



**PADDINGTON GREEN**  
POLICE STATION

# Internal Daylight, Sunlight & Overshadowing Report

Fire Statement (National Requirements)–  
November 2022 - GLA0711

NOVEMBER 2022



## **DAYLIGHT & SUNLIGHT**

INTERNAL DAYLIGHT, SUNLIGHT AND  
OVERSHADOWING REPORT

**Paddington Green Police Station**

**18 November 2022**

GIA No: **15876**

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Client **Berkeley Homes Limited**  
Architect **Squire & Partners**  
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# 1 EXECUTIVE SUMMARY

The purpose of this report is to ascertain whether the 2022 amended proposed development known as the Paddington Green Police Station will provide residential accommodation that is acceptable in relation to daylight and sunlight amenity, as well as meet its future occupants' expectations for a central London site.

The 2022 amended proposed development has been designed to deliver accommodation which has been well optimised for daylight and sunlight, whilst delivering generous accommodation which strikes the optimal balance between fabric efficiency, overheating and noise requirements, as well as its amenity offering. This has all been achieved whilst also seeking to deliver a viable scheme that makes efficient use of public land for new homes. Further optimisation undertaken for the 2022 amended proposed development has seen an improvement in both the overall compliance for daylight and the individual levels of light within those rooms falling below the recommended levels.

Paddington Green Police Station occupies an underutilised site, located within the Westminster Central Activities Zone (CAZ) and is within a strategic development zone, the Church Street/Edgware Road Housing Renewal Area. It enjoys the highest level of public transport accessibility possible and is bounded by multiple newly implemented and consented high-density developments which form the emerging context for this site.

Making optimal use of land has been crucial in developing the 2022 amended proposed development, and in particular the relationship between the various elements. This is exemplified by the massing dimensions and the distances between blocks in the emerging context, such as WEG, 14-17 PG and Merchant Square. The design has sought to ensure sufficient daylight and sunlight amenity is achieved and that the levels achieved are appropriate in the emerging context.

The rooms falling short of the national targets within the proposal achieve levels of daylight and sunlight which are commensurate with the levels found in the emerging context and are equivalent to the levels achieved within the neighbouring new developments. The 2022 amended proposed development is located in central London, in an area with the highest level of public transport accessibility as well as within a strategic development area and,

according to national policy, efficient use of land should be sought when delivering much needed residential accommodation.

In order to ascertain the levels of daylight and sunlight within the 2022 amended proposed development, all habitable rooms and shared open space have been assessed in accordance with the methodologies set out in the BRE Guidelines. For daylight, the illuminance within all habitable rooms has been assessed using the spatial daylight autonomy (sDA) methodology, whilst for sunlight, the sun exposure on 21<sup>st</sup> March has been assessed for the windows of all habitable rooms. For overshadowing within shared open space, the sun hours on ground methodology has been used. The assessments have been undertaken with all emerging consented neighbouring schemes in place in order to study the worst-case scenario.

The assessments of the 2022 amended proposed development have therefore been undertaken in accordance with the methodologies of the newly published BRE Guidelines 2022, which differs from the assessment of the 2021 Scheme. In order to allow for a comparison to the 2021 Scheme, the analysis for the 2021 Scheme has been re-run to the new 2022 BRE Guidelines criteria also and the results summarised within this report.

Regarding daylight:

- Of the 1,606 proposed habitable rooms, 1,148 (72%) see levels of sDA that either meet or exceed the BRE recommendation for their room use;
- 376 (72%) of the 521 proposed main living spaces, where good daylight amenity has been prioritised, are considered to offer good daylight levels given the inner-city location as they either meet the BRE recommended level or are only marginally below the recommendation;
- All 35 studios fall short of the recommended sDA level for rooms with a kitchen, but nine would either meet the recommended level for living rooms (four studios) or bedrooms (five studios);
- 897 (85%) of the 1,050 proposed bedrooms are considered to offer good daylight levels given the inner-city location as they either meet the BRE recommended level or are only marginally (see section 5.3) below the recommendation; and
- The areas where shortfalls occur are either located behind a recessed balcony which is considered a trade-off in amenity, or face another block of PGPS, West End Gate or 14-17 Paddington

Green. The levels of light within these areas are considered appropriate for the emerging context, where the site is seeking to make efficient use of land and comparable levels would be found in similar rooms at nearby new development.

Overall, we conclude that the 2022 amended proposed development makes the most of the available daylight and performs well for a large-scale residential development within a strategic development area, seeking to make efficient use of land for new homes. Owing to overheating and fabric efficiency constraints, spandrel panels have been proposed that result in reduced daylight ingress. Additionally, balconies have been provided for all dwellings which offer a valued form of external amenity however, reduced daylight performance within rooms behind/ beneath balconies is a typical trade-off in amenity common of most modern residential buildings. Using a flexible approach to the application of guidance relating to daylight (section 5.1), we therefore consider that future occupants will be provided with adequate daylight, that is appropriate to the emerging context all whilst balancing the need to deliver a viable scheme that makes efficient use of land and balances other policy objectives.

Regarding sunlight:

- Of the 1,606 proposed habitable rooms, 666 (42%) see levels of sun exposure that either meet or exceed the BRE recommendation for their room use;
- 330 (59%) out of 556 dwellings receive acceptable sunlight levels overall as at least one of their rooms, ideally the living space, see 1.5hrs or more of sunlight on 21<sup>st</sup> March or one of the alternative dates suggested by BS EN17037;
- 92 of the remaining dwellings see at least 1 hour of direct sunlight hitting their living space window(s) on 21<sup>st</sup> March so are considered acceptable given the inner-city urban location;
- The isolated areas where shortfalls occur are either facing another block of PGPS or have windows great than 90° of due south and so do not have a reasonable expectation of sunlight, however there are no entirely north facing dwellings. The design has sought to minimise northerly aspect living spaces as much as practicable and this makes up a very small proportion of the overall number of living spaces within the 2022 amended proposed development.

Overall, the 2022 amended proposed development makes the most of the available sunlight and

performs well for a large-scale inner-city residential development. Lower levels of sunlight are being seen in isolated areas that other development façades or are one of only a few living rooms with a predominately northerly aspect. Such results are common of most large-scale inner-city residential development, particularly where the site is seeking to make efficient use of land for new homes. Using a flexible approach to the application of guidance relating to sunlight (section 5.1), we therefore consider that future occupants will be provided with adequate sunlight, that is appropriate to the emerging context all whilst balancing the need to deliver a viable scheme that makes efficient use of land and balances other policy objectives.

For overshadowing, 32% of the proposed public realm meets the BRE criteria of two or more hours of direct sunlight within half of its area on 21<sup>st</sup> March. Whilst this falls short of the BRE recommendation, the area would meet the BRE recommendation of 50% just eight days later on 29<sup>th</sup> March. As such, the space can still be considered to offer adequate sunlight access throughout the year, which is very good for street-level open space in an inner-city, built area such as this site. Sun exposure images have demonstrated that the public realm provided within the site has been well optimised for sunlit external amenity, with good sunlight access received during the spring and summer months within the majority of the space, this being the time when the spaces are most likely to be in frequent use. The 2022 amended proposed development provides future occupants and visitors with good access to a variety of sunlit open space to enjoy throughout the year in conjunction with the wider sunlit amenity offering, such as Paddington Green directly adjacent to the site, Merchant Square and Paddington Basin, and St Mary's Churchyard.

It can therefore be concluded that the 2022 amended proposed development will offer its future occupants appropriate levels of amenity, including daylight and sunlight, which meet the expectations of an inner-city site. The levels of light achieved are considered appropriate for the emerging context, where the site is seeking to make efficient use of land. Therefore, the 2022 amended proposed development is considered to be in accordance with the NPPF, London Plan policy D6 and WCC policy 12, all whilst balancing the need to deliver a viable scheme that makes efficient use of land and balances other policy objectives.

## 2 PLANNING POLICY CONTEXT

### 2.1 NATIONAL PLANNING POLICY

#### Revised 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.”

#### 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 the proposed development would have an unreasonable impact on the daylight and sunlight levels enjoyed by neighbouring occupiers, as well as assessing 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.

### 2.2 STRATEGIC PLANNING POLICY

#### The Greater London Authority (GLA): The London Plan – Spatial Development Strategy for Greater London (March 2021)

Policy D6, Housing quality and housing states: “The design of development should provide sufficient daylight and sunlight to new and surrounding housing that is appropriate for its context, whilst avoiding overheating, minimising overshadowing and maximising the usability of outside amenity space”.

Policy D9, Tall Buildings, states that “...development proposals should address the following impacts: ...buildings should not cause adverse reflected glare [and] ...buildings should be designed to minimise light pollution from internal and external lighting.” It continues that “wind, daylight, sunlight penetration and temperature conditions around the building(s) and neighbourhood must be carefully considered and not compromise comfort and the enjoyment of open spaces, including water spaces, around the building”.

#### GLA: Housing Supplementary Planning Guidance (March 2016)

The SPG draws on the London Plan, primarily the relevant policy 7.6Bd, and provides further guidance on standards to daylight and sunlight.

Paragraph 1.3.45 of the guidance states that “an appropriate degree of flexibility needs to be applied when using BRE guidelines to assess the daylight and sunlight impacts of new development on surrounding properties, as well as within new developments themselves.”

The paragraph continues “guidelines should be applied sensitively to higher density development... where BRE advice suggests considering the use of alternative targets’ taking in to account the ‘local circumstances; the need to optimise housing capacity; and scope for character and form of an area to change over time.”

### **GLA: Sustainable Design and Construction Supplementary Planning Guidance (2014)**

Section 2.3 of the SPG provides guidance on key areas such as site layout and micro-climate in relation to site layout and building design.

With regard to site layout, paragraph 2.3.6 refers to measures to reduce carbon dioxide emissions *"include enabling access to daylight and sunlight for uses that require [light]."* In addition, the guidance states that *"site planning can minimise the impact of the shadow created by the new buildings to protect existing features such as open space and renewable solar technologies on roofs."* It goes on to say that *"developers should ensure the layout of their site and buildings maximises the opportunities provided by natural systems, such as light."*

Paragraph 2.3.8 of the SPG continues with effects on the micro-climate caused by new buildings which include *"overshadowing and reducing access to sunlight."*

The guidance states that the above effects should *"be considered during the design of a development and assessed once the designed is finalised."*

## **2.3 LOCAL PLANNING POLICY**

### **Westminster's City Plan 2019-2040 (April 2021)**

Policy 12, Housing Quality states that: *"A. All new homes and residential extensions will provide a well-designed, energy efficient and high-quality living environment, both internally and externally. New homes will be designed to a standard that ensures the safety, health and wellbeing of its occupants."*

The supporting text goes on to say that *"12.1 / Housing plays an important role in the safety, health and well-being of individuals and communities and in the shaping of neighbourhoods. It must therefore be designed to a high quality. This is particularly important in Westminster given the growing need for housing driving higher density developments."*

*12.2 / High quality can take many forms and can be achieved through design solutions such as [...] access to natural light and a dual aspect ..."*

## **2.4 OTHER RELEVANT GUIDANCE**

### **Historic England: Guidance on Tall Buildings – Historic England Advice Note 4 (2015)**

Paragraph 4.10 of the Historic England Advice Note 4 recommends that the following should be addressed in relation to tall buildings:

*"consideration of the impact on the local environment, including microclimate, overshadowing, night-time appearance, vehicle movements and the environment and amenity of those in the vicinity of the building".*

### 3 BRE GUIDELINES

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

#### 2.5 INTRODUCTION

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 1.5 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)

#### 2.6 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 on from the review of the European Standard by a dedicated commission of UK experts, the British Standard Institution appended to BS EN 17037:2018 a UK National Annex which brings the recommended light levels in line with those of the former BS8206-2:2008.

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

View out and Glare are not solely but 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.

In relation to sunlight access, the assessment considers the hours of sunlight reaching a window on the 21<sup>st</sup> March.



## 2.7 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 manually or most commonly through the use of specialist daylighting software. 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.

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 BR209 (2011) recommendations for Average Daylight Factor (ADF) of 1.0% ADF for bedrooms, 1.5% ADF for living rooms and 2.0% ADF for rooms with a kitchen. The BR209 (2022) target illuminance levels 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.

## 2.8 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 21<sup>st</sup>. 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 façades 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.. "*

## 2.9 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.."*

## 2.10 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



## 4 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.

The three dimensional representation of the proposed development has been modelled using the scheme drawings provided to us by Squire & Partners. This has been placed in the context of its surrounding buildings which have been modelled from survey information, photogrammetry, OS and site photographs. 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.

### 4.1 SIMULATION ASSUMPTIONS

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

#### Assessment Grids

For the daylight assessments, an analysis 'grid' is located within each room at working plane height (850 mm from floor level) and offset by 0.3m from the walls as recommended by BR 209.

Grid points are spaced by 0.2m .

#### Assessment Resolution

The climate-based daylight assessments have been undertaken on an hourly basis whilst the sunlight exposure assessment has been undertaken for every minute on the relevant days.

#### Surfaces reflectance

In general, reflectance value to be applied to surfaces in the computational modelling follows the BR 209 Annex C, 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

The following surface reflectance assumptions as per BR 209 have been used:

- Exterior ground and external obstructions -0.2

#### Glazing transmittance

A glazing transmittance of 68% has been used as suggested by BRE. Framing factors have been taken from the elevations supplied and are outlined in the table 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's massing.

The final transmittance values are shown in the table below.

	TV (NORMAL)	FRAMING FACTOR	MAINTENANCE FACTOR	TV (TOTAL)
2022 Amended Proposed Development - Window Type 1	0.68	0.75	0.92	0.47
2022 Amended Proposed Development - Window Type 2 (Obstructed Location)	0.68	0.80	0.76	0.41
2021 Scheme - Window Type 3	0.68	0.81	0.92	0.51
2021 Scheme - Window Type 4 (Obstructed Location)	0.68	0.85	0.76	0.44

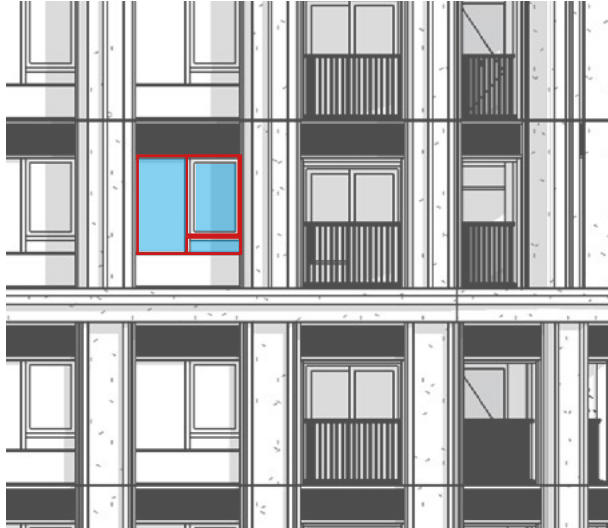


Fig. 01: 2022 amended proposed development - Window Type 1



Fig. 02: 2022 amended proposed development - Window Type 2

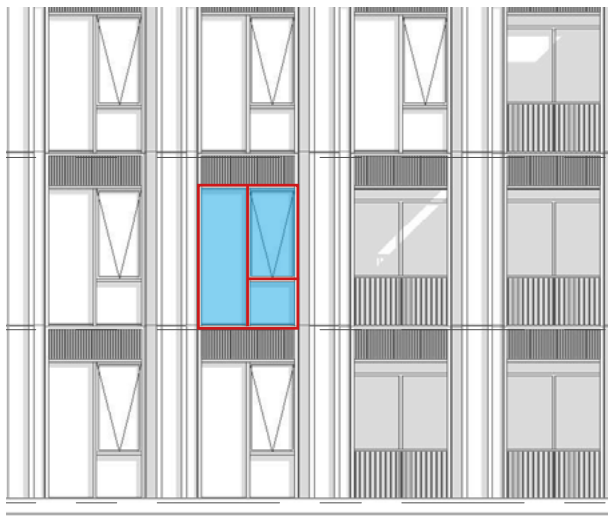


Fig. 03: 2021 Scheme - Window Type 3

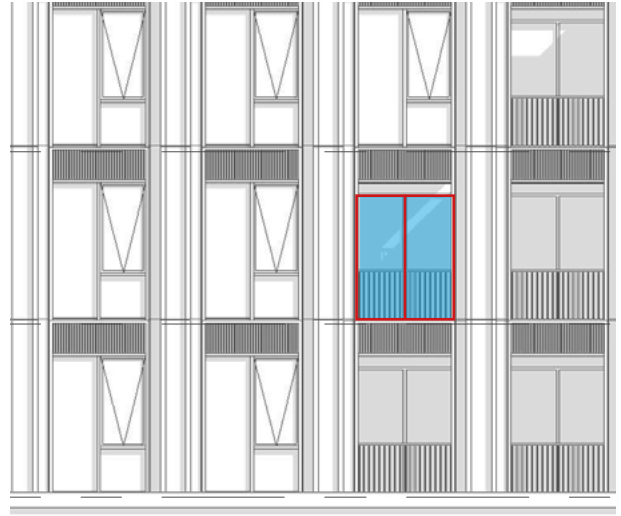


Fig. 04: 2021 Scheme - Window Type 4

## 5 DISCUSSION & CONCLUSIONS

The purpose of this report is to ascertain whether the 2022 amended proposed development known as the Paddington Green Police Station, will provide residential accommodation that is acceptable in relation to daylight and sunlight amenity as well as meet its future occupants' expectations for an urban site in central London.

### 5.1 BACKGROUND

Paddington Green Police Station occupies an underutilised site located within the Westminster Central Activities Zone (CAZ) and is within a strategic development zone, the Church Street/Edgware Road Housing Renewal Area. Additionally it is directly adjacent to Edgware Road Underground Station, has bus stops on the boundary and is within walking distance to Paddington Station. Therefore, this site enjoys the highest level of public transport accessibility possible.

The site is bounded also by multiple newly implemented and consented high-density developments which form the emerging context for this site.

For sites such as this, the NPPF encourages making the best use of land within sites that seek to deliver housing, particularly where high levels of transport accessibility is available. The NPPF states 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."

The London Plan sets out the strategic policy for locations such as this, and states that "*The design of development should provide sufficient daylight and sunlight to new and surrounding housing that is appropriate for its context, whilst avoiding overheating, minimising overshadowing and maximising the usability of outside amenity space*".

Westminster City Plan in Policy 6 sets out the Church Street/Edgware Road Housing Renewal Area as a key priority for delivering at least 2,000 new homes. The City Plan states that this should be achieved through "*Innovative and high-quality design to*

*ensure the most efficient use of land, including tall buildings*."

Making the best use of land has been a crucial in developing the 2022 amended proposed development, and in particular the relationship between the various elements. This is exemplified by the massing dimensions and the distances between blocks in the emerging context, such as West End Gate (WEG), 14-17 Paddington Green and Merchant Square. However as outlined in the following section, this has all been done whilst seeking to ensuring sufficient daylight and sunlight amenity is achieved and that the levels achieved are appropriate the emerging context.

For this reason, the rooms seeing levels of light lower than the national targets within the 2022 amended proposed development achieve levels of daylight and sunlight which are considered appropriate for the emerging context and are comparable with the levels achieved within the neighbouring new developments.

### 5.2 DESIGN EVOLUTION

GIA worked alongside Squire and Partners prior to submission of the 2021 Scheme to optimise the daylight and sunlight amenity within, whilst balancing other important factors, such as noise, privacy and overheating. During the design development of the 2022 amended proposed development, GIA have worked closely with Squire and Partners (architecture) and Buro Happold (overheating/energy performance) to further optimise the 2022 amended proposed development and ensure the best possible dwellings of high residential quality are being provided for future residents.

Such collaboration entailed an iterative process of technical assessments and feedback to the design team. As a result, a number of features have been implemented within the design to improve the daylight and sunlight performance of the 2022 amended proposed development, for instance:

- daylight to living spaces has been made a priority as these are the rooms where good daylight amenity is most valued;
- where possible, living rooms have been provided with multiple windows as well as dual aspect;
- balconies have been located in front of bedrooms with direct access from the living room from the

side wherever possible;

- where balconies have been located in front of living spaces, wherever possible, a second window flush with the facade has been provided;
- within studio flats, the bedroom zones have been placed behind the recessed balconies to give priority to good daylight within the living zone;
- fenestration has been maximised, while balancing the requirements for fabric efficiency, avoiding overheating and noise;
- light internal finishes have been considered throughout the 2022 amended proposed development to enhance the distribution of indoor light.

Since the 2021 Scheme, a number of design amendments have been made to improve the 2022 amended proposed development, some in terms of daylight, whilst others have been balanced alongside daylight considerations, such are:

- the massing has been revised to reduce floor plates in the east-west direction. Whilst this helps create wider gaps between blocks and also reduces the number of north facing windows, it does reduce the quantum of dwellings with south facing rooms, this being the aspect with the best daylight availability. It is also worth noting it has eliminated all north facing single aspect units;
- the Block K shoulder element has been removed which allows more light to the northerly elevations and more sunlight into Newcastle Place, however it similarly sees a reduction in east-facing dwellings that have good daylight availability;
- to offset the footprint amendments, the heights of the proposed buildings have increased. This has been done sensitively to minimise the impact on daylight within the proposed dwellings, it would have no material impact on Newcastle Place given its proximity directly to the north;
- gaps between each of the PGPS blocks have increased to improve access to daylight and increase sunlight within the public realm;
- separation distance between the PGPS blocks, West End Gate and 14-17 Paddington Green has been increased to allow increased daylight to the northerly elevations and increased sunlight within Newcastle Place;
- the podium between Blocks J and K has been removed which introduces an additional area of sunlit public realm and allows more light into Newcastle Place;

- the Block J and Block K roof terraces have been removed to allow for necessary roof-top plant to be accommodated. This has been offset by increases to the areas of sunlit public realm, particularly on the eastern and western ends of the site;
- the proportion of dual-aspect dwellings has been increased, allowing light to be captured from more than one direction;
- living spaces have been located within the areas that have the best daylight availability, particularly in the corner locations or outward facing facades, with a predominance of bedrooms within the northerly elevations (facing WEG and 14-17 PG) and gaps between the PGPS blocks; and
- spandrel panels have been introduced to the lower portion of all window flush with the elevations to address overheating and fabric efficiency constraints. Whilst this has an impact on daylight within the rooms, the height of the spandrel has been iteratively refined to provide the best possible balance between fabric efficiency/overheating and daylight.

This has resulted in the 2022 amended proposed development making the most of the daylight and sunlight available to this inner-city site, whilst delivering generous, high quality accommodation which strikes the optimal balance between fabric efficiency, overheating and noise requirements, as well as its amenity offering, all whilst delivering a viable scheme that makes efficient use of land for new homes.

## 5.3 CONCLUSIONS ON DAYLIGHT

As it is to be expected of a site located in central London and with the highest levels of public transport accessibility, the proposal seeks to make efficient use of land for new homes by delivering high density accommodation which is in-line with its immediate and emerging context, as it is visible in fig. 01 and 02.

In locations such as this, the BRE guidance acknowledges that it is sometimes not possible to meet its nationally applicable numerical targets, and as such recommends a more contextual numerical appraisal of daylight and sunlight, much like the London Plan and NPPF recommend.

In order to ascertain the levels of daylight within the 2022 amended proposed development, all habitable rooms have been assessed for illuminance using the spatial daylight autonomy (sDA) methodology.

The assessments of the 2022 amended proposed development have therefore been undertaken in accordance with the methodologies of the newly published BRE Guidelines 2022. In order to allow for a comparison to the 2021 Scheme, the analysis for the 2021 Scheme has been re-run to the new 2022 BRE Guidelines criteria also.

The results given on pages 22-175 have shown that of the 1,606 proposed habitable rooms, 1,148 (72%) see levels of sDA that either meet or exceed the BRE recommendation for their room use, see Section 5.5.

Of the 458 rooms that fall short of the sDA recommendations, 197 are open-plan living/kitchen/dining rooms (LKDs), 27 are living rooms (with separated kitchens), 35 are studios and 199 are bedrooms.

263 (57%) of the 460 LKDs meet or exceed the BRE recommendation of 200lux within half the room for half the daylight hours within a year. A further 47 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 150 living spaces, 29 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 339 open-plan LKDs (74% of the total) are considered to offer good daylight levels given the inner-city location.

Regarding living rooms, where the kitchen has been separated, 34 (56%) of the 61 living rooms meet or exceed the BRE recommendation of 150lux within half the room for half the daylight hours within a year. Of the remaining 27 living spaces, three fall marginally below the living room recommendation, with 40%, 42% and 47% of their area meeting the recommended level, and therefore the front portion would be adequately daylit.

Of the remaining 121 open-plan LKDs and 24 living rooms (145 total) which see lower levels of light:

- 83 are single-aspect rooms (although 13 are within a dual-aspect dwelling) which face either

south-east, south or west.

- 69 of these 83 have at least one of their windows located behind a recessed balcony, the other windows have spandrel panels which reduce their area of glazing but serve a crucial role in addressing the energy and overheating constraints.
- The other 14 are on the lower floors, facing PGPS Block J.
- 62 of the 145 main living spaces are dual-aspect rooms that have their balconies located within the corner for maximised usability and views.
- The final LKD is located within Block K at first floor, facing north-east and has an 39% of its area seeing 150lux for half the year which can be considered acceptable for the lower floors within an inner-city urban location.

Therefore, 131 main living spaces see lower daylight availability due to the obstruction caused by their balconies, in conjunction with taller massing opposite, such as other blocks of the 2022 amended proposed development or neighbouring emerging developments such as West End Gate, 14-17 Paddington Green and Merchant Square. Daylight within these rooms has been optimised through reduced room depths, maximised fenestration and providing second windows flush with the facade wherever possible. However, reduced daylight performance within rooms behind/beneath balconies is a typical trade-off in amenity common of most modern residential buildings where balconies provided a valued form of external amenity.

Turning to the 35 proposed studios, all 35 fall short of the BRE recommendation of 200lux within half the room for half the daylight hours within a year. Four of the 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. A further five would exceed the BRE recommendation of 100lux for bedrooms which is considered an acceptable daylight level for a studio within a high-density inner-city development.

All 26 remaining open-plan studios which see lower levels of light are single-aspect rooms which face either south-west towards Block J or south towards 1 and 2 Merchant Square, and have at least one of their windows located behind a recessed balcony, the other window serving the room has a spandrel



panel which reduces the area of glazing but serves a crucial role in addressing the energy and overheating constraints. These 26 open-plan studios therefore see lower daylight availability due to the obstruction cause by their balconies, in conjunction with taller massing opposite. Daylight within these rooms has been optimised through reduced room depths, placing the bedroom zone behind the balconies to prioritise daylight within the living room zone, maximised fenestration and providing second windows flush with the facade. However, reduced daylight performance within rooms behind/beneath balconies is a typical trade-off in amenity common of most modern residential buildings where balconies provided a valued form of external amenity.

Overall, the 2022 amended proposed development is delivering well daylight bedrooms with 81% (851 out of 1,050) meeting or exceeding the levels suggested by BRE. 46 of the remaining 199 bedrooms fall marginally below the bedroom recommendation of 100lux within half their area for half the daylight hours, with 40% to 49% of their area meeting the recommended level and are considered to offer good daylight levels given the inner-city location.

The remaining 153 bedrooms are located on the lower floors where the expectation for daylight is generally less within an inner-city urban location. 63 of these face another block of the 2022 amended proposed development and 59 face north towards West End Gate Blocks A & B or 14-17 Paddington Green Block H. The remaining 33 are located behind a recessed balcony, which limits daylight availability to the rooms behind. In all instances, priority has been given to maximising daylight provision within the main living spaces of these dwellings where occupants would spend more of their time during daylight hours and good daylight is most appreciated, resulting in predominantly bedrooms being within the more obstructed areas of the 2022 amended proposed development.

Overall, we conclude that the 2022 amended proposed development makes efficient use of the available daylight and performs well for a large-scale residential development seeking to make efficient use of land for new homes. Owing to overheating and energy constraints, spandrel panels have been proposed that reduce daylight ingress. Additionally, balconies have been provided for all dwellings which offer a valued form of external amenity however,

reduced daylight performance within rooms behind/beneath balconies is a typical trade-off in amenity common of most modern residential buildings. Using a flexible approach to the application of guidance relating to daylight, we therefore consider that future occupants will be provided with adequate daylight, that is appropriate to the emerging context all whilst balancing the need to deliver a viable scheme that makes efficient use of land and balances other policy objectives.

## 5.4 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 22-175 have shown that of the 1,606 proposed habitable rooms, 666 (42%) see levels of sun exposure on 21<sup>st</sup> March that either meet or exceed the BRE recommendation of 1.5hrs.

Of the 556 living spaces proposed (including all LKDs, living rooms and studios), 282 (51%) would see at least 1.5 hours of sunlight on the 21<sup>st</sup> March. A further 38 would meet the criteria on one of the alternative dates proposed by EN17037, 1<sup>st</sup> February or 25<sup>th</sup> February, this is predominantly due to the balcony above intercepting the higher-angle sunlight on 21<sup>st</sup> March. As such, these additional 38 living spaces are considered to receive acceptable sunlight levels.

Of the 236 living spaces falling below the recommended level of sunlight, 10 are located within a dwelling where at least one of the bedrooms meets the recommended level and therefore the dwelling overall meets the BRE recommendation. As such, it is considered that 330 (59%) out of 556 dwellings receive acceptable sunlight levels overall.

For the living rooms of the remaining 226 dwellings:

- 38 are only marginally below the BRE

recommendation of 1.5 hours with 1.25 hours or more and so are considered acceptably sunlight for the inner-city urban location;

- A further 54 see in excess of 1 hour of sunlight on 21<sup>st</sup> March so are considered acceptable given the inner-city urban location;
- 68 are either east, west or south-west facing, within areas that face onto other facades of the 2022 amended proposed development. Lower levels of sunlight are to be expected within isolated areas such as this; and
- 68 have a predominantly northerly aspect and so do not have a reasonable expectation of sunlight. The design has sought to minimise northerly aspect living spaces as much as practicable and this makes up a very small proportion of the overall number of living spaces within the 2022 amended proposed development.

Overall, the 2022 amended proposed development makes the most of the available sunlight and performs well for a large-scale inner-city residential development. Lower levels of sunlight are being seen in isolated areas, facing other development façades, or are the few living rooms with a predominately northerly aspect (greater than 90° of due south). Such results are common of most large-scale inner-city residential development, particularly where the site is seeking to make efficient use of land for new homes. Using a flexible approach to the application of guidance relating to sunlight, we therefore consider that future occupants will be provided with adequate sunlight, that is appropriate to the emerging context all whilst balancing the need to deliver a viable scheme that makes efficient use of land and balances other policy objectives.

## 5.5 DAYLIGHT & SUNLIGHT COMPARISON TO THE 2021 SCHEME

The 2021 Scheme was assessed in accordance with the now superseded BRE Guidelines 2011. For ease of comparison, the 2021 Scheme has been re-assessed using the methodologies of the newly published BRE Guidelines 2022 and the results provided within pages 182-301. The results are summarised below for comparative purposes.

For daylight, 1,059 (68%) of the 1,557 habitable rooms within the 2021 Scheme see levels of sDA that either meet or exceed the BRE recommendation

for their room use. Of the 498 rooms that fall short of the sDA recommendations, 207 are open-plan living/kitchen/dining rooms (LKDs), 16 are living rooms (with separated kitchens), 21 are studios and 254 are bedrooms. The 2022 amended proposed development has also sought to improve the quantum of light within the rooms falling short of guidance, this is evidenced by just 7% of the rooms within the 2022 amended proposed development seeing sDA levels less than 10%, compared to 16% for the 2021 Scheme.

For sunlight, of the 1,557 proposed habitable rooms 751 (48%) see levels of sun exposure on 21<sup>st</sup> March that either meet or exceed the BRE recommendation of 1.5hrs. Of the 556 living spaces proposed (including all LKDs, living rooms and studios), 336 (60%) would see at least 1.5 hours of sunlight on the 21<sup>st</sup> March.

## 5.6 CONCLUSIONS ON OVERSHADOWING

Sun Hours on Ground assessments have been undertaken for the public realm provided within the Site. The results from this assessment is shown on pages 176-179 of this report.

Generous street-level public realm is proposed, with various interconnected spaces provided throughout the site, which offers future residents and visitors different sunlit spaces to enjoy at different times of the day and the year. The 2022 amended proposed development results in an increase in public realm from 3,553 sqm to 4,755 sqm, which includes the part pedestrianisation of Newcastle Place, and removal of the podium between block J and K.

It should also be noted the site is directly adjacent to Paddington Green, a large, well sunlit area of public open space, as well being in close proximity to a number of other high-quality areas of public open space, such as those within Merchant Square and Paddington Basin, and St Mary's Churchyard.

The technical assessment have shown that 32% of the proposed public realm meets the BRE criteria of two or more hours of direct sunlight within half of its area on 21<sup>st</sup> March. Whilst this falls short of the BRE recommendation, the area would meet the BRE recommendation of 50% just eight days later on 29<sup>th</sup> March. As such, the space can still be considered to offer adequate sunlight access



Fig. 05: Overshadowing - Sun Hours on Ground Test - 21<sup>st</sup> March

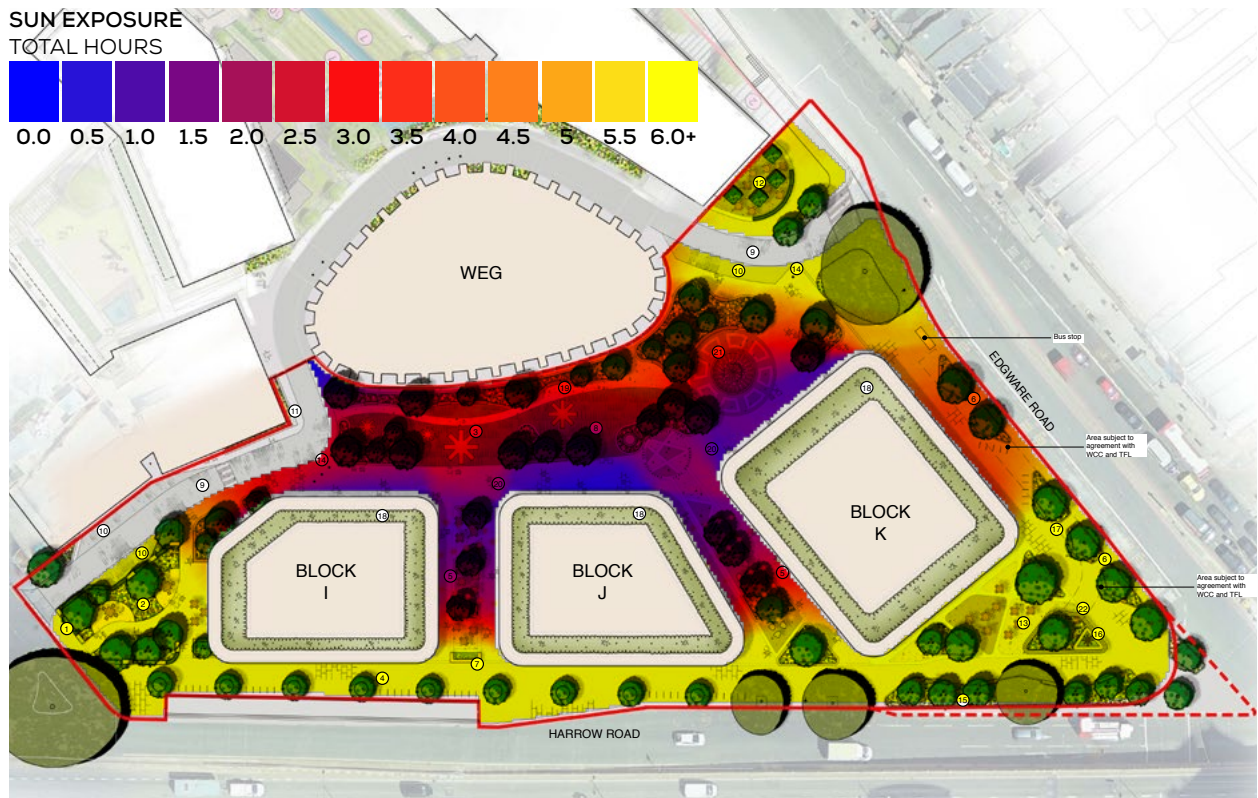


Fig. 06: Overshadowing - Sun Exposure - 21<sup>st</sup> June



throughout the year, which is considered very good for street-level open space in the inner-city, built area such as this site.

Additional sun exposure analysis has been provided on pages 178 and 179 which should the cumulative number of hours reaching ground on the 21<sup>st</sup> of each of the spring and summer months. These sun exposure images show that the majority of shading within the southern, eastern and western portions of the site would be gone by 21<sup>st</sup> April, as the sun has moved higher in the sky and passes over buildings on the southern side of Harrow Road.

The sun exposure images show that these areas will mostly see in excess of six hours of direct sunlight on ground on sunny days from April through to August, the times when these spaces are most likely to be in use for extended periods.

The Newcastle Place portion of the public realm is nestled between PGPS and WEG, by virtue of its location to the north of taller buildings, it is more shaded on 21<sup>st</sup> March, but sunlight levels increase through the spring month, where it would enjoy circa three hours of direct sunlight in the majority of its area on the summer solstice, when this space is most likely to be in use for extended periods.

Therefore, whilst this area falls slightly below the BRE recommended level, it would be well sunlit during the times of the year when well sunlit public realm is most appreciated and users of the site would have access to a variety of conditions at different time of the day and year within the site. This complements the other well sunlit areas of public open space within the immediate area.

We therefore conclude that the public realm provided within the site has been well optimised for sunlit external amenity. The 2022 amended proposed development provides future occupants and visitors with good access to a variety of sunlit open spaces to enjoy throughout the year in conjunction with the wider sunlit amenity offering.

## 5.7 OVERSHADOWING COMPARISON TO THE 2021 SCHEME

The 2021 Scheme has been re-assessed for overshadowing include the now pedestrianised areas of Newcastle Place and the pavement area surrounding the site, the results are provided within pages 302-303. The results are summarised below for comparative purposes.

The technical assessment shows that for the 2021 scheme, 29% of the street-level public realm saw two or more hours of direct sunlight on 21<sup>st</sup> March. The sun exposure images provided show Newcastle Place shaded throughout the day on 21<sup>st</sup> March, with a pocket of sunlight in the south-eastern corner of the site. On 21<sup>st</sup> June, Newcastle Place would see 1.5-2 hrs of sunlight within approximately half its area and the southern and eastern edges of the site mostly see in excess of 6 hours of sunlight.

The 2022 amended proposed development provides a much larger quantum of street level public realm, and sees an improvement within the proportion of public realm seeing two or more hours of direct sunlight with 32%, compared to 29% for the 2021 Scheme.

## 5.8 OVERALL CONCLUSIONS

Paddington Green Police Station is an underutilised site located within the Westminster Central Activities Zone (CAZ) and is within a strategic development zone, the Church Street/Edgware Road Housing Renewal Area. It enjoys the highest level of public transport accessibility possible and is bounded by multiple newly implemented and consented high-density developments which form the emerging context for this site.

Making the best use of land has been a crucial in developing the 2022 amended proposed development, in particular the relationship between the various elements. This is exemplified by the massing dimensions and the distances between blocks in the emerging context, such as WEG, 14-17 PG and Merchant Square. The design has sought to ensure sufficient daylight and sunlight amenity is achieved and that the levels achieved are appropriate the emerging context.

For this reason, the rooms falling short of the national targets within the 2022 amended proposed development achieve levels of daylight and sunlight which are commensurate to the emerging context and are equivalent to the levels achieved within the recently consented neighbouring developments. The 2022 amended proposed development is located in central London, in an area with the highest level of public transport accessibility as well as within a strategic development area and, according to national policy, best use of land should be sought when delivering much needed residential accommodation.

The 2022 amended proposed development has been designed to deliver accommodation which has been well optimised for daylight and sunlight to this inner-city site, whilst delivering generous accommodation which strikes the optimal balance between fabric efficiency, overheating and noise requirements, as well as its amenity offering, all whilst delivering a viable scheme that makes efficient use of land for new homes. The further optimisation undertaken for the 2022 amended proposed development has seen an improvement in both the overall compliance for daylight and the individual levels of light achieved within those rooms falling below the recommended levels.

It can therefore be concluded that the 2022 amended proposed development will offer its future occupants appropriate levels of amenity, including daylight and sunlight, which meet the expectations of an inner-city site in central London. The levels of light achieved are considered appropriate for the emerging context, where the site is seeking to make efficient use of land. Therefore, the 2022 amended proposed development is considered to be in accordance with the NPPF, London Plan policy D6 and WCC policy 12, all whilst balancing the need to deliver a viable scheme that makes efficient use of land and balances other policy objectives.

## 6 SITE OVERVIEW

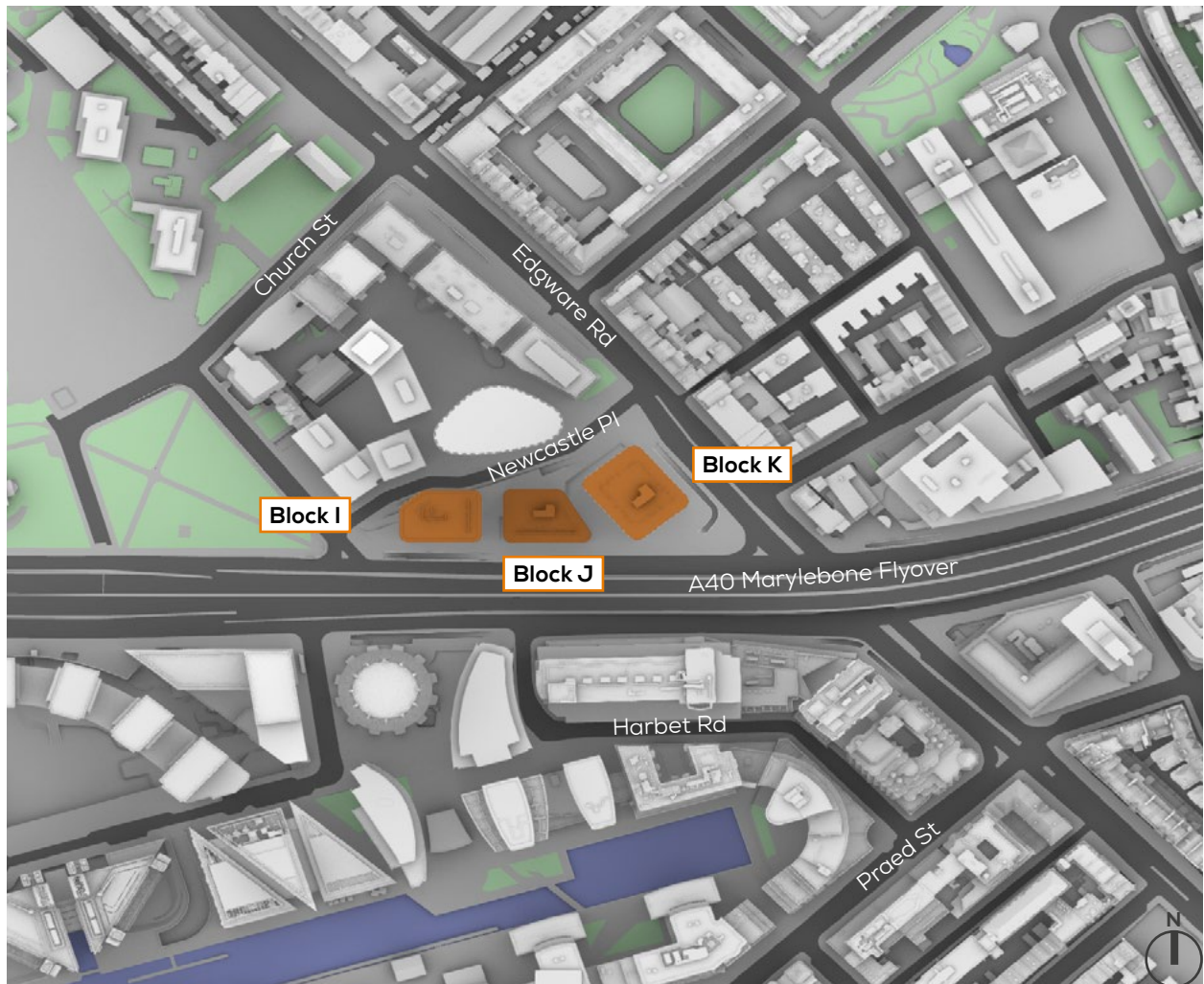


Fig. 07: Top view

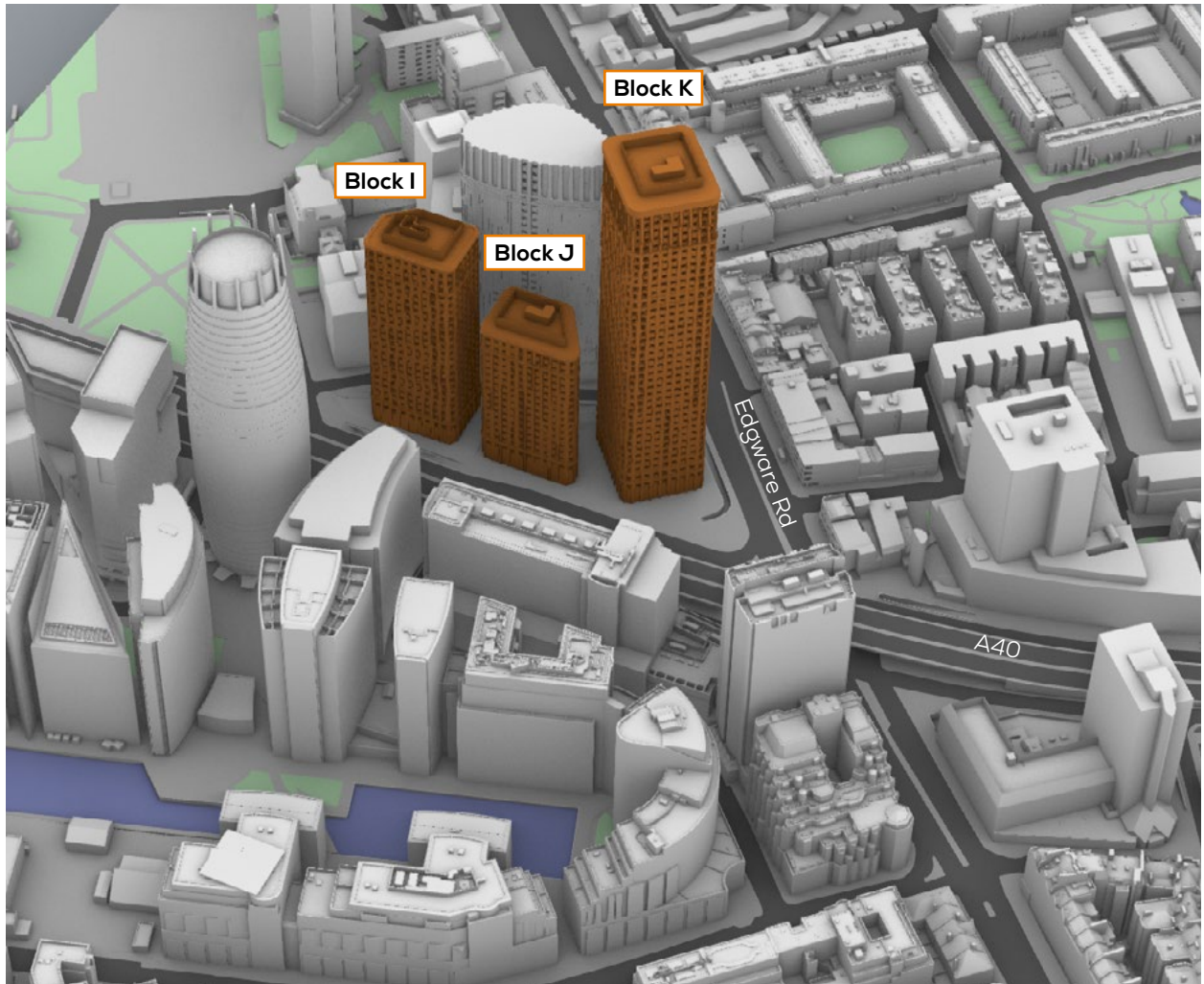


Fig. 08: Perspective view

# 7 INTERNAL DAYLIGHT AND SUNLIGHT ASSESSMENTS

(2022 Amended Proposed Development)

Block I–Level 01

ROOM REF.	ROOM USE	DAYLIGHT							SUNLIGHT		
		EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylit hours) Weather File: GBR_Gatwick				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
BLOCK I - LEVEL 01											
1	BEDROOM	100	17.6			1693			00:00	00:02	01:14
2	L/K/D	200	100.0		100.0	3636	3388	3146	00:00	00:32	02:17
3	L/K/D	200	78.9		98.5	3362	3021	2684	00:13	01:00	04:52
4	BEDROOM	100	74.7			2689			00:12	00:21	03:02
5	L/K/D	200	16.3		21.6	1802	1286	838	00:25	00:21	03:12
6	BEDROOM	100	93.7			2857			00:22	00:22	03:13
7	BEDROOM	100	77.9			2664			00:24	00:24	03:15
8	STUDIO	200	14.5	31.7	19.7	1925	1449	1096	00:31	00:28	03:20
9	L/K/D	200	12.3		25.9	2196	1687	1357	00:00	00:01	02:08
10	BEDROOM	100	10.2			1058			00:00	00:00	01:15
11	BEDROOM	100	6.6			826			00:00	00:00	00:46
12	LIVING ROOM	150	17.6			1751	1001		00:00	00:07	00:23
13	BEDROOM	100	3.0			374			00:00	00:00	00:00
14	BEDROOM	100	3.2			328			00:00	00:00	00:00
15	BEDROOM	100	2.9			266			00:00	00:00	00:00
16	BEDROOM	100	4.0			293			00:00	00:00	00:00
17	BEDROOM	100	3.2			729			00:00	00:00	00:00
18	L/K/D	200	0.0		0.7	1154	752	493	00:00	00:00	01:04

Table 01: Assessment Data



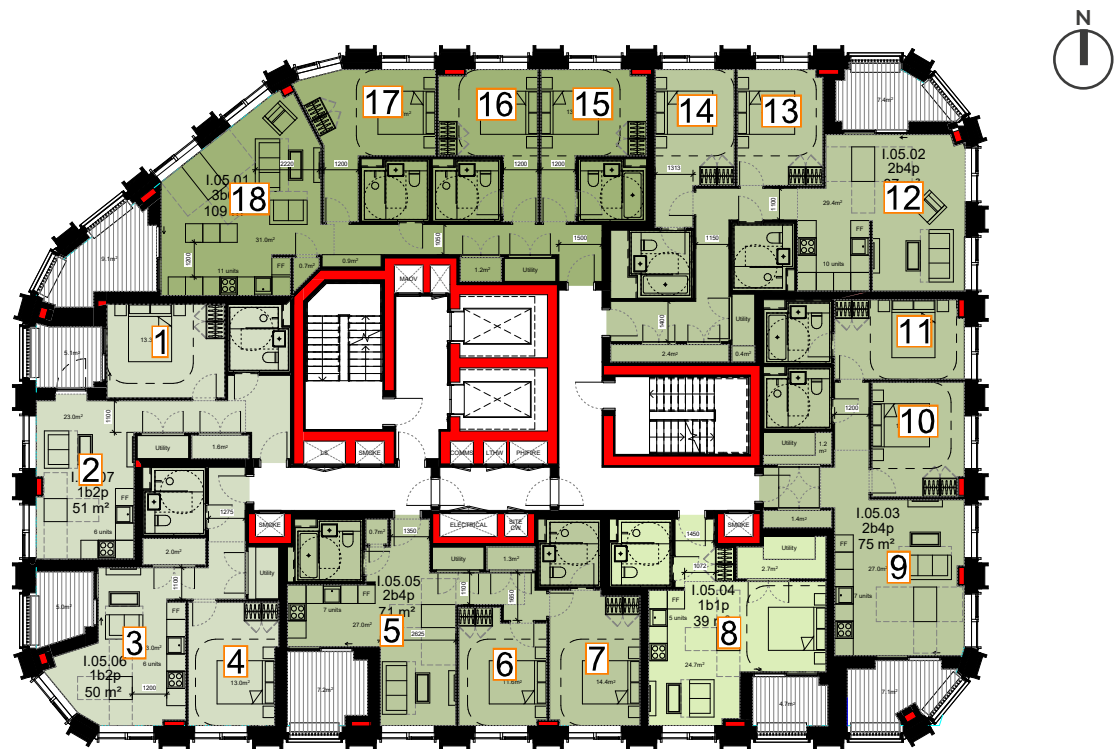
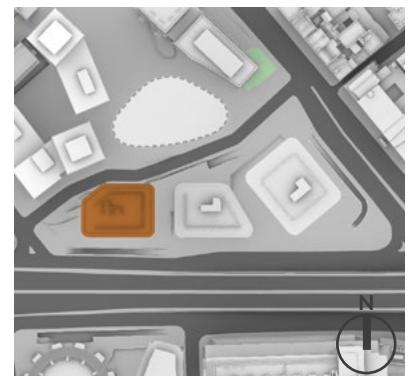


Fig. 09: Floor Plan



Block I–Level 02

		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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
BLOCK I - LEVEL 02											
19	BEDROOM	100	18.1			1729			00:00	00:02	01:18
20	L/K/D	200	100.0		100.0	3620	3343	3108	00:00	00:32	02:35
21	L/K/D	200	75.7		97.9	3324	2971	2635	00:13	01:14	05:15
22	BEDROOM	100	70.6			2699			00:12	00:34	03:26
23	L/K/D	200	17.1		23.0	1764	1245	780	00:19	00:30	03:39
24	BEDROOM	100	91.6			2838			00:21	00:32	03:43
25	BEDROOM	100	71.0			2628			00:24	00:33	03:45
26	STUDIO	200	14.7	31.9	20.0	1915	1432	1079	00:34	00:37	03:49
27	L/K/D	200	15.4		30.6	2275	1757	1417	00:05	00:01	02:16
28	BEDROOM	100	12.9			1216			00:00	00:08	01:15
29	BEDROOM	100	9.3			1001			00:00	00:41	00:46
30	LIVING ROOM	150	18.0			1898	1189		00:00	00:26	00:23
31	BEDROOM	100	6.0			400			00:00	00:00	00:00
32	BEDROOM	100	8.4			363			00:00	00:00	00:00
33	BEDROOM	100	5.8			316			00:00	00:00	00:00
34	BEDROOM	100	9.9			332			00:00	00:00	00:00
35	BEDROOM	100	9.7			880			00:00	00:00	00:00
36	L/K/D	200	1.5		3.8	1258	817	550	00:00	00:00	01:05

Table 02: Assessment Data

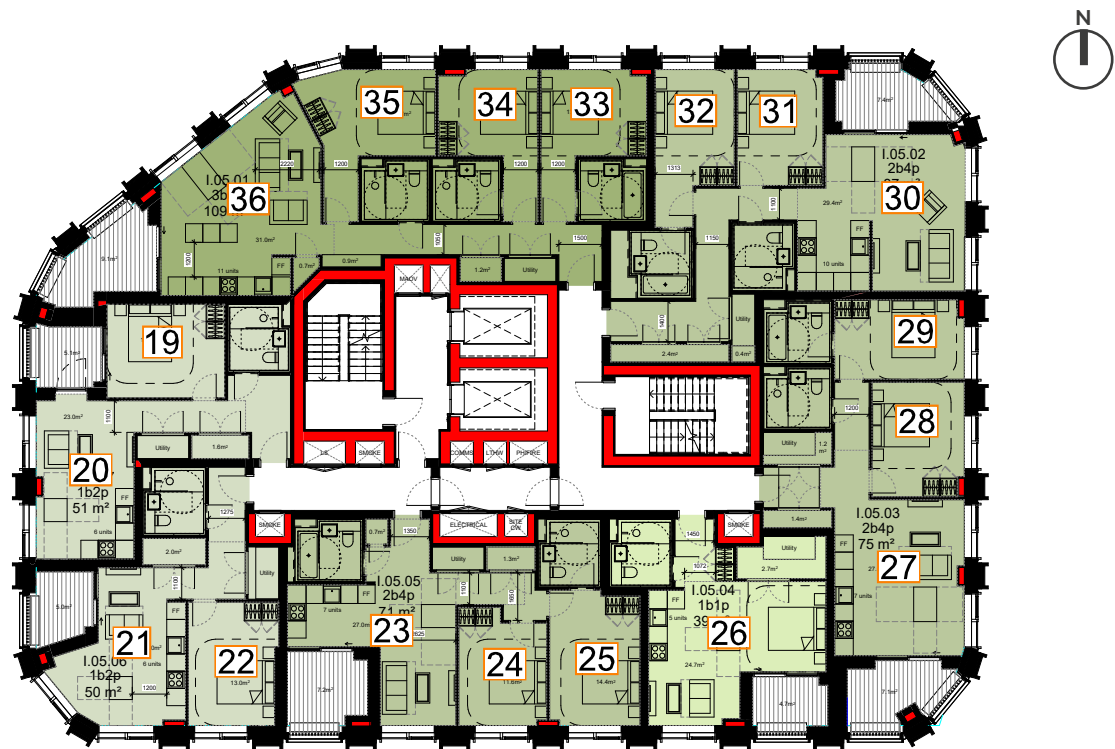
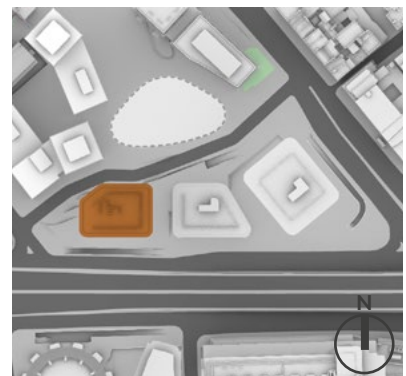


Fig. 10: Floor Plan





## Block I–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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 03									
37	BEDROOM	100	21.9			1821			00:00	00:02	01:18
38	L/K/D	200	100.0		100.0	3638	3391	3153	00:00	00:32	03:31
39	L/K/D	200	79.2		98.5	3361	3025	2679	00:15	01:18	05:57
40	BEDROOM	100	74.7			2751			00:12	00:47	04:08
41	L/K/D	200	17.1		23.3	1804	1271	810	00:19	00:47	04:19
42	BEDROOM	100	93.2			2894			00:21	00:48	04:25
43	BEDROOM	100	75.1			2726			00:24	00:49	04:28
44	STUDIO	200	16.0	34.5	21.6	1955	1516	1133	00:34	00:50	04:33
45	L/K/D	200	19.0		35.0	2389	1867	1500	00:05	00:56	02:25
46	BEDROOM	100	15.6			1338			00:00	01:06	01:15
47	BEDROOM	100	12.6			1102			00:00	00:51	00:46
48	LIVING ROOM	150	19.0			2033	1387		00:00	00:26	00:23
49	BEDROOM	100	7.2			510			00:00	00:00	00:00
50	BEDROOM	100	12.3			511			00:00	00:00	00:00
51	BEDROOM	100	9.4			555			00:00	00:00	00:00
52	BEDROOM	100	11.9			554			00:00	00:00	00:00
53	BEDROOM	100	14.5			1014			00:00	00:00	00:00
54	L/K/D	200	3.8		7.6	1448	949	667	00:00	00:00	01:05

Table 03: Assessment Data

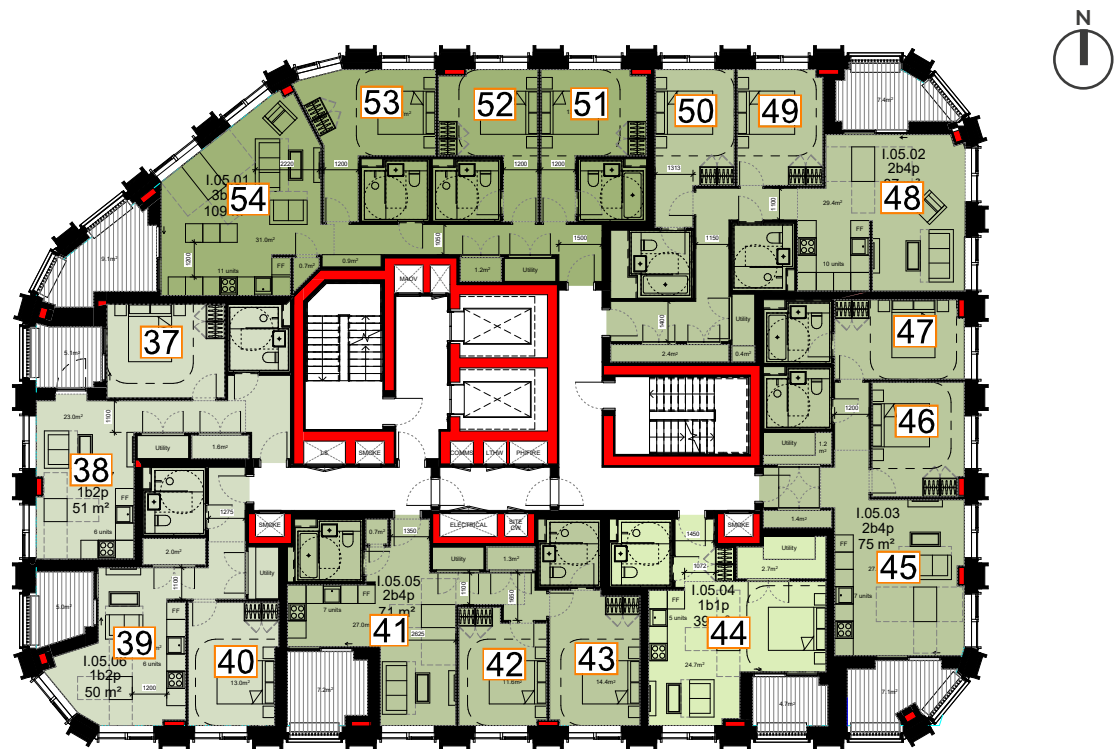
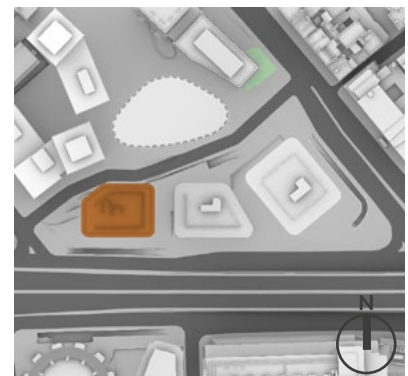


Fig. 11: Floor Plan



## Block I–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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
BLOCK I - LEVEL 04											
55	BEDROOM	100	26.7			1953			00:00	00:02	01:18
56	L/K/D	200	100.0		100.0	3686	3454	3230	00:00	00:32	03:53
57	L/K/D	200	86.4		99.1	3385	3049	2725	00:17	01:35	06:31
58	BEDROOM	100	78.4			2814			00:14	01:06	04:39
59	L/K/D	200	18.8		25.0	1841	1316	933	00:19	01:08	04:50
60	BEDROOM	100	96.3			2992			00:21	01:13	04:54
61	BEDROOM	100	79.3			2768			00:24	01:20	04:58
62	STUDIO	200	17.6	38.9	23.3	2034	1584	1172	00:38	01:26	05:00
63	L/K/D	200	22.5		40.1	2516	1999	1619	00:05	01:42	02:33
64	BEDROOM	100	18.8			1446			00:00	01:23	01:15
65	BEDROOM	100	15.9			1285			00:00	00:51	00:46
66	LIVING ROOM	150	22.0			2151	1529		00:00	00:26	00:23
67	BEDROOM	100	10.8			714			00:00	00:00	00:00
68	BEDROOM	100	15.6			708			00:00	00:00	00:00
69	BEDROOM	100	13.5			716			00:00	00:00	00:00
70	BEDROOM	100	16.6			714			00:00	00:00	00:00
71	BEDROOM	100	18.3			1247			00:00	00:00	00:00
72	L/K/D	200	8.3		12.3	1819	1208	923	00:00	00:00	01:05

Table 04: Assessment Data

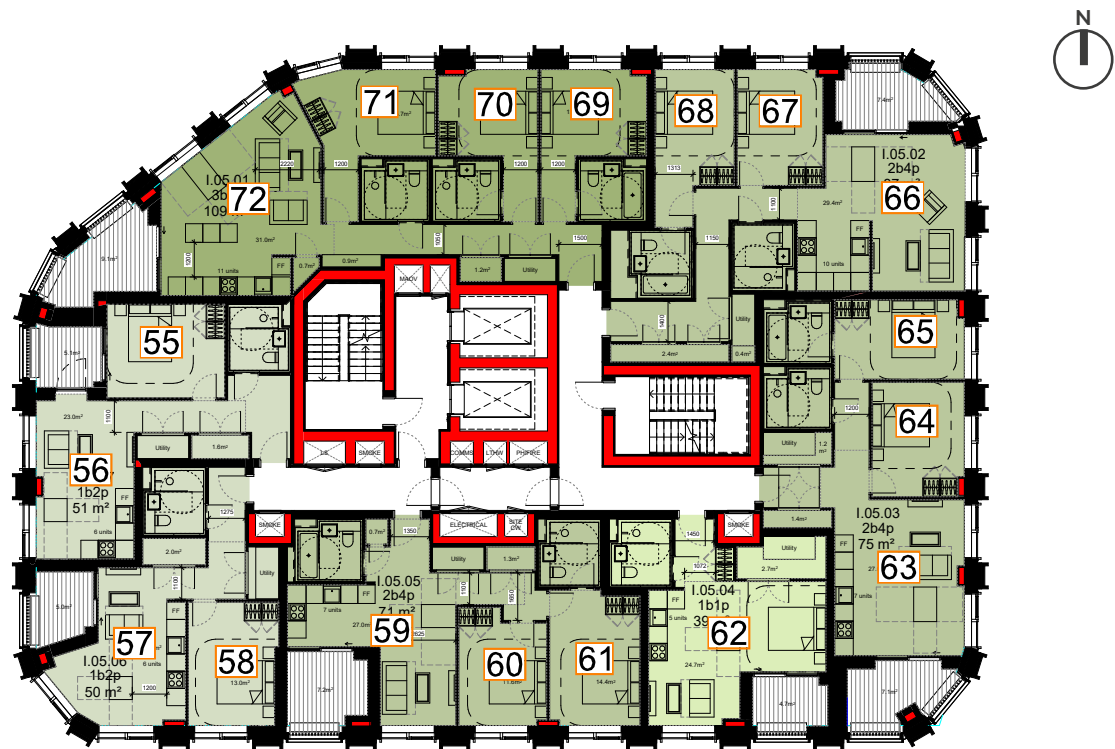
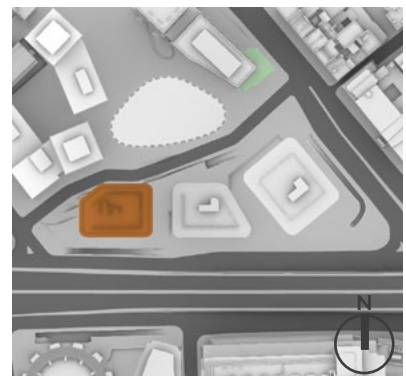


Fig. 12: Floor Plan



## Block I–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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
BLOCK I - LEVEL 05											
73	BEDROOM	100	37.6			2098			00:00	00:02	01:18
74	L/K/D	200	100.0		100.0	3725	3509	3283	00:00	00:44	04:17
75	L/K/D	200	92.6		99.4	3425	3096	2798	00:24	02:26	07:21
76	BEDROOM	100	83.0			2888			00:19	02:00	04:52
77	L/K/D	200	20.2		25.8	1892	1351	993	00:22	02:11	05:00
78	BEDROOM	100	99.0			3042			00:23	02:17	05:03
79	BEDROOM	100	86.2			2845			00:26	02:23	05:07
80	STUDIO	200	19.3	44.3	24.8	2109	1664	1252	00:40	02:30	05:10
81	L/K/D	200	28.1		45.3	2617	2126	1740	00:04	01:58	02:42
82	BEDROOM	100	22.6			1569			00:00	01:23	01:15
83	BEDROOM	100	16.6			1362			00:00	00:51	00:46
84	LIVING ROOM	150	24.1			2254	1628		00:04	00:26	00:23
85	BEDROOM	100	13.2			906			00:00	00:00	00:00
86	BEDROOM	100	20.8			984			00:00	00:00	00:00
87	BEDROOM	100	20.5			951			00:00	00:00	00:00
88	BEDROOM	100	21.9			979			00:00	00:00	00:00
89	BEDROOM	100	28.0			1566			00:00	00:00	00:00
90	L/K/D	200	14.6		24.8	2322	1602	1209	00:00	00:00	01:05

Table 05: Assessment Data

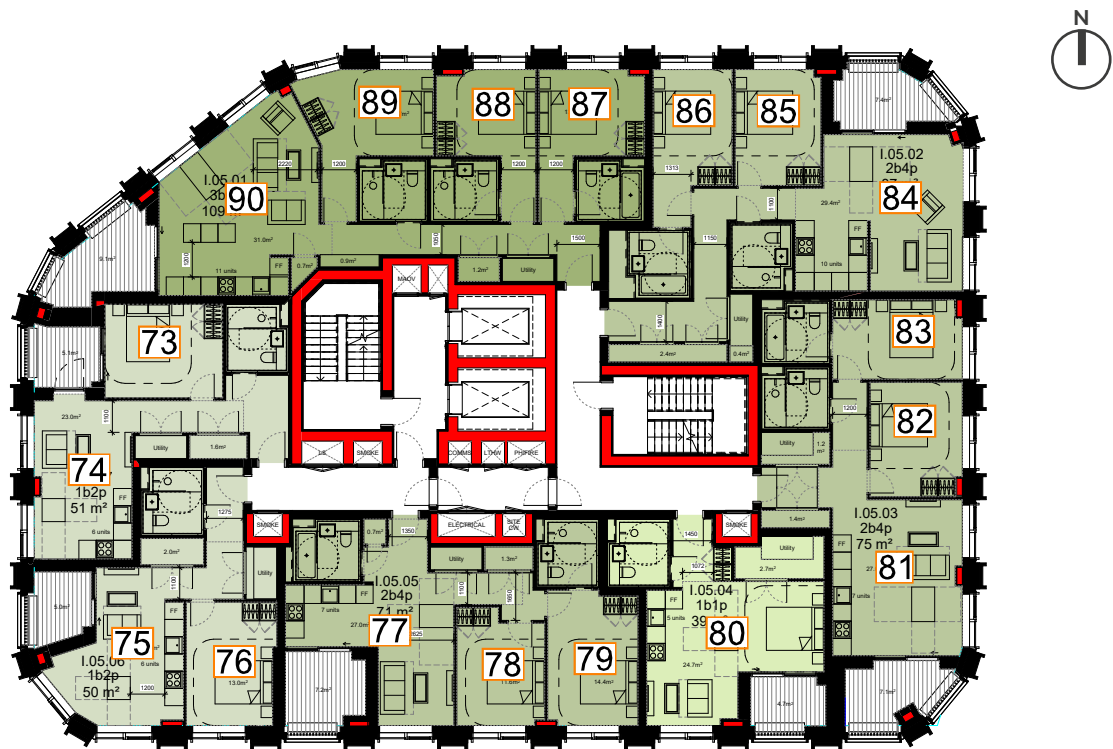
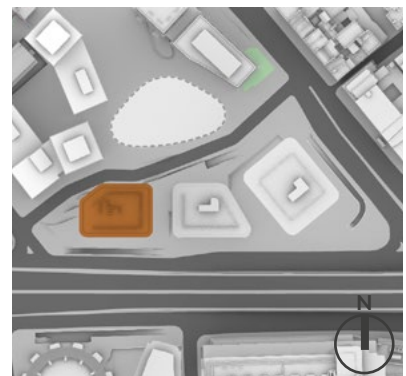


Fig. 13: Floor Plan



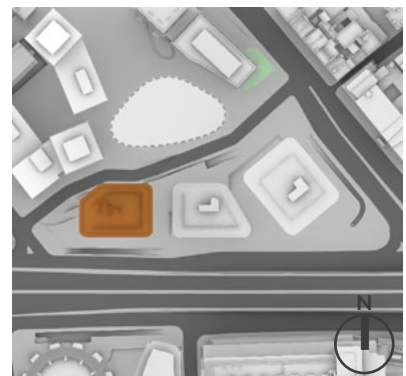
## Block I–Level 06

		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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 06									
91	BEDROOM	100	54.3			2231			00:00	00:02	01:18
92	L/K/D	200	100.0		100.0	3755	3565	3338	00:00	00:57	04:32
93	L/K/D	200	95.3		100.0	3464	3139	2861	00:41	03:17	07:49
94	BEDROOM	100	89.7			2966			00:25	02:51	05:31
95	L/K/D	200	21.9		27.8	1950	1414	1078	00:28	03:03	05:32
96	BEDROOM	100	99.5			3091			00:30	03:08	05:32
97	BEDROOM	100	91.2			2954			00:37	03:15	05:33
98	STUDIO	200	20.6	49.8	26.9	2204	1736	1347	00:50	03:22	05:33
99	L/K/D	200	33.6		50.8	2721	2222	1858	00:09	02:08	02:50
100	BEDROOM	100	25.8			1629			00:03	01:23	01:15
101	BEDROOM	100	21.2			1486			00:19	00:51	00:46
102	LIVING ROOM	150	28.1			2350	1731		00:29	00:26	00:23
103	BEDROOM	100	17.4			1098			00:00	00:00	00:00
104	BEDROOM	100	26.6			1293			00:00	00:00	00:00
105	BEDROOM	100	28.7			1316			00:00	00:00	00:00
106	BEDROOM	100	30.5			1342			00:00	00:00	00:00
107	BEDROOM	100	51.1			2245			00:00	00:00	00:00
108	L/K/D	200	28.1		47.0	2826	2159	1587	00:00	00:00	01:05

Table 06: Assessment Data



Fig. 14: Floor Plan





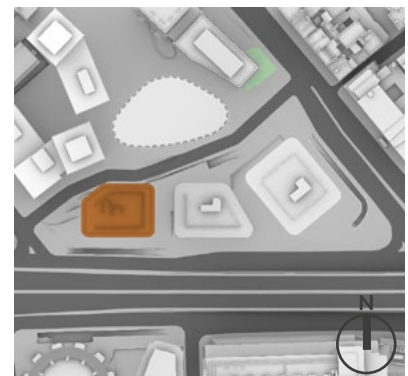
Block I–Level 07

ROOM REF.	ROOM USE	DAYLIGHT							SUNLIGHT		
		EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylit hours) Weather File: GBR_Gatwick				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
BLOCK I - LEVEL 07											
109	BEDROOM	100	77.1			2362			00:00	00:02	01:18
110	L/K/D	200	100.0		100.0	3782	3592	3382	00:00	01:06	04:32
111	L/K/D	200	96.1		100.0	3497	3186	2919	00:56	04:24	08:09
112	BEDROOM	100	95.4			3018			00:40	03:51	05:42
113	L/K/D	200	22.8		29.5	2017	1499	1124	00:43	03:56	05:42
114	BEDROOM	100	100.0			3167			00:49	03:57	05:44
115	BEDROOM	100	94.5			3046			00:54	04:01	05:44
116	STUDIO	200	21.8	55.3	29.6	2283	1808	1466	01:09	04:05	05:45
117	L/K/D	200	36.8		58.9	2816	2318	1960	01:06	02:15	02:59
118	BEDROOM	100	30.1			1694			00:45	01:23	01:15
119	BEDROOM	100	23.8			1551			00:54	00:51	00:46
120	LIVING ROOM	150	31.1			2442	1820		00:29	00:26	00:23
121	BEDROOM	100	22.2			1342			00:00	00:00	00:00
122	BEDROOM	100	33.8			1555			00:00	00:00	00:00
123	BEDROOM	100	35.1			1569			00:00	00:00	00:00
124	BEDROOM	100	39.1			1718			00:00	00:00	00:00
125	BEDROOM	100	82.3			2968			00:00	00:00	00:00
126	L/K/D	200	51.8		77.8	3228	2730	2220	00:00	00:00	01:11

Table 07: Assessment Data



Fig. 15: Floor Plan



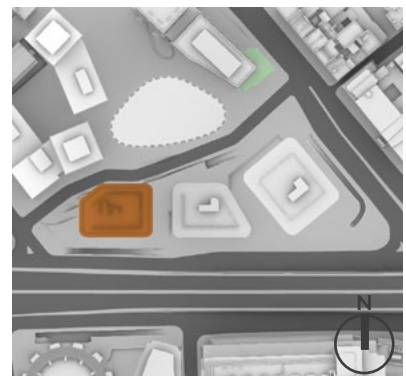
## Block I–Level 08

		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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 08									
127	BEDROOM	100	90.5			2450		3413	00:00	00:02	01:18
128	L/K/D	200	100.0		100.0	3807	3608		00:00	01:16	04:32
129	L/K/D	200	97.3		100.0	3548	3241	2989	01:09	05:10	08:18
130	BEDROOM	100	99.5			3072			01:08	04:37	05:47
131	L/K/D	200	24.4		30.3	2088	1601	1194	01:21	04:45	05:47
132	BEDROOM	100	100.0			3223			01:29	04:47	05:48
133	BEDROOM	100	98.2			3095			01:37	04:50	05:49
134	STUDIO	200	24.2	62.4	33.8	2361	1890	1573	01:57	04:53	05:48
135	L/K/D	200	41.9		64.0	2888	2412	2038	01:39	02:15	02:59
136	BEDROOM	100	32.3			1793			01:14	01:23	01:15
137	BEDROOM	100	26.5			1650			00:57	00:51	00:46
138	LIVING ROOM	150	34.4			2535	1894		00:29	00:26	00:23
139	BEDROOM	100	25.7			1530			00:00	00:00	00:00
140	BEDROOM	100	40.3			1796			00:00	00:00	00:00
141	BEDROOM	100	40.4			1824			00:00	00:00	00:00
142	BEDROOM	100	47.0			2128			00:00	00:00	00:00
143	BEDROOM	100	100.0			3262			00:00	00:00	00:00
144	L/K/D	200	77.3		98.0	3435	3086	2684	00:00	00:00	01:11

Table 08: Assessment Data



Fig. 16: Floor Plan



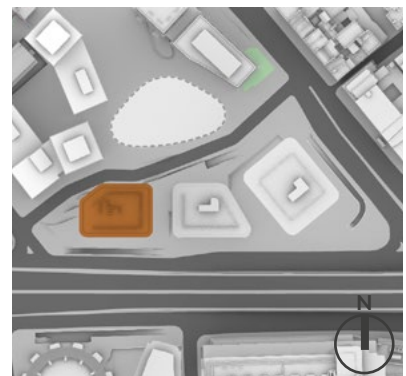
## Block I–Level 09

		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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 09									
145	BEDROOM	100	93.3			2501		3431	00:00	00:02	01:18
146	L/K/D	200	100.0		100.0	3812	3616		00:00	01:51	04:32
147	L/K/D	200	98.5		100.0	3574	3278	3036	01:48	05:21	08:19
148	BEDROOM	100	100.0			3103			01:49	04:49	05:47
149	L/K/D	200	25.8		32.3	2163	1712	1287	02:05	04:56	05:48
150	BEDROOM	100	100.0			3303			02:14	04:59	05:49
151	BEDROOM	100	100.0			3153			02:21	05:02	05:49
152	STUDIO	200	26.1	74.2	38.7	2478	1959	1710	02:40	05:04	05:50
153	L/K/D	200	46.6		72.5	2964	2468	2138	02:00	02:16	02:59
154	BEDROOM	100	36.6			1912			01:30	01:23	01:15
155	BEDROOM	100	29.8			1753			00:57	00:51	00:46
156	LIVING ROOM	150	40.0			2601	2001		00:29	00:26	00:23
157	BEDROOM	100	31.1			1666			00:00	00:00	00:00
158	BEDROOM	100	45.5			2077			00:00	00:00	00:00
159	BEDROOM	100	46.2			2116			00:00	00:00	00:00
160	BEDROOM	100	56.3			2470			00:00	00:00	00:00
161	BEDROOM	100	100.0			3412			00:00	00:00	00:00
162	L/K/D	200	95.5		100.0	3535	3209	2893	00:00	00:00	01:11

Table 09: Assessment Data



Fig. 17: Floor Plan





## Block I–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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 10									
163	BEDROOM	100	94.3			2545			00:00	00:02	01:18
164	L/K/D	200	100.0		100.0	3818	3624	3452	00:05	01:55	04:32
165	L/K/D	200	98.5		100.0	3596	3301	3085	02:40	05:34	08:21
166	BEDROOM	100	100.0			3166			02:39	05:02	05:49
167	L/K/D	200	27.0		34.0	2270	1811	1387	03:05	05:10	05:49
168	BEDROOM	100	100.0			3370			03:13	05:12	05:50
169	BEDROOM	100	100.0			3217			03:16	05:15	05:50
170	STUDIO	200	29.0	86.1	43.1	2599	2111	1798	03:59	05:17	05:51
171	L/K/D	200	51.6		80.0	3030	2552	2222	02:13	02:18	02:59
172	BEDROOM	100	41.4			2012			01:31	01:23	01:15
173	BEDROOM	100	33.1			1821			00:57	00:51	00:46
174	LIVING ROOM	150	42.2			2659	2074		00:29	00:26	00:23
175	BEDROOM	100	37.1			1846			00:00	00:00	00:00
176	BEDROOM	100	51.9			2257			00:00	00:00	00:00
177	BEDROOM	100	53.2			2311			00:00	00:00	00:00
178	BEDROOM	100	68.9			2678			00:00	00:00	00:00
179	BEDROOM	100	100.0			3499			00:00	00:00	00:00
180	L/K/D	200	100.0		100.0	3595	3276	3008	00:00	00:00	01:11

Table 10: Assessment Data

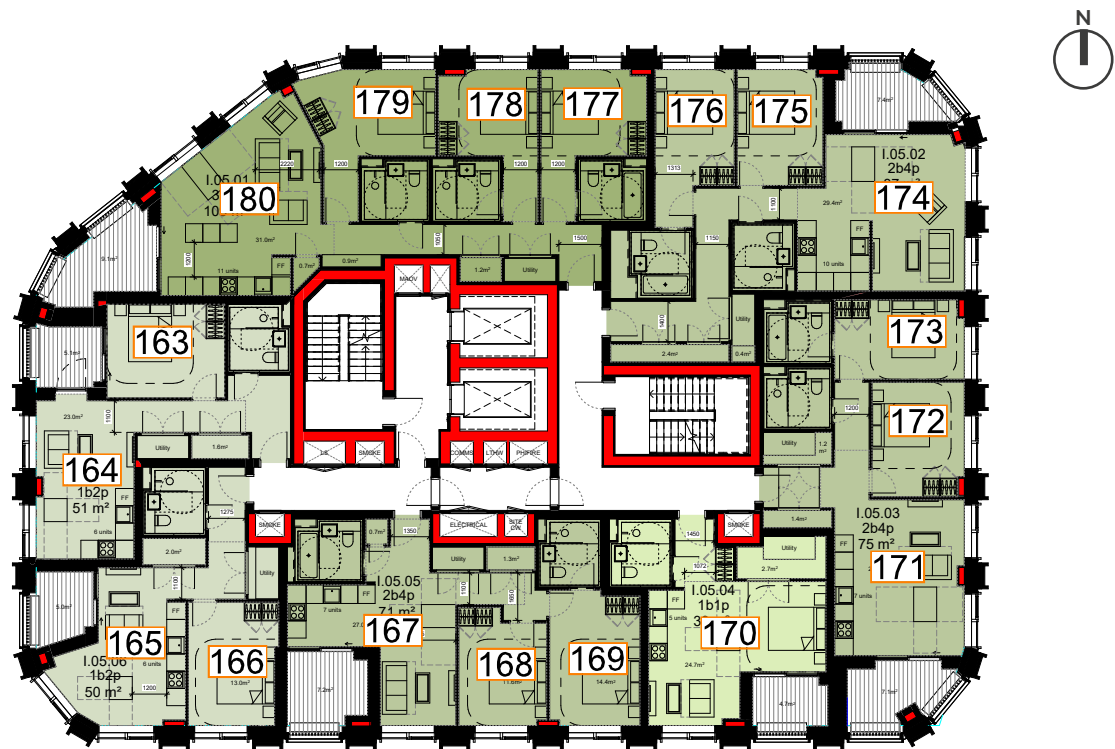
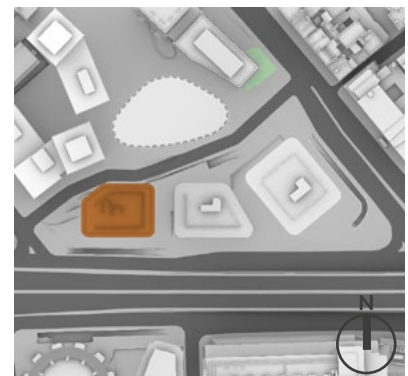


Fig. 18: Floor Plan



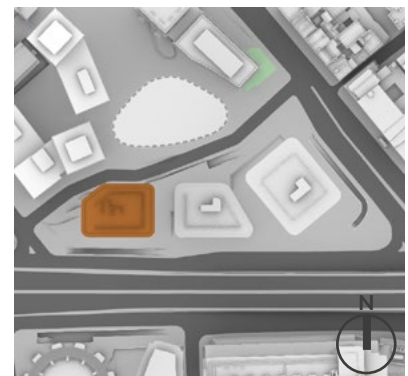
## Block I–Level 11

		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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL II									
181	BEDROOM	100	95.2			2571		3465	00:00	00:02	01:18
182	L/K/D	200	100.0		100.0	3825	3627		00:27	01:59	04:32
183	L/K/D	200	99.4		100.0	3614	3338	3121	03:54	06:01	08:22
184	BEDROOM	100	100.0			3229			04:06	05:26	05:51
185	L/K/D	200	28.9		35.4	2355	1887	1507	04:16	05:28	05:51
186	BEDROOM	100	100.0			3417			04:19	05:29	05:51
187	BEDROOM	100	100.0			3295			04:25	05:30	05:53
188	STUDIO	200	32.6	97.5	50.4	2718	2226	1872	04:35	05:31	05:52
189	L/K/D	200	56.9		85.6	3087	2646	2309	02:25	02:18	02:59
190	BEDROOM	100	43.5			2091			01:31	01:23	01:15
191	BEDROOM	100	36.4			1948			00:57	00:51	00:41
192	LIVING ROOM	150	46.8			2701	2155		00:29	00:26	00:22
193	BEDROOM	100	41.9			1981			00:00	00:00	00:00
194	BEDROOM	100	57.1			2421			00:00	00:00	00:00
195	BEDROOM	100	63.7			2508			00:00	00:00	00:00
196	BEDROOM	100	77.5			2768			00:00	00:00	00:00
197	BEDROOM	100	100.0			3550			00:00	00:00	00:00
198	L/K/D	200	100.0		100.0	3614	3336	3076	00:00	00:00	01:11

Table 11: Assessment Data



Fig. 19: Floor Plan



## Block I–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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 12									
199	BEDROOM	100	95.7			2594			00:00	00:02	01:18
200	L/K/D	200	100.0		100.0	3832	3637	3480	00:41	02:08	04:32
201	L/K/D	200	100.0		100.0	3625	3377	3148	04:38	06:05	08:24
202	BEDROOM	100	100.0			3269			04:31	05:31	05:51
203	L/K/D	200	30.1		37.6	2439	1940	1632	04:38	05:33	05:53
204	BEDROOM	100	100.0			3464			04:42	05:33	05:53
205	BEDROOM	100	100.0			3348			04:44	05:34	05:53
206	STUDIO	200	35.9	99.6	56.7	2810	2335	1954	04:57	05:35	05:54
207	L/K/D	200	63.0		90.9	3123	2734	2360	02:41	02:24	02:59
208	BEDROOM	100	46.8			2159			01:31	01:23	01:09
209	BEDROOM	100	40.4			2015			00:57	00:51	00:46
210	LIVING ROOM	150	51.1			2744	2207		00:29	00:20	00:23
211	BEDROOM	100	46.7			2147			00:00	00:00	00:00
212	BEDROOM	100	61.7			2528			00:00	00:00	00:00
213	BEDROOM	100	69.0			2608			00:00	00:00	00:00
214	BEDROOM	100	86.1			2900			00:00	00:00	00:00
215	BEDROOM	100	100.0			3590			00:00	00:00	00:00
216	L/K/D	200	100.0		100.0	3627	3367	3105	00:00	00:00	01:11

Table 12: Assessment Data

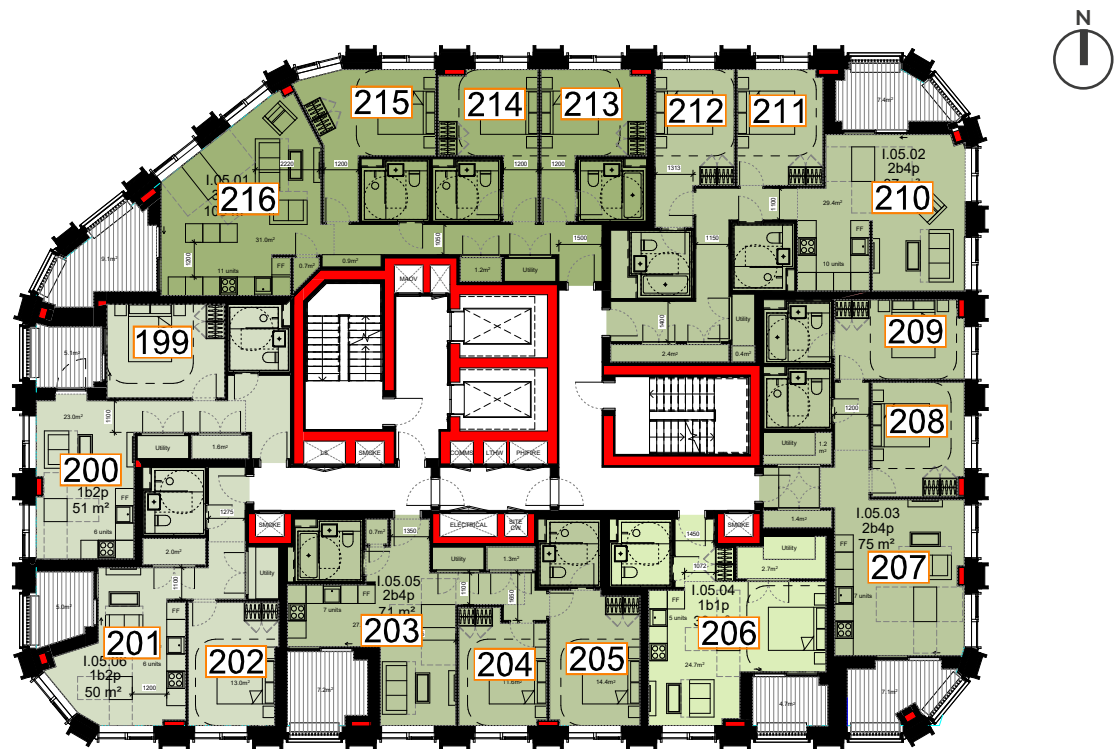
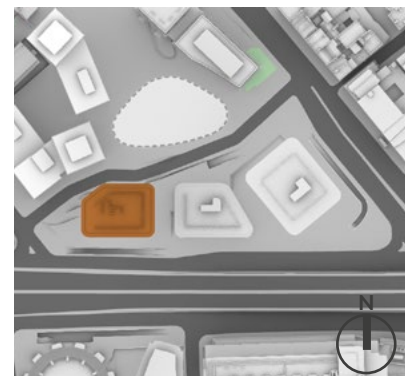


Fig. 20: Floor Plan





## Block I–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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 13									
217	BEDROOM	100	96.2			2624			00:16	00:03	01:18
218	L/K/D	200	100.0		100.0	3835	3650	3493	01:08	02:29	04:32
219	L/K/D	200	100.0		100.0	3641	3413	3183	04:56	06:14	08:25
220	BEDROOM	100	100.0			3328			04:44	05:38	05:53
221	L/K/D	200	32.0		40.7	2493	2005	1726	04:47	05:42	05:54
222	BEDROOM	100	100.0			3492			04:53	05:43	05:55
223	BEDROOM	100	100.0			3408			04:58	05:44	05:55
224	STUDIO	200	40.8	100.0	66.0	2873	2410	2021	05:10	05:45	05:56
225	L/K/D	200	67.8		92.9	3158	2815	2449	02:44	02:32	02:59
226	BEDROOM	100	51.1			2240			01:31	01:16	01:15
227	BEDROOM	100	43.7			2102			00:57	00:51	00:46
228	LIVING ROOM	150	55.5			2794	2296		00:23	00:26	00:19
229	BEDROOM	100	52.1			2246			00:00	00:00	00:00
230	BEDROOM	100	68.2			2627			00:00	00:00	00:00
231	BEDROOM	100	75.4			2690			00:00	00:00	00:00
232	BEDROOM	100	92.7			2947			00:00	00:00	00:00
233	BEDROOM	100	100.0			3611			00:00	00:00	00:00
234	L/K/D	200	100.0		100.0	3638	3392	3133	00:00	00:00	01:11

Table 13: Assessment Data



## Block I–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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 14									
235	BEDROOM	100	97.1			2659		3508	00:21	00:03	01:18
236	L/K/D	200	100.0		100.0	3846	3660		01:28	02:53	04:32
237	L/K/D	200	100.0		100.0	3658	3436	3210	05:26	06:30	08:27
238	BEDROOM	100	100.0			3380			05:04	05:50	05:55
239	L/K/D	200	32.3		43.8	2562	2079	1791	05:09	05:53	05:56
240	BEDROOM	100	100.0			3519			05:10	05:54	05:56
241	BEDROOM	100	100.0			3438			05:07	05:56	05:57
242	STUDIO	200	44.7	100.0	78.8	2946	2491	2120	05:17	05:57	05:57
243	L/K/D	200	77.1		95.7	3238	2898	2547	02:44	02:41	02:59
244	BEDROOM	100	58.6			2380			01:28	01:23	01:13
245	BEDROOM	100	52.3			2259			00:57	00:51	00:42
246	LIVING ROOM	150	62.5			2939	2429		00:29	00:23	00:40
247	BEDROOM	100	57.5			2345			00:00	00:00	00:00
248	BEDROOM	100	73.4			2705			00:00	00:00	00:00
249	BEDROOM	100	78.9			2791			00:00	00:00	00:00
250	BEDROOM	100	98.0			3004			00:00	00:00	00:00
251	BEDROOM	100	100.0			3620			00:00	00:00	00:00
252	L/K/D	200	100.0		100.0	3651	3413	3155	00:00	00:00	01:11

Table 14: Assessment Data

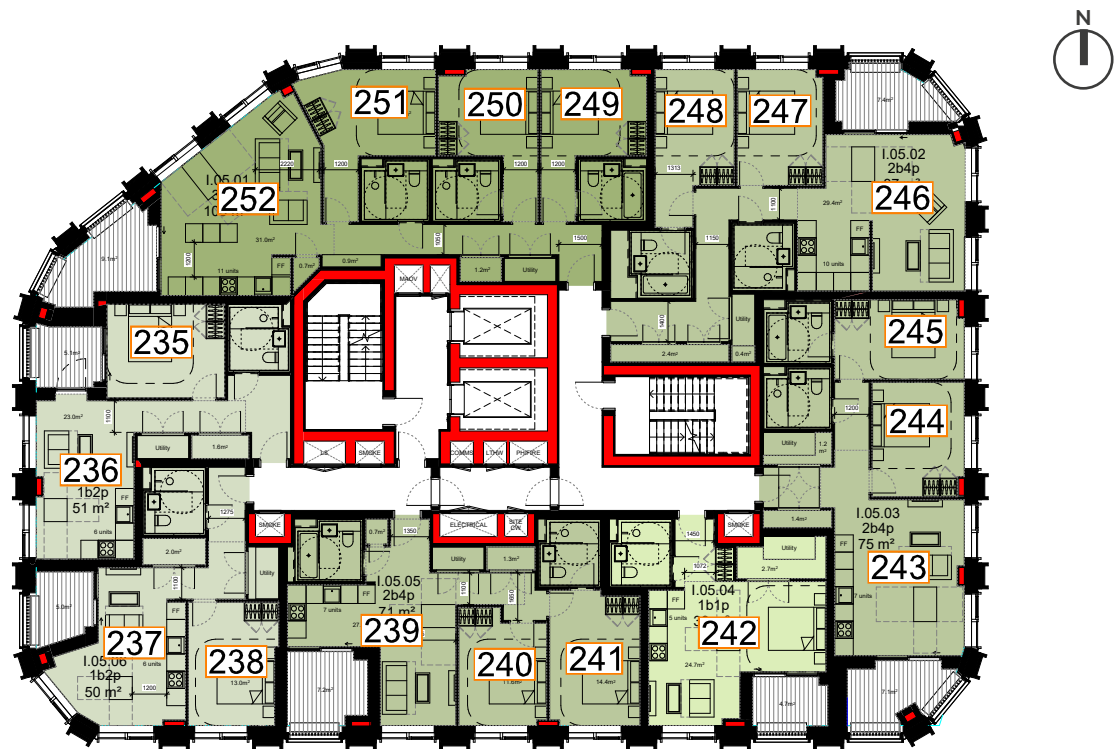
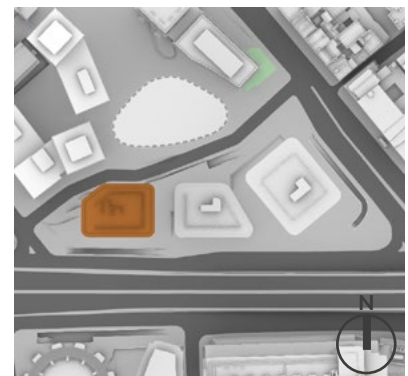


Fig. 22: Floor Plan



## Block I–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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 15									
253	BEDROOM	100	100.0			3639			01:17	03:21	04:32
254	BEDROOM	100	100.0			3738			01:20	03:09	04:32
255	BEDROOM	100	100.0			3712			01:23	02:56	04:32
256	L/K/D	200	100.0		100.0	3581	3297	3078	06:27	07:05	08:25
257	L/K/D	200	37.0		45.1	2522	2010	1754	05:38	06:08	05:57
258	BEDROOM	100	53.9			2257			00:59	00:19	00:00
259	L/K/D	200	100.0		100.0	3548	3232	2998	05:48	06:17	06:07
260	BEDROOM	100	58.4			2308			01:40	00:24	00:00
261	L/K/D	200	87.2		98.2	3340	3000	2696	02:45	02:49	02:59
262	BEDROOM	100	73.7			2727			01:31	01:23	01:24
263	BEDROOM	100	64.2			2573			00:57	00:45	01:22
264	LIVING ROOM	150	68.6			3054	2613		00:28	00:38	01:21
265	BEDROOM	100	60.5			2426			00:00	00:00	00:00
266	BEDROOM	100	78.6			2765			00:00	00:00	00:00
267	BEDROOM	100	83.6			2843			00:00	00:00	00:00
268	BEDROOM	100	99.3			3036			00:00	00:00	00:00
269	BEDROOM	100	100.0			3631			00:00	00:00	00:00
270	L/K/D	200	100.0		100.0	3667	3423	3172	00:00	00:00	01:03

Table 15: Assessment Data

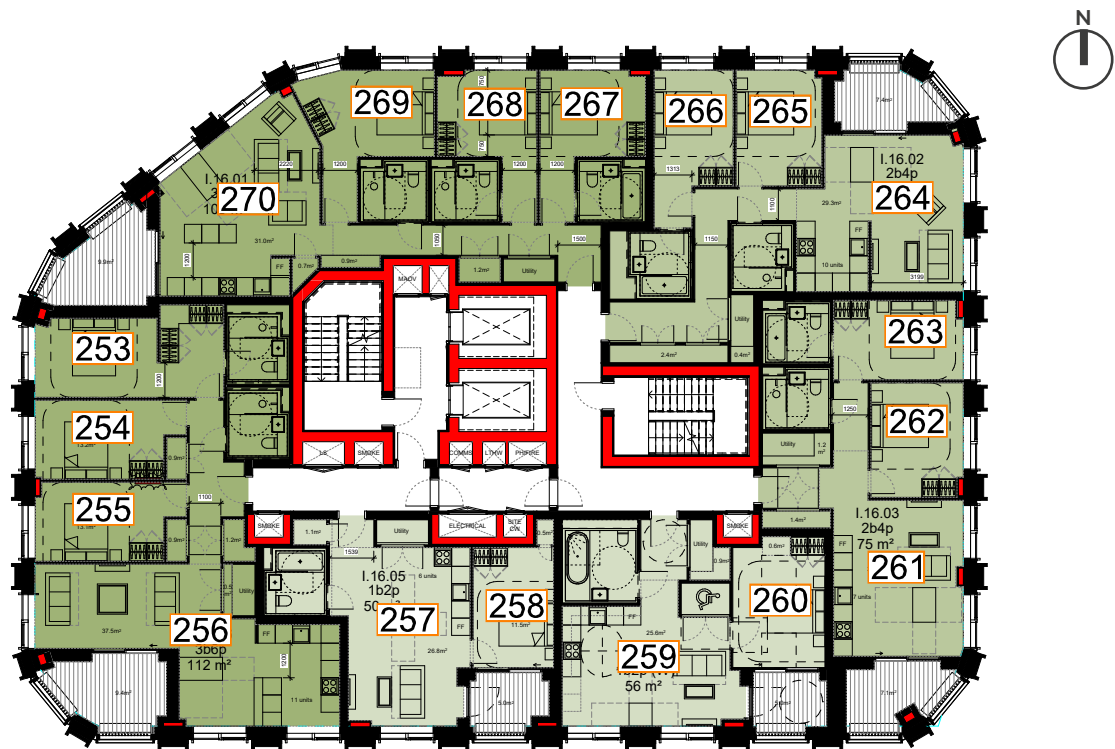
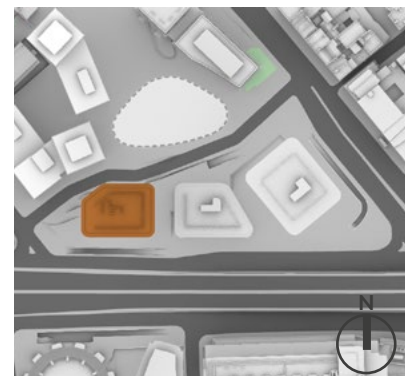


Fig. 23: Floor Plan





## Block I–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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 16									
271	BEDROOM	100	100.0			3644			01:18	03:33	04:32
272	BEDROOM	100	100.0			3744			01:21	03:29	04:32
273	BEDROOM	100	100.0			3715			01:23	03:14	04:32
274	L/K/D	200	100.0		100.0	3604	3326	3097	06:28	07:16	08:27
275	L/K/D	200	37.8		46.8	2577	2065	1789	05:55	06:22	05:59
276	BEDROOM	100	62.4			2336			01:00	00:29	00:00
277	L/K/D	200	100.0		100.0	3564	3254	3038	06:10	06:31	06:09
278	BEDROOM	100	63.8			2352			01:49	00:24	00:00
279	L/K/D	200	93.5		99.6	3489	3145	2895	02:46	02:57	02:59
280	BEDROOM	100	99.5			3128			01:26	01:38	02:30
281	BEDROOM	100	88.1			3093			00:55	01:37	01:54
282	LIVING ROOM	150	81.0			3240	2871		00:50	01:30	01:52
283	BEDROOM	100	67.1			2516			00:00	00:00	00:00
284	BEDROOM	100	83.1			2829			00:00	00:00	00:00
285	BEDROOM	100	86.5			2904			00:00	00:00	00:00
286	BEDROOM	100	100.0			3084			00:00	00:00	00:00
287	BEDROOM	100	100.0			3643			00:00	00:00	00:00
288	L/K/D	200	100.0		100.0	3684	3436	3192	00:00	00:00	01:03

Table 16: Assessment Data

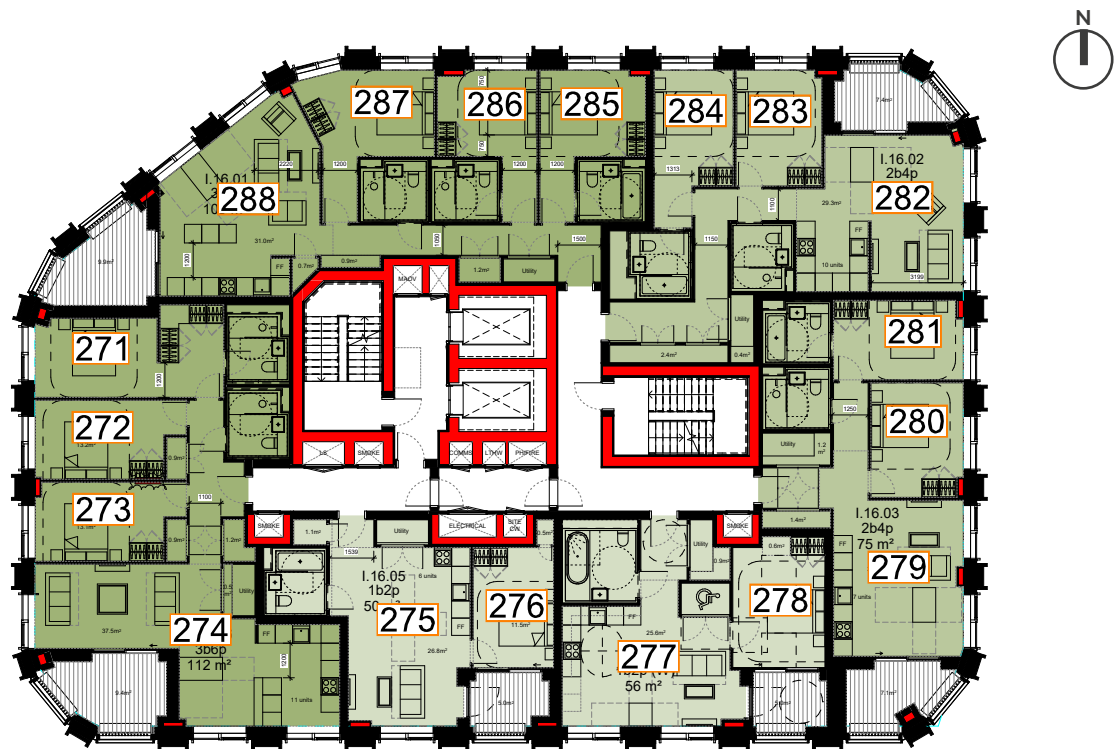
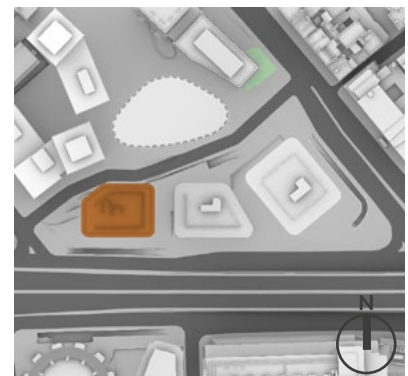


Fig. 24: Floor Plan



## Block I–Level 17

		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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 17									
289	BEDROOM	100	100.0			3659			01:20	03:33	04:32
290	BEDROOM	100	100.0			3748			01:23	03:33	04:32
291	BEDROOM	100	100.0			3719			01:25	03:33	04:32
292	L/K/D	200	100.0		100.0	3613	3357	3126	06:29	07:35	08:29
293	L/K/D	200	38.3		47.9	2631	2130	1826	05:57	06:30	06:01
294	BEDROOM	100	70.9			2392			01:01	00:29	00:00
295	L/K/D	200	100.0		100.0	3592	3285	3064	06:15	06:41	06:11
296	BEDROOM	100	73.8			2391			01:50	00:24	00:00
297	L/K/D	200	99.6		100.0	3593	3300	3076	02:46	03:24	04:23
298	BEDROOM	100	100.0			3374			02:01	02:51	02:48
299	BEDROOM	100	100.0			3386			01:57	02:05	02:48
300	LIVING ROOM	150	94.1			3454	3094		01:38	01:54	02:48
301	BEDROOM	100	74.9			2568			00:00	00:00	00:00
302	BEDROOM	100	84.4			2898			00:00	00:00	00:00
303	BEDROOM	100	90.1			2946			00:00	00:00	00:00
304	BEDROOM	100	100.0			3118			00:00	00:00	00:00
305	BEDROOM	100	100.0			3671			00:00	00:00	00:00
306	L/K/D	200	100.0		100.0	3695	3452	3213	00:00	00:00	01:03

Table 17: Assessment Data

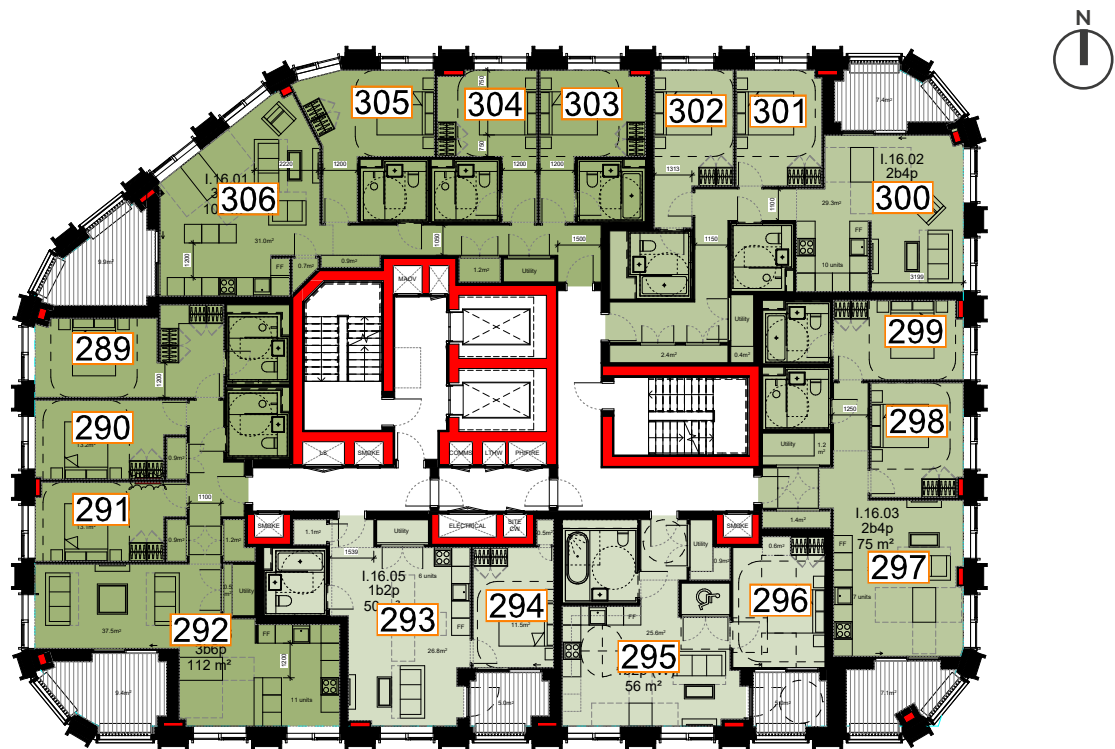
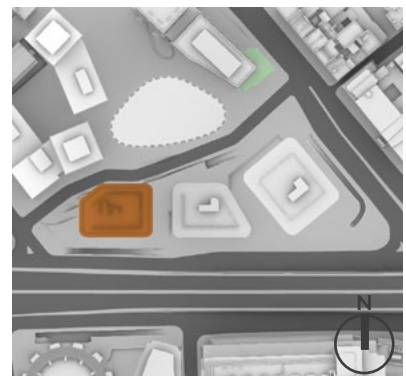


Fig. 25: Floor Plan



## Block I–Level 18

		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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 18									
307	BEDROOM	100	100.0			3670			01:22	03:33	04:32
308	BEDROOM	100	100.0			3752			01:25	03:33	04:32
309	BEDROOM	100	100.0			3735			01:27	03:33	04:32
310	L/K/D	200	100.0		100.0	3623	3382	3146	06:29	07:49	08:31
311	L/K/D	200	39.5		49.1	2681	2162	1859	05:58	06:32	06:03
312	BEDROOM	100	75.2			2437			01:02	00:29	00:00
313	L/K/D	200	100.0		100.0	3604	3313	3083	06:16	06:42	06:12
314	BEDROOM	100	86.0			2460			01:51	00:24	00:00
315	L/K/D	200	100.0		100.0	3630	3387	3143	02:47	03:46	04:26
316	BEDROOM	100	100.0			3488			02:01	03:01	03:47
317	BEDROOM	100	100.0			3508			01:59	03:01	03:35
318	LIVING ROOM	150	98.4			3519	3210		01:59	03:01	03:20
319	BEDROOM	100	78.4			2652			00:00	00:00	00:00
320	BEDROOM	100	89.6			2933			00:00	00:00	00:00
321	BEDROOM	100	92.4			2992			00:00	00:00	00:00
322	BEDROOM	100	100.0			3163			00:00	00:00	00:00
323	BEDROOM	100	100.0			3690			00:00	00:00	00:00
324	L/K/D	200	100.0		100.0	3701	3463	3228	00:00	00:00	01:03

Table 18: Assessment Data

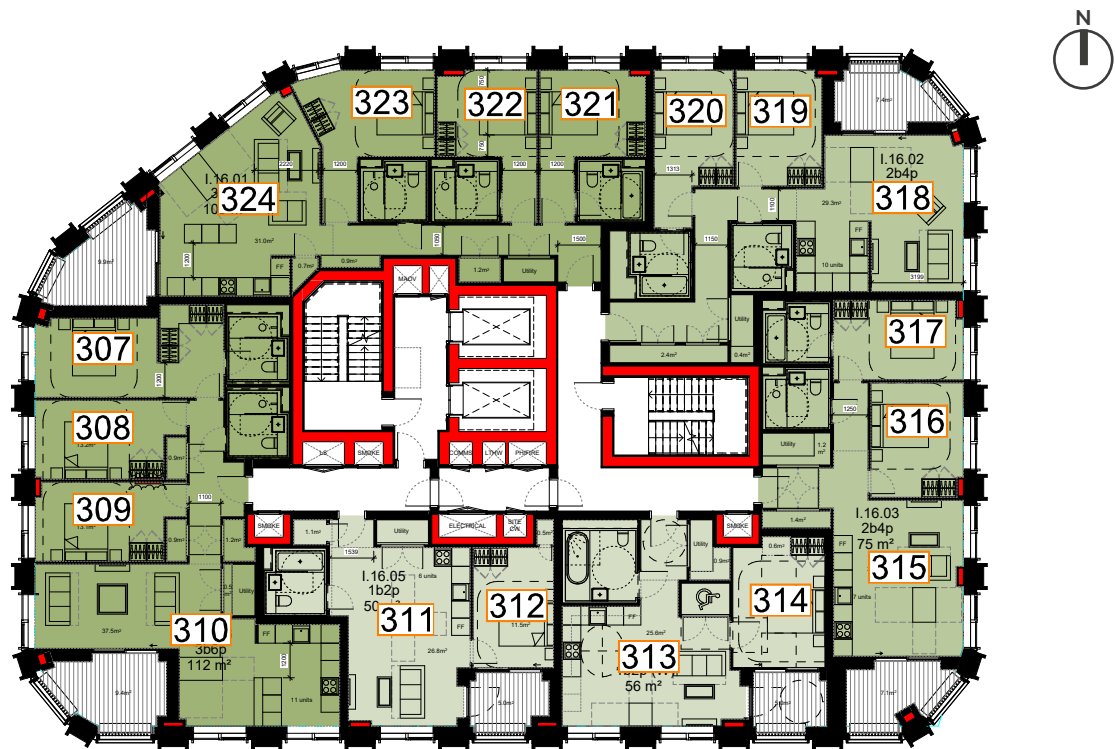
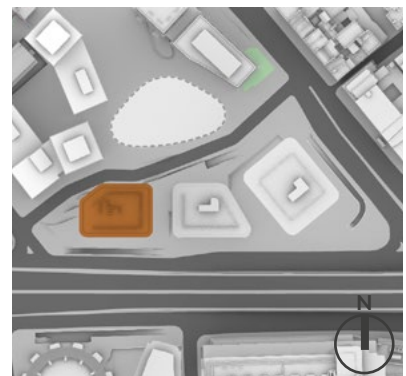


Fig. 26: Floor Plan





## Block I–Level 19

		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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
BLOCK I - LEVEL 19											
325	BEDROOM	100	100.0			3669			01:40	03:33	04:32
326	BEDROOM	100	100.0			3762			01:34	03:33	04:32
327	BEDROOM	100	100.0			3742			01:30	03:33	04:32
328	L/K/D	200	100.0		100.0	3631	3411	3161	06:32	07:51	08:32
329	L/K/D	200	40.4		50.4	2728	2201	1891	06:01	06:34	06:04
330	BEDROOM	100	78.8			2477			01:02	00:29	00:00
331	L/K/D	200	100.0		100.0	3614	3347	3104	06:18	06:44	06:13
332	BEDROOM	100	94.6			2489			01:51	00:24	00:00
333	L/K/D	200	100.0		100.0	3648	3428	3169	02:51	03:46	04:26
334	BEDROOM	100	100.0			3516			02:06	03:32	03:49
335	BEDROOM	100	100.0			3537			02:05	03:32	03:35
336	LIVING ROOM	150	99.3			3556	3261		02:07	03:32	03:20
337	BEDROOM	100	85.0			2715			00:00	00:00	00:00
338	BEDROOM	100	91.6			2979			00:00	00:00	00:00
339	BEDROOM	100	94.2			3023			00:00	00:00	00:00
340	BEDROOM	100	100.0			3189			00:00	00:00	00:00
341	BEDROOM	100	100.0			3699			00:00	00:00	00:00
342	L/K/D	200	100.0		100.0	3707	3479	3241	00:00	00:00	01:03

Table 19: Assessment Data

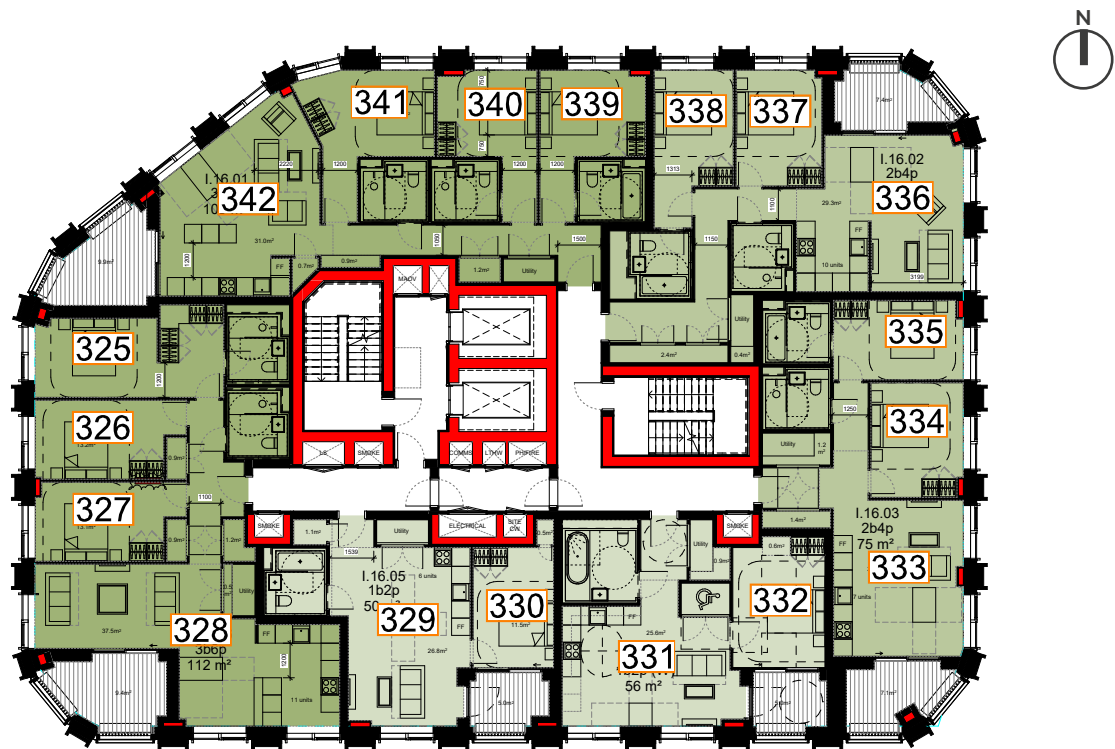
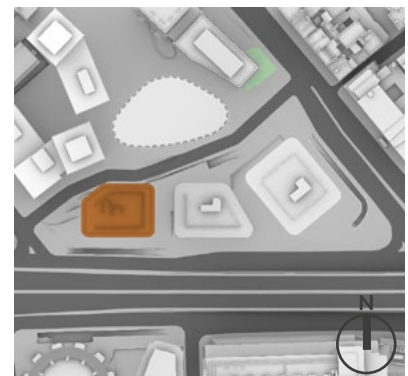


Fig. 27: Floor Plan



## Block I–Level 20

		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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I – LEVEL 20									
343	BEDROOM	100	100.0			3639			02:03	03:33	04:32
344	BEDROOM	100	100.0			3736			01:55	03:33	04:32
345	BEDROOM	100	100.0			3719			01:48	03:33	04:32
346	L/K/D	200	100.0		100.0	3624	3388	3149	06:37	07:53	08:34
347	L/K/D	200	39.5		50.2	2728	2214	1883	06:05	06:36	06:05
348	BEDROOM	100	69.7			2407			01:05	00:30	00:00
349	L/K/D	200	100.0		100.0	3606	3326	3090	06:23	06:46	06:15
350	BEDROOM	100	91.0			2418			01:54	00:29	00:00
351	L/K/D	200	100.0		100.0	3639	3407	3156	02:54	03:51	04:26
352	BEDROOM	100	100.0			3514			02:14	03:32	03:49
353	BEDROOM	100	100.0			3522			02:14	03:32	03:35
354	LIVING ROOM	150	99.1			3546	3248		02:15	03:32	03:20
355	BEDROOM	100	83.2			2621			00:00	00:00	00:00
356	BEDROOM	100	90.3			2926			00:00	00:00	00:00
357	BEDROOM	100	94.7			2966			00:00	00:00	00:00
358	BEDROOM	100	100.0			3151			00:00	00:00	00:00
359	BEDROOM	100	100.0			3673			00:00	00:00	00:00
360	L/K/D	200	100.0		100.0	3691	3446	3205	00:00	00:00	01:03

Table 20: Assessment Data

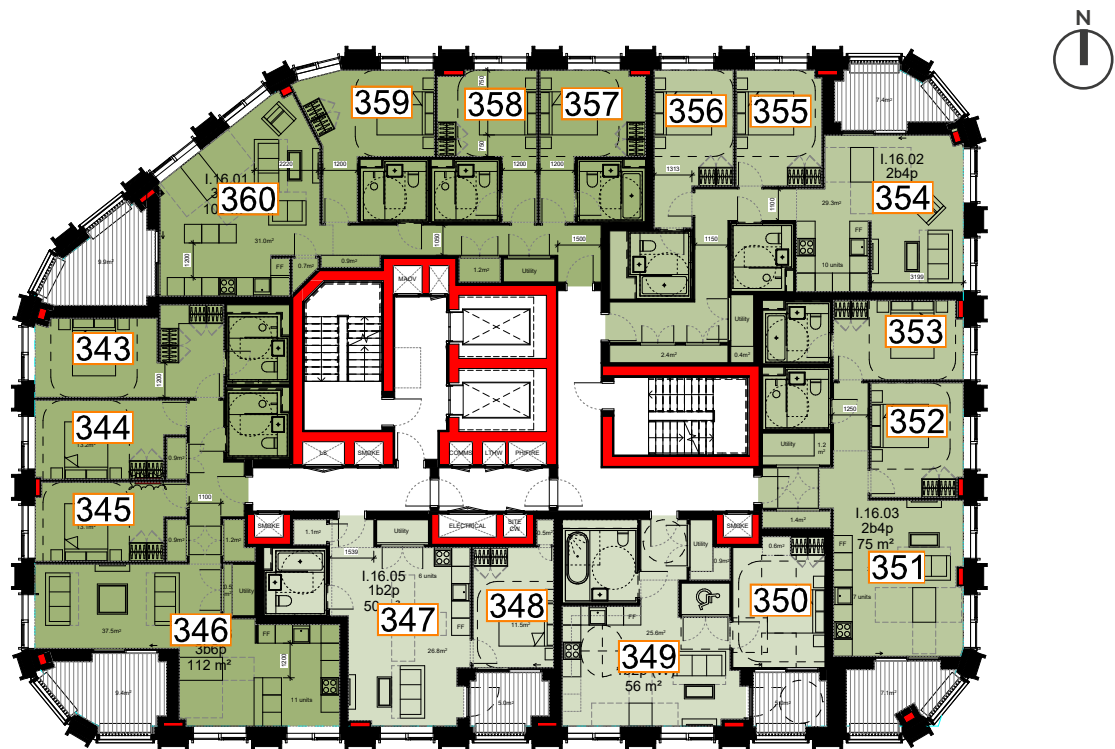
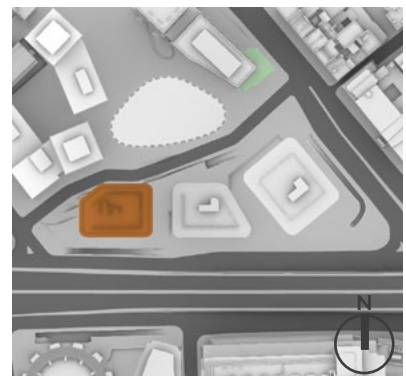


Fig. 28: Floor Plan



## Block I–Level 21

		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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 21									
361	BEDROOM	100	100.0			3688			02:19	03:33	04:32
362	BEDROOM	100	100.0			3778			02:19	03:33	04:32
363	BEDROOM	100	100.0			3758			02:14	03:33	04:32
364	L/K/D	200	100.0		100.0	3652	3448	3197	06:51	07:55	08:34
365	L/K/D	200	41.9		53.8	2807	2293	1962	06:18	06:38	06:06
366	BEDROOM	100	87.9			2586			01:12	00:29	00:00
367	L/K/D	200	100.0		100.0	3635	3400	3139	06:31	06:49	06:15
368	BEDROOM	100	98.2			2570			01:59	00:24	00:00
369	L/K/D	200	100.0		100.0	3679	3471	3223	03:02	03:46	04:26
370	BEDROOM	100	100.0			3561			02:24	03:32	03:48
371	BEDROOM	100	100.0			3588			02:24	03:32	03:33
372	LIVING ROOM	150	99.3			3607	3326		02:24	03:32	03:20
373	BEDROOM	100	95.8			2812			00:00	00:00	00:00
374	BEDROOM	100	98.1			3041			00:00	00:00	00:00
375	BEDROOM	100	98.2			3127			00:00	00:00	00:00
376	BEDROOM	100	100.0			3259			00:00	00:00	00:00
377	BEDROOM	100	100.0			3733			00:00	00:00	00:00
378	L/K/D	200	100.0		100.0	3732	3504	3276	00:00	00:00	01:03

Table 21: Assessment Data

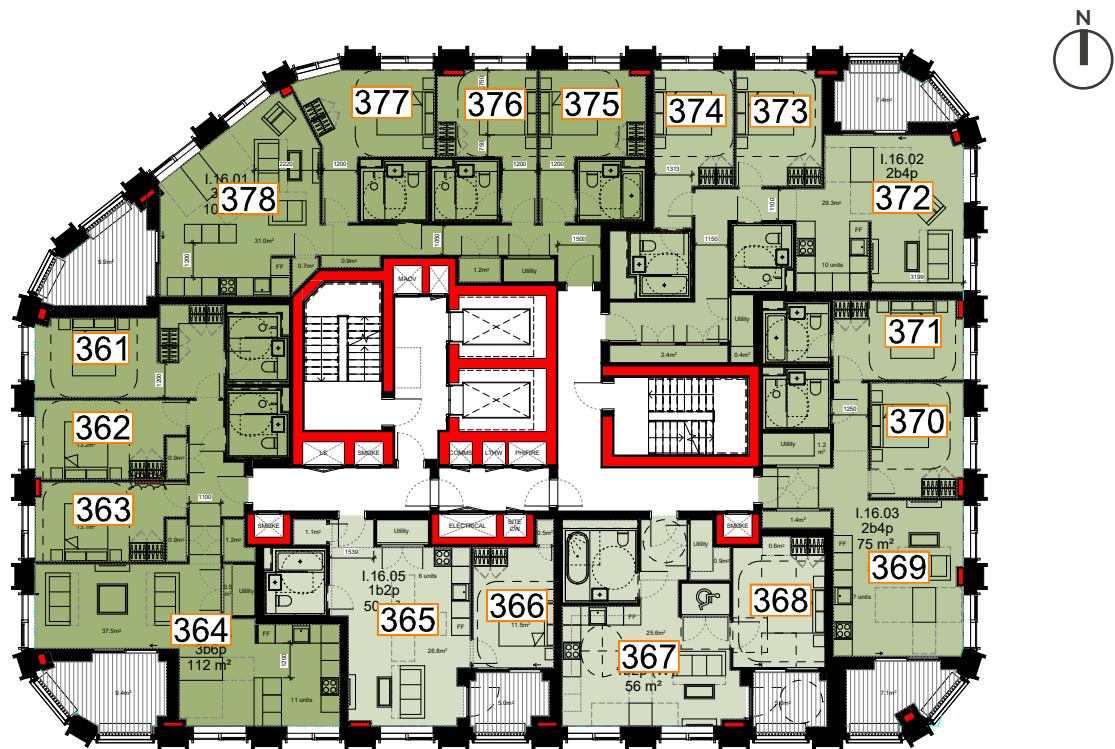
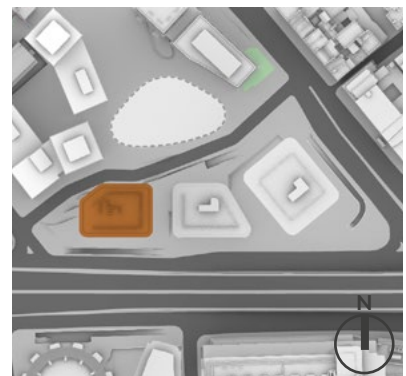


Fig. 29: Floor Plan



## Block I-Level 22

		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				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
		BLOCK I - LEVEL 22									
379	BEDROOM	100	100.0			3719			02:28	03:33	04:32
380	BEDROOM	100	100.0			3806			02:28	03:33	04:32
381	BEDROOM	100	100.0			3785			02:28	03:33	04:32
382	L/K/D	200	100.0		100.0	3701	3495	3274	07:09	07:58	08:35
383	L/K/D	200	45.1		57.9	2880	2413	2028	06:36	06:41	06:07
384	BEDROOM	100	92.7			2702			01:23	00:30	00:00
385	L/K/D	200	100.0		100.0	3666	3461	3201	06:45	06:51	06:16
386	BEDROOM	100	99.1			2713			02:06	00:29	00:00
387	L/K/D	200	100.0		100.0	3717	3511	3300	03:11	03:54	04:26
388	BEDROOM	100	100.0			3609			02:32	03:32	03:48
389	BEDROOM	100	100.0			3618			02:32	03:32	03:33
390	LIVING ROOM	150	99.8			3634	3394		02:32	03:32	03:20
391	BEDROOM	100	100.0			2907			00:00	00:00	00:00
392	BEDROOM	100	99.4			3151			00:00	00:00	00:00
393	BEDROOM	100	100.0			3223			00:00	00:00	00:00
394	BEDROOM	100	100.0			3348			00:00	00:00	00:00
395	BEDROOM	100	100.0			3759			00:00	00:00	00:00
396	L/K/D	200	100.0		100.0	3764	3566	3338	00:00	00:00	01:03

Table 22: Assessment Data





## Block I-Level 23

ROOM REF.	ROOM USE	DAYLIGHT							SUNLIGHT		
		EN SPATIAL DAYLIGHT AUTONOMY percentage of room achieving target illuminance for 2190 hrs (50% of daylight hours) Weather File: GBR_Gatwick				EN DAYLIGHT AUTONOMY hours at which the target illuminance is achieved across 50% of room (2190 hrs target) Weather File: GBR_Gatwick			HOURS:MIN		
		TARGET	RELEVANT ENSDA	100	150	100	150	200	1 FEB	25 FEB	21 MAR
BLOCK I - LEVEL 23											
397	BEDROOM	100	100.0			3714			02:38	03:33	04:32
398	L/K/D	200	98.0		100.0	3481	3158	2917	07:31	07:13	07:32
399	BEDROOM	100	100.0			3611			06:57	06:43	06:11
400	BEDROOM	100	100.0			3658			06:56	06:44	06:13
401	BEDROOM	100	100.0			3471			06:53	06:45	06:15
402	L/K/D	200	99.3		100.0	3269	2925	2604	06:52	07:53	08:15
403	BEDROOM	100	100.0			3329			02:38	03:32	03:33
404	BEDROOM	100	100.0			3303			02:38	03:32	03:20
405	BEDROOM	100	100.0			3714			02:38	03:24	03:07
406	BEDROOM	100	93.3			2896			00:00	00:00	00:00
407	BEDROOM	100	93.1			3019			00:00	00:00	00:00
408	BEDROOM	100	94.2			3288			00:00	00:00	00:00
409	BEDROOM	100	98.5			3072			00:00	00:00	00:00
410	BEDROOM	100	100.0			3815			00:00	00:00	00:55
411	L/K/D	200	95.9		99.4	3356	2954	2568	02:38	03:33	04:32

Table 23: Assessment Data