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Charlotte Street 66, London W1T 4QD

Internal Daylight Assessment

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Contents

Executive Summary

Price & Myers have been instructed to carry out an internal daylight assessment in order to support the planning application of the proposed development at Charlotte Street 66, London. The purpose of this report is to determine whether the proposed design meets the criteria set out in the Building Research Establishment Report 'Site layout planning for daylight and sunlight - A guide to good practice' (2011) and British Standard BS 8206-02 'Lighting for buildings – Part 2: Code of practice for daylighting' (2008).

Daylight levels within the habitable spaces of residential units of the proposed development were tested. These levels were checked against the British standard BS 8206-02 to support the planning application. The internal daylight simulations show that all living cum dining cum kitchen spaces receive adequate daylight and meet the required values of ADF of 2.0%. The assessment also confirms that daylight levels within the bedrooms on 1st to 4th levels are above minimum recommended values of 1%.

The assessment confirms that daylight levels within all of the habitable rooms in the development are above the minimum standards receiving ADF values exceeding the minimum standards. Therefore, it can be concluded that most of the habitable rooms will be well daylit throughout the year.

1 Introduction

Price & Myers have been instructed to carry out an internal daylight assessment in order to support the planning application of the proposed development at Charlotte Street 66, London.

The proposed scheme comprises a 5-storey mixed-use development with commercial spaces on the ground and dwellings on the upper levels. The first and second floors have one apartment each, whereas, the third and fourth floors are designed as a duplex apartment.

The purpose of this report is to determine whether the proposed design meets the criteria set out in the Building Research Establishment Report 'Site layout planning for daylight and sunlight - A guide to good practice' (2011) and British Standard BS 8206-02 'Lighting for buildings – Part 2: Code of practice for daylighting' (2008).

The assessment is based on drawings provided by the architect for the proposed development including information on the adjacent buildings. Street views and site photos were also used to model the surroundings of the project site. The living, bedroom and kitchen areas for the dwellings have been tested for daylighting which are located on the first to fourth building levels. Building elevations, materiality and fenestration is as per the design intent of the architect.

2 Site Analysis

2.1 Site surrounding buildings

The site is located on Charlotte Street with Tottenham Street to the south. 66 Charlotte Street is bound by mixed use development on either side and is currently occupied by commercial and office spaces. It is mostly surrounded by other commercial developments.

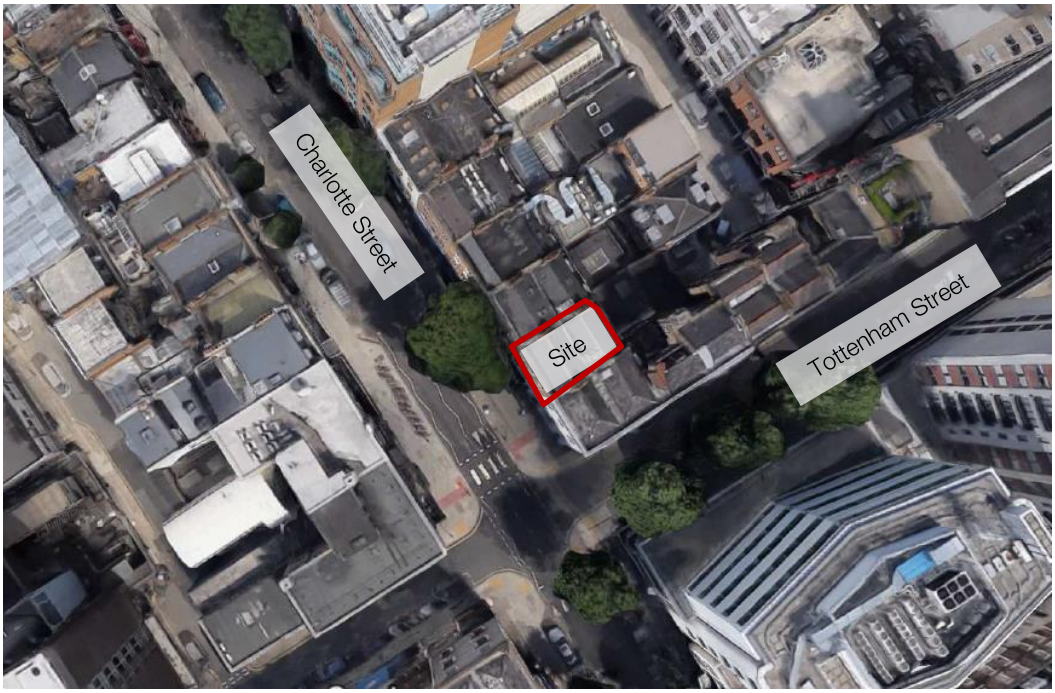

Figure 2-1 Site surrounding buildings

2.2 Site Model

A three-dimensional model was built in AutoCAD using the drawings provided by Roland Cowan Architects for the proposed development at 66 Charlotte Street and adjacent properties. Other surrounding buildings were modelled on the basis of information available from site pictures and internet mapping.

Internal daylight assessment was carried out for all habitable dwelling spaces that are located on the first to fourth levels. A light well is planned at the rear of the development which is intended to provide daylight access to adjacent bedrooms on levels 1-3. Additional roof lights have been provided on the roof to allow daylight into the fourth floor. All window openings and roof lights are modelled as per architectural drawings. Internal and external material reflectance values are assumed depending on design intention.

All floor plans with habitable spaces that have been considered for internal daylight assessment have been illustrated in Appendix B.

3 Internal Daylight Assessment

The quality and quantity of daylighting in an interior space depends on two main factors. The design of the interior environment is important: the size and position of windows, the depth and shape of the rooms and the colours of the internal surfaces are all important aspects. The design of the external environment also plays a major role and the presence of surrounding buildings will affect the amount of sunlight and daylight that is available.

Average daylight factor (ADF) is used as the measure of general illumination from skylight. The average daylight factor is the ratio of total daylight flux incident on a reference area to the total area of the reference plane, expressed as a percentage of outdoor illuminance on a horizontal plane due to an unobstructed hemisphere of sky of assumed or known luminance distribution.

It is considered general good practice to ensure that rooms in most buildings should have a predominantly daylit appearance.

The analysis of the required spaces was carried out under an overcast sky scenario (4000 lux), which is the predominant sky type in London, and is effectively the worst-case scenario. The daylighting levels are measured on the working plane level that is assumed at 0.85m for residential developments as defined in Building Research Establishment Report 'Site layout planning for daylight and sunlight: A guide to good practice' 2011.

In addition to the BRE guide, the British Standard BS 8206-02 'Lighting for buildings – Part 2: Code of practice for daylighting' (2008) has also been used for guidance in the assessment. As per the BS 8206-02, the minimum ADF values in a dwelling should be as following:

- 2% in kitchens,
- 1.5% in living rooms, and
- 1% in bedrooms

"Where one room serves more than one purpose, the minimum average daylight factor should be that for the room type with the highest value. For example, in a space which combines a living room and a kitchen the minimum average daylight factor should be 2%." – BS 8206-2:2008.

According to the general guidance, if the average daylight factor in a room is at least 5% then artificial lighting is usually not required during day time. If the ADF is between 2% and 5% then some supplementary artificial lighting may be required even though the room will have a daylit appearance.

The assessment needs to be carried out only for the habitable rooms where occupants have a reasonable expectation of daylight. As the BRE guide states that

'The guidelines given here are intended for use in adjoining dwellings where daylight is required, including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed.'

Internal Daylight Calculations

Daylight availability has been studied through simulations carried out on Autodesk Ecotect Analysis 2011 and Radiance 2.0. A three-dimensional model was built in AutoCAD using survey drawings for the proposed development and the adjacent properties. Other surrounding buildings were modelled on the basis of information available from survey drawings and internet mapping.

Simulations for daylight factor have been done on each floor of 66 Charlotte Street where habitable dwelling spaces are located. Material properties have been set as per intended design and window openings have been made as per drawings. The external finish for the proposed building's light well facing wall is assumed to be highly reflective.
The surface and glazing properties used for this assessment are presented in Appendix A.
Table 3-1shows average daylight factors of all the tested rooms within the proposed building.

ACCEPTANCE CRITERIA			Minimum ADF Required	Average Daylight Factor ADF (%)
Dwelling	Floor Level	Room Type		
1	1st	Living/Kitchen/Dining	2.0%	3.10%
		Bedroom 1	1%	2.45%
		Bedroom 2	1%	4.48%
2	2nd	Living/Kitchen/Dining	2.0%	2.01%
		Bedroom 1	1%	2.65%
		Bedroom 2	1%	6.04%
3	3rd	Living/Kitchen/Dining	2.0%	2.05%
		Bedroom 1	1%	2.79%
	4th	Bedroom 2	1%	3.78%
		Bedroom 3	1%	4.11%
		Bedroom 4	1%	5.03%

Table 3-1 Average Daylight Factors

The internal daylight simulations show that all living, dining and kitchen spaces that are street facing receive adequate daylight, with an average daylight factor ranging from 2.01%-3.1%. These are above minimum ADF required (2.0%) for a living cum dining cum kitchen.

The bedroom spaces on all levels receive adequate daylight as well, showing ADF values higher than the recommended 1% for bedroom spaces. The light well facing 'Bedroom 2' on the second floor shows ADF value (6.04%) higher than the recommended 2%-5%. Blinds may be required occasionally. This is not seen as a concern since the bedrooms may not be frequently used during the daytime.

4 Conclusion

An internal daylight assessment was carried out for the proposed development at 66 Charlotte Street. A three-dimensional model was built using the drawings provided by Roland Cowan Architects for the proposed development and adjacent properties.

Daylight levels within the habitable spaces of residential units of the proposed development were tested. These levels were checked against the British standard BS 8206-02 to support the planning application. The internal daylight simulations show that all living cum dining cum kitchen spaces receive adequate daylight and meet the required values of ADF of 2.0%. The assessment also confirms that daylight levels within the bedrooms on 1st to 4th levels are above minimum recommended value of 1%.

The light well facing 'Bedroom 2' on the second floor shows ADF value (6.04%) higher than the recommended 2%-5%. However, it should be considered that the bedroom will not be used frequently during daytime and any possibility of occasional glare can easily be controlled using blinds. The architect has made all possible endeavours to ensure daylight within all the habitable rooms by providing a light well for spaces that are not street facing.

Based on the analysis above, it can be concluded that all of the habitable rooms in the development will be well daylit throughout the year.

5 Appendix A

It is suggested that the surface reflectance and transmittance values that have been assumed for the assessment should be achieved in design. These values are presented in the tables below.

Table 5-1 Surface reflectivity values used for materials modelled

Model Input Data	Surface Reflectivity (0-1) by BRE
Window	0.75
Wall (all building walls)	0.5
Light well wall surfaces	0.8
Floor	0.3
Ceiling	0.7

Table 5-1 Visible transmittance values assumed for modelled glazing types

Glazing type	Visible Transmittance (0-1)
Window: Transparent	0.75
Roof Light: Translucent	0.60

6 Appendix B

Building Floor Plans indicating habitable spaces

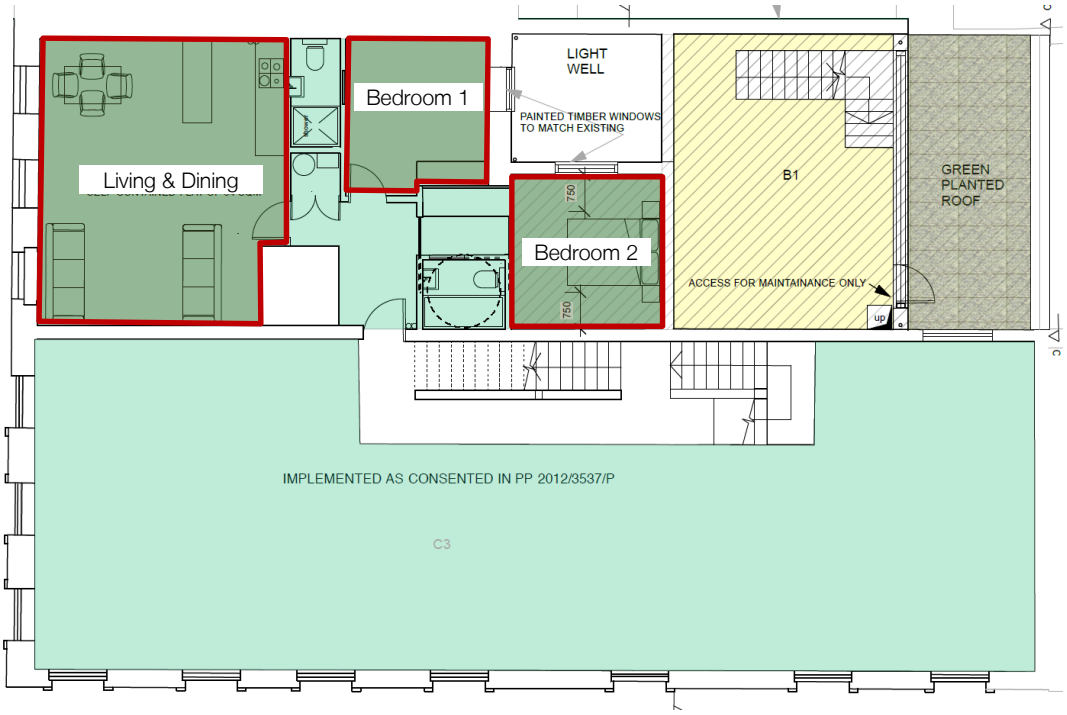

Figure 6-1: First Floor Plan – Dwelling 1

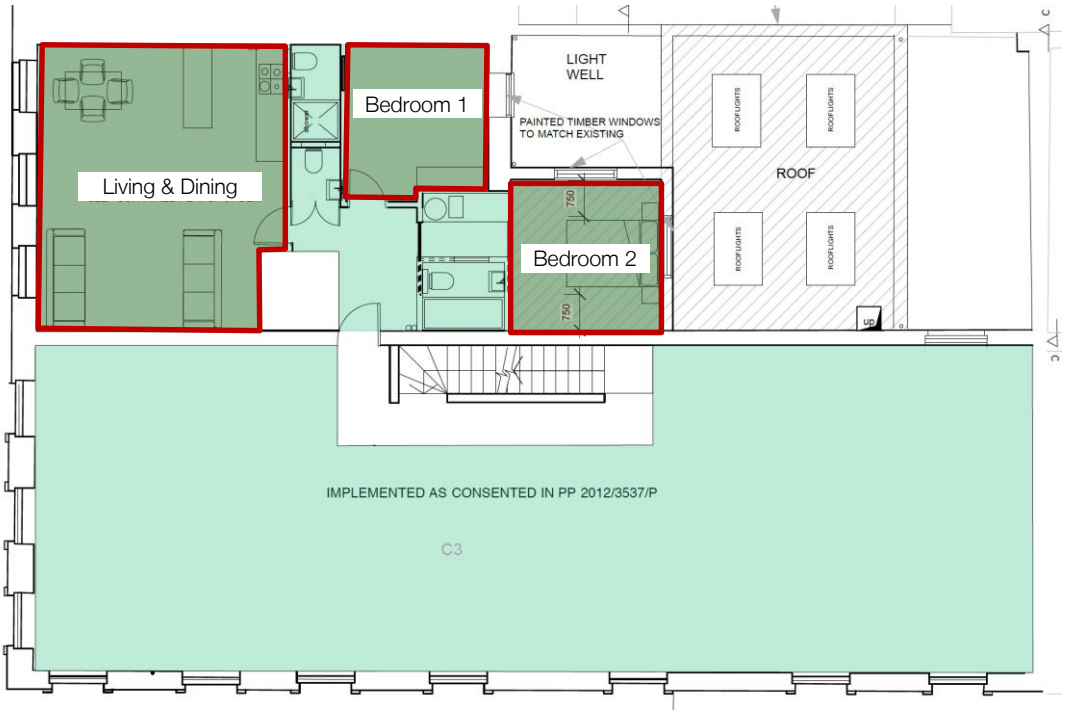

Figure 6-2: Second Floor Plan – Dwelling 2

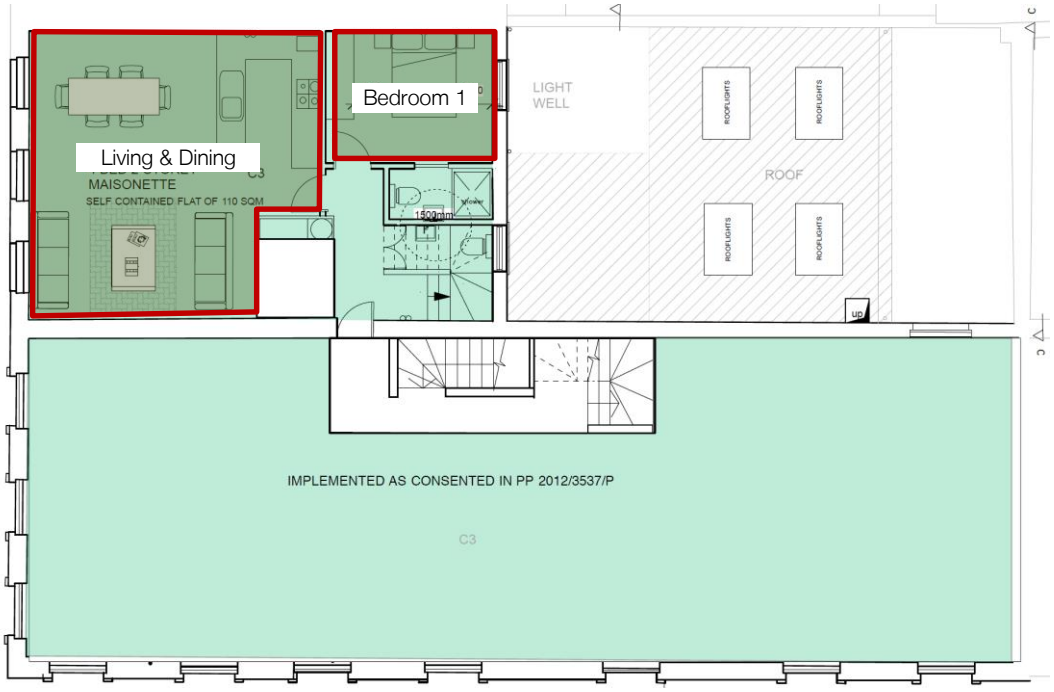

Figure 6-3: Third Floor Plan – Dwelling 3

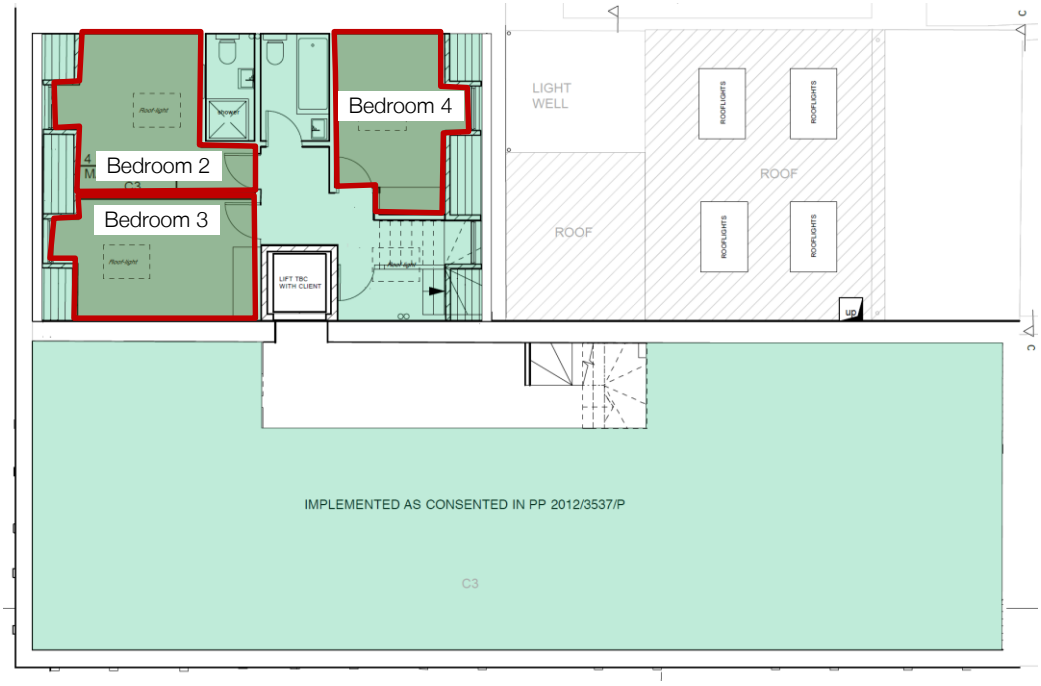

Figure 6-4: Fourth Floor Plan – Dwelling 3