model environments

Vernon House, London
Internal Daylight and External Impact Report

Rev C

Date 20th June 2019

TABLE OF CONTENTS

SCOPE

Model Environments Ltd was appointed by SAV Group to assess the internal natural light levels within the proposed redevelopment of an infill extension to four flats within Vernon House, St Marks Square, London. Checks were also made of any potential impact to neighbouring properties' access to natural light. The proposal comprises an extension to the existing ground floor infill, and the addition of three further floors above, with one unit being extended on each floor.

Impact has been assessed using the criteria set out in '*Site layout planning for daylight and sunlight – a guide to good practice*' by PJ Littlefair, published by the Building Research Establishment (BRE). Whilst the guide itself states that its guidelines are not mandatory, they are those predominantly referenced for daylight and sunlight standards in the UK.

It is important to note that with any modelling exercise there are assumptions and approximations that have to be made. As far as possible, details of all assumptions made, and approximations used are supplied as part of the report. These should be read carefully. All results are based on the output from computer modelling software and should be taken as an indication of the likely final situation, but these conditions cannot be guaranteed.

EXECUTIVE SUMMARY

All the habitable rooms tested within the proposed flats at Vernon House meet or exceed recommended benchmarks for internal levels of daylight.

The external impact of the proposal upon its neighbours is slight and is fully compliant with good practice, in line with BRE guidance.

METHODOLOGY

There are no national planning policy guidelines on sunlight, daylight and the effects of overshadowing. At the local level, the document *Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice'* by Paul Littlefair of the Building Research Establishment (BRE, 2011) has been adopted into many council's Unitary Plans and, even where some local authorities have not explicitly adopted the methodology, it is widely recognised as the best available means of determining potential impacts of this type. This assessment has been carried out in accordance with the best practice guidelines stated in this reference.

It should be noted that the guide says of itself that the intention is to help rather than constrain the designer, and that its advice is not mandatory. Further, whilst the document provides numerical guidelines for various natural light derived parameters, it advises that these should be applied flexibly, stating "the acceptability criteria should not be seen as absolute targets since natural light is only one of several factors in site layout design".

The BRE guidelines describe three separate parameters to quantify the potential effect of a new building on the light levels of its neighbours:

- **Daylight** – i.e. the impacts of all direct and indirect sunlight during the daytime;
- **Sunlight** – i.e. the impacts of only the direct sunlight; and
- **Overshadowing of Gardens and Open spaces**.

The table below summarises the criteria used for assessment in this study.

Parameter	Criteria	Acceptability Criteria	Source
Daylight	Angle to sky from the horizontal	Maximum 25°	BRE
	Vertical sky component (VSC)	Greater than 27%	BRE
	Average daylight factor (ADF)	Greater than 1-2% dependant on room use	BRE/BS 8206
	Percentage of the working plane behind the "No-Sky Line" (NSL)	"Significant Part"/80%*	BRE/BS 8206
Sunlight	Annual probable sunlight hours (APSH) - full year	Greater than 25%**	BRE
	Annual probable sunlight hours (APSH) - winter months	Greater than 5%**	BRE

* Whilst the guidelines describe the methodology for determining the percentage of the working plane that has a direct view of the sky, it does not give an acceptability criterion, only that supplementary electric lighting will be required if a "significant part" of the working plane lies beyond the no-sky line. However, the Code for Sustainable Homes and BS 8206 suggest that each room requires a minimum of 80%.

** Applies only to main living rooms, not to bedrooms, kitchens or other non-habitable rooms.

Daylight Assessment Methodology

The BRE guidelines propose that the impact to daylight be measured by the Vertical Sky Component (VSC), calculated for selected windows in the existing and proposed cases, and the values compared. The VSC is a general measure of the potential daylight available to a window. If, in the proposed case, the value of the VSC drops below 27% and drops below 0.8 times its former value, then occupants of the affected building will notice the reduction in daylight.

Sunlight Assessment Methodology

The BRE Report states that a new development may adversely affect the level of sunlight at an existing building if the centre of the window in a main living room receives less than one quarter of the annual probable sunlight hours (APSH) in a year or less than 5% of annual probable sunlight hours between 21 September - 21 March *and* is less than 0.8 times its former value in either period *and* has a reduction of APSH over 4%.

Internal Daylighting Assessment Methodology

For interior daylight recommendations, the BRE guidelines quotes the British Standard *Code of Practice for Daylighting* (BS8206-2) and CIBSE Lighting Guide LG10 *Daylighting and Window Design.* The guidance advises that only habitable rooms such as kitchens, living rooms, dining rooms, studies and bedrooms should be analysed.

The principal measurement is the Average Daylight Factor (ADF); this gives an indication of the levels of natural light within each room, the ADF is calculated over the working plane, which for residential rooms is set at 0.85m above floor level. The recommended minimum ADF values are: kitchens: 2.0%, living rooms: 1.5%, and bedrooms: 1.0%.

THE MODEL

The calculations were made using Ecotect 5.6 software from Autodesk Ltd and Radiance from Lawrence Berkeley Laboratories. Three-dimensional electronic models suitable for daylight/sunlight analysis were constructed to represent the current site conditions and the proposed development.

The model included a representation of buildings adjacent to the development site up to a distance judged to have an influence on the availability of natural light. The model was based on drawings and information supplied by the project's architect in May and June 2019.

Glazing was modelled with an overall transmittance of 0.6 to allow for the frame and pollution.

EXTERNAL IMPACT ASSESSMENT

Identification of Windows

The proposal is visible from the front facade windows of a row of properties across the street on Princess Road; based on this, 33 windows were identified for testing, spread across 6 properties; number 36 Regents Park Road and numbers 1, 3, 5, 7 and 9 Princess Road. A model image showing the windows tested appears below.

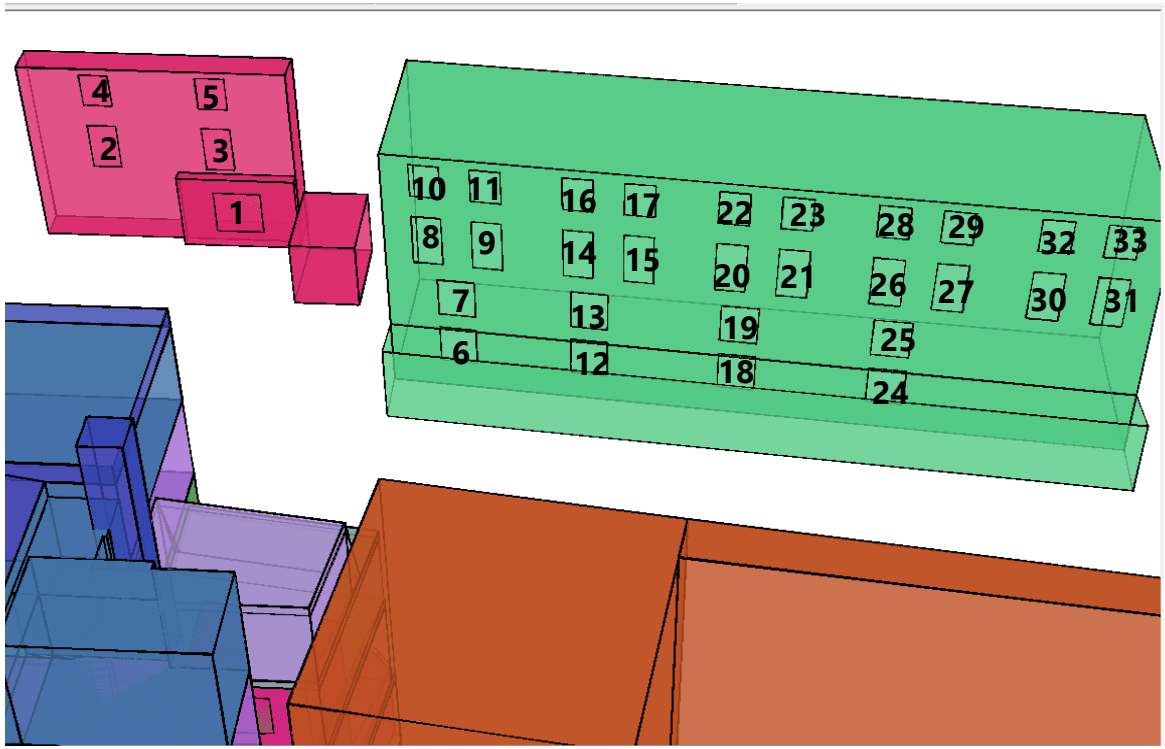

Image 1: Identification of Windows

Daylight Results

Building	Window	VSC Existing	VSC Proposed	Ratio	BRE Compliance
36 Regents Park Road	1	30%	29%	1.0	**Pass**
	2	33%	33%	1.0	**Pass**
	3	35%	34%	1.0	**Pass**
	4	36%	36%	1.0	**Pass**
	5	36%	36%	1.0	**Pass**
1 Princess Road	6	23%	23%	1.0	**Pass**
	7	29%	29%	1.0	**Pass**
	8	31%	31%	1.0	**Pass**
	9	31%	31%	1.0	**Pass**
	10	34%	34%	1.0	**Pass**
	11	34%	34%	1.0	**Pass**
3 Princess Road	12	24%	24%	1.0	**Pass**
	13	29%	29%	1.0	**Pass**
	14	31%	31%	1.0	**Pass**
	15	31%	31%	1.0	**Pass**
	16	34%	34%	1.0	**Pass**
	17	34%	34%	1.0	**Pass**

5 Princess Road	18	24%	24%	1.0	**Pass**
	19	29%	29%	1.0	**Pass**
	20	32%	32%	1.0	**Pass**
	21	32%	32%	1.0	**Pass**
	22	34%	34%	1.0	**Pass**
	23	34%	34%	1.0	**Pass**
7 Princess Road	24	24%	24%	1.0	**Pass**
	25	30%	30%	1.0	**Pass**
	26	32%	32%	1.0	**Pass**
	27	33%	33%	1.0	**Pass**
	28	35%	35%	1.0	**Pass**
	29	35%	35%	1.0	**Pass**
9 Princess Road	30	34%	34%	1.0	**Pass**
	31	34%	34%	1.0	**Pass**
	32	36%	36%	1.0	**Pass**
	33	36%	36%	1.0	**Pass**

The impact to all windows meets BRE good practice guidance regarding daylight.

Sunlight Results

Windows qualify for testing if they serve main living areas that face within 90° of south. The use of the rooms served by windows 1 – 33 is not known. For completeness all windows were tested for their access to Annual Probable Sunlight Hours (APSH), and Winter Probable Sunlight Hours (WPSH).

Building	Window	APSH Existing	APSH Proposed	Ratio	BRE Compliance	WPSH Existing	WPSH Proposed	Ratio	BRE Compliance
36 Regents Park Road	1	46%	46%	1.0	**Pass**	23%	22%	1.0	**Pass**
	2	46%	46%	1.0	**Pass**	23%	22%	1.0	**Pass**
	3	46%	46%	1.0	**Pass**	23%	22%	1.0	**Pass**
	4	46%	46%	1.0	**Pass**	23%	22%	1.0	**Pass**
	5	46%	46%	1.0	**Pass**	23%	22%	1.0	**Pass**
1 Princess Road	6	30%	30%	1.0	**Pass**	10%	10%	1.0	**Pass**
	7	42%	42%	1.0	**Pass**	21%	21%	1.0	**Pass**
	8	45%	45%	1.0	**Pass**	22%	22%	1.0	**Pass**
	9	43%	43%	1.0	**Pass**	20%	20%	1.0	**Pass**
	10	45%	45%	1.0	**Pass**	22%	22%	1.0	**Pass**
	11	44%	44%	1.0	**Pass**	21%	21%	1.0	**Pass**
3 Princess Road	12	34%	34%	1.0	**Pass**	15%	13%	0.9	**Pass**
	13	39%	39%	1.0	**Pass**	18%	18%	1.0	**Pass**
	14	40%	40%	1.0	**Pass**	18%	18%	1.0	**Pass**

	15	39%	39%	1.0	**Pass**	17%	17%	1.0	**Pass**
	16	42%	42%	1.0	**Pass**	19%	19%	1.0	**Pass**
	17	41%	41%	1.0	**Pass**	18%	18%	1.0	**Pass**
5 Princess Road	18	34%	34%	1.0	**Pass**	12%	12%	1.0	**Pass**
	19	38%	38%	1.0	**Pass**	15%	15%	1.0	**Pass**
	20	38%	38%	1.0	**Pass**	16%	16%	1.0	**Pass**
	21	39%	39%	1.0	**Pass**	16%	16%	1.0	**Pass**
	22	40%	40%	1.0	**Pass**	18%	17%	0.9	**Pass**
	23	40%	40%	1.0	**Pass**	17%	17%	1.0	**Pass**
7 Princess Road	24	34%	34%	1.0	**Pass**	12%	12%	1.0	**Pass**
	25	36%	36%	1.0	**Pass**	13%	13%	1.0	**Pass**
	26	37%	37%	1.0	**Pass**	14%	14%	1.0	**Pass**
	27	38%	38%	1.0	**Pass**	15%	15%	1.0	**Pass**
	28	39%	39%	1.0	**Pass**	16%	16%	1.0	**Pass**
	29	40%	40%	1.0	**Pass**	17%	17%	1.0	**Pass**
9 Princess Road	30	38%	38%	1.0	**Pass**	15%	15%	1.0	**Pass**
	31	38%	38%	1.0	**Pass**	15%	15%	1.0	**Pass**
	32	40%	40%	1.0	**Pass**	17%	17%	1.0	**Pass**
	33	40%	40%	1.0	**Pass**	17%	17%	1.0	**Pass**

The impact to the number of sunlight hours for all windows adheres to BRE good practice guidance.

INTERNAL DAYLIGHT RESULTS

Internal daylight levels were tested for five habitable rooms in the proposed infill development; the two ground floor rooms in unit G02; the kitchen and bedroom in 1st floor unit 113; and the living room in 2nd floor unit 213. This selection of proposed rooms was chosen using, professional judgement, due to the relative likelihood of their access to internal daylight being lower, across the proposal, than that expected in other habitable rooms.

Unit	Room	Average Daylight Factor(ADF)	Recommended Minimum	BRE Compliance
G02	Kitchen/Living	3.3%	2.0%	**Pass**
	Bedroom	1.0%	1.0%	**Pass**
113	Kitchen	4.0%	2.0%	**Pass**
	Bedroom	1.0%	1.0%	**Pass**
213	Living	1.6%	1.5%	**Pass**

All rooms tested meet or exceed benchmark's for internal daylighting. It is expected that the remaining untested rooms, which have better access to natural light than the five tested rooms, will have access to internal daylight exceeding the relevant benchmark's. Therefore the proposal is compliant with internal daylighting guidance.

A visual check of the four infill units, shows that all have living area's facing within 90° of south, as recommended by the BRE guide.

Below is an image of the model showing daylight across the working plane of the kitchen/living room of unit G02. The yellow grid squares represent a daylight factor of 10% or more; red squares have a daylight factor of 6%; blue squares have a daylight factor of 2%.

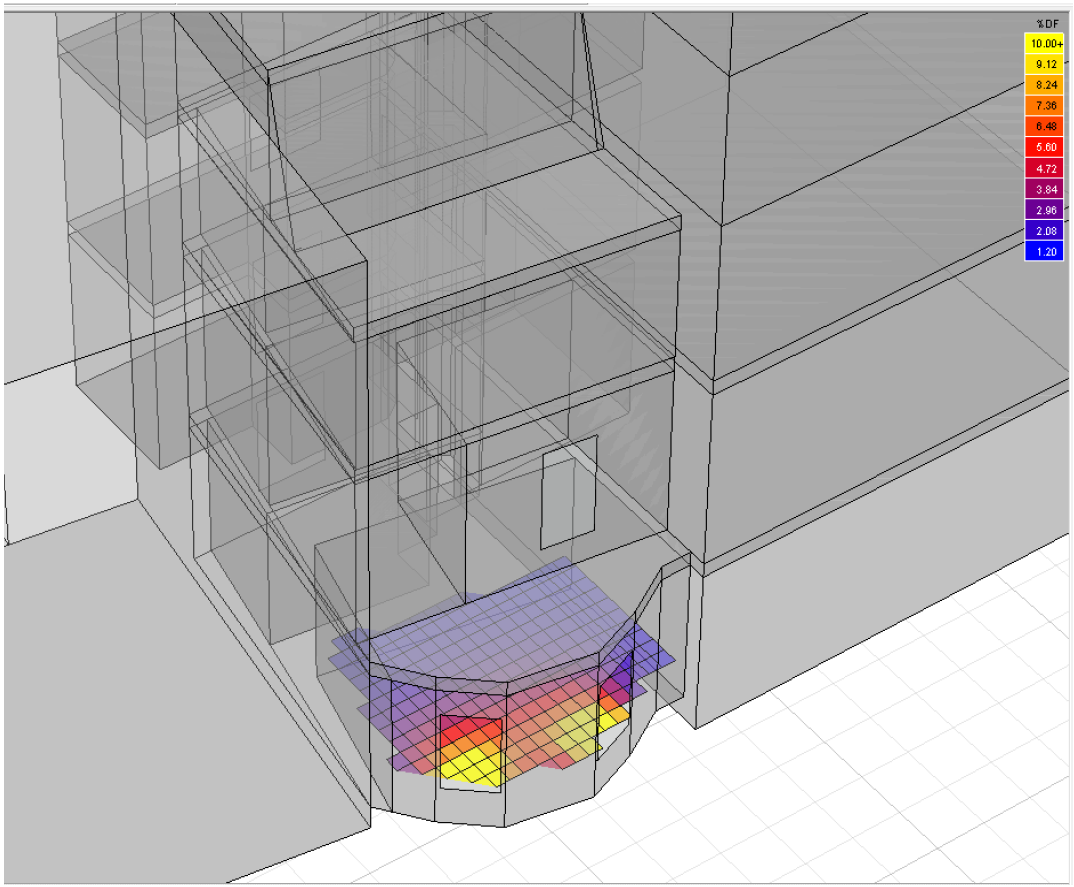

Image 2: Internal daylight in unit G02 kitchen/living room

CONCLUSION

- Overall, the proposal is acceptable in relation to BRE good practice guidance.

- The impact of the proposal on upon neighbouring properties' access to daylight and sunlight is negligible for all but two properties which are predicted to experience a very minor impact, well within good practice guidelines.

- The levels of daylight found within the rooms of the proposal are fully compliant with BRE guidelines.

Issue	Date	Remarks	Prepared by	Checked by
A	14th June 2019		Harry Westaway	Isabel Why
B	17th June 2019	QA	Harry Westaway	Isabel Why
C	20th June 2019		Harry Westaway	