

**Sources of Information**

**EXISTING BUILDING**  
MBS survey 3D Model received 07 June 2018  
MBS18\_841 Broad Street Mall, Reading.dwg

**SURROUNDING BUILDINGS**  
Corstorphine & Wright Architects proposal 3D model  
02 Nov 2018  
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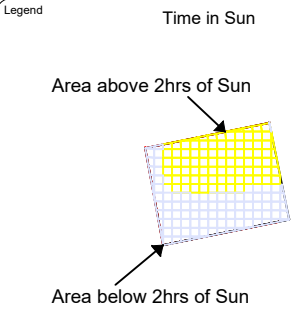
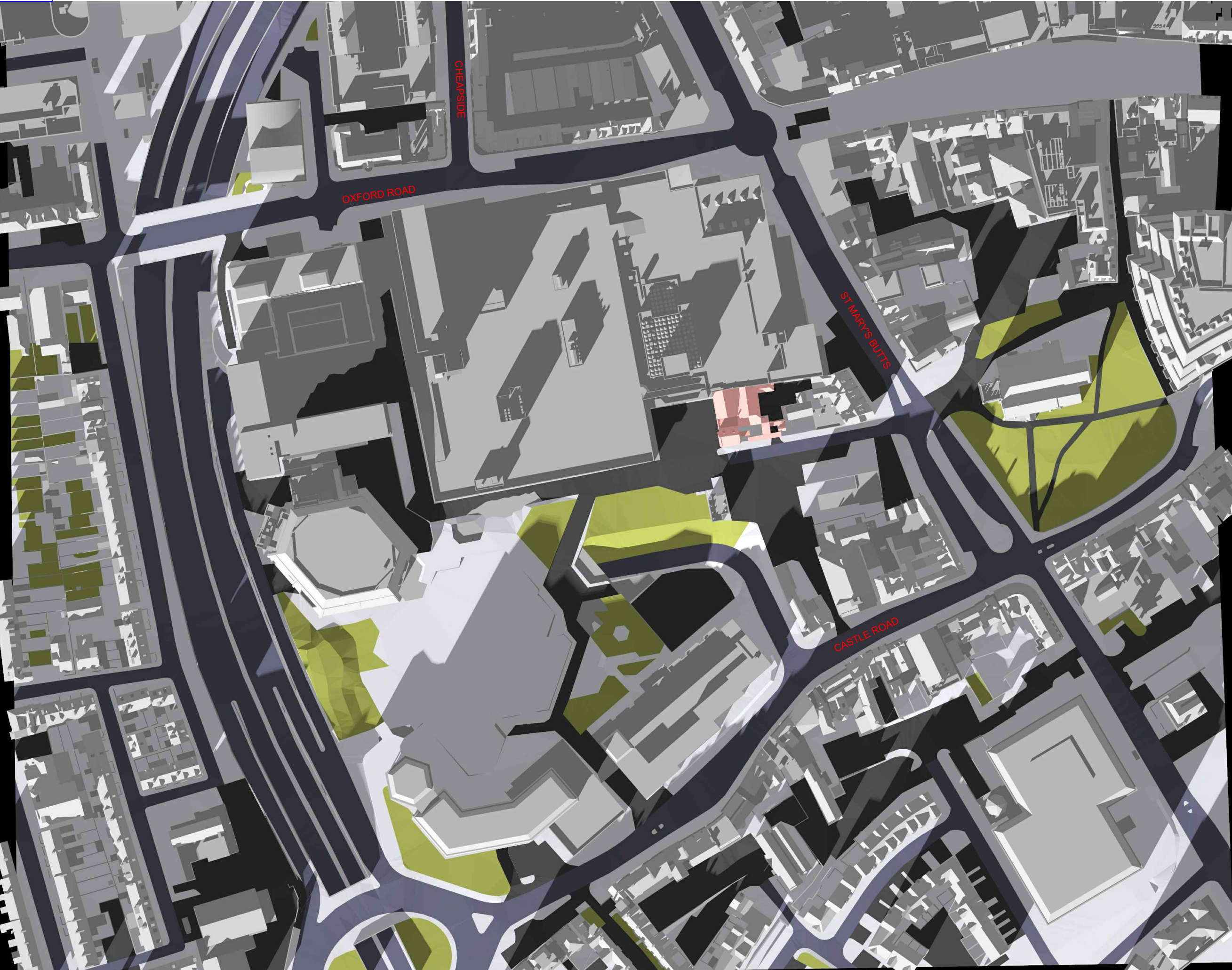
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BROAD STREET MALL READING

**Client**  
INCEPTION (READING) SARL

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| <b>Project No.</b><br>BR167_27 | <b>Drawing No.</b><br>BRE_423 | <b>Revision</b><br>- |
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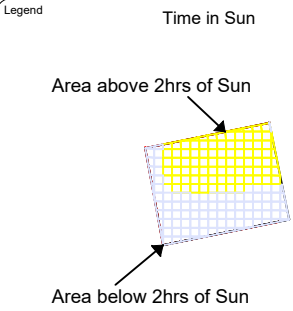
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**Client**  
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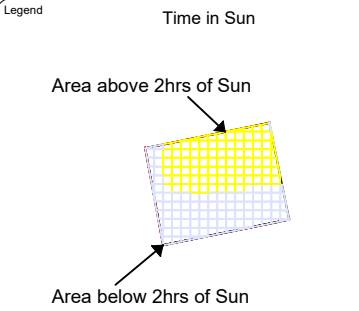
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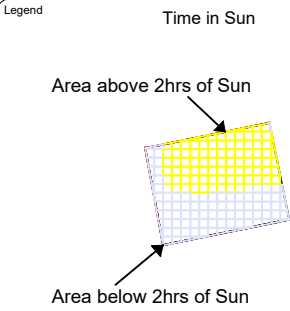
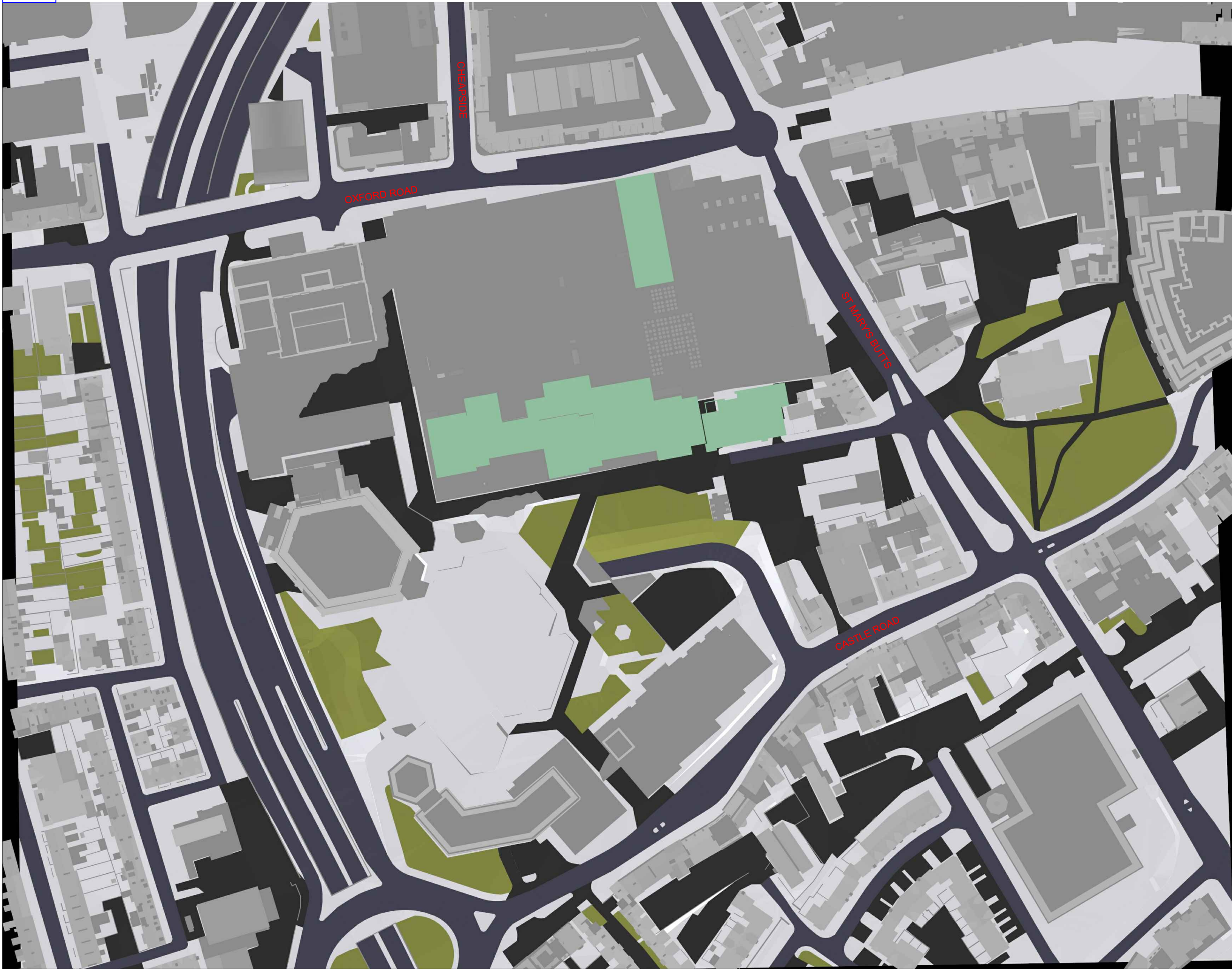
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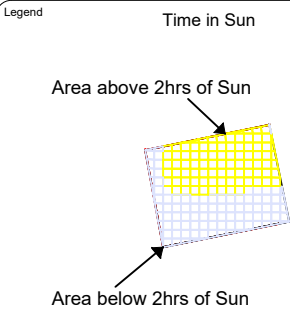
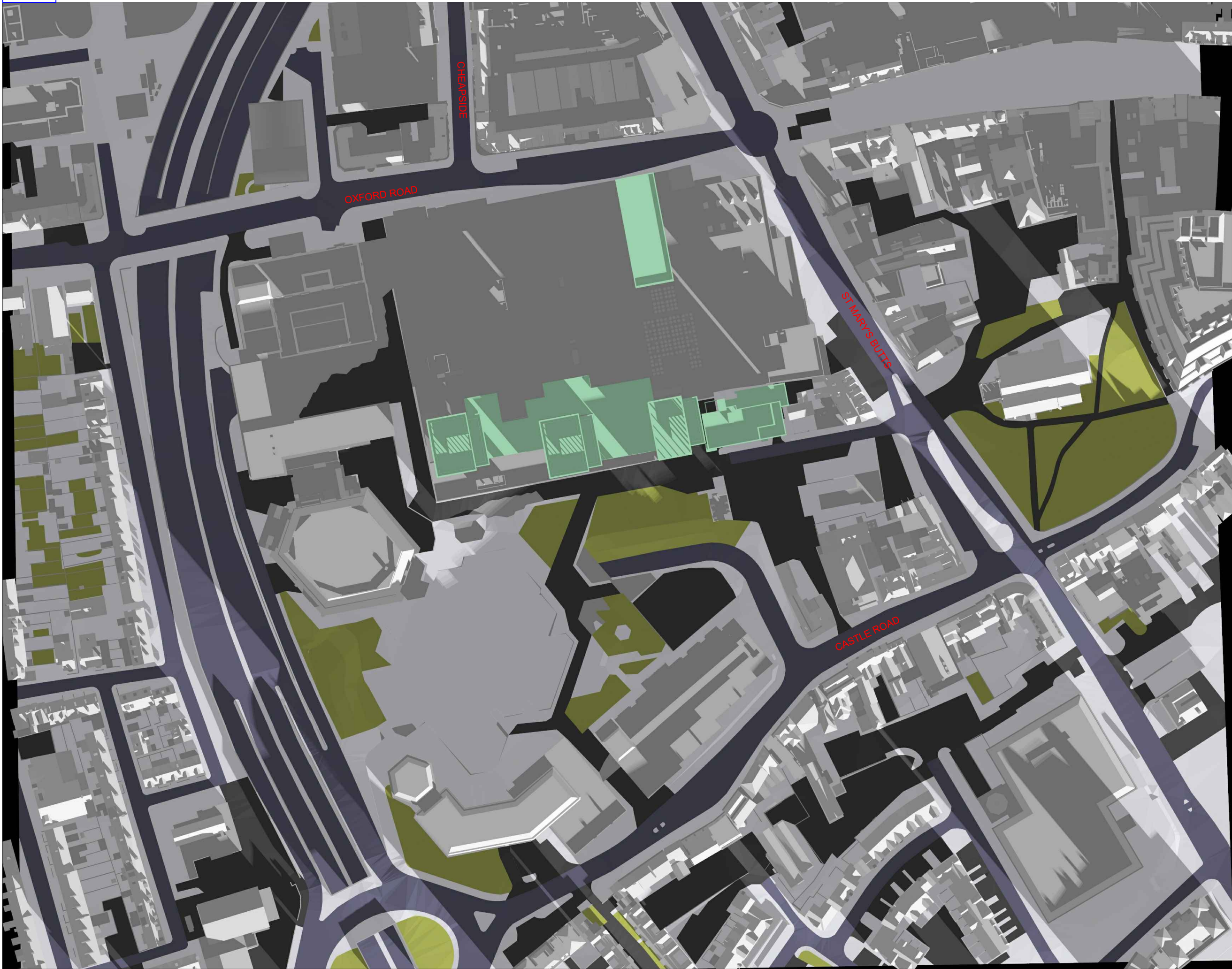
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INCEPTION (READING) SARL

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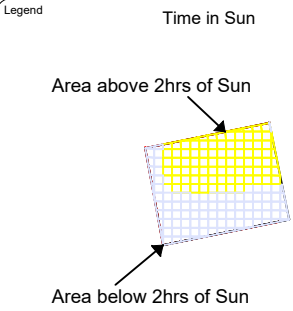
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INCEPTION (READING) SARL

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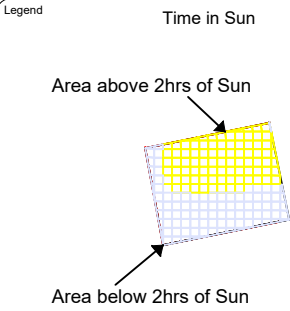
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Do not scale this drawing.  
All dimensions to be checked on site. Drawing to be read in conjunction with any specifications, schedules and Consultants drawings and details.



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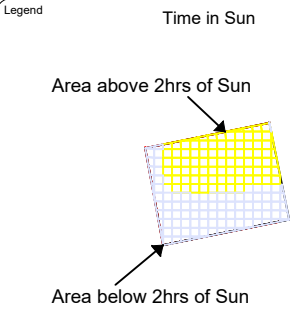
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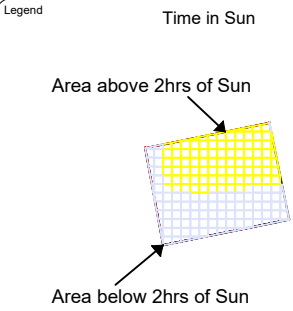
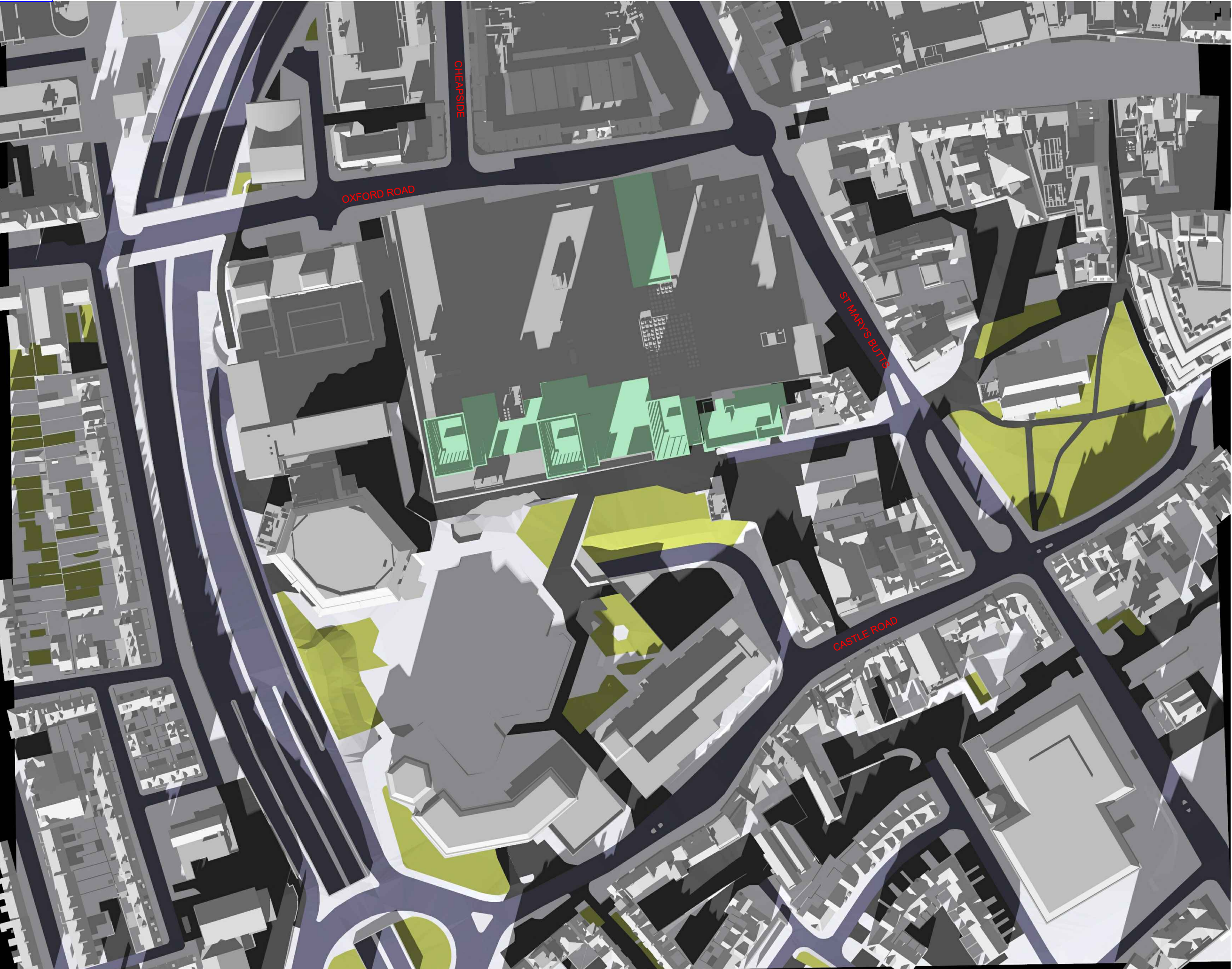
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BROAD STREET MALL READING

Client  
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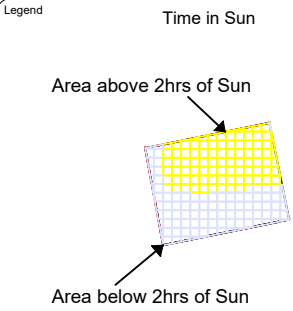
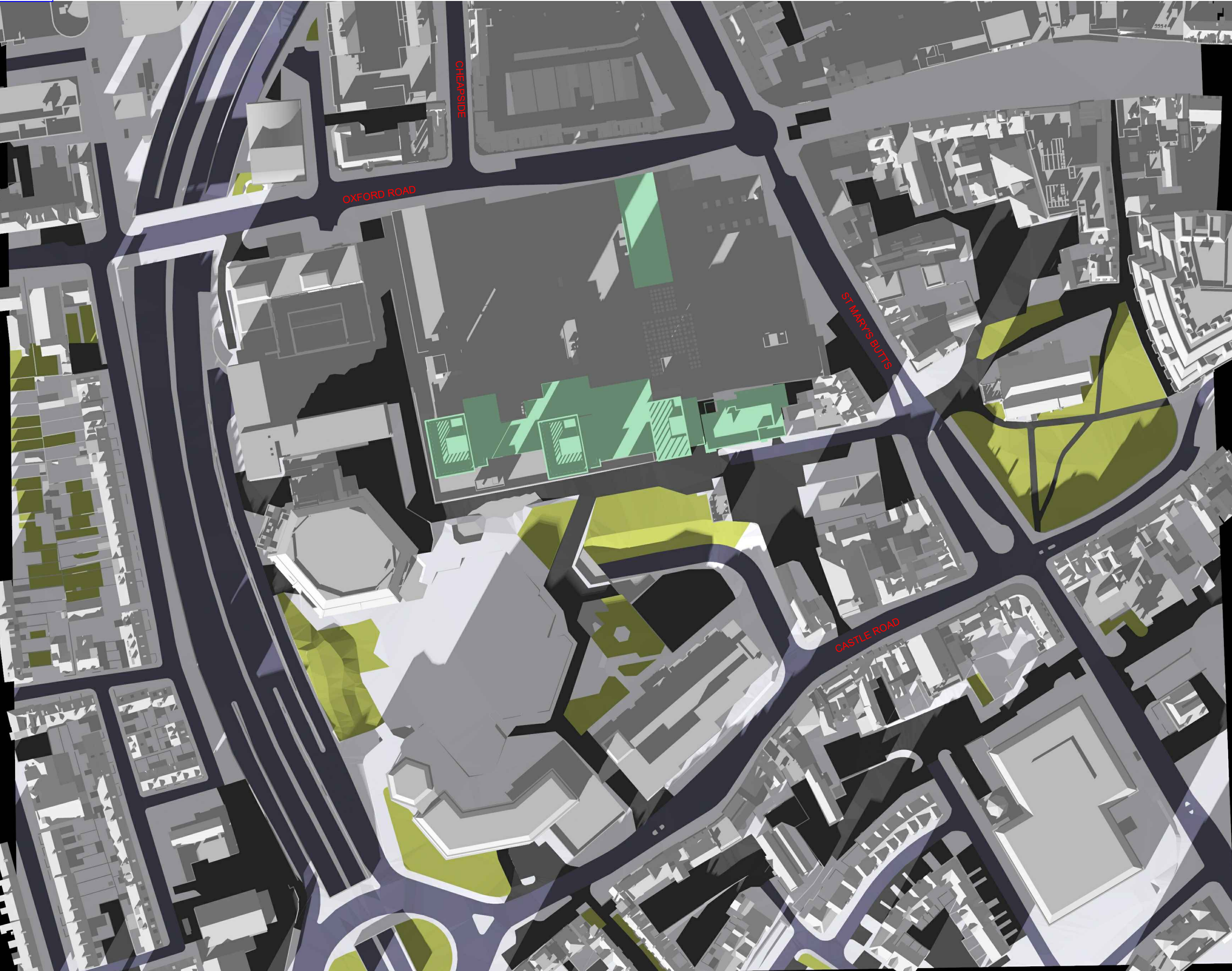
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BROAD STREET MALL READING

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| <b>Project No.</b><br>BR167_27 | <b>Drawing No.</b><br>BRE_432 | <b>Revision</b><br>- |
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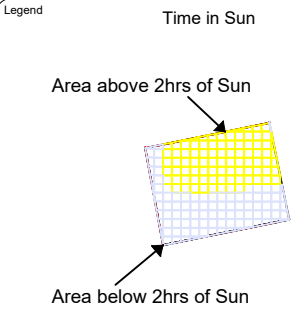
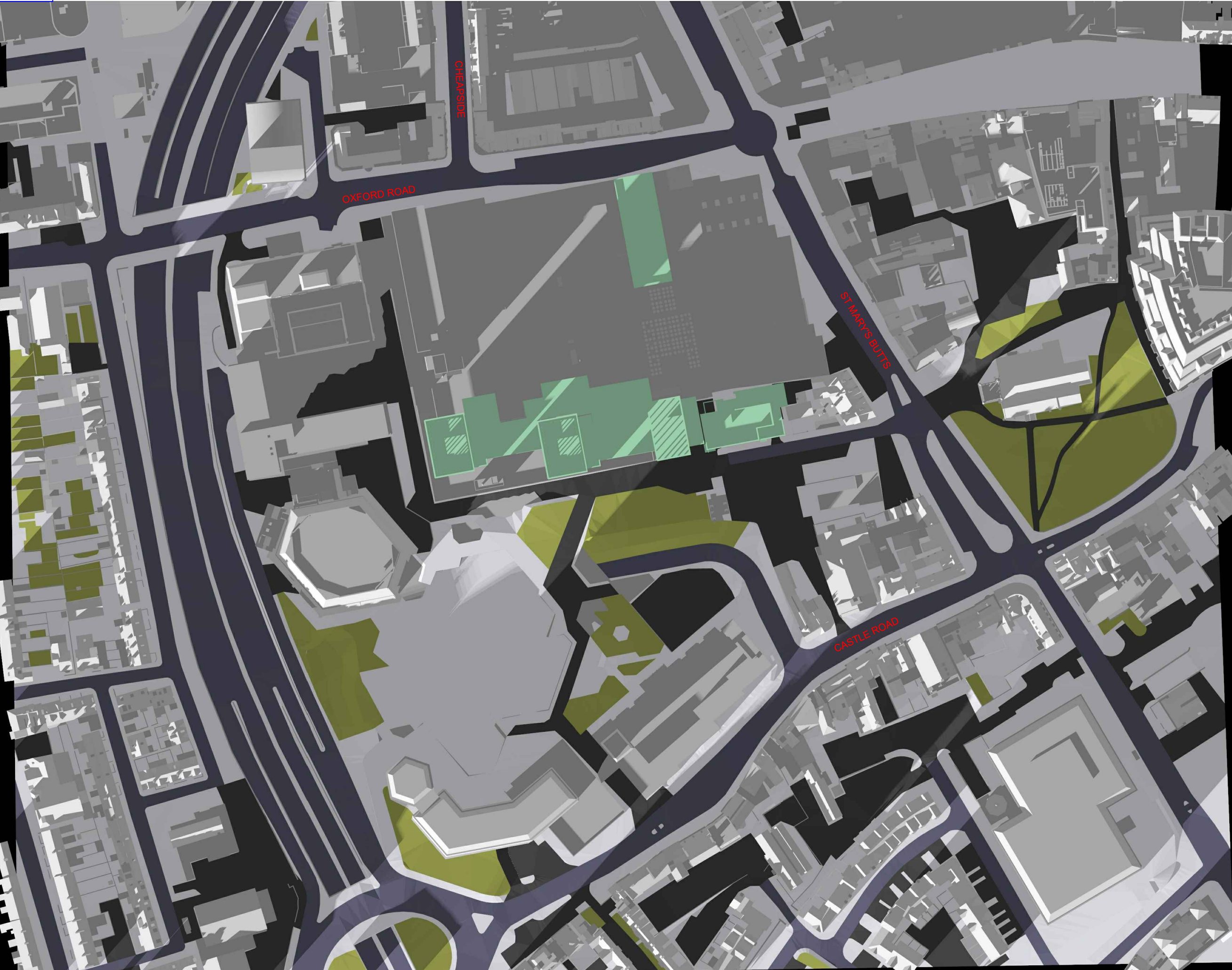
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TRANSIENT SHADOW ANALYSIS - DEC 21  
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| <b>Project No.</b><br>BR167_27 | <b>Drawing No.</b><br>BRE_433 | <b>Revision</b><br>- |
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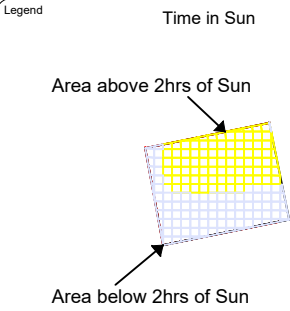
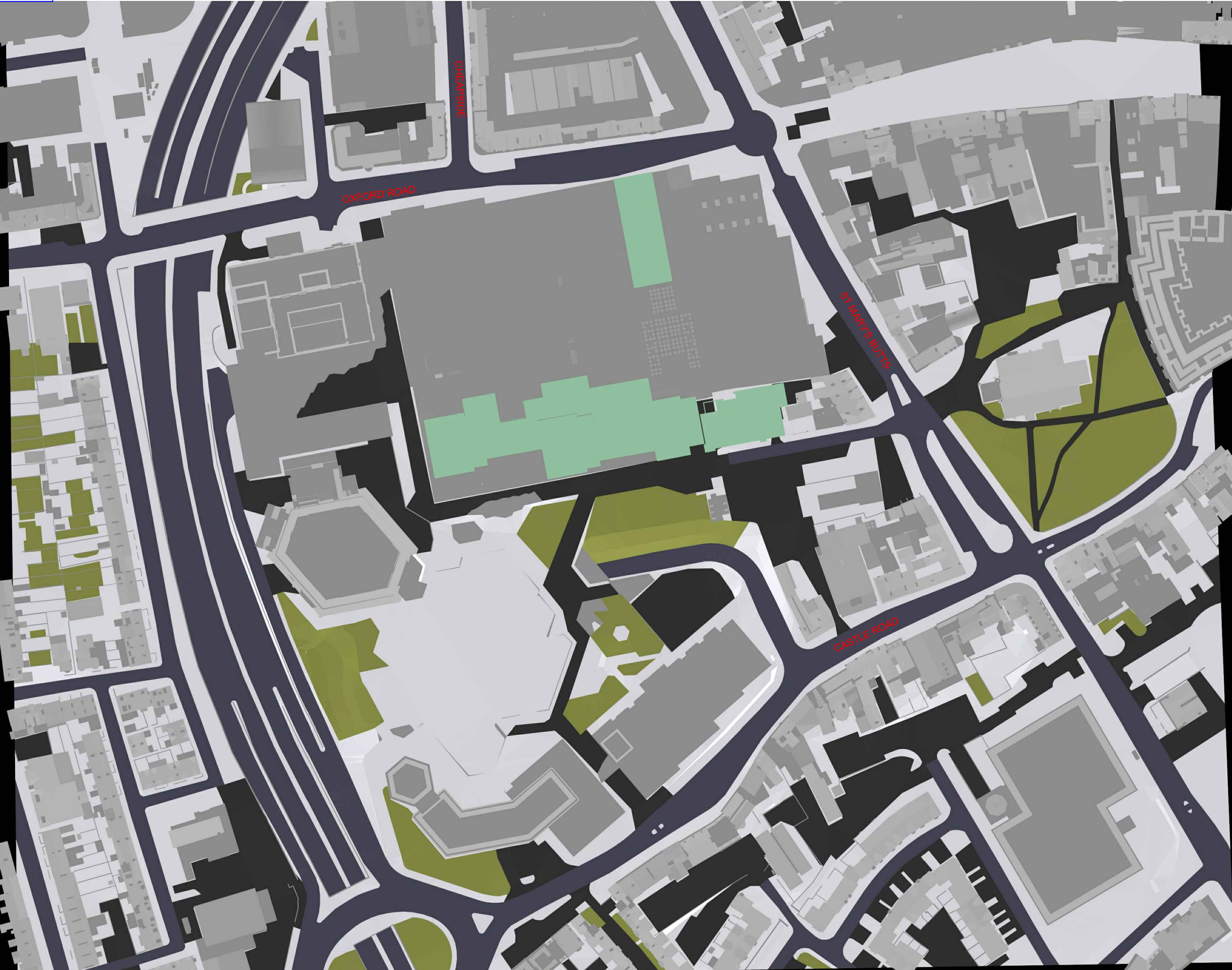
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| Project No.<br>BR167_27 | Drawing No.<br>BRE_436 | Revision<br>- |
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## **Appendix: Daylight, Sunlight and Overshadowing**

Annex 1: Key Legislation, Planning Policy & Guidance

Annex 2: Drawings – Existing Baseline, Proposed and Cumulative Scenarios

Annex 3: Daylight & Sunlight Results

Annex 4: No Sky Line Contour Drawings

Annex 5: Window Maps

Annex 6: Sun Hours on Ground Assessment

Annex 7: Transient Overshadowing Assessment

Annex 8: Internal Daylight, Sunlight and Overshadowing Amenity Report





# Internal Daylight, Sunlight and Overshadowing Report

## Broad Street Mall, Reading

23<sup>rd</sup> October 2019

### Contents

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### Appendices

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| Appendix I   | Drawing No. BRE/335                                                  |
| Appendix II  | Principles of Daylight, Sunlight and Overshadowing                   |
| Appendix III | Drawing Nos. BRE/363, BRE/364 and BRE/365                            |
| Appendix IV  | Drawing Nos. BRE/436, BRE/437, BRE/438, BRE/439, BRE/440 and BRE/441 |
| Appendix V   | Drawing No. BRE/346                                                  |

Status: Final  
Date: 23<sup>rd</sup> October 2019

# 1. Executive Summary

- 1.1
- We have been instructed to advise on daylight, sunlight and overshadowing matters internally to the proposed Development at Broad Street Mall, Reading.
- 1.2
- Policy context is important in establishing acceptable levels of amenity. The appropriateness of a proposed development, in daylight, sunlight and overshadowing terms, has therefore been considered against key policy documents.
- 1.3
- The NPPG and NPPF give guidance at government level. This seeks to ensure that the planning system encourages more efficient use of land and avoid building low density homes in accessible urban locations. It promotes a flexible approach in adopting and applying policy and guidance that could inhibit these objectives, which specifically includes reference to daylight and sunlight.
- 1.4
- In addition, policy aims to ensure that daylight and sunlight matters are not limited to an overly simplistic technical exercise against the default BRE Guidelines recommendations without due regard for the current and future physical and planning context.
- 1.5
- Whilst BRE Guideline target values may not be appropriate in a Town Centre location, the assessment of the proposed Development supports the fact that acceptable levels of daylight and sunlight are achievable.
- 1.6
- In terms of the proposed outdoor amenity areas, all those assessed receive at least two hours of direct sunlight on the 21st March to over 50% of their area, and are therefore BRE compliant.
- 1.7
- In summary, in our professional opinion the proposed Development makes good use of the daylight and sunlight potential available to the Site, given the Site context and the need to make efficient use of the land to provide much needed housing, whilst offering a range of other amenities, including open space, public and private, retail and community uses.

# 2. Introduction

- 2.1
- We have been instructed to advise on daylight, sunlight and overshadowing matters in relation to the proposed development at Broad Street Mall, Reading (*"Site"*). The Site is shown in Figure 1 below.
- 2.2
- This report considers potential daylight, sunlight and overshadowing which would be provided for future occupants.
- 2.3
- We have been specifically instructed to carry out the following:
  - Prepare a 3D computer model of the proposed development (*"Development"*) and surrounding context based upon the information cited on the drawings in Appendix 1. The 3D model of the surrounding context includes a consented massing at 20 Hosier Street (planning application ref 182054) which abuts site C of the proposed Development (this can be seen in Figure 1)
  - Undertake a daylight (Vertical Sky Component (*"VSC"*)) assessment of Sites A, B, C and E of the proposed Development using the methodologies set out in the Building Research Establishment (BRE) Guidelines – *Site Layout Planning for Daylight and Sunlight: a guide to good practice* (2011) (*"BRE Guidelines"*);
  - Undertake a sunlight assessment of Sites A, B, C and E of the proposed Development using the methodologies set out in the BRE Guidelines for Annual Probable Sunlight Hours (*"APSH"*); and
  - Undertake an overshadowing assessment using the methodology set out in the BRE Guidelines for Sun Hours on Ground (*"SHOG"*) for all relevant proposed communal outdoor amenity spaces.

### 3. Policy & Guidance

- 3.1
- Policy and guidance context in relation to daylight, sunlight and overshadowing is important in establishing acceptable levels of amenity.
- 3.2
- The appropriateness of a proposed development, in daylight, sunlight and overshadowing terms, should therefore be considered against key policy documents and other relevant standards and guidance.

**Key National Planning Policy and Legislation**

National Planning Practice Guidance 2019 ("NPPG")

- 3.3
- The NPPG (revision date: 22 07 2019. Paragraph: 007 Reference ID: 66-007-20190722) states that all developments should maintain acceptable living standards. What this means in practice, in relation to assessing appropriate levels of sunlight and daylight, will depend to some extent on the context for the development as well as its detailed design.
- 3.4
- For example in areas of high-density historic buildings, or city centre locations where tall modern buildings predominate, lower daylight and daylight and sunlight levels at some windows may be unavoidable if new developments are to be in keeping with the general form of their surroundings.
- 3.5
- In such situations good design (such as giving careful consideration to a building's massing and layout of habitable rooms) will be necessary to help make the best use of the site and maintain acceptable living standards.

National Planning Policy Framework published July 2019 ("NPPF")

- 3.6
- The NPPF states that Councils should take a 'flexible approach' when applying daylight and sunlight guidance to planning applications for new housing.
- 3.7
- The relevant paragraph 123c states that local planning authorities: *"should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework"*.
- 3.8
- It goes on to say: *"In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards.)"*
- 3.9
- This aims to ensure that daylight and sunlight matters are not limited to an overly simplistic technical exercise against the BRE Guidelines recommendations without due regard for the current and future physical and planning context.

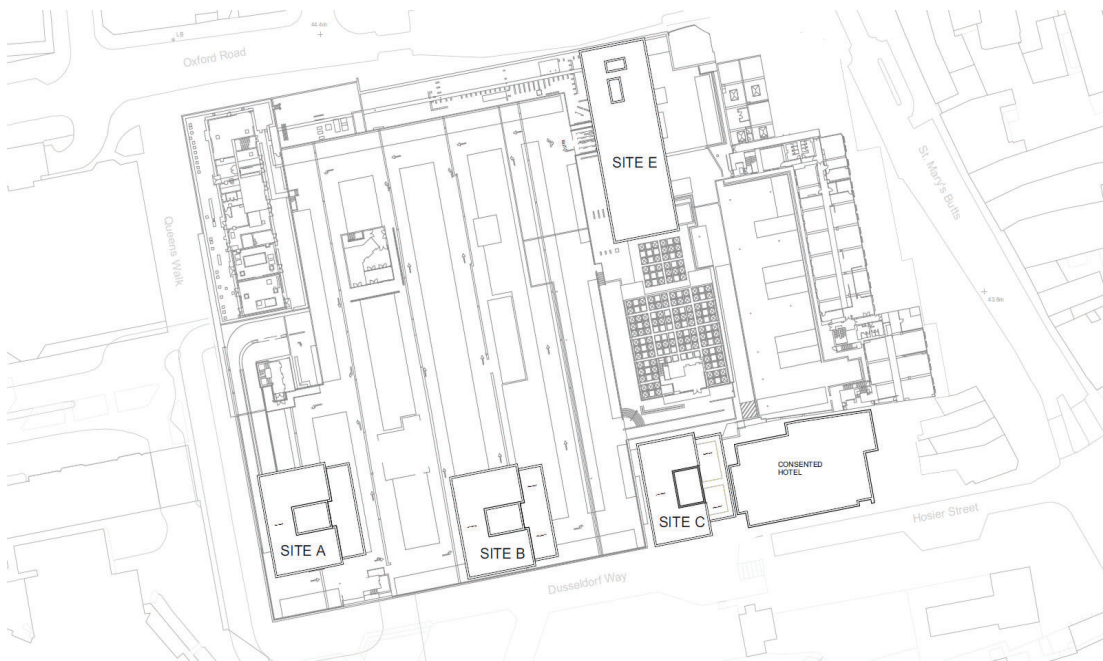


Figure 1: Site Location Plan

Key Local Planning Policy

Reading Core Strategy

3.10 Policy CS1 - Sustainable Construction and Design incorporates the use of Eco- Homes and BREEAM standards including Daylighting (Paragraph 4.9).

Reading Central Action Plan

3.11 Paragraph 8.61 states: "...in terms of effects of developments, the Building Research Establishment has guidelines on assessing daylighting and sunlighting effects of development, which the Council will apply flexibly given the high density of the central area."

Pre-Submission Local Plan November 2017

3.12 Policy CC8 states "Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of ... access to daylight and sunlight."

3.13 Paragraph 4.1.43 provides that: "reference to the 'BRE Site Layout Planning for Daylight and Sunlight: A guide to good practice' document may be of use in ensuring that new development adjacent to residential properties is not of adverse bulk and does not block out sunlight and daylight to habitable rooms and outdoor living spaces."

Reading Tall Buildings Strategy 2008

3.14 Paragraph 6.3 'General Principles' states: "all tall building should avoid significant negative impacts on existing residential properties in terms of outlook, privacy, daylight, sunlight, noise, light glare and night-time lighting."

DRAFT Minster Quarter Area Outline Development Framework 2018

3.15 Section 5.1 and 5.2 earmarks the Site for redevelopment and comments that the massing and orientation of the structures will need to minimise impacts on daylighting and shadowcasting.

Other relevant standards and Guidance

The BRE Guidelines

3.16 The BRE Guidelines are well established and are adopted by most Local Authorities as the appropriate scientific and empirical methods of measuring daylight and sunlight in order to provide objective data upon which to apply their planning policies. The Guidelines are not fixed standards but should be applied flexibly to take account of the specific circumstances of each case.

The Introduction of the BRE Guidelines states: "The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and this document should not be seen as an instrument of planning policy. Its aim is to help rather than constrain the developer. Although it

gives numerical guidelines, these should be interpreted flexibly because natural lighting is only one of the many factors in site layout design."

3.17 The 'flexibility' should reflect the specific characteristics of each case being considered. For example, as the numerical targets within the BRE Guidelines have been derived on the basis of a low density suburban housing model, it is entirely appropriate to apply a more flexible approach when dealing with higher rise developments in a denser urban environment where the general scale of development is greater.

3.18 This does not mean that the recommendations and targets within the BRE Guidelines can be disregarded but, instead, the 'flexibility' that should be applied should be founded on sound scientific principles that can be supported and justified. This requires a certain level of professional value judgement and experience.

Daylight

3.19 The BRE Guidelines adopt different methods of measurement depending on whether the assessment is for the impact on existing neighbouring premises or for measuring the adequacy of proposed new dwellings, which is the subject of this report.

3.20 Appendix C of the BRE Guidelines sets out various detailed tests that may be used to assess the interior daylight conditions of proposed rooms. These include the calculation of the Average Daylight Factor ("ADF") and No Sky Line ("NSL").

3.21 The ADF value determines the level of interior illumination that can be compared with British Standard 8206-2 (now superseded by British Standard EN 17037). The NSL shows the extent of light penetration into the room at working plane level, 850mm above floor level.

3.22 However, the test adopted in this report is carried out by subdividing the relevant facades of the Development in tiles. A Vertical Sky Component ("VSC") measurement is taken from the centre of each panel and this is then colour coded in order to give a graphical representation of the VSC levels achieved across a facade.

3.23 The VSC assessment methodology measures from a single point, at the centre of the window the amount of sky visible taking into account all external obstructions.

3.24 VSC is a useful 'rule of thumb' but has its limitations in determining likely daylight within a proposed building. For example, it does not take into account the size of the window, any reflected light off external obstructions, and within a room, or the use to which that room is put.

3.25 Paragraph 2.1.21 of the BRE Guidelines states: "Obstructions can limit access to light from the sky. This can be checked by measuring or calculating the angle of visible sky 'theta', angle of obstruction or VSC at the centre of the lowest window where daylight is required. If the VSC is:

- At least 27% ('theta' is greater than 65°, obstruction angle less than 25°) conventional window design will usually give reasonable results.
- Between 15% and 27 % ('theta' is between 45° and 65°, obstruction angle between 25° and 45°) special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight.

- *Between 5% and 15% ('theta' is between 25° and 45°, obstruction angle between 45° and 65°) it is very difficult to provide adequate daylight unless very large windows are used.*
- *Less than 5% ('theta' less than 25°, obstruction angle more than 65°) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed."*

Sunlight

- 3.26
- Requirements for provision of sunlight to new residential buildings are set out in Part 3.1 of the BRE Guidelines.
- 3.27
- Sunlight is considered important for living rooms and conservatories but is generally viewed as less important in bedrooms and in kitchens.
- 3.28
- Site layout and orientation are the most important factor affecting the duration of sunlight in buildings.
- 3.29
- The degree of satisfaction is related to the expectation of sunlight. If a room is necessarily north facing or if the building is in a densely-built urban area, the absence of sunlight is more acceptable than when its exclusion seems arbitrary.
- 3.30
- In Part 3.1 of the BRE Guidelines it is stated that the British Standard 8206-2 criterion applies to rooms of all orientations, although if a room faces significantly north of due east or west it is unlikely to be met.
- 3.31
- This sunlight tests in this report therefore do not consider proposed windows which face significantly north.
- 3.32
- Access to sunlight can be quantified for the interior of rooms. The BRE Guidelines state: *"British Standard 8206-2 recommends that interiors where the occupants expect sunlight should receive at least one quarter (25%) of APSH, including in the winter months between 21 September and 21 March at least 5% of APSH."*
- 3.33
- The BRE Guidelines also note that the above criterion is intended to give good access to sunlight, but that in special circumstances the planning authority may wish to choose different target values.

Overshadowing

- 3.34
- The BRE Guidelines acknowledge that good site layout planning for daylight and sunlight should not be limited to providing good natural lighting within buildings. It goes on to note that sunlight in the spaces in between buildings is important and valuable for several reasons, depending on the nature of the space.
- 3.35
- The BRE Guidelines note that the availability of sunlight should be checked for all open spaces where it will be required. This would normally include:
  - Gardens, usually the main back garden of a house;
  - Parks and playing fields;
  - Children's playgrounds;
  - Outdoor swimming pools and paddling pools;
  - Sitting out areas such as those between non-domestic buildings and in public squares; and
  - Focal points for views such as a group of monuments or fountains.

- 3.36
- The BRE Guidelines recommend checking for adequate sunlight penetration where at least half of the amenity areas listed above should receive at least 2 hours of sunlight on the Vernal Equinox, 21 March. This date is chosen as it represents average annual conditions, therefore sunlight amenity within the amenity area is expected to increase after this point, to a maximum on the summer solstice.  
  
Chartered Institution of Building Service Engineers (CIBSE); Applications Manual: Daylighting and Window Design of the Chartered Institute of Building Services Engineers: Lighting Guide LG10 (1999).
- 3.37
- This state: *"when daylighting decisions are made they will have implications for other, interrelated aspects of window performance such as solar heat gain, winter heat loss, provision of view, acoustic performance, privacy, security and protection from fire."*  
  
Commission for Architecture and the Built Environment (CABE) Guidance on Tall Buildings (2007).
- 3.38
- Paragraph 4.6 recommends that consideration be given to *"the effect on the local environment, including microclimate, overshadowing, night time appearance, vehicle movements and the environment and those in the vicinity of the building."*
- 3.39
- Further information on daylight, sunlight and overshadowing can be found in our Principles of Daylight and Sunlight document in Appendix 2.

## 4. Results of the Daylight, Sunlight and Overshadowing Assessments

### Daylight

- 4.1
- As previously discussed, a VSC of at least 27% combined with conventional window design will usually give reasonable results. Between 15% and 27 % larger windows, changes to room layouts and balconies are usually needed to provide adequate daylight. Between 5% and 15% it is very difficult to provide adequate daylight unless very large windows are used. Less than 5% it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed.
- 4.2
- Whilst the BRE Guidelines target values may not be appropriate in a Town Centre location, where obstruction angles could easily be 35-45 degrees or more (equating to a VSC of 21% and 15% respectively), the VSC assessment in Appendix 3 supports the fact that good access to daylight is achievable on the front face of the facades for Sites A, B, C and E.
- 4.3
- Reasonable levels of daylight are therefore achievable with conventional window design, nonetheless, the proposed Development comprises floor to ceiling windows, which will further enhance daylighting. In addition, with exception of the top most floors of Sites A and B only, there are no projecting or recessed balconies, which would otherwise significantly reduce the daylight entering windows below them. The top most floors of Sites A and B offer excellent amenity.
- 4.4
- The apartments within the proposed Development feature open plan living/kitchen/dining rooms. In common with many contemporary developments, the kitchen area is often located at the rear of deep open plan spaces, therefore intended to be predominantly artificially task lit given their distant location away from the main window wall. For the apartments which do feature kitchens and eating areas positioned at the rear, they will rely more on artificial lighting whilst the living room located at the front of the room will receive higher levels of daylight.
- 4.5
- In summary, in our professional opinion the proposed Development makes good use of the daylight potential available to the Site and additionally offers a range of amenities for future residents to enjoy.

### Sunlight

- 4.6
- The proposed Development provides a set of habitable blocks where sunlight has aimed to be maximised by avoiding single aspect north facing units where possible.
- 4.7
- The location of the Site in a Town Centre context and as part of a regeneration area means that a collection of blocks is to be expected in order to make the most efficient use of land; therefore not all of the flats can be orientated within 90 degrees of due south. The provision of sunlight has been balanced against Site constraints and other design objectives.
- 4.8
- The BRE Guidelines acknowledge that a site's existing layout and other design constraints may impose orientation or sunlight constraints which may not be possible to overcome. In this context, it is not always possible to fully meet the BRE Guidelines in Town Centre locations.

- 4.9
- As previously discussed, interiors where the occupants expect sunlight should receive at least one quarter (25%) of APSH, including in the winter months between 21 September and 21 March at least 5% of APSH.
- 4.10
- Whilst these BRE Guideline target values may not be appropriate in respect of the Site, where larger surrounding obstructions limit the amount of sunlight a building can potential receive, the assessment shown in Appendix 4 supports the fact that acceptable levels of sunlight (APSH) are achievable.
- 4.11
- With the exception of the top most floors of Sites A and B only, the proposed Development does not comprise of projecting or recessed balconies which tend to block sunlight, and it can therefore be concluded that overall good levels of sunlight (APSH) will be achieved across the proposed Development.
- 4.12
- In terms of the winter months, the assessment demonstrates that virtually the vast majority of the proposed Development facades receive the minimum recommendation of 5%.
- 4.13
- In summary, bearing in mind policy context, the Town Centre setting and other factors influencing site layout and design, the proposed Development makes good use of the potential sunlight.

### Outdoor Amenity Areas

- 4.14
- As previously discussed, the BRE Guidelines recommend at least half of an amenity area should receive at least 2 hours of sunlight on 21 March.
- 4.15
- The proposed amenity areas assessed are shown on the drawing in Appendix 5.
- 4.16
- The assessment demonstrates that all areas assessed receive at least two hours of direct sunlight on the 21<sup>st</sup> March to over 50% of their area, and are therefore compliant with the BRE Guidelines.

## 5. Summary and Conclusion

- 5.1 We have been instructed to advise on daylight, sunlight and overshadowing matters internally to the proposed Development.
- 5.2 The appropriateness of a proposed development, in daylight, sunlight and overshadowing terms, has been considered against key policy documents. At government level policy aims to ensure that daylight, sunlight and overshadowing matters are not limited to an overly simplistic technical exercise against the default BRE Guideline recommendations without due regard for the current and future physical and planning context.
- 5.3 The proposed Development makes good use of the daylight and sunlight potential available to the Site, whilst offering a range of other amenities, including open space, public and private, retail and community uses.
- 5.4 In our professional opinion, the proposed Development provides acceptable levels of amenity for future residents.

## Contact Details

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Appendix I

Drawing No. BRE/335



This drawing is Copyright © of GVA Grimley Limited.

**Do not scale this drawing.**  
All dimensions to be checked on site. Drawing to be read in conjunction with any specifications, schedules and Consultants drawings and details.

#### Sources of Information

MBS survey 3D Model received 07 June 2018  
MBS18\_841 Broad Street Mall, Reading.dwg

Corstorphine & Wright Architects proposal 3D model  
02 Nov 2018  
16428-3D View - Exploded

Accuties wide area model received 01 April 2018  
000222-Broad Street Mall, Reading\_HD\_MASTER.dwg

INFO 11 OCTOBER 2019 Updated 3D model  
16428-BSM-CURRENT.dwg  
Ajoining Hosier Street masterplan document  
Hosier St Development Framework.pdf  
received 21 May 2018

**AVISON  
YOUNG**

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#### Project Name

BROAD STREET MALL READING

#### Client

INCEPTION (READING) SARL

#### Drawing Title

3D VIEW  
PROPOSED

#### Drawn By

CC

#### Chk'd By

NTS

#### Scale @ A3

NTS

#### Date

14 OCT 2019

#### Project No.

BR167\_22

#### Drawing No.

BRE\_335

#### Revision

-

# Appendix II

## Principles of Daylight, Sunlight and Overshadowing

### Daylight & Sunlight Principles

The BRE Guidelines – Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice are well established and are adopted by most Local Authorities as the appropriate scientific and empirical methods of measuring daylight and sunlight in order to provide objective data upon which to apply their planning policies. The Guidelines are not fixed standards but should be applied flexibly to take account of the specific circumstances of each case.

The Introduction of the Guidelines states:

*"The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and this document should not be seen as an instrument of planning policy. Its aim is to help rather than constrain the developer. Although it gives numerical guidelines, these should be interpreted flexibly because natural lighting is only one of the many factors in site layout design."*

The 'flexibility' recommended in the Guidelines should reflect the specific characteristics of each case being considered. For example, as the numerical targets within the Guidelines have been derived on the basis of a low density suburban housing model, it is entirely appropriate to apply a more flexible approach when dealing with higher rise developments in a denser urban environment where the general scale of development is greater. In addition, where existing and proposed buildings have specific design features such as projecting balconies, deep recesses, bay windows etc., it is also equally valid to apply a degree of flexibility to take account of the effect of these particular design features. This does not mean that the recommendations and targets within the Guidelines can be disregarded but, instead, the 'flexibility' that should be applied should be founded on sound scientific principles that can be supported and justified. This requires a certain level of professional value judgement and experience.

### Daylighting

In respect of daylighting, the BRE Guidelines adopt different methods of measurement depending on whether the assessment is for the impact on existing neighbouring premises or for measuring the adequacy of proposed new dwellings. For safeguarding the daylight received by existing neighbouring residential buildings around a proposed development, the relevant recommendations are set out in Section 2.2 of the Guidelines.

The adequacy of daylight received by existing neighbouring dwellings is measured using two methods of measurement. First, it is necessary to measure the Vertical Sky Component (VSC) followed by the measurement of internal Daylight Distribution by plotting the position of the 'existing' and 'proposed' no sky line contour.

VSC is measured at the mid-point on the external face of the window serving a habitable room. For the purpose of the Guidelines, a "habitable" room is defined as a Kitchen, Living Room or Bedroom. Bathrooms, hallways and circulation space are excluded from this definition. In addition, many Local Authorities make a further distinction in respect of small kitchens. Where the internal area of a small kitchen limits the use to food preparation and is not of sufficient size to accommodate some other form of "habitable" use such as dining, the kitchen need not be classed as a "habitable" room in its own right.

VSC is a 'spot' measurement taken on the face of the window and is a measure of the availability of light from the sky from over the "existing" and "proposed" obstruction caused by buildings or structures in front of the window. As it is measured on the outside face of the window, one of the inevitable shortcomings is that it does not take account of the size of the window or the size or use of the room served by the window. For this reason, the BRE Guidelines require internal Daylight Distribution to be measured in addition to VSC.

The 'No Sky Line' contour plotted for the purpose of measuring internal Daylight Distribution identifies those areas within the room usually measured on a horizontal working plane set at table top level, where there is direct sky visibility. This therefore represents those parts within the room where the sky can be seen through the window. This second measure therefore takes account of the size of the window and the size of the room but is only more reliable than VSC when the actual room uses, layouts and dimensions are known. When interpreted in conjunction with the VSC value, the likely internal lighting conditions, and hence the quality of lighting within the room, can be assessed.

For VSC, the Guidelines states that:

*"If this Vertical Sky Component is greater than 27% then enough skylight should still be reaching the window of the existing building. Any reduction below this level should be kept to a minimum. If the Vertical Sky Component with the new development in place is both less than 27% and less than 0.8 times its former value, then the occupants of the existing building will notice the reduction in the amount of skylight."*

To put this in context, the maximum VSC value that can be received for a totally unobstructed vertical window is 40%. There are however circumstances where the VSC value is already below 27%. In such circumstances, it is permissible to reduce the existing VSC value by a factor of 0.2 (i.e. 20%) so that the value on the 'proposed' conditions remains more than 0.8 times its former value. The scientific reasoning for this permissible margin of reduction is that existing daylight (and sunlight) levels can be reduced by a factor of 20% before the loss becomes materially noticeable. This factor of reduction applies to VSC, daylight distribution, sunlight and overshadowing.

By contrast, the adequacy of daylight for proposed 'New-Build' dwellings is measured using the standards in the British Standard Code of Practice for Daylighting, BS8206 Part 2.

The British Standard relies upon the use of Average Daylight Factors (ADF) rather than VSC and Daylight Distribution. The use of ADF is referred to in the BRE Guidelines (Appendix C) but its use is usually limited as a supplementary 'check' of internal lighting conditions once the VSC and Daylight Distribution tests have been completed.

ADF is sometimes seen as a more accurate and representative measure of internal lighting conditions as it comprises a greater number of design factors and input variables/coefficients. That is, the value of ADF is derived from:

- The actual amount of daylight received by the window(s) serving the room expressed as the "angle of visible sky" which is derived from the VSC value and therefore represents the amount of light striking the face of the window.
- The loss of transmittance through the glazing.
- The size of the window (net area of glazing).
- The size of the room served by the window(s) (net internal surface area of the room).
- The internal reflectance values of the internal finishes within the room.
- The specific use of the room.

One of the main reasons why ADF is more appropriate for New-Build dwellings is that any of the above input variables can be changed during the course of the design process in order to achieve the required internal lighting values. The ability to make such changes is not usually available when dealing with existing neighbouring buildings.

Unlike the application of VSC and daylight distribution, the British Standard differentiates between different room uses. It places the highest ADF standard on Family Kitchens where the minimum target value is 2% df. Living Rooms should achieve 1.5% df, and Bedrooms 1.0% df.

### Sunlighting

The requirements for protecting sunlight to existing residential buildings are set out in section 3.2 of the BRE Guidelines.

The availability of sunlight varies throughout the year with the maximum amount of sunlight being available on the summer solstice and the minimum on the winter solstice. In view of this, the internationally accepted test date for measuring sunlight is the spring equinox (21 March), on which day the United Kingdom has equal periods of daylight and darkness and sunlight is available from approximately 08:30hrs to 17:30hrs. In addition, on that date, sunlight received perpendicular to the face of a window would only be received where that window faces within 90° of due south. The BRE Guidelines therefore limit the extent of testing for sunlight where a window faces within 90° of due south.

The sunlight standards are normally applied to the principal Living Room within each dwelling rather than to kitchens and bedrooms.

The recommendation for sunlight is:

*"If this window reference point can receive more than one quarter of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months of 21 September and 21 March, then the room should still receive enough sunlight .*

*Any reduction in sunlight access below this level should be kept to a minimum. If the availability of sunlight hours are both less than the amounts given and less than 0.8 times their former value, either over the whole year or just during the winter months, then the occupants of the existing building will notice the loss of sunlight."*

A good level of sunlight will therefore be achieved where a window achieves more than 25% APSH, of which 5% should be in the winter months. Where sunlight levels fall below this suggested recommendation, a comparison with the existing condition should be undertaken and if the reduction ratio is less than 0.2, i.e. the window continues to receive more than 0.8 times its existing sunlight levels, the impact on sunlight will be acceptable.

## Appendix III

### Drawing Nos. BRE/363, BRE/364 and BRE/365