

Appendix 9.1

Methodology and Baseline

Methodology

Outline Approach for Daylight, Sunlight and Overshadowing Assessments

- 1.1 The technical analyses carried out to inform the assessments have been undertaken by creating a digital three dimensional (3D) model of the existing site and Proposed Development, based on measured survey data.

Daylight

Vertical Sky Component

- 1.2 The VSC method of assessment is defined in the BRE Guidelines as the:

“ratio of that part of illuminance at a point on a given vertical plane that is received directly from a CIE standard overcast sky, to illuminate on a horizontal plane due to an unobstructed hemisphere of this sky”.

- 1.3 The 3D model uses Waldram Diagrams to establish the VSC and 3D geometric calculations for daylight distribution. This model (which is orientated to north by the use of Ordnance Survey (OS) information) enables the path of the sun to be tracked throughout the year to establish the shadow cast by the existing and proposed buildings, and thus calculate the sun hours on ground in each scenario.
- 1.4 Only those surrounding properties which have windows facing towards the application site were included in the assessment. If a nearby property has no windows facing the application site, these properties would not be affected by the Proposed Development in terms of light.
- 1.5 The assessment is calculated from the centre of a window on the outward face and measures the amount of light available on a vertical wall or window following the introduction of visible barriers, such as buildings.
- 1.6 The maximum VSC value is almost 40% for a completely unobstructed vertical wall or window. In terms of assessment criteria, the BRE Guidelines state that:

“If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected. This will be the case if either:

- *the VSC measured at the centre of an existing main window is less than 27%, and less than 0.8 times its former value*
- *the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value.”*

No Sky Line

- 1.7 The BRE Guidelines state that where room layouts are known, the effect on the daylight distribution can be calculated by plotting the NSL. In terms of the surrounding receptors, it has not been possible to obtain room layouts for all of the properties and therefore layouts have been assumed where information is not available.
- 1.8 The NSL method is a measure of the distribution of daylight at the ‘working plane’ within a room. The ‘working plane’ is a horizontal plane 0.85m above finished floor level for residential properties. The NSL divides those areas of the working plane which can receive direct sky light from those which cannot. If a significant area of the working plane lies beyond the NSL (i.e. it receives no direct sky light), then the distribution of daylight in the room may be poor and supplementary electric lighting may be required.
- 1.9 Where actual room layouts were available, these have been considered in the modelling of the internal layouts within the surrounding properties. Obtaining these room layouts enables precise evaluation of the diffuse levels of daylight within each of the rooms via the NSL. Where layout information was not available assumptions have been made as to the use and internal configuration of the rooms (from external observations) behind the fenestration observed. In such

cases a standard 4.2m (14 ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where access to buildings for surveying is unavailable.

- 1.10 The potential effects of daylighting distribution in an existing building can be found by plotting the NSL in each of the main rooms. For houses, this will include living rooms, dining rooms and kitchens. Bedrooms should also be analysed, although they are less important. The BRE Guidelines identify that if the area of a room that does receive direct sky light is reduced to less than 0.8 times its former value, then this would be noticeable to its occupants.
- 1.11 In relation to deep rooms lit by windows on one side, the BRE Guidelines state (para. 2.2.10):

“If an existing building contains rooms lit from one side only and greater than 5 m deep, then a greater movement of the no sky line may be unavoidable.”

Sunlight

Annual Probable Sunlight Hours

- 1.12 APSH is measured using a sun indicator containing 100 spots, each representing 1% of APSH. Therefore, where no obstruction exists the total annual probable sunlight hours would amount to 1486 hours and therefore each spot equates to 14.86 hours of the total annual sunlight hours.
- 1.13 The number of spots is calculated for the baseline and Proposed Development scenarios during the year and also during the winter period, and a comparison made between the two. This provides a percentage of APSH for each window assessed.
- 1.14 The BRE Guidelines note that:

“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.”;

“all main living rooms of dwellings...should be checked if they have a window facing within 90° of due south. Kitchens and bedrooms are less important, although care should be taken not to block too much sun.”;

“If the main living room to a dwelling has a main window facing within 90° of due north, but a secondary window facing within 90° of due south, sunlight to the secondary window should be checked.”; and

“...a south facing window will, in general, receive most sunlight, while a north facing one will receive it only on a handful of occasions. East and west facing windows will receive sunlight only at certain times of day”.

- 1.15 In relation to existing surrounding receptors, the BRE Guidelines state that a window may be adversely affected if a point at the centre of the window receives for the whole year, less than 25% of the APSH, including at least 5% of the APSH during the winter months (21st September to 21st March) and less than 0.8 times its former sunlight hours during either period, and if there is a reduction in total APSH which is greater than 4%.
- 1.16 It is often not possible to determine the room uses within each of the neighbouring properties, nor is it clear which windows should be considered as the ‘main windows’. Therefore, regardless of use, all the rooms with windows facing the site and within 90° of due south have been considered in the assessment.

Summary of Criteria for Daylight and Sunlight

- 1.17 The following table provides a summary of the criteria set out within the BRE Guidelines for daylight and sunlight.

Table 9.1 Summary of Daylight and Sunlight Assessment Criteria

| Method | BRE Criteria |
|---------------|---|
| VSC | A window may be adversely affected if its VSC measured at the centre of the window is less than 27% and less than 0.8 times its former value. |
| NSL | A room may be adversely affected if the daylight distribution (NSL) is reduced beyond 0.8 times its existing area. |

| Method | BRE Criteria |
|--------|---|
| ADF | Bedroom 1%, Living room 1.5% and kitchen 2%. |
| APSH | A window may be adversely affected if a point at the centre of the window received for the whole year, less than 25% of the APSH including at least 5% of the APSH during the winter months (21 st September to 21 st March) and less than 0.8 times its former sunlight hours during either period, and for existing neighbouring buildings, if there is a reduction in total APSH which is greater than 4%. |

Transient Overshadowing

- 1.18** Where a Proposed Development includes tall buildings, these may affect the sunlight availability to gardens or open spaces in close proximity to the site. Owing to the southerly location of the sun path, only amenity areas located within 90° of due north of the Proposed Development have the potential to be affected by overshadowing from tall buildings and therefore taken into consideration in this assessment.
- 1.19** The 2011 BRE guidelines suggest plotting a series of shadow plans illustrating the location of shadows cast from those buildings at different times of the day and period of the year to assess the potential overshadowing effects. To this end, the overshadowing plots are mapped for the three key dates listed below:
- 21st March (Spring Equinox);
 - 21st June (Summer Solstice); and
 - 21st December (Winter Solstice).
- 1.20** The 21st September (Autumn Equinox) is not assessed owing to the identical solar altitude and therefore equivalent outcomes of overshadowing to those presented for 21st March.
- 1.21** For each of these dates, the overshadowing is calculated at hourly intervals throughout daylight hours from sunrise to sunset. On 21st December, the sun is at its lowest altitude consequently creating long shadows to be cast and represents the worst-case scenario in terms of overshadowing.
- 1.22** The analysis described above varies according to different latitudes. The Site is located within London, which is at a latitude of 51.5° north.

Sun Hours on Ground

- 1.23** The BRE Guidelines suggest that Sun Hours on Ground assessments should be undertaken on the Equinox (21st March and 21st September). Using specialist software, the path of the sun is tracked to determine where the sun would reach the ground and where it would not.
- 1.24** It is recommended that at least half of a garden or amenity area should receive at least 2 hours of sunlight on 21st March or the area which receives 2 hours of direct sunlight should not be reduced to less than 0.8 times its former value (i.e. there should be no more than a 20% reduction).

Baseline Results

| Address | Total No. Windows that meet VSC Criteria (>27%) | | Total No. Windows that receive NSL in excess of 80% | | Total No. Rooms that meet APSH Criteria | |
|---------------|---|--------------------------|---|--------------------------|---|--------------------------|
| | Total Assessed | Total that meet Criteria | Total Assessed | Total that meet Criteria | Total Assessed | Total that meet Criteria |
| 67 Hawks Road | 5 | 5 | 3 | 3 | 3 | 3 |

| | | | | | | |
|--------------------------------|----|----|----|----|----|----|
| 65 Hawks Road | 5 | 5 | 3 | 3 | 3 | 3 |
| 69-69a Hawks Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 71 Hawks Road | 4 | 4 | 3 | 3 | 3 | 3 |
| 73 Hawks Road | 4 | 4 | 2 | 2 | 2 | 2 |
| 75 Hawks Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 77 Hawks Road | 4 | 4 | 2 | 2 | 2 | 2 |
| 79 Hawks Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 81 Hawks Road | 5 | 5 | 4 | 3 | 3 | 3 |
| 83 Hawks Road | 2 | 1 | 2 | 2 | 2 | 2 |
| 89 Hawks Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 87 Hawks Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 85 Hawks Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 93 Hawks Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 91 Hawks Road | 2 | 2 | 2 | 2 | 2 | 2 |
| Pyramid Court 99 Hawks Road | 33 | 26 | 25 | 25 | 25 | 25 |
| 3 Portman Road | 5 | 1 | 4 | 4 | 1 | 1 |
| 1 Portman Road | 4 | 3 | 4 | 4 | | |
| 40 Piper Road | 7 | 3 | 4 | 4 | 4 | 4 |
| 36 Piper Road | 6 | 5 | 3 | 3 | 2 | 2 |
| 38 Piper Road | 4 | 3 | 2 | 2 | 2 | 2 |
| 32 Piper Road | 6 | 4 | 3 | 2 | 1 | 1 |
| 34 Piper Road | 5 | 5 | 2 | 2 | 1 | 1 |
| 30 Piper Road | 5 | 4 | 2 | 2 | 2 | 2 |
| 28 Piper Road | 5 | 4 | 2 | 2 | 2 | 2 |
| 22 Piper Road | 5 | 4 | 2 | 2 | 2 | 2 |
| 24 Piper Road | 5 | 4 | 2 | 2 | 2 | 2 |
| 26 Piper Road | 5 | 3 | 2 | 2 | 2 | 2 |
| 5 Portman Road | 4 | 1 | 4 | 3 | | |
| 7 Portman Road | 3 | 0 | 3 | 3 | | |
| 37 Rowlls Road | 11 | 8 | 10 | 8 | 2 | 2 |
| 1 Somerset Road | 9 | 7 | 4 | 4 | 1 | 1 |

| | | | | | | |
|-----------------------------|----|----|----|---|---|---|
| 35 Portman Road | 9 | 4 | 6 | 5 | 1 | 1 |
| 37 Portman Road | 4 | 1 | 4 | 2 | | |
| 21 Portman Road | 5 | 3 | 4 | 3 | | |
| 23 Portman Road | 6 | 5 | 4 | 4 | 1 | 1 |
| 9 Portman Road | 5 | 4 | 4 | 2 | | |
| 11 Portman Road | 5 | 2 | 4 | 4 | | |
| 21 Piper Road | 2 | 2 | 2 | 2 | | |
| 19 Piper Road | 3 | 3 | 2 | 2 | 2 | 1 |
| 37 Cambridge Road | 2 | 2 | 1 | 1 | 1 | 1 |
| 35 Cambridge Road | 2 | 2 | 1 | 1 | 1 | 1 |
| 61 Cambridge Grove Road | 18 | 15 | 11 | 9 | 3 | 3 |
| 60 Vincent Road | 6 | 6 | 2 | 2 | | |
| 20 Vincent Road | 2 | 2 | 2 | 2 | | |
| 18 Vincent Road | 2 | 2 | 2 | 2 | | |
| 16 Vincent Road | 2 | 2 | 2 | 2 | | |
| 14 Vincent Road | 2 | 2 | 2 | 2 | | |
| 12 Vincent Road | 2 | 2 | 2 | 2 | | |
| 10 Vincent Road | 2 | 2 | 2 | 2 | | |
| 8 Vincent Road | 2 | 2 | 2 | 2 | | |
| 6 Vincent Road | 2 | 2 | 2 | 2 | | |
| 4 Vincent Road | 2 | 2 | 2 | 2 | | |
| 2 Vincent Road | 2 | 2 | 2 | 2 | | |
| 22 Vincent Road | 2 | 2 | 2 | 2 | | |
| 24 Vincent Road | 2 | 2 | 2 | 2 | | |
| 26 Vincent Road | 2 | 2 | 2 | 2 | | |
| 28 Vincent Road | 2 | 2 | 2 | 2 | | |
| 30 Vincent Road | 2 | 2 | 2 | 2 | | |
| 32 Vincent Road | 2 | 2 | 2 | 2 | | |
| The Lodge 42 Cambridge Road | 11 | 10 | 6 | 6 | 5 | 5 |

| | | | | | | |
|--|-----|-----|-----|-----|-----|-----|
| Cambridge Gardens | 652 | 251 | 529 | 470 | 291 | 184 |
| 136 Gloucester Road | 11 | 5 | 5 | 5 | 5 | 5 |
| 134 Gloucester Road | 15 | 9 | 5 | 5 | 5 | 4 |
| 59 Cambridge Road | 8 | 5 | 6 | 6 | 6 | 6 |
| 57 Cambridge Road | 8 | 5 | 6 | 6 | 5 | 5 |
| 63 Cambridge Road | 5 | 3 | 5 | 3 | 5 | 4 |
| 61 Cambridge Road | 6 | 4 | 5 | 5 | 3 | 3 |
| 48 Vincent Road | 5 | 3 | 3 | 3 | 1 | 0 |
| 34 Vincent Road | 4 | 4 | 2 | 2 | | |
| 52 Vincent Road | 4 | 3 | 3 | 3 | | |
| 50 Vincent Road | 4 | 2 | 2 | 2 | | |
| 46 Vincent Road | 5 | 3 | 3 | 3 | | |
| 44 Vincent Road | 4 | 3 | 2 | 2 | | |
| 42 Vincent Road | 4 | 3 | 3 | 3 | | |
| 40 Vincent Road | 4 | 4 | 2 | 2 | | |
| 38 Vincent Road | 4 | 4 | 2 | 2 | | |
| 36 Vincent Road | 4 | 4 | 2 | 2 | | |
| 33 Cambridge Road | 2 | 2 | 1 | 1 | 1 | 1 |
| 31 Cambridge Road | 4 | 4 | 2 | 2 | 2 | 2 |
| 29 Cambridge Road | 2 | 2 | 1 | 1 | 1 | 1 |
| 27 Cambridge Road | 2 | 2 | 1 | 1 | 1 | 1 |
| Vibe Student Living 66-70 Cambridge Road | 253 | 146 | 215 | 162 | 153 | 133 |
| Cascadia House Cambridge Road | 87 | 43 | 35 | 25 | 33 | 24 |
| 140 Cambridge Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 138 Cambridge Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 136 Cambridge Road | 3 | 2 | 2 | 2 | 2 | 2 |

| | | | | | | |
|--------------------------|-----|----|----|----|----|----|
| 134 Cambridge Road | 3 | 3 | 2 | 2 | 2 | 2 |
| 142 Cambridge Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 144 Cambridge Road | 3 | 2 | 3 | 2 | 3 | 3 |
| 146 Cambridge Road | 3 | 3 | 2 | 2 | 2 | 2 |
| 148 Cambridge Road | 3 | 3 | 2 | 2 | 2 | 2 |
| 2 Hampden Road | 104 | 73 | 60 | 55 | 26 | 21 |
| 54 Vincent Road | 3 | 3 | 2 | 2 | | |
| 56 Vincent Road | 4 | 1 | 2 | 2 | | |
| 58 Vincent Road | 1 | 1 | 1 | 1 | | |
| 62 Vincent Road | 2 | 2 | 2 | 2 | | |
| 64 Vincent Road | 3 | 3 | 2 | 2 | | |
| 66 Vincent Road | 3 | 3 | 2 | 2 | | |
| 13 Portman Road | 4 | 1 | 3 | 3 | | |
| 17 Portman Road | 4 | 0 | 4 | 3 | | |
| 25 Portman Road | 4 | 1 | 4 | 4 | | |
| 33 Portman Road | 3 | 0 | 3 | 1 | | |
| 15 Portman Road | 4 | 1 | 4 | 3 | 1 | 0 |
| 19 Portman Road | 6 | 1 | 6 | 4 | 2 | 1 |
| 27 Portman Road | 5 | 2 | 5 | 5 | 1 | 0 |
| 31 Portman Road | 4 | 1 | 4 | 2 | 1 | 0 |
| 29 Portman Road | 4 | 1 | 4 | 1 | | |
| 43 Portman Road | 6 | 1 | 6 | 2 | 1 | 0 |
| 41 Portman Road | 5 | 1 | 5 | 3 | | |
| 45 Portman Road | 21 | 9 | 5 | 3 | 1 | 1 |
| 47 Portman Road | 8 | 3 | 5 | 5 | 2 | 2 |
| 39 Portman Road | 20 | 11 | 3 | 3 | 1 | 1 |
| 2 Somerset Road | 4 | 3 | 2 | 2 | | |

| | | | | | | |
|-------------------------|----|----|---|---|---|---|
| 3 Somerset Road | 5 | 4 | 3 | 3 | | |
| 4 Somerset Road | 5 | 4 | 3 | 3 | | |
| 29 Rowlls Road | 4 | 2 | 4 | 3 | 1 | 0 |
| 31 Rowlls Road | 6 | 2 | 5 | 4 | | |
| 30 Rowlls Road | 11 | 11 | 5 | 5 | 2 | 2 |
| 28 Rowlls Road | 6 | 6 | 3 | 2 | | |
| 26 Rowlls Road | 7 | 7 | 3 | 3 | 1 | 1 |
| 24 Rowlls Road | 7 | 6 | 3 | 3 | | |
| 22 Rowlls Road | 7 | 5 | 2 | 2 | 1 | 0 |
| 20 Rowlls Road | 5 | 4 | 2 | 2 | | |
| 33 Rowlls Road | 2 | 2 | 2 | 2 | | |
| 63 Cambridge Grove Road | 4 | 2 | 2 | 2 | 2 | 2 |
| 65 Cambridge Grove Road | 5 | 3 | 2 | 2 | 2 | 2 |
| 67 Cambridge Grove Road | 4 | 3 | 2 | 2 | 2 | 2 |
| 69 Cambridge Grove Road | 3 | 3 | 3 | 3 | 3 | 3 |
| 71 Cambridge Grove Road | 3 | 3 | 2 | 2 | 2 | 2 |
| 73 Cambridge Grove Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 75 Cambridge Grove Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 77 Cambridge Grove Road | 5 | 5 | 2 | 2 | 2 | 2 |
| 79 Cambridge Grove Road | 2 | 2 | 2 | 2 | 2 | 2 |
| 81 Cambridge Grove Road | 3 | 3 | 2 | 2 | 2 | 2 |
| 83 Cambridge Grove Road | 5 | 4 | 2 | 2 | 2 | 2 |
| 17 Piper Road | 4 | 3 | 4 | 3 | 4 | 3 |
| 11 Piper Road | 17 | 14 | 6 | 5 | 4 | 3 |
| 13 Piper Road | 7 | 1 | 3 | 1 | 3 | 3 |
| 27 Piper Road | 5 | 5 | 4 | 4 | | |
| 25 Piper Road | 4 | 2 | 4 | 2 | | |
| 27a Piper Road | 5 | 5 | 4 | 4 | | |
| 87 Bonner Hill Road | 5 | 2 | 4 | 3 | | |
| 85 Bonner Hill Road | 4 | 2 | 4 | 3 | | |

| | | | | | | |
|----------------------|-------------|-------------|-------------|-------------|------------|------------|
| 89 Bonner Hill Road | 7 | 5 | 3 | 3 | 1 | 0 |
| 15 Piper Road | 10 | 9 | 7 | 7 | 4 | 3 |
| 33 Hampden Road | 10 | 6 | 6 | 3 | 3 | 3 |
| 22 Hampden Road | 7 | 4 | 7 | 6 | | |
| 141 Bonner Hill Road | 12 | 8 | 12 | 12 | | |
| 23 Piper Road | 2 | 2 | 2 | 2 | 1 | 0 |
| Total | 1819 | 1028 | 1315 | 1138 | 710 | 553 |