PROPOSED SCHEME DAYLIGHT, SUNLIGHT & OVERSHADOWING

Barnes Hospital

Produced by XCO2 for Star Land Realty UK Ltd

May 2024

XCO2
56 Kingsway Place, Sans Walk
London EC1R 0LU

+44 (0)20 7700 1000
mail@xco2.com
xco2.com

CONTENTS

	01	02	03	04	05	06	
Remarks	Draft	For planning	Update	For Planning	Update	Block C Update	
Prepared by	EL	EL	EL/FH	EL/FH	LU	YC	
Checked by	FH/SP	FH/SP	FH/SP	FH/SP	TK	EC	
Authorised by	RM	RM	RM	RM	RM	RM	
Date	16/07/2021	28/07/2021	20/08/2021	16/11/2021	12/12/2022	16/05/2024	
Project reference	8.972	8.972	8.972	8.972	8.972	8.972	

EXECUTIVE SUMMARY

The daylight, sunlight and overshadowing analysis indicates that the habitable rooms of the proposed development at Barnes Hospital will achieve adequate levels of daylight and sunlight considering site constrains and the urban context.

Daylight and Sunlight analysis was carried out for the proposed development at South Worple Way, located within the London Borough of Richmond upon Thames. This report outlines the results of the analysis for the planning application, assessing the daylight and sunlight received by the habitable spaces of the proposed development.

The methodology set out in this report is in accordance with BRE's "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" by PJ Littlefair et al. (2022) which is accepted as good practice by Planning Authorities.

Computer modelling software was used to carry out the assessments. The model used was based on the drawings by the design team.

DAYLIGHT ASSESSMENT

The rooms evaluated in the internal daylight assessment include open plan kitchen, living and dining spaces, and bedrooms within the proposed development.

The assessment was carried out for 40 no. sample dwellings considered to be the worst-case units in terms of daylight access across the scheme. All habitable rooms within these dwellings have been included in the assessment. The rooms encompass 40 kitchen/living/dining rooms (KLDs) and 68 bedrooms.

The analysis results indicated that 49 out of 108 rooms meet the recommendations set out by the BRE guide.

The remaining 59 rooms consist of 34 KLDs rooms and 25 bedrooms. Of these KLDs, 9 meet within 80% of the BRE recommendations (an sDA of 40%) and 8 meet within 60% of the BRE recommendations (an sDA of 30%). The remaining 17 KLDs have greater obstructions and the design has been adjusted as far as feasible to allow maximum daylight access.

For the remaining 25 bedrooms, 8 meet within 80% or above of the BRE recommendations and 10 meet within 60% or above of the BRE recommendations. The remaining 7 bedrooms fall short due to it having greater site obstructions. It is worth noting that most of these rooms are located ground floor thus subjected to slightly lower daylight penetration due to larger obstructions. The design team have also made amendments to the design in order to maximise the level of daylight received in the space as far as is considered feasible.

Overall, the proposed development as a whole is anticipated to achieve adequate levels of daylighting to all dwellings and habitable spaces, and is therefore considered to provide good quality of accommodation to the future occupants in terms of daylight considering the context and limitations of the site.

SUNLIGHT ASSESSMENT

The assessment was carried out for 40 no. dwellings considered to be the worst-case units in terms of sunlight access across the scheme.

The analysis has shown that 38 rooms will satisfy the BRE criteria for sunlight exposure. The remaining 2 living rooms fall short of the BRE criteria however they are located in units with at least one bedroom which passes the BRE criteria and therefore the unit can be considered to meet the sunlight criteria as a whole.

Overall, it can be concluded that the proposed design offers adequate accessibility to sunlight in living spaces considering the context and limitations of the site.

OVERSHADOWING ASSESSMENT

A solar access analysis was undertaken for a total of three amenity spaces for the full 24 hours on 21st of March in line with the BRE guidance. The results show that all three amenity spaces receive at least 2 hours of sunlight on 21 March over at least 50% of their area and therefore are meeting the BRE recommendations for amenity areas.

Overall, therefore, the amenity spaces of the site can be considered to be adequately sunlit for their purpose.

INTRODUCTION

The site is located in a low-density urban area. Site analysis was carried out to identify any potential daylight and sunlight impacts on the surrounding development. environment and the interpretation of the results requires careful consideration of the BRE guidance.

SITE

The proposed development is a residential 3-block development located within the London Borough of Richmond upon Thames on South Worple Way Street.

The total new build area is approximately 7,500 square metres brining a total of 110 residential units. The site is in a low-density urban area made up of mostly semidetached and terraced houses with front and back gardens. The site comprises a number of red-brick buildings ranging in date from 1889-1999. An outline application was submitted in 2018 (Application Reference Number: 18/3642/OUT) and was granted in September 2020. This current submission has been prepared in relation to the detailed application for the residential plot of the Barnes Hospital Site as approved under the Outline Planning Permission.

The adjoining site is assessed under the Outline Planning Permission scenario as this is considered worst-case given that the outline planning permission buildings are higher than the existing scenario. The scenario against which the assessment has been made is considered the worst case and therefore any alternative scenarios are likely to result in an improvement over the assessment.

Figure 1 below shows the approximate site location.

Figure 1: Site location of the proposed development.

METHODOLOGY

The assessment is based on guidelines set out in the BRE "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" (2022).

The methodology is based on the British Research Establishment's (BRE) publication "Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice," by PJ Littlefair et al. (2022).

The BRE publication Site Layout Planning for Daylight and Sunlight gives advice on site layout planning to achieve good daylighting in buildings. It is important to note that the advice given in the BRE guide is *"not mandatory"* and *"its aim is to help rather than constrain the designer".*

DAYLIGHT

The BRE guidelines refer to the British Standard BS EN 17037 *Daylight in Buildings* recommendations. This stipulates the calculation of the amount of daylight in a space using one of two methods: prediction of illuminance levels using hourly data, or the use of the daylight factor. For this assessment, the method predicting illuminance levels using hourly data is used. For daylight levels in dwellings, BS EN 17037 refers to the UK National Annex which outlines the illuminance level needed in a room according to its occupancy. These are as follows:

- 100 lux for bedrooms
- 150 lux for living rooms and
- 200 lux for kitchens, or rooms with kitchens

The calculation is carried out taking into consideration the relative illuminance values, the amount of daylight hours, and the area of the room. For a room to be compliant with the BRE guidance it must reach the required illuminance levels for at least 50% of the daylight hours across 50% of the room area.

This is measured by the Spatial Daylight Autonomy (sDA) metric. sDA is defined as the percentage area of the analysed space that is above a certain lux level for a certain percentage of time.

In addition to the amount of light hitting the working plane, this assessment takes into consideration surface materials and in particular their reflectance.

These calculations are carried out using Radiance based software approved by the BRE.

SUNLIGHT

Sunlight is valued within a space, and according to the BRE guidance access to sunlight can be quantified. BS EN 17037 recommends that a space should receive a minimum of 1.5 hours of direct sunlight on the 21st of March – the equinox. The guidance rates the amount of access to daylight as below:

- 1.5 hours as the minimum
- 3 hours as a medium level
- 4 hours as a high level

The BRE guidance states that *"in housing, the main requirement for sunlight is in living rooms, where it is valued at any time of day but especially in the afternoon. Sunlight is also required in conservatories. It is viewed as less important in bedrooms and in kitchens, where people prefer it in the morning rather than the afternoon."*

The guidance states at least one habitable room is required to meet the criteria per dwelling.

OVERSHADOWING

Open spaces should retain a reasonable amount of sunlight throughout the year. The BRE states that for an amenity space to *"appear adequately sunlit throughout the year, at least half of the area should receive at least two hours of sunlight on 21 March".*

DAYLIGHT ASSESSMENT

The analysis indicates that habitable spaces of the proposed development will receive good levels of daylighting.

A total of 108 rooms have been included in the assessment covering all the dwellings in the proposed development. All habitable rooms (KLDs and bedrooms) were assessed.

The references of the evaluated dwellings and the corresponding habitable rooms can be found in Appendix A – Proposed Scheme Window and Room Reference. The tables below show the illuminance on grid results for all the assessed rooms.

For the calculations, the following assumptions have been made:

- 50% interior wall reflectance
- 70% interior ceiling reflectance
- 20% interior floor reflectance
- 20% exterior surface reflectance
- 68% light transmission for vertical glazing

The 40 dwellings consist of 108 habitable rooms that encompass 40 KLDs and 68 bedrooms.

The results show that 6 out of 40 KLDs rooms meet the BRE recommendations. Of the 34 remaining rooms, 9 were found to only be marginally short of the criteria meeting within 80% or above of the BRE recommendations (with sDA equal to or greater than 40%), and 8 within 60% or above of the BRE recommendations (with sDA equal to or greater than 30%) which can be considered to still be an adequate level of daylight.

As for the bedrooms, 43 out of 68 bedrooms meet the BRE recommendations. 8 of the remaining 25 bedrooms were found to only be marginally short of the criteria meeting within 80% or above of the BRE recommendations (with sDA equal to or greater than 40%). 10 out of the 17 remaining rooms meet within 60% or above of the BRE recommendations (with sDA equal to or greater than 30%) which can be considered to still be an adequate level of daylight. The remaining bedroom is limited due to have greater site obstruction. It is worth noting that these rooms are located ground floor thus subjected to slightly lower daylight penetration due to larger obstructions. The design team have also made amendments to the design in order to maximise the level of daylight received in the space as far as is considered feasible.

Detailed results can be found within Appendix B - Detailed Daylight Results.

Table 1: Daylight Results Summary for Barnes Hospital.

Number of habitable rooms tested	108
Number of kitchen/living/dining rooms	40
Number of kitchen/living/dining rooms meeting the BRE recommendations	6
Number of kitchen/living/dining meeting within 80% or above of the BRE recommendations (sDA of at least 40%)	9
Number of kitchen/living/dining meeting within 60% or above of the BRE recommendations (sDA of at least 30%)	8
Number of kitchen/living/dining not meeting any of the above criteria	17
Number of bedrooms	68
Number of bedrooms meeting the BRE recommendations	43
Number of bedrooms meeting within 80% or above of the BRE recommendations (sDA of at least 40%)	8
Number of bedrooms meeting within 60% or above of the BRE recommendations (sDA of at least 30%)	10
Number of bedrooms not meeting any of the above criteria	7

SUNLIGHT ASSESSMENT

The analysis indicates that living spaces of the proposed development will receive good levels of sunlight.

A total of 40 living spaces were included in the assessment. The references of the evaluated living rooms and detailed sunlight results can be found in Appendix C - Detailed Sunlight Results.

The results show that 17 out of 40 assessed living rooms achieve more than 4 hours of solar access on March 21, and therefore are considered to receive high levels of sunlight. 12 of the remaining 22 living rooms achieve 3 hours of sunlight access on March 21 which is the medium level, and 9 rooms achieve more than 1.5 hours of sunlight access on March 21 which is the minimum recommended level of sunlight.

The remaining 2 living rooms fall short of the BRE criteria however they are located in units with at least one bedroom which passes the BRE criteria and therefore the unit can be considered to meet the sunlight criteria as a whole.

Table 2. Sunlight Results for Barnes Hospital

Number of living rooms tested	40
Number of living rooms with more than 4 hours of sunlight access	17
Number of living rooms with more than 3 hours of sunlight access	12
Number of living rooms with more than 1.5 hours of sunlight access	9
Number of living rooms with north/north-west facing orientation not meeting any of the above criteria	2

OVERSHADOWING ASSESSMENT

The analysis indicates that the open spaces of the proposed development will receive adequate sunlight.

A review of the site plan showed that there are 3 open spaces which are part of the proposed development, as shown in the figure below. A Solar Access Analysis was undertaken on these amenity areas for the full 24 hours on 21 March as set out by the BRE.

The amenity spaces taken into account are located on ground floor, see Figure 2.

The results show that all the assessed spaces receive at least 2 hours of sunlight on 21 March over at least 50% of their area and therefore are meeting the BRE recommendations for amenity areas. This can be seen in Table 3 below as well as in Figure 3.

Overall, it can be concluded that the proposed masterplan layout allows for good accessibility to sunlight across the open spaces within the site boundary.

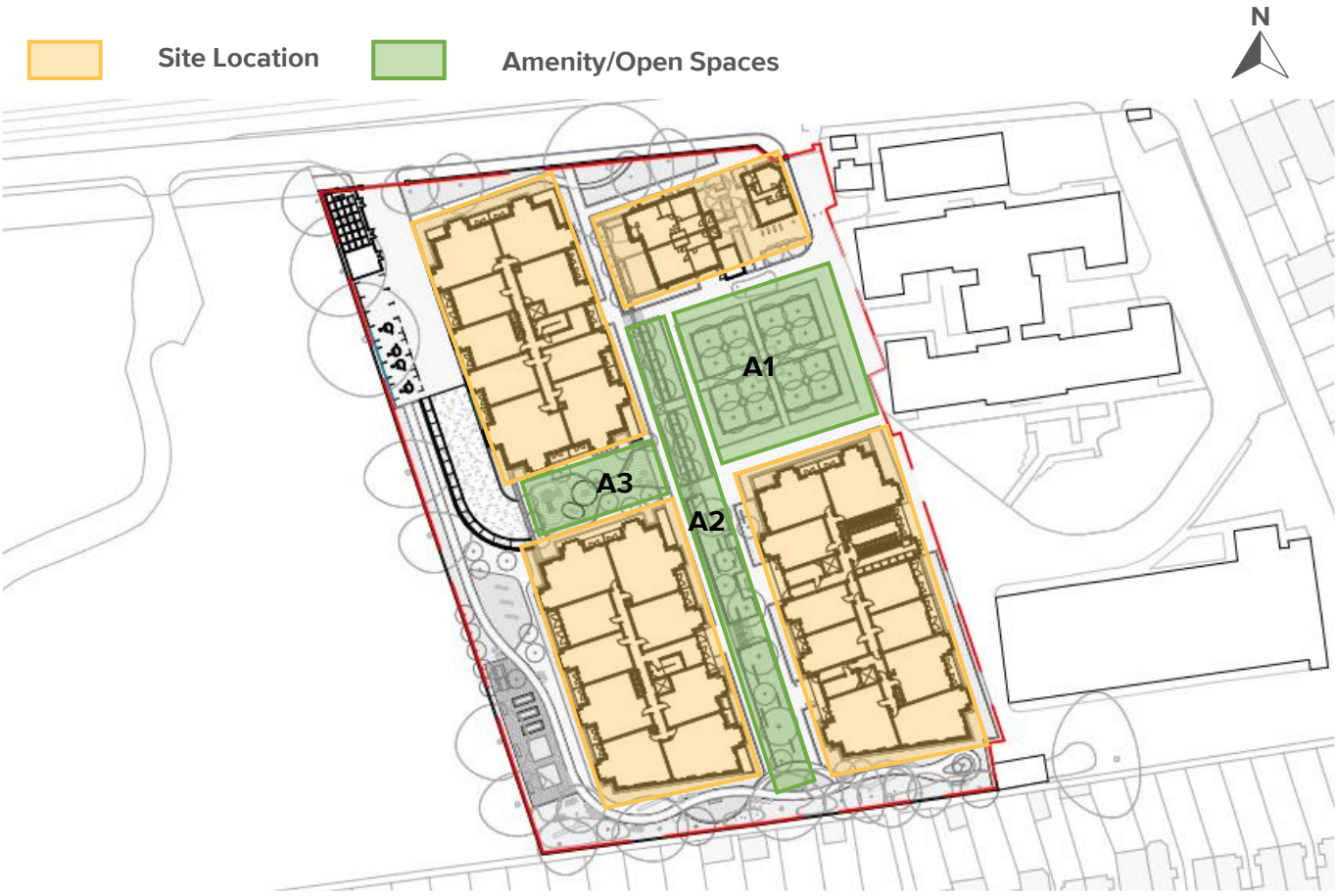


Figure 2: Open spaces in the development.

Area receiving at least 2 hours of sunlight on 21 March in the proposed context

Area receiving less than 2 hours of sunlight on 21 March in the proposed context

Figure 3: Overshadowing results for the open space in the proposed development.

Table 3: Overshadowing results proposed development.

Amenity Reference	Amenity Area (m^2)	Lit Area Proposed (m^2)	Proposed Lit Area (%)	Meets BRE Criteria
A1	460.00	460.00	100	Meets BRE Guidance
A2	414.40	414.40	100	Meets BRE Guidance
A3	210.00	195.75	93	Meets BRE Guidance

CONCLUSION

The daylight, sunlight and overshadowing analysis indicates that the habitable rooms of the proposed development at Barnes Hospital will achieve adequate levels of daylight and sunlight.

DAYLIGHT ASSESSMENT

A total of 108 rooms have been included in the assessment. All habitable rooms (KLDs and bedrooms) within the dwellings were assessed

The 40 dwellings consist of 108 habitable rooms that encompass 40 KLDs and 68 bedrooms.

The analysis results indicated that 49 out of 108 rooms satisfy the recommendations set out by the BRE Guide.

The remaining 59 rooms consist of 34 KLDs and 25 bedrooms. 9 of these KLDs meets within 80% of the BRE recommendations (an sDA of 40%) and 8 meet within 60% of the BRE recommendations (an sDA of 30%).

For the remaining 25 bedrooms, 8 meet within 80% or above of the BRE recommendations and 10 meet within 60% or above of the BRE recommendations. The remaining 7 bedrooms fall short due to it having greater site obstruction.

The design team have also made amendments to the design in order to maximise the level of daylight received as far as is considered feasible.

Overall, the proposed development as a whole is anticipated to achieve adequate levels of daylighting to all dwellings and habitable spaces, and is therefore considered to provide good quality of accommodation to the future occupants in terms of daylight considering the context and limitations of the site.

SUNLIGHT ASSESSMENT

All 40 living spaces were included in the assessment. The analysis has shown that 38 rooms will satisfy the BRE criteria for sunlight exposure.

The remaining 2 living rooms fall short of the BRE criteria however they are located in units with at least one bedroom which passes the BRE criteria and therefore the unit can be considered to meet the sunlight criteria as a whole.

Overall, it can be concluded that the proposed design offers adequate accessibility to sunlight in living spaces considering the context and limitations of the site.

OVERSHADOWING ASSESSMENT

A solar access analysis was undertaken for a total of 3 amenity spaces for the full 24 hours on 21st of March in line with the BRE guidance. The results show that all assessed spaces receive at least 2 hours of sunlight on 21 March over at least 50% of their area and therefore are meeting the BRE recommendations for amenity areas.

Overall, it can be concluded that the proposed masterplan layout allows for good accessibility to sunlight across the open spaces within the site boundary.

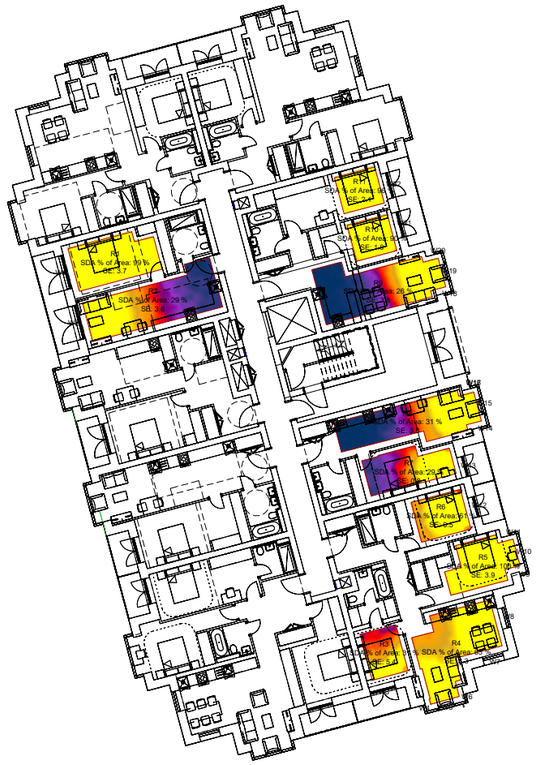
APPENDIX A – PROPOSED SCHEME WINDOW AND ROOM REFERENCE

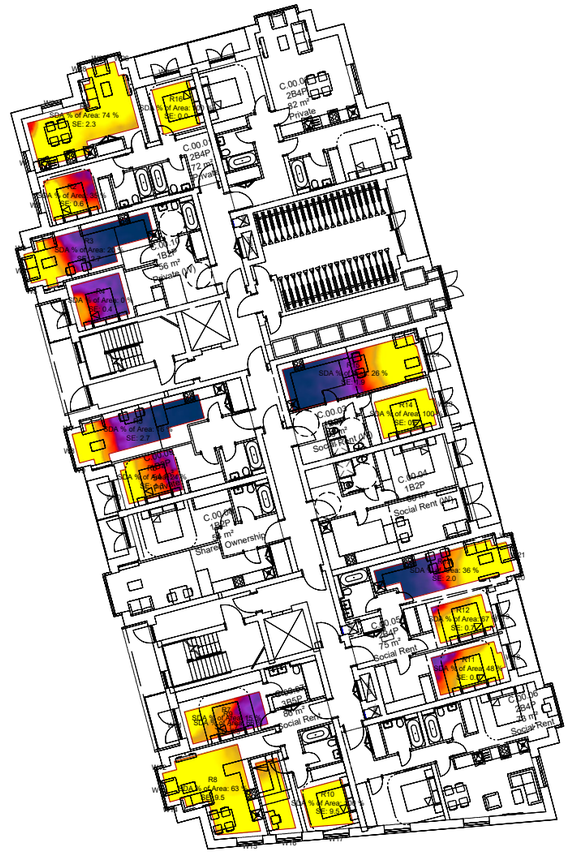
DO NOT SCALE

BACKGROUND DRAWING INFORMATION

FILE NAME	ORIGINATOR NAME	DESCRIPTION NAME	REV	DATE RECD

Notes





SDA % of Hours > req. lux

50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00

Rev	Date	Description	Chk'd	Appr

XCO2

The Gymnasium,
56 Kingsway Place,
Sans Walk, London
EC1R 0LU
+44 (0) 20 7700 1000
mail@xco2.com
www.xco2.com

Client
Star Land Realty UK Ltd

Architect
Scott Brownrigg Ltd

Project
Barnes Hospital

Title
SDA Results
Ground Floor

Scale@A3	Drawn	Checked	Date
N.T.S	LU	TK	13.12.2022

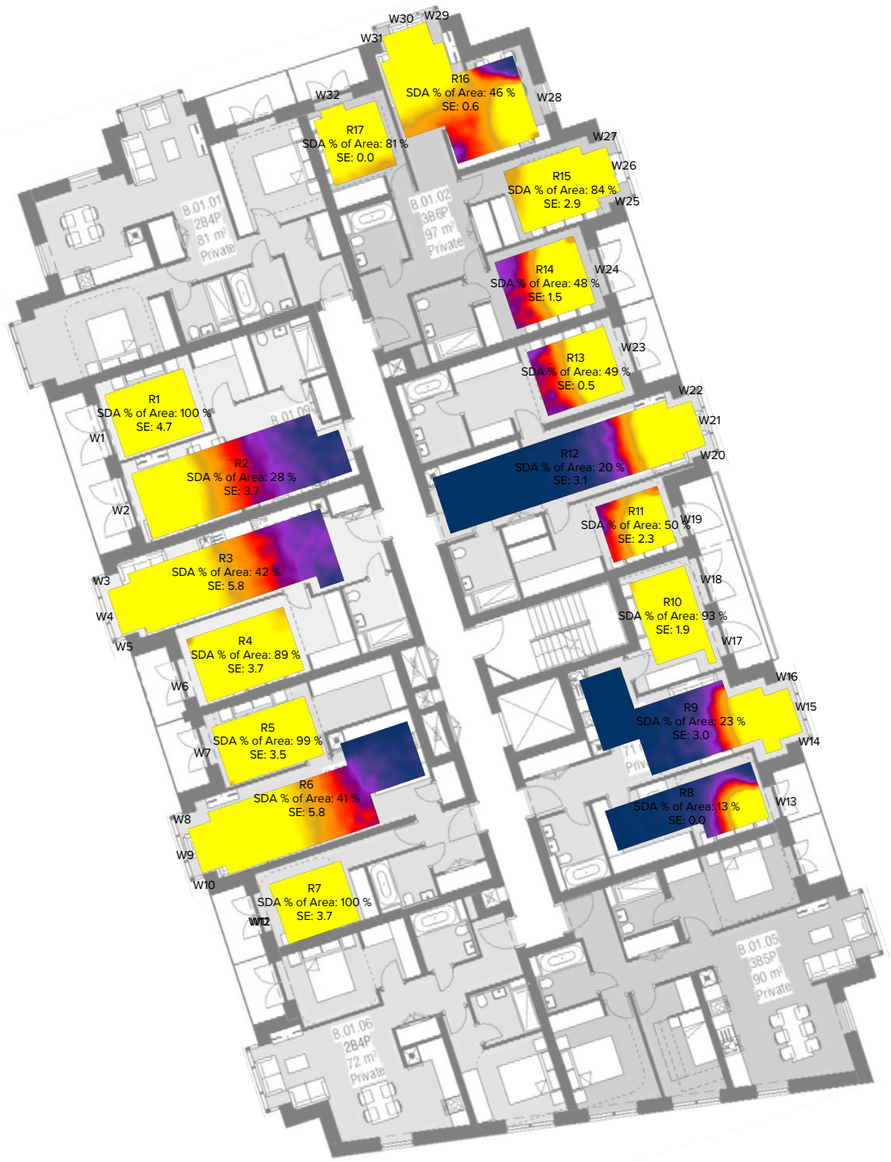
Drawing Number
9.845_01

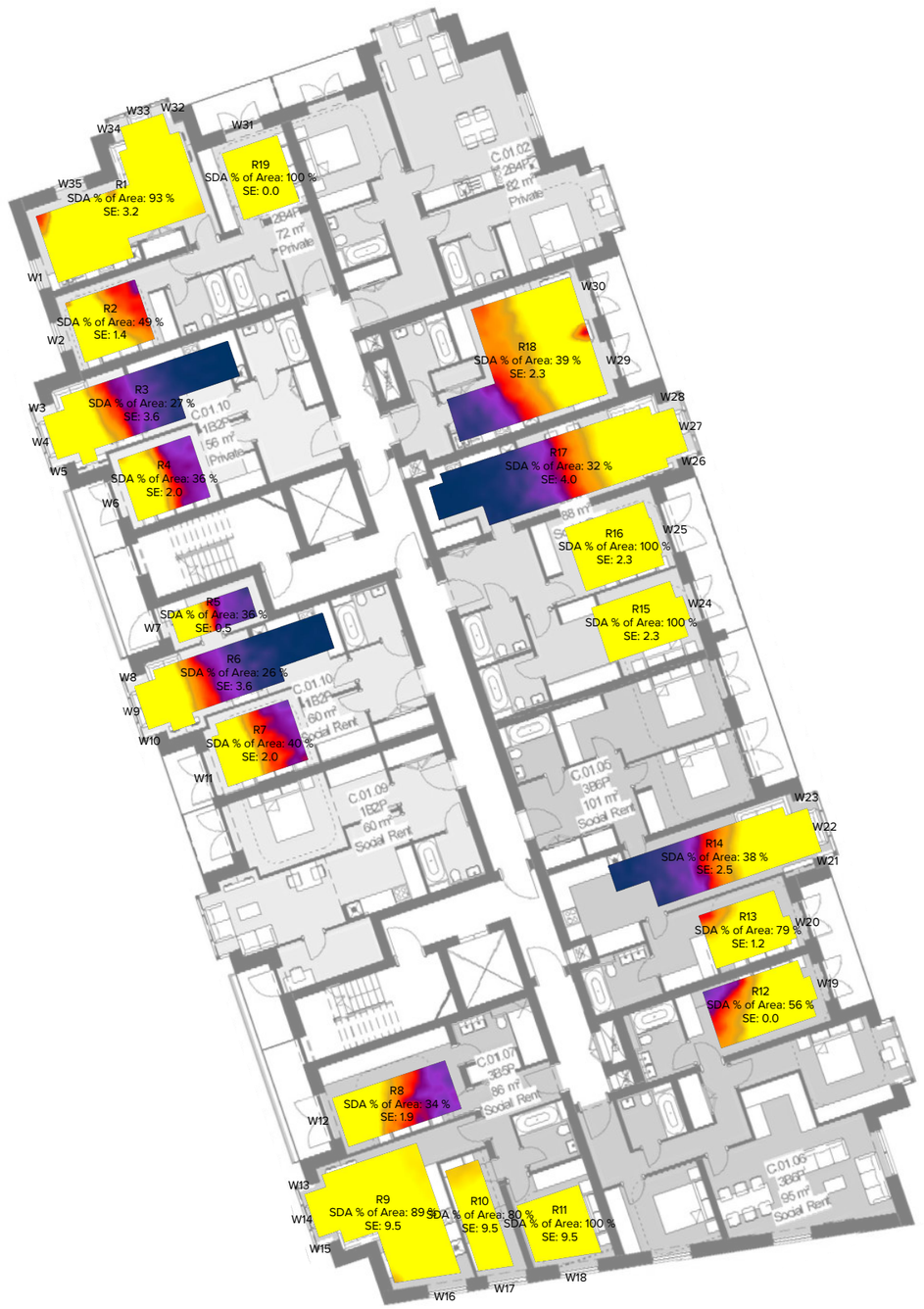
Revision
01

DO NOT SCALE

BACKGROUND DRAWING INFORMATION

FILE NAME	ORIGINATOR NAME	DESCRIPTION NAME	REV	DATE RECD





Notes

SDA % of Hours > req. lux

50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00

Rev.	Date	Description	Chk'd	Appr

ISSUE TYPE

XCO2

The Gymnasium,
56 Kingsway Place,
Sans Walk, London
EC1R 0LU
+44 (0) 20 7700 1000
mail@xco2.com
www.xco2.com

Client
Star Land Realty UK Ltd

Architect
Scott Brownrigg Ltd

Project
Barnes Hospital

Title
SDA Results
First Floor

Scale@A3	Drawn	Checked	Date
N.T.S	YC	EC	16.05.2024

Drawing Number
9.845_02

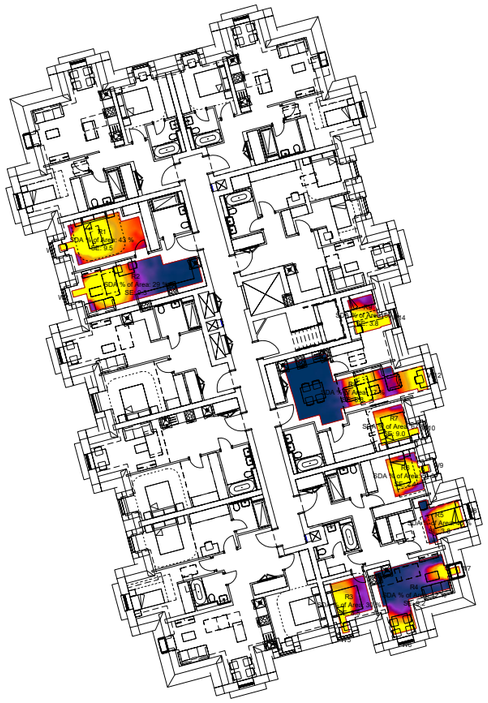
Revision
02

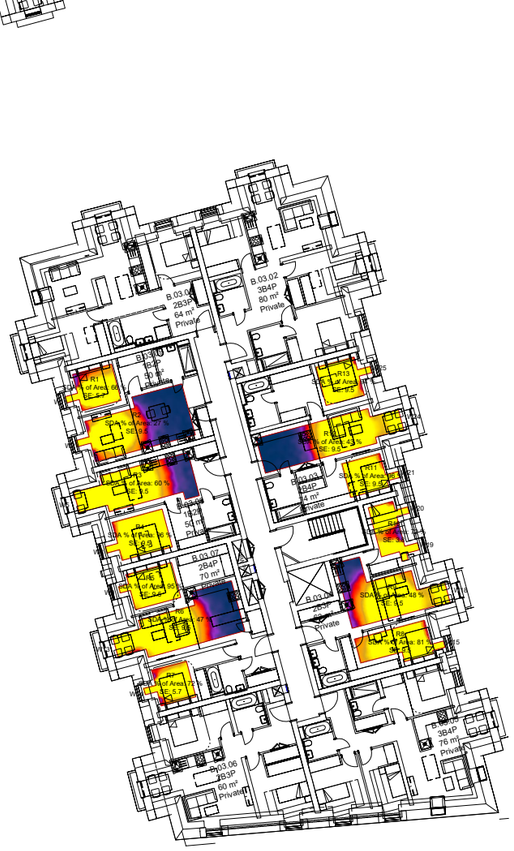
DO NOT SCALE

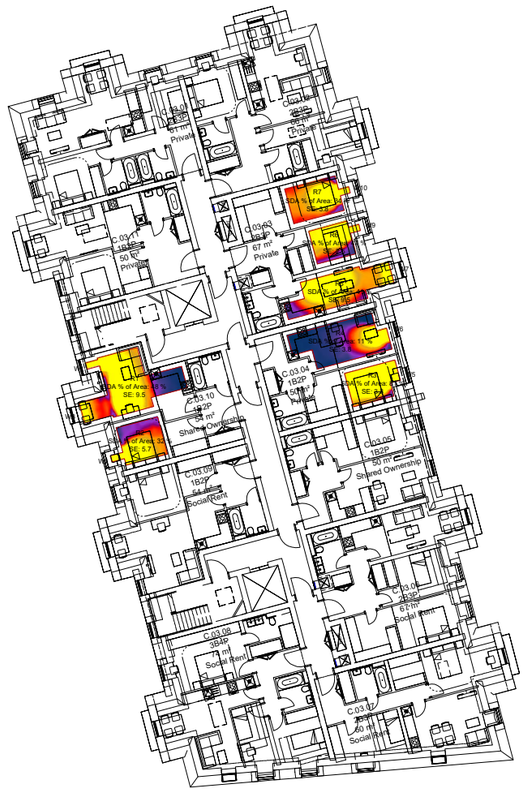
BACKGROUND DRAWING INFORMATION

FILE NAME	ORIGINATOR NAME	DESCRIPTION NAME	REV	DATE REC'D

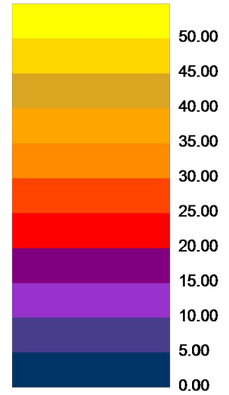
Notes







SDA % of Hours > req. lux



Rev	Date	Description	Chk'd	Appr

XCO2

The Gymnasium,
56 Kingsway Place,
Sans Walk, London
EC1R 0LU
+44 (0) 20 7700 1000
mail@xco2.com
www.xco2.com

Client
Star Land Realty UK Ltd

Architect
Scott Brownrigg Ltd

Project
Barnes Hospital

Title
SDA Results
Second Floor

Scale@A3	Drawn	Checked	Date
N.T.S	LU	TK	13.12.2022

Drawing Number
9.845_03

Revision
01

APPENDIX B - DETAILED DAYLIGHT RESULTS

Barnes Hospital
8.972
SDA BS En17037 Analysis - Proposed Scheme
Date of Analysis: 28/11/2022

XCO2

								Criteria				
Floor Ref	Room Ref	Room Use	Room Area m2	Effective Area	Median Lux	Area Meeting Req Lux	% of Area Meeting Req Lux	Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	Meets Criteria
Block C												
Ground	R1	LKD	25.26	18.36	273	13.66	74%	200	50%	50%	4380	YES
	R2	Bedroom	9.93	6.50	57	2.28	35%	100	50%	50%	4380	NO
	R3	LKD	21.23	14.73	56	2.93	20%	200	50%	50%	4380	NO
	R4	Bedroom	10.37	6.86	32	0.00	0%	100	50%	50%	4380	NO
	R5	LKD	20.34	13.97	44	2.23	16%	200	50%	50%	4380	NO
	R6	Bedroom	11.26	7.54	47	1.85	24%	100	50%	50%	4380	NO
	R7	Bedroom	12.77	8.57	48	1.31	15%	100	50%	50%	4380	NO
	R8	LKD	23.35	17.22	257	10.88	63%	200	50%	50%	4380	YES
	R9	Bedroom	8.88	5.29	150	3.49	66%	100	50%	50%	4380	YES
	R10	Bedroom	9.24	5.94	238	5.94	100%	100	50%	50%	4380	YES
	R11	Bedroom	12.63	8.53	100	4.10	48%	100	50%	50%	4380	NO
	R12	Bedroom	10.12	6.54	135	4.39	67%	100	50%	50%	4380	YES
	R13	LKD	20.66	14.38	109	5.14	36%	200	50%	50%	4380	NO
	R14	Bedroom	10.71	7.01	244	7.01	100%	100	50%	50%	4380	YES
	R15	LKD	26.07	19.51	77	5.12	26%	200	50%	50%	4380	NO
	R16	Bedroom	9.04	5.79	215	5.79	100%	100	50%	50%	4380	YES
First	R1	LKD	25.26	18.36	321	17.05	93%	200	50%	50%	4380	YES
	R2	Bedroom	9.93	6.50	94	3.17	49%	100	50%	50%	4380	NO
	R3	LKD	21.23	14.73	69	3.93	27%	200	50%	50%	4380	NO
	R4	Bedroom	10.37	6.86	56	2.50	36%	100	50%	50%	4380	NO
	R5	Bedroom	6.46	3.55	40	1.29	36%	100	50%	50%	4380	NO
	R6	LKD	20.34	13.97	55	3.62	26%	200	50%	50%	4380	NO
	R7	Bedroom	11.26	7.54	48	2.98	40%	100	50%	50%	4380	NO
	R8	Bedroom	12.77	8.57	53	2.94	34%	100	50%	50%	4380	NO
	R9	LKD	23.35	17.22	305	15.34	89%	200	50%	50%	4380	YES
	R10	Bedroom	8.88	5.29	185	4.23	80%	100	50%	50%	4380	YES
	R11	Bedroom	9.24	5.94	283	5.94	100%	100	50%	50%	4380	YES
	R12	Bedroom	12.63	8.53	127	4.81	56%	100	50%	50%	4380	YES
	R13	Bedroom	10.12	6.54	160	5.16	79%	100	50%	50%	4380	YES
	R14	LKD	20.66	14.38	128	5.50	38%	200	50%	50%	4380	NO
	R15	Bedroom	10.71	7.01	251	7.01	100%	100	50%	50%	4380	YES
	R16	Bedroom	11.72	7.94	269	7.94	100%	100	50%	50%	4380	YES
	R17	LKD	28.87	21.24	91	6.75	32%	200	50%	50%	4380	NO
	R18	LKD	27.92	21.28	158	8.31	39%	200	50%	50%	4380	NO
	R19	Bedroom	9.04	5.79	218	5.79	100%	100	50%	50%	4380	YES
Second	R1	LKD	23.07	15.87	171	7.59	48%	200	50%	50%	4380	NO
	R2	Bedroom	10.62	6.73	65	2.13	32%	100	50%	50%	4380	NO
	R3	Bedroom	10.10	6.49	138	5.24	81%	100	50%	50%	4380	YES
	R4	LKD	18.46	12.94	48	1.41	11%	200	50%	50%	4380	NO
	R5	LKD	17.37	11.60	167	4.77	41%	200	50%	50%	4380	NO
	R6	Bedroom	8.97	5.47	99	2.59	47%	100	50%	50%	4380	NO
	R7	Bedroom	11.45	7.43	77	2.53	34%	100	50%	50%	4380	NO
Block B												
Ground	R1	Bedroom	10.97	7.33	297	7.33	100%	100	50%	50%	4380	YES
	R2	LKD	21.70	15.16	118	5.10	34%	200	50%	50%	4380	NO
	R3	LKD	26.37	19.29	152	7.75	40%	200	50%	50%	4380	NO
	R4	Bedroom	13.23	9.16	150	7.98	87%	100	50%	50%	4380	YES
	R5	Bedroom	12.02	8.14	185	8.07	99%	100	50%	50%	4380	YES
	R6	LKD	28.35	20.66	132	8.07	39%	200	50%	50%	4380	NO
	R7	Bedroom	10.47	6.78	251	6.78	100%	100	50%	50%	4380	YES
	R8	Bedroom	15.73	10.39	12	0.97	9%	100	50%	50%	4380	NO
	R9	LKD	22.61	15.06	30	3.41	23%	200	50%	50%	4380	NO
	R10	Bedroom	6.54	3.73	74	1.39	37%	100	50%	50%	4380	NO
	R11	LKD	31.18	23.92	26	3.11	13%	200	50%	50%	4380	NO
	R12	Bedroom	10.71	7.13	44	2.06	29%	100	50%	50%	4380	NO
	R13	Bedroom	12.26	8.19	51	2.73	33%	100	50%	50%	4380	NO
	R14	Bedroom	10.85	7.11	257	6.32	89%	100	50%	50%	4380	YES
	R15	LKD	23.43	17.07	142	6.25	37%	200	50%	50%	4380	NO
	R16	Bedroom	10.03	6.44	143	4.07	63%	100	50%	50%	4380	YES
First	R1	Bedroom	10.97	7.34	319	7.34	100%	100	50%	50%	4380	YES
	R2	LKD	25.36	18.83	91	5.19	28%	200	50%	50%	4380	NO
	R3	LKD	26.37	19.29	150	8.11	42%	200	50%	50%	4380	NO
	R4	Bedroom	13.23	9.16	152	8.14	89%	100	50%	50%	4380	YES
	R5	Bedroom	12.02	8.14	181	8.06	99%	100	50%	50%	4380	YES
	R6	LKD	28.35	20.66	136	8.51	41%	200	50%	50%	4380	NO
	R7	Bedroom	9.73	6.34	233	6.34	100%	100	50%	50%	4380	YES
	R8	Bedroom	15.18	10.14	14	1.28	13%	100	50%	50%	4380	NO
	R9	LKD	25.08	17.52	37	4.07	23%	200	50%	50%	4380	NO
	R10	Bedroom	10.77	6.88	233	6.43	93%	100	50%	50%	4380	YES
	R11	Bedroom	8.25	5.16	99	2.58	50%	100	50%	50%	4380	YES
	R12	LKD	29.09	21.43	28	4.21	20%	200	50%	50%	4380	NO
	R13	Bedroom	11.03	7.39	96	3.61	49%	100	50%	50%	4380	NO
	R14	Bedroom	11.68	7.93	98	3.84	48%	100	50%	50%	4380	NO
	R15	Bedroom	12.79	8.67	284	7.24	84%	100	50%	50%	4380	YES
	R16	LKD	23.44	17.07	192	7.82	46%	200	50%	50%	4380	NO
	R17	Bedroom	9.68	6.22	173	5.06	81%	100	50%	50%	4380	YES
Second	R1	Bedroom	9.97	6.21	113	4.11	66%	100	50%	50%	4380	YES
	R2	LKD	26.07	19.34	74	5.16	27%	200	50%	50%	4380	NO
	R3	LKD	22.48	15.93	235	9.56	60%	200	50%	50%	4380	YES
	R4	Bedroom	12.44	8.20	250	7.90	96%	100	50%	50%	4380	YES
	R5	Bedroom	10.71	6.85	288	6.54	95%	100	50%	50%	4380	YES
	R6	LKD	26.65	19.50	197	9.24	47%	200	50%	50%	4380	NO
	R7	Bedroom	8.98	5.43	123	3.90	72%	100	50%	50%	4380	YES
	R8	Bedroom	13.26	8.41	202	6.80	81%	100	50%	50%	4380	YES
	R9	LKD	23.03	16.33	186	7.80	48%	200	50%	50%	4380	NO
	R10	Bedroom	10.48	5.94	195	4.30	72%	100	50%	50%	4380	YES
	R11	Bedroom	9.25	5.63	347	5.40	96%	100	50%	50%	4380	YES
	R12	LKD	25.70	18.57	165	8.05	43%	200	50%	50%	4380	NO
	R13	Bedroom	10.20	6.40	276	6.01	94%	100	50%	50%	4380	YES
Block A												
Ground	R1	Bedroom	16.80	11.94	196	11.77	99%	100	50%	50%	4380	YES
	R2	LKD	25.62	18.84	91	5.46	29%	200	50%	50%	4380	NO
	R3	Bedroom	9.18	5.88	62	1.84	31%	100	50%	50%	4380	NO

Barnes Hospital
8.972
SDA BS En17037 Analysis - Proposed Scheme
Date of Analysis: 28/11/2022

								Criteria				
Floor Ref	Room Ref	Room Use	Room Area m2	Effective Area	Median Lux	Area Meeting Req Lux	% of Area Meeting Req Lux	Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	Meets Criteria
	R4	LKD	22.64	16.34	257	10.27	63%	200	50%	50%	4380	YES
	R5	Bedroom	13.91	9.30	326	9.30	100%	100	50%	50%	4380	YES
	R6	Bedroom	10.54	6.99	118	4.28	61%	100	50%	50%	4380	YES
	R7	Bedroom	14.39	9.69	50	2.86	29%	100	50%	50%	4380	NO
	R8	LKD	22.84	16.07	97	5.05	31%	200	50%	50%	4380	NO
	R9	LKD	24.94	18.28	57	4.68	26%	200	50%	50%	4380	NO
	R10	Bedroom	8.25	5.16	170	4.66	90%	100	50%	50%	4380	YES
	R11	Bedroom	8.26	5.17	193	4.95	96%	100	50%	50%	4380	YES
First	R1	Bedroom	15.89	10.86	76	4.65	43%	100	50%	50%	4380	NO
	R2	LKD	22.14	15.57	61	4.59	29%	200	50%	50%	4380	NO
	R3	Bedroom	8.60	5.07	55	1.51	30%	100	50%	50%	4380	NO
	R4	LKD	18.43	12.53	43	1.51	12%	200	50%	50%	4380	NO
	R5	Bedroom	8.01	4.58	74	2.10	46%	100	50%	50%	4380	NO
	R6	Bedroom	7.87	4.61	115	2.37	51%	100	50%	50%	4380	YES
	R7	Bedroom	7.32	4.20	193	2.82	67%	100	50%	50%	4380	YES
	R8	LKD	27.76	19.76	18	3.28	17%	200	50%	50%	4380	NO
	R9	Bedroom	6.70	3.72	197	2.24	60%	100	50%	50%	4380	YES

APPENDIX C - DETAILED SUNLIGHT RESULTS

Barnes Hospital
8.972
Sunlight Exposure Analysis - Proposed Scheme
13/12/2022

Floor Ref	Room Ref	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure (Hours)	Rating
			Block C			
Ground	R1	LKD	W1	251°	2	
			W26	71°N	0	
			W27	341°N	0	
			W28	251°	0.3	
			W29	341°N	0	
					2.3	Minimum
Ground	R2	Bedroom	W2	251°	0.6	
					0.6	Failed
Ground	R3	LKD	W3	341°N	0	
			W4	251°	2.6	
			W5	161°	2.7	
					2.7	Minimum
Ground	R4	Bedroom	W6	251°	0.4	
					0.4	Failed
Ground	R5	LKD	W7	341°N	0	
			W8	251°	2.6	
			W9	161°	2.7	
					2.7	Minimum
Ground	R6	Bedroom	W10	251°	1.3	
					1.3	Failed
Ground	R7	Bedroom	W11	251°	1.7	
					1.7	Minimum
Ground	R8	LKD	W12	341°N	0	
			W13	251°	5	
			W14	161°	6	
			W15	172°	9.5	
					9.5	High
Ground	R9	Bedroom	W16	172°	9.5	
					9.5	High
Ground	R10	Bedroom	W17	172°	9.5	
					9.5	High
Ground	R11	Bedroom	W18	71°N	0	
					0	Failed
Ground	R12	Bedroom	W19	71°N	0.7	
					0.7	Failed
Ground	R13	LKD	W20	161°	1.8	
			W21	71°N	1.9	
			W22	341°N	0	
					2	Minimum
Ground	R14	Bedroom	W23	71°N	0.6	
					0.6	Failed
Ground	R15	LKD	W24	71°N	1.9	
					1.9	Minimum
Ground	R16	Bedroom	W25	341°N	0	
					0	Failed
First	R1	LKD	W1	251°	2.7	
			W32	71°N	0	
			W33	341°N	0.1	
			W34	251°	0.4	
			W35	341°N	0	
					3.2	Medium
First	R2	Bedroom	W2	251°	1.4	
					1.4	Failed
First	R3	LKD	W3	341°N	0	
			W4	251°	3.3	
			W5	161°	3.6	
					3.6	Medium
First	R4	Bedroom	W6	251°	2	
					2	Minimum
First	R5	Bedroom	W7	251°	0.5	
					0.5	Failed
First	R6	LKD	W8	341°N	0	
			W9	251°	3.4	
			W10	161°	3.4	
					3.6	Medium
First	R7	Bedroom	W11	251°	2	
					2	Minimum
First	R8	Bedroom	W12	251°	1.9	
					1.9	Minimum
First	R9	LKD	W13	341°N	0	
			W14	251°	5	
			W15	161°	6	
			W16	172°	9.5	
					9.5	High
First	R10	Bedroom	W17	172°	9.5	
					9.5	High
First	R11	Bedroom	W18	172°	9.5	
					9.5	High

Barnes Hospital
8.972
Sunlight Exposure Analysis - Proposed Scheme
13/12/2022

Floor Ref	Room Ref	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure (Hours)	Rating
First	R12	Bedroom	W19	71°N	0	
					0	Failed
First	R13	Bedroom	W20	71°N	1.2	
					1.2	Failed
First	R14	LKD	W21	161°	2.3	
			W22	71°N	2.4	
			W23	341°N	0	
					2.5	Minimum
First	R15	Bedroom	W24	71°N	2.3	
					2.3	Minimum
First	R16	Bedroom	W25	71°N	2.3	
					2.3	Minimum
First	R17	LKD	W26	161°	4	
			W27	71°N	3.8	
			W28	341°N	0	
					4	Medium
First	R18	LKD	W29	71°N	0.8	
			W30	71°N	2.3	
					2.3	Minimum
First	R19	Bedroom	W31	341°N	0	
					0	Failed
Second	R1	LKD	W1	251°	4.5	
			W2	251° Inc	9.5	
			W3	251°	5.7	
					9.5	High
Second	R2	Bedroom	W4	251°	5.7	
					5.7	High
Second	R3	Bedroom	W5	71°N	3.8	
					3.8	Medium
Second	R4	LKD	W6	71°N	3.8	
					3.8	Medium
Second	R5	LKD	W7	71°N	3.8	
			W8	251° Inc	9.5	
					9.5	High
Second	R6	Bedroom	W9	71°N	2.5	
					2.5	Minimum
Second	R7	Bedroom	W10	71°N	3.8	
					3.8	Medium
			Block B			
Ground	R1	Bedroom	W1	251°	3.7	
					3.7	Medium
Ground	R2	LKD	W2	251°	3.7	
					3.7	Medium
Ground	R3	LKD	W3	341°N	0.4	
			W4	251°	5.7	
			W5	161°	5.2	
					5.7	High
Ground	R4	Bedroom	W6	251°	3.7	
					3.7	Medium
Ground	R5	Bedroom	W7	251°	3.4	
					3.4	Medium
Ground	R6	LKD	W8	341°N	0.4	
			W9	251°	5.5	
			W10	161°	5.2	
					5.6	High
Ground	R7	Bedroom	W11	251°	3.7	
					3.7	Medium
Ground	R8	Bedroom	W12	71°N	0	
					0	Failed
Ground	R9	LKD	W13	161°	2.6	
			W14	71°N	2.6	
			W15	342°N	0	
					2.7	Minimum
Ground	R10	Bedroom	W16	71°N	0	
					0	Failed
Ground	R11	LKD	W17	161°	2.4	
			W18	71°N	2.5	
			W19	341°N	0	
					2.5	Minimum
Ground	R12	Bedroom	W20	72°N	0	
					0	Failed
Ground	R13	Bedroom	W21	71°N	1	
					1	Failed
Ground	R14	Bedroom	W22	161°	2.4	
			W23	71°N	2.4	
			W24	341°N	0	
					2.5	Minimum
Ground	R15	LKD	W25	71°N	0	
			W26	72°N	0	

Barnes Hospital
8.972
Sunlight Exposure Analysis - Proposed Scheme
13/12/2022

Floor Ref	Room Ref	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure (Hours)	Rating
			W27	341°N	0.4	
			W28	251°	0.2	
					0.4	Failed
Ground	R16	Bedroom	W29	341°N	0	
					0	Failed
First	R1	Bedroom	W1	251°	4.7	
					4.7	High
First	R2	LKD	W2	251°	3.7	
					3.7	Medium
First	R3	LKD	W3	341°N	0.4	
			W4	251°	5.7	
			W5	161°	5.5	
					5.8	High
First	R4	Bedroom	W6	251°	3.7	
					3.7	Medium
First	R5	Bedroom	W7	251°	3.5	
					3.5	Medium
First	R6	LKD	W8	341°N	0.4	
			W9	251°	5.7	
			W10	161°	5.5	
					5.8	High
First	R7	Bedroom	W11	251°	3.7	
			W12	251°	3.7	
					3.7	Medium
First	R8	Bedroom	W13	71°N	0	
					0	Failed
First	R9	LKD	W14	161°	2.8	
			W15	71°N	2.8	
			W16	342°N	0	
					3	Medium
First	R10	Bedroom	W17	71°N	0.1	
			W18	71°N	1.9	
					1.9	Minimum
First	R11	Bedroom	W19	71°N	2.3	
					2.3	Minimum
First	R12	LKD	W20	161°	3.1	
			W21	71°N	2.8	
			W22	341°N	0	
					3.1	Medium
First	R13	Bedroom	W23	72°N	0.5	
					0.5	Failed
First	R14	Bedroom	W24	71°N	1.5	
					1.5	Minimum
First	R15	Bedroom	W25	161°	2.9	
			W26	71°N	2.7	
			W27	341°N	0	
					2.9	Minimum
First	R16	LKD	W28	71°N	0.3	
			W29	72°N	0	
			W30	341°N	0.4	
			W31	251°	0.2	
					0.6	Failed
First	R17	Bedroom	W32	341°N	0	
					0	Failed
Second	R1	Bedroom	W1	251° Inc	5.7	
					5.7	High
Second	R2	LKD	W2	251°	5.7	
			W3	90° Hz	9.5	
					9.5	High
Second	R3	LKD	W4	90° Hz	9.5	
			W5	251°	5.7	
			W6	90° Hz	9.5	
			W7	90° Hz	9.5	
					9.5	High
Second	R4	Bedroom	W8	251°	5.7	
			W10	90° Hz	9.5	
					9.5	High
Second	R5	Bedroom	W9	251°	5.7	
			W11	90° Hz	9.5	
					9.5	High
Second	R6	LKD	W12	90° Hz	9.5	
			W13	251°	5.7	
					9.5	High
Second	R7	Bedroom	W14	251°	5.7	
					5.7	High
Second	R8	Bedroom	W15	72°N Inc	3.8	
			W16	90° Hz	9.5	
					9.5	High
Second	R9	LKD	W17	90° Hz	9.5	
			W18	71°N	3.8	
					9.5	High

Barnes Hospital
8.972
Sunlight Exposure Analysis - Proposed Scheme
13/12/2022

Floor Ref	Room Ref	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure (Hours)	Rating
Second	R10	Bedroom	W19	71°N	3.8	
			W20	71°N	3.8	
					3.8	Medium
Second	R11	Bedroom	W21	71°N Inc	3.8	
			W22	90° Hz	9.5	
					9.5	High
Second	R12	LKD	W23	90° Hz	9.5	
			W24	71°N	3.8	
					9.5	High
Second	R13	Bedroom	W25	72°N Inc	3.8	
			W26	90° Hz	9.5	
					9.5	High
			Block A			
Ground	R1	Bedroom	W1	251°	3.7	
					3.7	Medium
Ground	R2	LKD	W2	251°	3.6	
					3.6	Medium
Ground	R3	Bedroom	W3	161°	5.4	
					5.4	High
Ground	R4	LKD	W4	251°	5	
			W5	161°	7.2	
			W6	71°N	2.7	
			W7	161°	5.1	
			W8	71°N	2.6	
					8.3	High
Ground	R5	Bedroom	W9	161°	3.5	
			W10	71°N	3.2	
			W11	342°N	0	
					3.9	Medium
Ground	R6	Bedroom	W12	71°N	0.5	
					0.5	Failed
Ground	R7	Bedroom	W13	71°N	0.8	
					0.8	Failed
Ground	R8	LKD	W14	161° Inc	3.6	
			W15	71°N	3.8	
			W16	342°N	0	
			W17	342°N	0	
					3.8	Medium
Ground	R9	LKD	W18	161°	3.6	
			W19	71°N	3.8	
			W20	342°N	0	
					3.8	Medium
Ground	R10	Bedroom	W21	71°N	1	
					1	Failed
Ground	R11	Bedroom	W22	71°N	2.1	
					2.1	Minimum
First	R1	Bedroom	W1	251° Inc	5.7	
			W3	90° Hz	9.5	
					9.5	High
First	R2	LKD	W2	251° Inc	5.7	
			W4	90° Hz	9.5	
					9.5	High
First	R3	Bedroom	W5	161°	8.5	
					8.5	High
First	R4	LKD	W6	161°	9.2	
			W7	71°N	3.8	
					9.2	High
First	R5	Bedroom	W8	71°N	3.8	
					3.8	Medium
First	R6	Bedroom	W9	71°N	2.4	
					2.4	Minimum
First	R7	Bedroom	W10	71°N	3.8	
			W11	90° Hz	9	
					9	High
First	R8	LKD	W12	71°N	3.8	
			W13	90° Hz	8.8	
					8.8	High
First	R9	Bedroom	W14	71°N	3.8	
					3.8	Medium

XCO2
56 Kingsway Place, Sans Walk
London EC1R 0LU

+44 (0)20 7700 1000
mail@xco2.com
xco2.com