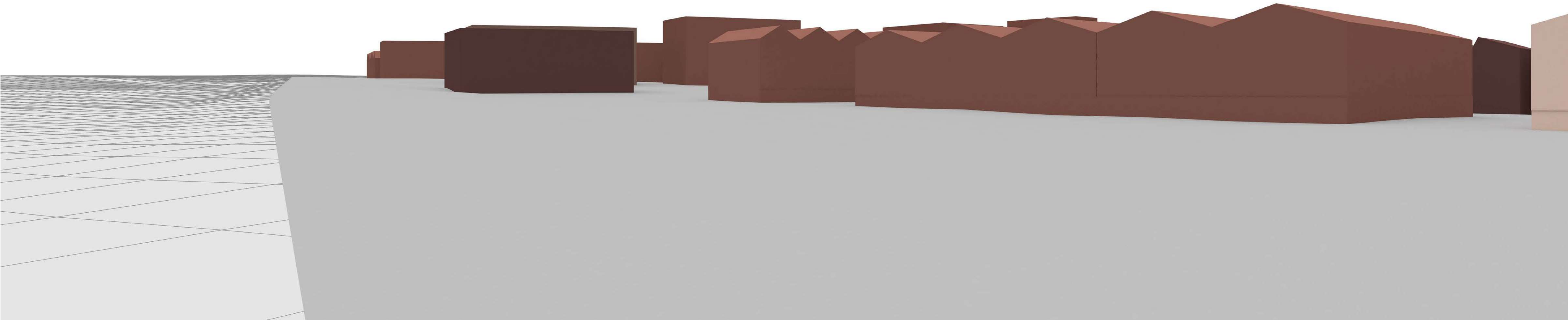












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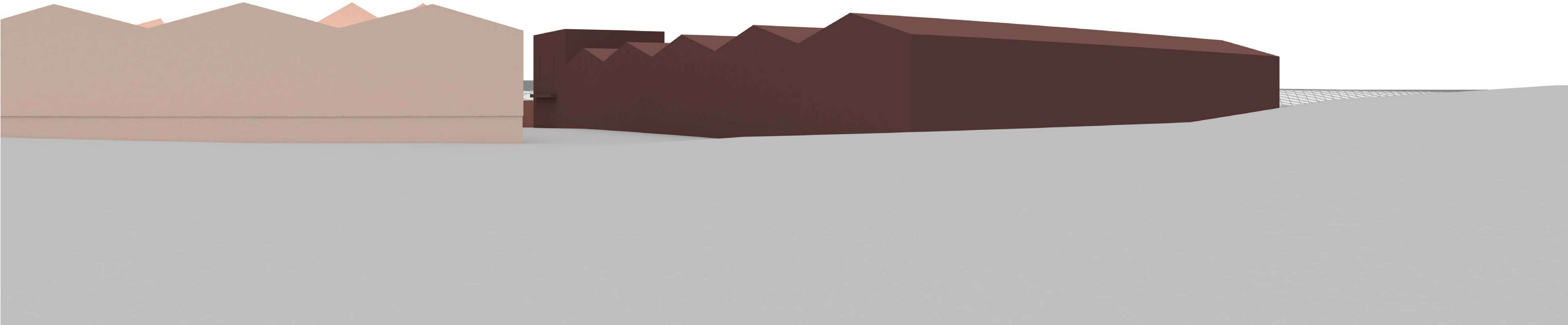
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North West Cambridge

Viewpoint 32

Illustrative Masterplan 3D Model View



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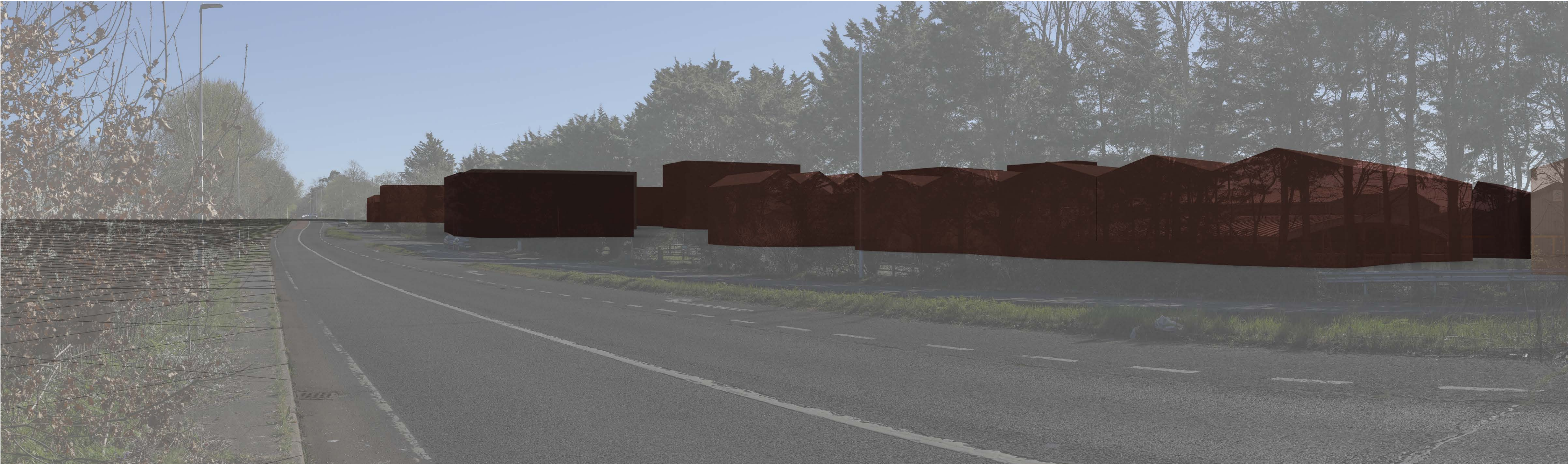
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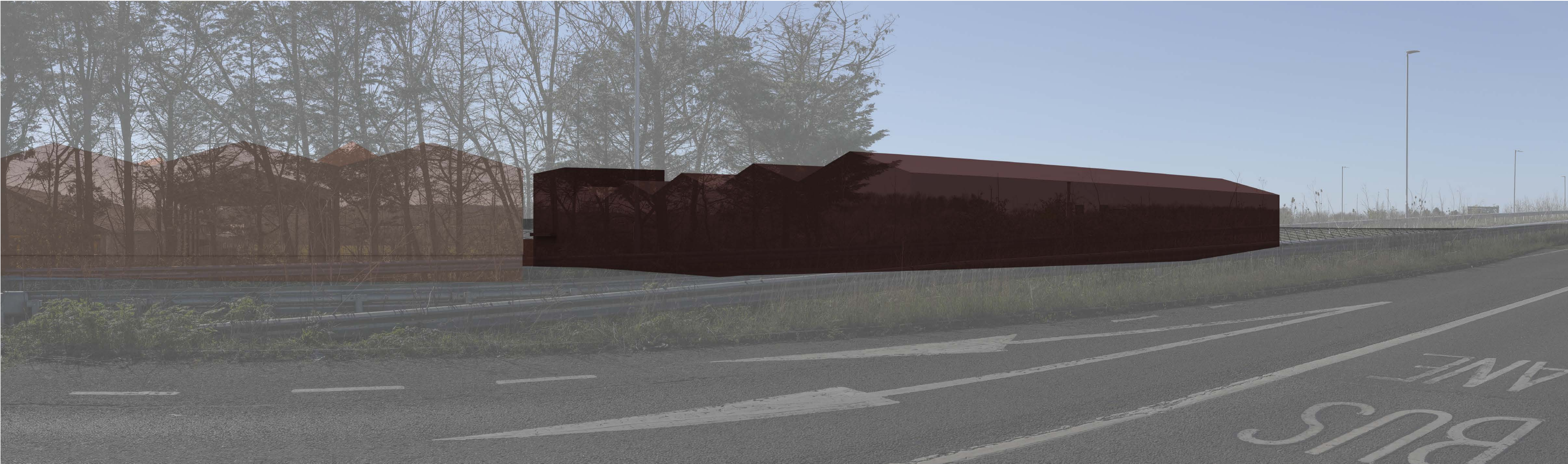
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North West Cambridge
Viewpoint 32

Illustrative Masterplan 3D Model View







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North West Cambridge
Viewpoint 32

Illustrative Masterplan Photomontage View (AVR2)







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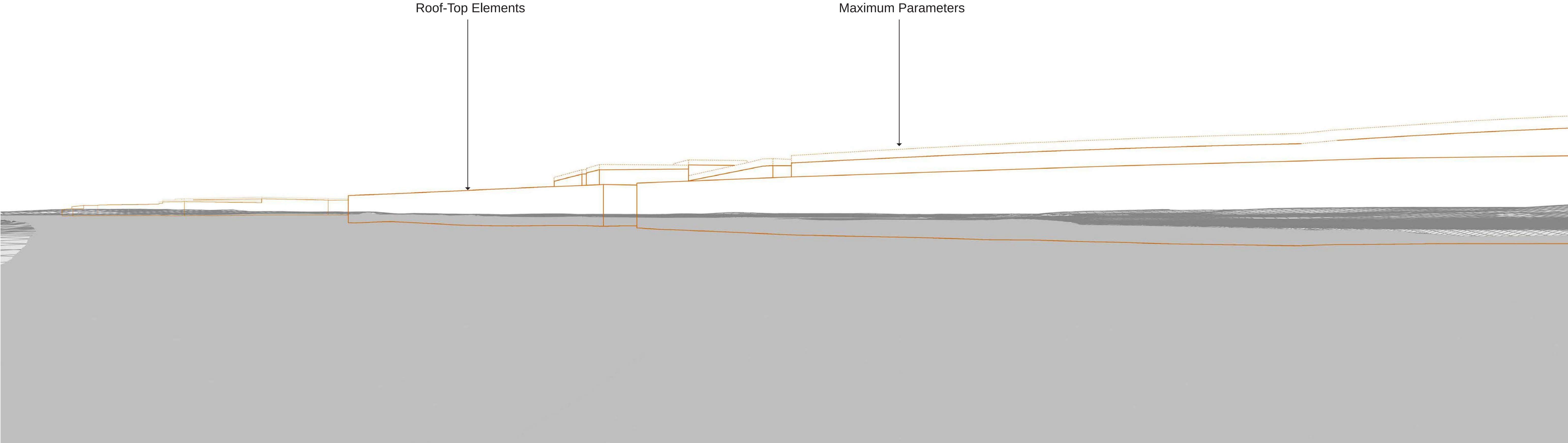
Technical Information

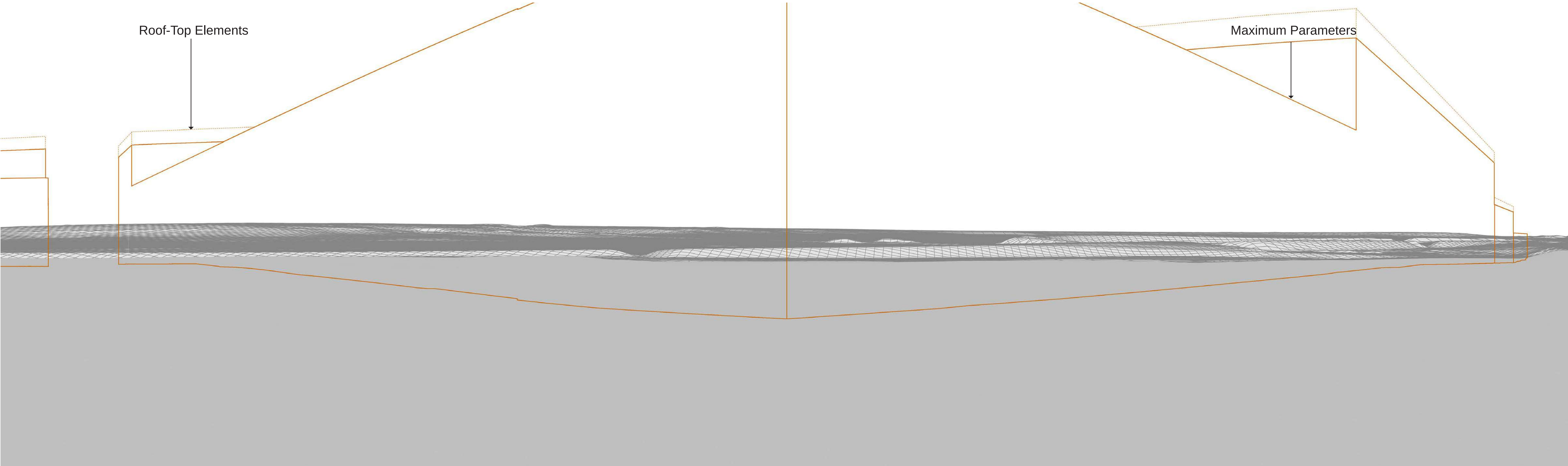
The technical photography, accuracy of 3D modelling and generation of visualisation is an Accurate Visual Representation. This is explained and presented in the accompanying Technical Methodology. **Printing Note**

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North West Cambridge
Viewpoint 33
Existing View



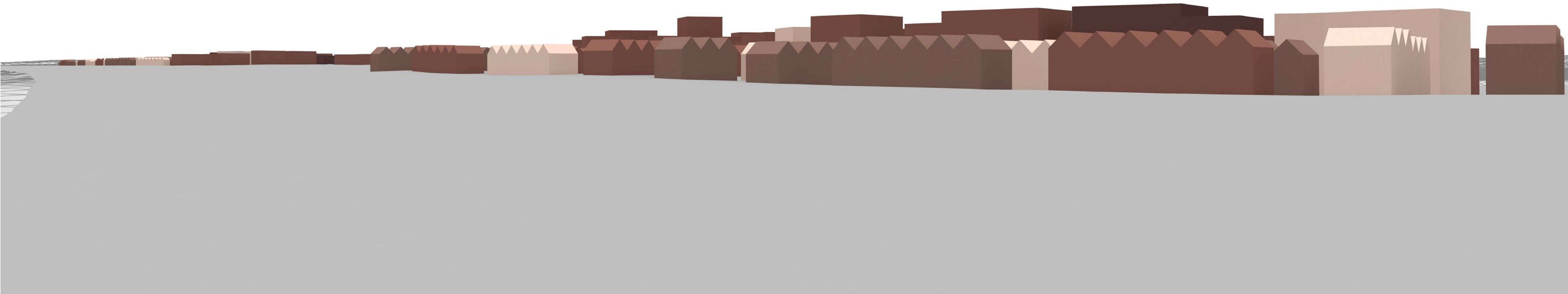












Viewing Information

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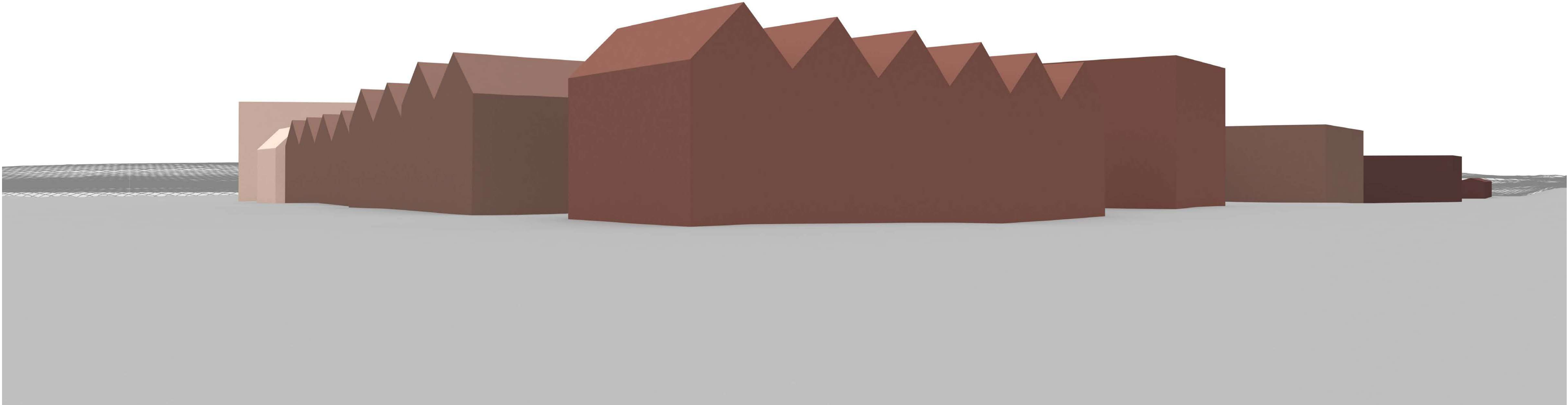
This viewpoint visualisation is spread across a single sheet 841mm wide and 297mm high. To give the correct viewing distance the sheet should be printed at a scale of 1:1 on large format paper and cut to size. Do not print at A3



North West Cambridge

Viewpoint 33

Illustrative Masterplan 3D Model View



Viewing Information

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North West Cambridge

Viewpoint 33

Illustrative Masterplan 3D Model View



Viewing Information

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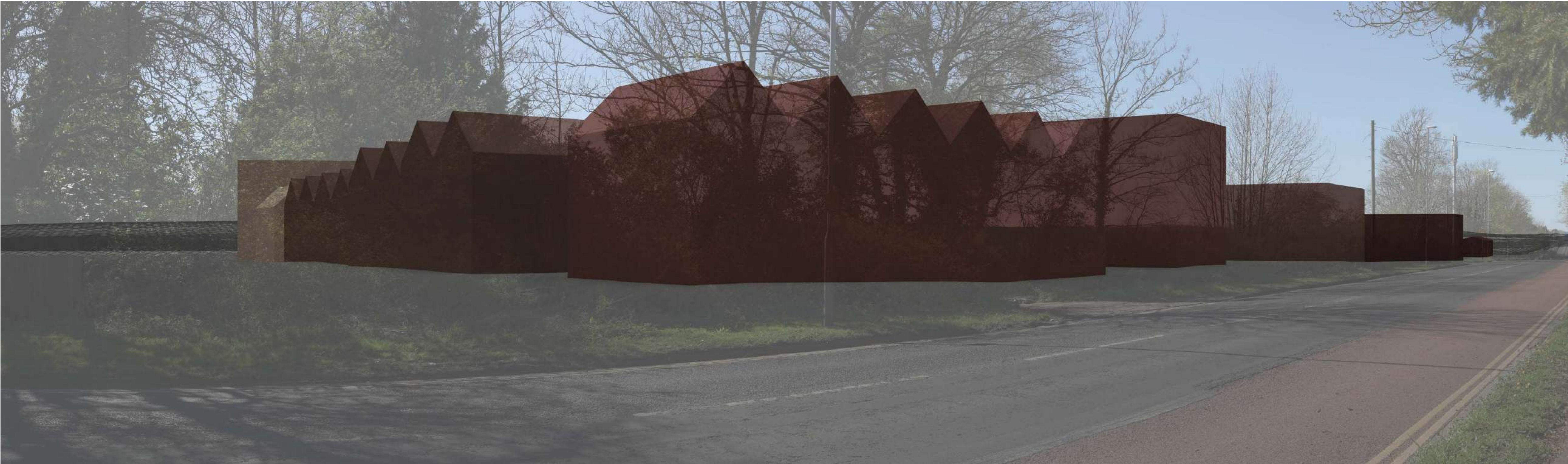
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North West Cambridge

Viewpoint 33

Illustrative Masterplan 3D Model Composite View



Viewing Information

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North West Cambridge Viewpoint 33

Illustrative Masterplan 3D Model Composite View





Viewing Information

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North West Cambridge
Viewpoint 33

Illustrative Masterplan Photomontage View (AVR2)



Viewing Information

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North West Cambridge
Viewpoint 33a
Existing View



Viewing Information

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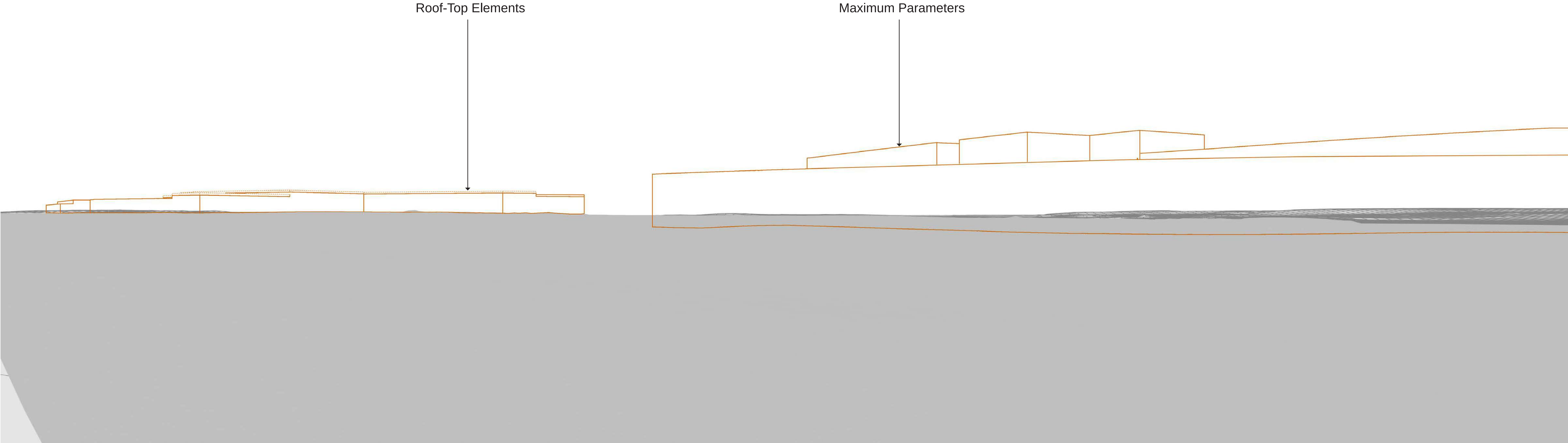
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North West Cambridge

Viewpoint 33a
Existing View



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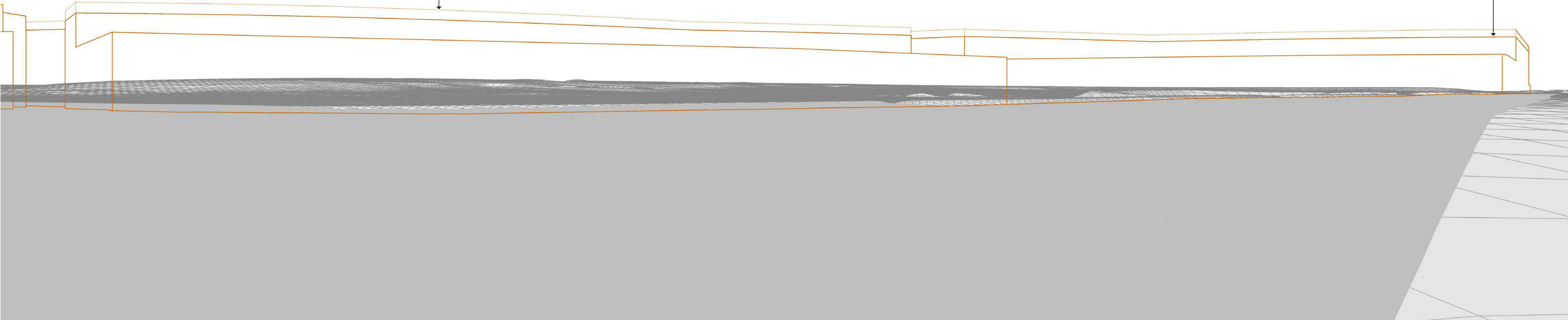
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North West Cambridge
Viewpoint 33a
Maximum Parameters 3D Model View

Roof-Top Elements

Maximum Parameters





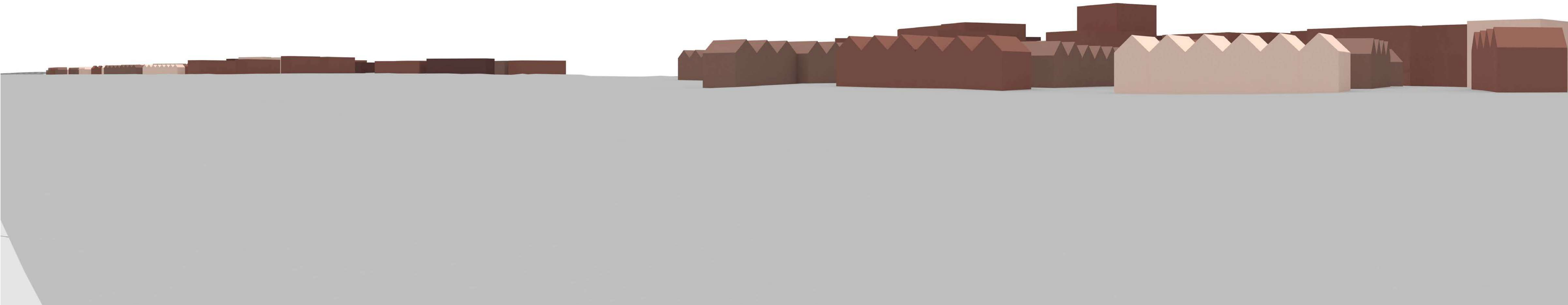




Maximum Parameters



Roof-Top Elements



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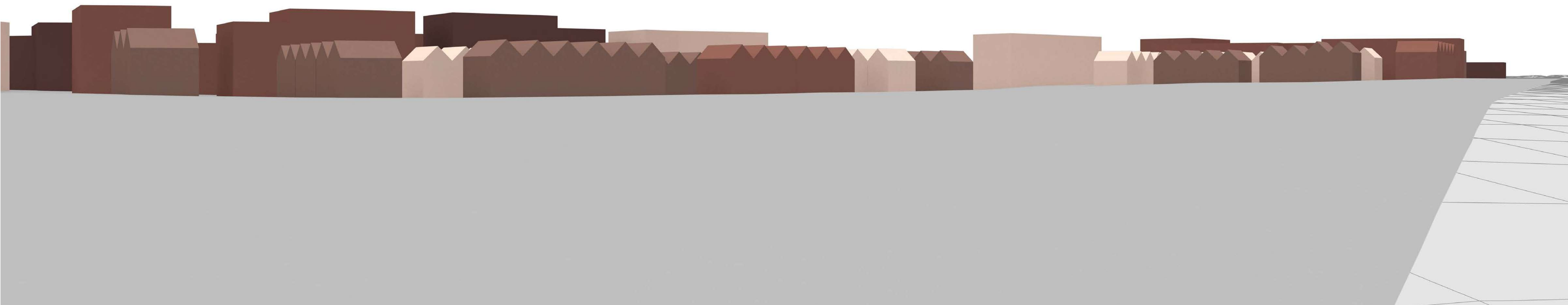
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North West Cambridge

Viewpoint 33a

Illustrative Masterplan 3D Model View



Viewing Information

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North West Cambridge

Viewpoint 33a

Illustrative Masterplan 3D Model View



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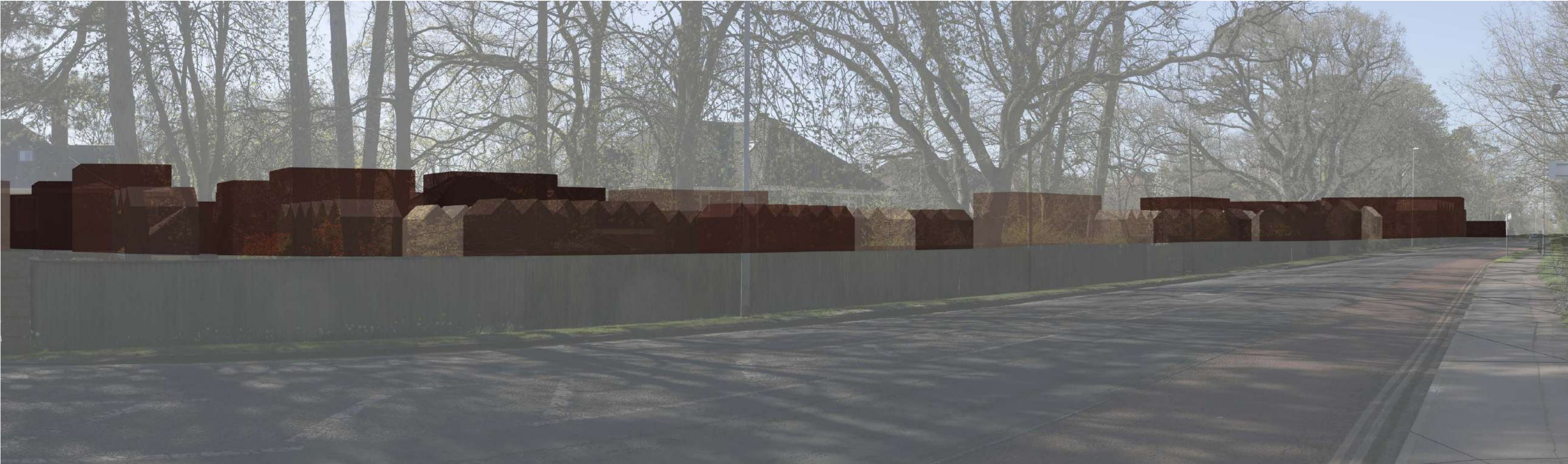
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North West Cambridge Viewpoint 33a

Illustrative Masterplan 3D Model Composite View



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North West Cambridge Viewpoint 33a

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North West Cambridge Viewpoint 33a

Illustrative Masterplan Photomontage View (AVR2)



Viewing Information

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North West Cambridge
Viewpoint 33a

Illustrative Masterplan Photomontage View (AVR2)







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North West Cambridge
Viewpoint 35
Existing View





Viewing Information

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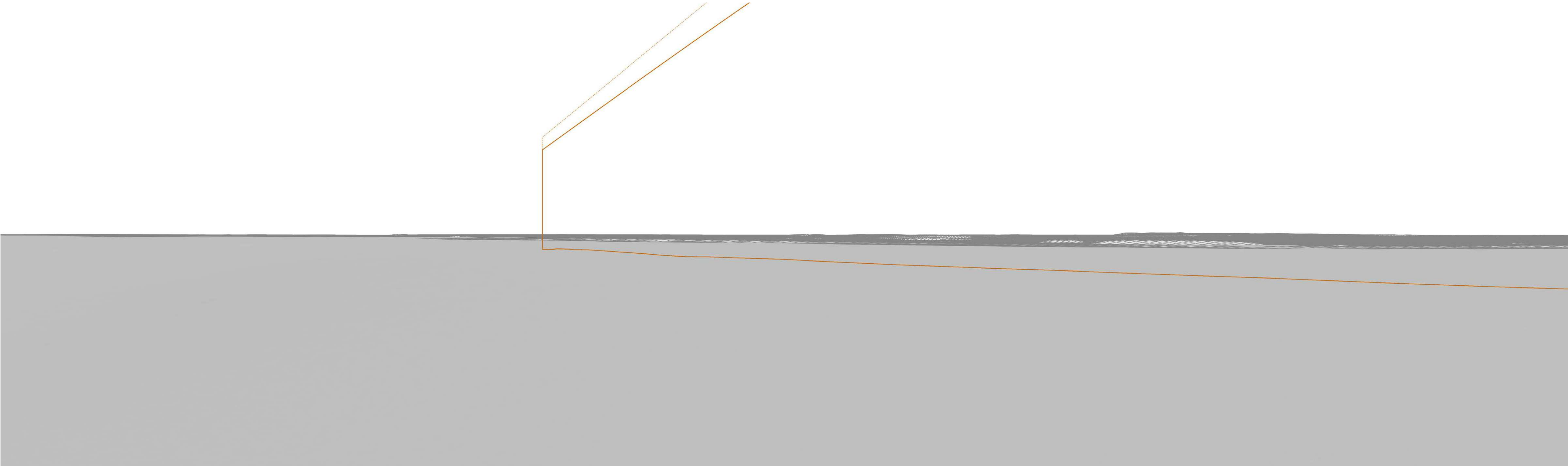
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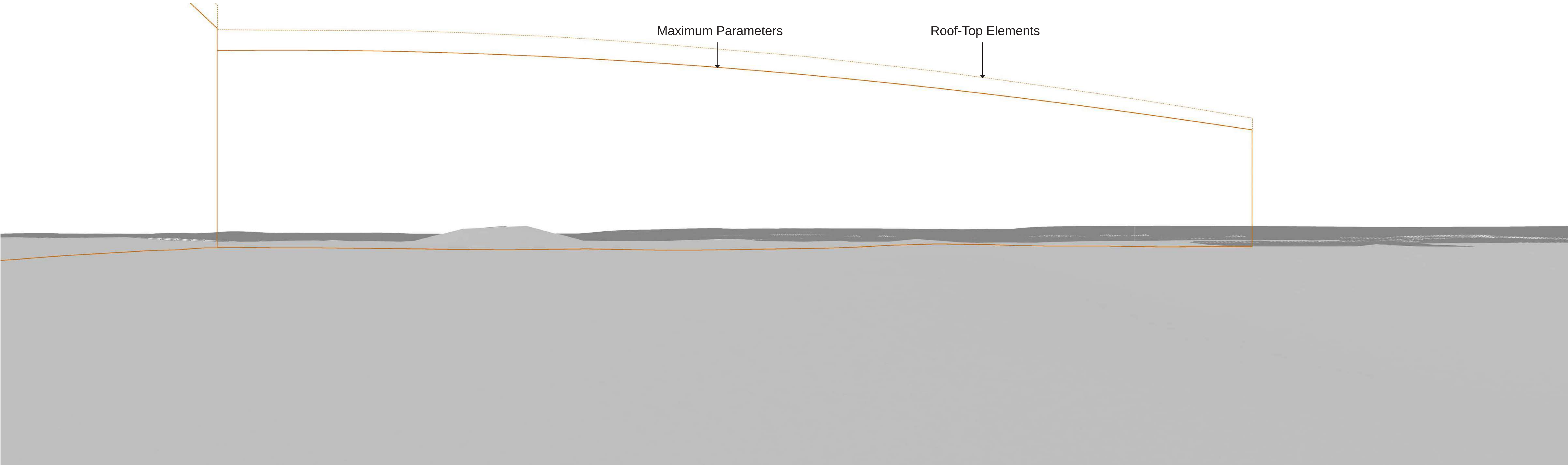


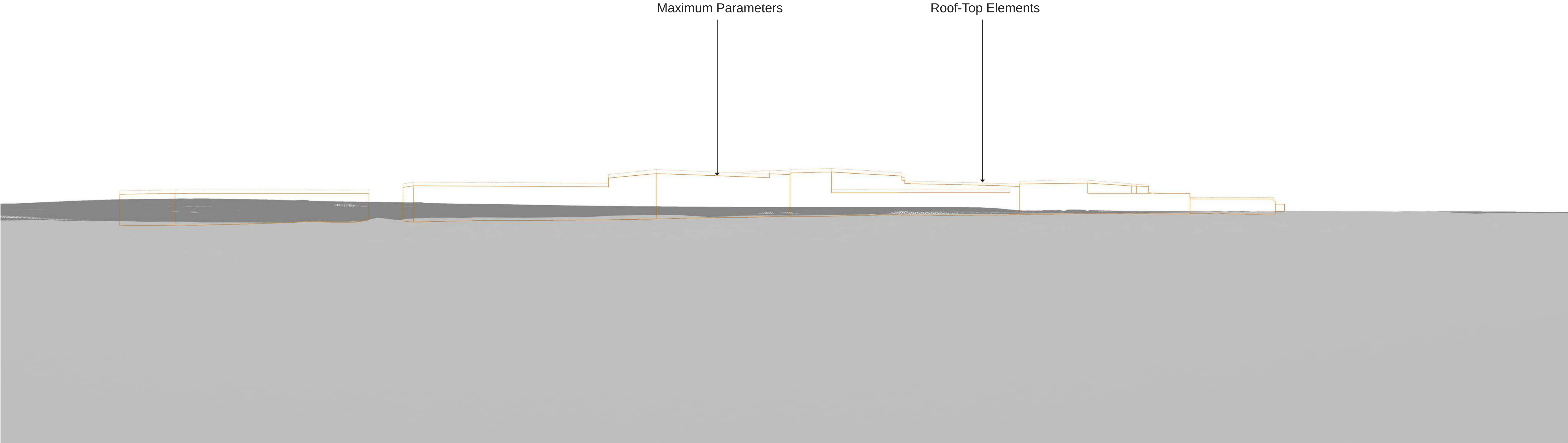
North West Cambridge

Viewpoint 35
Existing View















Viewing Information

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North West Cambridge

Viewpoint 35

Maximum Parameters 3D Model Composite View





Maximum Parameters

Roof-Top Elements





Viewing Information

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North West Cambridge

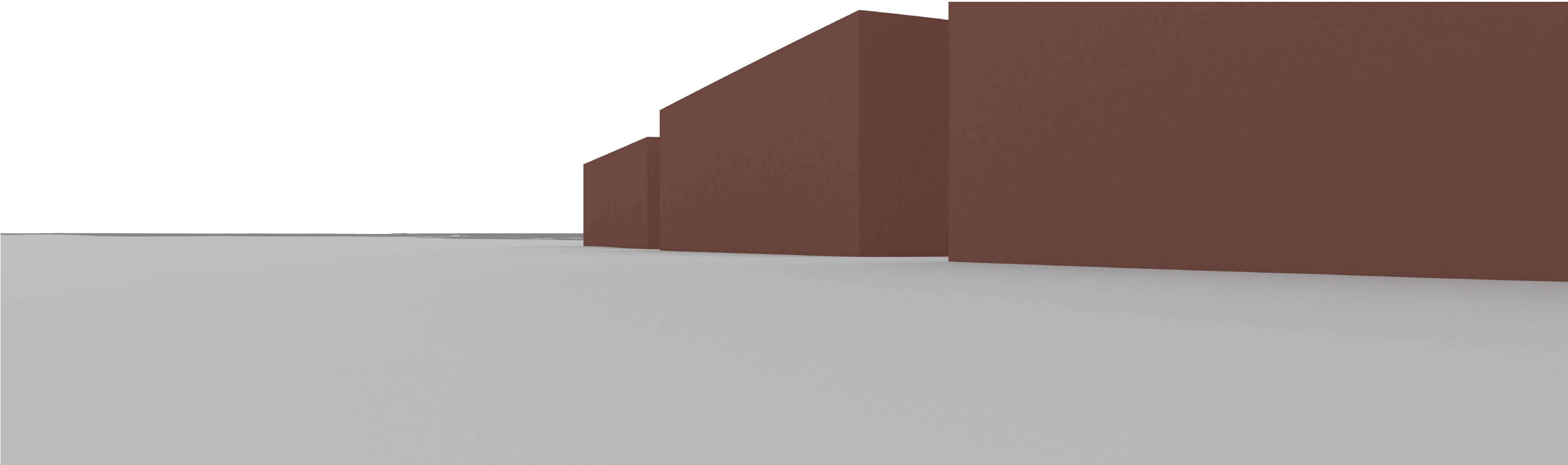
Viewpoint 35

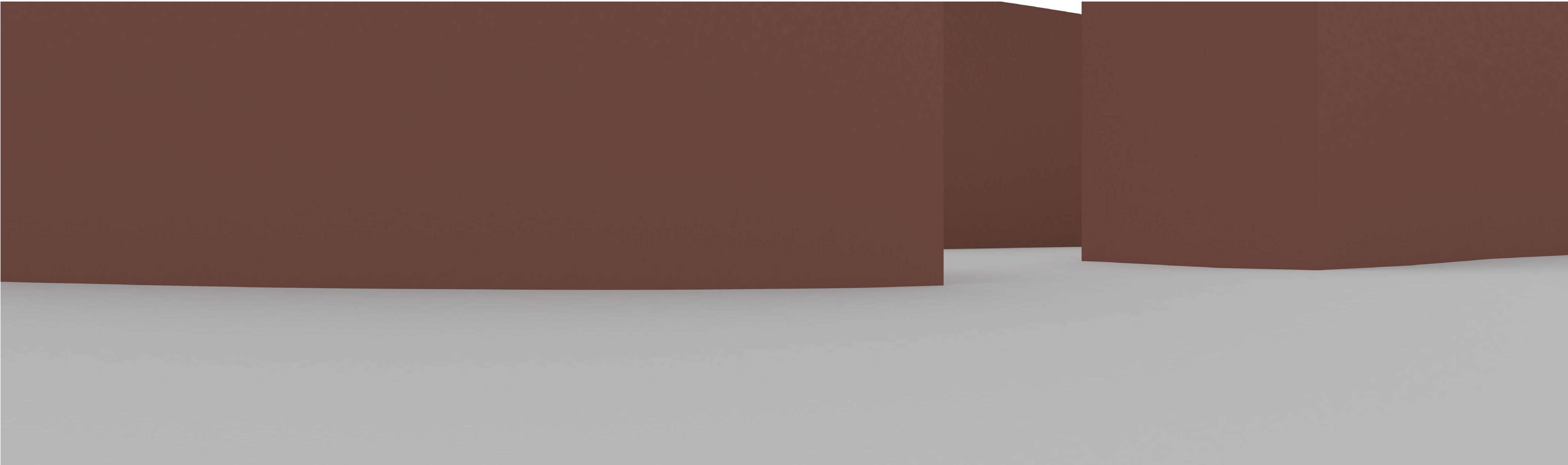
Maximum Parameters Photomontage View (AVR1)

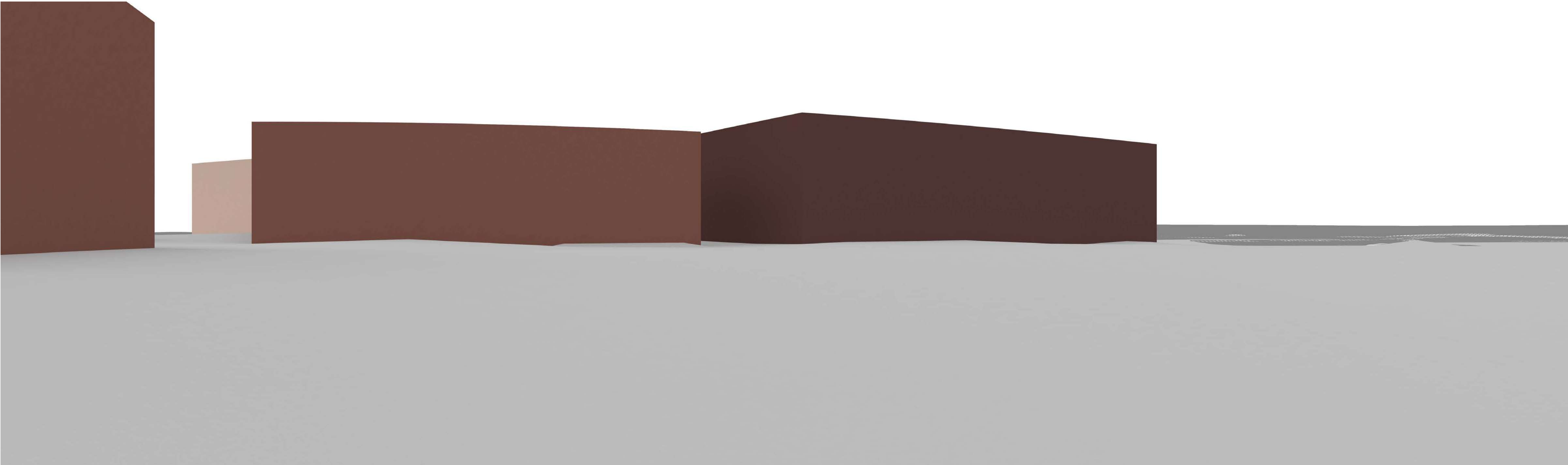














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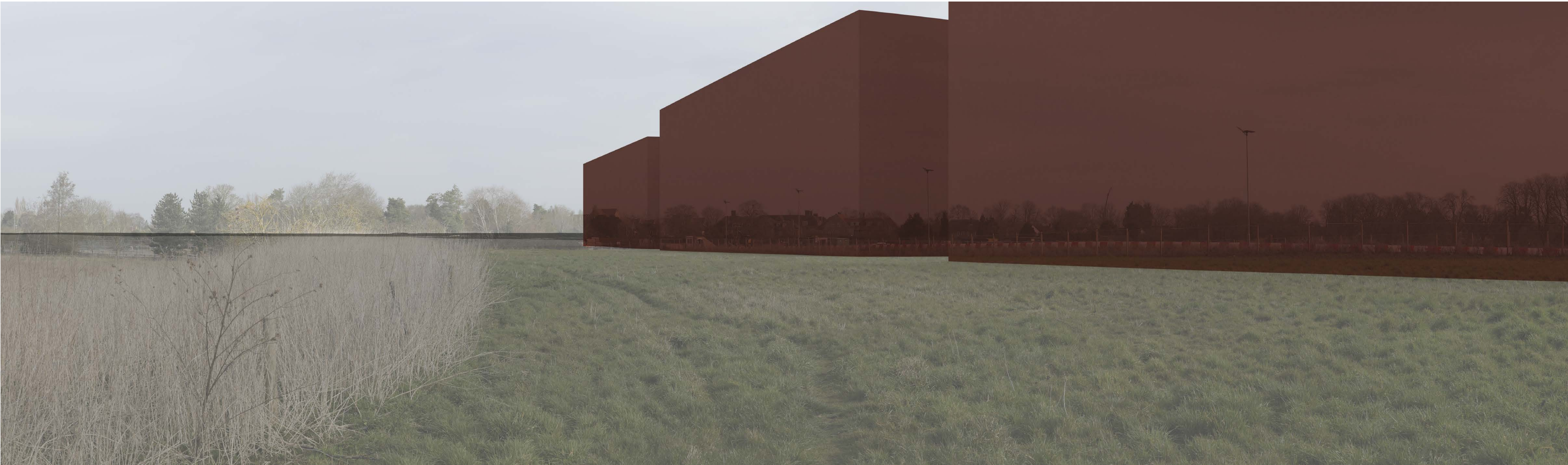
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North West Cambridge

Viewpoint 35

Illustrative Masterplan 3D Model View



Viewing Information

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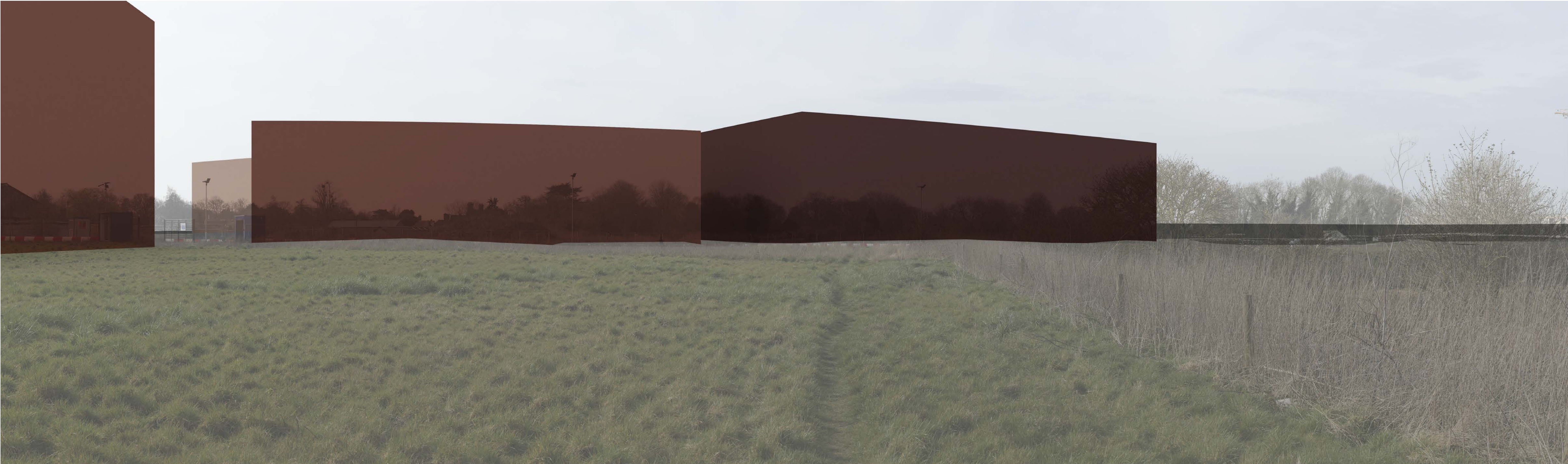


North West Cambridge

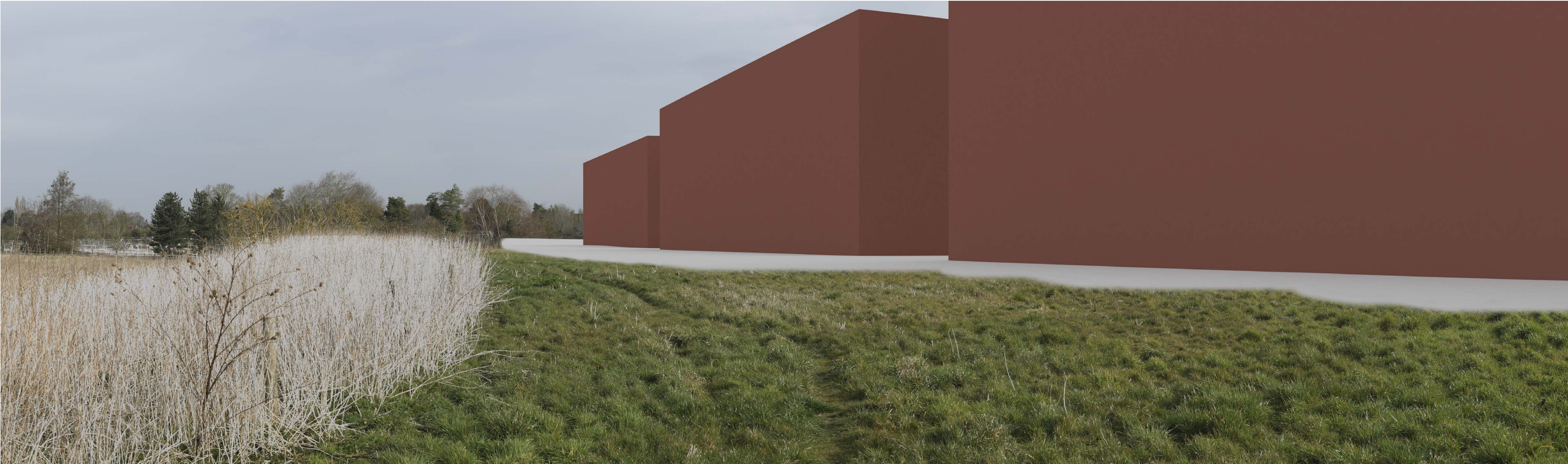
Viewpoint 35

Illustrative Masterplan 3D Model Composite View

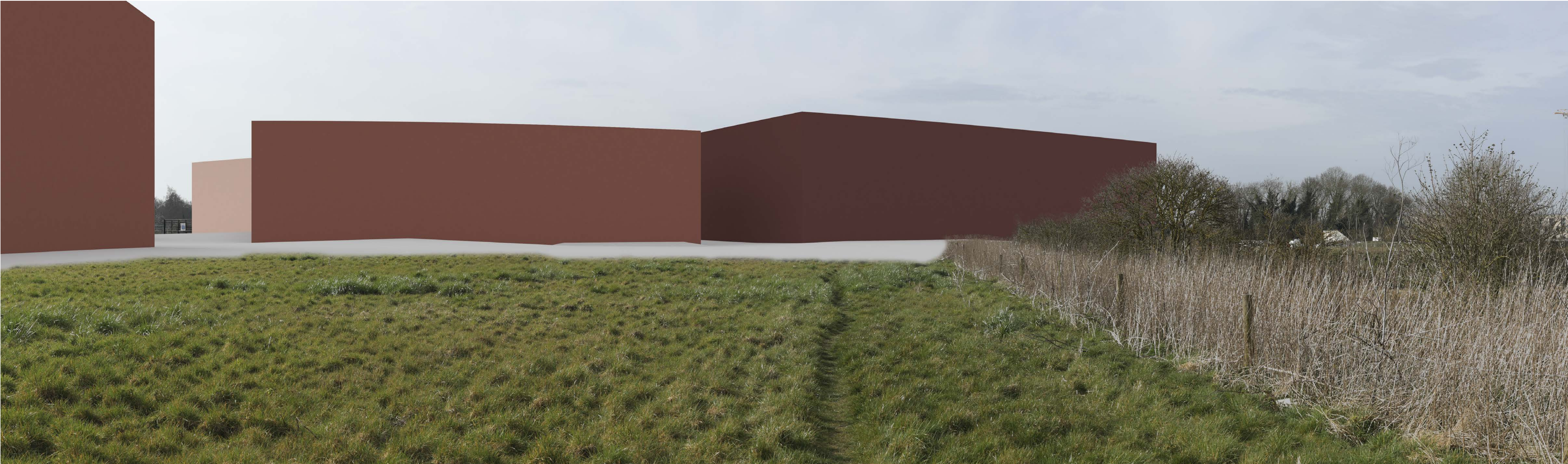














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North West Cambridge

Viewpoint 35

Illustrative Masterplan Photomontage View (AVR2)



Appendix 1

Technical Methodology:
Photography, 3D Modelling and Verified Visualisations (AVRs)

North West Cambridge

July 2025

 grant
associates

 Turner & Townsend



UNIVERSITY OF
CAMBRIDGE

 BIDWELLS



	Page
Introduction	1
Verified Photography and 3D Modelling	1
Surveying	2
3D Modelling	2
50mm lens on Full Frame Sensor Camera	5
Planar or Cylindrical Projection	5
3D Modelling Software	5
Viewing Printed Images	5
Summary	5
Appendix 1.1 Technical Viewpoint Sequences	
Appendix 1.2 Layout Information used for 3D Model Construction	
Appendix 1.3 Survey Equipment	
Appendix 1.4 Camera Equipment	

Introduction

Michael Spence BA (Hons), MLD, CMLI, REIA, FRGS is one of the UK's leading independent exponents of technical photography, verified photomontages and visualisations. Since 2013 Mike has been a technical advisor to the Landscape Institute on 'photography and photomontage in landscape and visual impact assessment', and has been undertaking this technical work for over 25 years. He is one of the main authors of the Landscape Institute's TGN 06/19 and provided technical support to Scottish Natural Heritage(NatureScot) on their windfarm visualisation guidance. He is a current member of the Landscape Institute Technical Committee. His background as a Chartered Landscape Architect, Registered EIA Practitioner and Fellow of the Royal Geographical Society working on strategic infrastructure projects has meant that the accuracy of the visualisation work is paramount, and technical photography, together with extensive surveying experience, use of GIS and detailed 3D modelling using real world co-ordinates ensures that the visualisations produced follow a clear and transparent methodology to ensure they are as accurate as possible.

Recent projects include the UNESCO World Heritage Sites at Valletta (Malta), Royal Botanic Gardens at Kew, Fountains Abbey for The National Trust, and West Cumbria Coal Mine for Friends of the Earth. Mike has also been working closely with Bath City Council on proposed development in the UNESCO World Heritage City of Bath. Mike's work and objective technical checks have been used at numerous Public Inquiries and Planning Hearings, on behalf of both local authorities, Historic England, the National Trust, Friends of the Earth and developers.

In May 2024 Bidwells contacted MSE to request Technical Photography, GNSS/RTK Surveying, 3D Modelling and preparation of visualisations to illustrate a proposed replacement building at Magdalen School in Oxford, using architectural information supplied by Walters & Cohen.

Verified Photography and 3D Modelling

The photographs were taken with a full frame camera (Canon EOS 5D Mark IV) and 50mm lens combination consistent with Landscape Institute's TGN 06/19, GLVIA3 and the emerging understanding of the requirement for technical photography for visualisation work. As part of the work 12 viewpoints were identified providing views of the site and visited in May 2024. The weather was overcast with clear visibility.

Technical Photography

The camera was mounted on a Manfrotto 303 SPH panoramic tripod head, levelled using a Manfrotto Leveller, supported on a Manfrotto Tripod. The tripod head was levelled using a spirit level, to avoid pitch and roll. The camera was set with the centre of the lens 1.60m above ground level. Photographs were taken in Manual mode with an aperture of f/8 or f/11 and a fixed focal length throughout. Photographs were taken in landscape orientation. A Sigma 50mm f/1.4 lens was used for all viewpoint photographs.



A Single Frame 50mm photograph is insufficient to capture the extents of a wide, linear development. Each view was taken with a series of overlapping 50mm images, as shown above.



To ensure consistent geometry each image was cylindrically re-projected, as above. This ensures that a full 360 degree panorama can be created to match the 3D model view, as shown below:



From the 360 degree panorama a 90 (or 180 degree) degree portion can be extracted to present the context view as shown below:



Surveying

The position of each camera location was surveyed using Spectra Precision GNSS equipment with Real Time Kinematic Correction (RTK) which achieves an accuracy down to 1cm in eastings, northings and height (metres Above Ordnance Datum). The equipment included Spectra Precision SP85 GNSS smart antennae with Panasonic Toughpad data recorder. A photograph of the camera location was taken.



3D Modelling

Using 3D models (Maximum Parameters Plan & Illustrative Masterplan) built by architects Hawkins Brown, MSE added 3D LIDAR photogrammetry height data to create a geo-referenced model.

Camera locations surveyed on site were added to the geo-referenced 3D model. This allowed existing features such as landform and buildings to be accurately aligned in the imagery.

Cylindrical renders generated using V-Ray for Rhino were exported from the 3D modelling software and used to overlay the cylindrical images. Target points from both the photograph and the model view were aligned to ensure a precise fit between the two images.

Visualisations are presented as either AVR 0, 1, 2 or 3. The differences are explained in the Landscape Institute's Technical Guidance Note 06/19: Visualisation of Development Proposals.

The results are presented as a sequence of visualisations as follows (these are either 90, 180, 270 or 360):

Existing View



Maximum Parameters Plan 3D Model View



Maximum Parameters Plan 3D Model Composite View



Maximum Parameters Plan 3D Model Photomontage (AVR1)



Illustrative Masterplan 3D Model View



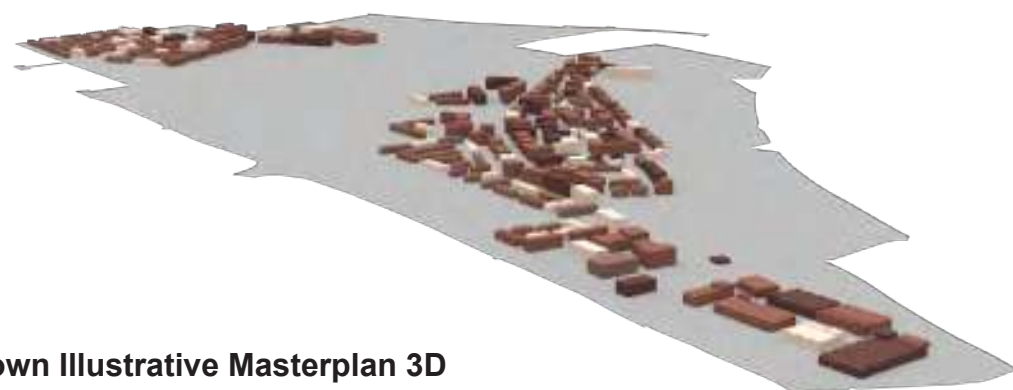
Illustrative Masterplan 3D Model Composite View



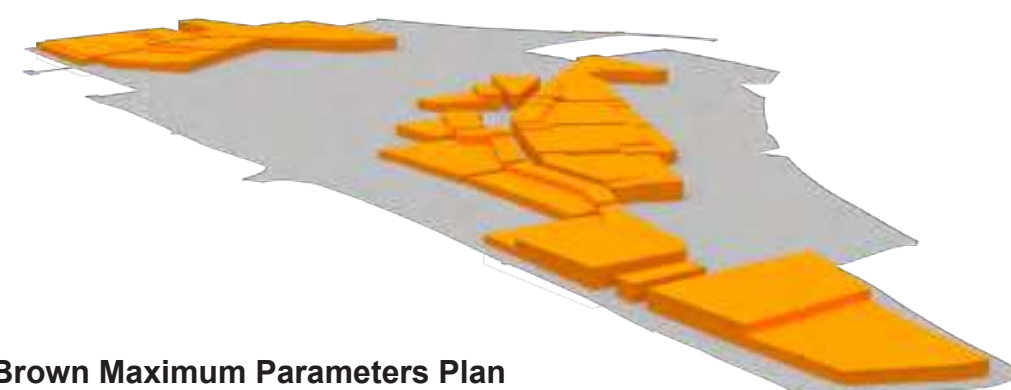
Illustrative Masterplan 3D Model Photomontage (AVR2)



The following images illustrate the combination of LIDAR DTM and the complex photogrammetry 3D model built by MSE, ensuring highly accurate 3D model placement.



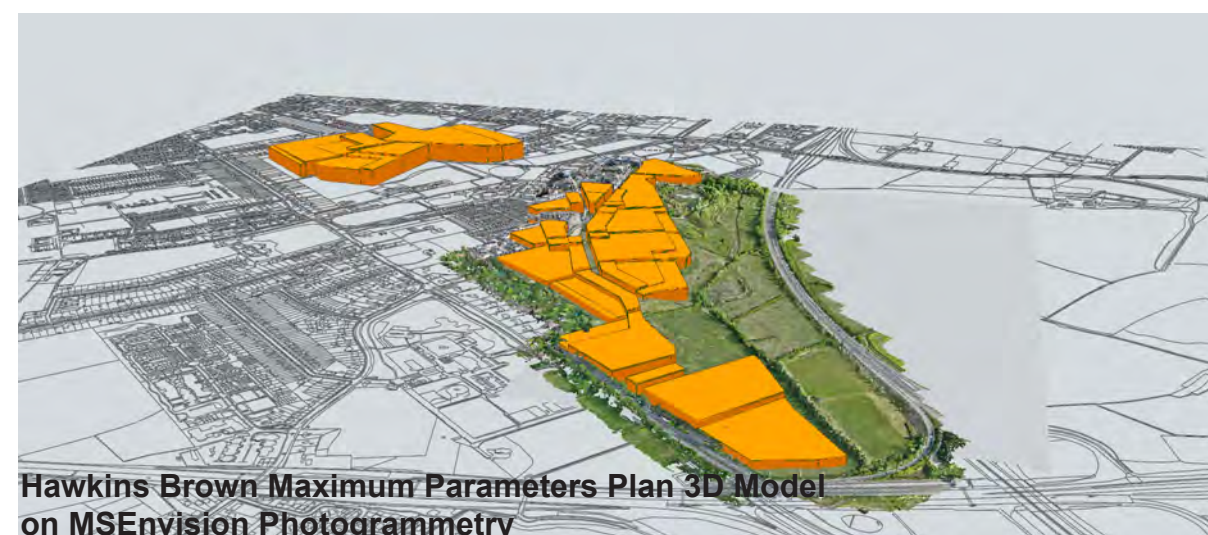
Hawkins Brown Illustrative Masterplan 3D Model on LIDAR 1m DTM data



Hawkins Brown Maximum Parameters Plan 3D Model on LIDAR 1m DTM data



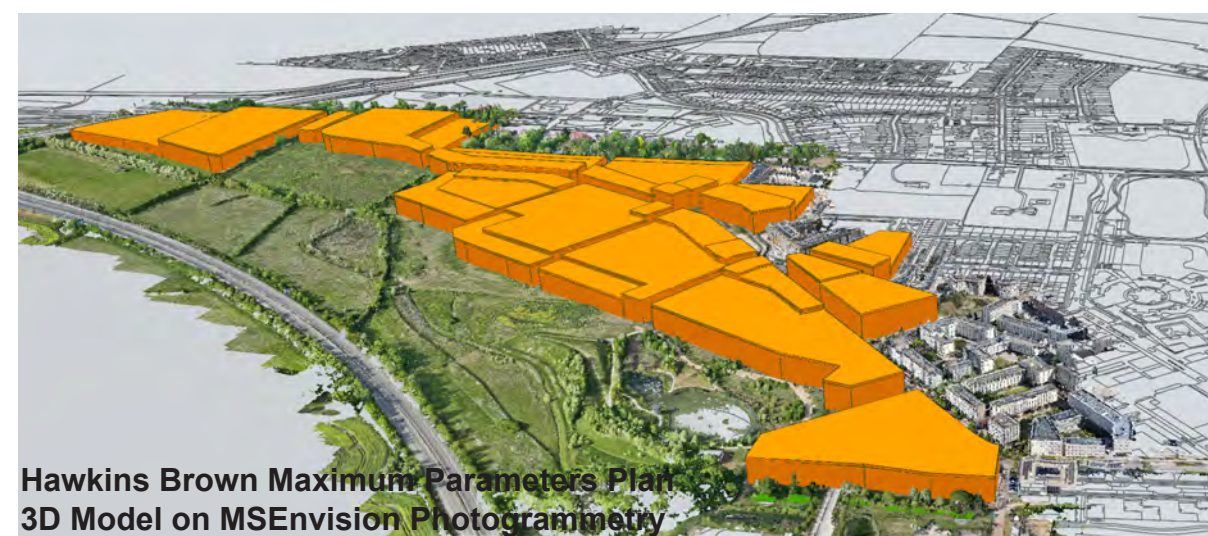
Hawkins Brown Illustrative Masterplan 3D Model on MSEnvision Photogrammetry



Hawkins Brown Maximum Parameters Plan 3D Model on MSEnvision Photogrammetry



Hawkins Brown Illustrative Masterplan 3D Model on MSEnvision Photogrammetry



Hawkins Brown Maximum Parameters Plan 3D Model on MSEnvision Photogrammetry

The following images illustrate the accuracy of the complex photogrammetry geo-referenced 3D model built by MSEnvision, ensuring highly accurate 3D model placement.



50mm lens on Full Frame Sensor Camera

For decades it has been accepted that a 50mm lens on a full frame sensor camera provides the optimum image to replicate what is seen by the human eye. There are important differences between the human eye (binocular) and the camera lens (monocular). These have been explored in research by The Highland Council & the University of Stirling, as well as by myself through the Landscape Institute. We know that a single frame 50mm image on an A3 sheet of paper provides the same view as that gained in the field by someone with one eye closed. As we are binocular, and normally use both eyes, a different size of image is required, and the reason why we have presented the images as effectively a 75mm image on A2 paper. This gives what The Highland Council, University of Stirling, Scottish Natural Heritage (NatureScot) and the Landscape Institute agree is the most representative size of image to understand the nature and scale of a development on a photograph.

Planar or Cylindrical Projection

All photographs are taken as single frame planar images. Each single frame image has a single point of perspective lying at the centre of the image. To correctly match and align with the 3D modelling software the camera must be mounted on a levelled tripod, and directed towards the proposed development.

When a viewpoint is close to the development, or a development is wide or you want to show the context of a view, a wider panorama is required. The alternative is to use a series of overlapping 50mm images and generate a 'cylindrical' perspective view,.

The 3D model renders have been rendered out in cylindrical projection to allow the precise image re-mapping to match the 90 degree cylindrical photograph.

3D Modelling software

The work has largely been undertaken using Rhino3D. All 3D modelling has been undertaken in metres and geo-referenced to align with OSGB36. RESOFT Windfarm was also used which is a 3D modelling package which we use to check on vertical and horizontal alignment of the 3D model against the precise image geometry. This is also set up to OSGB36. RESOFT Windfarm has been used to generate the geometric grid from LIDAR DTM data present in all 3D model visualisations.

Viewing Printed Images

The visualisations have been prepared to be printed in the Technical Methodology at A3 (420 x 297mm) and in the separate 'Verified Visualisations' document at A1 (841mm/420mm x 297mm), to show the scale of the proposed development.

The image size is considered to give a fair representation of the view for everyone, and the scale of the development in that view.

Summary

This work has been undertaken in accordance with the the Landscape Institute TGN 06/19 and the developing understanding of visualisation work. The accuracy of camera locations and 3D modelling conforms with the Landscape Institute's Type 4 (the highest level of accuracy). The 3D modelling has been produced to AVR1 & 2 (scale & form).

The photography has been undertaken in an extremely robust manner, using professional full frame sensor DSLR and 50mm lens with levelled tripod. The camera position has been surveyed using highly accurate GNSS equipment, giving high levels of accuracy of camera location. The 3D model has been built in Rhino 3D using detailed information contained in the planning application drawings. An additional check on the vertical scaling has been undertaken using RESOFT Windfarm. The development aligns perfectly align to the underlying LIDAR DTM.

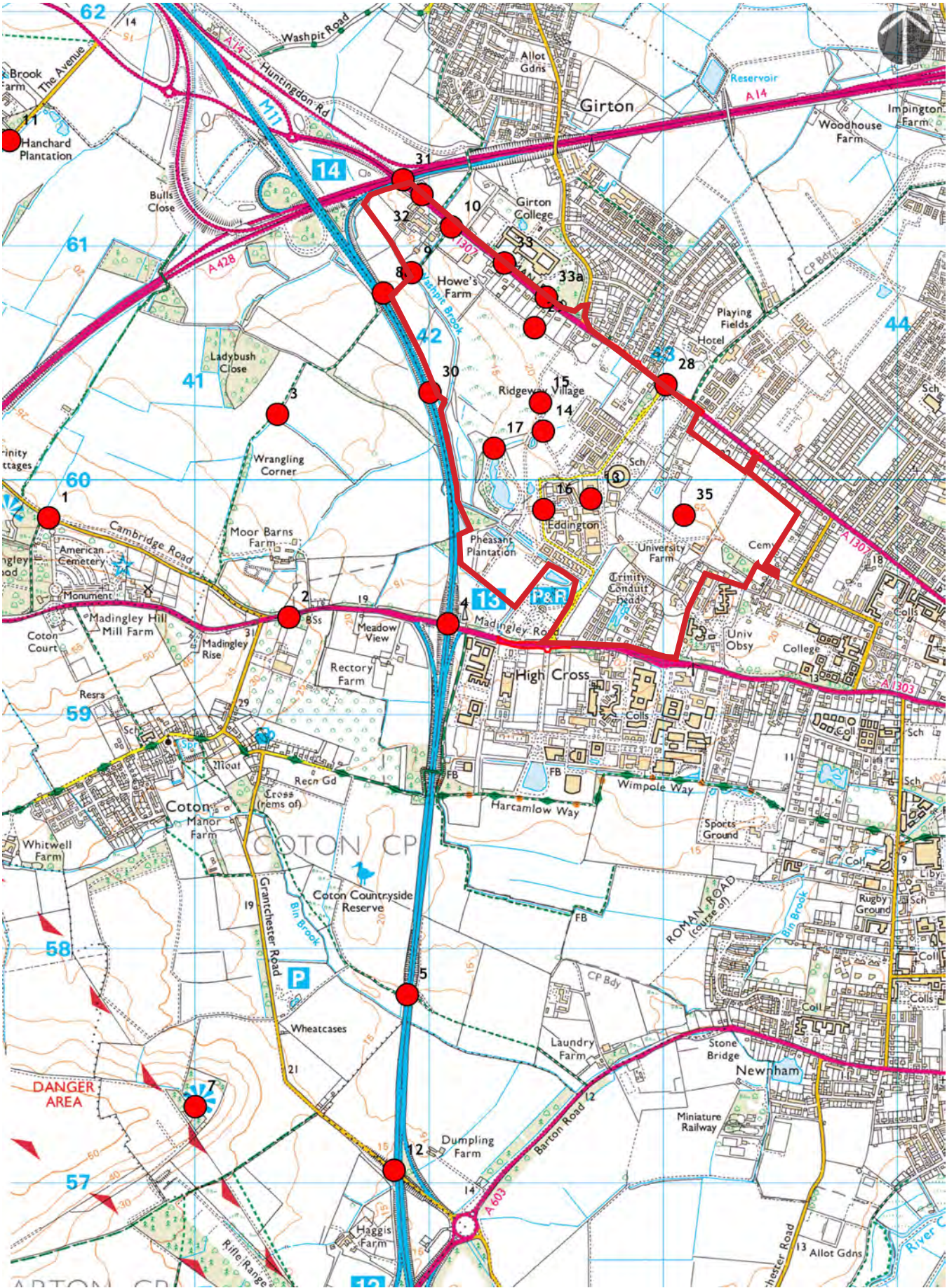
The resultant visualisations are highly accurate.

The photography, surveying and 3D modelling have followed a transparent methodology, and the resultant visualisations and the size at which they are presented are considered robust and fit for purpose to illustrate the positioning, and scale and massing of the proposed scheme in its local and wider context.

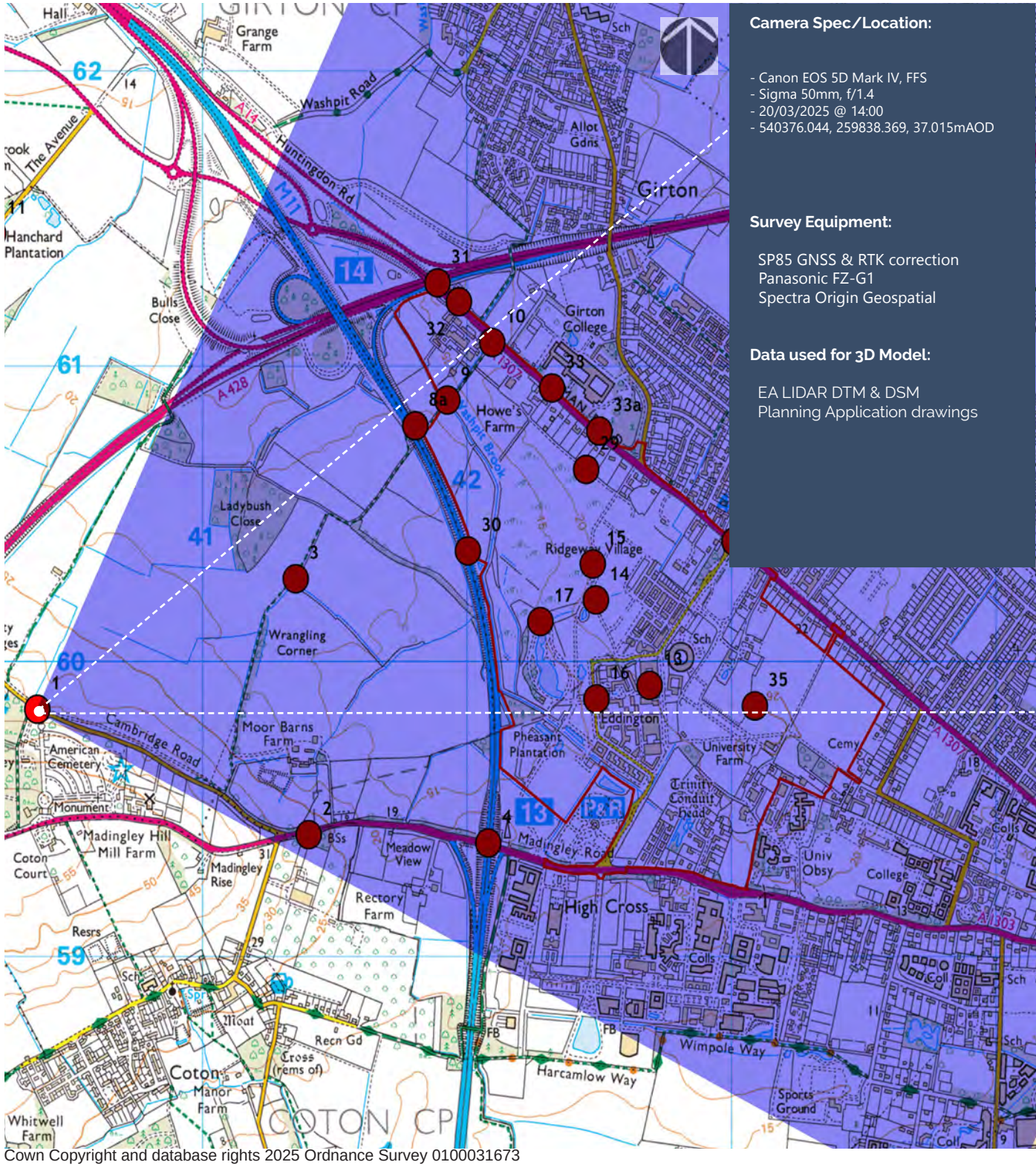


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Registered EIA Practitioner
Fellow of the Royal Geographical Society
Principal, MSEnvision Ltd

25 July 2025



Camera Location:



Tripod:

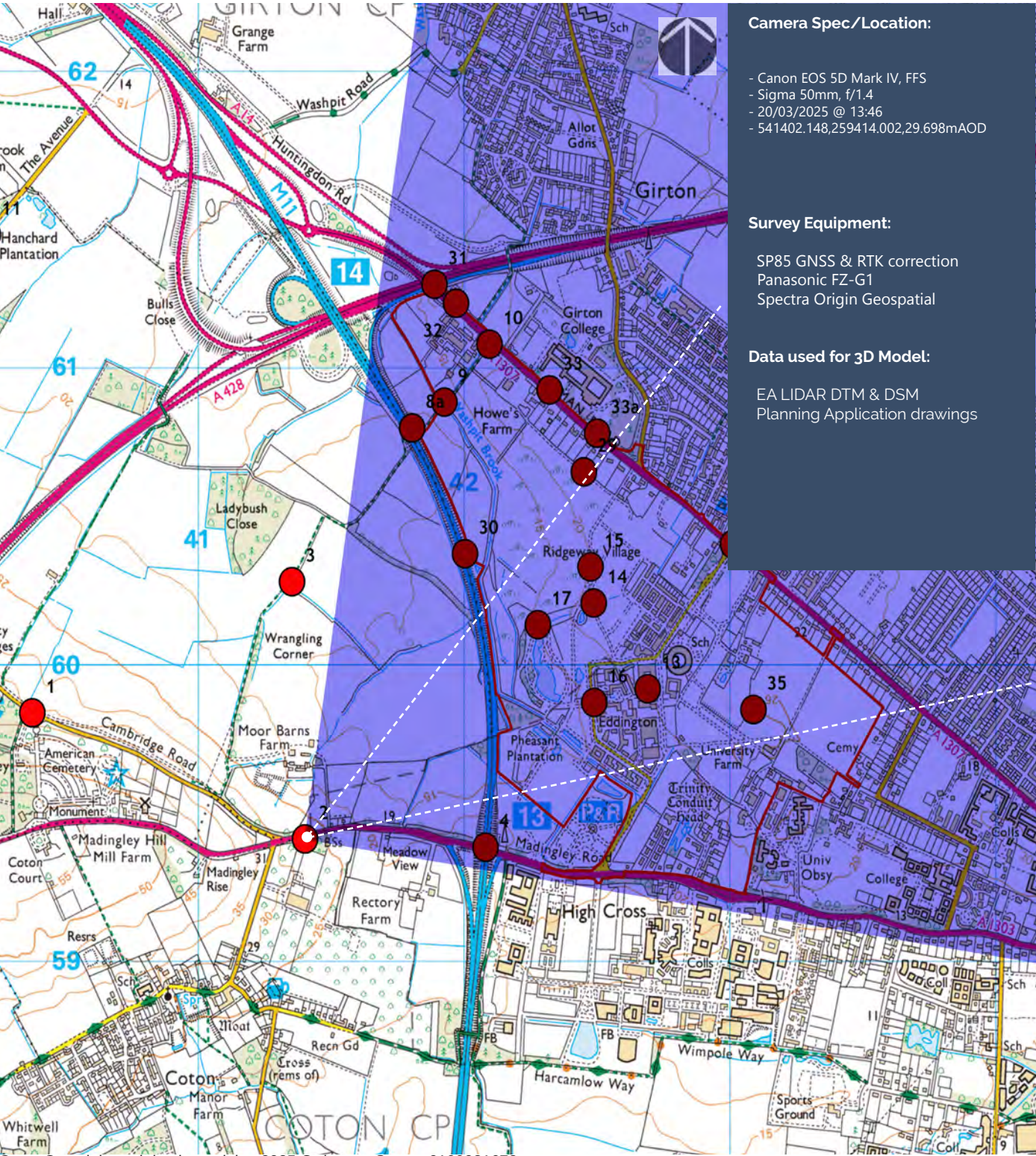


50mm Lens Planar Projection (actual 49.6mm; 39.9 deg HFOV)



Viewpoint 1 Single Frame 50mm Reference image

Camera Location:



Camera Spec/Location:

- Canon EOS 5D Mark IV, FFS
- Sigma 50mm, f/1.4
- 20/03/2025 @ 13:46
- 541402.148,259414.002,29.698mAOD

Survey Equipment:

- SP85 GNSS & RTK correction
- Panasonic FZ-G1
- Spectra Origin Geospatial

Data used for 3D Model:

- EA LIDAR DTM & DSM
- Planning Application drawings

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Tripod:



50mm Lens Planar Projection (actual 49.6mm; 39.9 deg HFOV)

Point of Perspective



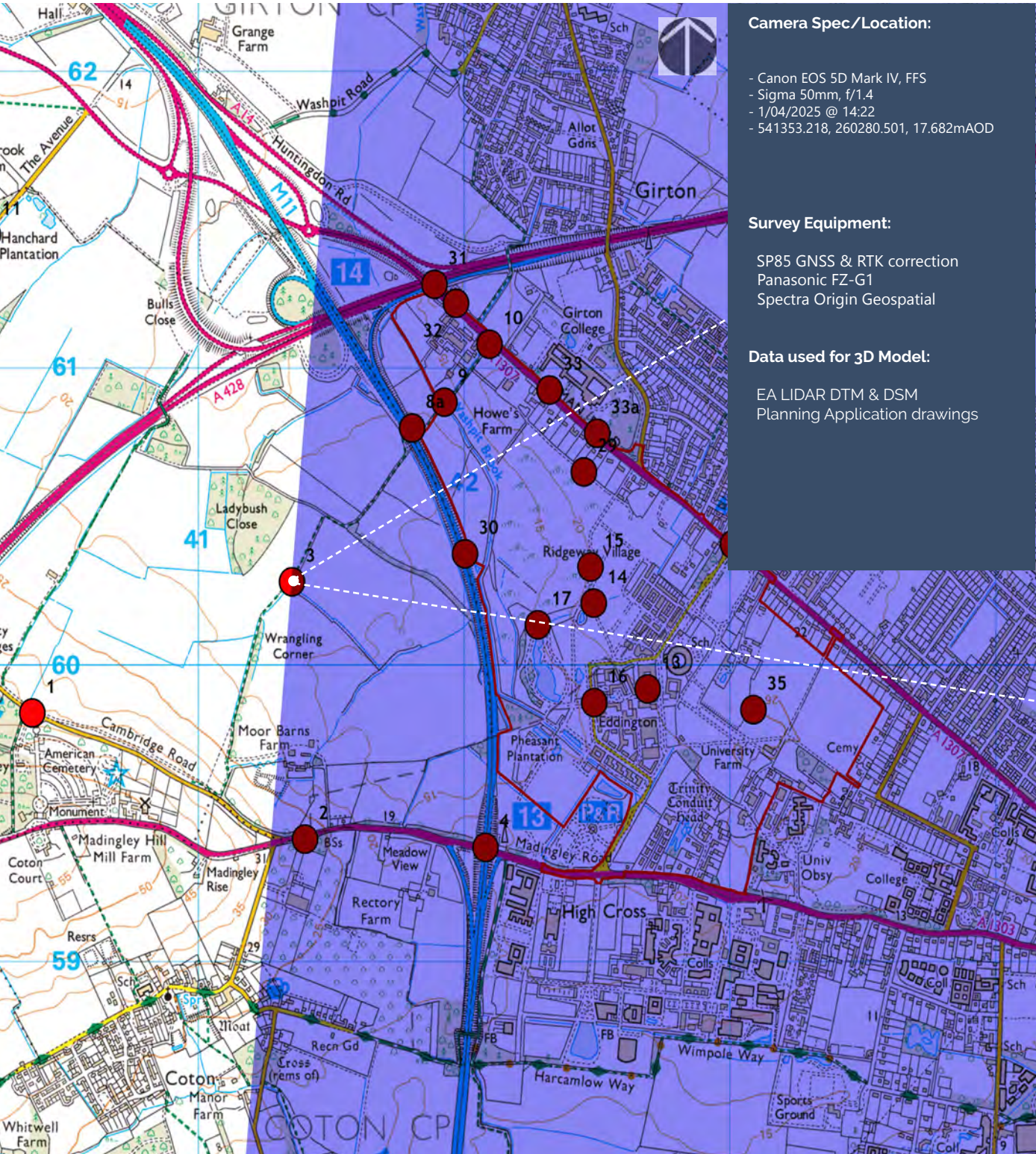
Point of Perspective

Point of Perspective

Point of Perspective

Viewpoint 2 Single Frame 50mm Reference image

Camera Location:



Camera Spec/Location:

- Canon EOS 5D Mark IV, FFS
- Sigma 50mm, f/1.4
- 1/04/2025 @ 14:22
- 541353.218, 260280.501, 17.682mAOD

Survey Equipment:

- SP85 GNSS & RTK correction
- Panasonic FZ-G1
- Spectra Origin Geospatial

Data used for 3D Model:

- EA LIDAR DTM & DSM
- Planning Application drawings

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Tripod:

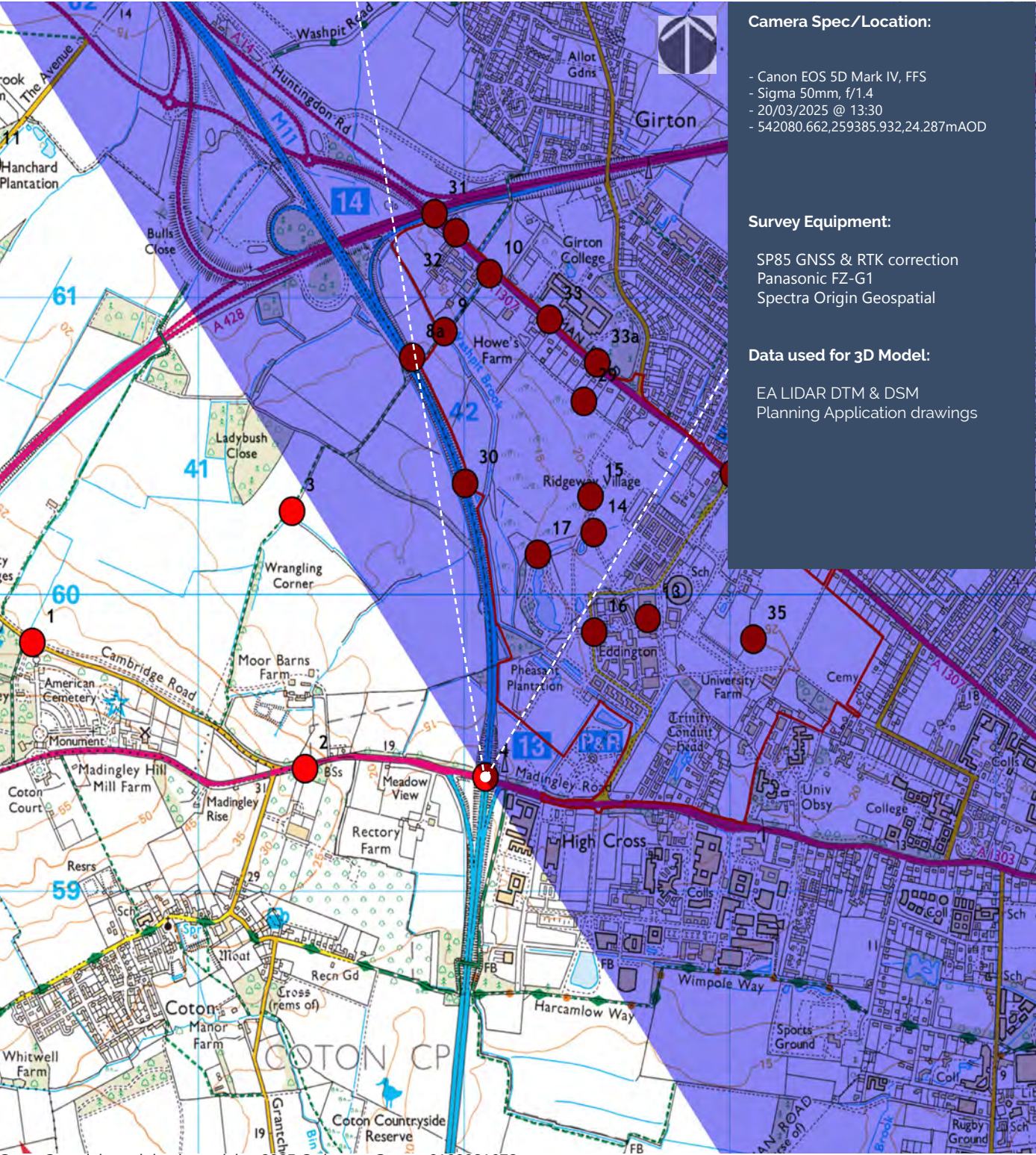


50mm Lens Planar Projection (actual 49.6mm; 39.9 deg HFOV)



Viewpoint 3 Single Frame 50mm Reference image

Camera Location:



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Tripod:



50mm Lens Planar Projection (actual 49.6mm; 39.9 deg HFOV)

Point of Perspective



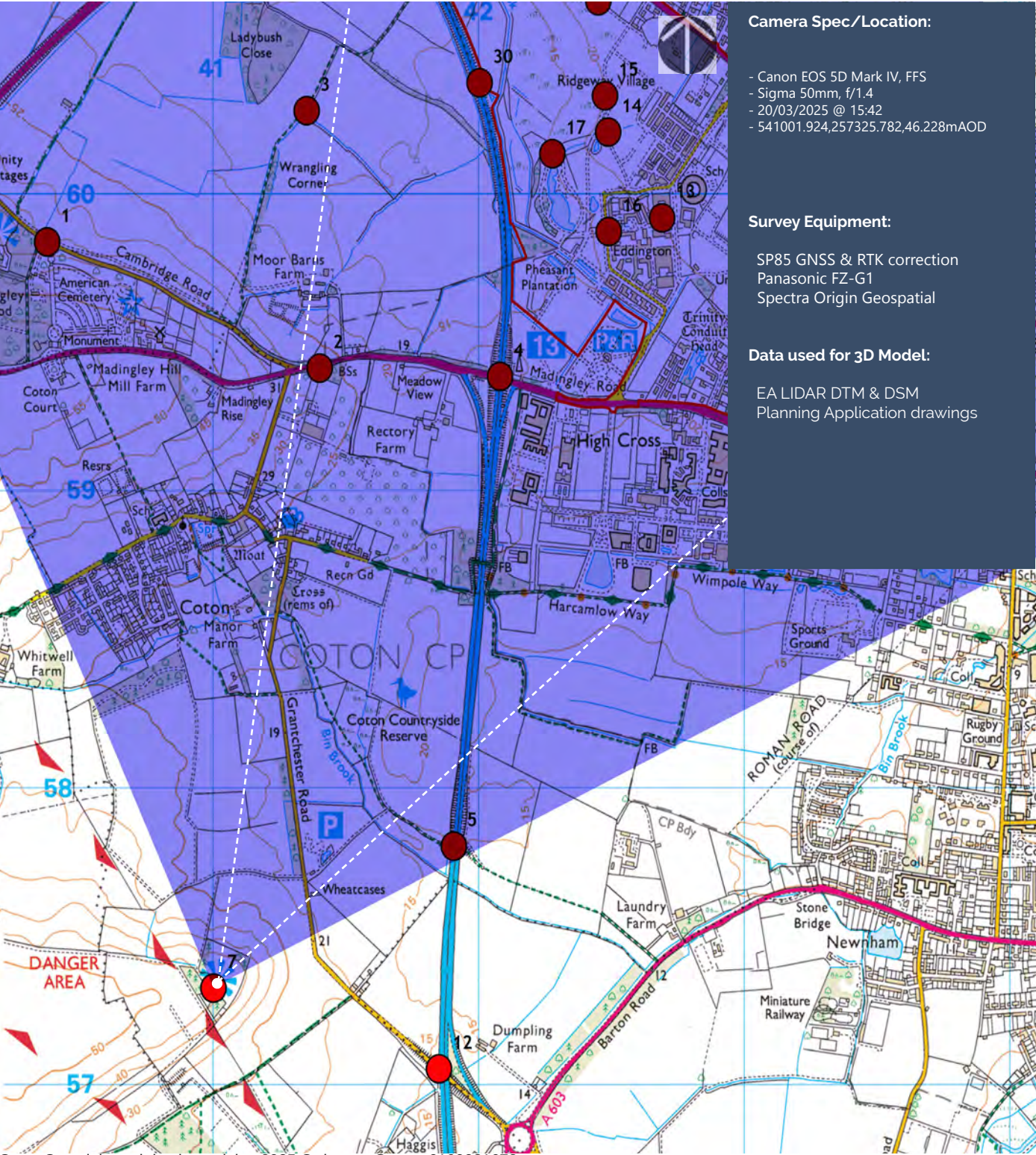
Point of Perspective

Point of Perspective

Point of Perspective

Viewpoint 4 Single Frame 50mm Reference image

Camera Location:



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Tripod:

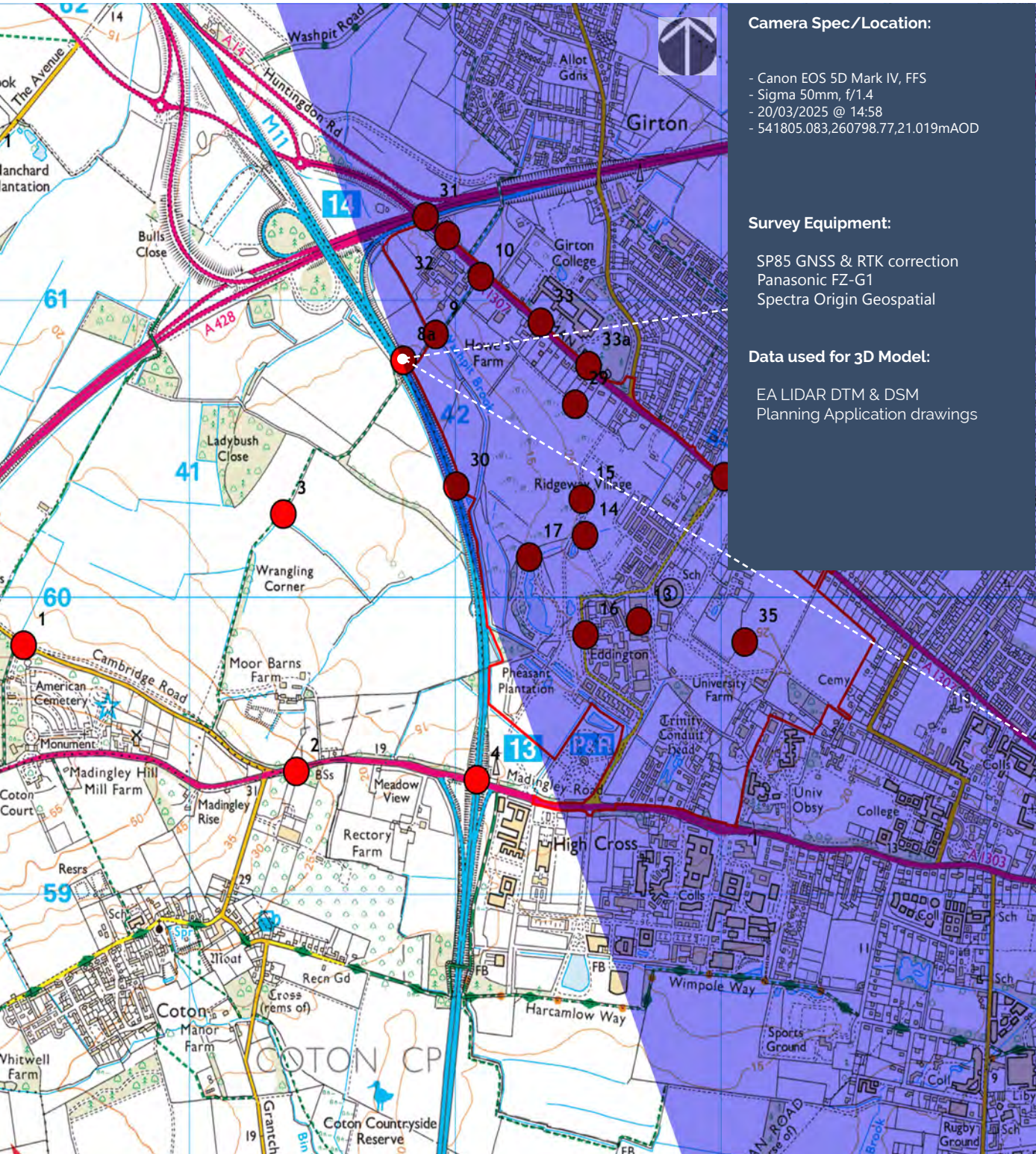


50mm Lens Planar Projection (actual 49.6mm; 39.9 deg HFOV)



Viewpoint 7 Single Frame 50mm Reference image

Camera Location:



Tripod:



50mm Lens Planar Projection (actual 49.6mm; 39.9 deg HFOV)

Point of Perspective



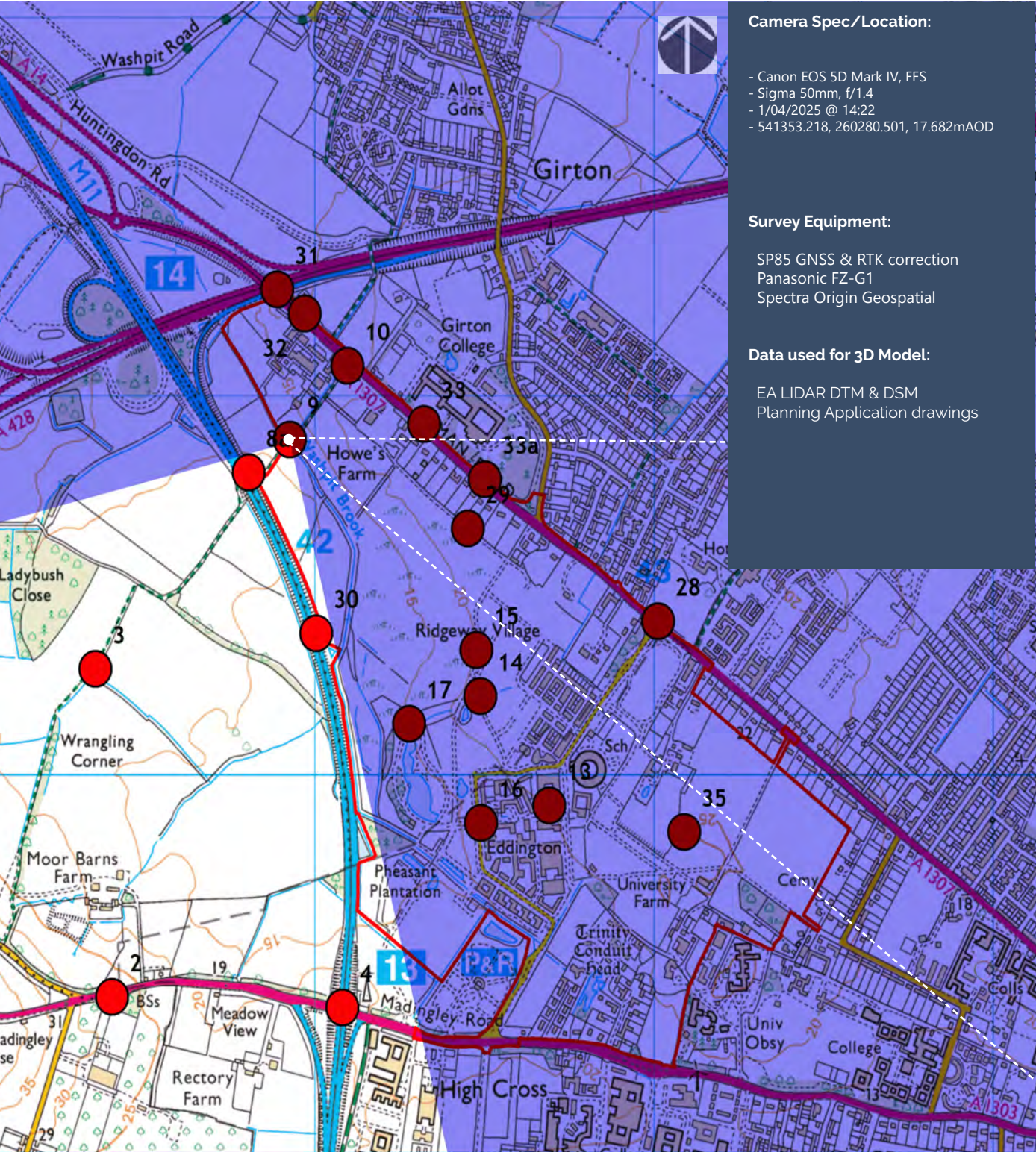
Point of Perspective

Point of Perspective

Point of Perspective

Viewpoint 8A Single Frame 50mm Reference image

Camera Location:



Camera Spec/Location:

- Canon EOS 5D Mark IV, FFS
- Sigma 50mm, f/1.4
- 1/04/2025 @ 14:22
- 541353.218, 260280.501, 17.682mAOD

Survey Equipment:

- SP85 GNSS & RTK correction
- Panasonic FZ-G1
- Spectra Origin Geospatial

Data used for 3D Model:

- EA LIDAR DTM & DSM
- Planning Application drawings

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Tripod:



50mm Lens Planar Projection (actual 49.6mm; 39.9 deg HFOV)

Point of Perspective



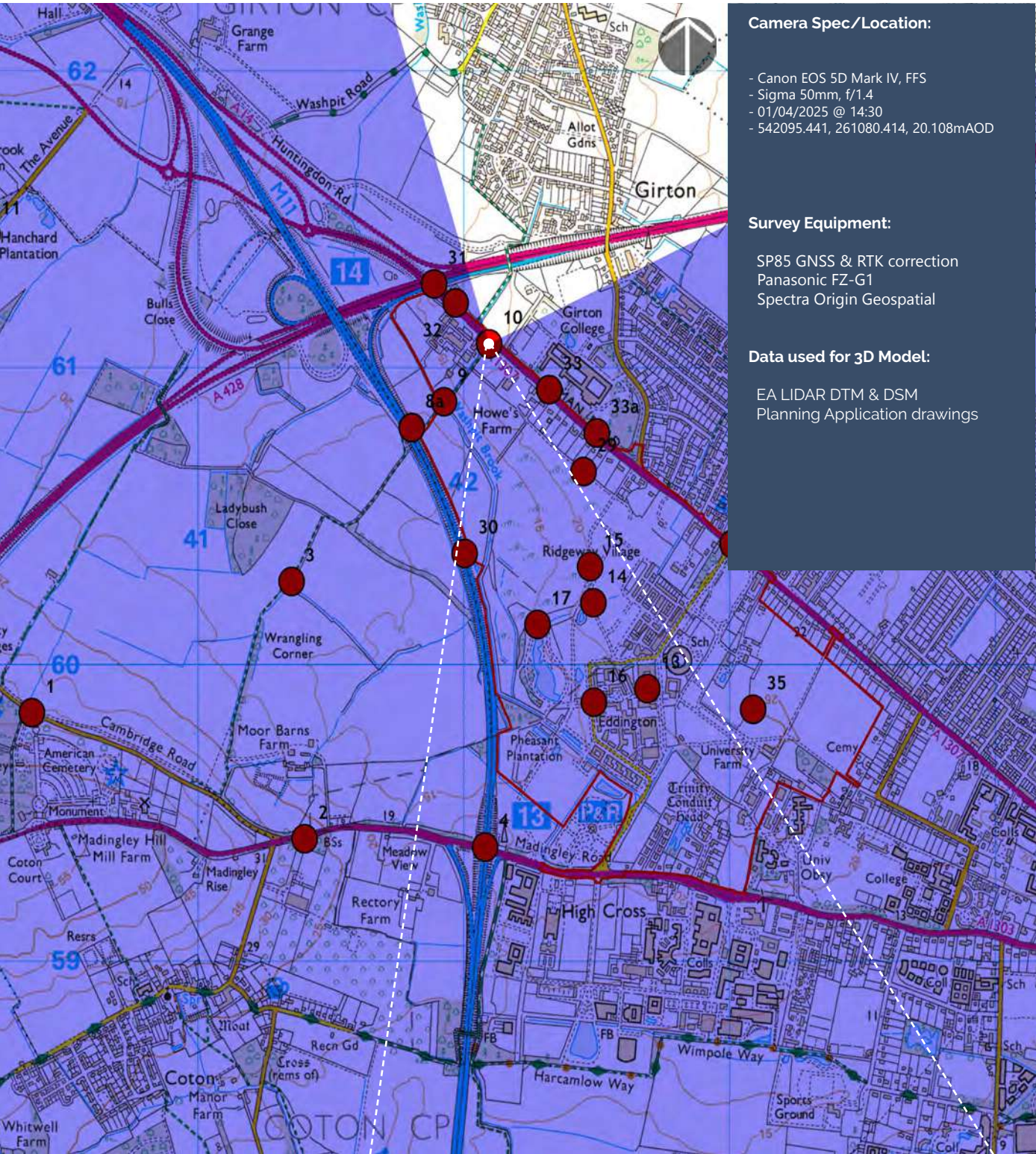
Point of Perspective

Point of Perspective

Point of Perspective

Viewpoint 9 Single Frame 50mm Reference image

Camera Location:



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Tripod:



50mm Lens Planar Projection (actual 49.6mm; 39.9 deg HFOV)



Viewpoint 10 Single Frame 50mm Reference image