

Prospect House, Stocking Lane, Rathfarnham, Dublin 16

Daylight and Sunlight Assessment Report
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1.0 Executive Summary

1.1 Summary of Assessment

3D Design Bureau were commissioned to carry out a comprehensive BRE daylight and sunlight assessment, along with an accompanying shadow study for the Prospect House, Stocking Lane, Rathfarnham, Dublin 16.

The assessment has been broken down into the following two main categories, of which there are sub categories summarised further below:

- Impact assessment: Effect on the surrounding environment and properties, which includes VSC, APSH and sunlighting analysis. The effects were assessed in the baseline state versus the proposed state.
- Scheme Performance: Daylight and sunlight assessment of the proposed development, which includes sunlighting to the proposed amenity spaces and internal daylighting (ADF) to the habitable rooms.

The impact assessment that was carried out for the purpose of this report has studied the potential levels of effect the surrounding existing environment and/or properties would sustain should the proposed development be built as proposed. The proposed state includes renovations to the Prospect House and the Gated Lodge House on the subject site.

This impact assessment covers the following categories:

- Effect on daylight (VSC) to surrounding properties. The effect to the VSC of the windows of the following neighbouring properties was assessed:
 - Prospect House
 - 28 | 30 Prospect View
 - 32 Prospect View
 - 34 Prospect View
 - 36 Prospect View
- Effect on sunlight (APSH) to surrounding properties. The effect to the APSH (annual and winter) of the windows of the following neighbouring properties was assessed:
 - 28 | 30 Prospect View
 - 32 Prospect View
 - 34 Prospect View
 - 36 Prospect View
- Effect on sunlight to surrounding external amenity spaces such as gardens:
 - 2 Prospect Drive



Figure 1.1: Scope of surrounding properties and environment assessed.

The BRE Guidelines recommend 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, does not subtend an angle of more than 25° to the horizontal, then the daylighting and sunlighting of the existing building are unlikely to be adversely affected. Using this guidance as a rule of thumb, The surrounding context was carefully considered to ensure all properties and amenity spaces that may potentially experience a level of effect were included in the study.

All assessed properties presented an imperceptible level of impact.

The daylight and sunlight assessment of the proposed development included an analysis of the levels of sunlight to the proposed amenity spaces, as well as access to daylight (ADF) in the habitable rooms of the proposed units within the development. All external amenity spaces as identified by the architect were assessed for sunlight. Typically, ADF values increase in rooms located on higher floor levels, due to a lesser obstruction from adjacent obstructions. However, for a more comprehensive study all habitable floors have been included in this assessment.

Please see Page 4 for a detailed breakdown of results.

1.2 Impact Assessment Results Overview:

Effect to Vertical Sky Component (VSC) on neighbouring properties:

- Windows Assessed: 40
 - Imperceptible: 40

Effect to Annual Probable Sunlight Hours (APSH):

- Windows Assessed: 32
 - Imperceptible: 32

Effect to Winter Probable Sunlight Hours (WPSH):

- Windows Assessed: 32
 - Imperceptible: 32

Effect to Sun On Ground (SOG) in existing neighbouring gardens / amenity areas:

- Gardens Assessed: 1
 - Imperceptible: 1

1.3 Scheme Performance Results Overview:

Sun On Ground (SOG) in proposed gardens / amenity areas:

- Areas Assessed: 2
 - Meeting the guidelines: 2

Average Daylight Factor (ADF) of internal proposed development:

- Rooms assessed: 55

ADF circa compliance rate for the proposed scheme:

- Rooms meeting the guidelines: 55
- Rooms not meeting the guidelines: 0
- Compliance rate: ~100%

2.0 Glossary

2.1 Terms and Definitions

Skylight

Non directional ambient light cast from the sky and environment.

Sunlight

Direct parallel rays of light emitted from the sun.

Daylight

Combined skylight and sunlight.

Overcast sky model

A completely overcast sky model, used for daylight calculation.

Existing Baseline Model State

The development site in its existing state. The proposed development has not been included. This model state has been used when generating the baseline results for all the existing neighbouring properties.

Proposed Development Model State

The proposed development has been modelled into the existing environment. This model state has been used when assessing the effect of the proposed development on the existing neighbouring properties, as well as assessments carried out within the proposed development itself.

Vertical Sky Component (VSC)

Ratio of that part of illuminance, at a point on a given vertical plane, that is received directly from an overcast sky model, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Usually the 'given vertical plane' is the outside of a window wall. The VSC does not include reflected light, either from the ground or from other buildings.

Annual Probable Sunlight Hours (APSH) / Winter Probable Sunlight Hours (WPSH)

Annual Probable Sunlight Hours (APSH) and Winter Probable Sunlight Hours are a measure of sunlight that a given window may expect over a year period (1 Jan - 31 Dec), or the winter period (21 Sep - 21 Mar) respectively.

It can be defined as the ratio between the annual or winter sunlight hours in a specific location, and the hours of sunlight an assessment point on a window actually receives.

North facing windows may receive sunlight on only a handful of occasions in a year, and windows facing eastwards or westwards will receive sunlight only at certain times of the day. Taking this into account, the BRE Guidelines suggest that windows with an orientation within 90 degrees of due south should be assessed.

Sun On Ground (SOG)

Assessment of what portion of a garden or amenity space is capable of receiving 2 hours or more of direct sunlight on March 21st.

Average Daylight Factor (ADF)

Ratio of total daylight flux incident on the working plane to the area of the working plane, expressed as a percentage of the outdoor illuminance on a horizontal plane due to an unobstructed overcast sky model.

Thus a 1% ADF would mean that the average indoor illuminance would be one hundredth the outdoor unobstructed illuminance.

Working plane

Horizontal, vertical or inclined plane in which a visual task lies. Normally the working plane may be taken to be horizontal, 850 mm above the floor in houses and factories, 700 mm above the floor in offices. The plane is offset 500 mm from the room boundaries.

LKD

Living / Kitchen / Dining room.

BRE Target Value

When assessing the effect a proposed development would have on a neighbouring property, a target value will be applied. This applied target value is generated as per the criteria set out for each study in the BRE Guidelines.

Alternative Target Value

It could be appropriate to use alternative target values when conducting assessment of effect on existing properties. If such instances occur the rationale will be clearly explained and the instances where the alternative target values have been applied will be clearly identified.

Level of BRE Compliance

Each table in the study that has a column identified as "Level of BRE Compliance", identifies how an assessed instance performs in relation to the appropriate target value. If the instance is in compliance with the recommendations as made in the BRE Guidelines the value will be expressed as "BRE Compliant". If the instance does not meet the criteria as set out in the BRE Guidelines a percentage will be expressed to determine the level of compliance with the recommendation. This value determines the definition of effect.

LUX

Lux is a standardised unit of measurement of light level intensity. A measurement of 1 lux is equal to the illumination of a one metre square surface that is one metre away from a single candle.

2.2 Definition of Effects

In order to categorise the varying degrees of compliance with the BRE Guidelines when assessing the effect a proposed development would have on the daylight and sunlight of an existing property, 3DDB have assigned numerical values to the levels of effect as listed in 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' prepared by the Environmental Protection Agency (Draft of 2017), and to Directive 2011/92/EU (as amended by Directive 2014/52/EU).

The list of definitions given below is taken from Table 3.3: Descriptions of Effects contained in the draft 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' prepared by the Environmental Protection Agency. Some comment is also given below on what these definitions might imply in the case of sunlight access.

Note: There are many factors to be taken into consideration when determining levels of effect. We have included typical numerical values that we have used when assigning levels of effect. These values should not be applied rigidly, but rather as a guide. Circumstances may occur that lead to flexibility being sought in our interpretation of these definitions. Such cases are always explained in the Analysis of Results section, if and when they occur.

Imperceptible

An effect capable of measurement but without significant consequences. For the purposes of this Sunlight and Daylight Assessment Report an "imperceptible" level of effect will be stated if the level of effect is within the criteria as recommended in the BRE Guidelines and the applied target value has been achieved.

Not Significant

An effect which causes noticeable changes in the character of the environment but without significant consequences. For the purposes of this Sunlight and Daylight Assessment Report, a "not significant" level of effect will be stated if the level of effect is marginally outside of the criteria as stated in the BRE Guidelines. Typically a "not significant" level of effect will be applied if the level of daylight or sunlight is reduced to between 90-99% of the applied target value.

Slight

An effect which causes noticeable changes in the character of the environment without affecting its sensitivities. For the purposes of this Sunlight and Daylight Assessment Report, a "slight" level of effect will be stated if the level of daylight or sunlight is reduced to between 75-90% of the applied target value.

Moderate

An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends. For the purposes of this Sunlight and Daylight Assessment Report, a "moderate" level of effect will be stated if the level of daylight or sunlight is reduced to between 50-75% of the applied target value. A "moderate" level of effect would be quite typical in instances where a proposed development is planned on an under-developed plot of land. The level of daylight and/or sunlight of an assessed property is reduced in a manner that is consistent with similar properties in the immediate surrounding area.

Significant

An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment. For the purposes of this Sunlight and Daylight Assessment Report a "significant" level of effect will be stated if the proposed development reduces the availability of daylight or sunlight of a neighbouring property to a low level. Typically a "significant" level of effect will be stated if the level of daylight or sunlight is reduced to between 30-50% of the applied target value.

Very Significant

An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment. For the purposes of this Sunlight and Daylight Assessment Report a "very significant" level of effect will be stated if the proposed development reduces the availability of daylight or sunlight of a neighbouring property to a very low level. Typically a "very significant" level of effect will be stated if the level of daylight or sunlight is reduced to between 10-30% of the applied target value.

Profound

An effect which obliterates sensitive characteristics. For the purposes of this Sunlight and Daylight Assessment Report, a "profound" level of effect will only be stated if the proposed development reduces the availability of daylight or sunlight of a neighbouring property to a level that is less than 10% of the applied target value.

Positive Effect

In relation to sunlight or daylight access, it is conceivable that there could be positive effects, but this implies that a development would involve a reduction of the size or scale of built form (e.g. such as the demolition of a building or the removal of a large belt of evergreen trees, which might result in an increase in sunlight access). Where improvements occur, a positive effect will only be stated if the ratio of change is greater than 1.20 (an improvement of 20%). Should less perceptible improvements occur an imperceptible level of effect will be stated.

Not Applicable (n.a.)

In instances where a baseline value is particularly low, levels of effects can appear exaggerated. To mitigate against such occurrences, if the baseline value in the VSC, APSH/WPSH or SOG studies is below 1%, the level of effect will be categorised as n.a. (not applicable).

2.3 Index of Tables

2.3.1 Impact Assessment: Vertical Sky Component

Below is an example of the table used to describe the effect on VSC.

Table No. 2.1: Example of VSC Table for an Impact Assessment						
Window Number	Baseline VSC Value	Proposed VSC Value	Ratio of Proposed VSC to Baseline VSC	Recommended Minimum VSC	Level of Compliance with BRE Guidelines	Effect of Proposed Development
House Number/Floor						
A	B	C	D	E	F	G

A: Window Number

The number in this column will identify the assessed window. All windows are represented visually in the corresponding figure.

B: Baseline VSC Value

The *Baseline VSC Value* represents the VSC value of the assessed window is calculated in the existing baseline model state (as explained in the "Glossary" on page 5).

C: Proposed VSC Value

The *Proposed VSC Value* represents the VSC value of the assessed window calculated in the proposed model state (as explained in the "Glossary" on page 5).

D: Ratio of Proposed VSC to Baseline VSC

This column expressed the ratio of change between the baseline VSC value and the proposed VSC value. The BRE Guidelines recommend that if the proposed value is less than 0.8 times the baseline value, then the reduction in daylight is more likely to be perceptible.

E: Recommended minimum VSC

The *BRE Target Value* for each window has been set according to the BRE Guidelines. The Guidelines state that a proposed development could possibly have a noticeable effect on the daylight received by an existing window, if the VSC value **both** drops below the guideline value of 27% **and** the VSC value is less than 0.8 times the baseline value.

Therefore, to determine the *recommended minimum Value*, 80% of the *Baseline VSC value* has been calculated. If this value is above the 27% threshold, a target value of 27% will be applied. If 80% of the baseline value is below 27%, then 80% of the baseline value is the appropriate target value.

F: Level of Compliance with the BRE Guidelines

This column states the compliance of the *Proposed VSC Value* with the *recommended minimum VSC* as per the BRE Guidelines. In essence, it shows whether or not the assessed window would experience a perceptible level of impact. If the window complies with the BRE Guidelines this cell will state "*BRE Compliant*". If the window does not meet the criteria as set out in the BRE Guidelines, a percentage of compliance with the *recommended minimum* will be stated.

G: Effect of Proposed Development

The levels of effect in this column describe the effect an assessed window will experience, based on its compliance with the *BRE Target Value*. The levels of effect used in this report have regard to the '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*' prepared by the Environmental Protection Agency (Draft of 2017), and to *Directive 2011/92/EU (as amended by Directive 2014/52/EU)* and a full list can be found in "*Definition of Effects*" on page 6.

2.3.2 Impact Assessment: Annual/Winter Probable Sunlight Hours (APSH/WPSH)

Below is an example of the table used to describe the effect to the APSH/WPSH of existing windows.

Table No. 2.2: Example of APSH/WPSH Impact Table for an Impact Assessment						
Window Number	Baseline APSH/WPSH	Proposed APSH/WPSH	Ratio of Proposed to Baseline APSH/WPSH	Recommended Minimum APSH/WPSH	Level of Compliance with BRE Guidelines	Effect of Proposed Development
House Number/Floor						
A	B	C	D	E	F	G

A: Window Number

The number in this column will identify the assessed window. All windows are represented visually in the corresponding figure.

B: Baseline APSH/WPSH

The *APSH/WPSH Value* represents percentage of the probable sunlight hours that the assessed window can receive, calculated in the existing baseline model state (as explained in the "Glossary" on page 5). The annual and winter assessments will be represented in separate tables.

C: Proposed APSH/WPSH

The *Proposed APSH/WPSH Value* represents the percentage of probable sunlight hours that the assessed window can receive, calculated in the proposed model state (as explained in the "Glossary" on page 5).

D: Ratio of Proposed to Baseline APSH/WPSH

This column expressed the ratio of change between the baseline APSH/WPSH value and the proposed APSH/WPSH value. The BRE Guidelines recommend that if the proposed value is less than 0.8 times the baseline value, then the reduction to sunlight is more likely to be perceptible.

E: Recommended Minimum APSH/WPSH

The *BRE Target Value* for each window has been set according to the BRE Guidelines. The Guidelines state that a proposed development could possibly have a noticeable effect on the sunlight received by an existing window, if the APSH value drops below the annual (25%) or WPSH value below the winter (5%) guidelines; **and** the APSH/WPSH value is less than 0.8 times the baseline value; **and** there is a reduction of more than 4% to the APSH.

Therefore, to determine the *recommended minimum APSH Value* for the annual study, 80% of the *Baseline APSH value* has been calculated. If this value is above the 25% threshold, a target value of 25% will be applied. If 80% of the baseline value is below 25%, then 80% of the baseline value is the appropriate target value.

To determine the *recommended minimum WPSH Value* for the winter study, 80% of the *Baseline winter APSH value* has been calculated. If this value is above the 5% threshold, a target value of 5% will be applied. If 80% of the baseline value is below 5%, then 80% of the baseline value is the appropriate target value.

F: Level of Compliance with BRE Guidelines

This column states the compliance of the *Proposed APSH/WPSH Value* with the *recommended minimum APSH/WPSH* as per the BRE Guidelines. In essence, it shows whether or not the assessed window would experience a perceptible level of impact. If the window complies with the BRE Guidelines this cell will state "BRE Compliant". If the window does not meet the criteria as set out in the BRE Guidelines, a percentage of compliance with the *recommended minimum* will be stated.

G: Effect of Proposed Development

The levels of effect in this column describe the effect an assessed window will experience, based on its compliance with the *BRE Target Value*. The levels of effect used in this report have regard to the 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' prepared by the Environmental Protection Agency (Draft of 2017), and to Directive 2011/92/EU (as amended by Directive 2014/52/EU) and a full list can be found in "Definition of Effects" on page 6.

2.3.3 Impact Assessment: Sun On Ground

Below is an example of the table used to describe the effect on SOG in existing gardens and amenity spaces.

Table No. 2.3: Example of SOG Table or an Impact Assessment						
Address	% of Area to Receive Above 2 Hours Sunlight on March 21st (Target >50%)				Level of Compliance with BRE Guidelines	Effect of Proposed Development
	Baseline	Proposed	Ratio of Proposed to Baseline	Recommended Minimum as per BRE Guidelines		
A	B	C	D	E	F	G

A: Address

This column contains the address of the assessed garden/amenity space. The locations of the gardens and amenity spaces assessed are visually represented in a corresponding figure.

B: Baseline

Baseline represents percentage of the assessed space's area that can receive more than 2 hours of sunlight on March 21st, calculated in the existing baseline model state (as explained in the "Glossary" on page 5).

C: Proposed

Proposed represents percentage of the assessed space's area that can receive more than 2 hours of sunlight on March 21st, calculated in the proposed model state (as explained in the "Glossary" on page 5).

D: Ratio of Proposed to Baseline

This column expressed the ratio of change between the baseline and the proposed values. The BRE Guidelines recommend that if the proposed value is less than 0.8 times the baseline value, then the reduction to sunlight is more likely to be perceptible.

E: Recommended Minimum as per the BRE Guidelines

The BRE Guidelines indicate that a proposed development could possibly have a noticeable effect on the sunlight received by an existing garden and/or amenity area, if half the area of the space does not receive at least two hours of sunlight during the spring equinox; **and** the area that receives more than two hours of sun on the spring equinox is less than 0.8 times its former value.

To determine the *recommended minimum*, 80% of the *Baseline* value has been calculated. If this value is above the 50% threshold, a target value of 50% will be applied. If 80% of the baseline value is below 50%, then 80% of the baseline value is the appropriate target value.

F: Level of BRE Compliance

This column states the compliance of the *Proposed* sunlight value with the *recommended minimum as per the BRE Guidelines*. In essence, it shows whether or not the assessed garden or amenity area would experience a perceptible level of impact. If the garden or amenity area complies with the BRE Guidelines this cell will state "*BRE Compliant*". If the garden or amenity area does not meet the criteria as set out in the BRE Guidelines, a percentage of compliance with the *recommended minimum* will be stated.

G: Effect of Proposed Development

The levels of effect in this column describe the effect an assessed garden or amenity space will experience, based on its compliance with the *BRE Target Value*. The levels of effect used in this report have regard to the 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' prepared by the Environmental Protection Agency (Draft of 2017), and to Directive 2011/92/EU (as amended by Directive 2014/52/EU) and a full list can be found in "*Definition of Effects*" on page 6.

2.3.4 Scheme Performance: Sun On Ground in Proposed Gardens and Amenity Spaces

Below is an example of the table used to describe SOG in proposed gardens and amenity spaces.

Table No. 2.4: Example of SOG Table for Scheme Performance			
Assessed Area	Area Capable of Receiving 2 Hours of Sunlight on March 21st	Recommended Minimum	Level of Compliance with BRE Guidelines
A	B	C	D

A: Assessed Area

This column identifies the assessed garden/amenity area.

B: Area Capable of Receiving 2 Hours of Sunlight on March 21st

The percentage of the proposed area that can receive more than 2 hours of sunlight on March 21st.

C: Recommended Minimum

The BRE Guidelines state that the percentage of a garden/amenity area that can receive more than 2 hours of sunlight on March 21st should be 50%. The target value for all spaces is set to 50%.

D: Level of Compliance with BRE Guidelines

This column states the compliance of the assessed space with the *BRE Target Value*. If the assessed garden or amenity area complies with the BRE Guidelines this cell will state "*BRE Compliant*". If the garden or amenity area does not meet the criteria as set out in the BRE Guidelines, a percentage of compliance with the *recommended minimum* will be stated.

2.3.5 Scheme Performance: Average Daylight Factor

Below is an example of the table used to describe the daylight factor in proposed units.

Table No. 2.5: Example of ADF Results Table for Scheme Performance				
Unit Number	Room Description	Predicted ADF Value	Recommended Minimum ADF	Level of Compliance with BRE Guidelines
A	B	C	D	E

A: Unit Number

This column identifies the assessed unit. All unit numbers are determined by the architect's drawings, unless otherwise stated.

B: Room Description

Room Description details which room of the unit has been assessed, e.g. bedroom, living room, etc.

C: Predicted ADF Value

The average daylight factor calculated for an assessed room.

D: Recommended Minimum ADF

This column will state the recommended minimum Average Daylight Factor for the room type as per the BRE Guidelines.

E: Level of Compliance with BRE Guidelines

This column states the compliance of the assessed space with the *BRE Target Value*. If the room complies with the BRE Guidelines this cell will state "*BRE Compliant*". If the room not meet the criteria as set out in the BRE Guidelines, a percentage of compliance with the *recommended minimum* will be stated.

2.3.6 Alternative Daylight Standards

Below is an example of the table used to describe the alternative daylight standard results..

Table No. 2.6: Example of Table for Alternative Daylight Standards Results for Scheme Performance								
Unit Number	Room Description	BS 8206-2		EN 17037			BS_EN 17037	
		Predicted ADF	Meets Criteria	% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets Criteria	% of area above target Lux (recommendation >50%)	Meets Criteria*
House Number/Floor								
A	B	C	D	E	F	G	H	I

A: Unit Number

This column identifies the assessed unit. All unit numbers are determined by the architect's drawings, unless otherwise stated.

B: Room Description

Room Description details which room of the unit has been assessed, e.g. bedroom, living room, etc.

C: Predicted ADF Value

The average daylight factor calculated for an assessed room.

D: Meets Criteria (BS 8206-2)

This column states if the assessed room achieves the ADF recommendation as per BS 8206-2: (An ADF above 2.0% for Kitchens, 1.5% for Living Rooms or above 1.0% for Bedrooms). For rooms with multiple purposes, such as LKDs, the higher target value should be taken.

E: % of area above 300 Lux

EN 17037 recommends at least 50% of the work-plane receives above 300 lux for at least half the daylight hours.

This column states percentage of the work-plane of the assessed room that is capable of receiving more than 300 lux for at least half the daylight hours.

F: % of area above 100 Lux

EN 17037 recommends at least 95% of the work-plane receives above 100 lux for at least half the daylight hours.

This column states percentage of the work-plane of the assessed room that is capable of receiving more than 100 lux for at least half the daylight hours.

G: Meets Criteria (EN 17037)

This column states if the assessed room achieves the recommended level of daylight as per EN 17037. (300 lux across more than 50% of the work plane and 100 lux across more than 95% of the work-plane for half the daylight hours)

H: % of area above Target Lux

BS EN 17037 recommends target lux levels to be achieved across at least 50% of the work-plane for at least half the daylight hours. The target values differ depending on the room function, 200 lux for Kitchens, 150 lux for Living Rooms or 100 lux for Bedrooms.

This column states percentage of the work-plane of the assessed room that is capable of receiving more than 300 lux for at least half the daylight hours.

I: Meets Criteria (BS EN 17037)

This column states if the assessed room achieves the recommended level of daylight as per BS EN 17037. Target lux levels achieved across more than 50% of the work plane: (200 lux for Kitchens, 150 lux for Living Rooms or 100 lux for Bedrooms). For rooms with multiple purposes, such as LKDs, the higher target value should be taken.

3.0 Guidelines / Standards

Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities. (2020)

In December of 2020, the Department of Housing, Planning and Local Government published a guidance document for new apartments, *Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities*. This document makes reference to the British Standard, *BS 8206-2:2008: Lighting for Buildings - Part 2: Code of Practice for Daylighting (the British Standard)* and to the Building Research Establishment's *Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice (the BRE Guidelines)*.

Paragraph 6.7 of the 2020 apartment guidelines states:

"Where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific [sic]. This may arise due to a design constraints associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."

Note: Section 3.2 of the Urban Development and Building Height Guides 2018, provides similar guidance as above.

A European Standard was published in 2018, entitled EN 17037 Daylight in Buildings. Furthermore, British authorities have published and adopted a national annex to the European standards, BS EN 17037. Neither EN 17037 nor BS EN 17037 are referenced in the Irish guidance and to the best of our knowledge is not referenced in any planning guidance document issued by Irish planning authorities. The BRE Guidelines have not been withdrawn. Until official guidance or instruction is published by a relevant authority on this matter, 3DDB will continue to reference the BRE Guidelines in our daylight and sunlight assessments.

This report will identify where daylight and sunlight recommendations have not been achieved. Rationale and compensatory design solutions are the remits of the planning consultant and project architect, when possible these will also be included in this report.

BRE - Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice (2011)

This document will be referred to as *the BRE Guidelines*. At the time of writing this report, the BRE Guidelines are in the second edition (BRE 209), with a third edition due for release. The BRE Guidelines sets out recommendations for appropriate levels of daylight and sunlight within a proposed development, as well as providing guidance on impacts arising from a proposed development to surrounding properties and amenity areas.

The BRE Guidelines will be used as the primary guiding document in the assessments that are carried out for the purpose of this report, as they are referenced in the Irish guidance document titled: *Sustainable Urban Housing: Design Standards for New Apartments*, as published in December of 2020 by the Department of Housing, Planning and Local Government.

A detailed description of the various recommendations for impact assessment and scheme performance is contained in section "4.0 Assessment Overview" on page 14 of this report.

BS 8206-2:2008: Lighting for Buildings - Part 2: Code of Practice for Daylighting (2008)

BS 8206-2:2008 is referenced in the second edition of the BRE Guidelines. It sets out minimum ADF recommendations for daylight within dwellings.

It should be noted that although this document has been superseded by EN 17037 / BS EN 17037, it is still considered to be the primary reference document as it is referenced in the BRE Guidelines, as well as the Irish guidance document *Sustainable Urban Housing: Design Standards for New Apartments*. Recommended minimum ADF values differ depending on the function of a room. An ADF of 2.0% is recommended for kitchens, 1.5% for living rooms and 1.0% for bedrooms. If a space has dual purposes it is advised that the higher target value should be applied.

EN 17037:2018 Daylight in Buildings (2018)

EN 17037 is a European Standard that provides recommendations for daylight within spaces using a different methodology than the Average Daylight Factor as used in the previous British Standard (BS 8206-2:2008).

EN 17037:2018 recommends that 300 lux should be received across 50% of the reference plane of a room for half of the daylight hours of the year, with no less than 100 lux received across 95% of the reference plane. No distinction is made for the function of the room for target lux levels within this standard.

The target values given within EN 17037 are difficult to achieve, especially where increased density is desired.

The criteria for lux levels as recommended in EN 17037 have been calculated for the proposed habitable rooms across all floors of the proposed development, as per the BRE study, and are contained within section "7.3 Appendix Results - Alternative Daylight Standards" on page 48 of this report.

EN 17037 also makes recommendations related to sunlight, glare and quality of view. These aspects are not addressed in this report.

BS EN 17037:2018 Daylight in Buildings (2018)

BS EN 17037:2018 is the British Annex to the European Standard (see above). The British Annex acknowledges that a rigid application of the European Standard could prove to be a difficult task. It states "... it is the opinion of the UK committee that the recommendations for daylight provision in a space [...] may not be achievable for some buildings, particularly dwellings."

Similar to the recommendations made in BS 8206-2:2008, target values differ depending on the function of a room. Target lux levels are applied across 50% of the reference plane of a room for half of the daylight hours. The target lux levels are 200 lux for kitchens, 150 lux for living rooms and 100 lux for bedrooms. No minimum is stated to be achieved across 95% of the work plane. If a space has dual purposes it is advised that the higher target value should be applied.

The criteria for lux levels as recommended in BS EN 17037 have been calculated for the proposed habitable rooms across all floors of the proposed development, as per the BRE study, and are contained within section "7.3 Appendix Results - Alternative Daylight Standards" on page 48 of this report.

Summary

It should be noted that the European Standard (EN 17037:2018 Daylight in Buildings) had been published prior to the publication of *Sustainable Urban Housing: Design Standards for New Apartments* in December 2020. Furthermore, British authorities have published and adopted a national annex to the European standards, BS EN 17037. Neither EN 17037 nor BS EN 17037 are referenced in the 2020 apartment guidelines and to the best of our knowledge are not referenced in any planning guidance document issued by Irish planning authorities. Additionally, the BRE Guidelines have not been withdrawn. Until official guidance or instruction is published by a relevant Irish planning authority on this matter, 3DDB will continue to reference the BRE Guidelines in our daylight and sunlight assessments and ADF will be the primary assessment to determine daylight within proposed habitable spaces. As such, circa compliance rates and analysis of results will focus on the results of the ADF study whilst the assessments that have been carried out regarding the criteria set out in EN 17037 and BS EN 17037 should be considered as supplementary studies.

Neither the British Standard, European Standard, British Annex to the European Standard nor the BRE Guide set out rigid standards or limits. They are all considered advisory documents. The BRE Guide is preceded by the following very clear statement as to how the design advice contained therein should be used:

"The advice given here 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."

That the recommendations of the BRE Guide are not suitable for rigid application to all developments in all contexts, is of particular importance in the context of national and local policies for the consolidation and densification of urban areas or when assessing applications for highly constrained sites (e.g. lands in close proximity or immediately to the south of residential lands).

4.0 Assessment Overview

4.1 Effect on Vertical Sky Component (VSC)

A proposed development could potentially have a negative effect on the level of daylight that a neighbouring property receives, if the obstructing building is large in relation to their distance from the existing dwelling.

To ensure a neighbouring property is not adversely affected, the Vertical Sky Component (also referred to as VSC) is calculated and assessed. VSC can be defined as the amount of skylight that falls on a vertical wall or window.

This report assesses the percentage of direct sky illuminance that falls on the assessment point of neighbouring windows that could be affected by the proposed development.

The BRE Guidelines state that if the VSC is:

- At least 27%, then conventional window design will usually give reasonable results;
- Between 15% and 27%, then special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight;
- Between 5% and 15%, then it is very difficult to provide adequate daylight unless very large windows are used;
- Less than 5%, then it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed.

In this assessment, the VSC of the assessment point on each of the assessed windows will be calculated, both in the 'baseline state' and in the 'proposed state'. The baseline state reflects the current VSC of the window, the proposed state will determine what the VSC of the window would be if the proposed development is built as planned.

A comparison between these values will determine the level of effect.

A proposed development could possibly have a noticeable effect on the daylight received by an existing window, if the following occurs:

- The VSC value drops below the guideline value of 27%; **and**
- The VSC value is less than 0.8 times the existing value.

The results for the study on the effect on VSC caused by the proposed development can be seen in section 6.1 on page 19.

4.2 Effect on Annual/Winter Probable Sunlight Hours (APSH/WPSH)

Annual/Winter Probable Sunlight Hours (APSH/WPSH) is a measure of sunlight that a given window may expect to receive over the period of a year. The percentage of APSH/WPSH that windows in existing properties receive might be affected by a proposed development.

Whether a window is considered for APSH/WPSH impact assessment is based on its orientation. A south-facing window will, in general, receive the most sunlight. North facing windows may receive sunlight on only a handful of occasions in a year, and windows facing eastwards or westwards will receive sunlight only at certain times of the day. Taking this into account, the BRE Guidelines suggest that windows with an orientation within 90 degrees of due south should be assessed.

If the assessment point of a window can receive more than 25% of APSH, including at least 5% of the WPSH, then the room should receive enough sunlight.

As with the VSC study, the APSH/WPSH will be calculated in the baseline state and the proposed state. A comparison of the results will determine the level of effect.

A proposed development could possibly have a noticeable effect on the sunlight received by an existing window, if the following occurs:

- The APSH value drops below the annual (25%) or winter (5%) guidelines; **and**
- The APSH value is less than 0.8 times the baseline value; **and**
- There is a reduction of more than 4% to the annual APSH.

The results of the study on APSH can be found in Section 6.2 on page 25.

4.3 Effect on Sun On Ground in Existing Gardens/Amenity Areas

The BRE Guidelines recommend that for a garden or amenity area to appear adequately sunlit throughout the year, at least half of it should receive at least two hours of sunlight on March 21st.

March 21st, also known as the spring equinox, is chosen as the assessment date as daytime and night-time are of approximately equal duration on this date.

The percentage of assessed areas which can receive two hours or more of direct sunlight on March 21st will be calculated in both the baseline and proposed states. A comparison between these values will determine the level of effect.

A proposed development could possibly have a noticeable effect on the sunlight received by an existing garden and/or amenity area, if the following occurs:

- Half the area of the space does not receive at least two hours of sunlight during the spring equinox; **and**
- The area that receives more than two hours of sun on the spring equinox is less than 0.8 times its former value.

The results of the study on effect on sun on ground the in neighbouring gardens (including a visual representation in the form of 2-hour false colour plans) can be found in Section 6.3 on page 33.

4.4 Shadow Study

A shadow study has been carried out on the baseline existing model state and the proposed model state. This visual representation of the shadows cast by the proposed development can be found in the hourly shadow diagrams in section 6.4 on page 34.

Hourly renderings have been shown from sunrise to sunset on the following dates:

- Spring equinox: March 21st Sunrise 6:25 | Sunset 18:40.
- Summer solstice: June 21st. Sunrise 4:57 | Sunset 21:57.
- Winter solstice: December 21st Sunrise 8:38 | Sunset 16:08.

Note: Considering the spring equinox (March 21st) and autumn equinox (22nd September) yield similar results, only the spring equinox was generated.

4.5 Sun On Ground in Proposed Outdoor Amenity Areas

The BRE Guidelines recommend that for a garden or amenity area to appear adequately sunlit throughout the year, at least half of it should receive at least two hours of sunlight on March 21st.

March 21st, also known as the spring equinox, is chosen as the assessment date as daytime and night-time are of approximately equal duration on this date.

The portion of each space capable of receiving 2 hours of direct sunlight on March 21st will be calculated individually, these figures will then be combined to give the development average.

The results for the study on sun on ground in the proposed outdoor amenity areas (including a visual representation in the form of 2-hour false colour plans) can be found in section 7.0 on page 43.

4.6 Average Daylight Factor in Proposed Habitable Rooms (ADF)

The BRE Guidelines define the Average Daylight Factor as the average illuminance on the working plane in a room, divided by the illuminance on an unobstructed horizontal surface outdoors.

In housing, the working plane is considered to be 850 mm above the finished floor level and is offset 500 mm from the room boundaries.

BS 8206-2:2008 Code of Practice for Daylighting recommends an ADF of 5% for a well day lit space where no additional electric lighting is available, and 2% for a partly daylit space with supplementary electric lighting.

In terms of housing, *BS 8206-2:2008*, as referenced in the BRE Guidelines, also gives minimum values of ADF. These recommendations are considered to be the minimum value of ADF required for the following habitable spaces:

- 2% for kitchens;
- 1.5% for living rooms;
- 1% for bedrooms.

Where rooms serve more than one function, the higher ADF target value has been taken.

This study has assessed the Average Daylight Factor (ADF) received in all habitable rooms across all floors of the proposed development.

Note: non-habitable rooms and circulation spaces (e.g. bathrooms and corridors) do not require ADF assessment according to the BRE Guidelines.

For definition of spaces and target values applied, please see the methodology section of this report in section 5.0 on page 16.

The results for the study on ADF can be seen in section 7.2 on page 44.

5.0 Methodology

5.1 Building the Baseline and Proposed Models

In order to obtain the results of this assessments, 3D Design Bureau (3DDB) constructed a series of architectural 3D digital models using Revit 2021, a BIM software application made available by Autodesk.

Downey Planning supplied 3DDB with DWGs of the proposed development, which was subsequently prepared for daylight and sunlight analysis.

A combination of survey information, aerial photography, available online photography and/or ordnance survey information were used to model the surrounding context and assessed buildings. **Note:** as the information gathered from online sources is not as accurate as surveyed information, some tolerance should be allowed to the placement of windows, boundary treatments and the results generated.

Normally trees and shrubs do not need to be included in the studies carried out in this report, partly because their shapes are almost impossible to predict, and partly because the dappled shade of a tree is more pleasant than the deep shadow of a building (this applies especially to deciduous trees). Where a dense belt or group of evergreens is specifically planned as a windbreak or for privacy purposes, it is better to include their shadow in the calculation of shaded area. If and when trees have been included as part of the study, it will be clearly stated.

Baseline

The baseline state reflects the existing environment. It includes the surrounding context and the subject site in their current standing. This includes any structures that are to be demolished as part of this application.

Proposed

The proposed state reflects the subject site if the development is built as proposed. This includes the demolishing of structures, landscaping etc. This state is taking into account the renovations on the Gated Lodge House and Prospect House, both on the subject site.

5.2 Generating Results

The 3D models as stated above were brought into specialist software packages specifically designed for the purpose of daylight and sunlight analysis.

The results are generated and analysed considering the BRE Guidelines, as expanded on below.

5.2.1 VSC

Assessment Criteria

The effect on Vertical Sky Component (VSC) has been calculated on Prospect House, 28|30 Prospect View, 32|34|36 Prospect View.

Under BRE Guidelines, only habitable rooms need to be assessed for effect on daylight and sunlight. In the absence of design layouts or floor plans, or information pertaining to the internal 'as-built' layouts, assumptions have been made regarding the function of the windows of the existing surrounding properties (i.e. what room type is served by the window being assessed).

Typically, the effect on ground floor windows is greater than the effect on windows of subsequent floors. However, floors above ground floor level have been included in this study to give a more comprehensive assessment.

Windows on the gable wall of 32 and 30 Prospect View were reasonably assumed to be either circulation or bathroom windows due to their size and position.

Assessment Points

The assessment points for measuring VSC or APSH are taken from the centre point of a standard window.

If the window being assessed is a full height window, the assessment point is taken at 1600 mm above the finished floor level.

If it can be determined or reasonably assumed that multiple windows are servicing the same room, each window will be assessed and the average value will be taken.

5.2.2 APSH/WPSH

Impact Assessment

Effect on Annual/Winter Probable Sunlight Hours (APSH/WPSH) has been calculated on the windows assessed in the VSC study. The BRE Guidelines suggest that windows with an orientation within 90 degrees of due south should be assessed. Therefore, the APSH/WPSH of windows that do not have an orientation within 90° of due south have not been assessed for the purposes of this report.

If it can be determined or reasonably assumed that multiple windows are servicing the same room, the APSH/WPSH will be assessed for the room as opposed to each individual window.

The assessment points for APSH/WPSH are equivalent to the VSC study.

5.2.3 Sun On Ground

Assessment Criteria

Effect on sunlight to existing neighbouring gardens and/or amenity areas has been assessed to the north of the proposed development, as areas located to the south are unlikely to be affected due to sun direction. Overshadowing is highly unlikely to occur in areas that are due south of any proposed development.

The levels of sunlighting to proposed amenity areas, as indicated by the architect, have been assessed. However, it should be noted that the numbering of these spaces in the Daylight and Sunlight Assessment Report has been assigned by 3DDB specifically for the purposes of this report. If other consultants are referencing these spaces in their own reports, it is unlikely they will be numbered the same.

5.2.4 ADF

Recommended Minimum ADF

The recommended minimum for Average Daylight Factor (ADF) is based on the function of the room being assessed.

The recommendations as per the BS 8206-2:2008 are as follows: 2% for kitchens; 1.5% for living rooms; and 1% for bedrooms. BS 8206-2:2008 also recommends that where a room serves more than one purpose, such as the modern day apartment design of the living/kitchen/dining (LKD) space, the minimum average daylight factor should be taken for the room with the highest value.

Following this advice, a target ADF value of 2.0% has been applied to LKDs within the proposed scheme.

Should full ADF compliance be sought, design changes could be needed, such as the removal of balconies or a reduction of unit sizes. Such mitigation measures could reduce the quality of living within the proposed units to a greater degree than the improvements that would be gained with increased ADF values.

In new developments, some internal spaces (e.g. studio apartments, shared communal areas etc.) can possibly be of a nature that do not have a predefined target value in the BS 8206-2:2008. In such instances, 3DDB have applied a target value they deem to be appropriate.

Defining Areas

Definition of rooms has been taken directly from the architectural drawings supplied by Downey Planning.

Should rooms include a winter garden, the winter garden is deemed to be an extension to the interior space and will be included in the assessed area of the room.

Circulation spaces, corridors, bathrooms etc. have not been assessed.

Indication of the assessed space in each room is provided in the floor plans that correspond to the ADF results in section "7.2 Average Daylight Factor" on page 44.

Work Plane

The calculation of ADF is carried out on a hypothetical work plane which lies 850 mm from the finished floor level in residential units and 700 mm in academic and office spaces. The work plane is offset 500 mm from the room boundaries. Room boundaries are taken from the inside face of the interior walls.

The Daylight Factor (DF) percentage has been calculated on the work plane across a series of points on a grid of approximately 300 mm.

The average of these figures determines the Average Daylight Factor (ADF).

Material Palette

Unless a material palette is provided by the architect the following values have been assumed for ADF calculations.

Object	Material	Reflectance	Object	Material	Reflectance Transmittance
Exterior walls	Standard Brick	0.3	Interior Walls	Off white paint	0.75
	Light Brick	0.4	Interior Ceiling	White paint	0.8
	Dark Brick	0.15	Interior Floor	Light timber	0.4
	Render	0.6	Miscellaneous	Miscellaneous	0.5
	Concrete	0.4	Glass	Double glazing	0.8
Ground cover	Paving	0.4		Maintenance Factor	0.91
	Tarmac	0.2		Glass adjusted for maintenance	0.73
	Grass	0.2	Frosted glass	0.5	

5.2.5 Alternative Daylight Standards

Supplementary studies have been carried out on daylight performance using the daylight recommendations given in EN 17037 and BS EN 17037. The model used for the ADF study has been used for these additional studies. As the results published in this section are considered to form part of an appendix, no reference will be made to them in the circa compliance rates, summary of results or conclusion of this report.

5.3 Shadow Study

The shadow study renderings have been carried out in order to give a visual representation to the results set out in the sunlight assessment section of this report.

Hourly renderings have been shown from sunrise to sunset on the following dates:

- Spring equinox: March 21st Sunrise 6:25 | Sunset 18:40.
- Summer solstice: June 21st. Sunrise 4:57 | Sunset 21:57.
- Winter solstice: December 21st Sunrise 8:38 | Sunset 16:08.

Note: Considering the spring equinox (March 21st) and autumn equinox (22nd September) yield similar results, only the spring equinox was generated.



6.0 Impact Assessment Results

6.1 Effect on Vertical Sky Component

6.1.1 28|30 Prospect House - Rear Windows

Table No. 6.1: VSC Results: 28 30 Prospect House - Rear Windows						
Window Number	Baseline VSC Value	Proposed VSC Value	Ratio of Proposed VSC to Baseline VSC	Recommended minimum VSC*	Level of Compliance with BRE Guidelines	Effect of Proposed Development**
No. 28 - Rear						
28a	34.72%	34.68%	1.00	27.00%	BRE Compliant	Imperceptible
28b	31.83%	31.83%	1.00	25.46%	BRE Compliant	Imperceptible
28c	37.19%	37.14%	1.00	27.00%	BRE Compliant	Imperceptible
28d	37.37%	37.32%	1.00	27.00%	BRE Compliant	Imperceptible
28e	37.46%	37.44%	1.00	27.00%	BRE Compliant	Imperceptible
No. 30 - Rear						
30a	30.13%	30.13%	1.00	24.10%	BRE Compliant	Imperceptible
30b	34.54%	34.46%	1.00	27.00%	BRE Compliant	Imperceptible
30c	32.68%	32.62%	1.00	26.14%	BRE Compliant	Imperceptible
30d	37.12%	37.12%	1.00	27.00%	BRE Compliant	Imperceptible
30e	32.66%	32.66%	1.00	26.13%	BRE Compliant	Imperceptible
30f	37.85%	37.51%	0.99	27.00%	BRE Compliant	Imperceptible

* The BRE Guidelines state that in order for a proposed development to have a noticeable effect on the VSC of an existing window, the value needs to both drop below the stated target value of 27% **and** be less than 0.8 times the baseline value.
 ** For the interpretation of level of effects please refer to "2.2 Definition of Effects" on page 6.



Figure 6.1: Left - Highlighted areas indicate the position of assessed windows., Right - Aerial view of assessed location