

DAYLIGHT & SUNLIGHT

IMPACT ON NEIGHBOURING PROPERTIES REPORT

Methodist Central Hall, Manchester

Methodist Central Buildings

18 March 2024

GIA No: **2590**

PROJECT DATA:

Client	**Methodist Central Buildings**
Architect	**OMI Architects**
Project Title	**Methodist Central Hall, Manchester**
Project Number	**2590**

REPORT DATA:

Report Title	**Daylight & Sunlight**
GIA Department	**Daylight Department**
Dated	**18 March 2024**
Fee Quote	**Fee Proposal No. 01**
Prepared by	**MB**
Checked by	**EP**
Type	**Final**

Revisions	No:	Date:	Notes:	Signed:

SOURCES OF INFORMATION:

Information Received	**IR01-20240221**
Release Number	**Rel_01**
Issue Number	**01**
3D models	**VU.CITY**
OS Data	**FIND Maps**

DISCLAIMER:

N.B This report has been prepared for Methodist Central Buildings by GIA as their appointed Daylight & Sunlight consultants. This report is intended solely for Methodist Central Buildings and may contain confidential information. No part or whole of its contents may be disclosed to or relied upon by any Third Parties without the express written consent of GIA. It is accurate as at the time of publication and based upon the information we have been provided with as set out in the report. It does not take into account changes that have taken place since the report was written nor does it take into account private information on internal layouts and room uses of adjoining properties unless this information is publicly available.

Map data
© Crown copyright and database rights 2018.
OS 100047514

CONTENTS

1 EXECUTIVE SUMMARY 2

2 THE SITE 4

3 POLICY & THE WIDER CONTEXT 6

4 BRE GUIDELINES & CONTEXT METHODOLOGY 7

5 DAYLIGHT & SUNLIGHT IMPACTS TO NEIGHBOURING PROPERTIES 9

6 CONCLUSIONS 14

APPENDICES

APPENDIX 01
ASSUMPTIONS

APPENDIX 02
PRINCIPLES OF DAYLIGHT, SUNLIGHT & OVERSHADOWING

APPENDIX 03
DRAWINGS

APPENDIX 04
RESULTS OF BRE COMPLIANT PROPERTIES
A: VSC, NSL & APSH
B: NSL CONTOURS

1 EXECUTIVE SUMMARY

GIA have assessed the OMI Architects' scheme (the "proposed development") for Methodist Central Hall, Manchester to understand the potential changes in light to the relevant sensitive receptors.

1.1 GIA have been instructed by Methodist Central Buildings to provide daylight and sunlight advice in relation to the proposed redevelopment of Methodist Central Hall, Manchester.

1.2 The technical analysis has been considered by reference to the criteria and methodology within the Building Research Establishment handbook (BR209, 2022).

1.3 As shown in Table 01 below, the surrounding properties will fully accord with the target criteria for VSC daylight, NSL daylight and APSH sunlight.

1.4 As such, the impact on these properties is negligible and considered wholly acceptable.

Name/Address of Building	Percentage of Windows Compliant for VSC Daylight	Percentage of Rooms Compliant for NSL Daylight	Percentage of Rooms Compliant for APSH Sunlight
3 Dale Street	33/33 (100%)	14/14 (100%)	5/5 (100%)
1 Dale Street	27/27 (100%)	15/15 (100%)	15/15 (100%)
Smithfield Building	41/41 (100%)	18/18 (100%)	18/18 (100%)
Chatsworth House	182/ 182 (100%)	70/70 (100%)	35/35 (100%)

Table 01: Daylight & Sunlight Levels

INTENTIONALLY BLANK PAGE

2 THE SITE

GIA have been instructed to review and advise on the daylight and sunlight impacts associated with the implementation of the proposed redevelopment of Methodist Central Hall, Manchester.

THE SITE

2.1 The site is bound by Dale Street to the north, Spear Street to the east, Oldham Street to the west and adjoining buildings to the south.

2.2 Figure 02 below illustrates the existing site. Further drawings are enclosed at Appendix 03 of this report.

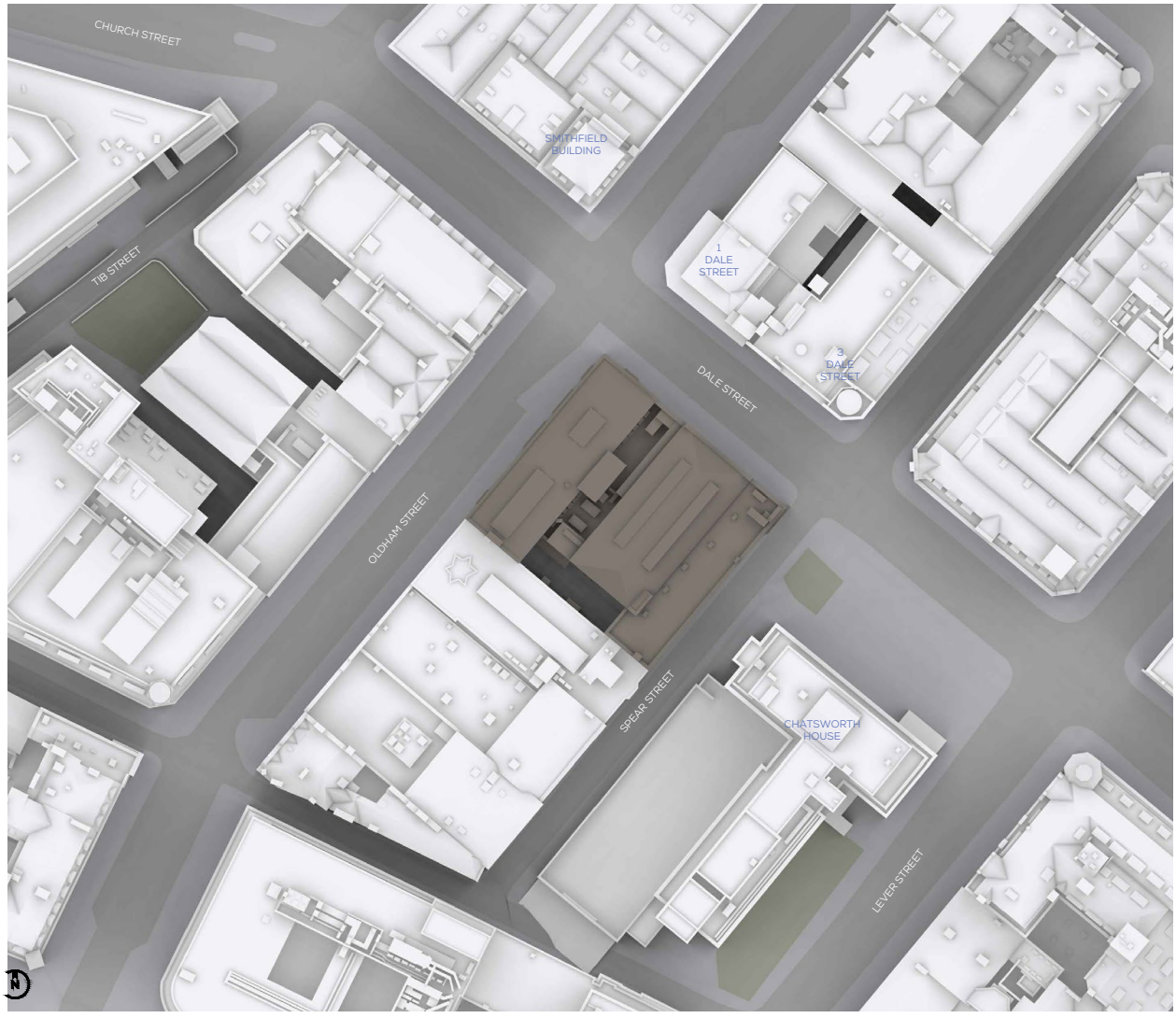


Figure 01: 3D model of the existing site

PROPOSED DEVELOPMENT

2.3 Our analysis of this option is based on the proposed scheme massing models produced by OMI Architects, issued on 21 February 2024

2.4 GIA's understanding of the proposed development is illustrated in Figure 03 and further drawings are enclosed at Appendix 03.

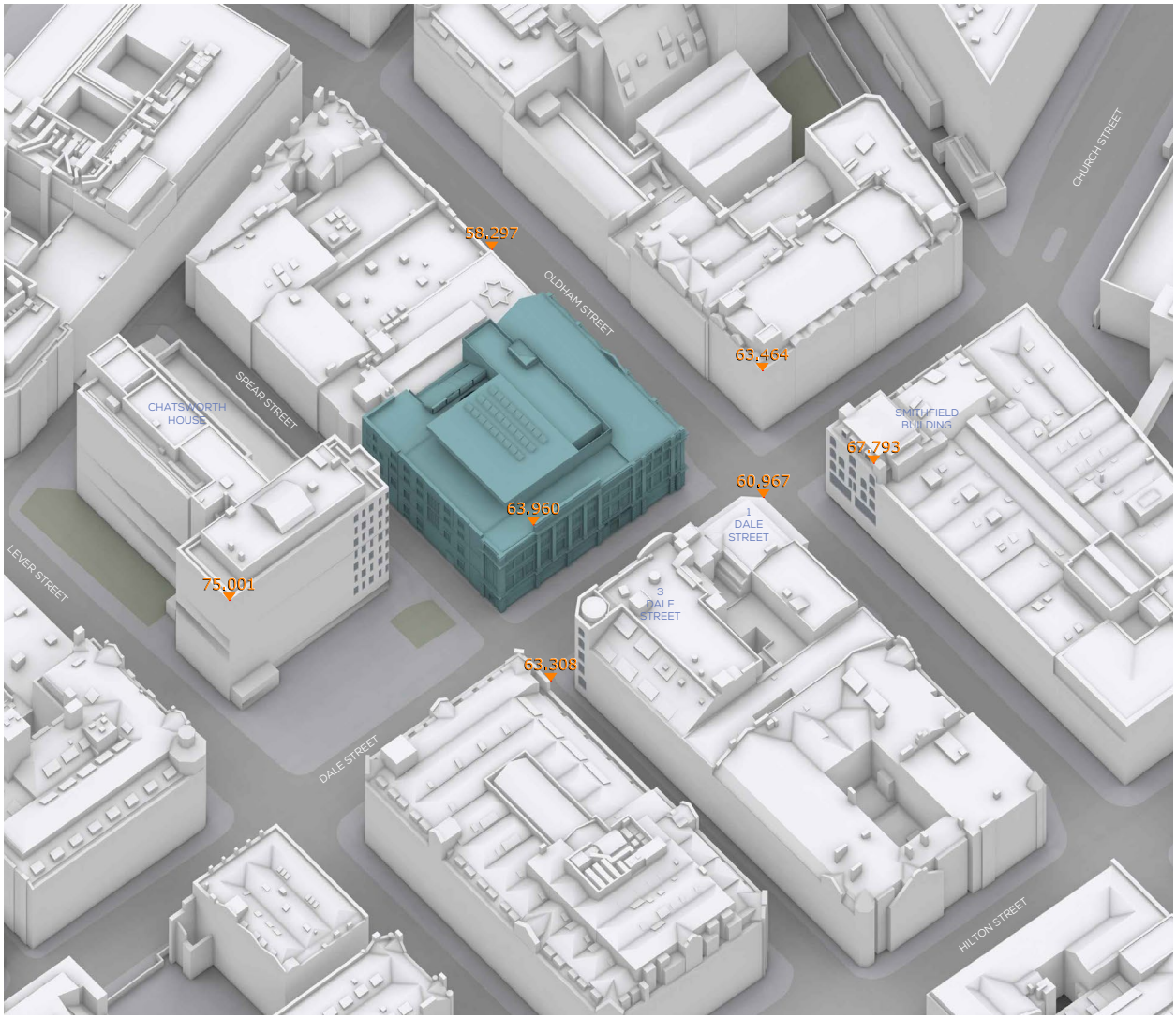


Figure 02: 3D Perspective View of the Proposed Scheme

3 POLICY & THE WIDER CONTEXT

3.1 Below we have detailed sections from the following documents as they are, in our opinion, the most pertinent in relation to daylight and sunlight matters and how we have approached the effects of the Proposed Development on the relevant neighbouring properties:

- National Planning Policy Framework (December 2023); and
- Planning Practice Guidance (February 2024).

NATIONAL PLANNING POLICY FRAMEWORK (DECEMBER 2023)

3.2 The NPPF highlights the Government's recognition that increased flexibility is required on daylight and sunlight in response to the requirement for higher density development. By stating that *"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)"*[1] (our emphasis).

NATIONAL PLANNING PRACTICE GUIDANCE (FEBRUARY 2024)

3.3 The PPG outlines that all developments should *"maintain acceptable living standards"* and that assessing appropriate daylight and sunlight amenity *"will depend to some extent on context"*[2].

1 MHCLG. (2023). National Planning Policy Framework (2023), p 38, para 129(c)

2 MHCLG. (2024). National Planning Policy Guidance (2024), para 66-007-20190722

INTENTIONALLY BLANK PAGE

4 BRE GUIDELINES & CONTEXT METHODOLOGY

The Building Research Establishment (BRE) have set out in their handbook *'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice (BR209, 2022)'*, guidelines and methodology for the measurement and assessment of daylight and sunlight.

BUILDING RESEARCH ESTABLISHMENT GUIDELINES (BR209, 2022)

4.1 The BRE Guidelines note that the document is intended to be used in conjunction with the interior daylight recommendations found within the British Standard BS EN 17037 Daylighting in Buildings and the Chartered Institution of Building Services Engineers (CIBSE) LG 10 Daylighting – a guide for designers.

4.2 The BRE handbook *"is intended for use in rooms in adjoining dwellings where daylight is required, including living rooms, kitchens, and bedrooms. Windows to bathrooms, toilets, storerooms, circulation areas, and garages need not be analysed. The guidelines may also be applied to any existing non-domestic building where the occupants have a reasonable expectation of daylight; this would normally include schools, hospitals, hotels and hostels, small workshops, and some offices."*

4.3 The BRE Guidelines provides two methodologies for daylight assessment of neighbouring properties, namely;

- The Vertical Sky Component (VSC); and
- The No Sky Line (NSL).

4.4 There is one methodology provided by the BRE Guidelines for sunlight assessment, denoted as Annual Probable Sunlight Hours (APSH).

4.5 It is an inevitable consequence of the built-up urban environment that daylight and sunlight will be more limited in dense urban areas. It is well acknowledged that in such situations there may be many planning and urban design matters to consider other than daylight and sunlight.

4.6 Paragraph 4.5.10 notes that *"numerical values given are purely advisory. Different criteria may be used based on the requirements for solar energy in an area viewed against other site layout constraints. Another important issue is whether the existing solar panels are reasonably sited, at a sensible height and distance from the boundary. A greater loss of solar radiation may be inevitable if panels are mounted close to the ground and near to the site boundary."*[1]

4.7 Appendix 02 of this report elaborates on the mechanics of each of the above assessment criteria, explains the appropriateness of their use and the parameters of each specific recommendation.

4.8 The following table provides a summary of the criteria set out within the BRE Guidelines for daylight and sunlight. For daylight and sunlight, the BRE Guidelines outline the approach within the accompanying Appendix I, in terms of assigning criteria to assess the effects:

"Adverse impacts occur when there is a significant decrease in the amount of skylight and sunlight reaching an existing building where it is required…The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied."

"Where the loss of skylight or sunlight fully meets the guidelines, the impact is assessed as negligible or minor adverse. Where the loss of light is well within the guidelines, or only a small number of windows or limited area of open space lose light (within the guidelines), a classification of negligible impact is more appropriate. Where the loss of light is only just within the guidelines and a larger number of windows or open space are affected, a minor adverse impact would be more appropriate, especially if there is a particularly strong requirement for daylight and sunlight in the affected building or open space."

"Where the loss of skylight or sunlight does not meet the guidelines in this book, the impact is assessed as minor, moderate or major adverse. Factors tending towards a minor adverse impact include:

- *Only a small number of windows are affected;*
- *The loss of light is only marginally outside the guidelines;*
- *An affected room has other sources of skylight or sunlight; and*
- *The affected building only has a low level of requirement for skylight or sunlight."*

1 Littlefair, P. (2022). Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice. Hertfordshire: HIS BRE Press, p 29 para 3.3.17

4.9 The classification of major adverse is documented within Paragraph 7 of the BRE Guidelines:

"Factors tending towards a major adverse impact include:

- *a large number of windows are affected;*
- *the loss of light is substantially outside the guidelines;*
- *all the windows in a particular property are affected; and*
- *the affected indoor spaces have a particular strong requirement for skylight or sunlight, e.g. a living room in a dwelling".*

Beneficial impacts occur when there is a significant increase in the amount of skylight and sunlight reaching an existing building. Beneficial impacts should be worked out on the same principals as adverse impacts."

4.10 The BRE Guidelines do not provide any Guidance on what constitutes a moderate adverse impact.

4.11 The initial numerical criteria for determining the magnitude of effect is based on percentage alterations, as follows:

Magnitude of Effect	Percentage Alteration
Negligible	0-20%
Minor	20-29.9%
Moderate	30-39.9%
Major	40%+

4.12 When considering the significance of daylight and sunlight effects, professional judgement has been used. Consideration has been given to the proportion of rooms/windows affected, as well as the percentage alterations, absolute changes, retained daylight and sunlight levels and sensitivity of the receptor. This is in addition to any other relevant factors, including mitigating factors such as location and nature of the development, balconies, overhangs or design features which may also affect the determination of assigning the criteria.

5 DAYLIGHT & SUNLIGHT IMPACTS TO NEIGHBOURING PROPERTIES

This section details the daylight and sunlight impacts in relation to the relevant properties neighbouring the Site.

5.1 A three-dimensional computer model of the Site and surrounding properties was produced based on photogrammtery. Where available we have included floor plans of the relevant properties and this context model has been used to carry out the technical assessments. All relevant assumptions made in producing this model can be found in Appendix 01.

RELEVANT SENSITIVE RECEPTORS

5.2 GIA have identified the following properties as relevant for daylight and sunlight assessment:

- 3 Dale Street
- 1 Dale Street
- Smithfield Building
- Chatsworth House

5.3 The properties are fully discussed in the following sections. All results can be found in Appendix 04.

INTENTIONALLY BLANK PAGE

3 DALE STREET

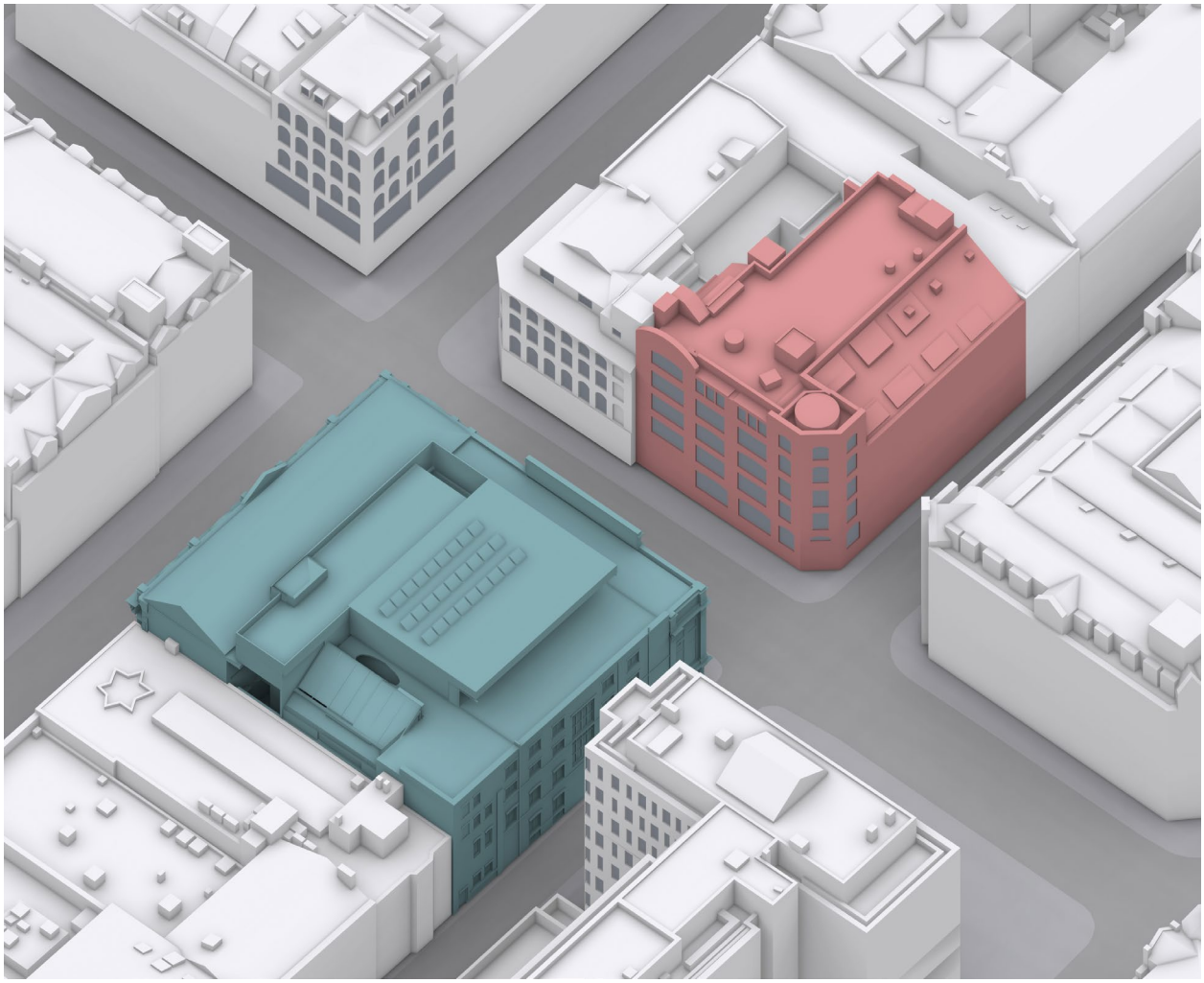


Figure 03: Rendered Image of 3 Dale Street

VERTICAL SKY COMPONENT					NO SKY LINE				
WINDOW					ROOM				
TOTAL	PASS	LOSS			TOTAL	PASS	LOSS		
		20-30	30-40	40+			20-30	30-40	40+
33	33	0	0	0	14	14	0	0	0

Table 02: VSC & NSL Results - 3 Dale Street

ANNUAL PROBABLE SUNLIGHT HOURS							
ROOM							
TOTAL	PASS	ANNUAL (%)			WINTER (%)		
		20-30	30-40	40+	20-30	30-40	40+
5	5	0	0	0	0	0	0

Table 03: APSH Results - 3 Dale Street

5.4 With the proposed development in place, this property will fully comply with the BRE target criteria for VSC daylight, NSL daylight and APSH sunlight.

5.5 As such, the impacts are negligible and considered wholly acceptable.

1 DALE STREET

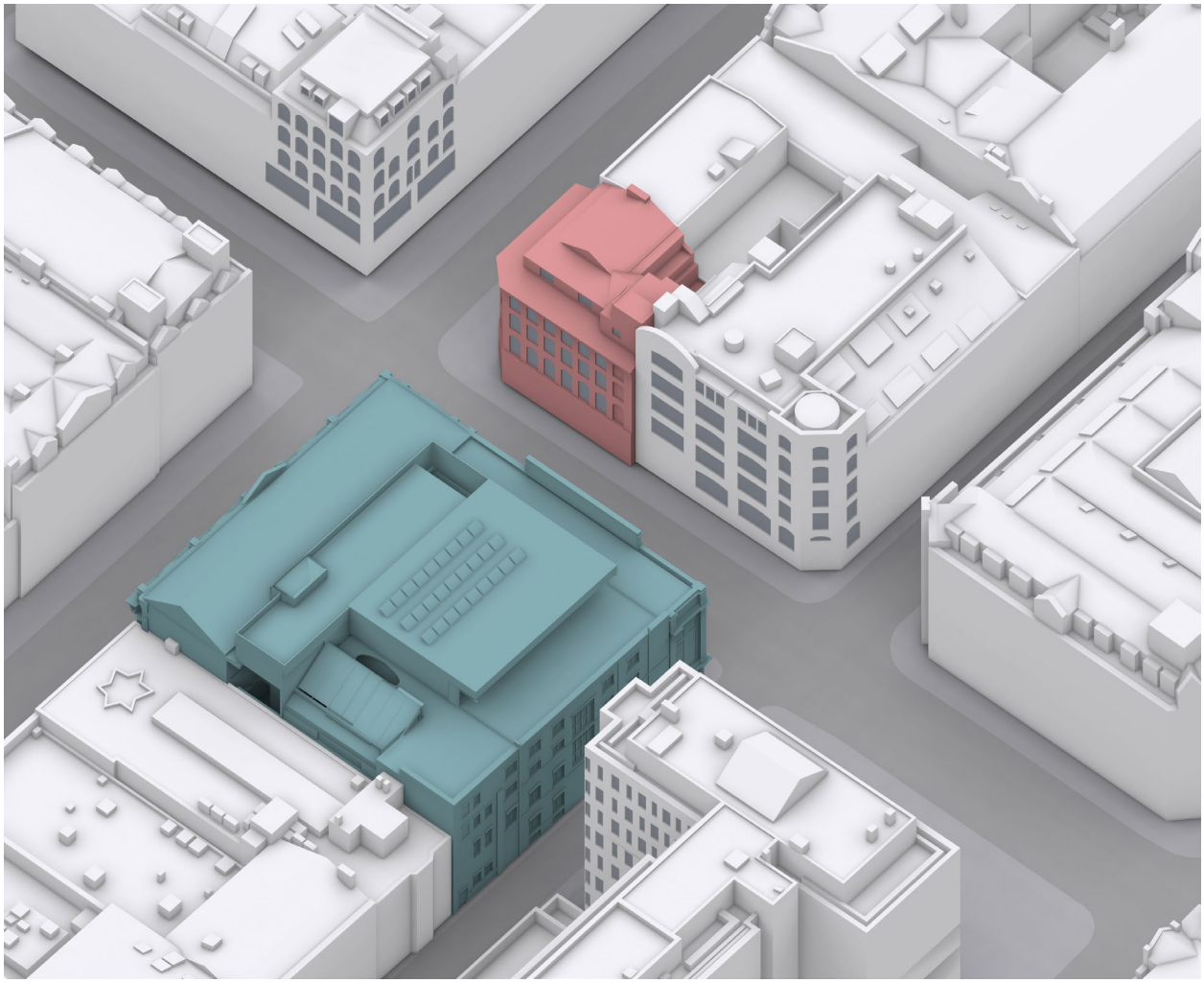


Figure 04: Rendered Image of 1 Dale Street

VERTICAL SKY COMPONENT					NO SKY LINE				
WINDOW					ROOM				
TOTAL	PASS	LOSS			TOTAL	PASS	LOSS		
		20-30	30-40	40+			20-30	30-40	40+
27	27	0	0	0	15	15	0	0	0

Table 04: VSC & NSL Results - 1 Dale Street

ANNUAL PROBABLE SUNLIGHT HOURS							
ROOM							
TOTAL	PASS	ANNUAL (%)			WINTER (%)		
		20-30	30-40	40+	20-30	30-40	40+
15	15	0	0	0	0	0	0

Table 05: APSH Results - 1 Dale Street

5.6 With the proposed development in place, this property will fully comply with the BRE target criteria for VSC daylight, NSL daylight and APSH sunlight.

5.7 As such, the impacts are negligible and considered wholly acceptable.

SMITHFIELD BUILDING

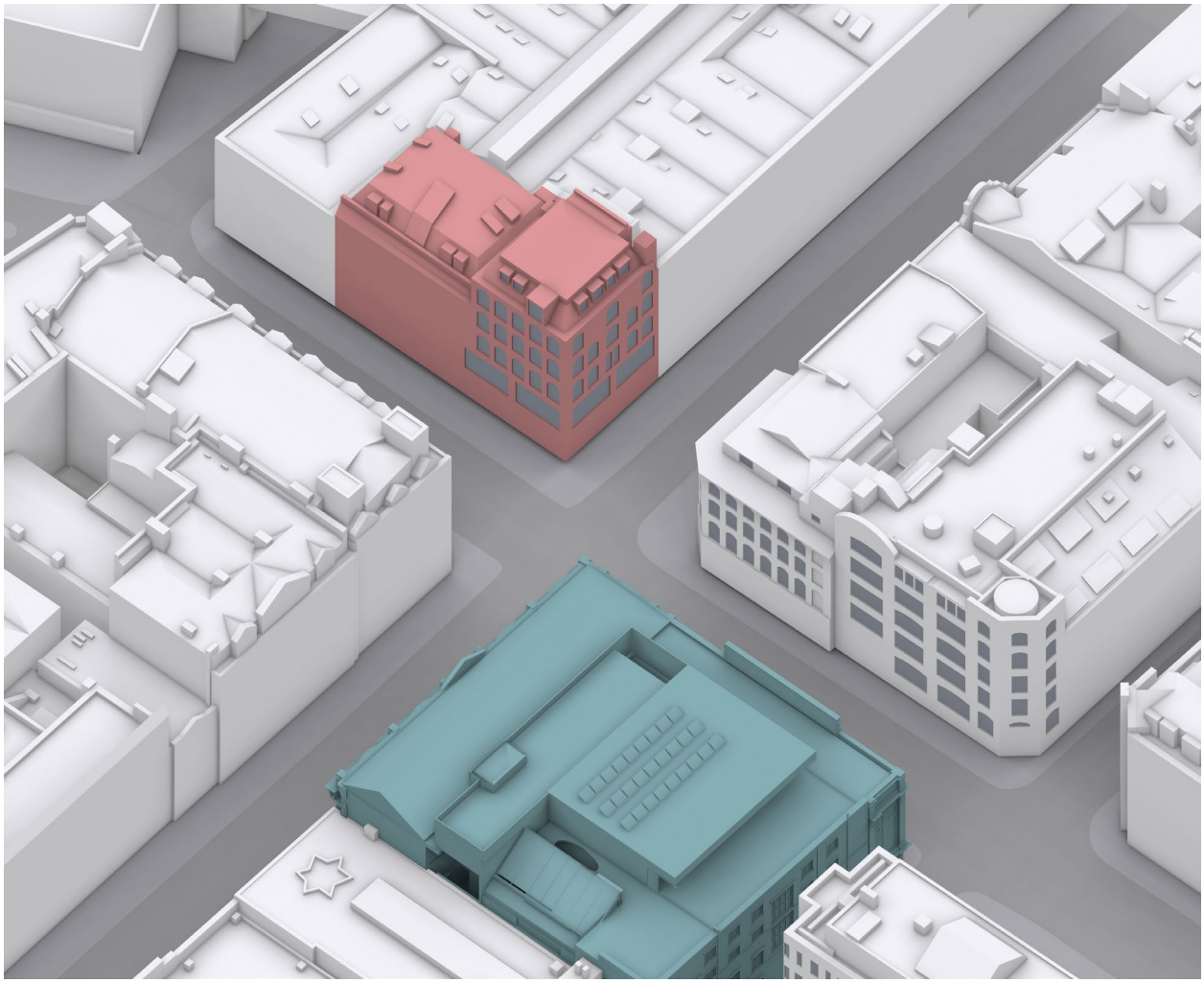


Figure 05: Rendered Image of Smithfield Building

VERTICAL SKY COMPONENT					NO SKY LINE				
WINDOW					ROOM				
TOTAL	PASS	LOSS			TOTAL	PASS	LOSS		
		20-30	30-40	40+			20-30	30-40	40+
41	41	0	0	0	18	18	0	0	0

Table 06: VSC & NSL Results - Smithfield Building

ANNUAL PROBABLE SUNLIGHT HOURS							
ROOM							
TOTAL	PASS	ANNUAL (%)			WINTER (%)		
		20-30	30-40	40+	20-30	30-40	40+
18	18	0	0	0	0	0	0

Table 07: APSH Results - Smithfield Building

5.8 With the proposed development in place, this property will fully comply with the BRE target criteria for VSC daylight, NSL daylight and APSH sunlight.

5.9 As such, the impacts are negligible and considered wholly acceptable.

CHATSWORTH HOUSE

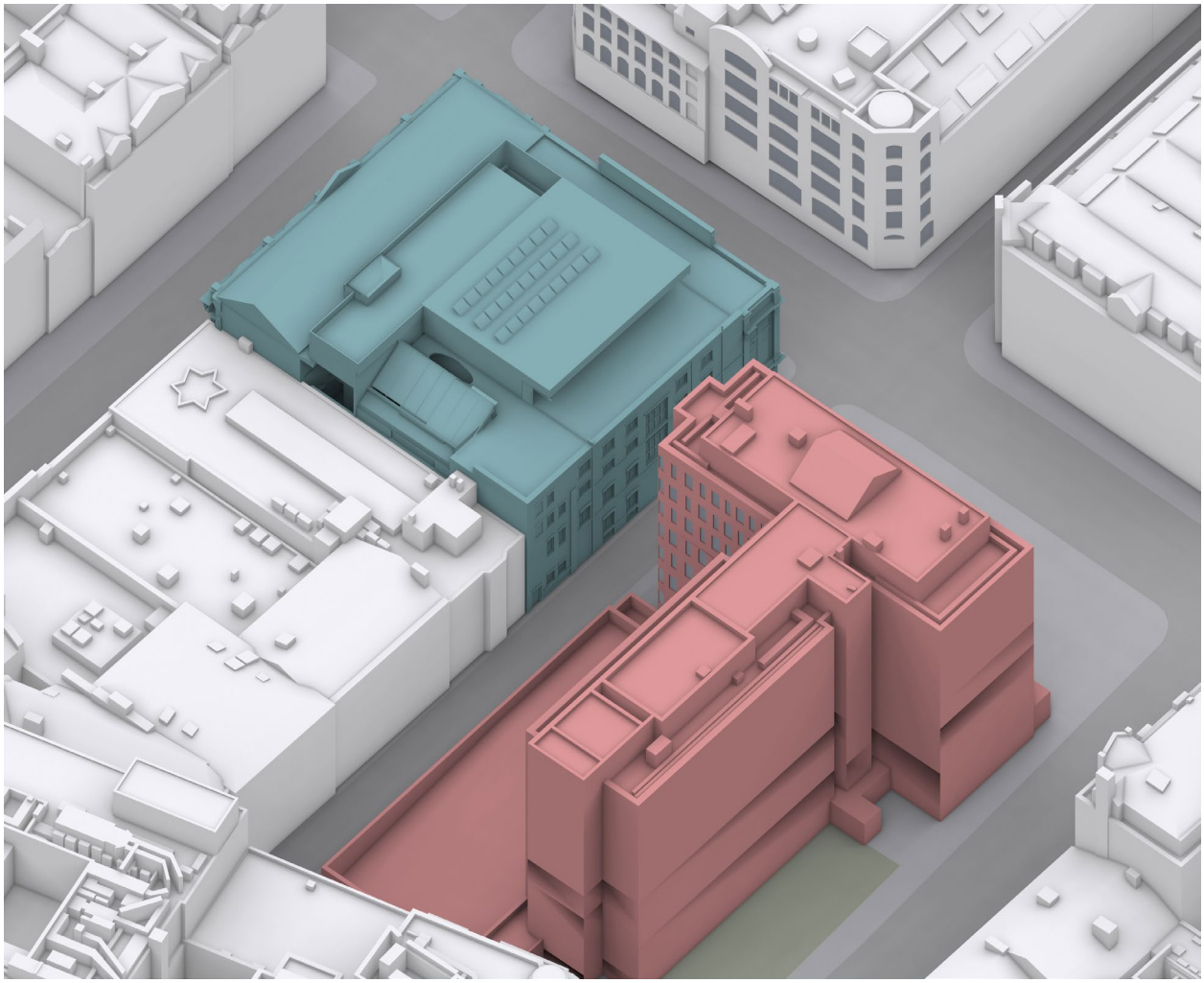


Figure 06: Rendered Image of Chatsworth House

VERTICAL SKY COMPONENT					NO SKY LINE				
WINDOW					ROOM				
TOTAL	PASS	LOSS			TOTAL	PASS	LOSS		
		20-30	30-40	40+			20-30	30-40	40+
182	182	0	0	0	70	70	0	0	0

Table 08: VSC & NSL Results - Chatsworth House

ANNUAL PROBABLE SUNLIGHT HOURS							
ROOM							
TOTAL	PASS	ANNUAL (%)			WINTER (%)		
		20-30	30-40	40+	20-30	30-40	40+
35	35	0	0	0	0	0	0

Table 09: APSH Results - Chatsworth House

5.10 With the proposed development in place, this property will fully comply with the BRE target criteria for VSC daylight, NSL daylight and APSH sunlight.

5.11 As such, the impacts are negligible and considered wholly acceptable.

6 CONCLUSIONS

GIA have undertaken a daylight and sunlight assessment in relation to the proposed redevelopment of Methodist Central Hall, Manchester. The technical analysis has been undertaken in accordance with the BRE handbook.

6.1 GIA have been instructed by Methodist Central Buildings to provide daylight and sunlight advice in relation to the proposed redevelopment of Methodist Central Hall, Manchester.

6.2 The technical analysis has been considered by reference to the criteria and methodology within the Building Research Establishment handbook (BR209, 2022).

6.3 All of the surrounding residential properties will fully accord with the target criteria for VSC daylight, NSL daylight and APSH sunlight.

6.4 As such, the impact on these properties is negligible and considered wholly acceptable.

For further details please contact us on:

LONDON

T **020 7202 1400**

E **mail@gia.uk.com**

The Whitehouse
Belvedere Road
London SE1 8GA

MANCHESTER

T **0161 672 5100**

E **manchester@gia.uk.com**

2 Commercial Street
Manchester
M15 4RQ

BELFAST

T **02892 449 674**

E **belfast@gia.uk.com**

River House
48-60 High Street
Belfast BT1 2BE

BRISTOL

T **0117 374 1504**

E **bristol@gia.uk.com**

33 Bristol
Colston Avenue
Bristol BS1 4UA

DUBLIN

T **020 7202 1400**

E **hello@giasurveyors.ie**

26-27 Upper Mount Street
Dublin Ireland
DO2 F890

GIA SURVEYORS LIMITED incorporated and registered in England and Wales with company number **14032506** whose registered office is at **The Whitehouse, Belvedere Road, London SE1 8GA**



DAYLIGHT & SUNLIGHT

IMPACT ON NEIGHBOURING PROPERTIES REPORT: APPENDICES

Methodist Central Hall, Manchester

Methodist Central Buildings

18 March 2024

GIA No: **2590**

PROJECT DATA:

Client	**Methodist Central Buildings**
Architect	**OMI Architects**
Project Title	**Methodist Central Hall, Manchester**
Project Number	**2590**

REPORT DATA:

Report Title	**Appendices**
GIA Department	**Daylight Department**
Dated	**18 March 2024**
Fee Quote	**Fee Proposal No. 01**
Prepared by	**MB**
Checked by	**EP**
Type	**Final**

Revisions	No:	Date:	Notes:	Signed:

SOURCES OF INFORMATION:

Information Received	**IR01-20240221**
Release Number	**Rel_01_2590_01**
Issue Number	**01**
Site Photos	**GIA**
3D models	**VU.CITY**
OS Data	**FIND Maps**

DISCLAIMER:

N.B This report has been prepared for Methodist Central Buildings by GIA as their appointed Daylight & Sunlight consultants. This report is intended solely for Methodist Central Buildings and may contain confidential information. No part or whole of its contents may be disclosed to or relied upon by any Third Parties without the express written consent of GIA. It is accurate as at the time of publication and based upon the information we have been provided with as set out in the report. It does not take into account changes that have taken place since the report was written nor does it take into account private information on internal layouts and room uses of adjoining properties unless this information is publicly available. layouts and room uses of adjoining properties unless this information is publicly available.

Map data
© Crown copyright and database rights 2018.
OS 100047514

CONTENTS

APPENDIX 01
ASSUMPTIONS 3

APPENDIX 02
PRINCIPLES OF DAYLIGHT, SUNLIGHT & OVERSHADOWING 7

APPENDIX 03
DRAWINGS 21
EXISTING 23
PROPOSED 27

APPENDIX 04
RESULTS & CONTOURS 33
EXISTING v PROPOSED (RESULTS) 35
EXISTING v PROPOSED (CONTOURS) 137

APPENDIX 01
ASSUMPTIONS

APPENDIX 01
ASSUMPTIONS

A 1.1 The context model has been produced using our VU.CITY platform. GIA have extracted the required area, creating a 3D model with an overall building tolerance of up to 150mm. The relevant windows have been added to the VU.CITY model from site photographs, observations and brick counting.

A 1.2 GIA have sought to create the most accurate 3D model possible based on the data available, however, a degree of tolerance should be applied.

A 1.3 The scope of buildings assessed has been determined as a reasonable zone which considers both the scale of the proposed scheme and the proximity of those buildings which surround and face the site. There may be properties outside of the considered scope that are affected by the scheme, however, no significant effects are anticipated.

A 1.4 GIA have obtained full or partial floor plans for the following properties:

- 1 Dale Street
- 3 Dale Street
- Chatsworth House
- Smithfield Building

A 1.5 These layouts have been incorporated into our 3D computer model. It is reasonable to assume that these layouts have been implemented, however, GIA would require access to confirm this.

A 1.6 Where GIA have not been able to source detailed internal floor-plans reasonable assumptions as to the internal layouts of the rooms behind the fenestration have been made. This is normal practice where access to adjoining properties is undesirable in terms of development confidentiality. Unless the building form dictates otherwise, we assume a standard 4.2m deep room (14ft) for residential properties.

A 1.7 Floor levels have been assumed for adjoining properties as access has not been obtained. This dictates the level of the working plane which is the point at which the No Sky Line assessments are carried out.

A 1.8 GIA have discounted rooms that appear to be or are confirmed to be bathrooms, hallways, circulation space etc. These rooms are not considered to be habitable and thus do not require assessment in accordance with the BRE Guidelines.

A 1.9 We are limited to identifying clearly visible solar panel arrays from online map imagery and what we can ascertain from site visits. Where solar tiles are in use, we may not be able to clearly identify them as solar receptors and therefore consider them in our assessment.

APPENDIX 02

PRINCIPLES OF DAYLIGHT, SUNLIGHT & OVERSHADOWING

gia

18 March 2024

APPENDIX 02

PRINCIPLES OF DAYLIGHT, SUNLIGHT & OVERSHADOWING

The Building Research Establishment (BRE) have set out in their handbook 'Site Layout Planning for Daylight & Sunlight: A Guide to Good Practice 3rd edition (2022)', guidelines and methodology for the measurement and assessment of daylight, sunlight and overshadowing.

BACKGROUND & CONTEXT

A 2.1 The quality of daylight and sunlight amenity as well as the overshadowing of open spaces is often stipulated within planning policy for protection or enhancement and a concern for adjoining owners and other interested parties.

A 2.2 The BRE Guidelines provide advice on site layout planning to determine the quality of daylight and sunlight both within buildings and reaching open spaces.

A 2.3 The BRE Guidelines note that the document is intended to be used in conjunction with the interior daylight recommendations found within the British Standard Daylight in buildings, BS EN 17037 and the CIBSE Publication LG 10 Daylighting – a guide for designers.

A 2.4 Whilst the BRE Guidelines are typically referred to for daylight sunlight and overshadowing matters within the planning process, they were not intended to be used as an instrument of planning policy, nor were the figures intended to be fixedly applied to all locations.

A 2.5 In the introduction of 'Site Layout Planning for daylight and sunlight (2022)', section 1.6 (page 7), states that:

> *"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 designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design (see Section 5). In special circumstances the developer or planning authority may wish to use different target values. For example, in a historic city centre, or in an area with modern high-rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings".*

A 2.6 Paragraph 2.2.3 (page 14) of the document states:

> *"Note that numerical values given here are purely advisory. Different criteria may be used based on the requirements for daylighting in an area viewed against other site layout constraints".*

A 2.7 The numerical criteria suggested by the BRE are therefore designed to provide industry advice/ guidance to plan/design with daylight in mind. Alternative values may be appropriate in certain circumstances such as highly dense urban areas. The BRE approach to creating alternative criteria is detailed within Appendix F of the Document.

A 2.8 Paragraph 2.2.2 (page 14) of the BRE Guidelines states:

> *"intended for use for rooms in adjoining dwellings where daylight is required, including living rooms, kitchens, and bedrooms. Windows to bathrooms, toilets, storerooms, circulation areas, and garages need not be analysed."*

A 2.9 Although primarily designed to be used for residential properties, the BRE Guidelines continue to state that they may be applied to any existing non-residential buildings where there may be a reasonable expectation of daylight including; schools, hospitals, hotels and hostels, small workshops, and some offices.

A 2.10 Many Local Planning Authorities consider daylight and sunlight an important factor for determining planning applications. Policies refer to both the protection of daylight and sunlight amenity within existing properties and areas of amenity as well as the creation of proposed dwellings and spaces with high levels of daylight and sunlight amenity.

A 2.11 Although Local Authorities will look to the BRE Guide to understand impacts it is their Planning Policies that will determine whether the changes in light should be a reason for refusal at planning.

A 2.12 It is an inevitable consequence of the built-up urban environment that daylight and sunlight will be more limited in dense urban areas. It is well acknowledged that in such situations there may be many other conflicting and potentially more important planning and urban design matters to consider other than just

the provision of ideal levels of daylight and sunlight.

A 2.13 The following sections extract relevant sections from the Guide.

EFFECTS TO DAYLIGHT

A 2.14 The BRE Guidelines provide two methodologies for daylight impact assessment, namely;

1 The Vertical Sky Component (VSC); and

2 The No Sky Line (NSL).

Vertical Sky Component (VSC)

A 2.15 The Vertical Sky Component (VSC) method is described in the Glossary of BRE Guidelines as the:

> *"Ratio of that part of illuminance, at a point on a given vertical plane, that is received directly from a CIE standard overcast sky, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Usually the 'given vertical plane' is the outside of a window wall. The VSC does not include reflected light, either from the ground or from other buildings"*

A 2.16 Put simply, the VSC provides an assessment of the amount of skylight falling on a vertical plane (generally a window) directly from the sky, in the circumstance of an overcast sky (CIE standard).

A 2.17 The national numerical value target "ideal" for VSC is 27%. The BRE Guidelines advise that upon implementation of a development, a window should retain a VSC value of 27% or at least 0.8 of its former value (i.e. no more than a 20% change) as per paragraph 2.2.23 of the Guide.

A 2.18 This form of assessment does not take account of window size, room use, room size, window number or dual aspect rooms. The assessment also assumes that all obstructions to the sky are 100% non-reflective thereby omitting the consideration of reflection and considering only the light coming directly from the sky.

A 2.19 The VSC calculation is undertaken in both the existing and proposed scenarios so as to make a comparison.

A 2.20 The image in Figure 01 depicts a Waldram Diagram which can be used to calculate the VSC. The existing buildings are solidly pictured with the proposed scheme semi-transparent in the foreground.

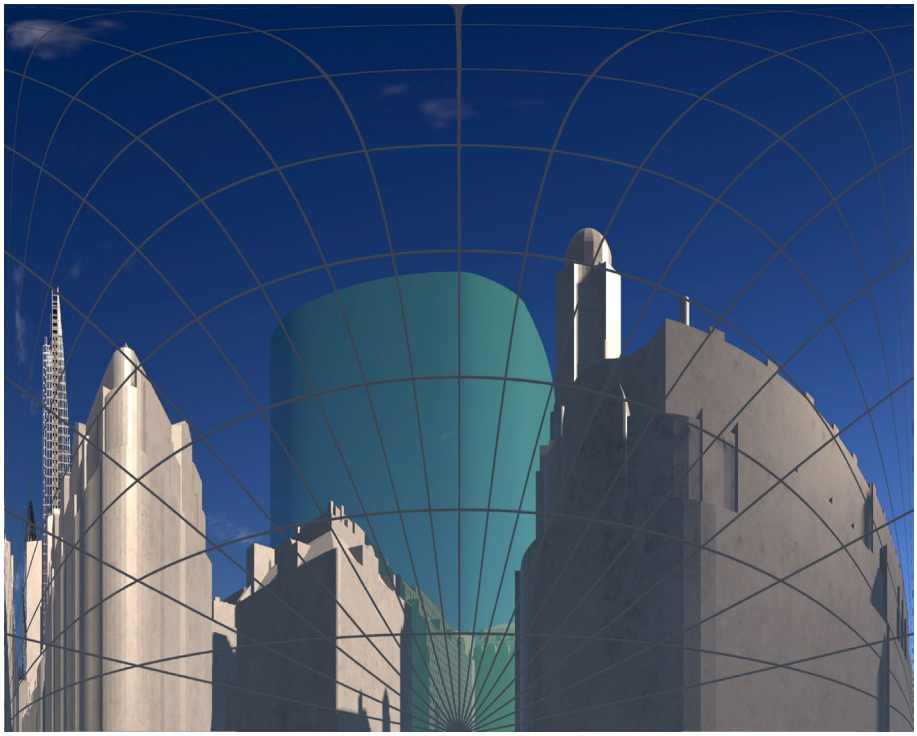


Figure 01: Waldram diagram

No Sky Line (NSL)

A 2.21 In addition to the VSC, the BRE recommends the NSL method of assessment where internal layouts are known. Whilst the VSC provides information on the quantum of light reaching a window, the NSL seeks to provide information on how well this light is distributed within the room. The NSL is sometimes also referred to as 'Daylight Distribution' for this reason.

A 2.22 The NSL is defined in the Glossary of the Guide as *"the outline on the working plane of the area from which no sky can be seen."* and so the NSL is effectively an assessment of sky visibility within a room. As stated already, the calculation is undertaken across the working plane which in accordance with paragraph 2.2.10 *"in houses [...] is assumed to be horizontal and 0.85m high"*.

A 2.23 Again, both the existing and proposed positions are calculated and presented alongside any change in position of the NSL. The results can then be presented in table format or else illustrated on a contour plot if required, an example of which can be found in Figure 02 below.

A 2.24 The BRE Guidelines state at paragraph 2.211 that:

> *"If, following construction of a new development, the no sky line moves so that the area of the existing room, which does receive direct skylight, is reduced to less than 0.8 times its former value this will be noticeable to the occupants, and more of the room will appear poorly lit. This is also true if the no sky line encroaches on key areas like kitchen sinks and worktops."*

A 2.25 In accordance with the strict application of the national numerical values, therefore the change in daylight would be noticeable to the occupants should the NSL experience a loss of NSL greater than 20%.

A 2.26 It is relevant to note that this assessment takes the number and size of windows serving a room into account as well as the shape of the room but, being concerned only with sky visibility and the distribution of light, does not consider the quantum of light reaching the room.

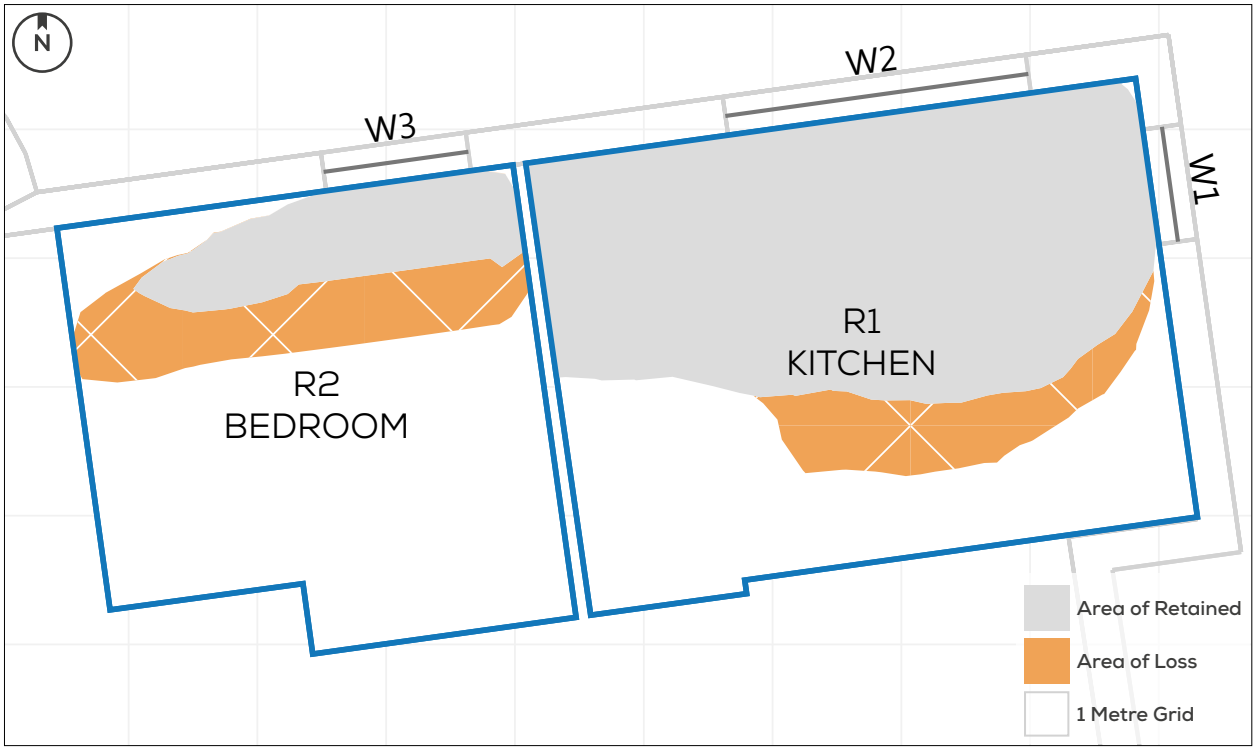


Figure 02: Example NSL diagram

Decision Chart (Figure 20 of the BRE Guide)

A 2.27 The flowchart in Figure 03 illustrates the steps and criteria outlined within the BRE Guidelines to understand whether the daylighting (VSC and NSL) may be significantly affected.

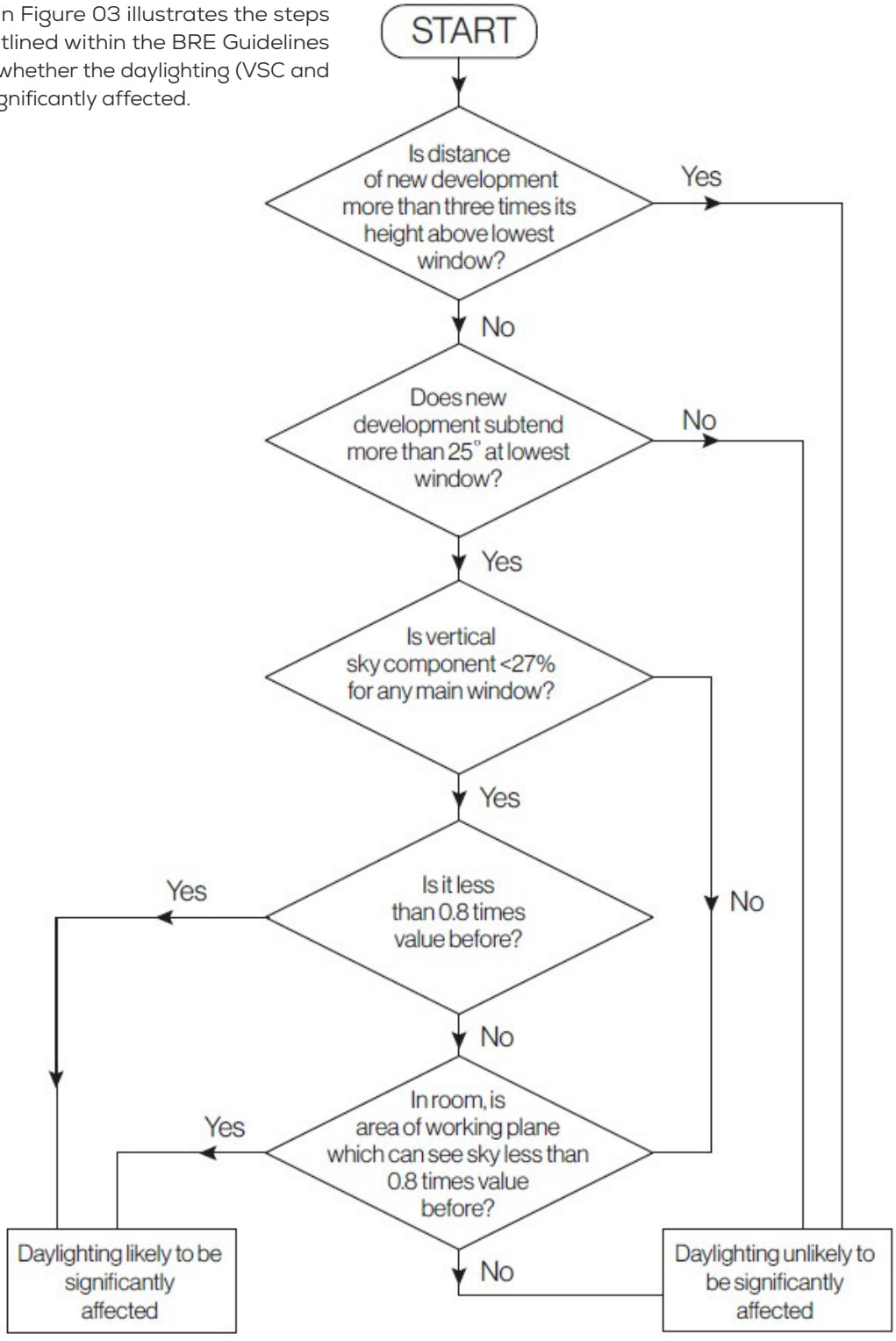


Figure 03: BRE Decision Chart (Figure 20): *diffuse daylight in existing buildings. This does not include an assessment of rights to light issues, which a developer may need to consider separately*

EFFECTS TO SUNLIGHT

Annual Probable Sunlight Hours (APSH)

A 2.28 The BRE Guidance suggests that to understand sunlight impacts to a property, an assessment of Annual Probable Sunlight Hours (APSH) is undertaken. The APSH is defined in the Glossary as:

> *"the long-term average of the total number of hours during a year in which direct sunlight reaches the unobstructed ground (when clouds are taken into account)"*

A 2.29 Expanding on the above within the Guidance, long-term averages were used to position 100 spots in the sky, representative of sunlight over the whole year. Correlating to the probability of the sun to shine, the majority of these (70) are at times to the six-months containing summer (from spring equinox to autumn equinox) which 30 are the 'winter' months from autumn equinox to spring. The APSH is calculated though calculating how many of these 'spots' can be seen from a location (normally a window) both overall and how many of these are during the winter months.

A 2.30 To understand the potential sunlight impacts therefore, all windows facing within 90 degrees of due south and overlooking the development are generally assessed for APSH.

A 2.31 The BRE Guidelines set out the overall methodology and criteria for the assessment of Sunlight in Chapter 3. The BRE Guidelines state in paragraph 3.2.3 and 3.2.5:

> *"To assess loss of sunlight to an existing building, it is suggested that all main living rooms of dwellings, and conservatories, should be checked if they have a window facing within 90 degrees of due south. Kitchens and bedrooms are less important, although care should be taken not to block too much sun."*
>
> *"A point at the centre of the window on the outside face of the window wall may be taken."*

A 2.32 In interpreting the results, the BRE Guidance states in summary 3.2.13 that:

> *"If a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window, then the sunlighting of the existing dwelling may be adversely affected. This will be the case if the centre of the window:*
>
> - *receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between 21 September and 21 March, and*
> - *receives less than 0.8 times its former sunlight hours during either period; and*
> - *has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours."*

A 2.33 The image in Figure 04 depicts the APSH sun spots overlaid on a Waldram Diagram. The existing buildings are solidly pictured with the proposed scheme semi-transparent in the foreground. The yellow spots indicate summer sun and the blue spots indicate winter sun.

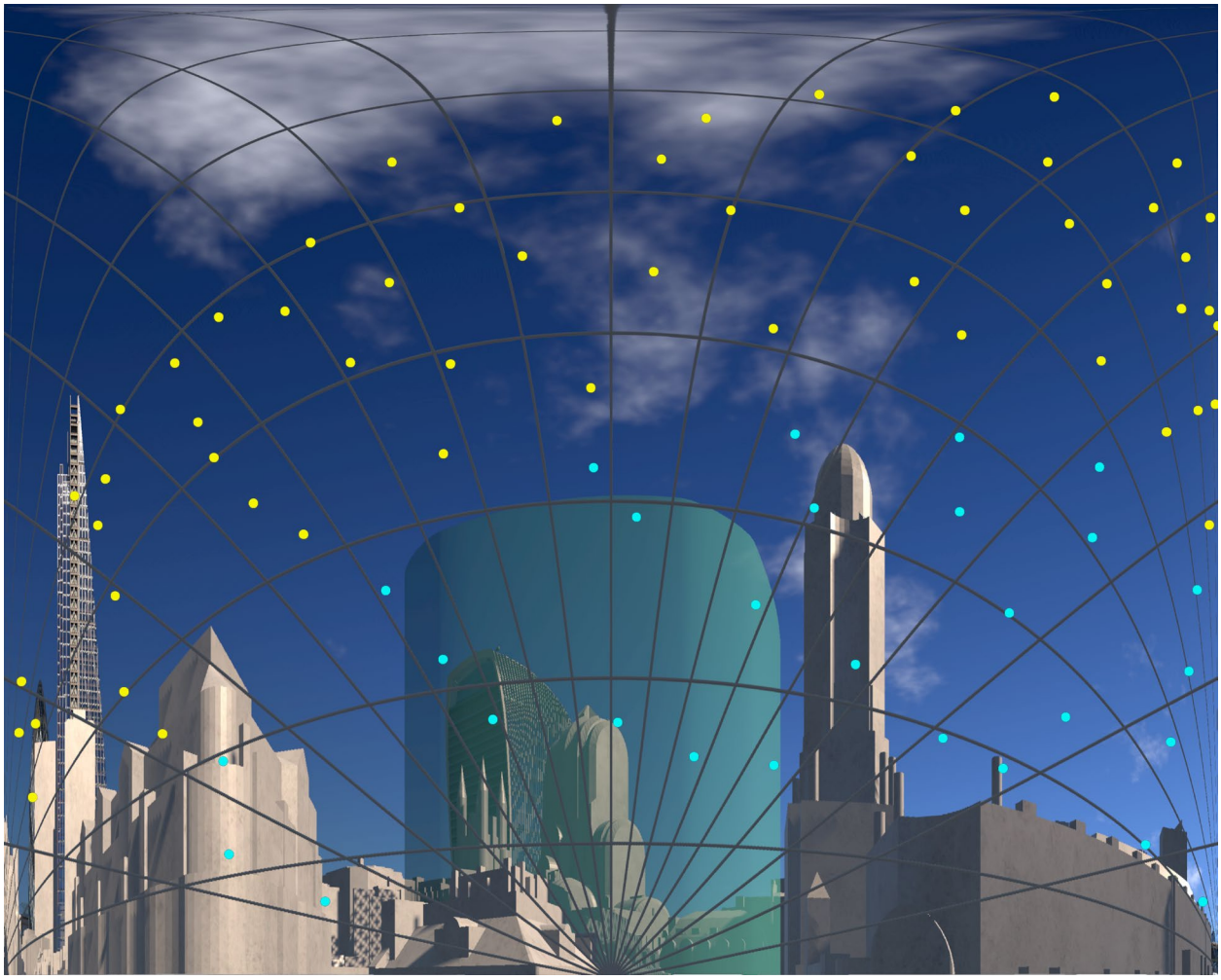


Figure 04: Waldram diagram

EFFECTS TO OVERSHADOWING

A 2.34 The BRE guidance in respect of overshadowing of amenity spaces is set out in section 3.3.1 of the handbook. Here it states as follows:

> *"Sunlight in the spaces between and around buildings has an important impact on the overall appearance and ambiance of a development. It is valuable for a number of reasons, to:*
>
> - *provide attractive sunlit views (all year)*
> - *make outdoor activities like sitting out and children's play more pleasant (mainly warmer months)*
> - *encourage plant growth (mainly spring and summer)*
> - *dry out the ground, reducing moss and slime (mainly in colder months)*
> - *melt frost, ice and snow (in winter)*
> - *dry clothes (all year)."*

A 2.35 It must be acknowledged that in urban areas the availability of sunlight on the ground is a factor which is significantly controlled by the existing urban fabric around the site in question and so may have very little to do with the form of the development itself. Likewise, there may be many other urban design, planning and site constraints which determine and run contrary to the best form, siting and location of a proposed development in terms of availability of sun on the ground.

Sun Hours on Ground & Transient Overshadowing

A 2.36 The Sun Hours on Ground method of overshadowing assessment uses specialist software to determine the sunlight exposure across an area of amenity.

A 2.37 The BRE Guidelines suggest that the Spring Equinox (21 March), being the year's midpoint, is a suitable date for the assessment. Paragraph 3.3.17 states:

> *"It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21 March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable."*

A 2.38 The Transient Overshadowing study is recommended where large buildings are proposed which may affect a number of gardens or open spaces or where an area is particularly sensitive at certain times of day or year. For the purpose of this assessment, the additional shadow cast is mapped and highlighted at hourly intervals from sunrise to sunset on the following dates:

- 21 March (Spring equinox)
- 21 June (Summer solstice)
- 21 December (Winter solstice)

A 2.39 The BRE guidelines do not provide any suggested criteria for Transient Overshadowing, rather it is a qualitative assessment to aid understanding.

BRE GUIDELINES: ADDITIONAL DAYLIGHT AND SUNLIGHT TESTS

Daylight - VSC and APSH to Rooms

A 2.40 As outlined within the BRE Guidelines (paragraph 2.2.6), the VSC value is calculated for each window; however:

> *"If a room has two or more windows of equal size, the mean of their VSCs may be taken".*

A 2.41 Where a room is served by two or more windows of the same or different sizes, the VSC value to the room can be calculated by applying an average weighting calculation to understand the VSC value to the room. The formula used is as follows;

Σ(Vn*An) / ΣAn

Where:

V = window VSC
A = window area
n = the number of windows

A 2.42 The BRE provide a methodology to calculate APSH in relation to the room and window, paragraph 3.1.12 states:

> *"If a room has multiple windows, the amount of sunlight received by each can be added together provided they occur at different times and sunlight hours are not double counted."*

A 2.43 The above extract of the BRE is in relation to proposed units rather than existing buildings. It does, however, make sense to apply this methodology to existing rooms as well, when room layouts are known as a room served by multiple windows could receive the benefit of sunlight from all windows and not just one.

A 2.44 GIA calculate the APSH room assessment in the following way:

1 The sunlight hours (both winter and annual) are calculated for each window. Instead of simply returning the overall per cent pass rate, i.e. one figure for winter, and one for the whole year, the yes/no result of each of the 100 sun spots is tracked. For this accounting to work, each sun dot needs to be assigned a unique identifier, e.g. from 1 to 100;

2 The sets of 100 sun spots are combined for each room using Boolean logic, i.e. conjunctions of yes/no values. The outcome of this step is a set of 100 yes/no values corresponding to the 100 sun spots, but on a per-room basis. Each per-room dot is counted if it is unobstructed for at least one of its windows; and

3 The unobstructed sun dots for the room are summed up and expressed as a percentage of the total number of annual and winter spots.

Balconies/Overhangs

A 2.45 The BRE recognises that existing architectural features on neighbouring buildings such as balconies and overhangs inherently restrict the quantum of skylight to a window. The BRE Guidelines note on page 11, paragraph 2.1.17 and page 16, paragraph 2.2.13:

> *"This is a particular problem if there are large obstructions opposite; with the combined effect of the overhang and the obstruction, it may be impossible to see the sky from inside the room, and hence to receive any direct skylight or sunlight at all."*

> *"Existing windows with balconies above them typically receive less daylight. Because the balcony cuts out light from the top part of the sky, even a modest obstruction opposite may result in a large relative impact on the VSC, and on the area receiving direct skylight. One way to demonstrate this would be to carry out an additional calculation of the VSC and the area receiving direct skylight, for both the existing and proposed situations, without the balcony in place."*

A 2.46 As noted by the BRE Guidelines, where there are existing overhanging features, larger reductions in skylight and sunlight may be unavoidable and alternative criteria can be used. The guidance suggests that in such situations a calculation is carried out that excludes the balcony or the obstruction.

DAYLIGHT - MIRROR MASSING & ADJOINING DEVELOPMENT LAND

Alternative target Values for Skylight and Sunlight Access "Mirror Massing"

A 2.47 The BRE Guidelines provide a calculation for the VSC and APSH analysis to quantify an appropriate alternative value based on the context of an environment. This approach is known as the 'mirror image' analysis (see Figure 05).

A 2.48 The BRE notes in paragraph F5:

> *"where an existing building has windows that are unusually close to the site boundary and taking more than their fair share of light. Figure F3 shows an example where side windows of an existing building are close to the boundary. To ensure that new development matches the height and proportions of existing buildings, the VSC and APSH targets for these windows could be set to those for a 'mirror-image' building of the same height and size, an equal distance away on the other side of the boundary."*

A 2.49 This analysis is used to understand the levels of Daylight (VSC) and Sunlight (APSH) that would be experienced by an extant neighbouring property if there were a building of the same height and extent opposite.

A 2.50 The mirror image assessment is fairly simplistic and is not, therefore, easily applied to large and complex site footprints which are not all built at equal distances from the site boundary or of the same footprint.

Adjoining Development Land

A 2.51 The "Adjoining Development Land" analysis provided within the BRE Guidelines is a simple test to ensure that a proposal is a reasonable distance from the boundary so as to "enable future nearby developments to enjoy a similar access to daylight." (2.3.1)

A 2.52 The BRE comments in paragraphs 2.3.3, 2.3.6 and 2.3.7 that:

> *"The diffuse daylight coming over the boundary may be quantified in the following way. As a first check, draw a section in a plane perpendicular to the boundary (Figure 21). If a road separates the two sites then the centre line of the road should be taken. Measure the angle to the horizontal subtended at a point 1.6 metres above the boundary by the proposed new buildings. If this angle is less than 43 ° then there will normally still be the potential for good daylighting on the adjoining development site (but see Sections 2.3.6 and 2.3.7)."*
>
> *"The guidelines above should not be applied too rigidly. A particularly important exception occurs when the two sites are very unequal in size and the proposed new building is larger in scale than the likely future development nearby. This is because the numerical values above are derived by assuming the future development will be exactly the same size as the ·proposed new building (Figure 22). If the adjoining sites for development are a lot smaller, a better approach is to make a rough prediction of where the nearest window wall of the future development may be; then to carry out the 'new building' analysis in Section 2.1 for this window wall."*
>
> *"The 43° angle should not be used as a form generator, to produce a building which slopes or steps down towards the boundary. Compare Figure 23 with Figure 22 to see how this can result in a higher than anticipated obstruction to daylight. In Figure 23 the proposed building subtends 34° at its mirror image, rather than the maximum of 25° suggested here. In cases of doubt, the best approach is again to carry out a new building analysis for the most likely location of a window wall of a future development."*

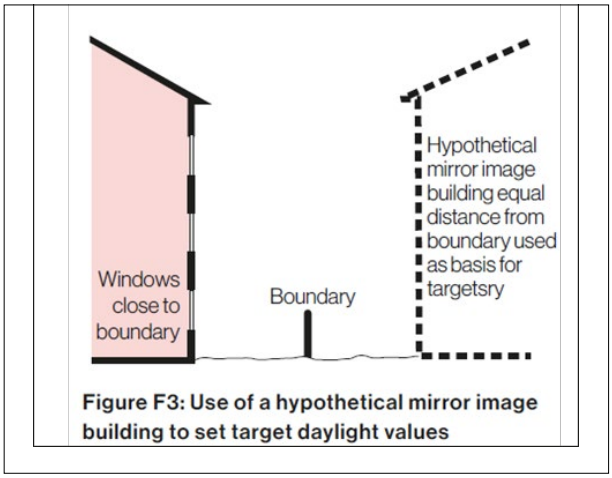


Figure 05: Littlefair, P. (2022). Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice. Hertfordshire: HIS BRE Press p 87 Figure F3

Image © BRE Guidelines

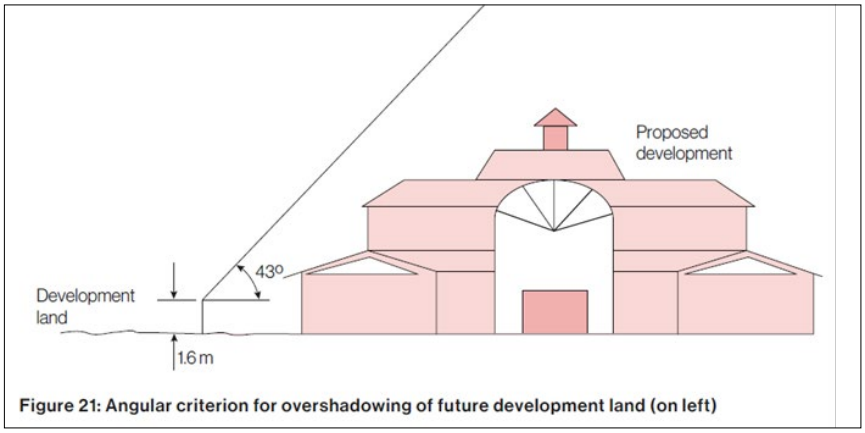


Image © BRE Guidelines

Figure 21: Angular criterion for overshadowing of future development land (on left)

Figure 06: Littlefair, P. (2022). Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice. Hertfordshire: HIS BRE Press p 19 Figure 21

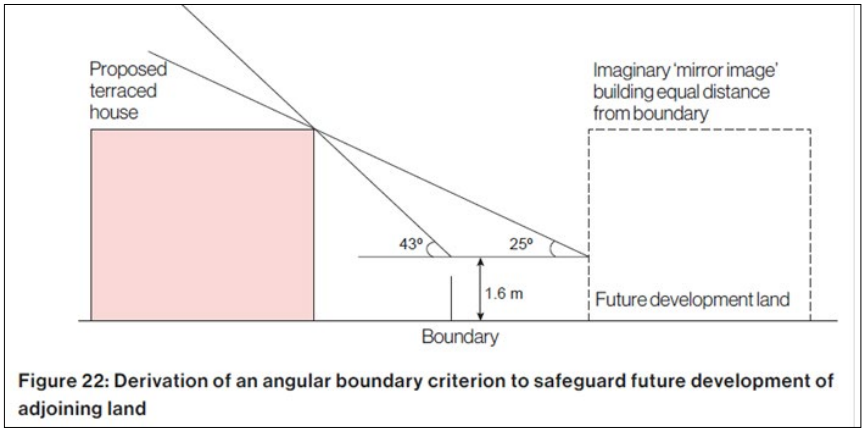


Image © BRE Guidelines

Figure 22: Derivation of an angular boundary criterion to safeguard future development of adjoining land

Figure 07: Littlefair, P. (2022). Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice. Hertfordshire: HIS BRE Press p 20 Figure 22

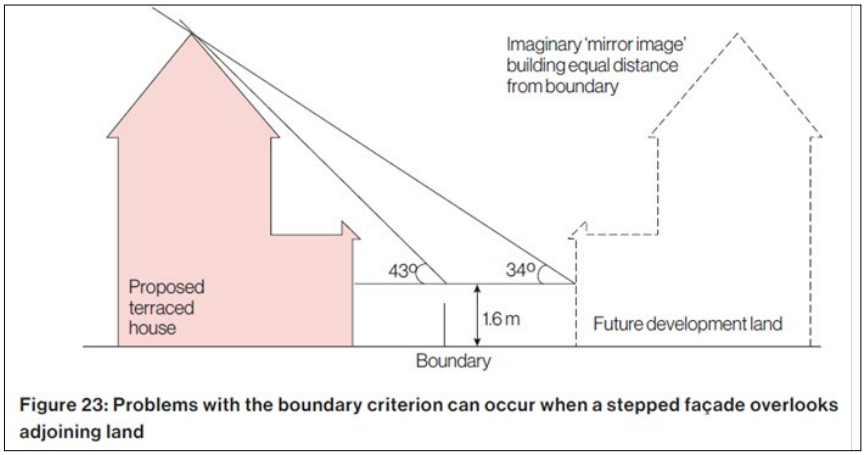


Image © BRE Guidelines

Figure 23: Problems with the boundary criterion can occur when a stepped façade overlooks adjoining land

Figure 08: Littlefair, P. (2022). Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice. Hertfordshire: HIS BRE Press p 20 Figure 23

A 2.53 As outlined above, the Adjoining Development Land analysis is predicated on ensuring that a proposal next to future development land is not negatively impacting the ability to develop in consideration of light matters.

PHOTOVOLTAICS

A 2.54 Paragraph 4.5.2 states that *"where a proposed development may result in loss of radiation to existing solar panels (either photovoltaic or solar thermal), an assessment should be carried out."*

A 2.55 Paragraph 4.5.8 states that *"Where the annual probable sunlight hours received by a solar panel with the new development in place is less than 0.90 times the value before, a more detailed calculation of the loss of solar radiation should be undertaken. This is a specialist type of assessment and expert advice should be sought. The assessment should include both direct solar and diffuse sky radiation; over a whole year, around 60% of the radiation received on a horizontal roof comes from the sky. However, reflected radiation from the ground and obstructions need not be included. The modelling should take account of the effects of cloud in reducing direct solar radiation at different times of year, and include a realistic simulation of the way that incoming solar radiation varies from different parts of the sky."*

A 2.56 Paragraph 4.5.9 states that *"if over the whole year the ratio of total solar radiation received with the new development, to the existing value is less than the values given in Table 2, then the loss of radiation is significant."*

Table 2. Recommended minimum ratios of solar radiation received.

Slope of solar panel in degrees to horizontal	Recommended minimum ratio of radiation received after/before
0-30	0.90
30.01-59.99	0.85
60-90	0.80

Image © BRE Guidelines

Figure 09: Table 2 from BRE Guidance Section 4, page 36

A 2.57 Finally, paragraph 4.5.10 notes that *"numerical values given are purely advisory. Different criteria may be used based on the requirements for solar energy in an area viewed against other site layout constraints. Another important issue is whether the existing solar panels are reasonably sited, at a sensible height and distance from the boundary. A greater loss of solar radiation may be inevitable if panels are mounted close to the ground and near to the site boundary."*

OTHER AMENITY CONSIDERATIONS

A 2.58 Daylight and sunlight is one factor among many under the heading of residential amenity considerations for any given development design or planning application; others include:

- View;
- Privacy;
- Security;
- Access;
- Enclosure;
- Microclimate;
- Solar Dazzle; and
- Solar Convergence.

INTENTIONALLY BLANK PAGE