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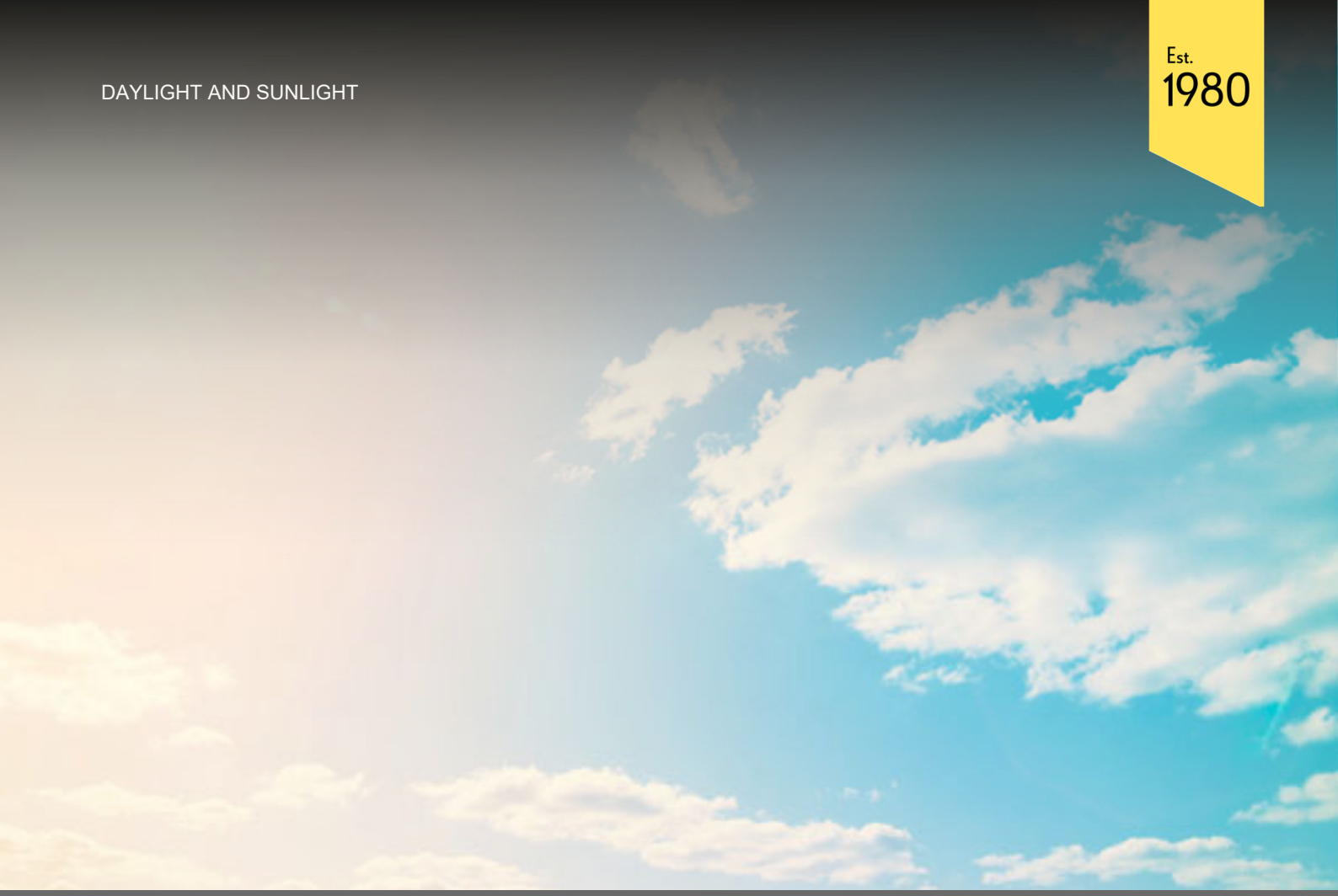

PARMA HOUSE
CLARENDON ROAD
PD 4 SCHEME OPTION

Internal Daylight and Sunlight Report

16 July 2024

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APPENDICES

1. Introduction

1.1. Delva Patman Redler LLP have been engaged by the Applicant to assess daylight and sunlight provision to the new dwellings within the proposed development at Parma House, Clarendon Road, N22 6XF ("the Site"). This report has been prepared to accompany the Applicant's planning application.

1.2. The Site is located within Haringey Council planning jurisdiction.

1.3. The proposed development and surrounding context is replicated in our 3D computer analysis model shown in Figure 1 below and on the spot-height drawing at Appendix 2.

1.4. The development comprises of converting the commercial building into residential use and creating two additional floors within the current building form. No change will occur to the building mass, but the external façade will be redesigned to increase the apertures.

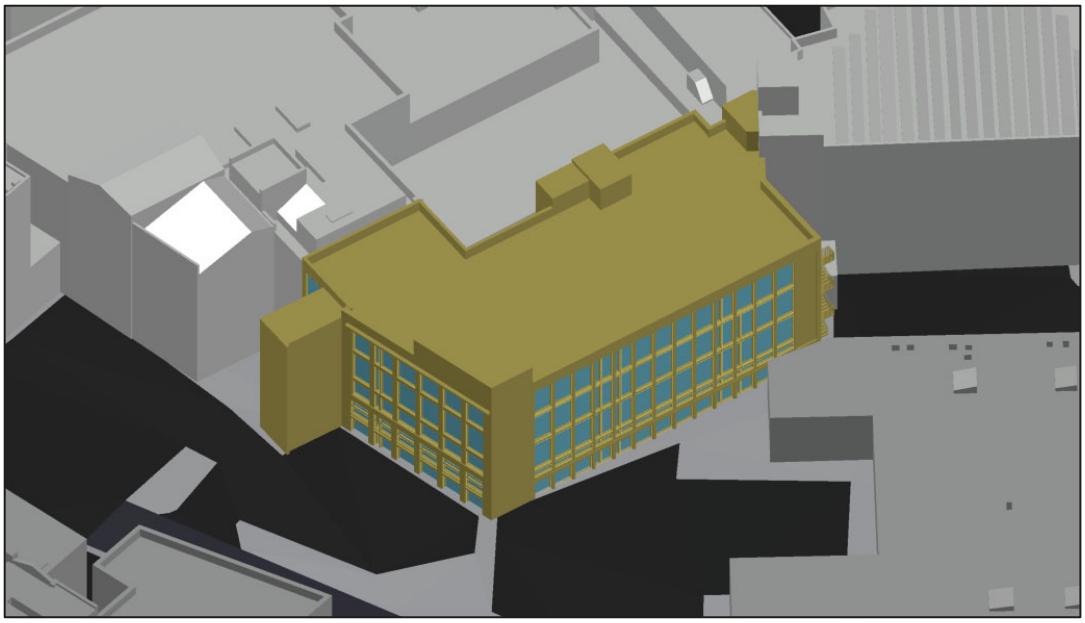


Figure 1 – 3D computer model of the proposed development and surrounding context used in our analyses

1.5. Our daylight and sunlight study has been carried out using the assessment methodologies recommended in *'Site Layout Planning for Daylight and Sunlight: A guide to good practice'* (BR209, 2022 edition) published by the Building Research Establishment.

1.6. The 2022 edition of the BRE guide introduced new methodologies and numerical guidelines for assessing internal daylight and sunlight within buildings. The numerical guidelines for daylight provision recommended in the 2022 edition of the BRE guide are more difficult to achieve than those in the 2011 edition. Consequently, the proposed development will achieve a lower percentage adherence to the 2022 guidelines than to the 2011 guidelines.

1.7. This report is accompanied by the Appendices listed on the Contents page, including an explanation of the BRE assessment methodologies, a glossary of technical terms, drawings, and tabulated results.

2. Planning policy and guidance

National Planning Policy and Guidance

National Planning Policy Framework (December 2023)

2.1. The National Planning Policy Framework (NPPF) sets out the Government's planning policies and how these should be applied. It provides a framework within which locally prepared plans for housing and other development can be produced. It places an emphasis on sustainable development and delivery of housing.

2.2. Chapter 11 of the NPPF, entitled *"Making effective use of land"*, promotes the effective use of land in meeting the need for homes and other uses. It gives examples such as developing under-utilised land and buildings, especially if this would help to meet identified needs for housing where land supply is constrained and available sites could be used more effectively, and upward extensions to create new homes, where they would be consistent with the prevailing height and form of neighbouring properties and the overall street scene.

2.3. In particular, paragraph 129 of the NPPF states:

> *Area-based character assessments, design guides and codes and masterplans can be used to help ensure that land is used efficiently while also creating beautiful and sustainable places. Where there is an existing or anticipated shortage of land for meeting identified housing needs, it is especially important that planning policies and decisions avoid homes being built at low densities, and ensure that developments make optimal use of the potential of each site. In these circumstances:*
>
> *c) local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards).*

National Design Guide (January 2021)

2.4. The National Design Guide is part of a suite of planning practice guidance that supports the NPPF. The National Design Guide outlines the Government's priorities for well-designed places.

2.5. Paragraph 71 of the guidance dealing with built form states:

> *Proposals for tall buildings (and other buildings with a significantly larger scale or bulk than their surroundings) require special consideration. This includes their location and siting; relationship to context; impact on local character, views and sight lines; composition - how they meet the ground and the sky; and environmental impacts, such as sunlight, daylight, overshadowing and wind. These need to be resolved satisfactorily in relation to the context and local character.*

2.6. Paragraphs 126 and 130 of the guidance dealing with homes and buildings state:

> *Well-designed homes and communal areas within buildings provide a good standard and quality of internal space. This includes room sizes, floor-to-ceiling heights, internal and external storage, sunlight, daylight and ventilation. The quality of internal space needs careful consideration in higher density developments, particularly for family accommodation, where access, privacy, daylight and external amenity space are also important.*
>
> *Well-designed private or shared external spaces are fit for purpose and incorporate planting wherever possible. The appropriate size, shape and position for an external amenity space can be defined by considering:*

- *how the associated building sits in the wider context, including access to public and open spaces;*
- *how the amenity space will be used, what for, and by whom;*
- *environmental factors that may affect its usability, such as sunlight and shade, noise or pollution;*
- *wider environmental factors affecting its quality or sustainability, such as a green corridor or drainage.*

National Model Design Code (June 2021)

2.7. The National Model Design Code provides detailed guidance to planning authorities on the production of design codes, guides and policies to promote successful design.

2.8. Paragraphs 114 to 117 of section B.2. dealing with built form states:

> *Building height may also have an impact on local environmental conditions in neighbouring properties, amenity spaces and public spaces in terms of daylight, sunlight, overshadowing, wind and micro-climate. The placing of tall buildings needs to maximise user comfort of spaces between buildings by taking into account their impact on orientation and overshadowing of public and private spaces, quality of external spaces at ground level, wind tunnel effect, noise pollution and enable safe dispersion of pollutants.*
>
> *Tall buildings can be considered in design codes. It may be appropriate to include criteria for the locations of tall buildings in some area types.… Tools that can assist with this include … characterisation studies and design strategies, dealing with issues such as urban form, historic character, building typologies, prevailing sunlight and daylight levels, green infrastructure, amenity space and quality of external spaces at ground level.*

2.9. Paragraph 188 of section H.2 dealing with health and wellbeing states:

> *The built environment has a significant impact on people's health and wellbeing. This relates across the design code with regard to walkable neighbourhoods, access to greenery and recreation, attractive buildings and public spaces, space standards, and strong communities. There are also specific elements relating to the impact of the design of homes and buildings that affect wellbeing including daylight, aspect and privacy, noise mitigation, security and access to private outdoor space.*
>
> *Good quality housing creates a pleasant indoor environment with adequate levels of natural lighting, and sunlight, without problems of overheating, good quality ventilation, privacy from overlooking and minimal noise impact.*

2.10. Paragraph 202 of section R.1 dealing with energy states:

> *The design of windows needs to consider orientation to balance heat loss and beneficial solar gain, daylight and sunlight. Southern-facing glazing can be beneficial in contributing to overall energy demand in winter. It can lead to overheating in summer and excessive heat loss on cold cloudy days in winter. Glazing needs to be sized appropriately for context and passive measures such as external shading devices or provision for future installation of shading devices needs to be considered to reduce reliance on mechanical ventilation.*

BRE Report 209, 'Site Layout Planning for Daylight and Sunlight: A guide to good practice' (2022)

2.11. The leading publication providing national guidance on the provision of daylight and sunlight to new development, is '*Site Layout Planning for Daylight and Sunlight: A guide to good practice*' (BR209, third edition, 2022) published by the Building Research Establishment (hereafter referred to as "the BRE guide"). It is referred to in development plan documents or supplementary planning documents of most planning authorities. It is intended to be used in conjunction with the interior daylighting

recommendations in BS EN17037:2018 '*Daylight in buildings*' and in CIBSE's lighting guide, *LG 10 'Daylighting - a guide to designer'*.

2.12. The BRE guide states:

> *Summary*
>
> *This guide gives advice on site layout planning to achieve good daylighting and sun lighting, within buildings and in the open spaces between them. It is intended to be used in conjunction with the interior daylight recommendations for new buildings in the British Standard, 'Daylight in buildings', BS EN 17037… It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location.*
>
> *Introduction*
>
> *(Its) main aim is … to help to ensure good conditions in the local environment, considered broadly, with enough sunlight and daylight on or between the buildings for good interior and exterior conditions.*
>
> *The guide is intended for building designers and their clients, consultants and planning officials. The advice given is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design. In special circumstances the developer or planning authority may wish to use different target values.*

British Standard, BS EN 17037:2018, 'Daylight in buildings' (May 2019)

2.13. British Standard, BS EN 17037:2018, *'Daylight in buildings'* provides a standard and methodology by which to assess daylight and sunlight provision in new buildings. Its general recommendations for daylight provision in a space may not be achievable for some buildings in the UK, particularly dwellings; for example, those with basement rooms or significant external obstructions, such as those in dense urban areas or in existing buildings being refurbished or converted into dwellings. The standard's National Annex therefore provides guidance on minimum daylight provision in UK dwellings.

Local planning policy

London Borough of Haringey: Development Management DPD: Adopted July 2017

2.14. The Council's development plan contains the following policies that are relevant to the effects of development on daylight and sunlight:

2.15. Policy DM1: Delivering High Quality Design states:

> *(a) Provide appropriate sunlight, daylight and open aspects (including private amenity space where required) to all parts of the development and adjacent buildings and land;*

2.16. The supporting text states, at paragraph 2.10:

> *The design and layout of buildings must enable sunlight and daylight to penetrate into and between buildings, and ensure that adjoining land or properties are protected from unacceptable overshadowing. The Building Research Establishment (BRE) provides guidance on site layout planning to achieve good sun-lighting and day-lighting (BRE Site Layout Planning for Daylight and Sunlight: a guide to good practice).*

3. Assessment methodology and numerical guidelines

3.1. The technical assessments that underpin this daylight and sunlight study have been carried out in accordance with the assessment methodologies recommended in the BRE guide.

3.2. The BRE guidance and numerical guidelines are summarised below. The technical assessment methodologies are explained at Appendix 1 of this report, which also contains a glossary of technical terms.

Daylight to new dwellings

Detailed design

3.3. Detailed recommendations for daylight in new buildings are given in BS EN 17037, *'Daylight in Buildings'* ('the British Standard') and repeated in the BRE guide. Appendix C of the BRE guide gives guidance on how to calculate the amount of daylight inside a room, which is summarised at Appendix 1 of this report.

3.4. Daylight provision in new rooms may be checked using either of the methods described in the BRE guide: either direct prediction of daylight illuminance levels using hourly climate data, or the use of the daylight factor, which is a ratio of unobstructed external illuminance under overcast sky conditions. Both are measures of the overall amount of daylight in a space. We have calculated daylight provision using the illuminance method.

3.5. The amount of daylight inside a room will depend on:

- the view of sky and level of obstruction outside the window(s);
- the surface reflectances of the external environment;
- the size, position and diffuse light transmittance of the window glazing; and
- the surface reflectances of the room surfaces.

3.6. Appendix C of the BRE guide gives recommendations for typical and maximum reflectances of exterior and interior surfaces and glazing transmittance, which are repeated at Appendix 1 of this report.

Numerical guidelines

3.7. The following minimum recommendations are given for housing in the UK:

- 100 lux in bedrooms
- 150 lux in living rooms
- 200 lux in kitchens

3.8. These are the median illuminances, to be exceeded over at least 50% of the assessment points in the room for at least half of the annual daylight hours.

3.9. They are minimum recommended values for locations where a predominantly daylit appearance is not achievable; for example, in basements or with significant external obstructions, such as in a dense urban area or with tall trees outside, or for existing buildings being refurbished or converted into dwellings.

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

3.11. 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. However, the BRE guide advises that local authorities could use discretion here. For example, the target for a living room could be used for a combined living/kitchen/dining area (LKD) of kitchen-diner (KD) if the kitchens are not treated as habitable

spaces, as it may avoid small separate kitchens in a design. (The kitchen space would still need to be included in the assessment area.) For this reason, we have adopted an alternative target of 150 lux for LKDs and KDs in our assessment.

Sunlight to new dwellings

3.12. In housing, the main requirement for sunlight is in living rooms, where it is valued at any time of day but especially in the afternoon. Sunlight is also required in conservatories. It is viewed as less important in bedrooms and in kitchens.

3.13. Site layout is the most important factor affecting the duration of sunlight in buildings. It can be divided into two main issues, orientation and overshadowing.

3.14. A south-facing window will, in general, receive most sunlight, while east- and west-facing windows will receive sunlight only at certain times of the day, and a north-facing elevation will only receive it on a handful of occasions (early morning and late evening in summer).

3.15. Sensitive layout design of flats will attempt to ensure that each individual dwelling has at least one main living room which can receive a reasonable amount of sunlight. The overall sunlighting potential of a large residential development may be initially assessed by counting how many dwellings have a window to a main living room facing south, east, or west. The aim should be to minimise the number of dwellings whose living rooms face solely north, northeast, or northwest, unless there is some compensating factor such as an appealing view to the north.

3.16. The overall access to sunlight of a new development can be considerably enhanced if the layout of new buildings is designed with care so that they overshadow each other as little as possible.

Numerical guideline

3.17. For interiors, access to sunlight can be quantified. BS EN 17037 recommends that a space should receive a minimum of 1.5 hours of direct sunlight on a selected date between 1 February and 21 March with cloudless conditions. The BRE guide suggests that 21 March (equinox) is used. The medium and high levels of recommendation are three hours and four hours respectively.

3.18. The criterion apply to rooms of all orientations, although the BRE guide advises that if a room faces significantly north of due east or west it is unlikely to be met. At least one habitable room per dwelling – preferably a main living room – should meet at least the minimum criterion.

Summary

3.19. In general, a dwelling will appear reasonably sunlit provided:

- at least one main window wall faces within 90° 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.

3.20. 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.

Flexible application of the guidelines and alternative target values

3.21. The default numerical guidelines in the BRE guide are not mandatory and must be interpreted flexibly because natural lighting is only one of many factors in site layout design (see paragraph 2.12 above).

3.22. For housing applications, the NPPF requires local planning authorities to take a flexible approach in applying daylight and sunlight policies and guidance where they would otherwise inhibit making efficient use of a site, as long as the resulting scheme would provide acceptable living standards (see paragraph 2.3 above).

3.23. As the Site sits within an area of potential future development, where higher levels of obstruction could occur, and lower levels of daylight and sunlight are inevitable, and as the proposed development has been designed to fulfil the aspirations for the Opportunity Area, there is an even

greater imperative for a flexible approach to be taken in applying daylight and sunlight policies and guidance.

3.24. For the reasons explained at paragraph 3.11 above, we have adopted an alternative target of 150 lux for the minimum illuminance level for any space multi-purpose space containing a kitchen, such as LKDs, KDs and studios.

3.25. Ultimately, it is for the planning authority to judge whether the levels of daylight and sunlight provision within the proposed development are acceptable in their neighbourhood context, having regard to all relevant planning policies and guidance and balanced against the merits of the proposed development.

Calculation model

3.26. The assessments require preparation of a 3D computer model of the development and its window apertures and internal spaces together with nearby obstructions (existing and potential future obstructions, if other buildings are planned to be constructed nearby).

3.27. The daylight assessment requires reasonable parameters to be used for internal and external surface reflectances, diffuse light transmittance of the glazing, and maintenance factors for the effects of dirt that are a representative of the proposed completed building.

3.28. The information and parameters used in our computer modelling and analysis are stated below at Section 5.

4. Scope of the assessment

4.1. Within the proposed development, we have assessed daylight and sunlight to all proposed residential units.

4.2. In total, 110 habitable rooms were assessed across all floors. Sunlight has been assessed to all habitable rooms irrespective of orientation; however, it should be borne in mind that rooms that do not have at least one window facing within 90˚ of due south will be much less likely to meet the sunlight guidelines (see paragraph 3.18 above).

5. Information used in our technical study

5.1. We have undertaken our technical study using a 3D computer model built in AutoCAD or Revit and specialist analysis software, which runs the assessments recommended in the BRE guide.

5.2. We compiled our 3D computer model from the following information:

5.2.1. Contextual massing: 3D computer model of the existing surrounding massing produced from photogrammetry (aerial photography) supplied by AccuCities Ltd.

5.2.2. Proposed development: 3D model and 2D floor plans supplied by Boehm-Lynas Architects on 11 July 2024 (file names: 052-BL-PD-XX-XX-BIM-A-PD2-Central V3QQR – Floor Plan – 0 – Site Layout & 1501-1506 & 1620)

5.3. Our 3D computer model is illustrated in Figure 1 of Section 1.

5.4. For the daylight illuminance assessment, we used the window and room parameters stated in Table 1.

***Table 1** – Window and room parameters used in illuminance calculations*

Parameter	Value – Proposed Dwellings
Maintenance factor (dirt on glass)	0.92 for vertical windows with normal exposure in residential developments in urban locations with good maintenance
Diffuse light transmittance of glazing	0.68 for double glazing
Frame and glazing bar factor	0.7 for metal frames and large panes
Internal surface reflectances	Finishes advised by Boehm-Lynas Architects; reflectances taken from guidelines: 0.8 for white ceilings 0.7 for pale cream walls 0.4 for light wood floors

Limitations and assumptions

5.5. In compiling our 3D computer model for our technical study, we have sought to be as accurate as reasonably possible within the scope of our instruction. We have relied upon the information noted above.

5.6. We have used proven and trusted specialist computer software (Waldram Tools for AutoCAD® or Revit®) to run the calculations recommended in the BRE guide.

5.7. To the best of our knowledge, the information and advice contained in this report is accurate at the date of issue, based on the information provided to or procured by us prior to its production.

6. Results of internal daylight and sunlight assessment

6.1. We assessed all habitable rooms in the development.

6.2. The room uses and reference numbers of the rooms that are included in our assessment are shown on the room location plans at Appendix . The plans also show the percentage of the assessment area of each room ('SDA % of Area') that would achieve the daylight illuminance target for the room type.

6.3. The daylight and sunlight assessment results are tabulated at Appendix . Coloured font has been used in the table to identify results that would be below the numerical guidelines, as follows:

- Orange font = proposed value is within 20% of the guideline
- Red font = proposed value is not within 20% of the guideline.

6.4. To recap, the numerical guidelines are:

6.4.1. Daylight: 100 lux in bedrooms, 150 lux in living rooms, or 200 lux in kitchens or multi-purpose rooms containing a kitchen, e.g., LKDs. (Note: These are the median illuminances to be exceeded over at least 50% of the assessment points in the room for at least half of the annual daylight hours.)

6.4.2. Sunlight: At least 1.5 hours of sunlight on 21 March to at least one habitable room per dwelling, preferably a main living room.

Daylight to new dwellings

6.5. The level of adherence to the BRE daylight guidelines, is summarised in **Table 2** below.

***Table 2** – Summary of daylight illuminance results*

Building	Daylight illuminance (BRE2022)			
	No. of rooms tested	Meeting min. target		No. below min. target
		No.	%	
Parma House	110	110	*100%*	0
Totals:	**110**	**110** *100%*		**0** *0%*

6.6. All 110 (100%) habitable rooms tested satisfy the BRE guidelines indicating that all dwellings will benefit from good levels of natural daylight.

Sunlight to new dwellings

6.7. All rooms in our assessment have been assessed for sunlight regardless of orientation or room use.

6.8. Although results are included for all room types, the guidelines for flatted developments are that one habitable room per dwelling (preferably a living room) should meet the sunlight guideline. Therefore, we set out in **Table 3** below the level of adherence to the BRE numerical guidelines for each of the dwellings that we assessed.

***Table 3** - Summary of sunlight exposure results*

Building	**Sunlight exposure** (all rooms)			
	No. of rooms tested	Meeting min. target		No. below min. target
		No.	%	
Parma House	110	78	*71%*	32
Totals:	**110**	**78** *71%*		**32** *29%*

6.9. Of the 110 dwellings assessed, 78 (71%) would satisfy the sunlight guidelines with at least one habitable room capable of receiving at least 1.5 hours of sunlight on 21 March.

6.10. The overall level of adherence with the BRE recommendations are acceptable and commensurate with other schemes in the area. It is inevitable that a small proportion of rooms will face predominately north and have their ability to receive direct sunlight hindered by their orientation.

7. Summary and conclusion

7.1. We assessed the daylight and sunlight provision to all the new dwellings and sunlight to amenity spaces within the proposed development using the methodologies recommended in the BRE guide (2022 edition).

7.2. The development comprises of converting the commercial building into residential use and adding two additional floors within the current building envelope. No change will occur to the building mass, but the external façade will be redesigned to increase the apertures.

7.3. The daylight results show that all 110 (100%) habitable rooms within the scheme satisfy the BRE guidelines.

7.4. Turning to sunlight, of the 110 habitable rooms assessed, 78 (71%) would satisfy the guidelines, with at least one habitable room capable of receiving at least 1.5 hours of sunlight on 21 March.

7.5. When developing in an urban context it is inevitable that some rooms will fall below the BRE recommendations in sunlight terms. The daylight results show that all proposed habitable units will benefit from acceptable levels of light.

7.6. It is submitted that the layout of the proposed development is consistent with the Council's local planning policy on daylight and sunlight, particularly having regard to paragraph 129 of the National Planning Policy Framework and paragraphs 1.3.45 and 1.3.46 of the Mayor of London's Housing SPG.

Delva Patman Redler LLP
Chartered Surveyors

Appendix 1

Assessment methodology and glossary

1. This appendix explains the daylight and sunlight assessment methodology recommended in *'Site Layout Planning for Daylight and Sunlight: A guide to good practice'* (BR209, 2022 edition) ('the BRE guide') and provides a glossary of the terminology used.

Daylight to new dwellings

2. BS EN 17037 *'Daylight in Buildings'* ('the British Standard') and the BRE guide provide two alternative methods for calculating the overall amount of daylight in a space:

   - illuminance method, or
   - daylight factor method.

Illuminance method

3. *Illuminance* is a measure of the amount of light falling on a surface, usually measured in lux (lumens per square metre). The illuminance method calculates the illuminance from daylight at each point on an assessment grid on the reference plane at hourly intervals for a typical year. It uses hourly climatic data for a typical year collected by a weather station near to the site's location and a mathematical model for the spatial distribution of real-world sky luminance (e.g., the Perez All-Weather Sky Model). Appropriate weather data files are available from various sources, including EnergyPlus and CIBSE.

4. The illuminance recommendations in the British Standard and BRE guide are based around the illuminances that would be met or exceeded over half of the room, over half of the annual daylight hours.

Daylight factor method

5. *Daylight factor* is the ratio of daylight illuminance at a reference point on the working plane within a space to outdoor illuminance on a horizontal plane due to an unobstructed CIE standard overcast sky The daylight factor method calculates the daylight factor at each point on an assessment grid on the reference plane. The standard overcast sky model is independent of orientation and location. In order to account for different climatic conditions at different locations, the British Standard and BRE guide give equivalent different daylight factor targets for various locations in the UK.

6. The daylight factor recommendations in the British Standard and BRE guide are based on calculating the daylight factor that would be exceeded over half of the room. The recommended daylight factor values are location specific; a set of targets is provided for each of 10 locations in the UK. The target values for the reference location at the nearest latitude to the development location should be used.

Calculation model

7. Both methodologies usually require assessment via detailed computer modelling to simulate the illuminance or daylight factor at calculation points within a proposed space. Appropriate simulation settings must be used. The calculation model should include all the room surfaces, and any surface outside the room that could affect the light received.

Surface reflectance

8. Internal and exterior surfaces and obstructions need to be modelled including appropriate surface reflectances. Fixtures and fittings need not be included. Surface reflectances should represent real conditions.

9. Where reflectance values have not been measured or specified, default values to be used in the calculation are given in Table C4 of the BRE guide, as follows: ceilings, 0.7; interior walls, 0.5; floors, 0.2; exterior walls and obstructions, 0.2; exterior ground, 0.2.

10. Where surface finishes have been specified or measured on site, they can be used in the calculations with appropriate factors for maintenance and furniture. To allow for these factors, maximum

reflectances in the calculations should not exceed: white painted surfaces, 0.8 indoors and 0.6 outdoors; light pastel walls, 0.7; light wood floors, 0.4. Surface reflectances used should be presented in the assessment, along with a specification of the materials if non-default reflectances are used.

Glazing transmission

11. Glazing transmission factors, including maintenance factors, need to be included in the simulation along with account for, or modelling of, window framing. Where window frames are not specifically included in the model, frame factors should be applied based on the ratio of glass to overall window aperture area for the type of window to be used; this will generally vary with window size and whether the windows have opening lights. Where window types have not been specified, results for the overall window aperture should be multiplied by a default framing factor as given in Table C5 of the BRE guide, as follows: windows with small panes, 0.5; normal windows with opening lights, 0.6; patio doors, 0.7.

12. For clean, clear double glazing with a low emissivity coating, a value of 0.68 for diffuse transmittance can be used. For other types of glazing, the diffuse transmittance, if needed, can be found by multiplying the manufacturer's normal incidence light transmittance by 0.91. Care needs to be taken to apply the correct values within the calculation software; often software programs use the normal incidence transmittance, which is directly available from the glazing manufacturer, and have inbuilt correction for light coming from oblique angles.

13. An additional maintenance factor also needs to be applied to the glazing transmission to account for dirt on the windows. Full details are given in the National Annex to BS EN 17037. For the more common residential applications, values are given in Table C6 of the BRE guide and reproduced below. These assume the windows will be regularly cleaned.

Table C6 – Maintenance factors for different types of windows

Type of window	Maintenance factor	
	Rural/suburban	Urban
Vertical, no overhang	0.96	0.92
Vertical, sheltered from rain, e.g. by balcony or overhang	0.88	0.76
Sloping rooflight	0.92	0.84
Horizontal rooflight	0.88	0.76

Assessment grid

14. The daylight calculations need to be carried out on a grid of points on a reference plane within each room assessed. The plane should normally be 0.85m from the floor level (sometimes described as the working plane height). The British Standard states that the assessment grid should exclude a band of 0.5m from the walls, unless otherwise specified. The BRE guide recommends that in dwellings the width of the band to be excluded should be of 0.3 m, to avoid excluding parts of the room that are used by the occupants.

15. The BRE guide advises that professional judgement should be used when setting up the reference plane in irregularly shaped rooms or those with corridor or annex areas. Examples are given in Figures C2 to C5 of the guide and include the following:

    - Where room layouts have small variations or alcoves along a wall's length, the inner or dominant section should be taken as a basis for the 0.3m gap to the assessment grid area. Fixed floor to ceiling cupboards can be excluded from the room area, but not kitchen units incorporating a worktop. Areas in bay windows may be included unless they are winter gardens separated from the room by a fixed partition.
    - In a room with a corridor, or annexed entrance, the corridor need not be included in the assessment grid area (unless it is wide enough to be part of the usable space in a room, typically over 1.5m wide). The room layout and surfaces, including the corridor would still need to be included in the calculation model.

- For a combined living/kitchen/ dining area (LKD), the kitchen should always be included as part of the room area in the calculations, even in cases where the kitchen is deemed non-habitable and the living room criterion is applied to the whole space.

16. The British Standard gives an equation for maximum grid spacing. However, for domestic rooms this could potentially give only nine points in the room. The BRE guide therefore recommends a maximum grid spacing of 0.3m and preferably less.

17. Outdoor and semi-conditioned spaces, partitioned from the room, like balconies and winter gardens should not be included in the reference grid, but the effects of balconies and overhangs above a window should be modelled.

Presentation of results

18. It may not be necessary to analyse every room in a proposed development. For example, if a building has the same room and window layouts on each floor, and rooms on a lower floor meet the recommendations, then the corresponding rooms on upper floors would be expected to meet the recommendations too.

19. For each room, the median illuminance or median daylight factor (exceeded over 50% of the reference plane) should be presented, as this enables comparison with the different recommendations in BS EN 17037.

20. Contour plots showing illuminances or daylight factors throughout the room may also be presented.

21. The proportional area of the reference plane exceeding a particular target value may also be presented. This value is labelled as 'SDA % of Area' on our contour plots. ('SDA' is an acronym for 'spatial daylight autonomy', which is a yearly metric that describes the percentage of room area that receives sufficient daylight according to the specified criteria in a particular standard.)

Sunlight to new dwellings

22. When calculating the sunlight, the BRE guide advises that:

> *If window positions are already known, a reference point on the inside face of the window aperture at the centre of the opening width and at least 1.2 m above the floor and 0.3 m above the sill (whichever is the higher) is used. Sunlight blocked by window reveals and balconies or overhangs above the window should not be included, but the effect of window frames and bars can be discounted. Surrounding obstructions should be modelled in detail, and if this is done a minimum solar altitude, as suggested in BS EN 17037, need not apply. If a room has multiple windows, the amount of sunlight received by each can be added together provided they occur at different times and sunlight hours are not double counted.*

23. In a room with multiple windows, our computer software calculates the total sunlight hours across all its windows without double counting.

Glossary of terms

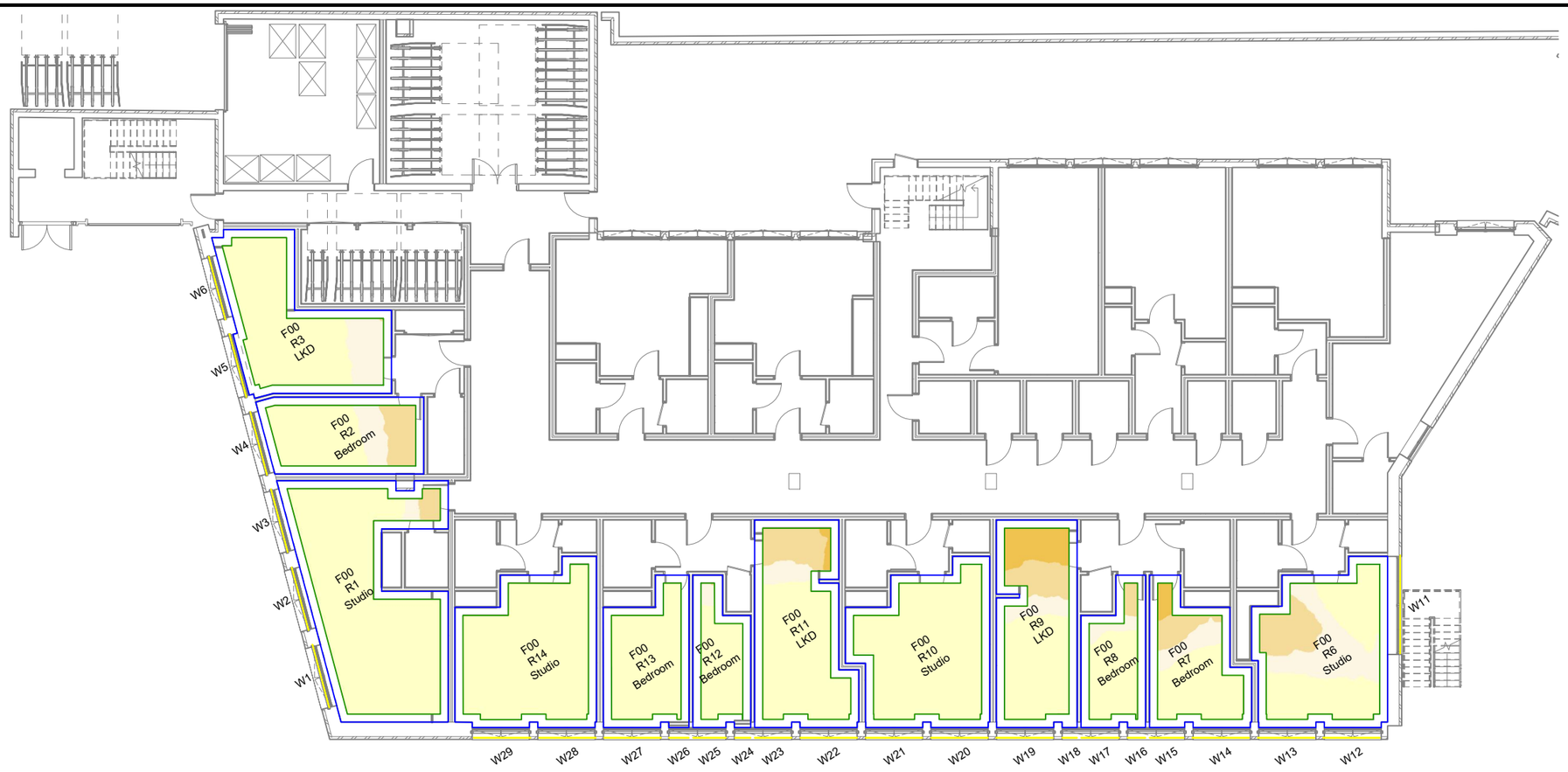
24. The daylight and sunlight terminology used in our report is explained below.

Term	Meaning
Daylight, natural light	Combined skylight and sunlight.
Illuminance	A measure of the amount of light falling on a surface, usually measured in lux.
Diffuse horizontal illuminance (from the sky)	Illuminance produced by skylight on a horizontal surface on the Earth.

Term	Meaning
Target illuminance	Illuminance from daylight that should be achieved for at least half of annual daylight hours across a specified fraction of the reference plane in a daylit space.
Climate-based daylight modelling	The prediction of daylight illuminance across a grid of points on the working plane inside a room at no greater than hourly intervals in a typical year using hourly climate data for a typical year collected by a weather station near to the site's location and a mathematical model for the spatial distribution of real-world sky luminance (e.g., the Perez All-Weather Sky Model).
Daylight factor	Ratio of total daylight illuminance at a reference point on the working plane within a space to outdoor illuminance on a horizontal plane due to an unobstructed CIE standard overcast sky.
Target daylight factor	Daylight factor value equivalent to the target illuminance to be exceeded for more than half of annual daylight hours over a specified fraction of the reference plane within a daylit space.
CIE standard overcast sky	A theoretical completely overcast sky whose luminance varies with angle of elevation, being three times brighter at the zenith (vertically overhead) than on the horizon, but not with orientation.
Obstruction angle	The angular altitude of the top of an obstruction above the horizontal, measured from a reference point in a vertical plane in a section perpendicular to the vertical plane.
Vertical sky component (**VSC**)	The amount of daylight falling on a vertical wall or window. It is the ratio of that part of illuminance, at a point on a given vertical plane (e.g. window), that is received directly from a CIE standard overcast sky, to simultaneous illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. The VSC does not include reflected light, either from the ground or from other buildings. The ratio is usually expressed as a percentage. The maximum value is almost 40% for a completely unobstructed vertical wall.
Reference plane or working plane	Horizontal, vertical, or inclined plane in which a visual task lies. Normally the working plane may be taken to be horizontal, 0.85 m above the floor in housing.
Assessment grid or calculation grid	Grid of calculation points on the reference plane that is used to calculate daylight factor or illuminance from daylight.

Appendix 2

Daylight and sunlight results for proposed dwellings



NO DIMENSIONS TO BE SCALED FROM THIS DRAWING

KEY:
Median illuminance (lux)
- ≥ 200
- ≥ 150
- ≥ 100
- ≥ 50
- < 50

SOURCE DATA:
EXISTING & SURROUNDING BUILDINGS:
Accucities 3D model
3D model received on 07/05/2024

PROPOSED BUILDINGS:
BOEHM-LYNAS
3D model received on 08/07/2024

052-BL-PD-XX-XX-BIM-A-PD2_CENTRAL

NOTES:

REV	Description	Drawn	Date

DELVA PATMAN REDLER
Chartered Surveyors

London 020 7936 3668
Liverpool 0151 242 0980
Bristol 0117 450 9703

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TITLE:
PARMA HOSUE
CLARENDON ROAD
N22 6UL

DRAWING:
DAYLIGHT ILLUMINANCE STUDY
Plan View
PD1b

DRAWN: MJ	JOB NBR: 24215
SCALE: 1:200@A3	
DATE: 08/07/2024	
DWG NO: ST-09-007_1	REV: -

F02

F03

NO DIMENSIONS TO BE SCALED FROM THIS DRAWING

KEY:
Median illuminance (lux)

- ≥ 200
- ≥ 150
- ≥ 100
- ≥ 50
- < 50

SOURCE DATA:
EXISTING & SURROUNDING BUILDINGS:
Accucities 3D model
3D model received on 07/05/2024

PROPOSED BUILDINGS:
BOEHM-LYNAS
3D model received on 08/07/2024

052-BL-PD-XX-XX-BIM-A-PD2_CENTRAL

NOTES:

REV	Description	Drawn	Date

DELVA PATMAN REDLER
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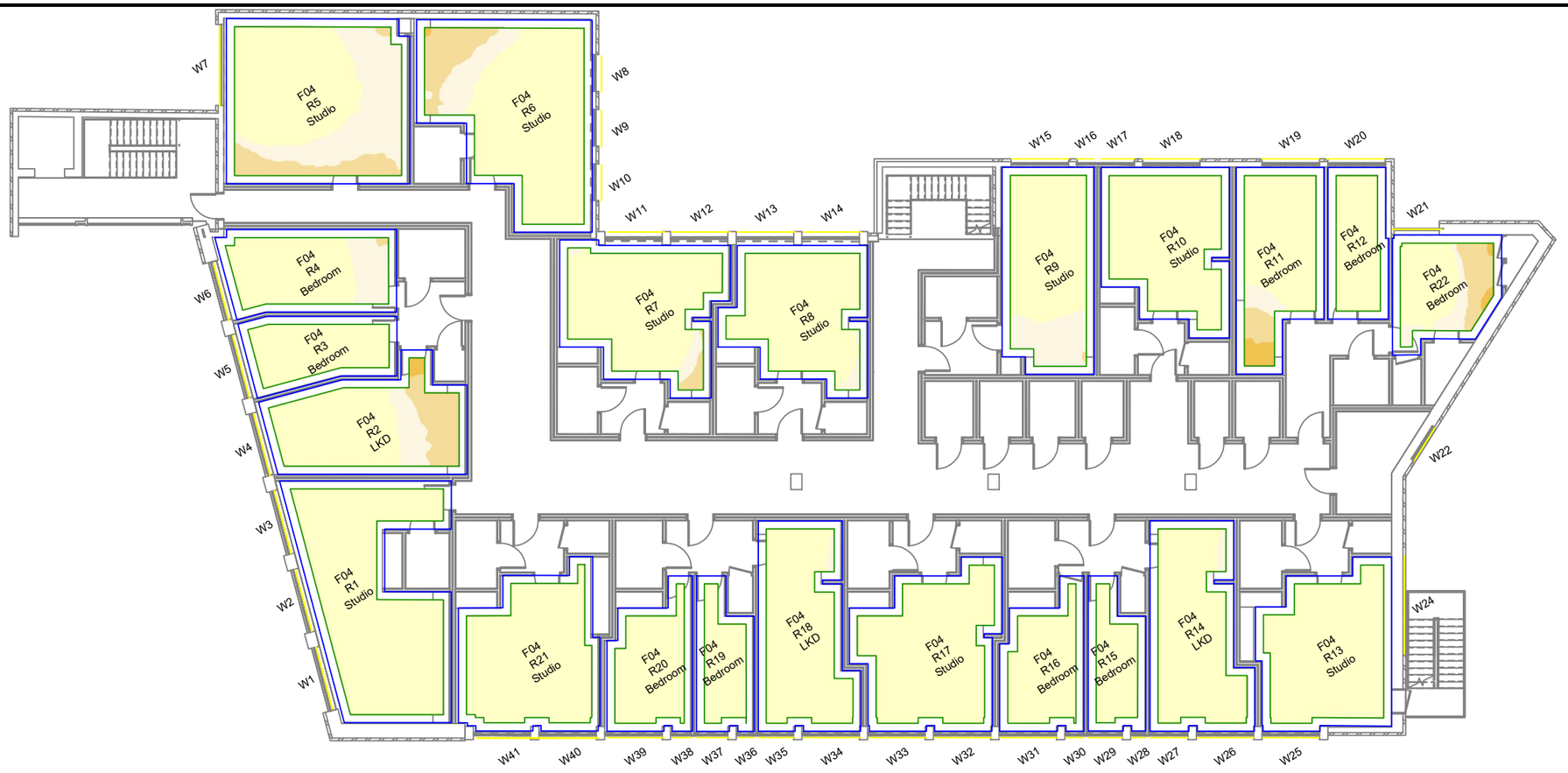
TITLE:
PARMA HOSUE
CLARENDON ROAD
N22 6UL

DRAWING:
DAYLIGHT ILLUMINANCE STUDY
Plan View
PD1b

DRAWN: MJ	JOB NBR: 24215
SCALE: 1:200@A3	
DATE: 08/07/2024	
DWG NO: ST-09-007_2	REV: -



NO DIMENSIONS TO BE SCALED FROM THIS DRAWING

KEY:
Median illuminance (lux)
- ≥ 200
- ≥ 150
- ≥ 100
- ≥ 50
- < 50

SOURCE DATA:
EXISTING & SURROUNDING BUILDINGS:
Accucities 3D model
3D model received on 07/05/2024

PROPOSED BUILDINGS:
BOEHM-LYNAS
3D model received on 08/07/2024

052-BL-PD-XX-XX-BIM-A-PD2_CENTRAL

NOTES:

REV	Description	Drawn	Date

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TITLE:
PARMA HOSUE
CLARENDON ROAD
N22 6UL

DRAWING:
DAYLIGHT ILLUMINANCE STUDY
Plan View
PD1b

DRAWN: MJ	JOB NBR: 24215
SCALE: 1:200@A3	
DATE: 08/07/2024	
DWG NO: ST-09-007_3	REV: -

Property & room attributes					Daylight/Sunlight (BRE 2022)				
					Daylight (illum)			Sun exp.	BS EN17037
Floor	Flat/Unit no.	Room ref.	Property type	Room use	Target illum (lx)	Median illum (lx)	% area ≥target	Room (Hrs)	Rm Sun exp. level
Parma House									
F00	Measured	R1	Residential	Studio	150	556	97%	2.1	Minimum
	Measured	R2	Residential	Bedroom	100	244	100%	2.2	Minimum
	Measured	R3	Residential	LKD	150	535	100%	2.3	Minimum
	Measured	R6	Residential	Studio	150	211	83%	2.4	Minimum
	Measured	R7	Residential	Bedroom	100	264	93%	2.8	Minimum
	Measured	R8	Residential	Bedroom	100	332	100%	4.0	Medium
	Measured	R9	Residential	LKD	150	225	65%	6.3	High
	Measured	R10	Residential	Studio	150	507	100%	7.1	High
	Measured	R11	Residential	LKD	150	424	81%	7.1	High
	Measured	R12	Residential	Bedroom	100	610	100%	7.5	High
	Measured	R13	Residential	Bedroom	100	715	100%	7.4	High
	Measured	R14	Residential	Studio	150	632	100%	6.9	High
F01	Measured	R1	Residential	Studio	150	642	100%	2.5	Minimum
	Measured	R2	Residential	LKD	150	178	59%	2.5	Minimum
	Measured	R3	Residential	Bedroom	100	368	100%	2.5	Minimum
	Measured	R4	Residential	Bedroom	100	243	100%	2.2	Minimum
	Measured	R7	Residential	Studio	150	191	60%	0.0	Not met
	Measured	R8	Residential	Studio	150	196	59%	0.0	Not met
	Measured	R14	Residential	LKD	150	248	65%	6.6	High
	Measured	R15	Residential	Bedroom	100	567	100%	7.1	High
	Measured	R16	Residential	Bedroom	100	824	100%	7.1	High
	Measured	R17	Residential	Studio	150	768	100%	7.1	High
	Measured	R18	Residential	LKD	150	608	97%	7.1	High
	Measured	R19	Residential	Bedroom	100	882	100%	7.5	High
	Measured	R20	Residential	Bedroom	100	1046	100%	7.4	High
	Measured	R21	Residential	Studio	150	899	100%	7.0	High
F02	Measured	R1	Residential	Studio	150	742	100%	2.8	Minimum
	Measured	R2	Residential	LKD	150	203	62%	2.8	Minimum
	Measured	R3	Residential	Bedroom	100	445	100%	2.7	Minimum
	Measured	R4	Residential	Bedroom	100	269	100%	2.4	Minimum
	Measured	R5	Residential	Studio	150	173	65%	0.0	Not met
	Measured	R6	Residential	Studio	150	213	67%	2.1	Minimum
	Measured	R7	Residential	Studio	150	285	80%	0.0	Not met
	Measured	R8	Residential	Studio	150	314	84%	0.0	Not met
	Measured	R9	Residential	Studio	150	169	54%	0.0	Not met
	Measured	R10	Residential	Studio	150	284	79%	0.0	Not met
	Measured	R11	Residential	Studio	150	287	84%	0.0	Not met
	Measured	R13	Residential	Studio	150	513	100%	7.3	High
	Measured	R14	Residential	LKD	150	620	99%	7.1	High
	Measured	R15	Residential	Bedroom	100	842	100%	7.5	High
	Measured	R16	Residential	Bedroom	100	1079	100%	7.4	High
	Measured	R17	Residential	Studio	150	912	100%	7.1	High

Orange or Red = Below guidelines (Orange = within 20% of guideline)
Grey APSH = not a main living room

Property & room attributes					Daylight/Sunlight (BRE 2022)				
					Daylight (illum)			Sun exp.	BS EN17037
Floor	Flat/Unit no.	Room ref.	Property type	Room use	Target illum (lx)	Median illum (lx)	% area ≥target	Room (Hrs)	Rm Sun exp. level
	Measured	R18	Residential	LKD	150	712	100%	7.1	High
	Measured	R19	Residential	Bedroom	100	995	100%	7.5	High
	Measured	R20	Residential	Bedroom	100	1178	100%	7.4	High
	Measured	R21	Residential	Studio	150	1103	100%	7.1	High
F03	Measured	R1	Residential	Studio	150	1034	100%	2.8	Minimum
	Measured	R2	Residential	LKD	150	287	79%	2.8	Minimum
	Measured	R3	Residential	Bedroom	100	632	100%	2.7	Minimum
	Measured	R4	Residential	Bedroom	100	395	100%	2.4	Minimum
	Measured	R5	Residential	Studio	150	188	76%	0.0	Not met
	Measured	R6	Residential	Studio	150	286	76%	2.3	Minimum
	Measured	R7	Residential	Studio	150	366	92%	0.0	Not met
	Measured	R8	Residential	Studio	150	417	94%	0.0	Not met
	Measured	R9	Residential	Studio	150	260	72%	0.8	Not met
	Measured	R10	Residential	Studio	150	411	96%	0.0	Not met
	Measured	R11	Residential	Studio	150	426	97%	0.0	Not met
	Measured	R12	Residential	Studio	150	206	64%	3.6	Medium
	Measured	R13	Residential	Studio	150	722	100%	7.1	High
	Measured	R14	Residential	LKD	150	714	100%	7.1	High
	Measured	R15	Residential	Bedroom	100	907	100%	7.5	High
	Measured	R16	Residential	Bedroom	100	1145	100%	7.4	High
	Measured	R17	Residential	Studio	150	950	100%	7.1	High
	Measured	R18	Residential	LKD	150	732	100%	7.1	High
	Measured	R19	Residential	Bedroom	100	1018	100%	7.5	High
	Measured	R20	Residential	Bedroom	100	1205	100%	7.4	High
	Measured	R21	Residential	Studio	150	1136	100%	7.1	High
F04	Measured	R1	Residential	Studio	150	915	100%	0.0	Not met
	Measured	R2	Residential	LKD	150	263	77%	0.0	Not met
	Measured	R3	Residential	Bedroom	100	588	100%	0.0	Not met
	Measured	R4	Residential	Bedroom	100	359	100%	0.0	Not met
	Measured	R5	Residential	Studio	150	209	88%	0.0	Not met
	Measured	R6	Residential	Studio	150	365	88%	5.1	High
	Measured	R7	Residential	Studio	150	451	96%	0.0	Not met
	Measured	R8	Residential	Studio	150	514	100%	0.0	Not met
	Measured	R9	Residential	Studio	150	345	100%	0.8	Not met
	Measured	R10	Residential	Studio	150	530	100%	0.3	Not met
	Measured	R11	Residential	Bedroom	100	318	94%	0.3	Not met
	Measured	R12	Residential	Bedroom	100	462	100%	0.1	Not met
	Measured	R13	Residential	Studio	150	500	100%	7.1	High
	Measured	R14	Residential	LKD	150	742	100%	7.1	High
	Measured	R15	Residential	Bedroom	100	939	100%	7.5	High
	Measured	R16	Residential	Bedroom	100	1182	100%	7.4	High
	Measured	R17	Residential	Studio	150	971	100%	7.1	High
	Measured	R18	Residential	LKD	150	745	100%	7.1	High
	Measured	R19	Residential	Bedroom	100	1030	100%	7.5	High

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Property & room attributes					Daylight/Sunlight (BRE 2022)				
					Daylight (illum)			Sun exp.	BS EN17037
Floor	Flat/Unit no.	Room ref.	Property type	Room use	Target illum (lx)	Median illum (lx)	% area ≥target	Room (Hrs)	Rm Sun exp. level
	Measured	R20	Residential	Bedroom	100	1227	100%	7.4	High
	Measured	R21	Residential	Studio	150	1152	100%	7.1	High
	Measured	R22	Residential	Bedroom	100	205	97%	0.0	Not met
F05	Measured	R1	Residential	Studio	150	798	100%	2.2	Minimum
	Measured	R2	Residential	LKD	150	256	78%	2.2	Minimum
	Measured	R3	Residential	Bedroom	100	524	100%	2.2	Minimum
	Measured	R4	Residential	Bedroom	100	342	100%	2.2	Minimum
	Measured	R5	Residential	Studio	150	212	94%	0.0	Not met
	Measured	R6	Residential	Studio	150	385	94%	5.2	High
	Measured	R7	Residential	Studio	150	384	98%	0.0	Not met
	Measured	R8	Residential	Studio	150	470	100%	0.0	Not met
	Measured	R9	Residential	Studio	150	342	100%	0.8	Not met
	Measured	R10	Residential	Studio	150	502	100%	0.3	Not met
	Measured	R11	Residential	Studio	150	553	100%	0.3	Not met
	Measured	R12	Residential	Studio	150	186	71%	4.3	High
	Measured	R13	Residential	Studio	150	1024	100%	8.6	High
	Measured	R14	Residential	LKD	150	658	100%	7.1	High
	Measured	R15	Residential	Bedroom	100	817	100%	7.5	High
	Measured	R16	Residential	Bedroom	100	1013	100%	7.4	High
	Measured	R17	Residential	Studio	150	847	100%	7.1	High
	Measured	R18	Residential	LKD	150	652	100%	7.1	High
	Measured	R19	Residential	Bedroom	100	894	100%	7.5	High
	Measured	R20	Residential	Bedroom	100	1060	100%	7.4	High
	Measured	R21	Residential	Studio	150	954	100%	7.1	High

Orange or Red = Below guidelines (Orange = within 20% of guideline)
Grey APSH = not a main living room