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DAYLIGHT & SUNLIGHT REPORT

King's Meadow View
Forbury Road, Reading, RG1 3JD

Our Ref: 4142

31 May 2023

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Appendix 2 – Detailed results of the daylight and sunlight assessment within the proposed development

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Report details

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2 Introduction

- 2.1.1 eb7 have been instructed to assess the amenity within the proposed King's Meadow View development Forbury Road, Reading, RG1 3JD. This report considers daylight and sunlight to the proposed accommodation and proposed amenity spaces. This report supplements the Daylight and Sunlight Chapter of the Environmental Statement (ES) which considers the environmental effects upon existing receptors which neighbour the proposals. These assessments consider the latest Squire & Partners scheme proposals dated May 2023.
- 2.1.2 The methodology and criteria used for these assessments is provided by Building Research Establishment's (BRE) guidance 'Site layout planning for daylight and sunlight: A guide to good practice' (BRE 209 2nd edition, 2022).
- 2.1.3 In order to carry out our study we have generated a 3D computer model (Test Environment) of the existing site, the key surrounding properties and the proposed iterative scheme.
- 2.1.4 As the proposed masterplan development includes residential accommodation, the potential daylight and sunlight levels to rooms within the proposals has been considered. This has been based on the illustrative scheme which provides an indication of the detail of a future Reserved Matters submission in line with the design code principles set by the masterplan application. In addition to this overshadowing to the proposed amenity spaces provided by the scheme has been assessed.
- 2.1.5 The numerical criteria suggested within the BRE guidelines has been applied to each of the assessments mentioned above. It is important to note that these guidelines are not a rigid set of rules but are advisory and need to be applied flexibly according to the specific context of a site.
- 2.1.6 In respect of the internal daylight / sunlight study this has considered only the lowest first floor units of the illustrative scheme as those where amenity levels will be more limited. Overall compliance rates across all units will significantly higher and commensurate with schemes of a similar scale and context when a detailed assessment of all units is undertaken at Reserved Matters stage.

3 Guidance

3.1 Daylight & sunlight for planning

'Site layout planning for daylight and sunlight: A guide to good practice', BRE 2022

- 3.1.1 The Building Research Establishment (BRE) Report 209, '*Site layout planning for daylight and sunlight: A guide to good practice*', is the reference document used by most local authorities for assessing daylight and sunlight in relation to new developments. Commonly referred to as 'the BRE guidelines', it provides various testing methodologies to calculate the potential light levels received by neighbours of a development site and provided within a proposed new development.
- 3.1.2 The guidance given within the BRE document makes direct reference to the British Standard BS EN17037 (2018) and the CIBSE (Chartered Institute of Building Services Engineers) guide LG10: Daylighting – a guide for designers (2014). It is intended to be used in conjunction with these documents, which provide guidance on the assessment of daylight and sunlight within new buildings.
- 3.1.3 The 2022 update to the BRE guidance was published on 9th June 2022. The assessment methodologies and target metrics in respect of the impacts to neighbouring properties remain broadly unchanged from the earlier guidance save for some areas of clarification. The primary change relates to the assessment of internal daylight and sunlight amenity within the proposed habitable accommodation. The new guidance reflects the British Standard BS EN17037, published in 2018, which was based on the relevant European Standard but included a 'National Annex' clarifying the proposed application of the new internal guidance within the UK.
- 3.1.4 Detailed guidance upon the updated internal amenity standards is set out below. It is however important to note that the standard set out in BS EN70137 / BRE 209 (2022) are generally harder to achieve than the previous Average Daylight Factor (ADF) assessments adopted under the 2011 version of the guidance. A lower compliance rate with the new targets does not therefore indicate a less acceptable scheme as the difference in the assessment metrics should be noted. This is particularly so in respect of urban development where a number of important design factors such as the provision of balcony private amenity space and limiting solar gain / overheating may lead to a trade-off against achieving higher internal amenity levels.

Daylight to new buildings or consented developments (BRE2022)

- 3.1.1 The 2022 update to the BRE 209 document was published on June 9th, 2022. The new guidance reflects the UK National Annex of the British Standard: BS EN17037 (2018) and provides two methodologies for assessing the internal daylight amenity to new

residential properties. These assessment methods are known as 'Daylight Illuminance' or 'Daylight Factor' and are described in more detail below:

Daylight Illuminance Assessment

- 3.1.2 The Daylight Illuminance method utilises climactic data for the location of the site, based on a weather file for a typical or average year, to calculate the illuminance at points within a room on at least hourly intervals across a year. The illuminance is calculated across an assessment grid sat at the reference plane (usually desk height).
- 3.1.3 The guidance provides target illuminance levels that should be achieved across at least half of the reference plane for half of the daylight hours within a year.¹ The targets set out within the national annex are as follows:
- Bedrooms – 100 Lux
 - Living Rooms – 150 Lux
 - Kitchens – 200 Lux
- 3.1.4 For spaces with a shared use the higher target would generally apply such that it would be appropriate to adopt a target of 150 lux for a student bed sitting room if students would often spend time in their room during the day. The guidance notes that discretion should be used and, for example, a target of 150 lux may be appropriate in a Living / Kitchen / Dining Room within a modern flatted development where the kitchens are not 'habitable' space and small separate kitchens are to be avoided.

Daylight Factor Assessment

- 3.1.5 The Daylight Factor method involves the computation of the daylight factor at each calculation point on the assessment grid.
- 3.1.6 The daylight factor is a ratio between internal and external illuminance expressed as a percentage. The calculation uses the CIE overcast sky model and is independent of orientation and location. In order to account for different climatic conditions at different locations different daylight factor targets may be applied for different cities with targets varying throughout the UK.
- 3.1.7 The daylight factor targets are to be achieved over at least 50% of the room assessment grid and are expressed as a median figure. For London/southeast these median daylight factor targets are:
- Bedrooms – 0.7%
 - Living Rooms – 1.1%

¹ The European Standard also includes a minimum illuminance target to be achieved over 95% of the reference plane however this need not apply to dwellings in the UK.

- Kitchens – 1.4%

3.1.8 For multi-purpose living / kitchen / diner arrangements the higher 'kitchen' targets can be difficult to achieve due to the depth of internal space. In such cases, it is generally accepted that the 1.5% target for living rooms be used instead as this represents the predominant use of the space. The BRE guide gives the following: -

"Non-daylit internal kitchens should be avoided wherever possible, especially if the kitchen is used as a dining area too. Daylight levels in kitchen areas should be checked. If the layout means that a small internal kitchen is inevitable, it should be directly linked to a well daylit room. Further guidance for assessment of this situation is given in Appendix C."

Sunlight to new buildings or consented developments (BRE2022)

- 3.1.9 In respect of direct sunlight, the 2022 BRE guidance reflects the BS EN 17037 recommendation that a space should receive a minimum of 1.5 hours of direct sunlight on a selected date between 1 February and 21 March with cloudless conditions. It is suggested that 21 March (equinox) be used for the assessment.
- 3.1.10 The BS EN 17037 criterion can be applied to all rooms of a unit, but it is preferable for the target to be achieved within a main living room. Rooms in all orientations may be assessed and the sunlight received by different windows may be added together providing there is no 'double-counting'.
- 3.1.11 Where a group of dwellings are planned the site layout and design should maximise the number of dwellings with main living rooms meeting these targets. It is also advised that a dwelling has at least one window wall facing within 90 degrees of due south.

Sunlight Amenity

- 3.1.12 The impact to overshadowing and the provision of sunlight to open spaces is assessed using the Sunlight Amenity test. This looks at the proportion of an amenity area that receives at least 2 hours of sun on the 21st of March in the present condition and compares this with the proportion of the area that receives at least 2 hours of sun on the 21st of March with the proposal in place.
- 3.1.13 For amenity space within a proposal to be considered well sunlit throughout the year, the BRE guide suggests that at least 50% of the space should enjoy at least 2 hours of direct sunlight on March 21st.

4 Application of the guidance

4.1 Scope of assessment

Impact analysis for neighbouring buildings

Assessment for proposed accommodation

- 4.1.1 Our assessment has considered the proposed residential units within the scheme. The daylight assessment considers all main habitable rooms (bedrooms, living rooms, kitchens etc.), toilets, hallways and staircases are not considered habitable use.
- 4.1.2 For sunlight the BRE acknowledges that windows with a predominantly northern orientation are unlikely to satisfy its targets and that main living rooms are most important. Therefore, our sunlight assessment focusses on the relevant living areas with windows facing within 90° of due south only.

"The overall sun lighting potential of a large residential development may be initially assessed by counting how many dwellings have a window to a main living room facing south, east or west. The aim should be to minimise the number of dwellings whose living rooms face solely north, northeast or northwest, unless there is some compensating factor such as an appealing view to the north."

4.2 Application of the numerical criteria

- 4.2.1 The opening paragraphs of the BRE guidelines state:

"The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer."

Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design... In special circumstances the developer or planning authority may wish to use different target values. For example, in a historic city centre, or in an area with modern high-rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings".

- 4.2.2 It is therefore very important to apply the BRE guidance sensibly and flexibly, with careful consideration of the specific site context. Its numerical targets theoretically apply to any built environment, from city centres to rural villages. However, in more tightly constrained environments, achieving the default BRE targets can be very challenging and conflict with other beneficial factors of site layout design.
- 4.2.3 With the above in mind it may be appropriate to adopt lower target values more appropriate to the location concerned. This is acknowledged in the BRE guidance at

paragraph 2.2.3 (page 7):

"Note that numerical values given here are purely advisory. Different criteria maybe used, based on the requirements for daylighting in an area viewed against other site layout constraints."

5 Planning Policy

- 5.1.1 We have considered local, regional and national planning policy relating to daylight and sunlight. In general terms, planning policy advises that new development will only be permitted where it is shown not to cause unacceptable loss of daylight or sunlight amenity to neighbouring properties.
- 5.1.2 The need to protect amenity of neighbours is echoed within recent publications from the Secretary of State for Housing, Communities and Local Government. This NPPF stresses that current guidance needs to be used flexibly where developments are located in urban areas and intend to achieve higher densities. More specifically the nationally applicable criteria given within the BRE guidance needs to be applied in consideration of the development's context.

5.2 Reading Borough Council

Reading Borough Local Plan – Reading Local Authority (November 2019)

- 5.2.1 This flexibility in approach is also reflected in the Reading Local Plan which states the following:

- 5.2.2 Section 4.1.36

'One of the key concerns of planning is to ensure that new development does not reduce the quality of the environment for others, particularly where it would affect residential properties. At the same time, ensuring that new development creates a quality living environment for future residents is also critical. The policy aims to ensure that existing and additional residential properties provide an acceptable living environment, which is a key element of a high quality of life. It is applicable to any type of development.'

CC8: SAFEGUARDING AMENITY

Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of....

- Access to sunlight and daylight;

- 5.2.3 Section 4.1.40

'Amenity levels for new residential development may also be considered. For instance, layouts should avoid locating living rooms, bathrooms and kitchens next to, above, or below proposed and neighbouring bedrooms unless effects can be adequately mitigated through design. Another example is that 'dual aspect' units will help to increase access to light.'

- 5.2.4 Section 5.3.47 & 5.3.49

"In terms of effects of developments, the Building Research Establishment (BRE) has guidelines on assessing daylight and sunlight effects of development, which the council will apply flexibly given the high density of the central area."

5.3 The National Planning Policy Framework - Department for Housing, Communities and Local Government (July 2021)

- 5.3.1 The latest version of the National Planning Policy Framework was issued in July 2021. The document sets out planning policies for England and how these are expected to be applied. In respect of daylight and sunlight it stresses the need to make optimal use of sites and to take a flexible approach to daylight and sunlight guidance. Para 125 States: -

11. Making effective use of land

Achieving appropriate densities

"125. Area-based character assessments, design guides and codes and masterplans can be used to help ensure that land is used efficiently while also creating beautiful and sustainable places. Where there is an existing or anticipated shortage of land for meeting identified housing needs, it is especially important that planning policies and decisions avoid homes being built at low densities and ensure that developments make optimal use of the potential of each site. In these circumstances:

c) local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards).

6 Sources of Information & Assumptions

- 6.1.1 A measured survey has been used to create a 3D computer model of the proposed development in the context of the existing site and surrounding buildings.
- 6.1.2 Where survey or planning information was unavailable, the position of the neighbouring property elevations has been estimated based upon brick counts from site photographs.
- 6.1.3 The full list of sources of information used in this assessment is as follows: -

6.2 Squire & Partners

3D model of the proposed development

18111-SQP-ZZ-05-DR-A-PL00013.dwg

Received 23/02/2023

6.3 Cloud 10 Ltd

Measured Survey Information

0659 Forbury Retail Park Reading 13-09-21.dwg

Received 13/09/2021

8 Assessment results

8.1 Daylight and sunlight within the proposal

- 8.1.1 The detail of the façade design and unit layouts for the proposals will be developed at Reserved Matters stage in accordance with the design code principles. In order to ensure that an appropriate level of amenity can be achieved within the detailed design we have undertaken a sample study of internal daylight and sunlight levels for a representative sample of the proposed accommodation based on the illustrative scheme and indicative unit / elevation detail.
- 8.1.2 Our sample study includes a selection of the blocks in different positions around the site and including those arranged on a north to south axis and those which are oriented more to the east / west. Our sample includes the northern blocks where queries have been raised about the opportunity for good amenity where separation distances between the blocks are reduced in comparison to the more central / southern blocks.
- 8.1.3 For the purpose of this initial assessment, we have considered only the lowest units within the scheme in order to appraise the performance of what would be the most constrained spaces. Compliance will only increase to the upper floors of the accommodation where their outlook increases.
- 8.1.4 As noted above our tests have been undertaken using the Daylight Illuminance assessments set out within the 2022 BRE guidance.
- 8.1.5 Full results of the daylight and sunlight assessments of the first-floor apartments, along with drawings to show the sample layout of rooms and windows, are attached within Appendix 2.

8.2 Daylight Assessment

Assessment Method	Total No. of Rooms	Rooms Meeting Target
Daylight Illuminance	89	68 (76%)

Table 1 - Daylight Illuminance Summary

- 8.2.1 The results of the Daylight Illuminance assessment indicate that 68 of the 89 typical units assessed meet the BRE targets for their specific room use. This compliance rate of 76% at first floor level considers the lowest units of the proposal where daylight levels will be more constrained.
- 8.2.2 This is however a good level of compliance with the detailed results, discussed below, confirming many rooms significantly exceed the BRE targets, Overall compliance will only increase to the upper levels and detailed design will present the opportunity to optimise the scheme including both the unit layouts and the facade / balcony detail.

- 8.2.3 The results for our sample show that appropriate daylighting levels can be achieved across the various block typologies around the site, As such the overall compliance is commensurate with schemes of a similar scale and context and good levels of internal amenity will be achieved for future residents.

Block East B02

Block	Total No. of Rooms	Rooms Meeting Target
East B02	17	13 (77%)

Table 2 - Block East B02 results



Image 2 - Site plan

- 8.2.4 East B02 is located in the northeast corner of the site. It is a linear block arranged on a north to south axis. The space separation between the proposed building to the west narrows to c.16m however the indicative unit layouts maximise the amenity to main living spaces by positioning them to the corners of the block and maximising dual aspect spaces as illustrated in the layout below. A core is positioned centrally to the western elevation in a space that would be most constrained in terms of outlook and daylighting.

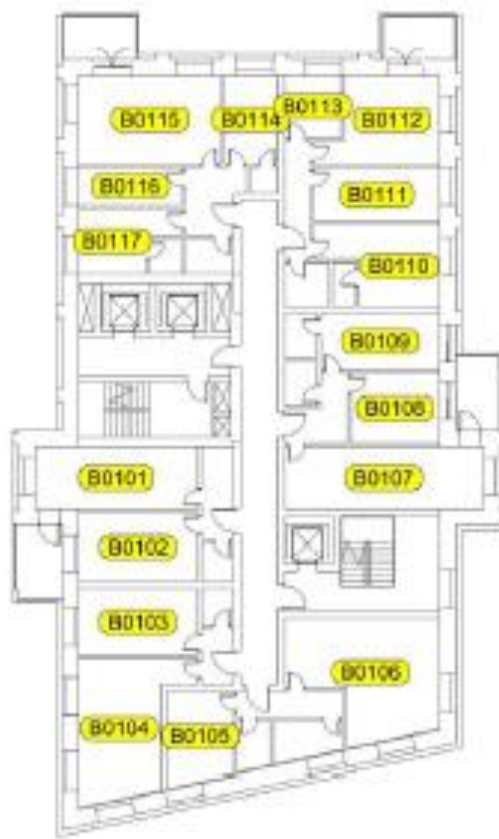


Image 3 - East B02 layout

- 8.2.5 Overall, the block performs well with just a small number of rooms falling below the target. Three of the four rooms are bedrooms and face inwards towards the eastern courtyard. These deviations are not particularly severe and will only affect the lowest floors in this building improving to the upper floors. Whilst B0102 is a bedroom that falls further below the targets this results from the balcony position which prioritises daylight to the neighbouring main living space.
- 8.2.6 The main living spaces perform very well with the majority of dual aspect LKD's significantly exceeding the target values. To the centre of the plan the living space B0101 is a deeper plan area however the kitchenette to the rear which will be task lit. Again, the layout prioritises amenity to the main living spaces with our assessment showing that a good level of compliance may be achieved in a future reserved matters scheme.

Block East B01

Block	Total No. of Rooms	Rooms Meeting Target
East B01	18	14 (77%)

Table 3 - Block East B01 results



Image 4 - Site plan

- 8.2.7 Block East B01 neighbours B02 in the northeast corner of the site. The block is aligned west to east and thus the units are oriented towards the centre of the site or benefit from a longer view to the north. Again, the layout of the space prioritises dual aspect main living rooms to the corners of the block and positions balconies generally offset to living areas in order to maximise amenity to the main living areas:



Image 5 - East B01 layout

- 8.2.8 The first floor of this block performs well with just three living spaces and one bedroom falling below the target. All four of these spaces are located in the southern part of the block facing the internal courtyards. The living spaces are deeper plan areas that are partially overhung by balconies which provide residents with private external amenity space. The BRE guide acknowledges the trade-off between the provision of external amenity and internal daylight levels, and this is not uncommon in modern flatted development. Again the living spaces are generally deeper plan with the kitchens to the rear benefitting from task lighting such that this is considered an appropriate balance of internal amenity and balcony provision. Overall compliance will only improve to the upper levels of the block and there is also the opportunity for glazing levels and the façade design to be optimised in detail design in order to further improve compliance.

Block West B02

Block	Total No. of Rooms	Rooms Meeting Target
West B02	21	15 (71%)

Table 4 - Block West B02 results



Image 6 - Site plan

- 8.2.9 Block West B02 is located in the north-western corner of the site and is a corner block having both a north-south and east-west wing. This layout again maximises the opportunity for dual aspect living spaces to the corners of the block.

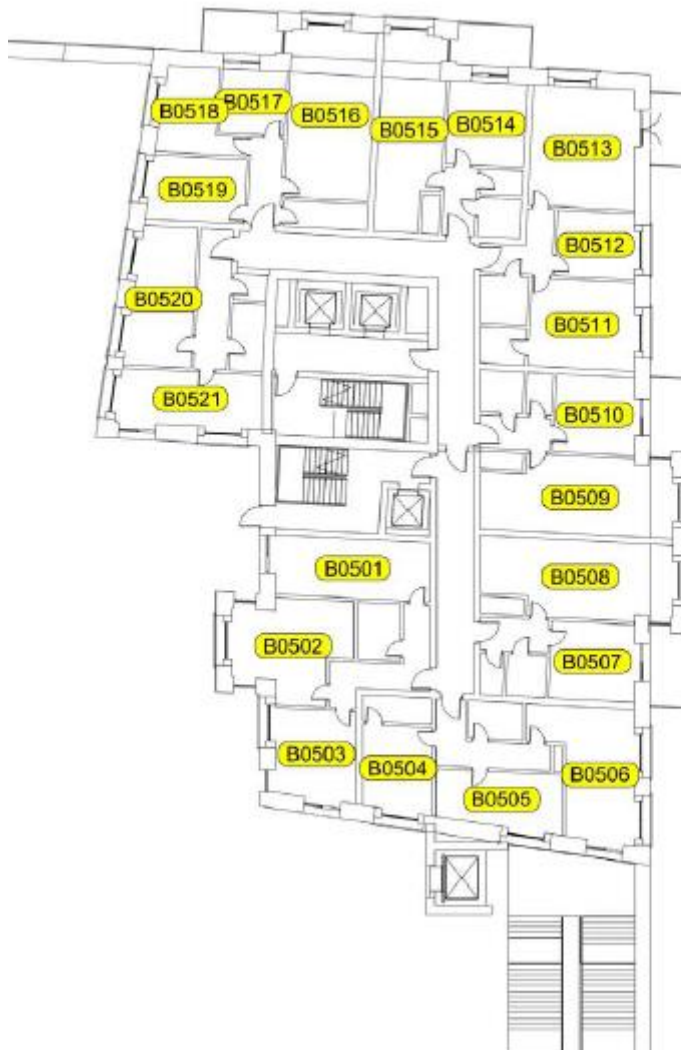


Image 7 - West B02

- 8.2.10 Our results show that 15 of the 21 rooms assessed meeting the BRE target. The majority of the small number of rooms that are failing do so by 35 lux or less which indicates an otherwise very good level of compliance for room located on the first floor where compliance will only improve to the upper floors. Indeed the majority of rooms materially exceed the target levels and there are no significant deviations affecting the main living spaces.

Block West B04

Block	Total No. of Rooms	Rooms Meeting Target
West B04	16	15 (94%)

Table 5 - Block West B04 results



Image 8 - Site plan

- 8.2.11 This proposed building is an east – west oriented block to the southern part of the site. The units will therefore enjoy outlook to the western courtyard and the Plummery Gardens. Again, the layouts maximise dual aspect rooms particularly in respect of the main living spaces:

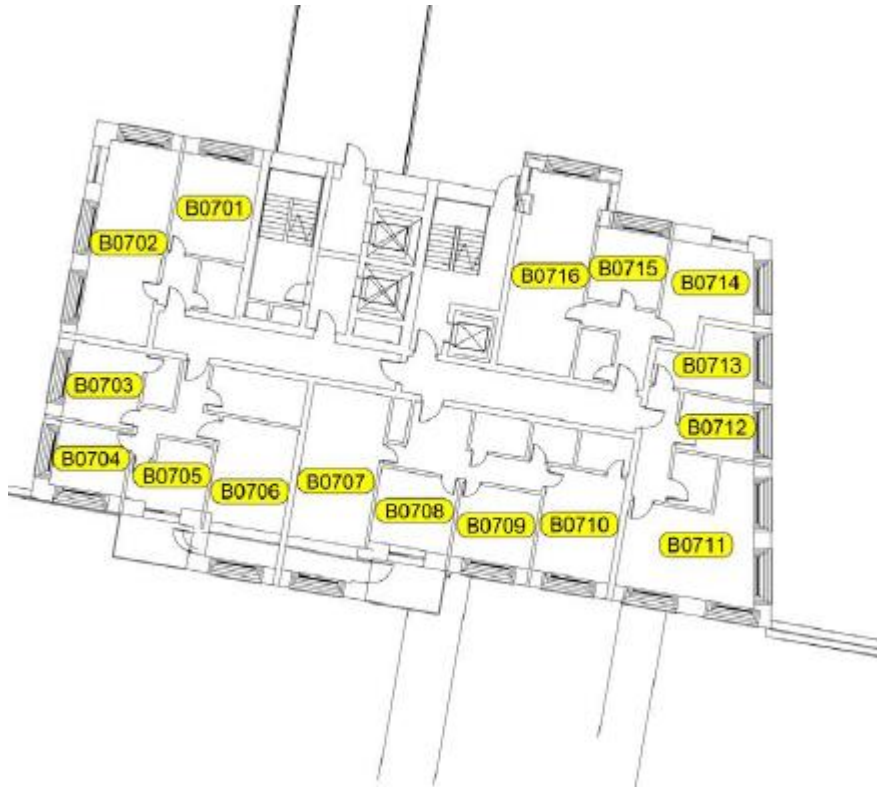


Image 9 - West B04 layout

- 8.2.12 Even to the lowest level almost all rooms meet the BRE target lux level. Just a single living space falls marginally below target by 11 lux, this would be an unnoticeable deviation from the targets and the results confirm a very good level of compliance that would only improve further to the upper floors.

Block West B03

Block	Total No. of Rooms	Rooms Meeting Target
West B03	17	11 (65%)

Table 6 - Block West B03 results



Image 10 - Site plan

- 8.2.13 West B03 is a north – south oriented block typical of those to the southern part of the site. Living spaces are either dual aspect or positioned to ensure they are less impacted by balconies. The core is also centred in a more constrained location to the centre of the footprint to prioritise amenity to main living spaces.

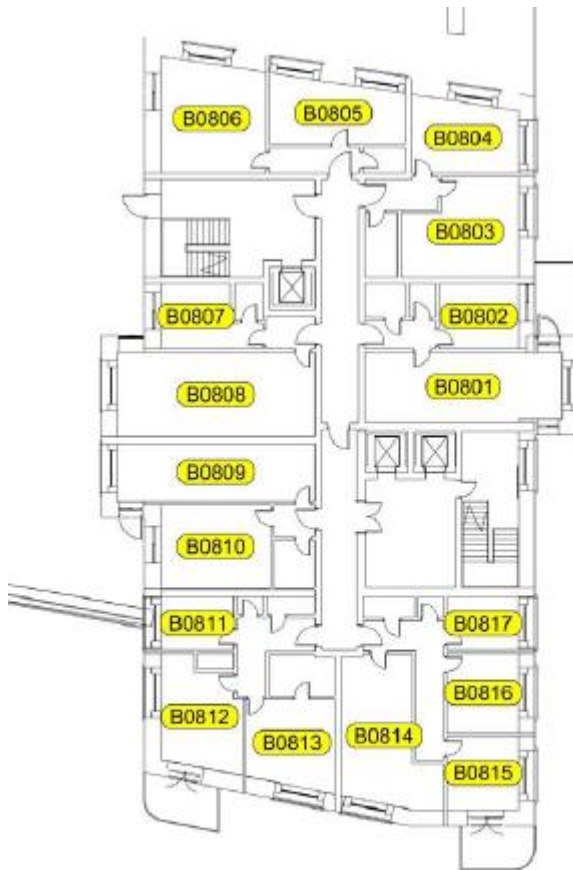


Image 11 - West B03 layout

- 8.2.14 A small number of the east/west facing rooms at first floor will fall below the targets however this is predominantly due to the windows being positioned beneath or adjacent to a balcony. Again, the presence of the balconies is a common trade-off in a modern development recognised by the BRE guide. The majority of rooms significantly exceed the BRE target lux levels and deviations to the main living rooms are very limited, these good levels of daylight will only improve to the upper floors and there will be opportunity in detailed design to further optimise the layout and design of this block through detailed consideration of window size and balcony position.

8.3 Sunlight Assessment

Number of sample units tested at First Floor	Total No. of units meeting sunlight targets
33	27 (81%)

Table 7 - Sunlight compliance summary

- 8.3.1 In terms of direct sunlight, it is common that site constraints will result in not all units being south facing. The proposal does however limit the properties outside of this orientation and maximises dual aspect rooms, particularly to main living spaces.
- 8.3.2 Where units do not have a southerly aspect, they enjoy a mitigating factor as recognised within the BRE guide such as a pleasant outlook to the central landscaped areas of the site.
- 8.3.3 Overall, the scheme performs well with 81% of the sample first floor units meeting or exceeding the BRE target. Of the 27 units that meet the sunlight targets, 23 of these have a main living space that meets the target of 1.5 hours of sunlight on March 21. The remaining 4 units have at least one habitable room meeting the sunlight requirement which is deemed as compliant with the BRE guidance.
- 8.3.4 This compliance is considered to be very high and indicates that appropriate compliance may be achieved in the detailed design of the proposals.

8.4 Sunlight within the proposed gardens and amenity areas

- 8.4.1 The landscaping strategy for the site has been developed by MacGregor Smith to and provides a range of valuable public and private amenity spaces. The strategy has developed with our input in order to provide a varied mix of spaces balancing sunny, shaded, active and passive areas for visitors and residents to Kings Meadow View.
- 8.4.2 The detailed of these spaces is set out in the landscaping drawing and relevant chapter of the design code. Alongside high quality design the varied character of the spaces is in line with the BRE guidance which notes that the importance of direct sunlight to outdoor spaces is linked to the specific use of that space. In particular s.3.3.1 of the guide notes that the primary requirement for good sunlight availability to spaces utilised for sitting out and child's play space if during the 'warmer' months which are considered to be between spring and summer.

Proposed Landscaped Strategy

- 8.4.3 The primary public spaces Plummary Gardens and the Eastern Courtyard will form important connections and link the recently completed Huntley Wharf development and future development sites the east of Forbury Retail Park.
- 8.4.4 Climate change is an important consideration in how external spaces can function and adapt to wetter winters, drier and hotter summers. Keeping cool in external spaces will become essential. We need to think differently about external spaces provided a balance of sunny and shaded spaces around buildings. The development proposal will need to positively design for a proportion of shade to give residents a choice and comfort during hot weather. This is actively considered through linking tertiary space like the woodland gardens that will provide retreat spaces, play and cooler pedestrian routes. Good performance of sunlight to ground needs to be achieved in the summer when the external spaces will have more intense use as noted in s.3.3.1 of the BRE guide.
- 8.4.5 We have assessed the provision of sunlight to the proposed amenity / shared communal areas using the BRE's 2-hour sun on-ground (sunlight amenity) assessment. This considers those parts of a space that can achieve 2+ hours of sun on a particular assessment date. For the purposes of our assessment we have considered the performance of the proposed landscaped space as a whole and then provided commentary on the performance and character of the individual spaces. In accordance with 3.3.15 of the BRE guide we have supplemented the March 21st equinox test with an assessment of the position on June 21st to illustrate the performance of the spaces during the summer months when the spaces be most used.

Overall Amenity Compliance

- 8.4.6 The results of our sunlight amenity assessments are attached at Appendix 3. These illustrate the performance of the spaces against the BRE 2+ hour sun on ground target as well as providing a graded study showing the levels of sunlight achieved where spaces fall below the 2+ hour level.
- 8.4.7 When considering the proposed landscaping as a whole our study shows that over 54% of the amenity areas will receive at least 2 hours of sunlight on March 21st. This fully satisfies the BRE target recommendations.
- 8.4.8 When considering the distribution of sunlight on the March 21st date the more open areas of the Plummary Gardens and eastern and western courtyards achieve the highest levels of sunlight as they are more open to the south. Whilst the central Green Streets and Woodland Gardens receive less direct sun earlier in the year, our graded studies do show that large areas of the space achieve c.1.2 – 1.6 hours of sunlight which is considered to be appropriate given the more shaded character of these spaces and the larger areas of space that meet the 2+ hours target within other areas of both private amenity and public realm.
- 8.4.9 The June 21st assessment shows high levels of sunlight in the summer months with 93% of the spaces achieving at least 2+ hours of sunlight. In summer, the Green Streets and Woodland Gardens will continue to offer more shaded space of a different character to the more open courtyard spaces and Plummary Gardens. The assessment of the summer position also demonstrates that the proposal accords with the intention of the BRE guidance that sunlight is most important for areas for child's play and sitting out during the warmer months,
- 8.4.10 Whilst our comprehensive assessments demonstrate compliance with the overall BRE targets we have also considered the performance and use of the individual spaces. This is set out below to provide detail on how each space functions and responds to the needs of residents throughout the year.

Plummary Gardens

- 8.4.11 Plummary Gardens will form the primary public space along the southern frontage of the development linking the Railway Station and Forbury Gardens to the west and Huntley Wharf and future development plots to the east. The space will be used as a shared cycling and pedestrian route as well as a Linear Public Space providing a new frontage and address for the development. The area is generous in depth and provides a significant green frontage to the scheme where people may dwell as well as transitioning to the courtyards, green streets, and gardens within the scheme.

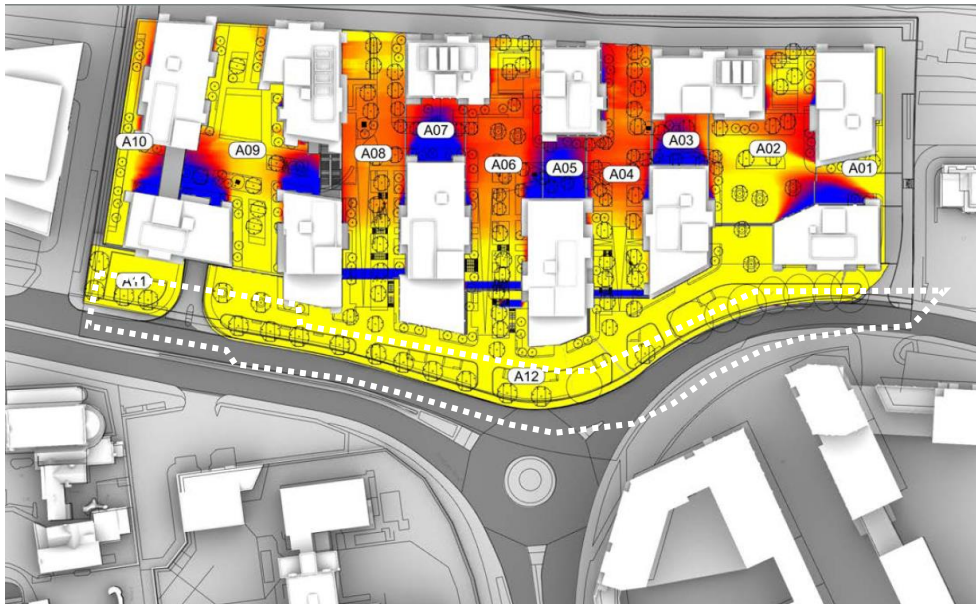


Image 12 - Plummary Gardens shading extract - March 21st

- 8.4.12 As noted above the southern aspect of the Plummary gardens results in the space enjoying good sunlight levels throughout the year and significantly exceeding the BRE guideline targets. The planting will also provide elements of shade in the warmer months supplemented by the opportunities to transition to the more sheltered elements of the proposal.

Woodland Gardens

- 8.4.13 The Woodland Gardens will form a secondary public space through the centre of the development provided doorstep play and more reflective spaces for residents. This will be more shaded in contrast to Plummery Gardens. This area will include Integrated children's play, garden Rooms providing sunny and shaded dwell spaces.



Image 13 - Woodland Gardens shading extract - March 21st

- 8.4.14 Woodland Gardens is situated to the centre of the site and is inherently more sheltered than the more open courtyards and Plummery Gardens. Such a space lends itself well to the more shaded amenity requirements of child's play and sitting out in the summer months where the spaces are a mix of more sheltered areas and those receiving direct sunlight.
- 8.4.15 As the graded image above shows this space will enjoy less than 2 hours of direct sunlight on the 21st March but it will however benefit from 1-1.5 hours of sun. There are also areas between the blocks which benefit from a higher level of shading where more shaded garden rooms and dwell spaces may be positioned.
- 8.4.16 Our supplementary June 21st assessment illustrates the position in the summer months when the spaces will enjoy higher levels of direct sunlight exceeding the 2+ hour target. The space therefore accords with the BRE guide which notes the need for importance of sunlight to these spaces in the warmer months whilst still providing some areas of shade and a different character to more open courtyard spaces.

Green Street



Image 14 - Green Street shading extract - March 21st

- 8.4.17 Green Street comprises of a series of landscaped streets providing north south connections through the development linking residents to Plummery Gardens and the Woodland Gardens. The spaces function as a shared cycle and pedestrian route, doorstep play, informal seating spaces as well as garden rooms providing sunny and shaded dwell spaces.
- 8.4.18 Our March 21st assessment shows that the Green Street areas will provide a varied character of landscaping and mix of more well sunlit space and shaded areas.
- 8.4.19 The southern areas of the streets opening onto Plummery Gardens achieve more than 2+ hours of direct sunlight and are a transition into the more sheltered areas within the site. Within the site there are more shaded areas but the majority of spaces achieve between 1 and 1.5 hours of direct sunlight on the 21st March. To the northern boundary the spaces between the proposed blocks enjoy higher sunlight levels due to their relationship with the more open central areas.
- 8.4.20 When utilised as cycle and pedestrian route residents and visitors will move through these zones transitioning between the more and less shaded areas. For sitting out and child play residents have choice in the earlier part of the year to utilise different areas of the Green Streets as well as using the courtyard and garden areas.
- 8.4.21 The Green Street zones are all open to the south so that sunlight availability increases during the warmer months as illustrated by our supplementary June 21st assessments. This shows that virtually all of the spaces will enjoy 2+ hours on that date whilst still providing some shelter and a different character for residents and visitors when compared with the more sheltered Woodland Gardens and the more open Courtyards and Plummery Gardens.

Eastern and Western Courtyard



Image 15 - Western / Eastern courtyard shading extract - March 21st

- 8.4.22 The Eastern Courtyard will provide a new public space enabling a pedestrian and cycle connection to the Tunnel link to Kings Meadow as well as a potential route and interface to any future development to the east. The Western Courtyard will provide a resident communal courtyard space for play and community events. As the graded assessment image above shows, both spaces will enjoy good levels of sunlight throughout the year with a suitable mix of shaded and well sunlight spaces.
- 8.4.23 Both Western and Eastern courtyards achieve good levels of compliance against the BRE targets with large areas of the spaces exceeding the 2+ hour sunlight target on March 21st. There are some areas of shade closest to the buildings providing some shelter and a varied character to the spaces.
- 8.4.24 Our June assessment shows these areas to be very well sunlit in the warmer months providing areas for more extended periods of sitting out, play and community events as well as an interface with leisure offerings to the eastern courtyard. Even in the summer months however both the planting and relationship with the proposed buildings provides areas of shade which will inform the location of areas for sitting out.
- 8.4.25 Overall, the external amenity provision within the scheme exceeds the BRE target for sunlight on the 21st March achieving 2 hours of direct sunlight to 54% of the space. Whilst the proposals comprise areas of different character residents and visitors will have a wide number of options for amenity throughout the year. At all times of the year there are opportunities for enjoying more sunlit or sheltered spaces.
- 8.4.26 Our assessment of the June 21st summer position shows how direct sunlight levels increase reflecting the time of year when the use of the spaces for sitting out and child play will be highest. This accords with the importance that the BRE guide places

on the sunlight in the warmer months for these activities whilst still providing elements of shelter. Overall, the sunlight levels fully meet the BRE targets and provide a well-designed and varied mix of public and private amenity.

9 Conclusions

9.1.1 This practice has undertaken an assessment of the provision of daylight and sunlight within a representative sample of the proposed residential units at first floor level to assess the quality of internal amenity provision to the proposals. In addition, our overshadowing assessments consider the quality and variety of the external landscaping provision in terms of both the private amenity spaces and proposed public realm.

9.2 Daylight and sunlight within the proposed residential units

9.2.1 The results of the Daylight Illuminance assessment indicate that 76% of the typical units assessed meet the BRE targets for their specific room use. This compliance rate at first floor level considers the lowest units of the proposal where daylight levels will be more constrained. This is however a good level of compliance with the detailed results, discussed below, confirming many rooms significantly exceed the BRE targets. Overall compliance will only increase to the upper levels and detailed design will present the opportunity to optimise the scheme including both the unit layouts and the facade / balcony detail.

9.2.2 The results for our sample show that appropriate daylighting levels can be achieved across the various block typologies around the site. As such the overall compliance is commensurate with schemes of a similar scale and context and good levels of internal amenity will be achieved for future residents.

9.2.3 Whilst direct sunlight levels are more orientation specific, the proposal limits the properties outside of a southerly orientation and maximises dual aspect rooms, particularly to main living spaces. Where units do not have a southerly aspect, they enjoy a mitigating factor as recognised within the BRE guide such as a pleasant outlook to the central landscaped areas of the site.

9.2.4 Overall, the scheme performs well with 81% of the sample first floor units meeting or exceeding the BRE target and this indicates that an appropriate compliance may be achieved in the detailed design of the proposals.

9.2.5 Overall, our daylight and sunlight analysis of the lowest residential units indicate a good level of compliance. The current performance shows the potential for high levels of daylight within the scheme and across the development as a whole. The overall compliance will only increase to the upper levels and is considered to be both acceptable and commensurate with schemes of a similar scale and context.

9.3 Overshadowing / sunlight within the proposed amenity areas

9.3.1 In terms of overshadowing the scheme provides a varied mix of spaces of different character. This includes more open public and private courtyards to the west and east of the site and the more sheltered central Woodland Gardens. The Plummary

Gardens and Green Street elements provide varied opportunities for moving past and through the site as well as space to dwell and opportunities for play.

- 9.3.2 Overall, the amenity provision within the scheme exceeds the BRE target for sunlight on the 21st March achieving 2 hours of direct sunlight to 54% of the space. Both residents and visitors will have a wide number of options for amenity throughout the year and, at all times, there are opportunities for enjoying more sunlit or sheltered spaces.
- 9.3.3 Our assessment of the June 21st summer position shows how direct sunlight levels increase in summer reflecting the time of year when the use of the spaces for sitting out and child play will be highest. This accords with the importance that the BRE guide places on the sunlight in the warmer months for these activities whilst still providing elements of shelter. Overall, the sunlight levels fully meet the BRE targets and provide a well-designed and varied mix of public and private amenity.



Appendix 1

Drawings of the existing, proposed and surrounding buildings



Sources of information

Cloud 10 Ltd
0659 Forbury Retail Park Reading 13-09-21.dwg
Received 13/09/2021

Squire & Partners
18111-SQP-ZZ-05-DR-A-PL00013.dwg
Received 23/02/2023

EB7 Ltd
Site Photographs
Ordnance Survey

Key:



Existing

NORTH



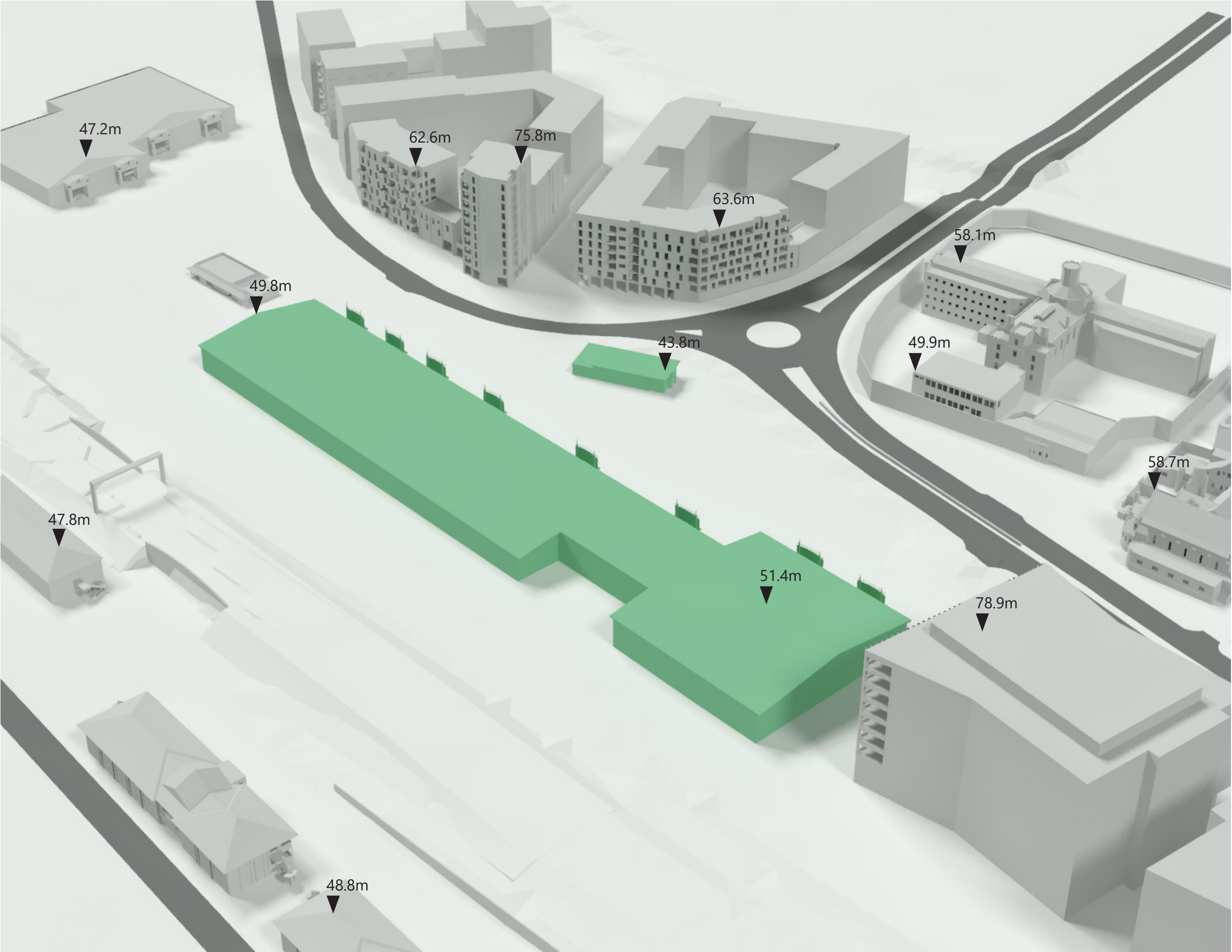
Project Forbury Retail Park Reading

Title Existing Condition Plan View

Drawn AP Checked --

Date 13/04/2023 Project 4142

Rel no. 04 Prefix DS01 Page no. 01



Sources of information

Cloud 10 Ltd
0659 Forbury Retail Park Reading 13-09-21.dwg
Received 13/09/2021

Squire & Partners
18111-SQP-ZZ-05-DR-A-PL00013.dwg
Received 23/02/2023

EB7 Ltd
Site Photographs
Ordnance Survey

Key:

Existing

Project Forbury Retail Park
Reading

Title Existing Condition
3D View

Drawn AP Checked --

Date 13/04/2023 Project 4142

Rel no. 04 Prefix DS01 Page no. 02



Sources of information

Cloud 10 Ltd
0659 Forbury Retail Park Reading 13-09-21.dwg
Received 13/09/2021

Squire & Partners
18111-SQP-ZZ-05-DR-A-PL00013.dwg
Received 23/02/2023

EB7 Ltd
Site Photographs
Ordnance Survey

Key:



Proposed
Max Extent

NORTH



Project Forbury Retail Park
Reading

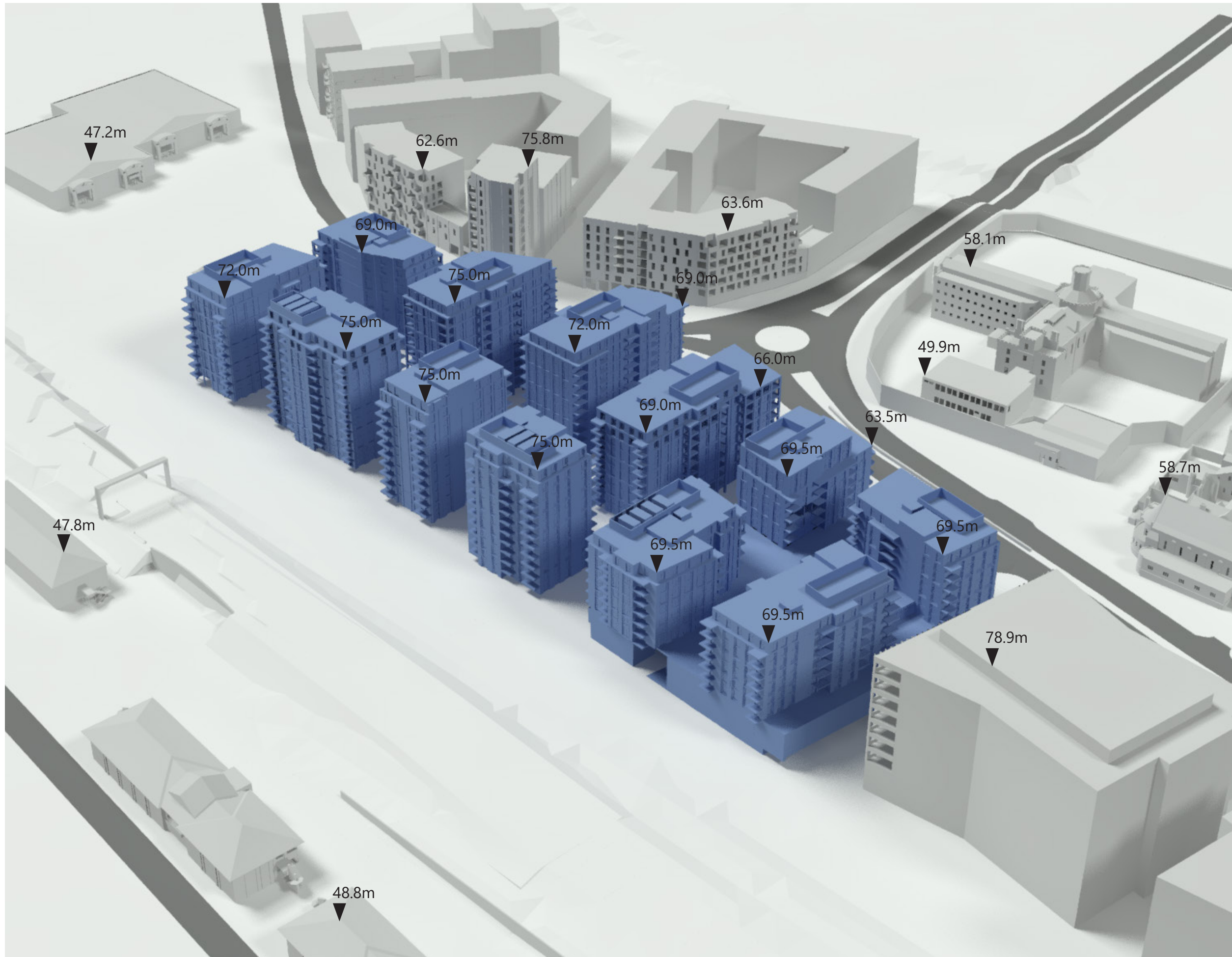
Title Proposed Development
Illustrative Scheme
Plan View

Drawn AP Checked --

Date 13/04/2023 Project 4142

Rel no. 04 Prefix DS01 Page no. 03

Site Photographs
Ordnance Survey

 Proposed
Max Extent

Rel no.	Prefix	Page no.
04	DS01	04



Appendix 2

Results of the daylight and sunlight assessments
within the proposed scheme at first floor level



Fig. 1: Bird's Eye View - Proposed Scenario



Fig. 2: Top View - Proposed Scenario

Calculation assumptions		
Reflectances: Internal floors: 0.4 Internal walls: 0.80 Internal ceilings: 0.80 Façade: 0.60 Balcony floor: 0.3 Balcony ceiling: 0.6 Surrounds: 0.2	Windows: Light transmittance 0.68 Maintenance factor 0.92 Framing factor 0.80 Calculation grids: Maximum cell size: 300mm Boundary offset: 300mm Weather file: London Gatwick	Daylight targets (London): Bedrooms: 100 lx Living rooms \ LKDs: 150 lx Kitchens: 200 lx Time targets: 50% of daytime Spacial targets: 50% of the daylit area (discarding the boundary offset)



Fig. 3: Internal Daylight (LX)

		Daylight LX (lux)		Sunlight (hrs)	
Room	Use	Value	Target	Value	South Angle*
B01 - Floor 1F					
B0101	Living room	89	150	1.5	0
B0102	Bedroom	26	100	0.0	90
B0103	Bedroom	68	100	0.9	90
B0104	LKD	180	150	2.7	12
B0105	Bedroom	63	100	2.3	12
B0106	Studio	289	150	4.3	12
B0107	Living room	223	150	4.2	90
B0108	Bedroom	132	100	1.4	90
B0109	Bedroom	173	100	0.5	90
B0110	Bedroom	265	100	3.4	90
B0111	Bedroom	223	100	3.9	90
B0112	LKD	359	150	4.1	90
B0113	Bedroom	405	100	0.0	180
B0114	Bedroom	309	100	0.0	180
B0115	LKD	323	150	1.8	90
B0116	Bedroom	122	100	1.7	90
B0117	Bedroom	115	100	1.5	90

Table 1: Results

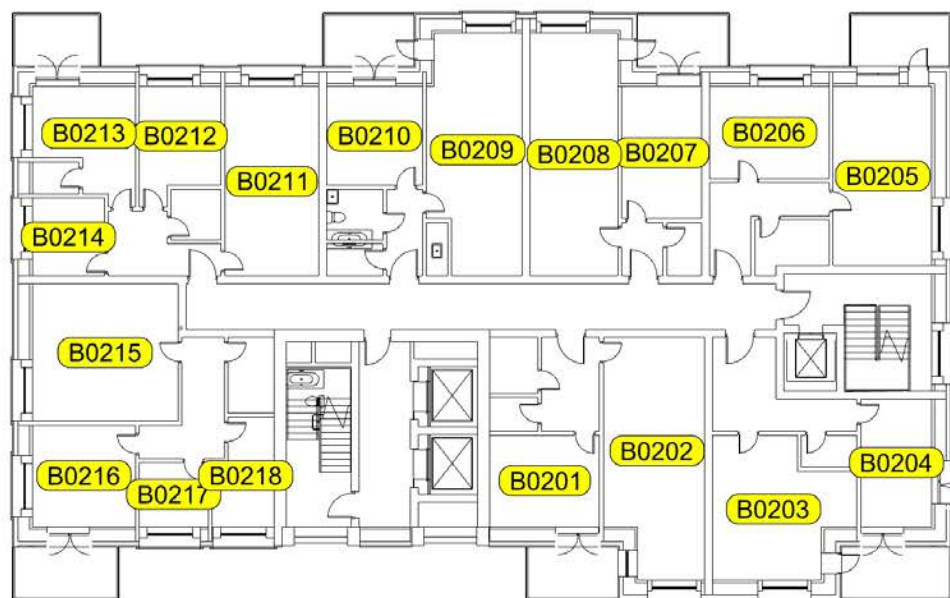


Fig. 4: Internal Daylight (LX)

		Daylight LX (lux)		Sunlight (hrs)	
Room	Use	Value	Target	Value	South Angle*
B02 - Floor 1F					
B0201	Bedroom	45	100	0.2	0
B0202	Living room	60	150	1.9	0
B0203	Living room	95	150	1.8	0
B0204	Bedroom	162	100	1.2	0
B0205	LKD	203	150	1.1	90
B0206	Bedroom	309	100	0.0	180
B0207	Bedroom	120	100	0.0	180
B0208	Living room	193	150	0.0	90
B0209	Living room	175	150	0.0	90
B0210	Bedroom	155	100	0.0	180
B0211	Living room	285	150	0.0	180
B0212	Bedroom	368	100	0.0	180
B0213	Bedroom	251	100	1.3	90
B0214	Bedroom	183	100	1.5	90
B0215	Living room	42	150	1.1	90
B0216	Bedroom	125	100	2.1	0
B0217	Bedroom	179	100	2.0	0
B0218	Bedroom	114	100	2.3	0

Table 2: Results



Fig. 5: Internal Daylight (LX)

		Daylight LX (lux)		Sunlight (hrs)	
Room	Use	Value	Target	Value	South Angle*
B05 - Floor 1F					
B0501	Bedroom	42	100	0.7	90
B0502	Living room	126	150	4.7	3
B0503	Bedroom	285	100	4.7	9
B0504	Bedroom	149	100	3.3	9
B0505	Bedroom	162	100	1.9	9
B0506	LKD	324	150	2.5	9
B0507	Bedroom	70	100	0.1	90
B0508	Living room	117	150	2.6	3
B0509	Living room	127	150	4.1	90
B0510	Bedroom	84	100	1.9	90
B0511	Bedroom	131	100	2.2	90
B0512	Bedroom	264	100	2.5	90
B0513	LKD	299	150	0.0	90
B0514	Bedroom	168	100	0.0	177
B0515	Living room	251	150	0.0	87
B0516	Living room	228	150	0.0	93
B0517	Bedroom	241	100	0.0	177
B0518	Bedroom	326	100	1.4	99
B0519	Bedroom	184	100	1.4	99
B0520	Bedroom	241	100	1.3	99
B0521	LKD	308	150	2.8	3

Table 3: Results



Fig. 6: Internal Daylight (LX)

		Daylight LX (lux)		Sunlight (hrs)	
Room	Use	Value	Target	Value	South Angle*
B07 - Floor 1F					
B0701	Bedroom	117	100	0.0	170
B0702	LKD	359	150	4.1	100
B0703	Bedroom	297	100	3.7	100
B0704	Bedroom	1217	100	6.6	10
B0705	Bedroom	279	100	1.8	10
B0706	Living room	464	150	9.1	10
B0707	Living room	331	150	9.1	10
B0708	Bedroom	220	100	1.8	10
B0709	Bedroom	554	100	7.8	10
B0710	Bedroom	429	100	8.7	10
B0711	LKD	709	150	8.5	10
B0712	Bedroom	202	100	2.4	90
B0713	Bedroom	190	100	2.2	90
B0714	Bedroom	235	100	1.9	90
B0715	Bedroom	244	100	0.0	170
B0716	Living room	139	150	0.0	80

Table 4: Results



Fig. 7: Internal Daylight (LX)

		Daylight LX (lux)		Sunlight (hrs)	
Room	Use	Value	Target	Value	South Angle*
B08 - Floor 1F					
B0801	Living room	111	150	2.7	0
B0802	Bedroom	40	100	0.0	90
B0803	Living room	83	150	0.9	90
B0804	Bedroom	307	100	1.3	90
B0805	Bedroom	227	100	0.0	171
B0806	Living room	191	150	1.6	90
B0807	Bedroom	54	100	0.0	90
B0808	Living room	97	150	3.1	90
B0809	Living room	179	150	4.2	0
B0810	Bedroom	96	100	1.9	90
B0811	Bedroom	519	100	4.2	90
B0812	LKD	526	150	6.4	11
B0813	Bedroom	390	100	8.9	11
B0814	Living room	373	150	8.5	11
B0815	Bedroom	641	100	7.0	0
B0816	Bedroom	237	100	3.0	90
B0817	Bedroom	265	100	2.5	90

Table 5: Results



Appendix 3

Results of the sunlight amenity assessment



Fig. 1: Sunlight Exposure

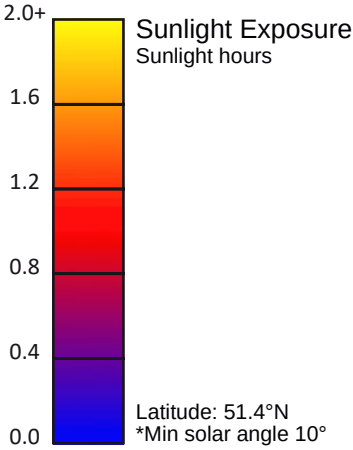
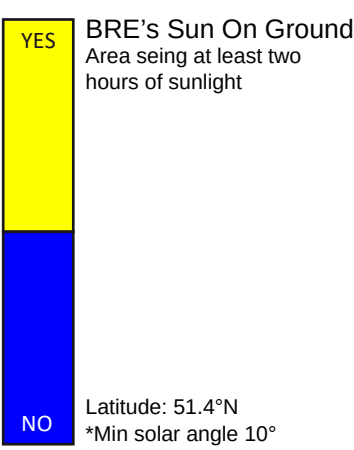


Fig. 2: BRE's Sun on Ground



Zone Name	Area (m2)	Sunlit Area* (%)
A01	403.5	60.5
A02	1,350.4	36.9
A03	279.3	0.0
A04	1,331.5	22.1
A05	255.1	0.0
A06	1,514.2	17.6
A07	335.4	0.0
A08	1,490.7	17.2
A09	1,751.1	51.9
A10	551.3	46.4
A11	534.4	100.0
A12	4,536.8	99.3
Total	14,333.6	54.2

*Sunlit Area = Area receiving at least 2hrs. of sunlight on 21st March

Table 1: Results



Fig. 3: Sunlight Exposure

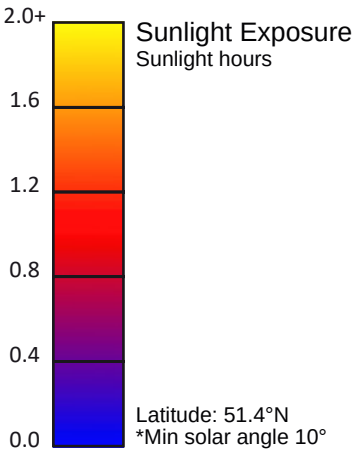
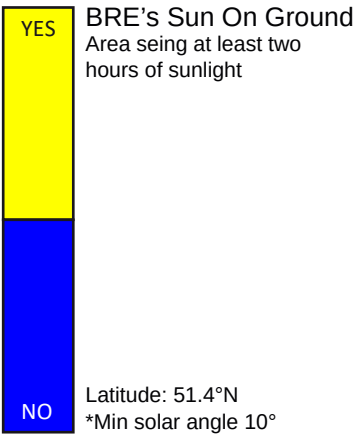


Fig. 4: BRE's Sun on Ground



Zone Name	Area (m2)	Sunlit Area* (%)
A01	403.5	97.1
A02	1,350.4	90.6
A03	279.3	96.1
A04	1,331.5	70.3
A05	255.1	61.1
A06	1,514.2	91.6
A07	335.4	89.4
A08	1,490.7	95.4
A09	1,751.1	96.9
A10	551.3	90.1
A11	534.4	100.0
A12	4,536.8	99.6
Total	14,333.6	93.0

*Sunlit Area = Area receiving at least 2hrs. of sunlight on 21st June

Table 2: Results



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