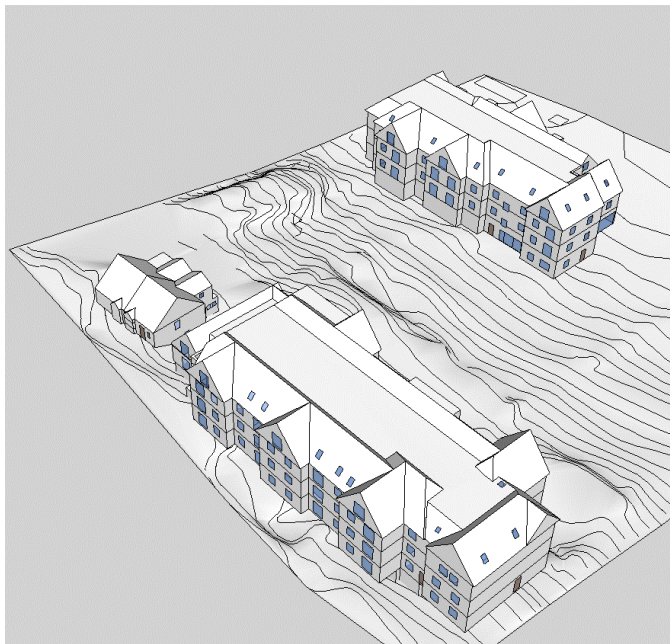

Knowles Retirement Living, Henley Road, Caversham

Daylight and Sunlight Impact Report

Daylight and Sunlight Impact Report
June 2022



Revision Schedule

Daylight and Sunlight statement
June 2022

Rev	Date	Details	Prepared by	Reviewed by	Approved by
01	Apr 2022	Final	P Giesberg	S. Bamford	P Giesberg
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1 Introduction

It is proposed to develop an area along Henley Road in Caversham, Reading and provide retirement living comprising two main blocks of retirement flat and auxiliary uses. The area is currently occupied by a number of houses and associated back gardens (figure 1.) Concerns have been raised about the effect the height of the buildings may have on the availability of daylight and sunlight to neighbouring properties as well as on available daylight and sunlight on and within the development itself. This report was prepared to support the determination of the application for planning consent for the proposed development.

Site and development

The proposed development is situated on the land of the properties at 205-219 Henley Road, Caversham, RG4 6LJ (Fig. 1).



Figure 1. Site Location overview with approximate boundary

The application site is located on the edge of town along Henley Road to the north of the development. To the south and east are fields and lakes. To the west of the proposed development a retirement home is currently under construction.

On the opposite side of Henley Road are residential properties. Directly to the west of the proposed development lies 215 and 217 Henley Road, a pair of semidetached houses.

It is proposed to demolish the existing houses 205 – 213 Henley Road, take some of the space of the rear gardens of 215 to 219 Henley Road and build two blocks (Block A and Block B) with landscaped gardens, car parking and site access (Fig. 2).

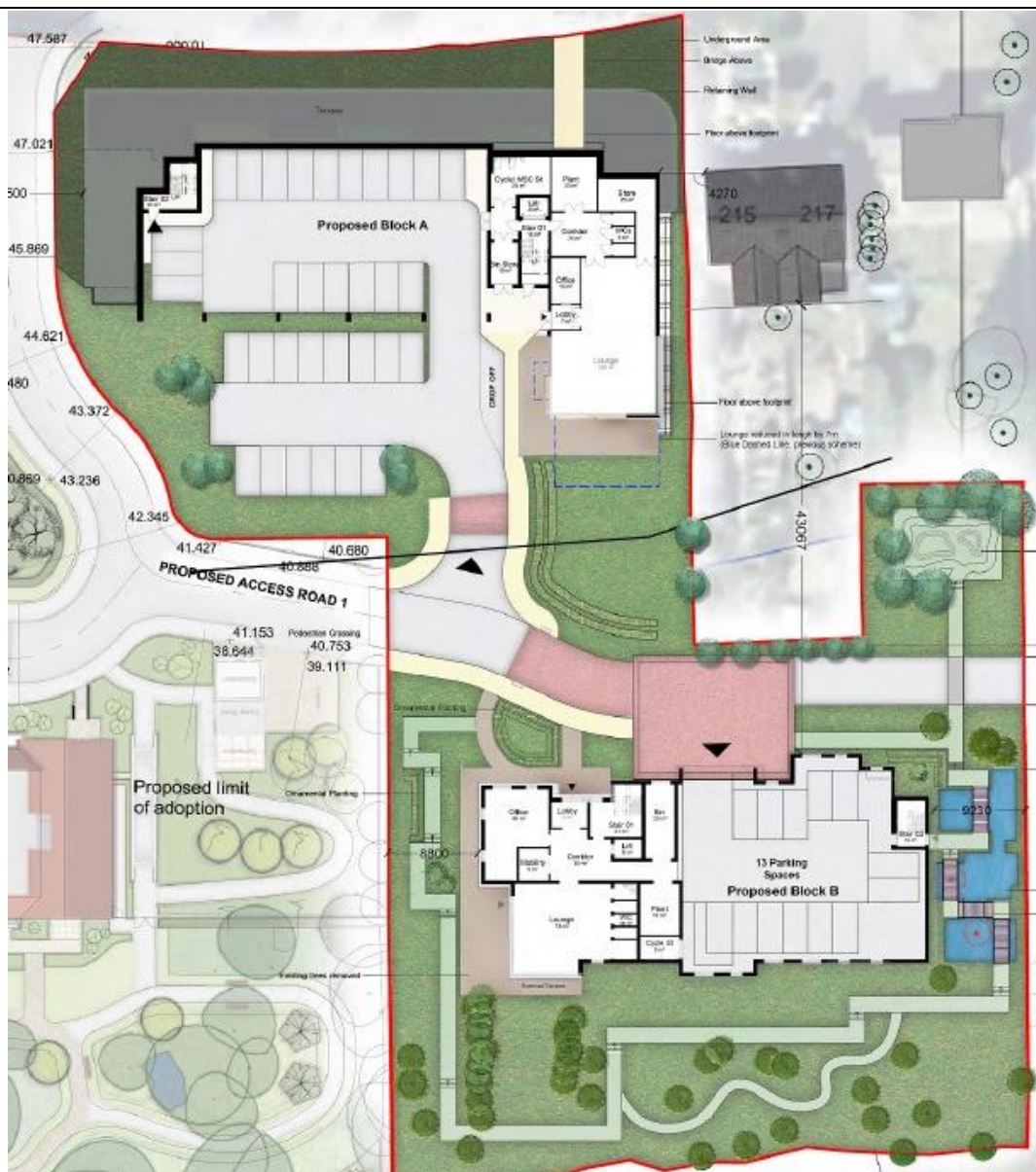


Figure 2. Overview of the proposed development.

2 Methodology and assessment criteria

2.1 Input data

Drawings of the proposed development and the neighbouring properties at 215 217 Henley Road were made available by the architect. The following drawings were used to create a 3D model in SketchUp 2021 for input into the IES VE software that was used for analysis.

Topographical Survey	8466-BOW-A0-XX-DR-A-0003-P0
Location Plan	8466-BOW-A0-XX-DR-A-0001-P0
Proposed Site Plan -Carpark Level	8466-BOW-A0-ZZ-DR-A-1001-P1
Proposed Site Plan – Roof Level	8466-BOW-A0-ZZ-DR-A-1002-P1
Proposed contextual Elevations	8466-BOW-A0-ZZ-DR-A-3001-P3
Proposed Site Sections	8466-BOW-A0-ZZ-DR-A-3002-P3
Block A Elevations	8466-BOW-A1-XX-DR-A-3001-P3
Block A Lower and Upper Ground Plan	8466-BOW-A1-ZZ-DR-A-2002-P5
Block A First and Second Floor Plan	8466-BOW-A1-ZZ-DR-A-2003-P5
Block A Third Floor and Roof Plan	8466-BOW-A1-ZZ-DR-A-2004-P5
Existing Site Elevations	8466-BOW-A1-ZZ-DR-A-2007-P5
Existing Site Sections	8466-BOW-A1-ZZ-DR-A-2008-P5
Block B Elevations	8466-BOW-A1-XX-DR-A-3001-P3
Block B Ground and First Floor Plan	8466-BOW-A1-ZZ-DR-A-2001-P5
Block B Second, Third and Roof Plan	8466-BOW-A1-ZZ-DR-A-2002-P5

A site visit was conducted to verify the information provided and supplement the information with additional measurements (tripod mounted Leica Disto X4-1).

The potential effect on diffuse daylight availability of the buildings at 214-224 Henley Road, which is to the north of the proposed development, was represented by a worst case local shading element of 8 m height and 29.75m distance to reflect the most disadvantageous scenario in terms of the daylight availability to the proposed development.

2.2 Effects on existing buildings

The effects of the proposed buildings on the availability of daylight on the existing buildings have been considered. The appraisal has been carried out using the methodology set out by Paul Littlefair in BR209 “*Site layout planning for daylight and sunlight: a guide to good practice*” (2011) (BRE Trust)

Diffuse light from the sky

It is important to safeguard the daylight that is available for nearby buildings in living rooms, kitchens and bedrooms. The Vertical Sky Component (VSC) is a measure of available daylight on a particular surface or window. The guidelines in the BRE209 document state that where a window has a VSC of 27 % or more daylighting is unlikely to be affected. In cases where the VSC is less than 27%, it is unlikely that a change in daylighting will be noticeable if a reduction in VSC is not less than 0.8 times the original value. Where information about internal layout is available a further test is the reduction in the area with a view of the sky is not more than 20%.

Where a room has more than 1 window the average weighted VSC should be used.

The VSC has been determined using the Virtual Environment building modelling software by IES (version 2021.4.0.0).

Sunlight Availability

If a living room of an existing dwelling has a window facing with 90 degrees of due south and any part of a new development subtends an angle of more than 25 degrees 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 meets all of the following three criteria:

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

The APSH has been determined using the Virtual Environment building modelling software by IES (version 2021.4.0.0).

Sunlight and Gardens and open space

The BRE guidance recommends 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 loss of sunlight is likely to be noticeable.

2.3 Effects on proposed development

Daylight availability

If the angle of the horizontal subtended by any obstruction at the level of the centre of lowest window in the new development is less than 25 degrees for the whole development then it is unlikely that the obstruction will have a substantial effect on daylight enjoyed by the proposed new building. If the angle is greater, then a more detailed check is needed to find the loss of daylight for the existing building.

It is important to safeguard the daylight that is available for nearby buildings in living rooms, kitchens and bedrooms. The Vertical Sky Component (VSC) is a measure of available daylight on a particular surface or window. The guidelines in the BRE209 document state that where a window has a VSC of 27 % or more daylighting is unlikely to be affected. In cases where the VSC is less than 27% but more than 15% sufficient daylight may still be available by specifying measures that allow more daylight entering the room, such as larger windows.

Sunlight availability

People appreciate having sunlight in their homes. In housing the main requirement for sunlight is in living rooms. Site layout is the most important factor affecting the duration of sunlight in buildings and is divided into two main issues: orientation and overshadowing.

With overshadowing again, the BRE guidelines suggest a sensible approach to minimise the level of overshadowing of south, south-east and south-west facing windows. For these windows there are criteria set to consider what level of sunlight would mean a window will appear reasonably sunlit: It receives at least 25% of annual probable sunlight hours (APSH) and 5% of the annual probable sunlight hours between 21 September and 21 March (WPSH).

Sunlight and Gardens and open space

The BRE guidance recommends 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.

Daylight Factor

The daylight factor is a measure of available light within a room. It is determined by a variety of parameters including the size and location of windows, the colour of the walls and the presence of shading objects in the vicinity of the windows. Detailed room layouts are required to calculate the daylight factor of a room. Where the Vertical Sky Component was below 27% the Average Daylight Factor for the room was determined. The daylight factor was determined using the Virtual Environment building modelling software by IESVE (version 2021.4.0.0).

The simulation was set to medium/high level of calculation quality suitable for the complex layout of the main living space.

An Average Daylight Factor of more than 5% points to a well daylit space and 2% to a partially daylit space. These are recommended values and it would depend on the use of the space how much weight to the recommendations should be given. For instance, daylight provision in a bedroom is less important than in a sitting room or kitchen. There are also a set of minimum standards for daylight availability:

- 2% for kitchens
- 1.5% for sitting and dining rooms
- 1% for bedrooms

For the purpose of this study, we have assumed BRE internal reflectance values pertaining to medium wooden floors (coefficient value of 0.4), light painted walls (0.8) and matt white painted ceilings (0.85). For the vertical windows we have assumed a glazing transmittance value of 0.68 which is based on using standard double glazing with a 0.8 frame to glazing ratio.

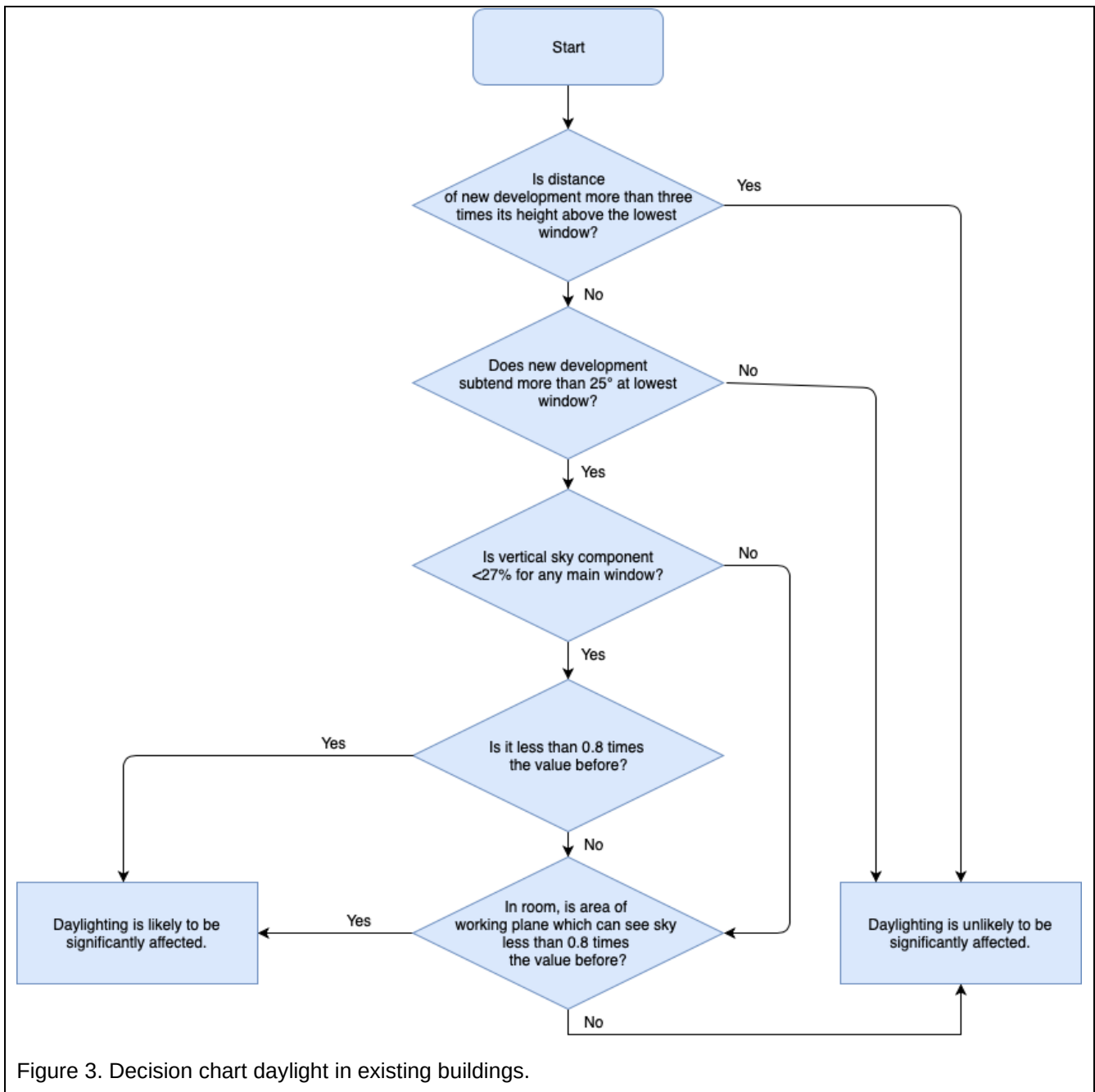


Figure 4 provides an overview of the model used for the assessment of daylight effects.

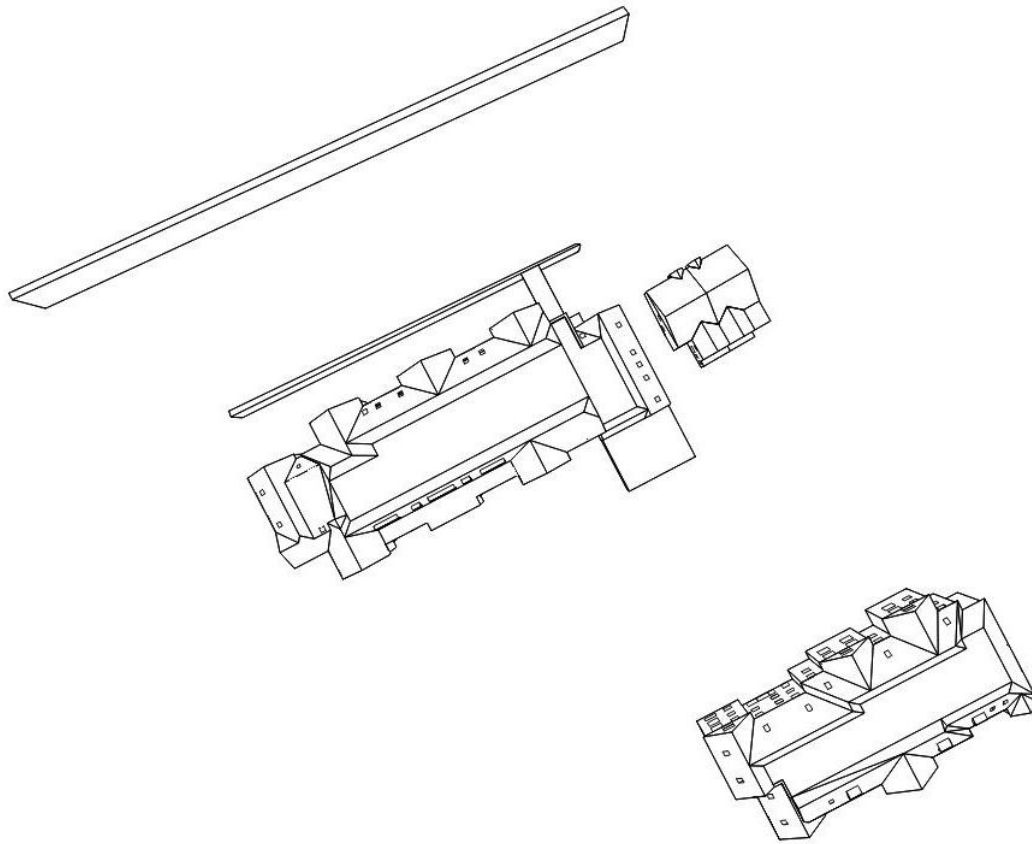


Figure 4 Birds-eye view of the proposed development and surrounding buildings

Appendix 1 provides an overview of the windows to habitable rooms within the proposed development and the numbering used to refer to these windows throughout this report.

3 Results

3.1 Scope of the analysis

The focus of the request for further information has been the Block A of the proposed development. We have appraised the effect of Block A on neighbouring properties as well as considered the layout in terms of optimizing for daylight and sunlight.

Effect on neighbouring properties.

There are a number of dwellings across the road of the proposed development. As the development is a lower level than Henley Road itself and there is a reasonable distance between the two areas, it is unlikely that the daylight or sunlight will be noticeably affected by the proposed development. The distance between the boundary of the proposed development at the location of 213 Henley Road and the house at 220 Henley Road was measured to be 23.75 m. The proposed new building is set back from its site boundary between 6 and 12 meters and 10 m above the ground level of the houses on the north of Henley Road. This means that any ground floor window with a centre at 1.5 m above ground level would have a line of sight to the top of the proposed development with an angle not more than 16 degrees, which complies with the 25 degrees rule. The houses on the north site of Henley Road are therefore not further considered in this report.

The house at 215 Henley Road has a side window that might be affected by the proposed development. Figure 1 shows the 25 degrees line from the assumed window position at No 215 Henley Road, and it intersects with the proposed development. As the window is not a main window to a living room the effect on sunlight will not be considered further. It is necessary though to consider the effect of daylight on this window through the analysis of the effect on the VSC.

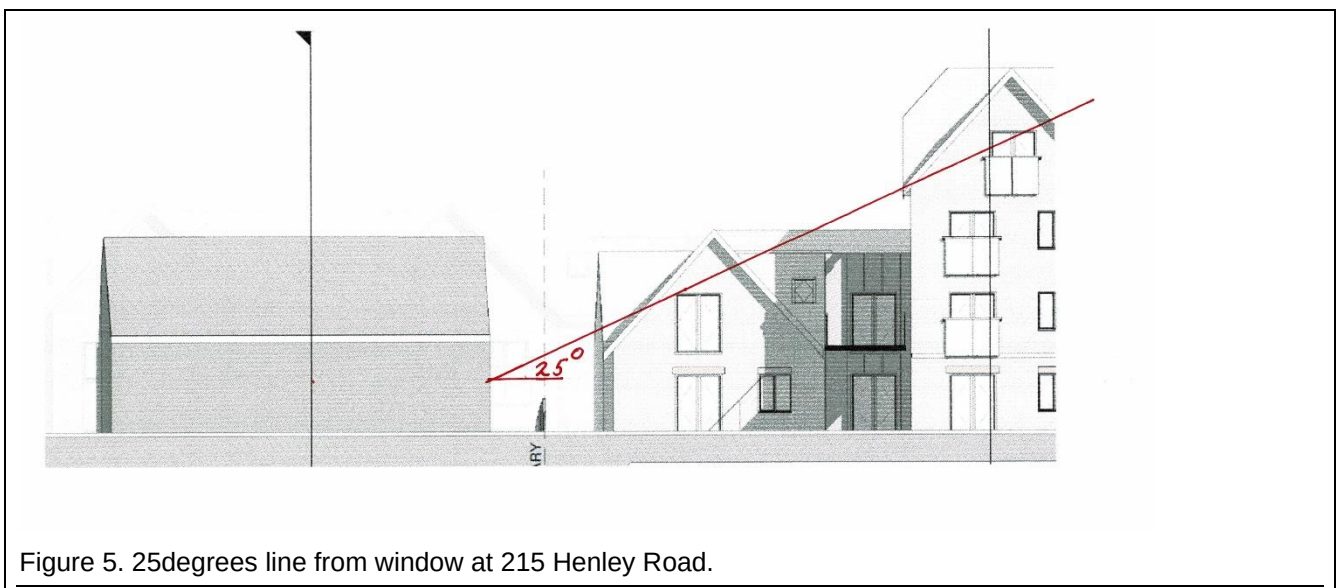
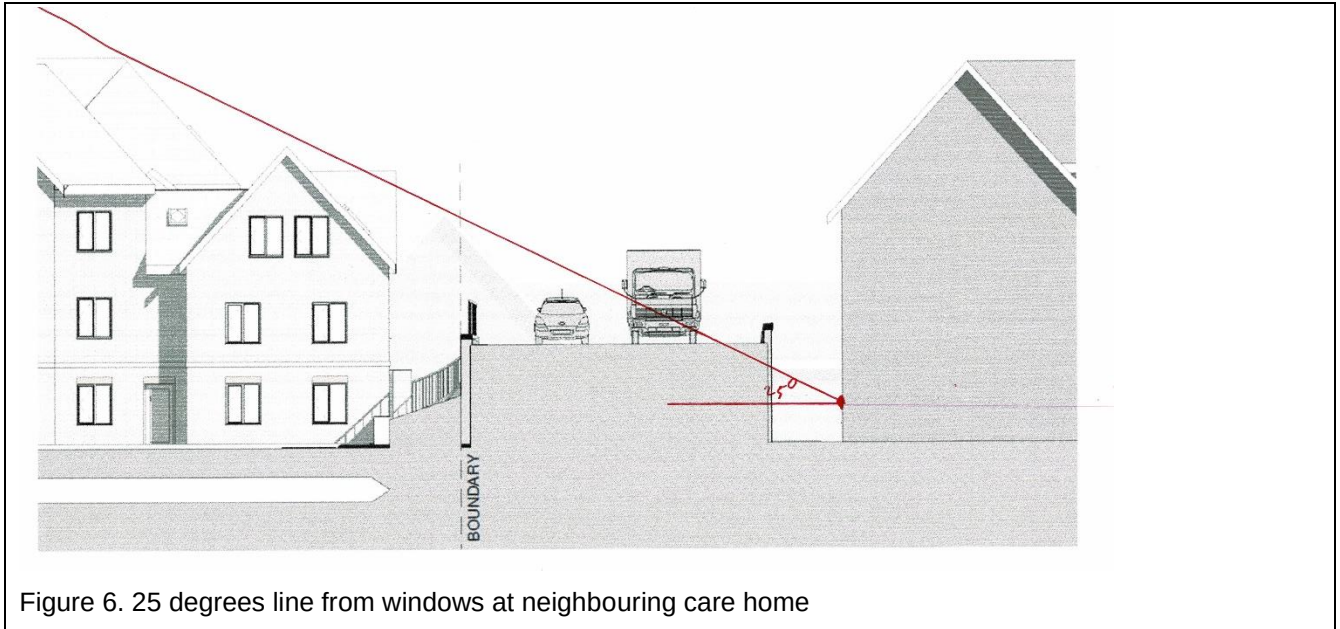


Figure 5. 25degrees line from window at 215 Henley Road.

There is another care home building planned to the west of the proposed block A. This building has some additional windows facing the proposed Block A. Figure 2 shows the 25 degrees line from the presumed position of these windows.



The 25 degrees line from the main flank window does not intersect with Block A and it is therefore unlikely that this proposed new building will be affected in terms of daylight or sunlight by the proposed Block A.

As Block A is constructed to the north of the back gardens at 215 and 217 Henley Road there will not be an effect on available sunlight to these areas and this will not be considered in further detail.

Daylight and sunlight availability proposed new buildings

Daylight availability on both Block A and Block B will be tested by determining the Vertical Sky Component on the windows of the proposed new buildings. In addition, a review of the number of units that receives good levels of sunlight will be carried out.

Finally, with regard to sunlight availability on amenity space, the 2-hour contours will be examined for the amenity areas around the two buildings.

3.2 Vertical Sky Component 215 Henley Road

The site was inspected by a daylight and sunlight surveyor on 29 March 2022. It was observed that the eastern façade of the main part of 215 Henley Road contained five windows, none of which served a habitable room (two were serving a hallway and three were a bathroom). Only the four windows on rear façade could potentially

be affected by the proposed new development. Kitchen window and living room window on the lower ground floor and two bedrooms windows on the upper ground floor.

Table 2. VSC on windows in neighbouring properties

Surface	V. S. C.	existing	%
Kitchen	20.29	25.14	81
Living Room (lower ground floor)	37.28	39.93	93
Master bedroom	38.32	39.88	96
Bedroom	30.39	33.93	90

3.3 Sunlight Availability 215 Henley Road

The window of the living room on the lower ground floor of 215 Henley Road is facing 90 degrees from due south. This window has good and largely unobstructed access to direct sunlight. The APSH were calculated both for the current, baseline scenario as the prediction post-construction. There will be a slight reduction from 77% to 69% for the annual value for the APSH. The value in winter is 28.77 after completion of the proposed development. Both values are well in excess the minimum of 25% and 5% respectively.

3.4 Vertical Sky Component Proposed Development.

Both Block A and Block B have relatively unblocked access to daylight. Some concern has been raised regarding the topographical positioning of the upper ground floor, which is set at a lower level than Henley Road, although for these windows the 25 degree rule is met too.

Table 3 Shows the VSC for all windows to habitable rooms in Block A and table 4 shows the VSC for all windows to habitable rooms in Block B`

With the exception of one of the windows (window 11 in Block B) which serves flat 3 all rooms are served with sufficient access to daylight and no special adjustments should be necessary.

The daylight availability in the bedroom of flat 3 was examined further by analysing the Average Daylight Factor. Figure 7 shows the distribution of the daylight factor within the bedroom. The analysis determined an ADF of 2.6.

Table 3. VSC Windows in Block A

Window	VSC	Status
1	34.31	Pass
2	31.68	Pass
3	27.08	Pass
5	33.43	Pass
6	38.91	Pass
6	33.60	Pass
7	36.66	Pass
8	36.06	Pass
9	34.64	Pass
10	34.98	Pass
11	29.17	Pass
12	31.92	Pass
15	33.12	Pass
16	33.21	Pass
17	30.58	Pass
18	30.63	Pass
19	27.87	Pass
20	28.78	Pass
21	39.10	Pass
22	36.17	Pass
23	36.50	Pass
24	35.14	Pass
25	34.95	Pass
26	32.43	Pass
27	32.44	Pass
31	31.00	Pass
32	31.06	Pass
33	28.74	Pass
34	28.45	Pass
35	39.00	Pass
36	36.58	Pass
37	37.00	Pass
38	35.22	Pass
39	34.98	Pass
40	32.74	Pass

Window	VSC	Status
41	32.44	Pass
46	37.23	Pass
47	37.51	Pass
48	35.03	Pass
49	36.03	Pass
50	33.35	Pass
51	34.29	Pass
52	28.36	Pass
53	27.82	Pass
54	39.70	Pass
55	39.50	Pass
56	39.37	Pass
57	39.77	Pass
58	39.84	Pass
59	39.86	Pass
60	39.60	Pass
61	37.45	Pass
62	36.47	Pass
63	37.14	Pass
64	35.04	Pass
65	35.52	Pass
66	34.48	Pass
67	35.67	Pass
68	39.08	Pass
69	39.21	Pass
70	39.97	Pass
71	39.84	Pass
72	39.90	Pass
73	39.63	Pass
74	39.65	Pass
75	39.42	Pass
76	39.16	Pass
77	37.89	Pass
78	37.38	Pass
79	36.66	Pass

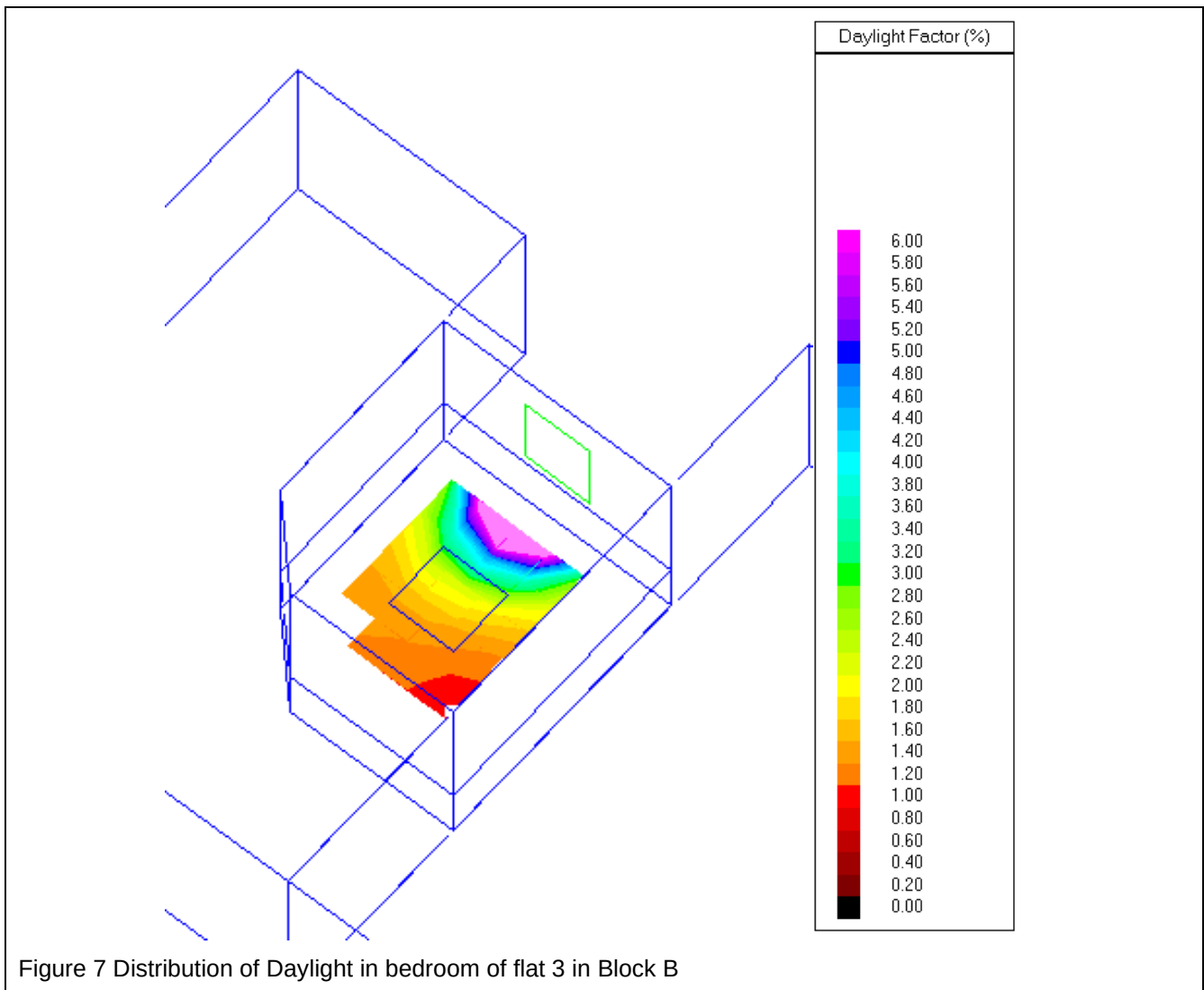
Window	VSC	Status
80	35.77	Pass
81	35.12	Pass
82	35.20	Pass
83	34.83	Pass
84	39.92	Pass
85	39.25	Pass
86	39.28	Pass
87	39.70	Pass
88	39.51	Pass
89	39.07	Pass
90	39.39	Pass
91	32.79	Pass
92	37.54	Pass

Window	VSC	Status
93	33.63	Pass
94	34.75	Pass
95	32.36	Pass
96	33.82	Pass
97	39.37	Pass
98	39.12	Pass
99	39.24	Pass
100	38.58	Pass
101	38.46	Pass
102	38.42	Pass
103	39.45	Pass
104	39.48	Pass
105	37.43	Pass

Table 4. VSC in Block B

Window	VSC	Status
2	31.36	Pass
3	29.40	Pass
4	38.68	Pass
5	37.36	Pass
6	37.74	Pass
7	37.38	Pass
8	37.21	Pass
10	27.76	Pass
11	24.79	Fail
12	38.43	Pass
13	37.13	Pass
14	37.20	Pass
15	36.22	Pass
16	36.47	Pass
18	34.64	Pass
19	33.63	Pass
22	32.29	Pass
23	39.98	Pass
23	33.15	Pass
24	30.29	Pass
25	31.97	Pass
27	37.57	Pass
28	36.50	Pass
29	36.34	Pass
30	35.60	Pass
31	35.30	Pass
32	34.90	Pass
33	34.83	Pass
34	37.62	Pass
35	34.25	Pass
36	34.26	Pass
37	28.98	Pass
38	40.05	Pass
39	39.67	Pass
40	39.77	Pass

Window	VSC	Status
42	40.23	Pass
43	39.09	Pass
44	39.41	Pass
45	32.84	Pass
46	35.83	Pass
47	39.56	Pass
48	32.63	Pass
49	35.15	Pass
50	32.81	Pass
51	40.08	Pass
53	39.64	Pass
54	39.70	Pass
55	39.97	Pass
56	39.82	Pass
57	40.08	Pass
57	38.96	Pass
58	32.52	Pass
59	39.78	Pass
60	32.29	Pass
61	39.61	Pass
62	39.67	Pass
65	37.47	Pass
66	33.20	Pass
67	36.57	Pass
68	32.73	Pass
69	39.84	Pass
70	39.93	Pass
73	38.62	Pass
74	38.95	Pass
75	39.29	Pass
76	39.33	Pass
77	39.13	Pass
78	37.44	Pass
81	32.99	Pass
82	37.86	Pass



3.5 Sunlight

A south facing wall will in general receive most sunlight, while north facing walls will only receive it early morning and late evening in summer. Particularly in flats it is not always possible to avoid north facing windows and in these cases the aim should be to minimize the number of dwellings whose living rooms face solely north, north-east or north-west. The BRE guidelines don't specify a percentage. The BRE guidance states:

"The aim should be to minimise the number of windows to a main living room facing solely north, north-west or north-east."

The total number of flats and main living rooms in Block A and Block B together is 51. Of these just over half (27) are facing within 90 degrees from due south. Figure 8 shows the sunlight exposure of all windows and clearly all the windows receive significantly more than the guidelines of 25% of annual sunlight. Tables 5 and 6

provides an overview of the Annual Probable Sunlight Hours for all the windows to habitable rooms facing 90 degrees from due south in blocks A and B

The nature of the development makes it hard to avoid north, north-west or north-east facing living rooms and the proposed design has optimised the number of sun receiving flats.

Table 5. Block A: Sunlight availability windows 90 degrees due south

Window	Annual	Winter
52	52.51	30.67
53	52.05	30.67
54	77.93	35.86
55	75.19	35.74
56	73.36	35.21
57	77.93	35.86
58	77.93	35.86
59	76.99	34.92
60	77.05	34.98
61	66.46	26.59
62	59.35	24.51
63	61.60	31.66
64	54.26	24.81
65	59.80	31.89
66	53.85	24.10
67	57.33	30.35
68	71.45	31.68
69	73.04	33.86
70	75.86	35.17
71	76.55	35.86
72	77.69	35.62
73	77.90	35.83
74	76.43	34.36
75	76.42	34.36

Window	Annual	Winter
76	71.12	34.24
77	67.37	34.00
78	60.43	26.09
79	62.49	33.28
80	55.49	25.49
81	59.85	32.00
82	53.54	23.56
83	57.29	30.19
84	77.93	35.86
85	73.80	35.71
86	74.76	35.46
87	77.93	35.86
88	77.93	35.86
89	76.27	34.20
90	76.35	34.28
97	77.70	35.63
98	77.70	35.63
99	77.93	35.86
100	77.16	35.09
101	77.15	35.08
102	77.09	35.02
103	75.72	30.20
104	69.04	23.57
105	73.90	31.83

Table 6. Block B: Sunlight availability windows 90 degrees due south

Window	Annual	Winter
34	67.67	34.07
35	60.8	31.38
36	58.87	31.55
37	51.84	27.96
38	77.93	35.86
39	76.87	35.86
40	75.44	35.44
41	83.08	36.55
42	73.81	36.55
43	68.36	29.46
44	70.61	33.21
45	57.91	33.06
46	57.39	24.4
47	68.38	32.15
48	57.77	31.85
49	55.5	24.55
50	56.66	32.02
51	77.93	35.86
52	78.15	35.86
53	76.54	35.86
54	75.77	35.59
55	77.84	35.77
56	77.93	35.86
57	71.61	29.56
58	53.47	21.39

Window	Annual	Winter
59	72.56	31.79
60	53.08	21.57
61	71.32	31.99
62	74.71	33.54
63	80.99	33.74
64	81.74	34.77
65	59.89	26.68
66	56.6	30.84
67	56.93	26.65
68	54.64	30.7
69	77.55	35.49
70	77.24	35.17
71	75.17	31.03
72	75.17	31.03
73	56.94	25.55
74	57.67	26.28
75	59.71	26.9
76	61.26	26.9
77	61.22	26.9
78	58.09	26.9
79	66.79	31.03
80	75.17	31.03
81	52.98	25.61
82	57.76	26.31
83	59.42	26.9

Sunlight on open space

The development is designed allowing for spacious landscape areas around the two blocks. There are three areas in particular designed to allow people enjoy the outdoor amenity space. The green just south of the lounge in Block A, the nature garden and the area to the south of Block B.

Figure 9 provides an overview of the area that receives at least 2 hours of sunlight on the typical 21 March. It demonstrates that the entire area dedicated to recreation complies with the 2 hour sunlight.

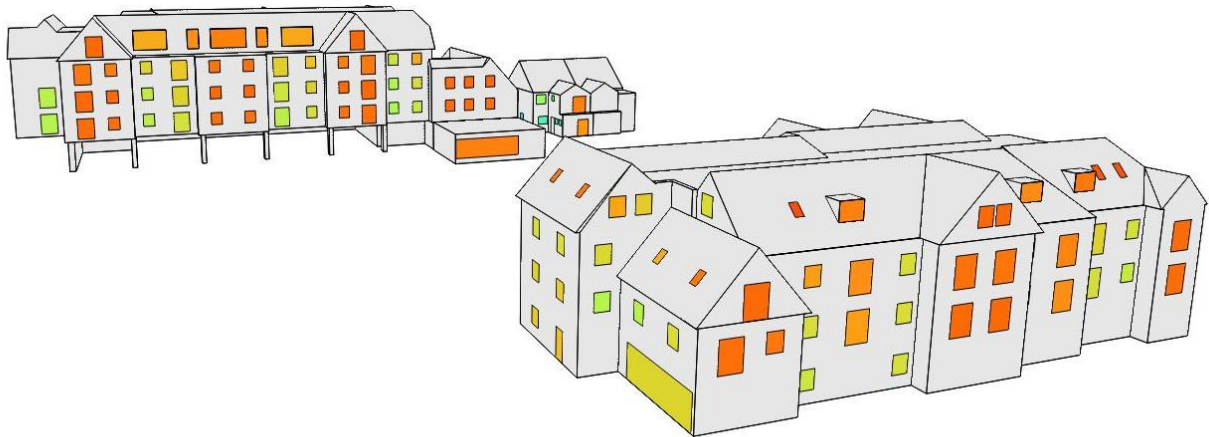


Figure 8. Windows receiving more than 25% of annual probable sunlight hours

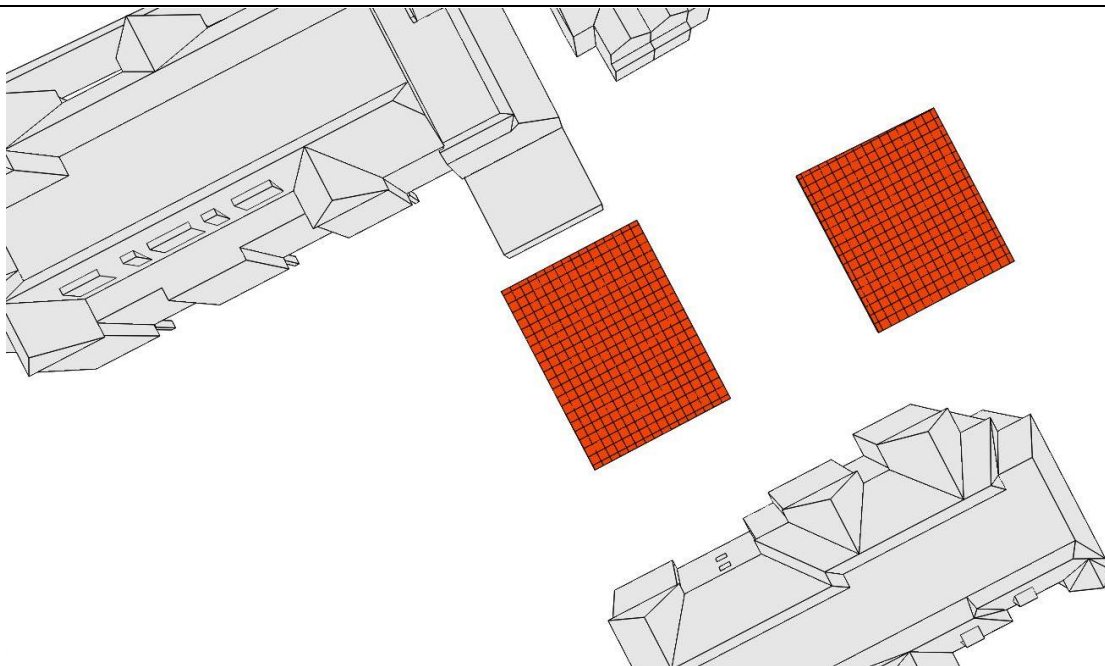
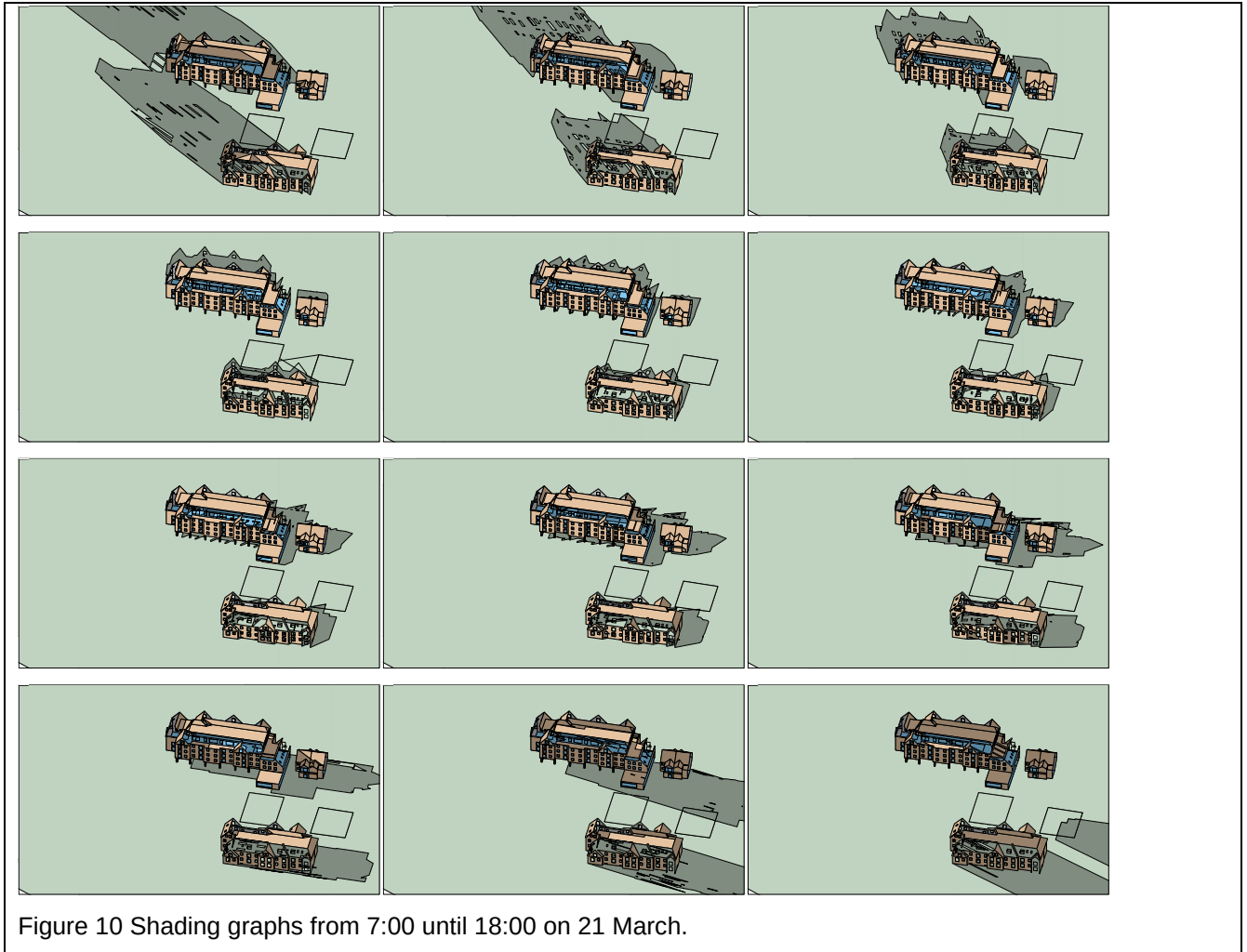


Figure 9. Sunlight availability on the areas dedicated for recreation. Areas in red receive at least 2 hours of sunlight on 21 March.

A series of shading studies was made to illustrate the sunlight availability in the wider area and shown in figure 10.



4 Discussion and conclusion

A daylight and sunlight assessment was carried out. Both the effects of the proposed development on neighbouring properties and the exposure of the proposed development itself to daylight and sunlight were analysed.

The design of the proposed development has minimised the impact on neighbouring properties and optimised the use of the available day and sunlight to benefit the flats and amenity space around the buildings.

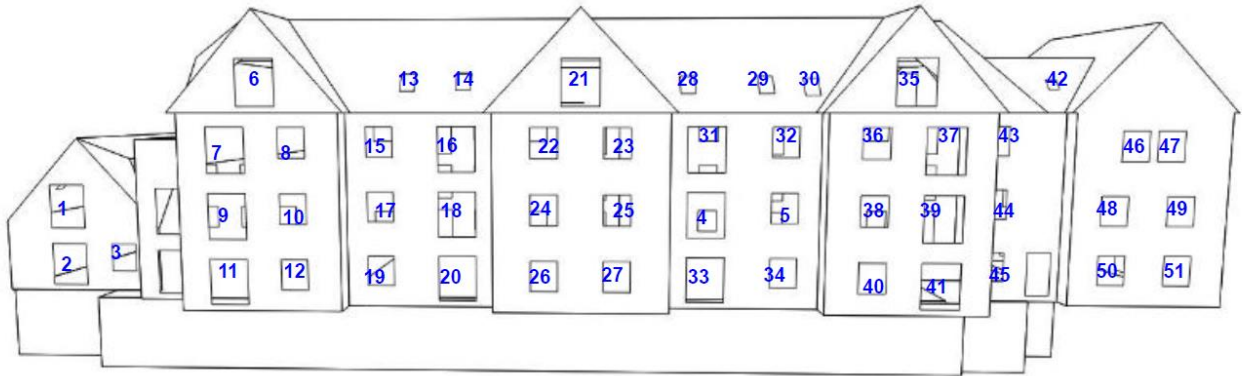
The proposed new buildings have windows that receive excellent levels of diffuse daylight, allowing for good levels of daylight in the rooms. Living rooms are all provided with good levels of glazing. Skylight only provision was restricted to smaller bedrooms ensuring that adequate daylight levels are achievable in all rooms.

One minor issue was found where a bedroom window was position recessed between two extruding walls of adjacent rooms. This bedroom window had a vertical sky component of less than 27. Subsequent detail analysis of the bedroom showed that the Average Daylight Factor would likely be 2.6, which is above the minimum guidelines of 1 for bedrooms.

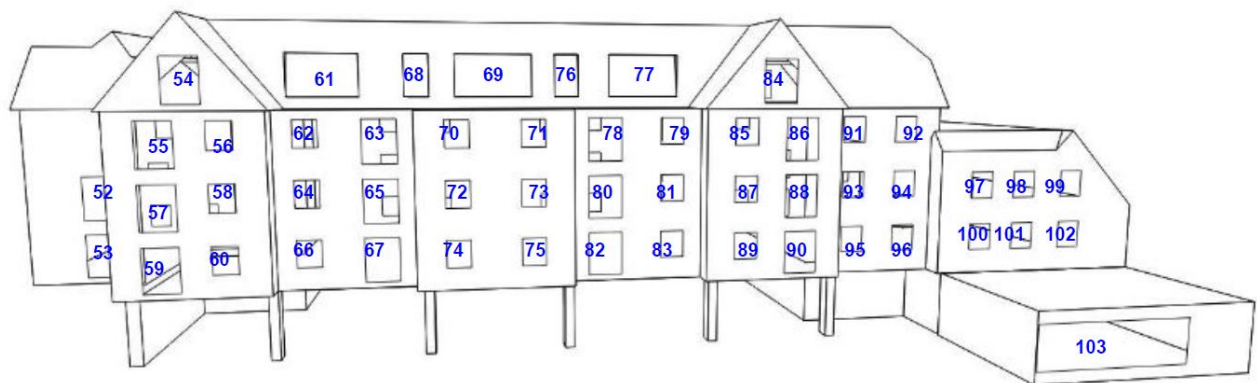
Not all main living rooms in the development are facing 90 degrees from due south and therefor will not receive direct sunlight during the day. This is part of the characteristics of a development with small, single aspect flats. Slightly over half of the flats would be exposed to sunlight.

It is concluded that the proposed development complies with the BRE guideline published in "*Site layout planning for daylight and sunlight: a guide to good practice*" (2011) (BRE Trust).

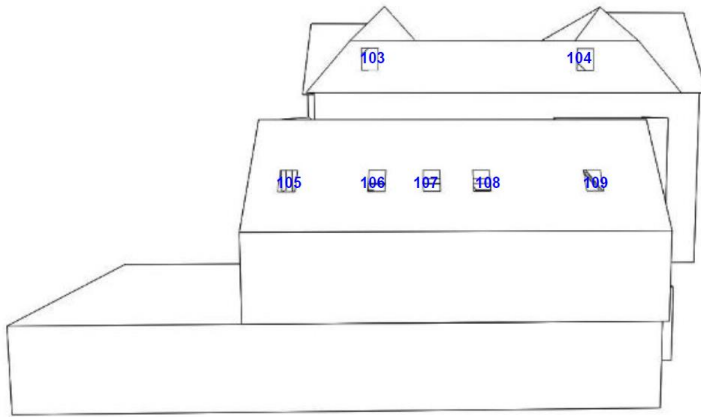
Appendix 1 Window Labelling



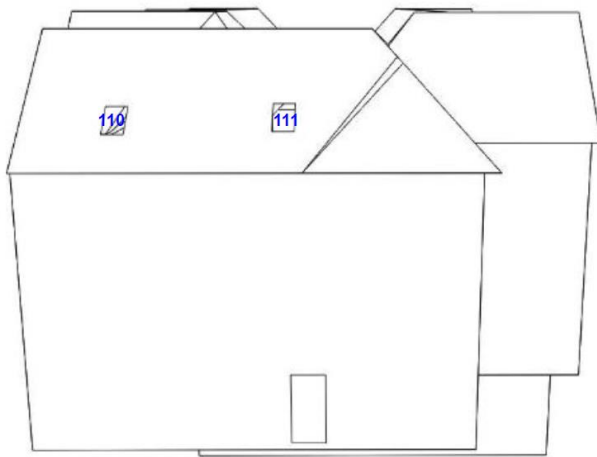
Block A North Façade



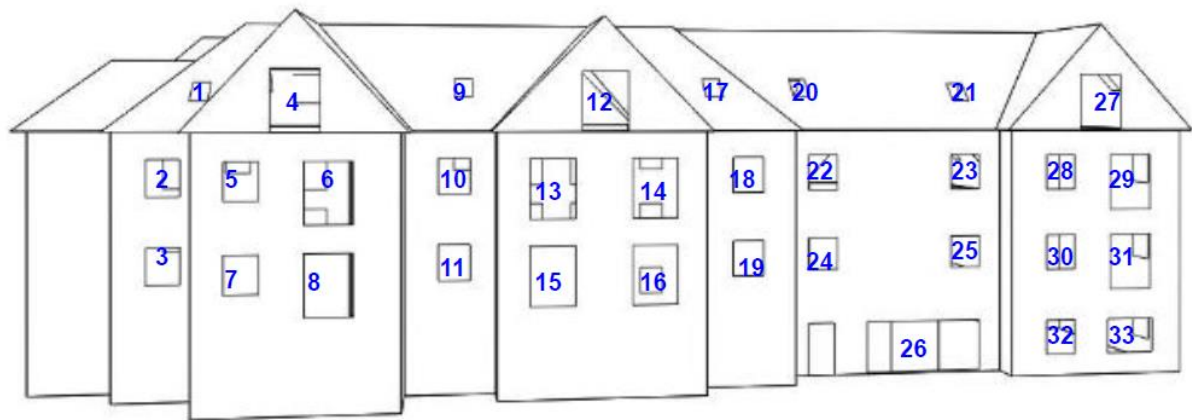
Block A – South Façade



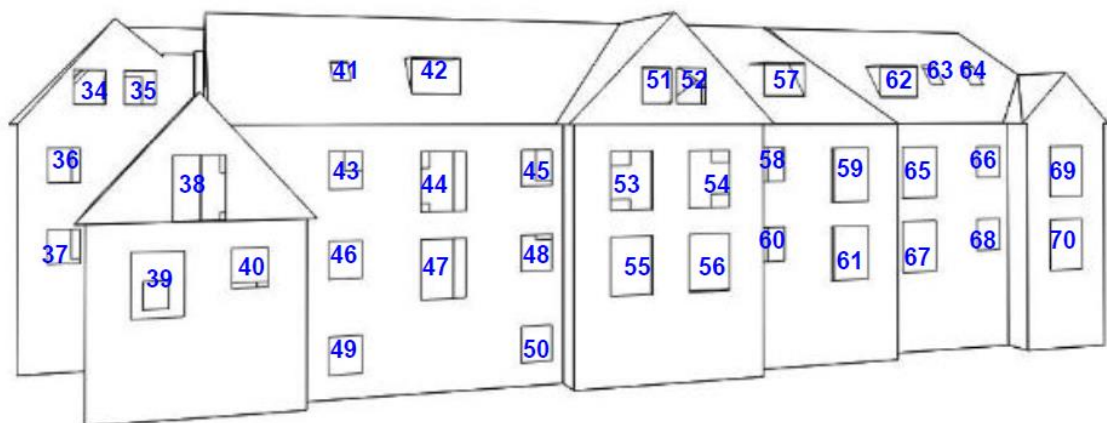
Block A – East Façade



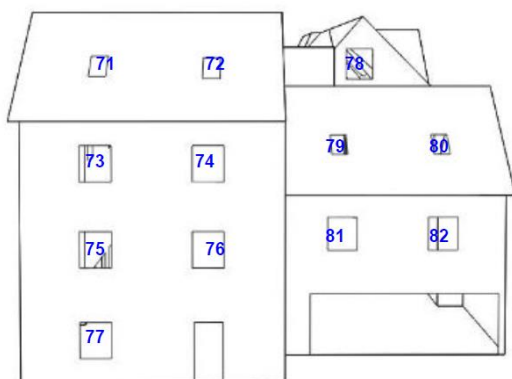
Block A – West Façade



Block B- North Facade



Block B – South Facade



Block B – Western Facade