February 2025

Residential Development at Leopardstown Road, Sandyford, Dublin

Daylight and Sunlight Assessment Report

Applicant: Dun Laoghaire - Rathdown County Council

"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." - BR 209

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Report Contents

The following report has been prepared by 3D Design Bureau (3DDB). 3DDB have over 7 years experience in producing daylight and sunlight assessments for large scale planning applications and are recognised as experts in the field. This report has been reviewed and overseen by Nicholas Polley and Richard Dalton. Nicholas is CEO of 3D Design Bureau and is a qualified Building Services Engineer (B.Sc.(Eng) Dip Eng) with over 25 years experience in the industry. Richard is Associate Director of 3DDB and has a bachelors degree in Building Information Modelling (BIM) with over 20 years experience in the industry.

1.0 Executive Summary

1.1 Summary of Assessment

The proposed development, submitted under the 'Part 8' planning process, is located on Leopardstown Road, Dublin 18. It involves the demolition of an existing property to pave the way for the construction of a 60-unit apartment block and 10 duplex units. This development is part of an ongoing effort to address housing demand in Dublin's growing suburbs.

For this proposal, 3DDB have been commissioned to conduct detailed daylight and sunlight assessment, as well as a shadow study. Paramount to the brief was the assessment of daylight access within the proposed units. Given the lack of constraints on the subject site, a high rate of compliance with the BRE recommendations for daylight access was targeted. This was achieved through a collaborative process between 3DDB and the design team.

Assessments have been broken down into the following two main categories, 'Impact Assessment' and 'Scheme Performance', of which there are subcategories as summarised below

Impact Assessment

Following advice within the BRE Guidelines, the surrounding context was carefully considered to ensure all properties that may potentially experience a level of effect have been included in the study.

The only properties that are located within an area of 'three times the hight of the proposed development' are 'Parc Clies' and 1-6 Leopardstown Rise as indicated in Figure 1.1 below as #1 and #2 respectively.

The relationship between the proposed development and the above neighbouring properties is such that a detailed

Figure 1.1: Location of neighbouring properties within three times the height of the proposed development: (1), Parc Clies, (2) 1-6 Leopardstown Rise.

impact analysis is not necessary. Further explanation of the criteria applied can be found in section "4.1 Impact Assessment, Window Selection Criteria" on page 11.

Scheme Performance

Daylight access for the habitable rooms of the proposed development has 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 external amenity spaces.

The results of these scheme performance assessments, which are in accordance with the BRE Guidelines, can be found in section A.0 on page 27. These results are summarised in section 1.2 and explained in section "5.1 Analysis of Scheme Performance Results" on page 20.

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. The results of the supplementary scheme performance assessments can be found in section B.0 on page 55.

1.2 Scheme Performance Results Overview:

Spatial Daylight Autonomy (SDA):

Spatial Daylight Autonomy (SDA) BRE 209 Criteria	
Unit Count	80
Rooms Assessed	229
Without Trees	
Compliant	229
Non-compliant	0
Compliance Rate*	100%
With Trees (Proposed and Existing Trees)	
Compliant	223
Non-compliant	6
Compliance Rate*	c. 97%
Note: It is the expert opinion of 3DDB that the appropriate criteria for SDA assessments are that of the BRE Guidelines (BRE 209)	

* Compliance rates stated for the SDA analysis are based on all habitable rooms within the proposed development.

Sunlight Exposure (SE):

Sunlight Exposure (SE)	
Units Assessed	80
SE with trees as opaque objects	
Non-Compliant	16
Minimum	12
Medium	2
High	50
Compliance Rate*	c. 80%
SE without deciduous trees	
Non-Compliant	15
Minimum	13
Medium	2
High	50
Compliance Rate*	c. 81%

* Compliance rates stated for the SE analysis are based on all units with the proposed development.

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

Sun On Ground (SOG) in proposed gardens / amenity areas	
Areas Assessed	2
Areas meeting the guidelines	2
Areas not meeting the guidelines	0
Compliance Rate*	100%

* Compliance rates stated for the SOG assessment are based on the public and communal open space only.

1.3 Supplementary Assessment Results Overview

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

Spatial Daylight Autonomy (SDA) under I.S. EN 17037 Criterion	
Unit Count	80
Rooms Assessed	229
Without Trees	
Compliant	188
Non-compliant	41
Compliance Rate*	c. 82%
With Trees (Proposed and Existing Trees)	
Compliant	184
Non-compliant	45
Compliance Rate*	c. 80%
Note: The study under the I.S. EN 17037 criterion should be considered a supplementary assessment. It is the expert opinion of 3DDB that the appropriate criteria are that of the BRE Guidelines (BRE 209)	

* Compliance rates stated for the SDA analysis are based on all habitable rooms within the proposed development.

No Sky Line (NSL):

No Sky Line (NSL):	
Unit Count	80
Rooms Assessed	229
Yes	229
No	0
Compliance Rate**	100%
** As the BRE Guidelines do not provide a recommended minimum for NSL in proposed developments, compliance rates for NSL are calculated using a criteria applied by 3DDB.	

* Compliance rates stated for the NSL analysis are based on all habitable rooms within the proposed development.

2.0 Guidelines / Standards

Overview

Neither the British Standard, European Standard, British Annex to the European Standard nor the BRE Guidelines (BR 209) 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 Guidelines 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.

It is the expert opinion of 3D Design Bureau, that the BRE Guidelines (*BR 209*) are the most appropriate guiding document for daylight and sunlight assessment. For daylight within proposed developments, a supplementary study has also been carried out under the criteria of *I.S. EN 17037*. The rationale for this opinion is outlined below.

Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities. (2023)

In July 2023, the Department of Housing, Planning and Local Government published an updated guidance document for new apartments, *Sustainable Urban Housing: Design Standards for New Apartments.* This document makes reference to, *EN 17037:2018: Daylight in Buildings* (the European Standard), *BS EN 17037:2018: Daylight in Buildings* (the UK National Annex to the European Standard) and to the 3rd edition of Building Research Establishment's *Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice* (BR 209 2022).

Paragraph 6.7 of the 2023 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. This may arise due to a design constraints [sic] 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. Rationale and compensatory design solutions are the remits of the planning consultant and/or the project architect, these will also be included in this report **where applicable.**

Note: Section 3.2 of the Urban Development and Building Height Guidelines 2018, provides similar guidance as above. However, it should be noted that at the time of publication of the *Urban Development and Building Height Guidelines (2018)*, BR 209 was in the 2nd edition, first published in 2011. Since then, a 3rd edition of BR 209 has been published (June 2022) and the 2nd edition has been withdrawn. BR 209 no longer references *BS 8206-2:2008*, which has also been withdrawn. The standard used as reference in BR 209 edition 3 is *BS EN 17037*.

BR 209 - Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice (2022)

This document will be referred to as the *BRE Guidelines*, the *BRE Guide* or *BR 209* in this report.

At the time of writing this report, the BRE Guidelines are in the third edition (BR 209). The BRE Guidelines set 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.

Upon publication of the 3rd Edition of the BR 209 (2022), the 2nd edition (2011) has been withdrawn. Among the updates from the 2nd to the 3rd edition are some changes in the recommended metrics to use for carrying out scheme performance assessments.

Daylight within proposed developments was previously assessed under the 2011 guidelines using an 'Average Daylight Factor' assessment (ADF). This has been replaced with a 'target illuminance assessment', also known as a 'Spatial Daylight Autonomy' assessment (SDA).

Sunlight within proposed developments was previously assessed under the 2011 guidelines using an 'Annual / Winter Probable Sunlight Hours' assessment (APSH/WPSH). This has been replaced with a 'Sunlight Exposure' assessment (SE). However, APSH/WPSH is still recommended for sunlight impact assessments.

As such, no ADF or APSH/WPSH assessment will be included as part of a scheme performance assessment under the updated guidelines.

Details of the criteria for new metrics, and all other relevant metrics, can be found in the methodology section on Page 11 of this report.

It is the expert opinion of 3D Design Bureau that the BRE Guidelines are the most appropriate guiding document for assessing daylight potential within a proposed development. The rationale for this opinion is outlined in the Dublin City Council development plan (2022-2028), which states:

"Prior to 2018, Ireland had no standard for daylight. In 2018, the National Standards Authority of Ireland adopted EN 17037 to directly become IS EN 17037. It is important to note that no amendments were made to this document and unlike BS EN 317037, it does not contain a national annex. It offers only a single target for new buildings (there are no space by space targets – e.g. a kitchen would have the same target as a warehouse or office). It does not offer guidance on how new developments will impact on surrounding existing environments. These limitations make it unsuitable for use in planning policy or during planning applications. BR 209 must still be used for this purpose."

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

A detailed description of the various recommendations for impact assessment and scheme performance is contained in section "4.3 Quantitative Impact Assessment Overview" on page 14 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.

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 deemed the appropriate 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. Because of these limitations, it is the expert opinion of 3D Design Bureau, that the recommendations made in the *BRE Guidelines* are more appropriate to use than those within *I.S. EN 17037*.

Regardless, a supplementary SDA study has been carried out on the proposed development using the criterion of *I.S. EN 17037*, with compliance rates stated. However, this should be considered a supplementary study.

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 "may not be achievable". 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.

Dun Laoghaire-Rathdown County Development Plan (2022-2028)

The guidance provided in the Dun Laoghaire-Rathdown County Development Plan 2022-2028 (DLR) references the 2nd Edition of the BRE guidelines (BR 209).

Section 12.3.4.2 of the DLR Development Plan states:

"Development shall be guided by the principles of Site Layout Planning for Daylight and Sunlight, A guide to good practice (Building Research Establishment Report, 2011) and/or any updated, or subsequent guidance, in this regard."

The DLR Development Plan allows for consideration of any updated or subsequent guidance and, therefore, the 3rd edition of the BRE guidelines (BR 209), which was released in 2022 after the publication of the DLR Development Plan, is considered as the primary document.

Summary

According to the aforementioned guiding documents, the following assessments are typically conducted for a daylight and sunlight study, depending on the specific requirements of the project.

Performance of the Proposed Development

Annual Probable Sunlight Hours (APSH) and Winter Probable Sunlight Hours (WPSH) on all relevant windows: APSH and WPSH are no longer recommended for scheme performance assessments under BR 209. They have been replaced with Sunlight Exposure (SE). When conducting a scheme performance assessment for sunlight in the habitable rooms of the proposed development, Sunlight Exposure is the relevant metric. An APSH/WPSH assessment will not be carried out in the scheme performance assessment of the proposed development.

Sunlight on Ground (SOG) in all amenity spaces: A SOG assessment will be carried out, where appropriate, for the amenity spaces of the proposed development.

Average Daylight Factor (ADF) in all habitable rooms: BR 209 (2022) states that ADF is no longer recommended as a relevant method of assessment. ADF has been replaced with a target illuminance assessment. (See below). As such, no ADF assessment will be carried out on the proposed development.

No Sky Line (NSL) in all habitable rooms: An NSL assessment will be conducted for the habitable rooms of the proposed development as a supplementary study as part of a scheme performance assessment.

Target Illuminance in all habitable rooms: A target illuminance assessment, also known as a Spatial Daylight Autonomy (SDA) assessment, has replaced ADF as the relevant metric for assessing daylight within proposed habitable spaces. The two recommended methodologies for this assessment are detailed in section 4.5.1 on page 17. In a scheme performance assessment, the SDA will be calculated for the habitable rooms of the proposed development.

Impact on the Surrounding Properties

Vertical Sky Component (VSC) on all relevant surrounding windows: A VSC impact assessment will be conducted, where appropriate, on the relevant surrounding windows determined by the BRE decision chart as illustrated in Figure 4.2 on page 11.

Annual Probable Sunlight Hours (APSH) and Winter Probable Sunlight Hours (WPSH) on all relevant surrounding windows: An APSH/WPSH impact assessment will be conducted, where appropriate, on the relevant surrounding windows/rooms that have an orientation within 90° of due south.

Sunlight on Ground (SOG) in all surrounding amenity spaces: A SOG impact assessment will be carried out, where appropriate, on the neighbouring gardens/ amenity spaces located within close proximity and to the north of the subject site.

3.0 Glossary

3.1 Terms and Definitions

Below is a list of daylight and sunlight terminology that may be used in this report depending on the assessments carried out.

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 12.

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 (WPSH) 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 of direct sunlight a room can expect to receive 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 BR 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. BR 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.

Level of Sunlight Exposure:

The level of sunlight exposure will be stated for each assessed room in the tables under section "A.3 Sunlight Exposure (SE) in Proposed Units" on page 43. Below is a list of the terms used to categorise the levels of sunlight exposure:

Below Minimum
Sunlight exposure will be categorised as 'below minimum' 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.

Unit Compliance:

In addition to the level of sunlight exposure expressed for each room, compliance will be stated on a unit-by-unit basis. A proposed unit is considered to be compliant if any habitable room within the unit is capable of receiving at least 1.5 hours of sunlight on the assessment date.

Non-Compliant
If no habitable rooms within a proposed unit can receive 1.5 hours of sunlight on the assessment date, the unit will be categorised as 'Non-Compliant'.

Compliant
If at least one habitable room within a proposed unit can receive 1.5 hours or more of sunlight on the assessment date, the unit will be categorised as 'Compliant'.

Typically unit compliance will be stated for the best performing room per unit only, 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 in the first instance only.

4.0 Methodology

4.1 Impact Assessment, Window Selection Criteria

To determine the properties to be included in the impact assessment, the decision chart taken from the BRE Guidelines has been followed, as shown in Figure 4.2.

Accordingly, all properties within a distance of three times the height of the proposed development, as illustrated in Figure 4.1, have been considered for impact assessment.

Figure 4.1: Properties within three times the height of the proposed development

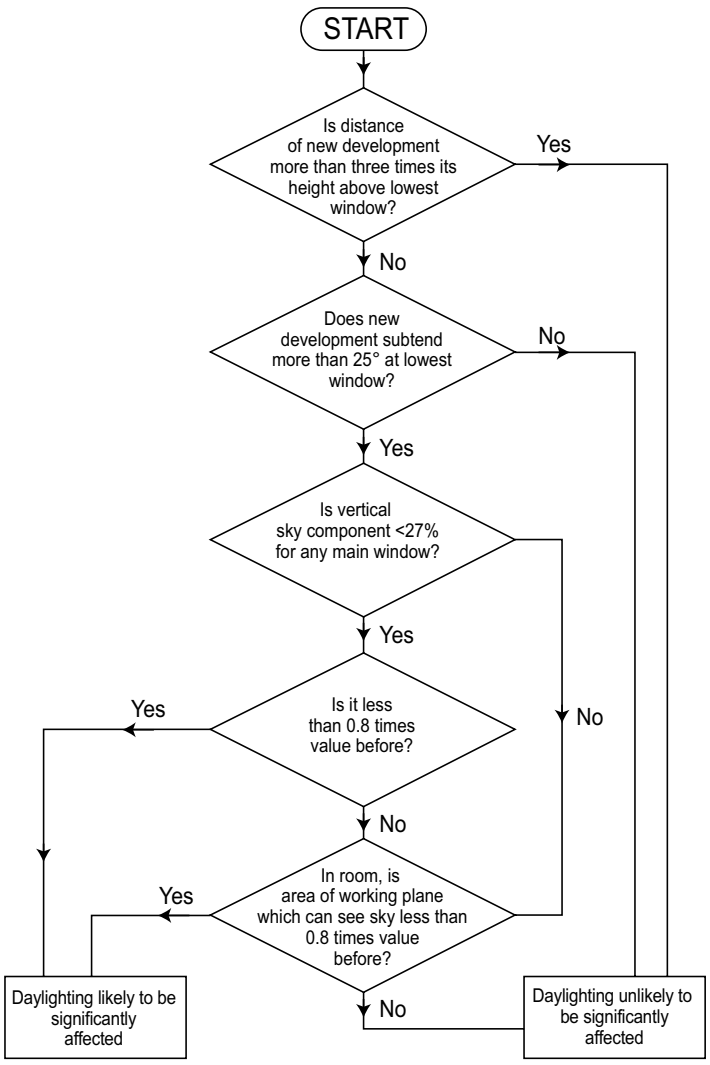

Figure 4.2: VSC decision chart, taken from BR 209.

As per the BRE Guidelines, a perpendicular section has been drawn from the main window wall of the potentially affected properties to determine if the proposed development subtends an angle of more than 25˚ at the lowest window.

If the proposed development subtends 25˚ in this section, then a VSC assessment should be conducted.

Figure 4.3: Example section A-A taken through 3 Leopardstown Rise.

However, if the proposed development does <u>not</u> subtend 25˚ in a perpendicular section, daylight is unlikely to be significantly affected and no further assessment will be carried out. Figure 4.3 shows a perpendicular section taken through 3 Leopardstown Rise, which provides an example among the existing properties that are within 3 times the height of the proposed development but the proposed development does not subtend 25˚ when measured in a perpendicular section from the lowest window.

A detailed description regarding the methodology of the VSC assessment can be found in 4.3.1 on page 14.

It is advisable that if a window/room does not meet the BRE criteria in the VSC impact assessment that a no sky line (NSL) assessment should then be carried out. However, a NSL assessment requires accurate dimensions and layouts of the existing rooms and windows. Due to common lack of availability regarding the required information, it is not common practice to carry out a no sky line study when assessing impact on existing properties.

The BRE Guidelines also apply the 25˚ rule to determine the need for an impact assessment for loss of sunlight (APSH/WPSH). They also advise that only windows with an orientation within 90˚ of due south should be assessed. It is recommended to assess the main living rooms of dwellings and conservatories, while APSH/WPSH assessments are typically not required for kitchens and bedrooms.

Furthermore, if a perpendicular obstruction falls within 45˚ when measured <u>both</u> in a plan and section view, a VSC impact assessment should be conducted to determine if daylight will be affected. This is referred to in the BRE Guidelines as the '45˚ approach'.

Figure 4.4 shows a perpendicular section and plan view of the closest window on the neighbouring property to the west, 'Parc Clies'. These diagrams demonstrate that while the proposed development does cross the 45˚ line in section, it does not in a plan view. This indicates that no further impact assessment is warranted.

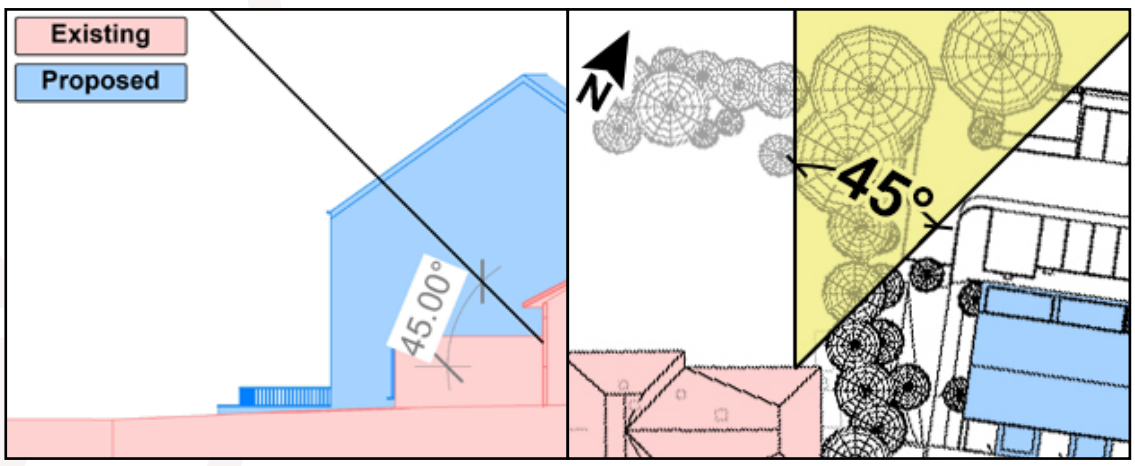

Figure 4.4: Example section B-B and plan view of closest window of Parc Clies

As the proposed development does not subtend 25˚ when measured in a perpendicular section from any of the neighbouring properties, and does not trigger the '45˚ approach,' no further impact assessment is required.

4.2 Preparing the analytical model

4.2.1 Building the Model States

The project architect, Reddy Architecture + Urbanism (RAU) supplied 3DDB with AutoCAD drawings and 3D models of the proposed development from which a 3D analytical model was created. Landscape drawings were issued by Ronan MacDiarmada + Associates Ltd (RDMA) Landscape Architects. A combination of survey information, aerial photography, available online photography and/or ordnance survey information were used to model the surrounding context. **Note:** as the information gathered from online sources is not as accurate as surveyed information, a reasonable tolerance should be allowed to the results that have been generated.

Baseline model state

As illustrated in Figure 4.5, the baseline model state includes the surrounding context and the subject site in their current standing. This includes any structures that are to be demolished as part of this application. In addition to the existing context, the baseline model state also includes the permitted development (ABP 31166921), which is located to the south-east of the subject site. Existing trees were placed using photogrammetry information, with assumptions made regarding exact size, position and species.

Figure 4.5: Model view of the baseline model state

The BRE Guidelines recommend that impact assessments should be carried out if any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal. This criteria has identified that the proposed development will not have an adverse effect to the daylight or sunlight of any of the surround properties.

Figure 4.6: Model view of the proposed model state

Proposed model state

As illustrated in Figure 4.6, the proposed model state reflects the subject site if the development is built as proposed. This includes proposed landscaping on the subject site and the demolition of existing structures, etc. Proposed buildings have been positioned in their location on the subject site with relevant surrounding context included. Proposed trees are represented with indicative models, using information supplied by RDMA.

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

Relevant weather and climatic data has been obtained for this report using a localised EnergyPlus Weather File (IRL_EM_Casement.AP.039670_TMYx).

4.2.2 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 modelling 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 photogrammetry 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.

BR 209 provides guidance on how trees should be treated depending on the study being carried out, as summarised below:

Impact to Vertical Sky Component (VSC) and Annual / Winter Probable Sunlight Hours (APSH / WPSH)

The BRE Guidelines state that when assessing the effect a new development would have on existing buildings, it is usual to ignore the effect of deciduous trees. This is because daylight is at its scarcest and most valuable in winter when most trees will not be in leaf. Evergreen trees should be included, particularly where a dense belt or group of evergreens is 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, unless there is a dense belt present or a group of trees specifically planned as a windbreak or for privacy purposes. Evergreen trees are included in the SOG assessment.

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 (BR 209) to allow for this is to run the sunlight exposure study in two states. Once with trees as opaque objects and secondly without deciduous trees in the assessment model. This gives a range of potential sunlight hours.

Spatial Daylight Autonomy (SDA)

BR 209 recommends when assessing daylight in a proposed building, it is appropriate to run the assessment with trees represented over the course of the whole year. Light transmittance values for the modelled trees are varied to account for summer and winter foliage.

Taking average values from *BRE Digest 350*, a light transmittance value of 60% has been applied to deciduous trees during the portion of year where a bare branch tree condition is most likely (from the 6th of October to the 24th of April). Representative of summer months, a light transmittance value of 20% has been applied to deciduous trees during the portion of year where a full leaf tree condition is most likely (from the 24th of April to the 6th of October).

A light transmittance value of 20% has been applied to evergreen trees throughout the year.

Units have also been assessed without trees to give an understanding of how the architecture performs should trees not be factored into the calculation.

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 trees represented in the same manner as the BR 209 assessment. Units have also been assessed without trees to give an understanding of how the architecture performs should trees not be factored into the calculation.

No Sky Line (NSL)

Because some sky can usually be seen through a tree canopy, deciduous trees have not been included in the No Sky Line assessment model. Evergreen trees may be included in this assessment, particularly if there is a dense belt or group planned for windbreak or for privacy purposes.

Shadow Study

The hourly renderings of the shadow study have been generated with evergreen trees represented as opaque objects, where applicable, 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.

4.3 Quantitative Impact Assessment Overview

4.3.1 Effect on Vertical Sky Component (VSC)

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

Section 4.1 outlines the decision process which was used to determine the appropriate properties to be included in the VSC impact assessment.

For the proposed development, all properties within a radius of three times the height of the proposed development have been considered for impact assessment. Should the angle from the windows to the proposed development subtend 25° in a perpendicular section, then VSC is calculated in both the baseline and proposed model states, and a comparison made.

A no skyline assessment requires accurate dimensions and layouts of both rooms and windows. However, the required information is rarely available for existing dwellings. As such, it is not common practice to carry out a no sky line (NSL) impact assessment.

VSC can be defined as the amount of skylight that falls on a vertical wall or window.

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

The BRE Guidelines state that if the VSC is:

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

The VSC for each window/room will be calculated in the relevant model states, as outlined in section 4.2 on page 12. A comparison between the results generated with these model states will determine the level of effect.

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

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

In instances where a baseline value is less than 1%, the impact will be considered '*non-applicable*' (n.a.)

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

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

Assessment Points

The VSC impact assessment has been carried out on the windows/rooms of the neighbouring properties that could be affected by the proposed development as highlighted in Figure 1.1 on page 3.

The assessment points for measuring VSC are taken from the centre point of a standard window. If the window being assessed is a full height window, the assessment point is taken at 1600 mm above the finished floor level.

Weighted Averages

If it can be determined or reasonably assumed that multiple windows are servicing the same room, each window has been assessed and a room VSC has been calculated by applying a weighted average calculation to the results.

When calculating weighted averages the proportion of the total glazing area represented for each window is taken into account. It should be noted that assumptions typically need to be made regarding window sizes, so a tolerance should be applied regarding calculated weighted averages.

In instances where weighted averages have been calculated, the VSC figures will be stated for each window on an individual basis as well as the calculated figure to be applied to the room, but the level of effect will only be stated for the room.

Project Assessment

Following the BRE decision chart, as illustrated in Figure 4.2 on page 11, no VSC impact assessment has been carried out on the windows/rooms of the neighbouring properties as the proposed development does not subtend 25° when measured in a perpendicular section from any of the existing windows.

This indicates that the proposed development would not have an adverse effect on the daylight of any of the existing properties.

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

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

A proposed development could potentially have a negative effect on the level of sunlight that a neighbouring property receives, if the obstructing building is located to the south and is large in relation to their distance from the existing dwelling. This can be determined if the distance of a proposed development is less than three times its height from an existing dwelling, or if the angle from an existing window to the proposed development subtends 25˚ to the horizontal when measured in a perpendicular section.

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

Section 4.1 outlines the decision process which was used to determine the appropriate properties to be included in the APSH/WPSH impact assessment.

The APSH/WPSH for each of the assessed windows will be calculated in the relevant model states, as outlined in section 4.2 on page 12. A comparison between the results generated with these model states will determine the level of effect.

If it can be determined or reasonably assumed that multiple windows are servicing the same room, the APSH/WPSH has been assessed for the room as opposed to each individual window. When APSH/WPSH is assessed for a room it considers sunlight coming from all windows, but does not double count if sunlight is reaching multiple windows at the same time.

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

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

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

In some circumstances, the available sunlight during the winter period (WPSH) may both drop below the recommended minimum of 5% with a proposed value of less than 0.8 times the baseline value, but the reduction to annual probable sunlight (APSH) is less than 4%. Such occurrences are considered compliant with the BRE Guidelines, and the impact to WPSH will be stated as '*n.a.*' on that basis.

Additionally, where a baseline value is less than 1%, the impact will be considered '*non-applicable*' (n.a.)

Under BRE Guidelines, only main living-rooms need to be assessed for effect on sunlight. In the absence of design layouts or floor plans, or information pertaining to the internal 'as-built' layouts, all windows assumed to be servicing habitable rooms have been included in the APSH/WPSH assessment provided they are orientated within 90˚ of due south and are in relative close proximity to the proposed development.

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

Assessment Points

The assessment points for measuring APSH/WPSH are taken from the centre point of a standard window. If the window being assessed is a full height window, the assessment point is taken at 1600 mm above the finished floor level.

Project Assessment

Following the BRE decision chart, as illustrated in Figure 4.2 on page 11, no APSH/WPSH impact assessment has been carried out on the windows/rooms of the neighbouring properties as the proposed development does not subtend 25˚ when measured in a perpendicular section from any of the existing windows.

This indicates that the proposed development would not have an adverse effect on the sunlight of any of the existing properties.

4.3.3 Effect on Sun On Ground in Existing Gardens/Amenity Areas (SOG)

The BRE Guidelines recommend that for a garden or amenity area to appear adequately sunlit throughout the year, at least half the area should receive at least two hours of sunlight on March 21st. As the BRE Guidelines does not provide a clear criteria on which neighbouring properties should be included in an impact on SOG study, 3DDB have carefully considered the neighbouring properties that may be affected when running the impact assessment. Gardens or amenity areas included in this study are typically located within close proximity, to the north of the proposed development.

Where a quantitative assessment has not been carried out it is on the basis that the omitted areas are unlikely to be adversely affected. Such instances may be because the areas are not deemed to be in close proximity to the proposed development or because they are located to the south. Should there be any concerns over the potential impact on any areas that have not been included in the quantitative assessment, a qualitative assessment may be carried out using the shadow study and false colour plans included in the report.

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 impact assessment includes evergreen trees, where applicable, in accordance with the BRE Guidelines. Typically deciduous trees will not be included unless there is a particularly dense belt.

The percentage of assessed areas which can receive two hours or more of direct sunlight on March 21st will be calculated in the relevant model states, as outlined in section 4.2 on page 12. A comparison between the results generated with these model states will determine the level of effect.

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

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

In instances where a baseline value is less than 1%, the impact will be considered '*non-applicable*' (n.a.)

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

Project Assessment

No quantitative SOG impact assessment has been carried out on the areas surrounding the subject site as the proposed development is not located significantly south of any garden or amenity area.

The false colour plans of the proposed SOG assessment section A.4 on page 53 and the hourly renderings of the shadow study in section C.0 on page 75, allow for a qualitative sunlight assessment of the surrounding areas.

4.4 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 4.2 on page 12. This visual representation of the shadows cast by the proposed development can be found in the hourly shadow diagrams in the appendix results section C.0 on page 75.

Hourly renderings have been shown from sunrise to sunset on the following dates in 2024:

- Spring equinox: March 21st Sunrise 6:32 | Sunset 18:33. (GMT)
- Summer solstice: June 21st. Sunrise 5:04 | Sunset 21:49. (BST)
- Winter solstice: December 21st Sunrise 8:45 | Sunset 16:00. (GMT)

The shadow study has been generated using the same model states as described in section 4.2.1. In certain cases, assumptions or estimations may have been made when modelling elements of the surrounding context and/or proposed site details when creating the various model states. Therefore, it is advisable for a reasonable tolerance to be applied when interpreting shadows in the qualitative assessment.

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

Note: The spring equinox (March 21st) and autumn equinox (21st September) yield similar shadows, albeit with a one hour difference as daylight saving time (BST) would be in effect. Only the spring equinox was included in the shadow study images in accordance with the BRE Guidelines.

4.5 Quantitative Scheme Performance Assessment Overview

4.5.1 Spatial Daylight Autonomy in Proposed Habitable Rooms (SDA)

Since the publication of the 3rd edition of the BRE Guidelines (BR 209 - 2022), Spatial Daylight Autonomy (SDA) is the recommended metric for assessing daylight access within a proposed development. Spatial Daylight Autonomy replaces Average Daylight Factor (ADF) in this regard, which was the recommended metric under the 2nd edition of the BRE Guidelines (BR 209 - 2011).

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 the calculation method using illuminance level better represents a real-world scenario as it accounts for the quality of daylight based on orientation. As such, the illuminance methodology has been adopted for all SDA assessments in this report using a localised EnergyPlus Weather File (IRL_EM_Casement.AP.039670_TMYx) to apply the relevant climate information.

In terms of housing, *BR 209* provides target SDA values to be received across at 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.

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 do not vary depending on the room function under this criteria.

This study has assessed the Spatial Daylight Autonomy (SDA) received in the habitable rooms of the proposed development under the BR 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 “Proposed Floor Plans” on page 27.

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 BR 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. 4.5.1 - 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	0.68
Ground cover	Paving	0.4		Maintenance factor	0.91
	Tarmac	0.2		Glass adjusted for maintenance	0.62
	Grass	0.2		Frosted glass	0.5

Project Assessment

The results for the study on SDA can be found in the appendix results section A.2 on page 33.
Analysis of the results can be found in section 5.1.1 on page 20.

The results of the supplementary SDA study under the I.S. EN 17037 criterion can be found in section B.0 on page 55.

4.5.2 Sunlight Exposure in Proposed Habitable Rooms (SE)

Since the publication of the 3rd edition of the BRE Guidelines (BR 209 - 2022), Sunlight Exposure (SE) is the recommended metric for assessing sunlight access within a proposed development. Sunlight Exposure replaces APSH/WPSH in this regard, which was the recommended metric under the 2nd edition of the BRE Guidelines (BR 209 - 2011).

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, where applicable, 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.

The sunlight exposure assessment focuses on habitable residential rooms. Unless sunlight access is deemed important for the functionality of a non-residential room in a proposed development, it will not be included in the study, which remains limited to residential rooms.

Project Assessment

The results for the study on sunlight exposure can be found in the appendix results section A.3 on page 43, with analysis of the results in section 5.1.2 on page 21.

4.5.3 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, where applicable, 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.4 on page 53, with analysis of the results in section 5.1.3 on page 23.

4.5.4 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 regarding NSL in the BRE Guidelines is in relation to impact assessments. NSL is not mentioned in the BRE section regarding daylight in new developments. Nevertheless, an NSL assessment was carried out on the proposed development as a supplementary study as it is requested in the DCC Development Plan 2022-2028 (Section 5.1, Appendix 16). Although the proposed development is not located within Dublin City, the NSL study has been included to provide consistency across 3DDB daylight and sunlight assessments.

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 B.0 on page 55.

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 the proposed development, both with and without trees. This has ensured that a clear understanding has been obtained regarding the daylight performance of the proposed development.

This proposed development consists of a 60 no. units within the apartment block, 10 no. ground floor apartments in the duplexes and 10 no. townhouses in the duplexes. In total there is approximately 229 no. habitable rooms.

All assessed rooms have achieved the recommended minimum level of daylight, as per the criteria as set out in the BRE Guidelines without trees factored into the calculation, with 6 no. falling below the recommended level once trees are accounted for.

I.S. EN 17037 sets out more onerous recommendations for SDA. As such, the number of habitable rooms achieving compliance under this standard is 184 in the assessment that includes trees. This gives a reduced circa compliance rate of c. 80%. The additional SDA assessment, under the I.S. EN 17037 criteria, when trees are not factored into the calculation has shown a compliance rate of c. 81%.

In cases where rooms comply with the criteria of BR 209 but do not meet the criteria of I.S. EN 17037, it is the recommendation of 3D Design Bureau that these rooms will appear adequately daylit. This recommendation is based on the fact that BR 209 provides room-specific criteria, unlike I.S. EN 17037. BR 209 considers the varying daylight requirements for different room types, which I.S. EN 17037 does not account for.

During the early phase of the process, RAU provided 3DDB with a work in progress model, which was used to run an initial daylight analysis. This initial assessment revealed that some rooms did not achieve the recommended level of daylight as per the BRE Guidelines.

The LKD of Unit 00_06 in the apartment block, as illustrated in figure Figure 5.1 below, is an example of a room that did not have sufficient daylight access in the original configuration. A suggestion was made to dramatically reconfigure this apartment by re-positioning the LKD on the eastern facade. This would result in the LKD becoming a dual aspect room and also substantially improvement daylight access within the room.

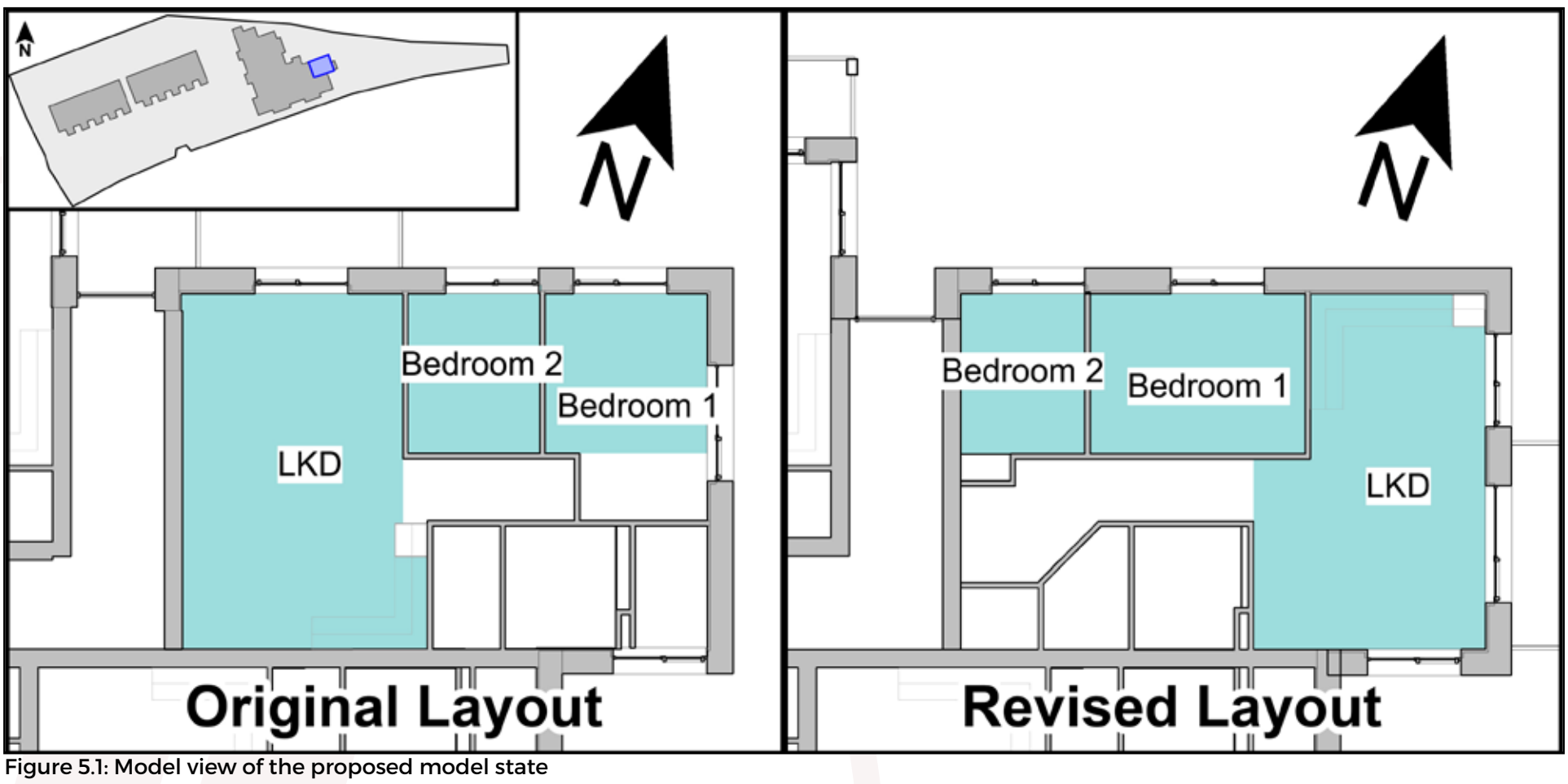

Figure 5.1: Model view of the proposed model state

The example above represents the most substantial design intervention to improve daylight access in this process, but other more typical design tweaks were also implemented where necessary. These include, increases to window sizes and minor adjustments to room and/or balcony arrangements where necessary

Full compliance, in the assessment that does not account for trees, was achieved through a collaborative design process between 3DDB and the project architects, RAU. However there are some instances of rooms having less than the recommended level of daylight in the study that accounts for the effect of trees. These are all ground floor apartment units within the proposed duplex blocks.

Each of the 6 no. rooms that do not achieve the recommended level of daylight, in the study that accounts for trees, are south facing LKDs within the ground floor duplex apartments. Figure 5.4 below demonstrated the daylight distribution throughout the ground floor LKDs of the more constrained duplex block.

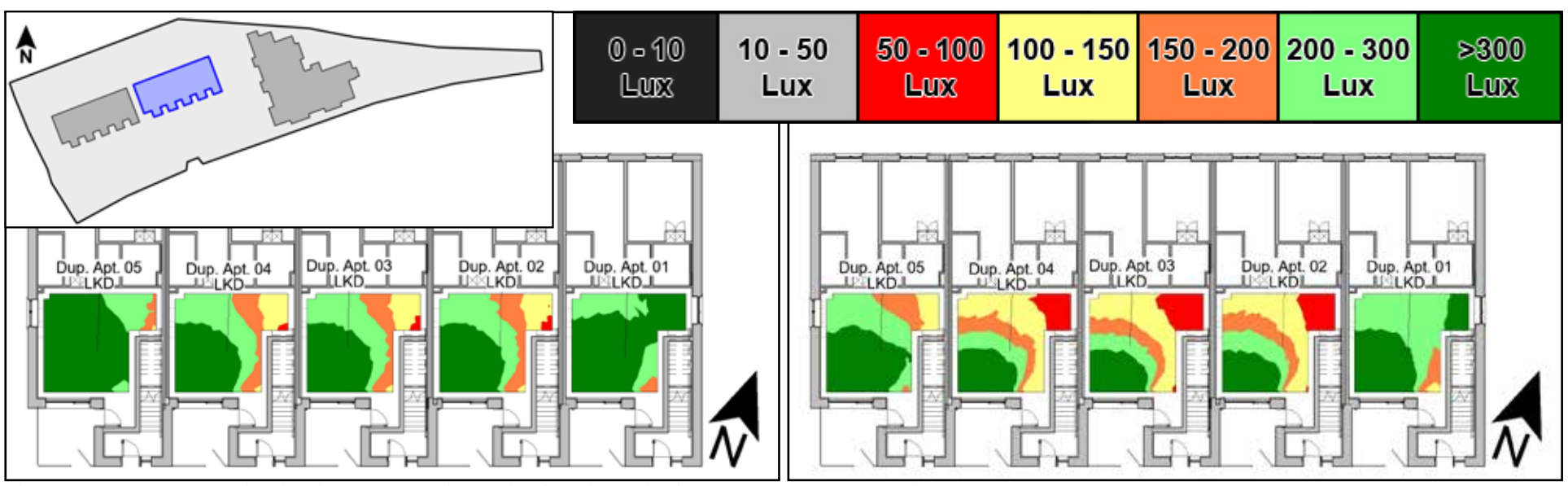

Figure 5.2: Heat-maps indicating the daylight distribution within the ground floor units of the duplex block.
Left: Without trees, Right: With trees as opaque objects, Inset: Block location and legend.

The heat-maps indicate that while the living area, to the front of the room, appears well-daylit in both studies, the kitchen area at the rear will become less well-daylit when trees are in full foliage. This portion of the room may require supplementary electric lighting, particularly on overcast days.

The primary daylight reduction stems from retaining existing, well-established trees on the site. On balance, it was the decision of the design team that, despite the effect on daylight, the retention of as many existing trees as is practical is an important aspect of retaining the character of the area.

It is the recommendation of 3DDB, that the proposed development has achieved a favourable level of daylight in the proposed units, not withstanding the units that are affected by trees.

The results for the study on SDA can be seen in section A.2 on page 33.

5.1.2 Sunlight Exposure (SE)

A sunlight exposure assessment has been carried out on all habitable rooms within the proposed development. For these assessments, trees have been included in the analytical model as opaque objects. The assessments have been carried out in two states:

- All trees included in assessment model.
- Only evergreen trees included in the assessment model.

This approach is in accordance with the BRE Guidelines.

In total, 80 no. units have been assessed across the apartment block and duplexes. Using the rationale explained in section 3.2 on page 10, the level of sunlight exposure for the assessed units is as follows:

In the assessment carried out with all trees considered as opaque objects, 50 no. units are considered *high*, 2 no. *medium*, 12 no. have reached the *minimum* recommendation with 16 units below the *minimum* recommendation.

When deciduous trees are not factored into the assessment model, one of the non-compliant units achieves the minimum recommendation and is categorised as compliant. Otherwise, there is no change to the categorisation of any of the other assessed units.

The SE assessment has shown that, depending on effect of trees, the circa compliance rate for the assessed units, in accordance with the BRE Guidelines, is between 80% & 81%.

The only instance of compliance variance due to tree inclusion is in one ground floor apartment of the duplex units. Identified as 'Dup. Apt. 02', is shown in Figure 5.4 below a large deciduous tree is located directly south of this unit, affecting the sunlight received by the window of the LKD. This existing tree is existing and will be retained in the proposed development.

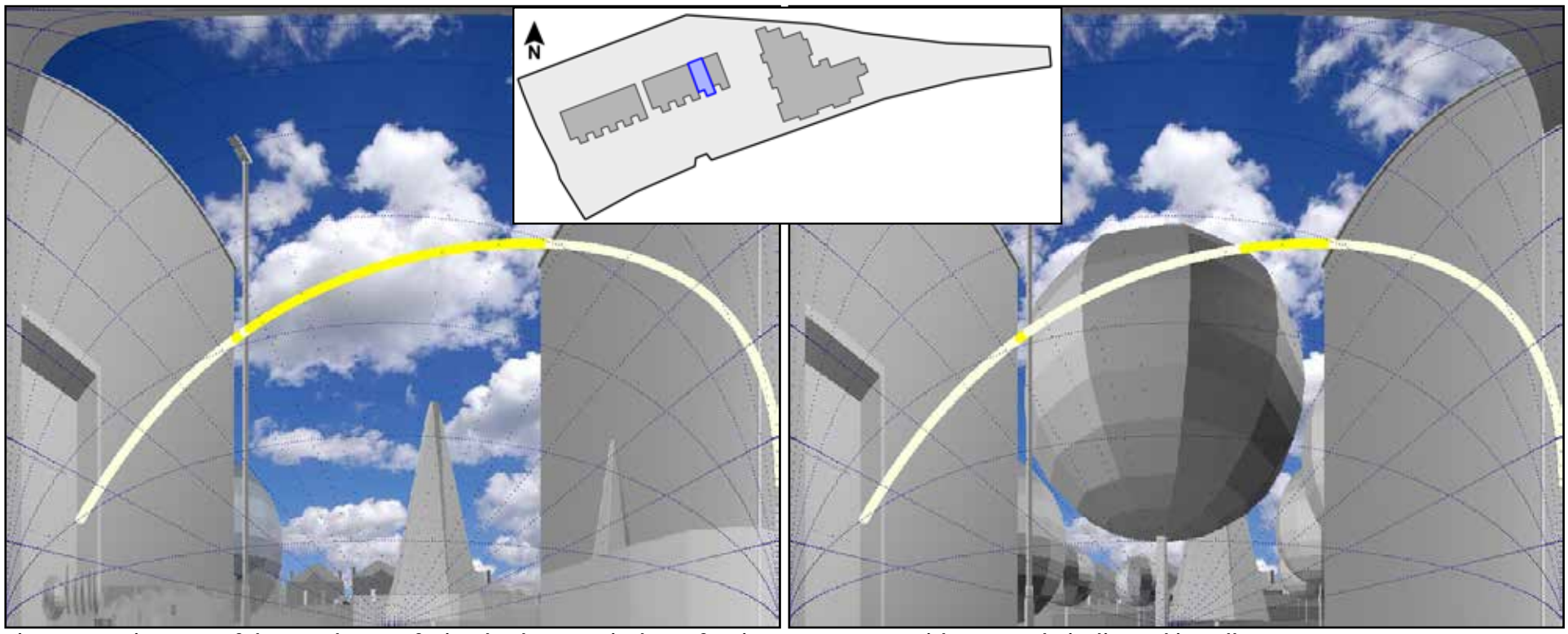

Figure 5.4: View out of the south -east facing bedroom window of Unit Dup. Apt. 02, with sun path indicated in yellow.
Left: Without deciduous trees, Right: with deciduous trees as opaque objects, Inset: unit location.

Deciduous trees provide dappled shade, and depending on branch position and foliage density. This tree will not completely block sunlight access.

This is a textbook example of why the BRE recommends that the SE assessments are conducted both with and without deciduous trees as opaque objects. Neither study provides the exact level of sunlight exposure in the assessed unit, but the combination of the two studies accounts for the best-case and worst-case scenario.

This study indicates that while this unit has a favourable orientation and is not overly constrained by the built environment, trees will have an effect on sunlight access.

Note: For a unit to be compliant under BR 209, only one habitable room within the unit needs to meet the guideline values

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.

This is the case with the proposed development. Other than the ground floor duplex unit that is affected by trees, as indicated above, each instance of non-compliance with the Sunlight Exposure recommendation is in a unit that is predominantly north facing. Whilst the majority of these units are dual aspect, the windows are facing north-east and north-west.

The compliance of 80%-81% that has been achieved is in line with the example layout used in the BRE Guidelines, as repeated in Figure 5.3 below, which is used to give advice on how to achieve a favourable balance in sunlight access within larger schemes where full compliance may not be possible.

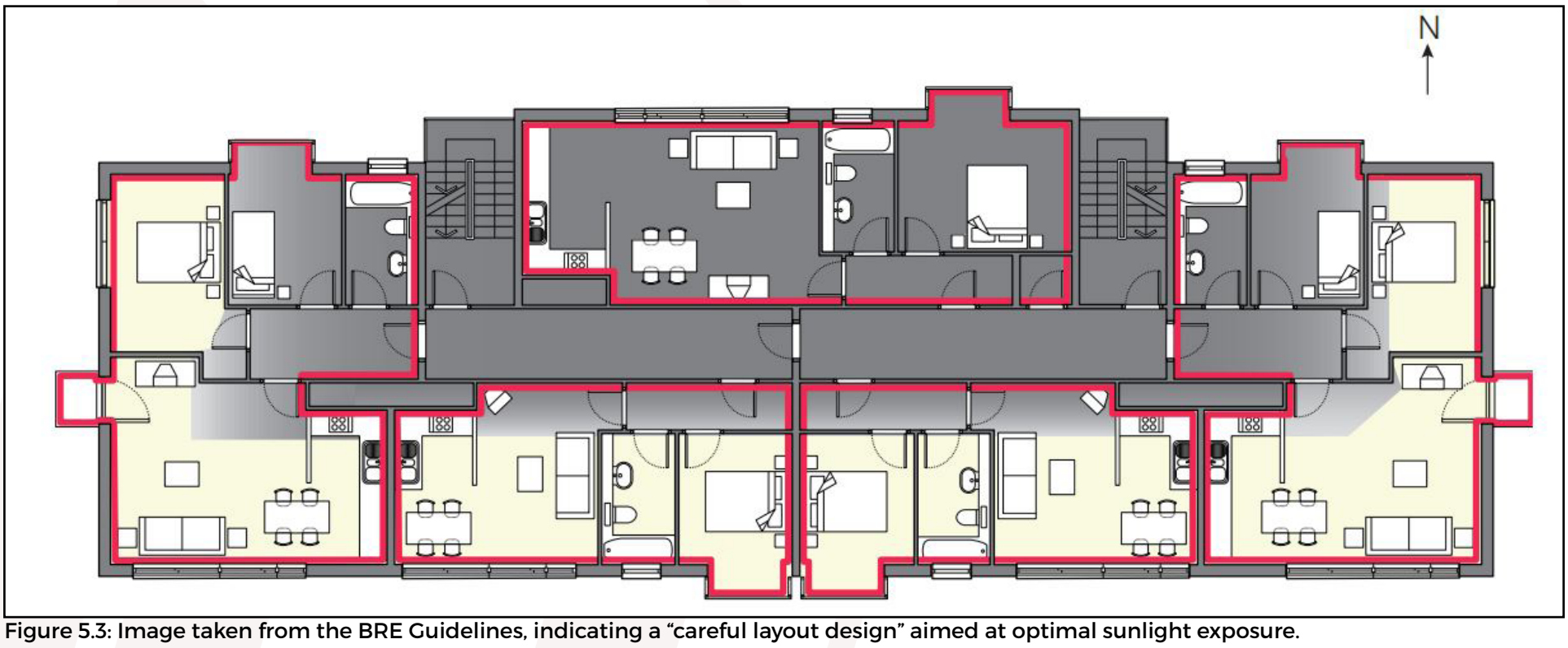

Figure 5.3: Image taken from the BRE Guidelines, indicating a "careful layout design" aimed at optimal sunlight exposure.

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 adequately in this regard.

The results for the study on SE in the habitable rooms of the proposed units can be seen in section A.3 on page 43.

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 'public open space' and 'communal open space' as defined by the design team.

In this assessment, the different public open spaces throughout the subject site were combined to assess the overall sunlight potential. The communal amenity areas were assessed using the same approach.

Both the public and communal open spaces are largely unobstructed to the south. These spaces have comfortably met the SOG criteria as recommended in the BRE Guidelines. This indicates that their will be adequate sunlight access in the open spaces of the proposed development throughout the year.

The results for the study on sunlighting in the proposed outdoor amenity spaces can be found in section A.4 on page 53.

A visual representation of these readings can be seen in the false colour plan in section A.4 and in the hourly shadow diagrams for March 21st in section C.1 on page 75 of the appendix section of this report.

6.0 Conclusion

3D Design Bureau (3DDB) were commissioned to carry out a daylight assessment, sunlight assessment and shadow study for the proposed residential development at Leopardstown Road in Dublin 18.

The proposed development has sufficient separation from all neighbouring properties and will not impose an adverse level of effect to daylight or sunlight.

The design of the proposed scheme has achieved full compliance in the daylight (SDA) assessment that does not account for trees and a high compliance rate once trees are considered. This is a result of the design team striking a favourable balance between daylight access and the retention of existing trees on site. Future occupants will have adequate daylight access throughout the majority of the development with some isolated locations being shaded by trees.

The Sunlight Exposure (SE) assessment has yielded favourable results, with the majority of units capable of a 'high' level of sunlight exposure.

It has been demonstrated that both the proposed public open space and communal open space, as defined by the design team, are unconstrained to the south and will have favourable sunlight access.

In conclusion, the proposed development has performed well in all assessments conducted. It serves as an exemplary model for delivering appropriate density on a greenfield site without causing adverse impacts on neighbouring properties.

Appendix - Results

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Appendix Contents

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

A.0 Scheme Performance

A.1 Proposed Floor Plans

A.1.1 Proposed Duplex Floor Plans - Duplex Terrace 1-5

Figure A.1: Duplex Terrace 1-5 - Site Location

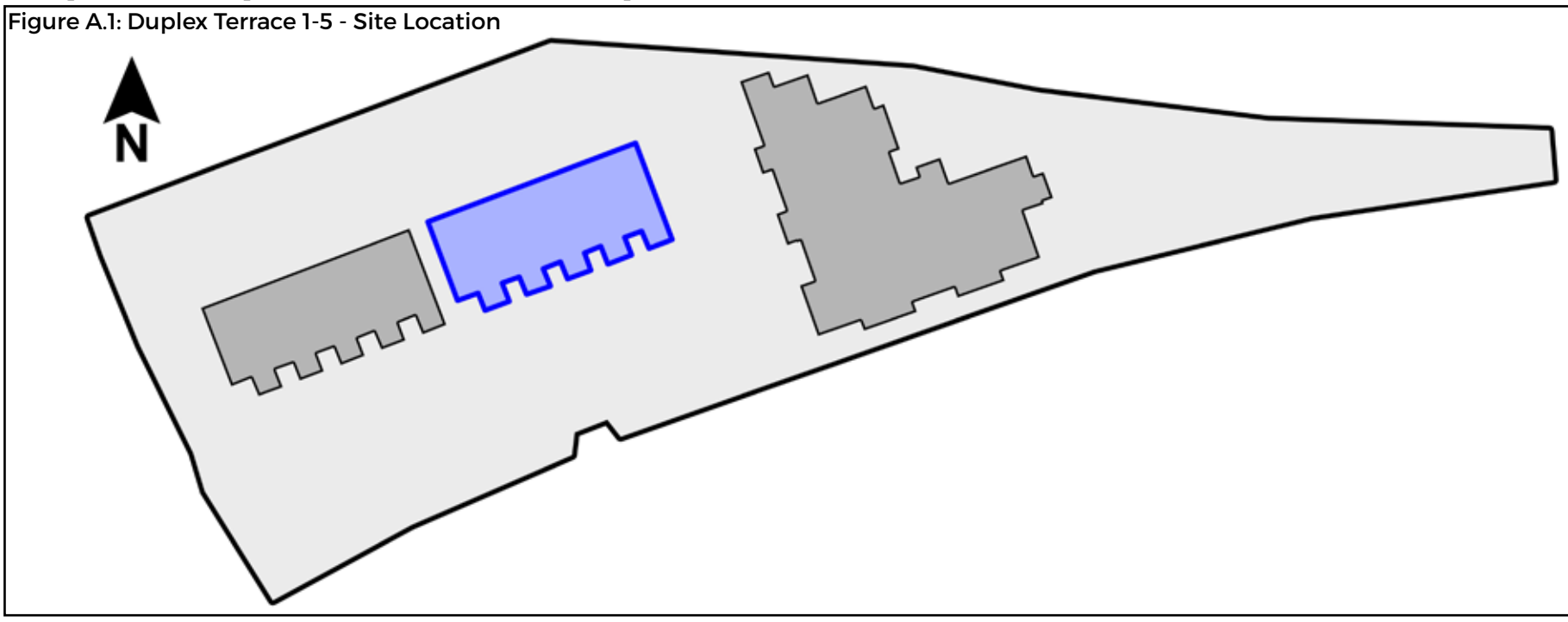


Figure A.2: Duplex Terrace 1-5 - Level 00

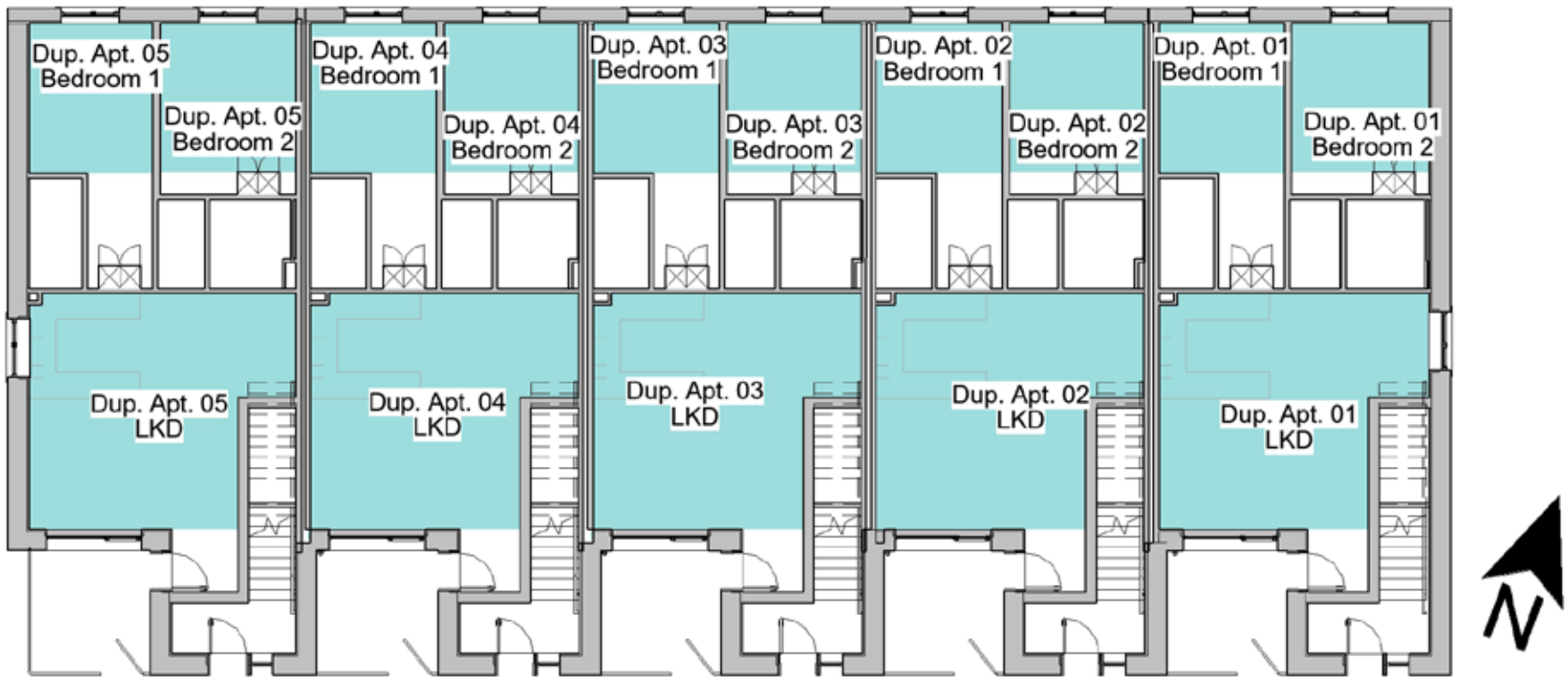
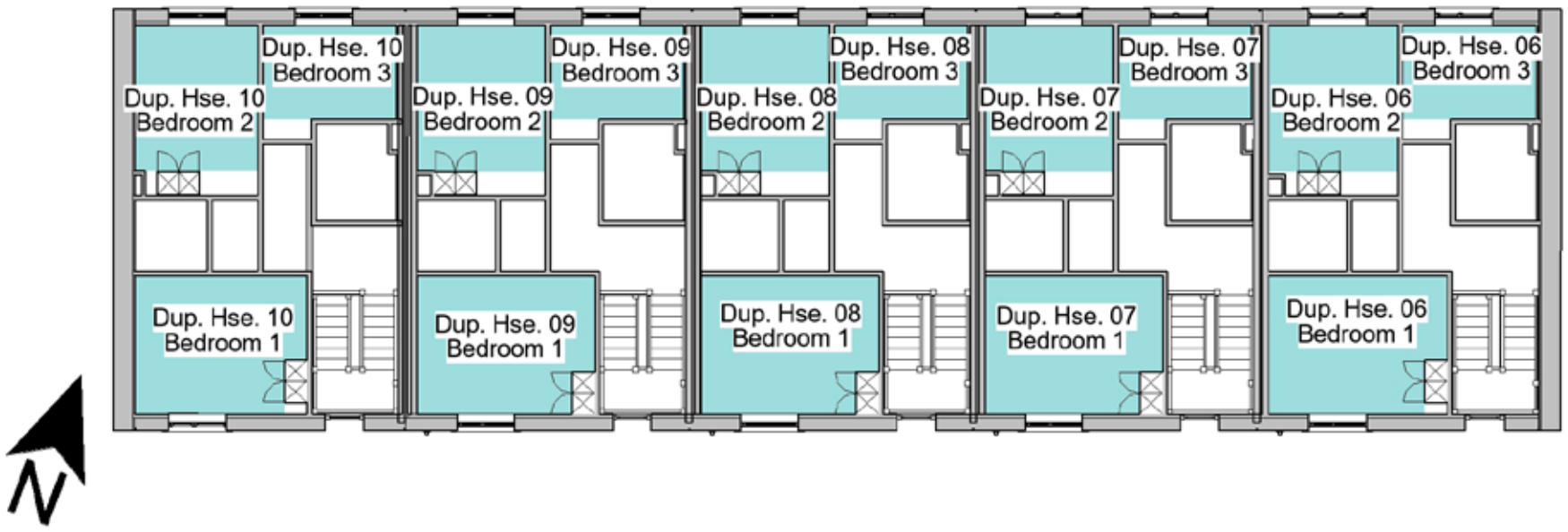


Figure A.3: Duplex Terrace 1-5 - Level 01

Figure A.4: Duplex Terrace 1-5 - Level 02



A.1.2 Proposed Duplex Floor Plans - Duplex Terrace 6-10

Figure A.5: Duplex Terrace 6-10 - Site Location

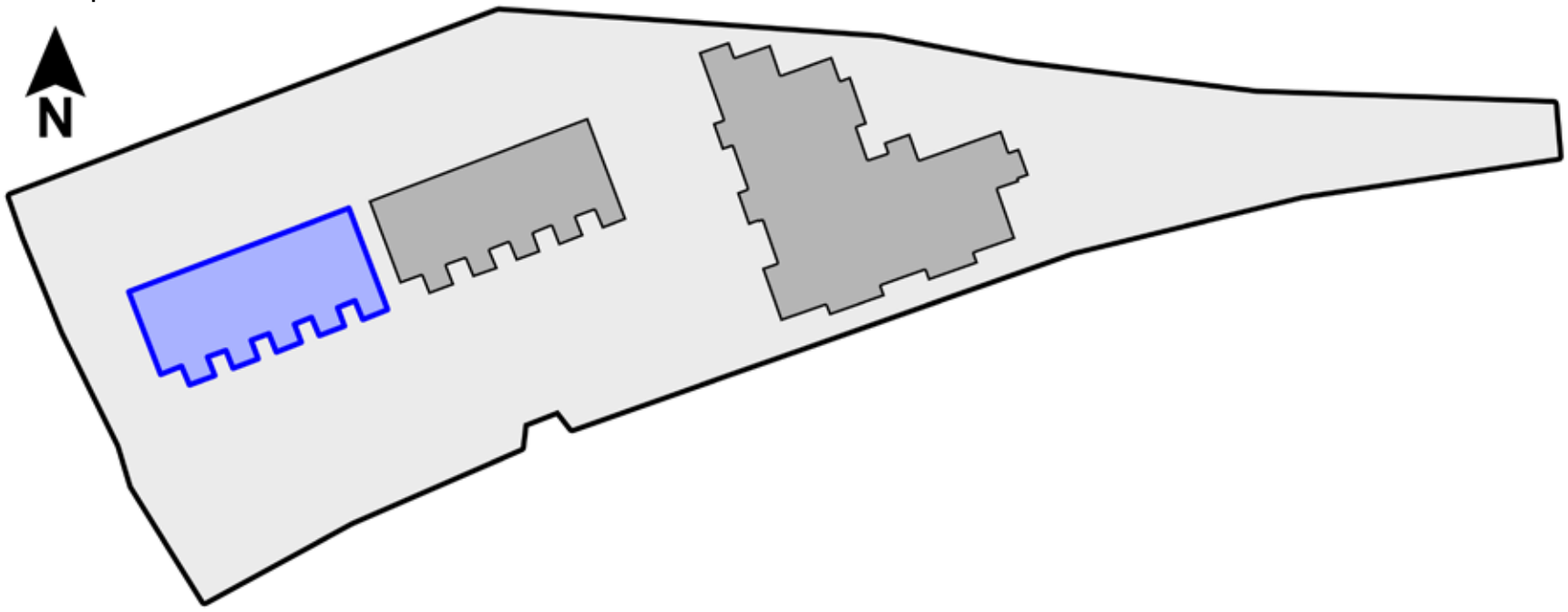


Figure A.6: Duplex Terrace 6-10 - Level 00

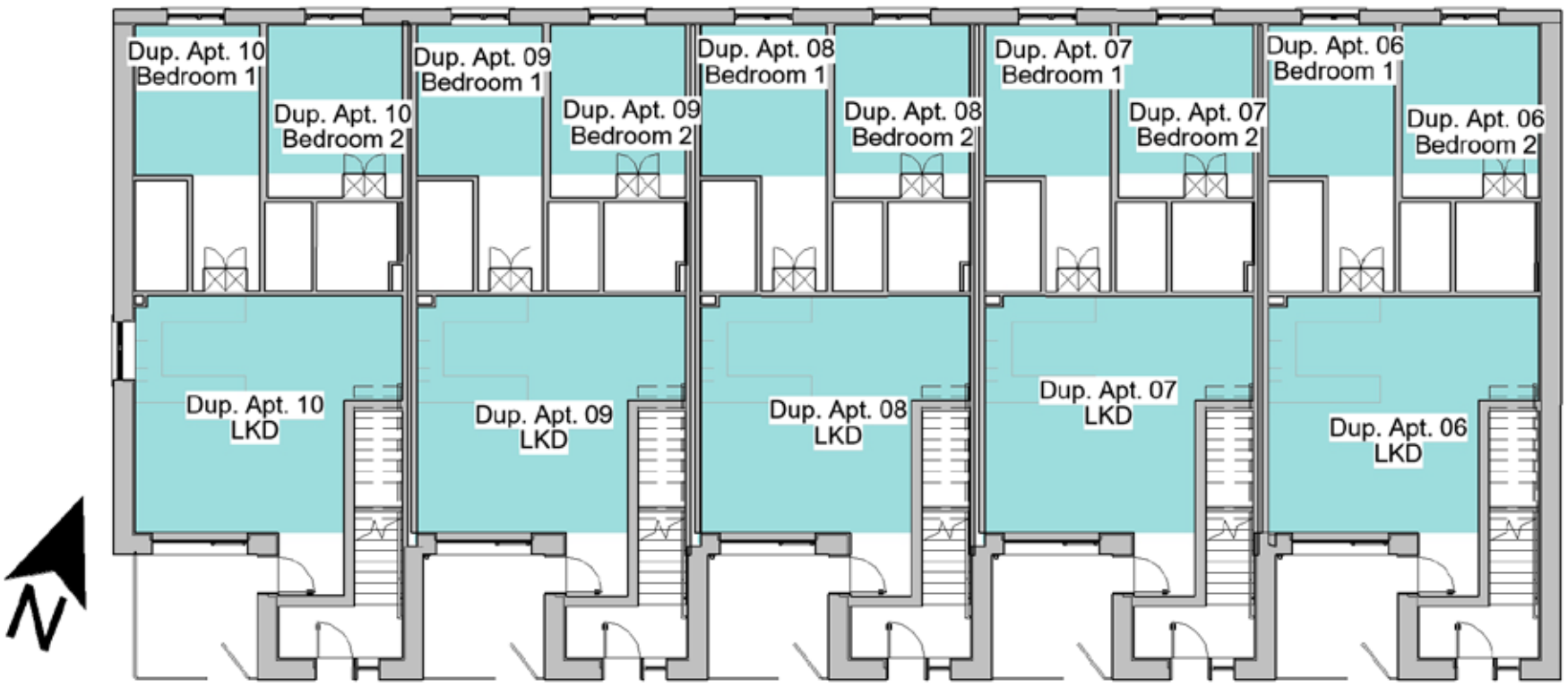


Figure A.7: Duplex Terrace 6-10 - Level 01

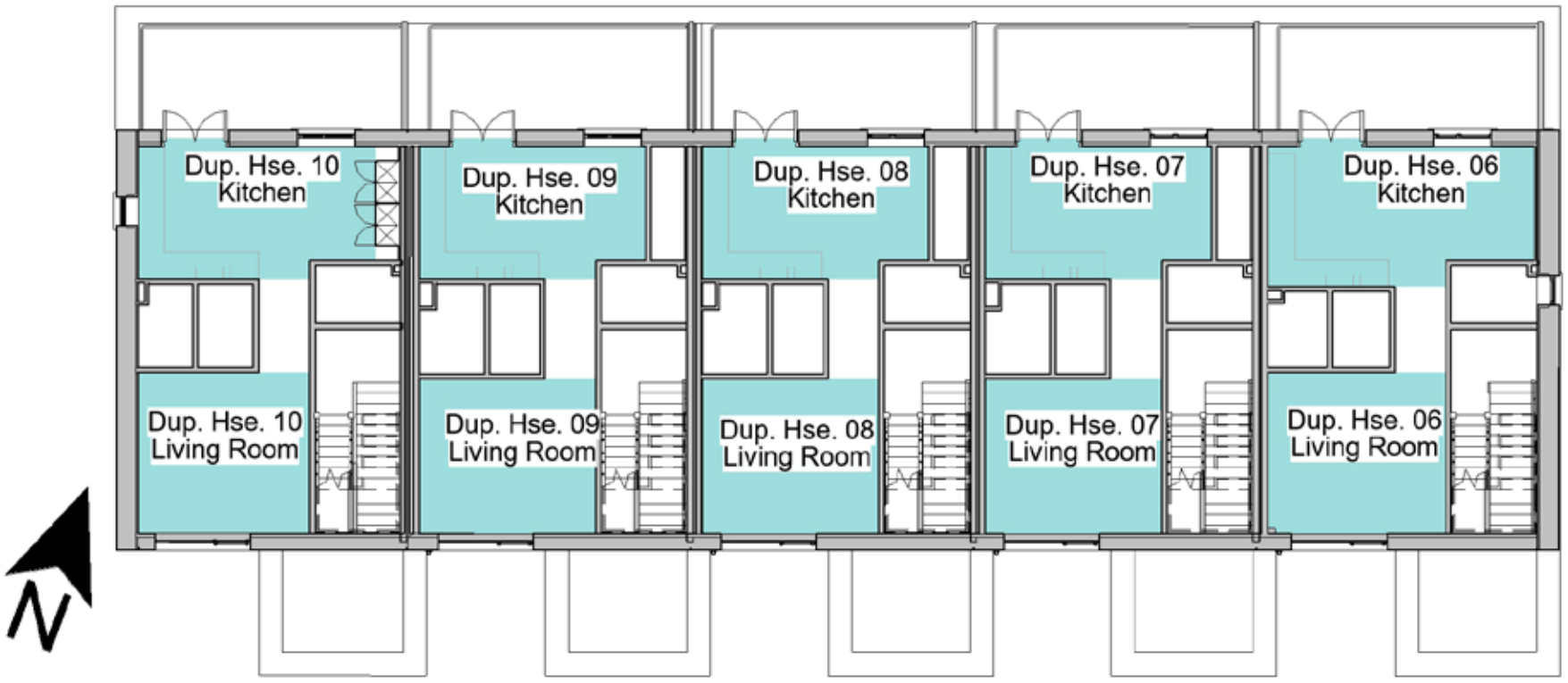
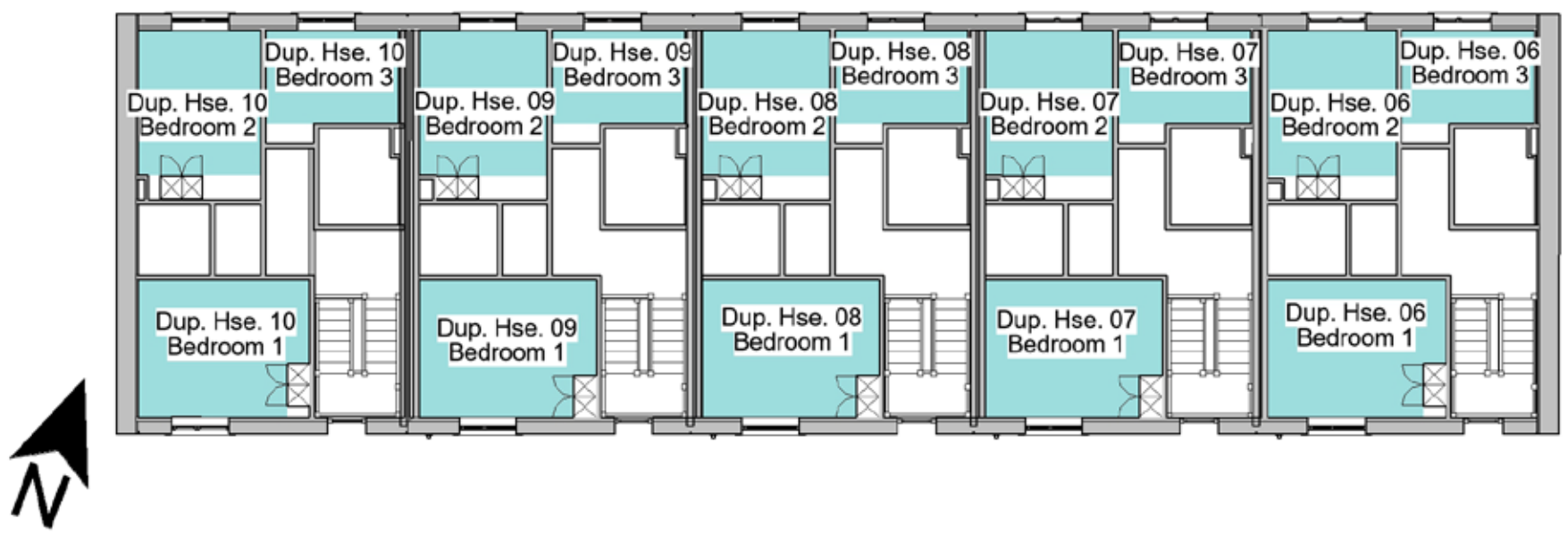


Figure A.8: Duplex Terrace 6-10 - Level 02



A.1.3 Proposed Apartment Block Floor Plans

Figure A.9: Apartment Block - Site Location

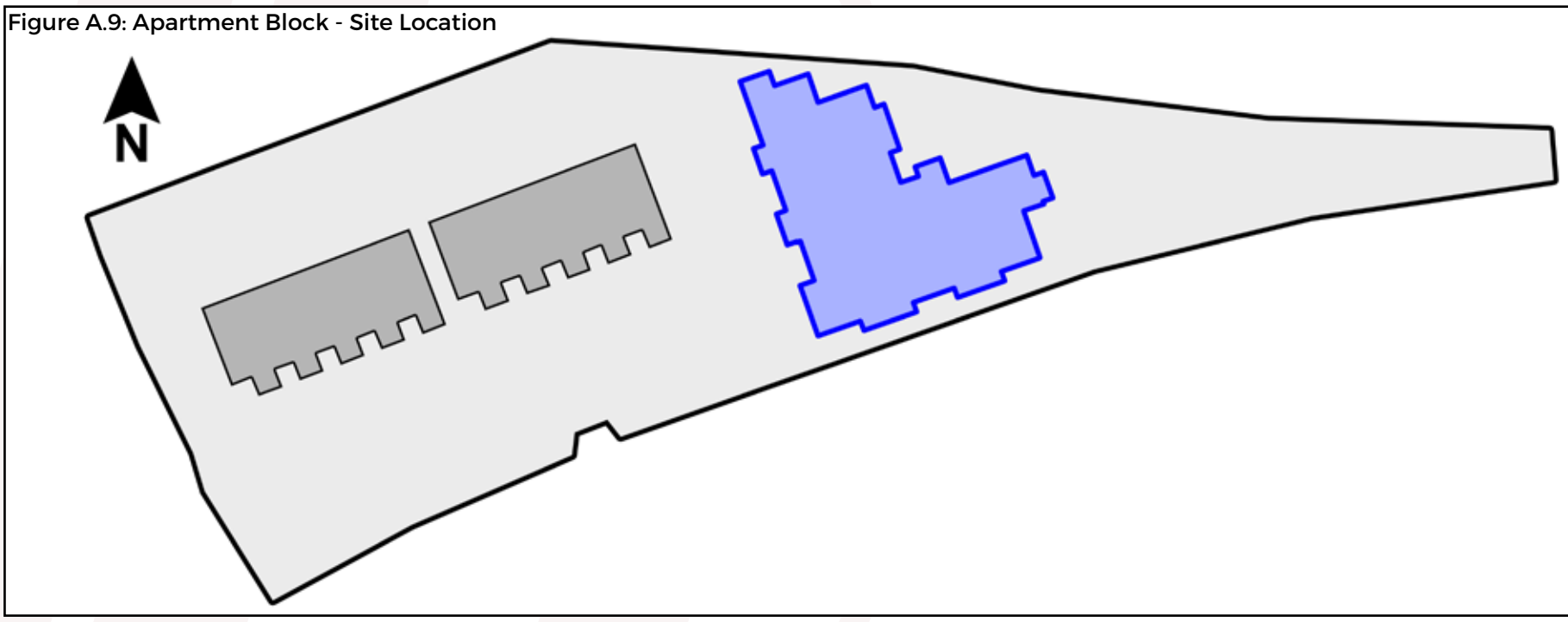


Figure A.10: Apartment Block - Level 00

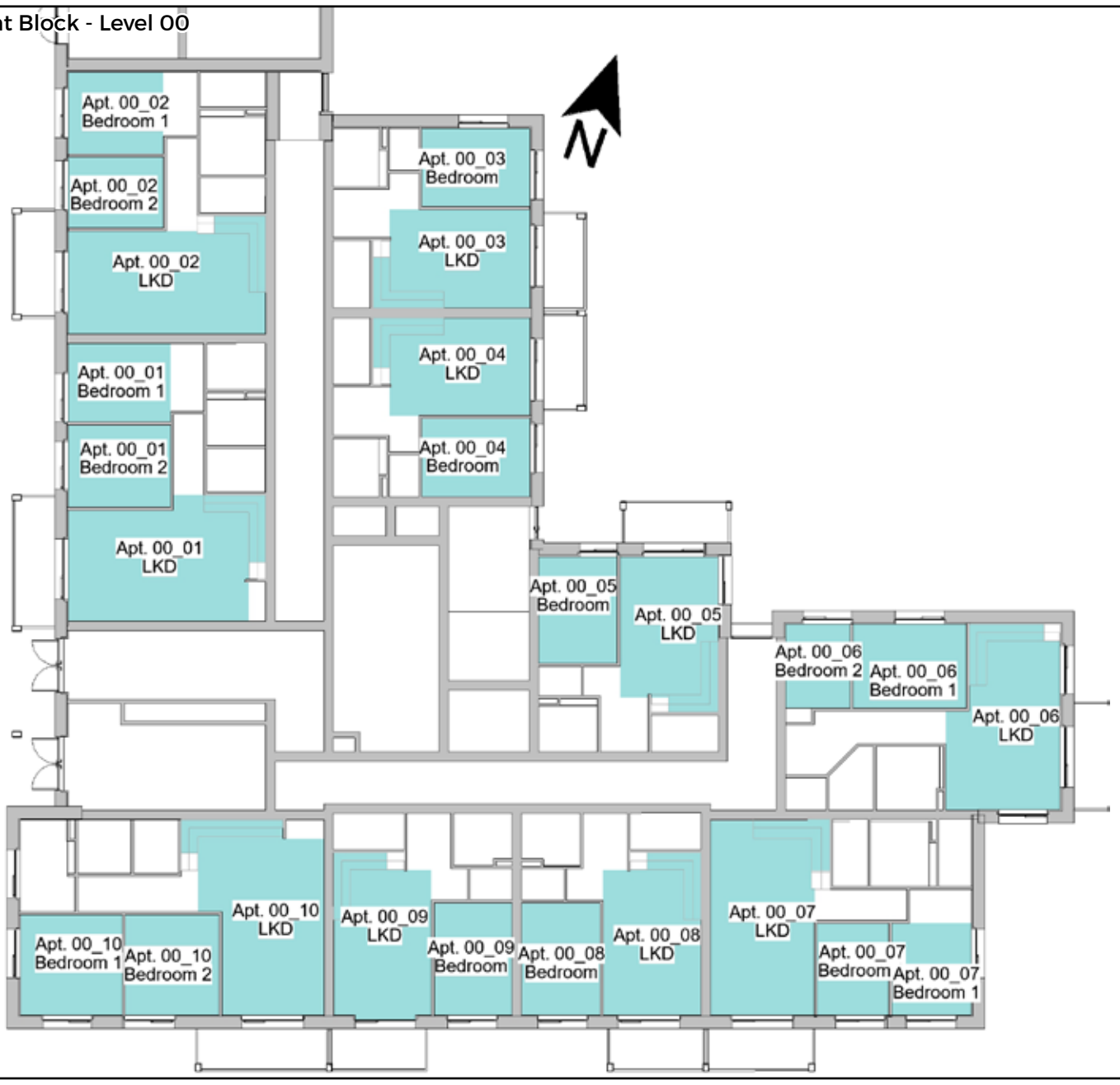


Figure A.11: Apartment Block - Level 01

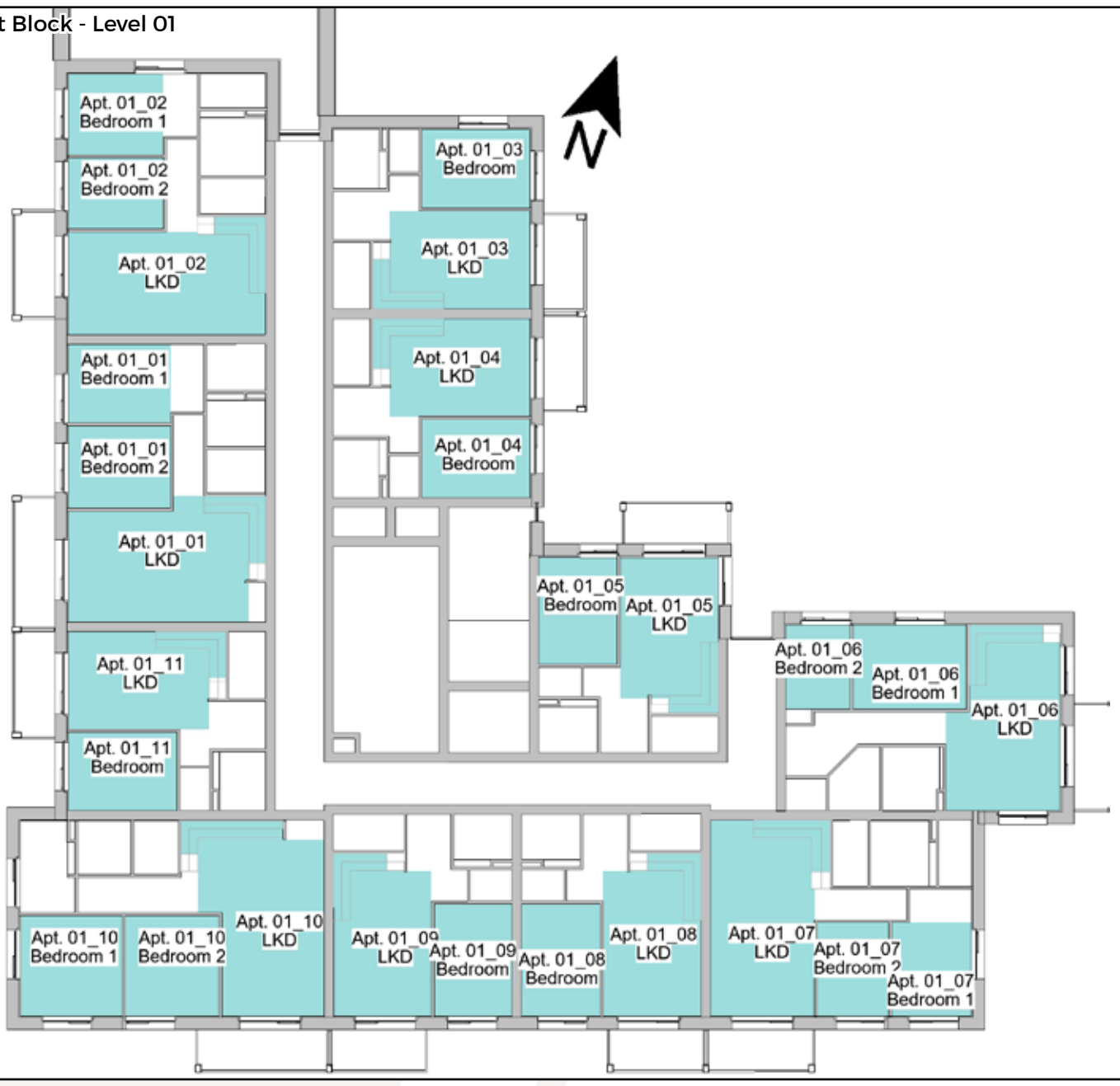


Figure A.12: Apartment Block - Level 02

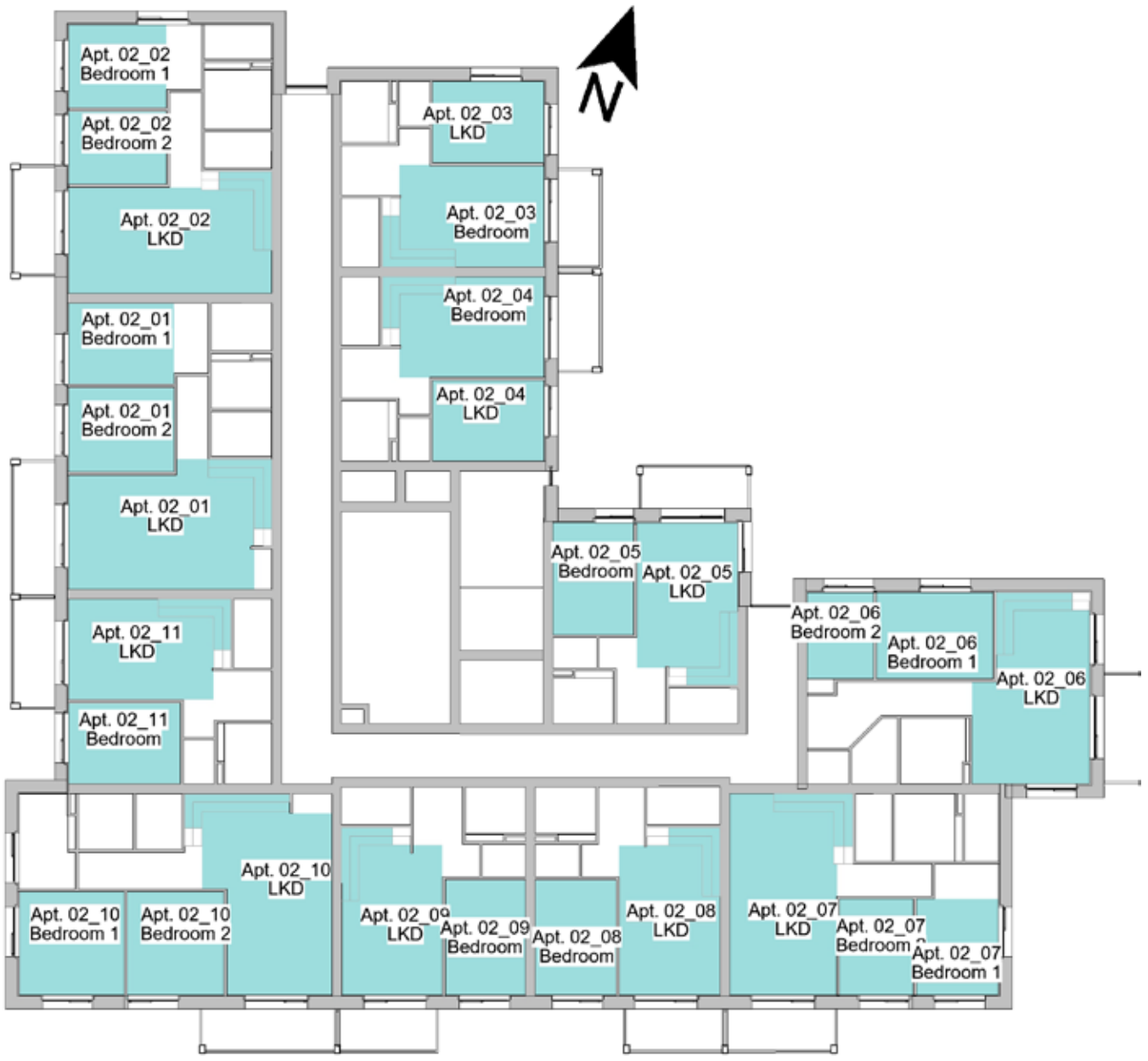


Figure A.13: Apartment Block - Level 03

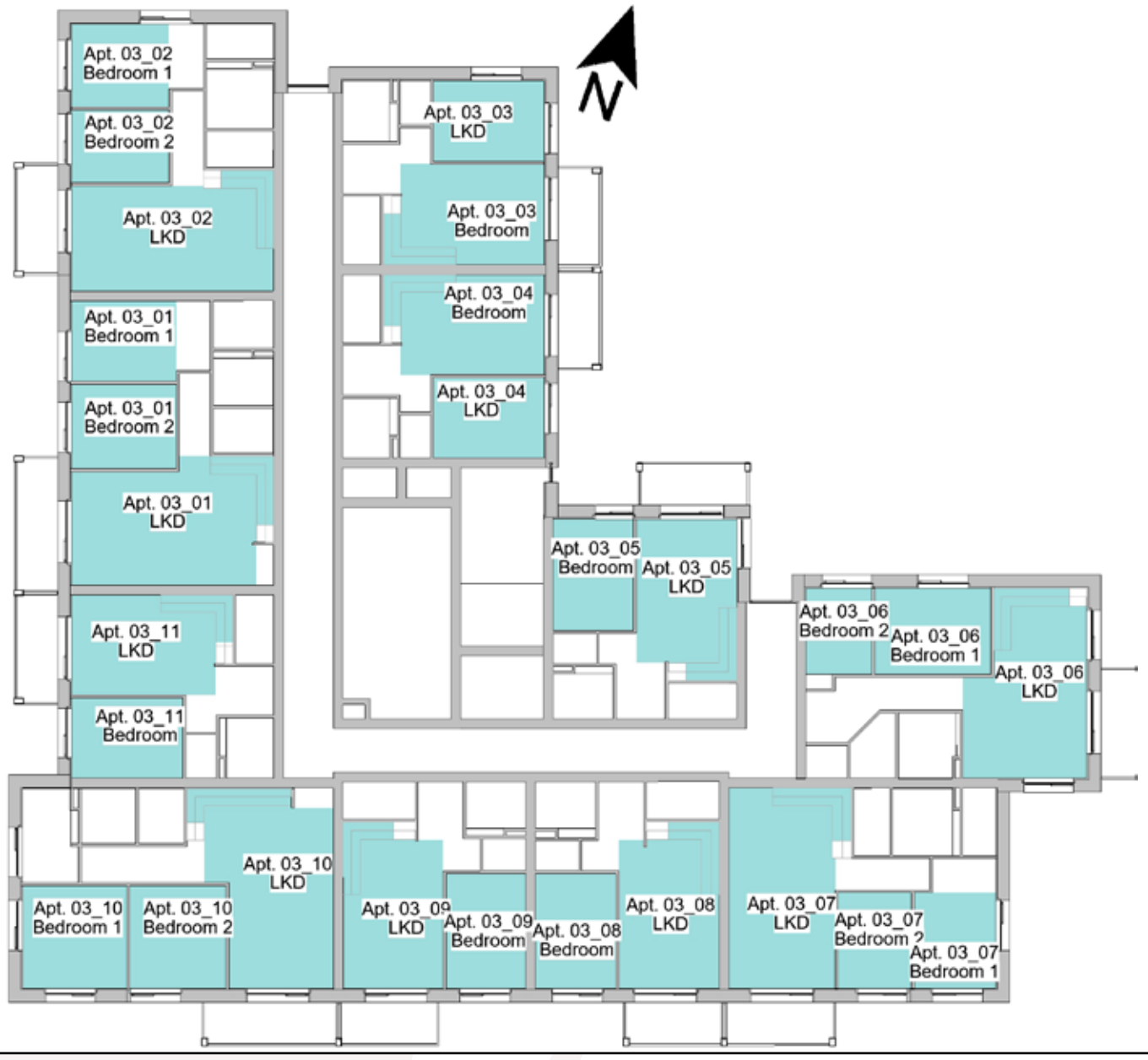


Figure A.14: Apartment Block - Level 04

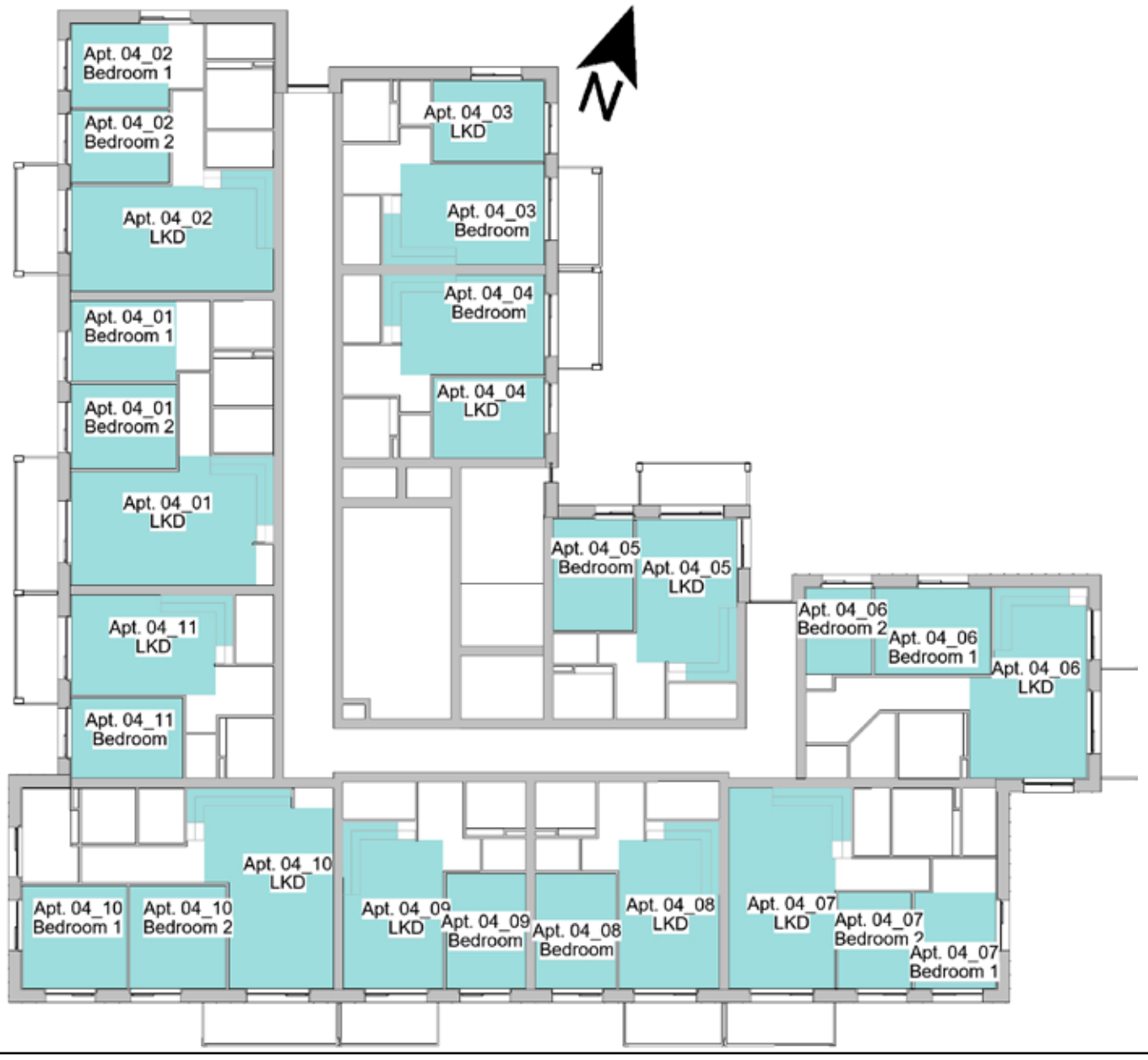


Figure A.15: Apartment Block - Level 05

A.2 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.2 - Scheme Performance SDA					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria
			Without Trees	With Trees	
A	**B**	**C**	**D**	**E**	**F**

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 in the unit has been assessed, e.g. bedroom, LKD, etc.

C: Target Lux

Under BR 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)

BR 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 (With Trees)

BR 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 the foliage of deciduous trees varied to account for summer and winter conditions, i.e. full leaf and bare branch.

F: Compliance with BR 209 Criteria

This column states if the assessed room achieves the recommended level of daylight as per BR 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'*.

Compliance rates will be stated for SDA, both with and without trees.

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

A.2.1 SDA Results: Duplex Apartments

Table No. A.2.1 - SDA Results: Duplex Apartments					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
Dup. Apt. 01	LKD	200	98%	94%	Compliant
Dup. Apt. 01	Bedroom 1	100	100%	100%	Compliant
Dup. Apt. 01	Bedroom 2	100	100%	100%	Compliant
Dup. Apt. 02	LKD	200	70%	36%	Trees affecting compliance
Dup. Apt. 02	Bedroom 1	100	100%	100%	Compliant
Dup. Apt. 02	Bedroom 2	100	100%	100%	Compliant
Dup. Apt. 03	LKD	200	71%	34%	Trees affecting compliance
Dup. Apt. 03	Bedroom 1	100	100%	100%	Compliant
Dup. Apt. 03	Bedroom 2	100	100%	100%	Compliant
Dup. Apt. 04	LKD	200	72%	37%	Trees affecting compliance
Dup. Apt. 04	Bedroom 1	100	100%	100%	Compliant
Dup. Apt. 04	Bedroom 2	100	100%	100%	Compliant
Dup. Apt. 05	LKD	200	96%	78%	Compliant
Dup. Apt. 05	Bedroom 1	100	100%	100%	Compliant
Dup. Apt. 05	Bedroom 2	100	100%	100%	Compliant
Dup. Apt. 06	LKD	200	76%	50%	Compliant
Dup. Apt. 06	Bedroom 1	100	100%	100%	Compliant
Dup. Apt. 06	Bedroom 2	100	100%	100%	Compliant
Dup. Apt. 07	LKD	200	72%	44%	Trees affecting compliance
Dup. Apt. 07	Bedroom 1	100	100%	99%	Compliant
Dup. Apt. 07	Bedroom 2	100	100%	100%	Compliant
Dup. Apt. 08	LKD	200	71%	46%	Trees affecting compliance
Dup. Apt. 08	Bedroom 1	100	100%	99%	Compliant
Dup. Apt. 08	Bedroom 2	100	100%	97%	Compliant
Dup. Apt. 09	LKD	200	70%	42%	Trees affecting compliance
Dup. Apt. 09	Bedroom 1	100	100%	99%	Compliant
Dup. Apt. 09	Bedroom 2	100	100%	100%	Compliant
Dup. Apt. 10	LKD	200	100%	74%	Compliant
Dup. Apt. 10	Bedroom 1	100	100%	96%	Compliant
Dup. Apt. 10	Bedroom 2	100	100%	98%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.

** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.

*** The SDA assessment without trees 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 within the proposed development.

The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 20.

For floor plans of the assessed units please refer to section A.1 on page 27.

A.2.2 SDA Results: Duplex Townhouses, Terrace 1-5

Table No. A.2.2 - SDA Results: Duplex Townhouses, Terrace 1-5					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
Dup. Hse. 01	Kitchen	200	100%	100%	Compliant
Dup. Hse. 01	Living Room	150	100%	100%	Compliant
Dup. Hse. 01	Bedroom 1	100	100%	100%	Compliant
Dup. Hse. 01	Bedroom 2	100	100%	100%	Compliant
Dup. Hse. 01	Bedroom 3	100	100%	100%	Compliant
Dup. Hse. 02	Kitchen	200	100%	100%	Compliant
Dup. Hse. 02	Living Room	150	100%	100%	Compliant
Dup. Hse. 02	Bedroom 1	100	100%	100%	Compliant
Dup. Hse. 02	Bedroom 2	100	100%	100%	Compliant
Dup. Hse. 02	Bedroom 3	100	100%	100%	Compliant
Dup. Hse. 03	Kitchen	200	100%	100%	Compliant
Dup. Hse. 03	Living Room	150	100%	100%	Compliant
Dup. Hse. 03	Bedroom 1	100	100%	100%	Compliant
Dup. Hse. 03	Bedroom 2	100	100%	100%	Compliant
Dup. Hse. 03	Bedroom 3	100	100%	100%	Compliant
Dup. Hse. 04	Kitchen	200	100%	100%	Compliant
Dup. Hse. 04	Living Room	150	100%	100%	Compliant
Dup. Hse. 04	Bedroom 1	100	100%	100%	Compliant
Dup. Hse. 04	Bedroom 2	100	100%	100%	Compliant
Dup. Hse. 04	Bedroom 3	100	100%	100%	Compliant
Dup. Hse. 05	Kitchen	200	100%	100%	Compliant
Dup. Hse. 05	Living Room	150	100%	100%	Compliant
Dup. Hse. 05	Bedroom 1	100	100%	100%	Compliant
Dup. Hse. 05	Bedroom 2	100	100%	100%	Compliant
Dup. Hse. 05	Bedroom 3	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.
*** The SDA assessment without trees 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 within the proposed development.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 20.
For floor plans of the assessed units please refer to section A.1 on page 27.

A.2.3 SDA Results: Duplex Townhouses, Terrace 6-10

Table No. A.2.3 - SDA Results: Duplex Townhouses, Terrace 6-10					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
Dup. Hse. 06	Kitchen	200	100%	100%	Compliant
Dup. Hse. 06	Living Room	150	100%	100%	Compliant
Dup. Hse. 06	Bedroom 1	100	100%	100%	Compliant
Dup. Hse. 06	Bedroom 2	100	100%	100%	Compliant
Dup. Hse. 06	Bedroom 3	100	100%	100%	Compliant
Dup. Hse. 07	Kitchen	200	100%	100%	Compliant
Dup. Hse. 07	Living Room	150	100%	100%	Compliant
Dup. Hse. 07	Bedroom 1	100	100%	100%	Compliant
Dup. Hse. 07	Bedroom 2	100	100%	100%	Compliant
Dup. Hse. 07	Bedroom 3	100	100%	100%	Compliant
Dup. Hse. 08	Kitchen	200	100%	100%	Compliant
Dup. Hse. 08	Living Room	150	100%	100%	Compliant
Dup. Hse. 08	Bedroom 1	100	100%	100%	Compliant
Dup. Hse. 08	Bedroom 2	100	100%	100%	Compliant
Dup. Hse. 08	Bedroom 3	100	100%	100%	Compliant
Dup. Hse. 09	Kitchen	200	100%	100%	Compliant
Dup. Hse. 09	Living Room	150	100%	100%	Compliant
Dup. Hse. 09	Bedroom 1	100	100%	100%	Compliant
Dup. Hse. 09	Bedroom 2	100	100%	100%	Compliant
Dup. Hse. 09	Bedroom 3	100	100%	100%	Compliant
Dup. Hse. 10	Kitchen	200	100%	100%	Compliant
Dup. Hse. 10	Living Room	150	100%	100%	Compliant
Dup. Hse. 10	Bedroom 1	100	100%	100%	Compliant
Dup. Hse. 10	Bedroom 2	100	100%	100%	Compliant
Dup. Hse. 10	Bedroom 3	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.
*** The SDA assessment without trees 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 within the proposed development.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 20.
For floor plans of the assessed units please refer to section A.1 on page 27.

A.2.4 SDA Results: Apartment Block, Level 00

Table No. A.2.4 - SDA Results: Apartment Block, Level 00					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
Apt. 00_01	LKD	200	62%	54%	Compliant
Apt. 00_01	Bedroom 1	100	100%	100%	Compliant
Apt. 00_01	Bedroom 2	100	100%	100%	Compliant
Apt. 00_02	LKD	200	54%	50%	Compliant
Apt. 00_02	Bedroom 1	100	100%	100%	Compliant
Apt. 00_02	Bedroom 2	100	100%	100%	Compliant
Apt. 00_03	LKD	200	73%	60%	Compliant
Apt. 00_03	Bedroom	100	100%	100%	Compliant
Apt. 00_04	LKD	200	63%	56%	Compliant
Apt. 00_04	Bedroom	100	100%	100%	Compliant
Apt. 00_05	LKD	200	79%	72%	Compliant
Apt. 00_05	Bedroom	100	90%	70%	Compliant
Apt. 00_06	LKD	200	100%	100%	Compliant
Apt. 00_06	Bedroom 1	100	100%	100%	Compliant
Apt. 00_06	Bedroom 2	100	100%	100%	Compliant
Apt. 00_07	LKD	200	77%	67%	Compliant
Apt. 00_07	Bedroom 1	100	100%	100%	Compliant
Apt. 00_07	Bedroom 2	100	100%	100%	Compliant
Apt. 00_08	LKD	200	99%	94%	Compliant
Apt. 00_08	Bedroom	100	100%	100%	Compliant
Apt. 00_09	LKD	200	98%	89%	Compliant
Apt. 00_09	Bedroom	100	100%	100%	Compliant
Apt. 00_10	LKD	200	70%	60%	Compliant
Apt. 00_10	Bedroom 1	100	100%	100%	Compliant
Apt. 00_10	Bedroom 2	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.
*** The SDA assessment without trees 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 within the proposed development.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 20.
For floor plans of the assessed units please refer to section A.1 on page 27.

A.2.5 SDA Results: Apartment Block, Level 01

Table No. A.2.5 - SDA Results: Apartment Block, Level 01					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
Apt. 01_01	LKD	200	67%	61%	Compliant
Apt. 01_01	Bedroom 1	100	100%	100%	Compliant
Apt. 01_01	Bedroom 2	100	100%	100%	Compliant
Apt. 01_02	LKD	200	58%	54%	Compliant
Apt. 01_02	Bedroom 1	100	100%	100%	Compliant
Apt. 01_02	Bedroom 2	100	100%	100%	Compliant
Apt. 01_03	LKD	200	85%	67%	Compliant
Apt. 01_03	Bedroom	100	100%	100%	Compliant
Apt. 01_04	LKD	200	72%	68%	Compliant
Apt. 01_04	Bedroom	100	100%	100%	Compliant
Apt. 01_05	LKD	200	91%	84%	Compliant
Apt. 01_05	Bedroom	100	98%	97%	Compliant
Apt. 01_06	LKD	200	100%	100%	Compliant
Apt. 01_06	Bedroom 1	100	100%	100%	Compliant
Apt. 01_06	Bedroom 2	100	100%	100%	Compliant
Apt. 01_07	LKD	200	86%	81%	Compliant
Apt. 01_07	Bedroom 1	100	100%	100%	Compliant
Apt. 01_07	Bedroom 2	100	100%	100%	Compliant
Apt. 01_08	LKD	200	100%	100%	Compliant
Apt. 01_08	Bedroom	100	100%	100%	Compliant
Apt. 01_09	LKD	200	100%	100%	Compliant
Apt. 01_09	Bedroom	100	100%	100%	Compliant
Apt. 01_10	LKD	200	82%	80%	Compliant
Apt. 01_10	Bedroom 1	100	100%	100%	Compliant
Apt. 01_10	Bedroom 2	100	100%	100%	Compliant
Apt. 01_11	LKD	200	99%	91%	Compliant
Apt. 01_11	Bedroom	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.
*** The SDA assessment without trees 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 within the proposed development.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 20.
For floor plans of the assessed units please refer to section A.1 on page 27.

A.2.6 SDA Results: Apartment Block, Level 02

Table No. A.2.6 - SDA Results: Apartment Block, Level 02					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
Apt. 02_01	LKD	200	78%	71%	Compliant
Apt. 02_01	Bedroom 1	100	100%	100%	Compliant
Apt. 02_01	Bedroom 2	100	100%	100%	Compliant
Apt. 02_02	LKD	200	65%	64%	Compliant
Apt. 02_02	Bedroom 1	100	100%	100%	Compliant
Apt. 02_02	Bedroom 2	100	100%	100%	Compliant
Apt. 02_03	LKD	200	100%	100%	Compliant
Apt. 02_03	Bedroom	100	100%	100%	Compliant
Apt. 02_04	LKD	200	100%	100%	Compliant
Apt. 02_04	Bedroom	100	100%	100%	Compliant
Apt. 02_05	LKD	200	95%	91%	Compliant
Apt. 02_05	Bedroom	100	99%	99%	Compliant
Apt. 02_06	LKD	200	100%	100%	Compliant
Apt. 02_06	Bedroom 1	100	100%	100%	Compliant
Apt. 02_06	Bedroom 2	100	100%	100%	Compliant
Apt. 02_07	LKD	200	91%	90%	Compliant
Apt. 02_07	Bedroom 1	100	100%	100%	Compliant
Apt. 02_07	Bedroom 2	100	100%	100%	Compliant
Apt. 02_08	LKD	200	100%	100%	Compliant
Apt. 02_08	Bedroom	100	100%	100%	Compliant
Apt. 02_09	LKD	200	100%	100%	Compliant
Apt. 02_09	Bedroom	100	100%	100%	Compliant
Apt. 02_10	LKD	200	86%	85%	Compliant
Apt. 02_10	Bedroom 1	100	100%	100%	Compliant
Apt. 02_10	Bedroom 2	100	100%	100%	Compliant
Apt. 02_11	LKD	200	100%	97%	Compliant
Apt. 02_11	Bedroom	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.
*** The SDA assessment without trees 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 within the proposed development.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 20.
For floor plans of the assessed units please refer to section A.1 on page 27.

A.2.7 SDA Results: Apartment Block, Level 03

Table No. A.2.7 - SDA Results: Apartment Block, Level 03					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
Apt. 03_01	LKD	200	82%	81%	Compliant
Apt. 03_01	Bedroom 1	100	100%	100%	Compliant
Apt. 03_01	Bedroom 2	100	100%	100%	Compliant
Apt. 03_02	LKD	200	72%	68%	Compliant
Apt. 03_02	Bedroom 1	100	100%	100%	Compliant
Apt. 03_02	Bedroom 2	100	100%	100%	Compliant
Apt. 03_03	LKD	200	100%	100%	Compliant
Apt. 03_03	Bedroom	100	100%	100%	Compliant
Apt. 03_04	LKD	200	100%	100%	Compliant
Apt. 03_04	Bedroom	100	100%	100%	Compliant
Apt. 03_05	LKD	200	97%	95%	Compliant
Apt. 03_05	Bedroom	100	100%	99%	Compliant
Apt. 03_06	LKD	200	100%	100%	Compliant
Apt. 03_06	Bedroom 1	100	100%	100%	Compliant
Apt. 03_06	Bedroom 2	100	100%	100%	Compliant
Apt. 03_07	LKD	200	93%	92%	Compliant
Apt. 03_07	Bedroom 1	100	100%	100%	Compliant
Apt. 03_07	Bedroom 2	100	100%	100%	Compliant
Apt. 03_08	LKD	200	100%	100%	Compliant
Apt. 03_08	Bedroom	100	100%	100%	Compliant
Apt. 03_09	LKD	200	100%	100%	Compliant
Apt. 03_09	Bedroom	100	100%	100%	Compliant
Apt. 03_10	LKD	200	88%	87%	Compliant
Apt. 03_10	Bedroom 1	100	100%	100%	Compliant
Apt. 03_10	Bedroom 2	100	100%	100%	Compliant
Apt. 03_11	LKD	200	100%	100%	Compliant
Apt. 03_11	Bedroom	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.
*** The SDA assessment without trees 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 within the proposed development.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 20.
For floor plans of the assessed units please refer to section A.1 on page 27.

A.2.8 SDA Results: Apartment Block, Level 04

Table No. A.2.8 - SDA Results: Apartment Block, Level 04					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
Apt. 04_01	LKD	200	86%	83%	Compliant
Apt. 04_01	Bedroom 1	100	100%	100%	Compliant
Apt. 04_01	Bedroom 2	100	100%	100%	Compliant
Apt. 04_02	LKD	200	81%	74%	Compliant
Apt. 04_02	Bedroom 1	100	100%	100%	Compliant
Apt. 04_02	Bedroom 2	100	100%	100%	Compliant
Apt. 04_03	LKD	200	100%	100%	Compliant
Apt. 04_03	Bedroom	100	100%	100%	Compliant
Apt. 04_04	LKD	200	100%	100%	Compliant
Apt. 04_04	Bedroom	100	100%	100%	Compliant
Apt. 04_05	LKD	200	98%	98%	Compliant
Apt. 04_05	Bedroom	100	100%	100%	Compliant
Apt. 04_06	LKD	200	100%	100%	Compliant
Apt. 04_06	Bedroom 1	100	100%	100%	Compliant
Apt. 04_06	Bedroom 2	100	100%	100%	Compliant
Apt. 04_07	LKD	200	96%	96%	Compliant
Apt. 04_07	Bedroom 1	100	100%	100%	Compliant
Apt. 04_07	Bedroom 2	100	100%	100%	Compliant
Apt. 04_08	LKD	200	100%	100%	Compliant
Apt. 04_08	Bedroom	100	100%	100%	Compliant
Apt. 04_09	LKD	200	100%	100%	Compliant
Apt. 04_09	Bedroom	100	100%	100%	Compliant
Apt. 04_10	LKD	200	93%	93%	Compliant
Apt. 04_10	Bedroom 1	100	100%	100%	Compliant
Apt. 04_10	Bedroom 2	100	100%	100%	Compliant
Apt. 04_11	LKD	200	100%	100%	Compliant
Apt. 04_11	Bedroom	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.
*** The SDA assessment without trees 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 within the proposed development.
The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 20.
For floor plans of the assessed units please refer to section A.1 on page 27.

A.2.9 SDA Results: Apartment Block, Level 05

Table No. A.2.9 - SDA Results: Apartment Block, Level 05					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
Apt. 05_01	LKD	200	94%	91%	Compliant
Apt. 05_01	Bedroom 1	100	100%	100%	Compliant
Apt. 05_01	Bedroom 2	100	100%	100%	Compliant
Apt. 05_02	LKD	200	95%	93%	Compliant
Apt. 05_02	Bedroom 1	100	100%	100%	Compliant
Apt. 05_02	Bedroom 2	100	100%	100%	Compliant
Apt. 05_03	LKD	200	100%	100%	Compliant
Apt. 05_03	Bedroom	100	100%	100%	Compliant
Apt. 05_04	LKD	200	100%	100%	Compliant
Apt. 05_04	Bedroom	100	100%	100%	Compliant
Apt. 05_05	LKD	200	99%	99%	Compliant
Apt. 05_05	Bedroom 1	100	100%	100%	Compliant
Apt. 05_05	Bedroom 2	100	100%	100%	Compliant
Apt. 05_06	LKD	200	97%	95%	Compliant
Apt. 05_06	Bedroom 1	100	100%	100%	Compliant
Apt. 05_06	Bedroom 2	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.

** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.

*** The SDA assessment without trees 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 within the proposed development.

The SDA circa compliance rates across the entire scheme can be found in section 5.1.1 on page 20.

For floor plans of the assessed units please refer to section A.1 on page 27.

A.3 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.3 - 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)

BR 209 recommends a minimum sunlight exposure of 1.5 hours for a proposed unit with preference given to main living rooms. BR 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: *Below minimum*,
- 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 the assessment date. 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 unit compliance will be stated for the best performing room per unit only, with lesser performing rooms indicated with a dash (-).

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)

BR 209 recommends a minimum sunlight exposure of 1.5 hours for a proposed unit with preference given to main living rooms. BR 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 (-).

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

A.3.1 SE Results: Duplex Apartments

Table No. A.3.1 - Sunlight Exposure Results: Duplex Apartments							
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**
Dup. Apt. 01	LKD	3.20	Medium	Compliant	3.20	Medium	Compliant
Dup. Apt. 01	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 01	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 02	LKD	0.80	Below Minimum	Non-Compliant	2.70	Minimum	Compliant
Dup. Apt. 02	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 02	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 03	LKD	2.20	Minimum	Compliant	2.70	Minimum	Compliant
Dup. Apt. 03	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 03	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 04	LKD	2.40	Minimum	Compliant	2.70	Minimum	Compliant
Dup. Apt. 04	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 04	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 05	LKD	5.40	High	Compliant	5.40	High	Compliant
Dup. Apt. 05	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 05	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 06	LKD	2.70	Minimum	Compliant	2.70	Minimum	Compliant
Dup. Apt. 06	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 06	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 07	LKD	2.70	Minimum	Compliant	2.70	Minimum	Compliant
Dup. Apt. 07	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 07	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 08	LKD	2.70	Minimum	Compliant	2.70	Minimum	Compliant
Dup. Apt. 08	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 08	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 09	LKD	2.40	Minimum	Compliant	2.70	Minimum	Compliant
Dup. Apt. 09	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 09	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 10	LKD	4.30	High	Compliant	6.50	High	Compliant
Dup. Apt. 10	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Apt. 10	Bedroom 2	0.00	Below Minimum	-	0.00	Below 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 can be found in section 5.1.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 10.

For floor plans of the assessed units please refer to section A.1 on page 27.

A.3.2 SE Results: Duplex Townhouses, Terrace 1-5

Table No. A.3.2 - Sunlight Exposure Results: Duplex Townhouses, Terrace 1-5

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**
Dup. Hse. 01	Kitchen	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 01	Living Room	6.90	High	-	6.90	High	-
Dup. Hse. 01	Bedroom 1	7.20	High	Compliant	7.20	High	Compliant
Dup. Hse. 01	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 01	Bedroom 3	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 02	Kitchen	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 02	Living Room	7.40	High	-	7.40	High	-
Dup. Hse. 02	Bedroom 1	7.50	High	Compliant	7.50	High	Compliant
Dup. Hse. 02	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 02	Bedroom 3	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 03	Kitchen	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 03	Living Room	7.30	High	-	7.90	High	Compliant
Dup. Hse. 03	Bedroom 1	7.80	High	Compliant	7.80	High	-
Dup. Hse. 03	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 03	Bedroom 3	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 04	Kitchen	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 04	Living Room	7.10	High	-	7.90	High	Compliant
Dup. Hse. 04	Bedroom 1	7.80	High	Compliant	7.80	High	-
Dup. Hse. 04	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 04	Bedroom 3	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 05	Kitchen	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 05	Living Room	7.90	High	Compliant	8.10	High	Compliant
Dup. Hse. 05	Bedroom 1	7.80	High	-	7.80	High	-
Dup. Hse. 05	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 05	Bedroom 3	0.00	Below Minimum	-	0.00	Below 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 can be found in section 5.1.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 10.

For floor plans of the assessed units please refer to section A.1 on page 27.

A.3.3 SE Results: Duplex Townhouses, Terrace 6-10

Table No. A.3.3 - Sunlight Exposure Results: Duplex Townhouses, Terrace 6-10							
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**
Dup. Hse. 06	Kitchen	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 06	Living Room	7.90	High	Compliant	7.90	High	Compliant
Dup. Hse. 06	Bedroom 1	7.80	High	-	7.80	High	-
Dup. Hse. 06	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 06	Bedroom 3	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 07	Kitchen	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 07	Living Room	7.90	High	Compliant	7.90	High	Compliant
Dup. Hse. 07	Bedroom 1	7.80	High	-	7.80	High	-
Dup. Hse. 07	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 07	Bedroom 3	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 08	Kitchen	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 08	Living Room	7.70	High	-	7.90	High	Compliant
Dup. Hse. 08	Bedroom 1	7.80	High	Compliant	7.80	High	-
Dup. Hse. 08	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 08	Bedroom 3	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 09	Kitchen	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 09	Living Room	7.00	High	-	7.90	High	Compliant
Dup. Hse. 09	Bedroom 1	7.40	High	Compliant	7.80	High	-
Dup. Hse. 09	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 09	Bedroom 3	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 10	Kitchen	2.10	Minimum	-	4.20	High	-
Dup. Hse. 10	Living Room	6.20	High	-	8.10	High	Compliant
Dup. Hse. 10	Bedroom 1	6.30	High	Compliant	7.80	High	-
Dup. Hse. 10	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Dup. Hse. 10	Bedroom 3	0.00	Below Minimum	-	0.00	Below 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 can be found in section 5.1.2 on page 21.
*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 10.
For floor plans of the assessed units please refer to section A.1 on page 27.

A.3.4 SE Results: Apartment Block, Level 00

Table No. A.3.4 - Sunlight Exposure Results: Apartment Block, Level 00							
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. 00_01	LKD	3.50	Medium	-	3.50	Medium	-
Apt. 00_01	Bedroom 1	4.10	High	Compliant	4.10	High	Compliant
Apt. 00_01	Bedroom 2	2.50	Minimum	-	2.90	Minimum	-
Apt. 00_02	LKD	3.10	Medium	Compliant	3.10	Medium	Compliant
Apt. 00_02	Bedroom 1	2.80	Minimum	-	2.80	Minimum	-
Apt. 00_02	Bedroom 2	1.40	Below Minimum	-	1.40	Below Minimum	-
Apt. 00_03	LKD	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 00_03	Bedroom	0.10	Below Minimum	Non-Compliant	0.10	Below Minimum	Non-Compliant
Apt. 00_04	LKD	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
Apt. 00_04	Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 00_05	LKD	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
Apt. 00_05	Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 00_06	LKD	4.00	High	Compliant	4.20	High	Compliant
Apt. 00_06	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 00_06	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 00_07	LKD	5.20	High	-	5.60	High	-
Apt. 00_07	Bedroom 1	7.30	High	Compliant	7.30	High	Compliant
Apt. 00_07	Bedroom 2	6.00	High	-	6.00	High	-
Apt. 00_08	LKD	6.80	High	Compliant	6.80	High	-
Apt. 00_08	Bedroom	6.40	High	-	7.00	High	Compliant
Apt. 00_09	LKD	5.20	High	-	6.10	High	-
Apt. 00_09	Bedroom	6.10	High	Compliant	6.40	High	Compliant
Apt. 00_10	LKD	6.30	High	-	6.70	High	-
Apt. 00_10	Bedroom 1	7.60	High	Compliant	9.30	High	Compliant
Apt. 00_10	Bedroom 2	6.40	High	-	6.90	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 can be found in section 5.1.2 on page 21.
*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 10.
For floor plans of the assessed units please refer to section A.1 on page 27.

A.3.5 SE Results: Apartment Block, Level 01

Table No. A.3.5 - Sunlight Exposure Results: Apartment Block, Level 01							
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. 01_01	LKD	2.90	Minimum	-	2.90	Minimum	-
Apt. 01_01	Bedroom 1	4.30	High	Compliant	4.30	High	Compliant
Apt. 01_01	Bedroom 2	2.40	Minimum	-	2.40	Minimum	-
Apt. 01_02	LKD	2.30	Minimum	-	2.30	Minimum	-
Apt. 01_02	Bedroom 1	4.20	High	Compliant	4.20	High	Compliant
Apt. 01_02	Bedroom 2	1.40	Below Minimum	-	1.40	Below Minimum	-
Apt. 01_03	LKD	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 01_03	Bedroom	0.10	Below Minimum	Non-Compliant	0.10	Below Minimum	Non-Compliant
Apt. 01_04	LKD	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
Apt. 01_04	Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 01_05	LKD	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
Apt. 01_05	Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 01_06	LKD	4.20	High	Compliant	4.20	High	Compliant
Apt. 01_06	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 01_06	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 01_07	LKD	4.20	High	-	4.20	High	-
Apt. 01_07	Bedroom 1	7.40	High	Compliant	7.40	High	Compliant
Apt. 01_07	Bedroom 2	5.80	High	-	5.80	High	-
Apt. 01_08	LKD	6.00	High	-	6.00	High	-
Apt. 01_08	Bedroom	6.90	High	Compliant	6.90	High	Compliant
Apt. 01_09	LKD	4.70	High	-	4.70	High	-
Apt. 01_09	Bedroom	5.90	High	Compliant	5.90	High	Compliant
Apt. 01_10	LKD	4.60	High	-	4.60	High	-
Apt. 01_10	Bedroom 1	9.40	High	Compliant	9.40	High	Compliant
Apt. 01_10	Bedroom 2	7.00	High	-	7.00	High	-
Apt. 01_11	LKD	2.90	Minimum	Compliant	2.90	Minimum	Compliant
Apt. 01_11	Bedroom	2.80	Minimum	-	2.80	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 can be found in section 5.1.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 10.

For floor plans of the assessed units please refer to section A.1 on page 27.

A.3.6 SE Results: Apartment Block, Level 02

Table No. A.3.6 - Sunlight Exposure Results: Apartment Block, Level 02							
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. 02_01	LKD	2.90	Minimum	-	2.90	Minimum	-
Apt. 02_01	Bedroom 1	4.30	High	Compliant	4.30	High	Compliant
Apt. 02_01	Bedroom 2	2.40	Minimum	-	2.40	Minimum	-
Apt. 02_02	LKD	2.90	Minimum	-	2.90	Minimum	-
Apt. 02_02	Bedroom 1	4.20	High	Compliant	4.20	High	Compliant
Apt. 02_02	Bedroom 2	2.30	Minimum	-	2.30	Minimum	-
Apt. 02_03	LKD	0.40	Below Minimum	Non-Compliant	0.40	Below Minimum	Non-Compliant
Apt. 02_03	Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 02_04	LKD	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
Apt. 02_04	Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 02_05	LKD	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
Apt. 02_05	Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 02_06	LKD	4.20	High	Compliant	4.20	High	Compliant
Apt. 02_06	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 02_06	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 02_07	LKD	4.20	High	-	4.20	High	-
Apt. 02_07	Bedroom 1	7.40	High	Compliant	7.40	High	Compliant
Apt. 02_07	Bedroom 2	5.80	High	-	5.80	High	-
Apt. 02_08	LKD	6.00	High	-	6.00	High	-
Apt. 02_08	Bedroom	6.90	High	Compliant	6.90	High	Compliant
Apt. 02_09	LKD	4.70	High	-	4.70	High	-
Apt. 02_09	Bedroom	5.90	High	Compliant	5.90	High	Compliant
Apt. 02_10	LKD	4.60	High	-	4.60	High	-
Apt. 02_10	Bedroom 1	9.40	High	Compliant	9.40	High	Compliant
Apt. 02_10	Bedroom 2	7.00	High	-	7.00	High	-
Apt. 02_11	LKD	2.90	Minimum	Compliant	2.90	Minimum	Compliant
Apt. 02_11	Bedroom	2.80	Minimum	-	2.80	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 can be found in section 5.1.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 10.

For floor plans of the assessed units please refer to section A.1 on page 27.

A.3.7 SE Results: Apartment Block, Level 03

Table No. A.3.7 - Sunlight Exposure Results: Apartment Block, Level 03							
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. 03_01	LKD	2.90	Minimum	-	2.90	Minimum	-
Apt. 03_01	Bedroom 1	4.30	High	Compliant	4.30	High	Compliant
Apt. 03_01	Bedroom 2	2.40	Minimum	-	2.40	Minimum	-
Apt. 03_02	LKD	2.90	Minimum	-	2.90	Minimum	-
Apt. 03_02	Bedroom 1	4.20	High	Compliant	4.20	High	Compliant
Apt. 03_02	Bedroom 2	2.30	Minimum	-	2.30	Minimum	-
Apt. 03_03	LKD	0.90	Below Minimum	Non-Compliant	0.90	Below Minimum	Non-Compliant
Apt. 03_03	Bedroom	0.70	Below Minimum	-	0.70	Below Minimum	-
Apt. 03_04	LKD	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
Apt. 03_04	Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 03_05	LKD	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
Apt. 03_05	Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 03_06	LKD	4.20	High	Compliant	4.20	High	Compliant
Apt. 03_06	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 03_06	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 03_07	LKD	4.20	High	-	4.20	High	-
Apt. 03_07	Bedroom 1	7.40	High	Compliant	7.40	High	Compliant
Apt. 03_07	Bedroom 2	5.90	High	-	5.90	High	-
Apt. 03_08	LKD	6.00	High	-	6.00	High	-
Apt. 03_08	Bedroom	6.90	High	Compliant	6.90	High	Compliant
Apt. 03_09	LKD	4.70	High	-	4.70	High	-
Apt. 03_09	Bedroom	5.90	High	Compliant	5.90	High	Compliant
Apt. 03_10	LKD	4.60	High	-	4.60	High	-
Apt. 03_10	Bedroom 1	9.40	High	Compliant	9.40	High	Compliant
Apt. 03_10	Bedroom 2	7.00	High	-	7.00	High	-
Apt. 03_11	LKD	2.90	Minimum	Compliant	2.90	Minimum	Compliant
Apt. 03_11	Bedroom	2.80	Minimum	-	2.80	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 can be found in section 5.1.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 10.

For floor plans of the assessed units please refer to section A.1 on page 27.

A.3.8 SE Results: Apartment Block, Level 04

Table No. A.3.8 - Sunlight Exposure Results: Apartment Block, Level 04							
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. 04_01	LKD	2.90	Minimum	-	2.90	Minimum	-
Apt. 04_01	Bedroom 1	4.60	High	Compliant	4.60	High	Compliant
Apt. 04_01	Bedroom 2	2.40	Minimum	-	2.40	Minimum	-
Apt. 04_02	LKD	2.90	Minimum	-	2.90	Minimum	-
Apt. 04_02	Bedroom 1	4.40	High	Compliant	4.40	High	Compliant
Apt. 04_02	Bedroom 2	2.30	Minimum	-	2.30	Minimum	-
Apt. 04_03	LKD	0.90	Below Minimum	-	0.90	Below Minimum	-
Apt. 04_03	Bedroom	1.00	Below Minimum	Non-Compliant	1.00	Below Minimum	Non-Compliant
Apt. 04_04	LKD	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
Apt. 04_04	Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 04_05	LKD	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
Apt. 04_05	Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 04_06	LKD	5.00	High	Compliant	5.00	High	Compliant
Apt. 04_06	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 04_06	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 04_07	LKD	7.80	High	Compliant	7.80	High	Compliant
Apt. 04_07	Bedroom 1	7.60	High	-	7.60	High	-
Apt. 04_07	Bedroom 2	7.50	High	-	7.50	High	-
Apt. 04_08	LKD	7.80	High	Compliant	7.80	High	Compliant
Apt. 04_08	Bedroom	7.50	High	-	7.50	High	-
Apt. 04_09	LKD	7.80	High	Compliant	7.80	High	Compliant
Apt. 04_09	Bedroom	7.60	High	-	7.60	High	-
Apt. 04_10	LKD	7.80	High	-	7.80	High	-
Apt. 04_10	Bedroom 1	9.40	High	Compliant	9.40	High	Compliant
Apt. 04_10	Bedroom 2	7.60	High	-	7.60	High	-
Apt. 04_11	LKD	2.90	Minimum	Compliant	2.90	Minimum	Compliant
Apt. 04_11	Bedroom	2.80	Minimum	-	2.80	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 can be found in section 5.1.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 10.

For floor plans of the assessed units please refer to section A.1 on page 27.

A.3.9 SE Results: Apartment Block, Level 05

Table No. A.3.9 - Sunlight Exposure Results: Apartment Block, Level 05							
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. 05_01	LKD	4.80	High	Compliant	4.80	High	Compliant
Apt. 05_01	Bedroom 1	4.60	High	-	4.60	High	-
Apt. 05_01	Bedroom 2	4.60	High	-	4.60	High	-
Apt. 05_02	LKD	4.80	High	Compliant	4.80	High	Compliant
Apt. 05_02	Bedroom 1	4.60	High	-	4.60	High	-
Apt. 05_02	Bedroom 2	4.60	High	-	4.60	High	-
Apt. 05_03	LKD	2.60	Minimum	Compliant	2.60	Minimum	Compliant
Apt. 05_03	Bedroom	2.40	Minimum	-	2.40	Minimum	-
Apt. 05_04	LKD	2.60	Minimum	Compliant	2.60	Minimum	Compliant
Apt. 05_04	Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 05_05	LKD	2.40	Minimum	-	2.40	Minimum	-
Apt. 05_05	Bedroom 1	0.00	Below Minimum	-	0.00	Below Minimum	-
Apt. 05_05	Bedroom 2	7.50	High	Compliant	7.50	High	Compliant
Apt. 05_06	LKD	4.80	High	-	4.80	High	-
Apt. 05_06	Bedroom 1	4.60	High	-	4.60	High	-
Apt. 05_06	Bedroom 2	7.50	High	Compliant	7.50	High	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 can be found in section 5.1.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to "3.2 Definition of Levels of Sunlight Exposure" on page 10.

For floor plans of the assessed units please refer to section A.1 on page 27.

A.4 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.4 - Scheme Performance SOG				
Assigned Area Number	Assessed Area	Area Capable of Receiving 2 Hours of Sunlight on March 21st	Recommended Minimum	Level of Compliance with BRE Guidelines	Meets BR 209 Criteria
A	**B**	**C**	**D**	**E**	**F**

A: Assigned Area Number

This column indicates the number that 3DDB have assigned to the assessed areas, which is included for the sole purpose of aiding in the identification of the corresponding space shown in the corresponding figure.

B: Assessed Area

This column identifies the assessed garden/amenity area.

C: 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.

D: 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%.

E: 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.

F: Meets BR 209 Criteria

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

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

A.4.1 Sun On Ground in Proposed Outdoor Amenity Areas

Table No. A.4.1 - SOG in Proposed Outdoor Amenity Areas Results:					
Assigned Area Number	Assessed Area	Area Capable of Receiving 2 Hours of Sunlight on March 21st	Recommended minimum	Level of Compliance with BRE Guidelines*	Meets BR 209 Criteria*
1	Public Open Space	94.38%	50.00%	BRE Compliant	Yes
2	Communal Open Space	82.55%	50.00%	BRE Compliant	Yes

* 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.

** The various 'Public' or 'Communal' open spaces across the proposed development have been combined for the SOG analysis. The figures in the table above indicate what portion of the spaces as a whole can receive at least two hours of sunlight on March 21st.

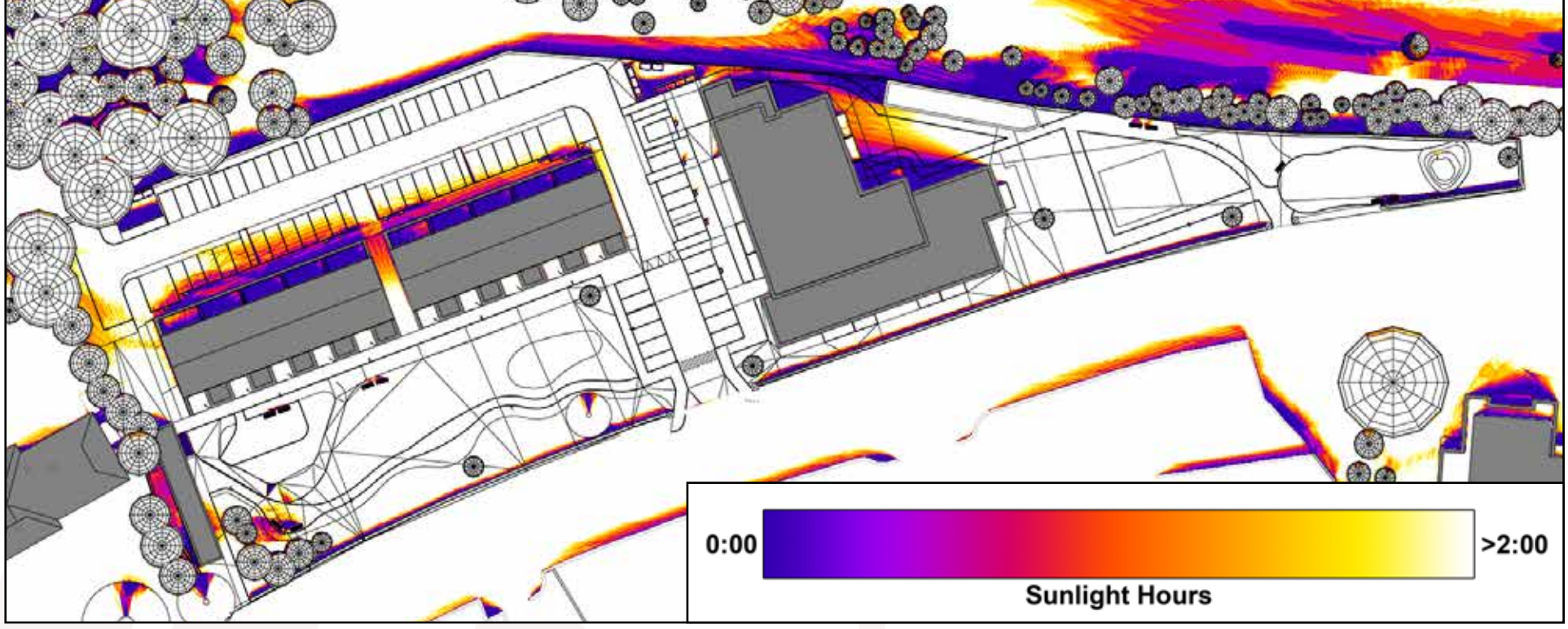


Figure A.16: Indication of the amenity areas that have been analysed (T), Area capable of receiving 2 hours of sunlight on March 21st shown in white (B)

B.0 Supplementary Study Results

B.1 SDA study, under the I.S. EN 17037 criteria

Below is an example of the table used to describe the supplementary study results for proposed units in the assessment of SDA under the I.S. EN 17037 criteria.

Table Example. B.1 - Supplementary SDA Results (I.S. EN 17037 criteria)						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria
		Area above 300 Lux	Area above 100 Lux	Area above 300 Lux	Area above 100 Lux	
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 in the unit has been assessed, e.g. bedroom, LKD, etc.

C: % of area above 300 Lux (No Trees)

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 when the assessment is carried out without trees in the analytical model.

D: % of area above 100 Lux (No Trees)

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 when the assessment is carried out without trees in the analytical model.

E: % of area above 300 Lux (Winter Trees)

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 with the foliage of deciduous trees varied to account for summer and winter conditions, i.e. full leaf and bare branch.

F: % of area above 100 Lux (Winter Trees)

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 with the foliage of deciduous trees varied to account for summer and winter conditions.

G: Compliance with I.S. EN 17037 Criteria

This column states if the assessed room achieves the recommended level of daylight as per I.S. EN 17037 with consideration to the various tree states.

If the recommended lux levels are achieved on the working plane, for half the daylight hours, both with and without trees, this column will state: *'Compliant'*.

If the recommended lux levels are not achieved on the working plane, for half the daylight hours, both with and without trees, this column will state: *'Non-compliant'*.

If the recommended lux levels are achieved on the working plane, for half the daylight hours, without trees but are not achieved with trees, this column will state: *'Trees affecting compliance'*.

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 of these figures may yield a negligible difference and should not be considered an error.

B.1.1 Supplementary SDA Results (I.S. EN 17037 criteria): Duplex Apartments

Table No. B.1.1 - Supplementary SDA Results (I.S. EN 17037 criteria): Duplex Apartments						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
Dup. Apt. 01	LKD	79%	100%	47%	100%	Trees affecting compliance
Dup. Apt. 01	Bedroom 1	43%	100%	40%	100%	Non-compliant
Dup. Apt. 01	Bedroom 2	46%	100%	39%	100%	Non-compliant
Dup. Apt. 02	LKD	43%	100%	23%	88%	Non-compliant
Dup. Apt. 02	Bedroom 1	43%	100%	38%	100%	Non-compliant
Dup. Apt. 02	Bedroom 2	48%	100%	43%	100%	Non-compliant
Dup. Apt. 03	LKD	45%	99%	24%	86%	Non-compliant
Dup. Apt. 03	Bedroom 1	44%	100%	32%	100%	Non-compliant
Dup. Apt. 03	Bedroom 2	48%	100%	39%	100%	Non-compliant
Dup. Apt. 04	LKD	46%	99%	25%	90%	Non-compliant
Dup. Apt. 04	Bedroom 1	44%	100%	37%	100%	Non-compliant
Dup. Apt. 04	Bedroom 2	48%	100%	38%	100%	Non-compliant
Dup. Apt. 05	LKD	83%	100%	51%	100%	Compliant
Dup. Apt. 05	Bedroom 1	48%	100%	37%	100%	Non-compliant
Dup. Apt. 05	Bedroom 2	48%	100%	39%	100%	Non-compliant
Dup. Apt. 06	LKD	45%	99%	34%	94%	Non-compliant
Dup. Apt. 06	Bedroom 1	46%	100%	32%	100%	Non-compliant
Dup. Apt. 06	Bedroom 2	48%	100%	34%	100%	Non-compliant
Dup. Apt. 07	LKD	46%	99%	30%	92%	Non-compliant
Dup. Apt. 07	Bedroom 1	44%	100%	30%	100%	Non-compliant
Dup. Apt. 07	Bedroom 2	48%	100%	32%	100%	Non-compliant
Dup. Apt. 08	LKD	45%	99%	31%	91%	Non-compliant
Dup. Apt. 08	Bedroom 1	44%	100%	29%	100%	Non-compliant
Dup. Apt. 08	Bedroom 2	48%	100%	30%	100%	Non-compliant
Dup. Apt. 09	LKD	42%	99%	29%	90%	Non-compliant
Dup. Apt. 09	Bedroom 1	44%	100%	30%	100%	Non-compliant
Dup. Apt. 09	Bedroom 2	48%	100%	30%	100%	Non-compliant
Dup. Apt. 10	LKD	88%	100%	53%	100%	Compliant
Dup. Apt. 10	Bedroom 1	48%	100%	28%	98%	Non-compliant
Dup. Apt. 10	Bedroom 2	48%	100%	29%	100%	Non-compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
For floor plans of the assessed units please refer to section A.1 on page 27.

B.1.2 Supplementary SDA Results (I.S. EN 17037 criteria): Duplex Townhouses, Terrace 1-5

Table No. B.1.2 - Supplementary SDA Results (I.S. EN 17037 criteria): Duplex Townhouses, Terrace 1-5						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
Dup. Hse. 01	Kitchen	100%	100%	100%	100%	Compliant
Dup. Hse. 01	Living Room	100%	100%	100%	100%	Compliant
Dup. Hse. 01	Bedroom 1	96%	100%	85%	100%	Compliant
Dup. Hse. 01	Bedroom 2	61%	100%	59%	100%	Compliant
Dup. Hse. 01	Bedroom 3	100%	100%	100%	100%	Compliant
Dup. Hse. 02	Kitchen	100%	100%	100%	100%	Compliant
Dup. Hse. 02	Living Room	100%	100%	100%	100%	Compliant
Dup. Hse. 02	Bedroom 1	100%	100%	87%	100%	Compliant
Dup. Hse. 02	Bedroom 2	63%	100%	61%	100%	Compliant
Dup. Hse. 02	Bedroom 3	100%	100%	100%	100%	Compliant
Dup. Hse. 03	Kitchen	100%	100%	100%	100%	Compliant
Dup. Hse. 03	Living Room	100%	100%	100%	100%	Compliant
Dup. Hse. 03	Bedroom 1	100%	100%	85%	100%	Compliant
Dup. Hse. 03	Bedroom 2	61%	100%	59%	100%	Compliant
Dup. Hse. 03	Bedroom 3	100%	100%	100%	100%	Compliant
Dup. Hse. 04	Kitchen	100%	100%	100%	100%	Compliant
Dup. Hse. 04	Living Room	100%	100%	100%	100%	Compliant
Dup. Hse. 04	Bedroom 1	100%	100%	85%	100%	Compliant
Dup. Hse. 04	Bedroom 2	61%	100%	59%	100%	Compliant
Dup. Hse. 04	Bedroom 3	100%	100%	100%	100%	Compliant
Dup. Hse. 05	Kitchen	100%	100%	100%	100%	Compliant
Dup. Hse. 05	Living Room	100%	100%	100%	100%	Compliant
Dup. Hse. 05	Bedroom 1	100%	100%	94%	100%	Compliant
Dup. Hse. 05	Bedroom 2	63%	100%	58%	100%	Compliant
Dup. Hse. 05	Bedroom 3	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
For floor plans of the assessed units please refer to section A.1 on page 27.

B.1.3 Supplementary SDA Results (I.S. EN 17037 criteria): Duplex Townhouses, Terrace 6-10

Table No. B.1.3 - Supplementary SDA Results (I.S. EN 17037 criteria): Duplex Townhouses, Terrace 6-10

Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
Dup. Hse. 06	Kitchen	100%	100%	100%	100%	Compliant
Dup. Hse. 06	Living Room	100%	100%	100%	100%	Compliant
Dup. Hse. 06	Bedroom 1	98%	100%	89%	100%	Compliant
Dup. Hse. 06	Bedroom 2	61%	100%	52%	100%	Compliant
Dup. Hse. 06	Bedroom 3	100%	100%	100%	100%	Compliant
Dup. Hse. 07	Kitchen	100%	100%	100%	100%	Compliant
Dup. Hse. 07	Living Room	100%	100%	100%	100%	Compliant
Dup. Hse. 07	Bedroom 1	100%	100%	91%	100%	Compliant
Dup. Hse. 07	Bedroom 2	63%	100%	54%	100%	Compliant
Dup. Hse. 07	Bedroom 3	100%	100%	100%	100%	Compliant
Dup. Hse. 08	Kitchen	100%	100%	100%	100%	Compliant
Dup. Hse. 08	Living Room	100%	100%	100%	100%	Compliant
Dup. Hse. 08	Bedroom 1	100%	100%	91%	100%	Compliant
Dup. Hse. 08	Bedroom 2	66%	100%	52%	100%	Compliant
Dup. Hse. 08	Bedroom 3	100%	100%	100%	100%	Compliant
Dup. Hse. 09	Kitchen	100%	100%	100%	100%	Compliant
Dup. Hse. 09	Living Room	100%	100%	100%	100%	Compliant
Dup. Hse. 09	Bedroom 1	99%	100%	87%	100%	Compliant
Dup. Hse. 09	Bedroom 2	66%	100%	50%	100%	Compliant
Dup. Hse. 09	Bedroom 3	100%	100%	100%	100%	Compliant
Dup. Hse. 10	Kitchen	100%	100%	100%	100%	Compliant
Dup. Hse. 10	Living Room	100%	100%	100%	100%	Compliant
Dup. Hse. 10	Bedroom 1	100%	100%	89%	100%	Compliant
Dup. Hse. 10	Bedroom 2	69%	100%	50%	100%	Compliant
Dup. Hse. 10	Bedroom 3	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
For floor plans of the assessed units please refer to section A.1 on page 27.

B.1.4 Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block, Level 00

Table No. B.1.4 - Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block, Level 00

Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
Apt. 00_01	LKD	44%	100%	39%	90%	Non-compliant
Apt. 00_01	Bedroom 1	100%	100%	98%	100%	Compliant
Apt. 00_01	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 00_02	LKD	40%	86%	37%	79%	Non-compliant
Apt. 00_02	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 00_02	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 00_03	LKD	48%	100%	36%	98%	Non-compliant
Apt. 00_03	Bedroom	100%	100%	100%	100%	Compliant
Apt. 00_04	LKD	36%	100%	30%	100%	Non-compliant
Apt. 00_04	Bedroom	48%	100%	42%	100%	Non-compliant
Apt. 00_05	LKD	63%	100%	55%	100%	Compliant
Apt. 00_05	Bedroom	5%	97%	3%	87%	Non-compliant
Apt. 00_06	LKD	100%	100%	100%	100%	Compliant
Apt. 00_06	Bedroom 1	86%	100%	73%	100%	Compliant
Apt. 00_06	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 00_07	LKD	57%	100%	50%	99%	Compliant
Apt. 00_07	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 00_07	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 00_08	LKD	80%	100%	71%	100%	Compliant
Apt. 00_08	Bedroom	100%	100%	100%	100%	Compliant
Apt. 00_09	LKD	77%	100%	69%	100%	Compliant
Apt. 00_09	Bedroom	100%	100%	100%	100%	Compliant
Apt. 00_10	LKD	58%	100%	48%	94%	Trees affecting compliance
Apt. 00_10	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 00_10	Bedroom 2	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
For floor plans of the assessed units please refer to section A.1 on page 27.

B.1.5 Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block, Level 01

Table No. B.1.5 - Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block, Level 01

Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
Apt. 01_01	LKD	47%	100%	43%	100%	Non-compliant
Apt. 01_01	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 01_01	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 01_02	LKD	41%	93%	38%	89%	Non-compliant
Apt. 01_02	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 01_02	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 01_03	LKD	58%	100%	42%	100%	Trees affecting compliance
Apt. 01_03	Bedroom	100%	100%	100%	100%	Compliant
Apt. 01_04	LKD	42%	100%	34%	100%	Non-compliant
Apt. 01_04	Bedroom	100%	100%	100%	100%	Compliant
Apt. 01_05	LKD	70%	100%	64%	100%	Compliant
Apt. 01_05	Bedroom	15%	100%	10%	100%	Non-compliant
Apt. 01_06	LKD	100%	100%	100%	100%	Compliant
Apt. 01_06	Bedroom 1	99%	100%	99%	100%	Compliant
Apt. 01_06	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 01_07	LKD	62%	100%	58%	100%	Compliant
Apt. 01_07	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 01_07	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 01_08	LKD	86%	100%	84%	100%	Compliant
Apt. 01_08	Bedroom	100%	100%	100%	100%	Compliant
Apt. 01_09	LKD	91%	100%	87%	100%	Compliant
Apt. 01_09	Bedroom	100%	100%	100%	100%	Compliant
Apt. 01_10	LKD	62%	100%	60%	100%	Compliant
Apt. 01_10	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 01_10	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 01_11	LKD	75%	100%	68%	100%	Compliant
Apt. 01_11	Bedroom	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
For floor plans of the assessed units please refer to section A.1 on page 27.

B.1.6 Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block, Level 02

Table No. B.1.6 - Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block, Level 02						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
Apt. 02_01	LKD	52%	100%	50%	100%	Compliant
Apt. 02_01	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 02_01	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 02_02	LKD	47%	100%	44%	99%	Non-compliant
Apt. 02_02	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 02_02	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 02_03	LKD	100%	100%	100%	100%	Compliant
Apt. 02_03	Bedroom	67%	100%	57%	100%	Compliant
Apt. 02_04	LKD	100%	100%	100%	100%	Compliant
Apt. 02_04	Bedroom	53%	100%	50%	100%	Compliant
Apt. 02_05	LKD	78%	100%	73%	100%	Compliant
Apt. 02_05	Bedroom	15%	100%	15%	100%	Non-compliant
Apt. 02_06	LKD	100%	100%	100%	100%	Compliant
Apt. 02_06	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 02_06	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 02_07	LKD	65%	100%	63%	100%	Compliant
Apt. 02_07	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 02_07	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 02_08	LKD	91%	100%	89%	100%	Compliant
Apt. 02_08	Bedroom	100%	100%	100%	100%	Compliant
Apt. 02_09	LKD	94%	100%	93%	100%	Compliant
Apt. 02_09	Bedroom	100%	100%	100%	100%	Compliant
Apt. 02_10	LKD	64%	100%	63%	100%	Compliant
Apt. 02_10	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 02_10	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 02_11	LKD	80%	100%	73%	100%	Compliant
Apt. 02_11	Bedroom	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
For floor plans of the assessed units please refer to section A.1 on page 27.

B.1.7 Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block, Level 03

Table No. B.1.7 - Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block, Level 03						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
Apt. 03_01	LKD	56%	100%	54%	100%	Compliant
Apt. 03_01	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 03_01	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 03_02	LKD	51%	100%	50%	100%	Compliant
Apt. 03_02	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 03_02	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 03_03	LKD	100%	100%	100%	100%	Compliant
Apt. 03_03	Bedroom	68%	100%	64%	100%	Compliant
Apt. 03_04	LKD	100%	100%	100%	100%	Compliant
Apt. 03_04	Bedroom	58%	100%	55%	100%	Compliant
Apt. 03_05	LKD	81%	100%	79%	100%	Compliant
Apt. 03_05	Bedroom	20%	100%	20%	100%	Non-compliant
Apt. 03_06	LKD	100%	100%	100%	100%	Compliant
Apt. 03_06	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 03_06	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 03_07	LKD	66%	100%	63%	100%	Compliant
Apt. 03_07	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 03_07	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 03_08	LKD	93%	100%	91%	100%	Compliant
Apt. 03_08	Bedroom	100%	100%	100%	100%	Compliant
Apt. 03_09	LKD	94%	100%	93%	100%	Compliant
Apt. 03_09	Bedroom	100%	100%	100%	100%	Compliant
Apt. 03_10	LKD	66%	100%	64%	100%	Compliant
Apt. 03_10	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 03_10	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 03_11	LKD	86%	100%	82%	100%	Compliant
Apt. 03_11	Bedroom	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
For floor plans of the assessed units please refer to section A.1 on page 27.

B.1.8 Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block, Level 04

Table No. B.1.8 - Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block, Level 04						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
Apt. 04_01	LKD	59%	100%	57%	100%	Compliant
Apt. 04_01	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 04_01	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 04_02	LKD	55%	100%	51%	100%	Compliant
Apt. 04_02	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 04_02	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 04_03	LKD	100%	100%	100%	100%	Compliant
Apt. 04_03	Bedroom	70%	100%	69%	100%	Compliant
Apt. 04_04	LKD	100%	100%	100%	100%	Compliant
Apt. 04_04	Bedroom	62%	100%	61%	100%	Compliant
Apt. 04_05	LKD	86%	100%	83%	100%	Compliant
Apt. 04_05	Bedroom	30%	100%	25%	100%	Non-compliant
Apt. 04_06	LKD	100%	100%	100%	100%	Compliant
Apt. 04_06	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 04_06	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 04_07	LKD	77%	100%	75%	100%	Compliant
Apt. 04_07	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 04_07	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 04_08	LKD	100%	100%	100%	100%	Compliant
Apt. 04_08	Bedroom	100%	100%	100%	100%	Compliant
Apt. 04_09	LKD	100%	100%	100%	100%	Compliant
Apt. 04_09	Bedroom	100%	100%	100%	100%	Compliant
Apt. 04_10	LKD	77%	100%	75%	100%	Compliant
Apt. 04_10	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 04_10	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 04_11	LKD	89%	100%	86%	100%	Compliant
Apt. 04_11	Bedroom	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
For floor plans of the assessed units please refer to section A.1 on page 27.

B.1.9 Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block, Level 05

Table No. B.1.9 - Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block, Level 05						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
Apt. 05_01	LKD	70%	100%	69%	100%	Compliant
Apt. 05_01	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 05_01	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 05_02	LKD	68%	100%	66%	100%	Compliant
Apt. 05_02	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 05_02	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 05_03	LKD	86%	100%	86%	100%	Compliant
Apt. 05_03	Bedroom	100%	100%	100%	100%	Compliant
Apt. 05_04	LKD	83%	100%	82%	100%	Compliant
Apt. 05_04	Bedroom	100%	100%	100%	100%	Compliant
Apt. 05_05	LKD	98%	100%	98%	100%	Compliant
Apt. 05_05	Bedroom 1	53%	100%	48%	100%	Trees affecting compliance
Apt. 05_05	Bedroom 2	100%	100%	100%	100%	Compliant
Apt. 05_06	LKD	77%	100%	76%	100%	Compliant
Apt. 05_06	Bedroom 1	100%	100%	100%	100%	Compliant
Apt. 05_06	Bedroom 2	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.5.1 on page 17.
For floor plans of the assessed units please refer to section A.1 on page 27.

B.2 Supplementary No Sky Line (NSL) assessment in proposed units.

Below is an example of the table used to describe the supplementary assessment results for 'No Sky Line' in proposed units.

Table Example. B.2 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%
A	**B**	**C**	**D**

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 in the unit has been assessed, e.g. bedroom, LKD, etc.

C: % 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.

D: 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'*, it signifies that the sky will be visible from more than 80% of the working plane.

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

B.2.1 Supplementary NSL Results: Duplex Apartments

Table No. B.2.1 - Supplementary NSL Results: Duplex Apartments			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
Dup. Apt. 01	LKD	100%	Yes
Dup. Apt. 01	Bedroom 1	98%	Yes
Dup. Apt. 01	Bedroom 2	97%	Yes
Dup. Apt. 02	LKD	99%	Yes
Dup. Apt. 02	Bedroom 1	98%	Yes
Dup. Apt. 02	Bedroom 2	98%	Yes
Dup. Apt. 03	LKD	99%	Yes
Dup. Apt. 03	Bedroom 1	98%	Yes
Dup. Apt. 03	Bedroom 2	98%	Yes
Dup. Apt. 04	LKD	99%	Yes
Dup. Apt. 04	Bedroom 1	98%	Yes
Dup. Apt. 04	Bedroom 2	98%	Yes
Dup. Apt. 05	LKD	99%	Yes
Dup. Apt. 05	Bedroom 1	98%	Yes
Dup. Apt. 05	Bedroom 2	98%	Yes
Dup. Apt. 06	LKD	98%	Yes
Dup. Apt. 06	Bedroom 1	98%	Yes
Dup. Apt. 06	Bedroom 2	97%	Yes
Dup. Apt. 07	LKD	98%	Yes
Dup. Apt. 07	Bedroom 1	98%	Yes
Dup. Apt. 07	Bedroom 2	98%	Yes
Dup. Apt. 08	LKD	97%	Yes
Dup. Apt. 08	Bedroom 1	98%	Yes
Dup. Apt. 08	Bedroom 2	98%	Yes
Dup. Apt. 09	LKD	96%	Yes
Dup. Apt. 09	Bedroom 1	98%	Yes
Dup. Apt. 09	Bedroom 2	98%	Yes
Dup. Apt. 10	LKD	100%	Yes
Dup. Apt. 10	Bedroom 1	98%	Yes
Dup. Apt. 10	Bedroom 2	98%	Yes

* 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."

For floor plans of the assessed units please refer to section A.1 on page 27.

B.2.2 Supplementary NSL Results: Duplex Townhouses, Terrace 1-5

Table No. B.2.2 - Supplementary NSL Results: Duplex Townhouses, Terrace 1-5			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
Dup. Hse. 01	Kitchen	99%	Yes
Dup. Hse. 01	Living Room	100%	Yes
Dup. Hse. 01	Bedroom 1	99%	Yes
Dup. Hse. 01	Bedroom 2	98%	Yes
Dup. Hse. 01	Bedroom 3	96%	Yes
Dup. Hse. 02	Kitchen	99%	Yes
Dup. Hse. 02	Living Room	100%	Yes
Dup. Hse. 02	Bedroom 1	99%	Yes
Dup. Hse. 02	Bedroom 2	98%	Yes
Dup. Hse. 02	Bedroom 3	96%	Yes
Dup. Hse. 03	Kitchen	99%	Yes
Dup. Hse. 03	Living Room	100%	Yes
Dup. Hse. 03	Bedroom 1	99%	Yes
Dup. Hse. 03	Bedroom 2	98%	Yes
Dup. Hse. 03	Bedroom 3	96%	Yes
Dup. Hse. 04	Kitchen	99%	Yes
Dup. Hse. 04	Living Room	100%	Yes
Dup. Hse. 04	Bedroom 1	99%	Yes
Dup. Hse. 04	Bedroom 2	98%	Yes
Dup. Hse. 04	Bedroom 3	96%	Yes
Dup. Hse. 05	Kitchen	100%	Yes
Dup. Hse. 05	Living Room	100%	Yes
Dup. Hse. 05	Bedroom 1	99%	Yes
Dup. Hse. 05	Bedroom 2	98%	Yes
Dup. Hse. 05	Bedroom 3	96%	Yes

* 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.”

For floor plans of the assessed units please refer to section A.1 on page 27.

B.2.3 Supplementary NSL Results: Duplex Townhouses, Terrace 6-10

Table No. B.2.3 - Supplementary NSL Results: Duplex Townhouses, Terrace 6-10			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
Dup. Hse. 06	Kitchen	98%	Yes
Dup. Hse. 06	Living Room	100%	Yes
Dup. Hse. 06	Bedroom 1	99%	Yes
Dup. Hse. 06	Bedroom 2	98%	Yes
Dup. Hse. 06	Bedroom 3	96%	Yes
Dup. Hse. 07	Kitchen	99%	Yes
Dup. Hse. 07	Living Room	99%	Yes
Dup. Hse. 07	Bedroom 1	99%	Yes
Dup. Hse. 07	Bedroom 2	98%	Yes
Dup. Hse. 07	Bedroom 3	96%	Yes
Dup. Hse. 08	Kitchen	99%	Yes
Dup. Hse. 08	Living Room	99%	Yes
Dup. Hse. 08	Bedroom 1	98%	Yes
Dup. Hse. 08	Bedroom 2	98%	Yes
Dup. Hse. 08	Bedroom 3	96%	Yes
Dup. Hse. 09	Kitchen	99%	Yes
Dup. Hse. 09	Living Room	98%	Yes
Dup. Hse. 09	Bedroom 1	98%	Yes
Dup. Hse. 09	Bedroom 2	98%	Yes
Dup. Hse. 09	Bedroom 3	96%	Yes
Dup. Hse. 10	Kitchen	100%	Yes
Dup. Hse. 10	Living Room	99%	Yes
Dup. Hse. 10	Bedroom 1	98%	Yes
Dup. Hse. 10	Bedroom 2	98%	Yes
Dup. Hse. 10	Bedroom 3	96%	Yes

* 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.”

For floor plans of the assessed units please refer to section A.1 on page 27.

B.2.4 Supplementary NSL Results: Apartment Block, Level 00

Table No. B.2.4 - Supplementary NSL Results: Apartment Block, Level 00			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
Apt. 00_01	LKD	98%	Yes
Apt. 00_01	Bedroom 1	99%	Yes
Apt. 00_01	Bedroom 2	99%	Yes
Apt. 00_02	LKD	89%	Yes
Apt. 00_02	Bedroom 1	99%	Yes
Apt. 00_02	Bedroom 2	99%	Yes
Apt. 00_03	LKD	99%	Yes
Apt. 00_03	Bedroom	99%	Yes
Apt. 00_04	LKD	97%	Yes
Apt. 00_04	Bedroom	98%	Yes
Apt. 00_05	LKD	100%	Yes
Apt. 00_05	Bedroom	95%	Yes
Apt. 00_06	LKD	100%	Yes
Apt. 00_06	Bedroom 1	96%	Yes
Apt. 00_06	Bedroom 2	99%	Yes
Apt. 00_07	LKD	98%	Yes
Apt. 00_07	Bedroom 1	100%	Yes
Apt. 00_07	Bedroom 2	99%	Yes
Apt. 00_08	LKD	100%	Yes
Apt. 00_08	Bedroom	99%	Yes
Apt. 00_09	LKD	99%	Yes
Apt. 00_09	Bedroom	99%	Yes
Apt. 00_10	LKD	96%	Yes
Apt. 00_10	Bedroom 1	99%	Yes
Apt. 00_10	Bedroom 2	96%	Yes

* 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."

For floor plans of the assessed units please refer to section A.1 on page 27.

B.2.5 Supplementary NSL Results: Apartment Block, Level 01

Table No. B.2.5 - Supplementary NSL Results: Apartment Block, Level 01			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
Apt. 01_01	LKD	98%	Yes
Apt. 01_01	Bedroom 1	99%	Yes
Apt. 01_01	Bedroom 2	99%	Yes
Apt. 01_02	LKD	95%	Yes
Apt. 01_02	Bedroom 1	100%	Yes
Apt. 01_02	Bedroom 2	99%	Yes
Apt. 01_03	LKD	99%	Yes
Apt. 01_03	Bedroom	99%	Yes
Apt. 01_04	LKD	97%	Yes
Apt. 01_04	Bedroom	98%	Yes
Apt. 01_05	LKD	100%	Yes
Apt. 01_05	Bedroom	95%	Yes
Apt. 01_06	LKD	100%	Yes
Apt. 01_06	Bedroom 1	96%	Yes
Apt. 01_06	Bedroom 2	99%	Yes
Apt. 01_07	LKD	98%	Yes
Apt. 01_07	Bedroom 1	100%	Yes
Apt. 01_07	Bedroom 2	99%	Yes
Apt. 01_08	LKD	99%	Yes
Apt. 01_08	Bedroom	99%	Yes
Apt. 01_09	LKD	99%	Yes
Apt. 01_09	Bedroom	99%	Yes
Apt. 01_10	LKD	96%	Yes
Apt. 01_10	Bedroom 1	99%	Yes
Apt. 01_10	Bedroom 2	97%	Yes
Apt. 01_11	LKD	99%	Yes
Apt. 01_11	Bedroom	99%	Yes

* 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.”

For floor plans of the assessed units please refer to section A.1 on page 27.

B.2.6 Supplementary NSL Results: Apartment Block, Level 02

Table No. B.2.6 - Supplementary NSL Results: Apartment Block, Level 02			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
Apt. 02_01	LKD	98%	Yes
Apt. 02_01	Bedroom 1	99%	Yes
Apt. 02_01	Bedroom 2	99%	Yes
Apt. 02_02	LKD	97%	Yes
Apt. 02_02	Bedroom 1	100%	Yes
Apt. 02_02	Bedroom 2	99%	Yes
Apt. 02_03	LKD	100%	Yes
Apt. 02_03	Bedroom	99%	Yes
Apt. 02_04	LKD	99%	Yes
Apt. 02_04	Bedroom	98%	Yes
Apt. 02_05	LKD	100%	Yes
Apt. 02_05	Bedroom	95%	Yes
Apt. 02_06	LKD	100%	Yes
Apt. 02_06	Bedroom 1	96%	Yes
Apt. 02_06	Bedroom 2	99%	Yes
Apt. 02_07	LKD	98%	Yes
Apt. 02_07	Bedroom 1	100%	Yes
Apt. 02_07	Bedroom 2	99%	Yes
Apt. 02_08	LKD	99%	Yes
Apt. 02_08	Bedroom	99%	Yes
Apt. 02_09	LKD	99%	Yes
Apt. 02_09	Bedroom	99%	Yes
Apt. 02_10	LKD	96%	Yes
Apt. 02_10	Bedroom 1	99%	Yes
Apt. 02_10	Bedroom 2	97%	Yes
Apt. 02_11	LKD	99%	Yes
Apt. 02_11	Bedroom	99%	Yes

* 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.”

For floor plans of the assessed units please refer to section A.1 on page 27.

B.2.7 Supplementary NSL Results: Apartment Block, Level 03

Table No. B.2.7 - Supplementary NSL Results: Apartment Block, Level 03			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
Apt. 03_01	LKD	98%	Yes
Apt. 03_01	Bedroom 1	99%	Yes
Apt. 03_01	Bedroom 2	99%	Yes
Apt. 03_02	LKD	97%	Yes
Apt. 03_02	Bedroom 1	100%	Yes
Apt. 03_02	Bedroom 2	99%	Yes
Apt. 03_03	LKD	100%	Yes
Apt. 03_03	Bedroom	99%	Yes
Apt. 03_04	LKD	99%	Yes
Apt. 03_04	Bedroom	98%	Yes
Apt. 03_05	LKD	100%	Yes
Apt. 03_05	Bedroom	95%	Yes
Apt. 03_06	LKD	100%	Yes
Apt. 03_06	Bedroom 1	96%	Yes
Apt. 03_06	Bedroom 2	99%	Yes
Apt. 03_07	LKD	98%	Yes
Apt. 03_07	Bedroom 1	100%	Yes
Apt. 03_07	Bedroom 2	99%	Yes
Apt. 03_08	LKD	99%	Yes
Apt. 03_08	Bedroom	99%	Yes
Apt. 03_09	LKD	99%	Yes
Apt. 03_09	Bedroom	99%	Yes
Apt. 03_10	LKD	96%	Yes
Apt. 03_10	Bedroom 1	99%	Yes
Apt. 03_10	Bedroom 2	97%	Yes
Apt. 03_11	LKD	99%	Yes
Apt. 03_11	Bedroom	99%	Yes

* 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.”

For floor plans of the assessed units please refer to section A.1 on page 27.

B.2.8 Supplementary NSL Results: Apartment Block, Level 04

Table No. B.2.8 - Supplementary NSL Results: Apartment Block, Level 04			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
Apt. 04_01	LKD	98%	Yes
Apt. 04_01	Bedroom 1	99%	Yes
Apt. 04_01	Bedroom 2	99%	Yes
Apt. 04_02	LKD	97%	Yes
Apt. 04_02	Bedroom 1	100%	Yes
Apt. 04_02	Bedroom 2	99%	Yes
Apt. 04_03	LKD	100%	Yes
Apt. 04_03	Bedroom	99%	Yes
Apt. 04_04	LKD	99%	Yes
Apt. 04_04	Bedroom	98%	Yes
Apt. 04_05	LKD	100%	Yes
Apt. 04_05	Bedroom	95%	Yes
Apt. 04_06	LKD	100%	Yes
Apt. 04_06	Bedroom 1	96%	Yes
Apt. 04_06	Bedroom 2	99%	Yes
Apt. 04_07	LKD	98%	Yes
Apt. 04_07	Bedroom 1	100%	Yes
Apt. 04_07	Bedroom 2	100%	Yes
Apt. 04_08	LKD	99%	Yes
Apt. 04_08	Bedroom	100%	Yes
Apt. 04_09	LKD	99%	Yes
Apt. 04_09	Bedroom	100%	Yes
Apt. 04_10	LKD	96%	Yes
Apt. 04_10	Bedroom 1	99%	Yes
Apt. 04_10	Bedroom 2	97%	Yes
Apt. 04_11	LKD	99%	Yes
Apt. 04_11	Bedroom	99%	Yes

* 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.”

For floor plans of the assessed units please refer to section A.1 on page 27.

B.2.9 Supplementary NSL Results: Apartment Block, Level 05

Table No. B.2.9 - Supplementary NSL Results: Apartment Block, Level 05			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
Apt. 05_01	LKD	99%	Yes
Apt. 05_01	Bedroom 1	99%	Yes
Apt. 05_01	Bedroom 2	99%	Yes
Apt. 05_02	LKD	97%	Yes
Apt. 05_02	Bedroom 1	100%	Yes
Apt. 05_02	Bedroom 2	99%	Yes
Apt. 05_03	LKD	100%	Yes
Apt. 05_03	Bedroom	100%	Yes
Apt. 05_04	LKD	100%	Yes
Apt. 05_04	Bedroom	99%	Yes
Apt. 05_05	LKD	98%	Yes
Apt. 05_05	Bedroom 1	97%	Yes
Apt. 05_05	Bedroom 2	99%	Yes
Apt. 05_06	LKD	100%	Yes
Apt. 05_06	Bedroom 1	98%	Yes
Apt. 05_06	Bedroom 2	100%	Yes

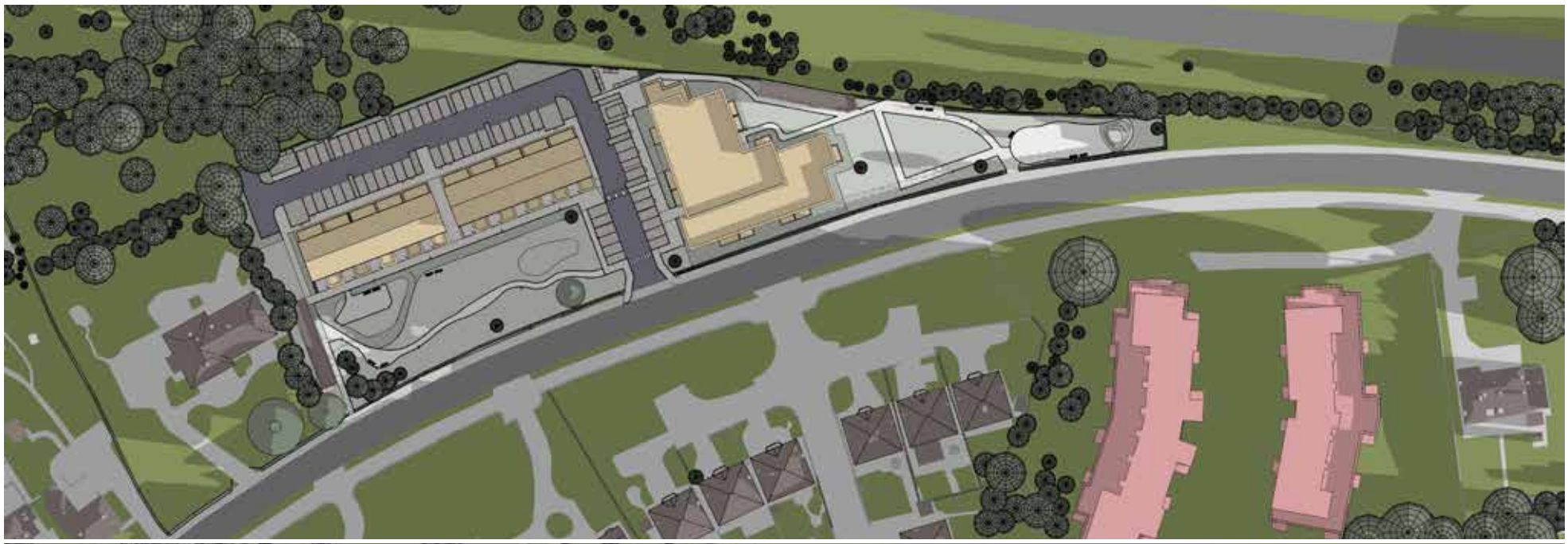
* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

For floor plans of the assessed units please refer to section A.1 on page 27.

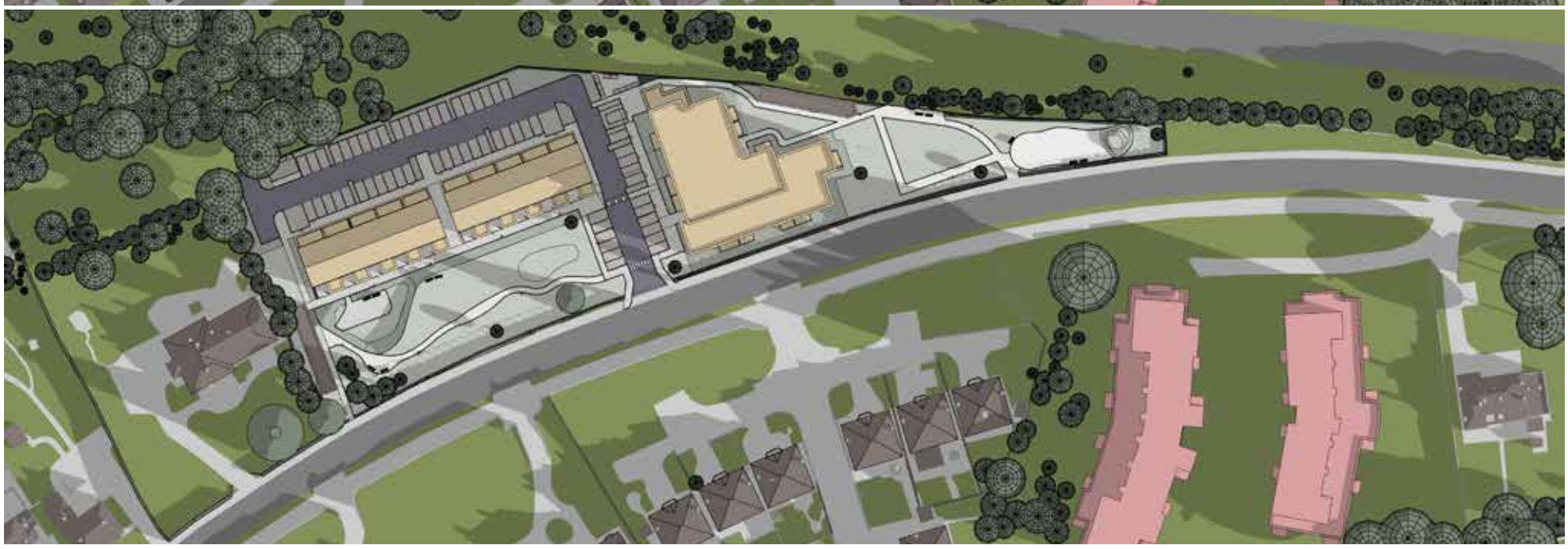
Proposed Shadow Study

N

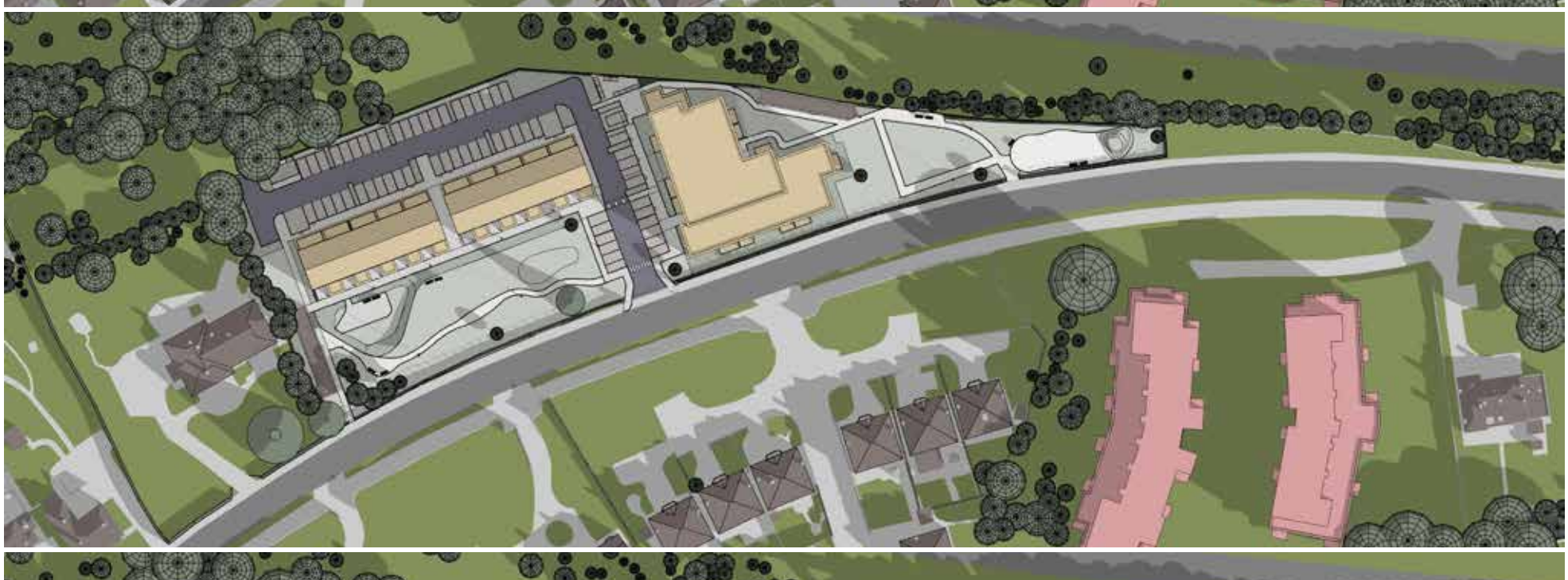
March 21st 7:00



March 21st 8:00



March 21st 9:00



March 21st 10:00

C.0 C.1	**Shadow Studies** **Shadow Study 21 March**	**Project:** Residential Development at Leopardstown Road, Sandyford, Dublin	**Proposed**	**Permitted** **(Ref: ABP31166921)**
	March 21st **Sunrise 6:32 | Sunset 18:33**	**Applicant:** Dun Laoghaire - Rathdown Co. Council		3D DESIGN BUREAU

Proposed Shadow Study

March 21st 11:00

March 21st 12:00

March 21st 13:00

March 21st 14:00

	Project: Residential Development at Leopardstown Road, Sandyford, Dublin	**Proposed**	**Permitted** (Ref: ABP31166921)
March 21st **Sunrise 6:32 | Sunset 18:33**	**Applicant:** Dun Laoghaire - Rathdown Co. Council		3D DESIGN BUREAU

Proposed Shadow Study

N

March 21st 15:00

March 21st 16:00

March 21st 17:00

March 21st 18:00

	Project: Residential Development at Leopardstown Road, Sandyford, Dublin	**Proposed**	**Permitted** (Ref: ABP31166921)
March 21st **Sunrise 6:32 | Sunset 18:33**	**Applicant:** Dun Laoghaire - Rathdown Co. Council		3D DESIGN BUREAU

N

Proposed Shadow Study

June 21st 6:00

June 21st 7:00

June 21st 8:00

June 21st 9:00

C.2 **Shadow Study 21 June**	**Project:** Residential Development at Leopardstown Road, Sandyford, Dublin	**Proposed**	**Permitted** (Ref: ABP31166921)
June 21st **Sunrise 5:04 | Sunset 21:49**	**Applicant:** Dun Laoghaire - Rathdown Co. Council		3D DESIGN BUREAU

Proposed Shadow Study

N

June 21st 10:00

June 21st 11:00

June 21st 12:00

June 21st 13:00

	Project: Residential Development at Leopardstown Road, Sandyford, Dublin	**Proposed**	**Permitted** (Ref: ABP31166921)
June 21st **Sunrise 5:04 | Sunset 21:49**	**Applicant:** Dun Laoghaire - Rathdown Co. Council		3D DESIGN BUREAU

Proposed Shadow Study

N

June 21st 14:00

June 21st 15:00

June 21st 16:00

June 21st 17:00

	Project: Residential Development at Leopardstown Road, Sandyford, Dublin	**Proposed**	**Permitted** (Ref: ABP31166921)
June 21st **Sunrise 5:04 | Sunset 21:49**	**Applicant:** Dun Laoghaire - Rathdown Co. Council		3D DESIGN BUREAU

Proposed Shadow Study

N

June 21st 18:00

June 21st 19:00

June 21st 20:00

June 21st 21:00

	Project: Residential Development at Leopardstown Road, Sandyford, Dublin	**Proposed**	**Permitted** (Ref: ABP31166921)
June 21st **Sunrise 5:04 | Sunset 21:49**	**Applicant:** Dun Laoghaire - Rathdown Co. Council		3D DESIGN BUREAU

Proposed Shadow Study

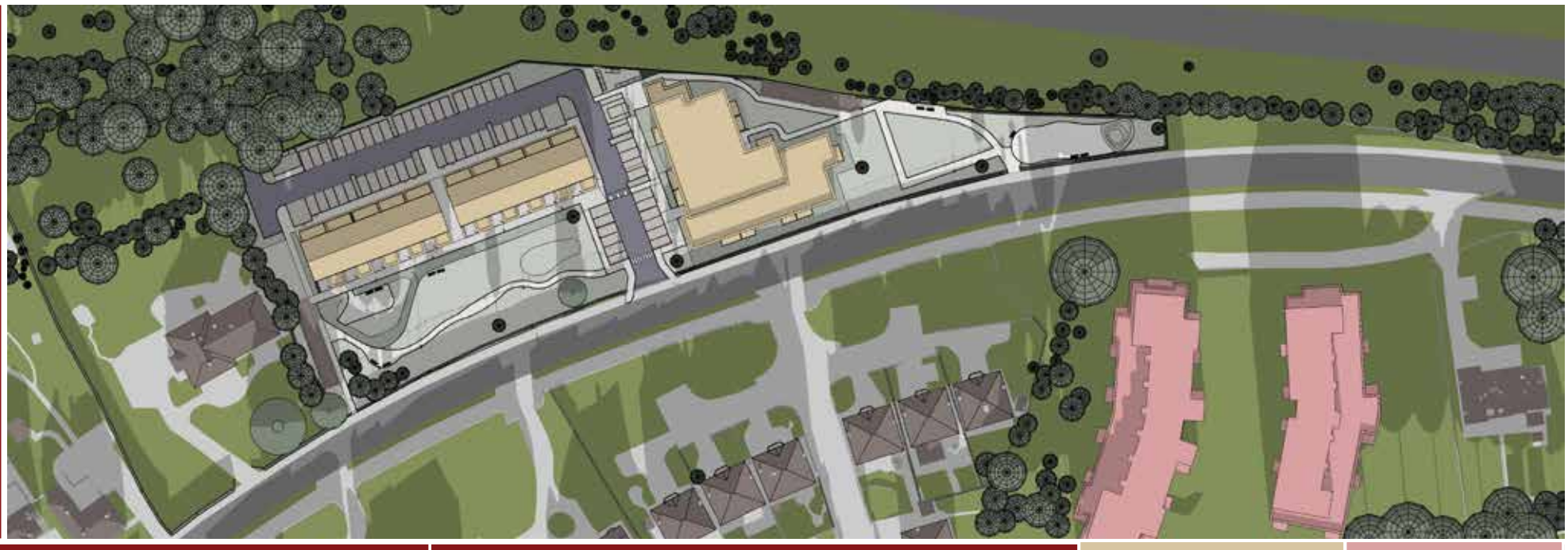
N

December 21st 9:00

December 21st 10:00

December 21st 11:00

December 21st 12:00



C.3	**Shadow Study 21 December**	**Project:** Residential Development at Leopardstown Road, Sandyford, Dublin	**Proposed**	**Permitted** (Ref: ABP31166921)
	December 21st **Sunrise 8:45 | Sunset 16:00**	**Applicant:** Dun Laoghaire - Rathdown Co. Council		3D DESIGN BUREAU

Proposed Shadow Study

N

December 21st 13:00

December 21st 14:00

December 21st 15:00

December 21st 16:00

	Project: Residential Development at Leopardstown Road, Sandyford, Dublin	**Proposed**	**Permitted** (Ref: ABP31166921)
December 21st **Sunrise 8:45 | Sunset 16:00**	**Applicant:** Dun Laoghaire - Rathdown Co. Council		3D DESIGN BUREAU