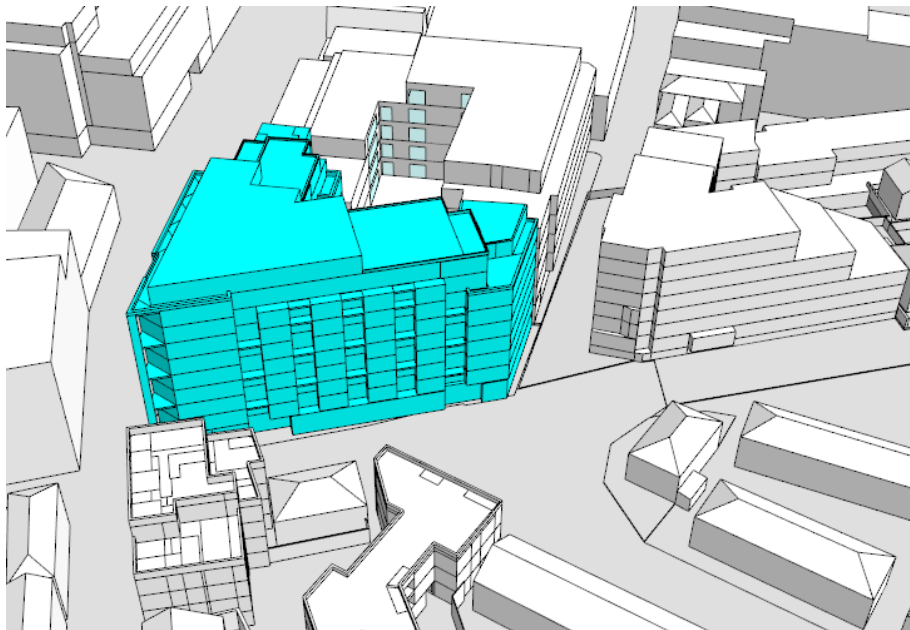




Ardee Street – Additional Apartments

Daylight, Sunlight and Overshadowing Study



Not Marked

Report For: NREK1

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1 Executive Summary

This report summarises the analyses undertaken to quantify the Sunlight and Daylight performance of the 2 additional apartments at Ardee Street/Mill Street/Newmarket Square located in Dublin, Ireland. The report focuses on measuring the daylight and sunlight performance within these apartments in the proposed development as well as the effect of this revision on the daylight and sunlight performance of the existing properties.

1.1 Planning Authority Guidelines

The Sustainable Urban Housing: Design Standards for New Apartments 2023 states the following in Section 6.6:

“Planning authorities should avail of appropriate expert advice where necessary and have regard to quantitative performance approaches to daylight provision outlined in guides like A New European Standard for Daylighting in Buildings IS EN17037:2018, UK National Annex BS EN17037:2018 and the associated BRE guide 209 2022 Edition (June 2022) or any relevant future standards or guidance specific to the Irish context, when undertaken by development proposers which offer the capability to satisfy minimum standards of daylight provision.”

With regards to daylighting and external sunlight exposure in particular, where different methodologies are found in each of the different standards, all methodologies have been employed for completeness to ensure appropriate and reasonable regard has been taken to address all assessments under all of the different standards. For clarity these are listed below and the following Section 1.2 denotes which standard is applicable for each assessment type:

- BRE Guide –3rd Edition of BR 209 BRE Site Layout Planning for Daylight and Sunlight
- BS EN 17037-2018+A1-2021 – Daylight in Buildings
 - This is the UK implementation of the European EN 17037-2018+A1-2021 standard. It supersedes BS 8206-2:2008 which is withdrawn in the UK. The BS EN standard includes a National Annex which addresses daylight requirements specific to dwellings which is notable as Ireland’s climate matches closely with the UK.
- IS EN 17037-2018+A1-2021 – Daylight in Buildings
 - This is the Irish implementation of the European EN 17037-2018+A1-2021 standard

1.2 Reference Standards & Summary of Assessments Undertaken

The various daylight and sunlight assessments that were undertaken using the IES VE software are based on a number of different standards which are referenced in the individual sections of this report. For clarity, the assessments that were undertaken are summarised below as well as the reference standards that were used for each (where applicable):

- **Shadow Analysis**
 - Assessed using shadow images cast at key times throughout the year, i.e. March 21st, June 21st and December 21st to determine if any overshadowing impact occurs and to what extent to any existing neighbouring dwellings in accordance with the BRE Guide (3rd Edition).

- **Sunlight to Amenity Spaces**
 - Assessed using annual Solar Exposure calculations to determine any impact to existing amenities and the sunlight received and also to assess the proposed developments amenity spaces to derive how much sunlight they can expect to receive in accordance with the BRE Guide (3rd Edition).
- **Sunlight to Existing Buildings**
 - Assessed using the Annual Probable Sunlight Hours (APSH) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to sunlight received to the existing neighbouring building main living areas.
- **Sunlight to Proposed Buildings**
 - Assessed using Solar Exposure calculations in accordance with IS/BS EN 17037-2018+A1-2021 (BRE Guide 3rd Edition)
 - The aim is to derive how much sunlight proposed development can expect to receive.
- **Daylight to Existing Buildings**
 - Assessed using the Vertical Sky Component (VSC) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to existing daylight received to the existing building neighbouring the site.
- **Daylight to Proposed Development**
 - Assessed in accordance with IS EN 17037:2018 Method 2 (BRE Guide 3rd Edition)
 - Assessed in accordance with BS EN 17037:2018 National Annex Method 2 (BRE Guide 3rd Edition)
 - The aim is to derive how much daylight will be received within each of the apartments within the proposed development.

The following can be concluded based on the assessments undertaken:

1.3 Shadow Analysis

The shadow analysis illustrates different shadows being cast at key times of the year (March 21st, June 21st and December 21st) for the Existing Situation and the Proposed Scheme. The results from the study are summarised as follows:

Ardee Street (North) / Chamber Street

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Ardee Street (South)

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Oscar Square

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Mill Street Student Accommodation

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Rear Courtyard – The Eight Building (Office development)

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Newmarket Yards

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Newmarket Street North

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

The potential shading impact is quantified via the “Sunlight to Amenity Spaces” and “Daylight to Existing Buildings” sections of this report.

1.4 Sunlight to Amenity Spaces

As outlined in Section 3.3.17 of the BRE Guide (3rd Edition), for a space to appear adequately sunlit throughout the year, at least half of the garden or amenity area should receive at least 2 hours of sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

Existing Amenity Spaces

On March 21st the existing amenity space will receive the same level of sunlight with the proposed development in place when compared to the permitted situation. In all cases the results comply with the recommendations in the BRE Guidelines.

Proposed Amenity Spaces

On March 21st, 61% of the combined proposed amenity areas situated within the development site will receive at least 2 hours of sunlight over their combined area, thus complying with the BRE recommendations which, given the city centre location of the development, are considered very positive. In addition, the roof top terrace areas will be high quality areas to use for the occupants. Nearly 100% of these amenity spaces will receive at least 2 hours of sunlight on March 21st.

1.5 Sunlight to Existing Buildings

This study considers the proposed development (incorporating the 2 additional apartments) and tests if the Annual Probable Sunlight Hours (APSH) results for the living room windows are greater than 25% annual and 5% winter sunlight or are greater than 0.8 times their former value (that of the permitted) with the proposed development in place or the reduction in sunlight across the year is less than 4% with the proposed development in place.

Only the neighbouring properties that could be affected by the additional 2 apartments were included in this assessment, as there will be no change to the remaining properties.

When compared to the permitted scheme, of the 61 no. points tested, 100% (61 no. points) meet the BRE recommended values over both the annual and the winter periods. The results are very similar to the permitted situation and therefore there will be no impact from the additional 2 apartments on the neighbouring properties.

1.6 Sunlight to Proposed Development

For the sunlight to proposed development assessment, this is covered in the following standards.

- IS/BS EN 17037-2018+A1-2021 & the BRE Guide 3rd Edition.

The methodologies discussed in each is the same.

As the sunlight exposure assessment in accordance with BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 considers the orientation of the rooms the following should be noted from section 3.1.11 of the guide.

“The BS EN 17037 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.”

For the 2 additional apartments, of the 2 no. points tested, 1 no. points (50%) meet the BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 sunlight exposure recommendations of greater than 1.5 hours on March 21st.

For the total development including the additional 2 apartments, of the 155 no. points tested, 102 no. points (66%), same as the permitted, meet the BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 sunlight exposure recommendations of greater than 1.5 hours on March 21st.

Where windows do not meet this recommendation, this is predominantly as a result of their orientation, or as a consequence of the impact of balcony projections.

Overall, the sunlight provision results to the proposed development in accordance with IS/BS EN 17037-2018+A1-2021 are considered very good in the context of an urban environment, due to the fact that not all living rooms can face south and the inclusion of balconies.

The sunlight exposure results are visually represented in Appendix B.

1.7 Daylight to Existing Buildings

This study considers the Proposed Scheme (incorporating the 2 additional apartments) and tests if the VSC results are greater than 27% or not less than 0.8 times the value of the Permitted Situation.

Only the neighbouring properties that could be affected by the additional 2 apartments were included in this assessment as there will be no change to the remaining properties.

When compared to the Permitted Situation, of the 122no. points tested, 100% (122 no. points) have a Proposed VSC value greater than 27% or not less than 0.8 times their former value (that of the permitted development). Therefore the 2 added apartments will not have any impact on the daylight of the neighbouring properties.

1.8 Daylight to Proposed Development

The proposed development has been assessed using the Method 2 climate-based approach and targeting the minimum recommended values outlined in Table A.1 of IS EN 17037:2018. To note, due to the change in design of the façade the apartment below on level 5 has also been include within the assessment.

100% of the 2 additional apartments achieve the recommended daylight levels with regards to this standard. The LKD on level 5 has dropped just below recommendations for this standard but does still meet the recommendations of the more appropriate BS EN standards. Across the proposed development as a whole, 90% of the tested rooms (same as permitted) are achieving the daylight provision targets in accordance with Table A.1 of IS EN 17037:2018 using Method 2.

BRE Guide 3rd Edition / BS EN 17037:2018 National Annex

In the UK, EN17037:2018 was adopted to form “BS EN 17037:2018”. 100% of the 2 additional apartments and the apartment on level 5 achieve the recommended daylight levels with regards to this standard. Across the proposed development as a whole, 97% of the tested rooms (same as permitted) are achieving the daylight provision targets in accordance with Table NA.1 of BS EN 17037:2018 using Method 2.

1.9 Observations

The daylight results for the 2 additional apartments are consistent with the figures achieved for the granted apartments on the same levels.

It is important to note that the recommendations within the BRE Guide (2nd and 3rd Editions) itself states “*although it gives numerical guidelines these should be interpreted flexibly because natural lighting is only one of many factors in site layout design*”, Although this is true appropriate and reasonable regard has still been taken to the BRE guide.

Whilst the results shown relate to the criteria as laid out in the BRE Guide (2nd and 3rd Editions), it is important to note that the BRE targets are guidance only and should therefore be used with flexibility and caution when dealing with different types of sites.

Taking all of the above information into account and based on the results from each of the assessments undertaken, the proposed development continues to perform well with the addition of these 2 apartments, when compared to the recommendations in the BRE Guide 2nd Edition/ BS 8206-



2:2008. With regards to the existing properties there is no impact when considering sunlight and daylight as a result of the proposed 2 additional apartments and the proposed development itself performs very well with the same regard.



2 Introduction

This report summarises the analyses undertaken to quantify the Sunlight and Daylight performance of the 2 additional apartments at Ardee Street/Mill Street/Newmarket Square located in Dublin, Ireland. The report focuses on measuring the daylight and sunlight performance within these apartments in the proposed development as well as the effect of this revision on the daylight and sunlight performance of the existing properties.

3 BRE – Site Layout Planning for Daylight and Sunlight (3rd Edition)

Access to daylight and sunlight is a vital part of a healthy environment. Sensitive design should provide sufficient daylight and sunlight to new residential developments while not obstructing light to existing homes nearby.

The 3rd Edition of the BR 209 BRE Site Layout Planning for Daylight and Sunlight, advise on planning developments for good access to daylight and sunlight and is widely used by local authorities to help determine the performance of new developments.

3.1 Impact Classification Discussion

BRE guidance in Appendix H (BRE Guide 3rd Edition) – Environmental Impact Assessment suggests impact classifications as minor, moderate and major adverse. It provides further classifications of these impacts with respect to criteria summarised in the table below.

Where the loss of skylight or sunlight fully meets the guidelines in the BRE guide (3rd Edition), the impact is assessed as negligible or minor adverse. Where the loss of skylight or sunlight does not meet the BRE guidelines, the impact is assessed as minor, moderate or major adverse.

Impact	Description
<i>Negligible adverse impact</i>	<ul style="list-style-type: none"> • <i>Loss of light well within guidelines, or</i> • <i>only a small number of windows losing light (within the guidelines) or limited area of open space losing light (within the guidelines)</i>
<i>Minor adverse impact (a)</i>	<ul style="list-style-type: none"> • <i>Loss of light only just within guidelines and</i> <ul style="list-style-type: none"> ○ <i>a larger number of windows are affected or</i> ○ <i>larger area of open space is affected (within the guidelines)</i>
<i>Minor adverse impact (b)</i>	<ul style="list-style-type: none"> • <i>only a small number of windows or limited open space areas are affected</i> • <i>the loss of light is only marginally outside the guidelines</i> • <i>an affected room has other sources of skylight or sunlight</i> • <i>the affected building or open space only has a low-level requirement for skylight or sunlight</i> • <i>there are particular reasons why an alternative, less stringent, guideline should be applied</i>
<i>Major adverse impact</i>	<ul style="list-style-type: none"> • <i>large number of windows or large open space areas are affected</i> • <i>the loss of light is substantially outside the guidelines</i> • <i>all the windows in a particular property are affected</i> • <i>the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight (living rooms / playground)</i>

3.2 Planning Authority Guidelines

The Sustainable Urban Housing: Design Standards for New Apartments 2023 states the following in Section 6.6:

“Planning authorities should avail of appropriate expert advice where necessary and have regard to quantitative performance approaches to daylight provision outlined in guides like A New European Standard for Daylighting in Buildings IS EN17037:2018, UK National Annex BS EN17037:2018 and the associated BRE guide 209 2022 Edition (June 2022) or any relevant future standards or guidance specific to the Irish context, when undertaken by development proposers which offer the capability to satisfy minimum standards of daylight provision.”

With regards to daylighting and external sunlight exposure in particular, where different methodologies are found in each of the different standards, all methodologies have been employed for completeness to ensure appropriate and reasonable regard has been taken to address all assessments under all of the different standards. For clarity these are listed below and the following Section 1.2 denotes which standard is applicable for each assessment type:

- BRE Guide –3rd Edition of BR 209 BRE Site Layout Planning for Daylight and Sunlight
- BS EN 17037-2018+A1-2021 – Daylight in Buildings
 - This is the UK implementation of the European EN 17037-2018+A1-2021 standard. It supersedes BS 8206-2:2008 which is withdrawn in the UK. The BS EN standard includes a National Annex which addresses daylight requirements specific to dwellings which is notable as Ireland’s climate matches closely with the UK.
- IS EN 17037-2018+A1-2021 – Daylight in Buildings
 - This is the Irish implementation of the European EN 17037-2018+A1-2021 standard

Furthermore, the EN 17037-2018+A1-2021 standard has already been adopted in the UK to inform the BS EN 17037-2018+A1-2021 standard which supersedes BS 8206-2:2008 which is now withdrawn. It is important to note that BS EN 17037-2018+A1-2021 includes a National Annex which specifically addresses daylight provision in residential dwellings in the UK. A similar annex is not included in the IS EN 17037-2018+A1-2021 standard.

Finally, the latest BRE guide ‘Site Layout Planning for Daylight and Sunlight’ (3rd Edition) has been published in June 2022. This now directly links to the new daylighting standards EN 17037-2018+A1-2021. Aside refinements to the BRE guide, the assessments are the same to what is found within the BRE guide 2nd Edition.

Therefore, with regards to interior daylighting and external sunlight exposure in particular, where different methodologies are found in each of the different standards, all have been carried out for completeness to ensure appropriate and reasonable regard has been taken to address all assessments under all of the different standards.

4 Methodology

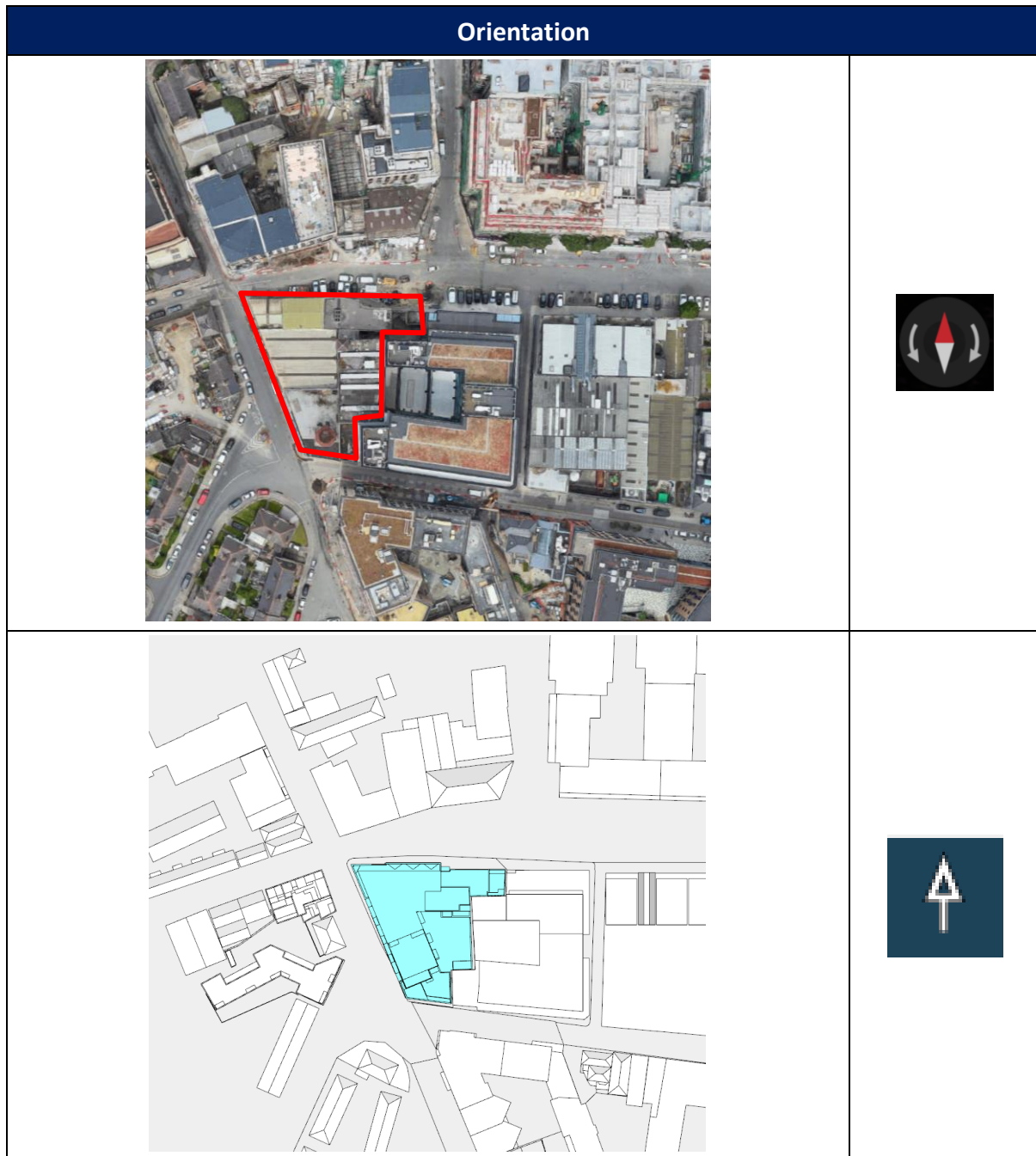
4.1 Reference Standards & Summary of Assessments Undertaken

The various daylight and sunlight assessments that were undertaken using the IES VE software are based on a number of different standards which are referenced in the individual sections of this report. For clarity, the assessments that were undertaken are summarised below as well as the reference standards that were used for each (where applicable):

- **Shadow Analysis**
 - Assessed using shadow images cast at key times throughout the year, i.e. March 21st, June 21st and December 21st to determine if any overshadowing impact occurs and to what extent to any existing neighbouring dwellings in accordance with the BRE Guide (3rd Edition).
- **Sunlight to Amenity Spaces**
 - Assessed using annual Solar Exposure calculations to determine any impact to existing amenities and the sunlight received and also to assess the proposed developments amenity spaces to derive how much sunlight they can expect to receive in accordance with the BRE Guide (3rd Edition).
- **Sunlight to Existing Buildings**
 - Assessed using the Annual Probable Sunlight Hours (APSH) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to sunlight received to the existing neighbouring building main living areas.
- **Sunlight to Proposed Buildings**
 - Assessed using Solar Exposure calculations in accordance with IS/BS EN 17037-2018+A1-2021 (BRE Guide 3rd Edition)
 - The aim is to derive how much sunlight proposed development can expect to receive.
- **Daylight to Existing Buildings**
 - Assessed using the Vertical Sky Component (VSC) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to existing daylight received to the existing building neighbouring the site.
- **Daylight to Proposed Development**
 - Assessed in accordance with IS EN 17037:2018 Method 2 (BRE Guide 3rd Edition)
 - Assessed in accordance with BS EN 17037:2018 National Annex Method 2 (BRE Guide 3rd Edition)
 - The aim is to derive how much daylight will be received within each of the apartments within the proposed development.

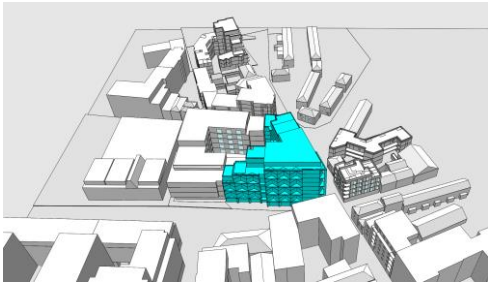
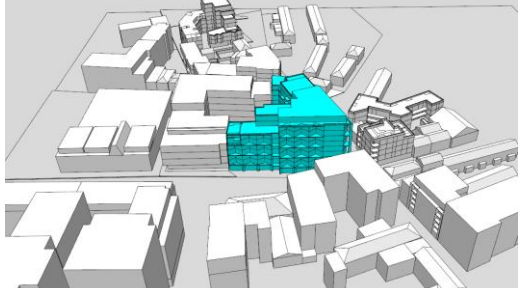
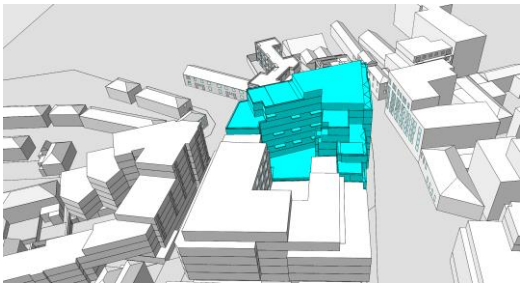
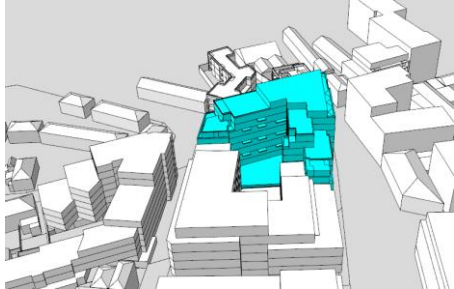
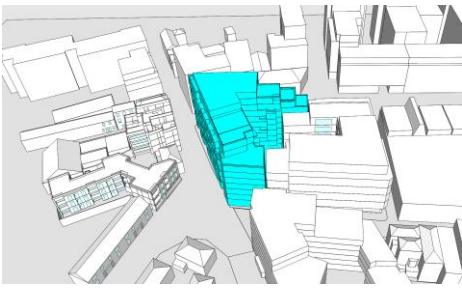
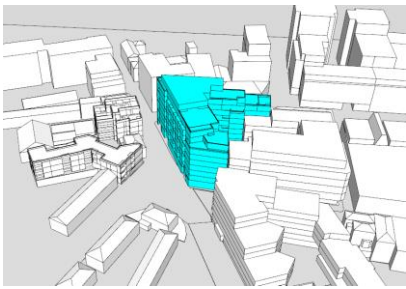
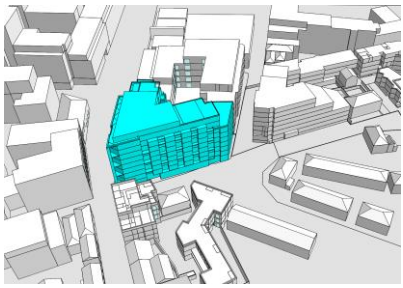
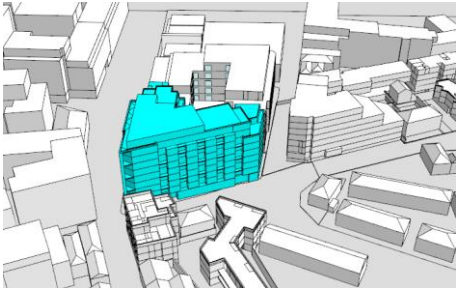
4.2 Orientation

The model orientation has been taken from drawings provided by the Architect with the resulting angle shown below used in the analysis.



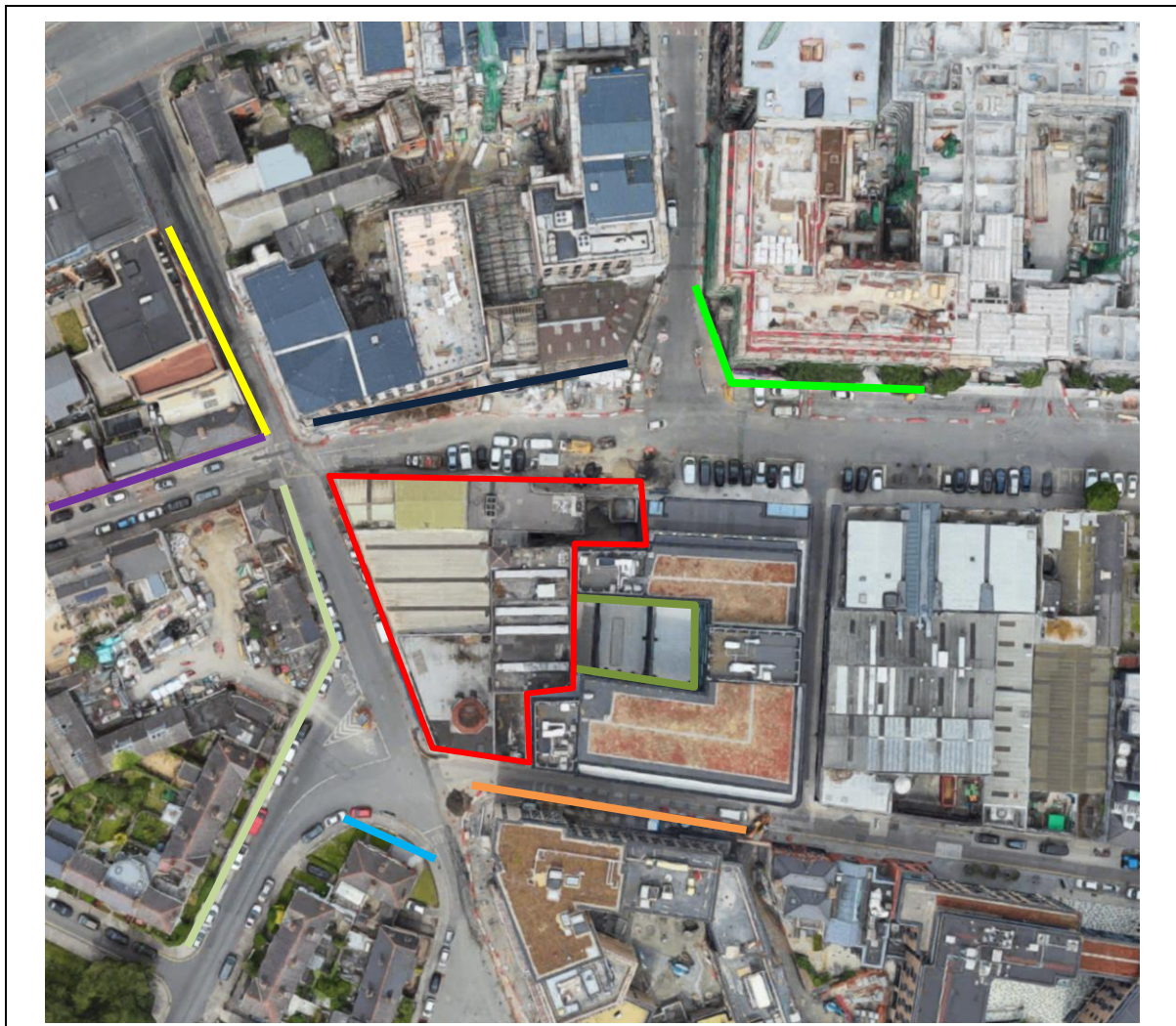
4.3 Proposed Model










The following images illustrate the models created from the architectural information provided and the use of Google/Bing maps where information was absent.

	Permitted Situation	Proposed Scheme
View looking from North of Site		
View looking from East of Site		
View looking from South of Site		
View looking from West of Site		

4.4 Potential Sensitive Receptors

To help understand the potential impact to surrounding buildings, potential sensitive receptors were identified as illustrated below.



	Proposed Site (approximate site boundary)
	Ardee Street (North)
	Chamber Street
	Ardee Street (South)/Oscar Square
	Oscar Square
	Mill Street Student Accommodation
	Newmarket Yards
	Rear Courtyard – The Eight Building (Office development)
	Newmarket Street North

5 Shadow Analysis

The statistics of Met Eireann, the Irish Meteorological Service, show that the sunniest months in Ireland are May and June, based on 1981-2010 averages or latest:

<https://www.met.ie/climate/30-year-averages>.

The following can also be shown:

- During December a mean daily duration of 1.7 hours of sunlight out of a potential 7.3 hours sunlight each day is received (i.e. only 23% of potential sunlight hours).
- During June a mean daily duration of 5.8 hours of sunlight out of a potential 15.9 hours sunlight each day is received (i.e. only 36% of potential sunlight hours).

Therefore, the impacts caused by overshadowing are generally most noticeable during the summer months and least noticeable during the winter months.

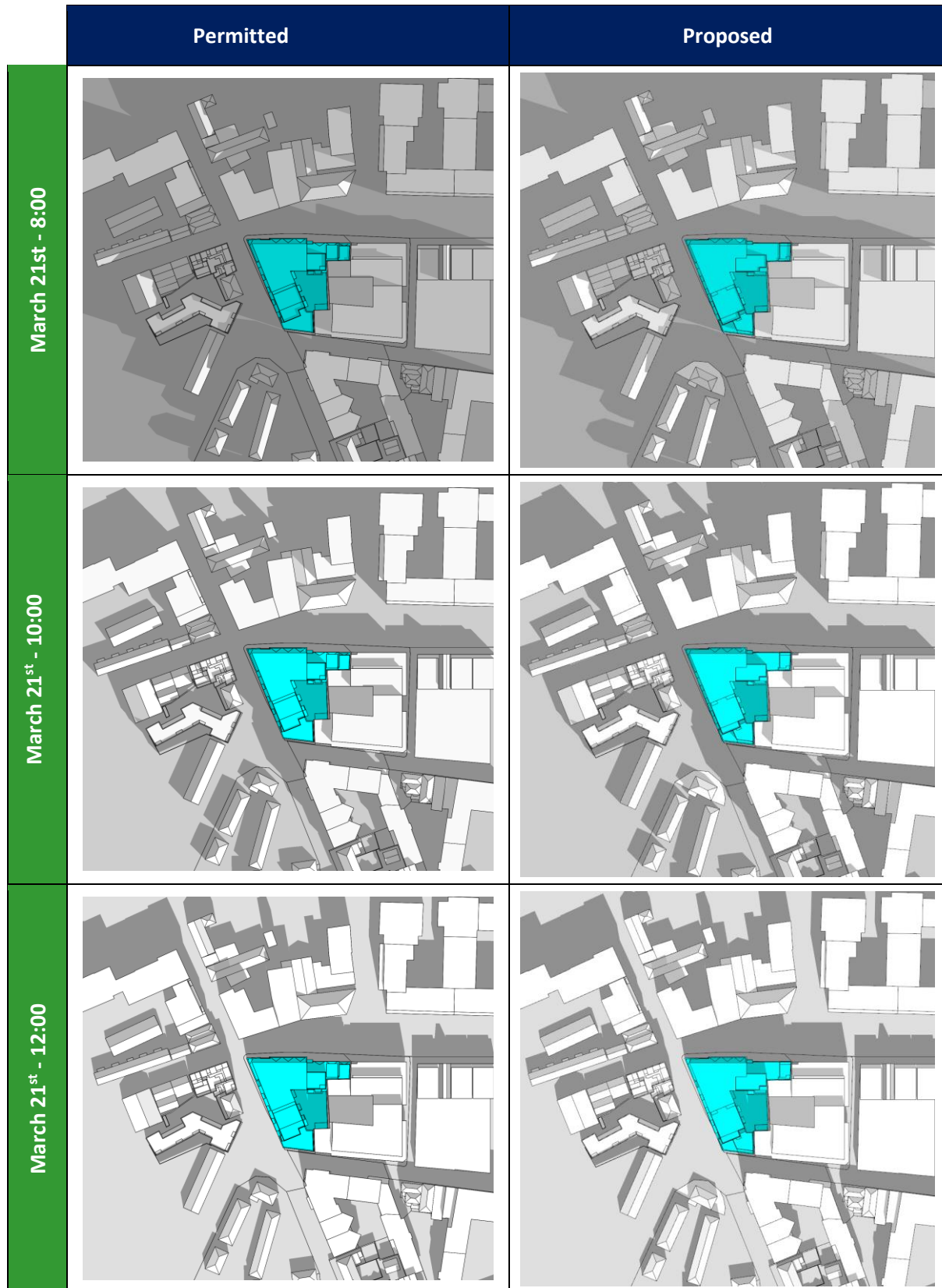
This section will consider the shadows cast by the proposed development on the following dates:

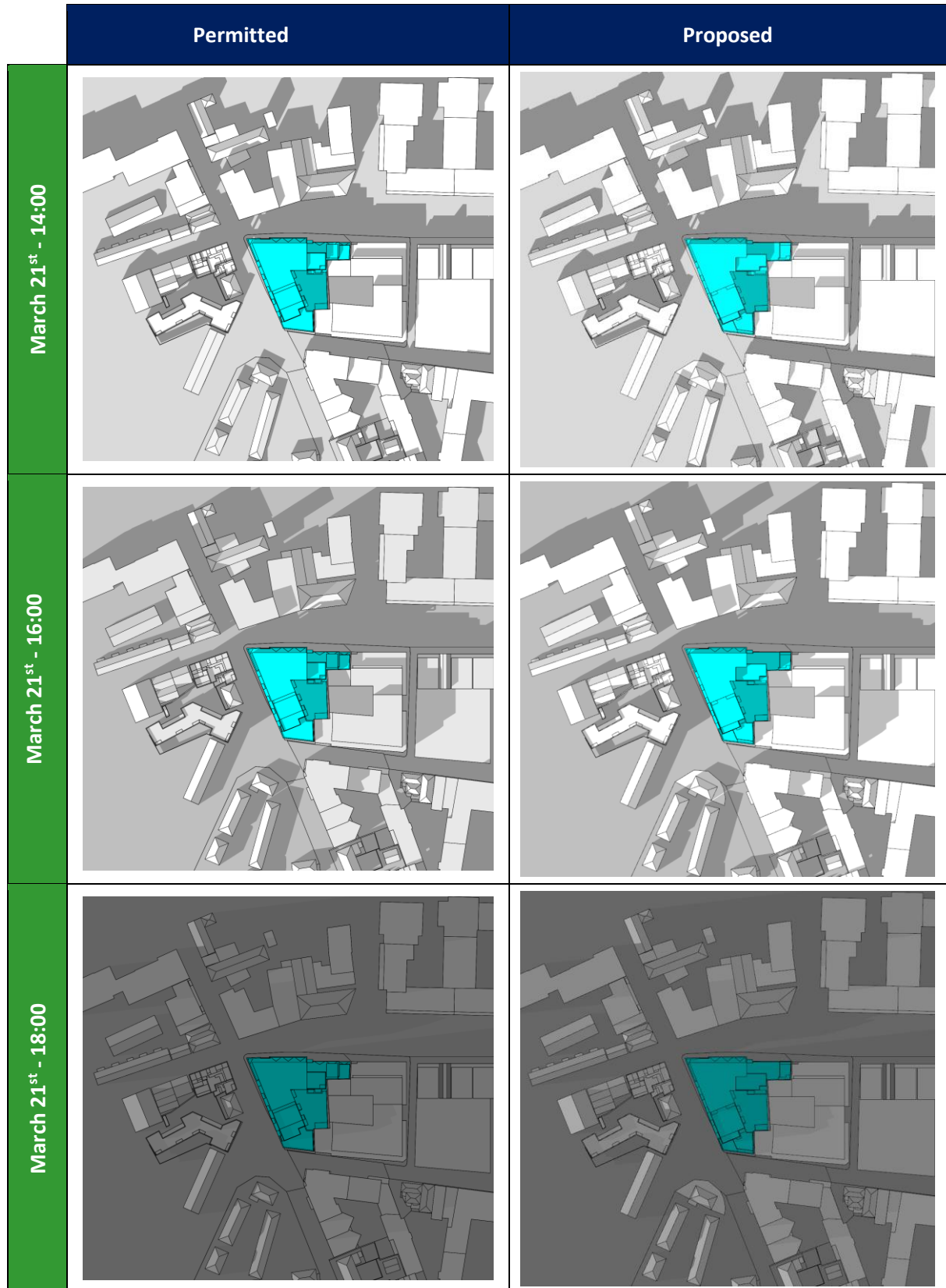
- March 21st / September 21st (Equinox)
- June 21st (Summer Solstice)
- December 21st (Winter Solstice)

These images illustrate shadows cast for 'perfect sunny' conditions with no clouds and assumed that the sun is shining for every hour shown. Given the discussion above it is important to remember that this is not always going to be the case.

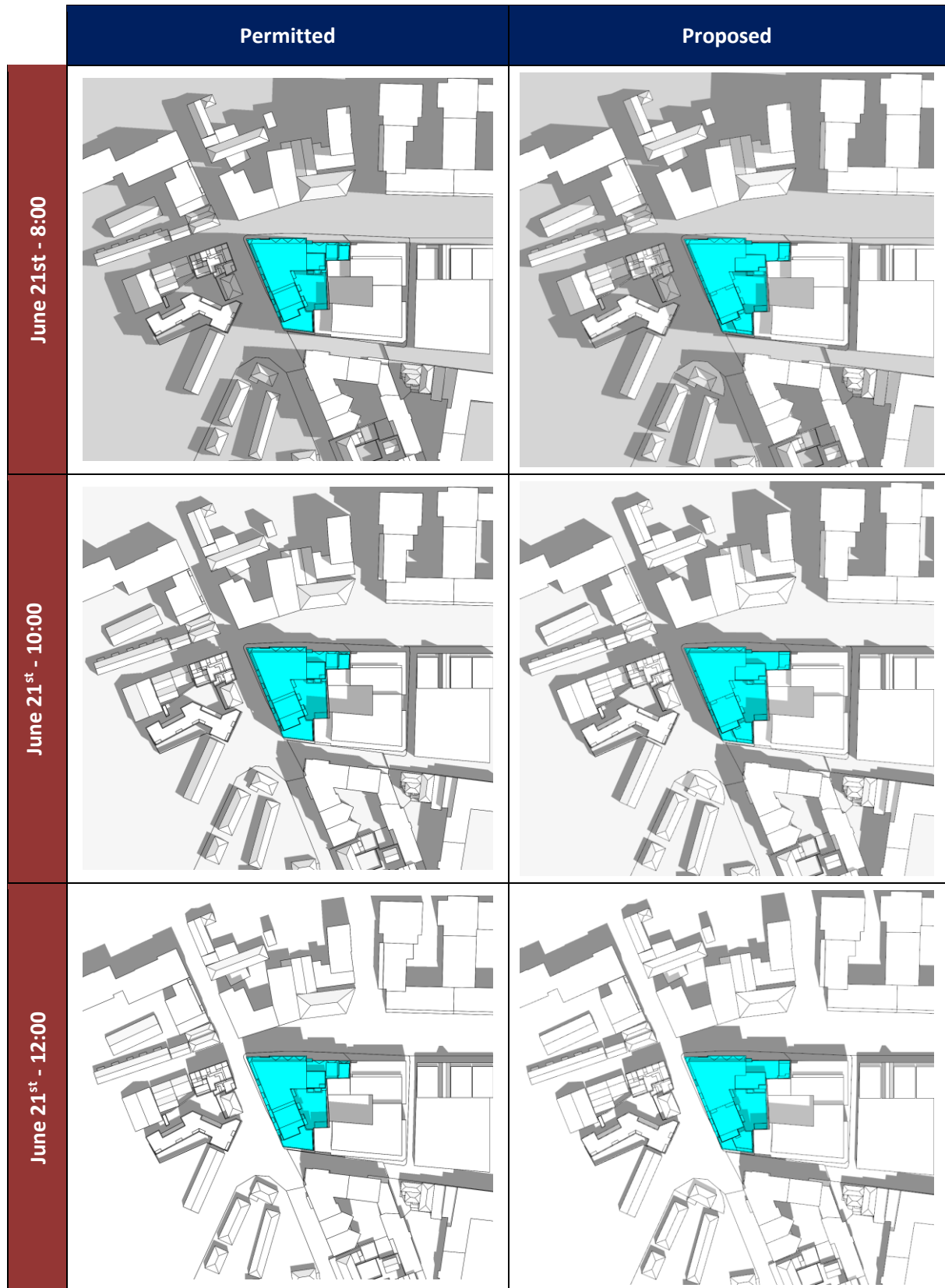
5.1 Plan View

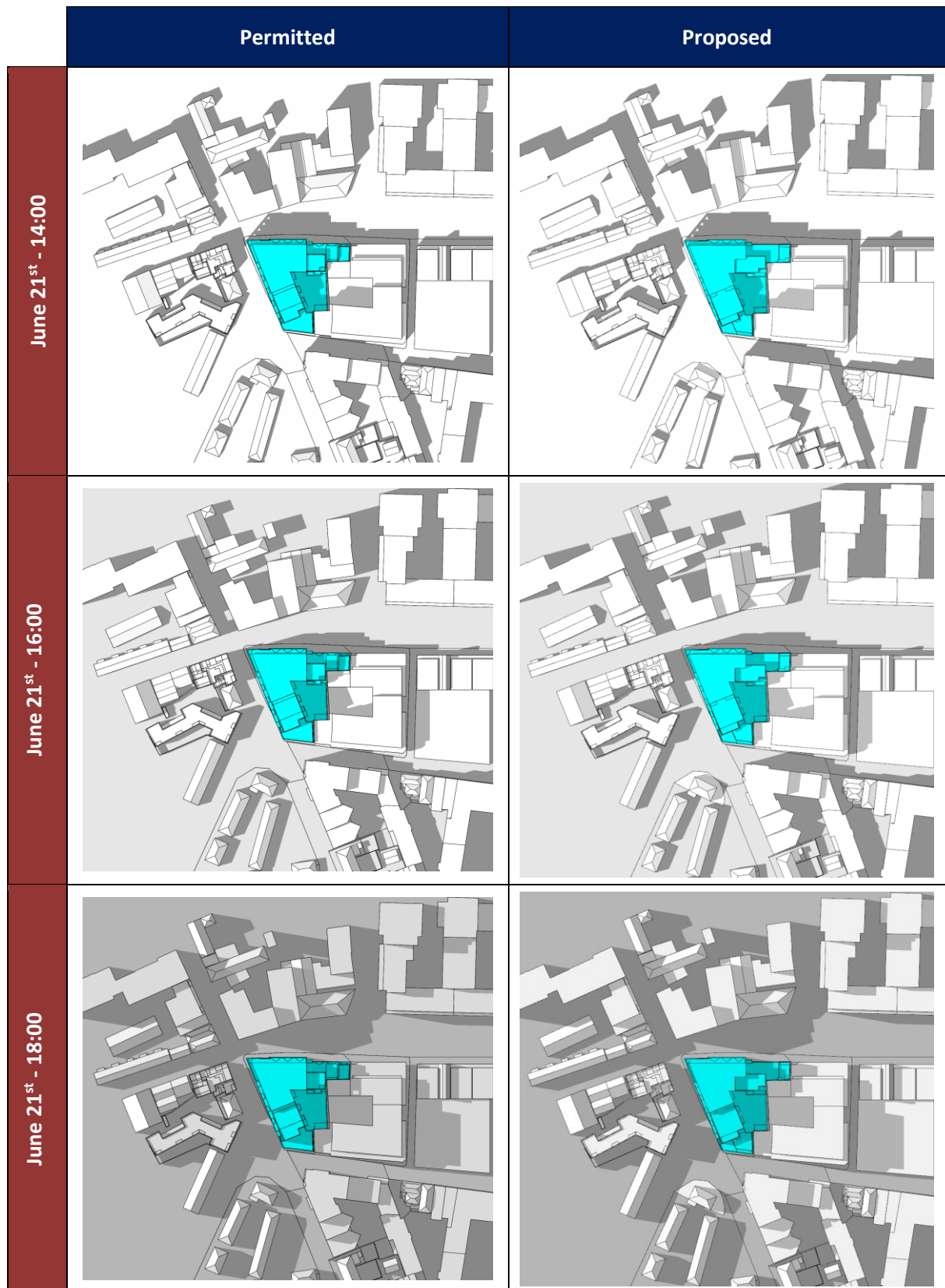
5.1.1 March 21st





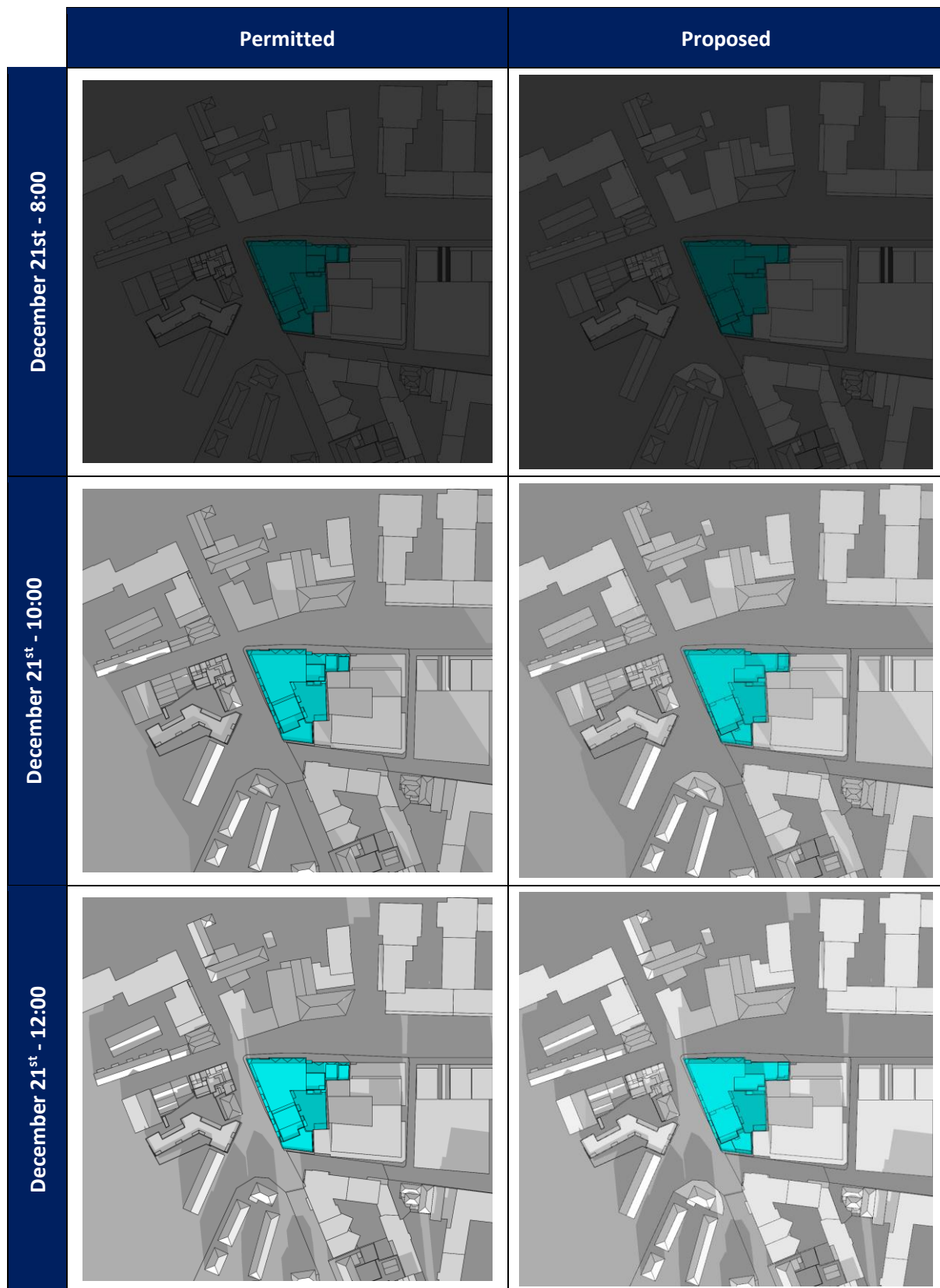
5.1.2 June 21st

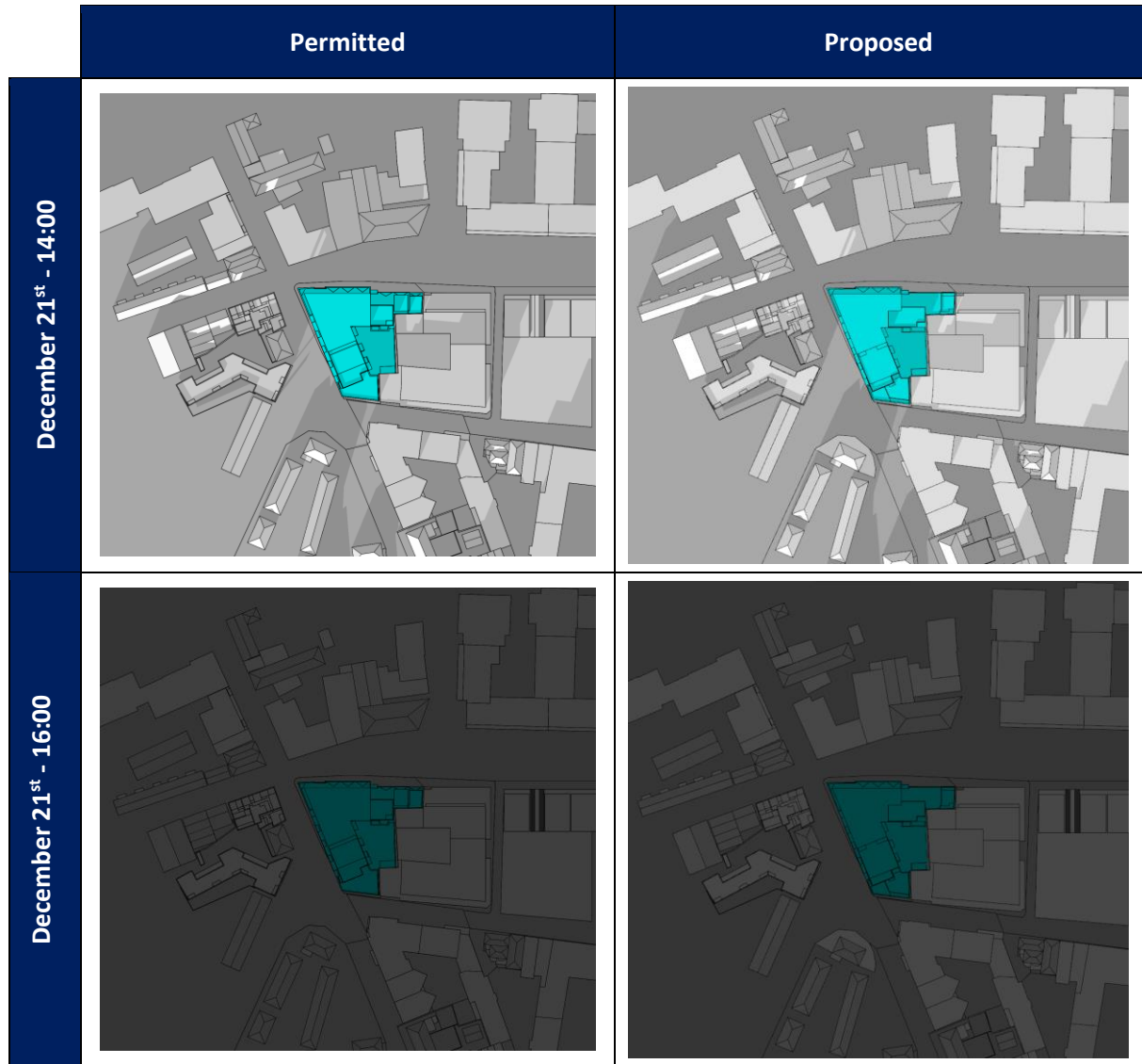






5.1.3 December 21st





5.2 3D View

5.2.1 March 21st

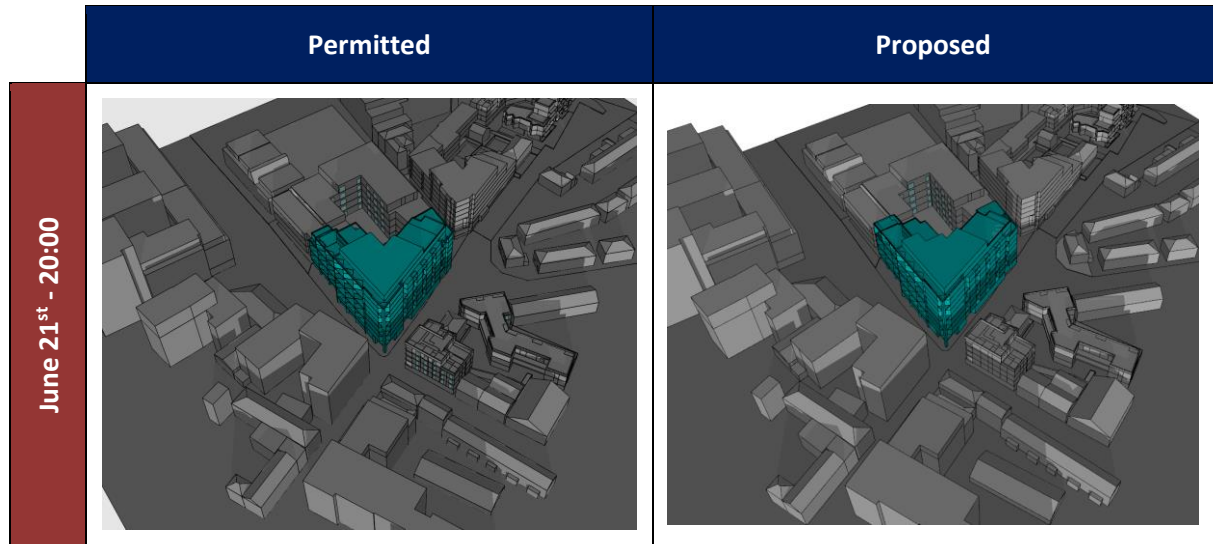
	Permitted	Proposed
March 21 st - 8:00		
March 21 st - 10:00		
March 21 st - 12:00		

	Permitted	Proposed
March 21 st - 14:00		
March 21 st - 16:00		
March 21 st - 18:00		

5.2.2 June 21st

	Permitted	Proposed
June 21 st - 8:00		
June 21 st - 10:00		
June 21 st - 12:00		

	Permitted	Proposed
June 21 st - 14:00		
June 21 st - 16:00		
June 21 st - 18:00		



5.2.3 December 21st

	Permitted	Proposed
December 21 st - 8:00		
December 21 st - 10:00		
December 21 st - 12:00		

	Permitted	Proposed
December 21 st - 14:00		
December 21 st - 16:00		

5.3 Discussion

The shadow analysis illustrates different shadows being cast at key times of the year (March 21st, June 21st and December 21st) for the Existing Situation and the Proposed Scheme. The results from the study are summarised as follows:

Ardee Street (North) / Chamber Street

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Ardee Street (South)

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Oscar Square

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Mill Street Student Accommodation

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Rear Courtyard – The Eight Building (Office development)

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Newmarket Yards

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Newmarket Street North

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

The potential shading impact is quantified via the “Sunlight to Amenity Spaces” and “Daylight to Existing Buildings” sections of this report.

6 Sunlight to Amenity Spaces

6.1 Guidance Requirements

The impact of the proposed development on the sunlight availability to the amenity spaces will be considered to determine how the amenity spaces perform when assessed against the BRE Guide (3rd Edition) which states the following in Section 3.3.17:

Summary

3.3.17 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 that can receive two hours of sun on 21 March is less than 0.80 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March.

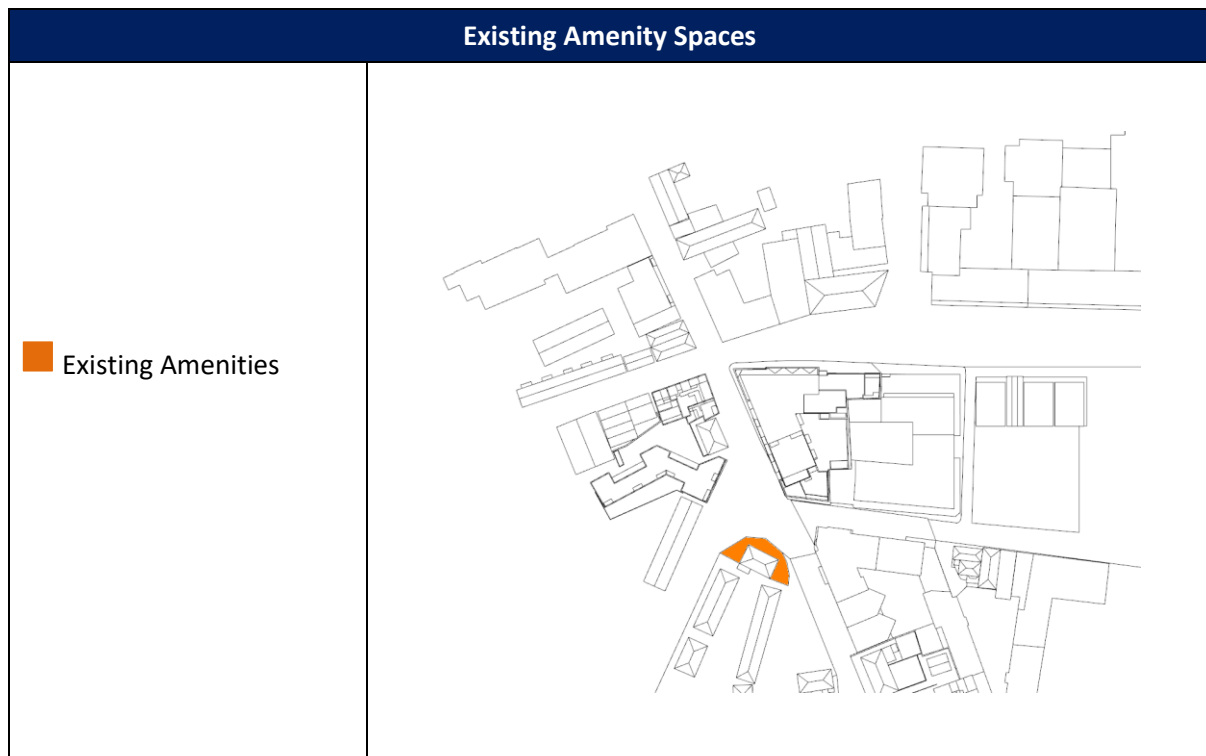
The BRE Guide (3rd Edition) states that for a space to appear adequately sunlit throughout the year, at least half of a garden or amenity space should receive at least 2 hours of sunlight on March 21st.

6.2 Existing and Proposed Amenity Spaces

As outlined in Section 3.3.17 of the BRE Guide (3rd Edition), for a space to appear adequately sunlit throughout the year, at least half of the garden or amenity space should receive at least 2 hours of sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

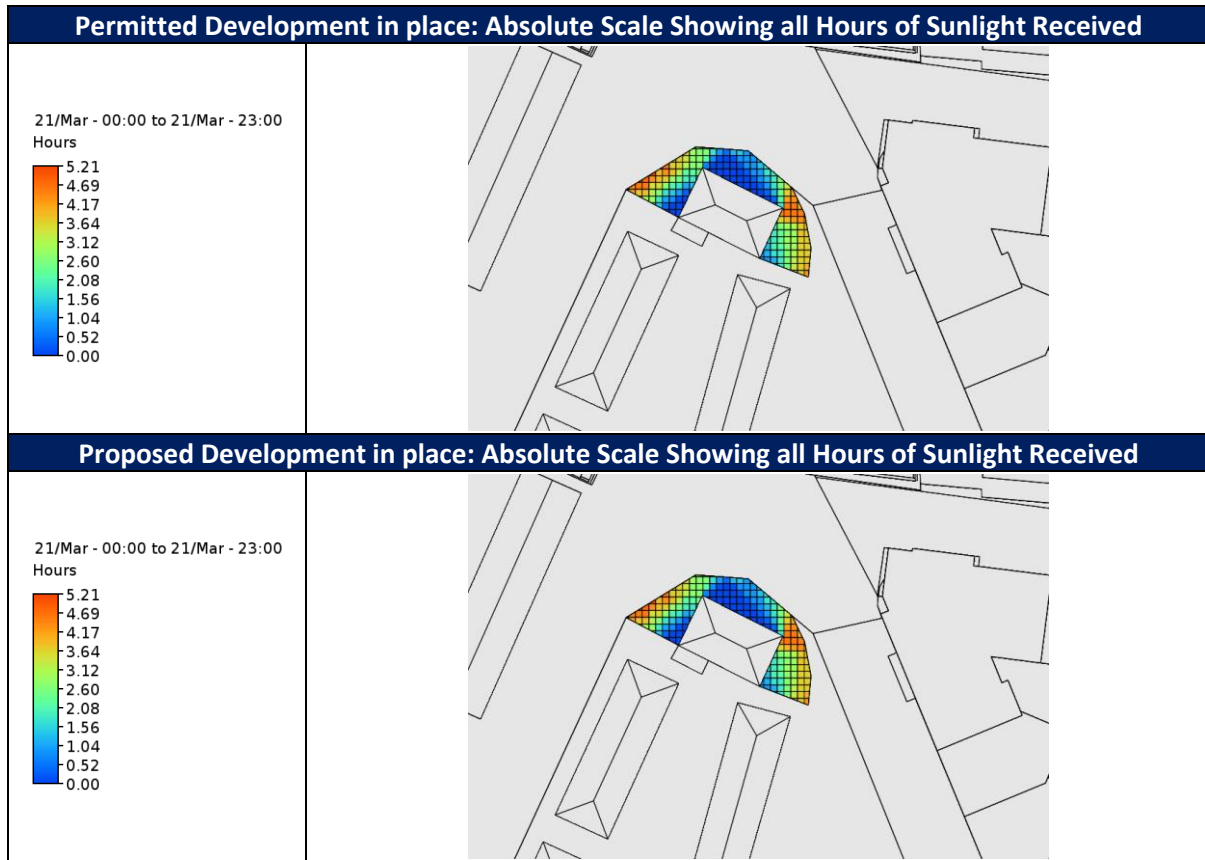
6.2.1 Existing Amenity Spaces

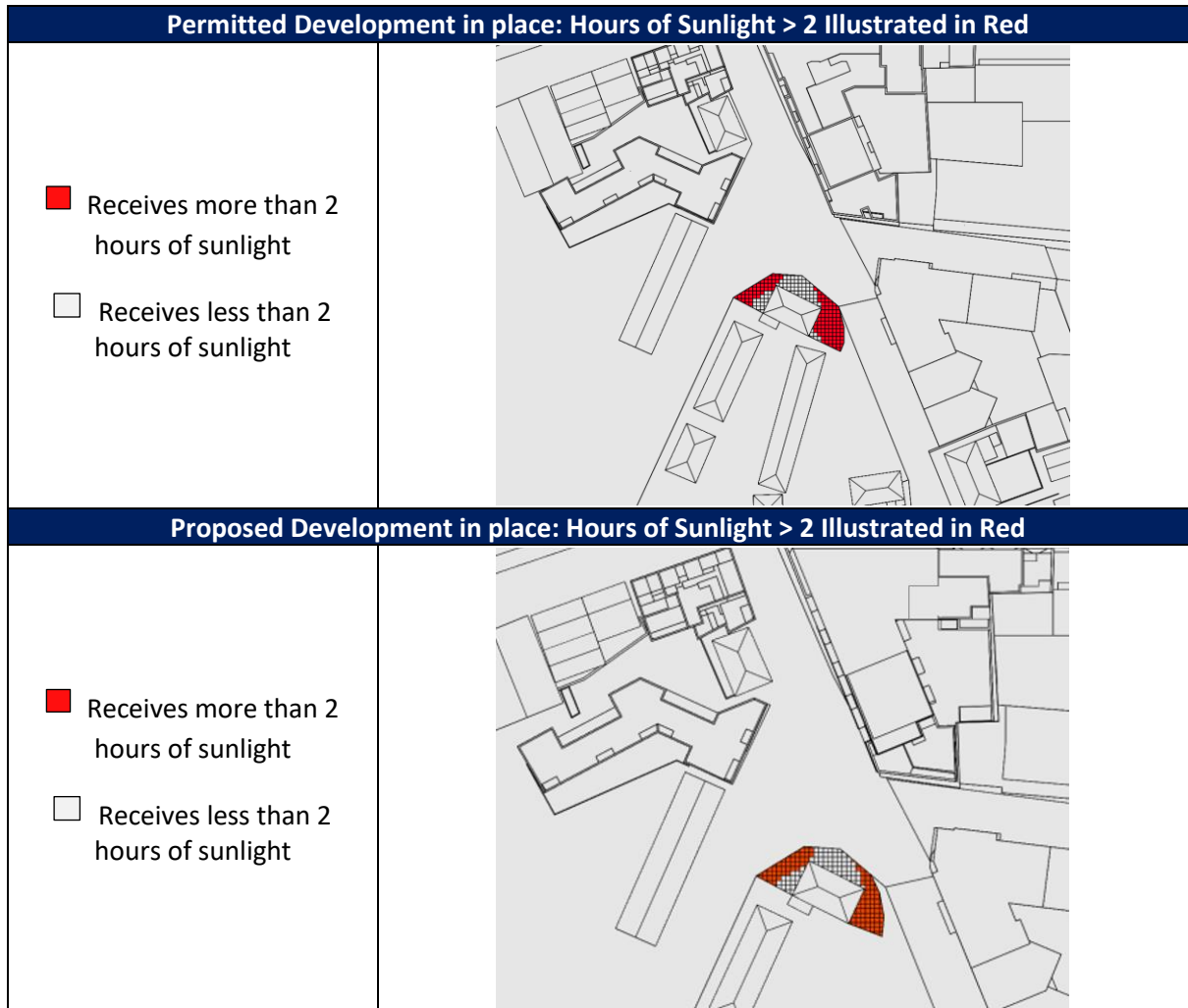
This analysis will be performed on the amenity space illustrated in the image below.



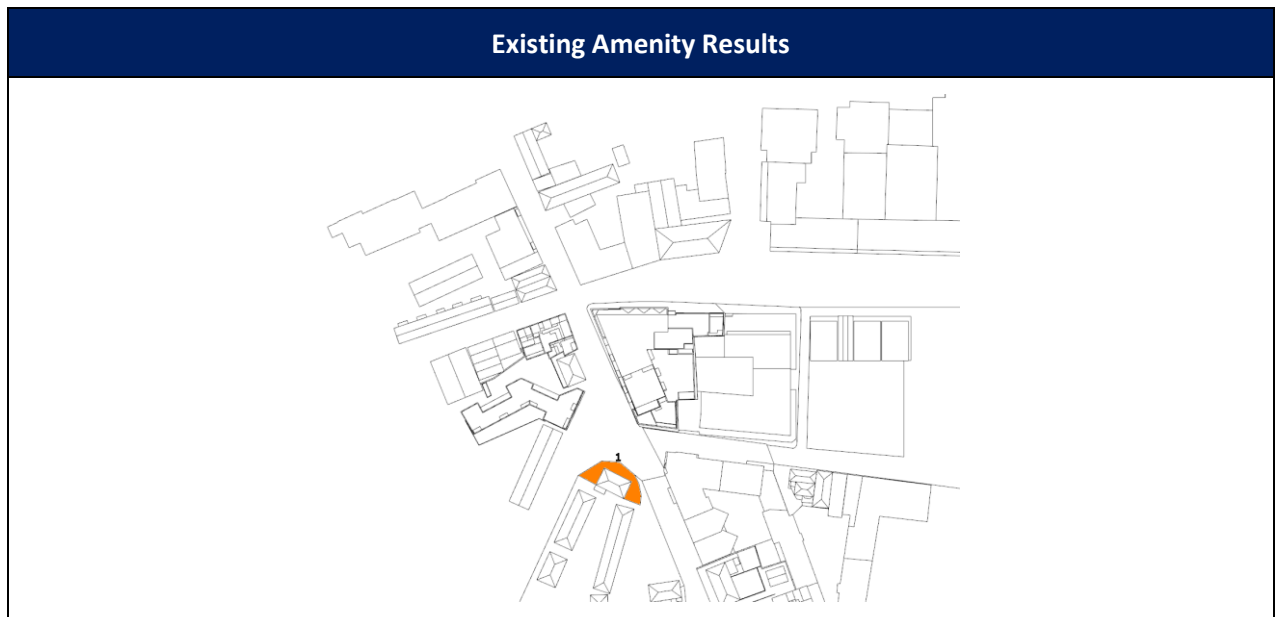
The following images illustrate the predicted results with respect to this space receiving at least 2 hours of sunlight on March 21st. Any areas that receive less than 2 hours of sunlight are colour-coded in grey.

6.2.1.1 Existing Amenity Spaces Results





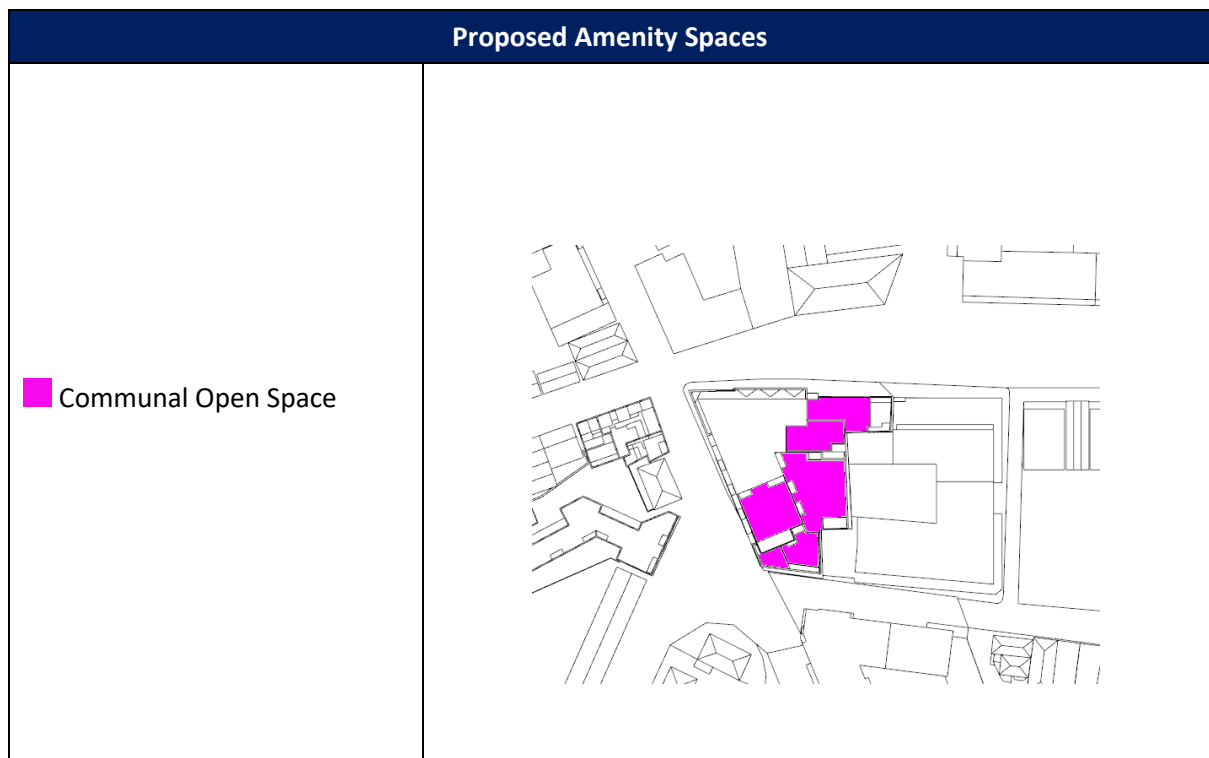
6.2.1.2 Existing Amenity Results



Ref	Area (m ²)	Existing Area with Permitted Development in Place >2 hrs		Existing Area with Proposed Development in Place >2 hrs		Proposed vs Permitted (%)	Comment
		(m ²)	(%)	(m ²)	(%)		
1	170	98.5	58%	98.5	58%	100%	✓

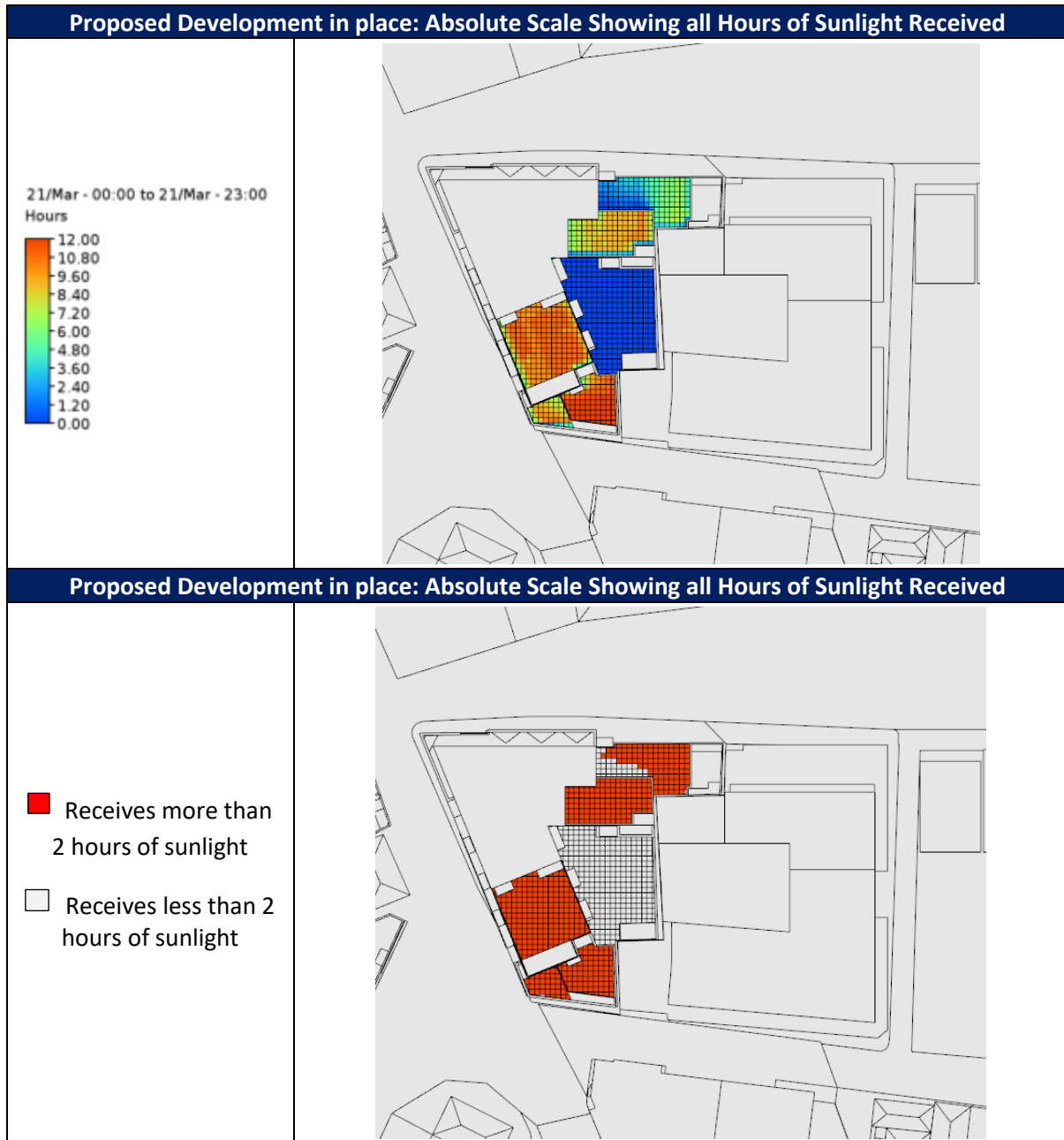
6.2.2 Proposed Amenity Spaces

This analysis will be performed on the amenity spaces illustrated in the image below.

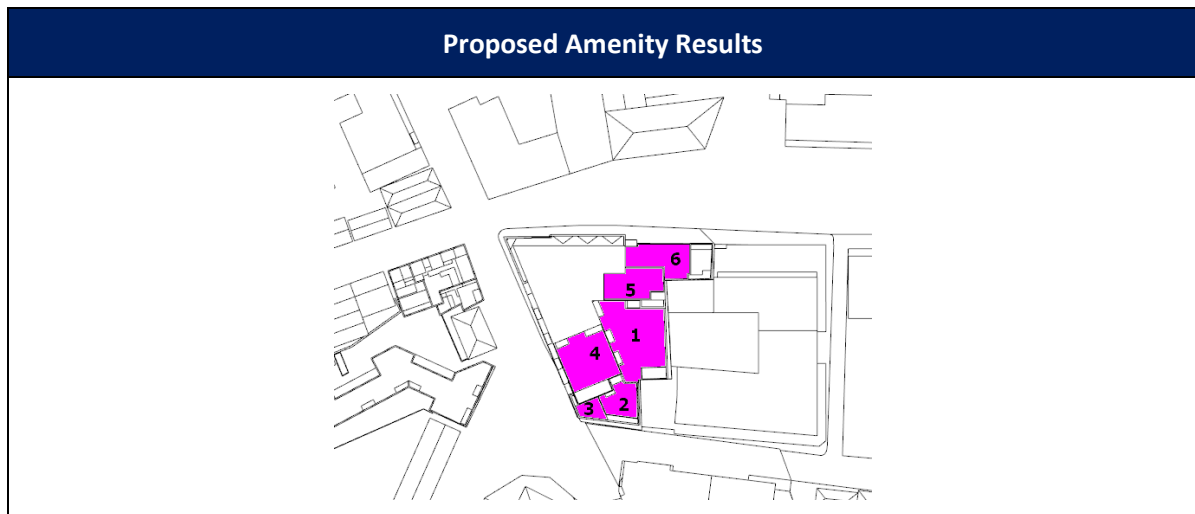


The following images illustrate the predicted results with respect to these spaces receiving at least 2 hours of sunlight on March 21st. Any areas that receive less than 2 hours of sunlight are colour-coded in grey.

6.2.2.1 Proposed Amenity Spaces Results



6.2.2.2 Proposed Amenity Results



Ref	Total Area (m ²)	Area Receiving >2h (m ²)	Percent Receiving >2h	Comment
1 (Courtyard Amenity)	310	0	0%	x
2 (Rooftop Amenity)	78	78	100%	✓
3 (Rooftop Amenity)	35	35	100%	✓
4 (Rooftop Amenity)	193	193	100%	✓
5 (Rooftop Amenity)	129	129	100%	✓
6 (Rooftop Amenity)	127	97	76%	✓
Total	872	532	61%	✓

6.3 Discussion

As outlined in Section 3.3.17 of the BRE Guide (3rd Edition), for a space to appear adequately sunlit throughout the year, at least half of the garden or amenity area should receive at least 2 hours of sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

Existing Amenity Spaces

On March 21st the existing amenity space will receive the same level of sunlight with the proposed development in place when compared to the permitted situation. In all cases the results comply with the recommendations in the BRE Guidelines.

Proposed Amenity Spaces

On March 21st, 61% of the combined proposed amenity areas situated within the development site will receive at least 2 hours of sunlight over their combined area, thus complying with the BRE recommendations which, given the city centre location of the development, are considered very positive. In addition, the roof top terrace areas will be high quality areas to use for the occupants. Nearly 100% of these amenity spaces will receive at least 2 hours of sunlight on March 21st.

7 Sunlight to Existing Buildings

7.1 Guidance – BRE Guide (3rd Edition)

The BRE Guide (3rd Edition) states that interiors where the occupants expect sunlight should receive at least one quarter (25%) of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months, between 21st September and 21st March.

Here 'probable sunlight hours' means the total number of hours in the year that the sun is expected to shine on unobstructed ground, allowing for average levels of cloudiness for the location in question.

If a window reference point can receive more than 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months between 21st September and 21st 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 available sunlight hours are both less than the amount given and less than 0.8 times their former value, either over the whole year or just during the winter months (21st September to 21st March) and reduction in sunlight across the year has a greater reduction than 4%, then the occupants of the existing building will notice the loss of sunlight.

Summary

3.2.13 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 and less than 0.80 times its former annual value; or less than 5% of annual probable sunlight hours between 21 September and 21 March and less than 0.80 times its former value during that period;
- and also has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

BRE 3rd Edition guidance document Site Layout Planning for Daylight and Sunlight

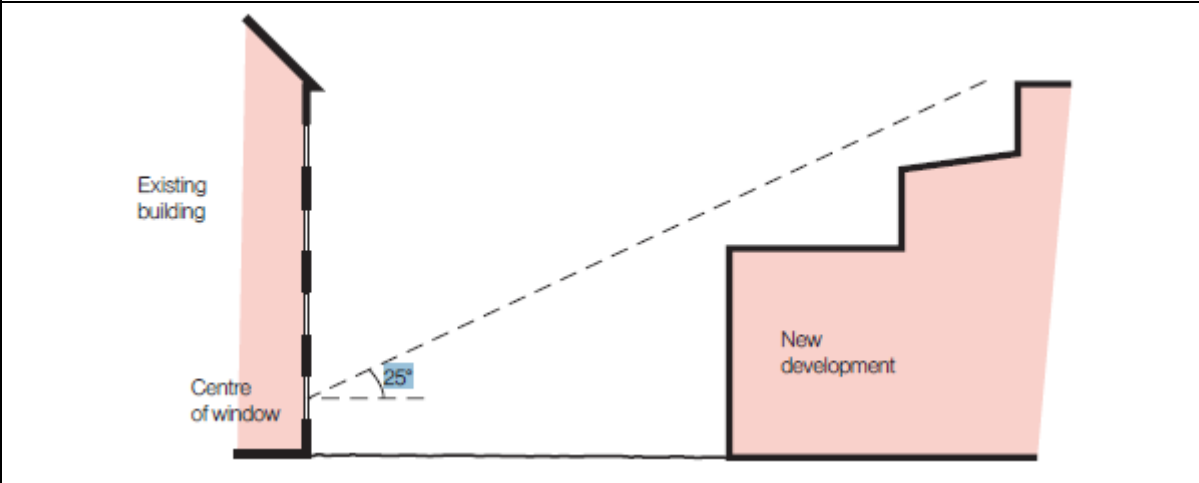
As such this study will compare the existing situation, the permitted situation and the proposed situation (incorporating proposed additional height to permitted development) and consider if the values on the existing surrounding buildings meet the requirements outlined above when compared to their former value (that of the existing situation and the permitted scheme).

7.2 AP SH Exclusions

The BRE recommendations note that if a new development sits within 90° of due south of any main living room window of an existing dwelling, then these should be assessed for AP SH. However, there are several exceptional cases in which AP SH is not required to be calculated, as indicated below:

3.2.9 It is not always necessary to do a full calculation to check sunlight potential. The guideline above is met provided either of the following is true:

- If the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window (note: obstructions within 90° of due north of the existing window need not count here).
- The window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal (Figure 14 in section 2.2). Again, obstructions within 90° of due north of the existing window need not be counted.
- The window wall faces within 20° of due south and the reference point has a VSC (section 2.1) of 27% or more.

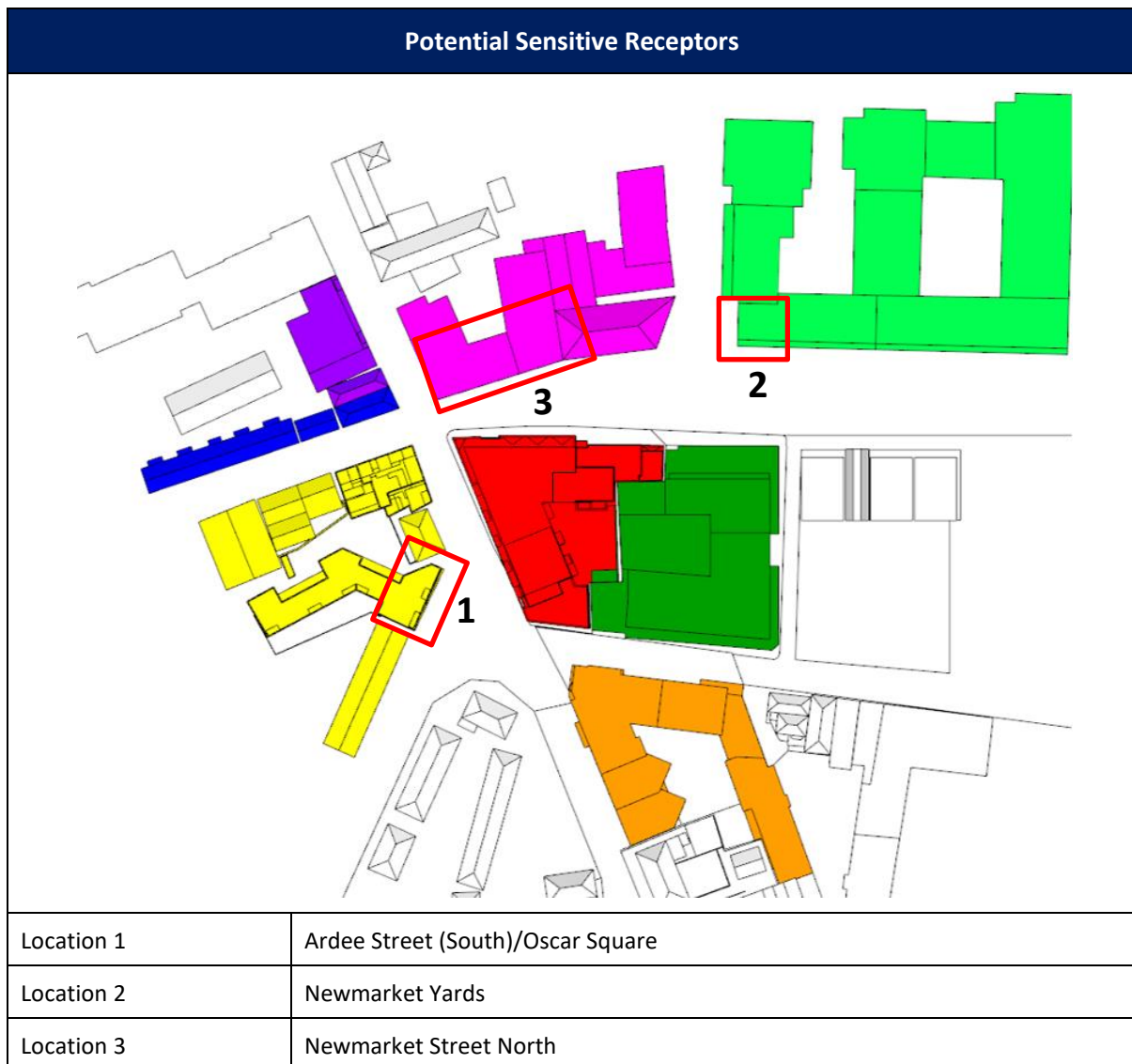


BRE 3rd Edition guidance document Site Layout Planning for Daylight and Sunlight

Consequently, AP SH will only be calculated for adjacent windows which meet the following conditions:

1. The height distance rule is not met and the existing building has living room with a main window which faces within 90 degrees of due south with the 25° rule not being met either.
2. Existing building is located to the North, East, or West of the Proposed Development.
3. The existing main living room window lies within 20 degrees of due south and has a VSC of less than 27%.

The existing neighbours highlighted below have been included in this analysis. The others were not assessed as they will not be impacted by the 2 additional apartments and there will be no change from the permitted situation.



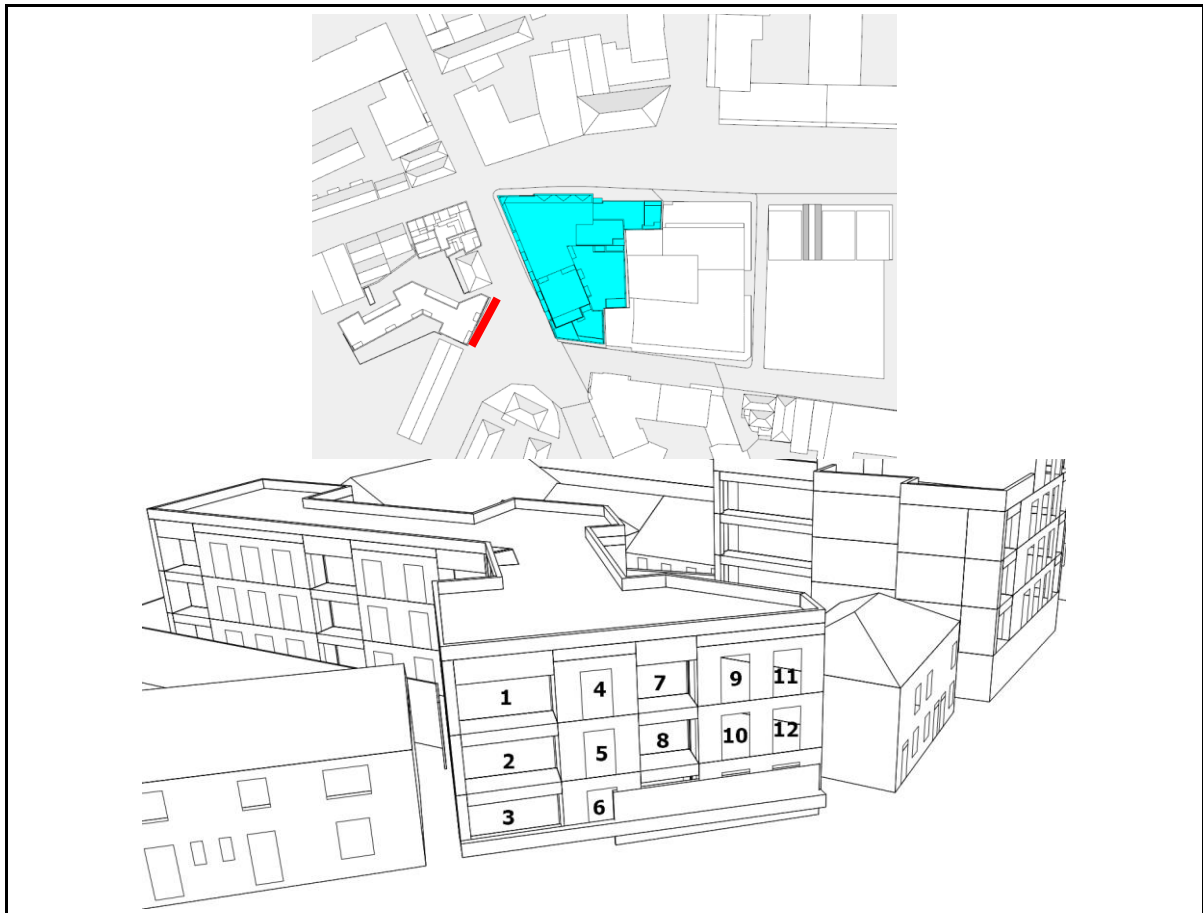
7.3 APSH & Sunlight Exposure Assessment

Based on the above criteria, the locations in the following sections have been modelled and analysed with the results also included.

Please note, the “Comment” symbol in each of the tables represents the following:

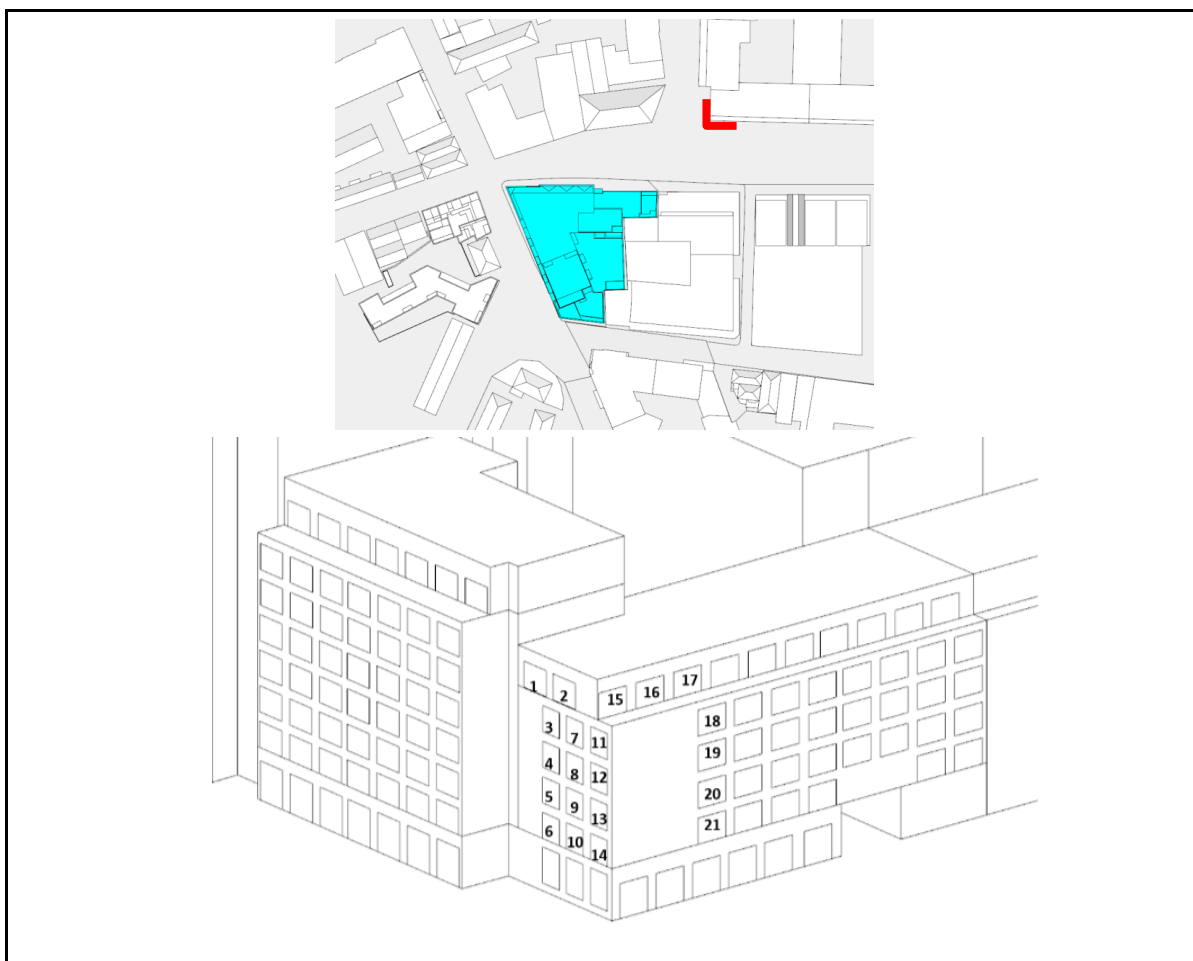
- ✓/✓ For these locations, both the Proposed Scheme annual and winter APSH results are greater than 25% and 5% respectively, or are greater than 0.8 times their former value or are less than 4% overall annual loss with the proposed development in place.
- ✓/x For these locations, the annual APSH results are greater than 25% or are greater than 0.8 times their former value with the proposed development in place, however, the winter results are below the guidelines.
- x/✓ For these locations, the annual APSH results are less than the recommended values, however, the winter APSH results are greater than 5% or greater than 0.8 times their former value with the proposed development in place.
- x/x For these locations, both the annual and winter APSH results are less than 25% and 5% respectively, and less than 0.8 times their former value or are greater than 4% overall annual loss with the proposed development in place.
- ✓/x(*) For these locations, the annual APSH results are greater than 25% or are greater than 0.8 times their former value with the proposed development in place, however, the winter results are below the guidelines. Although this is true the annual sunlight is within 4% or greater than the permitted situation which is an acceptable range with regards to sunlight.

7.3.1 Location 1: Ardee Street South



Ref.	Permitted Scheme APSH		Proposed Scheme APSH		Proposed Scheme APSH as a % of the Permitted Scheme		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	13.56	7.45	13.56	7.45	100%	100%	✓/✓
2	8.77	4.87	8.77	4.87	100%	100%	✓/✓
3	6.89	3.07	6.89	3.07	100%	100%	✓/✓
4	45.71	20.74	45.71	20.74	100%	100%	✓/✓
5	35.84	16.08	35.84	16.08	100%	100%	✓/✓
6	19.54	9.99	19.54	9.99	100%	100%	✓/✓
7	8.62	4.67	8.62	4.67	100%	100%	✓/✓
8	4.69	2.45	4.69	2.45	100%	100%	✓/✓
9	40.72	19.74	40.72	19.74	100%	100%	✓/✓
10	38.91	18.63	38.91	18.63	100%	100%	✓/✓
11	40.46	19.72	40.46	19.72	100%	100%	✓/✓
12	37.13	18.55	37.13	18.55	100%	100%	✓/✓

7.3.2 Location 2: Newmarket Yards



Ref.	Permitted Scheme APSH		Proposed Scheme APSH		Proposed Scheme APSH as a % of the Permitted Scheme		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	27.06	8.29	27.07	8.30	100%	100%	✓/✓
2	29.44	8.52	29.45	8.51	100%	100%	✓/✓
3	25.57	6.60	25.57	6.60	100%	100%	✓/✓
4	26.88	7.85	26.75	7.72	100%	98%	✓/✓
5	29.19	7.43	28.83	7.07	99%	95%	✓/✓
6	28.05	5.18	28.03	5.14	100%	99%	✓/✓
7	27.53	6.60	27.55	6.61	100%	100%	✓/✓
8	27.55	6.75	27.45	6.65	100%	99%	✓/✓
9	28.38	5.90	28.23	5.77	99%	98%	✓/✓
10	28.62	5.17	28.53	5.08	100%	98%	✓/✓
11	27.61	6.16	27.62	6.16	100%	100%	✓/✓
12	27.61	5.90	27.63	5.90	100%	100%	✓/✓
13	26.30	4.89	26.32	4.90	100%	100%	✓/✓
14	26.61	4.85	26.55	4.78	100%	99%	✓/✓
15	63.19	24.58	61.08	22.48	97%	91%	✓/✓
16	65.28	26.13	62.83	23.67	96%	91%	✓/✓
17	62.64	24.51	61.05	22.93	97%	94%	✓/✓



Ref.	Permitted Scheme APSH		Proposed Scheme APSH		Proposed Scheme APSH as a % of the Permitted Scheme		Comment
18	62.73	24.64	61.36	23.27	98%	94%	✓/✓
19	60.83	21.93	59.80	20.91	98%	95%	✓/✓
20	59.01	19.05	59.01	19.06	100%	100%	✓/✓
21	58.35	17.27	58.32	17.23	100%	100%	✓/✓

7.3.3 Location 3: Newmarket Student Accommodation – Ardee Point



Ref.	Permitted Scheme APSH		Proposed Scheme APSH		Proposed Scheme APSH as a % of the Permitted Scheme		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	46.26	11.09	46.26	11.09	100%	100%	✓/✓
2	47.55	11.1	47.55	11.1	100%	100%	✓/✓
3	49.19	10.08	49.19	10.08	100%	100%	✓/✓
4	40.87	9.65	40.87	9.65	100%	100%	✓/✓
5	44.67	10.76	44.67	10.76	100%	100%	✓/✓
6	41.88	7.14	41.88	7.14	100%	100%	✓/✓
7	42.76	6.77	42.76	6.77	100%	100%	✓/✓
8	43.45	6.14	43.45	6.14	100%	100%	✓/✓
9	42.12	5.34	42.12	5.34	100%	100%	✓/✓
10	45.44	5.79	45.44	5.79	100%	100%	✓/✓
11	42.21	9.86	42.21	9.86	100%	100%	✓/✓
12	38.48	6.82	38.48	6.82	100%	100%	✓/✓
13	40.88	6.86	40.88	6.86	100%	100%	✓/✓
14	40.54	5.47	40.54	5.47	100%	100%	✓/✓
15	40.64	5.36	40.64	5.36	100%	100%	✓/✓
16	42.12	4.44	42.12	4.44	100%	100%	✓/✓
17	40.11	9.39	40.11	9.39	100%	100%	✓/✓
18	34.08	5.7	34.08	5.7	100%	100%	✓/✓
19	37.93	6.5	37.93	6.5	100%	100%	✓/✓
20	36.74	5.75	36.74	5.75	100%	100%	✓/✓
21	38.96	4.85	38.96	4.85	100%	100%	✓/✓



Ref.	Permitted Scheme APSH		Proposed Scheme APSH		Proposed Scheme APSH as a % of the Permitted Scheme		Comment
22	40.2	3.18	40.2	3.18	100%	100%	✓/✓
23	35.81	7.8	35.81	7.8	100%	100%	✓/✓
24	28.04	3.47	28.04	3.47	100%	100%	✓/✓
25	31.55	3.93	31.55	3.93	100%	100%	✓/✓
26	32.63	3.12	32.63	3.12	100%	100%	✓/✓
27	33.7	2.85	33.7	2.85	100%	100%	✓/✓
28	38.13	3.4	38.13	3.4	100%	100%	✓/✓

7.4 Discussion

This study considers the proposed development (incorporating the 2 additional apartments) and tests if the Annual Probable Sunlight Hours (APSH) results for the living room windows are greater than 25% annual and 5% winter sunlight or are greater than 0.8 times their former value (that of the permitted) with the proposed development in place or the reduction in sunlight across the year is less than 4% with the proposed development in place.

Only the neighbouring properties that could be affected by the additional 2 apartments were included in this assessment, as there will be no change to the remaining properties.

When compared to the permitted scheme, of the 61 no. points tested, 100% (61 no. points) meet the BRE recommended values over both the annual and the winter periods. The results are very similar to the permitted situation and therefore there will be no impact from the additional 2 apartments on the neighbouring properties.

8 Sunlight to Proposed Development

8.1 Guidance – BRE Guide 3rd Edition / IS/BS EN 17037-2018+A1-2021

Section 5.3.1 of IS/BS EN 17037-2018+A1-2021 states that “*exposure to sunlight is an important quality criterion of an interior space and can contribute to human well-being.*” Table A.6 from IS/BS EN 17037-2018+A1-2021 summarises the recommendation for daily sunlight exposure.

Table A.6 — Recommendation for daily sunlight exposure

Level of recommendation for exposure to sunlight	Sunlight exposure
Minimum	1,5 h
Medium	3,0 h
High	4,0 h

Within the context of a domestic property, BRE Guide 3rd Edition/IS EN 17037:2018 states that at least one habitable space within a dwelling should receive the recommended minimum value of 1.5 hours of sunlight on the 21st of March. The test is carried out on a clear, cloud free day.

8.2 Sunlight Exposure Assessment

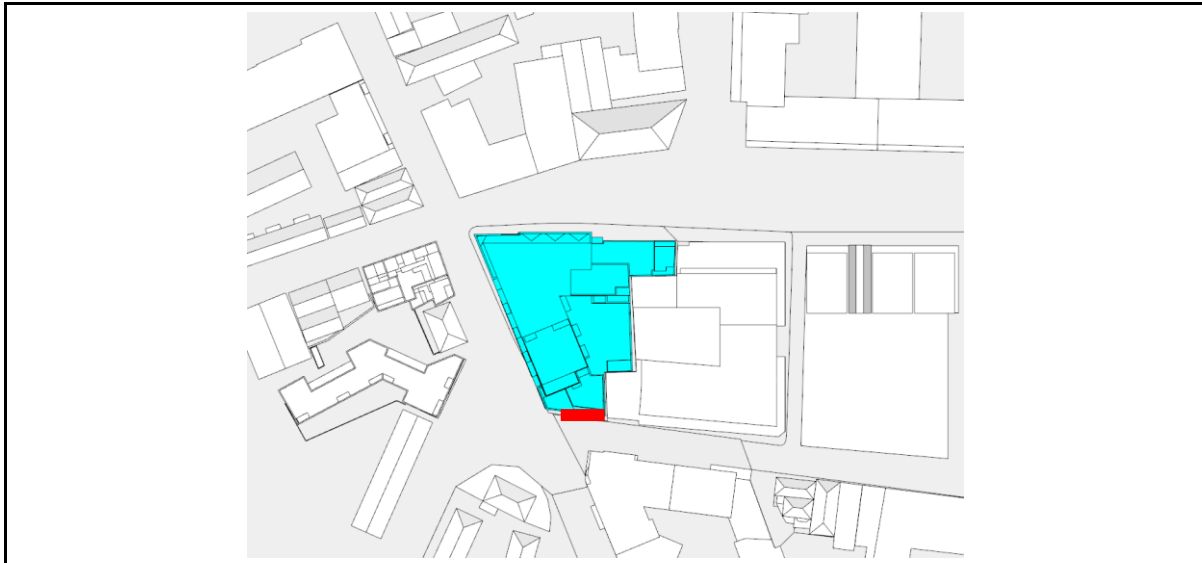
The 2 additional apartments’ main living room windows have been assessed with the results included in the following sections. The overall compliance for the whole development including the additional 2 apartments is shown in the Discussion section.

Please note, the “Comment” symbol in each of the tables represents the following:

BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021

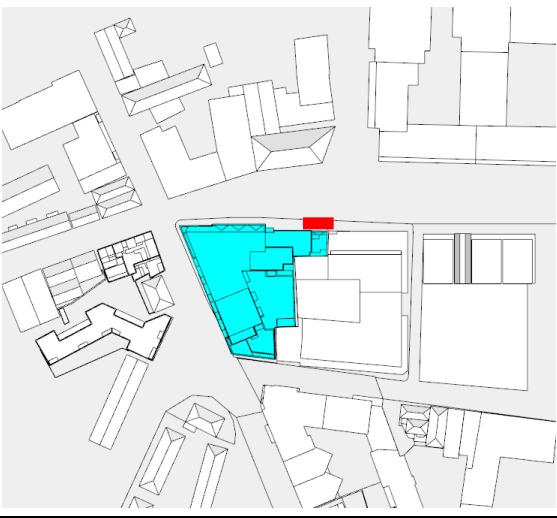

- ✓ These rooms achieve the minimum 1.5 hours of recommended sunlight exposure on March 21st.
- x These rooms do not achieve the minimum 1.5 hours of recommended sunlight exposure on March 21st.

8.2.1 View 01



Ref.	BRE Guide 3 rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs Comment
1	✓

8.2.2 View 02

	
	
Ref.	BRE Guide 3 rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs Comment
1	x

8.3 Discussion

BRE Guide 3rd Edition / IS/BS EN 17037-2018+A1-2021

As the sunlight exposure assessment in accordance with BRE Guide 3rd Edition / IS/BS EN 17037-2018+A1-2021 considers the orientation of the rooms the following should be noted from section 3.1.11 of the guide.

“The BS EN 17037 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.”

For the 2 additional apartments, of the 2 no. points tested, 1 no. points (50%) meet the BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 sunlight exposure recommendations of greater than 1.5 hours on March 21st.

For the total development including the additional 2 apartments, of the 155 no. points tested, 102 no. points (66%), same as the permitted, meet the BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 sunlight exposure recommendations of greater than 1.5 hours on March 21st.

Where windows do not meet this recommendation, this is predominantly as a result of their orientation, or as a consequence of the impact of balcony projections.

Overall, the sunlight provision results to the proposed development in accordance with IS/BS EN 17037-2018+A1-2021 are considered very good in the context of an urban environment, due to the fact that not all living rooms can face south and the inclusion of balconies.

The sunlight exposure results are visually represented in Appendix B.

9 Daylight to Existing Buildings

9.1 Guidance – BRE Guide (3rd Edition) / IS/BS EN 17037-2018+A1-2021

When designing a new development, it is important to safeguard the daylight to nearby buildings. The BRE Guide provides numerical values that are purely advisory. Different criteria may be used based on the requirements for daylighting in an area viewed against other site layout constraints. Another issue is whether the existing building is itself a good neighbour, standing a reasonable distance from the boundary and taking no more than its fair share of light. Any reduction in the total amount of skylight can be calculated by determining the vertical sky component at the centre of key reference points. The vertical sky component definition from the BRE Guide (3rd Edition) is described below:

Vertical sky component (VSC)	This is a measure of the amount of light reaching a window. It is 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.
-------------------------------------	--

The maximum possible VSC value for an opening in a vertical wall, assuming no obstructions, is 40%. This VSC at any given point can be tested in RadianceIES, a module of IES VE.

For typical residential schemes the BRE Guide (3rd Edition) states the following in Section 2.2.7:

2.2.7 If this VSC 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 VSC, with the new development in place, is both less than 27% and less than 0.8 times its former value, occupants of the existing building will notice the reduction in the amount of skylight. The area lit by the window is likely to appear more gloomy, and electric lighting will be needed more of the time.
--

It is also important to note that Section 2.1.6 of the BRE Guide states that if the VSC is between 15% and 27%, special measures such as larger windows can provide adequate daylight (refer to extract below).

2.1.6 The amount of daylight a room needs depends on what it is being used for. But roughly speaking, if θ is:

- greater than 65° (obstruction angle less than 25° or VSC at least 27%) conventional window design will usually give reasonable results.
- between 45° and 65° (obstruction angle between 25° and 45°, VSC between 15% and 27%) special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight.
- between 25° and 45° (obstruction angle between 45° and 65°, VSC between 5% and 15%) it is very difficult to provide adequate daylight unless very large windows are used.
- less than 25° (obstruction angle greater than 65°, VSC less than 5%) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed.

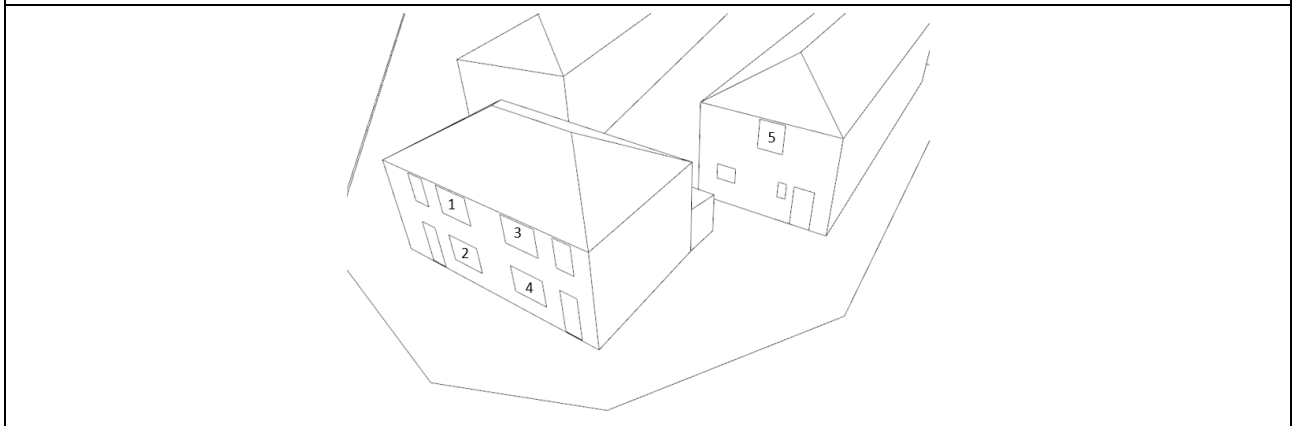
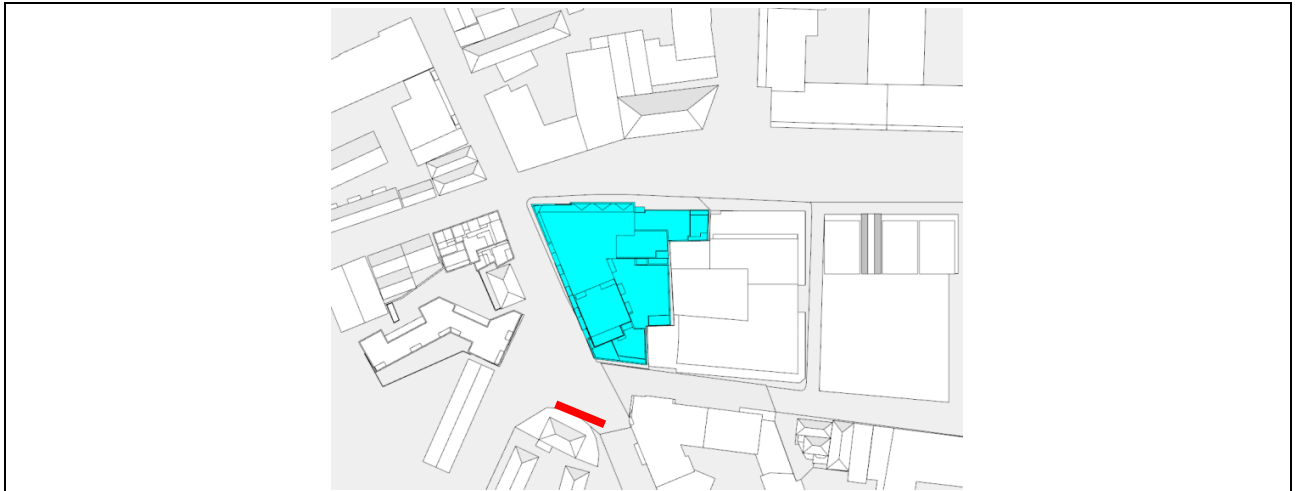
9.2 Assessment

Based on the above criteria, the locations in the following sections have been modelled and analysed with the results also included.

Please note, the “Comment” symbol in each of the tables represents the following:

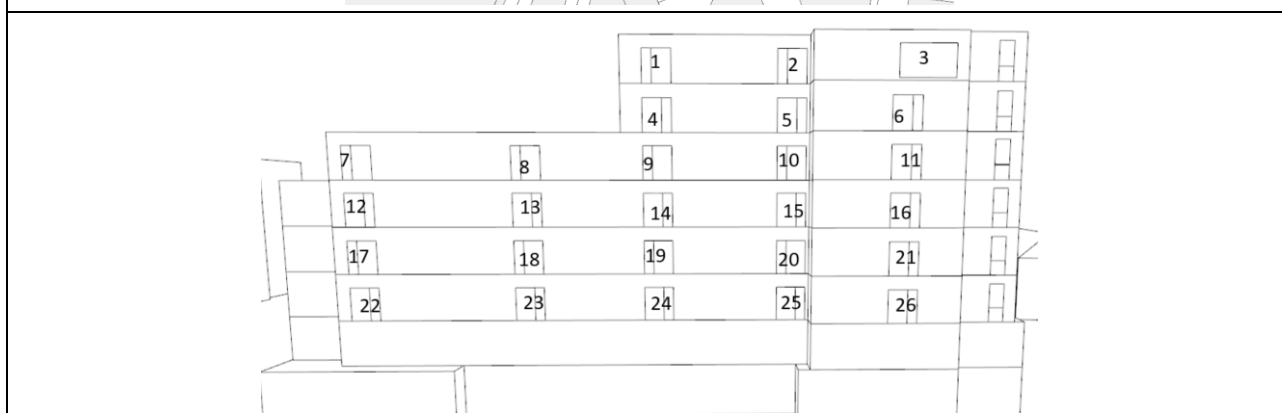
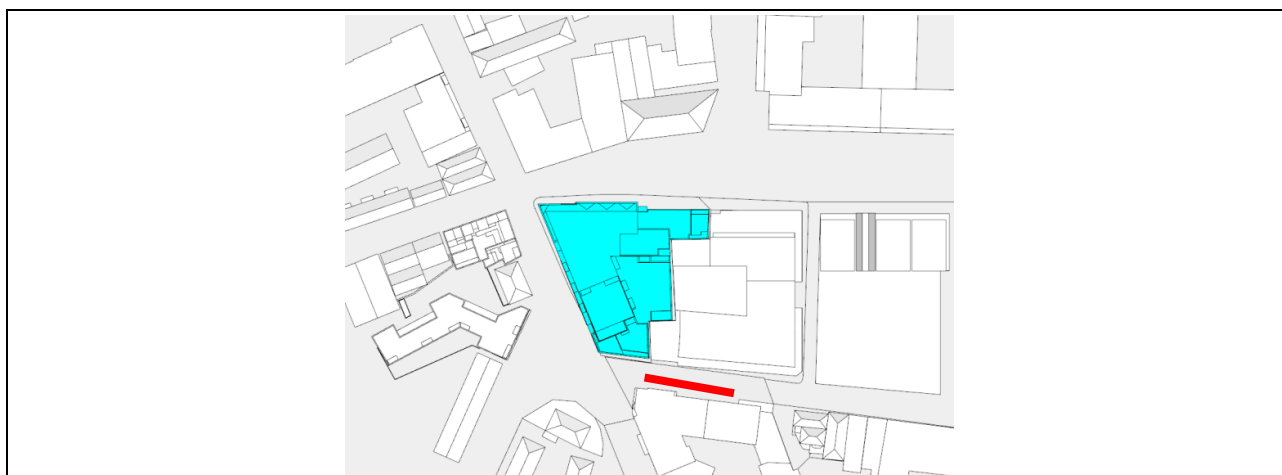
- ✓ For these locations, the Proposed Scheme VSC value is greater than 27% or 0.8 times their former value (that of the Existing Situation/Permitted Scheme).
- ✓¹ For these locations, the Proposed Scheme VSC value is less than 0.8 times its former value (that of the Existing). However, the Proposed Scheme VSC values are between 15% and 27% and hence adequate daylight should still be expected (as per Section 2.1.6 of the BRE Guide) given the presence of larger than conventional windows.
- x For these locations, the Proposed Scheme VSC value is less than 15% and less than 0.8 times its former value (that of the Existing/Permitted Situation), therefore, it does not achieve the BRE recommendations.

9.2.1 View 1: Oscar Square/Ardee Street 2



Ref.	Permitted Scheme VSC	Proposed Scheme VSC	Proposed VSC as a % of Permitted Situation	Comment
1	20.64	20.71	100%	✓
2	21.39	21.23	99%	✓
3	18.45	18.12	98%	✓
4	19.02	19.09	100%	✓
5	27.62	27.46	99%	✓

9.2.2 View 5: Mill Street Student Accommodation

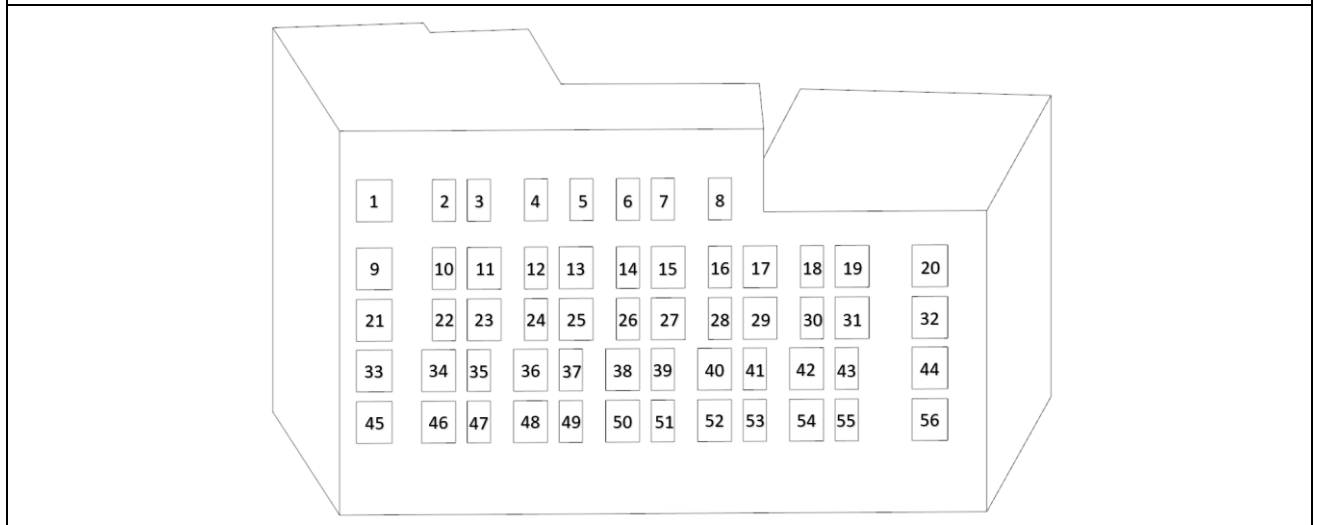


Ref.	Permitted Scheme VSC	Proposed Scheme VSC	Proposed VSC as a % of Permitted Situation	Comment
1	32.27	32.08	99%	✓
2	25.8	25.57	99%	✓
3	32.74	32.68	100%	✓
4	26.45	26.46	100%	✓
5	18.68	18.36	98%	✓
6	27.64	27.23	99%	✓
7	22.96	23.07	100%	✓
8	21.44	21.45	100%	✓
9	21.2	21.28	100%	✓
10	14.49	14.53	100%	✓
11	21.47	21.02	98%	✓
12	18.99	18.85	99%	✓
13	17.2	17.19	100%	✓
14	16.64	16.66	100%	✓
15	11.03	11.06	100%	✓
16	16.1	15.95	99%	✓
17	15.82	15.68	99%	✓



Ref.	Permitted Scheme VSC	Proposed Scheme VSC	Proposed VSC as a % of Permitted Situation	Comment
18	14.05	14.03	100%	✓
19	13.21	13.10	99%	✓
20	8.52	8.59	100%	✓
21	11.9	12	100%	✓
22	12.43	12.48	100%	✓
23	11.28	11.09	98%	✓
24	10.67	10.71	100%	✓
25	7.21	7.27	100%	✓
26	8.97	8.94	100%	✓

9.2.3 View 6: Newmarket Student Accommodation



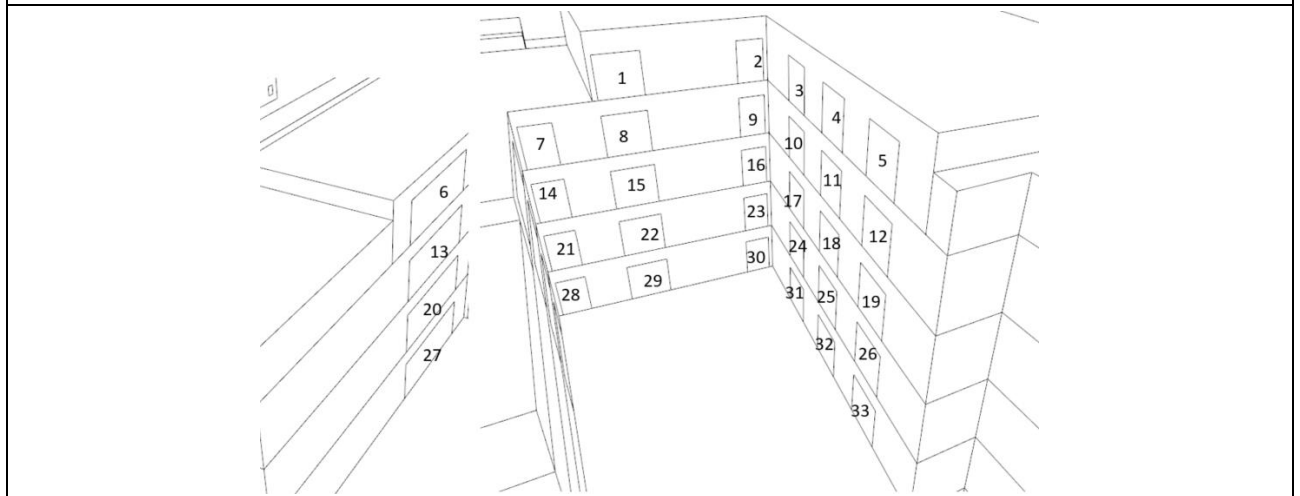
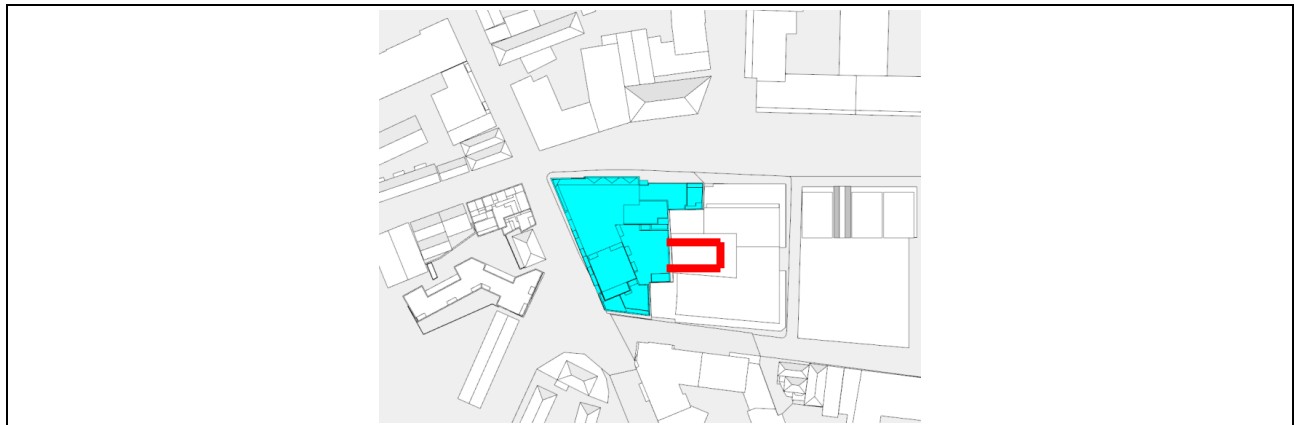
Ref.	Permitted Scheme VSC	Proposed Scheme VSC	Proposed VSC as a % of Permitted Situation	Comment
1	28.66	28.66	100%	✓
2	25.65	25.4	99%	✓
3	24.92	24.74	99%	✓
4	24.25	23.84	98%	✓
5	24.36	23.93	98%	✓
6	24.24	24.3	100%	✓
7	24.38	24.39	100%	✓

Ref.	Permitted Scheme VSC	Proposed Scheme VSC	Proposed VSC as a % of Permitted Situation	Comment
8	24.81	24.8	100%	✓
9	25.15	24.93	99%	✓
10	21.62	21.56	100%	✓
11	20.35	20.31	100%	✓
12	19.59	19.59	100%	✓
13	20.21	19.7	97%	✓
14	20.13	19.87	99%	✓
15	20.17	20.16	100%	✓
16	20.66	20.56	100%	✓
17	21.23	21.13	100%	✓
18	22.56	22.66	100%	✓
19	23.03	23.03	100%	✓
20	24.32	24.31	100%	✓
21	22.22	21.86	98%	✓
22	19.08	18.92	99%	✓
23	17.97	17.73	99%	✓
24	17.19	17.18	100%	✓
25	17.31	17.22	99%	✓
26	16.61	16.6	100%	✓
27	17.33	17.35	100%	✓
28	18.1	18.08	100%	✓
29	18.27	18.3	100%	✓
30	19.65	19.71	100%	✓
31	20.26	20.3	100%	✓
32	22.05	22.06	100%	✓
33	20.06	19.8	99%	✓
34	16.98	16.82	99%	✓
35	15.9	15.34	96%	✓
36	15.17	14.92	98%	✓
37	14.3	14.32	100%	✓
38	15.44	15.06	98%	✓
39	15.3	15.35	100%	✓
40	15.48	15.5	100%	✓
41	15.94	15.95	100%	✓
42	17.08	17.1	100%	✓
43	17.38	17.2	99%	✓
44	19.56	19.5	100%	✓
45	17.57	17.5	100%	✓
46	14.58	14.22	98%	✓
47	13.15	13.2	100%	✓



Ref.	Permitted Scheme VSC	Proposed Scheme VSC	Proposed VSC as a % of Permitted Situation	Comment
48	12.4	12.45	100%	✓
49	12.95	13.9	107%	✓
50	13.04	13.05	100%	✓
51	13.36	13.4	100%	✓
52	13.66	13.5	99%	✓
53	14.06	14.06	100%	✓
54	15.14	15.14	100%	✓
55	15.37	15.3	100%	✓
56	17.72	17.71	100%	✓

9.2.4 View 7: Existing Adjoining Commercial Office Scheme

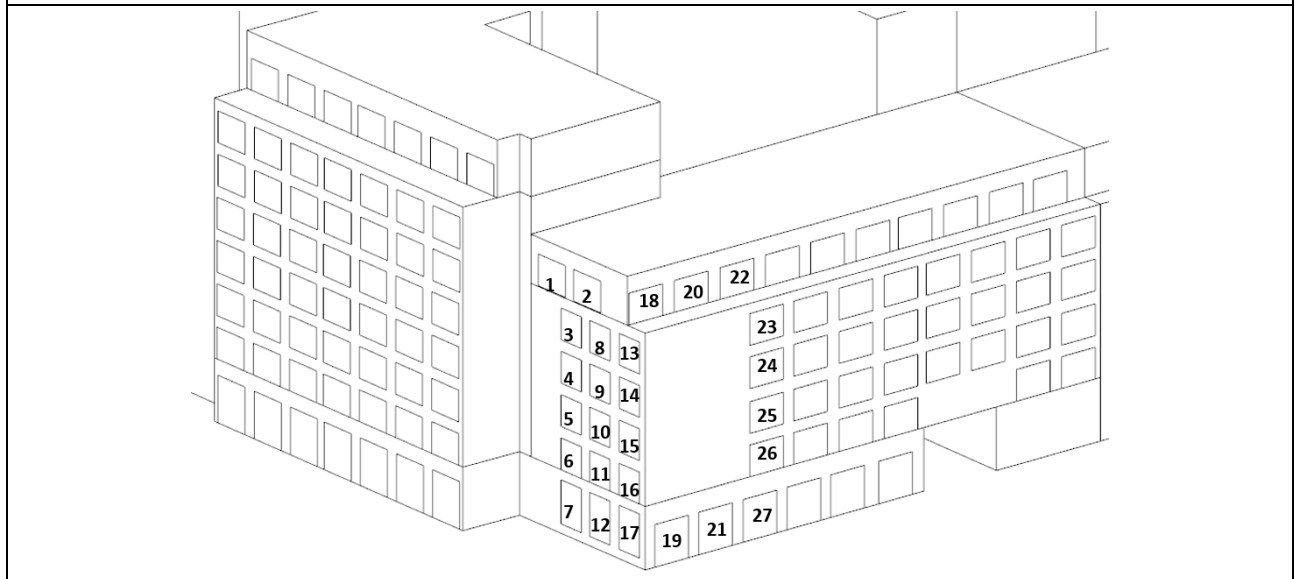
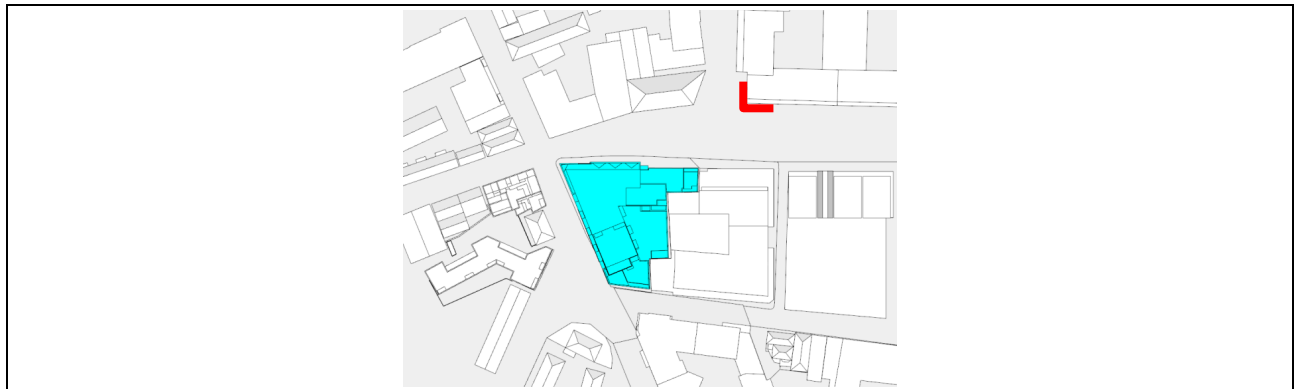


Ref.	Permitted Scheme VSC	Proposed Scheme VSC	Proposed VSC as a % of Permitted Situation	Comment
1	33.83	33.73	100%	✓
2	22.23	22.68	100%	✓
3	33.43	33.57	100%	✓
4	34.88	34.99	100%	✓
5	34.49	34.36	100%	✓
6	25.09	25.06	100%	✓
7	22.31	22.01	99%	✓
8	27.56	27.62	100%	✓
9	17.21	17.62	100%	✓
10	27.51	27.62	100%	✓
11	30.9	30.94	100%	✓
12	30.77	30.63	100%	✓
13	17.8	17.84	100%	✓
14	16.3	16.37	100%	✓
15	20.43	20.53	100%	✓
16	14.38	14.61	100%	✓



Ref.	Permitted Scheme VSC	Proposed Scheme VSC	Proposed VSC as a % of Permitted Situation	Comment
17	20.94	20.71	99%	✓
18	24.5	24.22	99%	✓
19	25.32	24.71	98%	✓
20	12.67	12.47	98%	✓
21	13.13	13.26	100%	✓
22	15.48	15.54	100%	✓
23	12.3	12.35	100%	✓
24	15.47	15.61	100%	✓
25	18.62	18.61	100%	✓
26	19.56	19.27	99%	✓
27	9.13	8.99	98%	✓
28	10.81	10.90	100%	✓
29	12.3	12.13	99%	✓
30	10.01	9.82	98%	✓
31	11.68	11.86	100%	✓
32	13.82	13.73	99%	✓
33	14.59	14.93	100%	✓

9.2.5 View 8: Newmarket Yards



Ref.	Permitted Scheme VSC	Proposed Scheme VSC	Proposed VSC as a % of Permitted Situation	Comment
1	29.26	29.35	100%	✓
2	33.30	33.06	99%	✓
3	29.66	29.49	99%	✓
4	26.94	26.90	100%	✓
5	25.10	25.09	100%	✓
6	22.36	22.57	100%	✓
7	19.95	19.82	99%	✓
8	31.41	31.57	100%	✓
9	29.42	29.74	100%	✓
10	27.23	27.16	100%	✓
11	24.88	24.89	100%	✓
12	21.93	22.10	100%	✓
13	32.83	32.71	100%	✓
14	30.50	30.41	100%	✓
15	28.01	28.21	100%	✓



Ref.	Permitted Scheme VSC	Proposed Scheme VSC	Proposed VSC as a % of Permitted Situation	Comment
16	25.79	25.97	100%	✓
17	23.30	23.65	100%	✓
18	36.75	36.67	100%	✓
19	25.36	25.50	100%	✓
20	37.10	37.05	100%	✓
21	26.31	26.16	99%	✓
22	37.26	37.22	100%	✓
23	36.34	36.26	100%	✓
24	34.77	34.80	100%	✓
25	32.73	32.70	100%	✓
26	30.46	30.11	99%	✓
27	26.77	26.55	99%	✓



9.3 Discussion

This study considers the Proposed Scheme (incorporating the 2 additional apartments) and tests if the VSC results are greater than 27% or not less than 0.8 times the value of the Permitted Situation.

Only the neighbouring properties that could be affected by the additional 2 apartments were included in this assessment as there will be no change to the remaining properties.

When compared to the Permitted Situation, of the 122no. points tested, 100% (122 no. points) have a Proposed VSC value greater than 27% or not less than 0.8 times their former value (that of the permitted development). Therefore the 2 added apartments will not have any impact on the daylight of the neighbouring properties.

10 Daylight to Proposed Development

This section addresses daylight provision to the proposed 2 additional apartments within the development. The purpose of the calculations is to quantify an overall percentage of units which exceeds the daylight provision recommendations. The objective of the design team is to maximise the number of units which exceed the minimum recommendations.

10.1 Reference Standards

The daylight provision to the proposed development was assessed against the following standards:

- BRE Guide (3rd Edition) / IS EN 17037:2018
- BRE Guide (3rd Edition) / BS EN 17037:2018

The following sections summarise the various requirements of each standard.

1.1.1 BRE Guide (3rd Edition) / IS EN 17037:2018

As outlined in Section 5.1.2 of the IS EN 17037:2018 standard:

“A space is considered to provide adequate daylight if a target illuminance level is achieved across a fraction of the reference plane within a space for at least half of the daylight hours. In addition, for spaces with vertical or inclined daylight openings, a minimum target illuminance level is also to be achieved across the reference plane”.

Annex A of IS EN 17037:2018 gives three levels of recommendation for the assessment of daylight provision in interior spaces which are summarised as follows:

“The three levels are: minimum, medium and high, and the minimum recommendation should be provided.”

It is important to note that IS EN 17037:2018 does not provide different illuminance targets for different space types. Therefore, in the case of residential developments; bedrooms, living rooms, kitchens and combined LKDs all have the same daylight provision targets.

Table A.1 of IS EN 17037:2018 (included below) provides recommendations for daylight provision by daylight openings in vertical and inclined surfaces. Note, Table A.2 provides similar recommendations for daylight openings in horizontal surfaces, e.g. rooflights. As there are no rooflights in the proposed development, the recommendations in Table A.2 are not followed.

To achieve the minimum level of daylight provision for vertical and inclined openings as per Table A.1, the following must be achieved:

- A target illuminance (E_T) of 300 lux must be achieved on over 50% of the floor area for over 50% of the available daylight hours, and
- A minimum target illuminance (E_{TM}) of 100 lux must be achieved on over 95% of the floor area for over 50% of the available daylight hours.
- Both targets above must be satisfied for a space to be deemed compliant with the requirements.

Table A.1 — Recommendations of daylight provision by daylight openings in vertical and inclined surface

Level of recommendation for vertical and inclined daylight opening	Target illuminance E_T lx	Fraction of space for target level $F_{plane,%}$	Minimum target illuminance E_{TM} lx	Fraction of space for minimum target level $F_{plane,%}$	Fraction of daylight hours $F_{time,%}$
Minimum	300	50 %	100	95 %	50 %
Medium	500	50 %	300	95 %	50 %
High	750	50 %	500	95 %	50 %

NOTE Table A.3 gives target daylight factor (D_T) and minimum target daylight factor (D_{TM}) corresponding to target illuminance level and minimum target illuminance, respectively, for the CEN capital cities.

The recommendations in Table A.1 can also be expressed in terms of a daylight factor “D”. Table A.3 provides the corresponding daylight factor (D) relative to a recommended target illuminance E_T (lx) and target minimum illuminance E_{TM} (lx) depending on the location for daylight openings in vertical and inclined surfaces. Note, Table A.4 provides similar target values for openings in horizontal surfaces, e.g. rooflights. As there are no rooflights in the proposed development, the recommendations in Table A.4 are not followed.

The extract from Table A.3 below is for Dublin with the daylight factor targets highlighted, i.e. to achieve the target illuminance (E_T) of 300 lux outlined in Table A.1, an equivalent target daylight factor is 2.0%. Furthermore, to achieve the minimum target illuminance (E_{TM}) of 100 lux outlined in Table A.1, an equivalent target daylight factor is 0.7%.

Table A.3 — Values of D for daylight openings to exceed an illuminance level of 100, 300, 500 or 750 lx for a fraction of daylight hours $F_{time,%} = 50\%$ for 33 capitals of CEN national members

Nation	Capital ^a	Geographical latitude φ [°]	Median External Diffuse Illuminance $E_{v,d,med}$	D to exceed 100 lx	D to exceed 300 lx	D to exceed 500 lx	D to exceed 750 lx
Ireland	Dublin	53,43	14 900	0,7 %	2,0 %	3,4 %	5,0 %

Therefore, to achieve the minimum level of daylight provision for vertical and inclined openings as per Table A.3, the following must be achieved:

- A target daylight factor (D_T) of 2.0% must be achieved on over 50% of the floor area for over 50% of the available daylight hours, and
- A minimum target daylight factor (D_{TM}) of 0.7% must be achieved on over 95% of the floor area for over 50% of the available daylight hours.
- Both targets above must be satisfied for a space to be deemed compliant with the requirements.

There are two methods to assess daylight provision to the interior which are based on target values in either Table A.1 or Table A.3 which are summarised as follows:

Method 1: This calculation method uses the daylight factor targets on the reference plane as per Table A.3. The assessment is carried out on a representative day and time during the year, i.e. 21st September @ 12:00 under standard CIE overcast sky conditions.

Method 2: This calculation method uses the illuminance targets on the reference plane as per Table A.1. The assessment is carried out for each hour over the course of the year (8,760 hours) using a local weather file which accounts for varying sky conditions and sun positions throughout the year.

As outlined in Section 5.1.4, the verification of daylight provision can be determined using either an adequate software or on-site measurements. When using a software, *“a representative model of the space is required together with the key parameters (such as any significant nearby obstructions, the assigned surface reflectance values and glazing transmissivity) that are a reasonable representation of those for the actual, completed building. This can be determined using either Method 1 or Method 2.”*

Based on the above criteria, the daylight provision to the proposed development has been assessed using an adequate software (i.e. IES VE), using the Method 2 climate-based approach and targeting the minimum recommended values outlined in Table A.1 of IS EN 17037:2018.

The Method 2 climate-based approach was selected as it is a far more accurate assessment method compared to Method 1. Climate based daylight modelling (CBDM) is more accurate compared to a calculation based on a single day during the year, i.e. Method 1. The amount of daylight varies throughout the year, primarily due to the sun’s position, so it is essential the impact of daylight variance is properly considered. CBDM utilises an annual simulation linking location, shading, climate data (including solar intensity and cloud cover) together with the building properties. This provides a complete overview on how the daylight performance varies throughout the year due to changes in these factors.

1.1.2 BRE Guide 3rd Edition / BS EN 17037:2018 National Annex

In the UK, EN17037:2018 was adopted to form “BS EN 17037:2018”. However, a “National Annex NA” was included which states:

“The UK committee supports the recommendations for daylight in buildings given in BS EN 17037:2018; however, it is the opinion of the UK committee that the recommendations for daylight provision in a space (see Clause A.2) may not be achievable for some buildings, particularly dwellings. The UK committee believes this could be the case for dwellings with basement rooms or those with significant external obstructions (for example, dwellings situated in a dense urban area or with tall trees outside), or for existing buildings being refurbished or converted into dwellings. This National Annex therefore provides the UK committee’s guidance on minimum daylight provision in all UK dwellings.”

Whereas IS EN 17037:2018 does not provide different illuminance targets for different space types, the BS EN 17037:2018 National Annex provides target illuminance values for bedrooms, living rooms and kitchens within residential developments as per Table NA.1 below. It is also important to note that as the climate in Ireland is similar to the UK, the targets outlined in the BS EN National Annex could also be applied to dwellings in Ireland.

Table NA.1 — Values of target illuminance for room types in UK dwellings

Room type	Target illuminance E_T (lx)
Bedroom	100
Living room	150
Kitchen	200

The BS National Annex also states:

“Where one room in a UK dwelling serves more than a single purpose, the UK committee recommends that the target illuminance is that for the room type with the highest value – for example, in a space that combines a living room and a kitchen the target illuminance is recommended to be 200 lx.”

Therefore, combined LKDs are to be assessed using a 200 lux target illuminance (E_T).

Finally, the BS National Annex also states that:

“It is the opinion of the UK committee that the recommendation in Clause A.2 – that a target illuminance level should be achieved across the entire (i.e. 95 %) fraction of the reference plane within a space – need not be applied to rooms in dwellings.”

Therefore, when assessing the daylight provisions in residential dwellings in accordance with BS EN 17037:2018, only the target illuminance (E_T) or target daylight factor (D_T) will be assessed for Bedrooms, Living Rooms, Kitchens (or combined LKDs) on over 50% of the floor area over 50% of the available daylight hours. The minimum target illuminance (E_{TM}) or minimum target daylight factor (D_{TM}) will not be assessed.

Based on the above criteria, the daylight provision to the proposed development has been assessed using an adequate software (i.e. IES VE), using the Method 2 climate-based approach and targeting the minimum recommended values outlined in Table NA.1 of BS EN 17037:2018.

10.2 Daylight Model Inputs

The following inputs were used in the study:

BRE Guide (3rd Edition) / IS EN / BS EN 17037:2018

- Weather File: Dublin.epw (15-year average)

Common Inputs to all Standards

- Working Plane Height: 0.85m
- Glazing Light Transmittance: 70%
- Window Frame thickness: 50 mm

The following surface reflectance values are used in the study:

Material Surface	Reflectance
External Wall	0.20
Internal Partition	0.50
Roof	0.20
Ground	0.20
Floor/Ceiling (Floor)	0.40
Floor/Ceiling (Ceiling)	0.70

10.3 Daylight Results

The following tables summarise the daylight provision results for the 2 additional apartments within the development as well as the total for the entire development including these apartments. Individual room results can be viewed in Appendix A. To note, due to the change in design of the façade the apartment below on level 5 has also been include within the assessment.

The purpose of the calculations is to quantify an overall percentage of rooms which exceed the recommendations. The objective of the design team is to maximise the number of units which exceed the recommendations.

Additional Apartments

The daylight provision results for the 2 additional apartments and the apartment below on level 5 are summarised below. A 83% compliance rate is achieved in accordance with the BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 Method 2 and 100% in accordance with BS EN 17037-2018+A1-2021 Method 2 National Annex.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	3
Total No. LKDs Tested	3
Total No. Spaces Tested	6

BRE Guide 3 rd Edition / IS EN 17037:2018 Method 2 Assessment				
Room Type	Pass (No.)	Pass (%)	Fail (No.)	Fail (%)
No. Bedrooms	3	100%	0	0%
No. LKDs	2	50%	1	50%
Total No.	5	83%	1	17%
BRE Guide 3 rd Edition / BS EN 17037:2018 Method 2 Assessment - National Annex				
Room Type	Pass (No.)	Pass (%)	Fail (No.)	Fail (%)
No. Bedrooms	3	100%	0	0%
No. LKDs	3	100%	0	0%
Total No.	6	100%	0	0%

Total for the Development

The overall daylight provision results for the total of the development including the additional 2 apartments are summarised below. A 90% (same as permitted) compliance rate is achieved in accordance with the BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 Method 2, a compliance rate of 97% (same as permitted) is achieved under BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 Method 2 National Annex.

Rooms Tested	No. Rooms
Total No. Bedrooms Tested	193
Total No. LKDs Tested	135
Total No. Spaces Tested	328



BRE Guide 3rd Edition / IS EN 17037:2018				
Method 2 Assessment				
Room Type	Pass (No.)	Pass (%)	Fail (No.)	Fail (%)
No. Bedrooms	183	95%	10	5%
No. LKDs	111	82%	24	18%
Total No.	294	90%	34	10%

BRE Guide 3rd Edition / BS EN 17037:2018				
Method 2 Assessment - National Annex				
Room Type	Pass (No.)	Pass (%)	Fail (No.)	Fail (%)
No. Bedrooms	193	100%	0	0%
No. LKDs	126	93%	9	7%
Total No.	319	97%	9	3%

11 Conclusion

The following can be concluded based on the assessments undertaken:

11.1 Shadow Analysis

The shadow analysis illustrates different shadows being cast at key times of the year (March 21st, June 21st and December 21st) for the Existing Situation and the Proposed Scheme. The results from the study are summarised as follows:

Ardee Street (North) / Chamber Street

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Ardee Street (South)

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Oscar Square

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Mill Street Student Accommodation

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Rear Courtyard – The Eight Building (Office development)

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Newmarket Yards

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

Newmarket Street North

When compared to the Permitted situation, no additional shading visible from the proposed development on these existing residential properties during the months of March, June and December.

The potential shading impact is quantified via the “Sunlight to Amenity Spaces” and “Daylight to Existing Buildings” sections of this report.

11.2 Sunlight to Amenity Spaces

As outlined in Section 3.3.17 of the BRE Guide (3rd Edition), for a space to appear adequately sunlit throughout the year, at least half of the garden or amenity area should receive at least 2 hours of sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

Existing Amenity Spaces

On March 21st the existing amenity space will receive the same level of sunlight with the proposed development in place when compared to the permitted situation. In all cases the results comply with the recommendations in the BRE Guidelines.

Proposed Amenity Spaces

On March 21st, 61% of the combined proposed amenity areas situated within the development site will receive at least 2 hours of sunlight over their combined area, thus complying with the BRE recommendations which, given the city centre location of the development, are considered very positive. In addition, the roof top terrace areas will be high quality areas to use for the occupants. Nearly 100% of these amenity spaces will receive at least 2 hours of sunlight on March 21st.

11.3 Sunlight to Existing Buildings

This study considers the proposed development (incorporating the 2 additional apartments) and tests if the Annual Probable Sunlight Hours (APSH) results for the living room windows are greater than 25% annual and 5% winter sunlight or are greater than 0.8 times their former value (that of the permitted) with the proposed development in place or the reduction in sunlight across the year is less than 4% with the proposed development in place.

Only the neighbouring properties that could be affected by the additional 2 apartments were included in this assessment, as there will be no change to the remaining properties.

When compared to the permitted scheme, of the 61 no. points tested, 100% (61 no. points) meet the BRE recommended values over both the annual and the winter periods. The results are very similar to the permitted situation and therefore there will be no impact from the additional 2 apartments on the neighbouring properties.

11.4 Sunlight to Proposed Development

For the sunlight to proposed development assessment, this is covered in the following standards.

- IS/BS EN 17037-2018+A1-2021 & the BRE Guide 3rd Edition.

The methodologies discussed in each is the same.

As the sunlight exposure assessment in accordance with BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 considers the orientation of the rooms the following should be noted from section 3.1.11 of the guide.

“The BS EN 17037 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.”

For the 2 additional apartments, of the 2 no. points tested, 1 no. points (50%) meet the BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 sunlight exposure recommendations of greater than 1.5 hours on March 21st.

For the total development including the additional 2 apartments, of the 155 no. points tested, 102 no. points (66%), same as the permitted, meet the BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 sunlight exposure recommendations of greater than 1.5 hours on March 21st.

Where windows do not meet this recommendation, this is predominantly as a result of their orientation, or as a consequence of the impact of balcony projections.

Overall, the sunlight provision results to the proposed development in accordance with IS/BS EN 17037-2018+A1-2021 are considered very good in the context of an urban environment, due to the fact that not all living rooms can face south and the inclusion of balconies.

The sunlight exposure results are visually represented in Appendix B.

11.5 Daylight to Existing Buildings

This study considers the Proposed Scheme (incorporating the 2 additional apartments) and tests if the VSC results are greater than 27% or not less than 0.8 times the value of the Permitted Situation.

Only the neighbouring properties that could be affected by the additional 2 apartments were included in this assessment as there will be no change to the remaining properties.

When compared to the Permitted Situation, of the 122no. points tested, 100% (122 no. points) have a Proposed VSC value greater than 27% or not less than 0.8 times their former value (that of the permitted development). Therefore the 2 added apartments will not have any impact on the daylight of the neighbouring properties.

11.6 Daylight to Proposed Development

BRE Guide 3rd Edition / IS EN 17037:2018

The proposed development has been assessed using the Method 2 climate-based approach and targeting the minimum recommended values outlined in Table A.1 of IS EN 17037:2018. To note, due to the change in design of the façade the apartment below on level 5 has also been include within the assessment.

100% of the 2 additional apartments achieve the recommended daylight levels with regards to this standard. The LKD on level 5 has dropped just below recommendations for this standard but does still meet the recommendations of the more appropriate BS EN standards. Across the proposed

development as a whole, 90% of the tested rooms (same as permitted) are achieving the daylight provision targets in accordance with Table A.1 of IS EN 17037:2018 using Method 2.

BRE Guide 3rd Edition / BS EN 17037:2018 National Annex

In the UK, EN17037:2018 was adopted to form “BS EN 17037:2018”. 100% of the 2 additional apartments and the apartment on level 5 achieve the recommended daylight levels with regards to this standard. Across the proposed development as a whole, 97% of the tested rooms (same as permitted) are achieving the daylight provision targets in accordance with Table NA.1 of BS EN 17037:2018 using Method 2.

11.7 Observations

The daylight results for the 2 additional apartments are consistent with the figures achieved for the granted apartments on the same levels.

It is important to note that the recommendations within the BRE Guide (2nd and 3rd Editions) itself states “*although it gives numerical guidelines these should be interpreted flexibly because natural lighting is only one of many factors in site layout design*”, Although this is true appropriate and reasonable regard has still been taken to the BRE guide.

Whilst the results shown relate to the criteria as laid out in the BRE Guide (2nd and 3rd Editions), it is important to note that the BRE targets are guidance only and should therefore be used with flexibility and caution when dealing with different types of sites.

Taking all of the above information into account and based on the results from each of the assessments undertaken, the proposed development continues to perform well with the addition of these 2 apartments, when compared to the recommendations in the BRE Guide 2nd Edition/ BS 8206-2:2008. With regards to the existing properties there is no impact when considering sunlight and daylight as a result of the proposed 2 additional apartments and the proposed development itself performs very well with the same regard.

12 Appendix A – Daylight Provision Results

The tables in the following sections summarise the daylight provision results for the rooms that were assessed in the proposed development. Note, within the tables the code “LKD” equates to combined Living, Kitchen, Dining area.

The results for the following daylight standard are included in each table:

- BRE Guide (3rd Edition) / IS EN 17037:2018
- BRE Guide (3rd Edition) / BS EN 17037:2018 National Annex

Please note, the “Comment” symbol in each of the tables represents the following:

BRE Guide (3rd Edition) / IS EN 17037:2018

- ✓ These rooms achieve both the target illuminance (E_T) and minimum target illuminance (E_{TM}) over the minimum floor area requirements, i.e. 300 lux for over 50% of their floor area (E_T) and 100 lux for over 95% of their floor area (E_{TM}).
- x These rooms do not achieve both the target illuminance (E_T) and minimum target illuminance (E_{TM}) over the minimum floor area requirements.

BRE Guide (3rd Edition) / BS EN 17037:2018 National Annex

- ✓ These rooms achieve the target illuminance (E_T) over the minimum floor area requirements, i.e. 100 lux for over 50% of bedroom floor areas, and 200 lux for over 50% of LKD floor areas.
- x These rooms do not achieve the target illuminance (E_T) over the minimum floor area requirements.

12.1 Daylight Provision Results

12.1.1 Level 5



Ref.	Room Activity	BRE Guide 3 rd Edition IS EN 17037:2018 Method 2			BRE Guide 3 rd Edition BS EN 17037:2018 Method 2 National Annex	
		Floor Area > E _T (%)	Floor Area > E _{TM} (%)	Comment	Floor Area > E _T (%)	Comment
1	LKD	40	100	x	100	✓
2	BED	100	100	✓	100	✓

12.1.2 Level 6 (Additional Studio)



Ref.	Room Activity	BRE Guide 3 rd Edition IS EN 17037:2018 Method 2			BRE Guide 3 rd Edition BS EN 17037:2018 Method 2 National Annex	
		Floor Area > E _T (%)	Floor Area > E _{TM} (%)	Comment	Floor Area > E _T (%)	Comment
1	Studio	100	100	✓	100	✓

12.1.3 Level 7 (1 Additional Apartment)



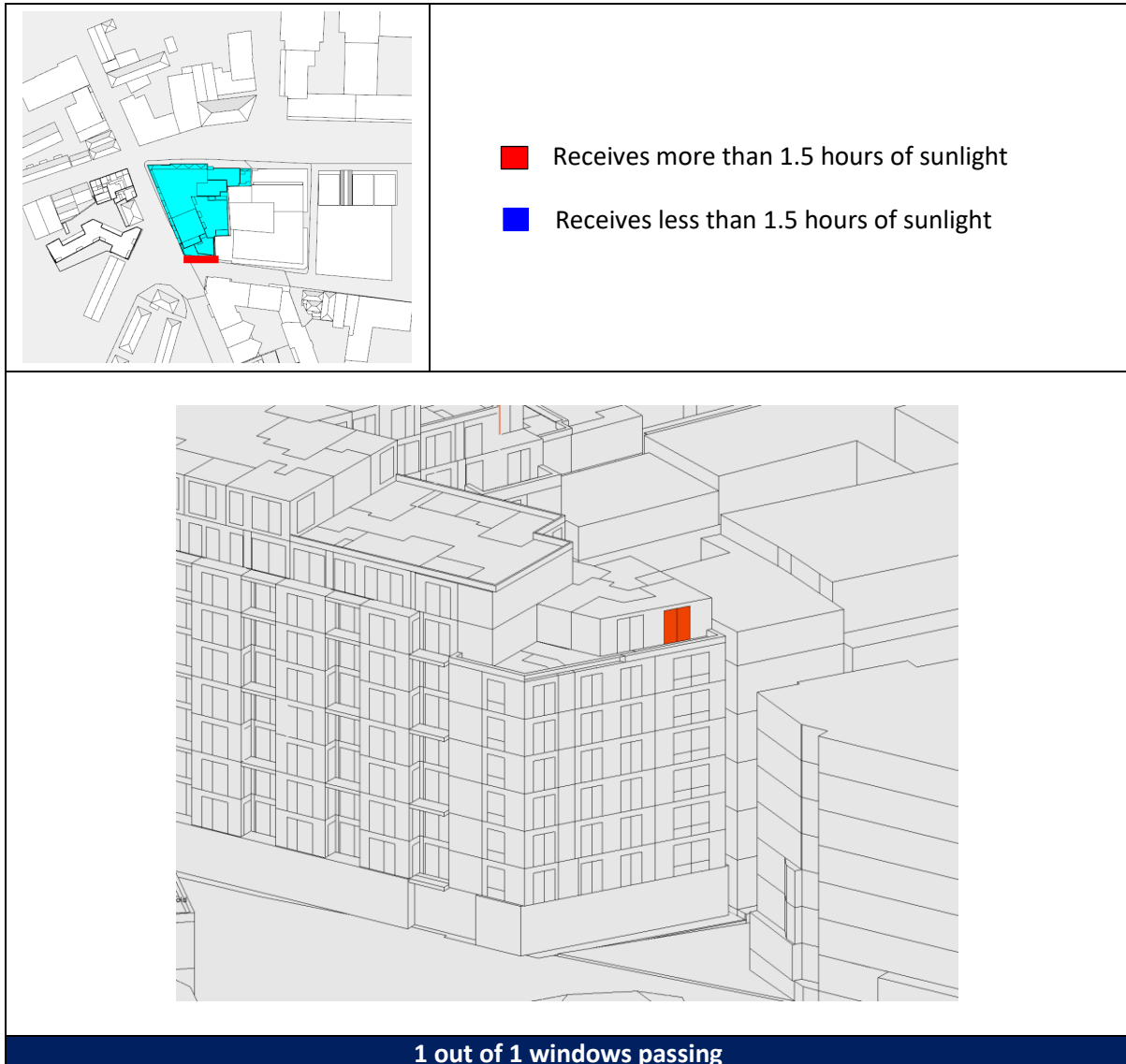
Ref.	Room Activity	BRE Guide 3 rd Edition IS EN 17037:2018 Method 2			BRE Guide 3 rd Edition BS EN 17037:2018 Method 2 National Annex	
		Floor Area > E _T (%)	Floor Area > E _{TM} (%)	Comment	Floor Area > E _T (%)	Comment
1	Bedroom	100	100	✓	100	✓
2	Bedroom	100	100	✓	100	✓
3	LKD	100	100	✓	100	✓

13 Appendix B – Sunlight Exposure Results

13.1 Sunlight Exposure Results (2 additional Apartments)

The IS EN 17037-2018+A1-2021 (BRE Guide 3rd Edition) sunlight exposure results tabulated in Section 8.2 for the proposed development are visually represented in the following images. The windows highlighted in “red” achieve the minimum 1.5 hours of recommended sunlight on March 21st, while the windows highlighted in “blue” do not achieve the recommended value.

13.1.1 View 01 (1 Additional Apartment)



13.1.2 View 02 (1 Additional Apartment)

