Daylight & Sunlight Report

R5 South

King's Cross Central
General Partner Ltd

March 2013

King's Cross

Contacts

Hoare Lea

140 Aztec West Business Park
Almondsbury
Bristol
BS32 4TX

T: +44 (0)1454 201 020
F: +44 (0)1454 201 704
W: www.hoarelea.com

Contents

0.0 Introduction

0.1 Planning Requirements

This Daylight and Sunlight report provides information to discharge Condition 43 of the King's Cross Central Outline Planning Permission (2004/2307/P) in respect of R5 South. The condition states:

Applications for the approval of Reserved Matters in relation to the residential accommodation shall be accompanied by details of how the proposed design applies the standards recommended in the Building Research Establishment's "Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice 1991".

The guide referred to in the condition was published in 1991. Subsequently, the 2nd edition was published in 2011.

This report provides the details required by the condition, setting out the level of daylight and sunlight achieved across the dwellings in R5 South against the Building Research Establishment's (BRE) recommended standards, "Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice 1991" document (the BRE Guidelines), making reference to the 2nd edition where relevant.

The BRE Guidelines specify that daylight to new build accommodation should be assessed using the Average Daylight Factor (ADF). This is a detailed method which considers not only the amount of sky visibility on the vertical face of the window, but also the window size, room size and room use.

In relation to sunlight, the criteria given in the BRE Guidelines calculates the annual probable sunlight hours (APSH) having regard to the amount of sun available in both summer and winter for each given window facing within 90º of due south. Summer is considered to be the six months between March 21 and September 21 and winter the remaining months.

The assessments within this report have been undertaken against the maximum building heights set out in Parameter Plan KXC 014 attached to the Outline Planning Permission, or in the case of Buildings R2, R4 and the 3 blocks comprising R5 North, the scheme for which Reserved Matters were approved in January 2009, April 2012 and April 2011 respectively.

The analysis has been carried out using a 3D computer model and specialist computer software. The sources of information are as follows:

- The King's Cross Central masterplan representing the Outline Planning Permission.
- Maccreanor Lavington Architects (MLA) architectural drawings for R5 South.

This document should also be read in the context of other plans and documents forming the R5 South submission, including the Planning Compliance Report and the Urban Design Report.

0.2 Site

R5 South is part of the new King's Cross Central (KXC) development.

R5 South comprises one of four blocks within the R5 plot. The North, West and East blocks were previously approved as part of the R5 North Reserved Matters submission (Ref. 2011/0431/P) and are currently under construction. When complete, the R5 buildings will together form a C-shape around a central courtyard. This submission deals only with the South block which comprises a total of 76 high quality private residential units.

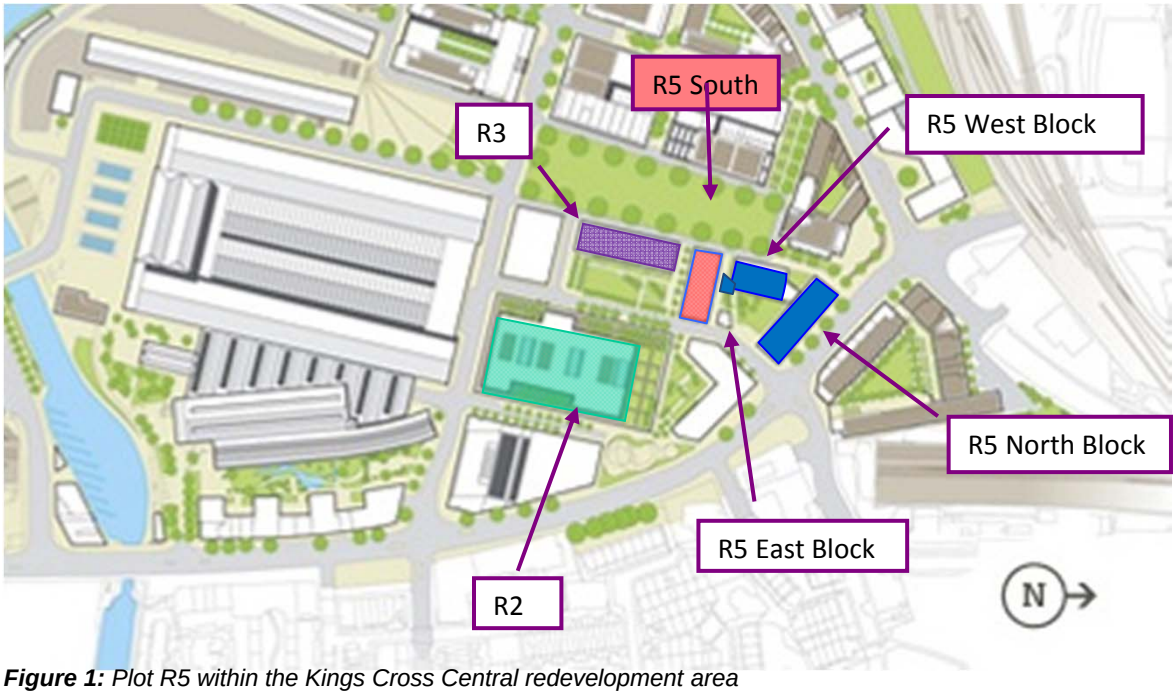

Figure 1: *Plot R5 within the Kings Cross Central redevelopment area*

The R5 site is bounded by York Way to the north-east, with the residential building, R4 (now complete and occupied as Rubicon Court), to the east, the R2 office building to the south east, and plot R3 to the south. Cubitt Park and plot S5 are to the west. Figure 1 above shows the location of R5 within the KXC development area.

0.3 Building

R5 South extends to a maximum height of ground plus 15 storeys, with a shoulder element of ground plus seven storeys. A commercial unit and entrance to the residential units above are located at ground floor. The apartments in R5 South are orientated on a south-south-east to north-north-west axis. Consequently, most of the apartments face north-north-east and south-south-west.

Levels 1 to 7 are composed of seven apartments each, ranging in size from studios to 3 bedroom flats. The tower has an additional six levels of four apartments, as well as three penthouse suites at the 'crown' of the building extending over the top two floors (levels 14 and 15). Four of the apartments on each floor and all three penthouses are dual aspect (i.e. 55 of the 76 units in total).

The ground level of R5 South is at +25.1m; the top of the building rises to +77.0 m. Floor to ceiling heights are 2.5 m, with a floor-to-floor height of 3.075m.

The ground floor commercial unit is not part of this daylight study.

Figure 2: *Birdseye view of R5 South model from North*

A 3D model was constructed from plans and elevations supplied by the client. Save for built-in storage units and kitchen worktops, no furniture is included in the assessment.

Figure 3: *Panoramic render: Level 9, apartment 1, bedroom 1. The green object is a built-in cupboard.*

0.4 Design Considerations

Throughout the design phase, the project team has worked together to maximise the daylight and sunlight levels within the proposed apartments, balancing design considerations such as the provision of external balconies, massing, internal layout, facade detailing and solar gain/solar shading with the recommended standards in the BRE Guidelines.

The 'C-shape' configuration of the collection of buildings making up plot R5 and the arrangement of the surrounding buildings will inevitably shade some of the R5 South facades at various times of the day. Indeed, self shading, particularly on the south facade is considered advantageous in terms of reducing solar gain within the apartments. R5 South and the courtyard have been orientated such that daylight can enter between the buildings and be reflected off the light coloured internal facades.

The facade design has been developed with the architects (MLA) to exceed Part L 2010 thermal criteria and maximise daylight and sunlight penetration throughout the day. This includes providing a mix of projecting, recessed and/or Juliet balconies with full height windows to all living spaces in R5 South.

The internal apartment layouts in all blocks have been designed to ensure living rooms include at least two windows. Overall 73% (55 out of 76) of apartments are dual aspect.

Where possible, the kitchens have been brought closer to the facade to increase natural light. However, it is acknowledged that kitchen areas are often suited to deep plan locations to take advantage of the extensive wall area for cupboards and to maximise available light for key living spaces.

The resulting design thus protects the architectural integrity of the building and provides high quality internal living spaces, which maximise daylight penetration into the building. This is demonstrated by the results and analysis in sections 1.4 and 2.4.

Figure 4 below shows a 3d model of the massing of R5 South and the approved massing of the neighbouring R5 North, R2 and R4 buildings. As noted previously, other buildings which have not yet received Reserved Matters approval are shown illustratively, based on the maximum permitted height and massing under the Outline Planning Permission.

For Building R3, which is still to be designed, the model assumes a step down from +77m AOD in the south to +53m in the north. This assumption has been informed by comparative computer simulations of the daylight and sunlight availability for the south facing apartments in R5 South using different massing options for R3.

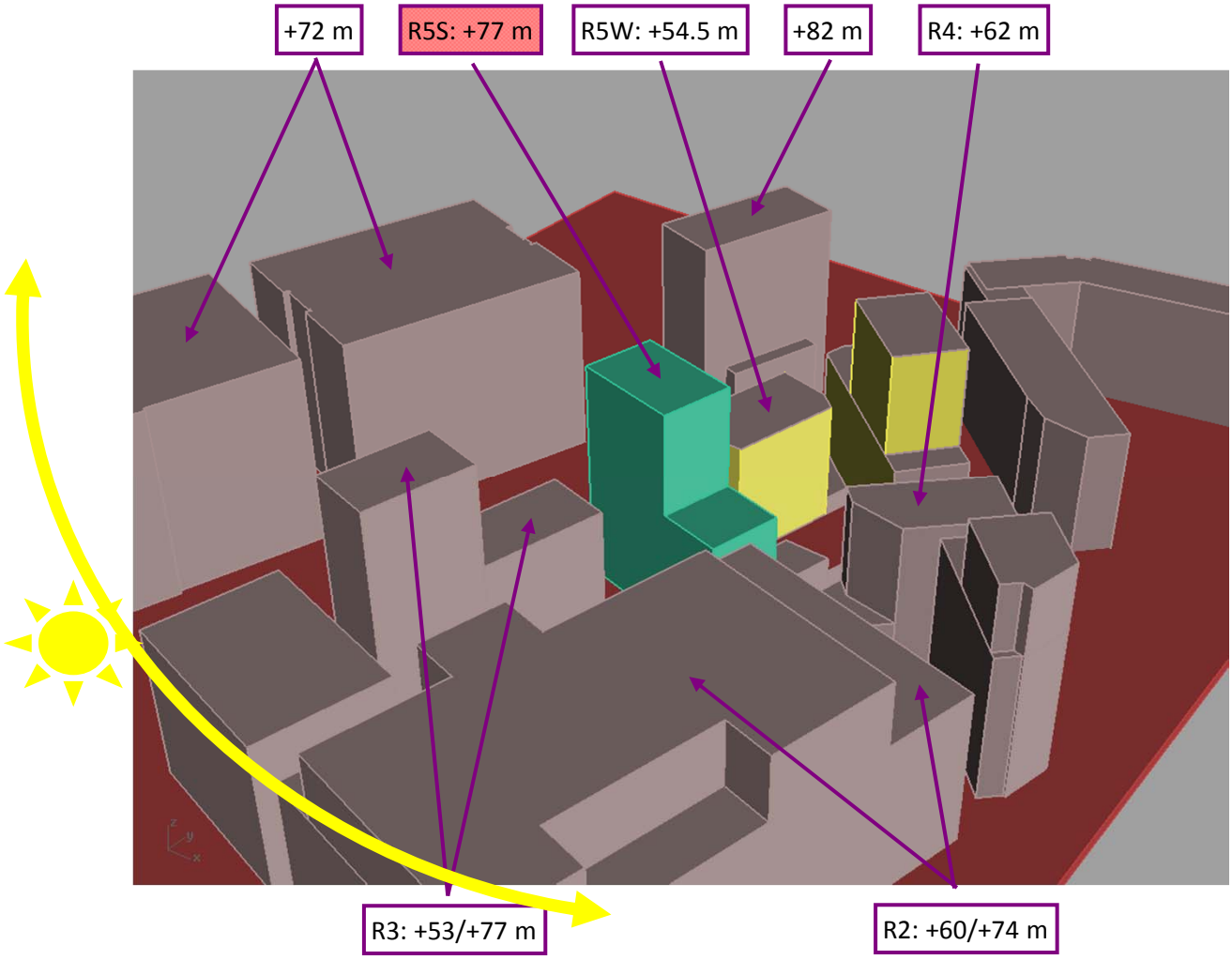

Figure 4: *Plot R5 South (in green) within the Kings Cross Central redevelopment area (all figures are AOD)*

0.5 Materials

Through model iteration and due to the proximity of the future Building R3, two different types of glazing were assumed for the calculations: Windows in the lower part of the block (levels 1 to 7) were given a glazing transmittance of 75%, while those in the upper part (levels 8 to 15) have a transmittance of 65%. This is to allow more daylight to enter the lower, more overshadowed floors, while providing good control of summer heat gains for the apartments on the more exposed upper levels.

Based on the calculation procedures defined in BS 8206:2-2008 ('Lighting for Buildings: Code of Practice for Daylighting'), a maintenance factor of 0.92 was applied, resulting in an overall glazing transmittance of 60% and 70% for the upper and lower floors, respectively.

The following reflectance values were also applied to the model:
- Floors: 30%
- Walls: 70%
- Ceilings: 70%
- Ground: 20%
- Obstruction: 50%

The analysis was carried out using a 3D computer model and the Radiance lighting simulation software assuming the massing set out in section 0.4.

Figure 5 *Birdseye view of R5 South model from South.*

0.6 Naming Conventions

Apartments on each floor were numbered, starting with ‘one’ at the north west corner of the building. For those apartments that have more than one bedroom, bedroom1 is the master bedroom (largest one), and the others follow in order of decreasing size.

The penthouse suites are slightly different in the sense that they all have a large, unpartitioned living space at level fourteen, and the bedrooms at level fifteen.

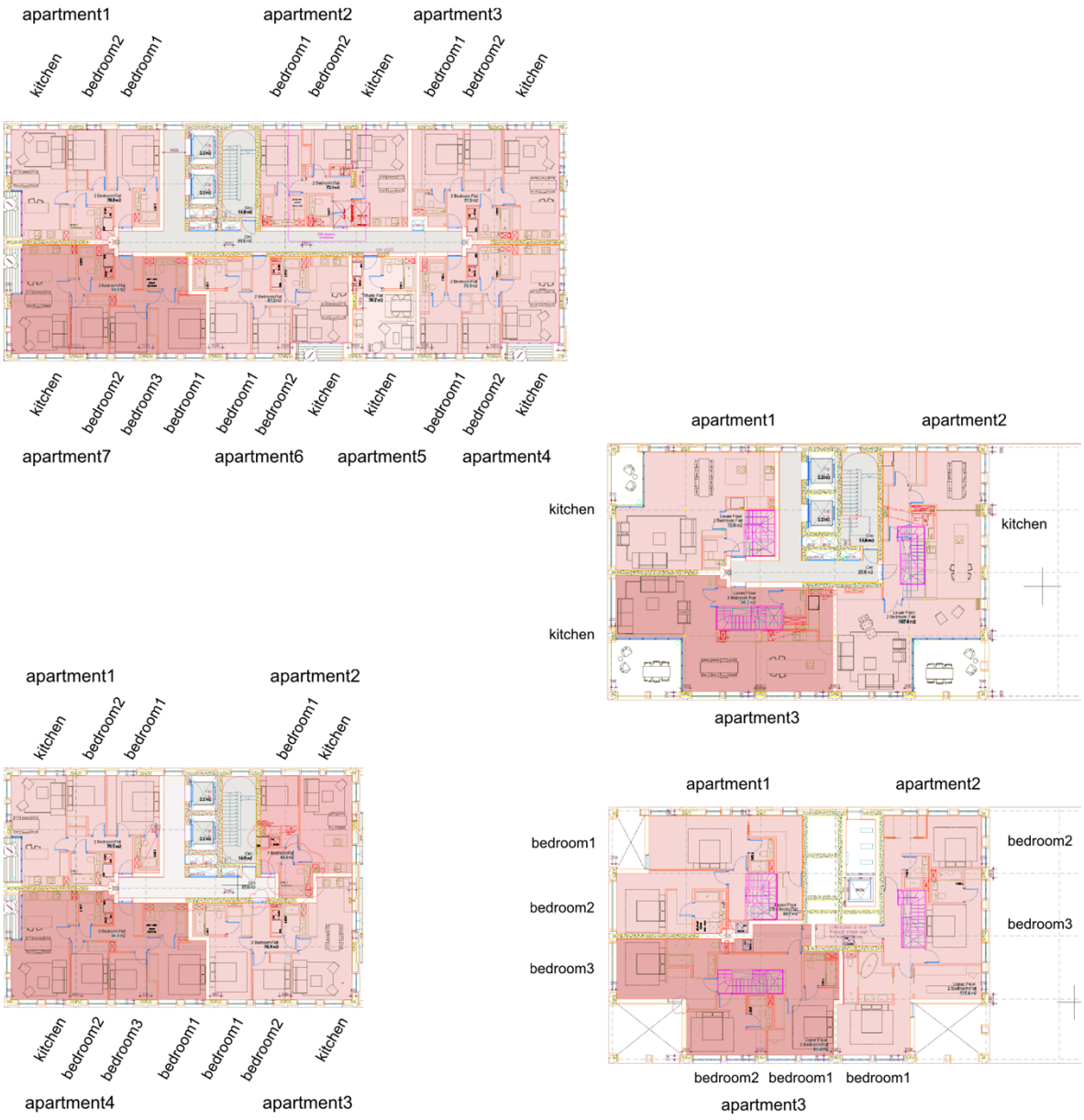

Figure 6: *Naming convention. Top left – Apartments floors 1 to 7; Bottom left - Apartments floors 8 to 13; Right - Apartments floors 14 and 15*

1.0 Daylighting

1.1 Daylight Requirements

The quality of daylight within an interior space may be quantified by the Average Daylight Factor or ADF. The BRE Guidelines recommend that daylight to habitable rooms (i.e. kitchens, living rooms and bedrooms) in new build accommodation should be assessed using the ADF. The table below summarises the recommended values for habitable rooms from the document, as referred to in Condition 43 of the Outline Planning Permission:

Area	Target ADF
Kitchens	2.0%
Living Rooms	1.5%
Bedrooms	1.0%

Although stated to be minimum values, it is acknowledged within the BRE Guidelines that the recommended ADF levels may be difficult to obtain in densely built up urban areas, as is the case with King's Cross Central.

For shared-use spaces, such as living spaces with an open kitchen area, the higher target value is used. As the majority of the apartments in R5 South have combined living room/kitchens, the higher target value of 2% has been used for the evaluation.

1.2 Daylight Procedure

To determine the ADF, Point Daylight Factors are calculated at a height of 0.85 m above floor. The grid points are spaced 0.3 m, and are at least 0.5 m away from any wall.

Figure 7 below shows a graphical representation of the Daylight Factors obtained for level 9 of R5 South. The grey areas represent the rooms not included in the assessment (i.e. bath rooms and internal corridors etc) and the communal circulation space and cores.

A CIE Overcast Standard Sky distribution is used for all DF calculations.

All calculations were done with the Radiance software package. Radiance was developed and is actively maintained by the US Lawrence Berkeley National Laboratory. It has been extensively validated and is the most powerful and accurate lighting simulation software packages available. To guarantee a high level of accuracy, the Radiance rendering parameters were set to:

-ab 5 -ad 3072 -as 512 -aa 0.12 -ar 384 -av 0 0

Appendix 1 lists the Average Daylight Factors for each room. The target meet/fall below criterion was evaluated before rounding to an accuracy of one decimal place.

Figure 7: *Exemplary plot of Daylight Factors, Level 9*

1.3 Daylight Design Considerations

The KXC development is high density with mixed-use, relatively high-rise buildings. This naturally results in many of the dwellings being overshadowed. This is most noticeable with apartments on the lower floors. In order to make maximum use of the available daylight, the design team took a number of different approaches.

The central axis of the block runs in a WNW-ESE direction so that the majority of rooms face NNW or SSE. Following BRE guidance, the highest levels of natural light are to be provided in kitchens (2.0%), followed by living rooms (1.5%). Daylight in bedrooms is considered less important (1.0%) due to their typical hours of use.

Where possible, the kitchen/living rooms have been located at one of the four corners of the building to ensure they obtain the best possible daylight. This maximises the number of dual aspect kitchen/living rooms, with 4 out of 7 of the units on each floor between levels 1 and 7 and all of the units on levels 8 to 15 featuring windows on two different elevations. Furthermore, the dual-aspect window configuration in those spaces is beneficial for sunlight availability (see Section 2.0).

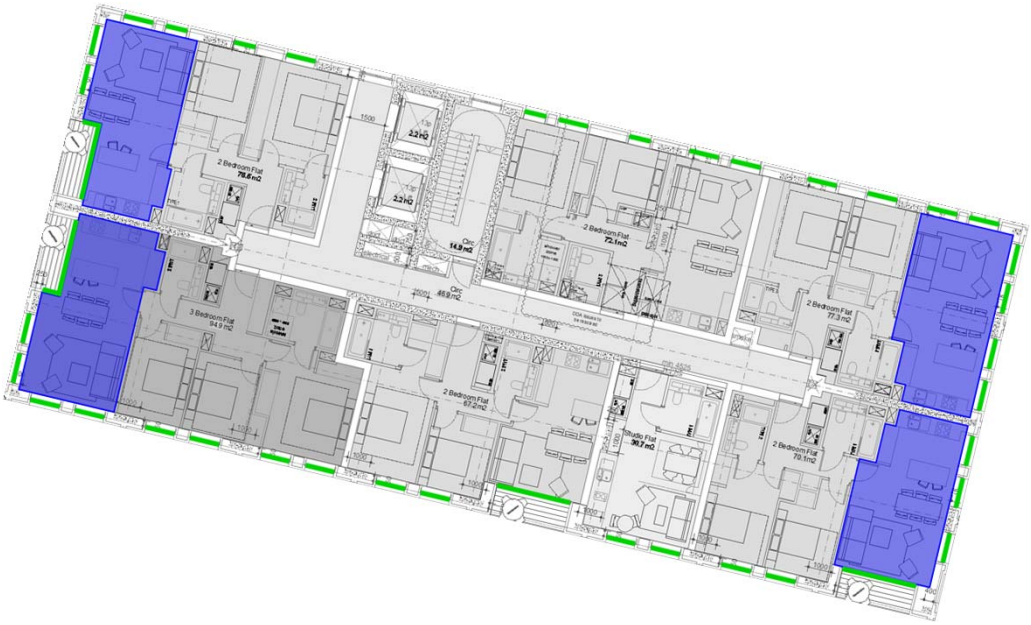

Figure 8: *Dual-aspect kitchens/living rooms maximise daylight and sunlight penetration.*

1.4 Daylight Analysis Summary

The table below summarises the number of rooms that meet or exceed the BRE's ADF criterion listed in Section 1.1. The full results for each apartment are listed in Appendix 1.

Floor	No. rooms	ADF meet/exceed	ADF falls below	%	living rooms that meet 1.5% target but <2% kitchen/lining room target
Level 01	20	4	16	20%	3
Level 02	20	5	15	25%	2
Level 03	20	6	14	30%	4
Level 04	20	7	13	35%	4
Level 05	20	8	12	40%	3
Level 06	20	12	8	60%	
Level 07	20	16	4	80%	
Level 08	12	10	2	83%	
Level 09	12	10	2	83%	1
Level 10	12	10	2	83%	1
Level 11	12	11	1	92%	1
Level 12	12	12	0	100%	
Level 13	12	12	0	100%	
Level 14	11	11	0	100%	
Overall	**223**	**134**	**89**	**60%**	**69%**

Of the total 223 habitable rooms in R5 South, 134 (60%) meet or exceed the guidelines.

Predictably, the lower levels are affected more by shading from the surrounding buildings. The pass rate improves for the higher levels, with 80% or more of all habitable rooms from level seven and above meeting or exceeding the BRE Guidelines. This is illustrated in figure 9.

The results, particularly below level six, are in part due to the deep penetrating open plan nature of majority of apartments and the shared kitchen/living spaces. Whilst it is the extremities of these rooms which fall below the recommended levels, this determines the overall ADF.

In terms of daylight factor averages, the relatively deep kitchen/living spaces could have faired better if the kitchens had been separated from the living rooms by a fixed partition wall. This would have not only made those spaces less deep, but would have also lowered the target ADF from 2.0% to 1.5% (living rooms). The downside to such an arrangement is that the kitchens would have no direct access to daylight. It was therefore a deliberate decision to join kitchens and living room into larger open-plan spaces. This is also in the spirit of Site Layout Planning for Daylight and Sunlight (2nd edition, 2011) which states:

'Non-daylit internal kitchens should be avoided wherever possible, especially if the kitchen is used as a dining area too. If the layout means that a small internal galley-type kitchen is inevitable, it should be directly linked to a well daylit living room'

Unfortunately, by following this guidance, shared open spaces with a kitchen area at the back are actually penalised by the ADF calculation procedure, although they might otherwise follow the guidance to the letter.

It is worth noting that if the lower living room ADF of 1.5% is used as the criterion for the combined living room/kitchens, a further 19 rooms pass the criteria, increasing the overall compliance to 69%.

Further, all but 11 of the proposed 76 units incorporate either a recessed or projecting balcony. Although balconies can lower internal daylight levels by shading the façade, this is balanced by the desire to provide private amenity space for as many apartments as possible.

The height and massing of the emerging design for Building R3 will inevitably impact on the daylight amenity for R5 South. However, the daylight levels achieved are not uncommon for a dense urban location such as this and reflect those on similar approved KXC schemes such as R5 North and R4.

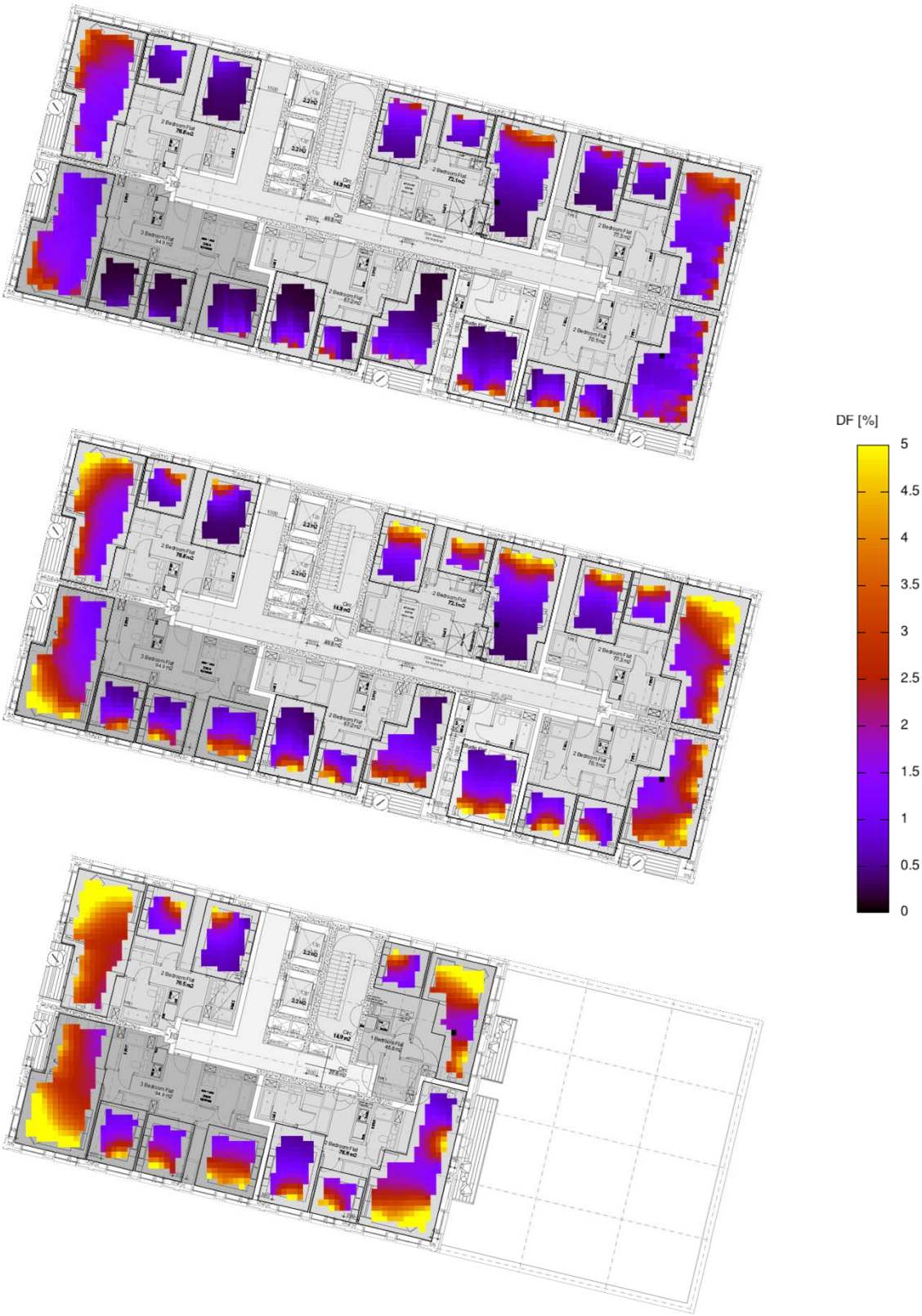

Figure 9: *Colour plots of Daylight Factors. Top to bottom: Level 1, 7, 13.*

2.0 Sunlighting

2.1 Sunlight Requirements

As well as having access to daylight, dwellings should receive sun light for at least part of the year. Sunlight is important for its psychological and physiological benefits. *SLP* recommends that every dwelling enjoys access to direct sunlight for at least part of the year.

The BRE Guidelines provides the following guidance in relation to sunlight:

"For interiors, access to sunlight can be quantified. The British Standard recommends that interiors where the occupants expect sunlight should receive at least one quarter of annual probable sunlight hours, APSH, including at least 5% of winter probable sunlight hours, WPSH, between 21 September and 21 March."

The BRE Guidelines have been used to assess the proposed dwellings within R5 South to identify the likely levels of sunlight to habitable rooms within the development for the purposes of addressing this part of Condition 43. In the case of new development, compliance with BRE Guidelines is achieved if levels of sunlight are equal to or exceed the values established for each parameter.

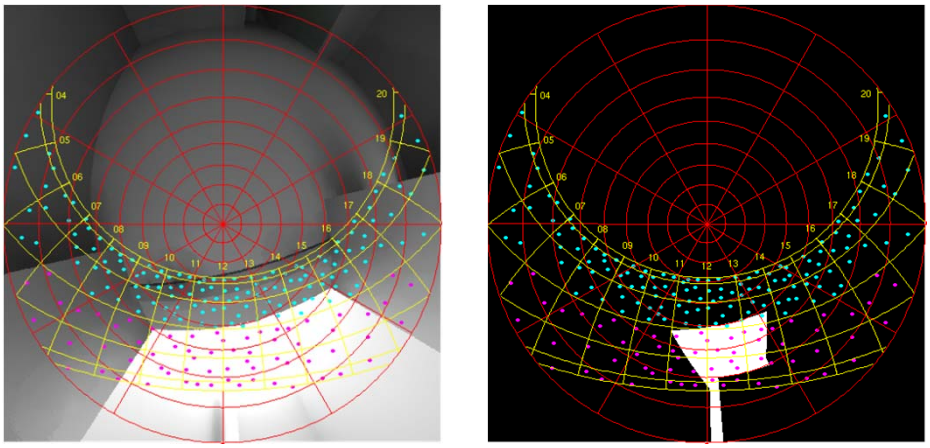

Figure 10: *Stereographic fisheye rendering and shading mask with PSH pepper plot and sunpath diagram*

2.2 Sunlight Procedure

Following the procedure laid out in British Standard 8206:2, Probable Sunlight Hours (PSH) were determined by overlaying 200 representative dots, each representing 0.5% PSH, over a stereographic view from each window. The unobstructed dots are then counted. The reference point is taken to be at the centre of the window, flush with the inside of the wall.

Where a room has more than one window, the higher PSH are used. All window frames were excluded from the computer model for the sunlight analysis. This is because many of the windows have vertical mullions running along the centre of the opening. Due to the close proximity of these mullions to the reference point, this would have resulted in many of the otherwise unobstructed dots to be masked off.

Following the guidance from the BRE, only living rooms facing within 90 degree of due south (i.e. those with the ability to receive sunlight) need to be assessed.

2.3 Sunlight Design Considerations

The potential level of access to sunlight that a window can receive depends on its orientation. Due to the characteristics of the sun's daily path across the sky which changes with the seasons, windows facing within 90 degrees of due north are highly unlikely to be exposed to the winter sun, and may only receive sunlight early in the morning or late in the evening for a few days around the summer solstice (21st June) if their orientation is close to due east or due west.

In addition, the lifts and staircase have been located to the north of the building to maximise the number of apartments on the south façade and dual aspect apartments are positioned on the corners to ensure that the living spaces have access to direct sunlight light.

As a result of the buildings orientation and its general arrangement, there are only seven apartments with exclusively north facing windows, with one such apartment on each of the lower floors (levels 1 to 7). All of the other apartments are either dual aspect, or face due south, where a very high availability of sunlight can be expected throughout the year.

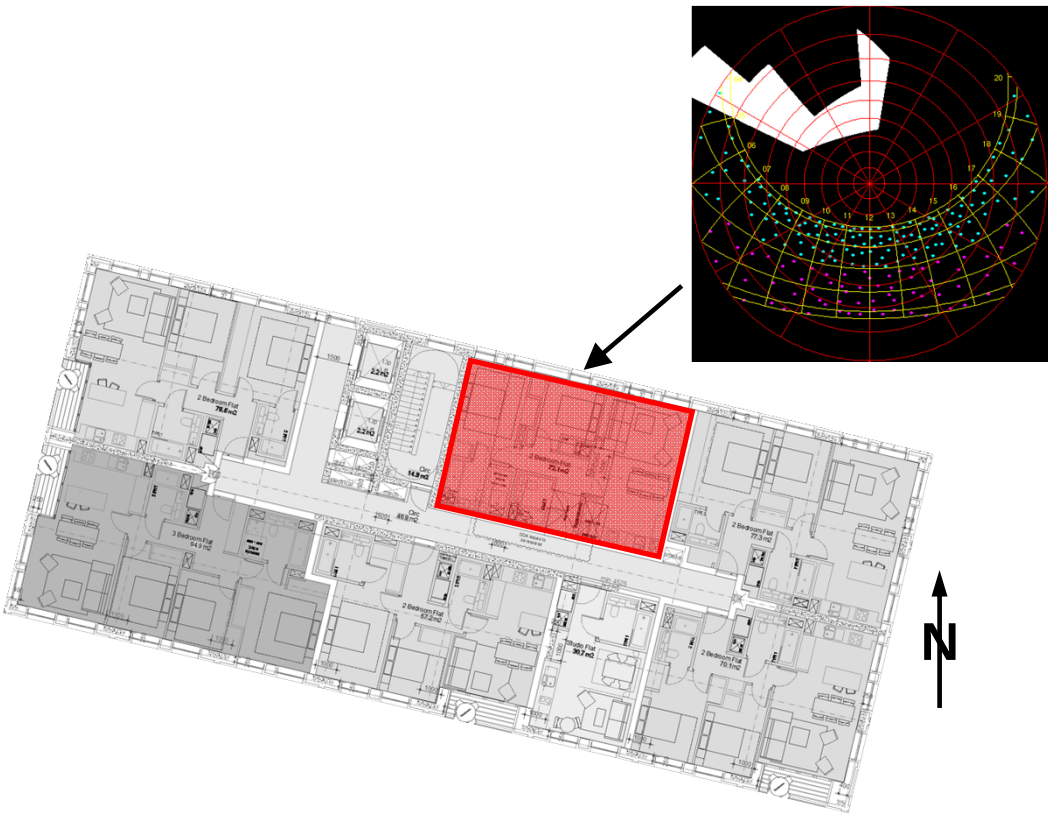

Figure 11: *Shading mask for level 7, apartment 2, bedroom 2. There are only seven apartments in the building with an exclusively north-facing aspect.*

2.4 Sunlight Analysis Summary

The table below summarises the results of the sunlight analysis on the living rooms within 90 degrees of due south, totalling 69 apartments. The detailed results for all units are located in Appendix 1.

Of the 69 apartments with the ability to receive sunlight, 52% meet or exceed the BRE Guidelines. The full results of all apartments is located in Appendix 1.

Predictably, the number of apartments that meet or exceed the guidance increases the higher you are in the building as the overshadowing effect reduces from adjacent buildings.

Floor	No. flats	PSH meet/exceed	PSH fall below	%
Level 01	6	2	4	33%
Level 02	6	0	6	0%
Level 03	6	0	6	0%
Level 04	6	2	4	33%
Level 05	6	4	2	66%
Level 06	6	4	2	66%
Level 07	7	4	2	66%
Level 08	4	2	2	50%
Level 09	4	3	1	75%
Level 10	4	3	1	75%
Level 11	4	3	1	75%
Level 12	4	3	1	75%
Level 13	4	3	1	75%
Level 14	3	3	0	100%

These results are considered to reflect the dense urban environment and are typical of apartments in similar city centre locations where neighbouring buildings tend to sit close together. Indeed, the BRE accept in their Guidelines document that recommended PSH may be difficult to achieve in such areas:

“Sometimes a larger reduction in sunlight may be necessary if new development is to match the height and proportion of existing buildings nearby.”

3.0 Conclusions

3.0 Conclusions

This report analyses the daylight and sunlight penetration of R5 South in the KXC development.

All apartments were modeled using 3D software and considered against the BRE Guidelines in terms of the ADF and APSH levels for the habitable rooms.

The high density, urban location and proximity to other ongoing and planned developments lead to some overshadowing of the building. However, overall, 60% of all the habitable rooms achieve or exceed the BRE criteria for daylighting. Those rooms which fall below the BRE Guidelines are generally affected by self-shading from other elements of R5 or adjacent buildings, include generous recessed or projecting balconies, and/or are deep set, open plan living and kitchen spaces which command a higher ADF level than living rooms alone. If open plan kitchens are excluded from the assessment, a further 19 living rooms (9%) that do not meet the recommended levels for multiuse spaces would in fact meet the ADF of 1.5% for separate living rooms.

Over half the windows that have the potential to receive sunlight achieve the criteria in BRE Guidelines. This is typical of apartments in city centre locations.

Both daylight and sunlight levels improve as one moves up the building.

The daylight and sunlight have been optimised within the high density masterplan enshrined within the Outline Planning permission. All design decisions that have been made seek to balance the requirements of the BRE Guidelines with the individual plot parameters (such as shape, orientation, massingand the desire for living spaces such as balconies and the R5 courtyard. The daylight and sunlight amenity achieved in the residential apartments is characteristic of and similar to other schemes in similar dense urban locations where buildings sit close to each other. As such, the daylight and sunlight in R5 South is, in our opinion, acceptable by reference to the BRE Guidelines, which have been applied as required by Condition 43.

Appendix 1 Detailed Results

Floors 1 to 3

Flat	Room	ADF [%]	ADF pass	PSH winter/year [%]	PSH pass	Overall pass
Level 01						
Flat: 01	bed1,bed2,kit1	0.5,0.7,1.9	f,f,f	0.0/0.0,0.0/0.0,0.0/4.0	f,f,f	f,f,f
Flat: 02	bed1,bed2,kit1	1.0,1.0,1.1	f,p,f	0.0/0.0,0.0/0.0,0.0/0.0	f,f,f	f,f,f
Flat: 03	bed1,bed2,kit1	0.7,1.0,1.6	f,p,f	0.0/0.0,0.0/0.0,1.0/6.5	f,f,f	f,f,f
Flat: 04	bed1,bed2,kit1	1.1,1.1,1.3	p,p,f	6.5/25.0,7.0/26.5,4.0/5.0	p,p,f	p,p,f
Flat: 05	kit1	0.9	f	6.5/25.0	p	f
Flat: 06	bed1,bed2,kit1	0.6,0.9,0.6	f,f,f	6.0/19.5,6.0/21.0,4.0/4.0	f,f,f	f,f,f
Flat: 07	bed1,bed2,bed3,kit1	0.6,0.3,0.3,1.5	f,f,f,f	3.5/12.5,0.5/9.0,0.5/7.0,5.0/18.0	f,f,f,f	f,f,f,f
Level 02						
Flat: 01	bed1,bed2,kit1	0.4,0.6,1.7	f,f,f	0.0/0.0,0.0/0.0,0.0/4.0	f,f,f	f,f,f
Flat: 02	bed1,bed2,kit1	1.0,1.2,0.7	p,p,f	0.0/0.0,0.0/0.0,0.0/0.0	f,f,f	f,f,f
Flat: 03	bed1,bed2,kit1	0.8,1.1,1.4	f,p,f	0.0/0.0,0.0/0.0,1.0/8.5	f,f,f	f,f,f
Flat: 04	bed1,bed2,kit1	1.2,1.2,1.4	p,p,f	7.5/21.0,7.5/21.0,4.5/6.0	f,f,f	f,f,f
Flat: 05	kit1	1.0	f	6.5/19.0	f	f
Flat: 06	bed1,bed2,kit1	0.7,0.9,0.8	f,f,f	7.0/16.0,7.5/17.5,4.5/4.5	f,f,f	f,f,f
Flat: 07	bed1,bed2,bed3,kit1	0.7,0.3,0.3,1.6	f,f,f,f	4.0/10.0,0.5/6.5,1.0/5.5,5.5/16.0	f,f,f,f	f,f,f,f
Level 03						
Flat: 01	bed1,bed2,kit1	0.4,0.6,1.7	f,f,f	0.0/0.0,0.0/0.0,0.0/5.0	f,f,f	f,f,f
Flat: 02	bed1,bed2,kit1	1.1,1.3,0.7	p,p,f	0.0/0.5,0.0/0.5,0.0/0.5	f,f,f	f,f,f
Flat: 03	bed1,bed2,kit1	1.0,1.4,1.7	f,p,f	0.0/0.0,0.0/0.0,1.0/10.5	f,f,f	f,f,f
Flat: 04	bed1,bed2,kit1	1.4,1.3,1.6	p,p,f	8.5/23.0,8.5/24.5,4.5/7.0	f,f,f	f,f,f
Flat: 05	kit1	1.1	f	8.0/22.5	f	f
Flat: 06	bed1,bed2,kit1	0.7,1.0,0.8	f,p,f	10.0/19.0,9.5/19.5,5.5/5.5	f,f,f	f,f,f
Flat: 07	bed1,bed2,bed3,kit1	0.7,0.3,0.3,1.7	f,f,f,f	5.5/11.5,1.0/7.0,1.0/5.5,6.0/16.5	f,f,f,f	f,f,f,f

Floors 4 to 6

Flat	Room	ADF [%]	ADF pass	PSH winter/year [%]	PSH pass	Overall pass
Level 04						
Flat: 01	bed1,bed2,kit1	0.4,0.6,1.8	f,f,f	0.0/0.0,0.0/0.0,0.0/6.0	f,f,f	f,f,f
Flat: 02	bed1,bed2,kit1	1.1,1.5,0.8	p,p,f	0.0/0.5,0.0/0.5,0.0/0.5	f,f,f	f,f,f
Flat: 03	bed1,bed2,kit1	1.1,1.6,1.9	p,p,f	0.0/0.0,0.0/0.0,1.0/12.0	f,f,f	f,f,f
Flat: 04	bed1,bed2,kit1	1.4,1.4,1.7	p,p,f	10.0/27.5,9.0/26.5,5.5/8.5	p,p,f	p,p,f
Flat: 05	kit1	1.2	f	9.5/25.0	p	f
Flat: 06	bed1,bed2,kit1	0.8,1.1,0.9	f,p,f	10.5/21.0,10.5/22.0,6.0/6.0	f,f,f	f,f,f
Flat: 07	bd1,bd2,bd3,kit1	0.8,0.4,0.4,1.8	f,f,f,f	5.5/13.5,1.0/10.5,1.0/9.5,6.5/19.0	f,f,f,f	f,f,f,f
Level 05						
Flat: 01	bed1,bed2,kit1	0.4,0.6,1.9	f,f,f	0.0/0.0,0.0/0.0,0.0/7.0	f,f,f	f,f,f
Flat: 02	bed1,bed2,kit1	1.2,1.6,0.9	p,p,f	0.0/0.5,0.0/0.5,0.0/0.5	f,f,f	f,f,f
Flat: 03	bed1,bed2,kit1	1.2,1.7,2.1	p,p,p	0.0/0.0,0.0/0.0,1.0/14.5	f,f,f	f,f,f
Flat: 04	bed1,bed2,kit1	1.5,1.5,1.9	p,p,f	10.5/30.5,10.5/30.0,5.5/9.5	p,p,f	p,p,f
Flat: 05	kit1	1.3	f	11.0/31.0	p	f
Flat: 06	bed1,bed2,kit1	0.8,1.2,0.9	f,p,f	10.5/26.5,10.5/27.0,6.5/6.5	p,p,f	f,p,f
Flat: 07	bd1,bd2,bd3,kit1	0.9,0.5,0.5,2.0	f,f,f,f	6.5/21.5,1.5/17.5,1.5/16.5,6.5/25.5	f,f,f,p	f,f,f,f
Level 06						
Flat: 01	bed1,bed2,kit1	0.5,0.8,2.1	f,f,p	0.0/0.0,0.0/0.0,0.0/7.5	f,f,f	f,f,f
Flat: 02	bed1,bed2,kit1	1.5,1.9,1.0	p,p,f	0.0/0.5,0.0/0.5,0.0/0.5	f,f,f	f,f,f
Flat: 03	bed1,bed2,kit1	1.3,1.8,2.3	p,p,p	0.0/0.0,0.0/0.0,1.5/16.5	f,f,f	f,f,f
Flat: 04	bed1,bed2,kit1	1.6,1.6,2.1	p,p,p	12.0/33.0,11.5/32.0,7.5/13.5	p,p,f	p,p,f
Flat: 05	kit1	1.4	f	12.5/33.5	p	f
Flat: 06	bed1,bed2,kit1	0.9,1.5,1.1	f,p,f	11.5/32.5,10.5/31.5,6.5/6.5	p,p,f	f,p,f
Flat: 07	bd1,bd2,bd3,kit1	1.3,0.8,0.9,2.2	p,f,f,p	8.0/29.0,4.0/25.5,4.5/26.0,10.0/31.5	p,p,p,p	p,f,f,p

Floors 7 to 9

Flat	Room	ADF [%]	ADF pass	PSH winter/year [%]	PSH pass	Overall pass
Level 07						
Flat: 01	bed1,bed2,kit1	0.8,1.3,2.5	f,p,p	0.0/0.0,0.0/0.0,0.0/9.0	f,f,f	f,f,f
Flat: 02	bed1,bed2,kit1	1.9,2.5,1.3	p,p,f	0.0/0.5,0.0/0.5,0.0/0.5	f,f,f	f,f,f
Flat: 03	bed1,bed2,kit1	1.4,2.1,3.0	p,p,p	0.0/0.0,0.0/0.0,4.0/20.5	f,f,f	f,f,f
Flat: 04	bed1,bed2,kit1	1.8,1.7,2.5	p,p,p	14.0/39.5,13.0/38.0,10.0/17.5	p,p,f	p,p,f
Flat: 05	kit1	1.6	f	14.5/40.0	p	f
Flat: 06	bed1,bed2,kit1	1.1,1.8,1.3	p,p,f	14.0/39.5,14.0/39.5,9.5/10.0	p,p,f	p,p,f
Flat: 07	bd1,bd2,bd3,kit1	1.8,1.2,1.4,2.5	p,p,p,p	12.5/38.0,13.0/38.5,13.5/39.0,14.5/40.0	p,p,p,p	p,p,p,p
Level 08						
Flat: 01	bed1,bed2,kit1	0.7,1.1,2.4	f,p,p	0.0/0.0,0.0/0.0,0.5/10.5	f,f,f	f,f,f
Flat: 02	bed1,kit1	1.4,2.4	p,p	0.0/0.5,4.0/22.5	f,f	f,f
Flat: 03	bed1,bed2,kit1	1.0,1.6,2.1	f,p,p	18.5/40.0,18.5/40.0,18.0/40.0	p,p,p	f,p,p
Flat: 04	bd1,bd2,bd3,kit1	1.7,1.2,1.3,2.4	p,p,p,p	17.5/39.0,17.5/39.0,16.5/38.0,17.0/38.5	p,p,p,p	p,p,p,p
Level 09						
Flat: 01	bed1,bed2,kit1	0.9,1.3,2.7	f,p,p	0.0/0.5,0.0/0.5,0.5/12.5	f,f,f	f,f,f
Flat: 02	bed1,kit1	1.5,2.9	p,p	0.0/0.5,4.0/25.0	f,p	f,p
Flat: 03	bed1,bed2,kit1	1.1,1.8,1.9	p,p,f	20.0/45.5,19.5/45.0,19.5/46.0	p,p,p	p,p,f
Flat: 04	bd1,bd2,bd3,kit1	1.9,1.3,1.5,2.6	p,p,p,p	19.0/44.5,18.5/44.0,18.5/44.0,18.0/43.5	p,p,p,p	p,p,p,p

Floors 10 to 14

Flat	Room	ADF [%]	ADF pass	PSH winter/year [%]	PSH pass	Overall pass
Level 10						
Flat: 01	bed1,bed2,kit1	1.0,1.5,2.9	f,p,p	0.0/0.5,0.0/0.5,0.5/13.0	f,f,f	f,f,f
Flat: 02	bed1,kit1	1.6,2.6	p,p	0.0/0.5,5.5/27.5	f,p	f,p
Flat: 03	bed1,bed2,kit1	1.1,1.9,1.9	p,p,f	21.5/47.0,21.0/46.5,21.0/47.5	p,p,p	p,p,f
Flat: 04	bd1,bd2,bd3,kit1	2.0,1.4,1.6,2.8	p,p,p,p	21.0/46.5,20.5/46.0,20.5/46.0,20.5/46.0	p,p,p,p	p,p,p,p
Level 11						
Flat: 01	bed1,bed2,kit1	1.1,1.6,3.1	p,p,p	0.0/0.5,0.0/0.5,1.5/15.0	f,f,f	f,f,f
Flat: 02	bed1,kit1	1.7,2.7	p,p	0.0/0.5,5.5/28.5	f,p	f,p
Flat: 03	bed1,bed2,kit1	1.2,2.0,1.9	p,p,f	22.0/47.5,21.5/47.0,21.5/50.0	p,p,p	p,p,f
Flat: 04	bd1,bd2,bd3,kit1	2.2,1.5,1.7,2.9	p,p,p,p	22.5/48.0,22.5/48.0,21.5/47.0,22.5/48.0	p,p,p,p	p,p,p,p
Level 12						
Flat: 01	bed1,bed2,kit1	1.1,1.7,3.2	p,p,p	0.0/0.5,0.0/0.5,1.5/16.5	f,f,f	f,f,f
Flat: 02	bed1,kit1	1.8,2.9	p,p	0.0/0.5,6.0/29.5	f,p	f,p
Flat: 03	bed1,bed2,kit1	1.2,2.1,2.0	p,p,p	23.5/49.0,23.0/48.5,23.0/51.5	p,p,p	p,p,p
Flat: 04	bd1,bd2,bd3,kit1	2.3,1.6,1.8,3.1	p,p,p,p	24.0/49.5,24.5/50.0,24.0/49.5,25.0/50.5	p,p,p,p	p,p,p,p
Level 13						
Flat: 01	bed1,bed2,kit1	1.2,1.9,3.7	p,p,p	0.0/0.5,0.0/0.5,2.5/18.5	f,f,f	f,f,f
Flat: 02	bed1,kit1	2.0,3.4	p,p	0.0/0.5,7.5/31.5	f,p	f,p
Flat: 03	bed1,bed2,kit1	1.4,2.4,2.6	p,p,p	24.5/54.0,24.0/53.5,24.5/57.0	p,p,p	p,p,p
Flat: 04	bd1,bd2,bd3,kit1	2.6,1.8,2.1,3.6	p,p,p,p	25.0/54.5,25.5/55.0,25.0/54.5,25.5/55.5	p,p,p,p	p,p,p,p
Level 14						
Flat: 01	bed1,bed2,kit1	2.3,4.0,3.4	p,p,p	0.0/4.5,9.0/33.5,9.0/33.5	f,p,p	f,p,p
Flat: 02	bd1,bd2,bd3,kit1	3.2,5.0,2.5,3.5	p,p,p,p	30.0/72.5,12.0/40.5,12.0/40.5,29.5/74.0	p,p,p,p	p,p,p,p
Flat: 03	bd1,bd2,bd3,kit1	2.9,3.6,4.1,3.8	p,p,p,p	30.0/72.5,30.0/72.5,9.0/33.5,30.0/73.0	p,p,p,p	p,p,p,p

King's Cross

5 Albany Courtyard
Piccadilly
London
W1J 0HF

T +44 (0)20 3664 0200
www.kingscross.co.uk