



Daylight/Sunlight Impact Assessment – 120 Kingsgate Road,
London

David Graham

16th April 2012

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1. INTRODUCTION

Hawkins Environmental Limited has been instructed by David Graham to undertake a daylight and sunlight assessment for the redevelopment of 120 Kingsgate Road, in the London Borough of Camden.

The proposed development will see the erection of a three storey building with basement to provide a 4-bedroom single-family dwellinghouse following the demolition of the existing single-storey office building.

Appendix 1 shows a plan of the site.

A previous application for a similar scheme was submitted to the London Borough of Camden (Application Ref: 2011/2106/P), which was refused for a number of reasons including concerns that:

“...by reason of its height, bulk, scale, and position is likely to result in an unacceptable level of daylight and sunlight to neighbouring occupiers and insufficient information has been supplied to demonstrate that the impact upon the levels of sunlight and daylight to...the adjoining occupiers of properties in Beacon House, 67 Hemstal Road.”

Consequently, David Graham has requested that a daylight/sunlight assessment is carried out in accordance with The Building Research Establishment (BRE) report, “Site layout planning for daylight and sunlight” by PJ Littlefair. This report summarises an assessment of the impacts of the proposed development on the surrounding properties potential to receive daylight and sunlight.

This report fully incorporates the changes in methodology as a consequence of the publication of the Second Edition of the BRE Report in 2011.

It should be noted that this assessment does not take into account Rights to Light. A Right to Light is a legal right which one property may acquire over another. If a building is erected which reduces the light available to the adjoining property below sufficient levels, Rights to Light may be infringed, which may attract compensation and/or an injunction to stop the development. However, Rights to Light should not be a material planning consideration and therefore, this issue has not been assessed as part of this report. However, in most circumstances, if the development passes the tests contained within the BRE Report, Rights to Light should not be infringed.

2. DAYLIGHT AND SUNLIGHT

The provision of daylight is as important as ensuring low levels of noise, or low levels of odour, in maintaining the enjoyment of one's property. Adequate levels of daylight are important not only to light and heat the home, but also for an occupant's emotional well being. Daylight is widely accepted to have a positive psychological effect on human beings and there is a great deal of evidence to suggest that people who are deprived of daylight are more susceptible to depression and mood swings. This is common in northern countries, such as Norway, Iceland and Canada where daylight is scarce during the winter months.

When assessing the effects of proposed building projects on the potential to cause issues relating to light, it is important to recognise the distinction between daylight and sunlight. Daylight is the combination of all direct and indirect sunlight during the daytime, whereas sunlight (for the purposes of this report) comprises only the direct elements of sunlight. On a cloudy or overcast day diffused daylight still shines through windows, even when sunlight is absent.

2.1. National Policy

The Department for Communities and Local Government (DCLG) sets national planning policy. Their document 'The Planning System: General Principles (2005), published in conjunction with Planning Policy Statement 1: Delivering Sustainable Development, discusses the need to protect amenities in the public's interest, of which the need for daylight/sunlight could be considered one such amenity. However, the government does not have an adopted policy on daylight, sunlight and the effects of overshadowing, and does not have targets, criteria or relevant planning guidance, in the way it has for other environmental impacts such as noise, landscape or air quality.

However, the **Building Research Establishment (BRE) report, "Site layout planning for daylight and sunlight" Second Edition 2011 by PJ Littlefair** (referred to as the BRE Report) is almost universally used as the official method in the UK and Ireland for determining the minimum standards of daylight and sunlight and for determining the impact of a development on daylight and sunlight availability; In addition, the **British Standard BS 8206:2008 Lighting for buildings – Part 2: Code of practice for daylighting** contains guidance on the minimum recommended levels of interior daylighting and introduces some of the calculation procedures used in the BRE Report.

2.2. The BRE Report

As this report is assessing the impact of a new development on an existing property, the BRE Report is the appropriate guidance to use to assess daylight and sunlight. The BRE Report contains guidance on how to design developments, whilst minimising the impacts on existing buildings from overshadowing and reduced levels of daylight and sunlight. As well as advice, the report contains a methodology to assess levels of daylight, sunlight and overshadowing, and contains criteria to determine the potential impacts of a new development on surrounding buildings. However, the report does state that the guidelines are not mandatory, but should be considered a guide to help rather than constrain the designer.

The BRE Report looks at three separate areas when considering the impacts on lighting:

- **Daylight** – i.e. the combined impacts of all direct sunlight and indirect skylight during the daytime;

- **Sunlight** – i.e. the impacts of only the direct sunlight; and
- **Overshadowing of Gardens and Open spaces.**

2.3. Daylight Assessment

The assessment of daylight is required for windows serving rooms in adjoining dwellings where daylight is required, including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, store rooms, circulation areas and garages need not be assessed. The guidelines also apply to any room that may have a reasonable expectation of daylight, including schools, hospitals, hotels and some offices.

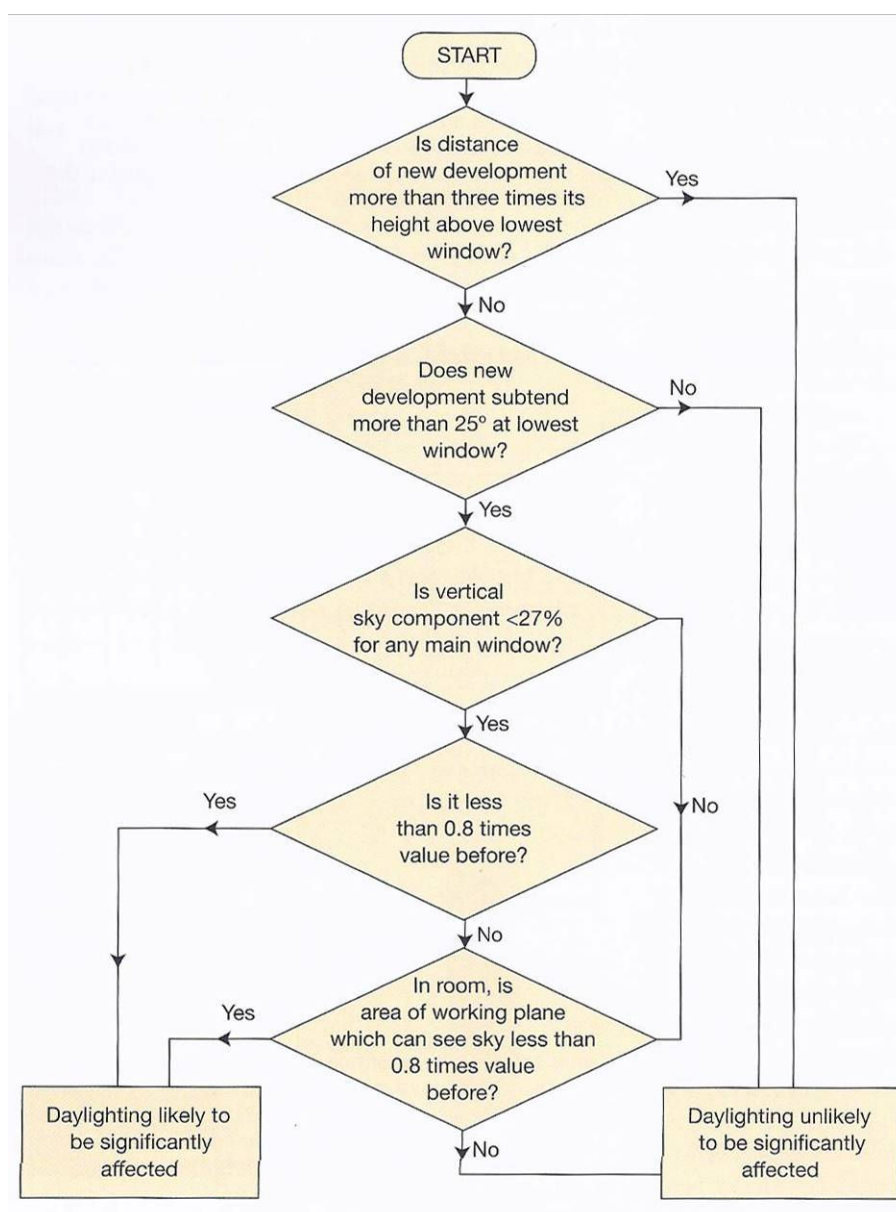
When assessing daylight, the numerical criteria must be viewed flexibly and should be considered against other site layout constraints. In addition, it is important to consider whether the existing building is itself a good neighbour, standing a reasonable distance from the boundary and not taking more than its fair share of light.

Figure 2.1 shows the decision chart, showing the processes involved in determining daylight impact. The assessment takes on several specific stages:

- 1) **The Distance Test:** loss of light to windows need not be analysed if the distance from the existing window to the development is three or more times its height above the centre of the existing window;
- 2) **The 25° Rule:** loss of light to windows need not be analysed if the angle to the horizontal subtended by the new development from the centre of the existing window is less than 25°;
- 3) **Daylight Assessment:** diffuse daylight of an existing may be adversely affected by a proposed development if either:
 - a. the Vertical Sky Component (VSC) measured at the centre of an existing main window is less than 27%, **and** less than 0.8 times its former value; or
 - b. the area of the working plane which can receive direct skylight is reduced to less than 0.8 times its former value.

It should be noted at determining the area of the working plane which can receive direct light from the sky (which is often referred to as the No-Sky Line or NSL) is seen as an additional assessment, rather than as an alternative to VSC. However, since plotting the NSL requires knowledge of the room geometry, which is not usually available during an impact assessment, it is not always possible to calculate the NSL since the use of too many assumptions would make the results meaningless and unreliable.

Figure 2.1: Decision Chart – Diffuse Daylight in Existing Buildings (taken from the BRE Report)



2.4. Sunlight Assessment

The assessment of sunlight is required for rooms in adjoining dwellings where sunlight is required. Generally, all main living rooms and conservatories should have access to direct sunlight. Kitchens and bedrooms are less important, although care should be taken not to block too much sun.

As with daylight, the numerical criteria for sunlight should be viewed flexibly and should be considered against other site layout constraints. It is important to understand that people like and appreciate sunlight and may resent the loss of sunlight, although is not an essential requirement of a dwelling, unlike daylight availability or access to a quiet noise environment. Therefore, larger reductions in sunlight may be acceptable, for example if new development is to match the height and proportion of existing buildings nearby.

The assessment of sunlight takes on several specific stages:

1. **Facing South:** loss of sunlight to windows only needs to be assessed if the window faces within 90° of due south;
2. **The Distance Test:** loss of sunlight to windows need not be analysed if the distance from the existing window to the development is three or more times its height above the centre of the existing window;
3. **The 25° Rule:** loss of sunlight to windows need not be analysed if the angle to the horizontal subtended by the new development from the centre of the existing window is less than 25°;
4. **Sunlight Assessment:** direct sunlight of an existing windows may be adversely effected by a proposed development if at the centre of a window:
 - a. receives less than 25% of Annual Probable Sunlight Hours (APSH), or less than 5% APSH between 21st September and 21st March; **and**
 - b. receives less than 0.8 times its former APSH during either period; **and**
 - c. has a reduction in sunlight over the whole year of greater than 4% APSH.

2.5. Overshadowing of Gardens and Open Spaces

The effects of overshadowing and the loss of sunlight on open spaces and gardens is another important element of any sunlight or daylight assessment. Assessments should not restrict themselves to looking at just the effects on providing good natural lighting within buildings as sunlight in the spaces between buildings has an important impact on the overall appearance and ambience of a development.

The Second Edition of the BRE Report, published in 2011, has significantly revised the assessment procedure for the overshadowing of gardens and outdoor amenity space, changing the emphasis from ensuring that as much area as possible receive direct sunlight to ensuring that the garden receives significant amounts of sunlight, albeit over a smaller area. Under the 1991 version of the report, ideally not more than a quarter, and certainly no more than two-fifths of a garden or outdoor amenity space should be prevented from receiving any sun at all on the 21st March. This means that providing at least 60% of a garden receives some direct sunlight, even for just a few minutes, the garden is adequately sunlit. However, the 2011 version requires at least 50% of the garden must receive at least two hours of direct sunlight on the 21st March. If this cannot be achieved,

providing that the area overshadowed was greater than 0.8 times its former value, no impact would have occurred.

2.6. The Impacts of Vegetation

It is important to note that according to the BRE Report, calculations normally do not take into account vegetation. The exception is when evergreen vegetation exists that forms a continuous barrier.

2.7. Determining Significance

The previous edition of the BRE Report has often been significantly misapplied when determining whether an impact to a development is significant and whether a development should be refused planning permission. Page 1 of the BRE Report states:

“The advice given (in the report) is not mandatory and 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 layout design.”

Often, Local Planning Authorities interpret the failure of a development to meet the guideline criteria as an indicator as to whether a development is acceptable. However, this is not the case and the BRE report suggests that the numerical values are purely advisory and there are times where alternative targets may be used, as described in Appendix F of the 2011 Edition of the BRE Report. For example:

- where the site already has an extant planning permission that the developer wants to vary, the VSC and APSH of the permitted scheme may be used as alternative benchmarks;
- in historic city centre environments, it is often not possible to achieve 27% VSC, therefore it is sensible to use a target value consistent with levels of daylight typically experienced in the street. For example, if the obstruction angle from ground floor level at other properties in the street is typically 40°, which corresponds to a VSC of 18%, this level could be used as a target value for development in that street, if new development is to match the scale and size of the existing development;
- where an existing building has windows that are unusually close to the site boundary and taking more than their fair share of light, to ensure that new development matches the height and proportions of existing buildings, the VSC and APSH targets for these windows could be set to those for a “mirror-image” building of the same height and size, an equal distance away on the other side of the boundary.

In addition, Appendix I of the 2011 Edition of the BRE Report provides new guidance on how to assess impact, which suggests that a semantic scale can be used to describe the impact, which can then be used help place the impact in context. **Table 2.1** summarises the impact magnitude criteria as described in the BRE Report.

Table 2.1: Impact Magnitude Criteria (adapted from Appendix I of the BRE Report 2011)

Criteria	Impact Magnitude
<p>Where the decrease in daylight or sunlight fails to meet the guidelines, and one or more of the following scenarios applies:</p> <ul style="list-style-type: none"> • a large number of windows or large area of open space is affected; • the loss of light is substantially outside the guidelines; • all windows in a particular property are affected; • the affected building or outdoor space has a particularly strong requirement for light, e.g. a living room in a dwelling or a children's playground. 	Major Adverse
<p>Where the decrease in daylight or sunlight fully meets the guidelines and a larger number of windows or open space are affected;</p> <p>or</p> <p>Where the decrease in daylight or sunlight fails to meet the guidelines, but one or more of the following scenarios applies:</p> <ul style="list-style-type: none"> • only a small number of windows or limited area of open space is affected; • the loss of light is only just outside the guidelines; • an affected room has other sources of light; • the affected building or outdoor space has a low level requirement for light. 	Minor Adverse
<p>Where the increase/decrease in daylight or sunlight fully meets the guidelines and only a small number of windows are affected;</p> <p>and</p> <p>If there is an increase in daylight or sunlight, the increase is "tiny".</p>	Negligible
Where the increase in daylight or sunlight is small and/or the number of affected windows or area of open space affected is small.	Minor Beneficial
Where the increase in daylight or sunlight is large and/or the number of affected windows or area of open space affected is large.	Major Beneficial

Note: Appendix I of the BRE report also suggests the use of "moderate adverse" and "moderate beneficial" impacts. However, there is no guidance on how to designate moderate impacts, although the guidance suggests that judgement should be used when classifying impact magnitude.

3. DAYLIGHT/SUNLIGHT PRE-ASSESSMENT

This section summarises the impact of the proposed development on levels of daylight and sunlight on surrounding windows.

3.1. Identification of Receptors

Based on a site visit on the 15th November 2011, and also based on the plans of the development, a number of windows have been identified as of being of concern. The Council have indicated that their main area of concern is the impact upon Beacon House, situated at 67 Hemstal Road, immediately behind the proposed development. Consequently, this assessment focuses upon the impacts on Beacon House.

The properties of concern can be seen in the site plan in **Appendix 1**. The windows under consideration can be seen in **Appendix 2**.

Appendix 2 shows that 25 windows have been assessed as part of the assessment. Beacon House is a five storey flatted development, with a total of 20 flats. It is understood from estate agent floor plans that each floor comprises four flats, one on each corner to the build; therefore each flat has windows on two facades. It is understood that each floor has exactly the same floor plan and therefore the corresponding window on each floor has the same room use.

On each floor, it is understood that two flats are potentially affected. The first flat has two south facing windows, both serving bedrooms (e.g. W1 and W2 on the fourth floor), plus a number of east facing rooms, including a small window serving a bathroom and two windows serving a living room and kitchen respectively (e.g. W10 and W11 on the fourth floor). The second flat on each floor has two south facing windows, one serving a bathroom, the other a bedroom (e.g. W12 on the fourth floor). In addition, there is a window at a 45 degree angle to both the east facing facade of the first flat and the south facing facade of the second flat that contains a window with frosted glass on the first to fourth floors only. For the purposes of the assessment it is assumed that this window serves a bathroom. In accordance with the BRE Guidance, windows serving bathrooms or circulation areas have not been assessed.

3.2. The Screening Assessments

Two tests are used to determine whether an assessment of daylight or sunlight is required: the distance test and the 25° rule.

The Distance Test states that loss of light to a window does not need to be analysed if the distance from the existing window to the development is three or more times its height above the centre of the existing window.

The 25° Rule states that if the new development subtends an angle of more than 25° to the horizontal from the lowest window of the existing properties, it is possible that the development may affect the amount of daylight reaching the property. Therefore, a full daylight assessment would be required.

In addition, windows need to be assessed to see if the windows face within 90° of due south, as if they do not, they do not require sunlight assessment.

For the purposes of this assessment, the screening assessments have not been conducted as the London Borough of Camden has specifically asked for the assessment of daylight and sunlight at Beacon House.

Therefore, the windows at Beacon House have been assessed. Since all 25 of the windows face within 90° of due south, all windows that will require a detailed assessment regarding changes in the levels of sunlight.

4. DAYLIGHT/SUNLIGHT IMPACT ASSESSMENT

This section summarises the impact of the proposed development on levels of daylight and sunlight on surrounding windows.

4.1. Methodology

This section summarises the daylight and sunlight impacts of the proposed development on surrounding properties. To determine these impacts, the IES Virtual Environment software (VE-Pro Suite) has been utilised to calculate the changes in levels of daylight and sunlight as a consequence of the proposed development. The VE-Pro software has been accredited by CIBSE and acknowledged by the BRE as a suitable software tool for undertaking daylight, sunlight and overshadowing assessments in accordance with the Building Research Establishment (BRE) report, “*Site layout planning for daylight and sunlight*” Second Edition 2011 by PJ Littlefair BRE Good Practice guidelines. Three separate modules of the VE-Pro suite have been utilised for this assessment:

- ModellT: enables the creation of three dimensional “Virtual Environment” models without CAD data, or alternatively allows you to create a 3D model from 2D CAD data. ModellT interfaces with ACAD Revit and Google SketchUp, allowing the import of models created within this packages;
- RadianceIES: is a detailed 3D simulation tool designed to predict daylight and electric light levels, and the appearance of a space prior to construction. Vertical Sky Components and Average Daylight Factors can be calculated for with and without the proposed development using RadianceIES;
- SunCast: is a 3D simulation tool used to calculate solar shading and sunlight availability. SunCast can be used to calculate the Annual Probable Sunlight Hours for with and without the proposed development.

Figures 4.1 to 4.4 show the three dimensional model of the development, with and without the proposed extensions.

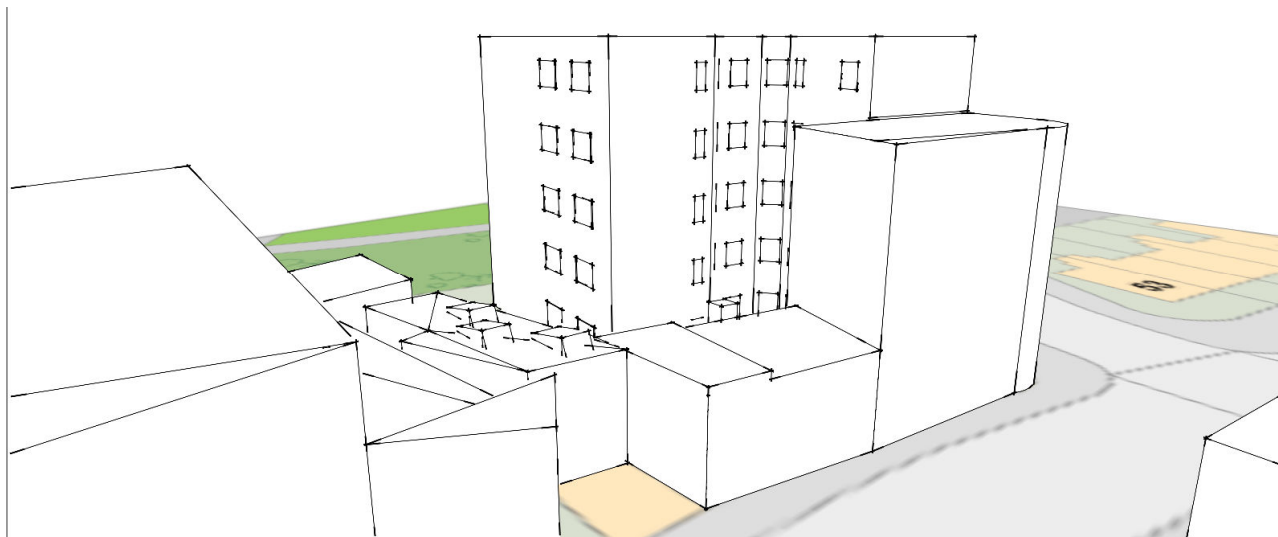
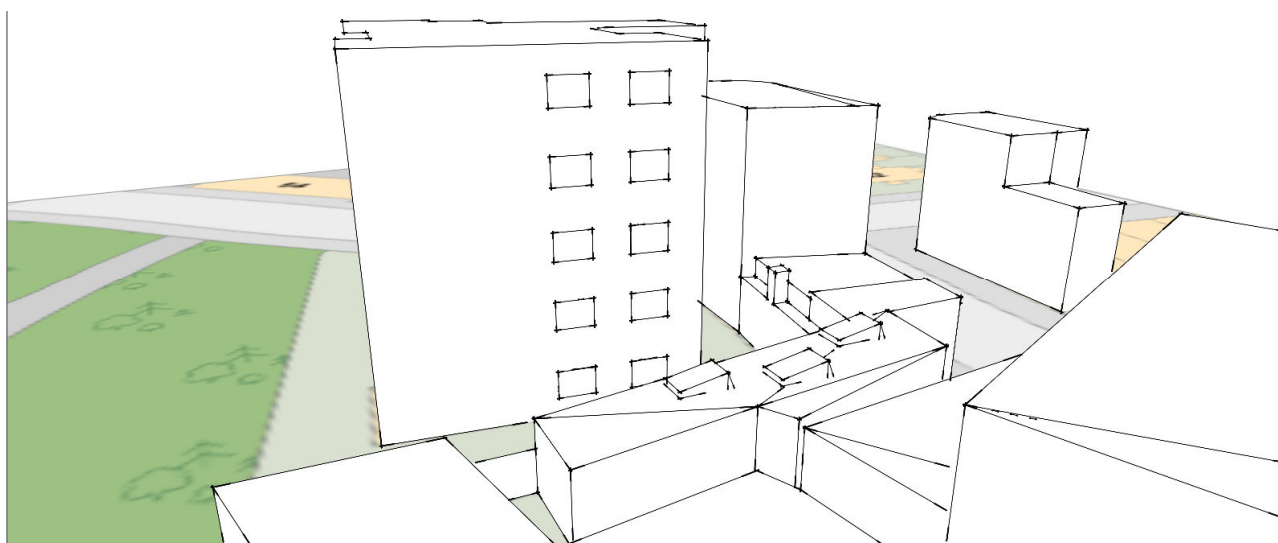
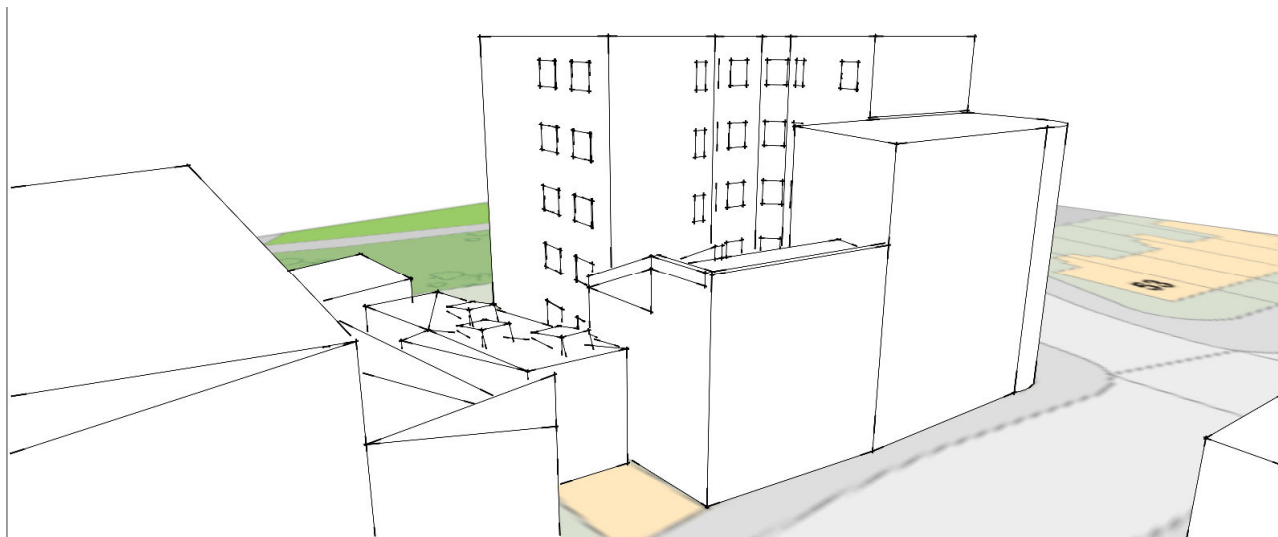
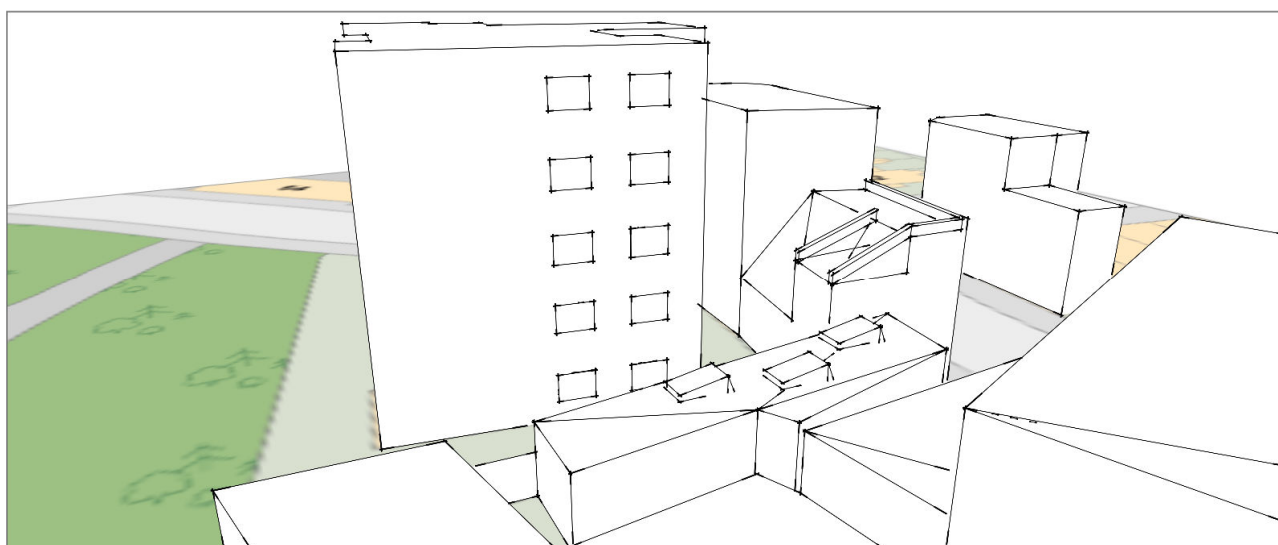
Figure 4.1: 3D model without new development – from the southeast**Figure 4.2: 3D model without new development – from the southwest**

Figure 4.3: 3D model with new development – from the southeast**Figure 4.4: 3D model with new development – from the southwest**

4.2. Daylight Assessment - VSC

When undertaking a daylight assessment, the BRE Report suggests a VSC of 27% or more should be achieved if a room is to be adequately daylighted. It also suggests that when existing levels of daylight are below 27% VSC, a reduction of more than 20% from the existing level will be noticeable to the inhabitants, i.e. an impact will occur.

Based on the plans of the site and the positions of the closest buildings, it is possible to calculate the vertical sky component for the residential buildings, for both with and without the proposed development. This is detailed in **Table 4.1**.

It can be seen from **Table 4.1** that all of the south facing windows W1 to W10 will be largely unaffected by the proposed development, with all windows with the exception of W10, receiving greater than the minimum recommended VSC of 27%. All of these windows, including W10, will receive a level of daylight with the development in place that is greater than 0.8 times its former value; therefore the reduction in daylight will be small such that it is unlikely to be noticeable.

For windows W11 to W20, which serve the same five flats as windows W1 to W10, the windows will similarly receive a level of daylight with the development in place that is greater than 0.8 times its former value; therefore, whilst the windows on the third, second, first and ground floors are below the minimum recommended VSC of 27%, the reduction is unlikely to be noticeable to the inhabitants and would therefore be acceptable.

For windows W21 to W25, which serve different flats to W1 to W20 and have additional north facing windows, W21 to W25 would all continue to receive a level of daylight in excess of 0.8 times its former value and therefore the reduction is unlikely to be noticeable to the inhabitants and would therefore be acceptable.

Using the results of the assessment, based on the criteria contained within Appendix I of the BRE Report, it is possible to quantify the magnitude and significance of the impact. Since all windows meet the recommendations in the BRE Report, the proposed development is considered to have a “negligible” impact on surrounding properties, in accordance with the BRE Report.

4.3. Daylight Assessment - NSL

Whilst the VSC determines the amount of daylight entering a room, the no-sky line determines how well the daylight is distributed in the room. Areas beyond the no-sky line will generally look gloomy.

The working plane is a notional surface, typically at about desk or table height, at which the daylight factor or the ‘no-sky line’ is calculated or plotted. For calculations in dwellings, it is taken to be at a position 0.85 m above the floor.

The no-sky line divides those areas of the working plane which can receive direct skylight, from those which cannot. If the external obstructions already exist, it is possible to measure directly the position of the no-sky line in a room.

Whilst it is desirable to assess the position of the NSL, the assessment requires details of the room and window geometry for the potentially affected properties. Unfortunately, as is the case with many impact assessments,

these details are not known and therefore it is not possible to accurately assess the changes in the distribution of daylight.

4.4. Sunlight Assessment

In order to assess the impact of a development on the levels of sunlight, the APSH has been calculated for all windows that which face within 90° of due south.

According to the BRE Report, direct sunlight on an existing window may be adversely effected by the proposed development if the centre of a window receives less than 25% of Annual Probable Sunlight Hours (APSH), or less than 5% APSH between 21st September and 21st March; and receives less than 0.8 times its former APSH during either period; and has a reduction in sunlight over the whole year of greater than 4% APSH.

Table 4.1 details the results of the Annual Probable Sunlight Hours (APSH) calculations for the windows under consideration.

It can be seen from **Table 4.1** that all windows will either not have a decrease in sunlight or will receive only a negligible decrease in sunlight. Whilst at W17 to W20, the windows receives less than 25% APSH, and/or less than 5% APSH during the winter months and receives less than 0.8 times its former APSH during either period, since the reduction in sunlight over the whole year is less than or equal to 4% APSH, under the BRE Guidelines, no impact has occurred.

Table 4.1: Daylight and Sunlight Impact Assessment

Address	Window Identifier	Floor	Vertical Sky Component			Annual Probable Sunlight Hours					
			Existing	Proposed	Ratio	Existing		Proposed		Ratio	
						Year	Winter	Year	Winter	Year	Winter
Beacon House	W1	Fourth	39.4%	39.4%	1.00	76%	37%	76%	37%	1.00	1.00
Beacon House	W2	Fourth	39.4%	39.1%	0.99	76%	37%	76%	37%	1.00	1.00
Beacon House	W3	Third	39.4%	34.4%	0.87	76%	37%	76%	37%	1.00	1.00
Beacon House	W4	Third	39.4%	39.2%	0.99	76%	37%	76%	37%	1.00	1.00
Beacon House	W5	Second	38.3%	38.2%	1.00	74%	35%	74%	35%	1.00	1.00
Beacon House	W6	Second	38.0%	37.7%	0.99	75%	36%	75%	36%	1.00	1.00
Beacon House	W7	First	37.1%	36.5%	0.98	69%	30%	69%	30%	1.00	1.00
Beacon House	W8	First	35.6%	35.6%	1.00	68%	29%	68%	29%	1.00	1.00
Beacon House	W9	Ground	31.3%	30.8%	0.98	52%	13%	52%	13%	1.00	1.00
Beacon House	W10	Ground	27.2%	26.8%	0.99	50%	11%	50%	10%	1.00	0.91
Beacon House	W11	Fourth	30.4%	30.4%	1.00	27%	5%	27%	5%	1.00	1.00
Beacon House	W12	Fourth	33.6%	33.6%	1.00	39%	14%	39%	14%	1.00	1.00
Beacon House	W13	Third	23.9%	23.9%	1.00	21%	4%	21%	4%	1.00	1.00
Beacon House	W14	Third	24.8%	24.6%	0.99	31%	11%	31%	11%	1.00	1.00
Beacon House	W15	Second	16.1%	16.1%	1.00	14%	4%	14%	4%	1.00	1.00

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16th April 2012

Address	Window Identifier	Floor	Vertical Sky Component			Annual Probable Sunlight Hours					
			Existing	Proposed	Ratio	Existing		Proposed		Ratio	
						Year	Winter	Year	Winter	Year	Winter
Beacon House	W16	Second	17.3%	17.3%	1.00	21%	9%	21%	9%	1.00	1.00
Beacon House	W17	First	12.1%	10.3%	0.85	10%	3%	8%	1%	0.80	0.33
Beacon House	W18	First	12.6%	11.8%	0.94	16%	8%	12%	4%	0.75	0.33
Beacon House	W19	Ground	8.3%	6.7%	0.81	8%	1%	5%	0%	0.63	0.00
Beacon House	W20	Ground	9.9%	8.0%	0.81	12%	4%	9%	1%	0.75	0.25
Beacon House	W21	Fourth	39.8%	36.8%	0.92	64%	30%	64%	30%	1.00	1.00
Beacon House	W22	Third	26.2%	26.2%	1.00	36%	12%	36%	12%	1.00	1.00
Beacon House	W23	Second	15.5%	15.2%	0.98	18%	8%	18%	8%	1.00	1.00
Beacon House	W24	First	12.3%	12.3%	1.00	16%	8%	16%	8%	1.00	1.00
Beacon House	W25	Ground	11.5%	10.8%	0.94	13%	5%	12%	4%	0.92	0.80

5. OVERSHADOWING IMPACT ASSESSMENT

This section summarises the impact of the proposed development on levels of sunlight to surrounding gardens and outdoor amenity space.

No gardens or open spaces have been identified as being of concern. As a consequence, the proposed development is not considered to have a significant impact on overshadowing.



6. CONCLUSIONS

Calculations were conducted in accordance with the BRE Report in order to determine the extent to which the proposed redevelopment at 120 Kingsgate Road will affect the levels of daylight and sunlight at adjacent properties.

The calculations have shown that at all properties, whilst there may be a reduction in daylight and sunlight as a consequence of the proposed development, under the guidance contained within the BRE Report, the impacts on levels of daylight and sunlight will be negligible.

Appendix 1 Site Plan

Appendix 1: Site Plan



Appendix 2 Window Schedules

Appendix 2: Window Schedules

