March 2022

Mixed Use Development, Lands at Clonburris, County Dublin.

Daylight and Sunlight Assessment Report in response to the Clarification of Additional Information request (SDZ22A/0010)

Applicant: Kellands Homes Ltd.

"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." - BRE 209

+353 (0) 1 288 0186

info@3ddesignbureau.com

www.3ddesignbureau.com

Report Contents

The full set of results for each assessment and shadow study can be found in the appendix section of this report.

1.0 Executive Summary

1.1 Summary of Assessment

3D Design Bureau were originally commissioned to carry out a daylight and sunlight assessment for the proposed mixed use development on lands at Clonburris, County Dublin. The study assessed levels of daylight and sunlight in units of the proposed apartments (blocks A and B only) along with a sunlight assessment and accompanying shadow study of the proposed public and communal open spaces across the entire site.

Under the Clarification of Additional Information request (Reg Ref: SDZ22A/0010) the local planning authority requested the following. "The submitted Daylight and Sunlight Assessment Report should be revised to include an assessment of the residential units in proposed Block K and any associated communal open space with this building"

A further meeting with the planning authority took place following the above request and as a result the original Block B within the scheme was omitted along with updates to the landscape plan and modifications to Block K.

To satisfy the clarification request and the subsequent design changes and omission of Block B, 3D Design Bureau ran scheme performance assessments on Block K along with reassessment of Block A from the original application. Reassessment of Block A was warranted due to changes surrounding the block. Compliance rates stated in this updated report are therefore associated with the assessments of these two blocks.

It should be noted that there is no change to the compliance rate for Block A whilst Block K is showing to be 100% compliant

The primary scheme performance assessments carried out for this updated report are all in accordance with the BRE Guidelines as summarised below:

Scheme Performance

Daylight access for the habitable rooms of the units in the proposed blocks A and K, have been assessed through a Spatial Daylight Autonomy (SDA) study. Sunlight access for the same rooms has been quantified through a Sunlight Exposure (SE) assessment. A Sun On Ground (SOG) study has also been carried out to indicate the level of sunlight on March 21st in the proposed amenity spaces. Supplementary scheme performance studies have also been carried out. These include an SDA assessment under the I.S. EN 17037 criterion, and a No Sky Line (NSL) study within proposed habitable rooms of both blocks.

The site plan below indicates the areas that have been assessed as listed above.

Please see Page 4 for a detailed breakdown of results.

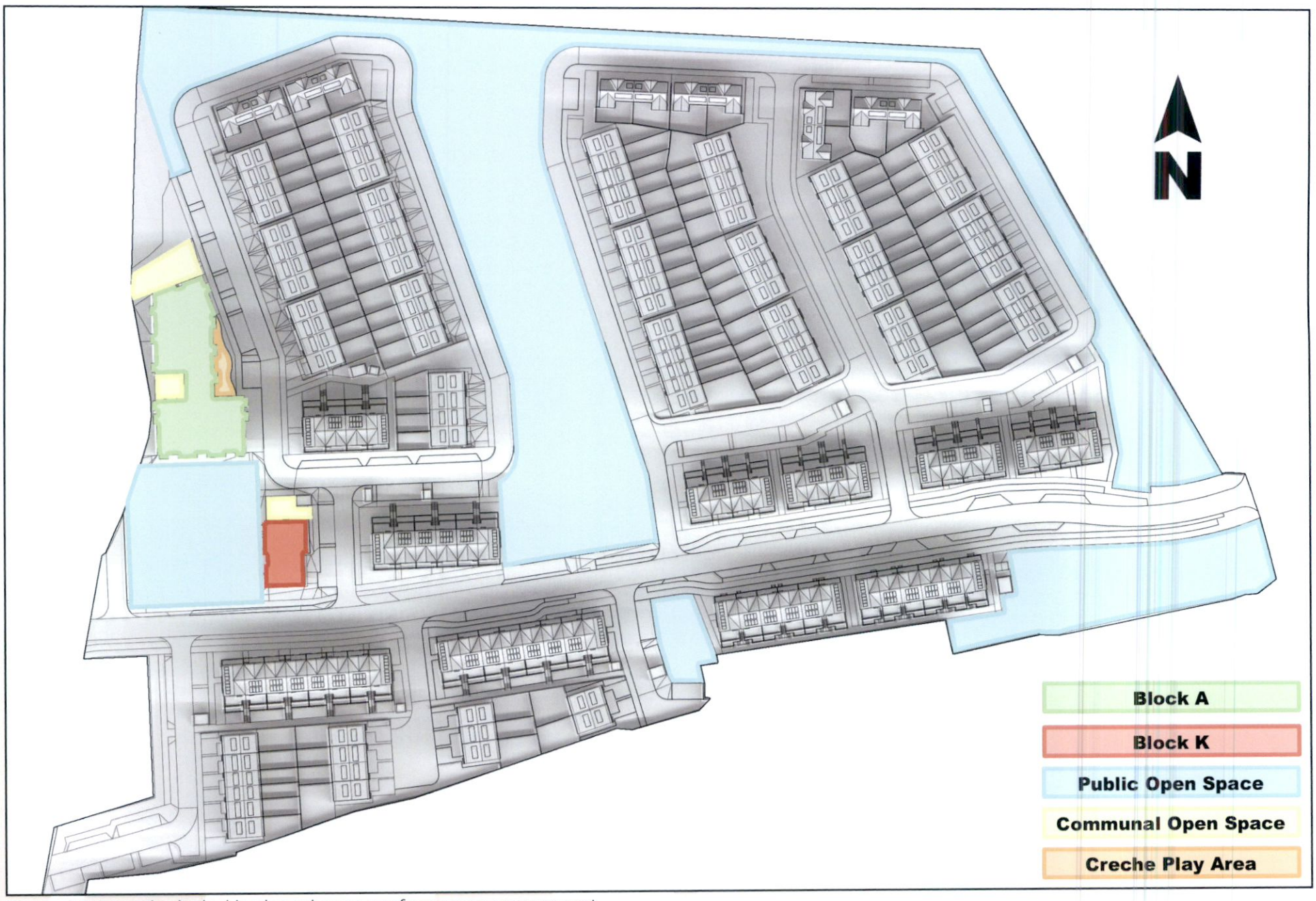


Figure 1.1: Areas included in the scheme performance assessment.

1.2 Scheme Performance Results Overview:

Spatial Daylight Autonomy (SDA):

- Rooms assessed: 121
- Without trees:
  - Rooms meeting the guideline: 121
  - Rooms not meeting the guideline: 0
- Trees in winter state:
  - Rooms meeting the guideline: 118
  - Rooms not meeting the guideline: 3
- Trees in summer state:
  - Rooms meeting the guideline: 118
  - Rooms not meeting the guideline: 3

Sunlight Exposure (SE):

- Units Assessed: 45
- Deciduous trees as opaque objects:
  - High: 14
  - Medium: 6
  - Minimum: 23
  - Non-compliant: 2
- Without deciduous trees:
  - High: 18
  - Medium: 5
  - Minimum: 20
  - Non-compliant: 2

Sun On Ground (SOG) in proposed amenity areas:

- Areas Assessed: 8
  - Areas meeting the guidelines: 7

1.3 Supplementary Assessment Results Overview

Spatial Daylight Autonomy (SDA) under I.S. EN 17037 Criterion:

- Rooms assessed: 121
  - Rooms meeting the guideline: 72
  - Rooms not meeting the guideline: 49

No Sky Line (NSL):

- Rooms assessed: 121
  - Rooms with meeting the applied criteria: 120
  - Rooms not meeting the applied criteria: 1

Table No. 1.3.0 - Summary of Scheme Performance Results

Assessment Name	Guiding Document	Compliance Rate
Spatial Daylight Autonomy	BRE 209 (2022)	c. 98%
SDA (without trees)	BRE 209 (2022)	c. 100%
SDA I.S. (EN 17037)	I.S. EN 17037	c. 60%
Sunlight Exposure	BRE 209 (2022)	c. 96%
Sun On Ground (Public Open Space)	BRE 209 (2022)	c. 100%
Sun On Ground (Communal Open Space)	BRE 209 (2022)	c. 100%
Sun On Ground (Creche Play Area)	BRE 209 (2022)	Non-compliant
No Sky Line (NSL)	BRE 209 (2022)	c. 99%*

*Compliance rates stated for NSL are calculated against an applied criteria as the BRE Guidelines do not provide a recommended minimum.

2.0 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*. 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* (BRE 209).

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."

As such, this report identifies where daylight and sunlight recommendations have and have not been achieved.

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

At the time of publication of *Design Standards for New Apartments* and the *Urban Development and Building Height Guides*, BRE 209 was in the 2nd edition, first published in 2011. Since then, a 3rd edition of BRE 209 has been published (June 2022) and the 2nd edition has been withdrawn. BRE 209 no longer references *BS 8206-2:2008*, which has also been withdrawn. The primary standard used as reference in BRE 209 edition 3 is *BS EN 17037*.

BRE - Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice (2022)

This document will be referred to as *the BRE Guidelines* in this report.

At the time of writing this report, the BRE Guidelines are in the third edition (BRE 209). 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 have been used as the primary guiding document in the assessments that have been carried out for the purpose of this report, as they are referenced in Irish guidance documents:

- *Sustainable Urban Housing: Design Standards for New Apartments*, as published in December of 2020 by the Department of Housing, Planning and Local Government and Heritage.
- *Urban Development and Building Heights*, as published in December of 2018 by the Government of Ireland.

Whilst the primary reference document for the BRE Guidelines is BS EN 17037, there are some subtle differences between BRE 209 and BS EN 17037. For the purposes of this report, the BRE Guidelines (BRE 209) is considered the primary reference.

A detailed description of the various recommendations for scheme performance is contained in section "4.2 Quantitative Scheme Performance Assessment Overview" on page 10 of this report.

EN 17037:2018: Daylight in Buildings (2018)

*EN 17037 i*s a European Standard that provides recommendations for daylight within spaces. (Emphasis added)

EN 17037:2018 recommends that 300 lux should be received across 50% of a hypothetical reference plane of any 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 particularly onerous, especially where increased density is desired in a residential setting. It is the opinion of 3D Design Bureau that these target values are less appropriate for proposed residential developments than the recommendations made in the BRE Guidelines, which apply room-specific target values for appropriate LUX levels.

Recommendations made in EN 17037 regarding Sunlight Exposure for proposed developments have been incorporated into the BRE Guidelines. As such, Sunlight Exposure is the primary assessment for sunlight within habitable rooms of the proposed development.

EN 17037 also makes recommendations related to glare and quality of view out. These aspects are not addressed in this report as these assessments have less relevance in a residential context where occupants have the freedom to move about in order to improve level of glare or alter the view out.

I.S. EN 17037:2018 Daylight in Buildings (2018)

*I.S. EN 17037 i*s a direct adoption of the European Standard *EN 17037:2018* that provides recommendations for daylight within spaces.

The target values given within *I.S. EN 17037* are directly adopted from *EN 17037.* As such, there are no room-specific recommendations for daylight. Whilst it could be deemed appropriate to apply *I.S. EN 17037* instead of *BRE 209* in the Republic of Ireland, it should be noted that BRE 209 is referenced in both the Sustainable Urban Housing: Design Standards for New Apartments (2020) and *Urban Development and Building Heights* (2018). To the best of our knowledge, (at the time of writing), the only reference that is made to *I.S. EN 17037* in a planning guidance document issued by an Irish planning authority is in the draft *Dublin City Development Plan (2022-2028),* in which I.S. EN 17037 is deemed unsuitable for use during planning applications.

It is the expert opinion of 3D Design Bureau, that the recommendations made in the *BRE Guidelines* are more appropriate than that within *I.S. EN 17037.* As such, the *BRE Guidelines* have formed the basis of the primary scheme performance assessment of daylight access within this report.

Regardless, a supplementary SDA study has been carried out using the same rooms as assessed under the primary study (BRE 209) using the criterion of *I.S. EN 17037*, with compliance rates stated. However, this should be considered a supplementary study. Compensatory design measures may not be put forward for non-compliant rooms under this standard as the rationale for non-compliance may be that targeting compliance with the I.S. EN 17037 daylight recommendations is not conducive to a well-balanced proposal.

BS EN 17037:2018: Daylight in Buildings (2018)

BS EN 17037 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."*

In BS EN 17037, daylight recommendations 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
- 100 Lux for bedrooms

No minimum is stated to be achieved across 95% of the working plane. If a space has dual purposes it is advised that the higher target value should be applied.

Summary

It is the expert opinion of 3D Design Bureau, that the BRE Guidelines (*BRE 209*) are the most appropriate guiding document for daylight and sunlight assessment, as such BRE 209 will be the primary reference document for all primary studies carried out for this report. For daylight within proposed developments, a supplementary study has been carried out under the criteria of *I.S. EN 17037.*

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). A compromise may have to be made concerning daylight and sunlight compliance to achieve national or local planning objectives.

3.0 Glossary

3.1 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.

Cloudless sky model
A completely cloudless sky model, used for sunlight exposure calculation.

Model State
The model state is a term used to describe the configuration of the digital model used to run analysis. Model states will typically reflect a baseline state and a proposed or cumulative state. For a definition of the model states used in the analysis carried out in this report, please refer to "Preparing the analytical model" on page 9.

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.

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.

Sunlight Exposure (SE)
The number of hours a room can expect to receive of direct sunlight on a given date between February 1st and March 21st at a determined point on the windows.

Spatial Daylight Autonomy (SDA)
Spatial Daylight Autonomy assesses whether a space receives sufficient daylight on a working plane during standard operating hours on an annual basis. For compliance, the target value is achieved across 50% of the working plane for half of the occupied period.

No Sky Line (NSL)
The no sky line divides points on the working plane which can and cannot see the sky.

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 300mm from the room boundaries under BRE 209 criteria, and 500mm from the room boundaries under I.S. EN 17037 criteria.

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.

3.2 Definition of Levels of Sunlight Exposure

For interiors, access to sunlight can be quantified. BRE 209 recommends that a space should receive a minimum of 1.5 hours of direct sunlight on a selected date between 1 February and 21 March with cloudless conditions. It is suggested that 21 March (equinox) be used. The medium level of recommendation is three hours and the high level of recommendation four hours. For dwellings, at least one habitable room, preferably a main living room, should meet at least the minimum criterion.

The level of sunlight exposure will be stated for each assessed room in the tables under section "A.2 Sunlight Exposure (SE) in Proposed Units" on page 30. Below is a list of the terms used to categorise the levels of sunlight exposure:

Non-compliant
A non-compliant level of sunlight exposure will be stated if the potential sunlight for the assessed room is less than 1.5 hours on March 21st. Note: the recommendation is that a room within a proposed unit is capable of receiving 1.5 hours of direct sunlight on March 21st. If an individual room does not achieve this recommendation, it does not mean that the unit is non compliant.

Minimum
A minimum level of sunlight exposure will be stated if the potential sunlight for the assessed room is between 1.5 hours and 3 hours on March 21st.

Medium
A medium level of sunlight exposure will be stated if the potential sunlight for the assessed room is between 3 hours and 4 hours on March 21st.

High
A high level of sunlight exposure will be stated if the potential sunlight for the assessed room is greater than 4 hours on March 21st.

4.0 Methodology

4.1 Preparing the analytical model

4.1.1 Building the Model States

The project architect, Davey + Smith Architects supplied 3DDB with AutoCAD drawings of the proposed development. Landscape drawings were issued by Landscape Architects, Ronan MacDiarmada & Associates. As standard practice, 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 results generated.

Proposed model state

The proposed model state reflects the subject site if the development is built as proposed following the changes made for the clarification for additional information request. This includes the demolishing of structures, landscaping etc. Proposed trees have been included using information provided by the landscape architect, with assumptions made regarding the size, position and species of existing trees.

All of the above information was subsequently used to prepare a digital analytical model in software specifically designed for of daylight and sunlight analysis.

4.1.2 Trees

It is generally not possible to accurately represent trees in a digital 3D model as the size and shape will differ greatly from tree to tree. When modeling trees for this assessment assumptions have been made and tree geometry has been simplified.

For the purpose of the analysis carried out in this report, the position and size of existing trees have been estimated using photographic information. The shape of the trees have been simplified and the species of each tree has been assumed. Simplified models of proposed trees within the development have also been included according to the information provided by the landscape architect.

Whilst evergreen trees are included in all studies, BRE 209 provides guidance on how deciduous trees should be treated depending on the study being carried out, as summarised below:

Spatial Daylight Autonomy (SDA)

BRE 209 recommends when assessing daylight in a proposed building, it is appropriate to run the assessment with deciduous trees represented in both winter and summer conditions. Light transmittance values of 60% and 20% have been applied to deciduous tree canopies for winter and summer assessments respectively.

I.S. EN 17037 does not give any guidance on how trees should be represented. For the purpose of this report, the SDA calculation under the I.S. EN 17037 criteria has been carried out with deciduous trees in summertime foliage to represent the worst case scenario.

Sunlight Exposure (SE)

The BRE Guidelines state that as deciduous trees would not be in full leaf on the recommended assessment date (March 21st), sunlight would be expected to penetrate deciduous trees. However, as trees have so many variables, it is impossible to accurately represent how they would affect sunlight at a given time. The suggested methodology (BRE 209) to allow for this is to run the sunlight exposure study in two states. Once with deciduous trees as opaque objects and secondly without deciduous trees in the assessment model. This gives a range of potential sunlight hours.

No Sky Line (NSL)

Because some sky can usually be seen through a tree canopy, trees have not been included in the No Sky Line assessment model unless there is a dense belt of evergreen trees specifically planned as a windbreak or for privacy purposes.

Sun On Ground (SOG)

The BRE Guidelines states that when assessing the impact of buildings on sunlight in gardens:

"...trees and shrubs are not normally included in the calculation unless a dense belt or group of evergreens is specifically planned as a windbreak or for privacy purposes. This is partly because the dappled shade of a tree is more pleasant than the deep shadow of a building (this applies especially to deciduous trees)."

As such, deciduous trees have not been included in the calculation of SOG in either the impact or scheme performance assessments.

Shadow Study

The hourly renderings of the shadow study have been generated with evergreen trees represented as opaque objects and without deciduous trees. This method best represents the methodology used for the impact assessment and allows for a better understanding of potential shadows cast by the proposed development through the tree canopy.

4.2 Quantitative Scheme Performance Assessment Overview

4.2.1 Spatial Daylight Autonomy in Proposed Habitable Rooms (SDA)

Spatial Daylight Autonomy assesses whether a room receives sufficient daylight on a working plane during standard operating hours on an annual basis. A given target value should be achieved across 50% of the working plane for half of the daylight hours.

There are two methods for calculating SDA:

- **Calculation method using illuminance level:** This requires the use of a detailed daylight calculation method where hourly (or sub-hourly) internal daylight illuminance values for a typical year are computed using hourly (or sub-hourly) sky and sun conditions derived from climate data appropriate to the site. This calculation method determines daylight provision directly from simulated illuminance values on the reference plane. The illuminance value of at least half the required area of the space should equal or exceed the target values.
- **Calculation method using daylight factor:** The daylight factor method assumes a constant ratio between internal and external illuminance. The daylight factors in the space shall be calculated by any reliable method that is based on the ISO 15469:2004 standard overcast sky (TYPE 1 or TYPE 16). Daylight factors are to be predicted across grid of points on a plane 0.85m above the floor of the space. The daylight factor of at least half the required area of the space should equal or exceed the target values.

It is the opinion of 3DDB that this calculation method using illuminance level better represents a real-world scenario as it accounts for the quality of light based on orientation. As such, the illuminance methodology has been adopted for all SDA assessments in this report.

In terms of housing, *BRE 209* provides target SDA values to be received across al least 50% of the working plane for at least half the daylight hours. The target values differ based on the function of the room assessed:

· 200 Lux for kitchens · 150 Lux for living rooms · 100 Lux for bedrooms

Where rooms serve more than one function, the higher SDA target value should been taken. 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 BRE 209. In such instances, 3DDB have applied a target value they deem to be appropriate. In the case of the proposed development there is a creche on the ground floor of Block A along with a study in Block K. 3DDB recommend that an SDA target value of 150 Lux be applied to both rooms. Whilst the analysis has been carried out on these rooms, they have not been included in the calculated compliance rates.

Under I.S. EN 17037 at least 50% of the working plane should receive above 300 lux for at least half the daylight hours, with 95% of the working plane receiving above 100 Lux for all rooms. The target SDA values not vary depending on the room function under this criteria.

This primary study has assessed the Spatial Daylight Autonomy (SDA) received in the habitable rooms of the proposed development under the BRE 209 criterion. The SDA of the proposed development has been calculated under the I.S. EN 17037 criterion as part of a supplementary assessment.

Defining Rooms

Definition of rooms has been taken directly from the architectural drawings supplied by the project architect.

In accordance with the BRE Guidelines 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 SDA results in the appendix section "A.1 Spatial Daylight Autonomy (SDA) in Proposed Units" on page 18.

Working Plane

The calculation of SDA is carried out on a hypothetical working plane which lies 850 mm from the finished floor level in residential units and 700 mm in academic and office spaces.

In the BRE 209 study the working plane is offset 300 mm from the room boundaries. Under the I.S. En 17037 criteria the working plane is offset 500 mm from the room boundaries. The working plane has a grid density of c. 300 mm.

Material Palette

Following consultation with the design team, material values used for SDA calculations are as per the table below:

Table No. 4.2.1 - Material Palette for SDA Calculations

Object	Material	Reflectance	Object	Material	Reflectance / Transmittance
Exterior walls	Standard Brick	0.3	Interior Walls	Pastel paint	0.70
	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	0.80
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

Trees

The primary SDA results have been generated with trees represented in both summer and winter states of foliage as per the BRE Guidelines. The study has also been carried out without trees included in the analytical model. The assessment without trees should be considered a supplementary study. Its purpose is to demonstrate that in some instances the inclusion of trees will cause a reduction to daylight levels. However, this is a necessary consequence of a balanced built environment that includes trees and the benefits they bring.

I.S. EN 17037 does not give any advice on how to include trees in the assessment. The supplementary SDA study, under the I.S. EN 17037 criterion, has been carried out with trees in summer foliage to represent the worst case scenario.

Project Assessment

The results for the study on SDA can be found in the appendix results section A.1 on page 18.

Analysis of the results can be found in section 5.1.1 on page 13.

4.2.2 Sunlight Exposure in Proposed Habitable Rooms (SE)

Sunlight exposure (SE) is a measure of sunlight that a given window may expect to receive on a given date between the 1st of February and the 21st of March. The BRE guidelines suggest that March 21st (equinox) is used as the assessment date.

In the presence of trees, SE results have been generated, both with deciduous trees as opaque objects and without the inclusion of deciduous trees, in accordance with the BRE Guidelines. Evergreen trees have been included as opaque objects in both states.

The level of sunlight exposure is categorised as follows:

- 1.5 Hours - Minimum
- 3 Hours - Medium
- 4 Hours - High

The recommendation for dwellings is that at least one habitable room, preferably a main living room, should receive at least the minimum criterion. Should no room within a given unit meet the recommended minimum level of sunlight exposure, it will be stated as non-compliant.

Sunlight exposure is carried out on habitable rooms within a proposed development. The assessment point for windows is 1.2m above the finished floor level, or 0.3m above the sill level (which ever is higher). If a room has multiple windows, the amount of sunlight received by each can be added together provided they occur at different times and sunlight hours are not double counted.

The criterion applies to rooms of all orientations, although if a room faces significantly north of due east or west it is unlikely to be met. As such, it is not always possible to achieve full compliance, especially in developments that contain single aspect units.

Project Assessment

The results for the study on sunlight exposure can be found in the appendix results section A.2 on page 30, with analysis of the results in section 5.1.2 on page 14.

4.2.3 Sun On Ground in Proposed Outdoor Amenity Areas (SOG)

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 analytical model for SOG assessment in proposed amenity areas includes evergreen trees as per the BRE Guidelines. Typically deciduous trees will not be included unless there is a particularly dense belt.

A quantitative SOG assessment has been carried out on the areas as indicated by the project architect. The shadow study and false colour plans allow for a qualitative assessment for all other areas.

The portion of each assessed space capable of receiving 2 hours of direct sunlight on March 21st has been calculated individually. These areas can be combined to give the development average where appropriate.

Project Assessment

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.

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 the appendix results section A.3 on page 41, with analysis of the results in section 5.1.3 on page 14.

4.2.4 No Sky Line in Proposed Habitable Rooms (NSL)

The no sky line divides the areas of the working plane which can receive direct skylight, from those which cannot. It indicates the distribution of direct daylight within a room.

The BRE Guidelines recommend the No Sky Line study as an appropriate metric for an impact assessment to daylight, but only where room layouts are known.

"The calculation can only be carried out where room layouts are known. Using estimated room layouts is likely to give inaccurate results and is not recommended."

All advice given for NSL in the BRE Guidelines are in relation to impact assessments. NSL is not mentioned in the BRE section regarding daylight in new developments. Regardless, a NSL assessment was carried out on the proposed development as a supplementary study as it is requested in the DCC (draft) development plan 2022-2028.

As the BRE Guidelines does not give advice on target NSL values for proposed rooms, no compliance rate has been stated. However a no skyline of 80% could be considered an appropriate figure given that the BRE Guidelines state that supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line.

The results of the supplementary NSL study can be found in section C.0 on page 48.

4.3 Qualitative Assessment - Shadow Study

A shadow study has been carried out to allow a qualitative comparison between the relevant model states, as outlined in section 4.1 on page 9. This visual representation of the shadows cast by the proposed development can be found in the hourly shadow diagrams in the appendix results section B.0 on page 43.

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.

The hourly renderings of the shadow study will be generated without deciduous trees and with evergreen trees represented as opaque objects when present in the model states.

Note: Considering the spring equinox (March 21st) and autumn equinox (21st September) yield similar results, only the spring equinox was generated in accordance with the BRE Guidelines.

5.0 Analysis of Results

5.1 Analysis of Scheme Performance Results

5.1.1 Spatial Daylight Autonomy (SDA)

This study has assessed the Spatial Daylight Autonomy (SDA) received in all habitable rooms within Blocks A & K. This has ensured that a clear understanding has been obtained regarding the daylight performance of these units. During the design process, Davey + Smith Architects were in consultation with 3D Design Bureau to ensure the proposed apartments could receive sufficient levels of daylight. Design tweaks were made in instances where under-performance was identified in this regard.

The assessed blocks consist of a combined total of 45 no. residential units which makes up approximately 121 no. habitable rooms.

Under the criteria as set out in the BRE 209, the SDA value in 118 no. habitable rooms meet or exceed their target values in the winter and summer time calculation. This gives a circa compliance rate of c. 98%.

The 3 no. units that do not achieve the recommended minimum level of sunlight are apartments 09, 10 and 22. All of which are located to the south of Block A. The assessment of these units that was carried out without trees has shown full compliance across these units. This indicates that the reason for non-compliance in these units is due to the shading caused by trees. As these units are south facing, with large windows, the placement of trees is an important design decision aimed at reducing the potential for solar gains. The inclusion of trees in this location is a conscious decision despite the inevitable reduction they would cause to daylight.

An SDA assessment has also been carried out on the classrooms within the proposed creche facility on the ground floor of Block A. All rooms have achieved the recommended level of daylight as applied by 3DDB. These rooms have not been counted when calculating compliance rates.

It should be noted that Block K consists of 6 no. units making up approximately 22 no. habitable rooms. All rooms show full compliance in both winter and summer states assessed.

All proposed rooms within Blocks A and K that have been assessed in the supplementary SDA assessment (excluding trees), have achieved the recommended level of daylight, giving a compliance rate of 100%.

I.S. EN 17037 sets out more onerous recommendations for SDA. As such, the number of rooms achieving compliance under this standard is 72, giving a reduced circa compliance rate of c. 60% across both blocks.

With regards to internal daylighting, Section 6.7 of the Sustainable Urban Housing: Design Standards for New Apartments December 2020, states the following:

"*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 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.*"

Where rooms are compliant with the criteria of BRE 209 and non-compliant with the I.S. EN 17037 criteria, it is the recommendation of 3D Design Bureau that these rooms will appear adequately daylit. The rationale for this opinion is that the criteria given in BRE 209 is room-specific, unlike I.S. EN 17037. BRE 209 takes into account the different daylight requirements of given room types, I.S. EN 17037 does not.

Based on the above statements, a rationale will be put forward for all rooms do not achieve the daylight provision targets in accordance with the standards they were assessed against within the primary study (BRE 209).

The rationale for non-compliance within the 3 no. units that do not achieve the BRE recommendations is that the reduced level of daylight is a result of the proposed trees. Although the trees may reduce daylight, they also provide many benefits to the development. Whilst some trees could be removed as a means of achieving full SDA compliance, it is the opinion of the design team that the inclusion of trees in the plaza to the south of Block A is an important aspect in achieving a balanced design.

It is the opinion of 3DDB that the proposed development has preformed very well in terms of daylight provision to the proposed blocks assessed. The results for the study on SDA can be seen in section A.1 on page 18.

5.1.2 Sunlight Exposure (SE)

A sunlight exposure assessment has been carried out on all habitable rooms within the residential portion of the proposed units in Blocks A & K. The assessment has been carried out with deciduous trees represented both as opaque objects and removed from the model in accordance with the BRE Guidelines.

In total 45 no. units have been assessed across both blocks. Using the rationale explained in section 3.2 on page 8, the level of sunlight exposure for 14-18 no. units is considered high, 5-6 no. medium, 20-23 no. have reached the minimum recommendation with 2 units below the minimum recommendation with deciduous trees as opaque and invisible states respectively.

The SE assessment has shown that c. 98% of the proposed units meet the criteria for sunlight exposure as set out in the BRE Guidelines.

Whilst, the criterion applies to rooms of all orientations, it should be noted that if a room faces significantly north of due east or west it is unlikely to be met. As such, it is not always possible to achieve full compliance, especially in developments that contain single aspect, north facing units. **Note:** For a unit to be compliant under BRE 209, only one habitable room within the unit needs to meet the guideline values.

As mentioned above, it is often not possible to achieve full compliance across an apartment block for sunlight exposure. The proposed blocks A & K contain just 2 no. units that do not achieve the recommended minimum level of sunlight. Both of which are located in Block A.

The two units in Block A that do not achieve the recommended minimum level of sunlight are apartments 01 and 13. They both have the same configuration and are located on top of each other on the 1st and 2nd floors. While these units are single-aspect, they are not north-facing. They have an aspect that is almost due east. The reason for non-compliance in these units is due to the obstruction to the south by the return of Block A. This obstruction does not cause a widespread obstruction to sunlight exposure, as the apartments situated to the north of 01 and 13 all achieve the minimum recommended level of sunlight exposure despite having a similar orientation and configuration.

No recommendation is made regarding the performance of a development as a whole for SE performance within, the BRE Guidelines. However, it is the opinion of 3DDB that the proposed development performs favourably in this regard.

The results for the study on SE in the habitable rooms of the proposed units can be seen in section A.2 on page 30.

5.1.3 Sun On Ground in Proposed Outdoor Amenity Areas

This study has assessed the level of sunlight on March 21st within the proposed amenity areas.

In total 8 no. spaces have been assessed, 7 no. of which would meet the criteria as set out in the BRE Guidelines.

The spaces that have been assessed are comprised of 4 no. public open spaces, 3 no. communal open spaces and a creche play area. All public and communal open spaces far exceed the minimum recommended level of sunlight.

The only space that does not achieve the recommended level of sunlight on March 21st is the Creche play area which is shaded by Block A to the South and West. This area will have access to sunlight predominantly during the morning hours. Whilst, the creche play area does not comply with the BRE recommendations for Sun On Ground, it could be argued that there are benefits to having a shaded area in context of a creche.

All public open spaces and communal open space 1 will have good sunlight access throughout the majority of the day. Communal open space 2 will have sunlight access throughout the afternoon.

The results for the study on sunlighting in the proposed outdoor amenity spaces can be found in section A.3 on page 41.

A visual representation of these readings can be seen in the false colour plan in section A.3 and in the hourly shadow diagrams for March 21st in section B.1 on page 43 of the appendix section of this report.

6.0 Conclusion

3D Design Bureau were commissioned to carry out a daylight and sunlight assessment for the proposed mixed use development on lands at Clonburris, County Dublin under the Clarification of Information request (SDZ221/0010) and following a further meeting with the planning authority thereafter.

To satisfy the request, this report presents a full internal daylight and sunlight assessment of Block K along with an updated set of results for Block A. The updated results have been included due to the changes within the site including the adjustment in position of Block K and the removal of Block B.

The levels of sunlight in the proposed amenity areas were also reassessed including an accompanying shadow study of the proposed public and communal open spaces across the entire site.

Sufficient daylight provision was an important factor in the design process for both the original application and this updated assessment. 3DDB worked closely with the project architects to ensure the apartments, within the proposed Blocks A and K, preformed well in this regard.

All habitable rooms within the assessed blocks have been designed in a manner to allow good daylight access. Nevertheless, there are small number of rooms (3 no.) that do not achieve the recommended minimum levels of daylight. These rooms are all located on the south of Block A, and have reduced levels of daylight due to the placement of trees adjacent the windows. However, these trees are a beneficial inclusion to the proposed design in terms a visual amenity and reduction of possible solar gains through shading. The inclusion of these trees was a conscious decision made by the design team despite the reduction of daylight in the identified units.

The assessment of sunlight exposure in the proposed apartments has yielded very positive results with the vast majority of assessed units achieving the recommended level of sunlight.

Future occupants of the proposed development will also benefit from public and communal open spaces, all of which far exceed the recommended minimum level of sunlight as per the BRE Guidelines.

Appendix - Results

+353 (0) 1 288 0186
info@3ddesignbureau.com
www.3ddesignbureau.com

Appendix Contents

Assessment criteria and detailed analysis of results can be found in the accompanying report.

A.0 Scheme Performance Results

A.1 Spatial Daylight Autonomy (SDA) in Proposed Units

Below is an example of the table used to describe the spatial daylight autonomy results in proposed units.

Table Example. A.1 - Scheme Performance SDA						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BRE 209 Criteria
			Without Trees	Winter	Summer	
A	B	C	D	E	F	G

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, LKD, etc.

C: Target Lux

Under BRE 209 the appropriate target lux levels to be achieved across 50% of the working plane of a room differ depending on the room type. Kitchens have a target lux of 200, living rooms have a target lux of 150 and bedrooms have a target lux of 100. In a room providing more than one function, such as an LKD, the higher target value should be taken i.e. 200 Lux.

D: % of area above target Lux (Without Trees)

BRE 209 recommends target lux levels to be achieved across at least 50% of the working 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 working plane of the assessed room that is capable of receiving more than the appropriate target lux for at least half the daylight hours with trees excluded from the analytical model. The figures shown in this column should be considered part of a supplementary study that helps identify if trees are having an effect on daylight within the proposed units.

E: % of area above target Lux (Winter)

BRE 209 recommends target lux levels to be achieved across at least 50% of the working 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 working plane of the assessed room that is capable of receiving more than the appropriate target lux for at least half the daylight hours with deciduous trees in the winter state, i.e. bare branch.

F: % of area above target Lux (Summer)

BRE 209 recommends target lux levels to be achieved across at least 50% of the working 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 working plane of the assessed room that is capable of receiving more than the appropriate target lux for at least half the daylight hours with deciduous trees in full foliage.

G: Compliance with BRE 209 Criteria

This column states if the assessed room achieves the recommended level of daylight as per BRE 209 with consideration to the various tree states.

If the target lux level is achieved across more than 50% of the working plane, for half the daylight hours, both with and without trees, this column will state: *'Compliant'*.

If the target lux level is not achieved across more than 50% of the working plane, for half the daylight hours, both with and without trees, this column will state: *'Non-compliant'*.

If the target lux level is achieved across more than 50% of the working plane, for half the daylight hours, without trees but is not achieved with trees, this column will state: *'Trees affecting compliance'*.

If the target lux level is achieved across more than 50% of the working plane, for half the daylight hours, with the trees in the winter state but is not achieved with trees in the summer state, this column will state: *'Trees affecting compliance (summer only)'*.

Compliance rates will be stated for SDA compliance with trees in all of the above states.

It should be noted that the figures displayed in the table of results have been rounded off. A manual calculation on these figures may yield a negligible difference and should not be considered an error.

A.1.1 Block A - Ground Floor

Table No. A.1.1 - SDA Results: Block A - Ground Floor						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BRE 209 Criteria*
			Without Trees***	Winter**	Summer**	
Creche	Baby Room	150	99%	96%	94%	Compliant
Creche	Toddler 1	150	78%	76%	75%	Compliant
Creche	Toddler 2	150	97%	94%	92%	Compliant
Creche	Wobbler 1	150	100%	100%	100%	Compliant
Creche	Wobbler 2	150	80%	63%	58%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Under the BRE 209 study the SDA has been calculated with trees represented with both winter and summer foliage.

The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 13 of the corresponding report.

*** The SDA assessment without trees is a supplementary study which indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight.

Figure A.1: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.1.2 Block A - 1st Floor

Table No. A.1.2 - SDA Results: Block A - 1st Floor						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BRE 209 Criteria*
			Without Trees***	Winter**	Summer**	
Apt A_01	LKD	200	100%	96%	91%	Compliant
Apt A_01	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_02	LKD	200	100%	100%	100%	Compliant
Apt A_02	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_03	LKD	200	100%	100%	100%	Compliant
Apt A_03	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_04	LKD	200	100%	100%	100%	Compliant
Apt A_04	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_04	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_05	LKD	200	100%	100%	100%	Compliant
Apt A_05	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_06	LKD	200	64%	57%	55%	Compliant
Apt A_06	Bedroom 1	100	96%	96%	95%	Compliant
Apt A_06	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_07	LKD	200	59%	58%	58%	Compliant
Apt A_07	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_07	Bedroom 2	100	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.
** Under the BRE 209 study the SDA has been calculated with trees represented with both winter and summer foliage.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 13 of the corresponding report.
*** The SDA assessment without trees is a supplementary study which indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight.

Figure A.2: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.1.3 Block A - 1st Floor

Table No. A.1.3 - SDA Results: Block A - 1st Floor						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BRE 209 Criteria*
			Without Trees***	Winter**	Summer**	
Apt A_08	LKD	200	83%	83%	82%	Compliant
Apt A_08	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_09	LKD	200	65%	39%	27%	Trees affecting compliance
Apt A_09	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_09	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_10	LKD	200	65%	42%	32%	Trees affecting compliance
Apt A_10	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_10	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_11	LKD	200	93%	79%	67%	Compliant
Apt A_11	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_11	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_12	LKD	200	86%	82%	82%	Compliant
Apt A_12	Bedroom 1	100	82%	72%	70%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.
** Under the BRE 209 study the SDA has been calculated with trees represented with both winter and summer foliage.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 13 of the corresponding report.
*** The SDA assessment without trees is a supplementary study which indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight.

Figure A.3: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.1.4 Block A - 2nd Floor

Table No. A.1.4 - SDA Results: Block A - 2nd Floor						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BRE 209 Criteria*
			Without Trees***	Winter**	Summer**	
Apt A_13	LKD	200	100%	100%	100%	Compliant
Apt A_13	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_14	LKD	200	100%	100%	100%	Compliant
Apt A_14	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_15	LKD	200	100%	100%	100%	Compliant
Apt A_15	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_16	LKD	200	100%	100%	100%	Compliant
Apt A_16	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_16	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_17	LKD	200	100%	100%	100%	Compliant
Apt A_17	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_18	LKD	200	83%	80%	79%	Compliant
Apt A_18	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_18	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_19	LKD	200	70%	68%	67%	Compliant
Apt A_19	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_19	Bedroom 2	100	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Under the BRE 209 study the SDA has been calculated with trees represented with both winter and summer foliage.

The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 13 of the corresponding report.

*** The SDA assessment without trees is a supplementary study which indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight.

Figure A.4: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.1.5 Block A - 2nd Floor

Table No. A.1.5 - SDA Results: Block A - 2nd Floor						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BRE 209 Criteria*
			Without Trees***	Winter**	Summer**	
Apt A_20	LKD	200	85%	85%	85%	Compliant
Apt A_20	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_21	LKD	200	100%	91%	86%	Compliant
Apt A_21	Bedroom 1	100	100%	100%	89%	Compliant
Apt A_21	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_22	LKD	200	66%	46%	38%	Trees affecting compliance
Apt A_22	Bedroom 1	100	100%	100%	94%	Compliant
Apt A_22	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_23	LKD	200	91%	73%	60%	Compliant
Apt A_23	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_23	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_24	LKD	200	77%	75%	75%	Compliant
Apt A_24	Bedroom 1	100	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.
** Under the BRE 209 study the SDA has been calculated with trees represented with both winter and summer foliage.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 13 of the corresponding report.
*** The SDA assessment without trees is a supplementary study which indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight.

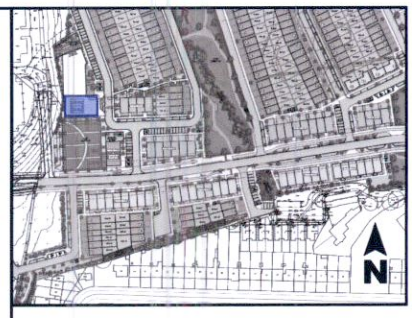


Figure A.5: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.1.6 Block A - 3rd Floor

Table No. A.1.6 - SDA Results: Block A - 3rd Floor						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BRE 209 Criteria*
			Without Trees***	Winter**	Summer**	
Apt A_25	LKD	200	90%	88%	88%	Compliant
Apt A_25	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_26	LKD	200	66%	60%	60%	Compliant
Apt A_26	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_26	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_27	LKD	200	66%	61%	60%	Compliant
Apt A_27	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_27	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_28	LKD	200	100%	100%	100%	Compliant
Apt A_28	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_28	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_29	LKD	200	96%	92%	92%	Compliant
Apt A_29	Bedroom 1	100	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.
** Under the BRE 209 study the SDA has been calculated with trees represented with both winter and summer foliage.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 13 of the corresponding report.
*** The SDA assessment without trees is a supplementary study which indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight.

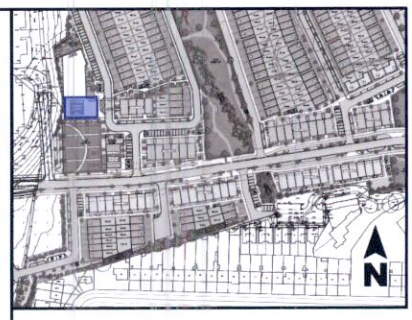


Figure A.6: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.1.7 Block A - 4th Floor

Table No. A.1.7 - SDA Results: Block A - 4th Floor						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BRE 209 Criteria*
			Without Trees***	Winter**	Summer**	
Apt A_30	Kitchen	200	61%	61%	61%	Compliant
Apt A_30	Living Room	150	100%	100%	100%	Compliant
Apt A_30	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_31	LKD	200	100%	100%	100%	Compliant
Apt A_31	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_31	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_32	LKD	200	67%	66%	66%	Compliant
Apt A_32	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_32	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_33	LKD	200	67%	66%	66%	Compliant
Apt A_33	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_33	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_34	LKD	200	95%	93%	93%	Compliant
Apt A_34	Bedroom 1	100	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.
** Under the BRE 209 study the SDA has been calculated with trees represented with both winter and summer foliage.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 13 of the corresponding report.
*** The SDA assessment without trees is a supplementary study which indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight.

Figure A.7: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.1.8 Block A - 4th Floor

Table No. A.1.8 - SDA Results: Block A - 4th Floor						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BRE 209 Criteria*
			Without Trees***	Winter**	Summer**	
Apt A_35	LKD	200	100%	100%	100%	Compliant
Apt A_35	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_36	LKD	200	70%	69%	68%	Compliant
Apt A_36	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_36	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_37	LKD	200	70%	69%	68%	Compliant
Apt A_37	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_37	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_38	LKD	200	100%	100%	100%	Compliant
Apt A_38	Bedroom 1	100	100%	100%	100%	Compliant
Apt A_38	Bedroom 2	100	100%	100%	100%	Compliant
Apt A_39	LKD	200	99%	99%	98%	Compliant
Apt A_39	Bedroom 1	100	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.
** Under the BRE 209 study the SDA has been calculated with trees represented with both winter and summer foliage.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 13 of the corresponding report.
*** The SDA assessment without trees is a supplementary study which indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight.

Figure A.8: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.1.9 Block K - Ground/First Floor

Table No. A.1.9 - SDA Results: Block K - Apartments 1 & 2						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BRE 209 Criteria*
			Without Trees***	Winter**	Summer**	
Apt K_01	Kitchen/Dining	200	100%	100%	100%	Compliant
Apt K_01	Living Room	150	100%	100%	100%	Compliant
Apt K_01	Bedroom 1	100	100%	100%	100%	Compliant
Apt K_01	Bedroom 2	100	100%	100%	100%	Compliant
Apt K_01	Bedroom 3	100	100%	100%	100%	Compliant
Apt K_02	Kitchen/Dining	200	100%	100%	100%	Compliant
Apt K_02	Living Room	150	100%	99%	98%	Compliant
Apt K_02	Bedroom 1	100	100%	100%	100%	Compliant
Apt K_02	Bedroom 2	100	100%	100%	100%	Compliant
Apt K_02	Bedroom 3	100	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Under the BRE 209 study the SDA has been calculated with trees represented with both winter and summer foliage.

The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 13 of the corresponding report.

*** The SDA assessment without trees is a supplementary study which indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight.

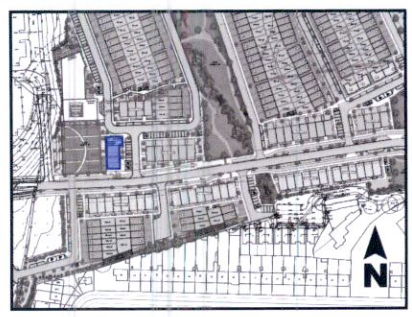
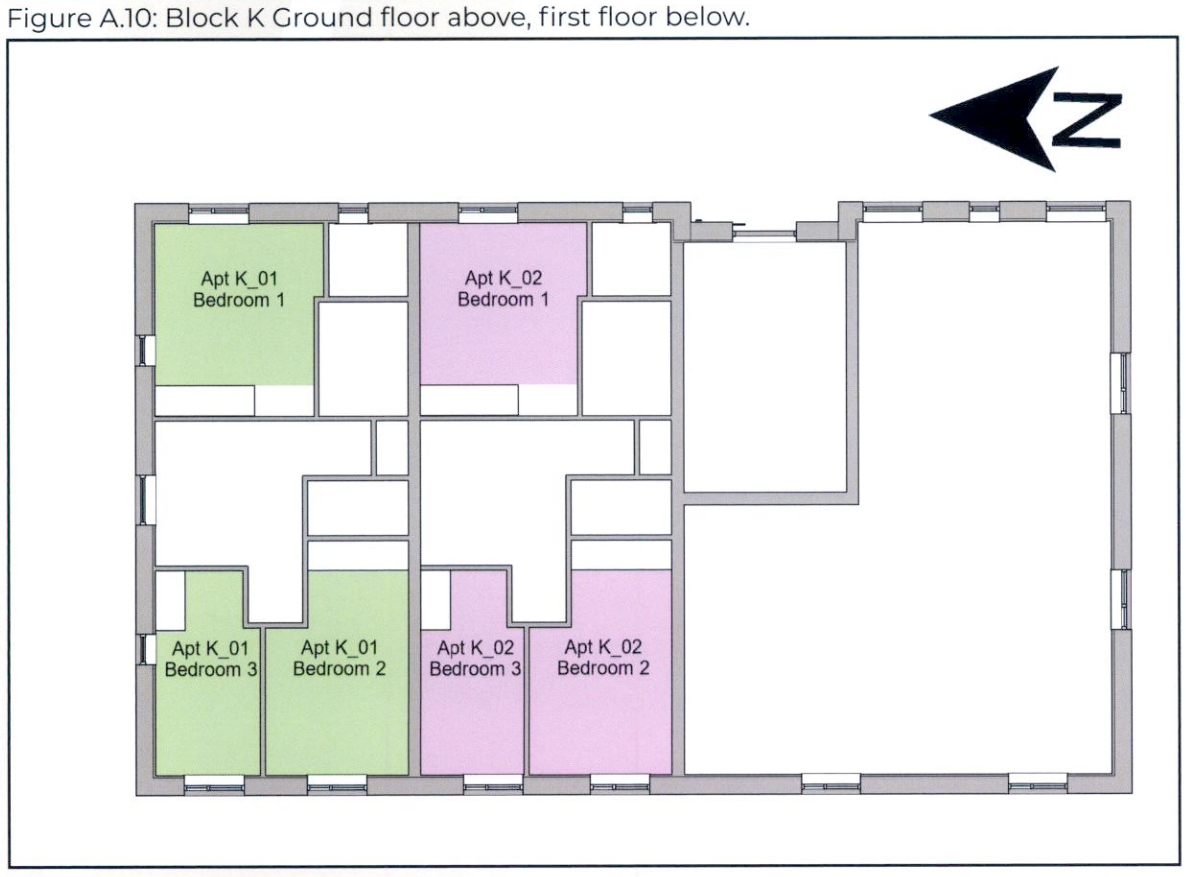


Figure A.9: Floor plans of assessed building (L), Keyplan highlighting the assessed building above.

Figure A.10: Block K Ground floor above, first floor below.



A.1.10 Block K - Second Floor

Table No. A.1.10 - SDA Results: Block K - Apartments 3 & 4						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BRE 209 Criteria*
			Without Trees***	Winter**	Summer**	
Apt K_03	LKD	200	100%	92%	65%	Compliant
Apt K_03	Bedroom 1	100	100%	100%	100%	Compliant
Apt K_03	Bedroom 2	100	100%	100%	100%	Compliant
Apt K_03	Bedroom 3	100	100%	100%	70%	Compliant
Apt K_04	LKD	200	100%	100%	100%	Compliant
Apt K_04	Bedroom 1	100	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Under the BRE 209 study the SDA has been calculated with trees represented with both winter and summer foliage.

The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 13 of the corresponding report.

*** The SDA assessment without trees is a supplementary study which indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight.

Figure A.11: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.1.11 Block K - Third Floor

Table No. A.1.11 - SDA Results: Block K - Apartments 5 & 6						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BRE 209 Criteria*
			Without Trees***	Winter**	Summer**	
Apt K_05	LKD	200	100%	100%	100%	Compliant
Apt K_05	Bedroom 1	100	100%	100%	100%	Compliant
Apt K_05	Bedroom 2	100	100%	100%	100%	Compliant
Apt K_06	LKD	200	100%	100%	100%	Compliant
Apt K_06	Bedroom 1	100	100%	100%	100%	Compliant
Apt K_06	Home Office	150	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Under the BRE 209 study the SDA has been calculated with trees represented with both winter and summer foliage.

The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 13 of the corresponding report.

*** The SDA assessment without trees is a supplementary study which indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight.

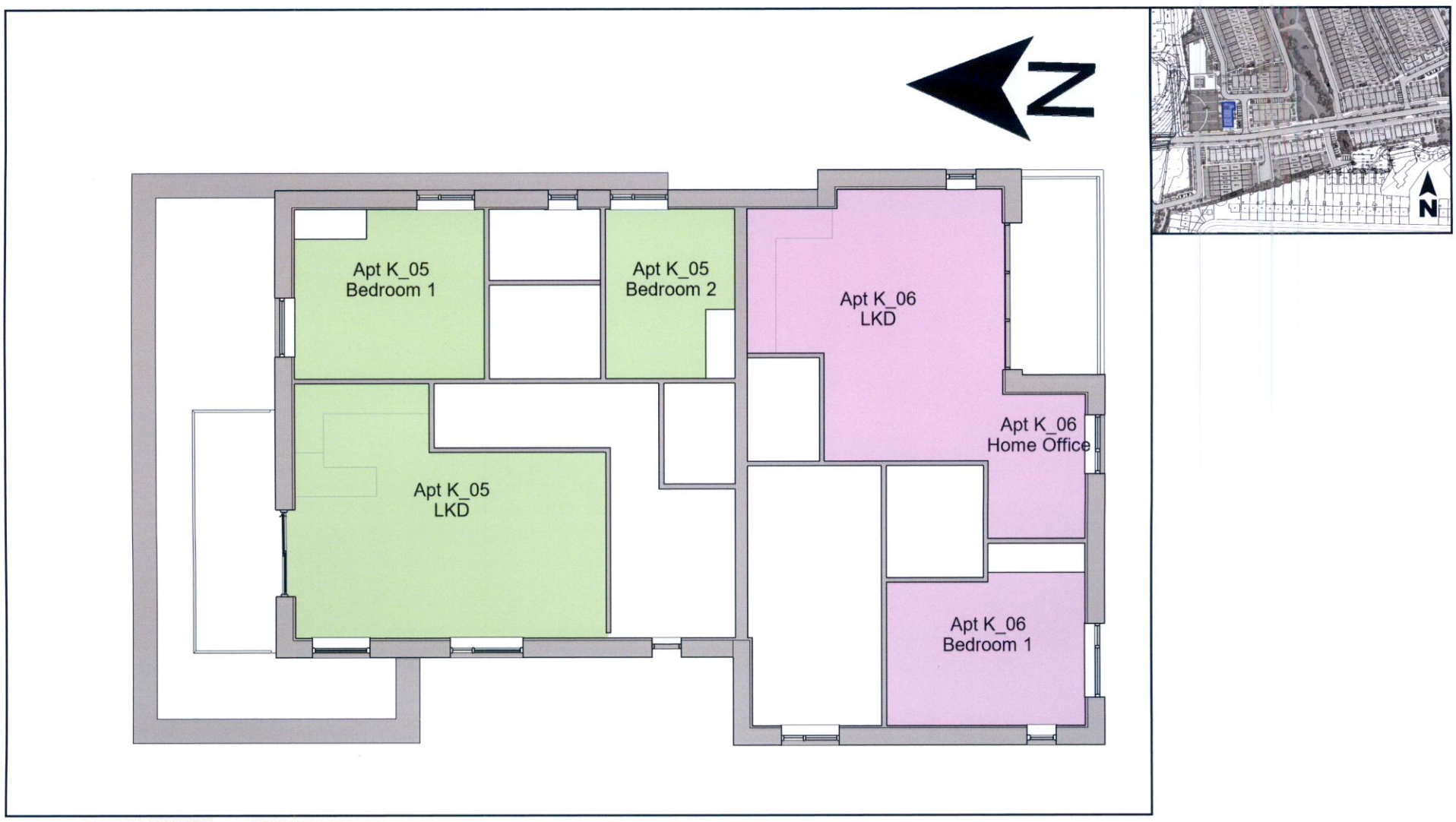


Figure A.12: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.2 Sunlight Exposure (SE) in Proposed Units

Below is an example of the table used to describe the SE performance of proposed habitable rooms.

Table Example. A.2 - Scheme Performance Sunlight Exposure							
Unit Number	Room Description	Deciduous Trees as Opaque Objects			Without Deciduous Trees		
		SE Hours on March 21st	Level of SE on March 21st	Unit compliance based on highest performing room	SE Hours on March 21st	Level of SE on March 21st	Unit compliance based on highest performing room
A	B	C	D	E	F	G	H

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: SE Hours on March 21st (Deciduous Trees as Opaque Objects)

This column will state the number of hours the assessed room can expect to receive on March 21st with the assessment carried out with deciduous trees as opaque objects.

D: Level of SE on March 21st (Deciduous Trees as Opaque Objects)

BRE 209 recommends a minimum sunlight exposure of 1.5 hours for a proposed unit with preference given to main living rooms. BRE 209 categorise sunlight exposure as minimum, medium and high, this column will categorise the level of sunlight exposure with deciduous trees as opaque objects based on the following:

- Less than 1.5 hours: *Non-compliant,*
- Between 1.5 hours and 3 hours: *Minimum*
- Between 3 hours and 4 hours: *Medium*
- More than 4 hours: *High*

E: Unit compliance based on highest performing room (Deciduous Trees as Opaque Objects)

A proposed unit is considered to be compliant provided any habitable room within the unit is capable of receiving at least 1.5 hours of sunlight on March 21st. This column will identify the highest performing room within a unit and state compliance for the associated unit based on that room with the assessment carried out with deciduous trees as opaque objects. Typically only one room per unit will be populated in this column, with lesser performing rooms indicated with a dash (-). However, if more than one room in a given unit is considered to be the best performing room, i.e. they have the same number of SE hours on March 21st, then the unit compliance column will be populated for each.

F: SE Hours on March 21st (Without Deciduous Trees)

This column will state the number of hours the assessed room can expect to receive on March 21st with the assessment carried out without deciduous trees.

G: Level of SE on March 21st (Without Deciduous Trees)

BRE 209 recommends a minimum sunlight exposure of 1.5 hours for a proposed unit with preference given to main living rooms. BRE 209 categorise sunlight exposure as minimum, medium and high, this column will categorise the level of sunlight exposure without deciduous trees using the same criteria as the study with deciduous trees as opaque objects.

H: Unit compliance based on highest performing room (Without Deciduous Trees)

A proposed unit is considered to be compliant provided any habitable room within the unit is capable of receiving at least 1.5 hours of sunlight on March 21st. This column will identify the highest performing room within a unit and state compliance for the associated unit based on that room with the assessment carried out without deciduous trees. Typically only one room per unit will be populated in this column, with lesser performing rooms indicated with a dash (-). However, if more than one room in a given unit is considered to be the best performing room, i.e. they have the same number of SE hours on March 21st, then the unit compliance column will be populated for each.

It should be noted that the figures displayed in the table of results have been rounded off. A manual calculation on these figures may yield a negligible difference and should not be considered an error.

A.2.1 Block A - 1st Floor

Table No. A.2.1 - Sunlight Exposure Results: Block A - 1st Floor							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
Apt A_01	LKD	0.90	Non-Compliant	Non-Compliant	0.90	Non-Compliant	Non-Compliant
Apt A_01	Bedroom 1	0.00	Non-Compliant	-	0.00	Non-Compliant	-
Apt A_02	LKD	2.40	Minimum	Compliant	2.40	Minimum	Compliant
Apt A_02	Bedroom 1	2.10	Minimum	-	2.10	Minimum	-
Apt A_03	LKD	2.40	Minimum	-	2.40	Minimum	-
Apt A_03	Bedroom 1	3.00	Medium	Compliant	3.00	Medium	Compliant
Apt A_04	LKD	0.50	Non-Compliant	-	0.50	Non-Compliant	-
Apt A_04	Bedroom 1	2.30	Minimum	Compliant	2.30	Minimum	Compliant
Apt A_04	Bedroom 2	0.50	Non-Compliant	-	0.50	Non-Compliant	-
Apt A_05	LKD	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_05	Bedroom 1	0.00	Non-Compliant	-	0.00	Non-Compliant	-
Apt A_06	LKD	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_06	Bedroom 1	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_06	Bedroom 2	2.10	Minimum	-	2.10	Minimum	-
Apt A_07	LKD	2.20	Minimum	-	2.20	Minimum	-
Apt A_07	Bedroom 1	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_07	Bedroom 2	2.10	Minimum	-	2.10	Minimum	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates across the entire scheme can be found in section 5.1.2 on page 14 of the corresponding report.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 8 of the corresponding report.

Figure A.13: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.2.2 Block A - 1st Floor

Table No. A.2.2 - Sunlight Exposure Results: Block A - 1st Floor							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
Apt A_08	LKD	1.90	Minimum	-	1.90	Minimum	-
Apt A_08	Bedroom 1	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_09	LKD	1.30	Non-Compliant	-	3.70	Medium	-
Apt A_09	Bedroom 1	2.70	Minimum	Compliant	7.60	High	Compliant
Apt A_09	Bedroom 2	1.30	Non-Compliant	-	4.80	High	-
Apt A_10	LKD	1.90	Minimum	Compliant	4.30	High	-
Apt A_10	Bedroom 1	1.80	Minimum	-	7.00	High	Compliant
Apt A_10	Bedroom 2	1.60	Minimum	-	4.80	High	-
Apt A_11	LKD	3.40	Medium	Compliant	3.40	Medium	-
Apt A_11	Bedroom 1	1.50	Minimum	-	7.00	High	Compliant
Apt A_11	Bedroom 2	1.10	Non-Compliant	-	4.80	High	-
Apt A_12	LKD	1.50	Minimum	Compliant	1.50	Minimum	Compliant
Apt A_12	Bedroom 1	0.00	Non-Compliant	-	0.00	Non-Compliant	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates across the entire scheme can be found in section 5.1.2 on page 14 of the corresponding report.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 8 of the corresponding report.

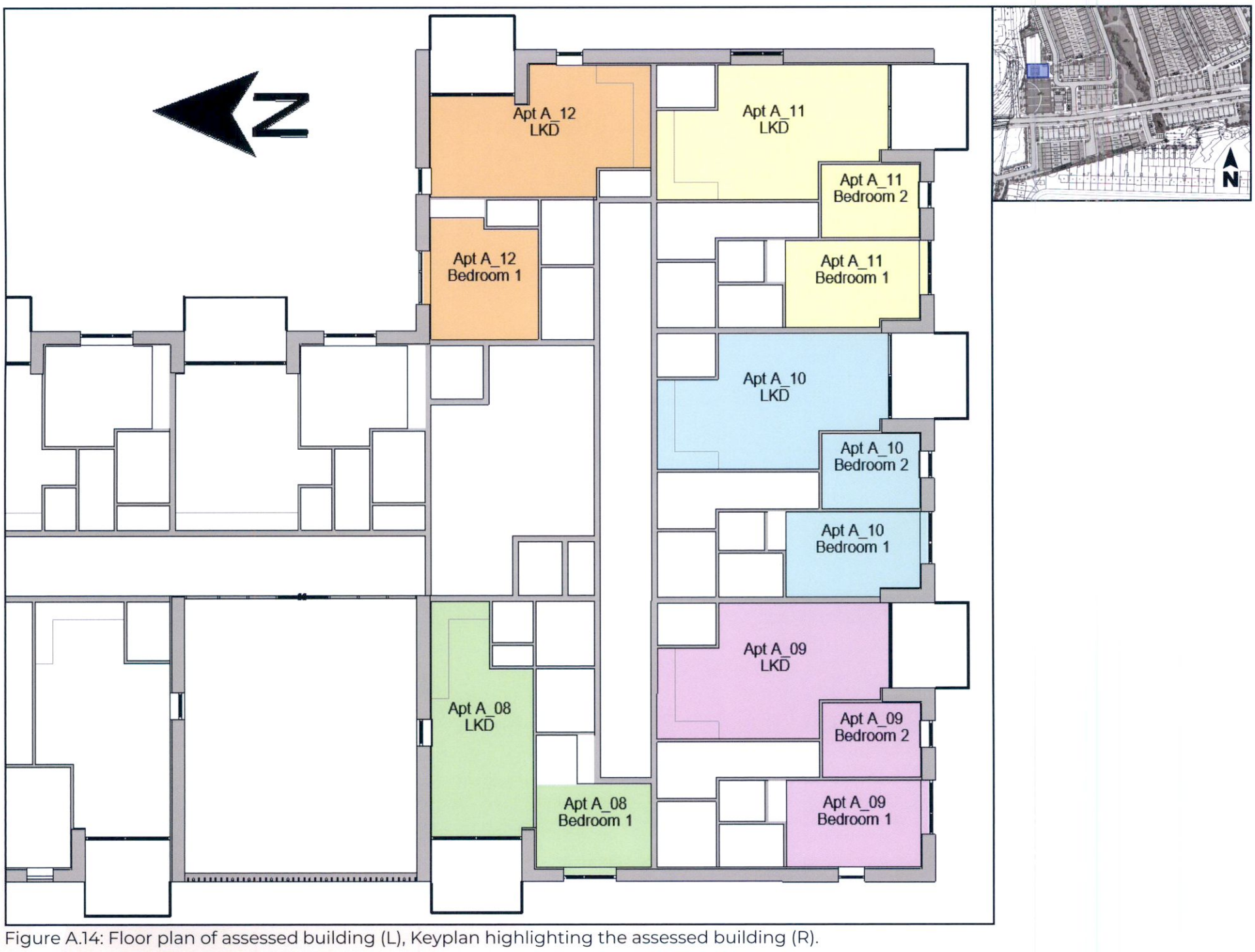


Figure A.14: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.2.3 Block A - 2nd Floor

Table No. A.2.3 - Sunlight Exposure Results: Block A - 2nd Floor							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
Apt A_13	LKD	0.90	Non-Compliant	Non-Compliant	0.90	Non-Compliant	Non-Compliant
Apt A_13	Bedroom 1	0.00	Non-Compliant	-	0.00	Non-Compliant	-
Apt A_14	LKD	2.40	Minimum	Compliant	2.40	Minimum	Compliant
Apt A_14	Bedroom 1	2.10	Minimum	-	2.10	Minimum	-
Apt A_15	LKD	2.40	Minimum	-	2.40	Minimum	-
Apt A_15	Bedroom 1	3.40	Medium	Compliant	3.40	Medium	Compliant
Apt A_16	LKD	0.50	Non-Compliant	-	0.50	Non-Compliant	-
Apt A_16	Bedroom 1	2.30	Minimum	Compliant	2.30	Minimum	Compliant
Apt A_16	Bedroom 2	0.50	Non-Compliant	-	0.50	Non-Compliant	-
Apt A_17	LKD	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_17	Bedroom 1	0.00	Non-Compliant	-	0.00	Non-Compliant	-
Apt A_18	LKD	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_18	Bedroom 1	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_18	Bedroom 2	2.10	Minimum	-	2.10	Minimum	-
Apt A_19	LKD	2.20	Minimum	-	2.20	Minimum	-
Apt A_19	Bedroom 1	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_19	Bedroom 2	2.10	Minimum	-	2.10	Minimum	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates across the entire scheme can be found in section 5.1.2 on page 14 of the corresponding report.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 8 of the corresponding report.

Figure A.15: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.2.4 Block A - 2nd Floor

Table No. A.2.4 - Sunlight Exposure Results: Block A - 2nd Floor							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
Apt A_20	LKD	1.90	Minimum	-	1.90	Minimum	-
Apt A_20	Bedroom 1	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_21	LKD	6.70	High	-	6.70	High	-
Apt A_21	Bedroom 1	7.00	High	Compliant	7.00	High	Compliant
Apt A_21	Bedroom 2	4.80	High	-	4.80	High	-
Apt A_22	LKD	3.70	Medium	-	3.70	Medium	-
Apt A_22	Bedroom 1	7.00	High	Compliant	7.00	High	Compliant
Apt A_22	Bedroom 2	4.80	High	-	4.80	High	-
Apt A_23	LKD	1.90	Minimum	-	1.90	Minimum	-
Apt A_23	Bedroom 1	7.00	High	Compliant	7.00	High	Compliant
Apt A_23	Bedroom 2	4.80	High	-	4.80	High	-
Apt A_24	LKD	1.60	Minimum	Compliant	1.60	Minimum	Compliant
Apt A_24	Bedroom 1	0.00	Non-Compliant	-	0.00	Non-Compliant	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates across the entire scheme can be found in section 5.1.2 on page 14 of the corresponding report.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 8 of the corresponding report.

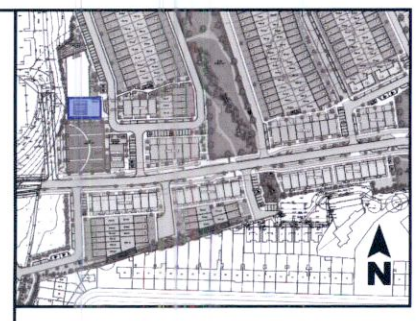


Figure A.16: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.2.5 Block A - 3rd Floor

Table No. A.2.5 - Sunlight Exposure Results: Block A - 3rd Floor							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
Apt A_25	LKD	1.90	Minimum	-	1.90	Minimum	-
Apt A_25	Bedroom 1	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_26	LKD	3.70	Medium	-	3.70	Medium	-
Apt A_26	Bedroom 1	7.60	High	Compliant	7.60	High	Compliant
Apt A_26	Bedroom 2	4.80	High	-	4.80	High	-
Apt A_27	LKD	3.80	Medium	-	3.80	Medium	-
Apt A_27	Bedroom 1	7.00	High	Compliant	7.00	High	Compliant
Apt A_27	Bedroom 2	4.80	High	-	4.80	High	-
Apt A_28	LKD	6.80	High	-	6.80	High	-
Apt A_28	Bedroom 1	7.00	High	Compliant	7.00	High	Compliant
Apt A_28	Bedroom 2	4.80	High	-	4.80	High	-
Apt A_29	LKD	1.80	Minimum	Compliant	1.80	Minimum	Compliant
Apt A_29	Bedroom 1	0.00	Non-Compliant	-	0.00	Non-Compliant	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates across the entire scheme can be found in section 5.1.2 on page 14 of the corresponding report.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 8 of the corresponding report.

Figure A.17: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.2.6 Block A - 4th Floor

Table No. A.2.6 - Sunlight Exposure Results: Block A - 4th Floor							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
Apt A_30	Living Room	1.90	Minimum	-	1.90	Minimum	-
Apt A_30	Bedroom 1	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_30	Kitchen	0.00	Non-Compliant	-	0.00	Non-Compliant	-
Apt A_31	LKD	6.80	High	-	6.80	High	-
Apt A_31	Bedroom 1	7.00	High	Compliant	7.00	High	Compliant
Apt A_31	Bedroom 2	4.80	High	-	4.80	High	-
Apt A_32	LKD	3.70	Medium	-	3.70	Medium	-
Apt A_32	Bedroom 1	7.00	High	Compliant	7.00	High	Compliant
Apt A_32	Bedroom 2	4.80	High	-	4.80	High	-
Apt A_33	LKD	3.70	Medium	-	3.70	Medium	-
Apt A_33	Bedroom 1	8.80	High	Compliant	8.80	High	Compliant
Apt A_33	Bedroom 2	4.80	High	-	4.80	High	-
Apt A_34	LKD	1.80	Minimum	Compliant	1.80	Minimum	Compliant
Apt A_34	Bedroom 1	0.00	Non-Compliant	-	0.00	Non-Compliant	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates across the entire scheme can be found in section 5.1.2 on page 14 of the corresponding report.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 8 of the corresponding report.

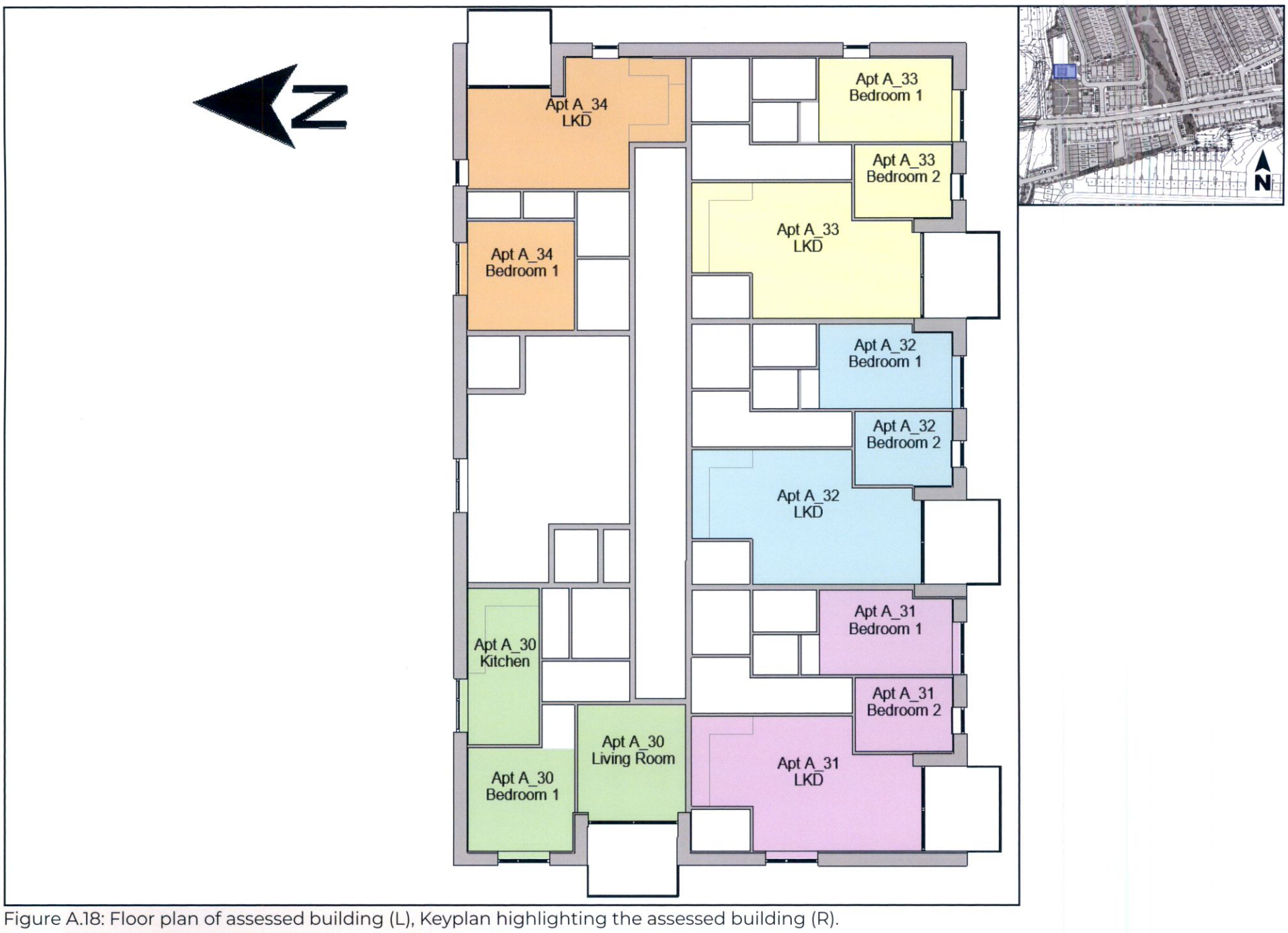


Figure A.18: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.2.7 Block A - 5th Floor

Table No. A.2.7 - Sunlight Exposure Results: Block A - 5th Floor							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
Apt A_35	LKD	1.90	Minimum	-	1.90	Minimum	-
Apt A_35	Bedroom 1	2.50	Minimum	Compliant	2.50	Minimum	Compliant
Apt A_36	LKD	4.30	High	-	4.30	High	-
Apt A_36	Bedroom 1	7.60	High	Compliant	7.60	High	Compliant
Apt A_36	Bedroom 2	4.80	High	-	4.80	High	-
Apt A_37	LKD	4.30	High	-	4.30	High	-
Apt A_37	Bedroom 1	7.00	High	Compliant	7.00	High	Compliant
Apt A_37	Bedroom 2	4.80	High	-	4.80	High	-
Apt A_38	LKD	6.80	High	-	6.80	High	-
Apt A_38	Bedroom 1	7.00	High	Compliant	7.00	High	Compliant
Apt A_38	Bedroom 2	4.80	High	-	4.80	High	-
Apt A_39	LKD	1.80	Minimum	Compliant	1.80	Minimum	Compliant
Apt A_39	Bedroom 1	0.00	Non-Compliant	-	0.00	Non-Compliant	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates across the entire scheme can be found in section 5.1.2 on page 14 of the corresponding report.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 8 of the corresponding report.

Figure A.19: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.2.8 Block k- Ground/First Floor

Table No. A.2.8 - Sunlight Exposure Results: Block K - Apartments 1 & 2							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
Apt K_01	Kitchen/Dining	2.60	Minimum	Compliant	4.00	High	Compliant
Apt K_01	Living Room	2.30	Minimum	-	2.90	Minimum	-
Apt K_01	Bedroom 1	1.20	Non-Compliant	-	2.70	Minimum	-
Apt K_01	Bedroom 2	1.20	Non-Compliant	-	3.00	Medium	-
Apt K_01	Bedroom 3	1.80	Minimum	-	3.00	Medium	-
Apt K_02	Kitchen/Dining	3.20	Medium	Compliant	3.20	Medium	Compliant
Apt K_02	Living Room	2.90	Minimum	-	2.90	Minimum	-
Apt K_02	Bedroom 1	2.70	Minimum	-	2.70	Minimum	-
Apt K_02	Bedroom 2	1.70	Minimum	-	3.00	Medium	-
Apt K_02	Bedroom 3	2.50	Minimum	-	3.00	Medium	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates across the entire scheme can be found in section 5.1.2 on page 14 of the corresponding report.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 8 of the corresponding report.

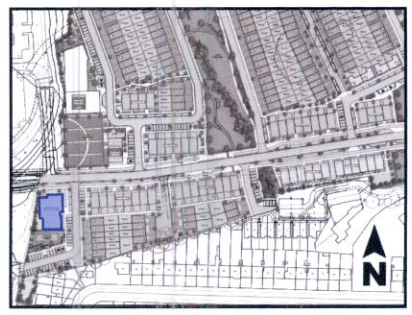


Figure A.20: Floor plans of assessed building (L), Keyplan highlighting the assessed building above.

Figure A.21: Block K Ground floor above, first floor below.

A.2.9 Block k- Second Floor

Table No. A.2.9 - Sunlight Exposure Results: Block K - Apartments 3 & 4							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
Apt K_03	LKD	3.70	Medium	Compliant	3.70	Medium	Compliant
Apt K_03	Bedroom 1	0.00	Non-Compliant	-	2.70	Minimum	-
Apt K_03	Bedroom 2	2.70	Minimum	-	2.70	Minimum	-
Apt K_03	Bedroom 3	2.60	Minimum	-	2.70	Minimum	-
Apt K_04	LKD	8.40	High	Compliant	9.40	High	Compliant
Apt K_04	Bedroom 1	1.50	Minimum	-	1.50	Minimum	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates across the entire scheme can be found in section 5.1.2 on page 14 of the corresponding report.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 8 of the corresponding report.

Figure A.22: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.2.10 Block k- Third Floor

Table No. A.2.10 - Sunlight Exposure Results: Block K - Apartments 5 & 6							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
Apt K_05	LKD	3.30	Medium	Compliant	3.30	Medium	Compliant
Apt K_05	Bedroom 1	2.70	Minimum	-	2.70	Minimum	-
Apt K_05	Bedroom 2	2.70	Minimum	-	2.70	Minimum	-
Apt K_06	LKD	7.60	High	-	7.60	High	-
Apt K_06	Bedroom 1	9.40	High	Compliant	9.40	High	Compliant
Apt K_06	Home Office	6.70	High	-	6.70	High	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates across the entire scheme can be found in section 5.1.2 on page 14 of the corresponding report.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 8 of the corresponding report.

Figure A.23: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

A.3 Sun On Ground (SOG) in Proposed Outdoor Amenity Areas

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

Table Example. A.3 - Scheme Performance SOG				
Assessed Area	Area Capable of Receiving 2 Hours of Sunlight on March 21st	Recommended Minimum	Level of Compliance with BRE Guidelines	Meets BRE 209 Criteria
A	**B**	**C**	**D**	**E**

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.

E: Meets BRE 209 Criteria

This column states if the assessed room achieves the recommended level of sunlight on March 21st as per BRE 209.

It should be noted that the figures displayed in the table of results have been rounded off. A manual calculation on these figures may yield a negligible difference and should not be considered an error.

A.3.1 Sun On Ground in Proposed Outdoor Amenity Areas

Table No. A.3.1 - SOG in Proposed Outdoor Amenity Areas Results:				
Assessed Area	Area Capable of Receiving 2 Hours of Sunlight on March 21st	Recommended minimum	Level of Compliance with BRE Guidelines*	Meets BRE 209 Criteria*
Public Open Space 1	99.7%	50.0%	BRE Compliant	Yes
Public Open Space 2	98.0%	50.0%	BRE Compliant	Yes
Public Open Space 3	98.0%	50.0%	BRE Compliant	Yes
Public Open Space 4	100.0%	50.0%	BRE Compliant	Yes
Communal Open Space 1	89.5%	50.0%	BRE Compliant	Yes
Communal Open Space 2	76.7%	50.0%	BRE Compliant	Yes
Communal Open Space 3	57.0%	50.0%	BRE Compliant	Yes
Creche Play Area	6.5%	50.0%	13.1%	No
* The BRE Guidelines recommend that for a garden or amenity to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on March 21st.				

Figure A.24: Indication of the amenity areas that have been analysed (T), Area capable of receiving 2 hours of sunlight on March 21st shown in white (B)

B.0 Shadow Studies

B.1 Shadow Study 21 March

March 21st
Sunrise 6:25 | Sunset 18:40

Project: Mixed Use Development, Lands at Clonburris, County Dublin.

Applicant: Kellands Homes Ltd.

3D DESIGN BUREAU

N

March 21st 7:00

March 21st 9:00

March 21st 11:00

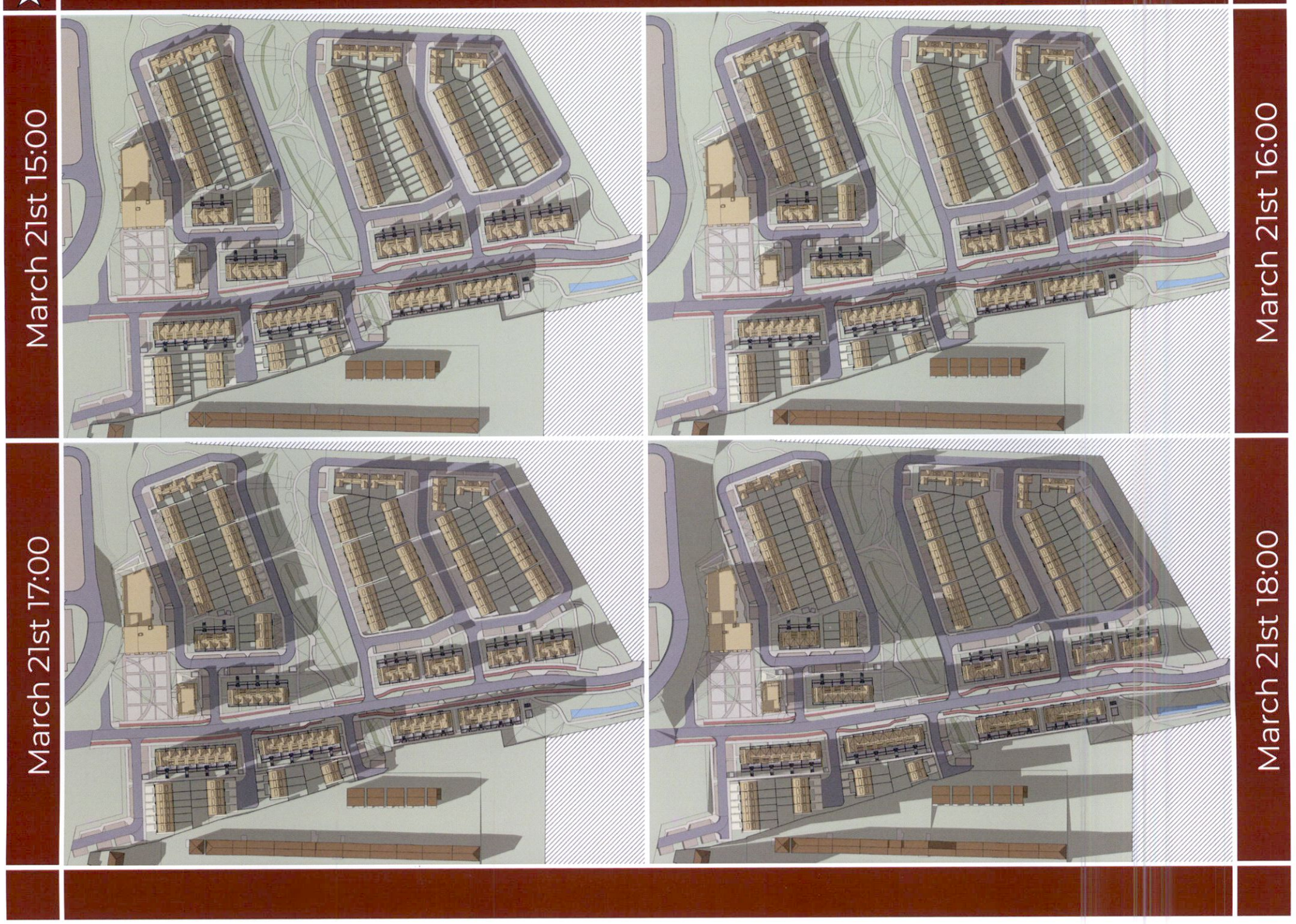
March 21st 13:00

March 21st 8:00

March 21st 10:00

March 1st 12:00

March 21st 14:00



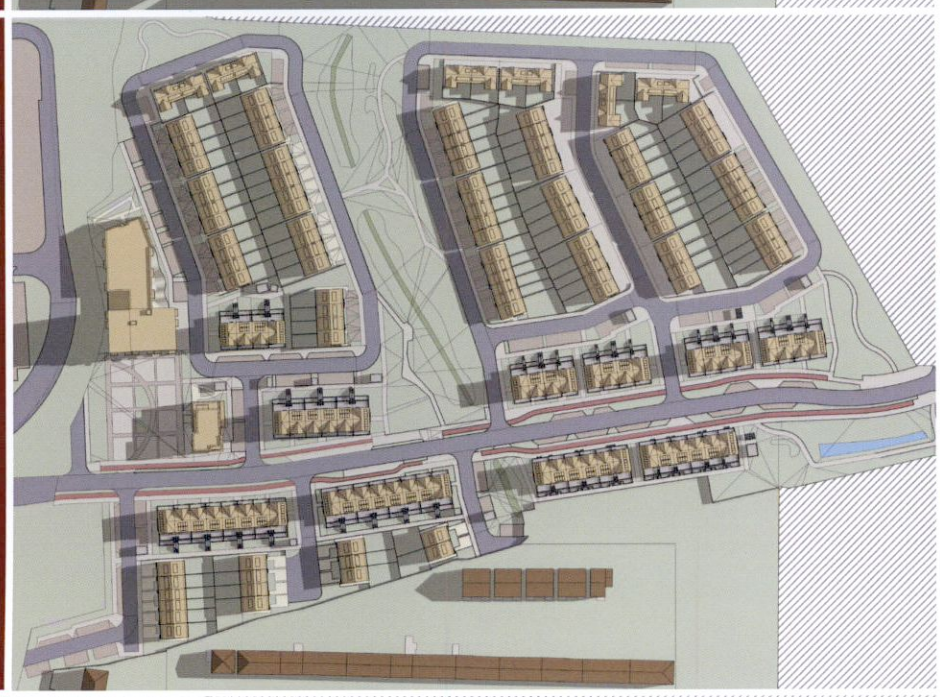
	Project: Mixed Use Development, Lands at Clonburris, County Dublin.	3D DESIGN BUREAU
March 21st **Sunrise 6:25 | Sunset 18:40**	**Applicant:** Kellands Homes Ltd.	

N

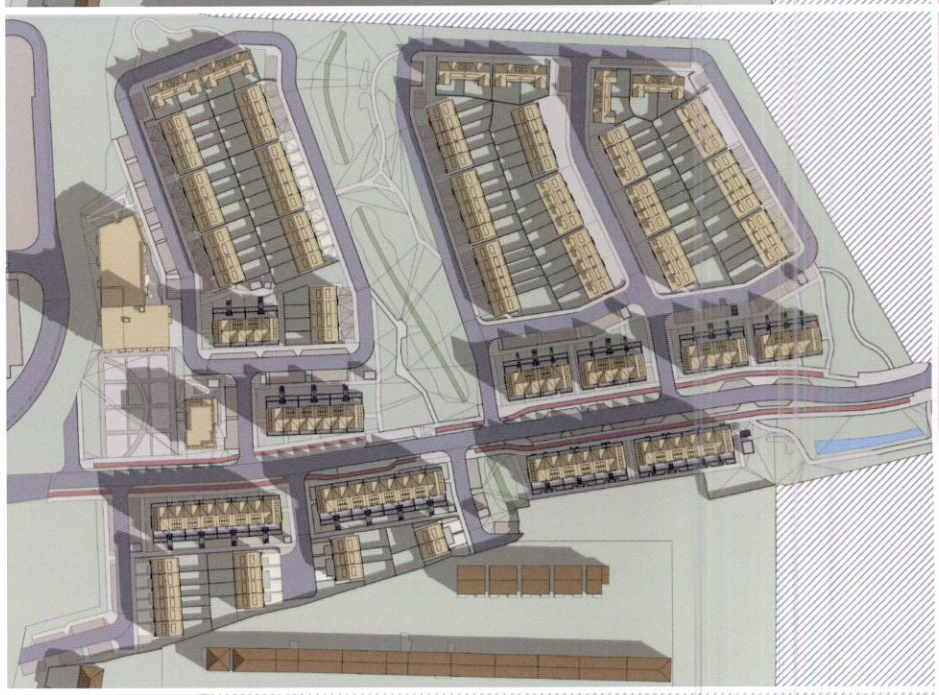
June 21st 6:00

June 21st 7:00

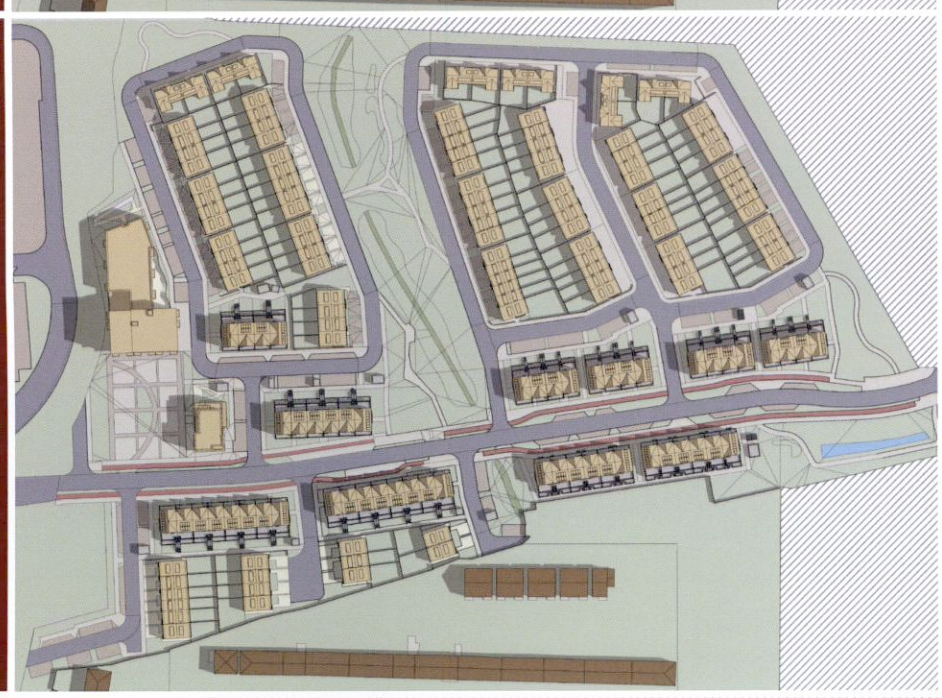
June 21st 8:00



June 21st 9:00

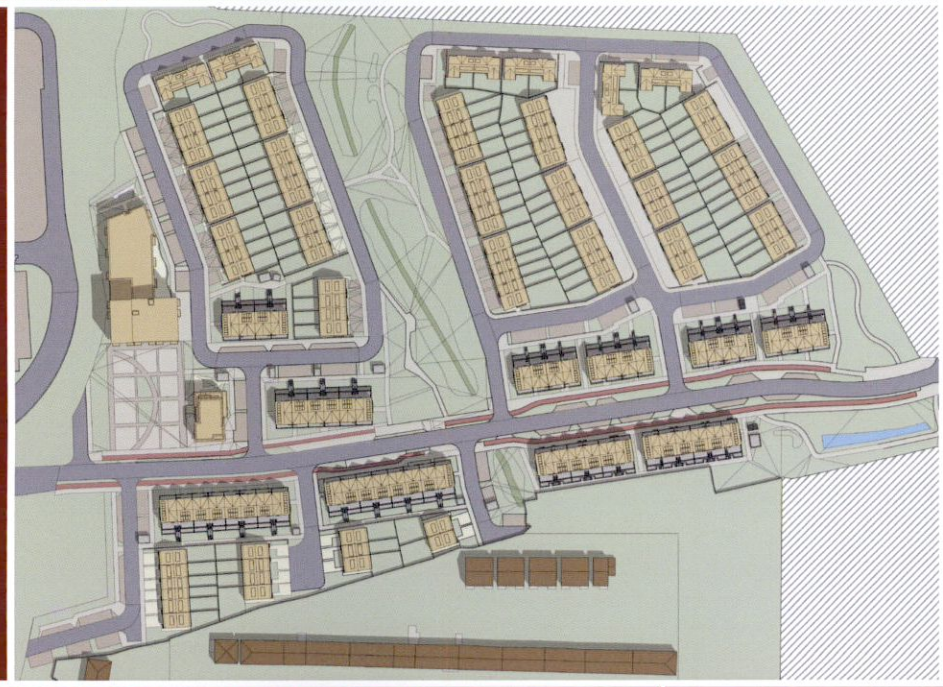


June 21st 10:00

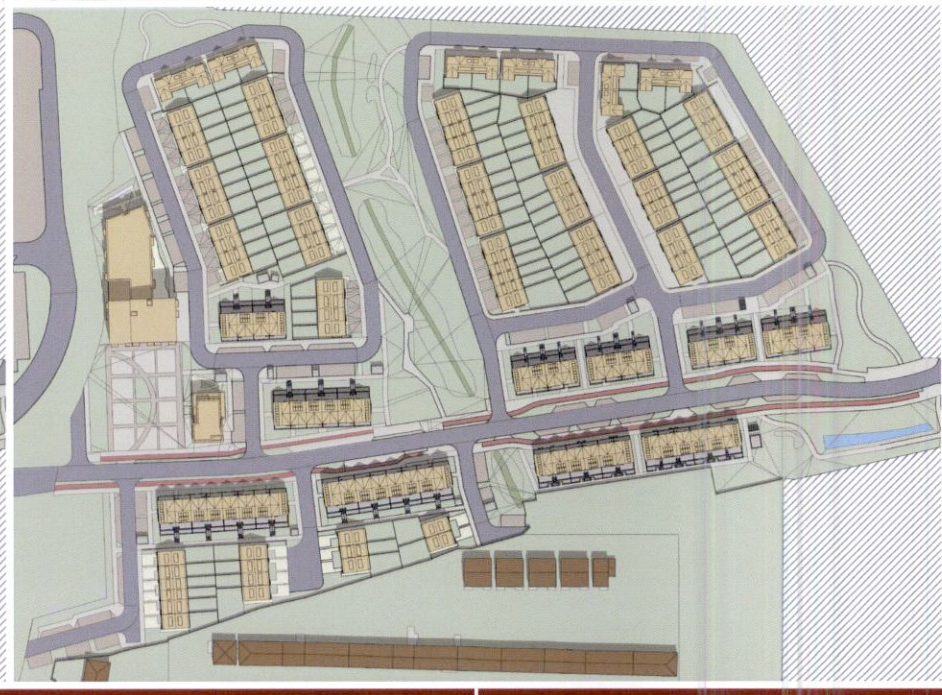


June 21st 11:00

June 21st 12:00



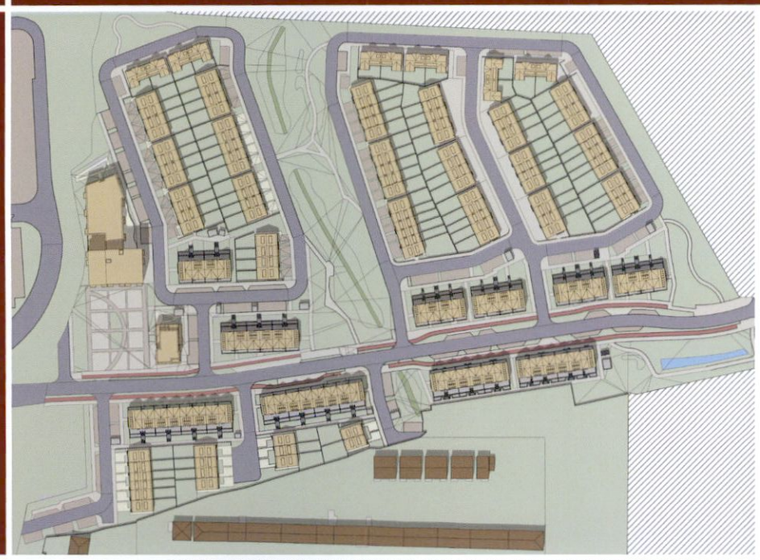
June 21st 13:00



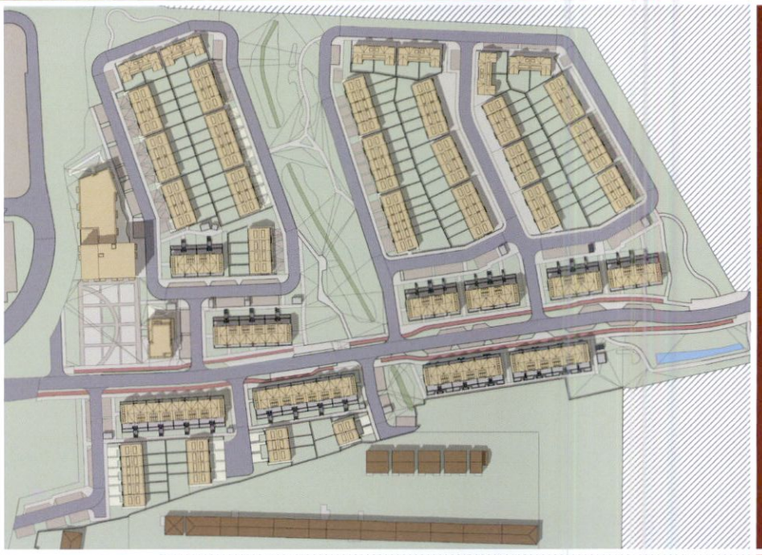
B.2 **Shadow Study 21 June**	**Project:** Mixed Use Development, Lands at Clonburris, County Dublin.		3D DESIGN BUREAU
June 21st **Sunrise 4:57 | Sunset 21:57**	**Applicant:** Kellands Homes Ltd.		

N

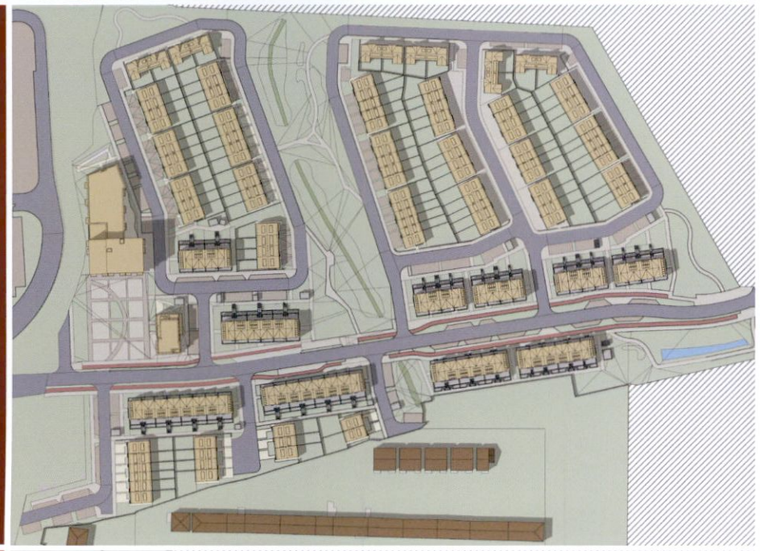
June 21st 14:00



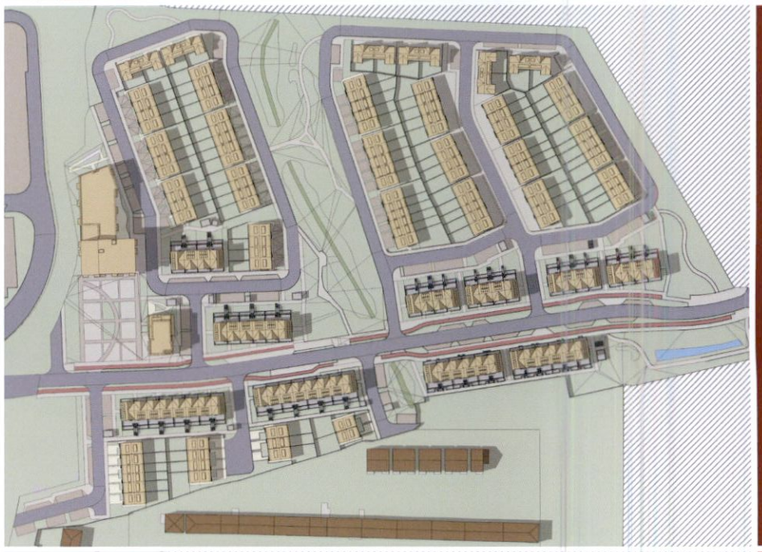
June 21st 15:00



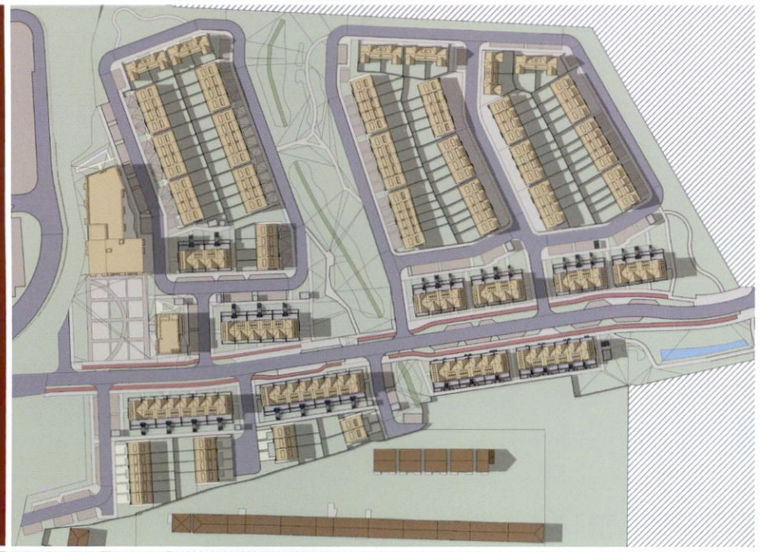
June 21st 16:00



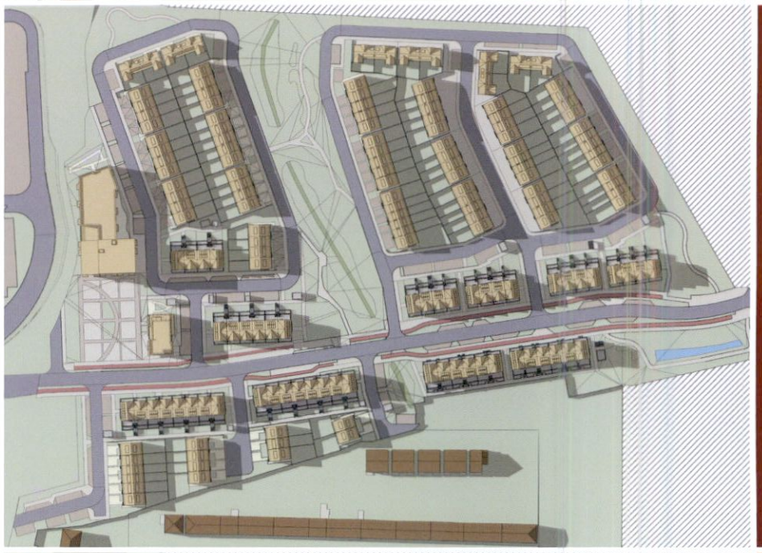
June 21st 17:00



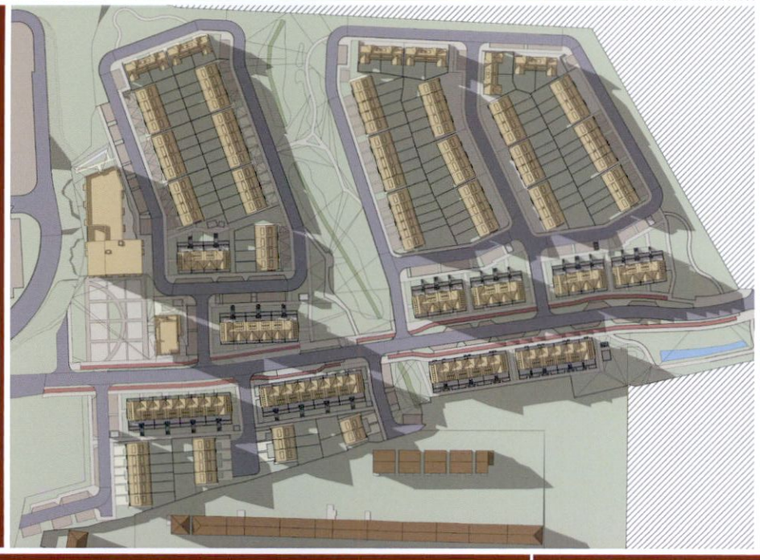
June 21st 18:00



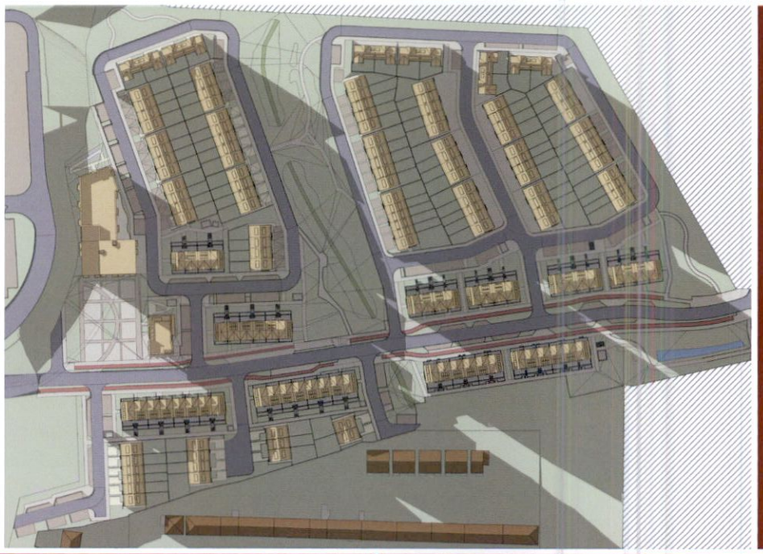
June 21st 19:00



June 21st 20:00



June 21st 21:00



Project: Mixed Use Development, Lands at Clonburris, County Dublin.

3D DESIGN BUREAU

June 21st
Sunrise 4:57 | Sunset 21:57

Applicant: Kellands Homes Ltd.

B.3 **Shadow Study 21 December**

December 21st
Sunrise 8:38 | Sunset 16:08

Project: Mixed Use Development, Lands at Clonburris, County Dublin.

Applicant: Kellands Homes Ltd.

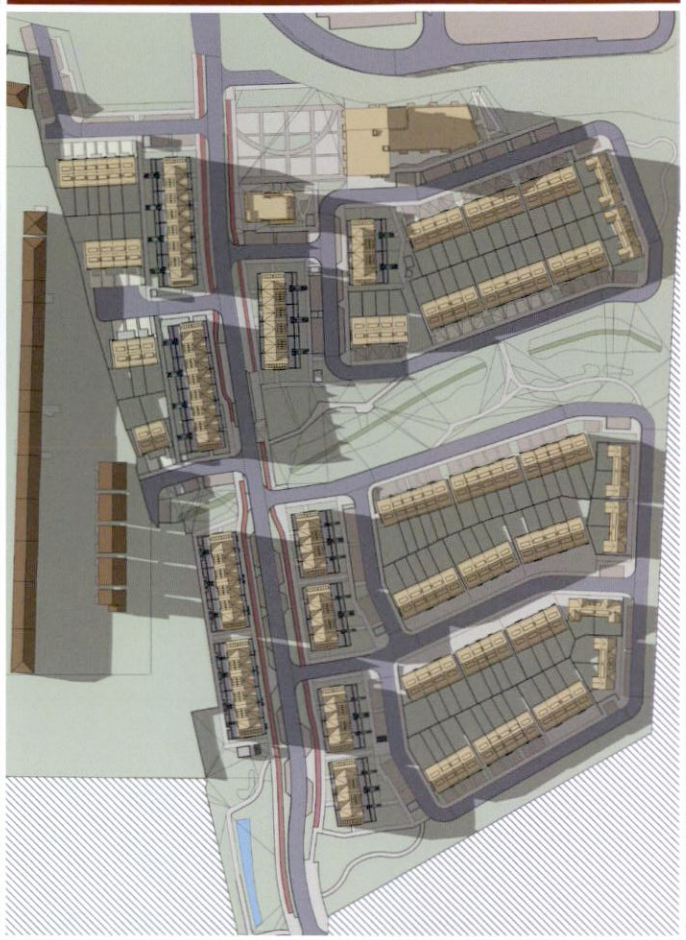
3D DESIGN BUREAU

N

December 21st 9:00

December 21st 11:00

December 21st 13:00

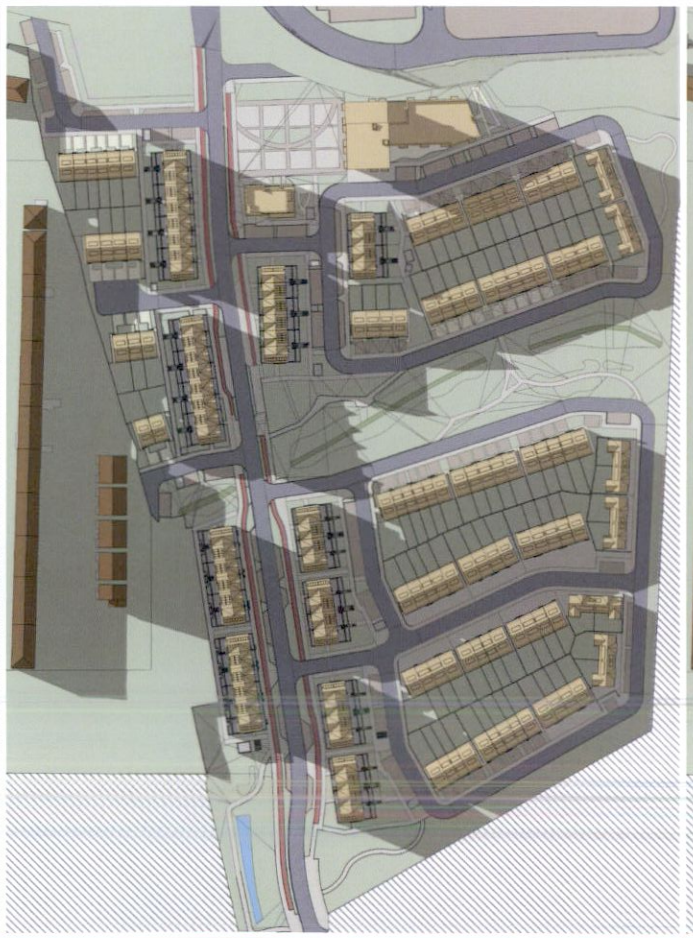


December 21st 15:00

December 21st 10:00

December 21st 12:00

December 21st 14:00



December 21st 16:00

C.0 Supplementary Studies

SDA study, under the I.S. EN 17037 criterion and No Sky Line (NSL) assessment in proposed units.

Below is an example of the table used to describe the supplementary study results for proposed units.

Table Example. C.3 - Scheme Performance SDA						
Unit Number	Room Description	I.S. EN 17037			No Sky Line (NSL)	
		% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets I.S. EN 17037 Criteria	% of room where the sky is visible from the working plane	Above 80%
A	B	C	D	E	F	G

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, LKD, etc.

C: % of area above 300 Lux

I.S. EN 17037 recommends at least 50% of the working plane receives above 300 lux for at least half the daylight hours.

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

D: % of area above 100 Lux

I.S. EN 17037 recommends at least 95% of the working plane receives above 100 lux for at least half the daylight hours.

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

E: Meets I.S. EN 17037 Criteria

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

F: % of room where the sky is visible from the working plane

This column states the percentage of the room from which there is a direct line of sight to the sky when assessed at the working plane height, which is 850mm above the finished floor level in residential rooms or 700mm above the finished floor level in offices or classrooms.

G: Above 80%

Whilst the BRE Guidelines only provide recommendations for NSL in the context of an impact analysis, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

If this column states: *'Yes'*, if signifies that the sky will be visible from more than 80% of the working plane.

If this column states: *'No'*, if signifies that the sky will be visible from less than 80% of the working plane and supplementary electric lighting may be required.

C.3.1 Block A - Ground Floor

Table No. C.3.1 - Supplementary Studies: Block A - Ground Floor						
Unit Number	Room Description	SDA (I.S. EN 17037 Criterion)			No Sky Line (NSL)	
		% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets I.S. EN 17037 Criteria*	% of room where the sky is visible from the working plane	Above 80%**
Creche	Baby Room	88%	100%	Compliant	100%	Yes
Creche	Toddler 1	37%	90%	Non-compliant	93%	Yes
Creche	Toddler 2	41%	100%	Non-compliant	99%	Yes
Creche	Wobbler 1	86%	100%	Compliant	100%	Yes
Creche	Wobbler 2	27%	84%	Non-compliant	93%	Yes

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

Figure C.1: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

C.3.2 Block A - 1st Floor

Table No. C.3.2 - Supplementary Studies: Block A - 1st Floor						
Unit Number	Room Description	SDA (I.S. EN 17037 Criterion)			No Sky Line (NSL)	
		% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets I.S. EN 17037 Criteria*	% of room where the sky is visible from the working plane	Above 80%**
Apt A_01	LKD	54%	100%	Compliant	99%	Yes
Apt A_01	Bedroom 1	31%	100%	Non-compliant	90%	Yes
Apt A_02	LKD	64%	100%	Compliant	99%	Yes
Apt A_02	Bedroom 1	53%	100%	Compliant	95%	Yes
Apt A_03	LKD	68%	100%	Compliant	99%	Yes
Apt A_03	Bedroom 1	61%	100%	Compliant	97%	Yes
Apt A_04	LKD	82%	100%	Compliant	99%	Yes
Apt A_04	Bedroom 1	46%	100%	Non-compliant	99%	Yes
Apt A_04	Bedroom 2	61%	100%	Compliant	91%	Yes
Apt A_05	LKD	94%	100%	Compliant	100%	Yes
Apt A_05	Bedroom 1	14%	100%	Non-compliant	98%	Yes
Apt A_06	LKD	39%	93%	Non-compliant	99%	Yes
Apt A_06	Bedroom 1	28%	100%	Non-compliant	90%	Yes
Apt A_06	Bedroom 2	28%	100%	Non-compliant	97%	Yes
Apt A_07	LKD	33%	100%	Non-compliant	96%	Yes
Apt A_07	Bedroom 1	37%	100%	Non-compliant	99%	Yes
Apt A_07	Bedroom 2	38%	100%	Non-compliant	96%	Yes

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

Figure C.2: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

C.3.3 Block A - 1st Floor

Table No. C.3.3 - Supplementary Studies: Block A - 1st Floor						
Unit Number	Room Description	SDA (I.S. EN 17037 Criterion)			No Sky Line (NSL)	
		% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets I.S. EN 17037 Criteria*	% of room where the sky is visible from the working plane	Above 80%**
Apt A_08	LKD	68%	100%	Compliant	99%	Yes
Apt A_08	Bedroom 1	85%	100%	Compliant	97%	Yes
Apt A_09	LKD	13%	63%	Non-compliant	96%	Yes
Apt A_09	Bedroom 1	89%	100%	Compliant	99%	Yes
Apt A_09	Bedroom 2	28%	100%	Non-compliant	96%	Yes
Apt A_10	LKD	16%	63%	Non-compliant	96%	Yes
Apt A_10	Bedroom 1	21%	100%	Non-compliant	99%	Yes
Apt A_10	Bedroom 2	38%	100%	Non-compliant	96%	Yes
Apt A_11	LKD	41%	99%	Non-compliant	99%	Yes
Apt A_11	Bedroom 1	18%	100%	Non-compliant	99%	Yes
Apt A_11	Bedroom 2	28%	100%	Non-compliant	96%	Yes
Apt A_12	LKD	63%	100%	Compliant	94%	Yes
Apt A_12	Bedroom 1	13%	76%	Non-compliant	65%	No

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

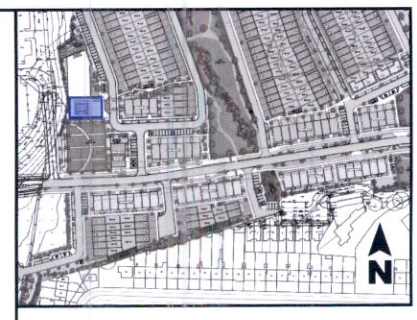


Figure C.3: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

C.3.4 Block A - 2nd Floor

Table No. C.3.4 - Supplementary Studies: Block A - 2nd Floor						
Unit Number	Room Description	SDA (I.S. EN 17037 Criterion)			No Sky Line (NSL)	
		% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets I.S. EN 17037 Criteria*	% of room where the sky is visible from the working plane	Above 80%**
Apt A_13	LKD	78%	100%	Compliant	99%	Yes
Apt A_13	Bedroom 1	36%	100%	Non-compliant	90%	Yes
Apt A_14	LKD	99%	100%	Compliant	99%	Yes
Apt A_14	Bedroom 1	64%	100%	Compliant	95%	Yes
Apt A_15	LKD	100%	100%	Compliant	99%	Yes
Apt A_15	Bedroom 1	78%	100%	Compliant	97%	Yes
Apt A_16	LKD	100%	100%	Compliant	99%	Yes
Apt A_16	Bedroom 1	53%	100%	Compliant	99%	Yes
Apt A_16	Bedroom 2	68%	100%	Compliant	91%	Yes
Apt A_17	LKD	100%	100%	Compliant	100%	Yes
Apt A_17	Bedroom 1	25%	100%	Non-compliant	98%	Yes
Apt A_18	LKD	52%	100%	Compliant	99%	Yes
Apt A_18	Bedroom 1	40%	100%	Non-compliant	99%	Yes
Apt A_18	Bedroom 2	33%	100%	Non-compliant	97%	Yes
Apt A_19	LKD	49%	100%	Non-compliant	96%	Yes
Apt A_19	Bedroom 1	42%	100%	Non-compliant	99%	Yes
Apt A_19	Bedroom 2	38%	100%	Non-compliant	96%	Yes

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

Figure C.4: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

C.3.5 Block A - 2nd Floor

Table No. C.3.5 - Supplementary Studies: Block A - 2nd Floor						
Unit Number	Room Description	SDA (I.S. EN 17037 Criterion)			No Sky Line (NSL)	
		% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets I.S. EN 17037 Criteria*	% of room where the sky is visible from the working plane	Above 80%**
Apt A_20	LKD	82%	100%	Compliant	99%	Yes
Apt A_20	Bedroom 1	93%	100%	Compliant	97%	Yes
Apt A_21	LKD	66%	100%	Compliant	100%	Yes
Apt A_21	Bedroom 1	18%	87%	Non-compliant	98%	Yes
Apt A_21	Bedroom 2	40%	100%	Non-compliant	96%	Yes
Apt A_22	LKD	25%	66%	Non-compliant	96%	Yes
Apt A_22	Bedroom 1	24%	97%	Non-compliant	98%	Yes
Apt A_22	Bedroom 2	53%	100%	Compliant	96%	Yes
Apt A_23	LKD	22%	91%	Non-compliant	100%	Yes
Apt A_23	Bedroom 1	24%	100%	Non-compliant	99%	Yes
Apt A_23	Bedroom 2	43%	100%	Non-compliant	96%	Yes
Apt A_24	LKD	64%	100%	Compliant	88%	Yes
Apt A_24	Bedroom 1	25%	100%	Non-compliant	98%	Yes

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

Figure C.5: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

C.3.6 Block A - 3rd Floor

Table No. C.3.6 - Supplementary Studies: Block A - 3rd Floor						
Unit Number	Room Description	SDA (I.S. EN 17037 Criterion)			No Sky Line (NSL)	
		% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets I.S. EN 17037 Criteria*	% of room where the sky is visible from the working plane	Above 80%**
Apt A_25	LKD	83%	100%	Compliant	100%	Yes
Apt A_25	Bedroom 1	78%	100%	Compliant	97%	Yes
Apt A_26	LKD	39%	100%	Non-compliant	96%	Yes
Apt A_26	Bedroom 1	100%	100%	Compliant	99%	Yes
Apt A_26	Bedroom 2	80%	100%	Compliant	96%	Yes
Apt A_27	LKD	39%	100%	Non-compliant	96%	Yes
Apt A_27	Bedroom 1	47%	100%	Non-compliant	99%	Yes
Apt A_27	Bedroom 2	83%	100%	Compliant	96%	Yes
Apt A_28	LKD	86%	100%	Compliant	100%	Yes
Apt A_28	Bedroom 1	44%	100%	Non-compliant	99%	Yes
Apt A_28	Bedroom 2	80%	100%	Compliant	96%	Yes
Apt A_29	LKD	78%	100%	Compliant	99%	Yes
Apt A_29	Bedroom 1	38%	100%	Non-compliant	97%	Yes

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

Figure C.6: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

C.3.7 Block A - 4th Floor

Table No. C.3.7 - Supplementary Studies: Block A - 4th Floor						
Unit Number	Room Description	SDA (I.S. EN 17037 Criterion)			No Sky Line (NSL)	
		% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets I.S. EN 17037 Criteria*	% of room where the sky is visible from the working plane	Above 80%**
Apt A_30	Kitchen	43%	100%	Non-compliant	90%	Yes
Apt A_30	Living Room	100%	100%	Compliant	99%	Yes
Apt A_30	Bedroom 1	69%	100%	Compliant	98%	Yes
Apt A_31	LKD	89%	100%	Compliant	100%	Yes
Apt A_31	Bedroom 1	56%	100%	Compliant	98%	Yes
Apt A_31	Bedroom 2	90%	100%	Compliant	96%	Yes
Apt A_32	LKD	43%	100%	Non-compliant	96%	Yes
Apt A_32	Bedroom 1	56%	100%	Compliant	98%	Yes
Apt A_32	Bedroom 2	93%	100%	Compliant	96%	Yes
Apt A_33	LKD	43%	100%	Non-compliant	96%	Yes
Apt A_33	Bedroom 1	100%	100%	Compliant	99%	Yes
Apt A_33	Bedroom 2	90%	100%	Compliant	96%	Yes
Apt A_34	LKD	86%	100%	Compliant	93%	Yes
Apt A_34	Bedroom 1	63%	100%	Compliant	98%	Yes

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

Figure C.7: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

C.3.8 Block A - 5th Floor

Table No. C.3.8 - Supplementary Studies: Block A - 5th Floor						
Unit Number	Room Description	SDA (I.S. EN 17037 Criterion)			No Sky Line (NSL)	
		% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets I.S. EN 17037 Criteria*	% of room where the sky is visible from the working plane	Above 80%**
Apt A_35	LKD	90%	100%	Compliant	100%	Yes
Apt A_35	Bedroom 1	97%	100%	Compliant	97%	Yes
Apt A_36	LKD	47%	100%	Non-compliant	96%	Yes
Apt A_36	Bedroom 1	100%	100%	Compliant	100%	Yes
Apt A_36	Bedroom 2	100%	100%	Compliant	96%	Yes
Apt A_37	LKD	47%	100%	Non-compliant	96%	Yes
Apt A_37	Bedroom 1	68%	100%	Compliant	99%	Yes
Apt A_37	Bedroom 2	100%	100%	Compliant	96%	Yes
Apt A_38	LKD	91%	100%	Compliant	100%	Yes
Apt A_38	Bedroom 1	68%	100%	Compliant	99%	Yes
Apt A_38	Bedroom 2	100%	100%	Compliant	95%	Yes
Apt A_39	LKD	84%	100%	Compliant	99%	Yes
Apt A_39	Bedroom 1	56%	100%	Compliant	97%	Yes

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

Figure C.8: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

C.3.9 Block K - Ground/First Floor

Table No. C.3.9 - Supplementary Studies: Block K - Apartments 1 & 2						
Unit Number	Room Description	SDA (I.S. EN 17037 Criterion)			No Sky Line (NSL)	
		% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets I.S. EN 17037 Criteria*	% of room where the sky is visible from the working plane	Above 80%**
Apt K_01	Kitchen/Dining	90%	100%	Compliant	99%	Yes
Apt K_01	Living Room	80%	100%	Compliant	98%	Yes
Apt K_01	Bedroom 1	64%	100%	Compliant	95%	Yes
Apt K_01	Bedroom 2	38%	100%	Non-compliant	98%	Yes
Apt K_01	Bedroom 3	93%	100%	Compliant	99%	Yes
Apt K_02	Kitchen/Dining	67%	100%	Compliant	99%	Yes
Apt K_02	Living Room	33%	100%	Non-compliant	94%	Yes
Apt K_02	Bedroom 1	38%	100%	Non-compliant	95%	Yes
Apt K_02	Bedroom 2	40%	100%	Non-compliant	98%	Yes
Apt K_02	Bedroom 3	46%	100%	Non-compliant	99%	Yes

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

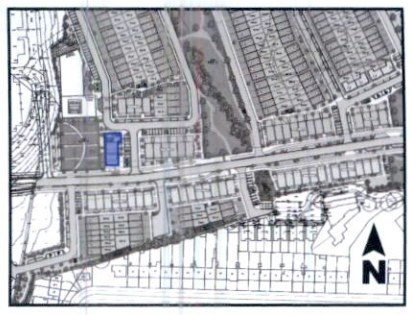


Figure C.9: Floor plans of assessed building (L), Keyplan highlighting the assessed building above.

Figure C.10: Block K ground floor above, first floor below.

C.3.10 Block K - Second Floor

Table No. C.3.10 - Supplementary Studies: Block K - Apartments 3 & 4						
Unit Number	Room Description	SDA (I.S. EN 17037 Criterion)			No Sky Line (NSL)	
		% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets I.S. EN 17037 Criteria*	% of room where the sky is visible from the working plane	Above 80%**
Apt K_03	LKD	41%	97%	Non-compliant	96%	Yes
Apt K_03	Bedroom 1	84%	100%	Compliant	98%	Yes
Apt K_03	Bedroom 2	57%	100%	Compliant	97%	Yes
Apt K_03	Bedroom 3	13%	78%	Non-compliant	99%	Yes
Apt K_04	LKD	100%	100%	Compliant	100%	Yes
Apt K_04	Bedroom 1	100%	100%	Compliant	99%	Yes

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

Figure C.11: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).

C.3.11 Block K - Second Floor

Table No. C.3.11 - Supplementary Studies: Block K - Apartments 3 & 4						
Unit Number	Room Description	SDA (I.S. EN 17037 Criterion)			No Sky Line (NSL)	
		% of area above 300 Lux (recommendation >50%)	% of area above 100 Lux (recommendation >95%)	Meets I.S. EN 17037 Criteria*	% of room where the sky is visible from the working plane	Above 80%**
Apt K_05	LKD	99%	100%	Compliant	100%	Yes
Apt K_05	Bedroom 1	100%	100%	Compliant	98%	Yes
Apt K_05	Bedroom 2	71%	100%	Compliant	95%	Yes
Apt K_06	LKD	100%	100%	Compliant	100%	Yes
Apt K_06	Home Office	100%	100%	Compliant	95%	Yes
Apt K_06	Bedroom 1	100%	100%	Compliant	100%	Yes

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 10.

** Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

Figure C.12: Floor plan of assessed building (L), Keyplan highlighting the assessed building (R).