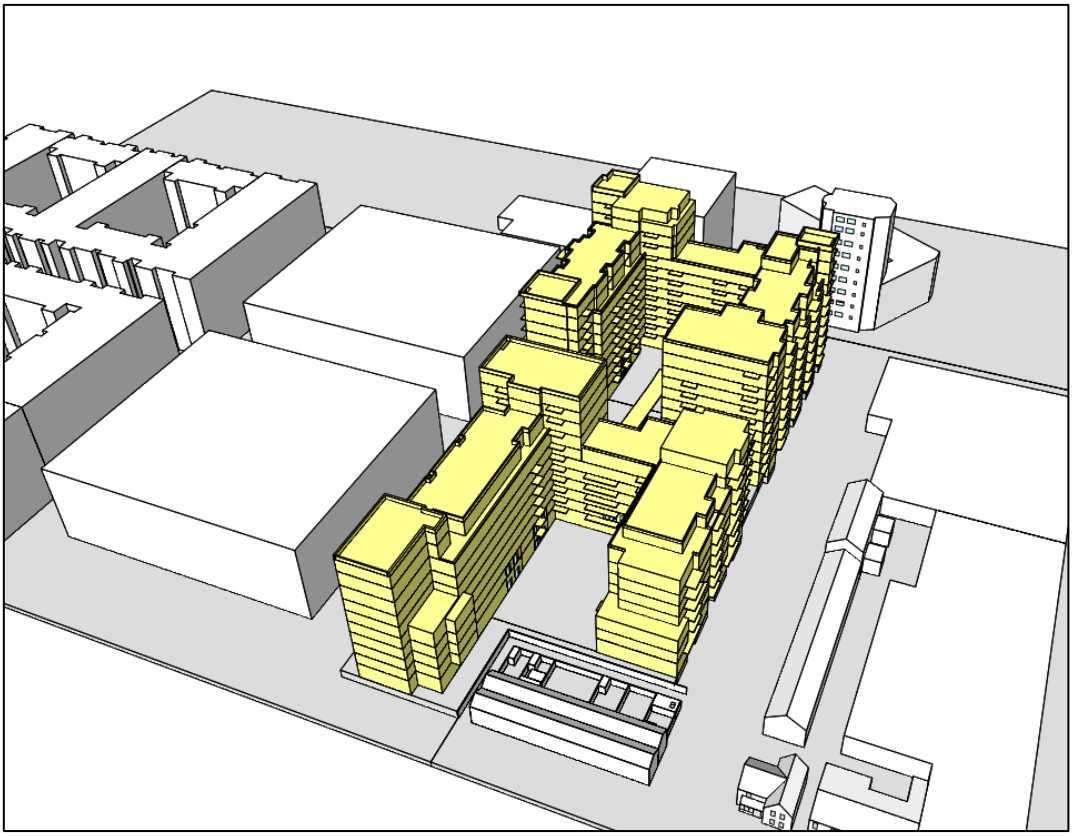
Report for: Ronan Group Real Estate
Project No: 13998

Spencer Place North, City Block 2, Spencer Dock, Dublin 1

Daylight, Sunlight and Overshadowing Study



Confidential

Version History

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Issued For:	**Prepared by:**		**Checked by:**
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Version:	**Date:**	**Revision Details:**	**Approved by:**
6	09/08/2019	Updated comments	John Gleeson

Contents

Executive Summary

IES completed sunlight and daylight analysis of proposed residential development at Spencer Dock Dublin 1.

The Development comprising of an alteration to permitted development Reg. Ref. DSDZ2896/18 and as amended by Reg. Ref. DSDZ4279/18 at Spencer Place North, City Block 2, Spencer Dock, Dublin 1. The proposed development seeks revisions to the permitted Block 1 and 2 to provide for an increase in the number of residential units from 349 no. to 464 no. apartment units and the change of use of the permitted aparthotel development to shared accommodation.

The following can be concluded based on the studies undertaken.

Shadow Analysis

In terms of shading on surrounding properties, the impact of the proposed development broadly in line with that of the Permitted Development and SDZ Scheme with respect to potential over-shadowing as shown by the images in Section and quantified in the Daylight Analysis of Existing Buildings section of the report.

Daylight Analysis of Existing Buildings

In summary, 64% (65 out of 101) of the points tested for the Proposed Scheme have a VSC of at least 27% or no less than 0.8 that of the value for the SDZ Scheme, in line with the BRE recommendations.

As such, the impact of the proposed development can be classified under the BRE as a ‘minor adverse impact’.

This performance is expected on the existing residential dwellings located in typical urban area. In general, good levels of light were received for a city centre location.

Sunlight to the Proposed Amenity Spaces

The sunlight availability in the amenity areas to both the Northern and Southern blocks in the proposed development matches that of both the Permitted Development and SDZ Scheme.

Average Daylight Factors

100% of the sample rooms tested in the Proposed Development have Average Daylight Factor (ADF) above the minimum recommended Average Daylight Factors (ADF) in line with BRE guidelines.

The results demonstrate the proposed development should achieve good levels of daylight in line with BRE recommendations. Given that tested rooms were on the first floor, results would be expected to improve at upper levels.

Discussion

It should be noted that the guidance in 'Site layout planning for daylight and sunlight: a guide to good practice' is not mandatory and the Report 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.

Whilst the results shown relate to the criteria as laid out in the BRE guidance targets it is important to note that the BRE targets have been drafted primarily for use in low density suburban development and should therefore be used with flexibility and caution when dealing other types of sites. Despite this, the site performs well in relation to the metrics considered in this report.

When comparing the proposed development against the SDZ Scheme the following can be concluded:

- In terms of shading on surrounding properties, the impact of the proposed development IS broadly in line with that of the Permitted Development and SDZ Scheme with respect to potential over-shadowing.
- 64% of the resultant VSC values for the residential properties tested are in line with the BRE recommendations.

Also in terms of Sunlight to the Proposed Amenity Spaces the proposed development is shown to perform as per both the Permitted Development and SDZ Scheme.

In terms of Average Daylight Factors (ADF), a number of sample rooms were selected on the first floor of the Proposed Development. The results show that 100% of these are above recommended Average Daylight Factors (ADF) in line with BRE guidelines.

Overall, the results demonstrate the proposed development performance is in line with BRE recommendations in the BRE ‘Site Layout Planning for Daylight and Sunlight’ guide, sometimes referred to as BRE Digest 209.

1 Introduction

This report was completed to quantify the Sunlight / Daylight impact of the proposed development at Spencer Place North on the existing dwellings located to the east and the south of the proposed development.

The Development comprising of an alteration to permitted development Reg. Ref. DSDZ2896/18 and as amended by Reg. Ref. DSDZ4279/18 at Spencer Place North, City Block 2, Spencer Dock, Dublin 1. The proposed development seeks revisions to the permitted Block 1 and 2 to provide for an increase in the number of residential units from 349 no. to 464 no. apartment units and the change of use of the permitted aparthotel development to shared accommodation.

For completeness, the Proposed development is compared against the previously Permitted Development and the DCC's Proposed SDZ Scheme.

The focus of the study considers the following items with respect to the proposed development:

- **Shadow Analysis** - A visual representation analysing any potential changes that may arise from the proposed development on to the neighbouring existing developments.
- **Daylight Analysis of Existing Buildings** - via consideration of Vertical sky component (VSC).
- **Sunlight to proposed amenity space and gardens** – via annual sunlight hour's comparison.
- **Average Daylight Factors** – via average daylight factor calculations across sample rooms on the first floor of the proposed development

Analysis was completed using the IES VE software.

The assessment is based on recommendations given in BRE – Site Layout Planning for Daylight and Sunlight guide.

2 Methodology

2.1 Receiving Environment

The application lands is currently a largely vacant brownfield site to the north of the River Liffey, Dublin.

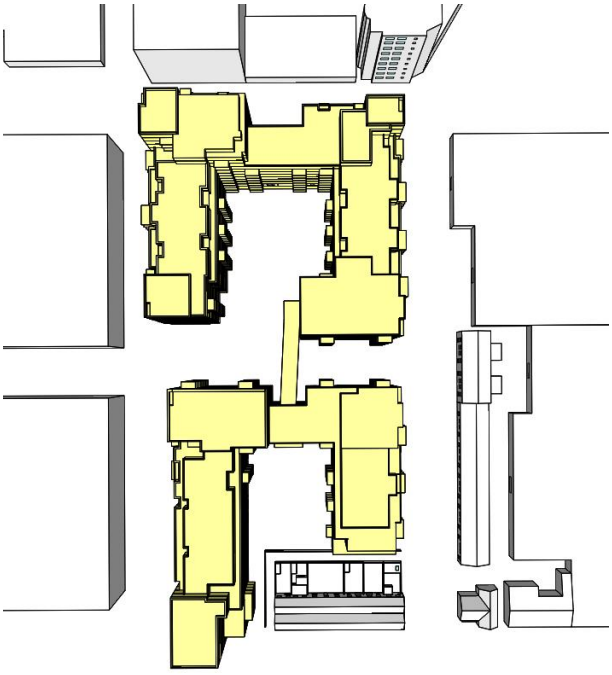
The site is bounded as follows:

- to the North by Sheriff Street Upper
- to the East by New Wapping Street
- to the South by Mayor Street Upper (including the terrace of two storey houses at No. 1-6 Mayor Street Upper)
- to the West by the remainder of the largely vacant City Block 2 lands

The application site comprises the eastern portion of City Block 2 (City Blocks 2B and 2D) of the North Lotts and Grand Canal Dock Permitted Development and has been identified for major redevelopment.

2.2 Orientation

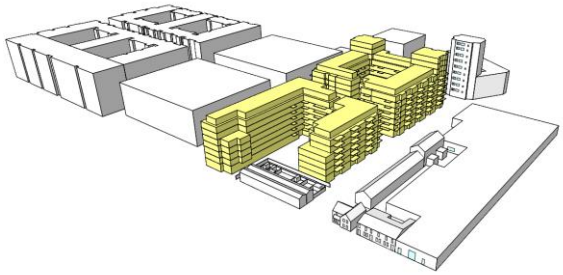
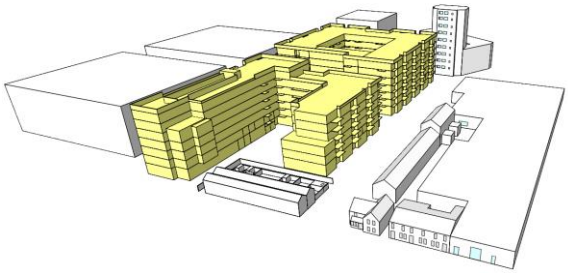
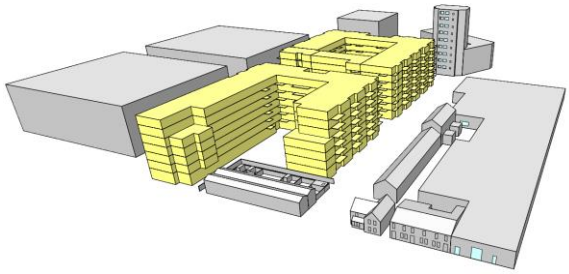
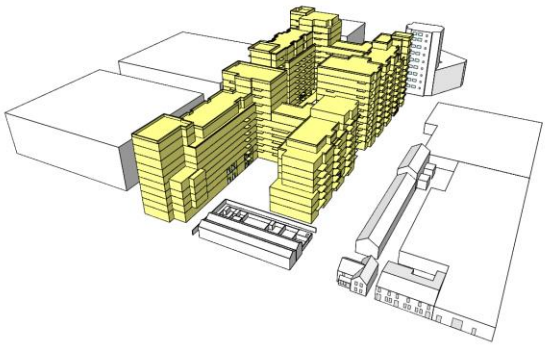
The model orientation has been taken from drawings provided by the Architect and the resulting angle shown below used in the analysis.

Orientation
 
 

2.3 Proposed Models

Given the current vacant character of the site and the relatively large areas of low density development surrounding the site, the shadow environment of the existing site and its immediate surroundings is inconsistent with what would be typical for an area of the type (urban / industrial docklands). As such, the analysis will focus on the following scenarios:

- Proposed SDZ Scheme
- Current SDZ Scheme
- Permitted Development
- Proposed Development

	
Proposed SDZ Scheme	**Permitted Development**
	
Current SDZ Scheme	**Proposed Development**

3 BRE – Site Layout Planning for Daylight and Sunlight (2nd edition)

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

The BRE Report, Site layout planning for daylight and sunlight: a guide to good practice (BR209), advises on planning developments for good access to daylight and sunlight, and is widely used by local authorities to help determine the impacts of new developments.

3.1 Impact Classification Discussion

BRE guidance in Appendix I – Environmental Impact Assessment suggests classifications of potential impacts with respect to criteria as follows;

Negligible to minor adverse impacts	*Fully meets guidelines in BRE report*
Negligible adverse impact	• *Loss of light well within guidelines, or* • *only a small number of windows or limited area of open space losing light (within the guidelines)*
Minor adverse impact (a)	• *Loss of light only just within guidelines, or* • *A large number of windows or large areas of open space areas affected (within the guidelines)*
Minor adverse impact (b)	• *only a small number of windows or limited open space areas are affected* • *the loss of light is only marginally outside the guidelines* • *an affected room has other sources of skylight or sunlight* • *the affected building or open only has a low level requirement for skylight or sunlight* • *there are particular reason why an alternative, less stringent, guideline should be applied*
Major adverse impact	• *large number of windows or large open space areas are affected* • *the loss of light is only substantially outside the guidelines* • *all the windows in a particular property are affected* • *the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight (living rooms / playground)*

3.2 Conventional Windows

The BRE Guide talks about Conventional window design based on the discussions around these it could be determined that this term refers to windows typical with a sill height of 800mm – 1000mm as shown in the images below.

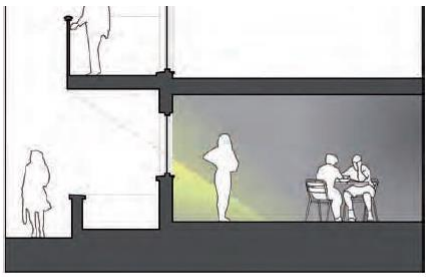


Figure 10: Balconies and projecting access ways can restrict daylight to rooms lit by windows below them

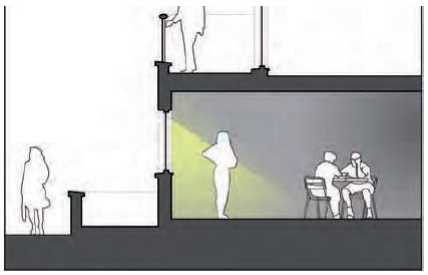
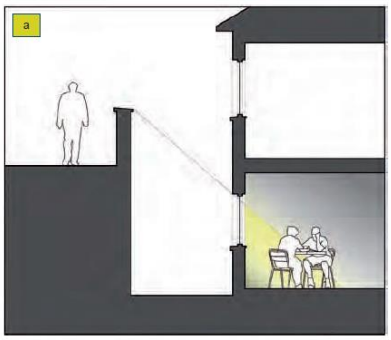
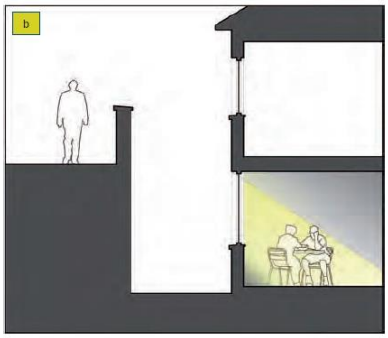


Figure 11: Section showing stepped back rooftop access ways. This gives improved daylight compared to a conventional section (see Figure 10).





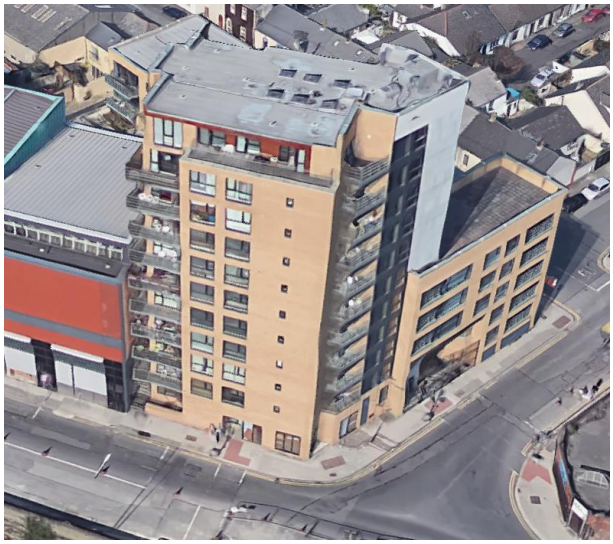
3.3 Potential Sensitive Receptors

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

	Sheriff Street Upper – Residential
	New Wapping Street – Residential
	Mayor Street Upper – Residential

3.3.1 Windows on Adjacent Properties

Windows shown on the following properties appear to be larger than conventional windows when compared against the BRE description above.



Sheriff Street Upper – Residential

New Wapping Street – Residential

Mayor Street Upper – Residential

4 Shadow Analysis

The statistics of Met Eireann, the Irish Meteorological Service, show that the sunniest months in Ireland are May and June.

The following can also be shown:

- During December, Dublin receives a mean daily duration of 1.7 hours of sunlight out of a potential 7.4 hours sunlight each day (i.e. only 22% of potential sunlight hours.
- During June, Dublin receives a mean daily duration of 6.4 hours of sunlight out of a potential 16.7 hours sunlight each day (i.e. only 38% of potential sunlight hours.

Therefore, impact 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 for the following scenarios:

- SDZ Scheme
- Permitted development
- Proposed development

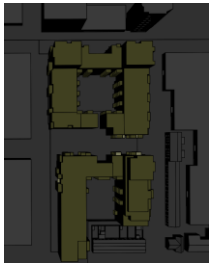
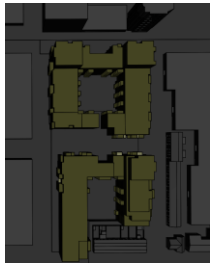
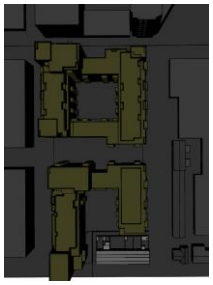
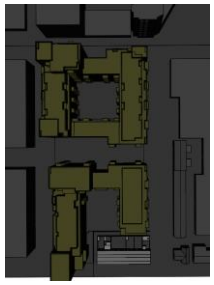
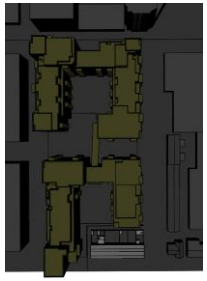
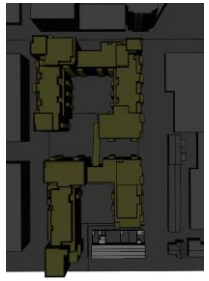
The following dates are considered;

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

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

4.1 Plan View

4.1.1 December 21st

					SDZ Scheme
					Permitted development
					Proposed development
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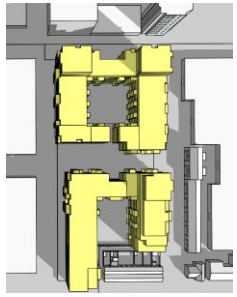
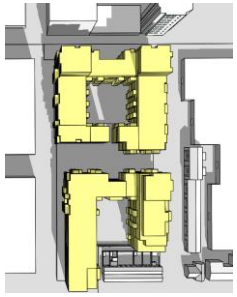
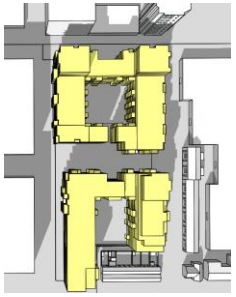
4.1.2 March 21st

					SDZ Scheme
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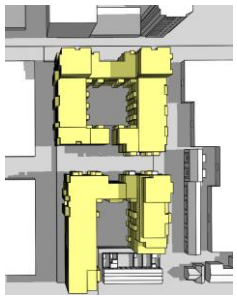
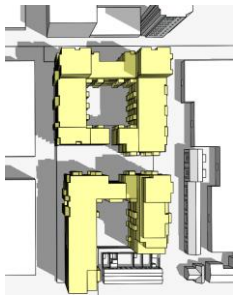
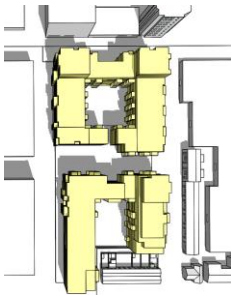
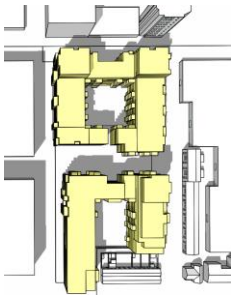
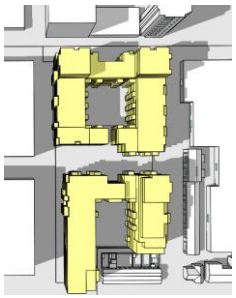
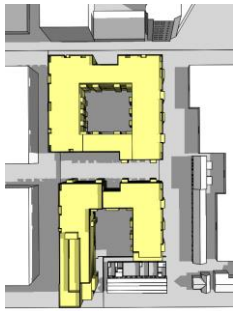
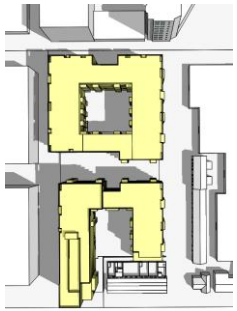
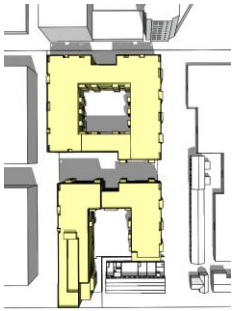
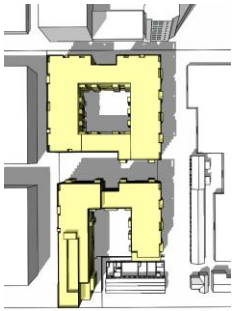
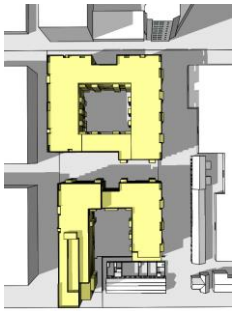
4.1.3 June 21st

					**SDZ Scheme**
					**Permitted development**
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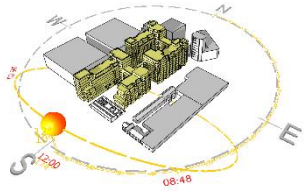
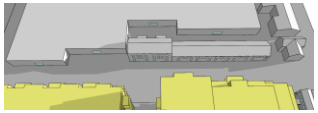
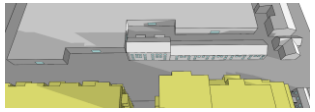
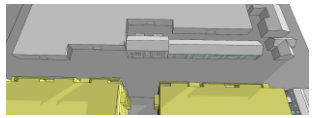
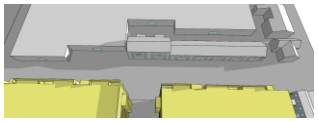
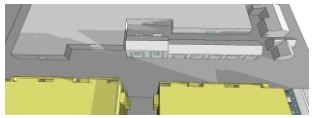
4.2 View 01: Looking over New Wapping Street

4.2.1 December 21st



					SDZ Scheme
					Permitted development
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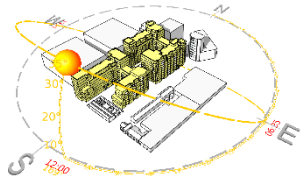
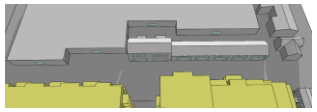
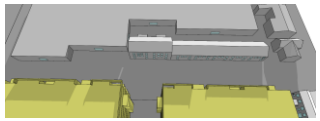
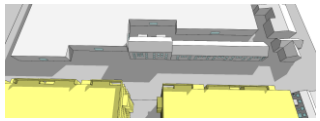
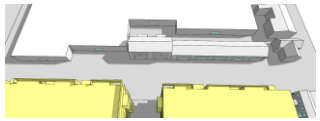
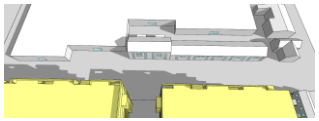
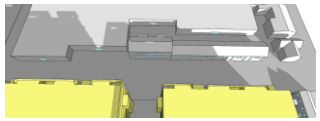
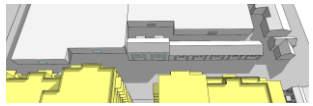
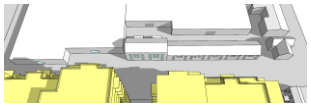
4.2.2 March 21st



					SDZ Scheme
					Permitted development
					Proposed development
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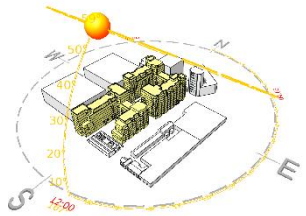
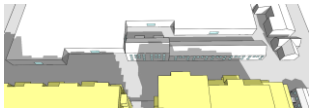
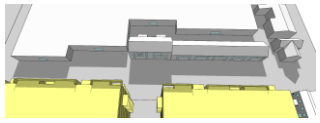
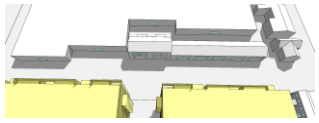
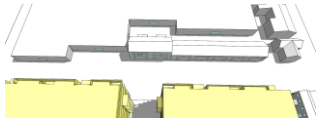
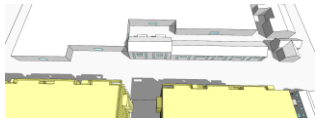
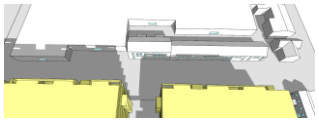
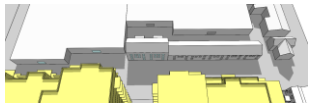
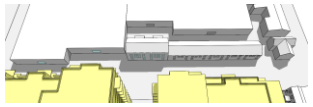
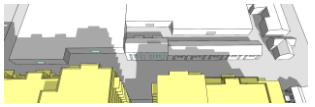
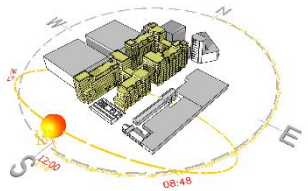
4.2.3 June 21st

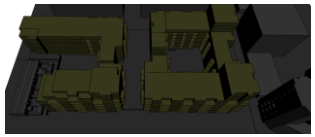
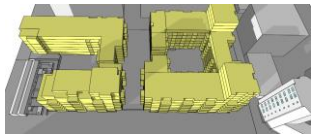
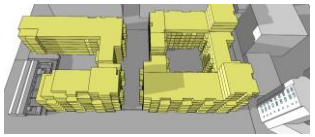
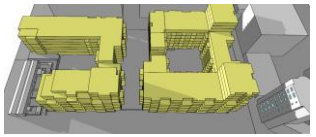
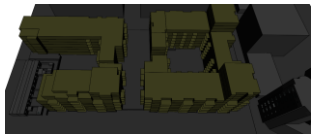
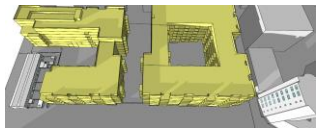
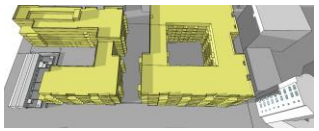
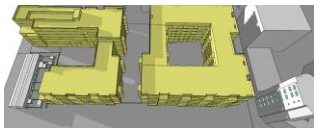
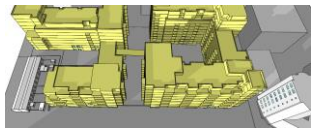
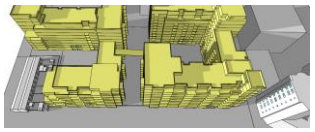
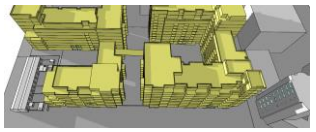


					SDZ Scheme
					Permitted development
					Proposed development
8:00 AM	10:00 AM	12:00 PM	14:00 PM	16:00 PM	

4.3 View 03: Looking over New Wapping Street

4.3.1 December 21st



					SDZ Scheme
					Permitted development
					Proposed development
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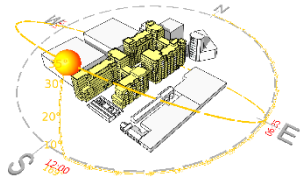
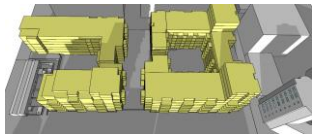
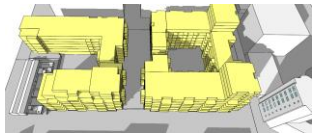
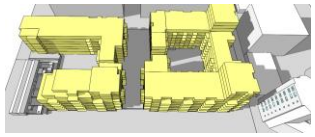
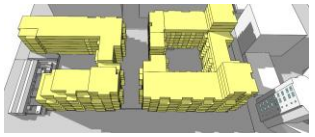
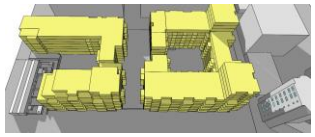
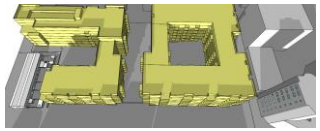
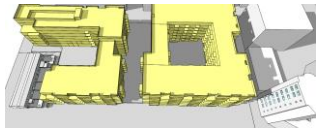
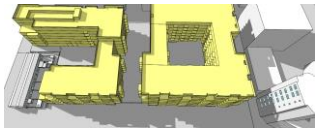
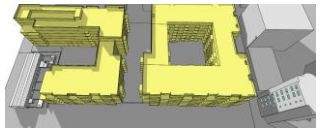
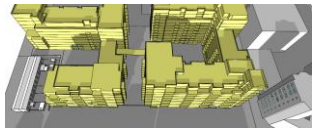
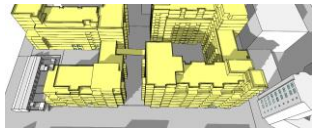
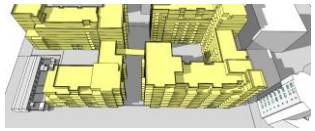
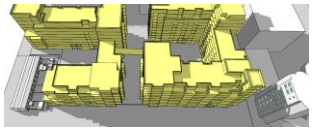
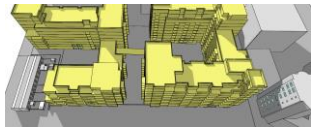
4.3.2 March 21st



					SDZ Scheme
					Permitted development
					Proposed development
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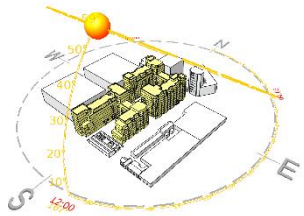
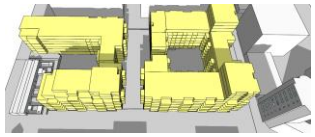
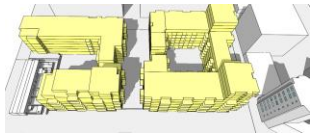
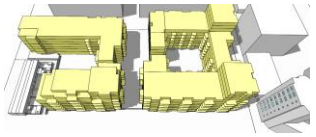
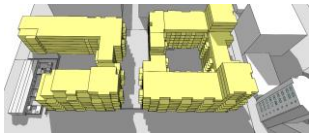
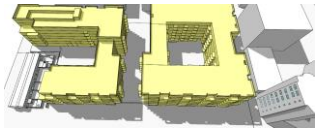
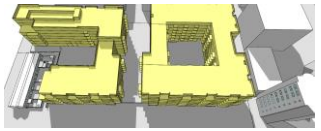
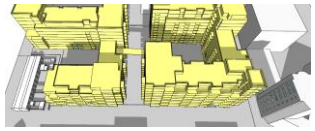
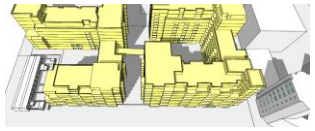
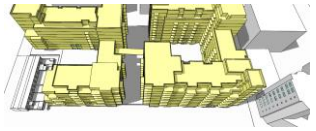
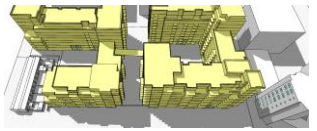
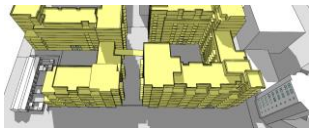
4.3.3 June 21st



					SDZ Scheme
					Permitted development
					Proposed development
8:00 AM	10:00 AM	12:00 PM	14:00 PM	16:00 PM	

4.4 Discussion

Shading from the proposed development is summarised as follows based on the analysis of images above:

- **Morning (until 12h00)**
  - **Sheriff Street Upper** – similar shading visible from the proposed development (compared with the permitted and SDZ Schemes) on the existing residential dwellings to the North of development site.
  - **New Wapping Street** - no additional shading visible from the proposed development (compared with the permitted and SDZ Schemes) on the existing residential dwellings, as they sit to the East of development site.
  - **Mayor Street Upper** - no additional shading visible from the proposed development (compared with the permitted and SDZ Schemes) on the existing residential dwellings, as they sit to the South of development site.
- **Midday (from 12h00 until 16h00)**
  - **Sheriff Street Upper** – similar shading visible from the proposed development (compared with the permitted and SDZ Schemes) on the existing residential dwellings to the North of development site.
  - **New Wapping Street** - no additional shading visible from the proposed development (compared with the permitted and SDZ Schemes) on the existing residential dwellings, as they sit to the East of development site.
  - **Mayor Street Upper** - no additional shading visible from the proposed development (compared with the permitted and SDZ Schemes) on the existing residential dwellings, as they sit to the South of development site.
- **Late Afternoon (from 16h00)**
  - **Sheriff Street Upper** – similar shading visible from the proposed development (compared with the permitted and SDZ Schemes) on the existing residential dwellings to the North of development site for the majority of the year with some additional shading visible late afternoon during March.
  - **New Wapping Street** - no additional shading visible from the proposed development (compared with the permitted and SDZ Schemes) on the existing residential dwellings, as they sit to the East of development site for the majority of the year. Some additional shading seen late afternoon during March and June.
  - **Mayor Street Upper** - no additional shading visible from the proposed development (compared with the permitted and SDZ Schemes) on the existing residential dwellings, as they sit to the South of development site.

In terms of shading on surrounding properties, the impact of the proposed development broadly in line with that of the Permitted Development and SDZ Scheme with respect to potential over-shadowing. This is quantified in the Daylight Analysis of Existing Buildings section of the report.

5 Daylight Analysis of Existing Buildings

5.1 Guidance Requirements

BRE Site layout planning for daylight and sunlight (Section 2.2)

When designing a new development, it is important to safeguard the daylight to nearby buildings. The BRE's 2011 guidance provide 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 Permitted 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 finding the vertical sky component at the centre of key reference points. The vertical sky component definition from the BRE's 2011 is described below;

Vertical sky component (VSC)	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 the Radiance module of the IES VE software.

For typical Schemes the BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight which 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.

5.1.1 VSC Values

The BRE Guide also states the following in Section 2.1.6 that the amount of daylight a room needs depends on what it is being used for, but roughly speaking if the VSC is:

- ≥ 27%, conventional window design will usually give reasonable results
- between 15 % and 27 % special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight
- between 5 % and 15 % it is difficult to provide adequate daylight unless very large windows are used
- <5 % it is often impossible to achieve reasonable daylight even if the whole window wall is glazed

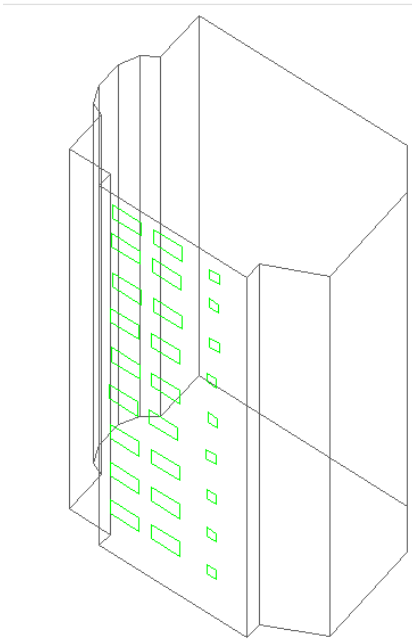
As such, these values will be referred to as part of the analysis of the adjacent properties comparing the Proposed development alongside the Previously Permitted Development and the SDZ Scheme then consider with respect to the BRE guidance above.

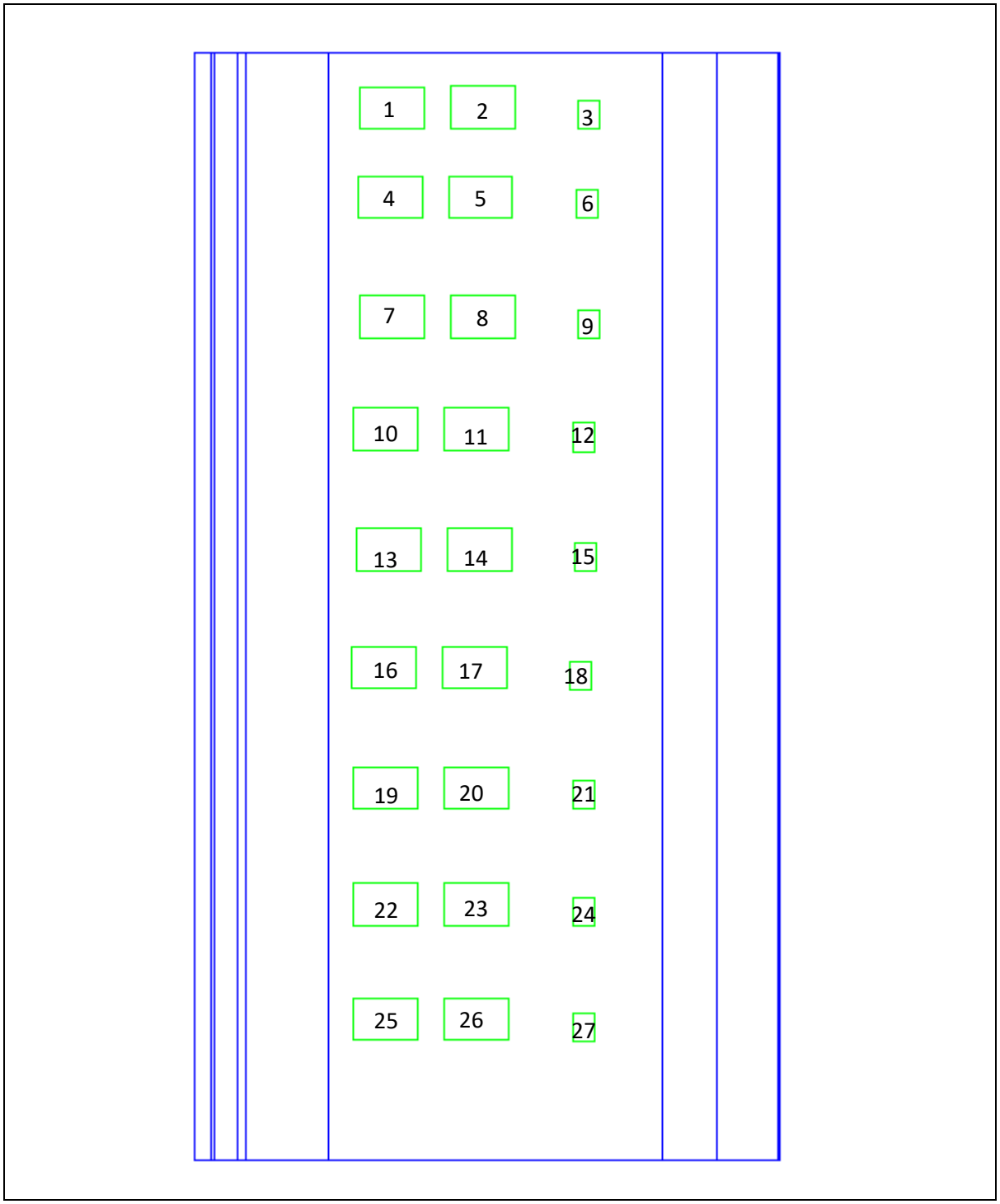
5.2 Assessment

5.2.1 Sheriff Street Upper – Residential

Based on the above the following locations have been modelled:

Sheriff Street Upper – Residential Development

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Points	Proposed SDZ Scheme VSC	Current SDZ Scheme VSC	Permitted Scheme VSC	Proposed development VSC	Permitted VSC as % of Proposed SDZ Permit	Proposed VSC as % of Proposed SDZ Permit	Permitted VSC as % of Current SDZ Permit	Proposed VSC as % of Current SDZ Permit	Comment
1	39.19	39.19	39.22	35.42	100%	90%	100%	90%	✓ 1
2	39.04	39.19	39.23	35.95	100%	92%	100%	92%	✓ 1
3	39.22	39.28	39.24	36.31	100%	93%	100%	92%	✓ 1
4	38.06	39.31	39.10	32.85	103%	86%	99%	84%	✓ 1
5	38.40	39.42	39.18	33.89	102%	88%	99%	86%	✓ 1
6	38.45	39.33	39.23	34.37	102%	89%	100%	87%	✓ 1
7	34.83	39.25	39.09	29.50	112%	85%	100%	75%	✓ 1
8	35.41	39.23	39.26	31.12	111%	88%	100%	79%	✓ 1
9	35.94	39.11	39.09	32.16	109%	89%	100%	82%	✓ 1
10	31.66	39.09	36.50	26.73	115%	84%	93%	68%	✓ 2
11	32.67	39.17	36.91	28.65	113%	88%	94%	73%	✓ 1
12	33.36	39.13	37.09	29.76	111%	89%	95%	76%	✓ 1
13	28.12	36.19	32.29	24.48	115%	87%	89%	68%	✓ 2
14	30.07	36.73	33.36	26.51	111%	88%	91%	72%	✓ 2
15	31.18	36.8	34.15	28.37	110%	91%	93%	77%	✓ 1
16	25.58	32.21	28.61	22.30	112%	87%	89%	69%	✓ 2
17	27.93	33.14	30.29	24.88	108%	89%	91%	75%	✓ 2
18	29.22	34.03	31.40	27.05	107%	93%	92%	79%	✓ 1
19	23.62	28.61	25.59	20.80	108%	88%	89%	73%	✓ 2
20	26.01	30.14	27.83	24.11	107%	93%	92%	80%	✓ 1
21	27.66	31.83	29.04	25.50	105%	92%	91%	80%	✓ 1
22	22.47	25.85	23.19	19.61	103%	87%	90%	76%	✓ 2
23	24.58	27.5	25.67	22.47	104%	91%	93%	82%	✓ 1
24	26.24	28.92	27.26	24.18	104%	92%	94%	84%	✓ 1
25	20.92	23.21	21.32	19.27	102%	92%	92%	83%	✓ 1
26	23.09	25.67	23.57	21.09	102%	91%	92%	82%	✓ 1
27	24.46	27.11	25.05	23.52	102%	96%	92%	87%	✓ 1

The following conclusions can be made:

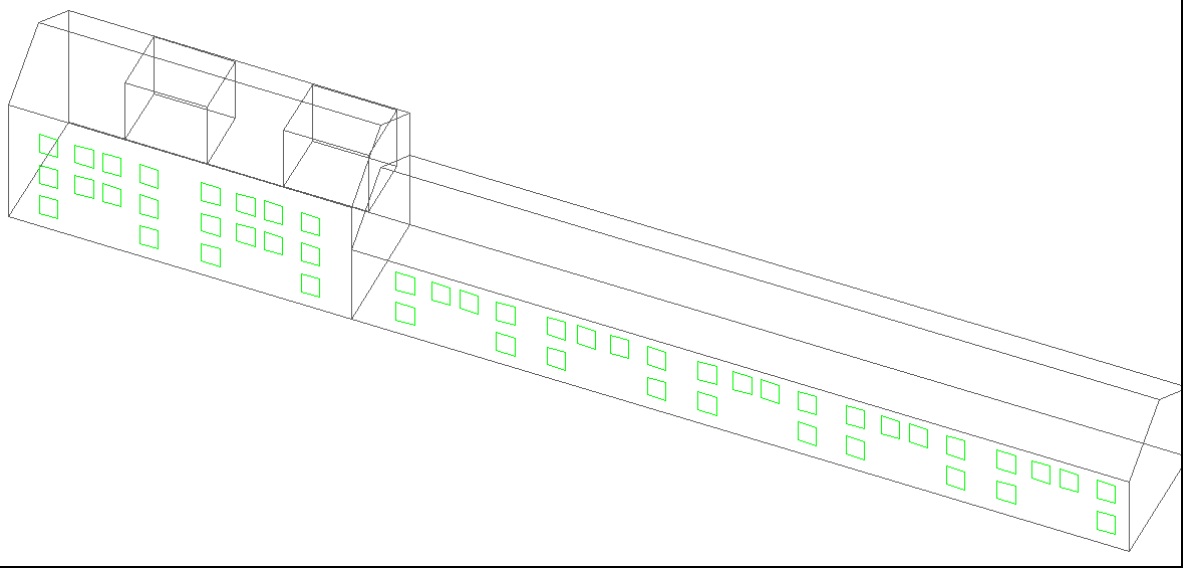
✓ 1 All of these points have a vertical sky component of more than 27% or not less than 0.8 times their former value. These points are in line with BRE recommendations. This equates to 74% (20 out of 27) of the points tested.

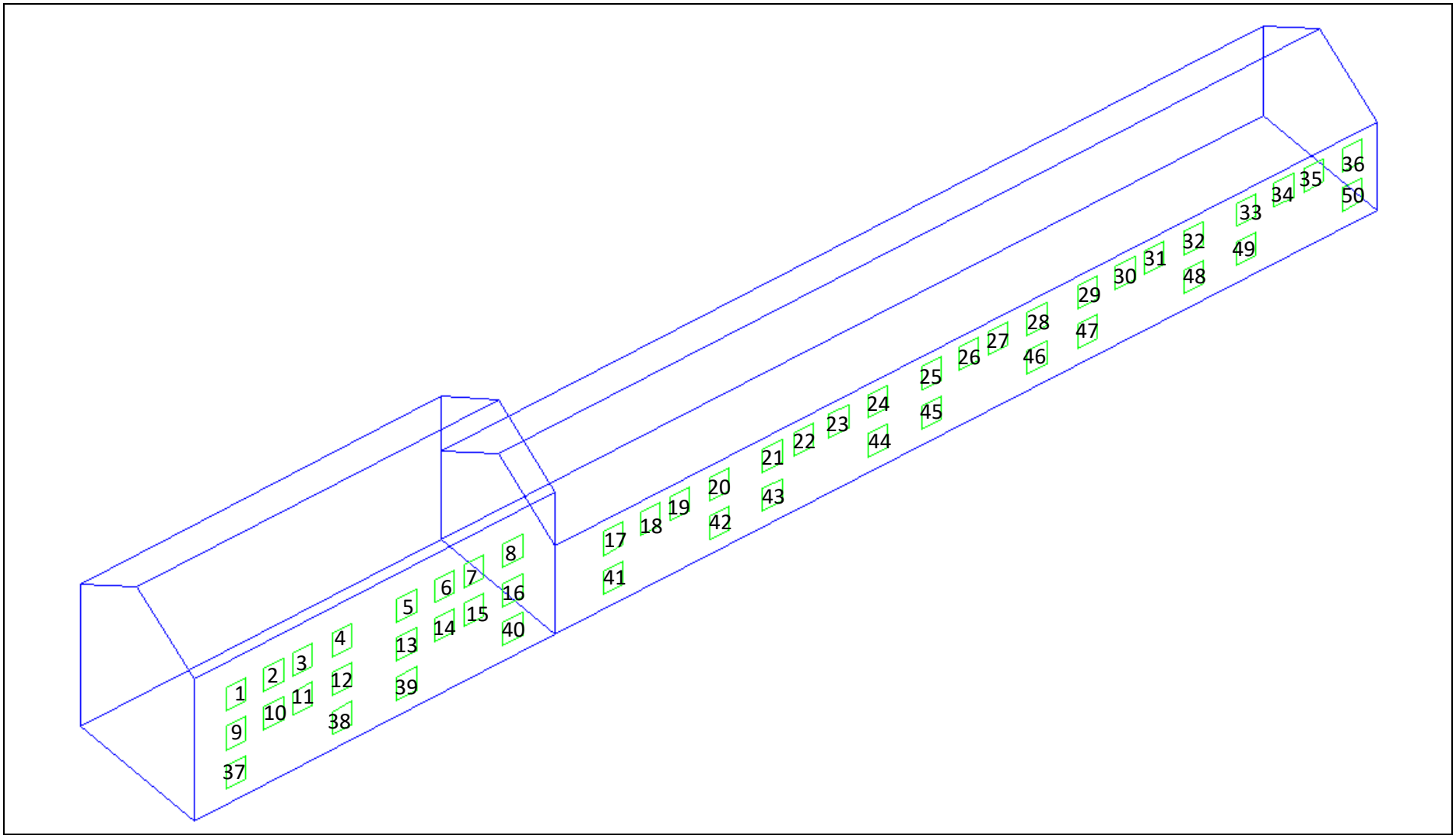
✓ 2 In these locations, the vertical sky component is >15%. VSCs of this level would be as expected in a city centre or an area with modern high-rise buildings, where a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing / permitted buildings. This equates to 26% (7 out of 27) of the points tested.

Additionally the BRE guide suggests that where windows have a VSC between 15% and 27% this should be sufficient to provide adequate daylight where larger than conventional windows exist.

5.2.2 New Wapping Street – Residential

New Wapping Street – Dwellings

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Points	Proposed SDZ Scheme VSC	Current SDZ Scheme VSC	Permitted Scheme VSC	Proposed development VSC	Permitted VSC as % of Proposed SDZ Permit	Proposed VSC as % of Proposed SDZ Permit	Permitted VSC as % of Current SDZ Permit	Proposed VSC as % of Current SDZ Permit	Comment
1	20.75	21.19	19.33	14.17	93%	68%	91%	67%	✓ 3
2	21.41	21.63	19.72	14.73	92%	69%	91%	68%	✓ 3
3	22.00	21.9	19.83	15.18	90%	69%	91%	69%	✓ 2
4	22.29	22.01	20.36	15.70	91%	70%	93%	71%	✓ 1
5	22.34	22.14	20.64	15.42	92%	69%	93%	70%	✓ 2
6	22.21	21.97	20.33	15.45	92%	70%	93%	70%	✓ 2
7	22.03	21.88	20.06	14.79	91%	67%	92%	68%	✓ 3
8	21.51	21.28	20.06	14.00	93%	65%	94%	66%	✓ 3
9	19.04	19.42	17.41	12.99	91%	68%	90%	67%	✓ 3
10	20.09	19.71	17.91	13.59	89%	68%	91%	69%	✓ 3
11	19.87	20.04	18.39	14.20	93%	71%	92%	71%	✓ 3
12	20.80	20.49	18.58	14.23	89%	68%	91%	69%	✓ 3
13	20.45	19.9	18.72	14.25	92%	70%	94%	72%	✓ 3
14	20.12	20.14	18.51	13.87	92%	69%	92%	69%	✓ 3
15	20.22	19.79	18.09	13.48	89%	67%	91%	68%	✓ 3
16	19.76	19.54	17.75	12.90	90%	65%	91%	66%	✓ 3
17	18.29	17.65	16.67	12.25	91%	67%	94%	69%	✓ 3
18	18.26	17.5	16.47	12.00	90%	66%	94%	69%	✓ 3
19	18.16	17.4	16.31	12.57	90%	69%	94%	72%	✓ 3
20	17.89	17.4	16.42	12.26	92%	69%	94%	70%	✓ 3
21	17.85	17.32	16.55	12.92	93%	72%	96%	75%	✓ 3
22	18.16	17.44	16.35	13.29	90%	73%	94%	76%	✓ 3
23	18.63	17.51	16.73	13.97	90%	75%	96%	80%	✓ 1
24	18.69	18.13	17.17	14.47	92%	77%	95%	80%	✓ 1
25	18.94	18.22	17.79	15.20	94%	80%	98%	83%	✓ 1
26	19.64	18.72	18.35	15.65	93%	80%	98%	84%	✓ 1
27	20.19	19.18	18.88	16.48	94%	82%	98%	86%	✓ 1
28	20.79	20.03	19.57	16.90	94%	81%	98%	84%	✓ 1
29	22.35	20.98	20.64	18.02	92%	81%	98%	86%	✓ 1
30	22.72	21.9	21.40	19.58	94%	86%	98%	89%	✓ 1
31	23.48	22.37	22.51	20.51	96%	87%	101%	92%	✓ 1
32	24.25	23.76	23.50	21.43	97%	88%	99%	90%	✓ 1
33	25.62	25.02	24.39	22.80	95%	89%	97%	91%	✓ 1
34	26.44	25.62	25.60	23.57	97%	89%	100%	92%	✓ 1
35	27.02	25.59	26.24	24.48	97%	91%	103%	96%	✓ 1
36	27.87	27.63	26.83	24.98	96%	90%	97%	90%	✓ 1
37	17.31	17.69	16.22	11.95	94%	69%	92%	68%	✓ 3
38	18.57	18.73	16.92	13.08	91%	70%	90%	70%	✓ 3
39	18.83	18.55	17.43	13.41	93%	71%	94%	72%	✓ 3
40	17.81	17.65	15.85	11.51	89%	65%	90%	65%	✓ 3
41	16.28	15.8	14.57	11.30	89%	69%	92%	72%	✓ 3
42	16.37	15.63	14.67	11.18	90%	68%	94%	72%	✓ 3
43	16.24	15.61	14.97	11.99	92%	74%	96%	77%	✓ 3
44	16.77	16.57	15.51	12.61	92%	75%	94%	76%	✓ 3
45	17.33	16.45	15.95	13.61	92%	79%	97%	83%	✓ 1
46	18.66	18.11	17.65	15.56	95%	83%	97%	86%	✓ 1
47	20.05	19.16	18.86	17.15	94%	86%	98%	90%	✓ 1
48	22.35	21.95	21.66	19.95	97%	89%	99%	91%	✓ 1
49	23.65	23.5	22.78	20.90	96%	88%	97%	89%	✓ 1
50	26.08	25.52	25.12	23.15	96%	89%	98%	91%	✓ 1

The following conclusions can be made:

✓ [1] All of these points have a vertical sky component of more than 27% or not less than 0.8 times their former value. These points are in line with BRE recommendations. This equates to 42% (21 out of 50) of the points tested.

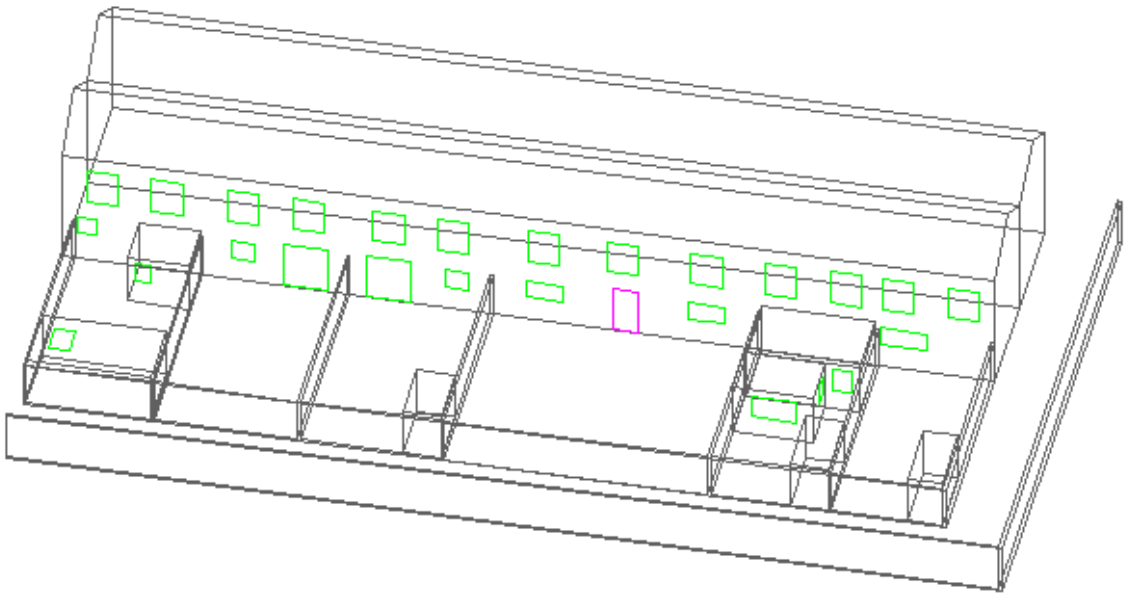
✓ [2] In these locations, the vertical sky component is >15%. VSCs of this level would be as expected in a city centre or an area with modern high-rise buildings, where a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing / permitted buildings. This equates to 6% (3 out of 50) of the points tested.

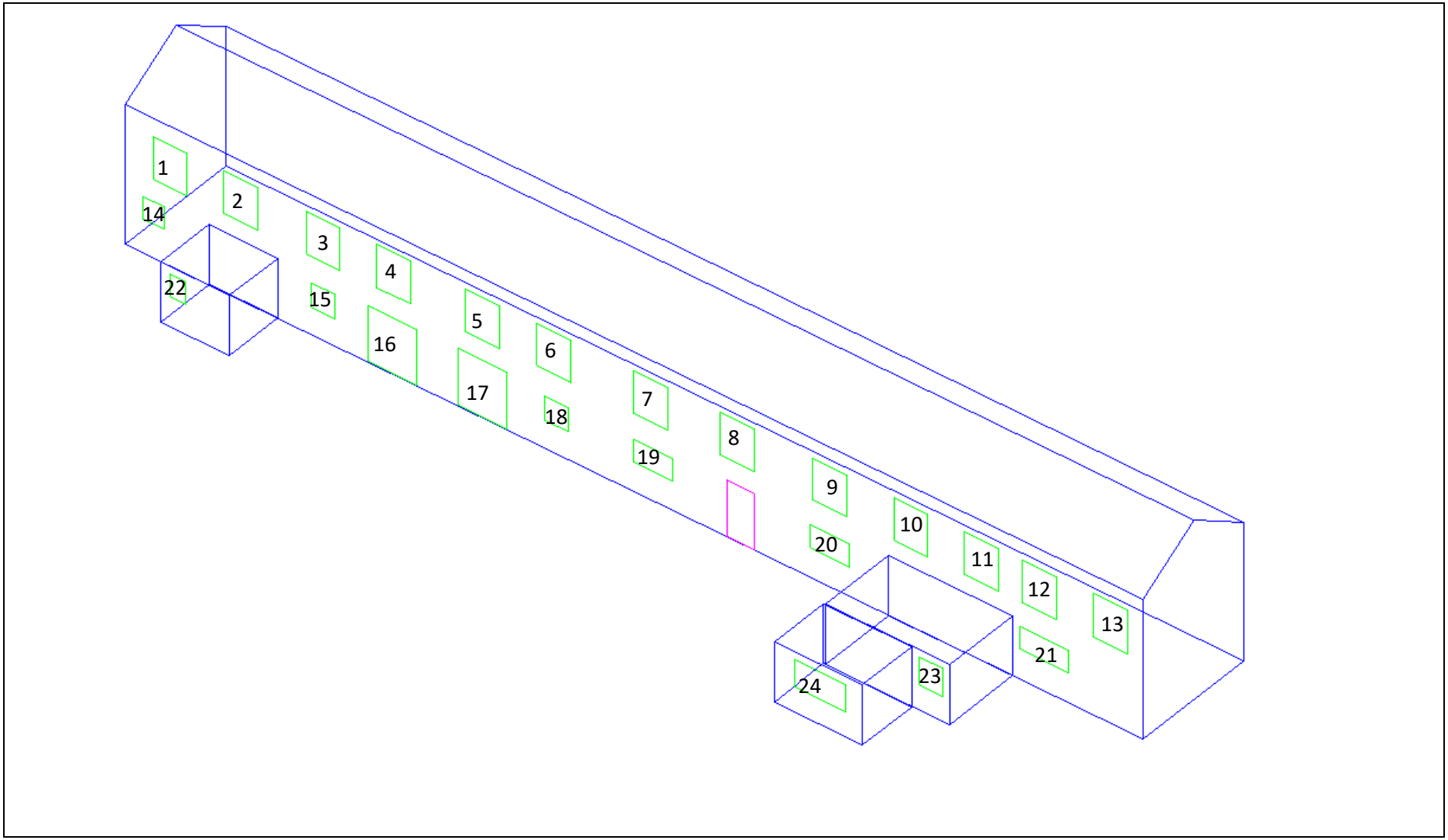
Additionally the BRE guide suggests that where windows have a VSC between 15% and 27% this should be sufficient to provide adequate daylight where larger than conventional windows exist.

✓ [3] In these locations, the resultant vertical sky component value is less than 0.80 of its former value. This equates to 52% (26 out of 50) of the points tested.

5.2.3 Mayor Street Upper – Residential

Mayor Street Upper – Dwellings

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Points	Proposed SDZ Scheme VSC	Current SDZ Scheme VSC	Permitted Scheme VSC	Proposed development VSC	Permitted VSC as % of Proposed SDZ Permit	Proposed VSC as % of Proposed SDZ Permit	Permitted VSC as % of Current SDZ Permit	Proposed VSC as % of Current SDZ Permit	Comment
1	26.07	25.63	25.59	24.81	98%	95%	100%	97%	✓ [1]
2	25.00	24.7	24.36	23.28	97%	93%	99%	94%	✓ [1]
3	23.03	22.73	21.94	21.10	95%	92%	97%	93%	✓ [1]
4	21.33	20.53	20.50	19.19	96%	90%	100%	93%	✓ [1]
5	20.14	20.08	19.33	17.42	96%	86%	96%	87%	✓ [1]
6	19.99	19.62	18.90	16.96	95%	85%	96%	86%	✓ [1]
7	19.58	19.67	18.75	16.70	96%	85%	95%	85%	✓ [1]
8	19.79	19.93	18.80	16.52	95%	83%	94%	83%	✓ [1]
9	19.27	19.46	18.19	15.99	94%	83%	93%	82%	✓ [1]
10	19.11	19.2	17.80	15.35	93%	80%	93%	80%	✓ [1]
11	18.26	18.58	17.55	14.95	96%	82%	94%	80%	✓ [1]
12	18.06	18.21	16.95	14.79	94%	82%	93%	81%	✓ [1]
13	17.28	17.2	15.85	14.14	92%	82%	92%	82%	✓ [1]
14	22.09	22.19	21.80	20.94	99%	95%	98%	94%	✓ [1]
15	19.96	19.21	19.04	18.09	95%	91%	99%	94%	✓ [1]
16	18.71	18.89	17.89	17.23	96%	92%	95%	91%	✓ [1]
17	15.84	15.77	14.78	13.59	93%	86%	94%	86%	✓ [1]
18	17.93	18.1	16.77	15.26	94%	85%	93%	84%	✓ [1]
19	18.17	17.99	17.02	15.12	94%	83%	95%	84%	✓ [1]
20	17.62	17.75	16.77	14.43	95%	82%	94%	81%	✓ [1]
21	15.55	15.53	14.44	12.75	93%	82%	93%	82%	✓ [1]
22	21.83	21.41	21.27	20.87	97%	96%	99%	97%	✓ [1]
23	14.48	14.66	13.30	11.31	92%	78%	91%	77%	✓ [1]
24	15.03	14.48	13.58	11.60	90%	77%	94%	80%	✓ [1]

The following conclusions can be made:

✓ [1] All of these points have a vertical sky component of more than 27% or not less than 0.8 times their former value. These points are in line with BRE recommendations. This equates to 100% (24 out of 24) of the points tested.

5.3 Discussion

In summary, 64% (65 out of 101) of the points tested for the Proposed Scheme have a VSC of at least 27% or no less than 0.8 that of the value for the SDZ Scheme, in line with the BRE recommendations.

As such, the impact of the proposed development can be classified under the BRE as a 'minor adverse impact'.

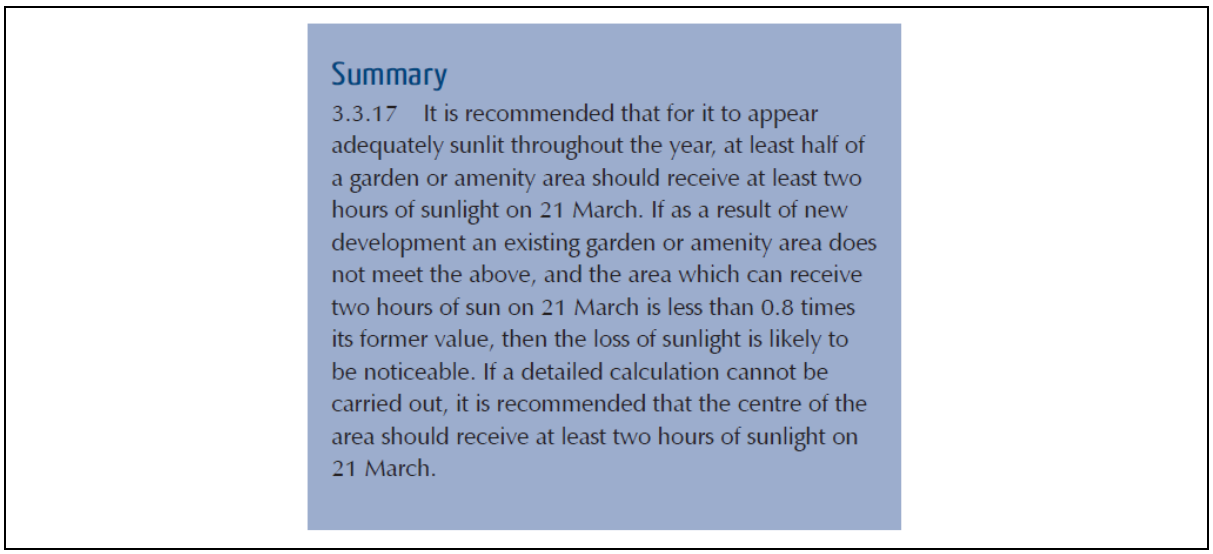
Given the context of the development in an urban area and the general intention to provide high density, urban living, it is considered the rate of VSC received by the surrounding development to the North would be considered acceptable. The vision of the area to provide high density living adjacent to quality public transport would support the VSC values presented. The VSC values in reality would also not be perceptible to the existing residents.

In addition, despite this, the Proposed Scheme was compared against the SDZ Scheme as amended, which is currently awaiting decision from An Bord Pleanála. This Scheme represents the vision of Dublin City Council for the area. The proposal is broadly in line with this massing and therefore, based on the above results, it is considered to be compliant with the proposed revised SDZ Scheme.

6 Sunlight to the Proposed Amenity Spaces

6.1 Requirements

The impact of the development proposal on the sunlight availability in the amenity areas will be considered to determine how they perform when assessed against the BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight 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 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. 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.

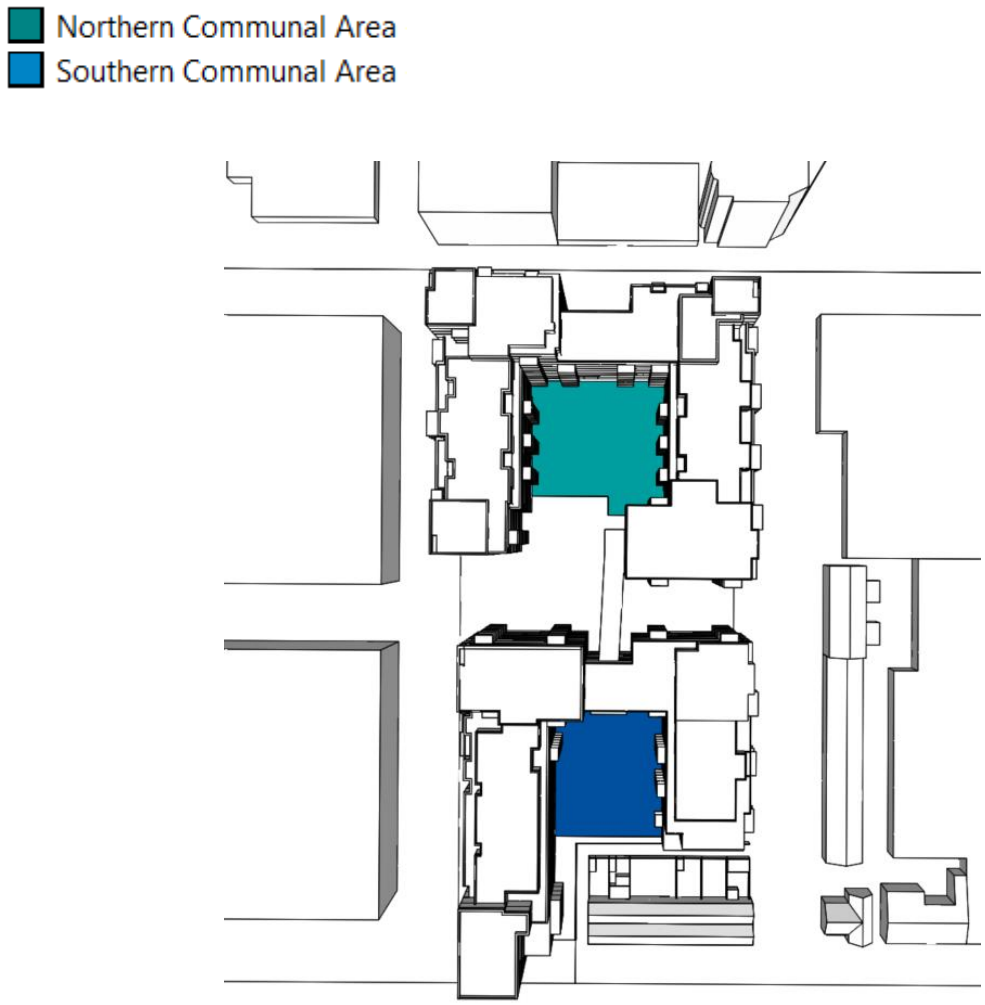
BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight states in 3.3.17 that for a space to, appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least 2 hours of sunlight on 21st March.

6.2 Assessment

6.2.1 Methodology

As stated above for a space to, appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least 2 hours of sunlight on 21st March.

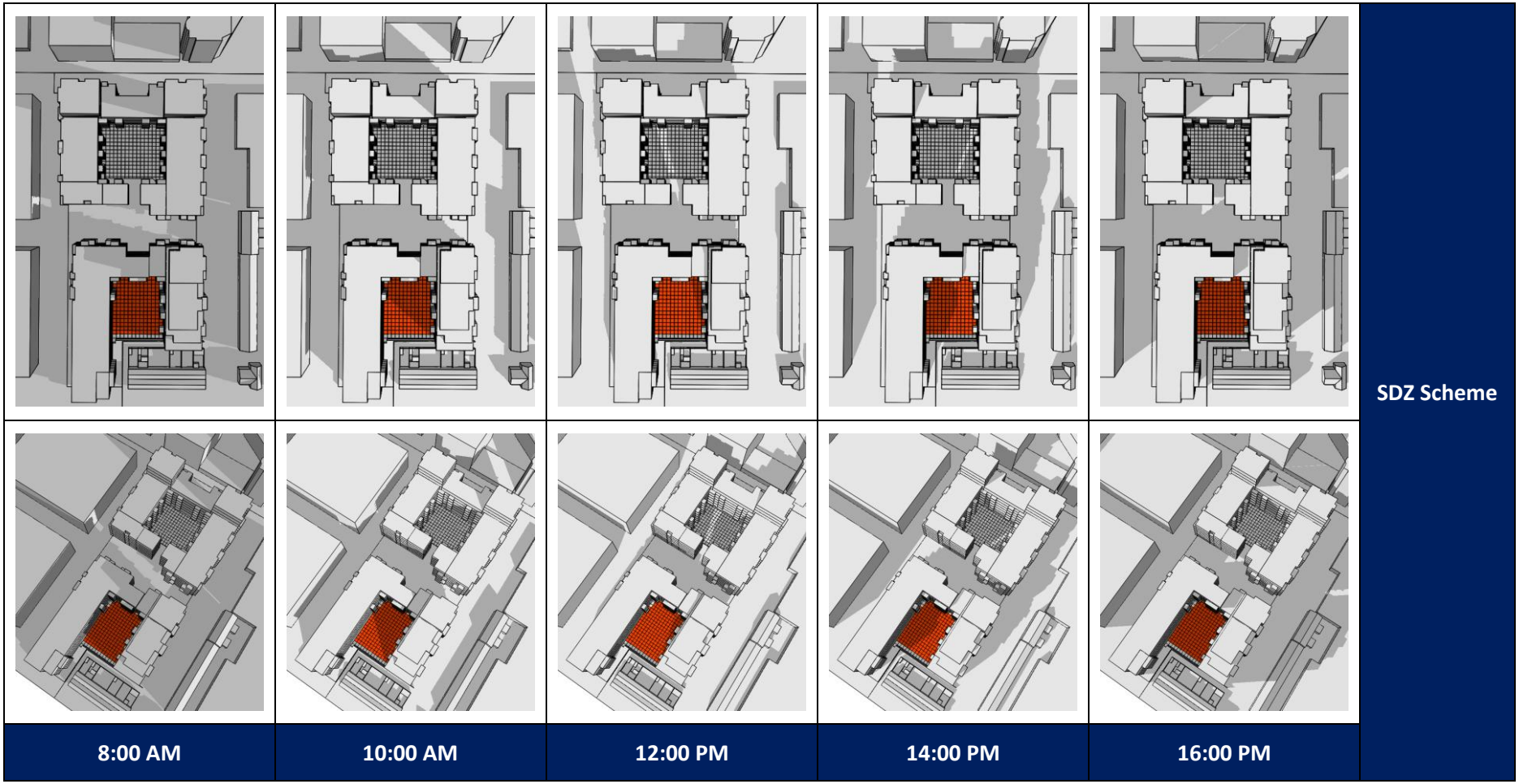
This analysis will be performed on the following proposed amenity spaces shown in the images below:



Proposed Development Amenity Areas

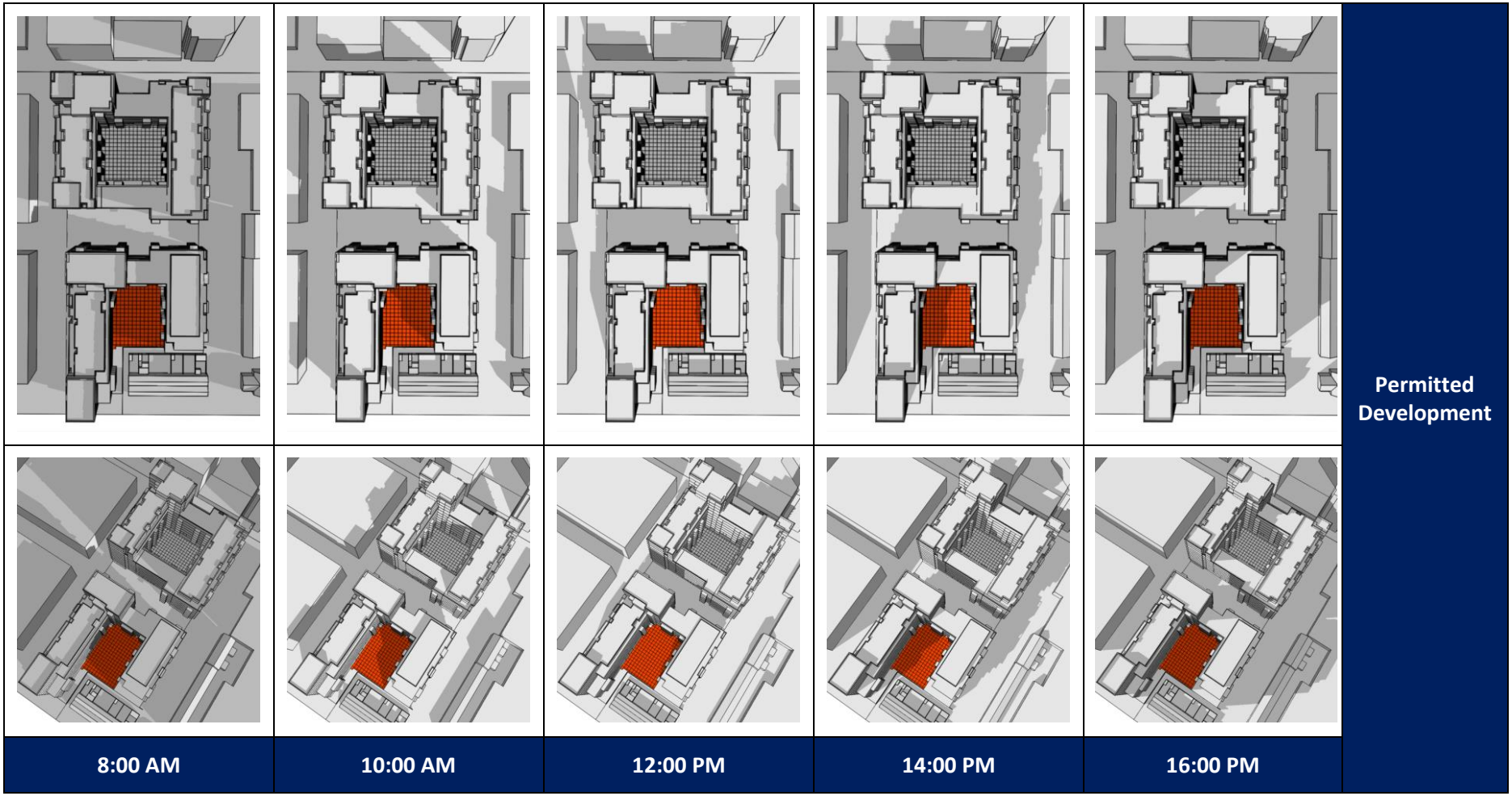
6.2.2 SDZ Scheme

The following images help illustrate the shadows cast on the proposed Amenity areas between 08h00 – 16h00.



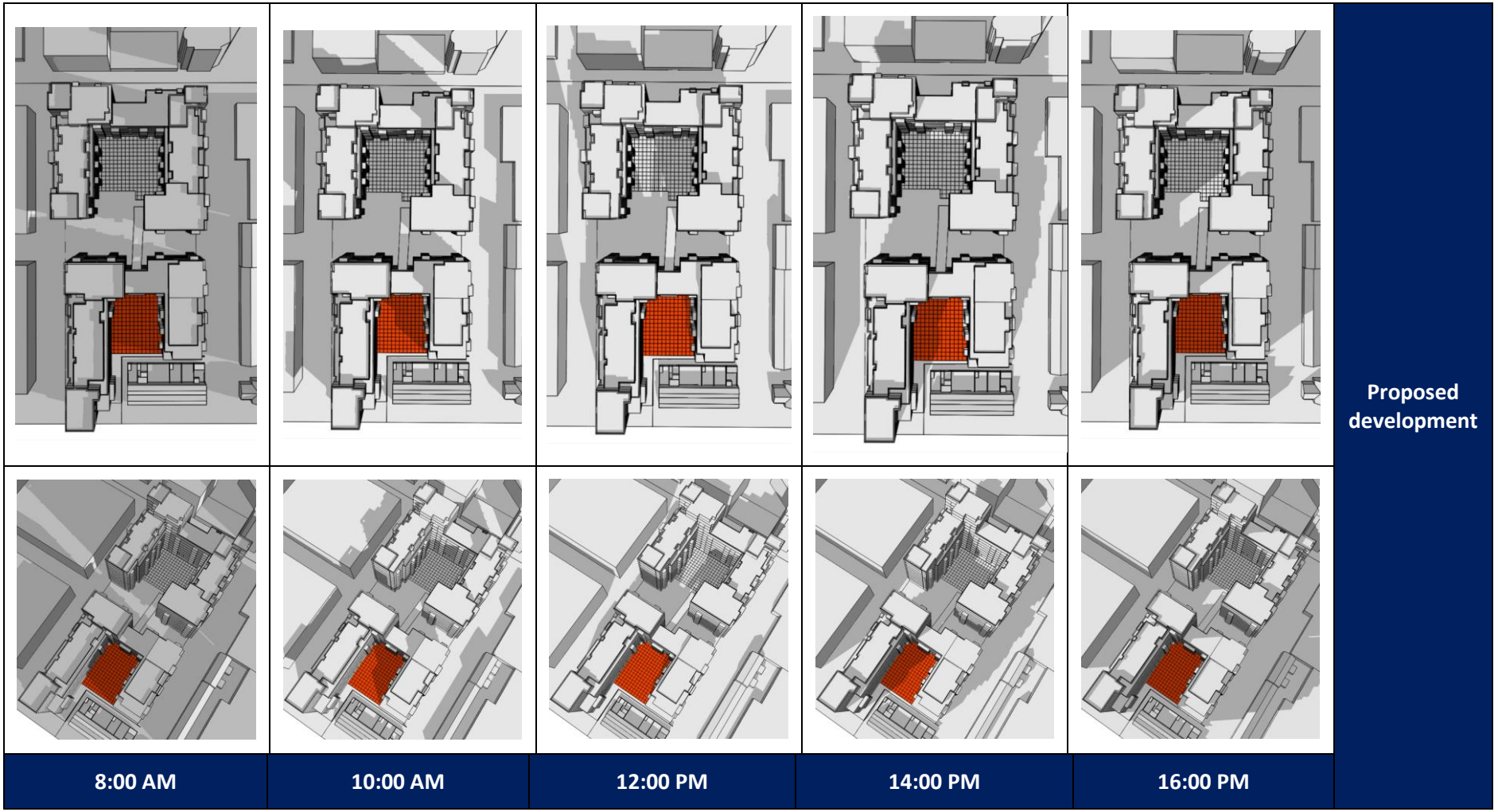
6.2.3 Permitted Development

The following images help illustrate the shadows cast on the proposed Amenity areas between 08h00 – 16h00.



6.2.4 Proposed Development

The following images help illustrate the shadows cast on the proposed Amenity areas between 08h00 – 16h00.



6.3 Discussion

The sunlight availability in the amenity areas to both the Northern and Southern blocks in the Proposed development matches that of both the Permitted Development and SDZ Scheme.

7 Average Daylight Factors

This section addresses daylight to the proposed apartments.

BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight states the following in Appendix C with respect to Average Daylight Factors (ADF);

> C4 If a predominantly daylit appearance is required, then the ADF should be 5% or more if there is no supplementary electric lighting, or 2% or more if supplementary electric lighting is provided. There are additional recommendations for dwellings of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms. These additional recommendations are minimum values of ADF which should be attained even if a predominantly daylit appearance is not achievable.

From BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight

From this the recommended Average Daylight Factors (ADF) are therefore;

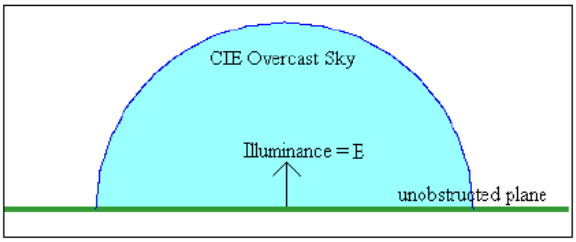
- Bedrooms – 1.0%
- Living Rooms / Kitchens – 1.5%

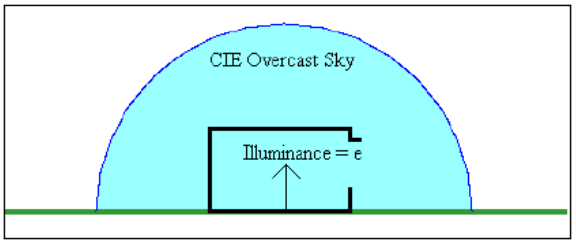
This study will consider the predicted average daylight factor to the proposed Phase 2B apartments. Analysis has been carried by using the Radiance module of IES VE software to quantify the metrics describe below.

Daylight is constantly changing, so its level at a point in a building is usually defined as an average daylight factor.

This is the ratio of the indoor illuminance at the point in question to the outdoor unobstructed horizontal illuminance.

Daylight Factor Methodology



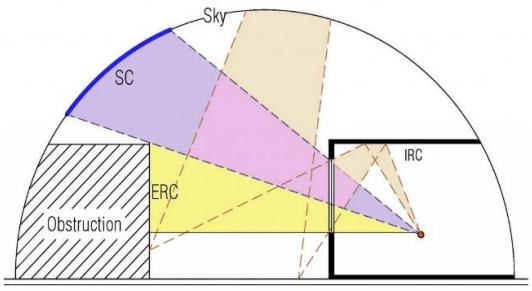


E = illuminance on unobstructed plane

e = illuminance at point in interior

Daylight Factor = e/E (often expressed as a percentage)

SC – Sky Component
ERC – Externally Reflected Component
IRC – Internally Reflected Component



Sources of Daylight at a Point Within a Room

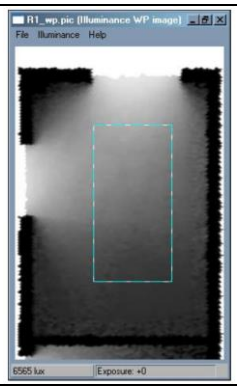
Both illuminances are measured under the same standard sky, a CIE overcast sky. Since the sun is in a particular position for only a short period each day, direct sunlight is excluded. Instead diffuse sunlight is used for average daylight calculations. Diffuse sunlight describes the sunlight that has been scattered by molecules and particles in the atmosphere but has still made it down to surface of the earth.

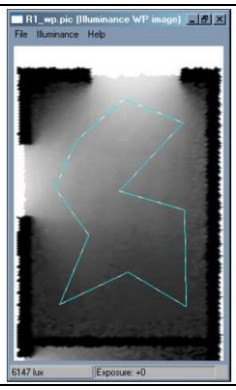
For average daylight factor there are three possible paths along which diffuse light can get into a room through glazed windows.

a) Light from the patch of sky visible at the point considered, is expressed as the sky component.
b) Light reflected from opposing exterior surfaces and then reaches the point, is expressed as the externally reflected component.
c) Light entering through the window but reaching the point only after reflection from internal surfaces, is expressed as the internally reflected component.

7.1 Area of Interest

In Radiance when an image is created for an Average Daylight Factor for a room individual values are created for multiple points across the room. For each room we are able to define a specific area within an image and only generate statistics on this region. This is defined as the “Area of Interest” (AoI) within the image. This can be any shape, as shown below;





Typically, the Area of Interest is set-up to include a ‘margin’ from the zone boundaries where illuminance data is not to be calculated or included in summary results.

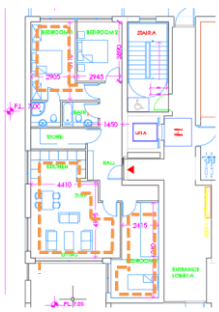
Also this follows CIBSE Light design conventions and can be used to help avoid inclusion of potentially misleading illuminance data close to rear walls and windows where tasks may not be undertaken due to furniture, etc.

A typical margin recommended by CIBSE is 0.5m and this is what is used in our calculations.

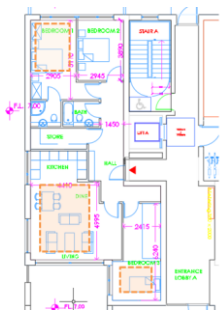
7.1.1 Area of Interest Configuration

In some instances, dependant on the layout and function of a room, the Area of Interest may be further reduced beyond the 0.5m margin.

The following images detail where how this may be typically amended as part of the analysis to ensure the occupied space is considered and ancillary spaces within the rooms (i.e. in front of wardrobes) excluded.



0.5m Boundary



Ammended based on function

7.2 Assumptions

The following assumptions are to be used in the study:

- Sky Conditions: Standard CIE overcast sky
- Time (24hr): 12:00
- Date: 21 September
- Working Plane: 0.85m

The following Surface Reflectance's are to be used in the study:

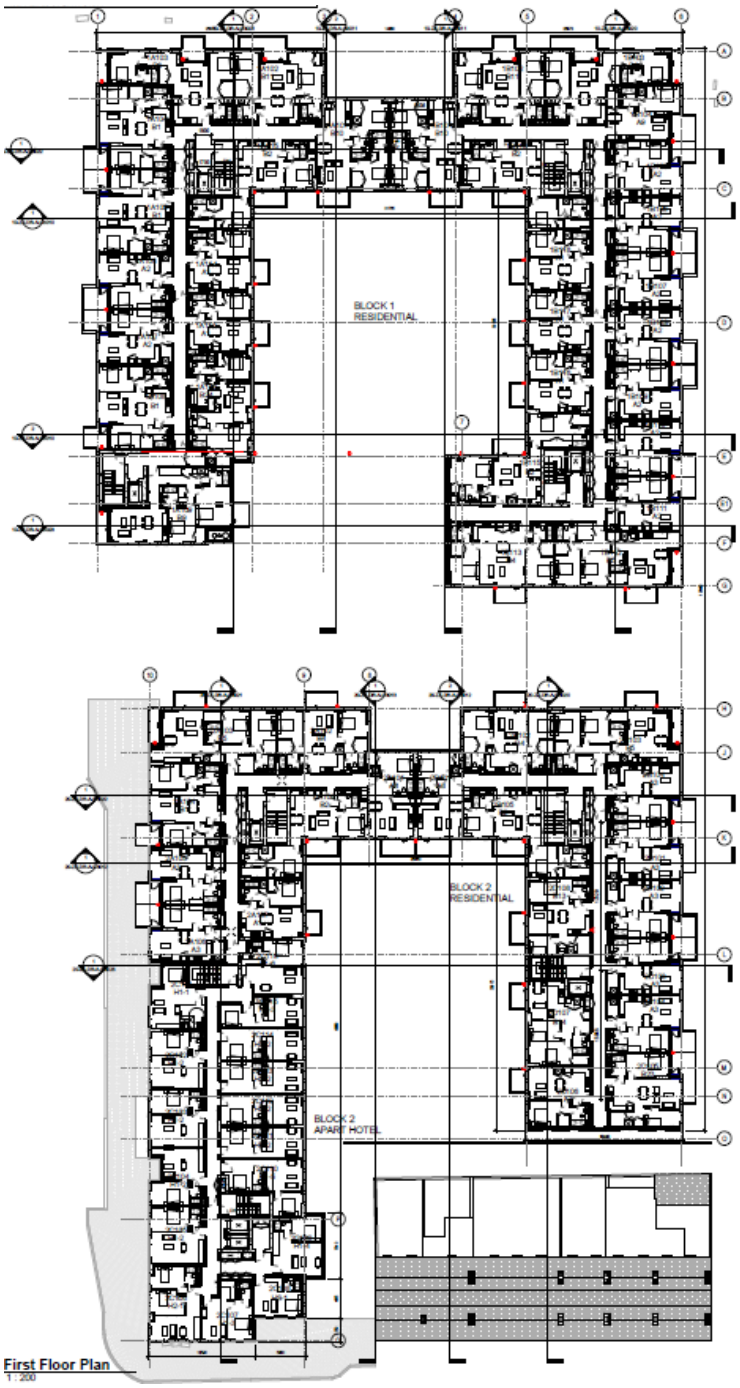
Material Surface	Reflectance
External Wall	0.50
Internal Partition	0.50
Roof	0.20
Ground	0.20
Floor/Ceiling (Floor)	0.20
Floor/Ceiling (Ceiling)	0.70

Glazing Transmittance:

- Light Transmittance: 70%
- Assumed Window Frame thickness: 100 mm

7.3 Rooms Considered

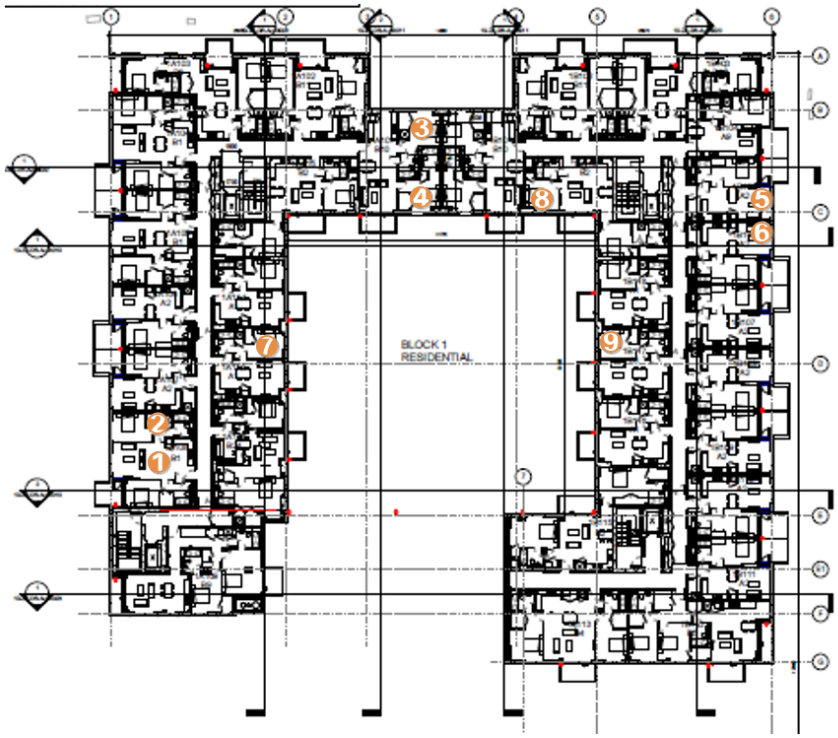
Typical rooms across the following floor plates were considered



First Floor

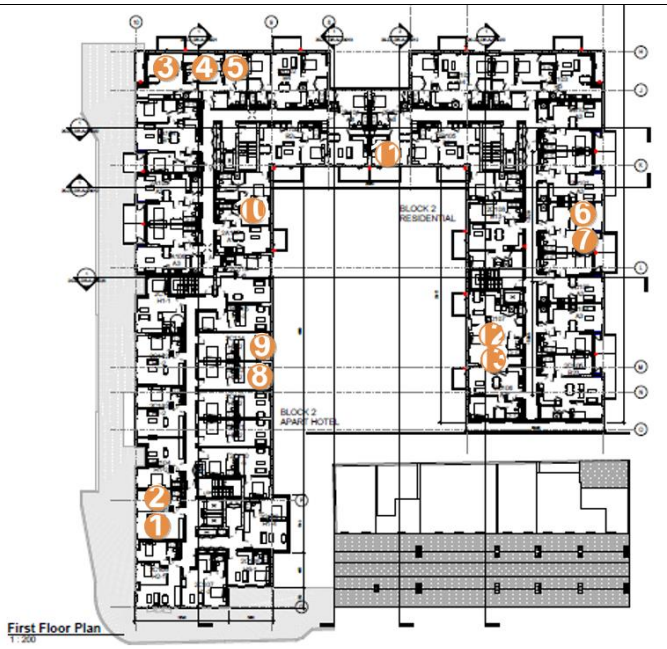
7.4 Average Daylight Factor Results

7.4.1 Floor 01 – Northern Block



Room Reference	Room Name	Average Daylight Factor	BRE Recommendation
1	L01: 1A108_Living	1.48	✓
2	L01: 1A108_Bedroom 01	1.78	✓
3	L01: 1A101_Bedroom 02	2.66	✓
4	L01: 1A101_Bedroom 01	2.14	✓
5	L01: 1B106_Living	4.10	✓
6	L01: 1B106_Bedroom	1.81	✓
7	L01: 1A113_Bedroom 01	1.22	✓
8	L01: 1B119_Bedroom 01	1.00	✓
9	L01: 1B117_Bedroom	1.16	✓

7.4.2 Floor 01 – Southern Block



Room Reference	Room Name	Average Daylight Factor	BRE Recommendation
1	L01: 2C105_Living	3.78	✓
2	L01: 2C105_Bedroom	2.16	✓
3	L01: 2A103_Living	1.97	✓
4	L01: 2A103_Bedroom 01	1.64	✓
5	L01: 2A103_Bedroom 02	1.64	✓
6	L01: 2D102_Living	4.11	✓
7	L01: 2D102_Bedroom	1.75	✓
8	L01: 2C114_Living	3.04	✓
9	L01: 2C115_Living	2.84	✓
10	L01: 2A107_Bedroom 01	1.14	✓
11	L01: 2B101_Living	1.54	✓
12	L01: 2D107_Bedroom 01	1.46	✓
13	L01: 2D107_Bedroom 02	1.21	✓

7.5 Discussion

Full results for the sample rooms are summarised as follows:

Tested	22
Bedroom Passes	14
Living Room Passes	8
Below BRE recommendations	0
	100%

All of the tested rooms in the proposed development tested have Average Daylight Factor (ADF) above recommended Average Daylight Factors (ADF) in line with BRE guidelines.

- Bedrooms – 1.0%
- Living Rooms / Kitchens – 1.5%

The results with respect to Average Daylight Factors demonstrate that the proposed development should achieve good levels of daylight in line with BRE recommendations. Given that tested rooms were on the first floor, results would be expected to improve at upper levels.

This is based on worst case locations on the lowers floors of each building. The quality of daylight in each apartment increases going upwards through each level.

8 Conclusion

8.1 Shadow Analysis

In terms of shading on surrounding properties, the impact of the proposed development broadly in line with that of the Permitted Development and SDZ Scheme with respect to potential over-shadowing as shown by the images in Section and quantified in the Daylight Analysis of Existing Buildings section of the report.

8.2 Daylight Analysis of Existing Buildings

In summary, 64% (65 out of 101) of the points tested have a vertical sky component value of at least 27% or no less than 0.8 that of the value for the SDZ Scheme in line with the BRE recommendations. As such, the impact of the proposed development can be classified under the BRE as a 'minor adverse impact'.

This performance is expected on the existing residential dwellings located in typical urban area. In general, good levels of light were received for a city centre location.

8.3 Sunlight to the Proposed Amenity Spaces

The sunlight availability in the amenity areas to both the Northern and Southern blocks in the Proposed development matches that of both the Permitted Development and SDZ Scheme.

8.4 Average Daylight Factors

100% of the tested sample rooms in the Proposed Development tested have Average Daylight Factor (ADF) above recommended Average Daylight Factors (ADF) in line with BRE guidelines.

The results with respect to Average Daylight Factors demonstrate that the Proposed development should achieve good levels of daylight in line with BRE recommendations. Given that tested rooms were on the first floor, results would be expected to improve at upper levels.

8.5 Discussion

It should be noted that the guidance in 'Site layout planning for daylight and sunlight: a guide to good practice' is not mandatory and the Report 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.

Whilst the results shown relate to the criteria as laid out in the BRE guidance targets it is important to note that the BRE targets have been drafted primarily for use in low density suburban development and should therefore be used with flexibility and caution when dealing other types of sites. Despite this, the site performs well in relation to the metrics considered in this report.

When comparing the proposed development against the SDZ Scheme the following can be concluded:

- In terms of shading on surrounding properties, the impact of the proposed development broadly in line with that of the Permitted Development and SDZ Scheme with respect to potential over-shadowing.
- 64% of the resultant VSC values for the residential properties tested are in line with the BRE recommendations.

Also in terms of Sunlight to the Proposed Amenity Spaces the proposed development is shown to perform as per both the Permitted Development and SDZ Scheme.

In terms of Average Daylight Factors (ADF), a number of sample rooms were selected on the first floor of the Proposed Development. The results show that 100% of these are above recommended Average Daylight Factors (ADF) in line with BRE guidelines.

Overall the results demonstrate that the proposed development performance is in line with BRE recommendations in the BRE ‘Site Layout Planning for Daylight and Sunlight’ guide, sometimes referred to as BRE Digest 209.

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