

RESIDENTIAL SHD DEVELOPMENT @ CAPDOO CLANE

Sunlight, Daylight & Shadow Assessment (Impact Neighbours & Development Performance)

V3a



Executive Summary

This report examines the impact the proposed Development will have on neighbours. We will also examine how the proposed development performs in terms of light. The report is, in accordance with "Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice" and BS 8206 Lighting for Buildings, Part 2: Code of Practice for Daylighting.

It should be noted at the outset that the BRE document sets out in its introduction that:

"Summary Page . . . It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location."

" 1.6 . . . The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design. . . . "

Change/Impact to existing buildings in the adjoining residential areas

- Since the proposed development generally sits below the 25° angle tested at 1.6m above ground level it complies with the BRE guidelines rule of thumb method and is unlikely to have a substantial effect on either the diffuse skylight or direct sunlight to neighbours and is compliant with the same.
- **Supplementary check of nearest residential properties likely to be impacted show that:**
 - **Skylight- VSC**– All tested windows pass the relevant VSC checks.
 - **Sunlight APSH & WPSH** – All tested windows pass the Annual APSH & Winter WPSH checks.

Performance of the proposed design

- **Light Distribution ADF** – (average daylight factor) for all but one (*which is very marginal*) tested rooms comply with the relevant requirements.
 - The development shows excellent overall ADF results.
 - The Average ADF for all living rooms is 2.1% and for bedrooms 2.4% in all blocks tested.
 - This is well in excess of the minimum requirements.
- **Shadow/Sunlight:** The majority of the provided amenity spaces generally pass the BRE requirement relating to the area receiving 2 hours of sunlight on the 21st of March > 50% which is within the BRE 80% careful layout design for apartments.
 - Shared amenity spaces receive excellent sunlight AB = **83%** and Blocks C1, 2 & 3 = **77%**

The application complies with the recommendations and guidelines of Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice (BRE 2011) and BS 8206 Lighting for Buildings and Part 2: Code of Practice for Daylighting.

This development has been successfully designed to maximise the occupant’s access to light and reduce the impact on “existing” buildings. As such the design has used the guidelines in the spirit they have been written and balanced the requirements of this report with other constraints to arrive at this design.

Introduction

Chris Shackleton Consulting (CSC) have been asked to examine the impact that the proposed development will have on the existing neighbouring properties. The proposed development consists of housing and apartment buildings. We have also been asked to examine how the proposed development performs in terms of light.

This analysis has been carried out in accordance with the recommendations of Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice (BRE 2011) and BS 8206 Lighting for Buildings and Part 2: Code of Practice for Daylighting.

All references quoted in this report are from BRE document “Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice – Second Edition – 2011 (BR 209) by Paul Littlefair” unless specifically noted otherwise.

Preliminary Overview

The aerial view shows the context for the site and the closest neighbouring window groups.

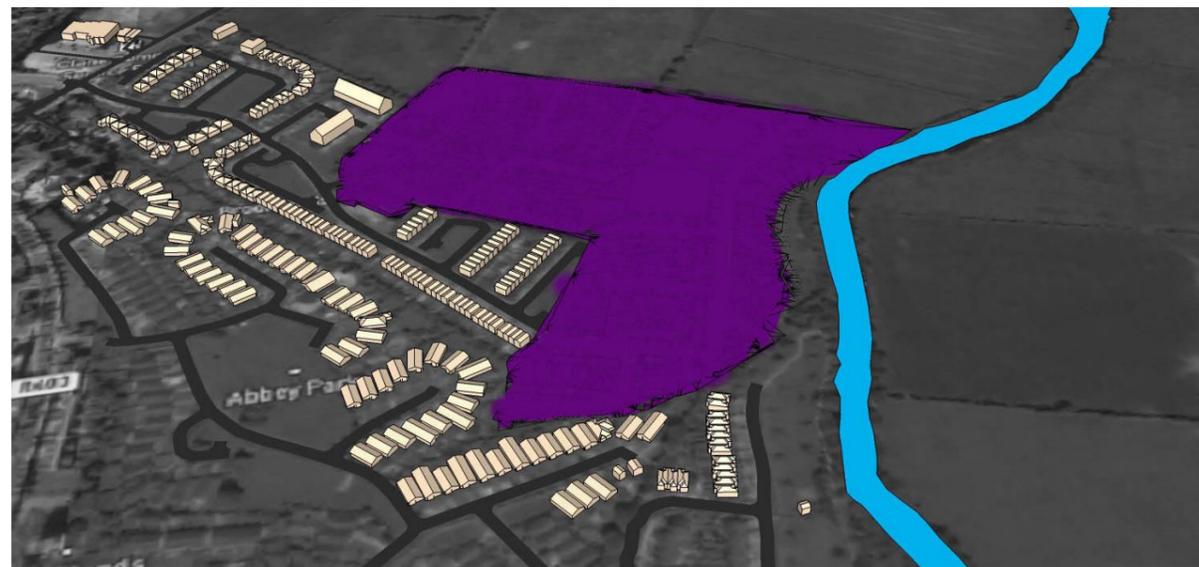


Google Earth extract © Google 2020

Design Model

A 3D model of the proposed development and the surrounding neighbouring properties was provided by the Architect. These had been modelled from survey information and drawings provided in plan, elevation and section formats. The model was geo-referenced to its correct location and an accurate solar daylight system was introduced. Here “Cream” indicates surrounding environment, “Purple” the existing development (greenfield), “Blue” this proposal.

The analysis is based on the information provided.



Existing Model



Proposed Model

Scope of this Report

We have been asked to address the following specific items in this report and our scope is limited to the same:

Impact on Existing Neighbours

In this document we will assess the potential impact of the proposed development on the neighbouring residential houses.

Given that the proposal is considerably offset from any surrounding buildings we shall apply the simplified tests based on a 25 degree section, which relates directly to an VSC of 27% .

Development Performance

For the proposed development we will examine the performance of the development under the following headings:

- Light distribution Average Daylight Factor – ADF – All habitable rooms
- Sunlight/Shadow performance proposed shared and private (balcony) amenity spaces

When examining the internal performance of the development we note that the layout and rooms follow similar design principles floor to floor. When testing the blocks performance, we have chosen to test the lowest residential floor for each block to provide a good representative indication of the overall building performance.

Impact on neighbours

Adjacent Properties - Light from the Sky impact on neighbouring properties

Tests were carried out to establish the quantity and quality of skylight (daylight) available to a room's windows. Locations tested are based on guideline recommendations for the closest facades which have windows with potential for impact. There is a simplified 25° rule of thumb which we can apply to for skylight impact on a development which is well distant from the surrounding neighbours.

This is detailed under clause 2.2.5

2.2.5 a modified form of the procedure adopted for new buildings can be used to find out whether an existing building still receives enough skylight. First, draw a section in a plane perpendicular to each affected main window wall of the existing building (Figure 14). Measure the angle to the horizontal subtended by the new development at the level of the centre of the lowest window. If this angle is less than 25° for the whole of the development, then it is unlikely to have a substantial effect on the diffuse skylight enjoyed by the existing building. If, for any part of the new development, this angle is more than 25°, a more detailed check is needed to find the loss of skylight to the existing building. Both the total amount of skylight and its distribution within the building are important.

Adjacent Properties - Sunlight into living spaces

Tests for the amount of sunlight that windows to living room. The same simplified 25° rule of thumb applies to Sunlight as it does for Skylight.

This is detailed under clause 3.2.2.

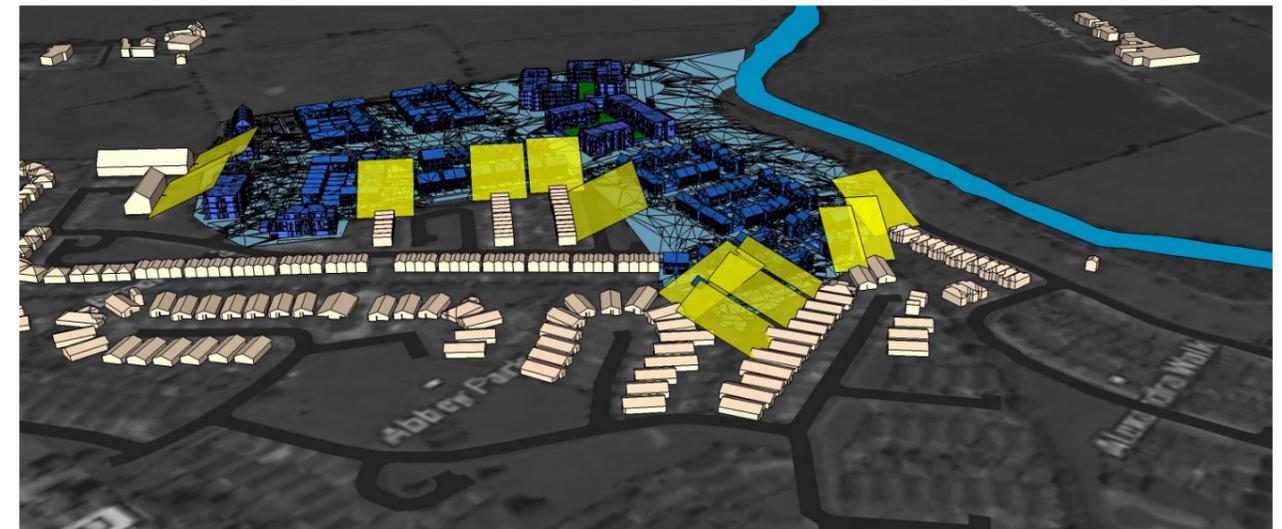
3.2.2 Obstruction to sunlight may become an issue if:

** some part of a new development is situated within 90° of due south of a main window wall of an existing building (Figure 27)*

** in the section drawn perpendicular to this existing window wall, the new development subtends an angle greater than 25° to the horizontal measured from the centre of the lowest window to a main living room (Figure 14).*

We have looked at potential impact to all neighbouring residential properties.

In each case test planes were inserted aligned with the facing facades of the surrounding building and offset 1.6m AGL. Any locations where the proposed building break these planes would be areas in need of additional investigation.



Multiple sectional planes testing if the proposed development impacts the relevant 25° planes



Overview of section planes

- The proposed development sits well below practically all of the 25° planes (yellow). To the South a small part of the roof of one of the houses just crosses this plane but it is very localised and is unlikely to constitute any impact.
- For the avoidance of doubt a standard analysis is completed for the façade of the neighbouring houses 7 .. 9 Abbey Park Grove.
- Additionally, we have also provided results for Block A & B Brookland Apartments which are the only other neighbours adjacent to apartments.

Supplementary Analysis Adjacent Properties – Light from the Sky impact on neighbouring properties

Tests were carried out to establish the quantity and quality of skylight (daylight) available to a room's windows. Locations tested are based on guideline recommendations for the closest facades which have windows with potential for impact.

We have investigated this impact under clause 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.

2.2.6 Any reduction in the total amount of skylight can be calculated by finding the VSC at the centre of each main window. In the case of a floor-to-ceiling window such as a patio door, a point 1.6 m above ground (or balcony level for an upper storey) on the centre line of the window may be used. For a bay window, the centre window facing directly outwards can be taken as the main window. If a room has two or more windows of equal size, the mean of their VSCs may be taken. The reference point is in the external plane of the window wall. Windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed. . . .

Tabulated results

Skylight to habitable rooms						
VSC						
Report	Check > 27% or ratio > 0.8					
Ref	Floor	Window	Existing	Proposed	Ratio	Result
AbbeyPkGve	00-GFL	W7	38.0	36.3	0.95	Pass
AbbeyPkGve	00-GFL	W8	38.8	33.7	0.87	Pass
AbbeyPkGve	00-GFL	W9	37.4	33.8	0.91	Pass
BrooklandA	00-GFL	W1	39.3	35.8	0.91	Pass
BrooklandB	00-GFL	W1	39.1	33.7	0.86	Pass

Note: When the proposed value exceeds the minimum requirement the ratio check is not required, and the result is coloured grey.

As expected from the 25° test the proposed VSC for all tested windows was well greater than 27% and complies with the requirements.

Supplementary Analysis Adjacent Properties – Sunlight into living spaces

Tests for the amount of sunlight that windows to living room and/or conservatory can receive over both annual and winter periods.

3.2.3 To assess loss of sunlight to an existing building, it is suggested that all main living rooms of dwellings, and conservatories, should be checked if they have a window facing within 90° of due south. . . .

3.2.11 . . . 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.

While not all windows relate to living rooms, we have for completeness tested all of them. Note only windows which face within 90° of due South require testing and those that do not, are notionally labelled as “North” in the table below.

Tabulated results

Sunlight on windows to living room spaces check											
Annual - 25% and Winter - 5%											
Design		Check > 25% or ratio > 0.8					Check > 5% or ratio > 0.8				
Ref	Floor	Window	Existing	Proposed	Ratio	Result	Existing	Proposed	Ratio	Result	
AbbeyPkGve	00-GFL	W7	68.5	66.0	0.96	Pass	25.6	25.6	1.00	Pass	
AbbeyPkGve	00-GFL	W8	62.7	54.5	0.87	Pass	22.9	22.8	0.99	Pass	
AbbeyPkGve	00-GFL	W9	North	North		Pass	North	North		Pass	
BrooklandA	00-GFL	W1	77.0	72.4	0.94	Pass	30.7	29.7	0.97	Pass	
BrooklandB	00-GFL	W1	76.5	66.6	0.87	Pass	30.3	20.4	0.67	Pass	

Note: When the proposed value exceeds the minimum requirement the ratio check is not required, and the result is coloured grey.

Once again, the impact on sunlight is minimal and fully compliant with the guidelines.

Since the proposed development generally sits below the 25° angle tested at 1.6m above ground level the proposed development complies with the BRE guidelines rule of thumb method and is unlikely to have a substantial effect on either the diffuse skylight or direct sunlight to neighbours and is compliant with the same.

No further analysis is required. However we have also completed a supplementary check on 7..9 Abbey Park Grove and the neighbouring residential houses closest to the apartment blocks (*Blocks A & B Brooklands*) the results of these concur with 25° check.

- Proposed Skylight VSC exceeds 27% and is compliant with the BRE guidelines
- Impact on Annual Probable Sunlight Hours Annual APSH & Winter WPSH levels are also fully compliant with the BRE guidelines

Summary - Adjacent Properties

Neighbouring properties will generally not be affected by the proposed development and the impacts on Skylight, Sunlight and Shadow have been tested in accordance with the best practice guidelines.

Change/Impact to existing buildings in the adjoining residential areas

- Since the proposed development generally sits below the 25° angle tested at 1.6m above ground level it complies with the BRE guidelines rule of thumb method and is unlikely to have a substantial effect on either the diffuse skylight or direct sunlight to neighbours and is compliant with the same.
- **Supplementary check of nearest residential properties likely to be impacted show that:**
 - **Skylight- VSC**– All tested windows pass the relevant VSC checks.
 - **Sunlight APSH & WPSH** – All tested windows pass the Annual APSH & Winter WPSH checks.

The potential impact of the proposed development on neighbours complies with the requirements of “Site layout planning for daylight and sunlight a guide to good practice Second Edition” - 2011 by Paul J Littlefair - BR209

Development Performance

Development Performance - Average Daylight Factor - ADF

Internal light distribution within a room is examined by testing ADF (Average Daylight Factor) against pre-defined parameters. Calculation of average daylight factor is based the BRE guidance document BR 209 and the referenced *BS 8206-2:2008 Lighting for buildings – Part 2: Code of practice for daylighting*.

This is defined under **Clause 2.11.3**

Daylight Factor

Ratio of illuminance at a point on a given plane due to light received from a sky of known or assumed luminance distribution, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky [BS 6100-7:2008, 59011]

Defined in the **BRE 209 Glossary (similarly in the BS code Clause 2.11.4 and 5.5)**

Average daylight factor:

Ratio of total daylight flux incident on the working plane to the area of the working plane, expressed as a percentage of the outdoor illuminance on a horizontal plane due to an unobstructed CIE standard overcast sky. Thus a 1% ADF would mean that the average indoor illuminance would be one hundredth the outdoor unobstructed illuminance

The average daylight factor (see 2.11.4) is used as the measure of general illumination from skylight. It is considered good practice to ensure that rooms in dwellings and in most other buildings have a predominantly daylit appearance. In order to achieve this the average daylight factor should be at least 2%.

If the average daylight factor in a space is at least 5% then electric lighting is not normally needed during the daytime, provided the uniformity is satisfactory (see 5.7 BS or 2.1.8 BRE 209). If the average daylight factor in a space is between 2% and 5% supplementary electric lighting is usually required. Values greater than 6% might suggest that the room has too much daylight.

- For the purposes of the calculation of daylight factor in this standard, it is assumed that the sky has the luminance distribution of the standard overcast sky.
- Direct and reflected sunlight are excluded from all values of illuminance.

This Code also provides under **Clause 5.6** guidance for

Minimum values of average daylight factor in dwellings

Even if a predominantly daylit appearance is not achievable in a dwelling, it is recommended that the average daylight factor should be at least the relevant value as given in Table 2 or clause 2.1.8 BRE 209

Table 2 - Minimum average daylight factor

Room type	Minimum Average daylight factor %
Bedrooms	1
Living rooms	1.5
Kitchens	2

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%.

In accordance with BRE 209 & BS 8206-2 computations are based on the standard CIE (Commission Internationale de l'Eclairage) overcast sky model. With the exclusion of direct and reflected sunlight from the computation of room average daylight factor it may be considered as worst-case scenario.

Light distribution was computed by modelling the internal configuration of rooms and windows placed within the existing topography and the adjacent buildings and then running a radiance analysis on the same. This analysis was based on a standard working plane for residential of 0.850m and results are provided in terms of Average Daylight Factor for selected rooms. See code for definitions.

The following reflectance/transmittance values were used for the analysis
These are generally from BS 8206 Part 2 - tables A.1 & A.2

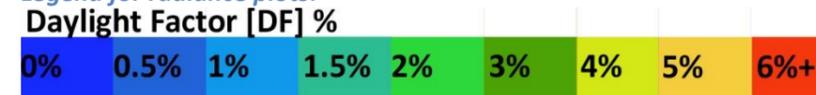
Surface	Description	Reflectance	
External Plane	Earth	0.2	
External Walls	Grey render / concrete	0.4	
Floor	Light Wood / cream carpet	0.4	
Internal Wall	Cream	0.7	
Ceiling	White	0.8	
Frame	Medium Grey	0.5	
Glass	Sealed double glazed unit	0.63	<Transmittance

We note that for apartment developments the majority of councils in Ireland and the UK accept the lower value of 1.5% assigned to living rooms to also include those with a small food preparation area (kitchen) as part of this space. The higher kitchen figure of 2.0% is more appropriate to a traditional house layout and room usage. The use of a reduced value accepted by Local Authorities is still compliant within the terms of the guidelines. This has been confirmed as acceptable and standard practice by the author Dr Paul Littlefair.

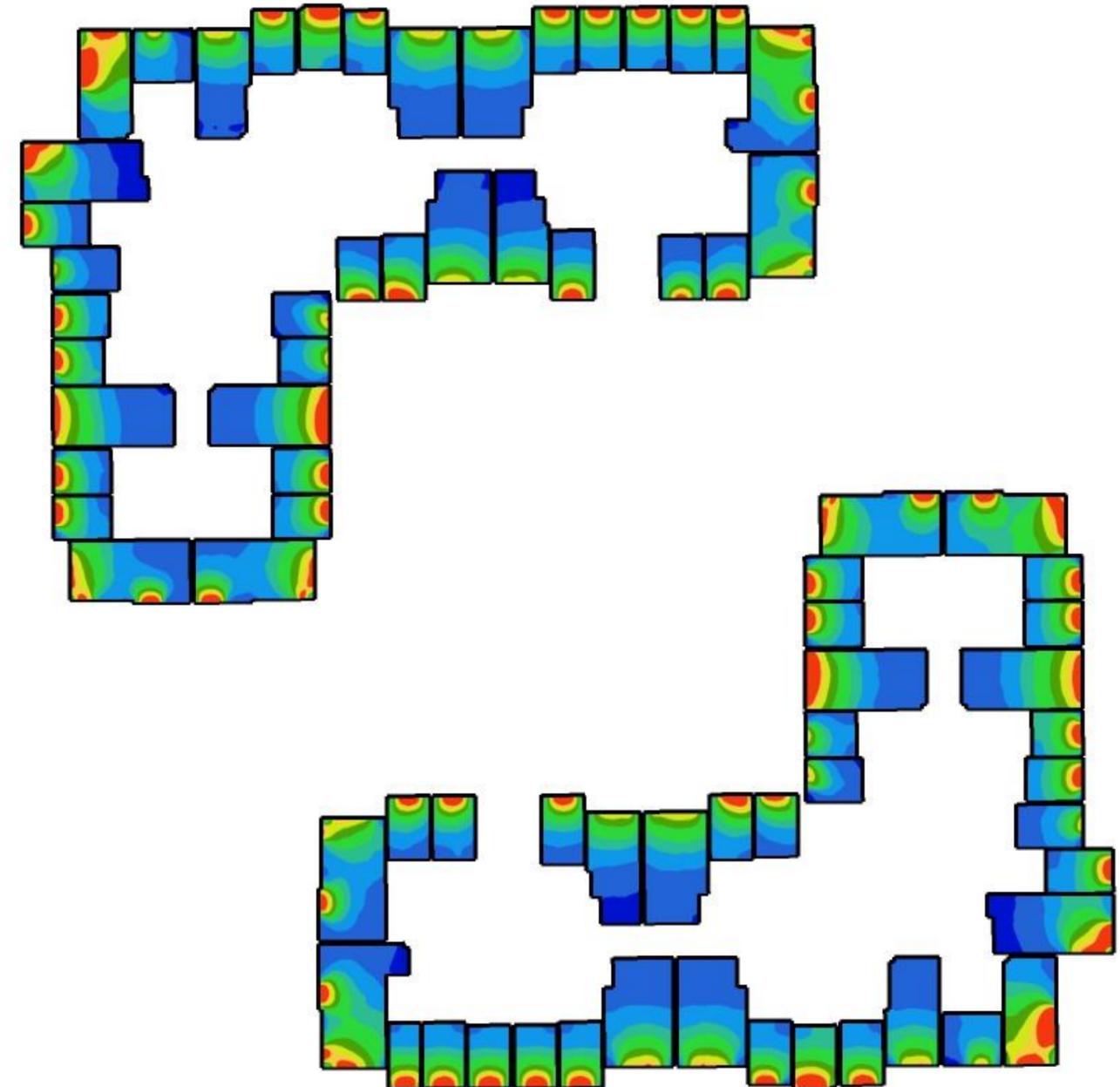
We have thus used the minimum values of **1.0%** for bedrooms and **1.5%** for the Living room spaces.

Block AB – Naming Convention – 1st Floor
 Lowest standard full residential floor

Legend for radiance plots:



Block AB - 1st Floor Analysis



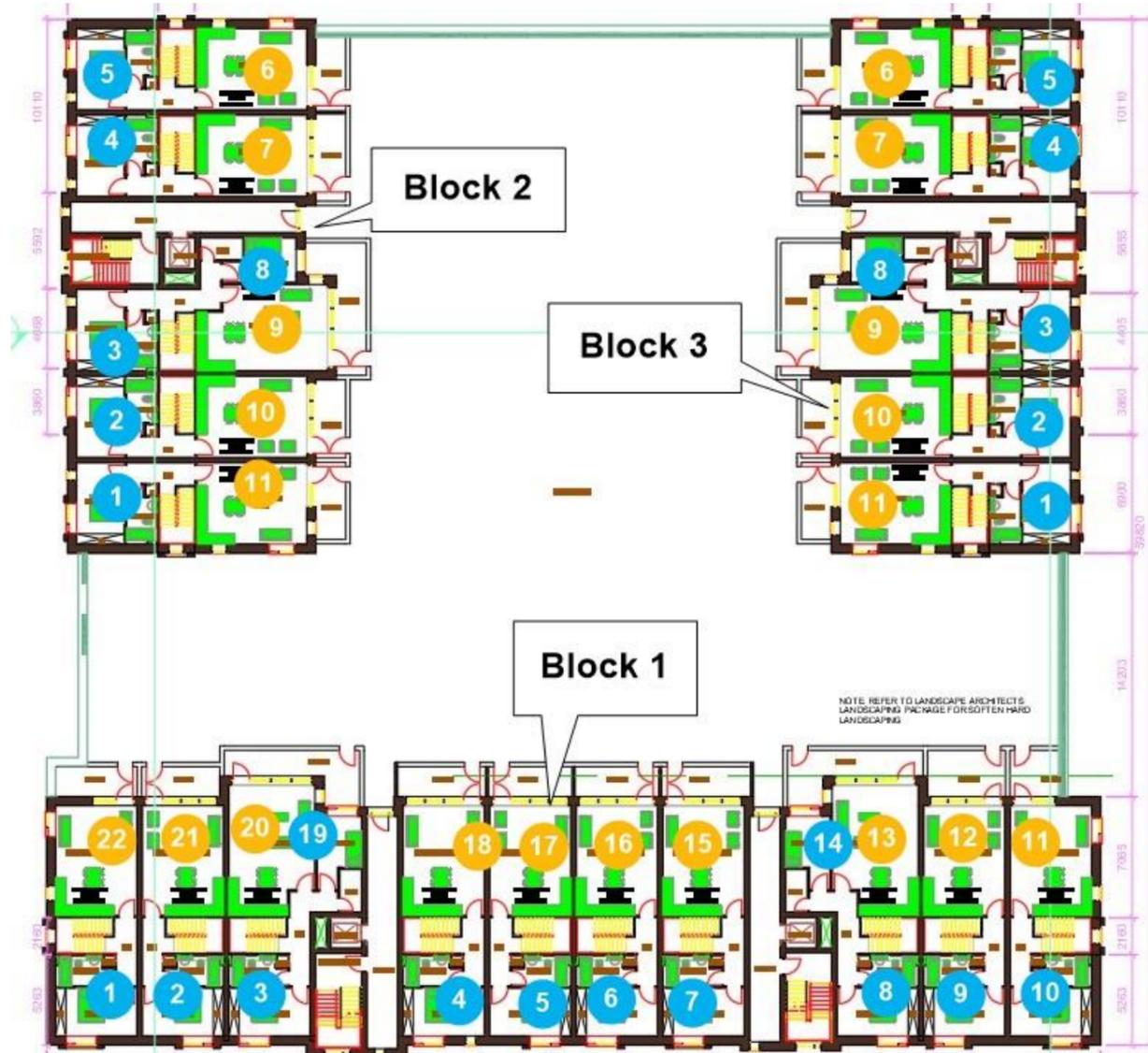
AB ₂ Average Daylight Factor					
For all habitable rooms					
ADF Values from radiance 3D model				Yes	
Room	Ref	Type	Min	ADF	Check
1	A01L	Living Room	1.5	2.2	Pass
2	A02	Bedroom	1.0	2.9	Pass
3	A03	Bedroom	1.0	2.5	Pass
4	A04	Bedroom	1.0	2.6	Pass
5	A05	Bedroom	1.0	2.6	Pass
6	A06	Bedroom	1.0	2.5	Pass
7	A07L	Living Room	1.5	1.5	Pass
8	A08L	Living Room	1.5	1.5	Pass
9	A09	Bedroom	1.0	2.3	Pass
10	A10	Bedroom	1.0	3.5	Pass
11	A11	Bedroom	1.0	2.4	Pass
12	A12L	Living Room	1.5	1.5	Pass
13	A13	Bedroom	1.0	1.4	Pass
14	A14L	Living Room	1.5	3.7	Pass
15	A15L	Living Room	1.5	1.9	Pass
16	A16	Bedroom	1.0	2.4	Pass
17	A17	Bedroom	1.0	1.4	Pass
18	A18	Bedroom	1.0	2.7	Pass
19	A19	Bedroom	1.0	2.9	Pass
20	A20L	Living Room	1.5	2.3	Pass
21	A21	Bedroom	1.0	2.7	Pass
22	A22	Bedroom	1.0	2.7	Pass
23	A23L	Living Room	1.5	2.9	Pass
24	A24L	Living Room	1.5	2.4	Pass
25	A25	Bedroom	1.0	2.6	Pass
26	A26	Bedroom	1.0	2.5	Pass
27	A27L	Living Room	1.5	2.4	Pass
28	A28	Bedroom	1.0	1.5	Pass
29	A29	Bedroom	1.0	1.4	Pass
30	A30	Bedroom	1.0	2.1	Pass
31	A31	Bedroom	1.0	2.7	Pass
32	A32L	Living Room	1.5	1.5	Pass
33	A33L	Living Room	1.5	1.5	Pass
34	A34	Bedroom	1.0	2.2	Pass
35	A35	Bedroom	1.0	2.3	Pass
36	A36	Bedroom	1.0	2.3	Pass
37	A37L	Living Room	1.5	1.9	Pass

AB ₂ Average Daylight Factor					
For all habitable rooms					
ADF Values from radiance 3D model				Yes	
Room	Ref	Type	Min	ADF	Check
38	B01L	Living Room	1.5	2.5	Pass
39	B02	Bedroom	1.0	2.9	Pass
40	B03	Bedroom	1.0	2.5	Pass
41	B04	Bedroom	1.0	2.6	Pass
42	B05	Bedroom	1.0	2.6	Pass
43	B06	Bedroom	1.0	2.5	Pass
44	B07L	Living Room	1.5	1.5	Pass
45	B08L	Living Room	1.5	1.5	Pass
46	B09	Bedroom	1.0	2.3	Pass
47	B10	Bedroom	1.0	3.6	Pass
48	B11	Bedroom	1.0	2.4	Pass
49	B12L	Living Room	1.5	1.5	Pass
50	B13	Bedroom	1.0	1.4	Pass
51	B14L	Living Room	1.5	3.7	Pass
52	B15L	Living Room	1.5	1.9	Pass
53	B16	Living Room	1.5	2.2	Pass
54	B17	Bedroom	1.0	1.2	Pass
55	B18	Bedroom	1.0	2.5	Pass
56	B19	Bedroom	1.0	2.7	Pass
57	B20L	Living Room	1.5	1.9	Pass
58	B21	Bedroom	1.0	2.4	Pass
59	B22	Bedroom	1.0	2.4	Pass
60	B23L	Living Room	1.5	2.0	Pass
61	B24L	Living Room	1.5	2.2	Pass
62	B25	Bedroom	1.0	2.6	Pass
63	B26	Bedroom	1.0	2.5	Pass
64	B27L	Living Room	1.5	2.4	Pass
65	B28	Bedroom	1.0	1.5	Pass
66	B29	Bedroom	1.0	1.4	Pass
67	B30	Bedroom	1.0	2.1	Pass
68	B31	Bedroom	1.0	2.7	Pass
69	B32L	Living Room	1.5	1.5	Pass
70	B33L	Living Room	1.5	1.4	Marginal
71	B34	Bedroom	1.0	2.2	Pass
72	B35	Bedroom	1.0	1.6	Pass
73	B36	Bedroom	1.0	2.2	Pass
74	B37L	Living Room	1.5	2.2	Pass

99% rooms (all but one which is marginal) comply with the BRE requirements for light distribution ADF

- Average ADF Living rooms: 2.0% Average ADF Bedrooms: 2.3%

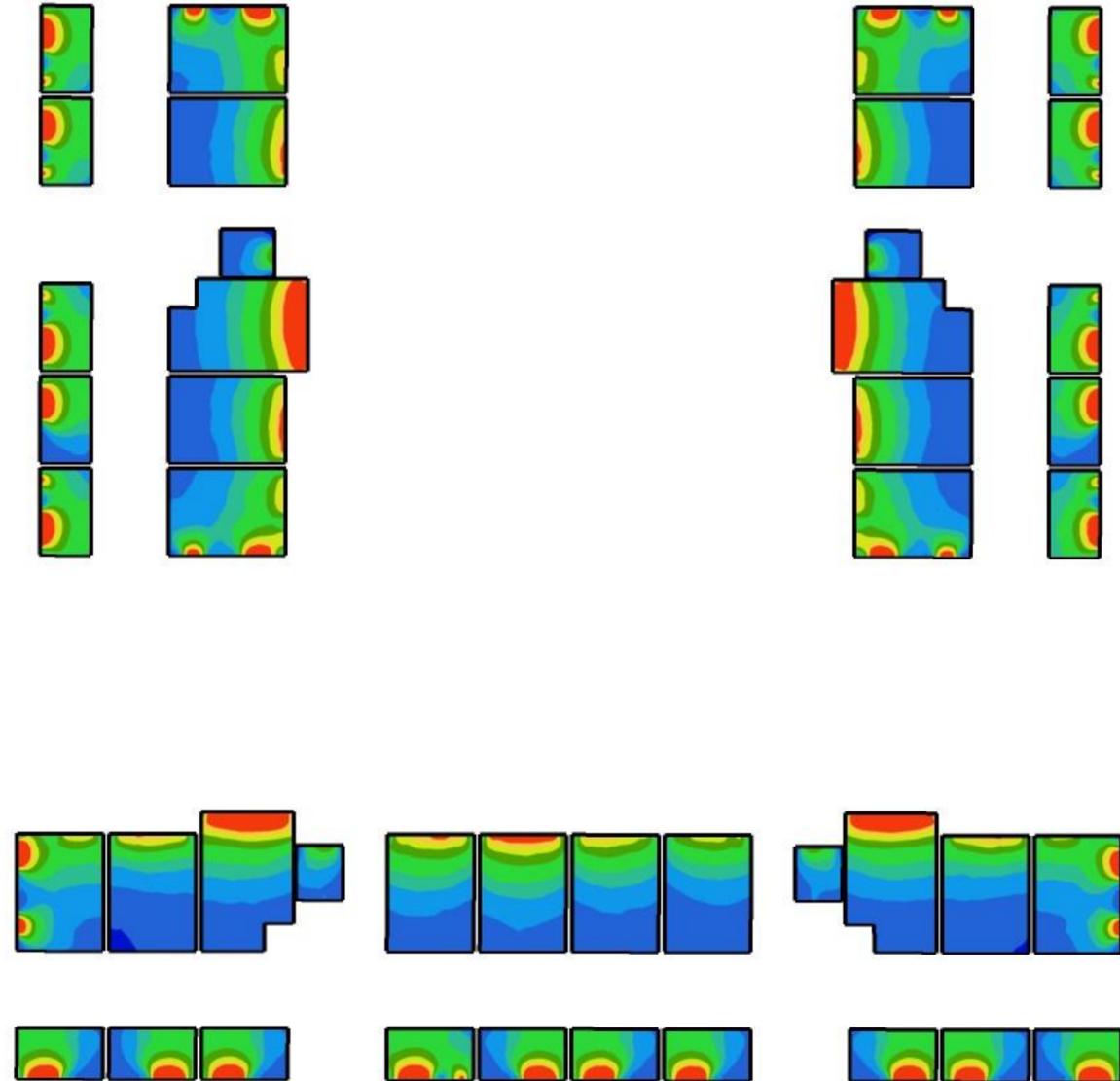
Block C - Naming Convention
 Lowest standard full residential floor



Legend for radiance plots:



Block C - 1st Floor Analysis



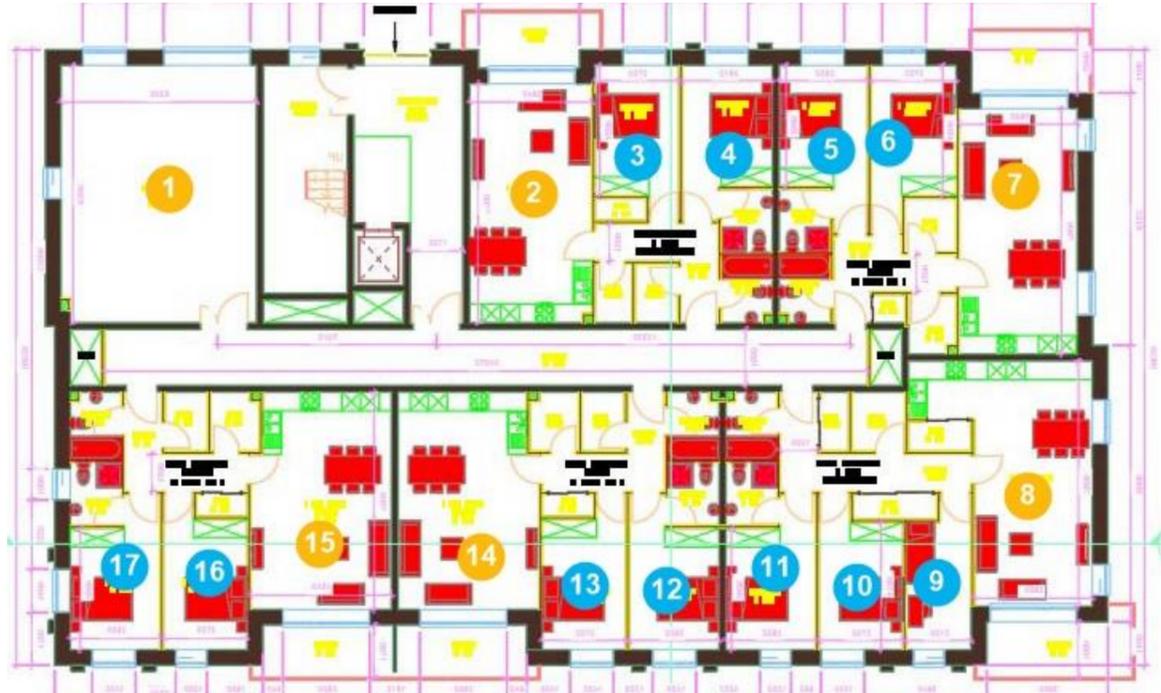
C ₂ Average Daylight Factor					
For all habitable rooms					
ADF Values from radiance 3D model				Yes	
Room	Ref	Type	Min	ADF	Check
1	C101	Bedroom	1.0	2.8	Pass
2	C102	Bedroom	1.0	2.7	Pass
3	C103	Bedroom	1.0	2.9	Pass
4	C104	Bedroom	1.0	3.4	Pass
5	C105	Bedroom	1.0	2.7	Pass
6	C106	Bedroom	1.0	2.8	Pass
7	C107	Bedroom	1.0	2.7	Pass
8	C108	Bedroom	1.0	2.9	Pass
9	C109	Bedroom	1.0	2.8	Pass
10	C110	Bedroom	1.0	2.8	Pass
11	C111L	Living Room	1.5	2.1	Pass
12	C112L	Living Room	1.5	1.5	Pass
13	C113L	Living Room	1.5	2.7	Pass
14	C114	Bedroom	1.0	1.4	Pass
15	C115L	Living Room	1.5	1.5	Pass
16	C116L	Living Room	1.5	1.7	Pass
17	C117L	Living Room	1.5	2.2	Pass
18	C118L	Living Room	1.5	1.9	Pass
19	C119	Bedroom	1.0	1.4	Pass
20	C120L	Living Room	1.5	2.8	Pass
21	C121L	Living Room	1.5	1.5	Pass
22	C122L	Living Room	1.5	2.3	Pass

C ₂ Average Daylight Factor					
For all habitable rooms					
ADF Values from radiance 3D model				Yes	
Room	Ref	Type	Min	ADF	Check
23	C201	Bedroom	1.0	3.2	Pass
24	C202	Bedroom	1.0	3.3	Pass
25	C203	Bedroom	1.0	3.3	Pass
26	C204	Bedroom	1.0	2.8	Pass
27	C205	Bedroom	1.0	3.2	Pass
28	C206L	Living Room	1.5	2.3	Pass
29	C207L	Living Room	1.5	1.9	Pass
30	C208L	Living Room	1.5	3.4	Pass
31	C209	Bedroom	1.0	1.2	Pass
32	C210L	Living Room	1.5	1.8	Pass
33	C211L	Living Room	1.5	2.5	Pass
34	C301	Bedroom	1.0	2.9	Pass
35	C302	Bedroom	1.0	2.6	Pass
36	C303	Bedroom	1.0	3.1	Pass
37	C304	Bedroom	1.0	3.2	Pass
38	C305	Bedroom	1.0	3.2	Pass
39	C306L	Living Room	1.5	2.5	Pass
40	C307L	Living Room	1.5	1.8	Pass
41	C308	Bedroom	1.0	1.2	Pass
42	C309L	Living Room	1.5	3.2	Pass
43	C310L	Living Room	1.5	1.9	Pass
44	C311L	Living Room	1.5	2.2	Pass

100% rooms comply with the BRE requirements for light distribution ADF

- Average ADF Living rooms: 2.2% Average ADF Bedrooms: 2.7%

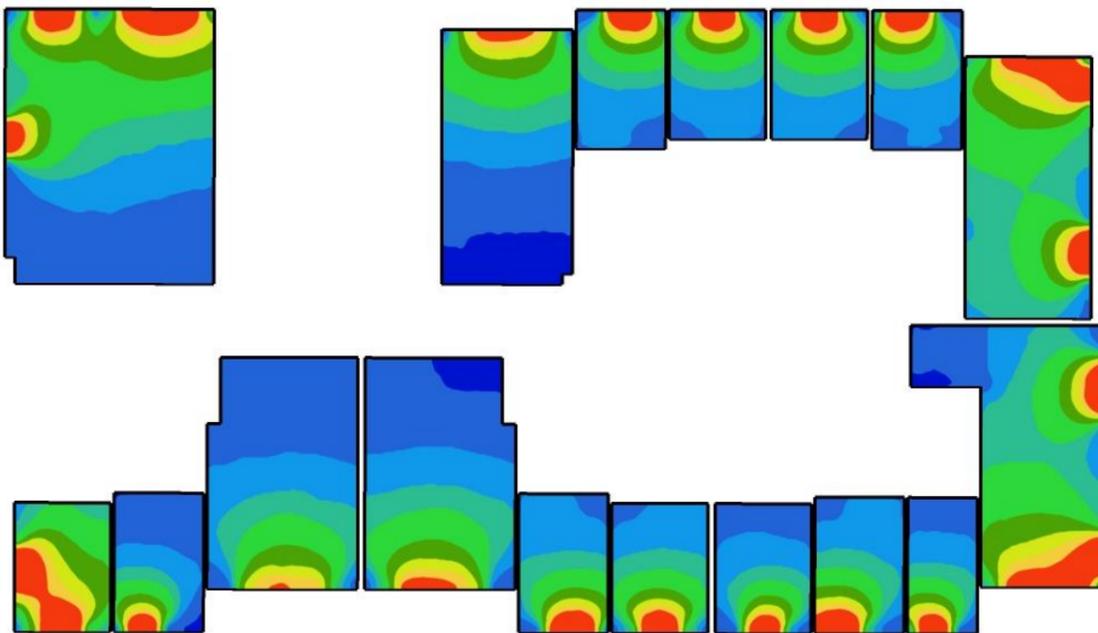
Block D – Naming Convention
GFL layout



Legend for radiance plots:



Block D – GFL Floor Analysis



D Average Daylight Factor					
For all habitable rooms					
ADF Values from radiance 3D model				Yes	
Room	Ref	Type	Min	ADF	Check
1	D01Com	Living Room	1.5	2.3	Pass
2	D02L	Living Room	1.5	1.5	Pass
3	D02	Bedroom	1.0	2.3	Pass
4	D03	Bedroom	1.0	2.3	Pass
5	D04	Bedroom	1.0	2.4	Pass
6	D05	Bedroom	1.0	2.2	Pass
7	D06L	Living Room	1.5	3.1	Pass
8	D07L	Living Room	1.5	2.8	Pass
9	D08	Bedroom	1.0	2.1	Pass
10	D09	Bedroom	1.0	2.4	Pass
11	D10	Bedroom	1.0	1.8	Pass
12	D11	Bedroom	1.0	2.4	Pass
13	D12	Bedroom	1.0	2.4	Pass
14	D13L	Living Room	1.5	1.6	Pass
15	D14L	Living Room	1.5	1.5	Pass
16	D15	Bedroom	1.0	1.7	Pass
17	D16	Bedroom	1.0	4.4	Pass

100% rooms comply with the BRE requirements for light distribution ADF

- Average ADF Living rooms: 2.1% Average ADF Bedrooms: 2.4%

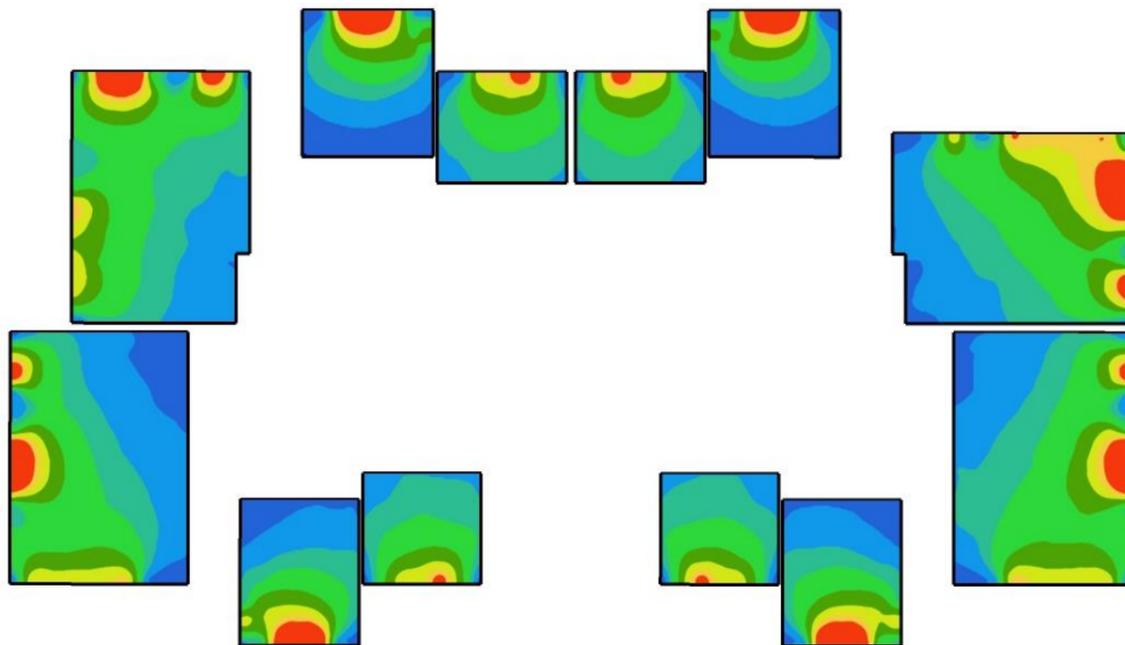
Block F – Naming Convention
1st Floor, 1st Residential over Creche



Legend for radiance plots:
 Daylight Factor [DF] %



Block F - 1st Floor Analysis

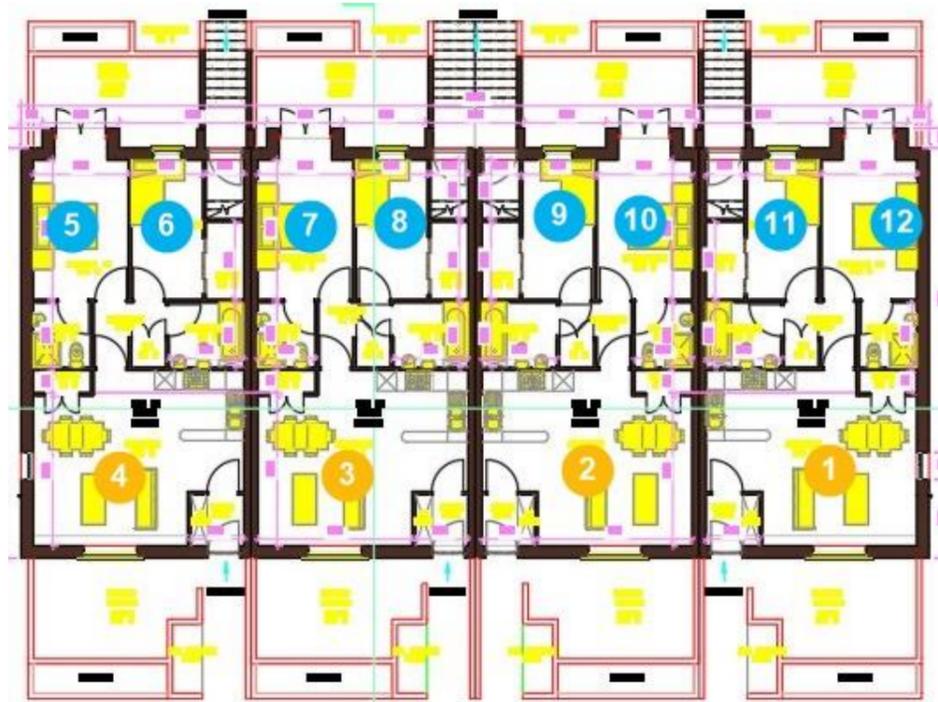


F Average Daylight Factor					
For all habitable rooms					
ADF Values from radiance 3D model				Yes	
Room	Ref	Type	Min	ADF	Check
1	F01L	Living Room	1.5	2.5	Pass
2	F02	Bedroom	1.0	2.5	Pass
3	F03	Bedroom	1.0	2.3	Pass
4	F04	Bedroom	1.0	2.3	Pass
5	F05	Bedroom	1.0	2.5	Pass
6	F06L	Living Room	1.5	2.3	Pass
7	F07L	Living Room	1.5	2.4	Pass
8	F08	Bedroom	1.0	2.2	Pass
9	F09	Bedroom	1.0	2.4	Pass
10	F10	Bedroom	1.0	2.4	Pass
11	F11	Bedroom	1.0	2.1	Pass
12	F12L	Living Room	1.5	2.8	Pass

100% rooms comply with the BRE requirements for light distribution ADF

- Average ADF Living rooms: 2.5% Average ADF Bedrooms: 2.3%

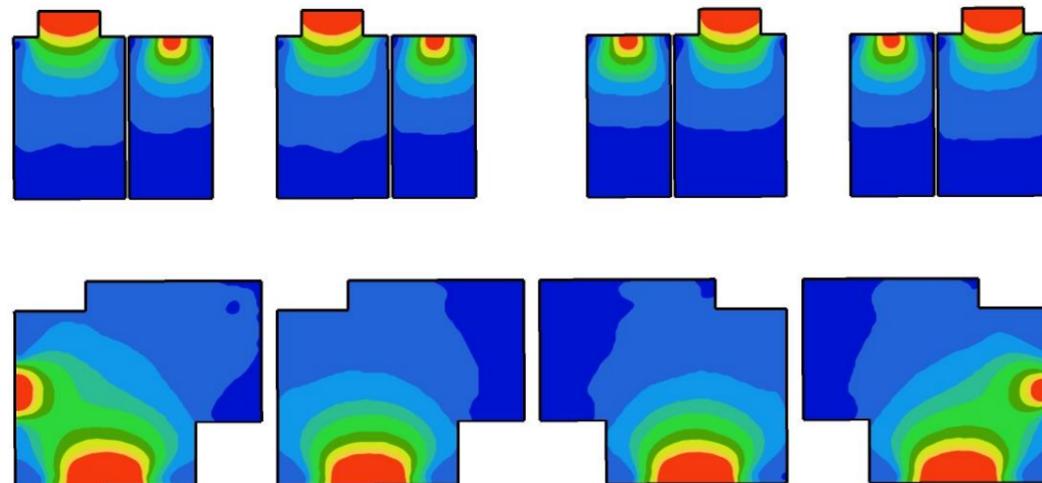
Block Duplex - Naming Convention
GFL layout



Legend for radiance plots:
Daylight Factor [DF] %



Block Duplex - GFL Floor Analysis



Dup ₂		Average Daylight Factor			
<i>For all habitable rooms</i>					
ADF Values from radiance 3D model				Yes	
		Type			
Room	Ref	Type	Min	ADF	Check
1	Dup-01L	Living Room	1.5	1.7	Pass
2	Dup-02L	Living Room	1.5	1.5	Pass
3	Dup-03L	Living Room	1.5	1.5	Pass
4	Dup-04L	Living Room	1.5	1.6	Pass
5	Dup-05	Bedroom	1.0	1.8	Pass
6	Dup-06	Bedroom	1.0	1.1	Pass
7	Dup-07	Bedroom	1.0	1.7	Pass
8	Dup-08	Bedroom	1.0	1.2	Pass
9	Dup-09	Bedroom	1.0	1.2	Pass
10	Dup-10	Bedroom	1.0	1.7	Pass
11	Dup-11	Bedroom	1.0	1.2	Pass
12	Dup-12	Bedroom	1.0	1.8	Pass

100% rooms comply with the BRE requirements for light distribution ADF

- Average ADF Living rooms: 1.6% Average ADF Bedrooms: 1.4%

ADF Check - Summary

ADF (average daylight factors) for all (*one very marginal*) tested rooms comply with the relevant requirements.

The development shows excellent overall ADF results.

And when examined in terms of all tested rooms in all blocks the **Average ADF** for all living rooms is **2.1%** and for bedrooms **2.4%**.

This is well in excess of the minimum requirements.

The proposed development complies with the requirements of the BRE guidelines in relation to ADF light distribution.

Development Performance - Shadow/Sunlight - Gardens and Open spaces

Tests for the availability of sunlight in amenity areas.

Shadow/Sunlight - Clause 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.

3.3.3 The availability of sunlight should be checked for all open spaces where it will be required. This would normally include:

- gardens, usually the main back garden of a house
- parks and playing fields
- children’s playgrounds
- outdoor swimming pools and paddling pools
- sitting out areas such as those between non-domestic buildings and in public squares
- focal points for views such as a group of monuments or fountains.

The amenities of the following properties were tested.

- Shared Amenity spaces to Blocks A & B and C1, 2, & 3
- Private Amenity Apartments
- Private Amenity Duplexes

We have tested the amenities relating to the rooms which have been evaluate previously namely:

- Apartments AB
- Apartments C1, 2, & 3
- Apartments D
- Apartments F
- Duplexes

In the case of spaces which open onto large, shared amenity spaces the results for these are shown in the tables below.

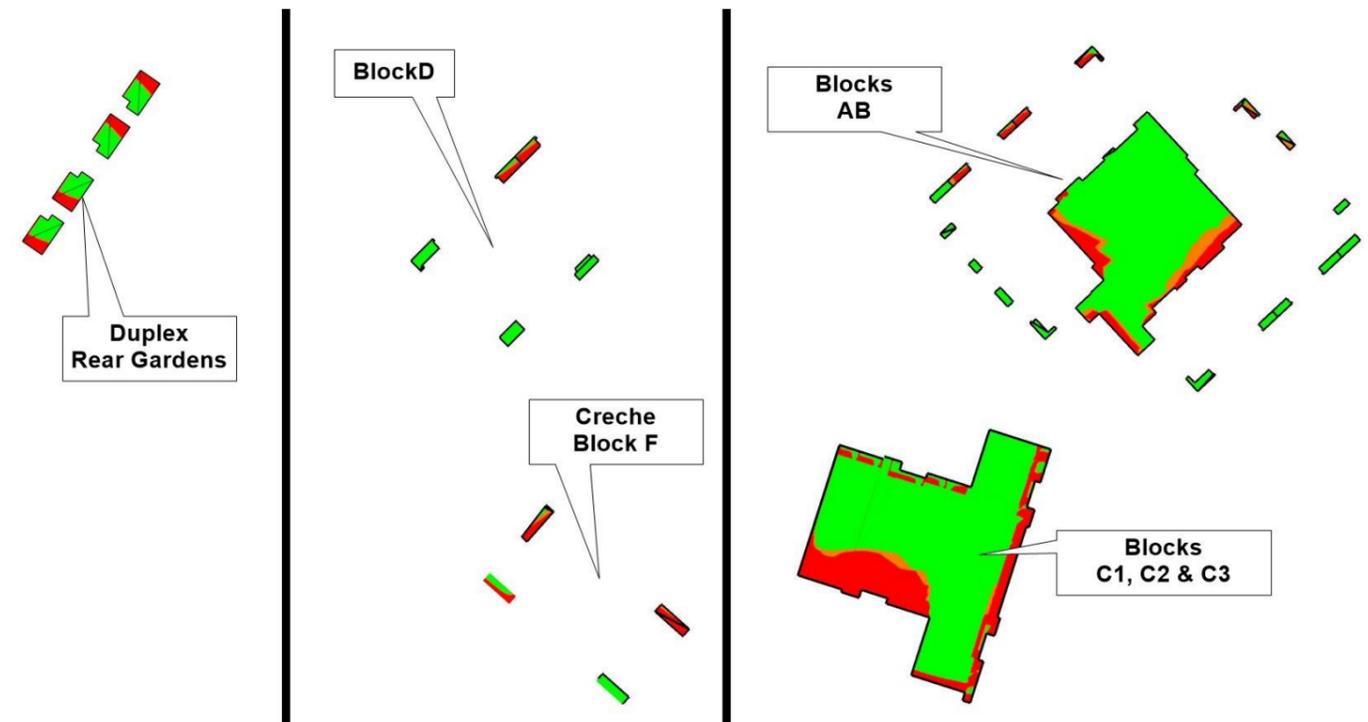
The guidelines accept the difficulty imposed by this requirement especially for larger apartment development and that it will not always be possible to have all apartments orientated to the sun. While it is preferred to have sunlight to balconies the guidelines are pragmatic in this regard.

The overall results are in line with the guidelines (4 out of 5) or 80% pass rate which is considered as “careful layout design”.

BRE 2-hour Shadow Plots

The graphic below indicates the areas which receive 2 hours of sunlight on the 21st March in accordance with the BRE guidelines.

- **Green** represents areas which exceed the 2-hour requirement - pass
- **Red** is less than the 2-hour requirement - fail
- **Orange** are marginal or borderline - just below the 2-hour requirement



Proposed

The results are tabulated below:

A & B Shadow / Sunlight Amenity					
>50% receives 2 hours of sunlight on 21st March)					
Block	Floor	Room	% 2hr Sunlight	Check	
A	01-1st	W1	92	Pass	
A	01-1st	W7	100	Pass	
A	01-1st	W8	100	Pass	
A	01-1st	W12	100	Pass	
A	01-1st	W14	100	Pass	
A	01-1st	W15	100	Pass	
A	01-1st	W20	43	Marginal	Additional 52% Marginal
A	01-1st	W23	27	Marginal	Additional 28% Marginal
A	01-1st	W24	See Shared Space	Pass	
A	01-1st	W27	See Shared Space	Pass	
A	01-1st	W31	See Shared Space	Pass	
A	01-1st	W32	See Shared Space	Pass	
A	01-1st	W37	See Shared Space	Pass	
B	01-1st	W1	31	.	North Additional 11% Marginal
B	01-1st	W7	5	.	North Additional 16% Marginal
B	01-1st	W8	17	.	North Additional 10% Marginal
B	01-1st	W12	17	.	North Additional 25% Marginal
B	01-1st	W14	100	Pass	
B	01-1st	W15	100	Pass	
B	01-1st	W20	100	Pass	
B	01-1st	W23	98	Pass	
B	01-1st	W24	See Shared Space	Pass	
B	01-1st	W27	See Shared Space	Pass	
B	01-1st	W31	See Shared Space	Pass	
B	01-1st	W32	See Shared Space	Pass	
B	01-1st	W37	See Shared Space	Pass	
AB	01-1st	Shared	83	Pass	<i>Podium apartments open to shared space AB</i>

85% of amenity spaces tested comply with the BRE requirements for Shadow.

The shared space for the 2 blocks AB shows that 83% of the total space is compliant with the BRE requirements well over the 50% minimum requirement.

C, D, F & Dup Shadow / Sunlight Amenity					
>50% receives 2 hours of sunlight on 21st March)					
Block	Floor	Room	% 2hr Sunlight	Check	
C	01-1st	Shared	74	Pass	<i>C Podium apartments open to shared space C</i>
D	00-GFL		N/A		
D	00-GFL	W2	100	Pass	
D	00-GFL	W7	100	Pass	
D	00-GFL	W8	100	Pass	
D	00-GFL	W14	29	.	Additional 15% Marginal
D	00-GFL	W15	18	.	Additional 14% Marginal
F	01-1st	W1	100	Pass	
F	01-1st	W6	48	Marginal	Additional 5% Marginal
F	01-1st	W7	14	.	Additional 21% Marginal
F	01-1st	W12	0	.	Additional 13% Marginal
Dup	00-GFL	W1	72	Pass	
Dup	00-GFL	W2	61	Pass	
Dup	00-GFL	W3	59	Pass	
Dup	00-GFL	W4	61	Pass	

77% of amenity spaces tested comply with the BRE requirements for Shadow

The shared space for the 3 blocks of C shows that 77% of the total space is compliant with the BRE requirements well over the 50% minimum requirement.

Please note that passing the BRE requirements does not imply that shadows will not be cast over an amenity space at all. Shadows which are transient by nature may not impact on the percentage of the space which receives 2 hours of sunlight on the 21st of March.

These results are generally compliant with the BRE guidelines and the Careful Design Layout for sunlight.

Conclusion

The majority of the provided amenity spaces generally pass the BRE requirement relating to the area receiving 2 hours of sunlight on the 21st of March > 50% which is within the BRE 80% careful layout design for apartments.

Shared amenity spaces receive excellent sunlight AB = 83% and Blocks C1, 2 & 3 = 77%

The tested spaces comply with the requirements of the BRE guidelines.

Summary – Development Performance

This report is in compliance with: "Site layout planning for daylight and sunlight a guide to good practice Second Edition - 2011 by Paul J Littlefair - BR209". It also references "BS 8206-2:2008 Lighting for buildings – Part 2: Code of practice for daylighting" as and where called for in the above BRE guidance document.

Performance of the proposed design

- **Light Distribution ADF** – (average daylight factor) for all but one (*which is very marginal*) tested rooms comply with the relevant requirements.
 - The development shows excellent overall ADF results.
 - The Average ADF for all living rooms is 2.1% and for bedrooms 2.4% in all blocks tested.
 - This is well in excess of the minimum requirements.
- **Shadow/Sunlight:** The majority of the provided amenity spaces generally pass the BRE requirement relating to the area receiving 2 hours of sunlight on the 21st of March > 50% which is within the BRE 80% careful layout design for apartments.
 - Shared amenity spaces receive excellent sunlight AB = **83%** and Blocks C1, 2 & 3 = **77%**

The application generally complies with the recommendations and guidelines of Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice (BRE 2011) and BS 8206 Lighting for Buildings, Part 2: Code of Practice for Daylighting.

Overall Summary

Change/Impact to existing buildings in the adjoining residential areas

- Since the proposed development generally sits below the 25° angle tested at 1.6m above ground level it complies with the BRE guidelines rule of thumb method and is unlikely to have a substantial effect on either the diffuse skylight or direct sunlight to neighbours and is compliant with the same.
- **Supplementary check of nearest residential properties likely to be impacted show that:**
 - **Skylight- VSC**– All tested windows pass the relevant VSC checks.
 - **Sunlight APSH & WPSH** – All tested windows pass the Annual APSH & Winter WPSH checks.

Performance of the proposed design

- **Light Distribution ADF** – (average daylight factor) for all but one (*which is very marginal*) tested rooms comply with the relevant requirements.
 - The development shows excellent overall ADF results.
 - The Average ADF for all living rooms is 2.1% and for bedrooms 2.4% in all blocks tested.
 - This is well in excess of the minimum requirements.
- **Shadow/Sunlight:** The majority of the provided amenity spaces generally pass the BRE requirement relating to the area receiving 2 hours of sunlight on the 21st of March > 50% which is within the BRE 80% careful layout design for apartments.
 - Shared amenity spaces receive excellent sunlight AB = **83%** and Blocks C1, 2 & 3 = **77%**

The application complies with the recommendations and guidelines of Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice (BRE 2011) and BS 8206 Lighting for Buildings and Part 2: Code of Practice for Daylighting.