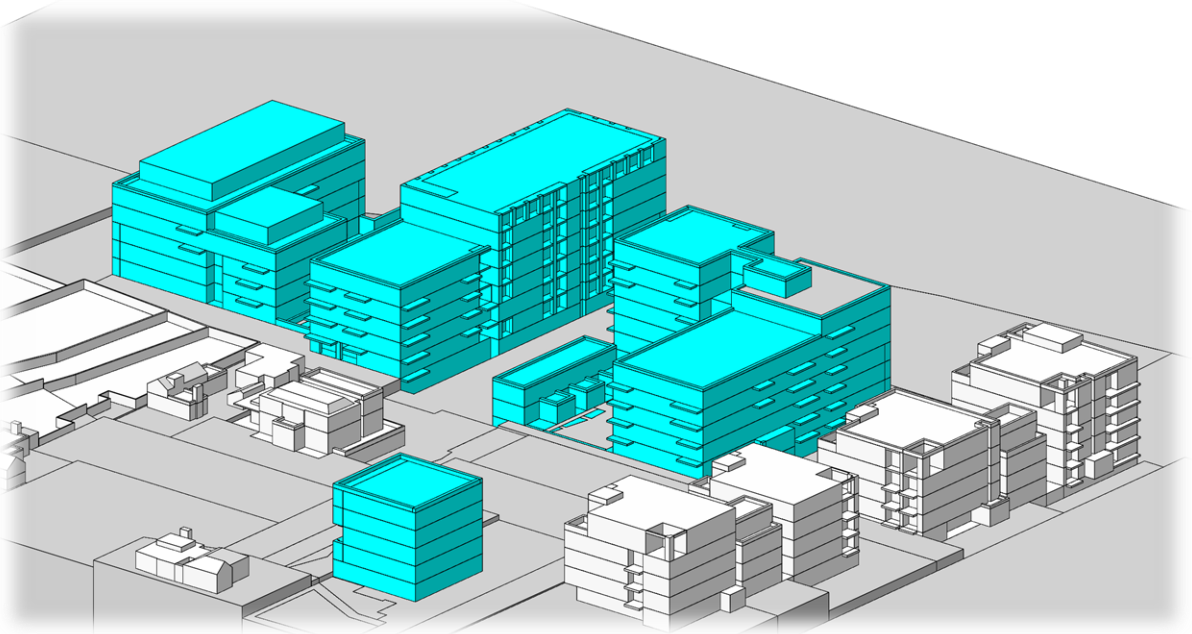




Knockrabo Phase 2

Daylight, Sunlight and Overshadowing Study



Report For: Knockrabo Investments DAC

Project No: 15407

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1 Executive Summary

This report summarises the daylight, sunlight and overshadowing study undertaken for the proposed Knockrabo Phase 2 development located in Co. Dublin. The report focuses on measuring the daylight and sunlight impact of the proposed development when compared to the existing situation. The report also focuses on the proposed design. The following can be concluded based on the analysis undertaken.

1.1 Daylight Analysis of Existing Buildings

This study considers the proposed scheme and the impact it will have on existing neighbouring dwellings adjacent to the development site. The BRE Guide states that if the VSC results are greater than either 27% or 0.8 times their former value (that of the existing situation) there will be negligible impact on the existing adjacent properties. Of the 45 points tested 96% (43 points) comply with the BRE recommendations.

Therefore the proposed development will have a negligible adverse impact on the adjacent buildings outside of the wider development.

For the adjacent Blocks A, B, C and D in Knockrabo Phase 1 which are a part of the wider development, an ADF analysis was undertaken to determine the impact the proposed development has on these blocks. The BRE guide states that *'Use of the ADF for loss of light to existing buildings is not generally recommended. However, there are some situations where meeting a set ADF target value with the new development in place could be appropriate as a criterion for loss of light:'*

"Point F8 (i) 'where the existing building is one of a series of new buildings that are being built one after the other, and each building has been designed as part of a larger group.'"

As such, since the construction details for the Knockrabo Phase 1 (Plans, Elevations & Sections) were available and are part of the wider development, ADF calculations were generated for the neighboring development with the proposed scheme in place.

The proposed development has no impact on the apartment units tested in Block A & B which continue to exceed the BRE guidelines for internal daylighting. The proposed development has a negligible adverse impact on the existing units in Block C & D as only 1 room out of 42 rooms tested has a resultant ADF below the BRE recommended guidelines with the proposed development in place.

1.2 Shadow Analysis

The shadow analysis illustrates different shadows being cast at three key times of the year (March 21st, June 21st and December 21st) for the existing scenario and with the proposed development in place.

The images indicate that the permitted dwellings on the East side of the project are receiving additional shading from the proposed development during late afternoon/evening of March (1400-1600) and in December (1400) with very minimal shading perceived during the late afternoon/evening in June (1600-1800).

With regards to the existing houses on Mount Anville Road, no additional shading is detected as they sit to the south of the development site.

Taking all of the above into account, the overall impact of overshadowing can be classed as a minor adverse impact, especially since the permitted development is Phase 1 of the Knockrabo development.

1.3 Sunlight to Existing and Proposed Amenity Spaces

As outlined in Section 3.3.17 of the BRE Guide, 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 the 21st of March.

Existing Gardens Adjacent to the Proposed Development

On the 21st of March, the existing gardens will continue to receive the same amount of sunlight even with the proposed development, thus complying with BRE guidelines.

Permitted Amenity Areas Adjacent to the Proposed Development

On the 21st of March, the permitted amenity areas with the proposed development in place will continue to receive over 2 hours of sunlight on at least 63% of their former value, thus exceeding BRE recommendations.

Proposed Amenity Areas

On the 21st of March, the proposed private communal amenity spaces within the development will receive over 2 hours of sunlight on 91% of their combined area, thus exceeding BRE recommendations.

On the 21st of March, the proposed public amenity spaces within the development will receive over 2 hours of sunlight on 99% of their combined area, thus exceeding BRE recommendations.

Overall, all amenity spaces assessed comply with BRE recommendations.

1.4 Annual Probable Sunlight Hours

Existing Buildings

The existing buildings adjacent to the development have not been assessed as they did not meet the required criteria.

Proposed Apartments

Within the BS 8206-2:2008 standard, when discussing annual probable sunlight hours regarding proposed developments, it is noted that:

“The degree of satisfaction is related to the expectation of sunlight. If a room is necessarily North facing or if the building is in a densely-built urban area, the absence of sunlight is more acceptable than when its exclusion seems arbitrary”.

This is also reflected in the correlating BRE guidance which notes:

“The BS 8206-2 criterion applies to rooms of all orientations, although if a room faces significantly north of due east or west it is unlikely to be met.”

The results of the APSH test note that 45% (160 of 352) of main living room windows tested are achieving 25% annual and 5% winter sunlight hours. The windows that do not meet this recommendation are as a result of their orientation, their courtyard position within this urban development and the provision of a balcony (refer to Section 11.7 Compensatory Measures). It can also be noted that in some cases all of these points are evidence to why a living room window did not achieve the recommended targets for sunlight.

1.5 Average Daylight Factors

Across the proposed development, 93% of the tested rooms are achieving Average Daylight Factors (ADF) above the BRE and BS 8206-2:2008 guidelines when Living/Kitchen/Dining spaces are assessed as whole rooms against a 2% ADF target.

With regards to internal daylighting, the Sustainable Urban Housing: Design Standards for New Apartments, Section 6.7 states the following:

“Where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to design constraints associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution.”

Compensatory measures have been incorporated in the design of the proposed development to offset reduced daylight performance in a number of bedrooms and LKDs. The floor areas of 68.7% of all apartments are more than 10% above the minimum area requirements set out within national policy and in addition, are provided with private amenity areas in the form of balconies. Taking both of these critical elements into consideration, the daylight results achieved are to a high standard as both of these factors are generally a detractor to good daylight performance. Furthermore, the number of dual aspect units and both communal and public open space provisions are above minimum recommendations. The incorporation of these compensatory measures more than offset the reduced daylight performance when the proposed development as a whole is considered.

The Living/Kitchen/Dining spaces have also been assessed as whole rooms against an alternative 1.5% ADF target. In addition to complying with further Irish Design Standards for New Apartments such as the provision of balconies (which reduce daylight within apartments as noted within the BRE guidelines) as well as the layout of the apartments with respect to Kitchens, the 1.5% ADF target is noted as the more appropriate target. Although the design target value is lower, this is compensated with a much higher valued outdoor private amenity provision which is noted to be a very desirable commodity for occupants to benefit their connection to the outdoors.

Therefore, when Living/Kitchen/Dining spaces are assessed as whole rooms against a 1.5% ADF target, a 98% compliance rate is achieved across all tested rooms within the proposed development.

1.6 Observations

It should be noted that the guidance in the BRE 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice' is not mandatory and the guide 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 the above, the site performs well in relation to the metrics considered in this report.

In addition, the BS 8206-2:2008 also states, *"The aim of the standard is to give guidance to architects, builders and others who carry out lighting design. It is recognised that lighting is only one of many matters that influence fenestration. These include other aspects of environmental performance (such as noise, thermal equilibrium and the control of energy use),*

fire hazards, constructional requirements, the external appearance and the surroundings of the site. The best design for a building does not necessarily incorporate the ideal solution for any individual function. For this reason, careful judgement should be exercised when using the criteria given in the standard for other purposes, particularly town planning.”

The approach within this report is further supported by the national policy guidance noted in the Sustainable Urban Housing: Design Standards for New Apartments, Section 6.7 which states:

“Where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to design constraints associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution.”

Taking all of the above information into account, overall the results demonstrate that the proposed development performs well when compared to the BRE recommendations in the BRE ‘Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice’ by Paul Littlefair, 2011 sometimes referred to as BRE Digest 209 and the “BS 8206-2:2008: Lighting for Buildings - Part 2: Code of Practice for Daylighting”.

2 Introduction

This report summarises the daylight, sunlight and overshadowing study undertaken for the proposed Knockrabo Phase 2 Development, Co. Dublin.

2.1 Analysis Performed

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

- **Daylight Analysis of Existing Buildings** - via consideration of the Vertical Sky Component (VSC) results.
- **Shadow Analysis** - A visual representation analysing any potential changes that may arise to the neighbouring existing developments when comparing the existing scenario to the scenario with the proposed development in place.
- **Sunlight to Existing and Proposed Amenity Spaces** – via sunlight hours simulation.
- **Average Daylight Factors**: via consideration of the Average Daylight Factor (ADF) for the proposed development.

It should be noted that the existing neighbouring dwelling to the south along Mount Anville Road do not fit the criteria noted within the BRE guidance to complete the Annual Probable Sunlight Hours (APSH) analysis as they do not sit north of the proposed development.

The analysis was completed using IES VE software and the assessment based on recommendations given in the BRE ‘Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice’ by Paul Littlefair, 2011 sometimes referred to as BRE Digest 209 and the “BS 8206-2:2008: Lighting for Buildings - Part 2: Code of Practice for Daylighting”

3 Methodology

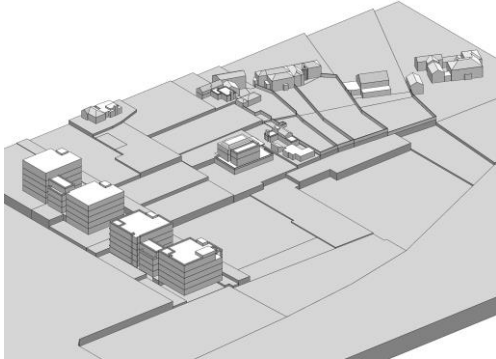
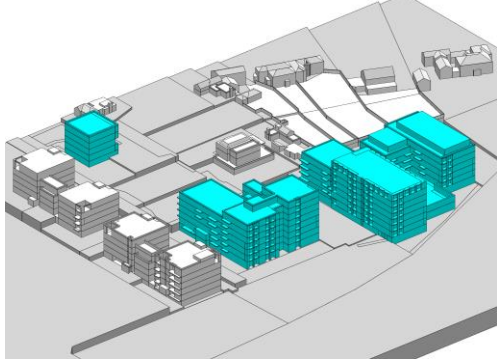
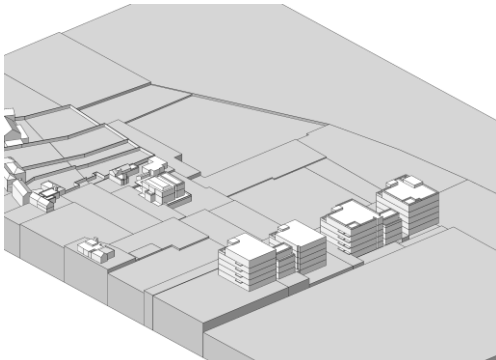
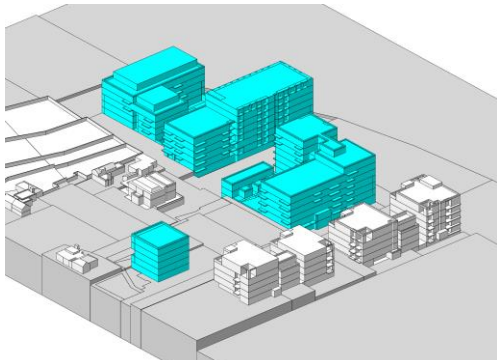
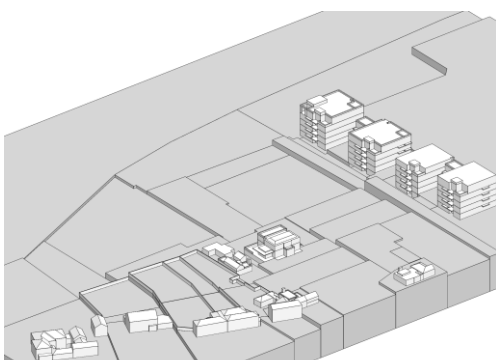
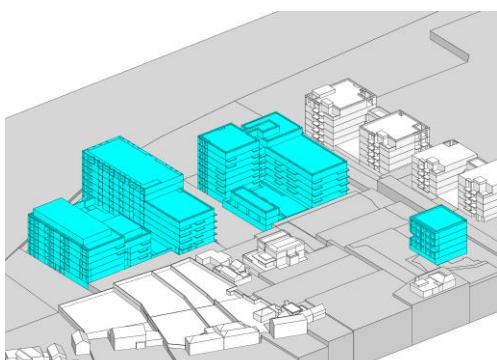
3.1 Orientation

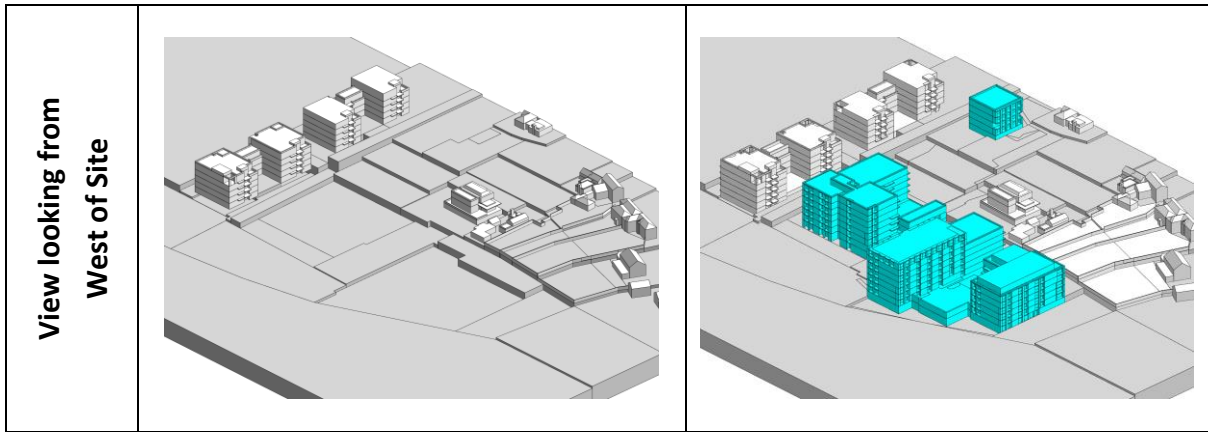
The model orientation has been taken from the drawings provided by the Architect, with the resulting angle shown below used in the analysis.

Orientation	

3.2 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.

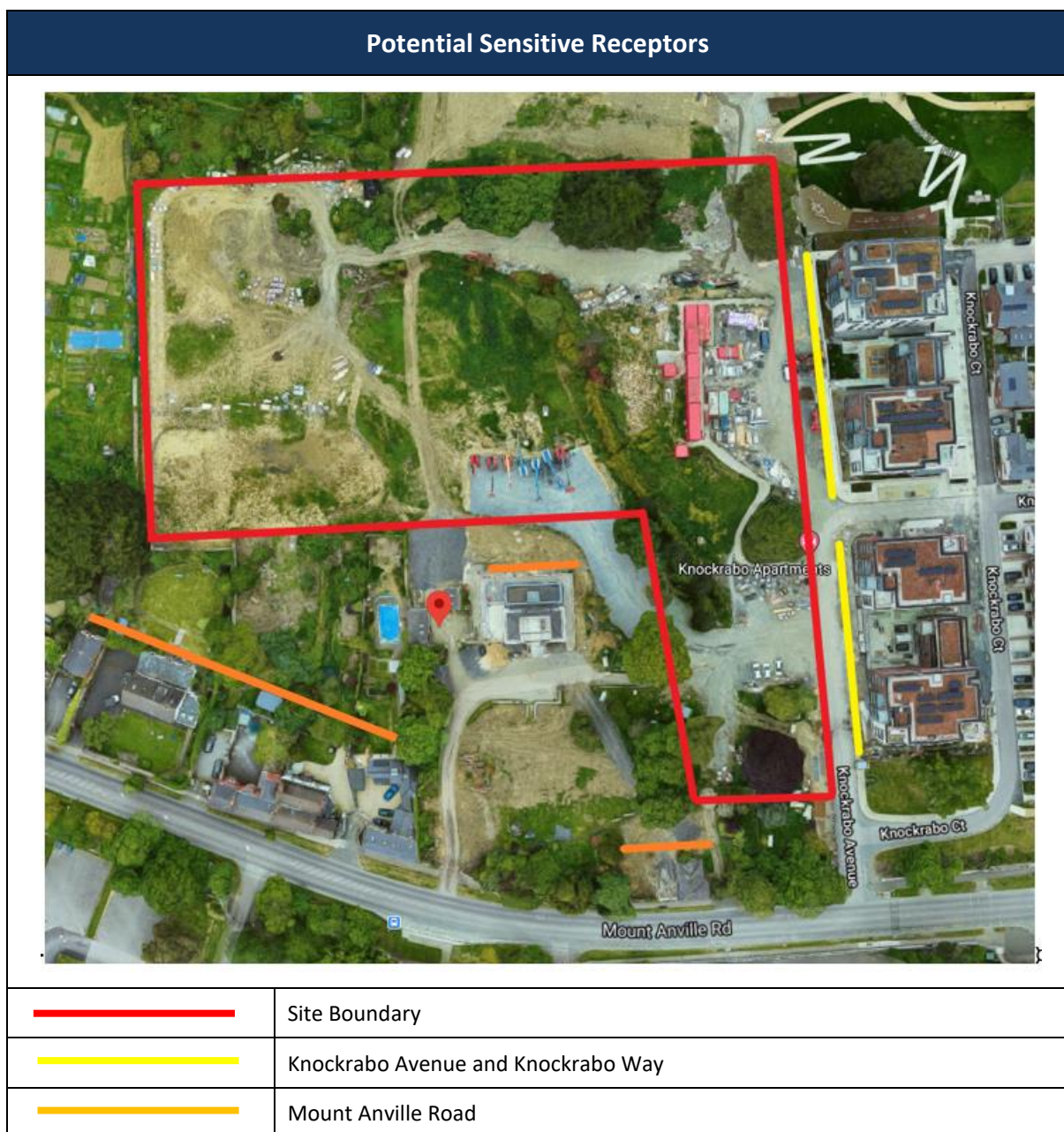
	Permitted/Existing Development	Proposed Development
View looking from North of Site		
View looking from East of Site		
View looking from South of Site		



3.3 Potential Sensitive Receptors

To help understand the proposed development’s impact on surrounding buildings, potential sensitive receptors were identified as illustrated on the following page. These are existing residential dwellings that are in close proximity to the proposed development. Other dwellings surrounding the proposed development were excluded based on Section 2.2.4 of the BRE guidance which states:

“Loss of light to existing windows need not be analysed 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.”



4 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 residential developments while not obstructing light to existing homes nearby.

The BRE guide, advises 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.

4.1 Impact Classification Discussion

BRE guidance in Appendix I – 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 does not fully meet the guidelines in the BRE guide, 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>

5 Daylight Analysis of Existing Buildings

5.1 Guidance Requirements

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 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 RadianceIES, a module of IES VE.

For typical residential schemes the BRE Guide 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.

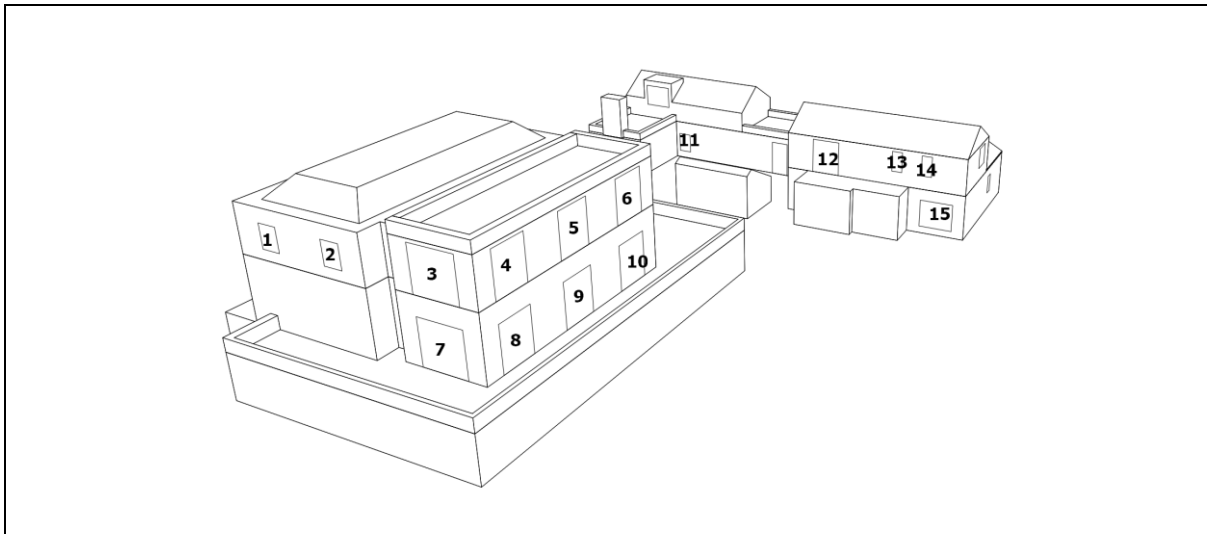
As such this study will compare the Existing Knockrabo Phase 1 scheme and Proposed development and consider if the VSC values are above 27% or not less than 0.8 times their former value (that of the Existing scheme).

5.2 Assessment

Based on the methodology outlined above, the following locations have been modelled and analysed based on their proximity to the proposed development:

5.2.1 View 1: Cedar Mount House



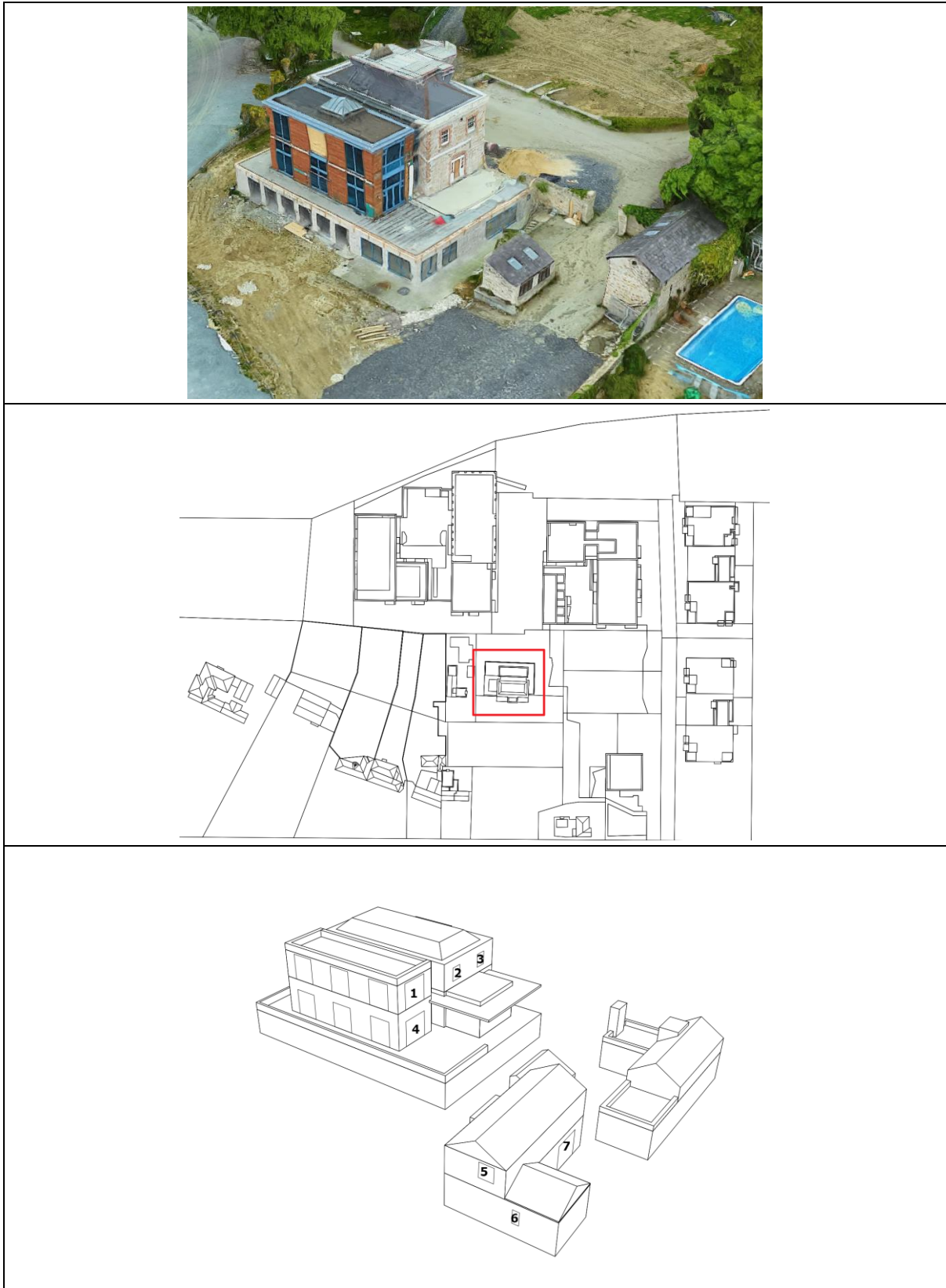


Ref.	Permitted/Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	37.48	35.01	93%	✓
2	37.34	35.16	94%	✓
3	37.45	34.98	93%	✓
4	38.82	33.85	87%	✓
5	38.83	33.81	87%	✓
6	39.15	33.95	87%	✓
7	36.13	33.19	92%	✓
8	38.55	31.86	83%	✓
9	38.85	31.37	81%	✓
10	38.88	31.59	81%	✓
11	20.05	19.55	98%	✓
12	35.56	33.02	93%	✓
13	36.40	33.03	91%	✓
14	36.54	32.53	89%	✓
15	32.66	27.72	85%	✓

The following conclusions can be made:

- ✓ The points tested have a VSC value greater than 27%. Therefore, these points exceed BRE recommendations.

5.2.2 View 2: Cedar Mount House

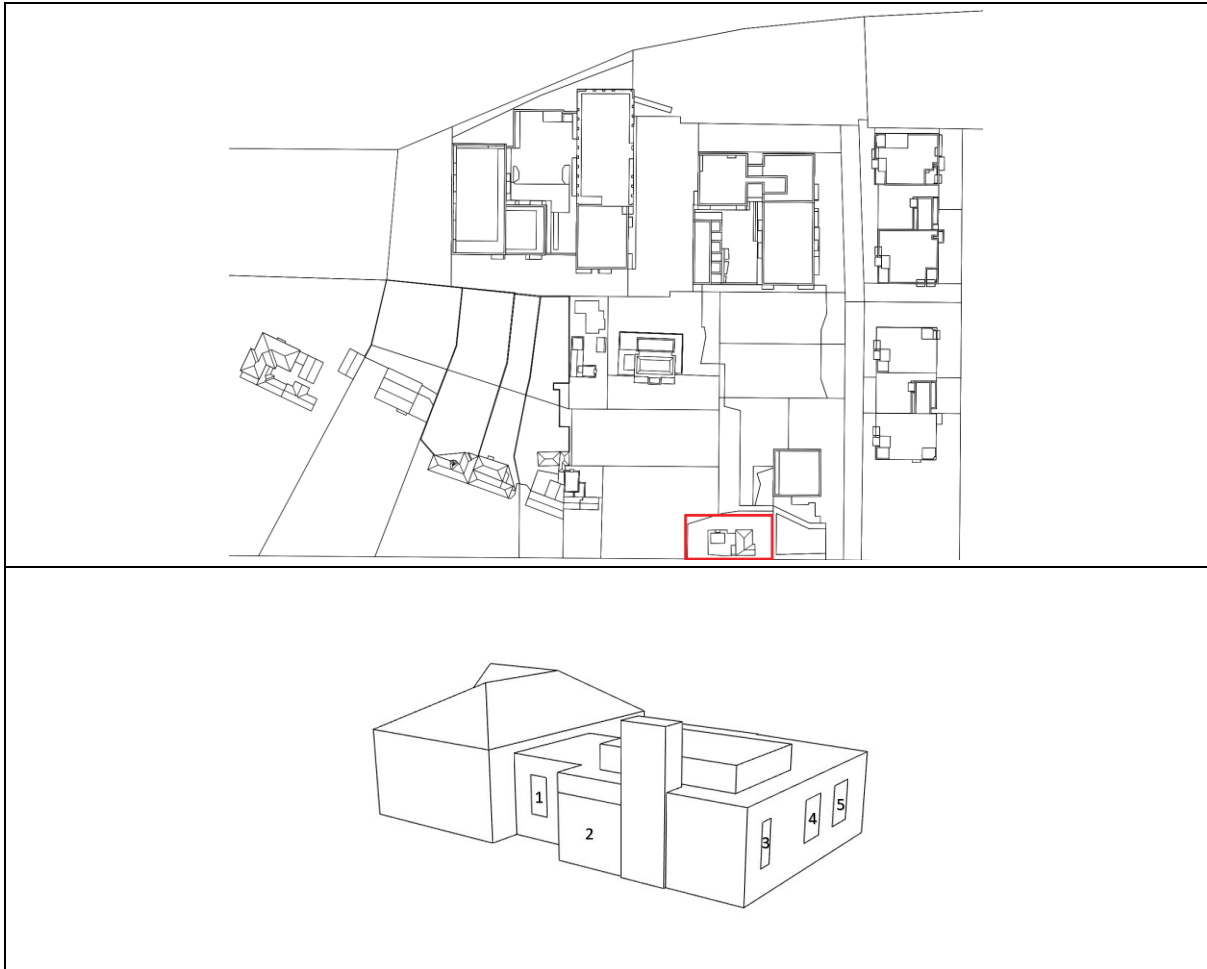


Ref.	Permitted/Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	38.86	37.46	96%	✓
2	39.14	37.83	97%	✓
3	39.00	38.12	98%	✓
4	32.72	30.38	93%	✓
5	39.10	22.00	56%	x
6	38.82	20.32	52%	x
7	32.42	32.10	99%	✓

The following conclusion can be made:

- ✓ The points tested have a VSC value greater than 27%. Therefore, these points exceed BRE recommendations.
- x The points tested have a VSC value below the BRE recommendations.

5.2.3 View 3: Knockrabo Gate Lodge (West)



Ref.	Permitted/Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	31.80	29.19	92%	✓
2	38.01	34.62	91%	✓
3	39.18	38.91	99%	✓
4	39.20	39.00	99%	✓
5	39.08	38.95	100%	✓

The following conclusion can be made:

✓ The points tested have a VSC value greater than 27%. Therefore, these points exceed BRE recommendations.

5.2.4 View 4: Mount Anville Road - Residential



Ref.	Permitted/Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	37.81	36.06	95%	✓
2	37.86	36.07	95%	✓
3	38.56	36.71	95%	✓
4	38.53	36.87	96%	✓
5	38.61	36.73	95%	✓
6	35.88	34.42	96%	✓
7	35.65	33.75	95%	✓
8	36.08	34.25	95%	✓
9	36.57	34.49	94%	✓
10	36.82	34.4	93%	✓
11	37.65	34.95	93%	✓
12	38.07	35.33	93%	✓
13	29.86	29.27	98%	✓
14	38.78	36.16	93%	✓
15	38.9	37.72	97%	✓

Ref.	Permitted/Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
16	39.02	37.5	96%	✓
17	39.06	37.66	96%	✓
18	38.62	36.85	95%	✓

The following conclusion can be made:

✓ The points tested have a VSC value greater than 27%. Therefore, these points exceed BRE recommendations.

5.3 Discussion

This study considers the proposed scheme and the impact it will have on existing neighbouring dwellings adjacent to the development site. The BRE Guide states that if the VSC results are greater than either 27% or 0.8 times their former value (that of the existing situation) there will be negligible impact on the existing adjacent properties. Of the 45 points tested 96% (43 points) comply with the BRE recommendations.

Therefore the proposed development will have a negligible adverse impact on the adjacent buildings outside of the wider development.

6 Permitted Phase 1 - Average Daylight Factors

ADF Analysis to Knockrabo Phase 1 Block A, B, C, and D

The BRE guide states that ‘Use of the ADF for loss of light to existing buildings is not generally recommended. However, there are some situations where meeting a set ADF target value with the new development in place could be appropriate as a criterion for loss of light:’

“Point F8 (i) ‘where the existing building is one of a series of new buildings that are being built one after the other, and each building has been designed as part of a larger group.”

As such, since the construction details for the Knockrabo Phase 1 (Plans, Elevations & Sections) were available and are part of the wider development, ADF calculations were generated for the neighboring development with the proposed scheme in place. A description of the additional analysis undertaken and the subsequent results are outlined in this section.

A detailed model for Blocks A, B, C and D was created including all Living Rooms and Bedrooms facing the proposed development from Level 0 through to Level 2 which amounts to 80 no. spaces. These spaces were chosen as they are the ones that would notice any change to daylight as a result of the proposed second phase of the development.

6.1 Settings

The following assumptions are to be used in this section of the study in both scenarios:

The following settings are default settings within the software as prescribed within the “BS 8206-2:2008: Lighting for Buildings - Part 2: Code of Practice for Daylighting”

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

The following surface reflectance values and model settings are used in the study – these are derived from discussions with the design team and aligned with material properties from “BS 8206-2:2008: Lighting for Buildings - Part 2: Code of Practice for Daylighting”:

Material Surface	Reflectance
External Wall – Red Brick	0.20
Internal Partition – White Paint	0.85
Roof - Default	0.20
Ground - Default	0.20
Floor/Ceiling (Floor) – Light Veneers	0.40
Floor/Ceiling (Ceiling) - White Paint	0.85

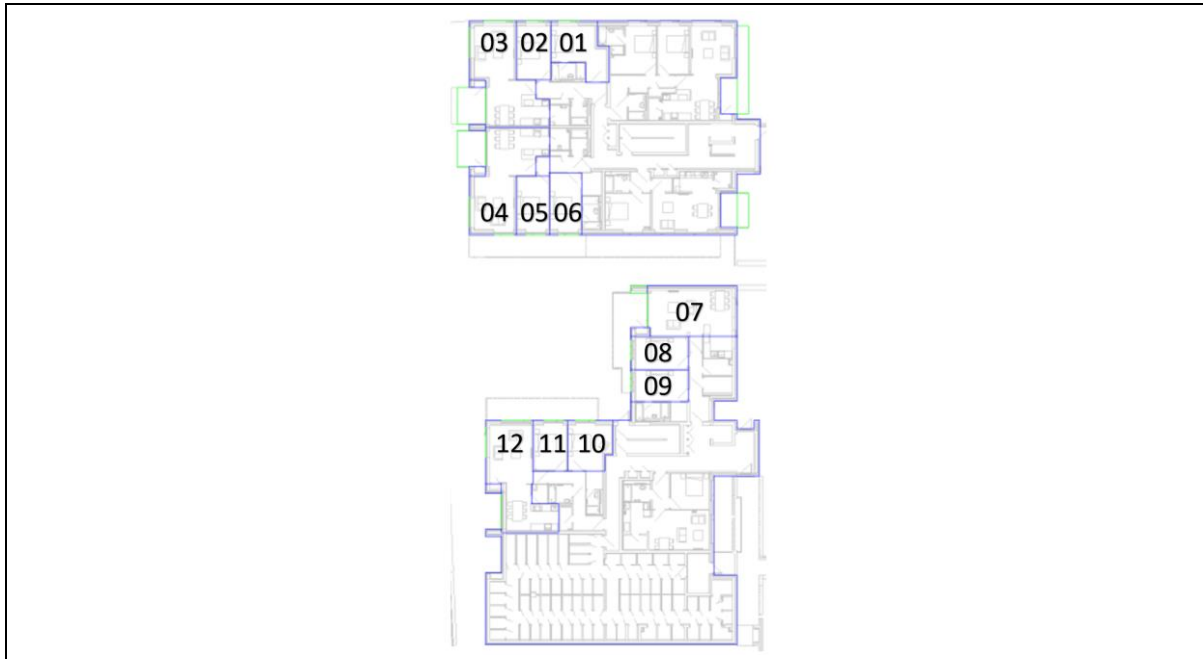
Glazing Transmittance:

- Light Transmittance (Default) 70%
- Window Frame thickness (From Architectural Information) 50 mm
- Floor to Floor Height (From Architectural Information) 3.10m

6.2 ADF Results

The following floorplans summarize the results of ADF analysis of the Knockrabo Phase 1 Blocks A, B, C, and D. Please note, the code L/K/D equates to Living, Kitchen, and Dining area.

6.2.1 Block A & Block B: L00

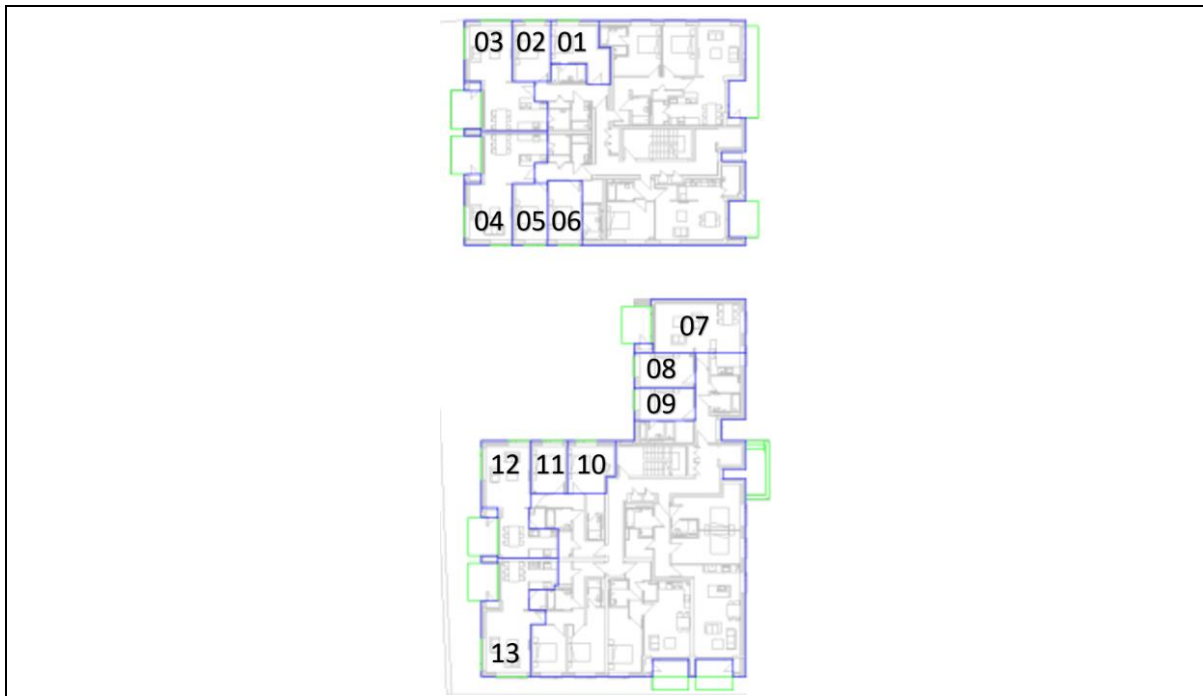


Ref.	Room Reference	Room Activity	Existing Scheme ADF	Existing Scheme with Proposed Dev. ADF	Comment
1	L00: BA-A1_Bedroom 02	Bedroom	2.88	2.95	✓
2	L00: BA-A1_Bedroom 01	Bedroom	3.70	3.77	✓
3	L00: BA-A1_Living	LKD	4.74	4.05	✓
4	L00: BA-A2_Living	LKD	3.41	2.13	✓
5	L00: BA-A2_Bedroom 01	Bedroom	1.58	1.48	✓
6	L00: BA-A2_Bedroom 02	Bedroom	1.29	1.21	✓
7	L00: BB-A1_Living	LKD	3.15	3.21	✓
8	L00: BB-A1_Bedroom 01	Bedroom	2.44	1.67	✓
9	L00: BB-A1_Bedroom 02	Bedroom	2.31	1.61	✓
10	L00: BB-A2_Bedroom 02	Bedroom	1.50	1.23	✓
11	L00: BB-A2_Bedroom 01	Bedroom	2.03	1.50	✓
12	L00: BB-A2_Living	LKD	4.48	2.57	✓

The following conclusion can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

6.2.2 Block A & Block B: L01

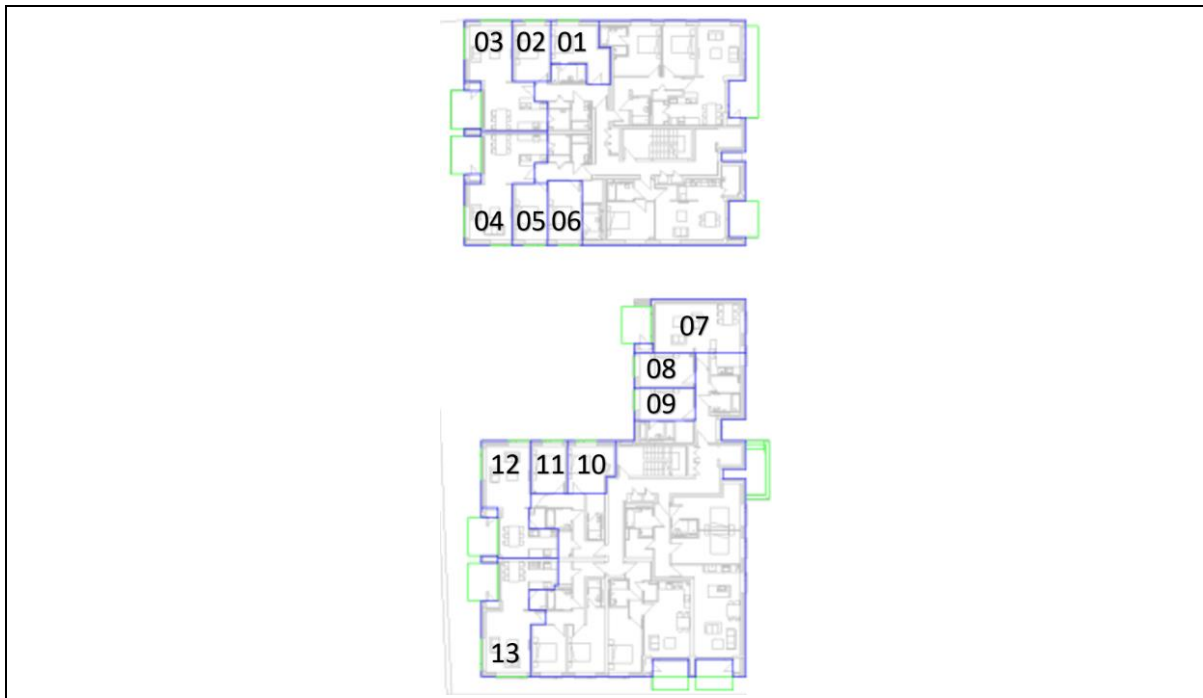


Ref.	Room Reference	Room Activity	Existing Scheme ADF	Existing Scheme with Proposed Dev. ADF	Comment
1	L01: BA-A1_Bedroom 02	Bedroom	3.00	2.98	✓
2	L01: BA-A1_Bedroom 01	Bedroom	3.69	3.37	✓
3	L01: BA-A1_Living	LKD	5.42	4.25	✓
4	L01: BA-A2_Living	LKD	4.07	2.45	✓
5	L01: BA-A2_Bedroom 01	Bedroom	2.31	1.79	✓
6	L01: BA-A2_Bedroom 02	Bedroom	1.96	1.51	✓
7	L01: BB-A1_Living	LKD	3.24	3.39	✓
8	L01: BB-A1_Bedroom 01	Bedroom	2.57	1.92	✓
9	L01: BB-A1_Bedroom 02	Bedroom	2.42	1.84	✓
10	L01: BB-A2_Bedroom 02	Bedroom	1.76	1.53	✓
11	L01: BB-A2_Bedroom 01	Bedroom	2.34	1.84	✓
12	L01: BB-A2_Living	LKD	4.20	2.55	✓
13	L01: BB-A3_Living	LKD	4.51	3.34	✓

The following conclusion can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

6.2.3 Block A & Block B: L02

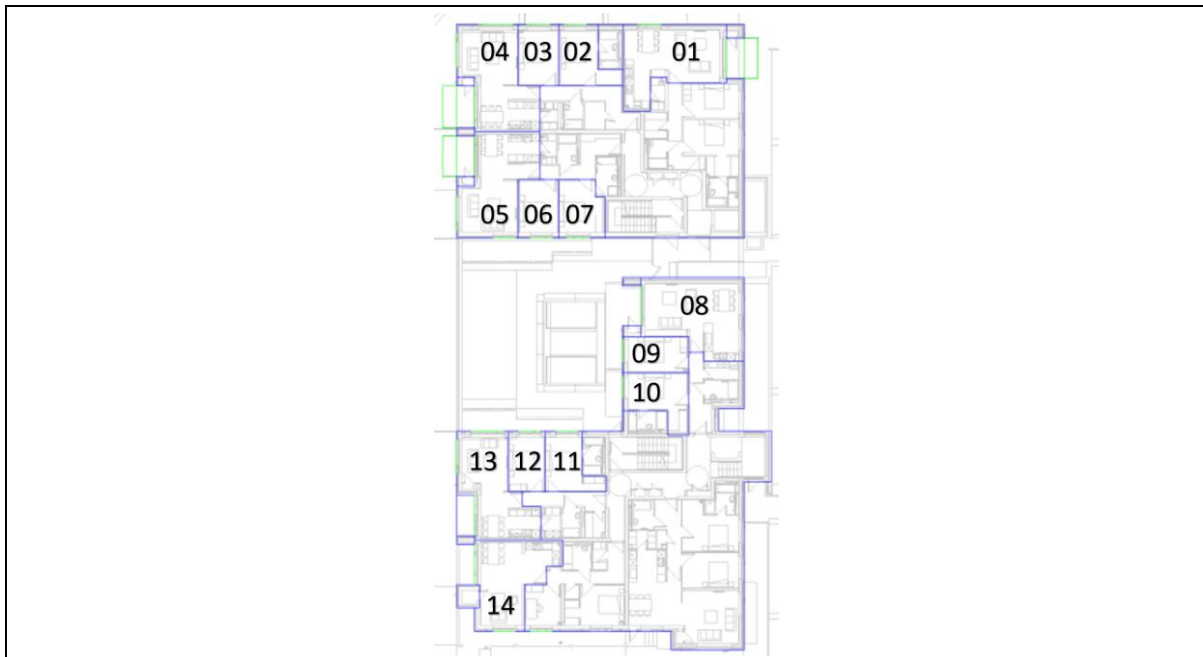


Ref.	Room Reference	Room Activity	Existing Scheme ADF	Existing Scheme with Proposed Dev. ADF	Comment
1	L02: BA-A1_Bedroom 02	Bedroom	3.01	2.98	✓
2	L02: BA-A1_Bedroom 01	Bedroom	3.69	3.37	✓
3	L02: BA-A1_Living	LKD	5.41	4.35	✓
4	L02: BA-A2_Living	LKD	4.17	2.75	✓
5	L02: BA-A2_Bedroom 01	Bedroom	2.64	2.16	✓
6	L02: BA-A2_Bedroom 02	Bedroom	2.33	1.90	✓
7	L02: BB-A1_Living	LKD	3.35	3.02	✓
8	L02: BB-A1_Bedroom 01	Bedroom	2.75	2.20	✓
9	L02: BB-A1_Bedroom 02	Bedroom	2.57	2.08	✓
10	L02: BB-A2_Bedroom 02	Bedroom	2.13	1.95	✓
11	L02: BB-A2_Bedroom 01	Bedroom	2.76	2.32	✓
12	L02: BB-A2_Living	LKD	4.40	3.05	✓
13	L02: BB-A3_Living	LKD	4.78	3.83	✓

The following conclusion can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

6.2.4 Block C & Block D: L00

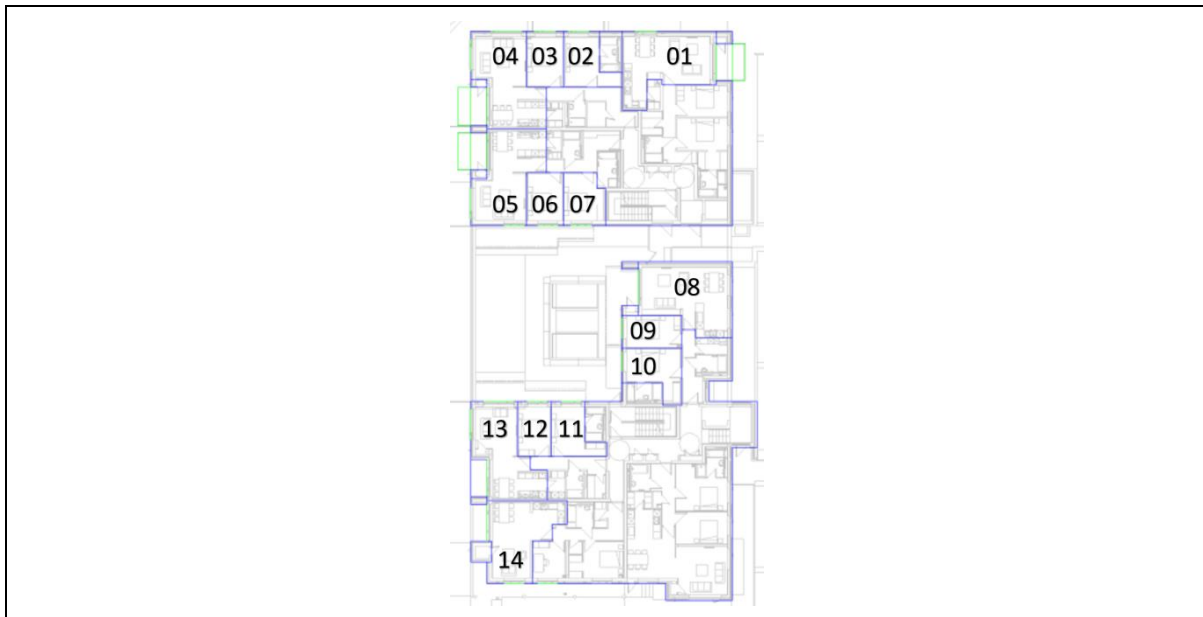


Ref.	Room Reference	Room Activity	Existing Scheme ADF	Existing Scheme with Proposed Dev. ADF	Comment
1	L00: BC-C1_Living	LKD	2.24	2.16	✓
2	L00: BC-C2_Bedroom 02	Bedroom	2.46	2.24	✓
3	L00: BC-C2_Bedroom 01	Bedroom	2.83	2.37	✓
4	L00: BC-C2_Living	LKD	5.17	4.29	✓
5	L00: BC-C3_Living	LKD	3.94	3.25	✓
6	L00: BC-C3_Bedroom 01	Bedroom	1.68	1.22	✓
7	L00: BC-C3_Bedroom 02	Bedroom	1.30	1.03	✓
8	L00: BD-D1_Living	LKD	3.64	3.81	✓
9	L00: BD-D1_Bedroom 01	Bedroom	2.20	2.10	✓
10	L00: BD-D1_Bedroom 02	Bedroom	1.65	1.86	✓
11	L00: BD-D2_Bedroom 02	Bedroom	1.49	1.23	✓
12	L00: BD-D2_Bedroom 01	Bedroom	2.07	1.61	✓
13	L00: BD-D2_Living	LKD	3.74	3.10	✓
14	L00: BD-D3_Living	LKD	2.12	1.78	✓ / x

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.
- ✓ / x This room in the existing scheme has an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008. However, with the proposed development in place, the resultant ADF falls below the recommended 2% ADF target although a high ADF is still achieved.

6.2.5 Block C & Block D: L01

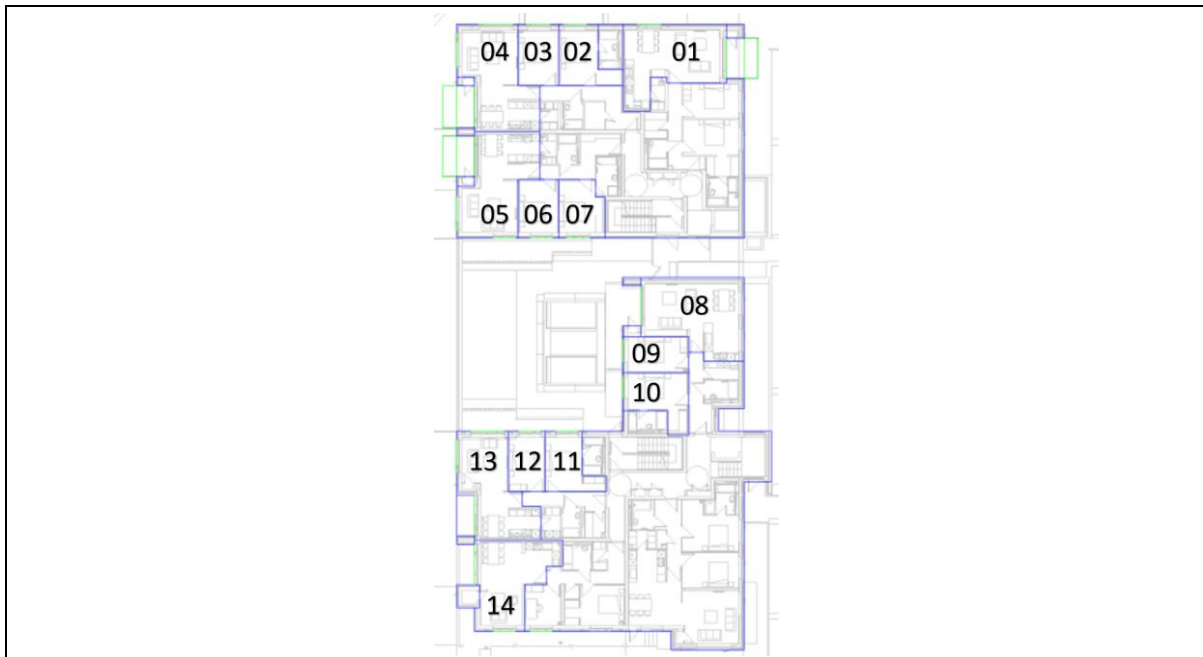


Ref.	Room Reference	Room Activity	Existing Scheme ADF	Existing Scheme with Proposed Dev. ADF	Comment
1	L01: BC-C1_Living	LKD	2.38	2.32	✓
2	L01: BC-C2_Bedroom 02	Bedroom	2.78	2.66	✓
3	L01: BC-C2_Bedroom 01	Bedroom	3.17	2.79	✓
4	L01: BC-C2_Living	LKD	5.57	4.77	✓
5	L01: BC-C3_Living	LKD	4.39	3.72	✓
6	L01: BC-C3_Bedroom 01	Bedroom	2.17	1.74	✓
7	L01: BC-C3_Bedroom 02	Bedroom	1.73	1.49	✓
8	L01: BD-D1_Living	LKD	3.64	3.39	✓
9	L01: BD-D1_Bedroom 01	Bedroom	2.75	2.58	✓
10	L01: BD-D1_Bedroom 02	Bedroom	2.06	2.03	✓
11	L01: BD-D2_Bedroom 02	Bedroom	2.02	1.81	✓
12	L01: BD-D2_Bedroom 01	Bedroom	2.80	2.33	✓
13	L01: BD-D2_Living	LKD	4.81	4.06	✓
14	L01: BD-D3_Living	LKD	4.39	3.45	✓

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

6.2.6 Block C & Block D: L02



Ref.	Room Reference	Room Activity	Existing Scheme ADF	Existing Scheme with Proposed Dev. ADF	Comment
1	L02: BC-C1_Living	LKD	2.93	2.87	✓
2	L02: BC-C2_Bedroom 02	Bedroom	3.05	2.98	✓
3	L02: BC-C2_Bedroom 01	Bedroom	3.45	3.10	✓
4	L02: BC-C2_Living	LKD	5.77	5.03	✓
5	L02: BC-C3_Living	LKD	4.61	3.98	✓
6	L02: BC-C3_Bedroom 01	Bedroom	2.59	2.20	✓
7	L02: BC-C3_Bedroom 02	Bedroom	2.19	1.99	✓
8	L02: BD-D1_Living	LKD	3.74	3.51	✓
9	L02: BD-D1_Bedroom 01	Bedroom	2.97	2.74	✓
10	L02: BD-D1_Bedroom 02	Bedroom	2.20	2.13	✓
11	L02: BD-D2_Bedroom 02	Bedroom	2.55	2.39	✓
12	L02: BD-D2_Bedroom 01	Bedroom	3.28	2.84	✓
13	L02: BD-D2_Living	LKD	5.21	4.55	✓
14	L02: BD-D3_Living	LKD	4.24	3.85	✓

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

6.3 Conclusion

The purpose of the supplemental ADF calculations is to quantify an overall percentage of units which exceeds the BRE recommendations and the BS 8206-2:2008 recommendations. This illustrates the impact of the proposed development on the neighbouring Blocks A, B, C, and D of Knockrabo Phase 1.

The proposed development has no impact on the apartment units tested in Block A & B which continue to exceed the BRE guidelines for internal daylighting.

The proposed development has a negligible adverse impact on the existing units in Block C & D as only 1 room out of 42 rooms tested has a resultant ADF below the BRE recommended guidelines with the proposed development in place.

The results of this analysis are summarised in the tables below.

6.3.1 Knockrabo Blocks A&B

	Existing Scheme	Existing Scheme with Proposed Development in Place
Tested	38	38
Bedroom Passes	24	24
Living/Kitchen/Dining Room Passes	14	14
Fail	0	0
% Pass	100%	100%

6.3.2 Knockrabo Blocks C&D

	Existing Scheme	Existing Scheme with Proposed Development in Place
Tested	42	42
Bedroom Passes	24	24
Living/Kitchen/Dining Room Passes	18	17
Fail	0	1
% Pass	100%	98%

7 Existing Buildings - Annual Probable Sunlight Hours (APSH)

The BRE Guide and the British Standard BS 8206-2:2008 recommend 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 one quarter 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

3.2.11 If a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window, then the sunlighting of the existing dwelling may be adversely affected. This will be the case if the centre of the window:

- receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between 21 September and 21 March and
- receives less than 0.8 times its former sunlight hours during either period and
- has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

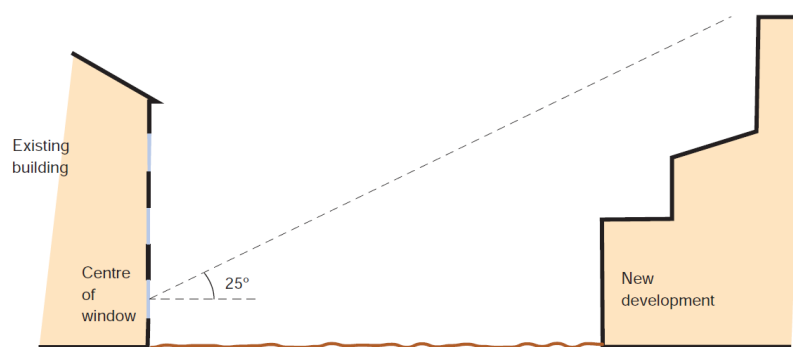
Extract from the BRE 'Site Layout Planning for Daylight and Sunlight' guide

7.1 APSH 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 APSH. However, there are several exceptional cases in which APSH is not required to be calculated, as indicated below:

3.2.7 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 (NB 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.



Extract from the BRE 'Site Layout Planning for Daylight and Sunlight' guide

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

1. The existing building has living room with a main window which faces within 90 degrees of due south.
2. Existing building is located to the North, East, or West of the Proposed Development.
3. The VSC of the existing window is less than 27%.

Based on the above, the existing buildings adjacent to the development have not been tested for the APSH since they did not meet the required criteria.

8 Proposed Buildings - Annual Probable Sunlight Hours (APSH)

The British Standard BS 8206-2:2008 recommends 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 one quarter 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.

As stated in Section 3.1.12 of the BRE Guide, “If window positions are already known, the centre of each main living room window can be used for the calculation”.

3.1.12 If window positions are already known, the centre of each main living room window can be used for the calculation. In the case of a floor-to-ceiling window such as a patio door, a point 1.6 m above ground on the centre line of the window may be used. In accordance with the recommendation in BS 8206-2, a point on the inside face of the window wall should be taken. Sunlight blocked by the window reveals should not be included, but the effect of the window frames in blocking sunlight need not be taken into account. If a room has multiple windows on the same wall or on adjacent walls, the highest value of APSH should be taken. If a room has two windows on opposite walls, the APSH due to each can be added together.

Summary (new buildings)

3.1.15 In general a dwelling, or non-domestic building which has a particular requirement for sunlight, will appear reasonably sunlit provided:

- at least one main window wall faces within 90° of due south and
- the centre of at least one window to a main living room can receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours in the winter months between 21 September and 21 March.

3.1.16 Where groups of dwellings are planned, site layout design should aim to maximise the number of dwellings with a main living room that meets the above recommendations.

Extract from the BRE 'Site Layout Planning for Daylight and Sunlight' guide

8.1.1 Block E View 01

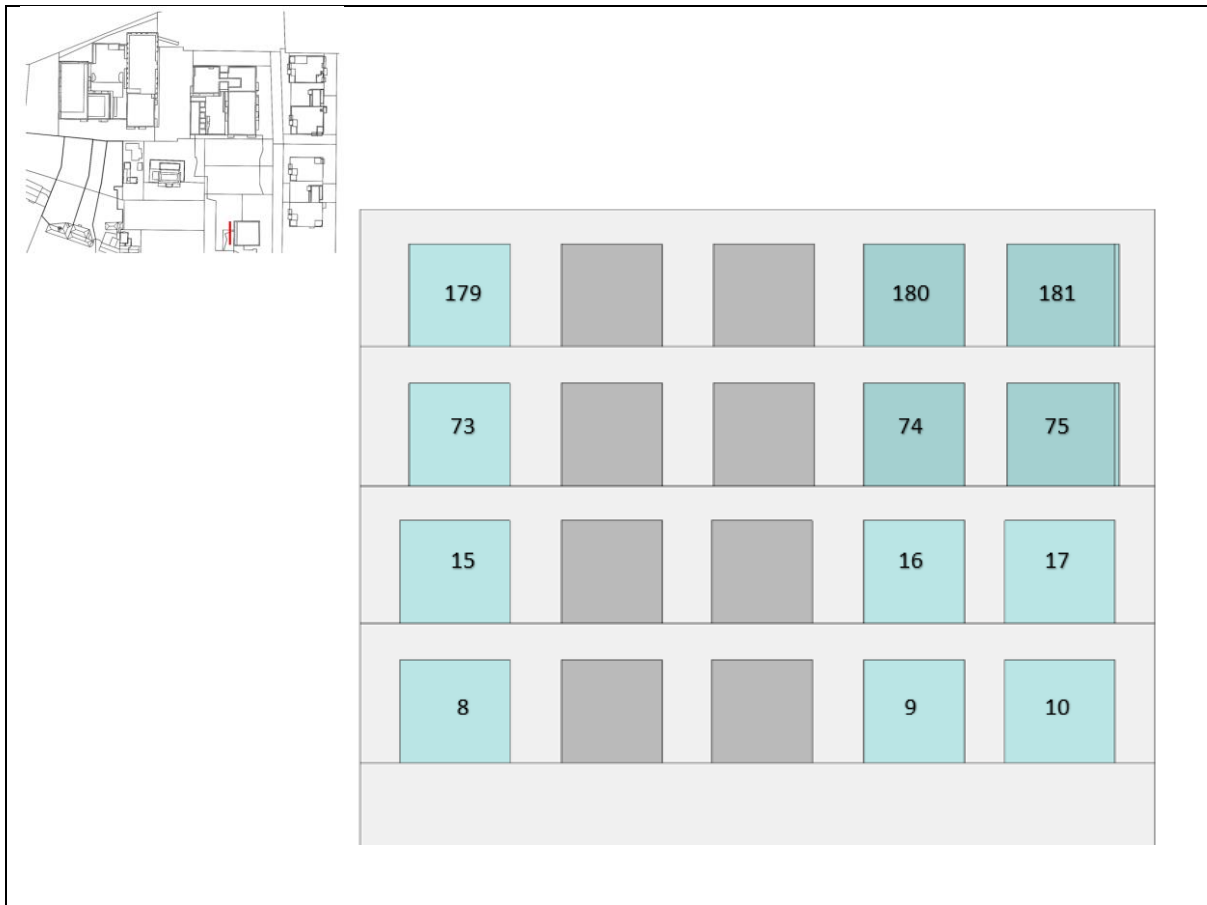


Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
174	74.13	33.57	✓/✓
175	74.13	33.57	✓/✓
176	74.13	33.57	✓/✓
68	74.13	33.57	✓/✓
69	74.13	33.57	✓/✓
70	74.13	33.57	✓/✓
19	74.13	33.57	✓/✓
20	74.13	33.57	✓/✓
4	74.13	33.57	✓/✓
5	74.13	33.57	✓/✓

The following conclusions can be made:

- ✓/✓ All of these windows are south facing and as such meet the recommendations as stated within the BRE Guide / BS 8206-2:2008.

8.1.2 Block E View 02

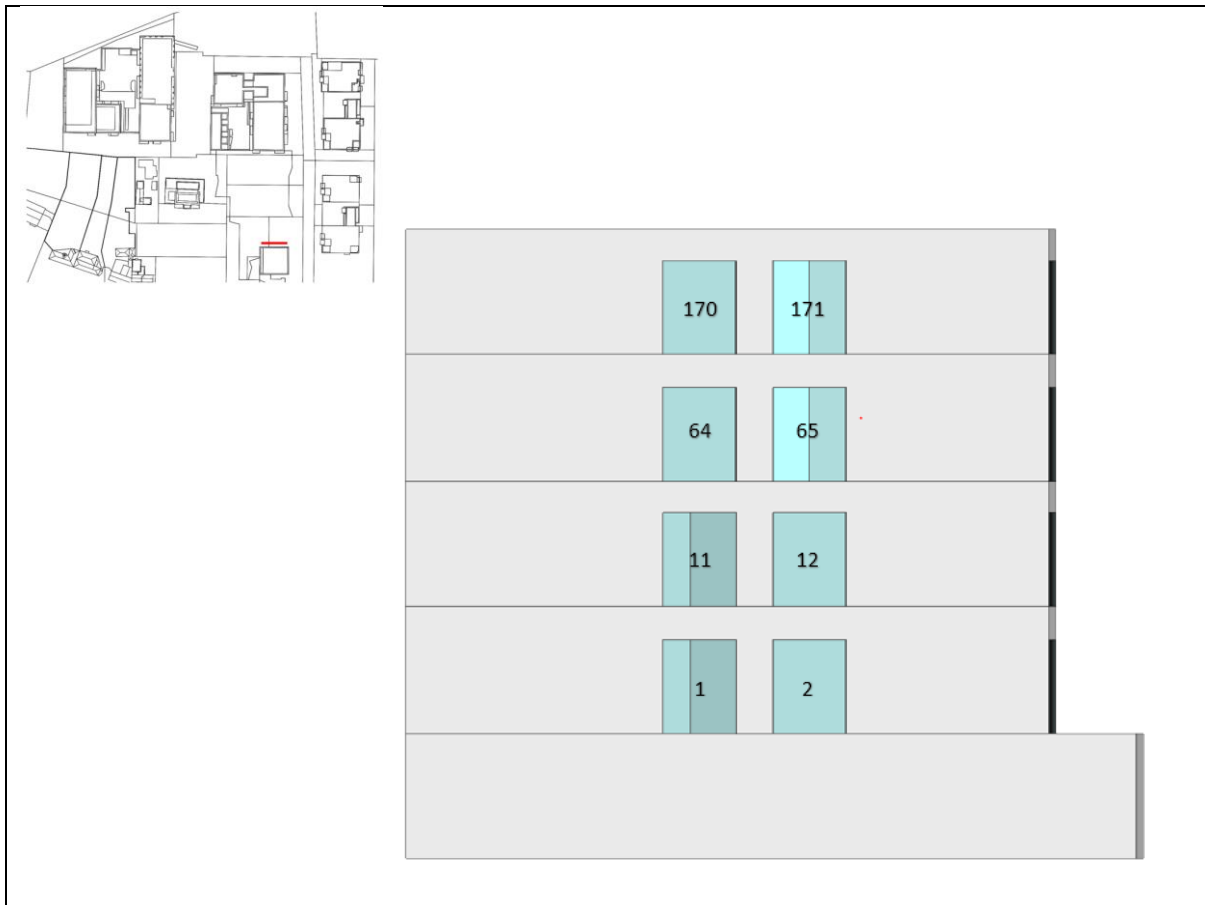


Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
179	18.20	12.54	x/✓
180	20.50	12.50	x/✓
181	18.44	10.43	x/✓
73	18.20	12.54	x/✓
74	20.50	12.50	x/✓
75	18.44	10.43	x/✓
15	17.88	12.53	x/✓
16	20.46	12.50	x/✓
17	18.70	10.70	x/✓
8	17.83	12.47	x/✓
9	20.22	12.50	x/✓
10	18.40	10.70	x/✓

The following conclusions can be made:

x/✓ All of these windows are south east facing. They meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 winter sunlight, but not annual sunlight. This is as a result of the balconies in place.

8.1.3 Block E View 03



Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
170	25.17	4.90	✓/x
171	25.17	4.90	✓/x
64	24.15	4.90	x/x
65	24.15	4.90	x/x
11	23.08	4.90	x/x
12	23.08	4.90	x/x
1	22.08	4.20	x/x
2	22.15	4.27	x/x

The following conclusions can be made:

✓/x All of these windows are north west facing. They meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual sunlight, but not winter sunlight. This is as a result of their orientation as noted within the guidelines. (See discussions section 8.2 for more information)

x/x All of these windows are north west facing. They do not meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual or winter sunlight. This is as a result of their orientation. (See discussions section 8.2 for more information)

8.1.4 Block F View 01



Ref.	Proposed		Comments
	Annual (%)	Winter (%)	
23	47.2	21.04	✓/✓
27	43.07	17.29	✓/✓
29	38.84	15.13	✓/✓
488	25.1	13.39	✓/✓
476	68.41	29.27	✓/✓
904	21.38	10.35	x/✓
879	43.13	22.24	✓/✓
431	17.84	7.15	x/✓
387	39.44	20.07	✓/✓
336	14.61	5.07	x/✓
285	35.4	17.59	✓/✓
282	12.35	3.71	x/x
275	30.1	14.63	✓/✓
133	9.49	2.53	x/x
130	21.89	9.77	x/✓
524	7.2	1.8	x/x
529	18.06	8.01	x/✓
949	8.26	1.53	x/x

The following conclusions can be made:

- ✓/✓ All of these windows are south east facing and as such meet the recommendations as stated within the BRE Guide / BS 8206-2:2008.

- x/√ All of these windows are south east facing. They meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 winter sunlight, but not annual sunlight. This is as a result of the balconies in place and part of an urban development.
- x/x All of these windows are south east facing. They do not meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual or winter sunlight. This is as a result of their orientation. (See discussions section 8.2 for more information)

8.1.5 Block F View 02



Ref.	Proposed		Comments
	Annual (%)	Winter (%)	
914	5.15	0	x/x
422	6.86	0.28	x/x
326	6.8	0.28	x/x
206	6.8	0.27	x/x
95	6.68	0.21	x/x
561	6.74	0.21	x/x
913	5.58	0	x/x
419	5.99	0	x/x
323	5.94	0	x/x
199	5.95	0	x/x
92	5.91	0	x/x
538	5.95	0	x/x
482	25.82	4.84	√/x
892	23.78	2.8	x/x
402	23.59	2.61	x/x
300	22.19	1.4	x/x
190	21.6	1.32	x/x
87	20.37	0.7	x/x
522	19.55	0.7	x/x
484	25.54	4.57	√/x
895	22.52	2.1	x/x
405	21.09	0.87	x/x
303	20.07	0.46	x/x
183	18.33	0	x/x
84	17.33	0	x/x

Ref.	Proposed		Comments
	Annual (%)	Winter (%)	
526	15.91	0	x/x
951	13.57	0	x/x

The following conclusions can be made:

- ✓/x All of these windows are north west facing. They meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual sunlight, but not winter sunlight. This is as a result of their orientation as noted within the guidelines. (See discussions section 8.2 for more information)

- x/x All of these windows are north west facing. They do not meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual or winter sunlight. This is as a result of their orientation. (See discussions section 8.2 for more information)

8.1.6 Block F View 03



Ref.	Proposed		Comments
	Annual (%)	Winter (%)	
440	28	6.64	✓/✓
345	25.66	5.72	✓/✓
215	24.09	5.59	x/✓
103	22.54	5.58	x/✓
439	27.86	6.67	✓/✓
344	24.36	5.91	x/✓
214	23.07	5.59	x/✓
102	22.51	5.59	x/✓
550	18.75	3.68	x/x
437	27.78	6.98	✓/✓
342	19.66	5.91	x/✓
212	21.53	5.59	x/✓
100	20.57	5.59	x/✓
563	16.33	4.26	x/x
444	27.77	6.99	✓/✓
349	16.31	5.21	x/✓
219	12.77	4.69	x/x
107	11.03	4.96	x/x
547	4.93	0.35	x/x
489	30.75	8.39	✓/✓

Ref.	Proposed		Comments
	Annual (%)	Winter (%)	
916	9.58	0.23	x/x
443	28.8	6.99	✓/✓
348	20.02	4.67	x/x
218	12.81	3.63	x/x
106	9.85	3.12	x/x
546	7.14	0.99	x/x
490	19.53	0.85	x/x
915	15.3	2.45	x/x
434	28.46	6.99	✓/✓
339	24.84	5.93	x/✓
209	20.99	4.11	x/x
97	17.46	2.8	x/x
542	13.79	1.27	x/x

The following conclusions can be made:

- ✓/✓ All of these windows are north east facing and as such meet the recommendations as stated within the BRE Guide / BS 8206-2:2008.
- x/✓ All of these windows are north east facing. They meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 for winter sunlight, but not annual sunlight. This is as a result of the balconies in place and part of an urban development. (See discussions section 8.2 for more information)
- x/x All of these windows are north east facing. They do not meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual or winter sunlight. This is as a result of their orientation. (See discussions section 8.2 for more information)

8.1.7 Block F View 04



Ref.	Proposed		Comments
	Annual (%)	Winter (%)	
480	74.04	33.48	✓/✓
886	73.43	32.87	✓/✓
394	69.54	32	✓/✓
293	64.62	30.63	✓/✓
269	59.95	28.15	✓/✓
128	46.27	16.03	✓/✓
534	30.25	4.41	✓/✓
481	74.06	33.5	✓/✓
887	73.1	32.54	✓/✓
395	47.75	28.93	✓/✓
291	39.48	26.03	✓/✓
267	38.47	24.74	✓/✓
126	34.1	22.26	✓/✓
535	26.29	15.46	✓/✓
445	32.98	16.67	✓/✓
362	19.13	14.41	x/✓
262	17.57	13.42	x/✓
123	16.48	13.17	x/✓
417	71	31.26	✓/✓
316	48.56	27.63	✓/✓
236	47.55	27.46	✓/✓

Ref.	Proposed		Comments
	Annual (%)	Winter (%)	
112	44.38	26.6	✓/✓
553	42.79	25.59	✓/✓
416	71	31.26	✓/✓
315	60.42	26.61	✓/✓
235	56.53	26.44	✓/✓
111	53.13	24.76	✓/✓
552	49.76	23.21	✓/✓
414	71.15	31.72	✓/✓
313	67.05	29	✓/✓
233	44.23	25.5	✓/✓
109	38.94	24.47	✓/✓

The following conclusions can be made:

- ✓/✓ All of these windows are south east facing and as such meet the recommendations as stated within the BRE Guide / BS 8206-2:2008.
- x/✓ All of these windows are south east facing. They meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 for winter sunlight, but not annual sunlight. This is as a result of the balconies in place, being set back from the main elevation and being part of an urban development. (See discussions section 8.2 for more information)

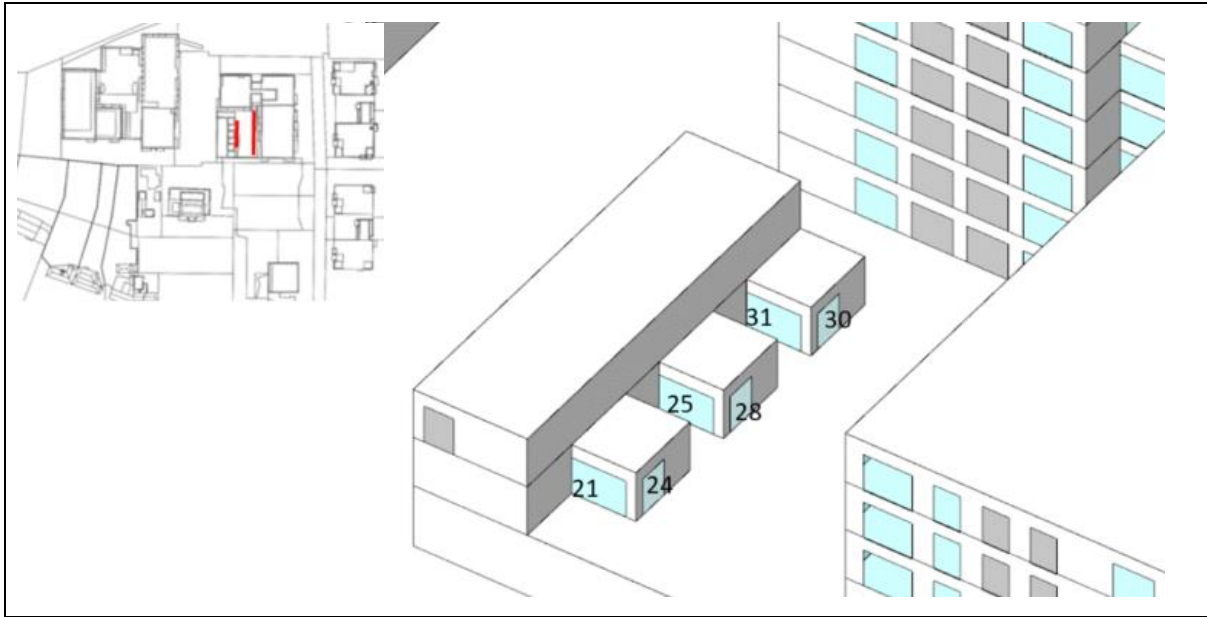
8.1.8 Block F View 05



Ref.	Proposed		Comments
	Annual (%)	Winter (%)	
456	52.72	27.19	✓/✓
375	35.31	22.48	✓/✓
251	32.16	20.74	✓/✓
122	28.43	18.85	✓/✓
560	26.21	16.49	✓/✓
455	57.54	27.89	✓/✓
374	34.86	21.76	✓/✓
250	32.82	21.45	✓/✓
121	29.19	18.76	✓/✓
559	26.36	15.82	✓/✓
445	62.05	29.18	✓/✓
367	60.4	27.55	✓/✓
243	59.18	27.53	✓/✓
114	56.04	25.57	✓/✓
555	53.7	24.02	✓/✓

The following conclusions can be made:

- ✓/✓ All of these windows are south west facing and as such meet the recommendations as stated within the BRE Guide / BS 8206-2:2008.



Ref.	Proposed		Comments
	Annual (%)	Winter (%)	
21	31.22	10	✓/✓
24	19.65	4.2	x/x
25	14.07	0.43	x/x
28	16.84	4.2	x/x
31	11.4	0.43	x/x
30	13.49	4.2	x/x

The following conclusions can be made:

✓/✓ This window is south east facing and as such meet the recommendations as stated within the BRE Guide / BS 8206-2:2008.

x/x All of these windows are inner courtyard and north east facing. They do not meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual or winter sunlight. This is as a result of their orientation. (See discussions section 8.2 for more information)

8.1.9 Block G View 01

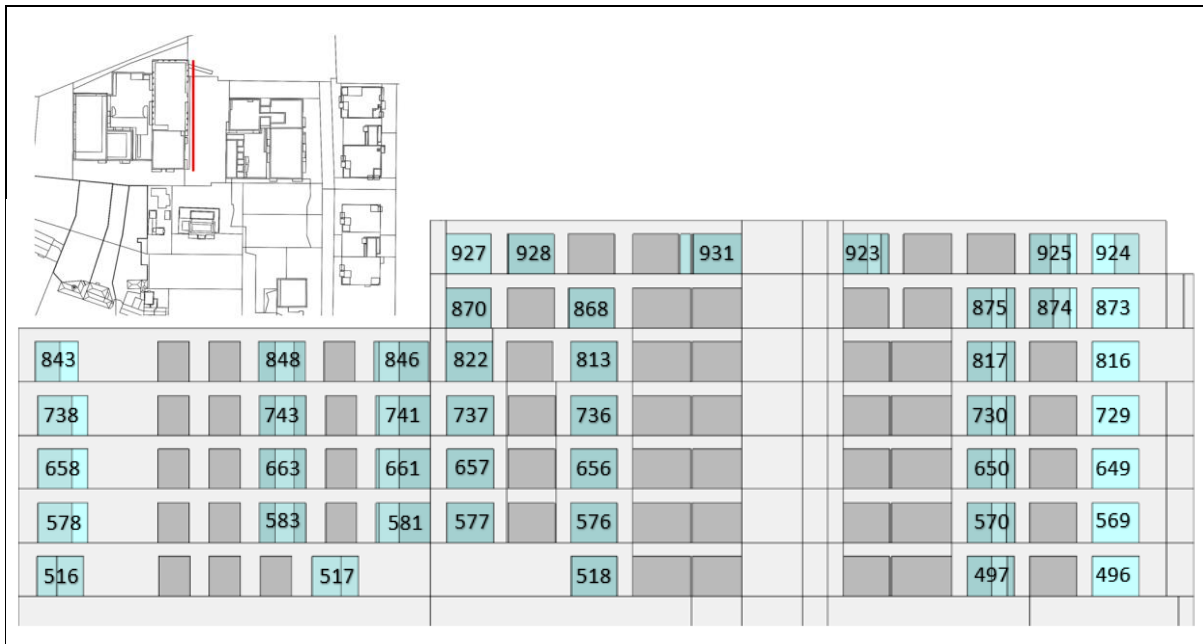


Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
934	7.53	0.69	x/x
936	7.90	1.38	x/x
935	7.04	1.52	x/x
877	8.93	0.74	x/x
855	25.87	4.90	√/x
828	7.18	0.42	x/x
811	25.87	4.90	√/x
727	7.24	0.42	x/x
725	25.87	4.90	√/x
647	7.18	0.42	x/x
645	25.87	4.90	√/x
567	7.24	0.42	x/x
565	25.87	4.90	√/x
494	7.18	0.42	x/x
492	25.87	4.90	√/x

The following conclusions can be made:

- √/x All of these windows are north west facing. They meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual sunlight, but not winter sunlight. This is as a result of their orientation as noted within the guidelines. (See discussions section 8.2 for more information)
- x/x All of these windows are north west facing with balconies. They do not meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual or winter sunlight. This is as a result of their orientation and balcony provision. (See discussions section 8.2 for more information)

8.1.10 Block G View 02



Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
927	7.09	0.23	x/x
928	7.74	1.09	x/x
931	6.26	0.87	x/x
923	5.01	0.17	x/x
925	8.16	0.80	x/x
924	8.32	0.81	x/x
870	7.14	0.23	x/x
868	8.66	0.89	x/x
875	7.34	0.64	x/x
874	9.16	0.74	x/x
873	9.29	0.74	x/x
843	29.30	7.69	✓/✓
848	29.97	8.39	✓/✓
846	29.83	8.39	✓/✓
822	6.49	0.32	x/x
813	26.39	6.99	✓/✓
817	22.93	6.99	x/✓
816	25.55	6.99	✓/✓
738	27.61	7.21	✓/✓
743	24.86	8.20	x/✓
741	18.81	6.43	x/✓
737	26.58	7.55	✓/✓
736	25.53	6.99	✓/✓

Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
730	20.39	6.99	x/√
729	23.54	6.99	x/√
658	17.23	4.89	x/x
663	22.11	6.26	x/√
661	15.22	4.50	x/x
657	24.76	5.94	x/√
656	23.93	5.59	x/√
650	18.52	5.82	x/√
649	19.12	6.01	x/√
578	14.33	2.57	x/x
583	18.03	3.25	x/x
581	12.16	2.78	x/x
577	22.14	5.05	x/√
576	21.94	5.30	x/√
570	16.91	5.59	x/√
569	16.27	5.59	x/√
516	12.78	1.46	x/x
517	9.75	1.76	x/x
518	19.48	4.00	x/x
497	13.99	4.36	x/x
496	13.70	4.70	x/x

The following conclusions can be made:

- √/√ This window is north east facing and as such meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 as they are positioned on upper floors with no balcony to obstruct sunlight.
- x/√ All of these windows are north east facing. They meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 for winter sunlight, but not annual sunlight. This is as a result of the balconies in place, being set back from the main elevation and being part of an urban development. (See discussions section 8.2 for more information)
- x/x All of these windows are north east facing with balconies. They do not meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual or winter sunlight. This is as a result of the balconies in place and being part of an urban development. (See discussions section 8.2 for more information)

8.1.11 Block G View 03

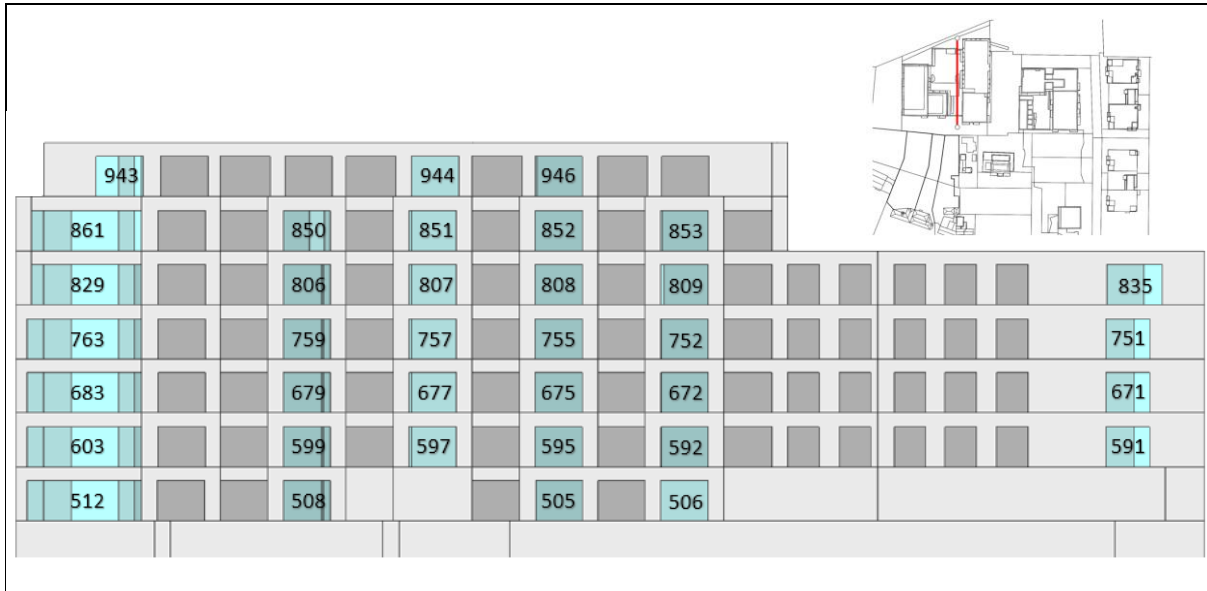


Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
918	74.13	33.57	✓/✓
919	74.13	33.57	✓/✓
921	74.13	33.57	✓/✓
864	73.57	33.16	✓/✓
839	72.73	32.87	✓/✓
838	72.73	32.87	✓/✓
836	72.65	32.87	✓/✓
747	71.45	32.67	✓/✓
746	51.59	29.81	✓/✓
744	54.54	28.93	✓/✓
667	45.62	27.99	✓/✓
666	47.63	27.32	✓/✓
664	61.60	28.45	✓/✓
587	44.40	26.72	✓/✓
586	45.24	25.78	✓/✓
584	57.07	25.34	✓/✓
503	51.92	21.21	✓/✓

The following conclusions can be made:

- ✓/✓ This window is south east facing and as such meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 due to their orientation.

8.1.12 Block G View 04



Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
943	24.40	14.09	x/√
944	24.36	13.87	x/√
946	24.38	14.08	x/√
861	22.40	13.04	x/√
850	69.21	30.05	√/√
851	68.49	29.33	√/√
852	67.72	28.56	√/√
853	67.17	28.01	√/√
829	21.95	12.88	x/√
806	67.67	28.51	√/√
807	65.83	26.67	√/√
808	64.48	25.32	√/√
809	63.52	24.36	√/√
763	21.93	12.52	x/√
759	65.07	25.91	√/√
757	62.51	23.34	√/√
755	59.24	20.08	√/√
752	55.76	17.13	√/√
683	20.14	11.06	x/√
679	60.51	21.35	√/√
677	56.39	17.23	√/√
675	52.59	13.64	√/√
672	49.25	11.04	√/√

Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
603	19.59	10.18	x/√
599	56.46	17.30	√/√
597	51.96	12.80	√/√
595	47.60	9.14	√/√
592	44.53	8.11	√/√
512	17.63	8.55	x/√
508	45.59	11.87	√/√
505	42.04	7.06	√/√
506	39.01	7.57	√/√

The following conclusions can be made:

- √/√ This window is south west facing and as such meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 due to their orientation and upper position within this urban development.
- x/√ All of these windows are south west east facing. They meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 for winter sunlight, but not annual sunlight. This is as a result of the balconies in place, being set back from the main elevation and being part of an urban development. (See discussions section 8.2 for more information)

8.1.13 Block H View 01



Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
468	25.16	4.74	✓/x
467	25.14	4.72	✓/x
466	25.09	4.66	✓/x
793	17.95	0.43	x/x
780	6.36	0.30	x/x
769	25.87	4.90	✓/x
698	8.55	0.00	x/x
691	6.42	0.31	x/x
689	25.87	4.90	✓/x
618	4.49	0.00	x/x
611	6.42	0.31	x/x
609	25.87	4.90	✓/x
144	2.35	0.00	x/x
137	6.52	0.35	x/x
135	25.87	4.90	✓/x
42	1.30	0.00	x/x
36	6.47	0.35	x/x
34	25.87	4.90	✓/x

The following conclusions can be made:

- ✓/x All of these windows are north west facing. They meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual sunlight, but not winter sunlight. This is as a result of their orientation as noted within the guidelines. (See discussions section 8.2 for more information)
- x/x All of these windows are north west facing with balconies. They do not meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual or winter sunlight. This is as a result of the balconies in place, orientation and being part of an urban development. (See discussions section 8.2 for more information)

8.1.14 Block H View 02



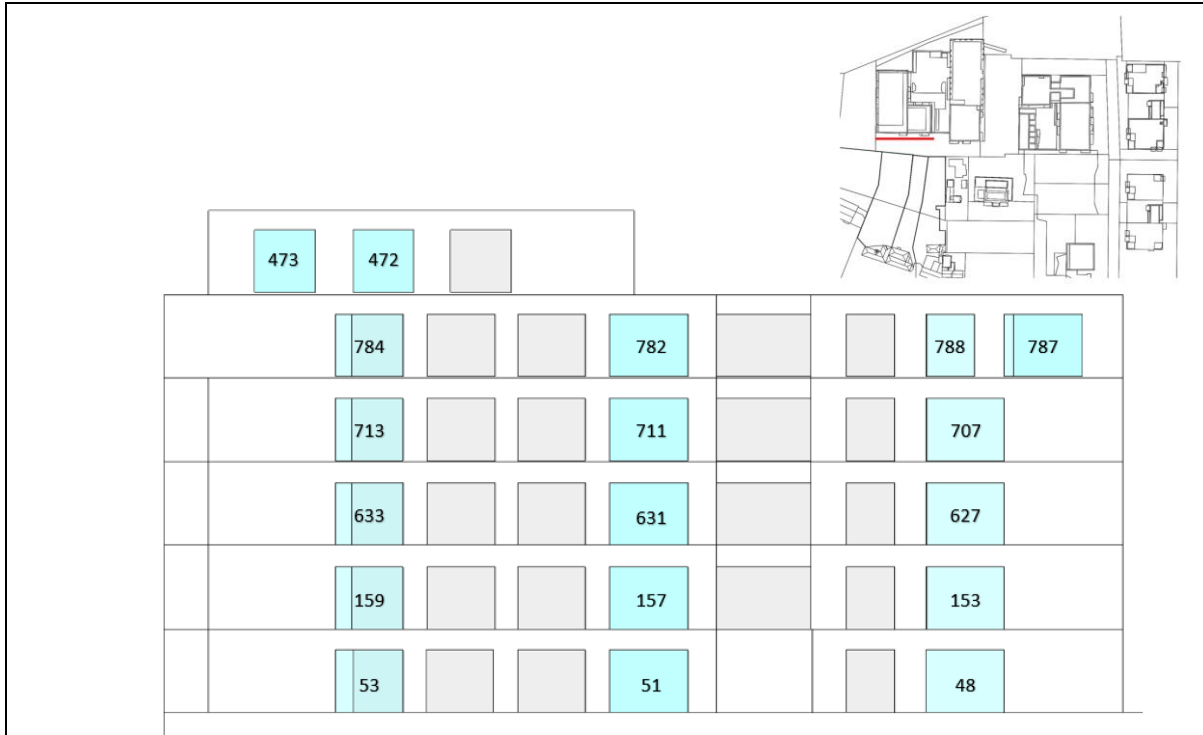
Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
469	26.68	7.70	✓/✓
792	26.48	7.96	✓/✓
790	25.88	7.69	✓/✓
801	0.08	0.00	x/x
802	11.96	0.37	x/x
800	22.36	3.62	x/x
798	21.98	5.07	x/✓
705	24.42	7.90	x/✓
703	21.35	7.69	x/✓
696	0.00	0.00	x/x
697	0.24	0.00	x/x
695	9.82	0.14	x/x
693	17.81	1.68	x/x
625	22.88	6.98	x/✓
623	18.27	7.16	x/✓
616	0.00	0.00	x/x
617	0.00	0.00	x/x
615	3.82	0.00	x/x
613	11.15	0.16	x/x
151	20.99	5.59	x/✓
149	14.56	5.47	x/✓

Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
142	0.00	0.00	x/x
143	0.00	0.00	x/x
141	0.91	0.00	x/x
139	7.98	0.00	x/x
46	17.79	4.05	x/x
44	14.37	5.31	x/√
40	0.00	0.00	x/x
38	5.22	0.00	x/x

The following conclusions can be made:

- √/√ These windows are north east facing and as such meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 due to their upper position within this urban development.
- x/√ All of these windows are north east facing. They meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 for winter sunlight, but not annual sunlight. This is as a result of the balconies in place and their courtyard position within this urban development. (See discussions section 8.2 for more information)
- x/x All of these windows are north east facing with balconies. They do not meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 annual or winter sunlight. This is as a result of the balconies in place, orientation and their courtyard position within this urban development. (See discussions section 8.2 for more information)

8.1.15 Block H View 03

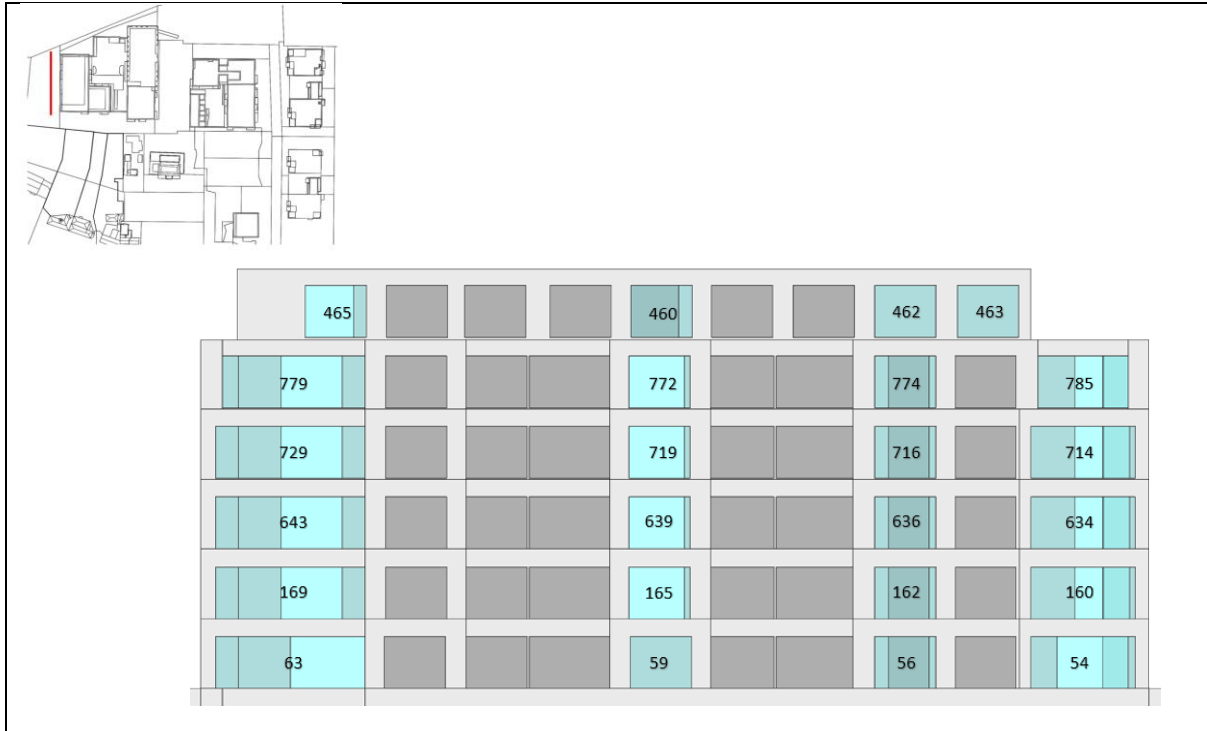


Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
473	73.84	33.28	✓/✓
472	73.88	33.32	✓/✓
784	74.13	33.57	✓/✓
782	73.76	33.57	✓/✓
788	72.41	33.57	✓/✓
787	72.01	33.57	✓/✓
713	73.20	33.57	✓/✓
711	72.57	33.57	✓/✓
707	69.24	33.53	✓/✓
633	71.01	31.85	✓/✓
631	71.24	32.92	✓/✓
627	67.03	31.64	✓/✓
159	69.12	30.77	✓/✓
157	68.96	31.89	✓/✓
153	51.69	29.28	✓/✓
53	67.46	29.89	✓/✓
51	67.26	30.19	✓/✓
48	49.30	28.24	✓/✓

The following conclusions can be made:

- ✓/✓ These windows are south east facing and as such meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 due to their orientation within this urban development.

8.1.16 Block H View 04



Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
465	68.05	29.24	✓/✓
460	68.05	29.24	✓/✓
462	68.05	29.24	✓/✓
463	68.05	29.24	✓/✓
779	24.40	13.66	x/✓
772	69.23	30.07	✓/✓
774	69.23	30.07	✓/✓
785	27.07	14.85	✓/✓
729	23.54	6.99	x/✓
719	69.23	30.07	✓/✓
716	69.23	30.07	✓/✓
714	27.65	15.02	✓/✓
643	24.88	13.82	x/✓
639	69.23	30.07	✓/✓
636	69.23	30.07	✓/✓
634	27.65	15.02	✓/✓
169	25.33	13.96	✓/✓
165	69.23	30.07	✓/✓
162	69.23	30.07	✓/✓
160	28.16	15.17	✓/✓
63	24.88	13.82	x/✓

Ref.	Proposed		Comment
	Annual (%)	Winter (%)	
59	69.23	30.07	✓/✓
56	69.23	30.07	✓/✓
54	27.65	15.02	✓/✓

The following conclusions can be made:

- ✓/✓ These windows are south east facing and as such meet the recommendations as stated within the BRE Guide / BS 8206-2:2008 due to their orientation within this urban development.

8.2 Discussions

Within the BS 8206-2:2008 standard, when discussing annual probable sunlight hours regarding proposed developments, it is noted that:

“The degree of satisfaction is related to the expectation of sunlight. If a room is necessarily North facing or if the building is in a densely-built urban area, the absence of sunlight is more acceptable than when its exclusion seems arbitrary”.

This is also reflected in the correlating BRE guidance which notes:

“The BS 8206-2 criterion applies to rooms of all orientations, although if a room faces significantly north of due east or west it is unlikely to be met.”

The results of the APSH test note that 45% (160 of 352) of main living room windows tested are achieving 25% annual and 5% winter sunlight hours. The windows that do not meet this recommendation are as a result of their orientation, their courtyard position within this urban development and the provision of a balcony (refer to Section 11.7 Compensatory Measures). It can also be noted that in some cases all of these points are evidence to why a living room window did not achieve the recommended targets for sunlight.

9 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.

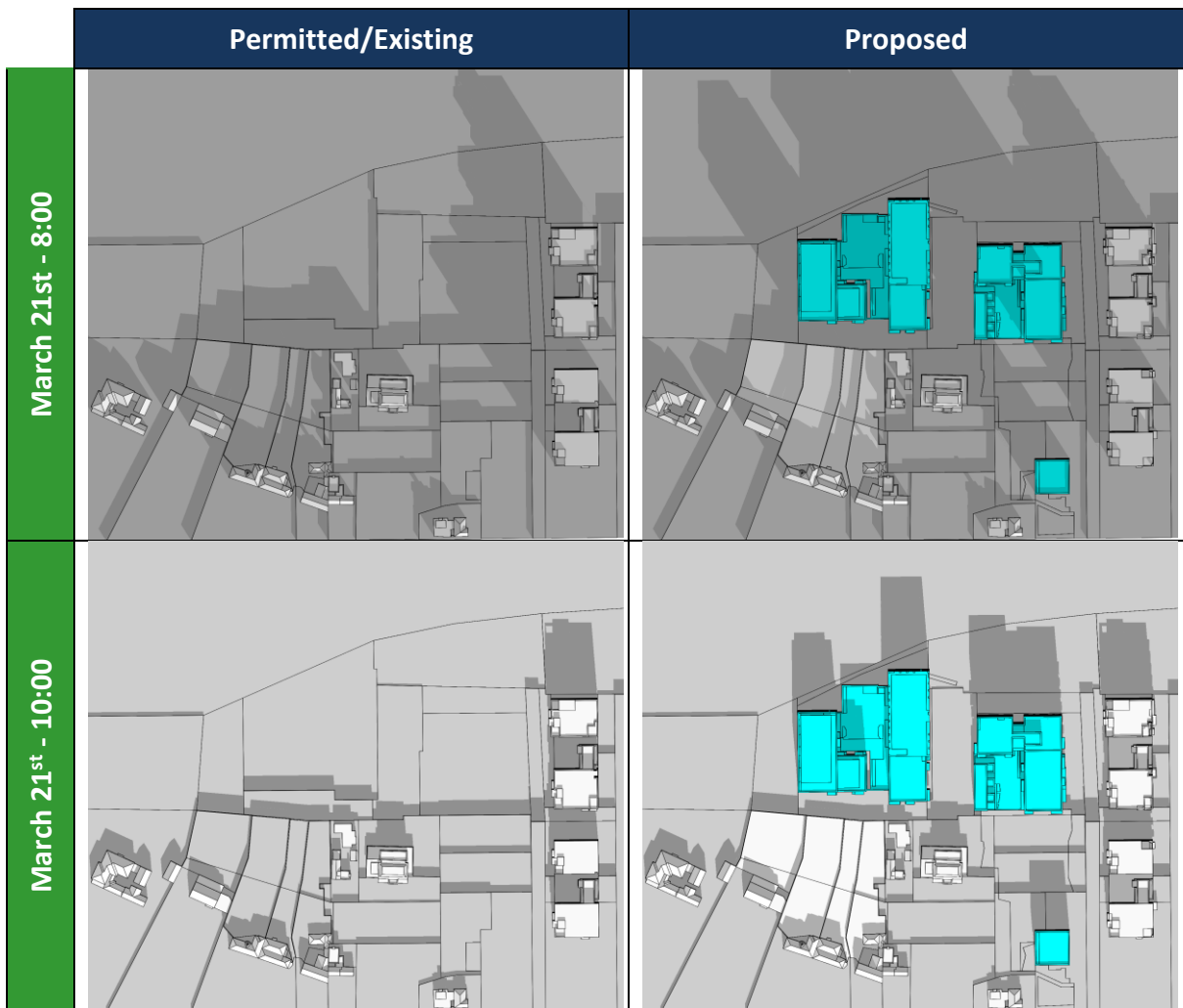
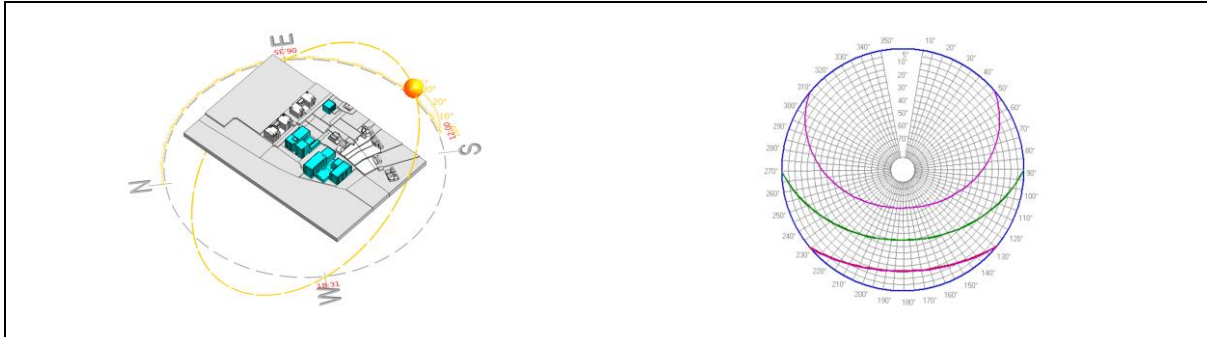
This section will consider the shadows cast by the proposed development on the following dates:

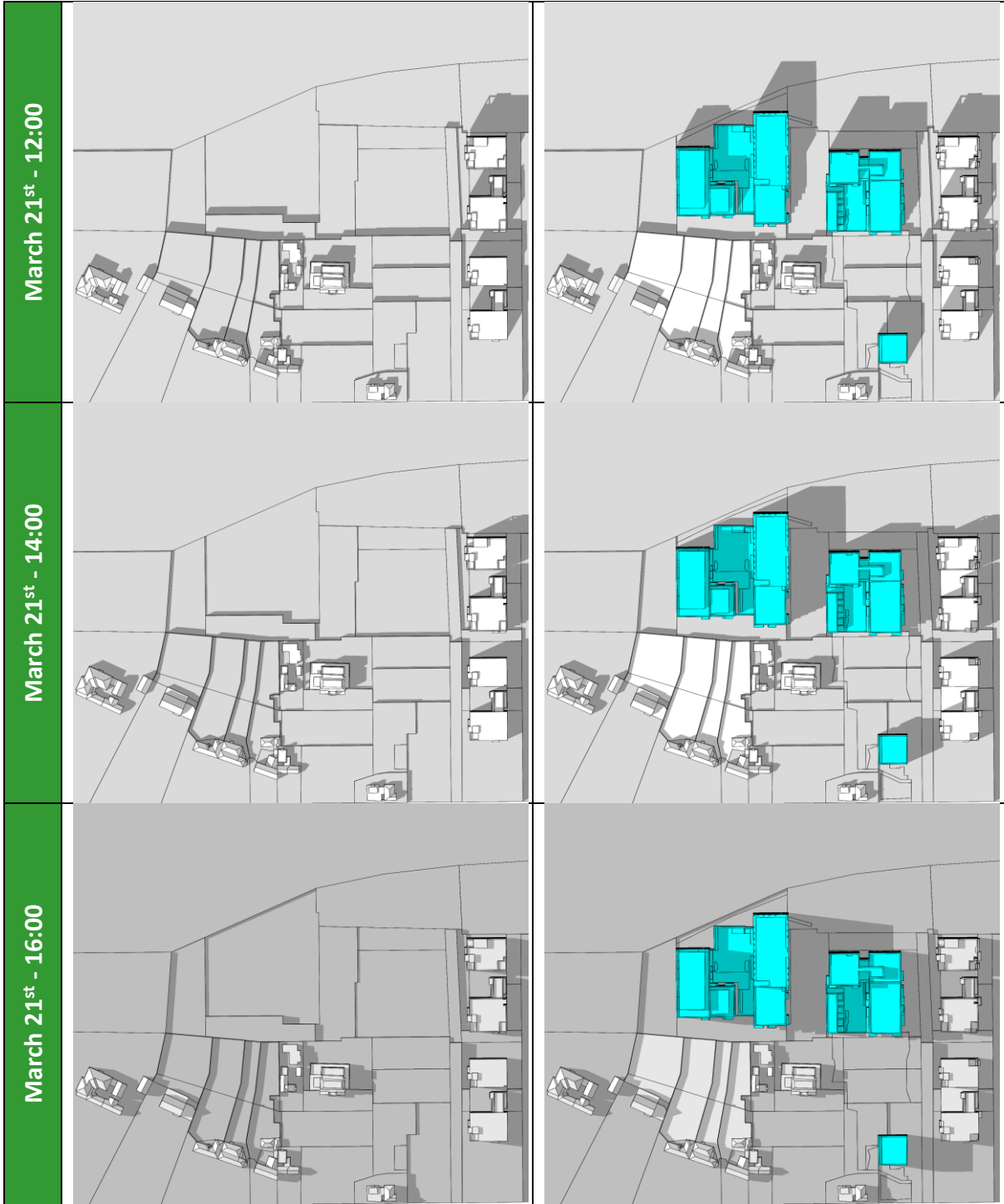
- March 21st / September 21st (Equinox)
- June 21st (Summer Solstice)
- December 21st (Winter Solstice)

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.

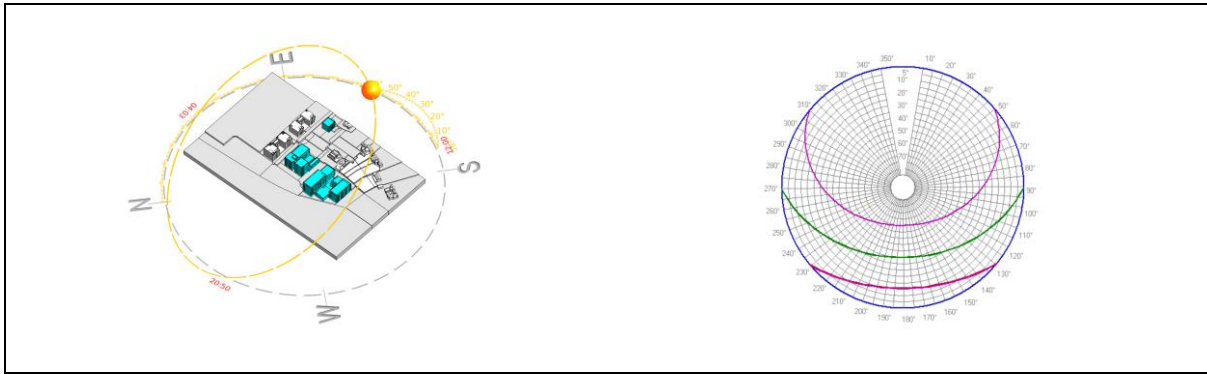
9.1 Plan View

9.1.1 March 21st



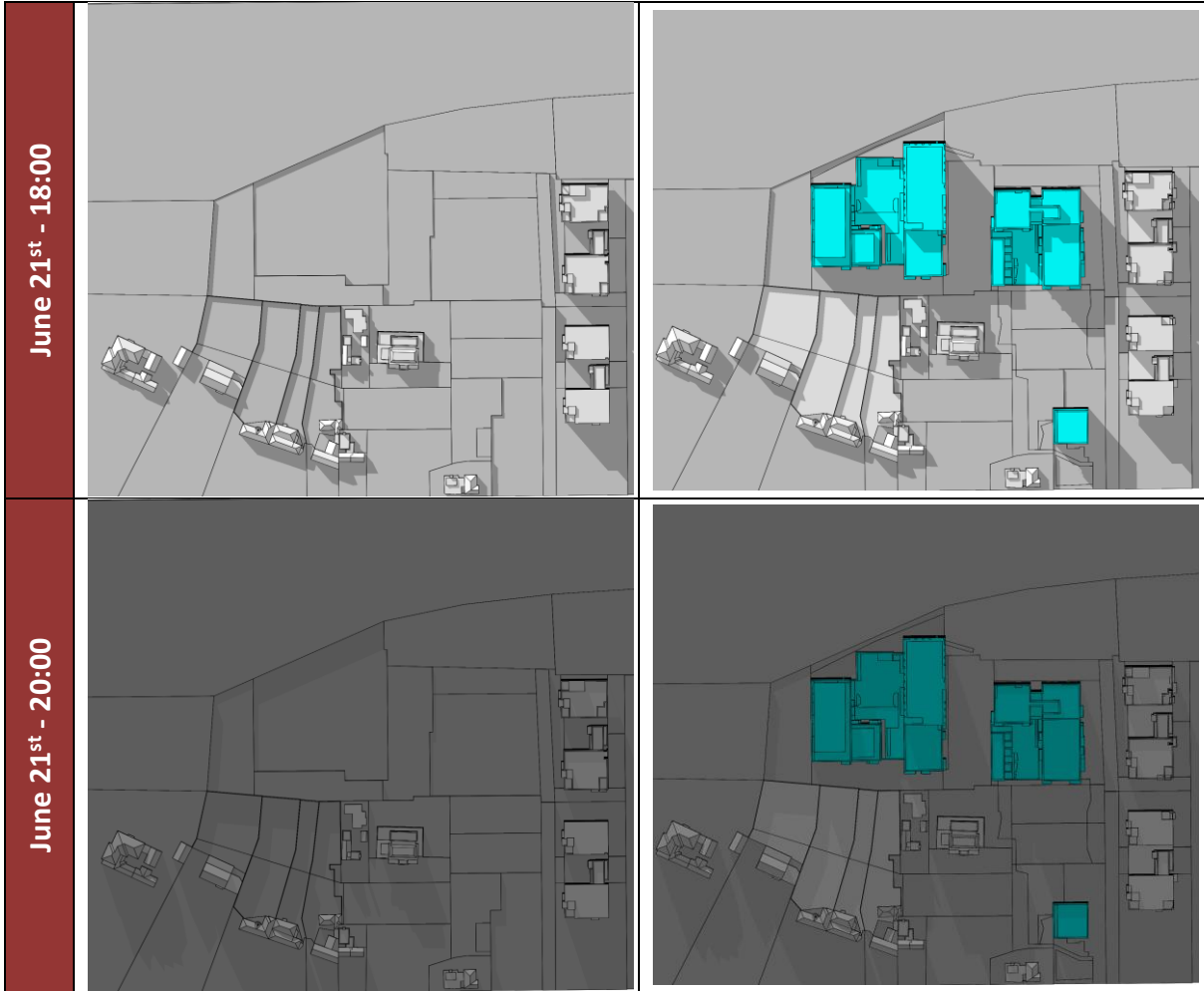


9.1.2 June 21st

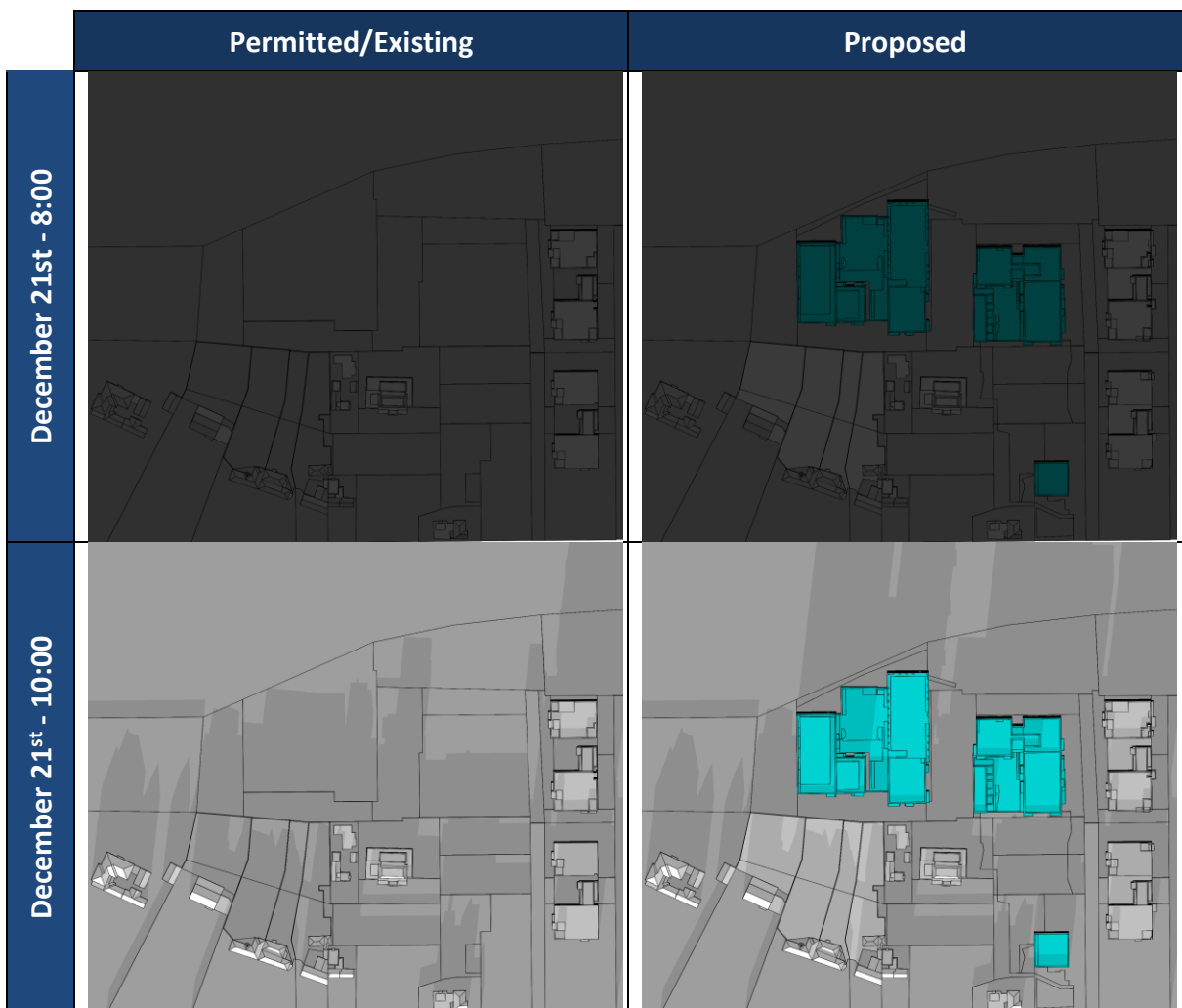
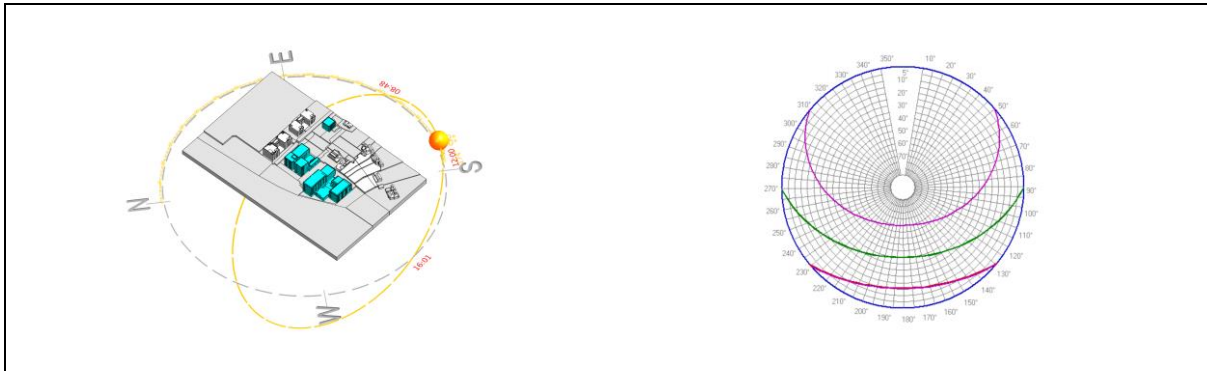


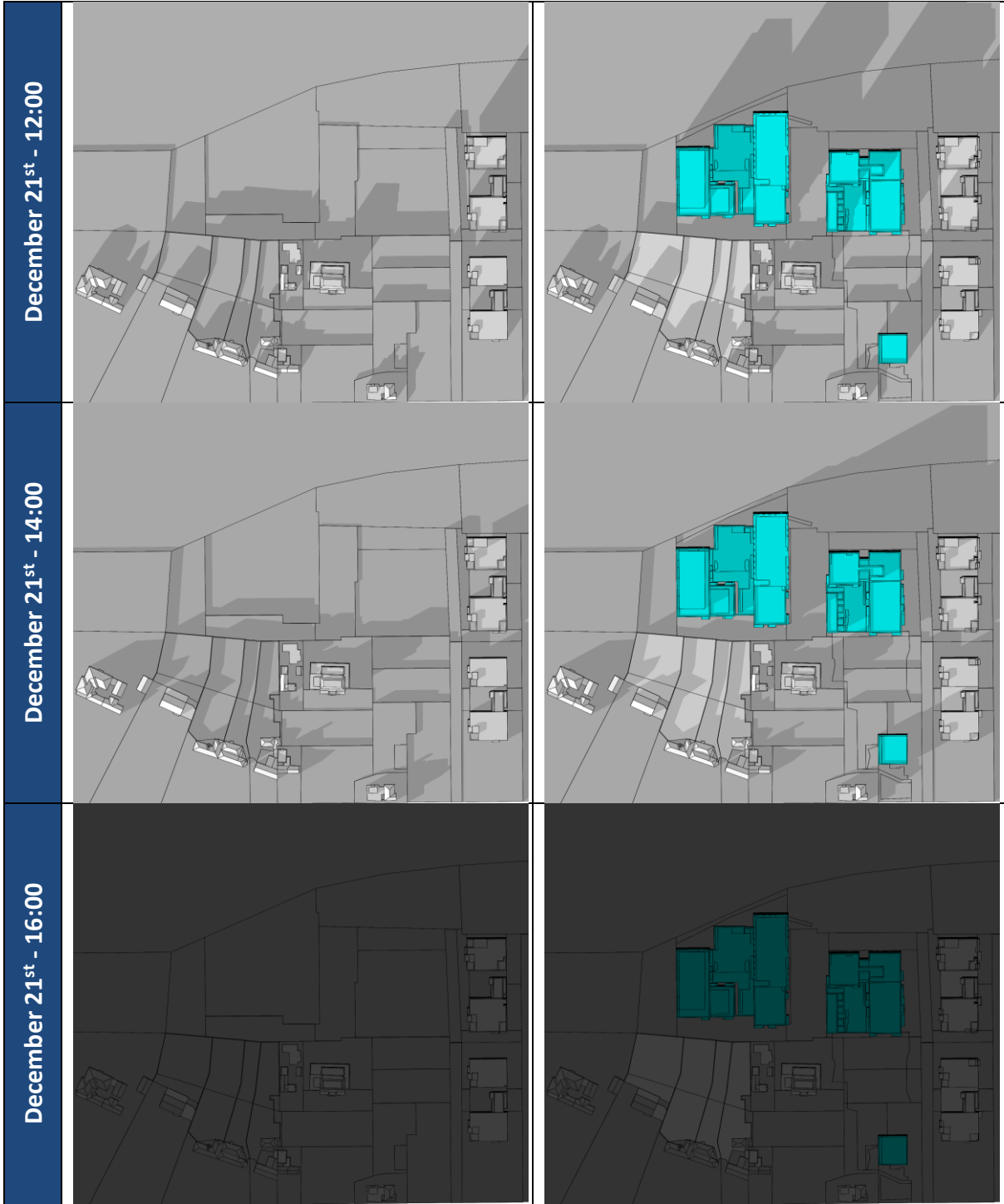
	Permitted/Existing	Proposed
June 21 st - 8:00		
June 21 st - 10:00		





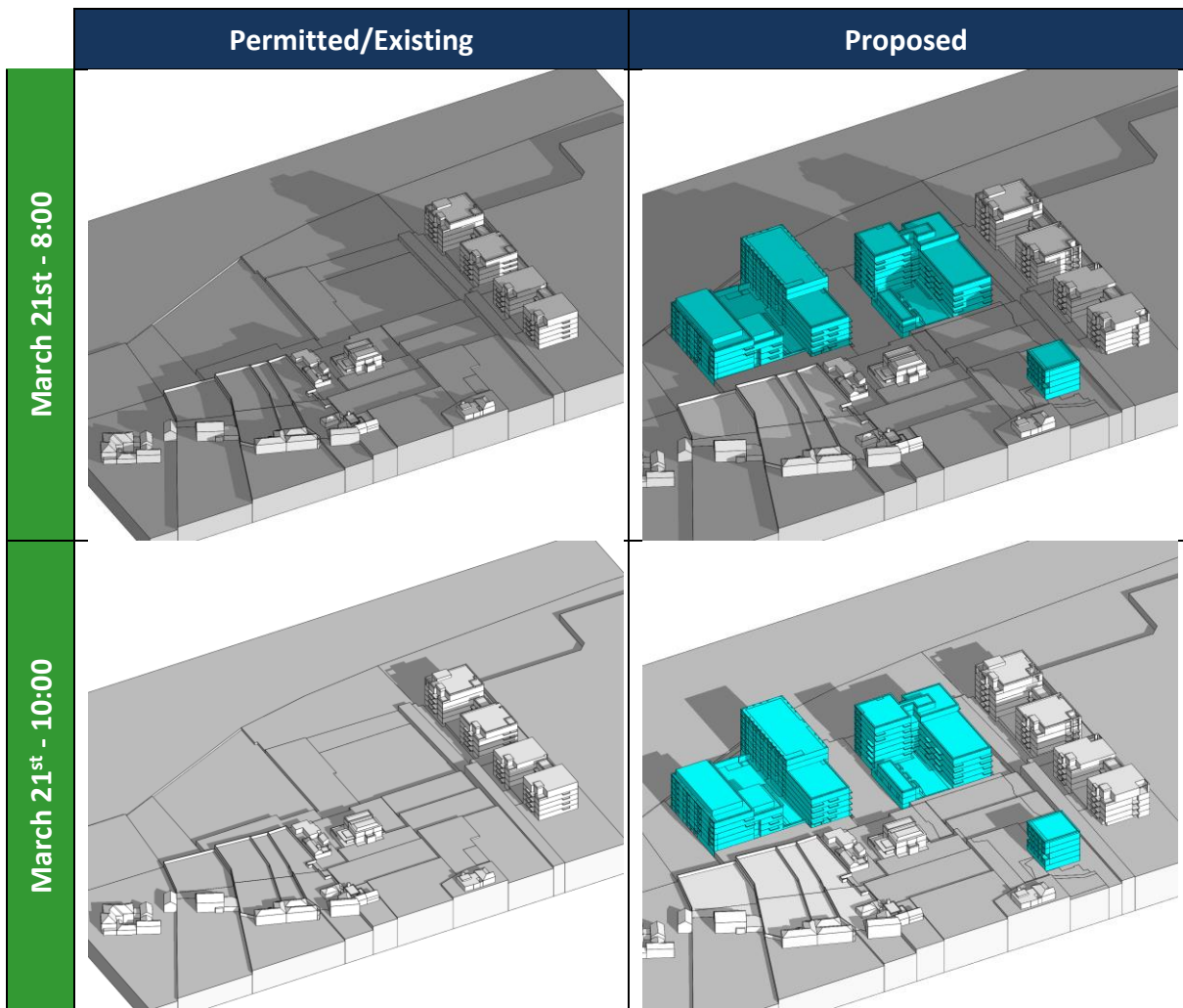
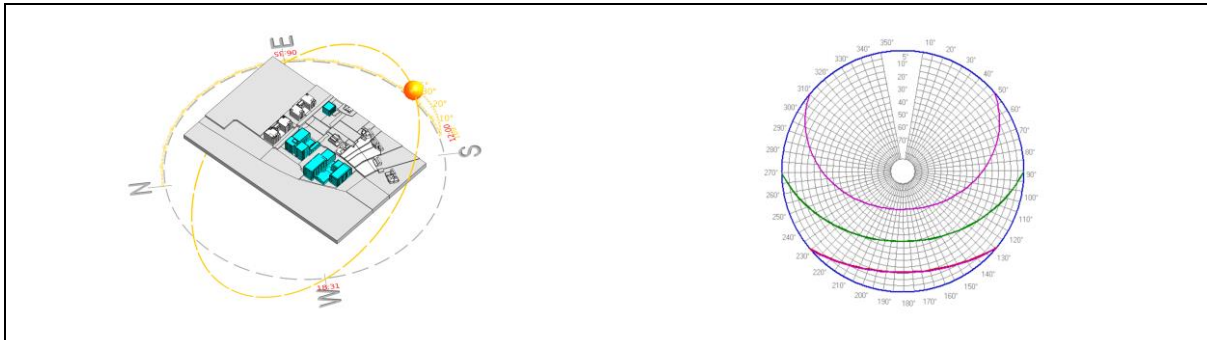
9.1.3 December 21st

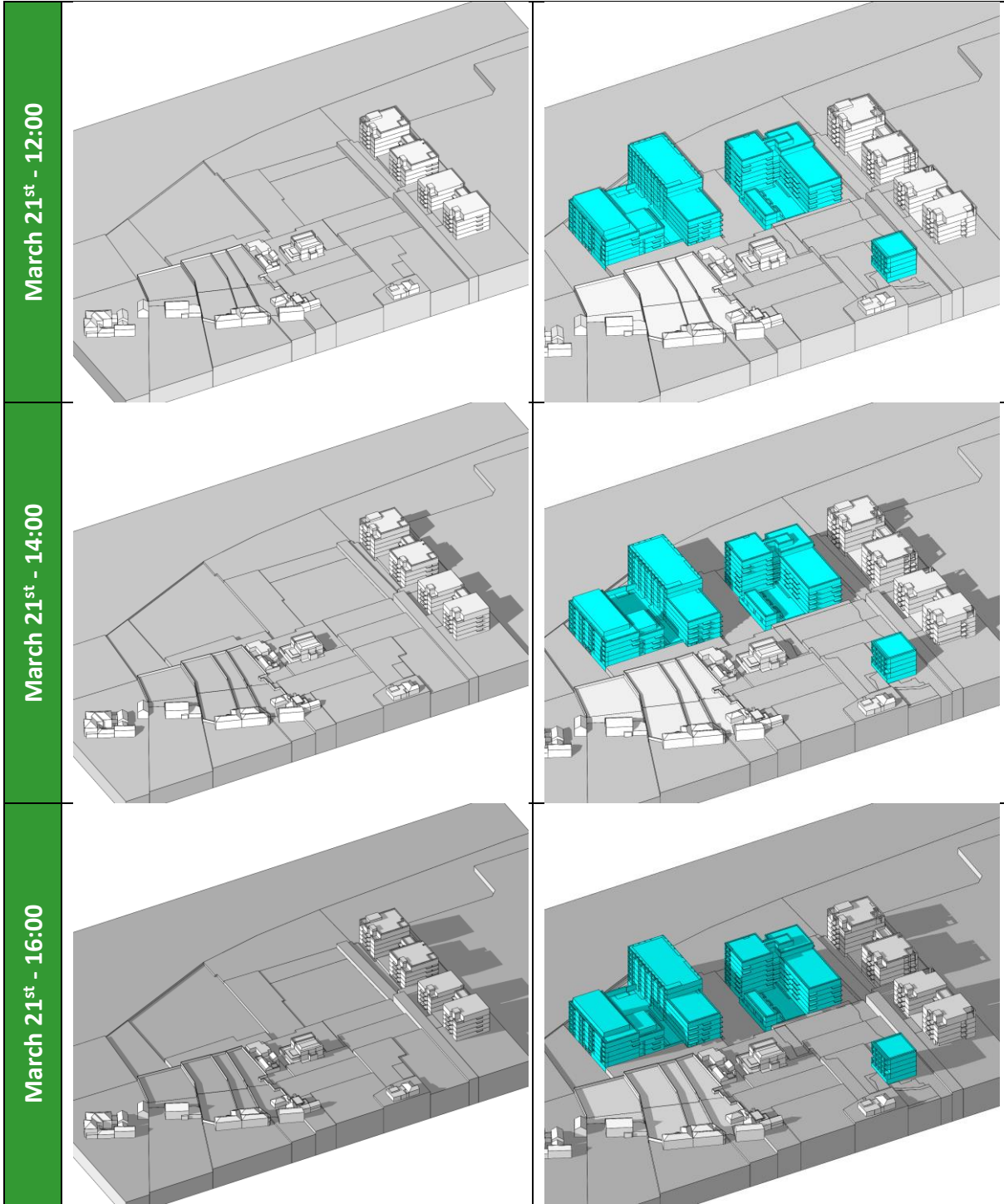




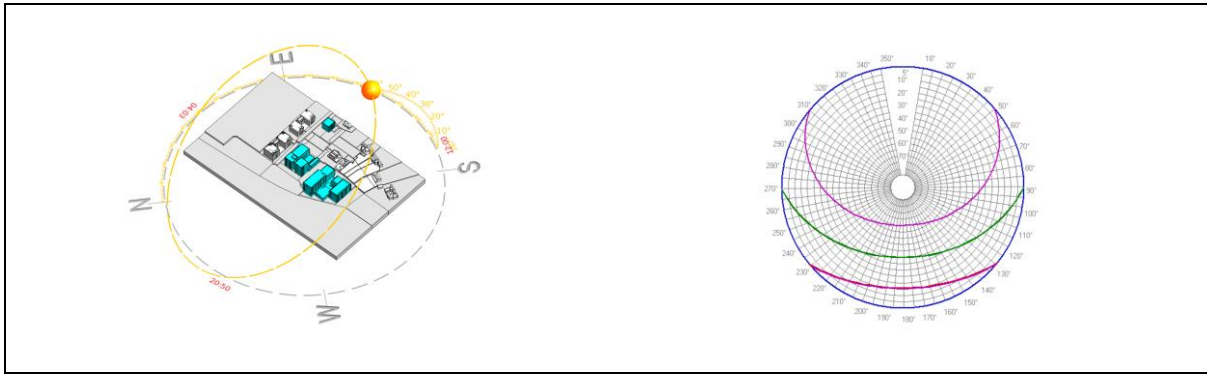
9.2 3D View

9.2.1 March 21st

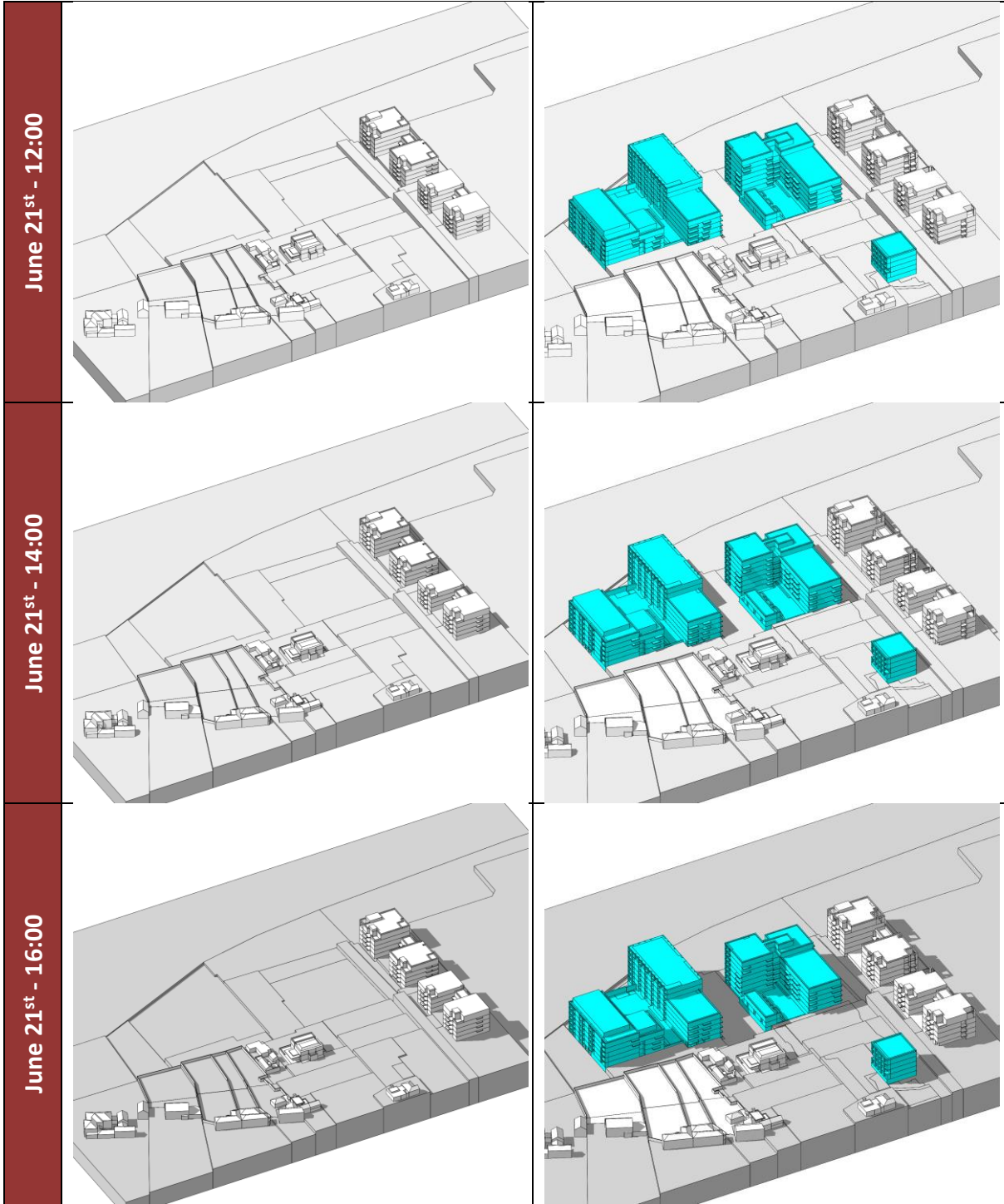


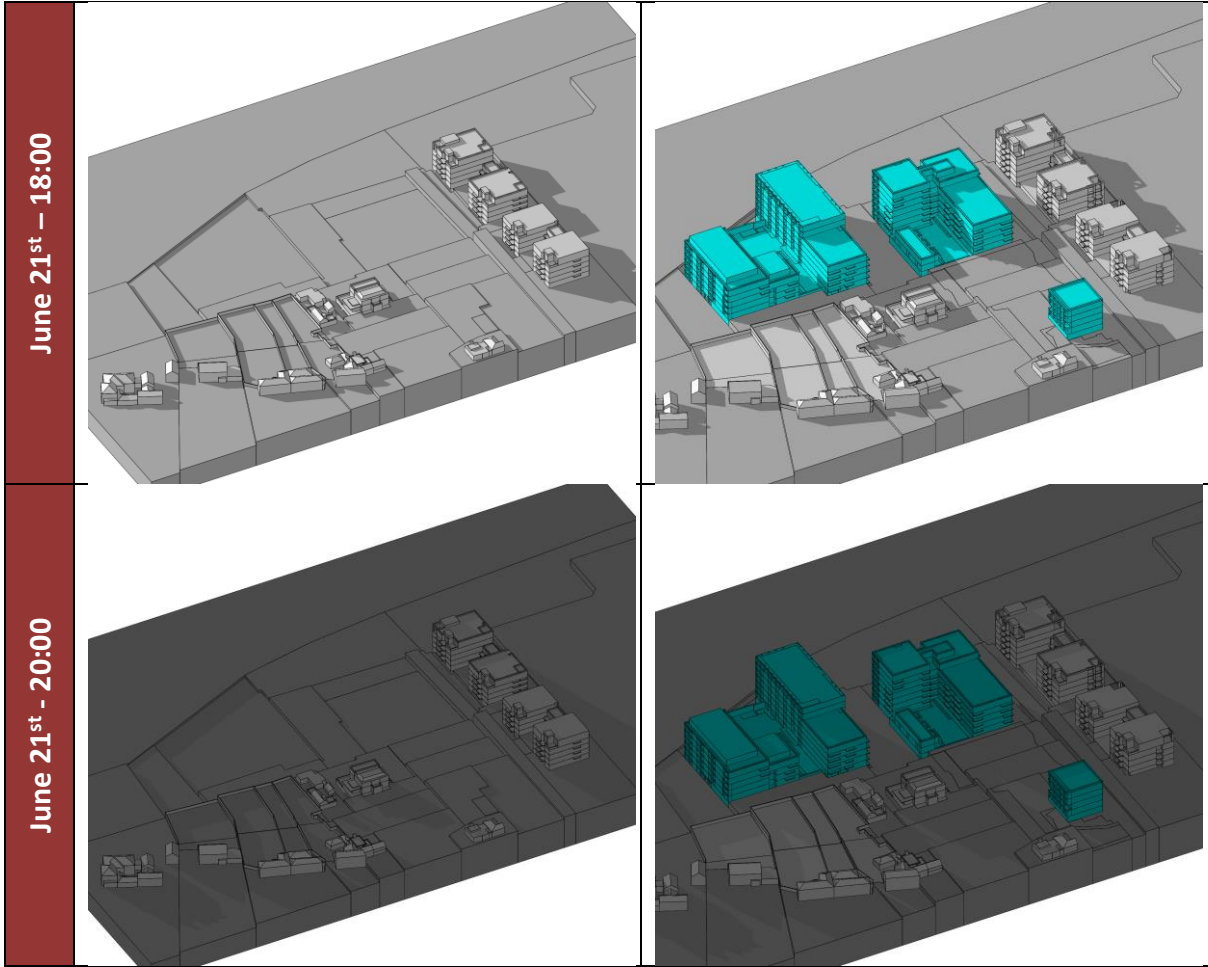


9.2.2 June 21st

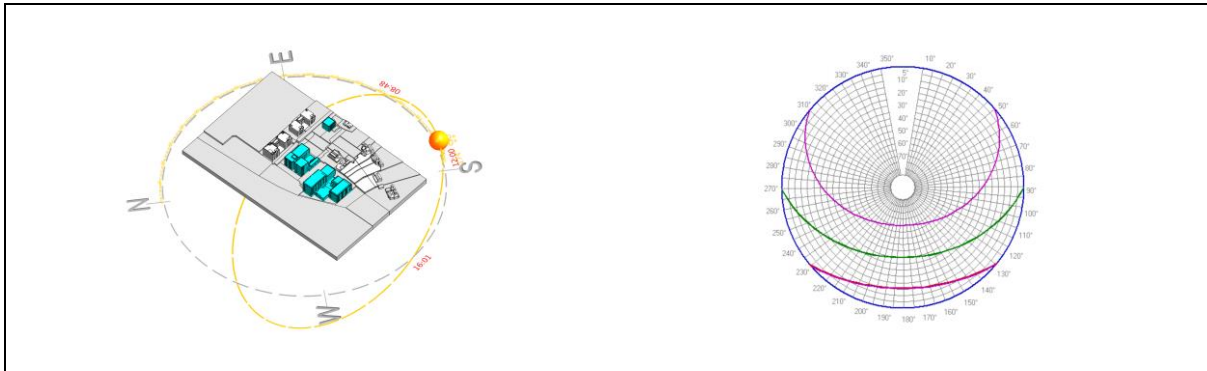


	Permitted/Existing	Proposed
June 21 st - 8:00		
June 21 st - 10:00		

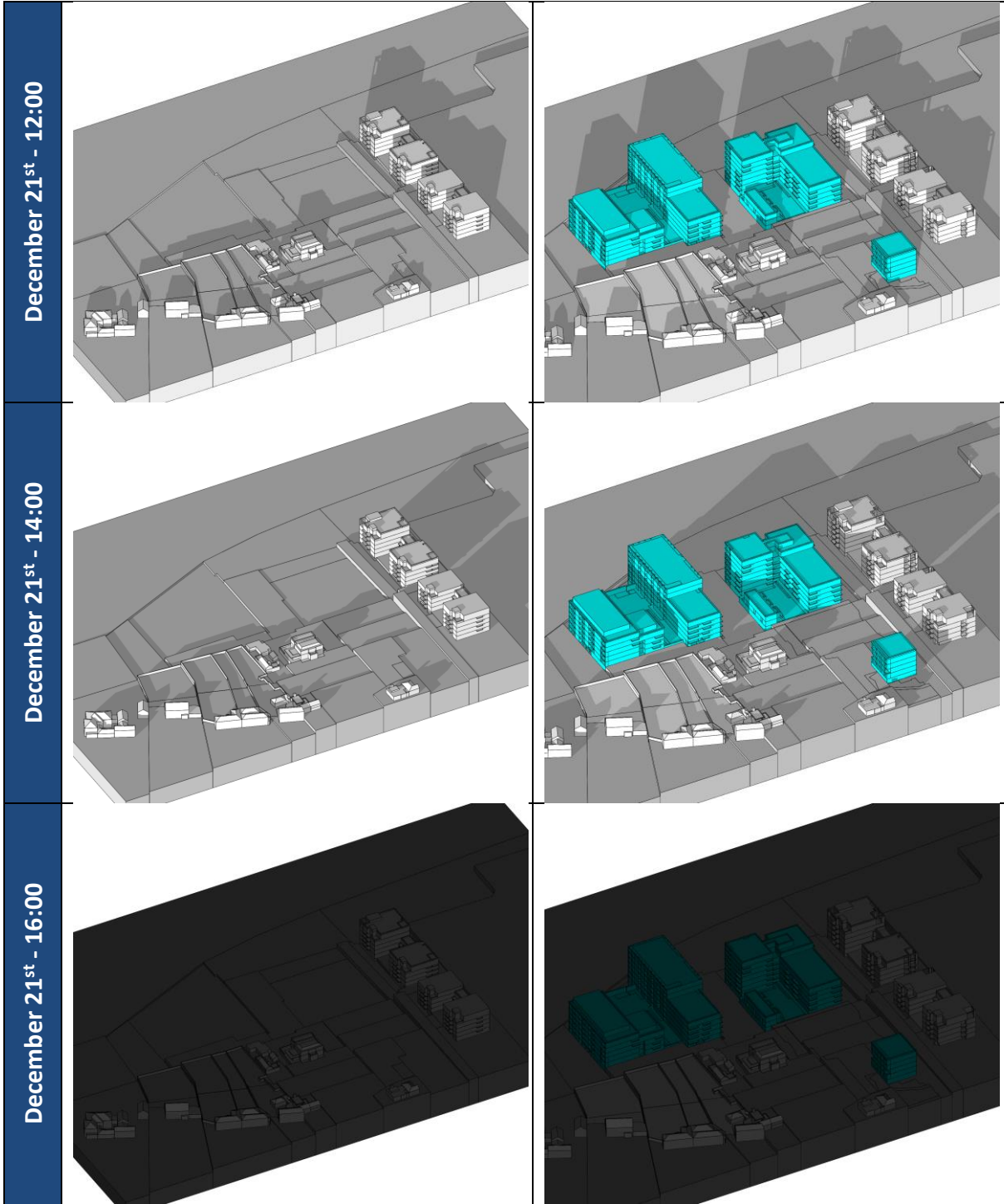




9.2.3 December 21st



	Permitted/Existing	Proposed
December 21 st - 8:00		
December 21 st - 10:00		



9.3 Discussion

The shadow analysis illustrates different shadows being cast at three key times of the year (March 21st, June 21st and December 21st) for the existing scenario and with the proposed development in place.

The images indicate that the permitted dwellings on the East side of the project are receiving additional shading from the proposed development during late afternoon/evening of March (1400-1600) and in December (1400) with very minimal shading perceived during the late afternoon/evening in June (1600-1800).

With regards to the existing houses on Mount Anville Road, no additional shading is detected as they sit to the south of the development site.

Taking all of the above into account, the overall impact of overshadowing can be classed as a minor adverse impact, especially since the permitted development is Phase 1 of the Knockrabo development and part of the same overall development in an urban area.

The proposed development's performance is further quantified within the daylight analysis to the existing buildings and sunlight to existing amenities sections of this report.

10 Sunlight to Existing & Proposed Amenity Spaces

10.1 Guidance Requirements

The impact of the proposed development on the sunlight availability to the amenity areas will be considered to determine how the amenities perform when assessed against the BRE Guidelines which states the following in Section 3.3.17:

Summary

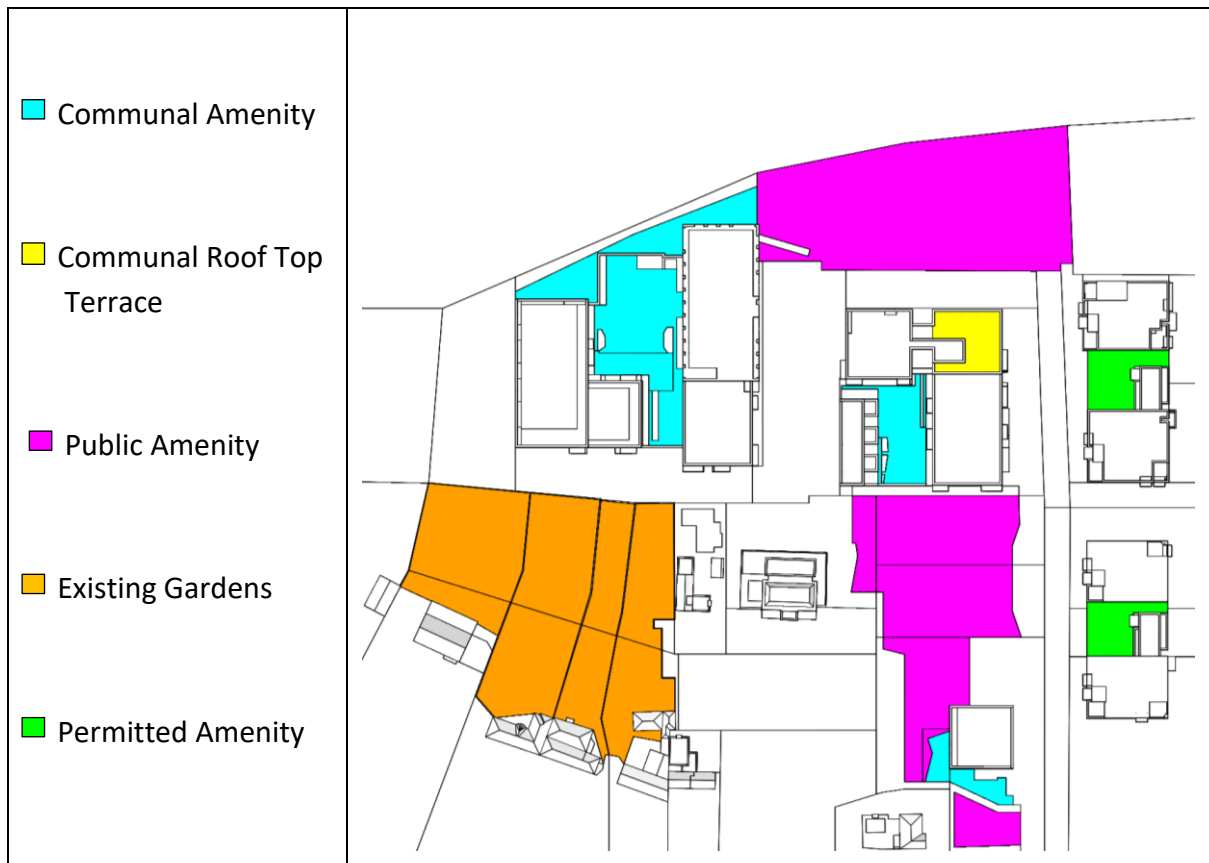
3.3.17 It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area which can 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.

The BRE Guidelines state 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.

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

10.2 Amenity Areas

As stated previously, 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 all the neighbouring and proposed amenity spaces as illustrated in the image below.

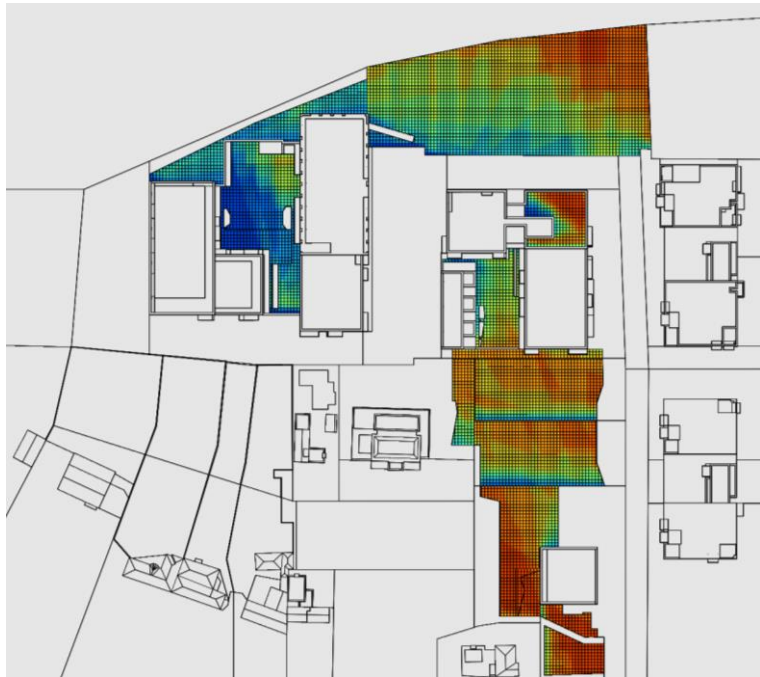
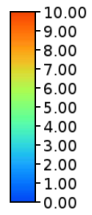


10.3 Sunlight Results for Proposed Amenity Areas

The following images illustrate the proposed amenity areas that are receiving at least 2 hours of sunlight on 21st March.

**Absolute Scale Illustrating all Hours of Sunlight Received
Proposed Amenity Areas**

21/Mar - 00:00 to 21/Mar - 23:00
Hours

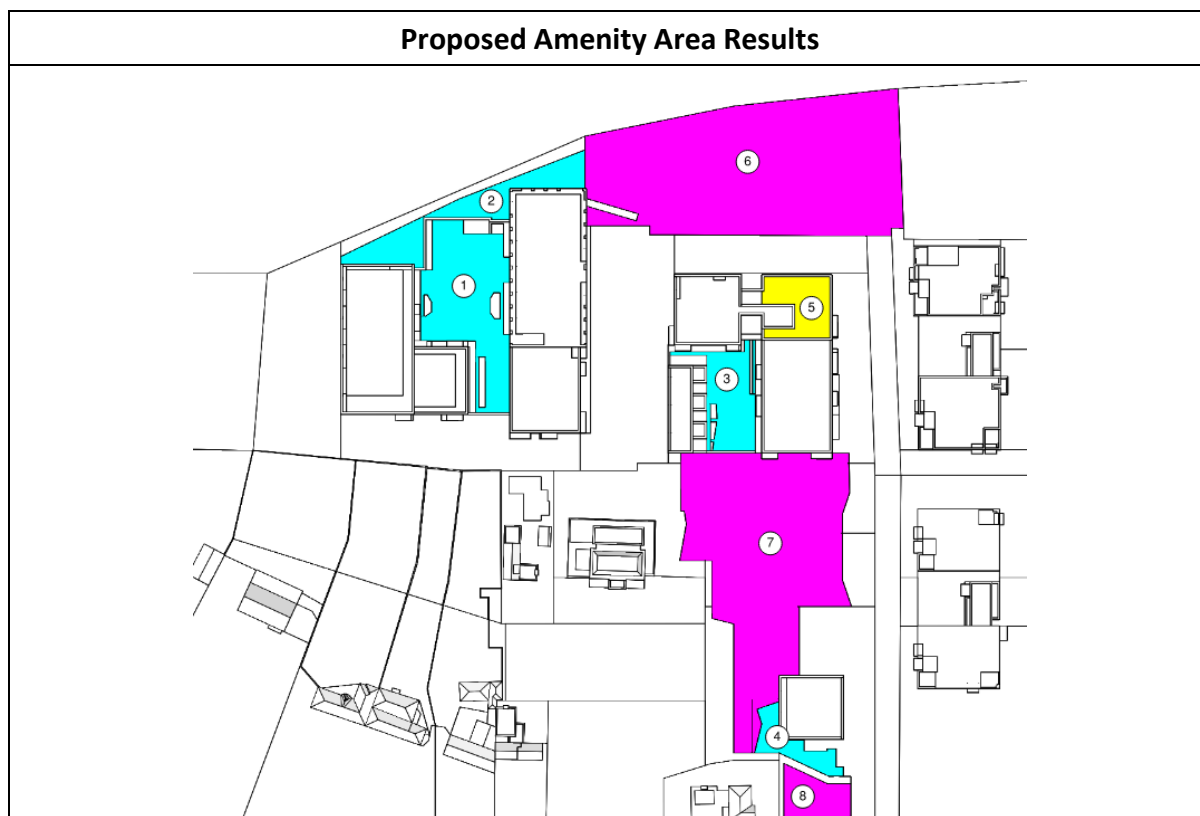


**Hours of Sunlight > 2 Illustrated in Red
Proposed Amenity Areas**

- Receives more than 2 hours of sunlight
- Receives less than 2 hours of sunlight



The results illustrated above are summarised in the following tables.



Communal Amenity Areas				
Reference #	Area (m ²)	Area (m ²) >2 hours 21 st March	Total % > 2 Hours 21 st March	Comment
1	836	439	53%	✓
2	570	560	98%	✓
3	370	362	98%	✓
4	175	175	100%	✓
5 (Roof Terrace)	3,040	3,005	99%	✓
Total	4,991	4,541	91%	✓

Public Amenity Areas				
Reference #	Area (m ²)	Area (m ²) >2 hours 21 st March	Total % > 2 Hours 21 st March	Comment
5	2,422	2,403	99%	✓
6	217	217	100%	✓
7	257	237	92%	✓
Total	2,896	2,857	99%	✓

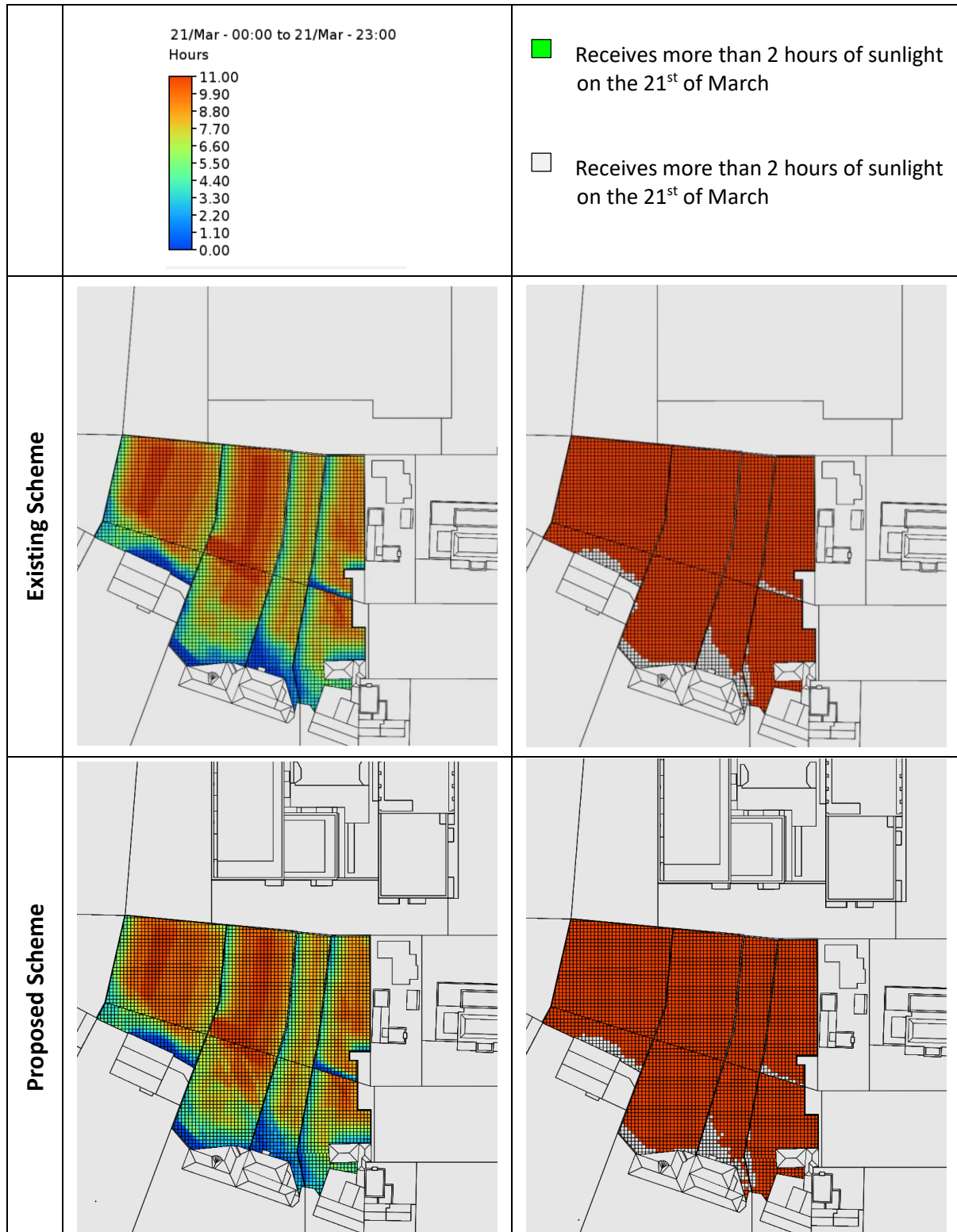
The following conclusion can be made:

- ✓ The proposed amenity space will receive at least 2 hours of sunlight on over 50% of its area, exceeding the BRE guidelines.

10.4 Existing and Permitted Amenity Results

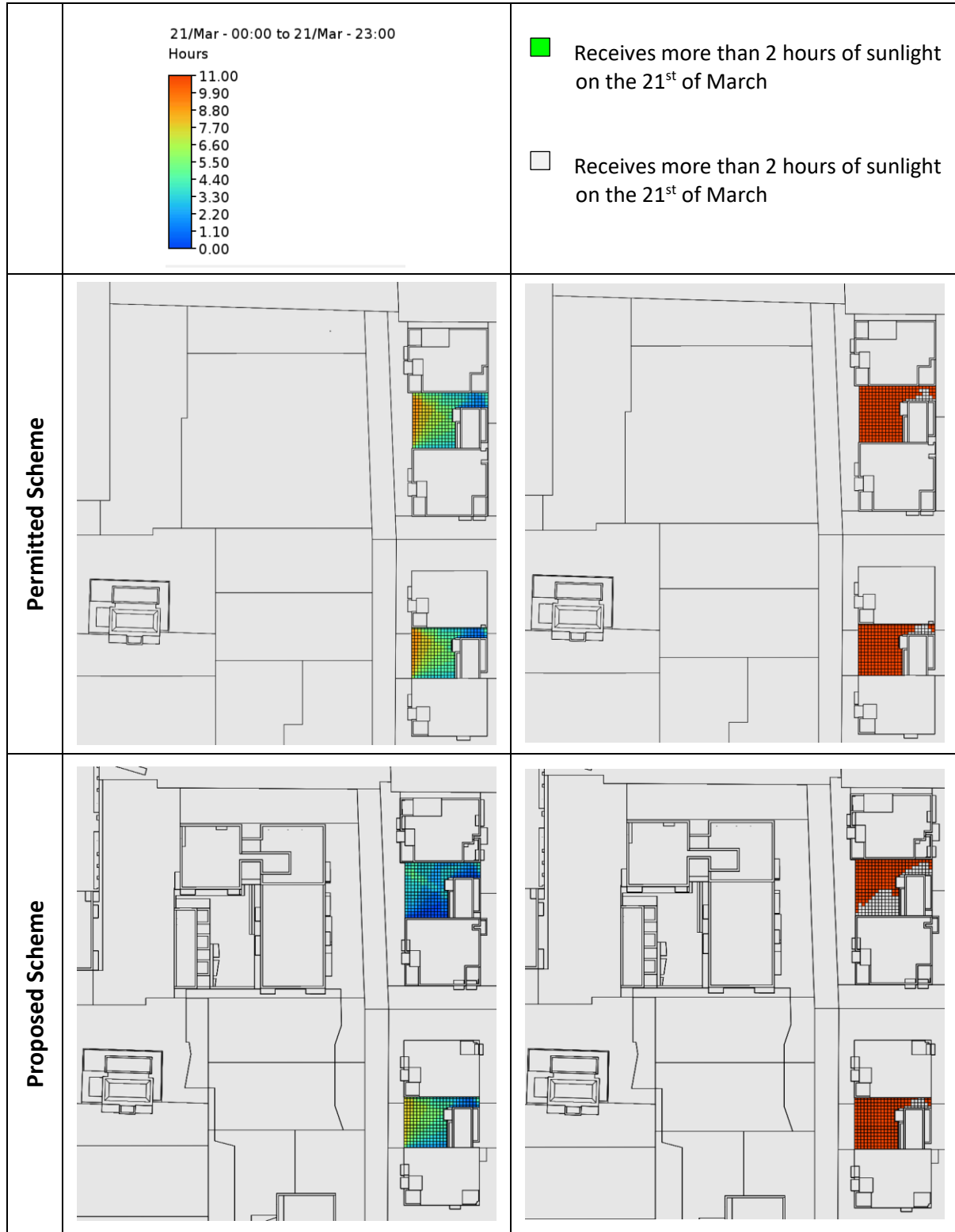
10.4.1 Existing and Permitted Amenity Areas

The following images illustrate the total sunlight being received by the existing garden areas on the 21st March.

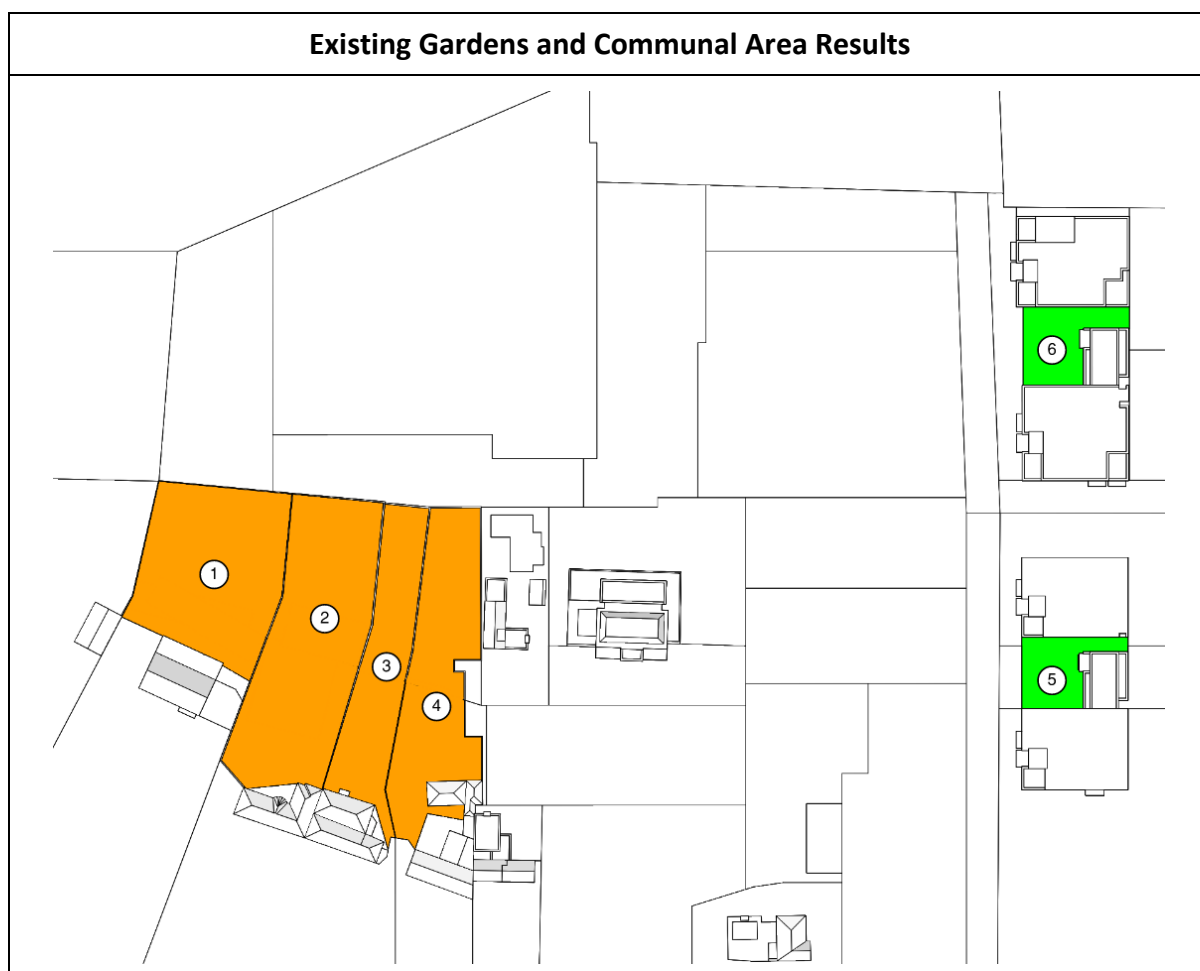


10.4.2 Permitted Amenity Areas

The following images illustrate the total sunlight being received by the permitted amenity areas on the 21st March.



The results illustrated above are summarised in the following table.



Ref	Area (m ²)	Existing Area >2 hrs		Existing Area with Proposed Development in Place >2 hrs		Proposed vs Existing (%)	Comment
		(m ²)	(%)	(m ²)	(%)		
Existing Gardens							
1	1075	1,024	95%	1,024	95%	100%	✓
2	1335	1,286	96%	1,286	96%	100%	✓
3	699	595	85%	595	85%	100%	✓
4	997	958	96%	958	96%	100%	✓
Existing Communal Areas							
5	263	247	94%	247	94%	100%	✓
6	230	214	93%	134	58%	63%	✓

The following conclusion can be made:

- ✓ The tested amenity space will continue to receive at least 2 hours of sunlight on over 50% of its area, exceeding the BRE guidelines.

10.5 Solar Amenity Discussion

As outlined in Section 3.3.17 of the BRE Guide, 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 the 21st of March.

Existing Gardens Adjacent to the Proposed Development.

On the 21st of March, the existing gardens will continue to receive the same amount of sunlight even with the proposed development, thus complying with BRE guidelines.

Permitted Amenity Areas Adjacent to the Proposed Development

On the 21st of March, the permitted amenity areas with the proposed development in place will continue to receive over 2 hours of sunlight on at least 63% of their former value, thus exceeding BRE recommendations.

Proposed Amenity Areas

On the 21st of March, the proposed private communal amenity spaces within the development will receive over 2 hours of sunlight on 91% of their combined area, thus exceeding BRE recommendations.

On the 21st of March, the proposed public amenity spaces within the development will receive over 2 hours of sunlight on 99% of their combined area, thus exceeding BRE recommendations.

Overall, all amenity spaces assessed comply with BRE recommendations.

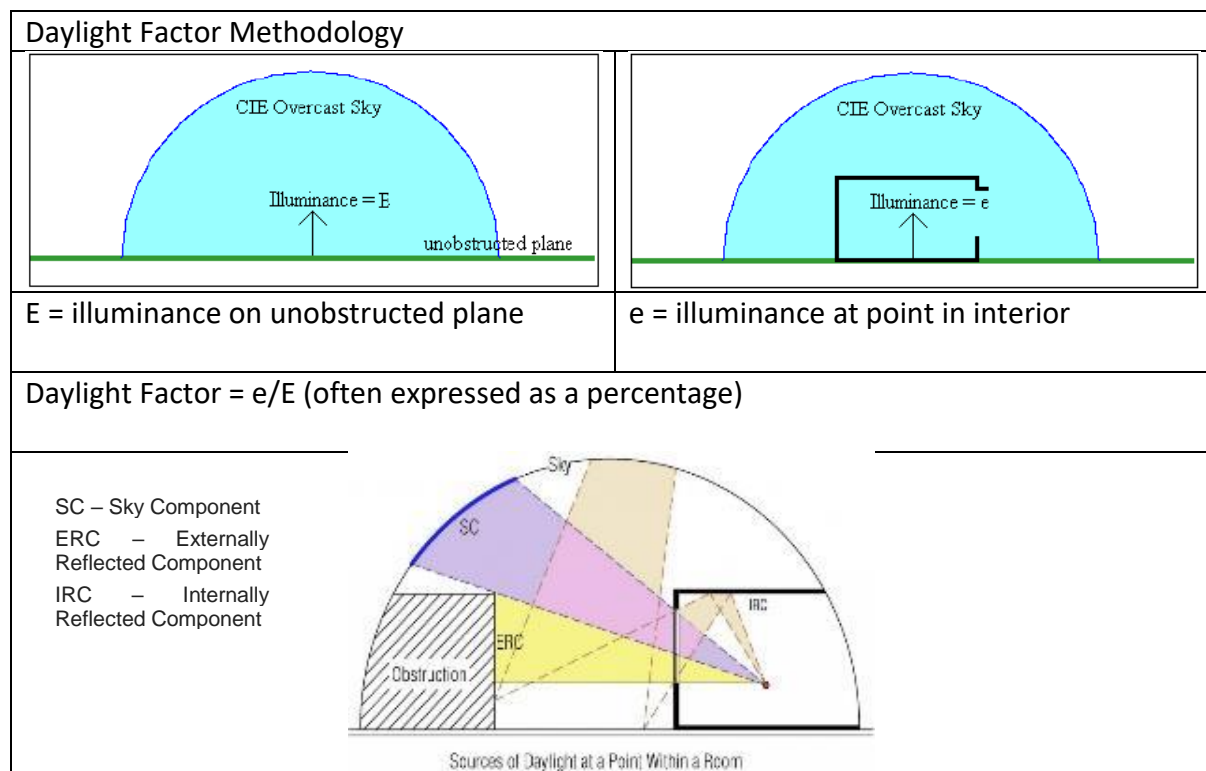
11 Average Daylight Factors (ADF)

This section addresses daylight to the proposed apartments. The purpose of the ADF calculations is to quantify an overall percentage of units which exceeds the BRE / BS 8206-2:2008 recommendations. Our proposed methodology was run the daylight analysis of all apartments within the scheme.

11.1 Introduction to ADF

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

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



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.

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

Average Daylight Factor is an average of all measured points within the space.

11.2 Reference and Metrics

The BRE guide 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.

Therefore, the recommended Average Daylight Factors (ADF) are summarized as follows:

- Bedrooms – 1.0%
- Living Rooms – 1.5%
- Kitchens – 2.0%

The BRE guide does not provide explicit guidance for an open space that is a combination of Living/Kitchen/Dining (L/K/D) functions. In addition, a separate document the “*BS 8206-2:2008: Lighting for Buildings - Part 2: Code of Practice for Daylighting*” focuses on internal daylighting performance and states:

“Where one room serves more than one purpose, the minimum average daylight factor should be that for the room type with the highest value. For example, in a space which combines a living room and a kitchen the minimum average daylight factor should be 2%.”

Although the above target is referenced within BS 8206-2:2008, it also states, “*The aim of the standard is to give guidance to architects, builders and others who carry out lighting design. It is recognised that lighting is only one of many matters that influence fenestration. These include other aspects of environmental performance (such as noise, thermal equilibrium and*

the control of energy use), fire hazards, constructional requirements, the external appearance and the surroundings of the site. The best design for a building does not necessarily incorporate the ideal solution for any individual function. For this reason, careful judgement should be exercised when using the criteria given in the standard for other purposes, particularly town planning.”

For the purposes of clarity, we have assessed all LKDs against the 2% ADF target. However, we have also assessed the LKDs against an alternative 1.5% ADF target which is outlined in Section 11.9.

11.3 Planning Authority Guidelines

The BRE guide notes that the *“advice is not mandatory and that the guide should not be seen as an instrument of planning policy”*. It should be noted when trying to achieve height and density within a development (Urban Development and Building Heights, Guidelines for Planning Authorities 2018), where deep plan single aspect combine modern flexible living spaces exist (in some situations with a balcony in place as well), it is very difficult to achieve good levels of daylight across the whole space. Therefore, when considering the modelling approach noted above, results should be interpreted with flexibility as noted in the BRE guide:

“Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design.”

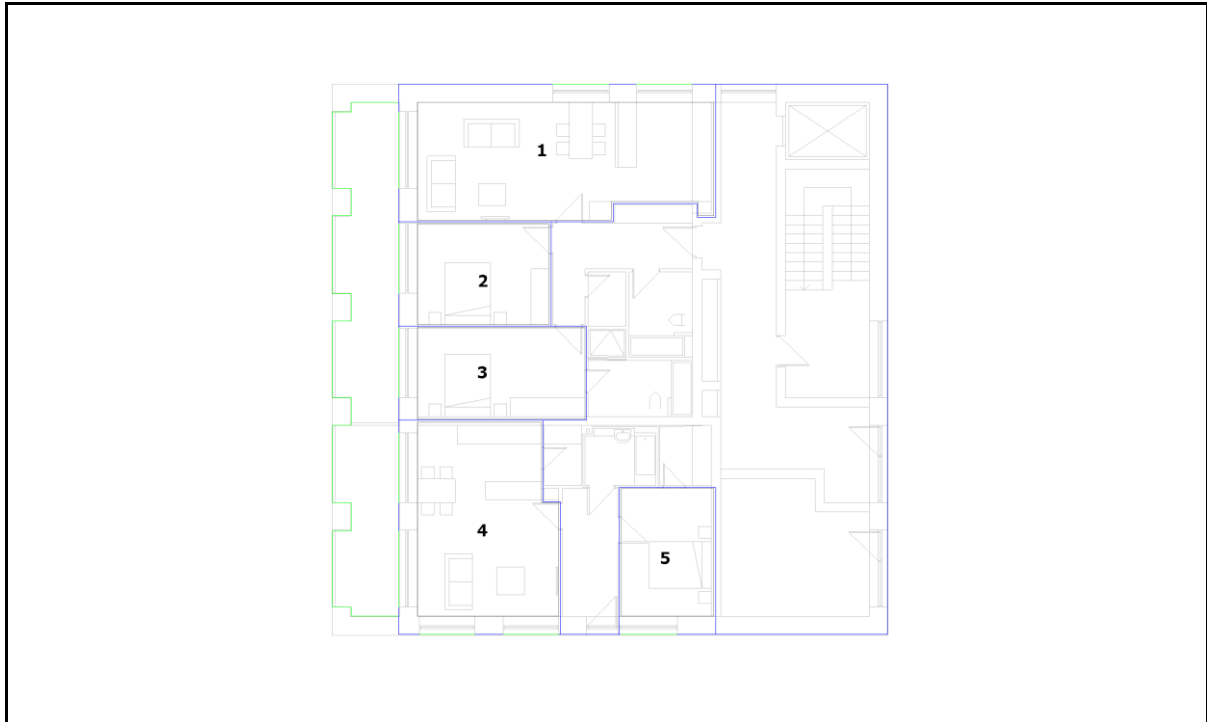
It should be noted for completeness, that there is a new standard for the assessment of daylight access within buildings entitled “IS EN 17037:2018: Daylight in Buildings”. This new standard is not currently directly referred within the ‘Urban Development and Building Heights’, guidelines for Planning Authorities 2018.

Whereas the BRE 209 or BS 8206-2:2008 are currently referred within the Urban Development and Building Heights, guidelines for Planning Authorities 2018 and have been noted to be accepted by An Bord Pleanála.

11.5 Average Daylight Factor Results

The following floor plans highlights the rooms that were simulated to ascertain the Average Daylight Factors. To note, within the tables the code LKD equates to Living, Kitchen and Dining area. All rooms required for assessment were included within this report.

11.5.1 Level 0 – Block E

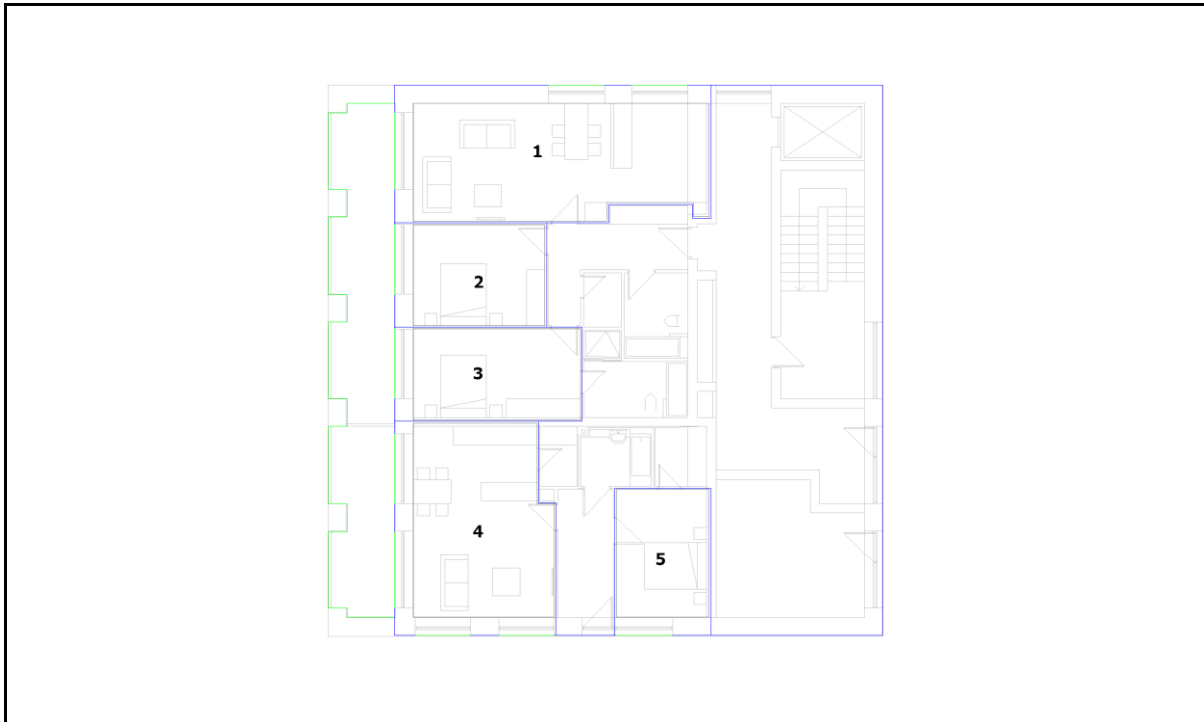


Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L00: BE-001_Living	LKD	3.50	✓
2	L00: BE-001_Bedroom 01	Bedroom	1.41	✓
3	L00: BE-001_Bedroom 02	Bedroom	1.24	✓
4	L00: BE-002_Living	LKD	4.73	✓
5	L00: BE-002_Bedroom	Bedroom	3.72	✓

The following conclusion can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

11.5.2 Level 1 – Block E



Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L01: BE-0101_Living	LKD	3.75	✓
2	L01: BE-0101_Bedroom 01	Bedroom	1.41	✓
3	L01: BE-0101_Bedroom 02	Bedroom	1.20	✓
4	L01: BE-0102_Living	LKD	5.05	✓
5	L01: BE-0102_Bedroom	Bedroom	3.54	✓

The following conclusion can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

11.5.3 Level 2 – Block E



Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L02: BE-0201_Living	LKD	3.46	✓
2	L02: BE-0201_Bedroom 01	Bedroom	1.38	✓
3	L02: BE-0201_Bedroom 02	Bedroom	1.20	✓
4	L02: BE-0202_Living	LKD	4.59	✓
5	L02: BE-0202_Bedroom 01	Bedroom	4.44	✓
6	L02: BE-0202_Bedroom 02	Bedroom	5.06	✓

The following conclusion can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

11.5.4 Level 3 – Block E



Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L03: BE-0301_Living	LKD	3.71	✓
2	L03: BE-0301_Bedroom 01	Bedroom	1.47	✓
3	L03: BE-0301_Bedroom 02	Bedroom	1.28	✓
4	L03: BE-0302_Living	LKD	4.92	✓
5	L03: BE-0302_Bedroom 01	Bedroom	4.78	✓
6	L03: BE-0302_Bedroom 02	Bedroom	5.50	✓

The following conclusion can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

11.5.5 Level 1 - Block F



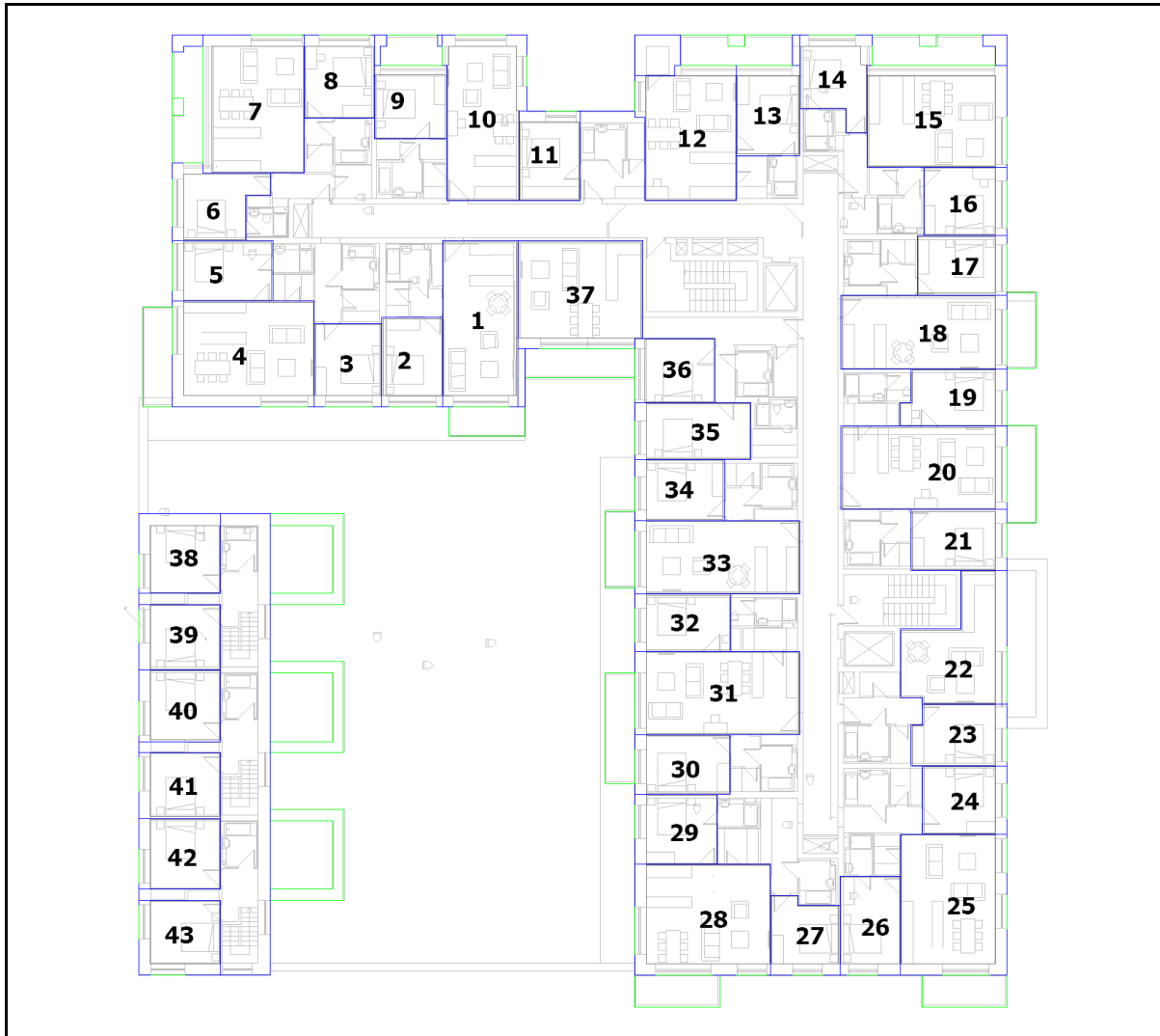
Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L01: BF-0101_Living/Kitchen	LKD	1.64	x / ✓
2	L01: BF-0101_Bedroom	Bedroom	3.42	✓
3	L01: BF-0102_Bedroom 02	Bedroom	3.14	✓
4	L01: BF-0102_Living/Kitchen	LKD	1.92	x / ✓
5	L01: BF-0102_Bedroom 01	Bedroom	1.93	✓
6	L01: BF-0103_Bedroom 01	Bedroom	2.60	✓
7	L01: BF-0103_Living/Kitchen	LKD	3.05	✓
8	L01: BF-0103_Bedroom 02	Bedroom	5.32	✓
9	L01: BF-0104_Bedroom	Bedroom	2.99	✓
10	L01: BF-0104_Living/Kitchen	LKD	2.88	✓
11	L01: BF-0105_Bedroom 02	Bedroom	2.32	✓
12	L01: BF-0105_Living/Kitchen	LKD	1.81	x / ✓
13	L01: BF-0105_Bedroom 01	Bedroom	2.46	✓
14	L01: BF-0106_Bedroom 01	Bedroom	5.62	✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
15	L01: BF-0106_Living/Kitchen	LKD	3.78	✓
16	L01: BF-0106_Bedroom 02	Bedroom	3.12	✓
17	L01: BF-0107_Bedroom	Bedroom	2.83	✓
18	L01: BF-0107_Living/Kitchen	LKD	1.50	x / ✓
19	L01: BF-0108_Bedroom 01	Bedroom	1.67	✓
20	L01: BF-0108_Living/Kitchen	LKD	1.42	x
21	L01: BF-0108_Bedroom 02	Bedroom	1.63	✓
22	L01: BF-0109_Living/Kitchen	LKD	2.05	✓
23	L01: BF-0109_Bedroom	Bedroom	1.64	✓
24	L01: BF-0113_Living/Kitchen	LKD	2.05	✓
25	L01: BF-0113_Bedroom	Bedroom	2.11	✓
26	L01: BF-0110_Bedroom 01	Bedroom	2.88	✓
27	L01: BF-0110_Living/Kitchen	LKD	3.88	✓
28	L01: BF-0110_Bedroom 02	Bedroom	2.63	✓
29	L01: BF-0111_Bedroom 01	Bedroom	1.73	✓
30	L01: BF-0111_Living/Kitchen	LKD	1.81	x / ✓
31	L01: BF-0111_Bedroom 02	Bedroom	2.27	✓
32	L01: BF-0112_Living/Kitchen	LKD	1.67	x / ✓
33	L01: BF-0112_Bedroom	Bedroom	1.74	✓
34	L01: BF-0114_Living/Kitchen	LKD	2.00	✓
35	L01: BF-0115_Living/Kitchen	LKD	2.27	✓
36	L01: BF-0116_Living/Kitchen	LKD	3.51	✓

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.
- x/✓ The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 2% ADF target. However, the whole space complies with the 1.5% ADF target.
- x The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 1.5% ADF target or in the case of Bedrooms, is less than the 1% ADF target

11.5.6 Level 2 - Block F



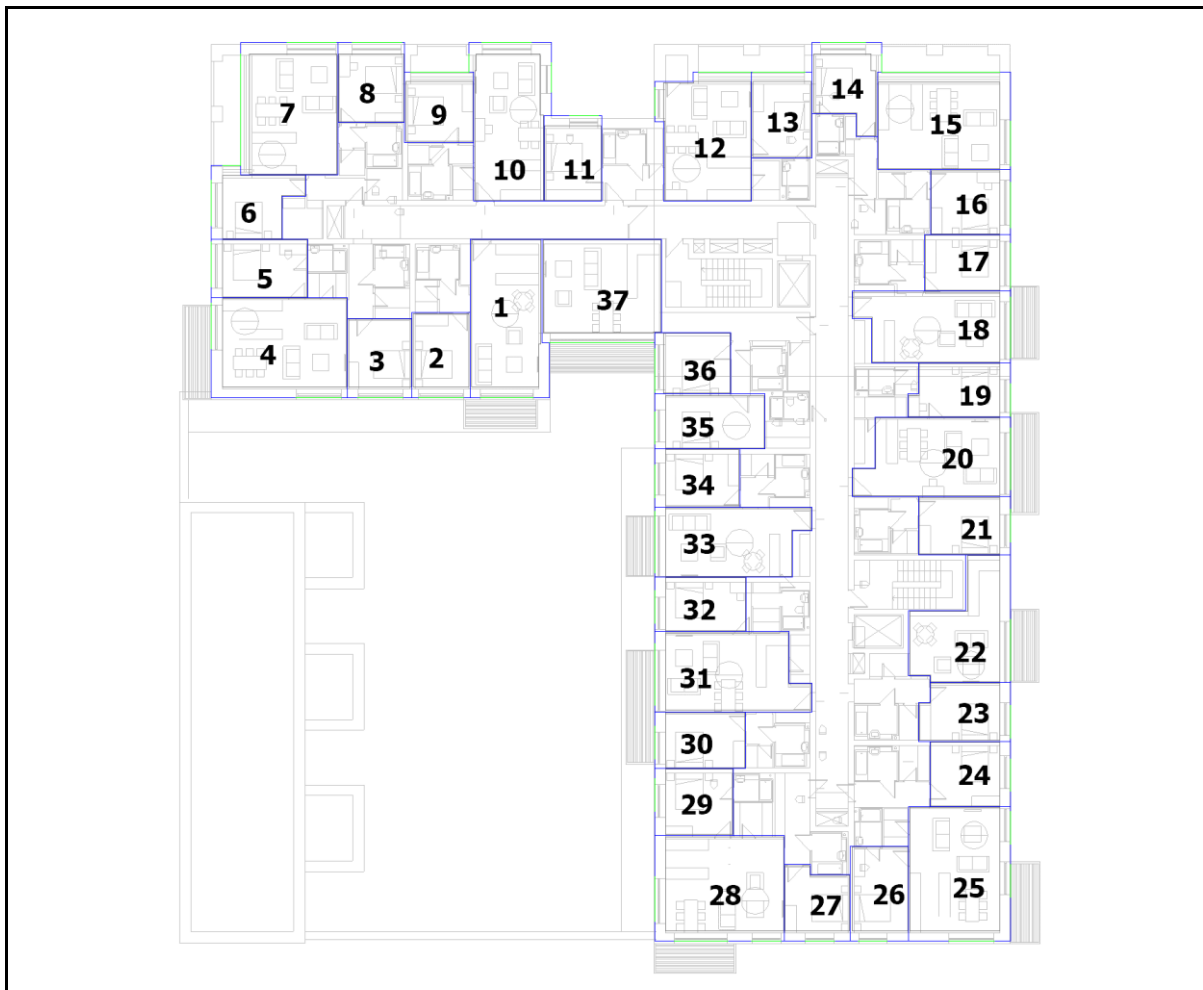
Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L02: BF-0201_Living	LKD	1.57	x / ✓
2	L02: BF-0201_Bedroom	Bedroom	3.91	✓
3	L02: BF-0202_Bedroom 02	Bedroom	3.98	✓
4	L02: BF-0202_Living	LKD	2.13	✓
5	L02: BF-0202_Bedroom 01	Bedroom	2.27	✓
6	L02: BF-0203_Bedroom 01	Bedroom	3.06	✓
7	L02: BF-0203_Living	LKD	3.20	✓
8	L02: BF-0203_Bedroom 02	Bedroom	5.44	✓
9	L02: BF-0204_Bedroom	Bedroom	2.94	✓
10	L02: BF-0204_Living	LKD	2.93	✓
11	L02: BF-0205_Bedroom 02	Bedroom	2.39	✓
12	L02: BF-0205_Living	LKD	1.83	x / ✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
13	L02: BF-0205_Bedroom 01	Bedroom	2.43	✓
14	L02: BF-0206_Bedroom 01	Bedroom	5.64	✓
15	L02: BF-0206_Living	LKD	3.95	✓
16	L02: BF-0206_Bedroom 02	Bedroom	3.61	✓
17	L02: BF-0207_Bedroom	Bedroom	3.26	✓
18	L02: BF-0207_Living	LKD	1.90	x / ✓
19	L02: BF-208_Bedroom 01	Bedroom	1.95	✓
20	L02: BF-208_Living	LKD	1.67	x / ✓
21	L02: BF-208_Bedroom 02	Bedroom	2.07	✓
22	L02: BF-0209_Living	LKD	2.38	✓
23	L02: BF-0209_Bedroom	Bedroom	2.17	✓
24	L02: BF-0210_Bedroom 02	Bedroom	2.40	✓
25	L02: BF-0210_Living	LKD	3.17	✓
26	L02: BF-0210_Bedroom 01	Bedroom	2.46	✓
27	L02: BF-0211_Bedroom 01	Bedroom	3.25	✓
28	L02: BF-0211_Living	LKD	4.37	✓
29	L02: BF-0211_Bedroom 02	Bedroom	2.92	✓
30	L02: BF-0212_Bedroom 01	Bedroom	1.93	✓
31	L02: BF-0212_Living	LKD	2.04	✓
32	L02: BF-0212_Bedroom 02	Bedroom	2.57	✓
33	L02: BF-0213_Living	LKD	1.83	x / ✓
34	L02: BF-0213_Bedroom	Bedroom	1.95	✓
35	L02: BF-0214_Bedroom 02	Bedroom	1.42	✓
36	L02: BF-0214_Bedroom 01	Bedroom	1.42	✓
37	L02: BF-0214_Living	LKD	1.57	x / ✓
38	L02: BF-0114_Bedroom 01	Bedroom	2.35	✓
39	L02: BF-0114_Bedroom 02	Bedroom	2.35	✓
40	L02: BF-0115_Bedroom 01	Bedroom	2.58	✓
41	L02: BF-0115_Bedroom 02	Bedroom	2.65	✓
42	L02: BF-0116_Bedroom 01	Bedroom	2.88	✓

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.
- x/✓ The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 2% ADF target. However, the whole space complies with the 1.5% ADF target.

11.5.7 Level 3 - Block F



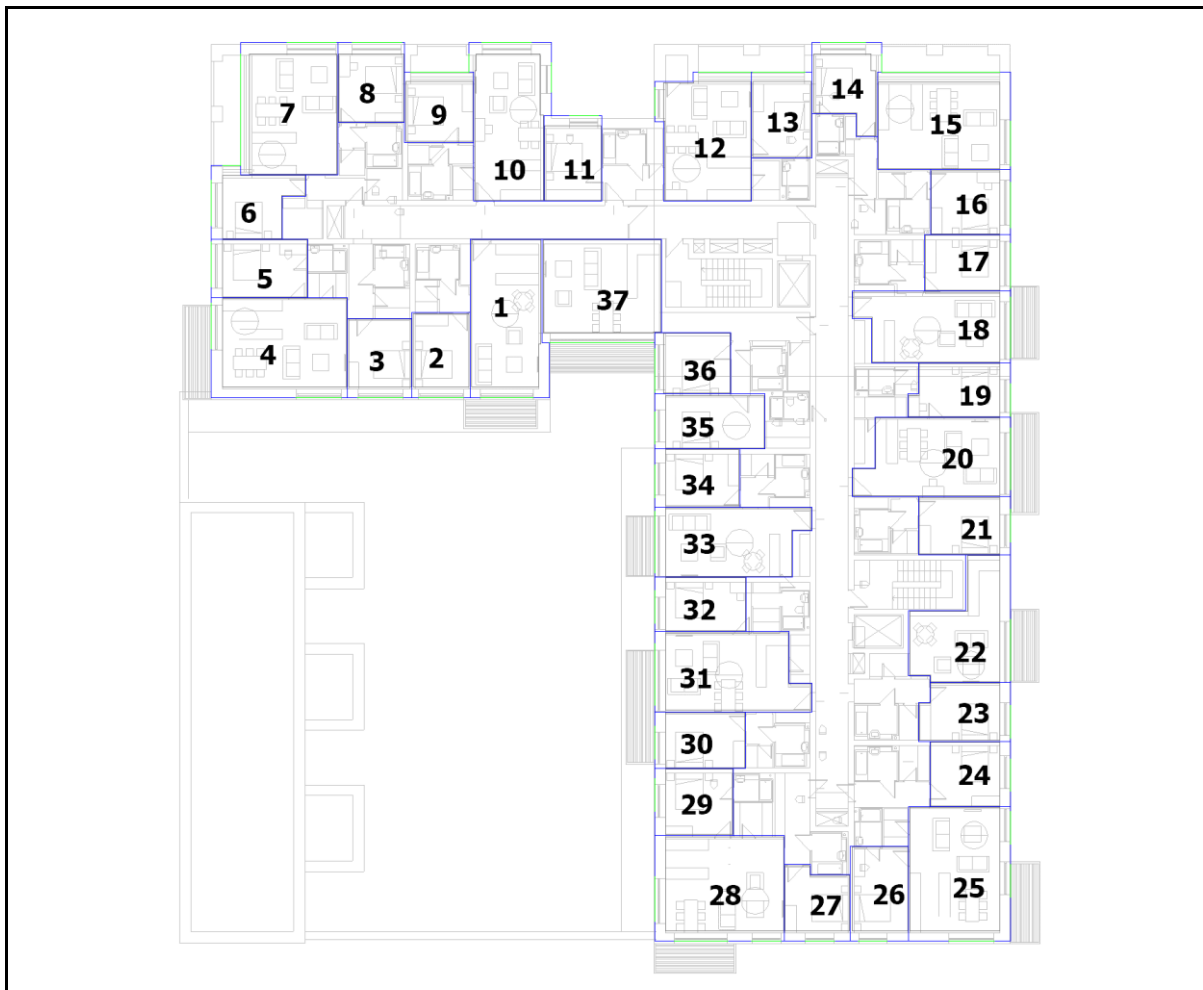
Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L03: BF-0301_Living	LKD	1.62	x / ✓
2	L03: BF-0301_Bedroom	Bedroom	3.94	✓
3	L03: BF-0302_Bedroom 02	Bedroom	3.85	✓
4	L03: BF-0302_Living	LKD	2.21	✓
5	L03: BF-0302_Bedroom 01	Bedroom	2.79	✓
6	L03: BF-0303_Bedroom 01	Bedroom	3.75	✓
7	L03: BF-0303_Living	LKD	3.59	✓
8	L03: BF-0303_Bedroom 02	Bedroom	5.72	✓
9	L03: BF-0304_Bedroom	Bedroom	3.07	✓
10	L03: BF-0304_Living	LKD	3.12	✓
11	L03: BF-0305_Bedroom 02	Bedroom	2.58	✓
12	L03: BF-0305_Living	LKD	2.01	✓
13	L03: BF-0305_Bedroom 01	Bedroom	2.55	✓
14	L03: BF-0306_Bedroom 01	Bedroom	5.94	✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
15	L03: BF-0306_Living	LKD	4.29	✓
16	L03: BF-0306_Bedroom 02	Bedroom	4.23	✓
17	L03: BF-0307_Bedroom	Bedroom	3.83	✓
18	L03: BF-0307_Living	LKD	2.29	✓
19	L03: BF-308_Bedroom 01	Bedroom	2.51	✓
20	L03: BF-308_Living	LKD	2.07	✓
21	L03: BF-308_Bedroom 02	Bedroom	2.53	✓
22	L03: BF-0309_Living	LKD	3.31	✓
23	L03: BF-0309_Bedroom	Bedroom	2.65	✓
24	L03: BF-0310_Bedroom 02	Bedroom	2.89	✓
25	L03: BF-0310_Living	LKD	3.67	✓
26	L03: BF-0310_Bedroom 01	Bedroom	2.74	✓
27	L03: BF-0311_Bedroom 01	Bedroom	3.60	✓
28	L03: BF-0311_Living	LKD	4.66	✓
29	L03: BF-0311_Bedroom 02	Bedroom	3.00	✓
30	L03: BF-0312_Bedroom 01	Bedroom	1.93	✓
31	L03: BF-0312_Living	LKD	2.05	✓
32	L03: BF-0312_Bedroom 02	Bedroom	2.64	✓
33	L03: BF-0313_Living	LKD	2.01	✓
34	L03: BF-0313_Bedroom	Bedroom	2.30	✓
35	L03: BF-0314_Bedroom 02	Bedroom	1.49	✓
36	L03: BF-0314_Bedroom 01	Bedroom	1.45	✓
37	L03: BF-0314_Living	LKD	1.79	x / ✓

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.
- x/✓ The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 2% ADF target. However, the whole space complies with the 1.5% ADF target.

11.5.8 Level 4 - Block F



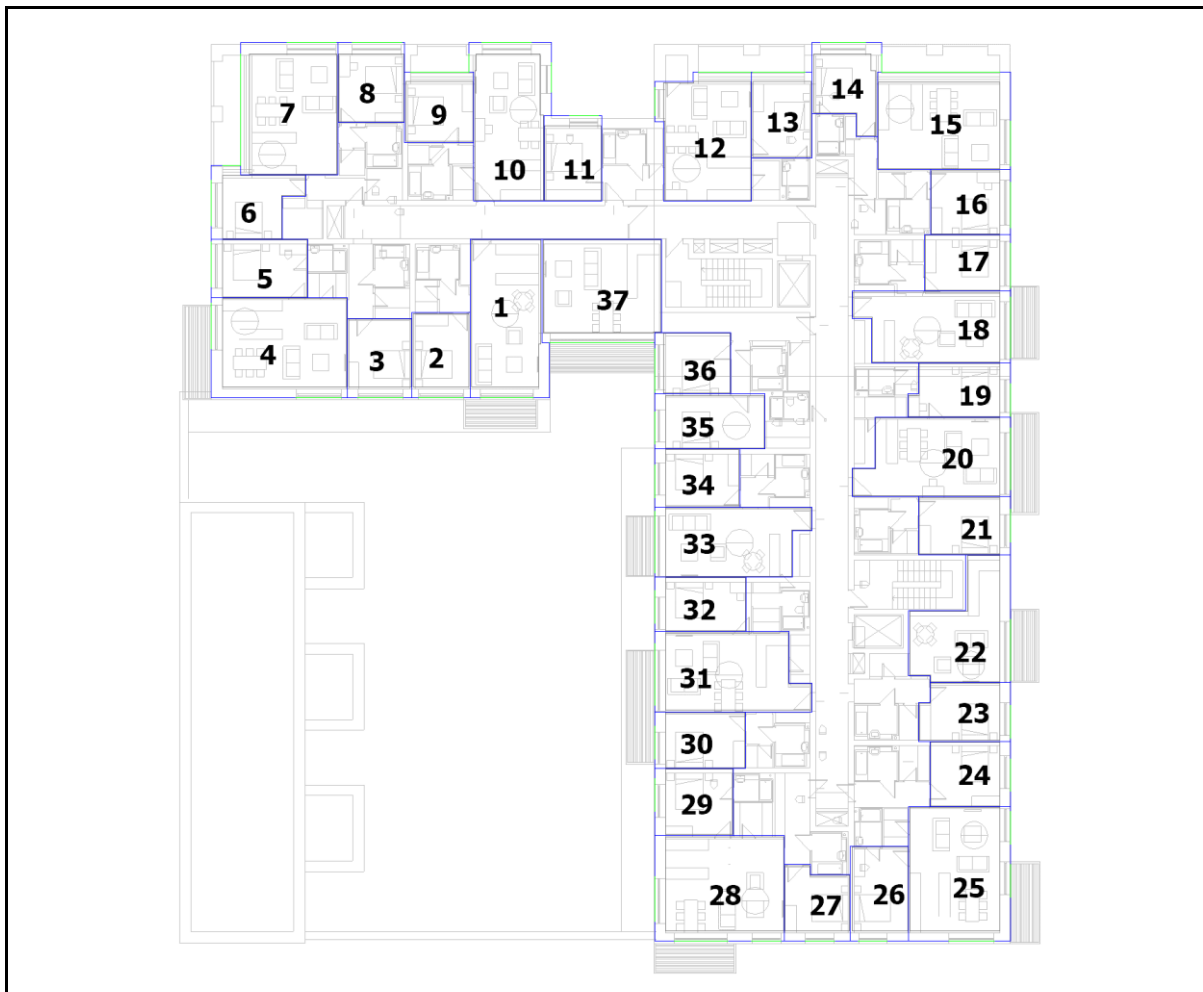
Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L04: BF-0401_Living	LKD	2.06	✓
2	L04: BF-0401_Bedroom	Bedroom	4.31	✓
3	L04: BF-0402_Bedroom 02	Bedroom	4.57	✓
4	L04: BF-0402_Living	LKD	2.92	✓
5	L04: BF-0402_Bedroom 01	Bedroom	3.24	✓
6	L04: BF-0403_Bedroom 01	Bedroom	4.37	✓
7	L04: BF-0403_Living	LKD	4.13	✓
8	L04: BF-0403_Bedroom 02	Bedroom	5.77	✓
9	L04: BF-0404_Bedroom	Bedroom	3.32	✓
10	L04: BF-0404_Living	LKD	3.17	✓
11	L04: BF-0405_Bedroom 02	Bedroom	2.62	✓
12	L04: BF-0405_Living	LKD	2.09	✓
13	L04: BF-0405_Bedroom 01	Bedroom	2.75	✓
14	L04: BF-0406_Bedroom 01	Bedroom	6.00	✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
15	L04: BF-0406_Living	LKD	4.67	✓
16	L04: BF-0406_Bedroom 02	Bedroom	4.62	✓
17	L04: BF-0407_Bedroom	Bedroom	4.25	✓
18	L04: BF-0407_Living	LKD	2.26	✓
19	L04: BF-408_Bedroom 01	Bedroom	2.79	✓
20	L04: BF-408_Living	LKD	2.09	✓
21	L04: BF-408_Bedroom 02	Bedroom	2.83	✓
22	L04: BF-0409_Living	LKD	2.67	✓
23	L04: BF-0409_Bedroom	Bedroom	2.93	✓
24	L04: BF-0410_Bedroom 02	Bedroom	3.20	✓
25	L04: BF-0410_Living	LKD	4.26	✓
26	L04: BF-0410_Bedroom 01	Bedroom	2.81	✓
27	L04: BF-0411_Bedroom 01	Bedroom	3.69	✓
28	L04: BF-0411_Living	LKD	4.99	✓
29	L04: BF-0411_Bedroom 02	Bedroom	3.27	✓
30	L04: BF-0412_Bedroom 01	Bedroom	2.40	✓
31	L04: BF-0412_Living	LKD	2.17	✓
32	L04: BF-0412_Bedroom 02	Bedroom	2.98	✓
33	L04: BF-0413_Living	LKD	2.16	✓
34	L04: BF-0413_Bedroom	Bedroom	2.65	✓
35	L04: BF-0414_Bedroom 02	Bedroom	1.75	✓
36	L04: BF-0414_Bedroom 01	Bedroom	1.77	✓
37	L04: BF-0414_Living	LKD	2.04	✓

The following conclusion can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

11.5.9 Level 5 - Block F



Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L05: BF-0501_Living	LKD	2.11	✓
2	L05: BF-0501_Bedroom	Bedroom	4.63	✓
3	L05: BF-0502_Bedroom 02	Bedroom	4.99	✓
4	L05: BF-0502_Living	LKD	3.29	✓
5	L05: BF-0502_Bedroom 01	Bedroom	3.69	✓
6	L05: BF-0503_Bedroom 01	Bedroom	4.87	✓
7	L05: BF-0503_Living	LKD	4.35	✓
8	L05: BF-0503_Bedroom 02	Bedroom	5.81	✓
9	L05: BF-0504_Bedroom	Bedroom	3.10	✓
10	L05: BF-0504_Living	LKD	3.27	✓
11	L05: BF-0505_Bedroom 02	Bedroom	2.67	✓
12	L05: BF-0505_Living	LKD	2.03	✓
13	L05: BF-0505_Bedroom 01	Bedroom	2.57	✓
14	L05: BF-0506_Bedroom 01	Bedroom	6.00	✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
15	L05: BF-0506_Living	LKD	4.60	✓
16	L05: BF-0506_Bedroom 02	Bedroom	4.92	✓
17	L05: BF-0507_Bedroom	Bedroom	4.76	✓
18	L05: BF-0507_Living	LKD	3.15	✓
19	L05: BF-508_Bedroom 01	Bedroom	3.05	✓
20	L05: BF-508_Living	LKD	3.05	✓
21	L05: BF-508_Bedroom 02	Bedroom	3.22	✓
22	L05: BF-0509_Living	LKD	3.98	✓
23	L05: BF-0509_Bedroom	Bedroom	3.19	✓
24	L05: BF-0510_Bedroom 02	Bedroom	3.44	✓
25	L05: BF-0510_Living	LKD	4.93	✓
26	L05: BF-0510_Bedroom 01	Bedroom	2.87	✓
27	L05: BF-0511_Bedroom 01	Bedroom	3.76	✓
28	L05: BF-0511_Living	LKD	5.72	✓
29	L05: BF-0511_Bedroom 02	Bedroom	3.45	✓
30	L05: BF-0512_Bedroom 01	Bedroom	3.35	✓
31	L05: BF-0512_Living	LKD	3.06	✓
32	L05: BF-0512_Bedroom 02	Bedroom	3.24	✓
33	L05: BF-0513_Living	LKD	2.93	✓
34	L05: BF-0513_Bedroom	Bedroom	2.99	✓
35	L05: BF-0514_Bedroom 02	Bedroom	2.03	✓
36	L05: BF-0514_Bedroom 01	Bedroom	2.60	✓
37	L05: BF-0514_Living	LKD	3.65	✓

The following conclusion can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

11.5.10 Level 6 - Block F



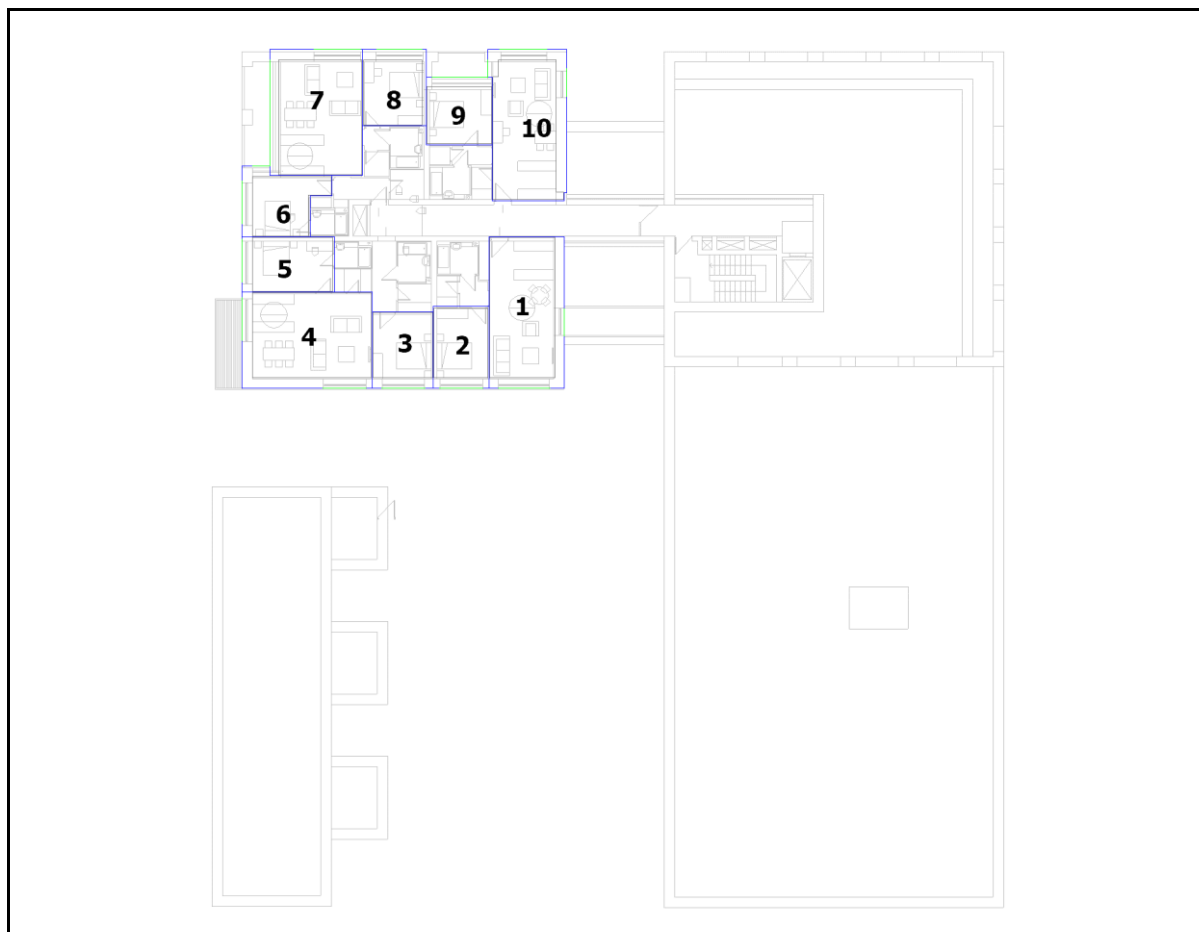
Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L02: BF-0201_Living	LKD	3.95	✓
2	L02: BF-0201_Bedroom	Bedroom	5.09	✓
3	L02: BF-0202_Bedroom 02	Bedroom	5.17	✓
4	L02: BF-0202_Living	LKD	3.54	✓
5	L02: BF-0202_Bedroom 01	Bedroom	4.06	✓
6	L02: BF-0203_Bedroom 01	Bedroom	5.28	✓
7	L02: BF-0203_Living	LKD	4.69	✓
8	L02: BF-0203_Bedroom 02	Bedroom	5.84	✓
9	L02: BF-0204_Bedroom	Bedroom	3.16	✓
10	L02: BF-0204_Living	LKD	3.60	✓
11	L02: BF-0205_Bedroom 02	Bedroom	2.83	✓
12	L02: BF-0205_Living	LKD	2.06	✓
13	L02: BF-0205_Bedroom 01	Bedroom	2.43	✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
14	L02: BF-0206_Bedroom 01	Bedroom	2.22	✓
15	L02: BF-0206_Living	LKD	2.76	✓
16	L02: BF-0206_Bedroom 02	Bedroom	2.58	✓
17	L02: BF-0207_Bedroom	Bedroom	5.90	✓
18	L02: BF-0207_Living	LKD	5.28	✓

The following conclusion can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

11.5.11 Level 7 - Block F

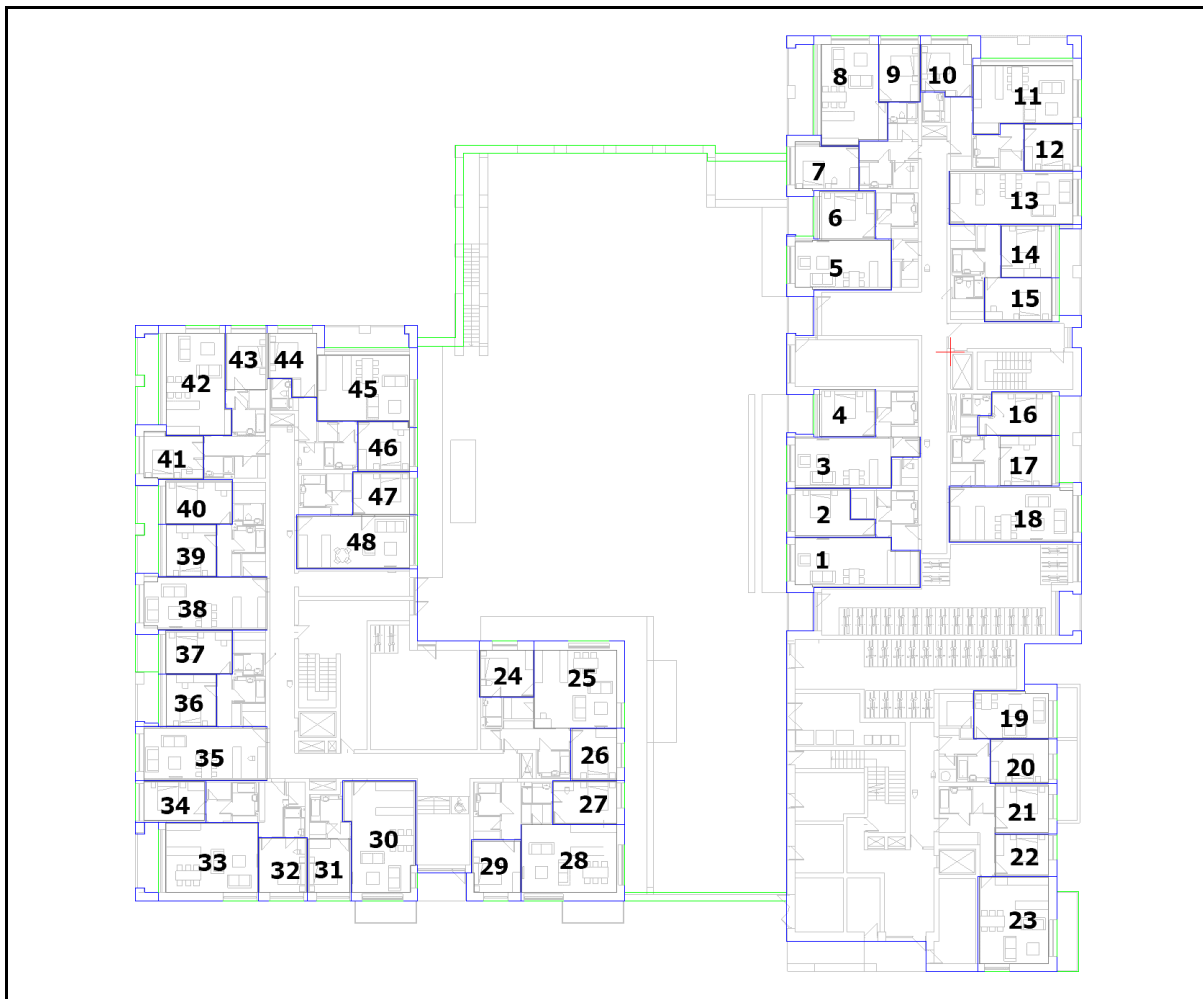


Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L07: BF-0701_Living	LKD	4.00	✓
2	L07: BF-0701_Bedroom	Bedroom	5.19	✓
3	L07: BF-0702_Bedroom 02	Bedroom	5.27	✓
4	L07: BF-0702_Living	LKD	4.30	✓
5	L07: BF-0702_Bedroom 01	Bedroom	4.35	✓
6	L07: BF-0703_Bedroom 01	Bedroom	5.52	✓
7	L07: BF-0703_Living	LKD	4.70	✓
8	L07: BF-0703_Bedroom 02	Bedroom	5.90	✓
9	L07: BF-0704_Bedroom	Bedroom	4.06	✓
10	L07: BF-0704_Living	LKD	3.82	✓

The following conclusion can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.

11.5.12 Level 1 – Blocks G & H



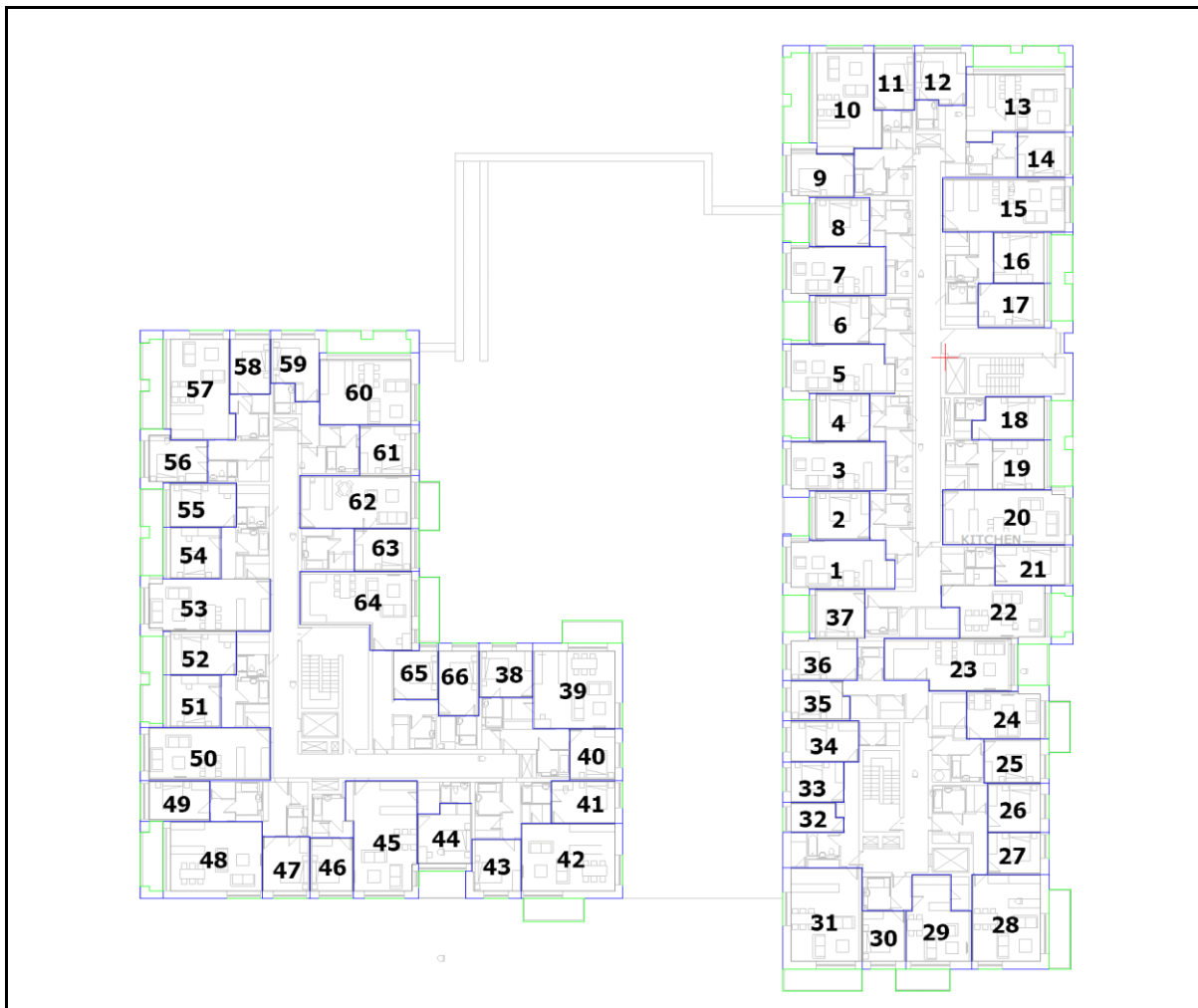
Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L01: BG-102_Living	LKD	1.56	x / ✓
2	L01: BG-102_Bedroom	Bedroom	2.66	✓
3	L01: BG-103-Living	LKD	2.16	✓
4	L01: BG-103-Bedroom	Bedroom	1.00	✓
5	L01: BG-104_Living	LKD	2.04	✓
6	L01: BG-104_Bedroom	Bedroom	1.55	✓
7	L01: BG-105-Bedroom 01	Bedroom	2.20	✓
8	L01: BG-105-Living	LKD	4.24	✓
9	L01: BG-105-Bedroom 02	Bedroom	5.49	✓
10	L01: BG-106-Bedroom 01	Bedroom	5.48	✓
11	L01: BG-106-Living	LKD	4.76	✓
12	L01: BG-106-Bedroom 02	Bedroom	4.93	✓
13	L01: BG-107-Living	LKD	2.15	✓
14	L01: BG-107-Bedroom 01	Bedroom	2.16	✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
15	L01: BG-107-Bedroom 02	Bedroom	1.53	✓
16	L01: BG-101_Bedroom 02	Bedroom	1.18	✓
17	L01: BG-101_Bedroom 01	Bedroom	1.38	✓
18	L01: BG-101_Living	LKD	1.50	x / ✓
19	L01: BG-108-Living	LKD	1.92	x / ✓
20	L01: BG-108-Bedroom	Bedroom	2.24	✓
21	L01: BG-109-Bedroom 01	Bedroom	2.42	✓
22	L01: BG-109-Bedroom 02	Bedroom	2.45	✓
23	L01: BG-109-Living	LKD	2.35	✓
24	L01: BH-101-Bedroom 02	Bedroom	2.10	✓
25	L01: BH-101-Living	LKD	1.53	x / ✓
26	L01: BH-101-Bedroom 01	Bedroom	1.19	✓
27	L01: BH-102-Bedroom 01	Bedroom	1.01	✓
28	L01: BH-102-Living	LKD	2.36	✓
29	L01: BH-102-Bedroom 02	Bedroom	3.36	✓
30	L01: BH-103-Living	LKD	2.23	✓
31	L01: BH-103-Bedroom	Bedroom	4.89	✓
32	L01: BH-104-Bedroom 02	Bedroom	4.52	✓
33	L01: BH-104-Living	LKD	3.77	✓
34	L01: BH-104-Bedroom 01	Bedroom	5.15	✓
35	L01: BH-105-Living	LKD	2.28	✓
36	L01: BH-105-Bedroom 02	Bedroom	2.80	✓
37	L01: BH-105-Bedroom 01	Bedroom	2.12	✓
38	L01: BH-106-Living	LKD	2.22	✓
39	L01: BH-106-Bedroom 02	Bedroom	2.87	✓
40	L01: BH-106-Bedroom 01	Bedroom	2.08	✓
41	L01: BH-107-Bedroom 01	Bedroom	5.06	✓
42	L01: BH-107-Living	LKD	4.65	✓
43	L01: BH-107-Bedroom 02	Bedroom	4.95	✓
44	L01: BH-108-Bedroom 01	Bedroom	4.81	✓
45	L01: BH-108-Living	LKD	3.36	✓
46	L01: BH-108-Bedroom 02	Bedroom	2.24	✓
47	L01: BH-109_Bedroom	Bedroom	1.10	✓
48	L01: BH-109_Living	LKD	1.42	x

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.
- x/✓ The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 2% ADF target. However, the whole space complies with the 1.5% ADF target.
- x The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 1.5% ADF target or in the case of Bedrooms, is less than the 1% ADF target

11.5.13 Level 2 – Blocks G & H



Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L02: BG-203_Living	LKD	2.37	✓
2	L02: BG-203_Bedroom	Bedroom	2.33	✓
3	L02: BG-204-Living	LKD	2.11	✓
4	L02: BG-204-Bedroom	Bedroom	1.25	✓
5	L02: BG-205-Living	LKD	2.15	✓
6	L02: BG-205-Bedroom	Bedroom	1.59	✓
7	L02: BG-206_Living	LKD	2.49	✓
8	L02: BG-206-Bedroom	Bedroom	1.84	✓
9	L02: BG-207-Bedroom 01	Bedroom	4.14	✓
10	L02: BG-207-Living	LKD	4.48	✓
11	L02: BG-207-Bedroom 02	Bedroom	5.59	✓
12	L02: BG-208-Bedroom 02	Bedroom	5.57	✓
13	L02: BG-208-Living	LKD	4.98	✓
14	L02: BG-208-Bedroom 01	Bedroom	5.12	✓

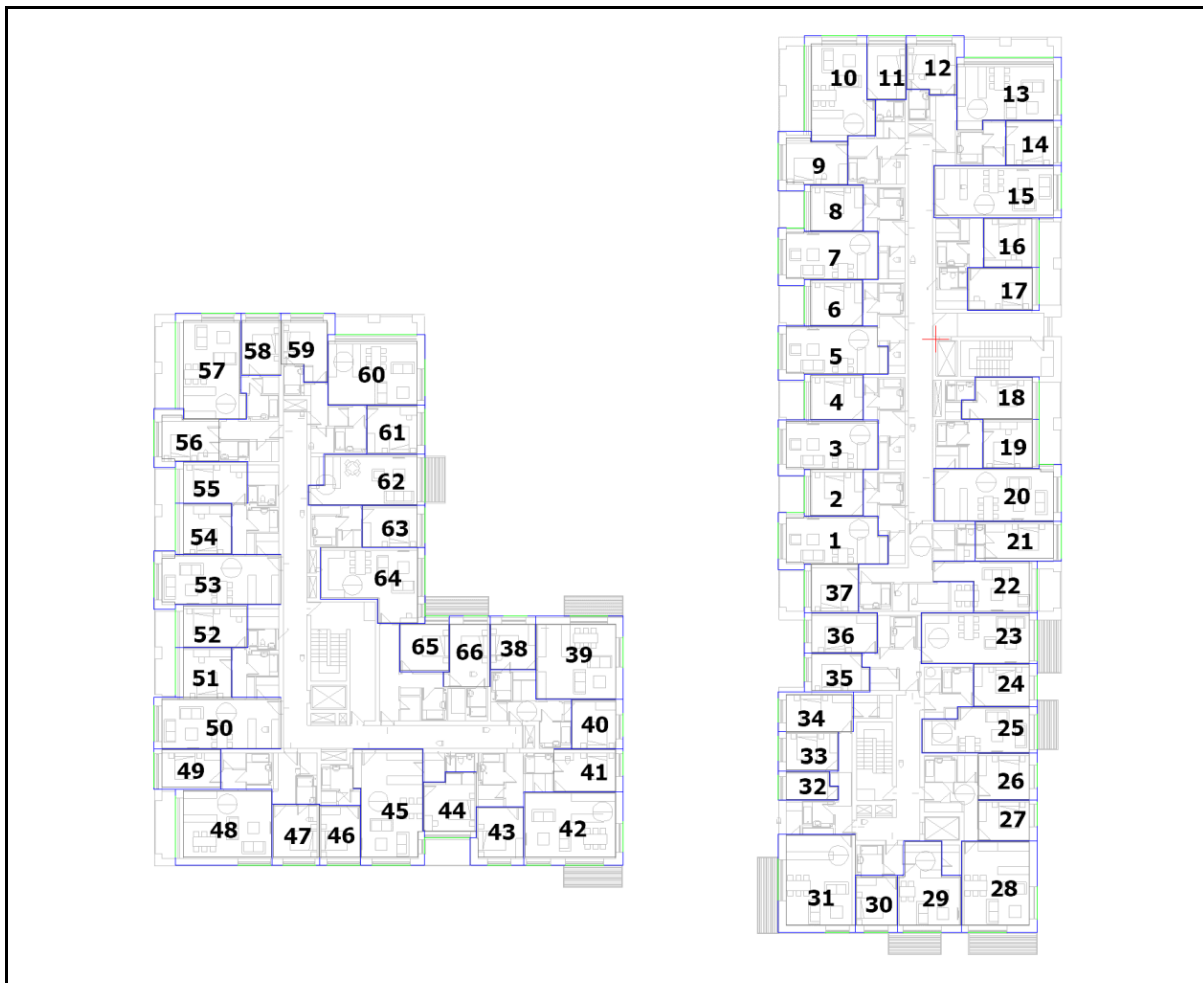
Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
15	L02: BG-209-Living	LKD	2.04	✓
16	L02: BG-209-Bedroom 01	Bedroom	2.28	✓
17	L02: BG-209-Bedroom 02	Bedroom	1.62	✓
18	L02: BG-201_Bedroom 02	Bedroom	1.22	✓
19	L02: BG-201_Bedroom 01	Bedroom	1.46	✓
20	L02: BG-201_Living	LKD	1.75	x / ✓
21	L02: BG-202-Bedroom 01	Bedroom	2.62	✓
22	L02: BG-202-Living	LKD	2.65	✓
23	L02: BG-210-Living	LKD	1.00	x
24	L02: BG-211-Living	LKD	2.18	✓
25	L02: BG-211-Bedroom	Bedroom	2.46	✓
26	L02: BG-212_Bedroom 01	Bedroom	2.67	✓
27	L02: BG-212_Bedroom 02	Bedroom	2.76	✓
28	L02: BG-212-Living	LKD	2.74	✓
29	L02: BG-213-Living	LKD	2.16	✓
30	L02: BG-213-Bedroom	Bedroom	3.26	✓
31	L02: BG-214-Living	LKD	3.06	✓
32	L02: BG-214-Bedroom 02	Bedroom	2.79	✓
33	L02: BG-214-Bedroom 03	Bedroom	1.89	✓
34	L02: BG-214-Bedroom 01	Bedroom	1.46	✓
35	L02: BG-210-Bedroom 01	Bedroom	1.88	✓
36	L02: BG-210-Bedroom 02	Bedroom	1.64	✓
37	L02: BG-202-Bedroom 02	Bedroom	1.11	✓
38	L02: BH-201-Bedroom 02	Bedroom	2.36	✓
39	L02: BH-201-Living	LKD	1.71	x / ✓
40	L02: BH-201-Bedroom 01	Bedroom	1.11	✓
41	L02: BH-202-Bedroom 02	Bedroom	1.33	✓
42	L02: BH-202-Living	LKD	2.44	✓
43	L02: BH-202-Bedroom 01	Bedroom	3.45	✓
44	L02: BH-203-Bedroom 02	Bedroom	3.97	✓
45	L02: BH-203-Living	LKD	2.34	✓
46	L02: BH-203-Bedroom 01	Bedroom	5.07	✓
47	L02: BH-204-Bedroom 01	Bedroom	4.67	✓
48	L02: BH-204-Living	LKD	3.92	✓
49	L02: BH-204-Bedroom 02	Bedroom	5.22	✓
50	L02: BH-205-Living	LKD	2.31	✓
51	L02: BH-205-Bedroom 02	Bedroom	2.91	✓
52	L02: BH-205-Bedroom 01	Bedroom	2.20	✓
53	L02: BH-206-Living	LKD	2.25	✓
54	L02: BH-206-Bedroom 01	Bedroom	2.98	✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
55	L02: BH-206-Bedroom 02	Bedroom	2.16	✓
56	L02: BH-207-Bedroom 01	Bedroom	5.12	✓
57	L02: BH-207-Living	LKD	4.79	✓
58	L02: BH-207-Bedroom 02	Bedroom	5.22	✓
59	L02: BH-208-Bedroom 02	Bedroom	4.99	✓
60	L02: BH-208-Living	LKD	3.56	✓
61	L02: BH-208-Bedroom 01	Bedroom	2.69	✓
62	L02: BH-209_Living	LKD	1.07	x
63	L02: BH-209_Bedroom	Bedroom	2.10	✓
64	L02: BH-210-Living	LKD	1.51	x / ✓
65	L02: BH-210-Bedroom 02	Bedroom	1.05	✓
66	L02: BH-210-Bedroom 01	Bedroom	1.32	✓

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.
- x/✓ The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 2% ADF target. However, the whole space complies with the 1.5% ADF target.
- x The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 1.5% ADF target or in the case of Bedrooms, is less than the 1% ADF target

11.5.14 Level 3 – Blocks G & H



Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L03: BG-303_Living	LKD	2.12	✓
2	L03: BG-303_Bedroom	Bedroom	2.83	✓
3	L03: BG-304-Living	LKD	2.27	✓
4	L03: BG-304-Bedroom	Bedroom	1.51	✓
5	L03: BG-305-Living	LKD	2.40	✓
6	L03: BG-305-Bedroom	Bedroom	1.81	✓
7	L03: BG-306_Living	LKD	2.75	✓
8	L03: BG-306-Bedroom	Bedroom	2.03	✓
9	L03: BG-307-Bedroom 01	Bedroom	4.50	✓
10	L03: BG-307-Living	LKD	4.78	✓
11	L03: BG-307-Bedroom 02	Bedroom	5.89	✓
12	L03: BG-308-Bedroom 02	Bedroom	5.75	✓
13	L03: BG-308-Living	LKD	5.28	✓
14	L03: BG-308-Bedroom 01	Bedroom	5.55	✓
15	L03: BG-309-Living	LKD	2.14	✓

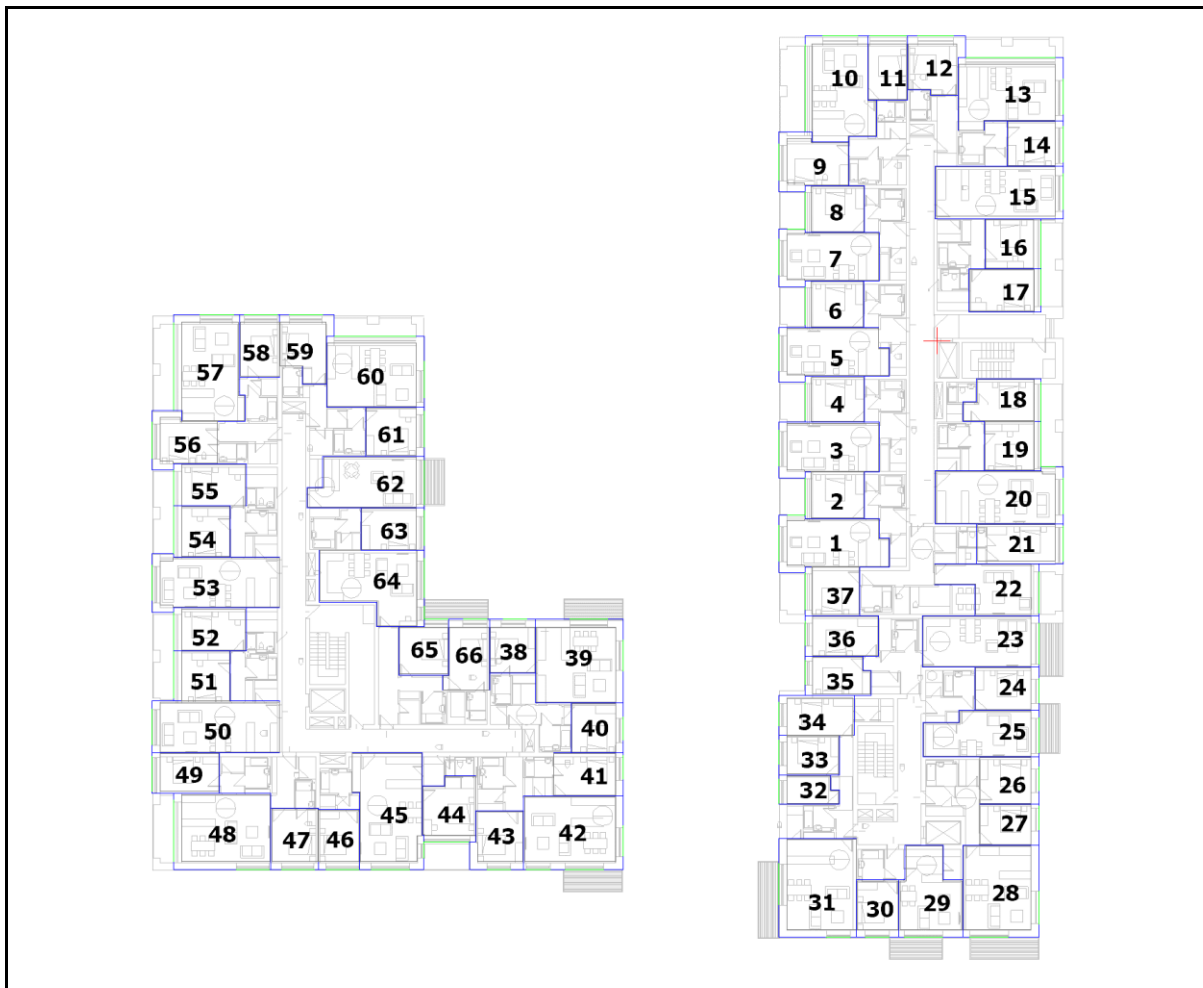
Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
16	L03: BG-309-Bedroom 01	Bedroom	2.73	✓
17	L03: BG-309-Bedroom 02	Bedroom	1.79	✓
18	L03: BG-301_Bedroom 02	Bedroom	1.40	✓
19	L03: BG-301_Bedroom 01	Bedroom	1.67	✓
20	L03: BG-301_Living	LKD	2.00	✓
21	L03: BG-302-Bedroom 01	Bedroom	2.74	✓
22	L03: BG-302-Living	LKD	2.25	✓
23	L03: BG-310-Living	LKD	1.30	x
24	L03: BG-311-Bedroom	Bedroom	2.38	✓
25	L03: BG-311_Living	LKD	1.89	x / ✓
26	L03: BG-312_Bedroom 01	Bedroom	2.89	✓
27	L03: BG-312_Bedroom 02	Bedroom	3.04	✓
28	L03: BG-312-Living	LKD	2.96	✓
29	L03: BG-313-Living	LKD	2.38	✓
30	L03: BG-313-Bedroom	Bedroom	3.67	✓
31	L03: BG-314-Living	LKD	3.42	✓
32	L03: BG-314-Bedroom 02	Bedroom	3.31	✓
33	L03: BG-314-Bedroom 03	Bedroom	2.29	✓
34	L03: BG-314-Bedroom 01	Bedroom	1.81	✓
35	L03: BG-310-Bedroom 01	Bedroom	2.22	✓
36	L03: BG-310-Bedroom 02	Bedroom	1.76	✓
37	L03: BG-302-Bedroom 02	Bedroom	1.51	✓
38	L03: BH-301-Bedroom 02	Bedroom	3.17	✓
39	L03: BH-301-Living	LKD	2.09	✓
40	L03: BH-301-Bedroom 01	Bedroom	1.64	✓
41	L03: BH-302-Bedroom 02	Bedroom	1.24	✓
42	L03: BH-302-Living	LKD	2.78	✓
43	L03: BH-302-Bedroom 01	Bedroom	3.74	✓
44	L03: BH-303-Bedroom 02	Bedroom	2.78	✓
45	L03: BH-303-Living	LKD	2.42	✓
46	L03: BH-303-Bedroom 01	Bedroom	5.43	✓
47	L03: BH-304-Bedroom 01	Bedroom	4.99	✓
48	L03: BH-304-Living	LKD	4.15	✓
49	L03: BH-304-Bedroom 02	Bedroom	5.48	✓
50	L03: BH-305-Living	LKD	2.45	✓
51	L03: BH-305-Bedroom 02	Bedroom	3.03	✓
52	L03: BH-305-Bedroom 01	Bedroom	2.31	✓
53	L03: BH-306-Living	LKD	2.38	✓
54	L03: BH-306-Bedroom 01	Bedroom	3.11	✓
55	L03: BH-306-Bedroom 02	Bedroom	2.28	✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
56	L03: BH-307-Bedroom 01	Bedroom	5.37	✓
57	L03: BH-307-Living	LKD	5.02	✓
58	L03: BH-307-Bedroom 02	Bedroom	5.52	✓
59	L03: BH-308-Bedroom 02	Bedroom	5.20	✓
60	L03: BH-308-Living	LKD	4.01	✓
61	L03: BH-308-Bedroom 01	Bedroom	3.33	✓
62	L03: BH-309_Living	LKD	1.23	x
63	L03: BH-309_Bedroom	Bedroom	2.79	✓
64	L03: BH-310-Living	LKD	1.81	x / ✓
65	L03: BH-310-Bedroom 02	Bedroom	1.27	✓
66	L03: BH-310-Bedroom 01	Bedroom	1.55	✓

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.
- x/✓ The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 2% ADF target. However, the whole space complies with the 1.5% ADF target.
- x The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 1.5% ADF target or in the case of Bedrooms, is less than the 1% ADF target

11.5.15 Level 4 – Blocks G & H



Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L04: BG-403_Living	LKD	2.44	✓
2	L04: BG-403_Bedroom	Bedroom	3.12	✓
3	L04: BG-404-Living	LKD	2.53	✓
4	L04: BG-404-Bedroom	Bedroom	1.76	✓
5	L04: BG-405-Living	LKD	2.59	✓
6	L04: BG-405-Bedroom	Bedroom	1.97	✓
7	L04: BG-406_Living	LKD	2.89	✓
8	L04: BG-406-Bedroom	Bedroom	2.14	✓
9	L04: BG-407-Bedroom 01	Bedroom	4.65	✓
10	L04: BG-407-Living	LKD	4.88	✓
11	L04: BG-407-Bedroom 02	Bedroom	5.94	✓
12	L04: BG-408-Bedroom 02	Bedroom	5.80	✓
13	L04: BG-408-Living	LKD	5.36	✓
14	L04: BG-408-Bedroom 01	Bedroom	5.73	✓

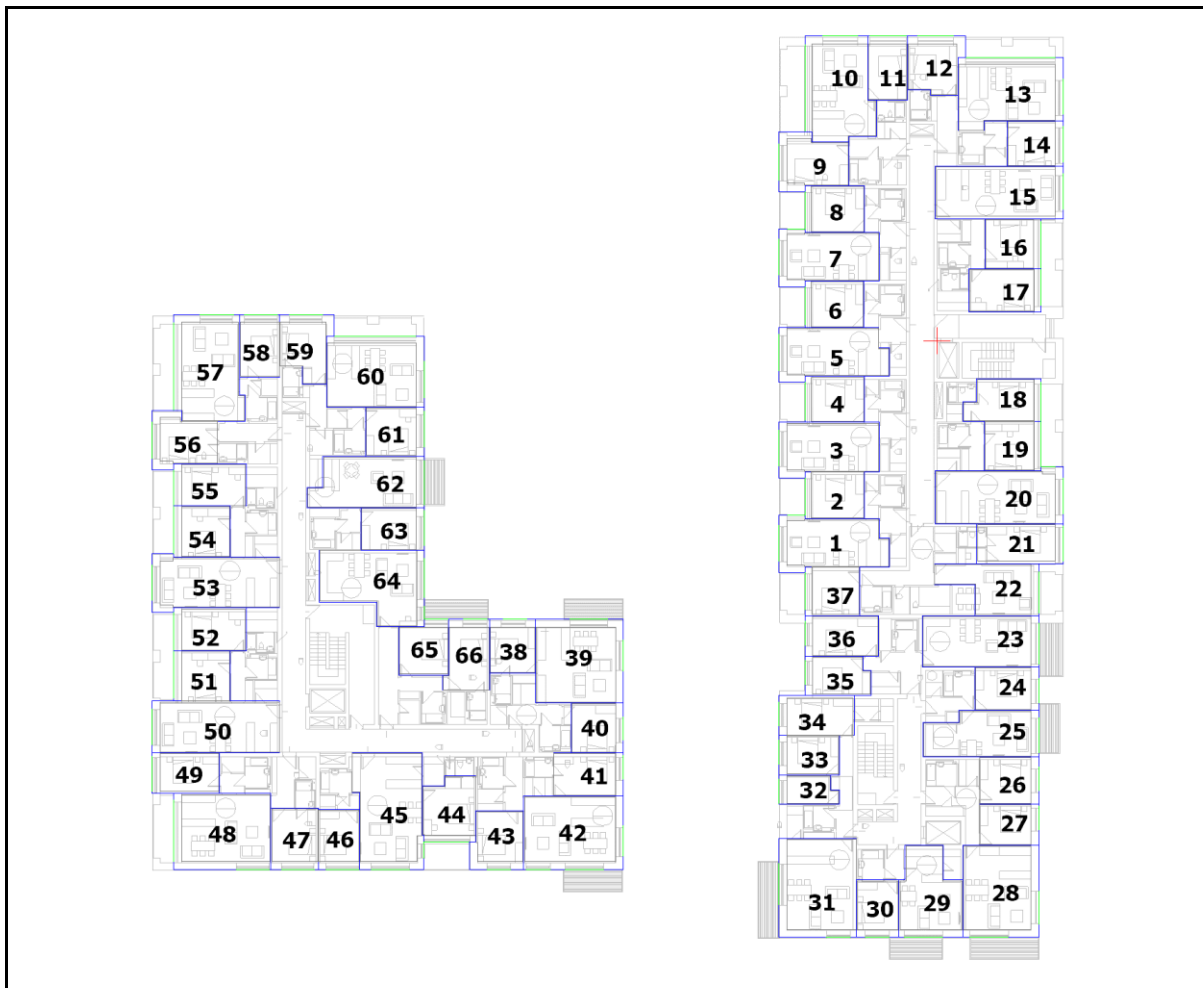
Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
15	L04: BG-409-Living	LKD	2.22	✓
16	L04: BG-409-Bedroom 01	Bedroom	2.86	✓
17	L04: BG-409-Bedroom 02	Bedroom	1.88	✓
18	L04: BG-401_Bedroom 02	Bedroom	1.57	✓
19	L04: BG-401_Bedroom 01	Bedroom	1.92	✓
20	L04: BG-401_Living	LKD	2.17	✓
21	L04: BG-402-Bedroom 01	Bedroom	2.31	✓
22	L04: BG-402-Living	LKD	2.50	✓
23	L04: BG-410-Living	LKD	1.50	x / ✓
24	L04: BG-411-Bedroom	Bedroom	2.65	✓
25	L04: BG-411_Living	LKD	2.14	✓
26	L04: BG-412_Bedroom 01	Bedroom	3.17	✓
27	L04: BG-412_Bedroom 02	Bedroom	3.34	✓
28	L04: BG-412-Living	LKD	3.71	✓
29	L04: BG-413-Living	LKD	2.48	✓
30	L04: BG-413-Bedroom	Bedroom	3.90	✓
31	L04: BG-414-Living	LKD	3.86	✓
32	L04: BG-414-Bedroom 02	Bedroom	4.33	✓
33	L04: BG-414-Bedroom 03	Bedroom	3.09	✓
34	L04: BG-414-Bedroom 01	Bedroom	2.44	✓
35	L04: BG-410-Bedroom 01	Bedroom	2.79	✓
36	L04: BG-410-Bedroom 02	Bedroom	2.19	✓
37	L04: BG-402-Bedroom 02	Bedroom	2.13	✓
38	L04: BH-401-Bedroom 02	Bedroom	3.48	✓
39	L04: BH-401-Living	LKD	2.20	✓
40	L04: BH-401-Bedroom 01	Bedroom	2.47	✓
41	L04: BH-402-Bedroom 02	Bedroom	1.84	✓
42	L04: BH-402-Living	LKD	3.69	✓
43	L04: BH-402-Bedroom 01	Bedroom	3.86	✓
44	L04: BH-403-Bedroom 02	Bedroom	2.86	✓
45	L04: BH-403-Living	LKD	2.48	✓
46	L04: BH-403-Bedroom 01	Bedroom	5.54	✓
47	L04: BH-404-Bedroom 01	Bedroom	5.10	✓
48	L04: BH-404-Living	LKD	4.22	✓
49	L04: BH-404-Bedroom 02	Bedroom	5.52	✓
50	L04: BH-405-Living	LKD	2.47	✓
51	L04: BH-405-Bedroom 02	Bedroom	3.06	✓
52	L04: BH-405-Bedroom 01	Bedroom	2.34	✓
53	L04: BH-406-Living	LKD	2.41	✓
54	L04: BH-406-Bedroom 01	Bedroom	3.13	✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
55	L04: BH-406-Bedroom 02	Bedroom	2.30	✓
56	L04: BH-407-Bedroom 01	Bedroom	5.42	✓
57	L04: BH-407-Living	LKD	5.05	✓
58	L04: BH-407-Bedroom 02	Bedroom	5.57	✓
59	L04: BH-408-Bedroom 02	Bedroom	5.26	✓
60	L04: BH-408-Living	LKD	4.27	✓
61	L04: BH-408-Bedroom 01	Bedroom	3.94	✓
62	L04: BH-409_Living	LKD	1.93	x / ✓
63	L04: BH-409_Bedroom	Bedroom	3.41	✓
64	L04: BH-410-Living	LKD	2.25	✓
65	L04: BH-410-Bedroom 02	Bedroom	1.44	✓
66	L04: BH-410-Bedroom 01	Bedroom	1.71	✓

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.
- x/✓ The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 2% ADF target. However, the whole space complies with the 1.5% ADF target.

11.5.16 Level 5 – Blocks G & H



Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L05: BG-503_Living	LKD	2.64	✓
2	L05: BG-503_Bedroom	Bedroom	2.06	✓
3	L05: BG-504-Living	LKD	2.77	✓
4	L05: BG-504-Bedroom	Bedroom	1.97	✓
5	L05: BG-505-Living	LKD	2.75	✓
6	L05: BG-505-Bedroom	Bedroom	2.10	✓
7	L05: BG-506_Living	LKD	3.00	✓
8	L05: BG-506-Bedroom	Bedroom	2.23	✓
9	L05: BG-507-Bedroom 01	Bedroom	4.78	✓
10	L05: BG-507-Living	LKD	4.95	✓
11	L05: BG-507-Bedroom 02	Bedroom	5.99	✓
12	L05: BG-508-Bedroom 02	Bedroom	5.97	✓
13	L05: BG-508-Living	LKD	5.49	✓
14	L05: BG-508-Bedroom 01	Bedroom	5.89	✓

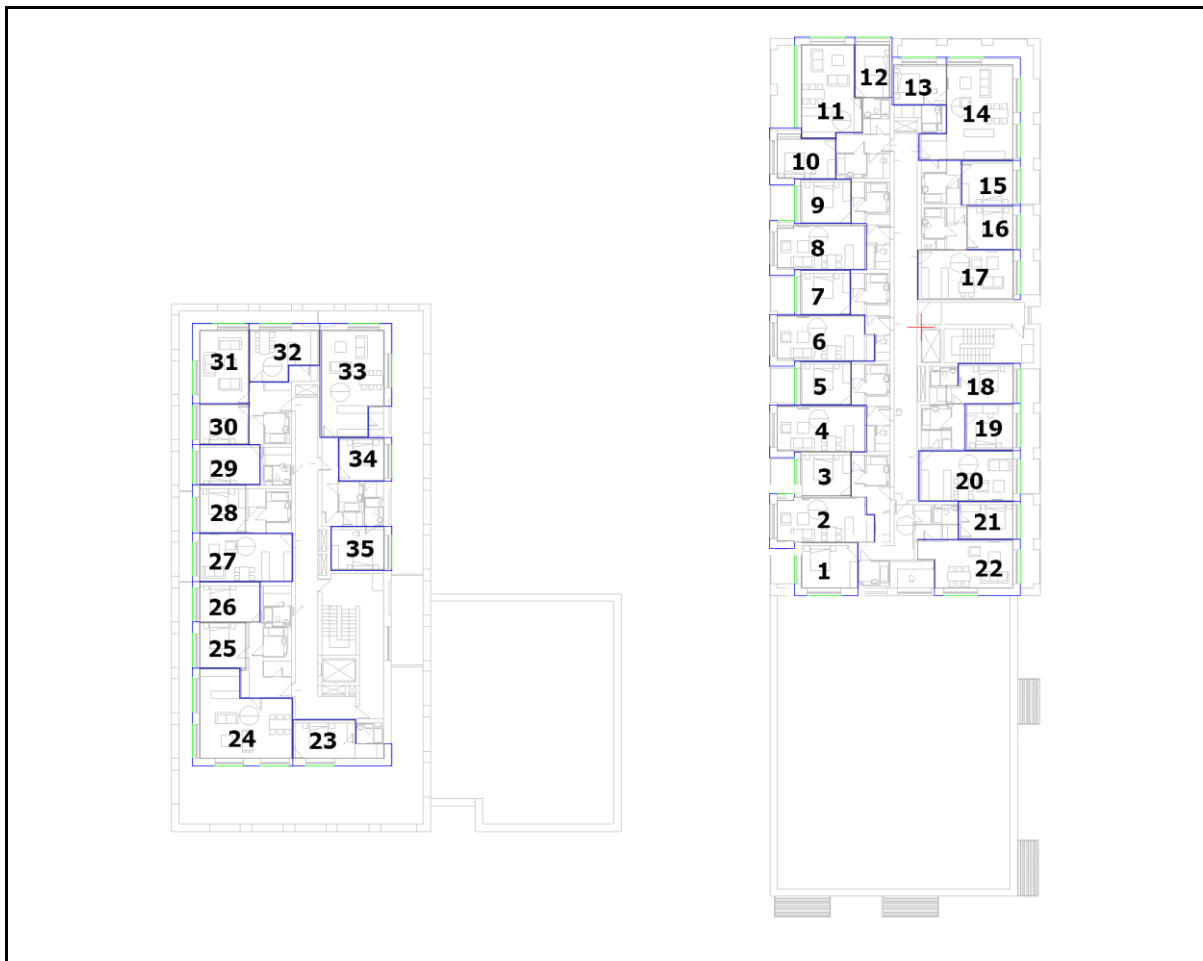
Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
15	L05: BG-509-Living	LKD	2.29	✓
16	L05: BG-509-Bedroom 01	Bedroom	3.00	✓
17	L05: BG-509-Bedroom 02	Bedroom	1.99	✓
18	L05: BG-501_Bedroom 02	Bedroom	1.80	✓
19	L05: BG-501_Bedroom 01	Bedroom	2.24	✓
20	L05: BG-501_Living	LKD	2.31	✓
21	L05: BG-502-Bedroom 01	Bedroom	3.10	✓
22	L05: BG-502-Living	LKD	1.52	x / ✓
23	L05: BG-510-Living	LKD	2.17	✓
24	L05: BG-511-Living	LKD	3.24	✓
25	L05: BG-511-Bedroom	Bedroom	2.72	✓
26	L05: BG-512_Bedroom 01	Bedroom	3.38	✓
27	L05: BG-512_Bedroom 02	Bedroom	3.51	✓
28	L05: BG-512-Living	LKD	4.81	✓
29	L05: BG-513-Living	LKD	3.51	✓
30	L05: BG-513-Bedroom	Bedroom	4.24	✓
31	L05: BG-514-Living	LKD	4.35	✓
32	L05: BG-514-Bedroom 02	Bedroom	5.15	✓
33	L05: BG-514-Bedroom 03	Bedroom	3.77	✓
34	L05: BG-514-Bedroom 01	Bedroom	3.02	✓
35	L05: BG-510-Bedroom 01	Bedroom	2.52	✓
36	L05: BG-510-Bedroom 02	Bedroom	2.16	✓
37	L05: BG-502-Bedroom 02	Bedroom	2.73	✓
38	L05: BH-501-Bedroom 02	Bedroom	3.78	✓
39	L05: BH-501-Living	LKD	3.72	✓
40	L05: BH-501-Bedroom 01	Bedroom	3.28	✓
41	L05: BH-502-Bedroom 02	Bedroom	2.52	✓
42	L05: BH-502-Living	LKD	5.67	✓
43	L05: BH-502-Bedroom 01	Bedroom	3.92	✓
44	L05: BH-503-Bedroom 02	Bedroom	2.89	✓
45	L05: BH-503-Living	LKD	2.51	✓
46	L05: BH-503-Bedroom 01	Bedroom	5.60	✓
47	L05: BH-504-Bedroom 01	Bedroom	5.16	✓
48	L05: BH-504-Living	LKD	4.17	✓
49	L05: BH-504-Bedroom 02	Bedroom	5.56	✓
50	L05: BH-505-Living	LKD	2.49	✓
51	L05: BH-505-Bedroom 02	Bedroom	2.93	✓
52	L05: BH-505-Bedroom 01	Bedroom	2.23	✓
53	L05: BH-506-Living	LKD	2.42	✓
54	L05: BH-506-Bedroom 01	Bedroom	3.00	✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
55	L05: BH-506-Bedroom 02	Bedroom	2.20	✓
56	L05: BH-507-Bedroom 01	Bedroom	5.45	✓
57	L05: BH-507-Living	LKD	4.94	✓
58	L05: BH-507-Bedroom 02	Bedroom	5.63	✓
59	L05: BH-508-Bedroom 02	Bedroom	5.39	✓
60	L05: BH-508-Living	LKD	4.39	✓
61	L05: BH-508-Bedroom 01	Bedroom	4.54	✓
62	L05: BH-509_Living	LKD	2.79	✓
63	L05: BH-509_Bedroom	Bedroom	4.41	✓
64	L05: BH-510-Living	LKD	2.55	✓
65	L05: BH-510-Bedroom 02	Bedroom	2.41	✓
66	L05: BH-510-Bedroom 01	Bedroom	2.76	✓

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.
- x/✓ The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 2% ADF target. However, the whole space complies with the 1.5% ADF target.

11.5.17 Level 6 – Blocks G & H



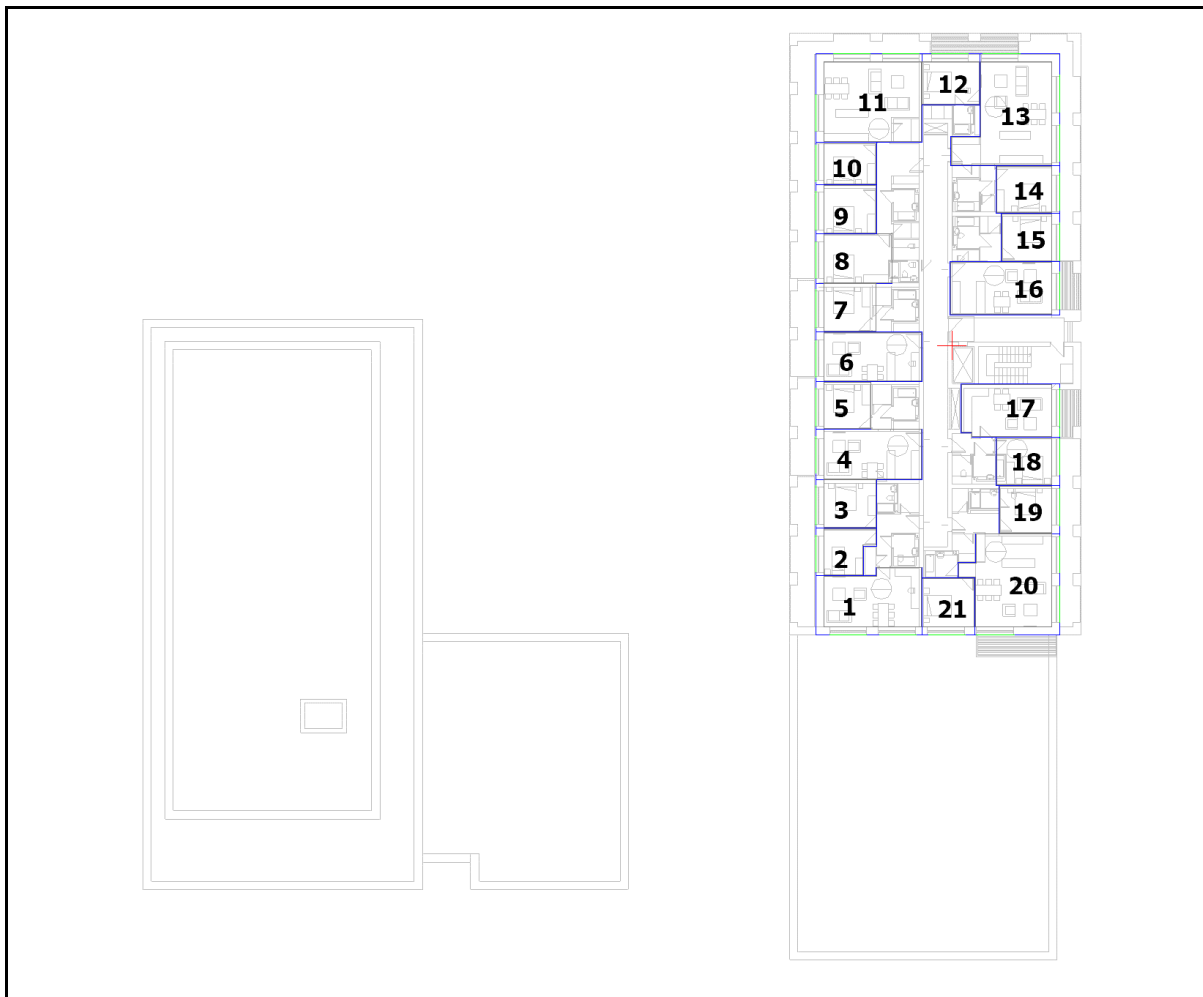
Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L06: BG-602-Bedroom 02	Bedroom	6.23	✓
2	L06: BG-603_Living	LKD	2.74	✓
3	L06: BG-603_Bedroom	Bedroom	2.13	✓
4	L06: BG-604-Living	LKD	2.93	✓
5	L06: BG-604-Bedroom	Bedroom	2.00	✓
6	L06: BG-605-Living	LKD	2.87	✓
7	L06: BG-605-Bedroom	Bedroom	2.08	✓
8	L06: BG-606_Living	LKD	3.03	✓
9	L06: BG-606-Bedroom	Bedroom	2.32	✓
10	L06: BG-607-Bedroom 01	Bedroom	4.86	✓
11	L06: BG-607-Living	LKD	4.86	✓
12	L06: BG-607-Bedroom 02	Bedroom	6.00	✓
13	L06: BG-608-Bedroom 02	Bedroom	2.73	✓
14	L06: BG-608-Living	LKD	2.90	✓
15	L06: BG-609-Bedroom 02	Bedroom	2.29	✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
16	L06: BG-609-Bedroom 01	Bedroom	2.49	✓
17	L06: BG-609_Living	LKD	1.44	x
18	L06: BG-601_Bedroom 02	Bedroom	1.92	✓
19	L06: BG-601_Bedroom 01	Bedroom	2.35	✓
20	L06: BG-601_Living	LKD	1.39	x
21	L06: BG-602-Bedroom 01	Bedroom	2.29	✓
22	L06: BG-602-Living	LKD	4.43	✓
23	L06: BH-605-Bedroom 03	Bedroom	4.26	✓
24	L06: BH-605-Living	LKD	6.90	✓
25	L06: BH-605-Bedroom 02	Bedroom	5.62	✓
26	L06: BH-605-Bedroom 01	Bedroom	4.53	✓
27	L06: BH-606-Living	LKD	2.75	✓
28	L06: BH-606-Bedroom 01	Bedroom	5.22	✓
29	L06: BH-606-Bedroom 02	Bedroom	4.61	✓
30	L06: BH-607-Bedroom 01	Bedroom	5.90	✓
31	L06: BH-607-Living	Living	6.85	✓
32	L06: BH-607-Kitchen-Dining	K/D	4.01	✓
33	L06: BH-608-Living	LKD	3.95	✓
34	L06: BH-608_Bedroom 01	Bedroom	5.55	✓
35	L06: BH-608_Bedroom 02	Bedroom	4.11	✓

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.
- x The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 1.5% ADF target or in the case of Bedrooms, is less than the 1% ADF target

11.5.18 Level 7 – Blocks G & H



Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
1	L07: BG-703_Living	LKD	4.46	✓
2	L07: BG-703_Bedroom 01	Bedroom	2.28	✓
3	L07: BG-703_Bedroom 02	Bedroom	2.03	✓
4	L07: BG-704-Living	LKD	1.24	x
5	L07: BG-704-Bedroom	Bedroom	2.25	✓
6	L07: BG-705-Living	LKD	1.28	x
7	L07: BG-705-Bedroom	Bedroom	2.12	✓
8	L07: BG-707_Bedroom 03	Bedroom	1.61	✓
9	L07: BG-707-Bedroom 02	Bedroom	2.08	✓
10	L07: BG-707-Bedroom 01	Bedroom	2.16	✓
11	L07: BG-707-Living	LKD	2.68	✓
12	L07: BG-708-Bedroom 02	Bedroom	2.72	✓
13	L07: BG-708-Living	LKD	2.61	✓
14	L07: BG-708-Bedroom 01	Bedroom	2.23	✓

Ref.	Room Reference	Room Activity	Average Daylight Factor	Comment
15	L07: BG-709-Bedroom	Bedroom	2.50	✓
16	L07: BG-709-Living	LKD	1.51	x / ✓
17	L07: BG-701_Living	LKD	1.70	x / ✓
18	L07: BG-701_Bedroom 01	Bedroom	2.03	✓
19	L07: BG-701_Bedroom 02	Bedroom	2.16	✓
20	L07: BG-702-Living	LKD	3.67	✓
21	L07: BG-702_Bedroom	Bedroom	5.87	✓

The following conclusions can be made:

- ✓ These rooms have an ADF greater than the recommended minimum values (2.0% for combined L/K/Ds and 1.0% for bedrooms) as stated within the BRE Guide / BS 8206-2:2008.
- x/✓ The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 2% ADF target. However, the whole space complies with the 1.5% ADF target.
- x The ADF in these rooms falls below the BRE Guide / BS 8206-2:2008 recommendation for a L/K/D when the whole space is assessed against the 1.5% ADF target or in the case of Bedrooms, is less than the 1% ADF target

11.6 Discussion

The purpose of the ADF calculations is to quantify an overall percentage of units which exceeds the BRE recommendations and the BS 8206-2:2008 recommendations. The objective of the design team is to maximise the number of units which exceed the BRE and the BS 8206-2:2008 recommendations. To note, all apartments within the development were included within the assessment.

As noted previously in Section 11.2, where there are combined living/kitchen/dining areas within the development, these have been assessed as whole spaces against a 2% ADF target.

The results are summarised in the following tables:

Rooms Tested	No. Rooms
Total Bedrooms Tested	380
Total Living/Kitchen/Dining Areas Tested	226
Total Living Area Tested (BF-L06)	1
Total Kitchen/Dining Tested (BF-L06)	1
Total Spaces Tested	608

Whole Space For L/K/D against 2% ADF Target		%
Bedrooms Pass	380	100%
L/K/D Areas Pass	187	83%
Living Area Pass (BF-L06)	1	100%
K/D Pass (BF-L06)	1	100%
Total Pass	567	93%

Across the proposed development, 93% of the tested rooms are achieving Average Daylight Factors (ADF) above the BRE and BS 8206-2:2008 guidelines when Living/Kitchen/Dining spaces are assessed as whole rooms against a 2% ADF target.

11.7 Compensatory Measures

Compensatory measures have been incorporated into the design of the proposed development to offset reduced daylight performance in a number of bedrooms and LKDs. These measures are summarised as follows:

- 68.7% of the apartment units have a floor area greater than the minimum floor area requirements. Note, larger apartments make it more difficult to achieve the recommended daylight levels.
- 51.5% of the apartment units are dual aspect which is above the 50% minimum requirement. As a result, more apartment units than the recommended minimum will achieve quality daylight from dual-aspect orientations.
- All apartment units have a balcony and although the provision of a private balcony has a negative impact on internal daylight levels, this is offset by the provision of private amenity space which was deemed of critical importance to the future occupants by the design team.
- 22.4% of the overall Knockrabo development lands are provided as public open space, well in excess of the minimum requirements.
- An additional 50% of communal open space above the minimum requirements is proposed across the development, including landscaped courtyards and a roof top terrace with views over Dublin

The incorporation of the above compensatory measures more than offset the reduced daylight performance when the proposed development as a whole is considered.

11.8 Alternative ADF Target for Combined Living, Kitchen and Dining Spaces

As previously stated in Section 10.2, the BRE guide does not provide explicit guidance for an open space that is a combination of Living/Kitchen/Dining (L/K/D) functions. In addition, a separate document the “*BS 8206-2:2008: Lighting for Buildings - Part 2: Code of Practice for Daylighting*” focuses on internal daylighting performance and states:

“Where one room serves more than one purpose, the minimum average daylight factor should be that for the room type with the highest value. For example, in a space which combines a living room and a kitchen the minimum average daylight factor should be 2%.”

Although the above target is referenced within BS 8206-2:2008, it also states, “*The aim of the standard is to give guidance to architects, builders and others who carry out lighting design. It is recognised that lighting is only one of many matters that influence fenestration. These include other aspects of environmental performance (such as noise, thermal equilibrium and the control of energy use), fire hazards, constructional requirements, the external appearance and the surroundings of the site. The best design for a building does not necessarily incorporate the ideal solution for any individual function. For this reason, careful judgement should be exercised when using the criteria given in the standard for other purposes, particularly town planning.*”

In this context, the living area has been treated as the main activity, with the design constraint of the kitchen being placed at the back of the space. This design decision is understandable as the kitchen area is classed as a “non-habitable transient space” because their functional significant purpose is only to serve as food preparation and not as a long-term sitting area. Additionally, not every space within a commercially viable apartment development can be in direct connection with an exterior elevation, making the kitchen the obvious choice for this position given that it is a transient space that will require supplementary electric lighting. This is strong evidence that the 1.5% average daylight factor is the appropriate target on this basis.

As stated in Section 2.1.14 of the BRE guide: “*Non-daylit internal kitchens should be avoided wherever possible, especially if the kitchen is used as a dining area too. If the layout means that a small internal galley-type kitchen is inevitable, it should be directly linked to a well daylit living room*”.

Ireland is currently in the midst of a widely recognised housing crisis with a need for quality domestic dwellings. This puts a premium on the number of properties to help overcome the national issue. Modern architectural design maximises the space function by creating open Living/Dining/Kitchen areas. Where previously solid partition walls may have existed to separate these functions, they are now removed to help maximise an open space that creates a more flexible and larger feeling habitable environment.

Therefore, where a kitchen may have been closed off into a cellular space with no access to daylight, the kitchen can now take advantage of daylight distribution from the adjoining living/dining area. Kitchen environments will still typically rely on artificial light, primarily for detail and safety precautions whilst preparing meals, but with this open layout form they will capture daylight that previously would not be available and which will help reduce artificial lighting needs at suitable times. This in turn helps to reduce electrical energy consumption.

With the kitchens positioned at the back of the space where artificial lighting will typically be required, then aspiring to achieve daylight contribution should be seen as the goal and not measuring it to fixed requirements. As the kitchens will be classed as a “non-habitable transient spaces”, the daylight benefit is primary to the habitable spaces of the Living and Dining areas.

The Living/Kitchen/Dining spaces have also been assessed as whole rooms against an alternative 1.5% ADF target. In addition to complying with further Irish Design Standards for New Apartments such as the provision of balconies (which reduce daylight within apartments as noted within the BRE guidelines) as well as the layout of the apartments with respect to Kitchens, the 1.5% ADF target is noted as the more appropriate target. Although the design target value is lower, this is compensated with a much higher valued outdoor private amenity provision which is noted to be a very desirable commodity for occupants to benefit their connection to the outdoors.

The following table summarises the overall compliance rate across the development based on an alternative ADF target of 1.5% for combined Living, Kitchen and Dining areas. Therefore, when Living/Kitchen/Dining spaces are assessed as whole rooms against a 1.5% ADF target, a 98% compliance rate is achieved across all tested rooms within the proposed development.

Whole Space For L/K/D against 1.5% ADF Target		%
Bedrooms Pass	380	100%
L/K/D Areas Pass	216	96%
Living Area Pass (BF-L06)	1	100%
K/D Pass (BF-L06)	1	100%
Total Pass	598	98%

12 Conclusion

The following can be concluded based on the studies undertaken:

12.1 Daylight Analysis of Existing Buildings

This study considers the proposed scheme and the impact it will have on existing neighbouring dwellings adjacent to the development site. The BRE Guide states that if the VSC results are greater than either 27% or 0.8 times their former value (that of the existing situation) there will be negligible impact on the existing adjacent properties. Of the 45 points tested 96% (43 points) comply with the BRE recommendations.

Therefore the proposed development will have a negligible adverse impact on the adjacent buildings outside of the wider development.

For the adjacent Blocks A, B, C and D in Knockrabo Phase 1 which are a part of the wider development, an ADF analysis was undertaken to determine the impact the proposed development has on these blocks. The BRE guide states that *‘Use of the ADF for loss of light to existing buildings is not generally recommended. However, there are some situations where meeting a set ADF target value with the new development in place could be appropriate as a criterion for loss of light:’*

“Point F8 (i) ‘where the existing building is one of a series of new buildings that are being built one after the other, and each building has been designed as part of a larger group.’”

As such, since the construction details for the Knockrabo Phase 1 (Plans, Elevations & Sections) were available and are part of the wider development, ADF calculations were generated for the neighboring development with the proposed scheme in place.

The proposed development has no impact on the apartment units tested in Block A & B which continue to exceed the BRE guidelines for internal daylighting. The proposed development has a negligible adverse impact on the existing units in Block C & D as only 1 room out of 42 rooms tested has a resultant ADF below the BRE recommended guidelines with the proposed development in place.

12.2 Shadow Analysis

The shadow analysis illustrates different shadows being cast at three key times of the year (March 21st, June 21st and December 21st) for the existing scenario and with the proposed development in place.

The images indicate that the permitted dwellings on the East side of the project are receiving additional shading from the proposed development during late afternoon/evening of March

(1400-1600) and in December (1400) with very minimal shading perceived during the late afternoon/evening in June (1600-1800).

With regards to the existing houses on Mount Anville Road, no additional shading is detected as they sit to the south of the development site.

Taking all of the above into account, the overall impact of overshadowing can be classed as a minor adverse impact, especially since the permitted development is Phase 1 of the Knockrabo development.

12.3 Sunlight to Existing and Proposed Amenity Spaces

As outlined in Section 3.3.17 of the BRE Guide, 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 the 21st of March.

Existing Gardens Adjacent to the Proposed Development

On the 21st of March, the existing gardens will continue to receive the same amount of sunlight even with the proposed development, thus complying with BRE guidelines.

Permitted Amenity Areas Adjacent to the Proposed Development

On the 21st of March, the permitted amenity areas with the proposed development in place will continue to receive over 2 hours of sunlight on at least 63% of their former value, thus exceeding BRE recommendations.

Proposed Amenity Areas

On the 21st of March, the proposed private communal amenity spaces within the development will receive over 2 hours of sunlight on 91% of their combined area, thus exceeding BRE recommendations.

On the 21st of March, the proposed public amenity spaces within the development will receive over 2 hours of sunlight on 99% of their combined area, thus exceeding BRE recommendations.

Overall, all amenity spaces assessed comply with BRE recommendations.

12.4 Annual Probable Sunlight Hours

Existing Buildings

The existing buildings adjacent to the development have not been assessed as they did not meet the required criteria.

Proposed Apartments

Within the BS 8206-2:2008 standard, when discussing annual probable sunlight hours regarding proposed developments, it is noted that:

“The degree of satisfaction is related to the expectation of sunlight. If a room is necessarily North facing or if the building is in a densely-built urban area, the absence of sunlight is more acceptable than when its exclusion seems arbitrary”.

This is also reflected in the correlating BRE guidance which notes:

“The BS 8206-2 criterion applies to rooms of all orientations, although if a room faces significantly north of due east or west it is unlikely to be met.”

The results of the APSH test note that 45% (160 of 352) of main living room windows tested are achieving 25% annual and 5% winter sunlight hours. The windows that do not meet this recommendation are as a result of their orientation, their courtyard position within this urban development and the provision of a balcony (refer to Section 11.7 Compensatory Measures). It can also be noted that in some cases all of these points are evidence to why a living room window did not achieve the recommended targets for sunlight.

12.5 Average Daylight Factors

Across the proposed development, 93% of the tested rooms are achieving Average Daylight Factors (ADF) above the BRE and BS 8206-2:2008 guidelines when Living/Kitchen/Dining spaces are assessed as whole rooms against a 2% ADF target.

With regards to internal daylighting, the Sustainable Urban Housing: Design Standards for New Apartments, Section 6.7 states the following:

“Where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to design constraints associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution.”

Compensatory measures have been incorporated in the design of the proposed development to offset reduced daylight performance in a number of bedrooms and LKDs. The floor areas of 68.7% of all apartments are more than 10% above the minimum area requirements set out within national policy and in addition, are provided with private amenity areas in the form of balconies. Taking both of these critical elements into consideration, the daylight results

achieved are to a high standard as both of these factors are generally a detractor to good daylight performance. Furthermore, the number of dual aspect units and both communal and public open space provisions are above minimum recommendations. The incorporation of these compensatory measures more than offset the reduced daylight performance when the proposed development as a whole is considered.

The Living/Kitchen/Dining spaces have also been assessed as whole rooms against an alternative 1.5% ADF target. In addition to complying with further Irish Design Standards for New Apartments such as the provision of balconies (which reduce daylight within apartments as noted within the BRE guidelines) as well as the layout of the apartments with respect to Kitchens, the 1.5% ADF target is noted as the more appropriate target. Although the design target value is lower, this is compensated with a much higher valued outdoor private amenity provision which is noted to be a very desirable commodity for occupants to benefit their connection to the outdoors.

Therefore, when Living/Kitchen/Dining spaces are assessed as whole rooms against a 1.5% ADF target, a 98% compliance rate is achieved across all tested rooms within the proposed development.

12.6 Observations

It should be noted that the guidance in the BRE 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice' is not mandatory and the guide 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 the above, the site performs well in relation to the metrics considered in this report.

In addition, the BS 8206-2:2008 also states, *"The aim of the standard is to give guidance to architects, builders and others who carry out lighting design. It is recognised that lighting is only one of many matters that influence fenestration. These include other aspects of environmental performance (such as noise, thermal equilibrium and the control of energy use), fire hazards, constructional requirements, the external appearance and the surroundings of the site. The best design for a building does not necessarily incorporate the ideal solution for any individual function. For this reason, careful judgement should be exercised when using the criteria given in the standard for other purposes, particularly town planning."*

The approach within this report is further supported by the national policy guidance noted in the Sustainable Urban Housing: Design Standards for New Apartments, Section 6.7 which states:

“Where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to design constraints associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution.”

Taking all of the above information into account, overall the results demonstrate that the proposed development performs well when compared to the BRE recommendations in the BRE ‘Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice’ by Paul Littlefair, 2011 sometimes referred to as BRE Digest 209 and the “BS 8206-2:2008: Lighting for Buildings - Part 2: Code of Practice for Daylighting”.

