



DAYLIGHT & SUNLIGHT

INTERNAL DAYLIGHT, SUNLIGHT AND
OVERSHADOWING REPORT

The Oracle, Reading

09 December 2022

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DISCLAIMER:

N.B This report is accurate as at the time of publication and based upon the information we have been provided with as set out in the report. It does not take into account changes that have taken place since the report was written.

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1 EXECUTIVE SUMMARY

The purpose of this report is to ascertain whether the proposed development will provide residential accommodation considered acceptable in terms of daylight, sunlight and overshadowing.

This report contains the final assessments undertaken for all proposed units within The Oracle, Reading scheme. All assessment have been undertaken in accordance with the BRE Guidelines 2022.

Overall, the results show that the proposed development will provide future occupants with acceptable levels of daylight. 738 (69%) of all 1,069 habitable rooms within the proposed development will meet the BRE's recommendation in terms of Illuminance (Spatial Daylight Autonomy/sDA).

Of the 331 rooms that fall short of the sDA recommendations, 248 are open-plan living/kitchen/dining rooms (LKDs), four are studios and 79 are bedrooms.

Of the main living spaces (including studios) falling short of the sDA recommendations, 27 open-plan living/kitchen/dining rooms and two studios achieve the recommendation for living rooms. A further 43 fall marginally (40% or greater) below the recommended level of 50%. A further 31 would achieve 150 lux within the front third of their space for half of the daylight hours of the year. These 101 main living spaces are considered to offer acceptable daylight amenity for a large-scale residential development.

The remaining rooms are mostly located on the lower floors within areas that face onto other development facades and have their main window further obstructed by a balcony overhead. This is a typical trade-off in amenity common of most modern residential developments where balconies provide a valued form of external amenity. The levels of daylight achieved are common of most large-scale residential development, particularly where the site is seeking to make optimum use of land for new homes.

545 (51%) of the 1,069 proposed rooms meet the BRE recommendation for sun exposure on 21st March, by receiving 1.5hrs or more of direct sunlight. 285 (52%) of the 545 proposed living spaces (including studios), where sunlight is most appreciated, meet the criteria on 21st March, or one of the alternative dates put forward within EN17037. The remaining living rooms are within isolated areas that see lower levels of sunlight predominantly due their easterly or westerly orientation. 40 of these living rooms would however be within dwellings that are considered acceptably sunlit as at least one of their bedrooms meets the target sunlight hours.

39 living spaces (including four studios) are served by windows which are not oriented within 90-degrees of due south therefore access to sunlight is more restricted and they therefore do not have a reasonable expectation of sunlight. The design has sought to minimise living spaces which are within 90-degrees of due north as much as practicable, and avoids any rooms having a predominately north aspect which is an excellent result for a large-scale flatted development. The levels of sunlight achieved are common of most large-scale residential development, particularly where the site is seeking to make optimum use of land for new homes.

A variety of open spaces have been provided within the scheme which offers future residents and visitors different sunlit spaces to enjoy throughout the year. 75% of the total open space provision sees two or more hours of direct sunlight on 21st March, exceeding the BRE recommendation of 50%. Additionally, all open spaces, when considered in isolation, meet the recommended level. Therefore, the proposed open spaces provide future occupants and visitors to the site with good access to a variety of sunlit open spaces to enjoy throughout the year.

We therefore consider that future occupants will be provided with adequately daylit and sunlit dwellings in accordance with the NPPF and Policies CC8 and CR10 of the Reading Borough Local Plan (2019) all whilst balancing the need to deliver a viable scheme that makes optimum use of land and balances other policy objectives.

2 INTRODUCTION

GIA has been instructed to provide a report upon the potential availability of Daylight and Sunlight to the proposed accommodation within the residential scheme prepared by CallisonRTKL. GIA was specifically instructed to carry out the following:

- To create a 3D computer model of the proposal based upon drawings prepared by CallisonRTKL.
- Carry out a daylight assessment using the methodologies set out in the BRE guidance for Illuminance (Spatial Daylight Autonomy/sDA).
- Carry out a sunlight assessment using the methodologies set out in the BRE guidance for Sun Exposure.
- Carry out an overshadowing assessment using the methodology set out in the BRE guidance for Sun Hours On Ground (SHOG) for all relevant amenity areas.
- Prepare a report setting out the analysis and our findings.

3 PLANNING POLICY CONTEXT

3.3 NATIONAL PLANNING POLICY

National Planning Policy Framework (2021)

The National Planning Policy Framework was revised in July 2021 and paragraph 125, part C stipulates that “...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).”

Planning Practice Guidance (2021 update)

Paragraph 6 of the section ‘Effective use of land’ states that “Where a planning application is submitted, local planning authorities will need to consider whether...daylight and sunlight within the development itself will provide satisfactory living conditions for future occupants”

Paragraph 7 states that “All developments should maintain acceptable living standards. What this means in practice, in relation to assessing appropriate levels of sunlight and daylight, will depend to some extent on the context for the development as well as its detailed design. For example, in areas of high-density historic buildings, or city centre locations where tall modern buildings predominate, lower daylight and daylight and sunlight levels at some windows may be unavoidable if new developments are to be in keeping with the general form of their surroundings.

In such situations good design (such as giving careful consideration to a building’s massing and layout of habitable rooms) will be necessary to help make the best use of the site and maintain acceptable living standards.”

3.4 LOCAL PLANNING POLICY

Reading Borough Local Plan (November 2019)

Policy CC8 (Safeguarding Amenity) states that:

“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;
- [...].”

The additional information regarding Policy CC8 then goes on to recommend the use of the ‘BRE Site Layout Planning for Daylight and Sunlight: A guide to good practice’ document.

Policy CR10 (Tall Buildings) states that:

“In Reading, tall buildings are defined as 10 storeys of commercial floorspace or 12 storeys of residential (equating to 36 metres tall) or above. Tall buildings will meet all the requirements below:

- [...]
- In addition to the area-specific requirements, all tall building proposals should be of excellent design and architectural quality, and should:*
- [...]
- Avoid significant negative impacts on existing residential properties and the public realm in terms of outlook, privacy, daylight, sunlight, noise, light glare and nighttime lighting;
- [...].”

4 RELEVANT GUIDANCE

The Building Research Establishment (BRE) have set out in their handbook 'Site Layout Planning for Daylight and Sunlight a Guide to Good Practice (BR 209 2022)', guidelines and methodology for the measurement and assessment of daylight and sunlight within proposed buildings.

The BRE published the new edition of 'Site layout planning for daylight and sunlight: a guide to good practice' in June 2022 (BR 209). This is to be read in conjunction with BS EN 17037:2018 "Daylight in buildings", the UK National Annex of the British Standard and the CIBSE publication LG 10 'Daylighting – a guide for designers'.

The BR 209 new edition contains amended methodologies for appraising the daylight and sunlight quality within new developments. Nonetheless, the main aim of the guidance is maintained: *"to help rather than constrain the designer"* as stated in Paragraph 1.6 of the new guidance.

The report provides advice, but also clearly states that it *"is not mandatory and the guide should not be seen as an instrument of planning policy."* The guidance also acknowledges in its introduction that *"Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design (see Section 5). 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."* (Paragraph 1.6)

4.1 BS EN 17037:2018 AND THE UK ANNEX

The British Standard BS8206-2:2008 was superseded by the new European Standard on daylight BS EN 17037:2018 "Daylight in buildings".

Following a review of the European Standard by a dedicated commission of UK experts, the British Standard Institution concluded that the targets suggested *"may not be achievable for some buildings, particularly dwellings"*. In particular, the UK committee believed this could be the case for *"dwellings with basement rooms or those with significant external obstructions (for example, dwellings situated in a dense urban area or with tall trees outside), or for existing buildings being refurbished or converted into dwellings"*

As a consequence, a UK National Annex was appended to BS EN 17037:2018 which suggested alternative targets, in line with those of the former BS8206-2:2008 and the previous (2011) BR209. These lower targets were then incorporated into the 2022 publication of BR209.

With this site being located within central London, a dense urban environment, the relevant targets are considered to be those contained within the UK National Annex as outlined and discussed further in Section 3.2 adjacent. It is important here to re-emphasise though that these UK targets were designed to be in line with those from the previous British Standard and BR209 publications and so utilising them does not represent a weakening of standards, rather it enables continuity in the understanding of daylight levels within residential developments.

The BS EN 17037 includes four criteria: daylighting, views, sunlight access and glare. However, daylighting and sunlight access are the only criteria considered relevant for residential buildings and therefore discussed within this report.

View out and Glare are mostly relevant in offices and schools, where occupants are more fixed to a certain location within a room. In residential habitable rooms, occupants tend to move more freely and therefore view out and glare are not assessed within residential buildings.

4.2 DAYLIGHT

The BRE set out the methods for assessing daylight within a proposed building within section 2.1 and Appendix C of the handbook. This is based on the methods detailed in the BS EN 17037.

BS EN 17037 suggests two possible methodologies for appraising daylight:

- Illuminance Method
- Daylight Factor Method

These methodologies are discussed in more detail below.

Whilst Vertical Sky Component (VSC) is no longer directly used to calculate the levels of daylight indoors, this is still referenced within the BRE guidance as a metric to appraise the level of obstruction faced by a building and the potential for good daylight indoors.

This method of assessment may also be used to appraise the daylight quality in the early stages of the design, when room layouts or window locations are still undecided.

Vertical Sky Component (VSC)

This method of assessment can be undertaken using a skylight indicator or a Waldram diagram. It measures from a single point, at the centre of the window (if known at the early design stage), the quantum of sky visible taking into account all external obstructions. Whilst these obstructions can be either other buildings or the general landscape, trees are usually ignored unless they form a continuous or dense belt of obstruction.

The VSC method is a useful 'rule of thumb' but has some significant limitations in determining the true quality of daylight within a proposed building. It does not take into account the size of the window, any reflected light off external obstructions, any reflected light within the room, or the use to which that room is put.

Illuminance method

Climate Based Daylight Modelling (CBDM) is used to predict daylight illuminance using sun and sky conditions derived from standard meteorological

data (often referred to as climate or weather data). This analytical method allows the prediction of absolute daylight illuminance based on the location and building orientation, in addition to the building's daylight systems (shading systems, for example). Annex A within the BS EN 17037 proposes values of target illuminances and minimum target illuminances to exceed 50 % of daylight hours.

This is considered to be the most accurate approach when using climate data, however, it provides a very large amount of data for each assessed room, which then needs to be interrogated. One of the methodologies that can be used to interrogate this data is Spatial Daylight Autonomy (sDA).

Spatial Daylight Autonomy (sDA)

The sDA assessment is designed to understand how often each point of the room's task area sees illuminance levels at or above a specific threshold.

BS EN 17037 sets out minimum illuminance levels (300lx) that should be exceeded over 50% of the space for more than half of the daylight hours in the year. It also includes recommendations for medium and high daylighting levels within a space (500lx and 700lx respectively). It should be noted here, however, that these targets are specified irrespective of a space's use or design.

As discussed within Section 4.1, the National Annex suggests that these targets can be challenging to achieve within residential settings, particularly in areas of higher density and so suggests lower targets can be considered in this situation. It should be noted here that the reduced targets suggested within the BS EN 17037:2018 National Annex are provided so as to be comparable with the previous BR209's recommendations for ADF. These targets, considered relevant for this application, are:

- 100 lux for bedrooms
- 150 lux for living rooms
- 200 lux for living/kitchen/diners, kitchens, and studios.

It is however stated in paragraph C17 of the BRE that: *"Where a room has a shared use, the highest target should apply. For example in a bed sitting room in student accommodation, the value for a living room should be used if students would often spend time in their rooms during the day. Local authorities*

could use discretion here. For example, the target for a living room could be used for a combined living/dining/kitchen area if the kitchens are not treated as habitable spaces, as it may avoid small separate kitchens in a design”.

Daylight Factor method

This method involves calculating the median daylight factor on a reference plane (assessment grid).

“The daylight factor is the illuminance at a point on the reference plane in a space, divided by the illuminance on an unobstructed horizontal surface outdoors. The CIE standard overcast sky is used, and the ratio is usually expressed as a percentage.”

This method of assessments considers an overcast sky, and therefore the orientation and location of buildings is not relevant. In order to account for different climatic conditions, Annex A within the BS EN 17037 sets equivalent daylight factor targets (D) for various locations in Europe.

The median daylight factor (MDF) should meet or exceed the target daylight factor relative to a given illuminance for more than half of daylight hours, over 50% of the reference plane.

4.3 SUNLIGHT

The BRE provide guidance in respect of sunlight quality for new developments within section 3.1 of the handbook. It is generally acknowledged that the presence of sunlight is more significant in residential accommodation than it is in commercial properties, and this is reflected in the BRE document.

It states, *“in housing, the main requirement for sunlight is in living rooms, where it is valued at any time of the 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 BRE guide considers the critical aspects of orientation and overshadowing in determining the availability of sunlight at a proposed development site.

The guide proposes minimising the number of dwellings whose living room face solely north unless

there is some compensating factor such as an appealing view to the north, and it suggests a number of techniques to do so. Furthermore, it discusses massing solutions with a sensitive approach to overshadowing, so as to maximize access to sunlight.

At the same time, it acknowledges that the site’s existing urban environment may impose orientation or overshadowing constraints which may not be possible to overcome.

To quantify sunlight access for interiors where sunlight is expected, it refers to the BS EN 17037 criterion that the minimum duration of sunlight exposure in at least one habitable room of a dwelling should be 1.5 h on March 21st. Table A.5 also establishes medium and high sunlight targets (3 and 4 hours).

This is to be checked at a reference point located centrally to the window’s width and at the inner surface of the aperture (façade and/or roof). For multiple apertures in different facades it is possible to cumulate the time of sunlight availability if not occurring at the same time. The reference point is minimum 1.2 m above the floor and 0.3 m above the window sill if present.

The summary of section 3.1 of the guide states as follows:

“In general, a dwelling or non-domestic building which has a particular requirement for sunlight, will appear reasonably sunlit provided that:

- *At least one main window faces within 90 degrees of due south, and*
- *a habitable room, preferably a main living room, can receive a total of at least 1.5 hours of sunlight on 21 March. This is assessed at the inside centre of the window(s); sunlight received by different windows can be added provided they occur at different times and sunlight hours are not double counted.. ”*

4.4 OVERSHADOWING

The BRE guidance in respect of overshadowing of amenity spaces is set out in section 3.3 of the handbook. Here it states as follows:

"Sunlight in the spaces between and around buildings has an important impact on the overall appearance and ambience of a development. It is valuable for a number of reasons, to:

- *provide attractive sunlit views (all year)*
- *make outdoor activities like sitting out and children's play more pleasant (mainly warmer months)*
- *encourage plant growth (mainly spring and summer)*
- *dry out the ground, reducing moss and slime (mainly in colder months)*
- *melt frost, ice and snow (in winter)*
- *dry clothes (all year).*

Again, it must be acknowledged that in urban areas the availability of sunlight on the ground is a factor which is significantly controlled by the existing urban fabric around the site in question and so may have very little to do with the form of the development itself. Likewise, there may be many other urban design, planning and site constraints which determine and run contrary to the best form, siting and location of a proposed development in terms of availability of sun on the ground.

The summary of section 3.3 of the guide states as follows:

"3. 3 .17 It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area that can receive two hours of sun on 21 March is less than 0.80 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March.."

4.5 FURTHER RELEVANT INFORMATION

CIBSE LG 10 'Daylighting – a guide for designers'.

This guide details the process of designing for daylighting. It outlines considerations of form, orientation, and other aspects involved in designing the building envelope to optimise natural light.

The guidance in this document is written primarily for buildings located within the UK, and will be most applicable to projects in northern hemisphere. However, the principles are universal, and can be applied to other locations if the appropriate weather data is used and local standards and regulations are respected

5 METHODOLOGY

In order to undertake the daylight and sunlight assessments set out in the previous pages, we have prepared a three dimensional computer model and used specialist lighting simulation software.

Calculation Model

The three dimensional representation of the proposed development has been modelled using the scheme drawings provided to us by CallisonRTKL (Blocks YHP1 and YHP2). This has been placed in the context of its surrounding buildings which have been modelled from survey information, photogrammetry and OS. This allows for a precise model, which in turn ensures that analysis accurately represents the amount of daylight and sunlight available to the building facades, internal and external spaces, considering all of the surrounding obstructions and orientation.

Assessments grid

For the daylight assessments, an analysis 'grid' is located within each room at working plane height (850 mm from FFL) and offset by 0.30m from the walls as recommended by BR 209.

Grid points are spaced by 0.20m.

Weather Data

The weather file recorded at Gatwick Airport was considered the most relevant for this assessment.

Surfaces reflectance

The BR 209 states that "surface reflectances should represent real conditions. Where reflectance values have not been measured or specified, default values to be used in the calculation are given in Table C4."

At C24 the BR209 states "Where surface finishes have been specified or measured on site, they can be used in the calculations with appropriate factors for maintenance and furniture. To allow for these factors, maximum reflectances for white painted surfaces in the calculations should not exceed 0.8 indoors, and 0.6 outdoors. Maximum reflectances for light pastel walls should not exceed 0.7 in the calculations, and maximum reflectances for light wood floors should not exceed 0.4. Surface reflectances used should be presented in the assessment, along with a specification of the materials if non-default reflectances are used."

The reflectance values shown in table C4 are used as standard, unless specified by the design team. The following assumptions have been confirmed as appropriate by the client:

- Interior walls - White Paint Finish - 0.7
- Ceilings - White Paint Finish - 0.8
- Floors - Light Timber Veneer (or similar) - 0.4

Table C4: Recommended default surface reflectances

SURFACE	DEFAULT REFLECTANCE
INTERIOR WALLS	0.5
CEILINGS	0.7
FLOORS	0.2
EXTERIOR WALLS AND OBSTRUCTIONS	0.2
EXTERIOR GROUND	0.2

Glazing transmittance

BR 209 para C25 states "Glazing transmission factors, including maintenance factors, need to be included in the simulation along with account for, or modelling of, window framing. Where window frames are not specifically included in the model, frame factors should be applied based on the ratio of glass to overall window aperture area for the type of window to be used; this will generally vary with window size and whether the windows have opening lights."

C26 follows that "For clean, clear double glazing with a low emissivity coating, a value of 0.68 for diffuse transmittance can be used." Which equates to a normal visible transmittance (VLT), prior to the application of maintenance factors, of 75%. This has been used within the assessments.

Framing factors have been taken from the elevations supplied and are outlined below.

Maintenance factors have been applied as per BR209 with 0.92 selected for windows not beneath an overhang and 0.76 for those overhung by the building massing. The final transmittance values and maintenance factors are shown in Table 01 below.

Framing Factors

As standard in BR 209 "Where window types have not been specified, results for the overall window aperture should be multiplied by a default framing factor as given in Table C5."

The Framing Factor (FF) in this instance was calculated on the provided elevations. Eleven window types have been detected throughout all the elevations. The final transmittance values are shown in the table below:

Table 01: Typical reflectance, transmittance and maintenance factors

	GLAZING TYPE AND MAINTENANCE FACTORS:	TV(Normal)	FRAMING FACTOR	MAINT. FACTOR	TV(Total)
	Window type 1 - NOT SHELTERED	0.75	0.56	0.92	0.39
	Window type 2 - NOT SHELTERED	0.75	0.6	0.92	0.41
	Window type 3 - SHELTERED	0.75	0.6	0.76	0.34
	Window type 4 - NOT SHELTERED	0.75	0.65	0.92	0.45
	Window type 5 - SHELTERED	0.75	0.65	0.76	0.37
	Window type 6 - NOT SHELTERED	0.75	0.7	0.92	0.48
	Window type 7 - SHELTERED	0.75	0.7	0.76	0.40
	Window type 8 - NOT SHELTERED	0.75	0.75	0.92	0.52
	Window type 9 - SHELTERED	0.75	0.75	0.76	0.43
	Window type 10 - NOT SHELTERED	0.75	0.8	0.92	0.55
	Window type 11 - NOT SHELTERED	0.75	0.9	0.92	0.62

5.1 GLAZING TRANSMITTANCE - WINDOW MAPS

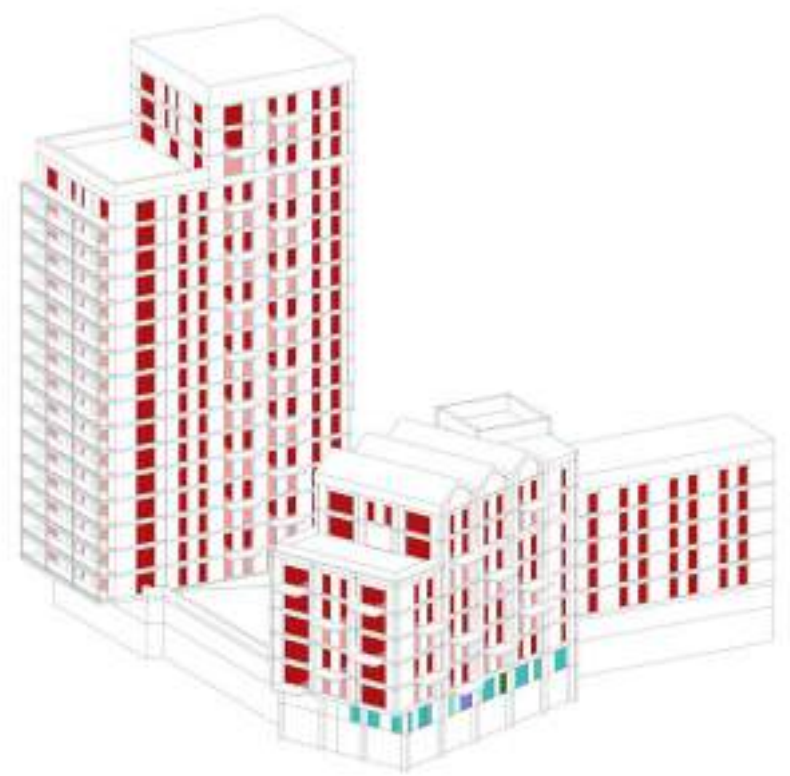


Fig. 01: South-east view - Block_YHP1

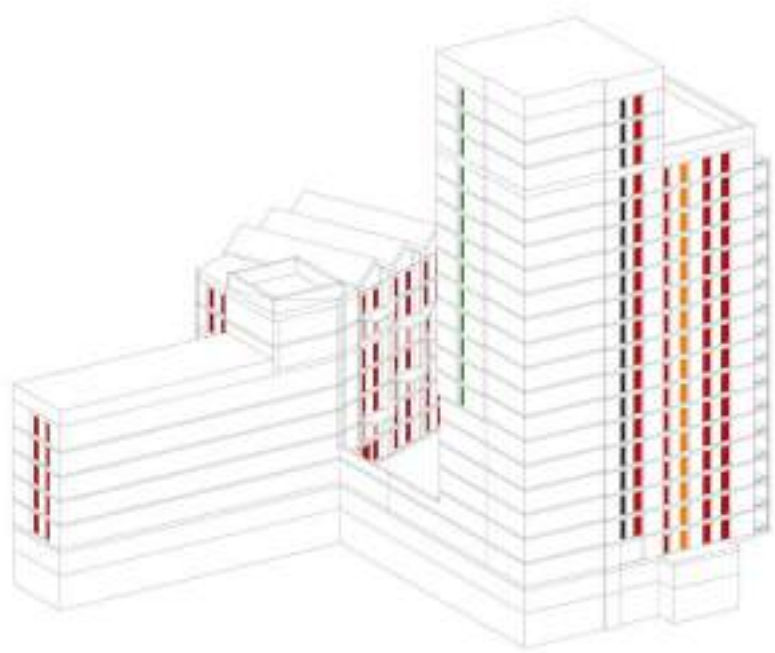


Fig. 02: North-west view - Block_YHP1





Fig. 03: North-east view - Block_YHP1



Fig. 04: South-west view - Block_YHP1

5.2 GLAZING TRANSMITTANCE - WINDOW MAPS

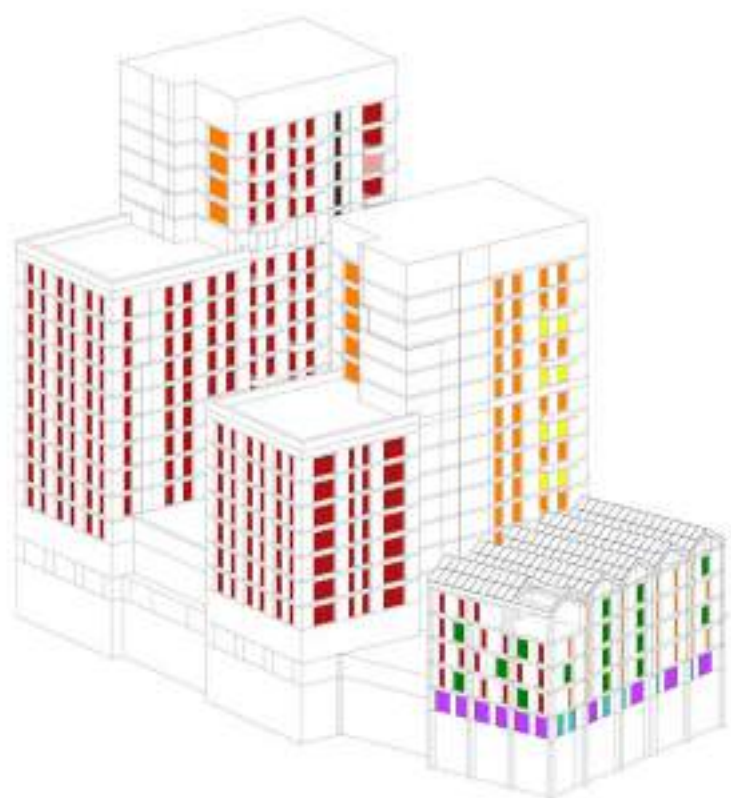


Fig. 05: South-east view - Block_YHP2



Fig. 06: North-west view - Block_YHP2





Fig. 07: North-east view - Block_YHP2

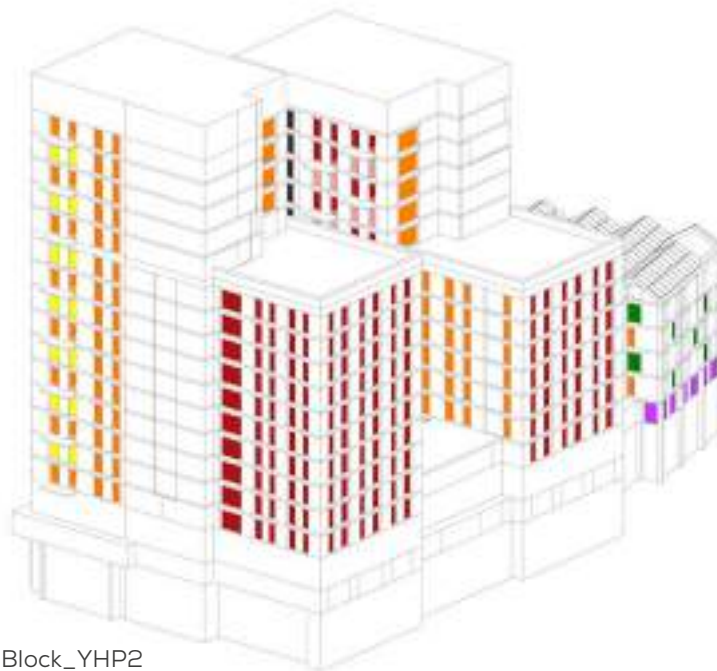


Fig. 08: South-west view - Block_YHP2

6 CONCLUSIONS

6.1 CONCLUSIONS ON DAYLIGHT

In order to ascertain the levels of daylight within the proposed development, all habitable rooms have been assessed for illuminance using the spatial daylight autonomy (sDA) methodology.

The results given on pages 22-139 have shown that of the 1,069 proposed habitable rooms, 738 (69%) see levels of sDA that either meet or exceed the BRE recommendation for their room use.

Of the 331 rooms that fall short of the sDA recommendations, 248 are open-plan living/kitchen/dining rooms (LKDs), four are studios and 79 are bedrooms.

180 (42%) of the 428 LKDs meet or exceed the BRE recommendation of 200lux within half the room for half the daylight hours within a year. A further 27 LKDs that fall short of the recommendation for rooms with a kitchen, would meet or exceed the BRE recommendation of 150lux for living rooms and are therefore considered acceptably daylit for their primary function as living spaces.

Of the remaining 221 main living spaces, 41 fall marginally below the living room recommendation, with 40% to 49% of their area meeting the recommended level, and therefore the front portion where the living space is located would be adequately daylit. Therefore, a total of 248 open-plan LKDs (58% of the total) are considered to offer good daylight levels.

Of the remaining 180 open-plan LKDs which see lower levels of light, 50 are mostly located on the lower floors within areas that face onto other development facades and have their main window further obstructed by a balcony overhead. This is a typical trade-off in amenity common of most modern residential developments where balconies provide a valued form of external amenity.

31 of the remaining 130 would achieve 150 lux within the front third of their space for half the daylight hours in the year, therefore the living zones at the front are well daylit.

17 (81%) of the 21 open plan studios meet or exceed the BRE recommendation of 200lux within half the room for half the daylight hours within a

year. A further two studios that fall short of the recommendation for rooms with a kitchen, would meet or exceed the BRE recommendation of 150lux for living rooms and are therefore considered acceptably daylit for their primary function as living spaces.

One of the two remaining studios falls marginally below the living room recommendation, with 47% of its area meeting the recommended level, and the other has the front 40% meeting the recommended level, therefore the front portion of these rooms, where the living space is located, would be adequately daylit. Therefore, all 21 studios are considered to offer adequate daylight levels.

Overall, the scheme is delivering well daylit bedrooms with 87% (541 out of 620) meeting or exceeding the levels suggested by BRE. 23 of the remaining 79 bedrooms fall marginally below the bedroom recommendation, with 40% to 49% of their area meeting the recommended level, and are therefore considered to be adequately daylit.

The remaining 56 bedrooms are located on the lower floors where the expectation for daylight is lower and are obstructed by a proposed block immediately opposite. 21 of these bedrooms are further obstructed by projecting balconies.

Overall, we conclude that the levels of light achieved within the Development are in line with expectation for a large-scale residential development with balconies, particularly where the site is seeking to make optimum use of land for new homes. We therefore consider that future occupants will be provided with adequate daylight in accordance with the NPPF and Policies CC8 and CR10 of the Reading Borough Local Plan (2019), all whilst balancing the need to deliver a viable scheme that makes optimum use of land and balances other policy objectives.

6.2 CONCLUSIONS ON SUNLIGHT

In terms of sunlight, BRE states that in housing, the main requirement for sunlight is in living rooms and that it is viewed as less important in bedrooms and in kitchens. The guidelines then go on to say that *"a habitable room, preferably a main living room"* should meet the criteria and that *"Where groups of dwellings are planned, site layout design should aim to maximise the number of dwellings with a main living room that meets the above recommendations"*. Therefore, whilst all rooms have been assessed for sunlight, greatest importance ought to be given to the performance of living spaces.

The results given on pages 22-139 have shown that of the 1,069 proposed habitable rooms, 545 (51%) see levels of sun exposure on 21st March that either meet or exceed the BRE recommendation of 1.5hrs.

Of the 449 living spaces proposed (including studios), 279 (62%) would see at least 1.5 hours of sunlight on the 21st March.

Of the 170 living spaces (166 LKDs and four studios) falling below the recommended level of sunlight, a further six would meet the criteria on one of the alternative dates proposed by EN17037, 1st February or 25th February, this is predominantly due to the balcony overhead intercepting the higher-angle sunlight on 21st March. As such, these additional six living spaces receive good sunlight levels when it is most appreciated through the winter months.

Furthermore, 40 are within a unit where at least one of the bedrooms passes and so the dwelling is considered to be acceptably sunlit as at least one habitable room sees 1.5 hours of sunlight on 21st March.

Of the remaining 124 living spaces falling below the recommended level of sunlight, 11 are only marginally below the BRE recommendation of 1.5 hours with 1.25 hours or more and 18 would see at least 1 hour of sunlight on 21st March.

39 living spaces (including four studios) are served by windows which are not oriented within 90-degrees of due south therefore access to sunlight is more restricted and they are not considered to have a reasonable expectation of sunlight. The design has sought to minimise living spaces which are within

90-degrees of due north as much as practicable, and avoids any rooms having a predominately north aspect which is an excellent result for a large-scale flatted development.

The remaining living spaces are generally located within areas that face onto other development facades to the east or west. Owing to their easterly or westerly orientation, these rooms only have the potential to capture half of the sun path, mostly in the mornings or afternoons when the sun is lower in the sky and so is intercepted by massing opposite. 33 of these living spaces also have their main window further obstructed by a balcony overhead. This is a typical trade-off in amenity common of most modern residential developments where balconies provide a valued form of external amenity.

Overall, we conclude that the levels of sunlight achieved within the Development are in line with expectation for a large-scale residential development with balconies, particularly where the site is seeking to make optimum use of land for new homes. We therefore consider that future occupants will be provided with adequate sunlight in accordance with the NPPF and Policies CC8 and CR10 of the Reading Borough Local Plan (2019), all whilst balancing the need to deliver a viable scheme that makes optimum use of land and balances other policy objectives.

6.3 CONCLUSIONS ON OVERSHADOWING

Sun Hours on Ground assessments have been undertaken for the areas of open space provided within the proposed scheme. The results from these assessments are shown on pages 140-143 of this report.

A variety of open spaces have been provided throughout the scheme which offers future residents and visitors different sunlit spaces to enjoy during the year. Overall, 75% of the total open space provided sees two or more hours of direct sunlight on 21st March, exceeding the BRE recommendation of 50%.

In terms of each space individually, all open spaces and terraces meet or exceed the BRE criteria:

- North-site Public Realm - 77%;
- South-site Public Realm - 83%;
- North-site podium terrace - 50%;
- South-site podium terrace - 56%;
- South-site level 04 terrace - 69%;
- South-site level 09 terrace - 96%; and
- South-site level 12 terrace - 98%.

Sun exposure images have been provided for all area on pages 142 and 143 which show good sunlight access particularly on the summer solstice, when these spaces are most likely to be in frequent use.

Therefore, due to all open space provided meeting the BRE recommended level, we conclude that the open spaces provide future occupants and visitors to the site with good access to a variety of sunlit open spaces to enjoy throughout the year.

6.4 OVERALL CONCLUSION

Overall, the results show that the proposed development will provide future occupants with acceptable levels of daylight. 738 (69%) of all 1,069 habitable rooms within the proposed development will meet the BRE's recommendation in terms of Illuminance (Spatial Daylight Autonomy/sDA).

Of the 331 rooms that fall short of the sDA recommendations, 248 are open-plan living/kitchen/dining rooms (LKDs), four are studios and 79 are bedrooms.

Of the main living spaces (including studios) falling short of the sDA recommendations, 27 open-plan living/kitchen/dining rooms and two studios achieve the recommendation for living rooms. A further 43 fall marginally (40% or greater) below the recommended level of 50% and so are considered to offer acceptable daylight levels. A further 31 would achieve 150 lux within the front third of their space for half of the daylight hours of the year. These 101 main living spaces are considered to offer acceptable daylight amenity for a large-scale residential development.

The remaining rooms are mostly located on the lower floors within areas that face onto other development facades and have their main window further obstructed by a balcony overhead. This is a typical trade-off in amenity common of most modern residential developments where balconies provide a valued form of external amenity. The levels of light achieved are common of most large-scale residential development, particularly where the site is seeking to make optimum use of land for new homes.

545 (51%) of the 1,069 proposed rooms meet the BRE recommendation for sun exposure on 21st March, by receiving 1.5hrs or more of direct sunlight. 285 (52%) of the 545 proposed living spaces (including studios), where sunlight is most appreciated, meet the criteria on 21st March, or one of the alternative dates put forward within EN17037. The remaining living rooms are within isolated areas that see lower levels of sunlight predominantly due their easterly or westerly orientation.

40 of these living rooms would however be within dwellings that are considered acceptably sunlit as at least one of their bedrooms meets the target sunlight hours. The levels of light achieved are common of

most large-scale residential development, particularly where the site is seeking to make optimum use of land for new homes.

A variety of open spaces have been provided within the scheme which offers future residents and visitors different sunlit spaces to enjoy throughout the year. 75% of the total open space provision sees two or more hours of direct sunlight on 21st March, exceeding the BRE recommendation of 50%. Additionally, all open spaces, when considered in isolation, meet the recommended level. Therefore, the proposed open spaces provide future occupants and visitors to the site with good access to a variety of sunlit open spaces to enjoy throughout the year.

We therefore consider that future occupants will be provided with adequately daylit and sunlit dwellings in accordance with the NPPF and Policies CC8 and CR10 of the Reading Borough Local Plan (2019), all whilst balancing the need to deliver a viable scheme that makes optimum use of land and balances other policy objectives.

7 SITE OVERVIEW



Fig. 09: Top view



Fig. 10: Perspective view

8 INTERNAL DAYLIGHT AND SUNLIGHT ASSESSMENTS

Level 00M

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHPI - LEVEL 00M										
1	L/K/D	100.0	98.0	89.2	200	89.2		00:09	02:10	02:33
2	BEDROOM	100.0	67.5	39.3	100	100.0		00:00	00:00	00:08
3	L/K/D	28.0	14.5	7.2	200	7.2		00:00	00:00	00:12
4	BEDROOM	100.0	100.0	97.7	100	100.0		00:00	00:14	01:14
5	L/K/D	65.1	52.7	43.0	200	43.0		00:00	00:00	00:37
6	BEDROOM	100.0	63.2	40.9	100	100.0		00:00	00:00	00:25
7	L/K/D	63.7	49.2	40.3	200	40.3		00:00	00:00	00:34
8	BEDROOM	98.2	64.3	40.9	100	98.2		00:00	00:00	00:38
9	L/K/D	97.3	79.1	63.3	200	63.3		00:00	00:06	01:08
10	BEDROOM	89.9	44.6	27.7	100	89.9		00:00	00:00	00:00

Table 02: Assessment Data



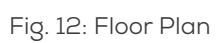
Fig. 11: Floor Plan



Level 01

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 01										
11	BEDROOM	84.3	46.3	30.6	100	84.3		00:00	00:00	00:00
12	L/K/D	95.4	69.1	40.8	200	40.8		00:00	00:26	01:27
13	BEDROOM	100.0	68.4	42.9	100	100.0		00:00	00:00	00:39
14	BEDROOM	100.0	90.1	60.5	100	100.0		00:00	00:31	01:48
15	L/K/D	45.4	28.7	19.0	200	19.0		00:00	00:00	00:46
16	L/K/D	44.0	30.5	20.9	200	20.9		00:00	00:38	01:46
17	BEDROOM	100.0	77.6	49.3	100	100.0		00:00	00:00	00:46
18	BEDROOM	100.0	80.5	50.9	100	100.0		00:00	00:00	00:05
19	L/K/D	41.4	24.6	15.1	200	15.1		00:00	00:00	00:00
20	BEDROOM	98.6	62.8	36.5	100	98.6		00:00	00:00	00:00
21	L/K/D	66.5	48.7	35.0	200	35.0		00:00	00:00	00:00
22	BEDROOM	100.0	77.8	56.1	100	100.0		00:00	00:00	00:00
23	L/K/D	46.2	31.5	21.0	200	21.0		00:00	00:00	00:00
24	BEDROOM	66.7	30.4	15.8	100	66.7		00:00	00:00	00:00
25	L/K/D	26.9	12.6	6.2	200	6.2		00:00	00:00	00:00
26	BEDROOM	100.0	93.6	55.8	100	100.0		00:00	00:00	00:00
27	L/K/D	43.4	30.6	22.4	200	22.4		00:00	00:00	00:00
28	BEDROOM	93.9	39.9	20.9	100	93.9		00:00	00:00	00:00
29	L/K/D	100.0	100.0	100.0	200	100.0		00:12	02:59	04:23
30	BEDROOM	66.3	30.3	16.3	100	66.3		00:00	02:19	02:53
31	BEDROOM	81.8	29.0	13.6	100	81.8		00:03	01:49	03:45
32	L/K/D	100.0	100.0	100.0	200	100.0		02:04	02:39	04:09
33	BEDROOM	22.3	8.0	2.1	100	22.3		01:26	01:17	00:00
34	L/K/D	31.5	17.5	10.8	200	10.8		01:21	01:24	01:37
35	BEDROOM	72.5	37.4	24.0	100	72.5		00:57	01:08	01:45
36	BEDROOM	46.2	26.3	16.4	100	46.2		00:47	00:42	01:20
37	L/K/D	24.3	11.6	7.3	200	7.3		00:46	00:57	01:44
38	L/K/D	9.1	5.6	3.3	200	3.3		00:18	00:17	01:08
39	BEDROOM	94.5	49.7	30.1	100	94.5		00:29	00:40	01:38

Table 03: Assessment Data



Level 02

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 02										
40	BEDROOM	97.5	63.6	40.5	100	97.5		00:00	00:00	00:00
41	L/K/D	98.1	86.7	63.5	200	63.5		00:00	00:30	01:54
42	BEDROOM	100.0	91.5	54.8	100	100.0		00:00	00:00	00:51
43	BEDROOM	100.0	100.0	73.0	100	100.0		00:00	00:33	02:02
44	L/K/D	51.9	32.7	21.9	200	21.9		00:00	00:00	01:05
45	L/K/D	47.4	34.6	23.1	200	23.1		00:00	00:36	01:57
46	BEDROOM	100.0	92.8	55.3	100	100.0		00:00	00:00	00:54
47	BEDROOM	100.0	96.9	57.9	100	100.0		00:00	00:00	00:17
48	L/K/D	45.2	28.8	16.9	200	16.9		00:00	00:00	00:00
49	BEDROOM	99.3	77.0	42.6	100	99.3		00:00	00:00	00:00
50	L/K/D	74.5	53.8	40.1	200	40.1		00:00	00:00	00:00
51	BEDROOM	76.6	36.3	18.1	100	76.6		00:00	00:00	00:06
52	L/K/D	26.6	13.4	7.0	200	7.0		00:00	00:00	00:00
53	BEDROOM	100.0	90.1	60.8	100	100.0		00:00	00:00	00:02
54	L/K/D	51.1	35.8	26.3	200	26.3		00:00	00:00	00:00
55	BEDROOM	97.1	36.0	19.2	100	97.1		00:00	00:00	00:00
56	L/K/D	29.9	14.2	6.7	200	6.7		00:00	00:00	00:00
57	BEDROOM	100.0	100.0	73.0	100	100.0		00:00	00:00	00:00
58	L/K/D	100.0	100.0	100.0	200	100.0		01:08	03:27	02:54
59	BEDROOM	100.0	90.4	61.2	100	100.0		00:28	03:00	04:12
60	BEDROOM	100.0	98.9	72.2	100	100.0		00:16	02:28	04:05
61	L/K/D	100.0	100.0	100.0	200	100.0		02:05	03:20	06:14
62	BEDROOM	87.8	52.7	34.0	100	87.8		01:26	01:28	02:05
63	L/K/D	34.2	20.2	12.9	200	12.9		01:21	01:24	01:56
64	BEDROOM	84.2	45.6	26.3	100	84.2		01:03	01:07	02:05
65	BEDROOM	55.6	29.8	19.3	100	55.6		00:46	00:42	01:40
66	L/K/D	27.0	14.6	8.9	200	8.9		00:57	00:59	01:59
67	L/K/D	4.3	1.2	0.2	200	0.2		00:18	00:17	01:08
68	BEDROOM	7.3	0.5	0.0	100	7.3		00:40	00:00	00:00

Table 04: Assessment Data



Fig. 13: Floor Plan



Level 03

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 03										
69	BEDROOM	98.3	81.0	51.2	100	98.3		00:00	00:00	00:00
70	L/K/D	100.0	91.8	80.7	200	80.7		00:00	00:43	02:08
71	BEDROOM	100.0	98.9	61.0	100	100.0		00:00	00:00	01:05
72	BEDROOM	100.0	100.0	93.4	100	100.0		00:00	00:37	02:08
73	L/K/D	54.6	35.9	23.7	200	23.7		00:00	00:00	01:05
74	L/K/D	49.1	37.1	25.1	200	25.1		00:00	00:37	02:08
75	BEDROOM	100.0	96.7	61.8	100	100.0		00:00	00:00	01:04
76	BEDROOM	100.0	97.5	63.5	100	100.0		00:00	00:00	00:23
77	L/K/D	47.1	30.3	19.6	200	19.6		00:00	00:00	00:00
78	BEDROOM	100.0	87.8	48.0	100	100.0		00:00	00:00	00:00
79	L/K/D	84.0	57.8	43.7	200	43.7		00:00	00:00	00:00
80	BEDROOM	86.0	40.4	18.7	100	86.0		00:00	00:00	00:13
81	L/K/D	28.8	14.2	7.5	200	7.5		00:00	00:00	00:00
82	BEDROOM	100.0	94.2	63.7	100	100.0		00:00	00:00	00:10
83	L/K/D	53.5	37.6	27.2	200	27.2		00:00	00:00	00:00
84	BEDROOM	100.0	100.0	68.6	100	100.0		00:00	00:00	00:01
85	L/K/D	48.7	34.2	25.1	200	25.1		00:00	00:00	00:00
86	BEDROOM	100.0	54.7	25.7	100	100.0		00:00	00:00	00:05
87	L/K/D	100.0	100.0	100.0	200	100.0		02:02	03:52	05:24
88	BEDROOM	92.7	46.6	24.2	100	92.7		01:29	03:26	03:05
89	BEDROOM	97.2	46.0	22.7	100	97.2		01:00	03:10	04:01
90	L/K/D	100.0	100.0	100.0	200	100.0		02:26	03:59	05:00
91	BEDROOM	43.1	16.5	6.9	100	43.1		01:30	01:17	00:00
92	BEDROOM	88.3	54.4	33.3	100	88.3		01:35	01:24	02:16
93	L/K/D	31.3	18.1	10.8	200	10.8		01:16	01:09	02:21
94	L/K/D	10.1	4.6	2.2	200	2.2		00:47	00:42	01:23
95	BEDROOM	23.4	5.3	0.6	100	23.4		01:04	00:16	00:00
96	L/K/D	14.6	8.2	5.2	200	5.2		00:18	00:17	01:08
97	BEDROOM	58.0	26.4	15.5	100	58.0		00:42	00:40	01:38

Table 05: Assessment Data



Fig. 14: Floor Plan



Level 04

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 04										
98	BEDROOM	100.0	95.0	72.7	100	100.0		00:00	00:00	00:00
99	L/K/D	100.0	95.2	88.4	200	88.4		00:00	00:49	02:08
100	BEDROOM	100.0	98.9	68.9	100	100.0		00:00	00:00	01:05
101	BEDROOM	100.0	100.0	99.3	100	100.0		00:00	00:52	02:08
102	L/K/D	55.9	38.4	24.2	200	24.2		00:00	00:00	01:05
103	L/K/D	50.9	39.6	26.5	200	26.5		00:00	00:45	02:05
104	BEDROOM	100.0	100.0	69.7	100	100.0		00:00	00:00	01:05
105	BEDROOM	100.0	98.7	71.1	100	100.0		00:00	00:00	00:28
106	L/K/D	48.1	33.0	20.1	200	20.1		00:00	00:00	00:00
107	BEDROOM	100.0	93.2	54.1	100	100.0		00:00	00:00	00:00
108	L/K/D	89.7	60.6	46.4	200	46.4		00:00	00:00	00:00
109	BEDROOM	100.0	98.2	68.4	100	100.0		00:00	00:00	00:18
110	L/K/D	54.8	37.4	26.9	200	26.9		00:00	00:00	00:00
111	BEDROOM	92.4	40.4	21.6	100	92.4		00:00	00:00	00:18
112	L/K/D	35.2	17.5	8.1	200	8.1		00:00	00:00	00:00
113	BEDROOM	100.0	100.0	76.2	100	100.0		00:00	00:00	00:10
114	L/K/D	50.1	35.7	26.5	200	26.5		00:00	00:00	00:00
115	BEDROOM	100.0	100.0	83.8	100	100.0		00:00	00:00	00:07
116	L/K/D	100.0	100.0	100.0	200	100.0		02:53	03:47	03:22
117	BEDROOM	100.0	98.9	83.7	100	100.0		02:12	03:40	05:11
118	BEDROOM	100.0	99.4	97.2	100	100.0		01:44	03:28	04:40
119	L/K/D	100.0	100.0	100.0	200	100.0		03:21	04:42	05:55
120	BEDROOM	98.4	68.6	43.6	100	98.4		01:38	01:28	02:43
121	BEDROOM	49.1	21.1	9.9	100	49.1		01:35	01:24	01:22
122	L/K/D	13.3	4.8	1.9	200	1.9		01:16	00:46	00:00
123	L/K/D	28.0	15.7	10.1	200	10.1		00:46	00:46	01:40
124	BEDROOM	78.9	46.8	27.5	100	78.9		01:06	01:05	02:13
125	L/K/D	18.1	10.1	6.4	200	6.4		00:18	00:19	01:08
126	BEDROOM	76.7	32.6	18.7	100	76.7		00:40	00:57	01:38

Table 06: Assessment Data



Fig. 15: Floor Plan



Level 05

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 05										
127	BEDROOM	100.0	97.5	84.3	100	100.0		00:00	00:00	00:00
128	L/K/D	100.0	96.4	90.3	200	90.3		00:00	00:53	02:08
129	BEDROOM	100.0	100.0	74.0	100	100.0		00:00	00:00	01:05
130	BEDROOM	100.0	100.0	99.3	100	100.0		00:00	00:55	02:08
131	L/K/D	57.6	40.1	26.4	200	26.4		00:00	00:00	01:05
132	L/K/D	51.8	40.5	27.8	200	27.8		00:00	00:55	02:08
133	BEDROOM	100.0	100.0	78.9	100	100.0		00:00	00:00	01:05
134	BEDROOM	100.0	100.0	78.6	100	100.0		00:00	00:00	00:28
135	L/K/D	50.1	35.0	21.8	200	21.8		00:00	00:00	00:00
136	BEDROOM	100.0	96.6	62.2	100	100.0		00:00	00:00	00:00
137	L/K/D	93.7	64.3	50.4	200	50.4		00:00	00:00	00:00
138	BEDROOM	100.0	98.8	71.3	100	100.0		00:00	00:00	00:18
139	L/K/D	56.5	39.0	27.7	200	27.7		00:00	00:00	00:00
140	BEDROOM	100.0	97.7	70.2	100	100.0		00:00	00:00	00:18
141	L/K/D	55.9	39.5	29.0	200	29.0		00:00	00:00	00:00
142	BEDROOM	100.0	79.7	35.5	100	100.0		00:00	00:00	00:18
143	L/K/D	40.5	25.5	13.7	200	13.7		00:00	00:00	00:00
144	BEDROOM	100.0	100.0	93.9	100	100.0		00:00	00:00	00:11
145	L/K/D	100.0	100.0	100.0	200	100.0		03:00	04:12	06:32
146	BEDROOM	100.0	100.0	93.3	100	100.0		02:46	03:40	05:45
147	BEDROOM	100.0	100.0	98.9	100	100.0		02:24	03:32	04:51
148	L/K/D	100.0	100.0	100.0	200	100.0		03:56	04:59	07:26
149	BEDROOM	99.5	72.9	47.9	100	99.5		01:36	01:32	03:05
150	L/K/D	44.2	28.6	18.9	200	18.9		01:35	01:32	02:16
151	BEDROOM	100.0	66.1	41.5	100	100.0		01:13	01:20	02:49
152	BEDROOM	55.6	24.0	14.6	100	55.6		00:47	01:03	01:40
153	L/K/D	22.4	8.4	3.8	200	3.8		01:04	01:08	00:04
154	L/K/D	21.9	12.6	7.6	200	7.6		00:18	00:43	01:17
155	BEDROOM	91.7	40.4	22.8	100	91.7		00:42	01:23	01:53

Table 07: Assessment Data

Level 06

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 06										
156	BEDROOM	100.0	98.6	85.4	100	100.0		00:00	00:00	00:00
157	L/K/D	67.5	46.6	39.3	200	39.3		00:00	00:00	00:00
158	BEDROOM	99.4	61.9	29.2	100	99.4		00:00	00:00	00:18
159	BEDROOM	97.0	42.6	22.5	100	97.0		00:00	00:00	00:00
160	BEDROOM	100.0	100.0	74.3	100	100.0		00:00	00:00	00:18
161	L/K/D	58.9	41.1	30.4	200	30.4		00:00	00:00	00:00
162	BEDROOM	100.0	100.0	85.5	100	100.0		00:00	00:00	00:18
163	L/K/D	100.0	93.0	79.3	200	79.3		02:45	05:36	06:49
164	L/K/D	100.0	89.7	80.9	200	80.9		03:39	05:15	07:42
165	BEDROOM	100.0	76.6	48.5	100	100.0		01:20	01:53	02:45
166	BEDROOM	96.5	61.4	37.4	100	96.5		00:52	01:42	02:00
167	L/K/D	40.8	26.5	18.1	200	18.1		00:56	02:00	02:15
168	L/K/D	11.1	5.4	2.1	200	2.1		00:23	01:21	02:05
169	BEDROOM	37.3	13.5	5.7	100	37.3		00:42	00:11	00:54

Table 08: Assessment Data



Fig. 17: Floor Plan



Level 07

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylit hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 07										
170	BEDROOM	100.0	100.0	91.0	100	100.0		00:00	00:00	00:00
171	L/K/D	68.9	47.7	39.4	200	39.4		00:00	00:00	00:15
172	BEDROOM	100.0	100.0	92.9	100	100.0		00:00	00:00	00:18
173	BEDROOM	100.0	100.0	72.8	100	100.0		00:00	00:00	00:00
174	BEDROOM	100.0	100.0	78.4	100	100.0		00:00	00:00	00:18
175	L/K/D	59.4	41.4	30.6	200	30.6		00:00	00:00	00:00
176	BEDROOM	100.0	100.0	95.9	100	100.0		00:00	00:00	00:18
177	L/K/D	100.0	100.0	100.0	200	100.0		02:47	06:12	06:48
178	L/K/D	100.0	100.0	100.0	200	100.0		03:53	06:24	07:47
179	BEDROOM	100.0	83.0	54.4	100	100.0		01:20	02:45	02:45
180	BEDROOM	100.0	71.3	43.9	100	100.0		00:52	02:03	02:20
181	L/K/D	44.3	29.5	19.7	200	19.7		00:58	02:26	02:17
182	L/K/D	33.2	20.0	11.5	200	11.5		00:23	01:32	02:41
183	BEDROOM	97.4	77.2	39.4	100	97.4		00:45	02:32	02:39

Table 09: Assessment Data



Fig. 18: Floor Plan



Level 01

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 01										
184	BEDROOM	14.4	7.5	5.2	100	14.4		00:00	00:00	00:00
185	L/K/D	11.3	6.9	4.6	200	4.6		00:00	00:04	01:06
186	L/K/D	15.9	9.7	5.9	200	5.9		00:00	00:00	00:18
187	BEDROOM	12.2	2.3	0.6	100	12.2		00:00	00:00	00:50
188	BEDROOM	18.0	7.0	2.3	100	18.0		00:00	00:00	00:01
189	L/K/D	23.7	13.7	8.6	200	8.6		00:00	00:00	00:00
190	BEDROOM	41.0	22.3	15.4	100	41.0		00:00	00:00	00:00
191	L/K/D	100.0	95.4	67.4	200	67.4		02:20	00:58	00:19
192	BEDROOM	54.6	14.2	4.3	100	54.6		02:39	00:59	00:36
193	BEDROOM	41.8	12.0	3.2	100	41.8		02:17	00:57	00:44
194	L/K/D	100.0	99.2	82.0	200	82.0		05:41	04:45	05:12
195	BEDROOM	100.0	100.0	72.2	100	100.0		04:09	04:38	04:51
196	L/K/D	52.9	35.6	24.1	200	24.1		03:14	03:45	03:58
197	BEDROOM	57.0	30.2	19.2	100	57.0		02:35	03:07	03:19

Table 10: Assessment Data



Fig. 19: Floor Plan



Level 02

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 02										
198	BEDROOM	30.7	18.9	12.2	100	30.7		00:00	00:15	01:47
199	BEDROOM	39.4	25.3	16.5	100	39.4		00:00	00:00	00:49
200	L/K/D	4.1	1.0	0.0	200	0.0		00:00	00:09	01:44
201	L/K/D	7.8	2.4	0.3	200	0.3		00:00	00:00	00:33
202	BEDROOM	67.4	42.4	30.8	100	67.4		00:00	00:00	01:07
203	BEDROOM	57.6	34.3	25.0	100	57.6		00:00	00:00	00:10
204	L/K/D	28.8	17.8	10.8	200	10.8		00:00	00:00	00:04
205	BEDROOM	54.8	28.7	20.2	100	54.8		00:00	00:00	00:01
206	L/K/D	100.0	99.6	90.9	200	90.9		02:20	01:00	00:19
207	BEDROOM	62.4	21.3	5.7	100	62.4		02:44	00:59	00:38
208	BEDROOM	53.2	16.5	5.1	100	53.2		02:28	00:52	00:48
209	L/K/D	100.0	100.0	93.9	200	93.9		06:15	05:03	05:23
210	BEDROOM	100.0	100.0	80.9	100	100.0		04:11	04:47	05:07
211	L/K/D	57.0	39.3	27.5	200	27.5		03:20	03:55	04:15
212	BEDROOM	67.4	32.6	19.8	100	67.4		02:45	03:16	03:36
213	BEDROOM	100.0	75.0	50.6	100	100.0		03:15	03:30	03:35
214	L/K/D	19.2	10.7	7.4	200	7.4		03:36	03:31	03:10

Table 11: Assessment Data



Fig. 20: Floor Plan



Level 03

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 03										
215	BEDROOM	34.5	22.3	13.9	100	34.5		00:00	00:29	01:47
216	BEDROOM	46.5	32.4	21.2	100	46.5		00:00	00:00	00:49
217	L/K/D	24.4	15.8	10.4	200	10.4		00:00	00:16	02:01
218	L/K/D	27.0	16.7	11.1	200	11.1		00:00	00:00	00:57
219	BEDROOM	33.7	9.9	4.1	100	33.7		00:00	00:05	01:29
220	BEDROOM	28.5	14.0	7.6	100	28.5		00:00	00:00	00:31
221	L/K/D	33.4	21.0	12.7	200	12.7		00:00	00:00	00:22
222	BEDROOM	64.9	36.2	22.9	100	64.9		00:00	00:00	00:20
223	L/K/D	100.0	100.0	94.3	200	94.3		02:20	01:07	00:37
224	BEDROOM	73.8	23.4	8.5	100	73.8		02:44	01:01	00:35
225	BEDROOM	64.6	19.6	6.3	100	64.6		02:25	00:57	00:43
226	L/K/D	100.0	100.0	96.7	200	96.7		06:17	05:01	05:42
227	BEDROOM	100.0	100.0	94.3	100	100.0		04:24	04:56	05:23
228	L/K/D	59.9	42.2	30.7	200	30.7		03:32	04:07	04:36
229	BEDROOM	76.7	37.8	23.3	100	76.7		02:57	03:31	04:02
230	BEDROOM	100.0	92.7	62.2	100	100.0		03:25	03:45	03:45
231	L/K/D	20.5	12.3	7.4	200	7.4		03:45	03:31	03:14

Table 12: Assessment Data



Fig. 21: Floor Plan



Level 04

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 04										
232	BEDROOM	40.8	27.7	18.9	100	40.8		00:00	00:42	01:47
233	BEDROOM	56.5	40.6	27.6	100	56.5		00:00	00:00	00:49
234	L/K/D	9.6	3.6	1.0	200	1.0		00:00	00:29	02:02
235	L/K/D	13.7	5.7	2.2	200	2.2		00:00	00:00	01:03
236	BEDROOM	88.4	61.0	43.6	100	88.4		00:00	00:13	01:50
237	BEDROOM	82.0	51.7	35.5	100	82.0		00:00	00:00	00:51
238	L/K/D	37.7	25.6	15.6	200	15.6		00:00	00:00	00:40
239	BEDROOM	72.3	44.1	28.2	100	72.3		00:00	00:00	00:39
240	L/K/D	100.0	100.0	96.8	200	96.8		02:20	01:08	00:52
241	BEDROOM	78.0	27.0	9.2	100	78.0		02:44	01:08	00:38
242	BEDROOM	70.3	22.2	8.2	100	70.3		02:28	00:59	00:48
243	L/K/D	100.0	100.0	99.2	200	99.2		06:35	05:23	05:55
244	BEDROOM	100.0	100.0	100.0	100	100.0		04:37	05:08	05:43
245	L/K/D	62.0	45.7	33.2	200	33.2		03:46	04:19	04:58
246	BEDROOM	89.0	43.0	25.6	100	89.0		03:10	03:45	04:25
247	BEDROOM	100.0	100.0	75.0	100	100.0		03:37	04:07	04:32
248	L/K/D	26.3	15.1	10.2	200	10.2		03:54	04:15	04:25

Table 13: Assessment Data



Fig. 22: Floor Plan



Level 05

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 05										
249	BEDROOM	51.3	34.5	24.8	100	51.3		00:00	00:59	02:10
250	BEDROOM	73.5	51.2	36.5	100	73.5		00:00	00:00	00:49
251	L/K/D	33.7	23.1	15.0	200	15.0		00:00	00:44	02:05
252	L/K/D	39.1	27.2	18.3	200	18.3		00:00	00:00	01:05
253	BEDROOM	59.9	27.9	12.8	100	59.9		00:00	00:30	01:53
254	BEDROOM	48.3	23.8	14.0	100	48.3		00:00	00:00	01:05
255	L/K/D	42.9	29.1	18.3	200	18.3		00:00	00:00	00:57
256	BEDROOM	77.7	53.2	34.0	100	77.7		00:00	00:00	00:56
257	L/K/D	100.0	100.0	98.0	200	98.0		02:20	01:12	01:16
258	BEDROOM	89.4	30.5	10.6	100	89.4		02:44	01:16	00:35
259	BEDROOM	76.6	26.6	9.5	100	76.6		02:24	01:08	00:46
260	L/K/D	100.0	100.0	99.7	200	99.7		06:34	05:35	06:18
261	BEDROOM	100.0	100.0	100.0	100	100.0		04:40	05:23	06:02
262	L/K/D	63.4	48.9	35.6	200	35.6		03:49	04:37	05:21
263	BEDROOM	98.8	46.5	27.3	100	98.8		03:14	04:04	04:52
264	BEDROOM	100.0	100.0	85.4	100	100.0		03:44	04:29	05:17
265	L/K/D	31.2	17.1	11.3	200	11.3		04:05	04:47	04:51

Table 14: Assessment Data



Fig. 23: Floor Plan



Level 06

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 06										
266	BEDROOM	64.7	45.0	32.4	100	64.7		00:00	00:55	02:04
267	BEDROOM	97.1	65.3	48.2	100	97.1		00:00	00:00	01:01
268	L/K/D	23.3	10.1	5.2	200	5.2		00:00	00:54	02:07
269	L/K/D	28.6	13.2	5.9	200	5.9		00:00	00:00	01:05
270	BEDROOM	100.0	83.1	57.6	100	100.0		00:00	00:35	01:51
271	BEDROOM	100.0	79.1	54.7	100	100.0		00:00	00:00	01:05
272	L/K/D	48.2	32.9	23.2	200	23.2		00:00	00:00	01:05
273	BEDROOM	86.2	64.9	39.9	100	86.2		00:00	00:00	01:05
274	L/K/D	100.0	100.0	99.3	200	99.3		02:19	01:12	01:27
275	BEDROOM	95.0	36.2	12.1	100	95.0		02:44	01:12	00:38
276	BEDROOM	82.9	27.8	12.0	100	82.9		02:28	01:10	00:59
277	L/K/D	100.0	100.0	100.0	200	100.0		06:38	05:54	06:20
278	BEDROOM	100.0	100.0	100.0	100	100.0		04:40	05:23	06:09
279	L/K/D	66.0	51.3	38.2	200	38.2		03:49	04:37	05:28
280	BEDROOM	100.0	53.5	32.0	100	100.0		03:14	04:05	05:00
281	BEDROOM	100.0	100.0	97.6	100	100.0		03:44	04:33	05:20
282	L/K/D	36.8	19.9	12.0	200	12.0		04:05	04:52	04:51

Table 15: Assessment Data

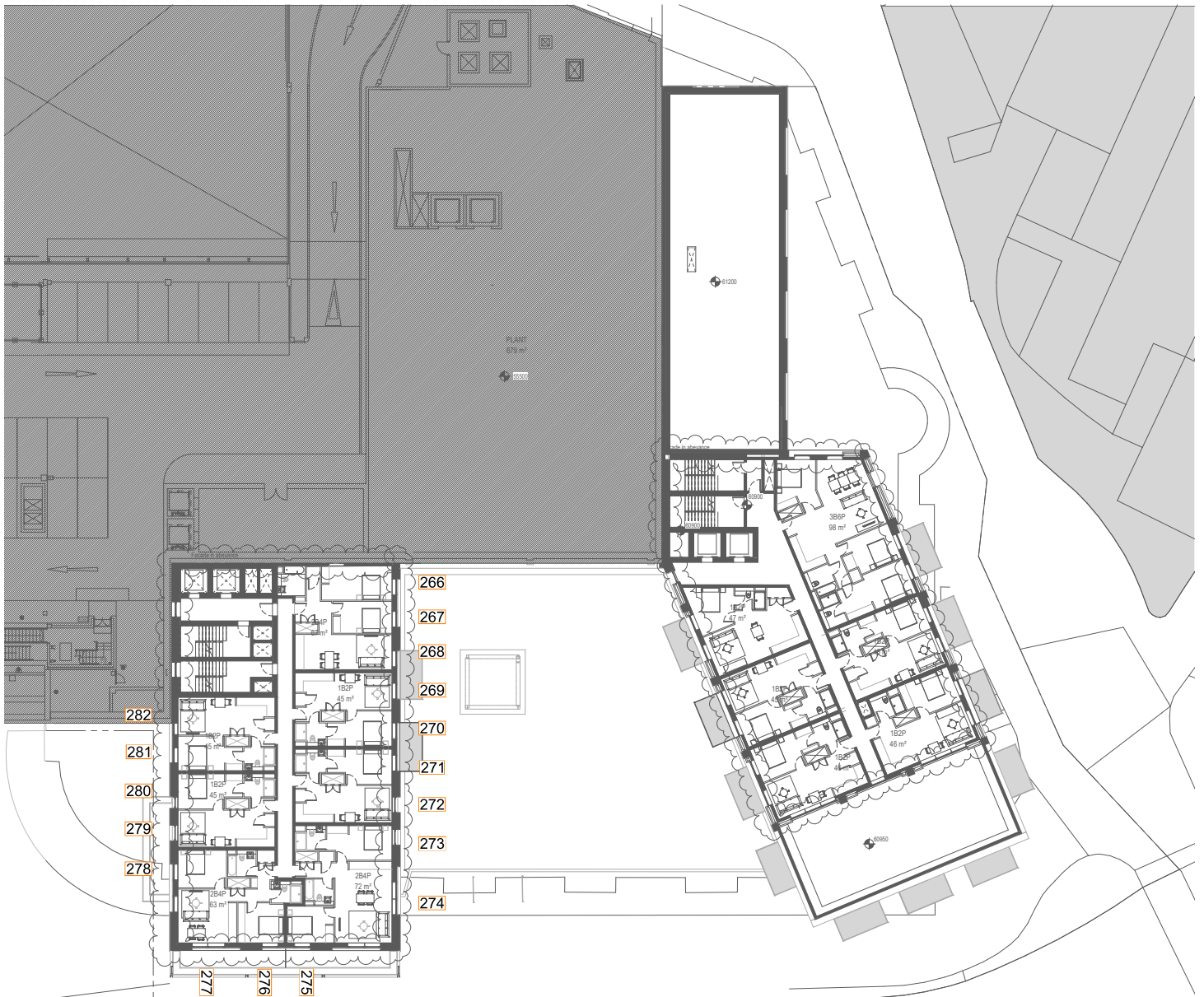


Fig. 24: Floor Plan



Level 07

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 07										
283	BEDROOM	100.0	100.0	100.0	100	100.0		00:00	00:55	02:08
284	BEDROOM	100.0	82.9	61.2	100	100.0		00:00	00:00	01:05
285	L/K/D	44.8	31.9	22.8	200	22.8		00:00	00:53	02:07
286	L/K/D	50.9	37.2	28.6	200	28.6		00:00	00:00	01:05
287	BEDROOM	94.8	50.6	25.0	100	94.8		00:00	00:39	01:53
288	BEDROOM	92.4	44.2	25.0	100	92.4		00:00	00:00	01:05
289	L/K/D	52.0	36.7	25.6	200	25.6		00:00	00:00	01:05
290	BEDROOM	97.3	72.3	46.3	100	97.3		00:00	00:00	01:05
291	L/K/D	100.0	100.0	99.8	200	99.8		02:28	01:12	01:31
292	BEDROOM	98.6	39.0	14.2	100	98.6		02:44	01:15	00:40
293	BEDROOM	88.6	30.4	11.4	100	88.6		02:25	01:10	00:59
294	L/K/D	100.0	100.0	100.0	200	100.0		06:35	05:46	06:22
295	BEDROOM	100.0	100.0	100.0	100	100.0		04:40	05:23	06:09
296	L/K/D	66.3	52.7	39.3	200	39.3		03:49	04:37	05:28
297	BEDROOM	100.0	59.3	32.0	100	100.0		03:14	04:05	05:00
298	BEDROOM	100.0	100.0	100.0	100	100.0		03:44	04:33	05:25
299	L/K/D	41.2	21.2	13.3	200	13.3		04:05	04:52	05:42

Table 16: Assessment Data



Fig. 25: Floor Plan



Level 08

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 08										
300	BEDROOM	100.0	100.0	100.0	100	100.0		00:00	00:55	02:08
301	BEDROOM	100.0	97.6	71.2	100	100.0		00:00	00:00	01:05
302	L/K/D	35.8	17.1	9.8	200	9.8		00:00	00:54	02:07
303	L/K/D	42.0	24.5	12.4	200	12.4		00:00	00:00	01:05
304	BEDROOM	100.0	100.0	74.4	100	100.0		00:00	00:38	01:53
305	BEDROOM	100.0	100.0	70.3	100	100.0		00:00	00:00	01:05
306	L/K/D	57.4	39.1	28.8	200	28.8		00:00	00:00	01:05
307	BEDROOM	100.0	77.1	53.7	100	100.0		00:00	00:00	01:05
308	L/K/D	95.4	95.4	95.4	200	95.4		02:37	01:12	01:37
309	BEDROOM	98.6	44.0	17.0	100	98.6		02:57	01:12	00:47
310	BEDROOM	92.4	32.3	15.8	100	92.4		02:34	01:10	01:06
311	L/K/D	100.0	100.0	100.0	200	100.0		06:38	05:53	06:23
312	BEDROOM	100.0	100.0	100.0	100	100.0		04:40	05:23	06:09
313	L/K/D	67.4	54.3	40.4	200	40.4		03:49	04:37	05:28
314	BEDROOM	100.0	64.0	33.7	100	100.0		03:14	04:05	05:00
315	BEDROOM	100.0	100.0	100.0	100	100.0		03:44	04:33	05:25
316	L/K/D	42.7	21.5	14.3	200	14.3		04:05	04:52	05:42

Table 17: Assessment Data

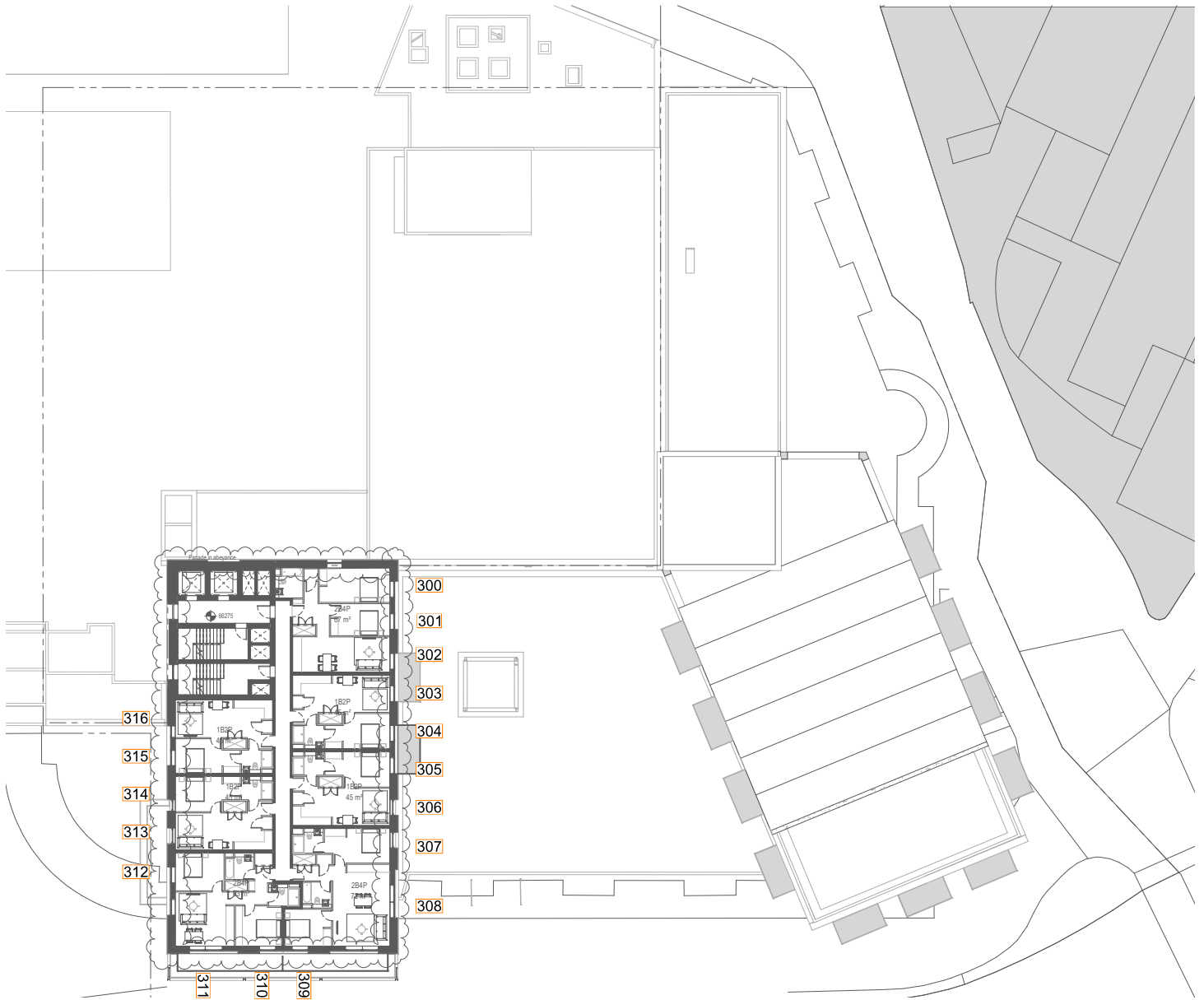


Fig. 26: Floor Plan



Level 09

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 09										
317	BEDROOM	100.0	100.0	100.0	100	100.0		00:00	00:55	02:08
318	BEDROOM	100.0	100.0	78.8	100	100.0		00:00	00:00	01:05
319	L/K/D	50.8	37.0	26.4	200	26.4		00:00	00:53	02:08
320	L/K/D	60.1	42.6	32.1	200	32.1		00:00	00:00	01:05
321	BEDROOM	100.0	69.2	36.0	100	100.0		00:00	00:39	01:55
322	BEDROOM	100.0	64.0	34.3	100	100.0		00:00	00:00	01:05
323	L/K/D	58.2	41.2	30.5	200	30.5		00:00	00:00	01:05
324	BEDROOM	100.0	79.8	57.4	100	100.0		00:00	00:00	01:05
325	L/K/D	95.4	95.4	95.4	200	95.4		02:34	01:14	01:44
326	BEDROOM	100.0	52.5	17.7	100	100.0		02:58	01:15	00:55
327	BEDROOM	96.2	38.0	17.1	100	96.2		02:45	01:09	01:14
328	L/K/D	100.0	100.0	100.0	200	100.0		06:46	05:47	06:34
329	BEDROOM	100.0	100.0	100.0	100	100.0		04:40	05:23	06:09
330	L/K/D	67.9	56.4	42.0	200	42.0		03:49	04:37	05:28
331	BEDROOM	100.0	65.7	35.5	100	100.0		03:14	04:05	05:00
332	BEDROOM	100.0	100.0	100.0	100	100.0		03:44	04:33	05:25
333	L/K/D	43.5	22.0	14.6	200	14.6		04:05	04:52	05:42

Table 18: Assessment Data

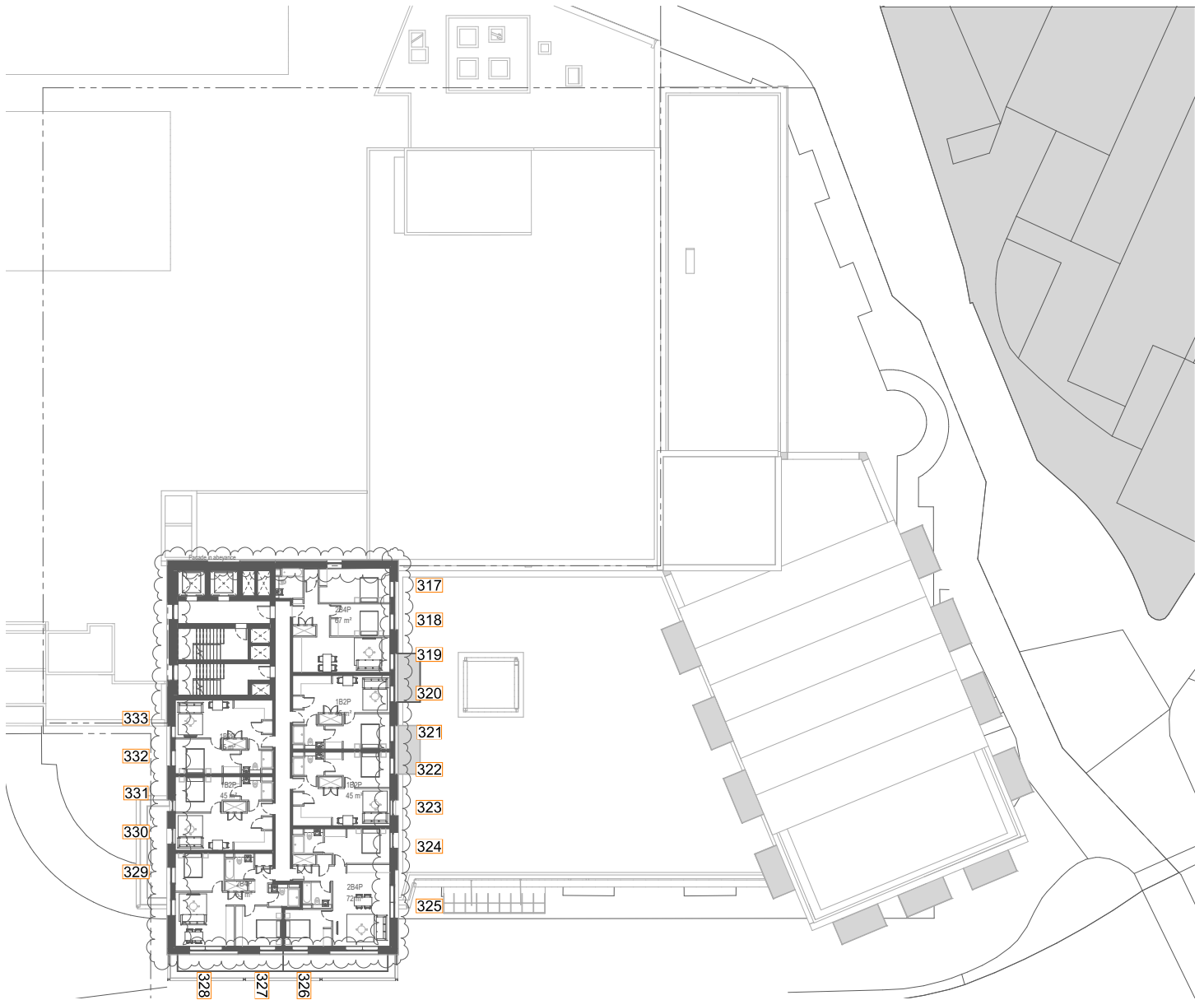


Fig. 27: Floor Plan



Level 10

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 10										
334	BEDROOM	100.0	100.0	100.0	100	100.0		00:00	00:55	02:08
335	BEDROOM	100.0	100.0	81.2	100	100.0		00:00	00:00	01:05
336	L/K/D	38.6	19.7	12.2	200	12.2		00:00	00:54	02:08
337	L/K/D	47.2	29.4	14.6	200	14.6		00:00	00:00	01:05
338	BEDROOM	100.0	100.0	81.4	100	100.0		00:00	00:38	02:08
339	BEDROOM	100.0	100.0	77.9	100	100.0		00:00	00:00	01:05
340	L/K/D	59.6	42.3	31.3	200	31.3		00:00	00:00	01:05
341	BEDROOM	100.0	80.3	59.0	100	100.0		00:00	00:00	01:05
342	L/K/D	95.4	95.4	95.4	200	95.4		02:37	01:18	01:56
343	BEDROOM	100.0	57.4	21.3	100	100.0		02:56	01:12	01:05
344	BEDROOM	96.8	40.5	17.1	100	96.8		02:49	01:10	01:24
345	L/K/D	100.0	100.0	100.0	200	100.0		06:53	05:53	06:46
346	BEDROOM	100.0	100.0	100.0	100	100.0		04:40	05:23	06:09
347	L/K/D	69.3	56.7	43.0	200	43.0		03:49	04:37	05:28
348	BEDROOM	100.0	71.5	36.6	100	100.0		03:14	04:05	05:00
349	BEDROOM	100.0	100.0	100.0	100	100.0		03:44	04:33	05:25
350	L/K/D	44.5	23.3	14.8	200	14.8		04:05	04:52	05:42

Table 19: Assessment Data

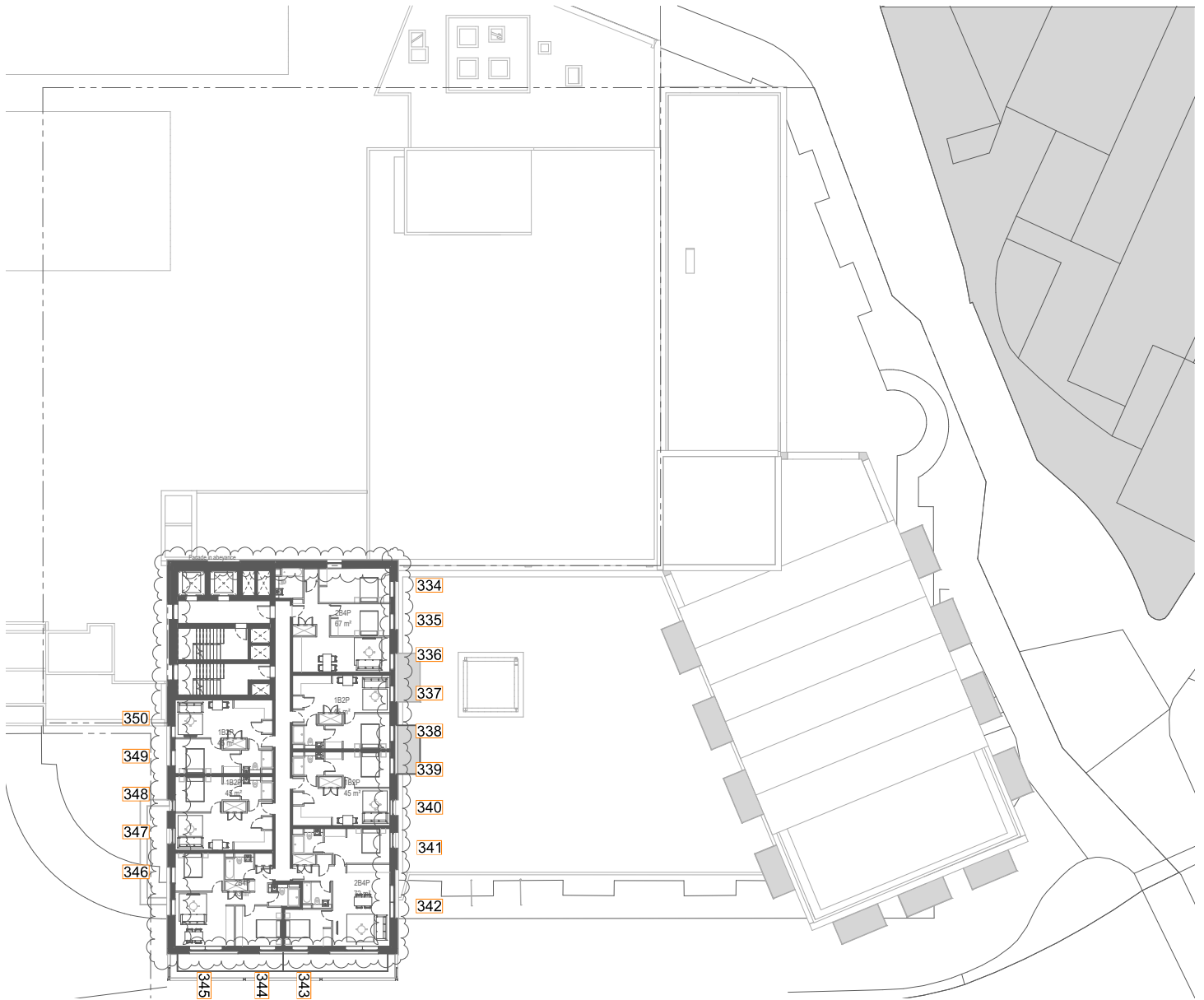


Fig. 28: Floor Plan



Level 11

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 11										
351	BEDROOM	100.0	100.0	100.0	100	100.0		00:00	00:55	02:08
352	BEDROOM	100.0	100.0	82.4	100	100.0		00:00	00:00	01:05
353	L/K/D	51.6	37.0	26.7	200	26.7		00:00	00:54	02:08
354	L/K/D	60.4	43.4	32.1	200	32.1		00:00	00:00	01:05
355	BEDROOM	100.0	76.2	39.0	100	100.0		00:00	00:39	02:08
356	BEDROOM	100.0	70.9	36.0	100	100.0		00:00	00:00	01:05
357	L/K/D	60.1	43.1	31.3	200	31.3		00:00	00:00	01:05
358	BEDROOM	100.0	81.4	61.2	100	100.0		00:00	00:00	01:05
359	L/K/D	95.4	95.4	95.4	200	95.4		02:34	01:29	02:30
360	BEDROOM	100.0	63.8	22.7	100	100.0		02:58	01:21	01:05
361	BEDROOM	98.7	48.1	20.3	100	98.7		02:44	01:15	01:37
362	L/K/D	100.0	100.0	100.0	200	100.0		06:53	05:51	06:59
363	BEDROOM	100.0	100.0	100.0	100	100.0		04:40	05:23	06:09
364	L/K/D	69.8	57.5	43.6	200	43.6		03:49	04:37	05:28
365	BEDROOM	100.0	71.5	37.8	100	100.0		03:14	04:05	05:00
366	BEDROOM	100.0	100.0	100.0	100	100.0		03:44	04:33	05:25
367	L/K/D	45.8	24.0	15.3	200	15.3		04:05	04:52	05:42

Table 20: Assessment Data

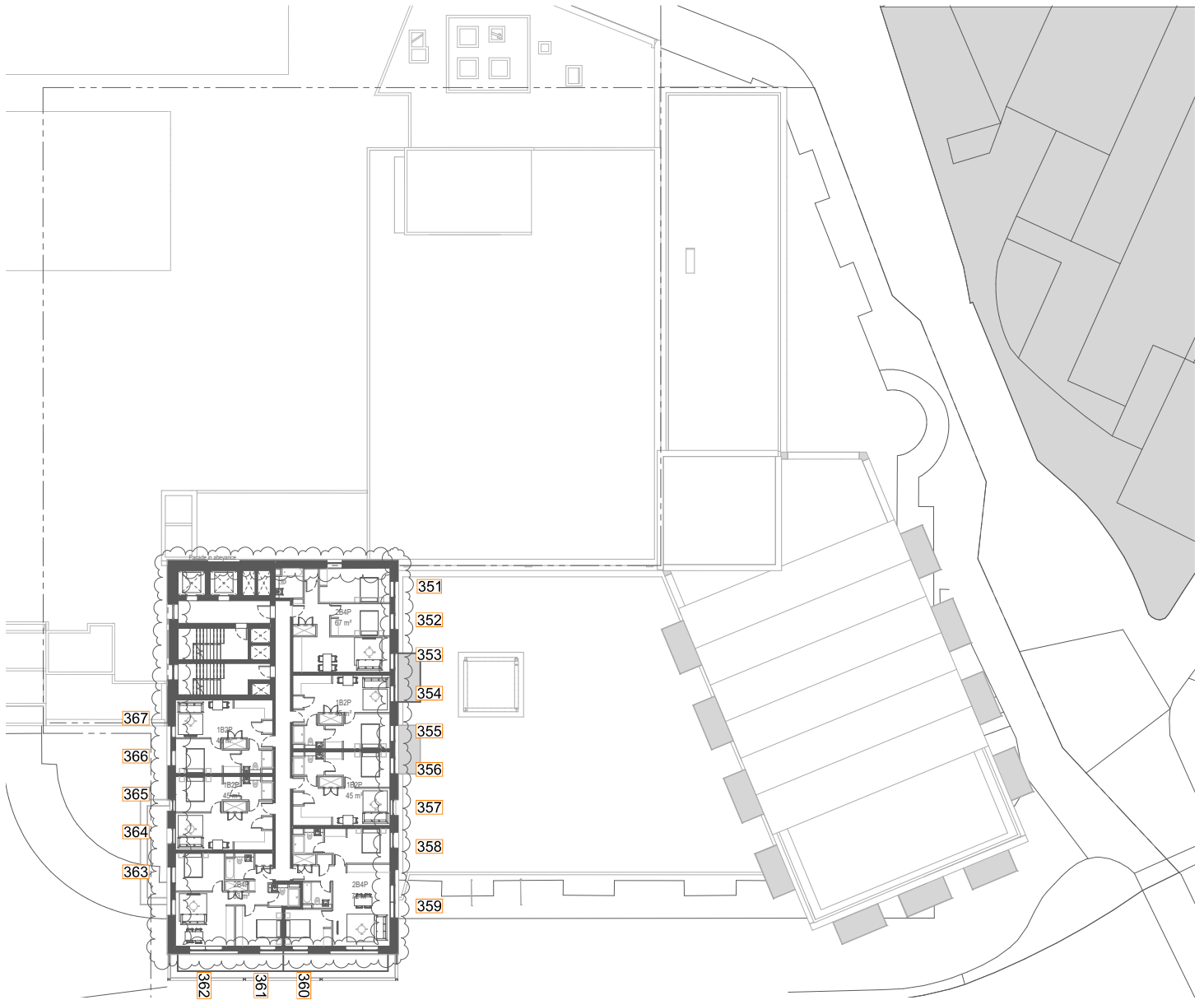


Fig. 29: Floor Plan



Level 12

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 12										
368	BEDROOM	100.0	100.0	100.0	100	100.0		00:00	00:55	02:08
369	BEDROOM	100.0	100.0	84.7	100	100.0		00:00	00:00	01:05
370	L/K/D	40.4	21.8	13.0	200	13.0		00:00	00:54	02:08
371	L/K/D	48.5	30.5	16.2	200	16.2		00:00	00:00	01:05
372	BEDROOM	100.0	100.0	81.4	100	100.0		00:00	00:39	02:08
373	BEDROOM	100.0	100.0	78.5	100	100.0		00:00	00:00	01:05
374	L/K/D	60.4	43.4	31.8	200	31.8		00:00	00:00	01:05
375	BEDROOM	100.0	82.4	61.2	100	100.0		00:00	00:00	01:05
376	L/K/D	95.4	95.4	95.4	200	95.4		02:37	01:56	03:02
377	BEDROOM	100.0	70.2	26.2	100	100.0		02:56	01:48	01:26
378	BEDROOM	99.4	55.7	22.2	100	99.4		02:49	01:41	01:59
379	L/K/D	100.0	100.0	100.0	200	100.0		06:53	06:00	07:17
380	BEDROOM	100.0	100.0	100.0	100	100.0		04:40	05:23	06:09
381	L/K/D	70.9	58.0	45.2	200	45.2		03:49	04:37	05:28
382	BEDROOM	100.0	76.7	39.0	100	100.0		03:14	04:05	05:00
383	BEDROOM	100.0	100.0	100.0	100	100.0		03:44	04:33	05:25
384	L/K/D	47.6	24.0	15.1	200	15.1		04:05	04:52	05:42

Table 21: Assessment Data

Level 13

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 13										
385	BEDROOM	100.0	100.0	100.0	100	100.0		00:00	00:55	02:08
386	BEDROOM	100.0	100.0	82.4	100	100.0		00:00	00:00	01:05
387	L/K/D	52.1	37.6	27.2	200	27.2		00:00	00:55	02:08
388	L/K/D	61.2	43.4	33.2	200	33.2		00:00	00:00	01:05
389	BEDROOM	100.0	79.7	42.4	100	100.0		00:00	00:44	02:08
390	BEDROOM	100.0	73.8	39.5	100	100.0		00:00	00:00	01:05
391	L/K/D	60.9	42.9	31.8	200	31.8		00:00	00:00	01:05
392	BEDROOM	100.0	83.5	64.9	100	100.0		00:00	00:00	01:05
393	L/K/D	95.4	95.4	95.4	200	95.4		02:46	03:04	03:19
394	BEDROOM	100.0	75.2	30.5	100	100.0		03:05	02:45	01:58
395	BEDROOM	99.4	62.0	25.3	100	99.4		02:45	02:36	02:31
396	L/K/D	100.0	100.0	100.0	200	100.0		06:53	06:53	07:49
397	BEDROOM	100.0	100.0	100.0	100	100.0		04:40	05:23	06:09
398	L/K/D	71.1	58.8	46.0	200	46.0		03:49	04:37	05:28
399	BEDROOM	100.0	80.2	39.5	100	100.0		03:14	04:05	05:00
400	BEDROOM	100.0	100.0	100.0	100	100.0		03:44	04:33	05:25
401	L/K/D	48.6	24.8	15.3	200	15.3		04:05	04:52	05:42

Table 22: Assessment Data

Level 14

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 14										
402	BEDROOM	100.0	100.0	100.0	100	100.0		00:00	00:55	02:08
403	BEDROOM	100.0	100.0	85.3	100	100.0		00:00	00:00	01:05
404	L/K/D	40.9	23.1	12.7	200	12.7		00:00	00:55	02:08
405	L/K/D	49.1	30.5	17.0	200	17.0		00:00	00:00	01:05
406	BEDROOM	100.0	100.0	86.0	100	100.0		00:00	00:55	02:08
407	BEDROOM	100.0	100.0	80.2	100	100.0		00:00	00:00	01:05
408	L/K/D	60.1	43.7	31.5	200	31.5		00:00	00:00	01:05
409	BEDROOM	100.0	83.5	64.9	100	100.0		00:00	00:00	01:05
410	L/K/D	95.4	95.4	95.4	200	95.4		03:54	03:37	03:19
411	BEDROOM	100.0	80.9	37.6	100	100.0		03:41	03:14	02:02
412	BEDROOM	100.0	73.4	30.4	100	100.0		03:13	03:37	02:58
413	L/K/D	100.0	100.0	100.0	200	100.0		06:53	07:51	07:58
414	BEDROOM	100.0	100.0	100.0	100	100.0		04:40	05:23	06:09
415	L/K/D	72.2	59.9	46.5	200	46.5		03:49	04:37	05:28
416	BEDROOM	100.0	80.2	41.9	100	100.0		03:14	04:05	05:00
417	BEDROOM	100.0	100.0	100.0	100	100.0		03:44	04:33	05:25
418	L/K/D	49.4	24.6	15.9	200	15.9		04:05	04:52	05:42

Table 23: Assessment Data

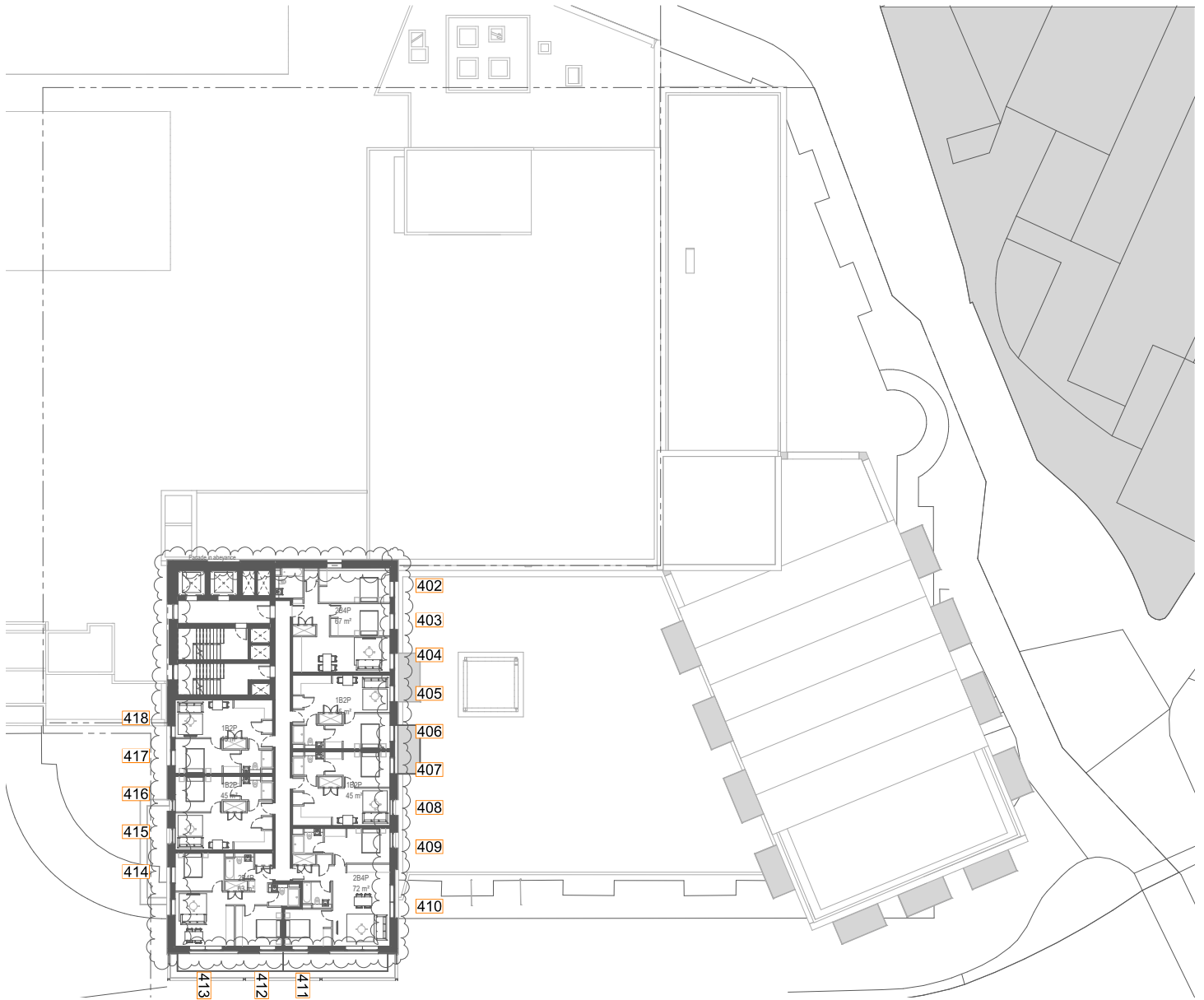


Fig. 32: Floor Plan



Level 15

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 15										
419	BEDROOM	100.0	100.0	100.0	100	100.0		00:00	00:55	02:08
420	BEDROOM	100.0	100.0	87.1	100	100.0		00:00	00:00	01:05
421	L/K/D	53.6	37.8	27.5	200	27.5		00:00	00:55	02:08
422	L/K/D	61.2	44.2	32.9	200	32.9		00:00	00:00	01:05
423	BEDROOM	100.0	82.6	45.9	100	100.0		00:00	00:55	02:08
424	BEDROOM	100.0	76.2	41.3	100	100.0		00:00	00:00	01:05
425	L/K/D	60.6	42.9	31.8	200	31.8		00:00	00:00	01:05
426	BEDROOM	100.0	83.5	64.4	100	100.0		00:00	00:00	01:05
427	L/K/D	95.4	95.4	95.4	200	95.4		05:17	04:05	03:19
428	BEDROOM	100.0	92.2	42.6	100	100.0		04:51	03:42	02:02
429	BEDROOM	100.0	89.9	36.1	100	100.0		04:09	04:04	03:18
430	L/K/D	100.0	100.0	100.0	200	100.0		07:41	08:42	08:20
431	BEDROOM	100.0	100.0	100.0	100	100.0		04:40	05:23	06:09
432	L/K/D	72.2	60.7	47.3	200	47.3		03:49	04:37	05:28
433	BEDROOM	100.0	85.5	41.9	100	100.0		03:14	04:05	05:00
434	BEDROOM	100.0	100.0	100.0	100	100.0		03:44	04:33	05:25
435	L/K/D	49.4	26.9	15.9	200	15.9		04:05	04:52	05:42

Table 24: Assessment Data

Level 16

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 16										
436	BEDROOM	100.0	100.0	100.0	100	100.0		00:00	00:55	02:08
437	BEDROOM	100.0	100.0	91.2	100	100.0		00:00	00:00	01:05
438	L/K/D	46.1	31.1	17.6	200	17.6		00:00	00:55	02:08
439	L/K/D	54.2	36.1	24.8	200	24.8		00:00	00:00	01:05
440	BEDROOM	100.0	100.0	89.5	100	100.0		00:00	00:55	02:08
441	BEDROOM	100.0	100.0	82.0	100	100.0		00:00	00:00	01:05
442	L/K/D	62.0	44.5	32.9	200	32.9		00:00	00:00	01:05
443	BEDROOM	100.0	84.0	66.5	100	100.0		00:00	00:00	01:05
444	L/K/D	95.4	95.4	95.4	200	95.4		07:15	07:44	08:14
445	BEDROOM	100.0	100.0	100.0	100	100.0		06:11	06:46	06:26
446	BEDROOM	100.0	100.0	100.0	100	100.0		05:19	05:58	06:40
447	L/K/D	100.0	100.0	100.0	200	100.0		08:28	10:28	12:02
448	BEDROOM	100.0	100.0	100.0	100	100.0		04:40	05:23	06:09
449	L/K/D	72.5	60.7	47.6	200	47.6		03:49	04:37	05:28
450	BEDROOM	100.0	87.8	44.8	100	100.0		03:14	04:05	05:00
451	BEDROOM	100.0	100.0	100.0	100	100.0		03:44	04:33	05:25
452	L/K/D	50.1	27.4	16.6	200	16.6		04:05	04:52	05:42

Table 25: Assessment Data

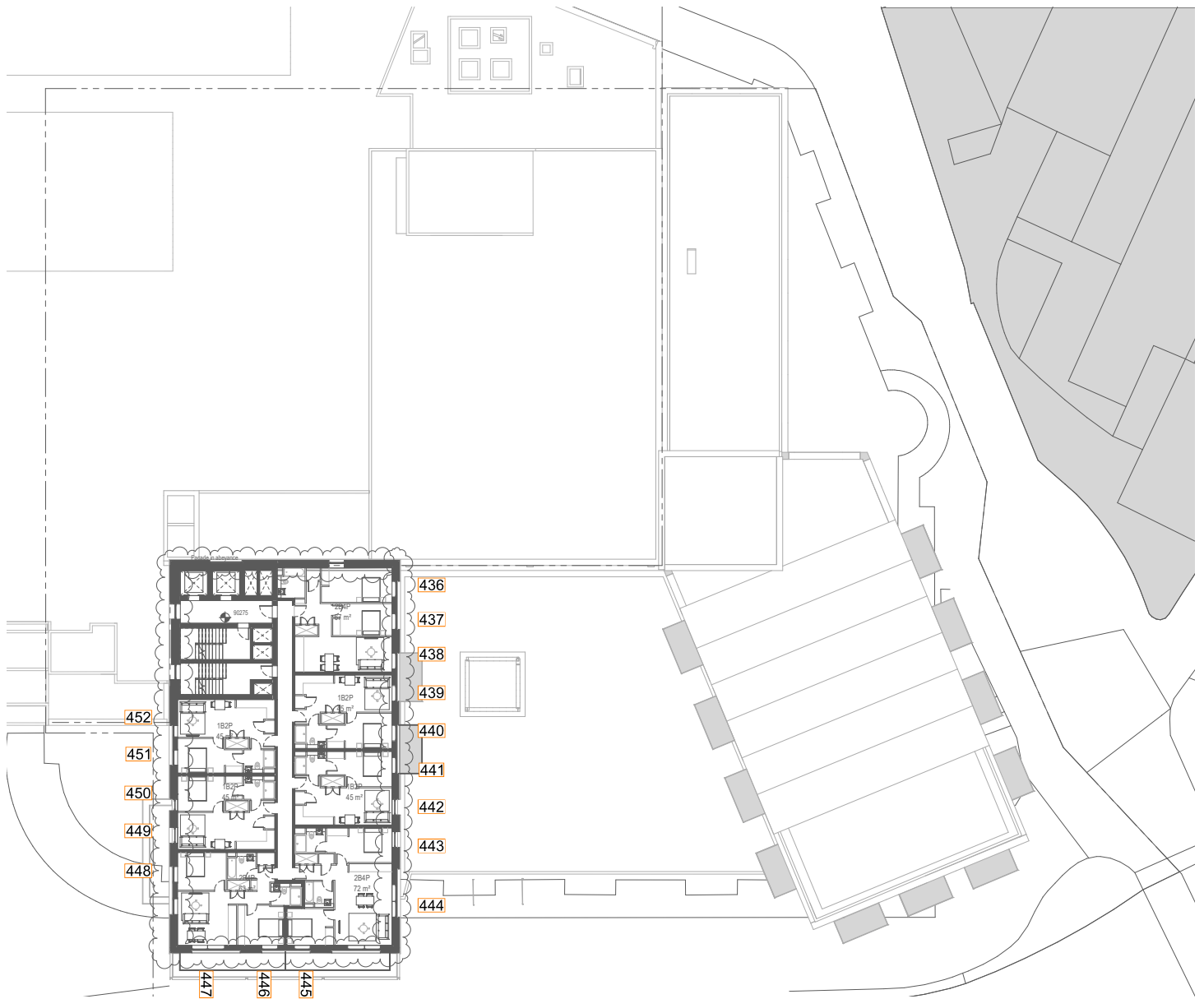


Fig. 34: Floor Plan



Level 17

		DAYLIGHT						SUNLIGHT		
ROOM REF.	ROOM USE	EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylit hours) Weather File: GBR_Gatwick						HOURS:MIN		
		100	150	200	TARGET	RELEVANT ENSDA		1 FEB	25 FEB	21 MAR
BLOCK_YHP1 - LEVEL 17										
453	BEDROOM	100.0	100.0	100.0	100	100.0		00:00	00:55	02:08
454	BEDROOM	100.0	100.0	91.2	100	100.0		00:00	00:00	01:05
455	L/K/D	52.8	39.4	28.2	200	28.2		00:00	00:55	02:08
456	BEDROOM	100.0	100.0	100.0	100	100.0		00:00	00:00	01:05
457	L/K/D	100.0	100.0	100.0	200	100.0		06:33	07:09	07:43
458	BEDROOM	100.0	94.2	50.9	100	100.0		05:08	05:46	05:39
459	L/K/D	100.0	100.0	100.0	200	100.0		08:52	10:22	11:56
460	BEDROOM	100.0	93.0	48.8	100	100.0		04:05	04:52	05:42

Table 26: Assessment Data

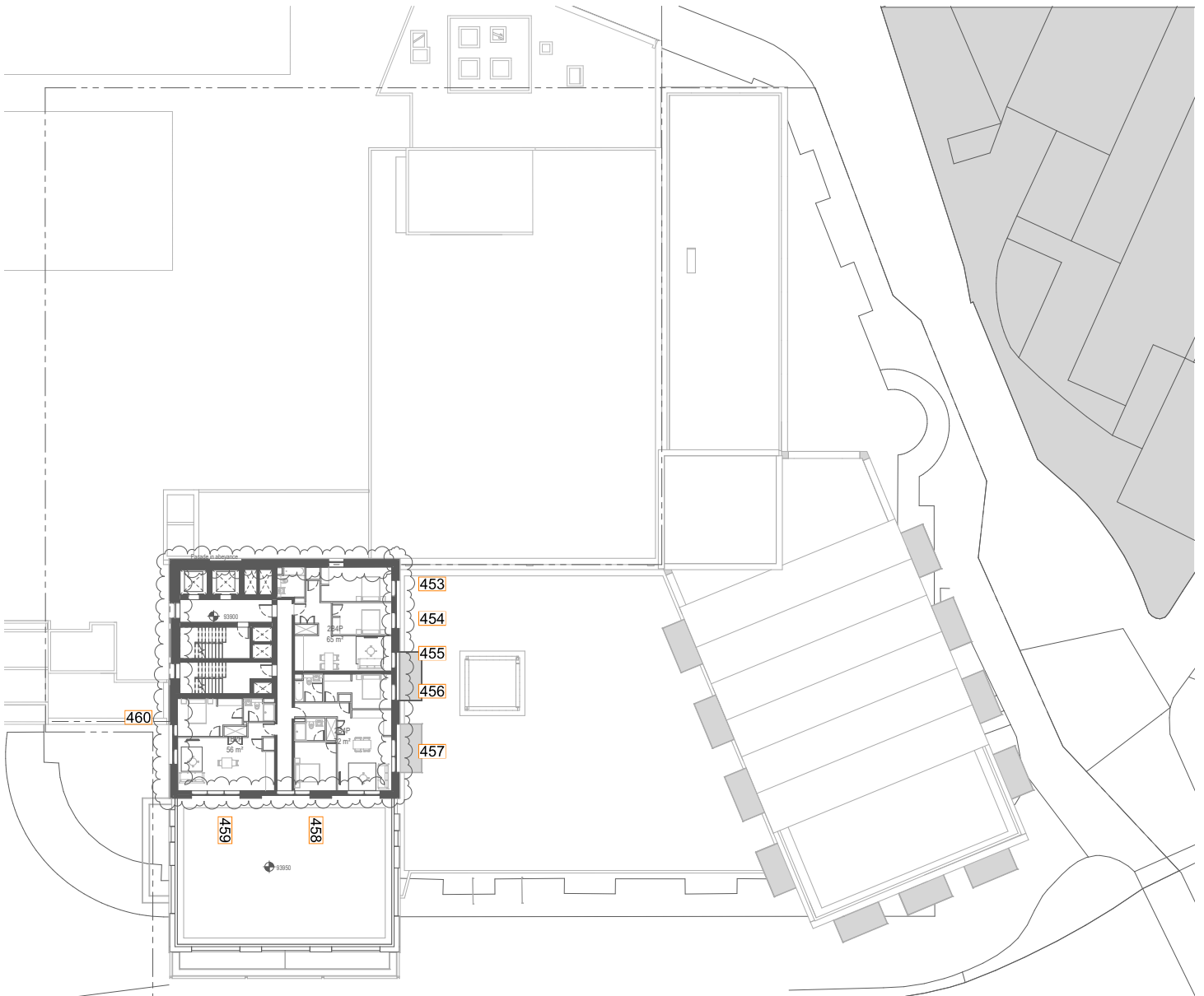


Fig. 35: Floor Plan

