October 2026
3DDB Ref: 2524/075

Rathcoole Housing – Part 10 Application

Daylight and Sunlight Assessment Report

Applicant: South Dublin 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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The following report has been prepared by 3D Design Bureau (3DDB). 3DDB have over ten 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 bachelor's degree in Building Information Modelling (BIM) with over 20 years' experience in the industry.

1.0 Executive Summary

1.1 Summary of Assessment

3D Design Bureau (3DDB) were commissioned to carry out a comprehensive daylight and sunlight assessment, along with an accompanying shadow study for the proposed Rathcoole Housing – Part 10 Application. The development includes a mix of apartment blocks, duplexes and houses and sports facilities on the site owned by South Dublin County Council in Rathcoole, South County Dublin.

The proposed development is located within a low-density area, with much of the site comprising undeveloped woodland. The main part of the development is located centrally within the site, at a considerable distance from the surrounding existing buildings. Only two low-rise buildings are located alongside the gateway and suburban areas to the north.

The habitable rooms assessed for daylight and sunlight performance are contained within apartment blocks and duplexes. Habitable rooms within the Age Friendly units were also assessed. These units are arranged within two-storey, low-rise buildings, with apartments stacked vertically and served by separate entrances.

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

Explanations of key terms and the relevant daylight and sunlight assessment standards are included in sections E.0 & F.0 at the end of this report.

Impact Assessment

Following advice within section 2.2 of the BRE Guidelines (BR 209 - 2022), the surrounding context was carefully considered to ensure all properties and amenity spaces that may potentially experience a level of effect were included in the study. A more detailed explanation of the criterion applied can be found in section "2.1 Impact Assessment, Window Selection Criteria" on page 8.

The impact assessment that was carried out for the purpose of this report is in accordance with the BRE Guidelines. The potential levels of effect that the proposed development would have on the surrounding existing environment and/or properties have been assessed in the 'baseline state' versus the 'proposed state'. For definitions of the model states, including visual representations, please refer to section "2.2 Preparing the analytical model" on page 10.

The assessed properties, indicated in Figure 1.1 below, include:

- 18 Coolamber Road
- 49A Coolamber Drive



Figure 1.1: Scope of surrounding properties and environment assessed. Buildings assessed for Scheme Performance are indicated in orange.

The impact assessment, in accordance with the BRE Guidelines, aimed to cover the following metrics:

- **Vertical Sky Component (VSC):** Assessment of the potential effect on daylight to the windows of the properties listed above.
- **Annual and Winter Probable Sunlight Hours (APSH/WPSH):** Assessment of the potential effect on sunlight to windows oriented within 90° of due south.
- **Sun on Ground (SOG):** Assessment of the potential effect on sunlight availability to the rear gardens.

Based on the findings set out in "2.1 Impact Assessment, Window Selection Criteria" on page 8, none of the windows serving the surrounding properties meet the assessment criteria. Therefore, VSC and APSH/WPSH assessments were not carried out for these properties.

Accordingly, the only assessment undertaken for the surrounding properties relates to sunlight availability (SOG)to the rear gardens of 18 Coolamber Road and 49A Coolamber Drive.

The results of the impact assessments can be found in section A.0 on page 26. These results are summarised in section 1.2 and explained in section "3.1 Analysis of Impact Assessment Results" on page 19.

Scheme Performance

- **Spatial Daylight Autonomy (SDA):** Assessment of daylight availability within the habitable rooms of the assessed buildings of the proposed development, which include :

- Apartment blocks (Plots D1 & D2)
- Duplexes (Plots A3 & A4)
- Apartment units -part of Age Friendly Housing (Plot BZ)

- **Sunlight Exposure (SE):** Assessment of sunlight exposure within the same habitable rooms.
- **Sun on Ground (SOG):** Assessment of sunlight availability across the proposed external amenity spaces (Public and Communal Open Spaces) on March 21st. This date corresponds to the spring equinox, when day and night are of approximately equal duration, and is commonly used as a representative assessment date.



Figure 1.2: Model View of the proposed development.

The results of these scheme performance assessments, which are in accordance with the BRE Guidelines, can be found in section C.0 on page 37. These results are summarised in section 1.3 and explained in section "3.2 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 D.0 on page 69.

Qualitative Assessment

In addition to the quantitative assessments detailed in the 'Impact Assessment' and 'Scheme Performance' sections, a qualitative assessment has been undertaken to provide further understanding of the variation in sunlight across the surrounding environment. This includes:

- **Shadow Study:** Hourly renderings illustrating shadow movement and extent of shadow on three key dates: the spring equinox (March 21st), summer solstice (June 21st), and winter solstice (December 21st) (section B.0 on page 28).

The false colour plans produced as part of the Sun on Ground (SOG) assessment (section C.4 on page 67) also provide a qualitative indication of sunlight distribution across the amenity areas.

1.2 Impact Assessment Results Overview - Neighbouring Properties:

The levels of effect in the tables below describe the effect the proposed development would have, based on its compliance with the various BRE Target Values. A full list of definitions and a numerical rationale for each can be found in the section "Definition of Effects" on page 90 of this report.

Effect to Sun On Ground (SOG):

Effect to Sun On Ground (SOG)	
Assessed Areas/Gardens Total	2
Compliance Total	2
Categorisation of Effects	
Beneficial Impact*	0
Negligible	2
Minor Adverse	0
Moderate Adverse	0
Major Adverse	0
n.a.**	0

* 'Beneficial Impact' will only be stated if the ratio of change is greater than 1.20 (an improvement of 20%). Should less perceptible improvements occur a 'Negligible' level of effect will be stated.

**In instances where a baseline value is particularly low, levels of effects can appear exaggerated. To mitigate such occurrences, if the baseline value in the VSC, APSH/WPSH or SOG studies is below 1%, 3DDB have categorised the level of effect as n.a. (not applicable).

1.3 Scheme Performance Results Overview:

Spatial Daylight Autonomy (SDA):

Spatial Daylight Autonomy (SDA) BRE 209 Criteria	
Unit Count	80
Rooms Assessed	221
Without Trees	
Compliant	219
Non-compliant	2
Compliance Rate*	c. 99%
With Trees (Proposed and Existing Trees)	
Compliant	219
Non-compliant	2
Compliance Rate*	c. 99%
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 the rooms that have been assessed within the Apartment Blocks, Duplexes and Age Friendly Living units of the proposed development. Compensatory design solutions have been provided by the project architects for units which contain non-compliant rooms.

Sunlight Exposure (SE):

Sunlight Exposure (SE)	
Units Assessed	80
SE without deciduous trees	
Non-Compliant	3
Minimum	8
Medium	7
High	62
Compliance Rate*	c. 96%
SE with all trees	
Non-Compliant	3
Minimum	8
Medium	8
High	61
Compliance Rate*	c. 96%

For the interpretation of levels of Sunlight Exposure please refer to “E.3 Definition of Levels of Sunlight Exposure” on page 91.

* Compliance rates stated for the SE analysis are based on the units that have been assessed.

Sun On Ground (SOG) in proposed amenity areas:

Sun On Ground (SOG)	
Areas Assessed	6
Areas meeting the guidelines	6
Areas not meeting the guidelines	0

1.4 Supplementary Assessment Results Overview

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

* Compliance rates stated for the SDA analysis are based on the rooms that have been assessed. 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 be 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.

Spatial Daylight Autonomy (SDA) under I.S. EN 17037 Criterion	
Unit Count	80
Rooms Assessed	221
Without Trees	
Compliant	191
Non-compliant	30
Compliance Rate*	c. 86%
With Trees (Proposed and Existing Trees)	
Compliant	180
Non-compliant	41
Compliance Rate*	c. 81%
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)	

No Sky Line (NSL):

* Compliance rates stated for the NSL analysis are based on the rooms that have been assessed.

No Sky Line (NSL):	
Unit Count	80
Rooms Assessed	221
Yes	217
No	4
Compliance Rate*	c. 98%
Note: 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.	

2.0 Methodology

2.1 Impact Assessment, Window Selection Criteria

To determine the properties to be included in the impact assessment, the decision chart taken from Figure 20 of the BRE Guidelines has been followed, as shown in Figure 2.1 below.

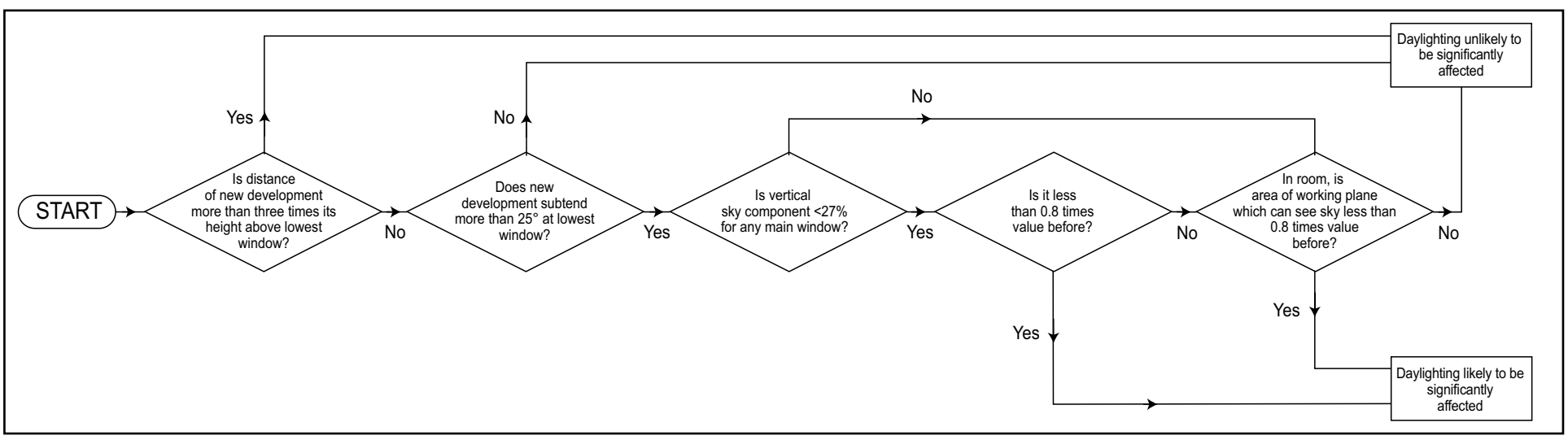


Figure 2.1: VSC decision chart, replicated from section 2.2 of the BRE Guidelines.



Figure 2.2: Properties within three times the height of the proposed development

Accordingly, all properties located within a distance of three times the height of the proposed development, as illustrated in Figure 2.2, have been considered for the impact assessment. This includes two surrounding properties, 18 Coolamber Road and 49A Coolamber Drive, as indicated in Figure 2.2.



Figure 2.3: Aerial view of the neighbouring properties.

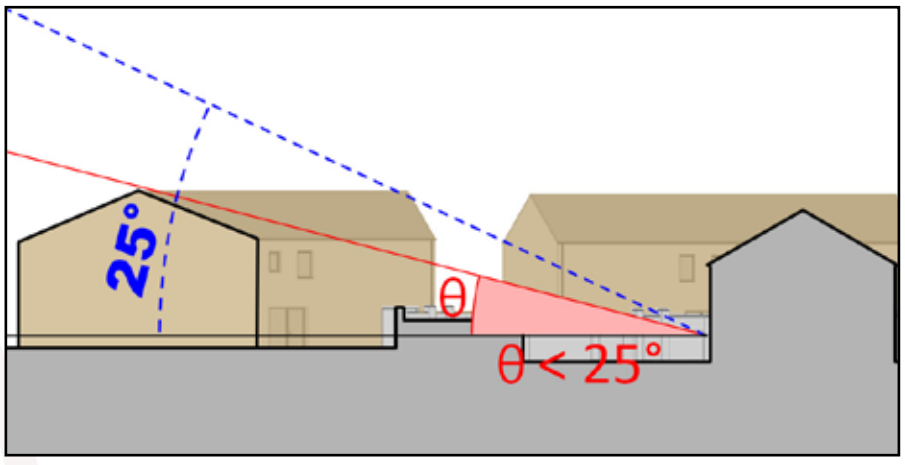


Figure 2.4: Example Section B-B taken through 18 Coolamber Rd.

Based on a review of publicly available information, none of the façades of these properties that directly face the proposed development appear to contain windows serving habitable rooms. (as shown in Figure 2.3). Therefore, windows located on walls perpendicular to the proposed development were also investigated.

Figure 2.4 shows a perpendicular section through 18 Coolamber Road, which is the property in closest proximity to the proposed development. This provides an example where an existing window is located within three times the height of the proposed development; however, the proposed development does not subtend an angle of 25° when measured in the perpendicular section.

As recommended in Section 2.2.5 of the BRE Guidelines, a perpendicular section has been drawn from the main window wall of the potentially affected properties to determine whether the proposed development subtends an angle of more than 25° at the lowest window. Where the proposed development subtends an angle of 25° or more in this perpendicular section, a VSC assessment should be undertaken. Conversely, where the proposed development does not subtend 25°, daylight is unlikely to be significantly affected and no further assessment is required.

Additionally, if a proposed obstruction falls within 45° when measured both in a plan and elevation view, then it is also appropriate to conduct a VSC impact assessment to determine if daylight will be affected. This is referred to in section 2.2.17 of the BRE Guidelines as the '45° approach'. The 45° approach was also considered when identifying properties for inclusion in the impact assessment.

Based on the selection criteria outlined above, none of the windows serving habitable rooms within the assessed properties required further daylight assessment. The same conclusion applies to NSL and APSH/WPSH assessments, which have their own additional selection criteria, as outlined in the following sections.

According to section 2.2.10 of the BRE Guidelines, it is advisable that where VSC assessments are conducted, a No Sky Line (NSL) assessment should also be carried out where room layouts are known. However, an NSL assessment requires accurate dimensions and layouts of the existing rooms and windows. Due to the common lack of availability regarding the required information, as is the case with the assessed properties of this study, NSL assessments are often not feasible when assessing impact on existing properties. A detailed description regarding the methodology of the VSC assessment can be found in 2.3.1 on page 13.

Section 3.2.9 of BRE Guidelines also applies 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. The BRE recommends assessing the main living rooms of dwellings and conservatories, while APSH/WPSH assessments are typically not required for kitchens and bedrooms.

In practice, 3DDB include all windows meeting the proximity criteria in an APSH/WPSH assessment if they are reasonably assumed to serve habitable spaces. This approach avoids distinguishing whether the windows serve bedrooms or living areas, thereby eliminating the need to make assumptions about the specific functions of rooms in existing dwellings.

While section 2.1.21 and 2.2.23 of the BRE Guidelines recommends conducting an impact assessment on the lowest window where daylight/sunlight is needed, if a property is found to have a window potentially affected by the proposed development, based on the previously explained criteria, other windows facing the proposed development on that property may also be assessed. This approach provides a more comprehensive understanding of the overall impact on the property.

2.2 Preparing the analytical model

2.2.1 Building the Model States

The project architect, Metropolitan Workshop supplied 3DDB with 3D model of the proposed development from which a detailed 3D analytical model was created. Landscape drawings were provided by AECOM.

In line with standard practice, a desktop-based approach has been adopted to gather information regarding the existing subject site and its surroundings. In lieu of a bespoke on-site survey, a combination of available survey information, aerial photography, and ordnance survey data was used to model the context and assessed buildings. As information gathered from online sources is not as precise as a physical survey, a reasonable tolerance should be allowed for the placement of windows, boundary treatments, and the results generated.

Baseline model state

As illustrated in Figure 2.5, the baseline model state reflects the existing environment. It includes the surrounding context and the subject site in their current standing. This includes any structures that are to be demolished as part of this application. Existing trees were placed using topographical survey information with assumptions made regarding exact size, position and species. Special consideration has been given to the main woodland areas, where trees were identified as forming dense groups or belts and may therefore be included in the specific assessment regardless of whether the foliage is deciduous or evergreen. Further explanation regarding trees approach are provided in section 2.2.2 on page 12.

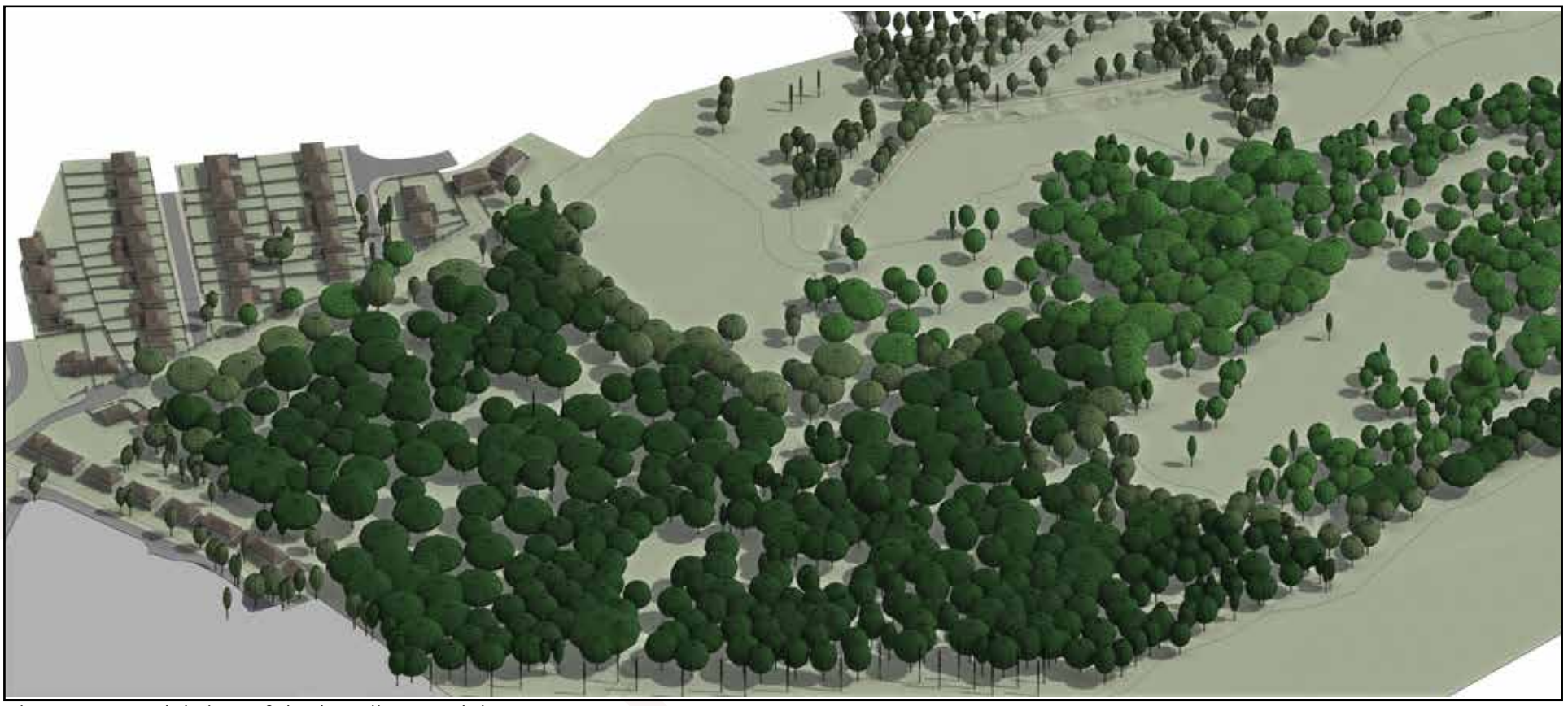


Figure 2.5: Model view of the baseline model state

Proposed model state

As illustrated in Figure 2.6, 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 accurately positioned in their location on the subject site with relevant surrounding context included. Simplified models of proposed trees within the development are also included according to the information provided by the landscape architect, with removal of existing trees also taken into account.

The assessment model includes all surrounding windows identified in accordance with the screening criteria for impact assessment, as set out in section 2.1 of this report. This ensures that all receptors with the potential to experience an adverse effect have been captured within the VSC and APSH/WPSH analysis.

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



Figure 2.6: Model view of the proposed model state

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

2.2.2 Trees

As stated in section 3.3.9 of the BRE Guidelines, the exact shapes of trees are “almost impossible to predict”. When modelling trees for assessments tree geometry is simplified. Where tree survey information is not provided, the position and size of existing trees are estimated using photogrammetry information. The shape of the trees is simplified and an average transmittance value is applied using information from table G1 from the BRE Guidelines. Simplified models of proposed trees within the development are also 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)

Section G1.2 of the BRE Guidelines states that when assessing the effect a new development would have on existing buildings, “it is usual to ignore the effect of existing 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)

Regarding SOG assessments, section G4.1 of the BRE Guidelines states:

“...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 are not 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)

Section G3.1 of the BRE Guidelines states 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. Firstly, with all 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 dates from *BRE Digest 350*, appropriate light transmittance values are applied to deciduous trees to represent the ‘full leaf’ and ‘bare branch’ states.

Evergreen trees are represented as ‘full-leaf’ throughout the year.

The BRE Guidelines (section G2.3) also state:

“The calculation model should account for the obstruction to daylight caused by the trees. This needs to be done by modelling a representative shape of the trees. Often trees are irregularly shaped and simple modelling, using height and spread data and assuming a circular tree, will give inaccurate results. A special survey on site is generally required to produce the required data on the tree profile, using a clinometer or other device to measure tree height. Buildings and other solid objects should also be taken into account.”

In the absence of a ‘special survey’ being conducted, as mentioned above, simplified models representing trees are used. The information for these trees is taken from photogrammetry information and an arborist report when available. A reasonable tolerance should be applied to the results generated to account for trees not being represented exactly as they appear on site.

Units are also 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 is carried out with trees represented in the same manner as the BR 209 assessment. Units are also 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 are not 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 are generated with evergreen trees represented as opaque objects, where applicable, and typically 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.

2.3 Quantitative Impact Assessment Overview

2.3.1 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 2.1 outlines the decision process which was used to determine the appropriate properties to be included in the VSC impact assessment.

For proposed developments, all properties within a distance of three times the height of the proposed development are considered with regards to an 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 Sky Line 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.

Where applicable, 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.

Section 2.1.6 of the BRE Guidelines states 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.

Where a VSC assessment is warranted, the values for each relevant window/room may be calculated in the corresponding model states, as outlined in section 2.2 on page 10. A comparison of these results can be used to indicate 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 (section 2.2.2), 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 may be included in this study to give a more comprehensive assessment.

Assessment Points

The VSC impact assessment is 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 will be 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 estimations 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 2.1 on page 8, 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 adverse daylight effects on surrounding properties would not be expected under the BRE assessment criteria.

2.3.2 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 its 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 an angle of 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, section 3.2.3 of the BRE Guidelines suggest that windows with an orientation within 90 degrees of due south should be assessed.

Section 2.1 outlines the decision process which is used to determine the appropriate properties to be included in an APSH/WPSH impact assessment.

The APSH/WPSH for each of the assessed windows should be calculated in the relevant model states, as outlined in section 2.2 on page 10. A comparison between the results generated using these model states can be used to determine the level of effect.

If it can be determined or reasonably assumed that multiple windows are servicing the same room, the APSH/WPSH will be assessed for the room as opposed to each individual window. 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. Despite being two components of the same technical study, the results for APSH and WPSH are presented separately in this report. This approach distinguishes between annual and winter sunlight impacts, thereby facilitating a more detailed analysis of the effect of the proposed development.

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 (Section 3.2.6), 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.)

According to section 3.2.3 of the BRE Guidelines, only main living-rooms, or rooms comprising living space, 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 will be 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, floors above ground floor level may be 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 2.1 on page 8, 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 adverse sunlight effects on surrounding properties would not be expected under the BRE assessment criteria.

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

Section 3.3.17 of 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 do not provide 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 a shadow study and/or false colour plans.

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.

In accordance with section 3.3.9 of the BRE Guidelines, deciduous trees will not typically be included unless there is a particularly dense belt. The analytical model for SOG impact assessment includes evergreen trees, where applicable.

Where applicable, the percentage of assessed areas which can receive two hours or more of direct sunlight on March 21st is calculated in the relevant model states, as outlined in section 2.2 on page 10. A comparison between the results generated with these model states can be used to 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 north of the proposed development, as areas located to the south are unlikely to be affected as the sun does not cast shadows in this direction. Overshadowing is highly unlikely to occur in areas that are due south of any proposed development.

Project Assessment

The SOG impact assessment has been carried out on the neighbouring gardens/amenity areas that could be affected by the proposed development as outlined above.

The assessed properties are 18 Coolamber Rd and 49A Coolamber Dr.

The false colour plans of the proposed SOG assessment section C.4 on page 67 and the hourly renderings of the shadow study in section B.0 on page 28, allow for a qualitative sunlight assessment of the surrounding areas.

The results of the impact to sun on ground assessment in the neighbouring gardens/amenity areas (including a visual representation in the form of 2-hour false colour plans) can be found in the appendix results section A.1 on page 26, with analysis of the results in section 3.1 on page 19.

2.4 Qualitative Assessment - Shadow Study

2.4.1 Shadow Study

A shadow study has been carried out to allow a qualitative comparison between the relevant model states, as outlined in section 2.2 on page 10. This visual representation of the shadows cast by the proposed development can be found in the hourly shadow diagrams in the appendix results section B.0 on page 28.

Hourly renderings have been shown from sunrise to sunset on the following dates in 2026:

- Spring equinox: March 21st Sunrise 6:32 | Sunset 18:32. (GMT)
- Summer solstice: June 21st Sunrise 5:04 | Sunset 21:49. (BST) (Daylight savings)
- 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 2.2.1. 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 section 3.3.14 of the BRE Guidelines.

2.5 Quantitative Scheme Performance Assessment Overview

2.5.1 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 as the preferred SDA assessment methodology by 3DDB. A localised EnergyPlus Weather File is used to apply the relevant climate information. In the case of this report, the weather file used is IRL_EM_Casement.AP.039670_TMYx.epw).

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 be 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

The definition of rooms are typically taken directly from the architectural drawings supplied by the project architect. Sometimes, the applied names of rooms may differ slightly. e.g. A “Kitchen / Living / Dining room (KLD)” may be referred to as a ‘Living / Kitchen / Dining room’ (LKD).

According to section 2.1.14 of the BRE Guidelines areas like bathrooms, stairwells, garages, and storage areas do not have a special requirement for daylight. As such these spaces have not been assessed.

Where an SDA assessment has been conducted, an indication of the assessed space in each room will be indicated in the floor plans that correspond to the SDA results in the appendix section “Proposed Floor Plans” on page 37.

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 project's architect, material values used for SDA calculations are as per the table below:

Table No. 2.5.1 - Material Palette for SDA Calculations

Object	Material	Reflectance	Object	Material	Reflectance / Transmittance
Exterior walls	Standard Brick	0.3	Interior Walls	Pastel paint	0.7
	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	Glass transmittance value	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 C.2 on page 47.

Analysis of the results can be found in section 3.2.1 on page 20.

The results of the supplementary SDA study under the I.S. EN 17037 criterion can be found in section D.0 on page 69.

This study indicates the daylight potential of the proposed development. As-built daylight performance within the occupied development may vary from the results of this assessment due to changes to the exterior context, weather conditions and/or occupiers choice of interior finishes and furniture placement.

2.5.2 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. Section 3.1.10 of the BRE guidelines suggests 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 section G3 of 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 assessed 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 (whichever 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 C.3 on page 57, with analysis of the results in section 3.2.2 on page 21.

This study predicts the sunlight potential of the proposed units. Real-world performance post-construction can vary based on actual weather patterns and any alterations to the external environment.

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

Section 3.3.17 of the BRE Guidelines recommends 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 section G4.1 of the BRE Guidelines. Typically deciduous trees will not be included unless there is a particularly dense belt.

A quantitative SOG assessment may be carried out on the areas as indicated by the project architect. Shadow studies and false colour plans can 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 should be calculated individually. These areas can be combined to give the development average where appropriate.

Project Assessment

The levels of sunlight 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 of 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 C.4 on page 67, with analysis of the results in section 3.2.3 on page 22.

This analysis quantifies the anticipated sunlight levels within the assessed amenity areas. The as-built outcome is subject to variation, depending on real-world weather and any changes to the exterior setting.

2.5.4 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.

Section D3 of the BRE Guidelines recommends 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 (section 2.2) 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).

Since the BRE Guidelines do not provide a recommended minimum NSL for proposed developments, compliance rates are calculated using criteria applied by 3DDB, derived from the logic of the Guidelines. Specifically, an NSL of 80% is considered an appropriate benchmark; this aligns with Section 2.2.10 of the BRE Guidelines, which states that supplementary electric lighting is required if a significant portion of the working plane—defined as 20% or more—lies beyond the No Sky Line.

The results of the supplementary NSL study can be found in section D.0 on page 69.

3.0 Analysis of Results

3.1 Analysis of Impact Assessment Results

3.1.1 Effect on Sun On Ground in Existing Gardens

This study has assessed the effect the proposed development would have on the level of sunlight on March 21st in the rear gardens of the neighbouring properties 18 Coolamber Rd and 49A Coolamber Dr.

In total 2 no. spaces have been assessed. Using the rationale explained in section E.2 on page 90, effect on the SOG of these spaces would be considered 'negligible'.

These results are positive and expected, as only two surrounding gardens were identified as requiring assessment (shown in Figure 3.1). The main part of the development is not closely surrounded by existing structures. The proposed buildings in closest proximity to the existing properties are generally of a similar character and scale to the surrounding dwellings; therefore, their impact on the surrounding gardens is considered 'negligible'.



Figure 3.1: The private gardens assessed for SOG assessment.

The results of the Sun On Ground study (SOG) on the neighbouring gardens can be found in section A.1 on page 26.

A visual representation of these readings can be seen in the 2 hour false colour plans in section A.1 and in the hourly shadow diagrams for March 21st in section B.1 on page 28.

3.2 Analysis of Scheme Performance Results

3.2.1 Spatial Daylight Autonomy (SDA)

This study has assessed the Spatial Daylight Autonomy (SDA) for habitable rooms of assessed buildings within the proposed development both with and without trees. This dual approach ensures a comprehensive understanding of the development's daylight potential. The assessed buildings include: the apartment blocks (Plot D1 and D2) , duplexes (Plots A3, A4) and apartment units of Age Friendly Living (Plot BZ).

The assessed buildings contain 80 no. units, which makes up approximately 221 no. habitable rooms.

Under the criteria as set out in the BR 209, considering trees, the SDA value in 219 no. habitable rooms meets or exceeds the appropriate target values. This gives a circa compliance rate of 99%. For a scheme of this size, this could be considered an excellent level of compliance, which was to be expected given the low-density character of the development.

The additional SDA assessment, which excludes trees, has shown the same overall compliance rate. This indicates that the proposed trees have been carefully arranged to minimise their potential impact on daylight availability. The isolated instances initially identified where trees affected compliance have been addressed and reduced through the design process. The site retains woodland character, with a substantial number of existing trees. However, the distance between the assessed buildings and the denser parts of the tree groups helps to minimise their potential effect on performance.

The assessed buildings include Age Friendly Housing Apartments. Occupants of these units may have specific requirements associated with age and mobility. All 10 assessed rooms in the Age Friendly units meet their SDA targets with and without trees.

There are only two non-compliant rooms, D2.01.08 LKD and D2.02.16 LKD, the locations of which are indicated in Figure 3.2. Their respective SDA values are 38% and 43% (in models including trees). The relatively deep layouts of these rooms make them particularly sensitive to their orientation and the constraints imposed by neighbouring elements of the proposed development, which collectively contribute to the reduced SDA values.

Floor plans indicating unit numbers can be found in section C.1 on page 37. The results for the study on SDA can be seen in section C.2 on page 47.

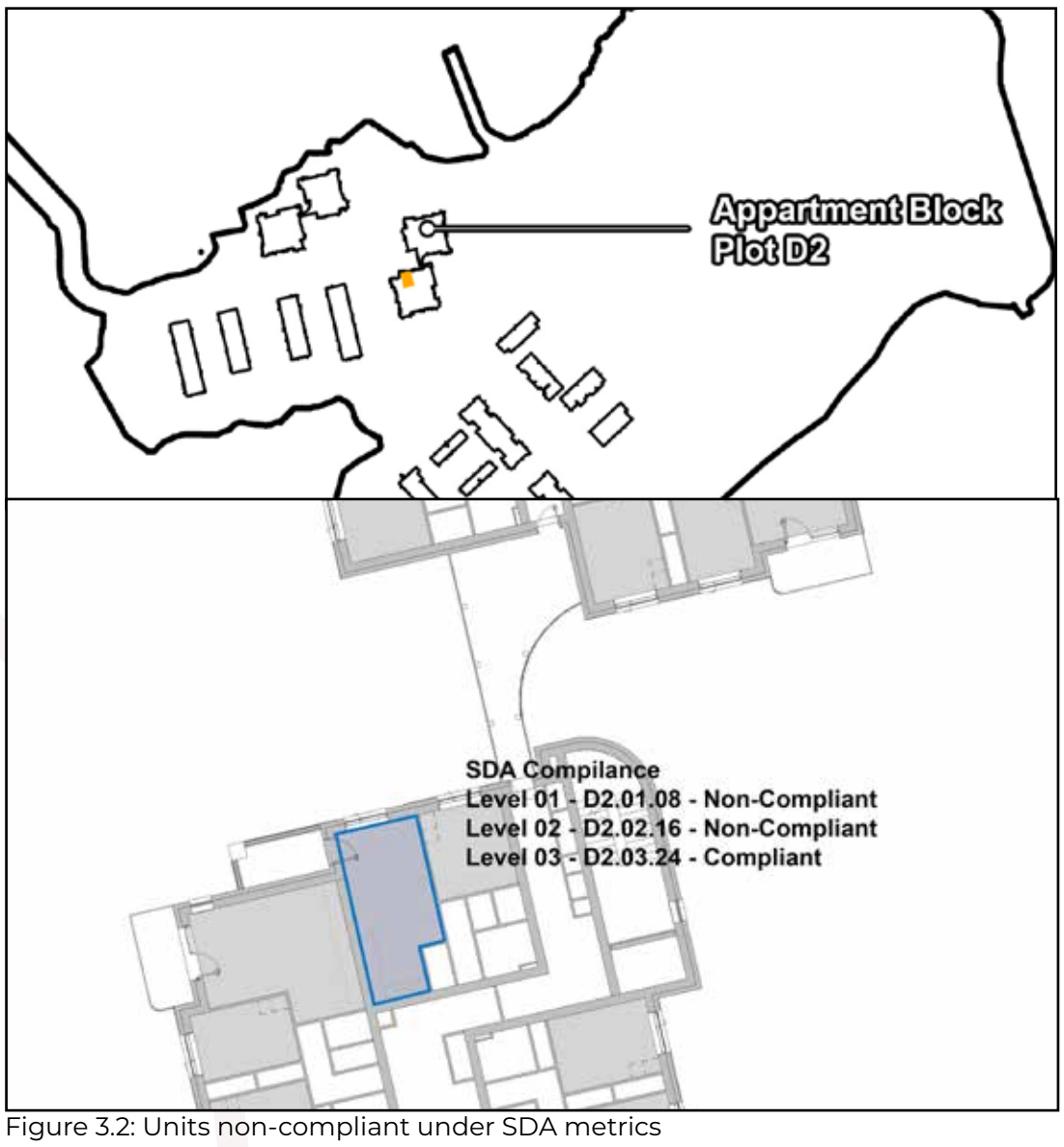


Figure 3.2: Units non-compliant under SDA metrics

Compensatory Design Solutions (CDS)

This report identifies where assessed rooms do not meet the daylight targets set in section 2.1 of the BRE Guidelines. It is intended to inform the relevant authority's discretionary review, which is based on an assessment of the project's specific circumstances.

The project architect has provided a rationale and/ or a compensatory design solution for rooms that does not achieve the recommended daylight levels in BR 209 **(D2.01.08 LKD and D2.02.16 LKD)**

- Both one-bedroom apartments are generously sized at 51 m², exceeding the minimum floor area requirements.
- The units also benefit from private amenity spaces that surpass the minimum standards, providing a higher quality and more usable outdoor environment in this location. In addition, the kitchen, living and dining spaces are dual aspect, allowing for attractive views towards Rathcoole Park.

Collectively, these factors help to offset the identified shortfall and contribute to a high-quality residential environment for future occupants

SDA Assessment under I.S.EN17037

I.S. EN 17037 sets out more onerous recommendations for SDA. As such, the number of the assessed residential habitable rooms achieving compliance under this standard is 180 in the assessment that includes trees. This gives a reduced circa compliance rate of c. 81%. The additional SDA assessment, under this standard, that does not include trees has shown a compliance rate of c. 86%.

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 be 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.

3.2.2 Sunlight Exposure (SE)

A sunlight exposure assessment has been carried out on all habitable rooms within assessed buildings of the proposed development. As part of this assessment, both existing surrounding trees and proposed trees have been incorporated into the analytical model and treated as opaque elements.

The assessments have been carried out in two states:

- All trees (evergreen and deciduous) included in the assessment model.
- Only evergreen trees included in the assessment model.

This approach provides a range of potential sunlight hours, accounting for the seasonal variability of deciduous trees and is in accordance with section G3 of the BRE Guidelines.

In total, 80 no. units have been assessed. Using the rationale explained in section E.3 on page 91, the level of sunlight exposure for the assessed units is as follows:

In the assessment carried out with all tree types:

- high: 61 no. (at least 4 hours)
- medium: 8 no. (at least 3 hours)
- minimum: 8 no. (at least 1.5 hours)
- below minimum recommendation: 3 no. (less than 1.5 hours)

With only evergreen trees included in the assessment model:

- high: 62 no. (at least 4 hours)
- medium: 7 no. (at least 3 hours)
- minimum: 8 no. (at least 1.5 hours)
- below minimum recommendation: 3 no. (less than 1.5 hours)

The SE assessment has shown that, regardless of the effect of trees, the approximate compliance rate for the assessed units, in accordance with the BRE Guidelines is 96%.

Note: For a unit to be compliant under BR 209, at least 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.

The three non-compliant units are indicated in Figure 3.3 with two of these also being among the units identified as non-compliant for SDA. Despite having west-facing windows, the views out from these units are constrained by the neighbouring proposed building elements.

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

The results for the study on SE in the habitable rooms of the proposed units can be seen in section C.3 on page 57.

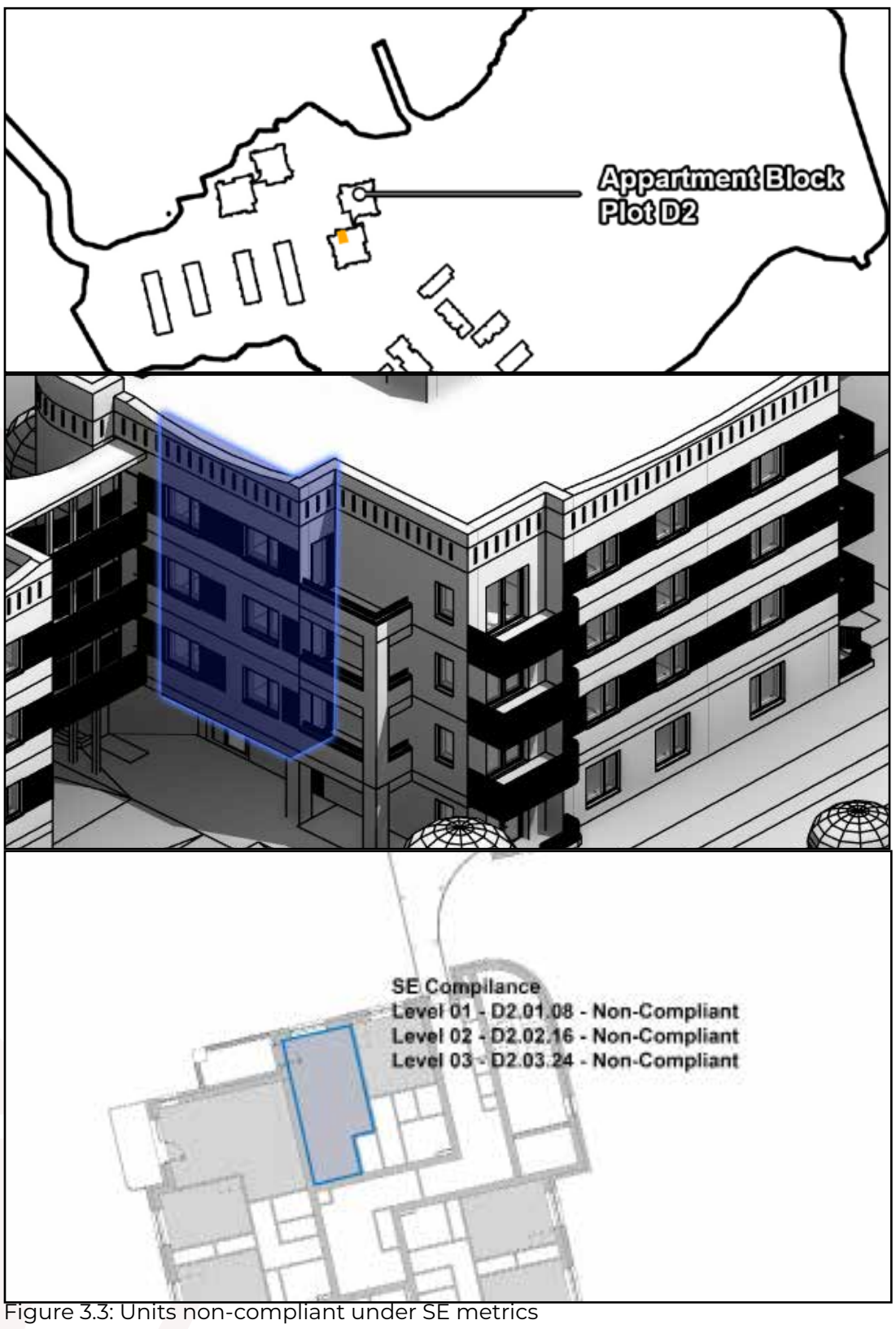


Figure 3.3: Units non-compliant under SE metrics

3.2.3 Sun On Ground in Proposed Outdoor Amenity Areas

This study has assessed the level of sunlight on March 21st within the proposed amenity areas as indicated in Figure 3.4 below.

In total 6 no. spaces have been assessed, comprising one Public Open Space (POS) and five Communal Open Spaces (COS). All six spaces meet the criteria set out in Section 3.3 of the BRE Guidelines.

The results demonstrate very positive sunlight performance, both in terms of overall compliance and the individual results achieved. Three of the assessed spaces (POS, COS 3, And COS 4) receive at least two hours of direct sunlight on 21 March across circa 100% of their respective areas. Communal COS 2 records the lowest result, with over 73% of its area receiving at least two hours of direct sunlight. Nevertheless, this remains comfortably above the BRE recommended minimum of 50%, further demonstrating the favourable sunlight conditions across the proposed open spaces.

The results for the study on sunlighting in the proposed outdoor amenity spaces can be found in section C.4 on page 67.

A visual representation of these readings can be seen in the false colour plan in section C.4 and in the hourly shadow diagrams for March 21st in section B.1 on page 28 of the appendix section of this report.



Figure 3.4: Indication of the amenity areas that have been analysed

4.0 Conclusion

3D Design Bureau (3DDB) were commissioned to carry out a daylight assessment, sunlight assessment and shadow study for the proposed Rathcoole Housing – Part 10 Application.



Figure 4.1: Scope of surrounding properties and environment assessed.

The impact assessment for this report has quantified the effect the proposed development would have on the level of daylight and sunlight received by neighbouring properties/environment that fall under the criteria outlined in section “2.1 Impact Assessment, Window Selection Criteria” on page 8. It covers the private gardens of 18 Coolamber Rd and 49a Coolamber Dr in Figure 4.1 above.

The assessed gardens experience a ‘negligible’ level of impact. This outcome was anticipated, given the limited interaction between the proposed development and the existing surrounding properties. The findings are also consistent with the wider impact assessment, as none of the windows serving habitable rooms within the surrounding properties met the selection criteria for further assessment under the VSC and APSH/WPSH methodologies. Consequently, no surrounding windows required detailed daylight or sunlight assessment.

The scheme performance assessment quantifies daylight and sunlight provision within the proposed apartment blocks (Plots D1 and D2), duplexes (Plots A3 and A4) and Age-Friendly apartment units (Plot BZ).

The proposed development demonstrates a high level of compliance across all daylight and sunlight metrics under the BRE Guidelines (BR 209). Spatial Daylight Autonomy (SDA) analysis indicates that approximately 99% of assessed habitable rooms (219 out of 221) meet or exceed their target lux thresholds both with and without tree considerations. The two non-compliant units benefit from compensatory design solutions, including generous floor areas above minimum standards, dual-aspect living spaces, oversized private amenity space, and parkland views.

Sunlight Exposure (SE) within the proposed units achieves an approximate 96% compliance rate (77 out of 80 units meeting at least the minimum exposure criteria) regardless of tree coverage.

Furthermore, all proposed outdoor amenity areas meet the Sun on Ground (SOG) recommendations, with a high proportion of each assessed area receiving at least two hours of direct sunlight on 21 March.

Overall, the proposed development demonstrates favourable daylight and sunlight performance within the assessed residential units and amenity areas, while resulting in a ‘negligible’ impact on surrounding properties.

Appendix - Results

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

A.0 Impact Assessment Results.

A.1 Effect on Sun On Ground (SOG) in Existing Gardens.

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

Table Example. A.1 - SOG Impact Assessment							
Assigned Area Number	Address	% of Area to Receive Above 2 Hours Sunlight on March 21st (Target ≥50%)				Level of Compliance with BRE Guidelines	Effect of Proposed Development
		Baseline	Proposed	Ratio of Proposed to Baseline	Recommended Minimum as per BRE Guidelines		
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**

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: Address

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

C: Baseline

Baseline represents the percentage of the assessed space's area that can receive more than 2 hours of sunlight on March 21st, calculated in the existing baseline model state (as explained in the "Building the Model States" on page 10).

D: Proposed

Proposed represents the percentage of the assessed space's area that can receive more than 2 hours of sunlight on March 21st, calculated in the proposed model state (as explained in the "Building the Model States" on page 10).

E: Ratio of Proposed to Baseline

This column expresses the ratio of change between the baseline and the proposed values. Section 3.3.17 of the BRE Guidelines recommends that if the proposed value is less than 0.8 times the baseline value, then the reduction to sunlight is more likely to be perceptible.

F: Recommended Minimum as per the BRE Guidelines

Section 3.3.17 of the BRE Guidelines indicate that a proposed development could possibly have a noticeable effect on the sunlight received by an existing garden and/or amenity area, if half the area of the space does not receive at least two hours of sunlight during the spring equinox; **and** the area that receives more than two hours of sun on the spring equinox is less than 0.8 times its former value.

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

G: Level of BRE Compliance

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

H: Effect of Proposed Development

The levels of effect in this column describe the effect an assessed area will experience, based on its compliance with the *BRE Target Value*. A full list of definitions and a numerical rationale for each can be found in the section *"Definition of Effects"* on page 90.

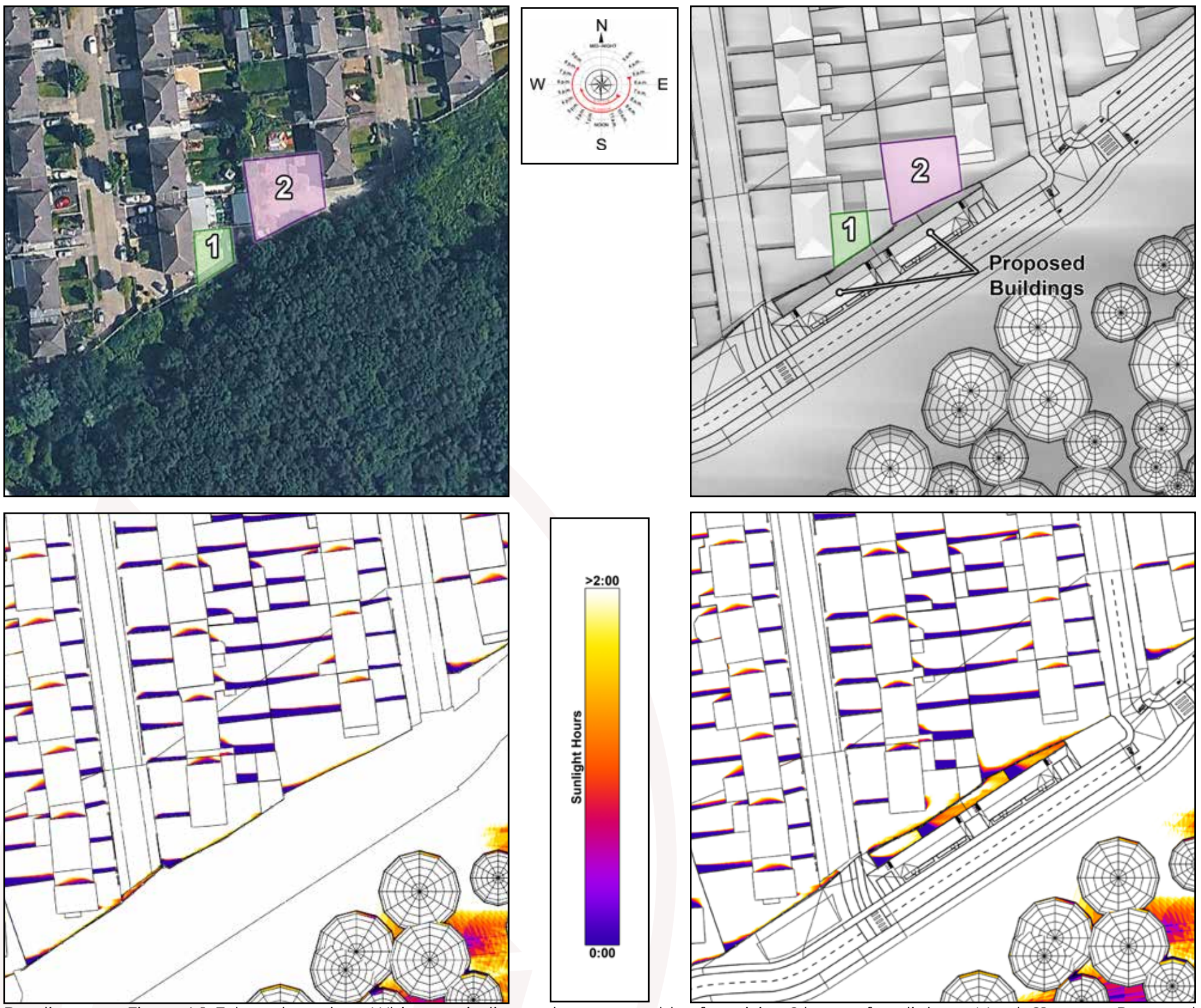
It should be noted that the figures displayed in the table of results have been rounded off. A manual calculation of these figures may yield a negligible difference and should not be considered an error.

A.1.1 SOG in Existing Gardens- Results.

Table No. A.1.1 - SOG Results:							
Assigned Area Number	Address	% of Area to Receive Above 2 Hours Sunlight on March 21st (Target ≥50%)				Level of Compliance with BRE Guidelines*	Effect of Proposed Development**
		Baseline	Proposed	Ratio of Proposed to Baseline	Recommended minimum		
1	18 Coolamber Road	96.63%	88.72%	0.92	50.00%	BRE Compliant	Negligible
2	49A Coolamber Dr	100.00%	90.65%	0.91	50.00%	BRE Compliant	Negligible

* Section 3.3.17 of the BRE Guidelines states that in order for a proposed development to have a noticeable effect on the amount of sunlight received in an existing garden or amenity area, the value needs to both drop below the stated target value of 50% **and** be reduced by more than 20% of the existing value.

** For the interpretation of level of effects please refer to “E.2 Definition of Effects” on page 90.



Baseline Figure A.1: False colour plans. White area indicates the area capable of receiving 2 hours of sunlight on March 21st. Proposed

N

Baseline	Proposed
March 21st 7:00	
March 21st 8:00	
March 21st 9:00	
March 21st 10:00	

B.0 B.1	Shadow Studies Shadow Study 21 March	Project: Rathcoole Housing – Part 10 Application	Proposed
	March 21st Sunrise 6:32 | Sunset 18:32	Applicant: South Dublin County Council	3D DESIGN BUREAU

N

	Baseline	Proposed
March 21st 11:00		
March 21st 12:00		
March 21st 13:00		
March 21st 14:00		

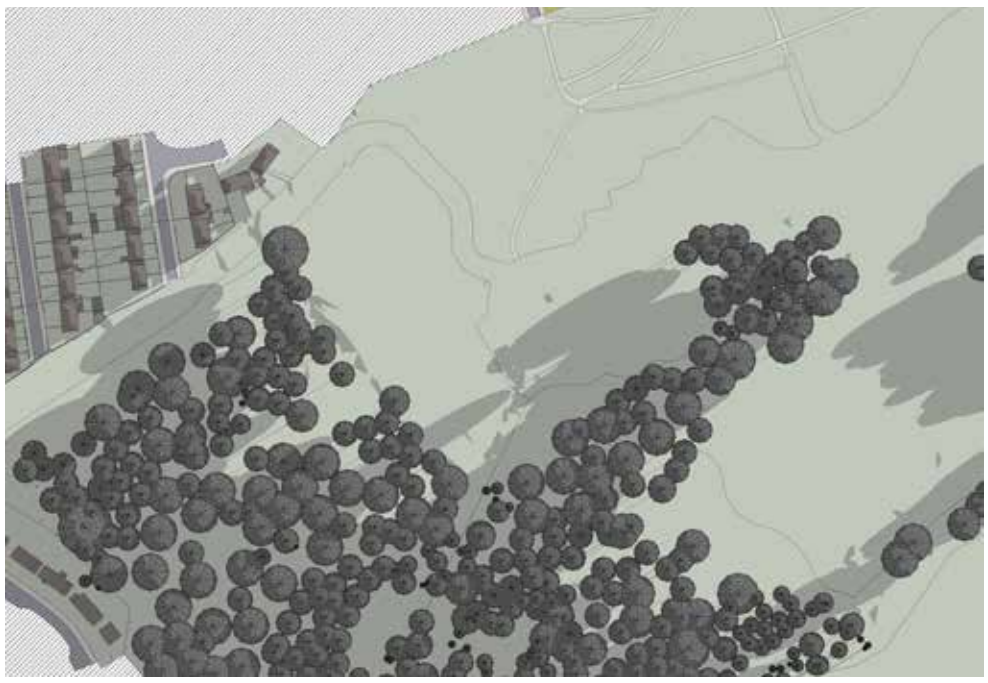
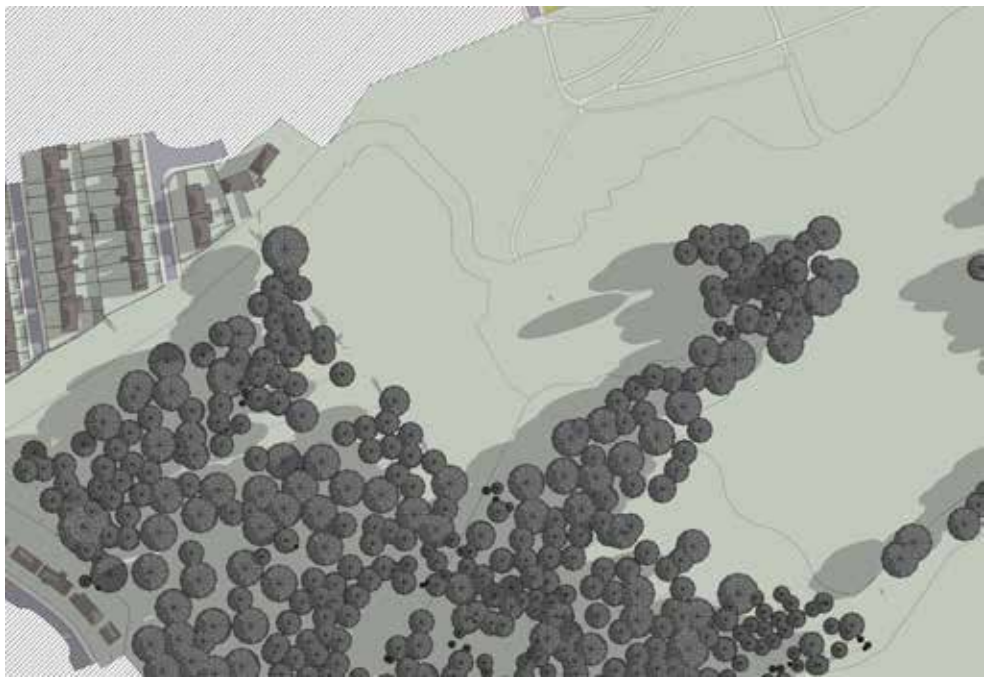
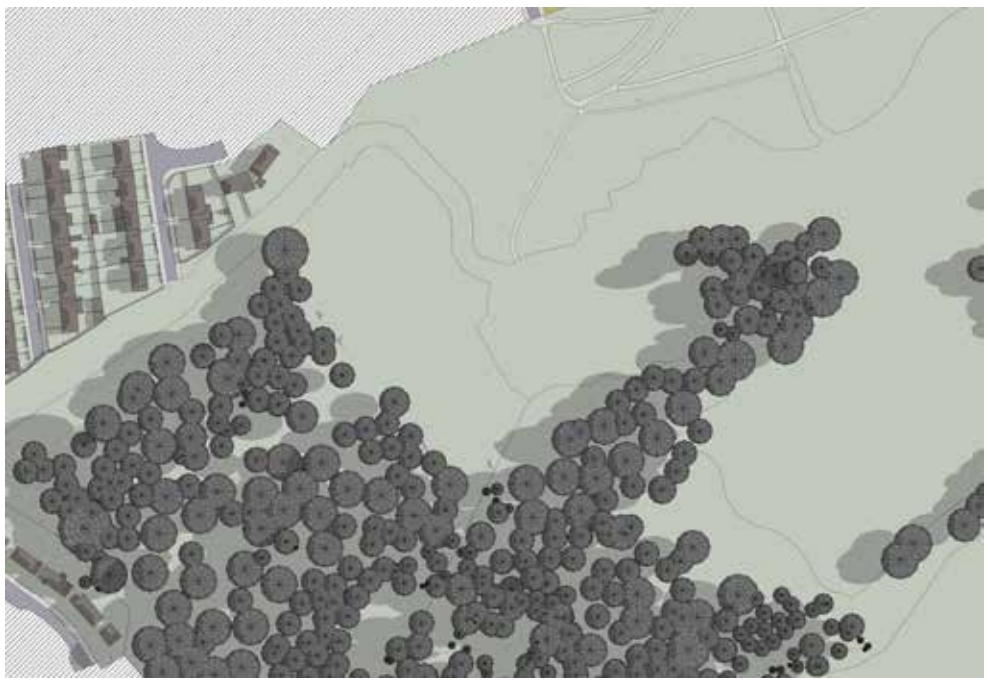
	Project: Rathcoole Housing – Part 10 Application	**Proposed**
March 21st Sunrise 6:32 | Sunset 18:32	**Applicant: South Dublin County Council**	3D DESIGN BUREAU

N

Baseline	Proposed
March 21st 15:00	
March 21st 16:00	
March 21st 17:00	
March 21st 18:00	

	Project: Rathcoole Housing – Part 10 Application	**Proposed**
March 21st Sunrise 6:32 | Sunset 18:32	**Applicant: South Dublin County Council**	3D DESIGN BUREAU

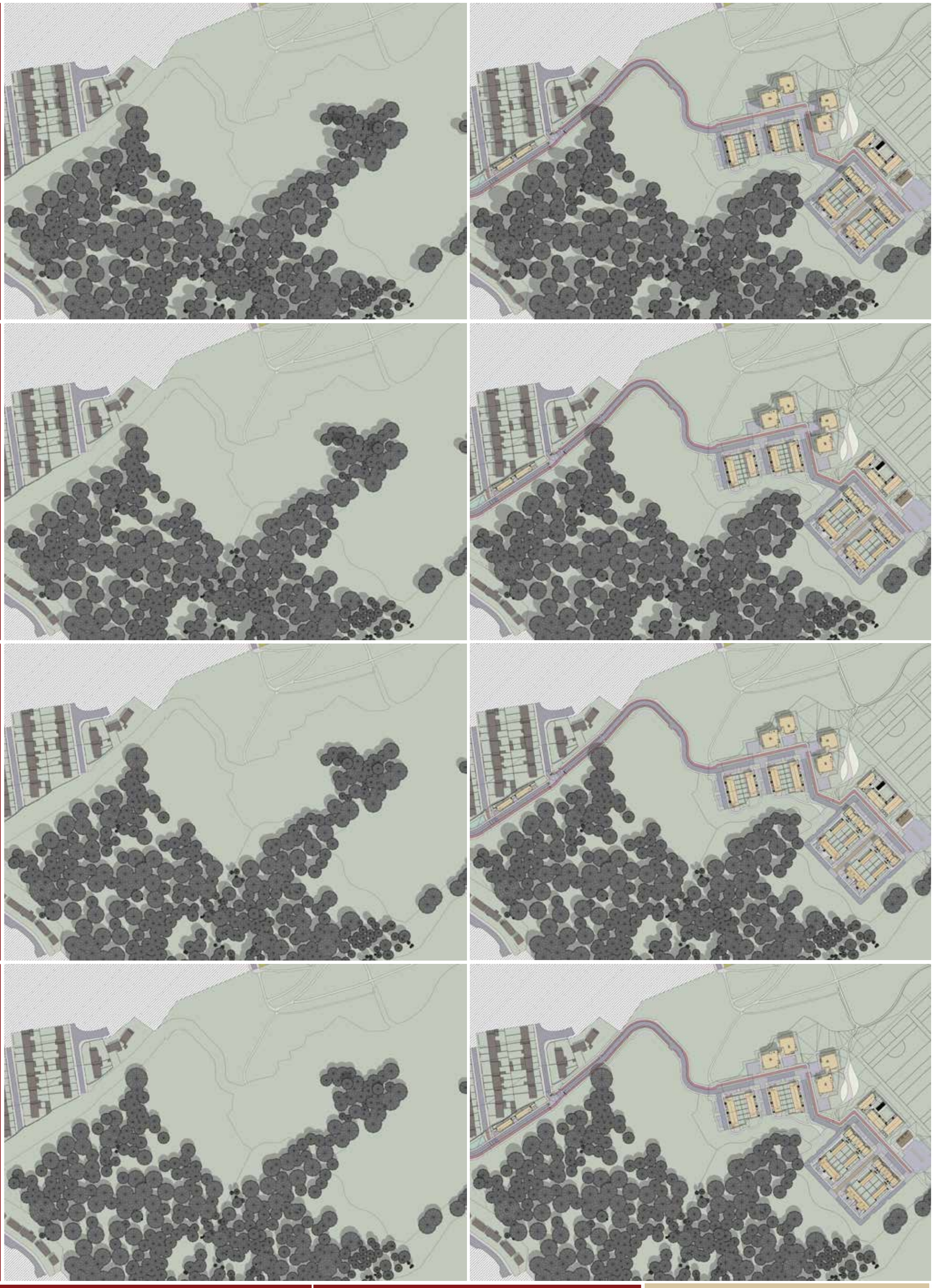
N

	Baseline	Proposed
June 21st 6:00		
June 21st 7:00		
June 21st 8:00		
June 21st 9:00		

B.2 Shadow Study 21 June	**Project: Rathcoole Housing – Part 10 Application**	**Proposed**
June 21st Sunrise 5:04 | Sunset 21:49	**Applicant: South Dublin County Council**	3D DESIGN BUREAU

N

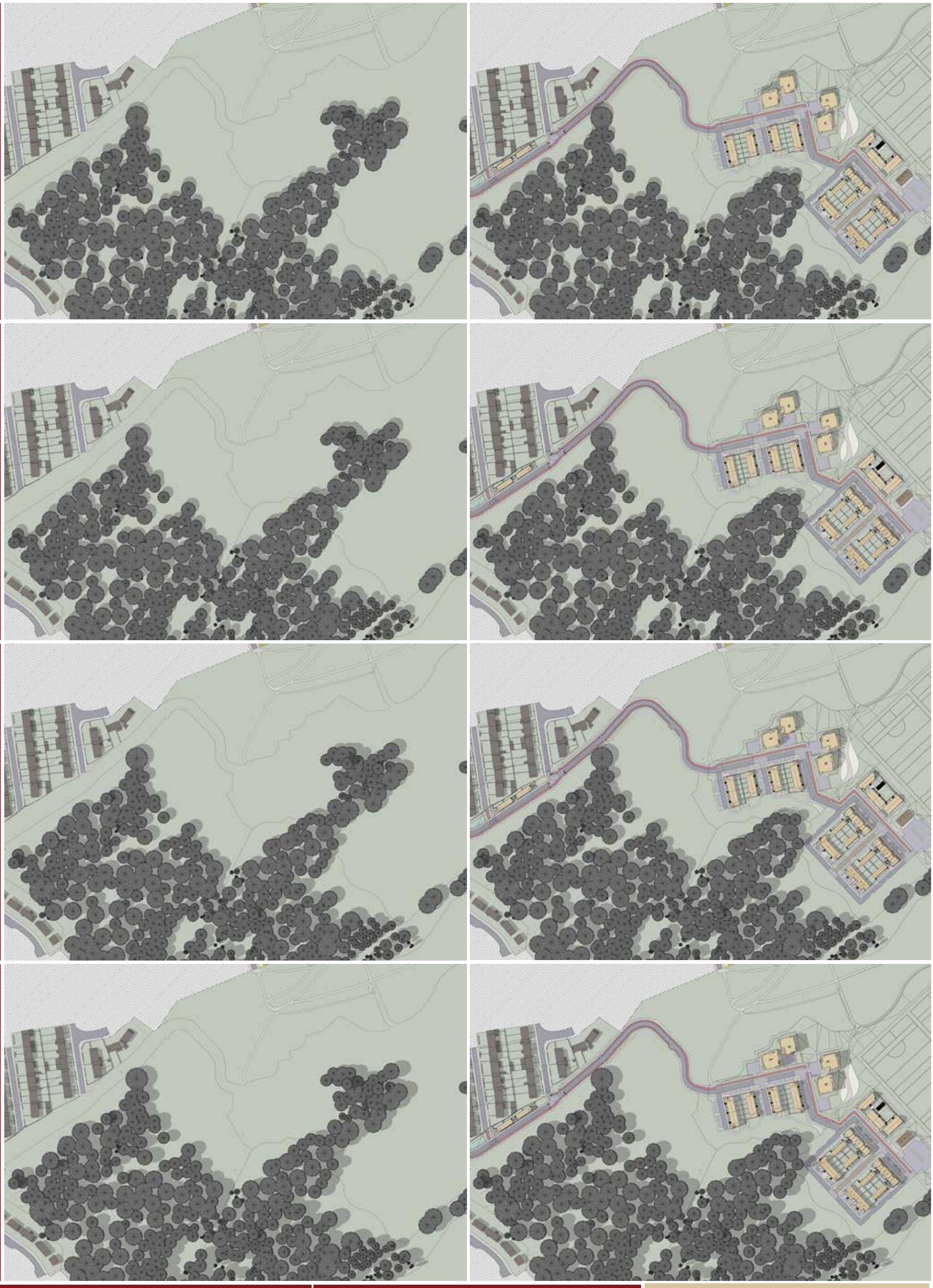
Baseline	Proposed
June 21st 10:00	
June 21st 11:00	
June 21st 12:00	
June 21st 13:00	



	Project: Rathcoole Housing – Part 10 Application	**Proposed**
June 21st Sunrise 5:04 | Sunset 21:49	**Applicant: South Dublin County Council**	3D DESIGN BUREAU

N

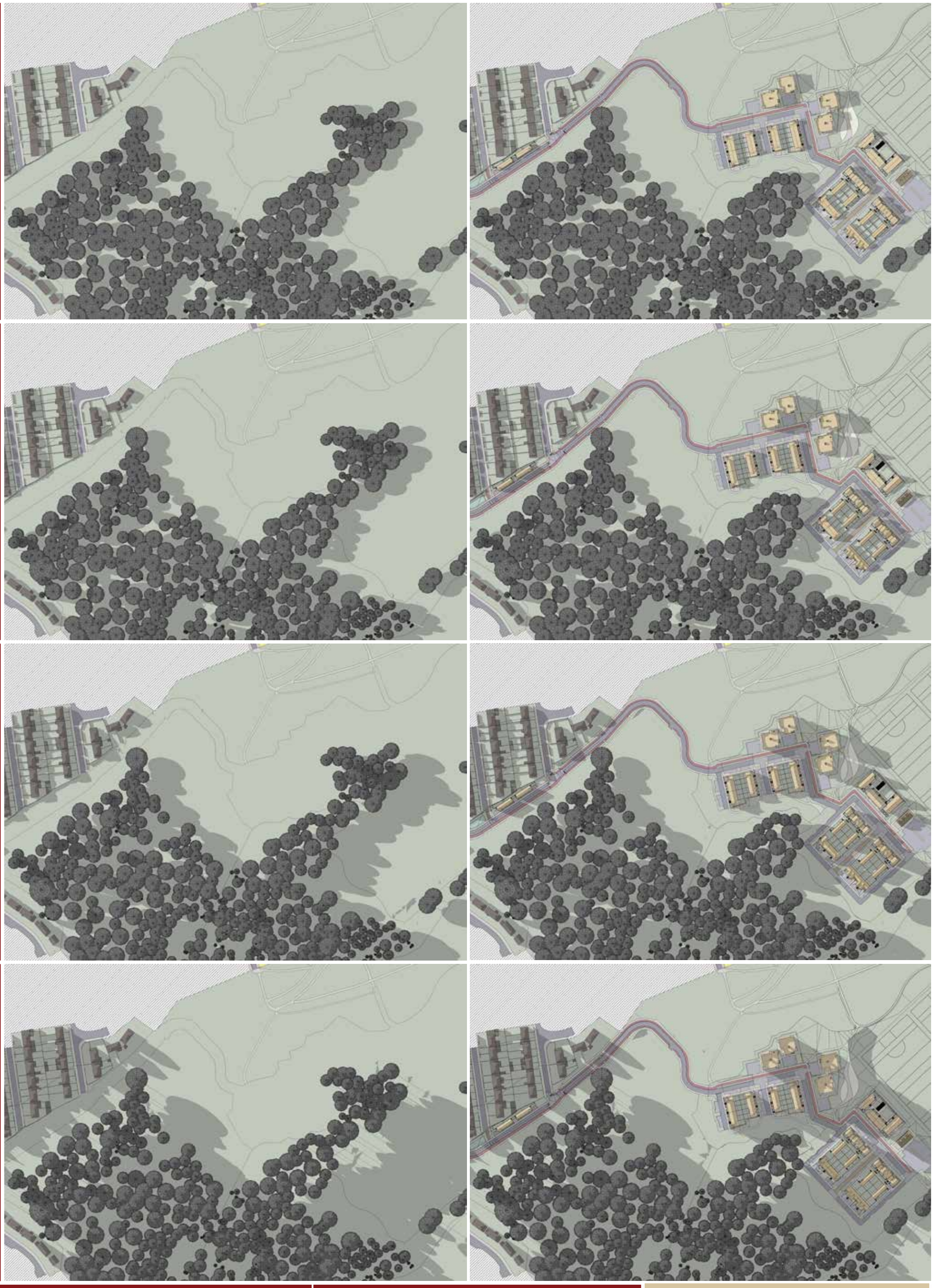
Baseline	Proposed
June 21st 14:00	
June 21st 15:00	
June 21st 16:00	
June 21st 17:00	



	Project: Rathcoole Housing – Part 10 Application	**Proposed**
June 21st Sunrise 5:04 | Sunset 21:49	**Applicant: South Dublin County Council**	3D DESIGN BUREAU

N

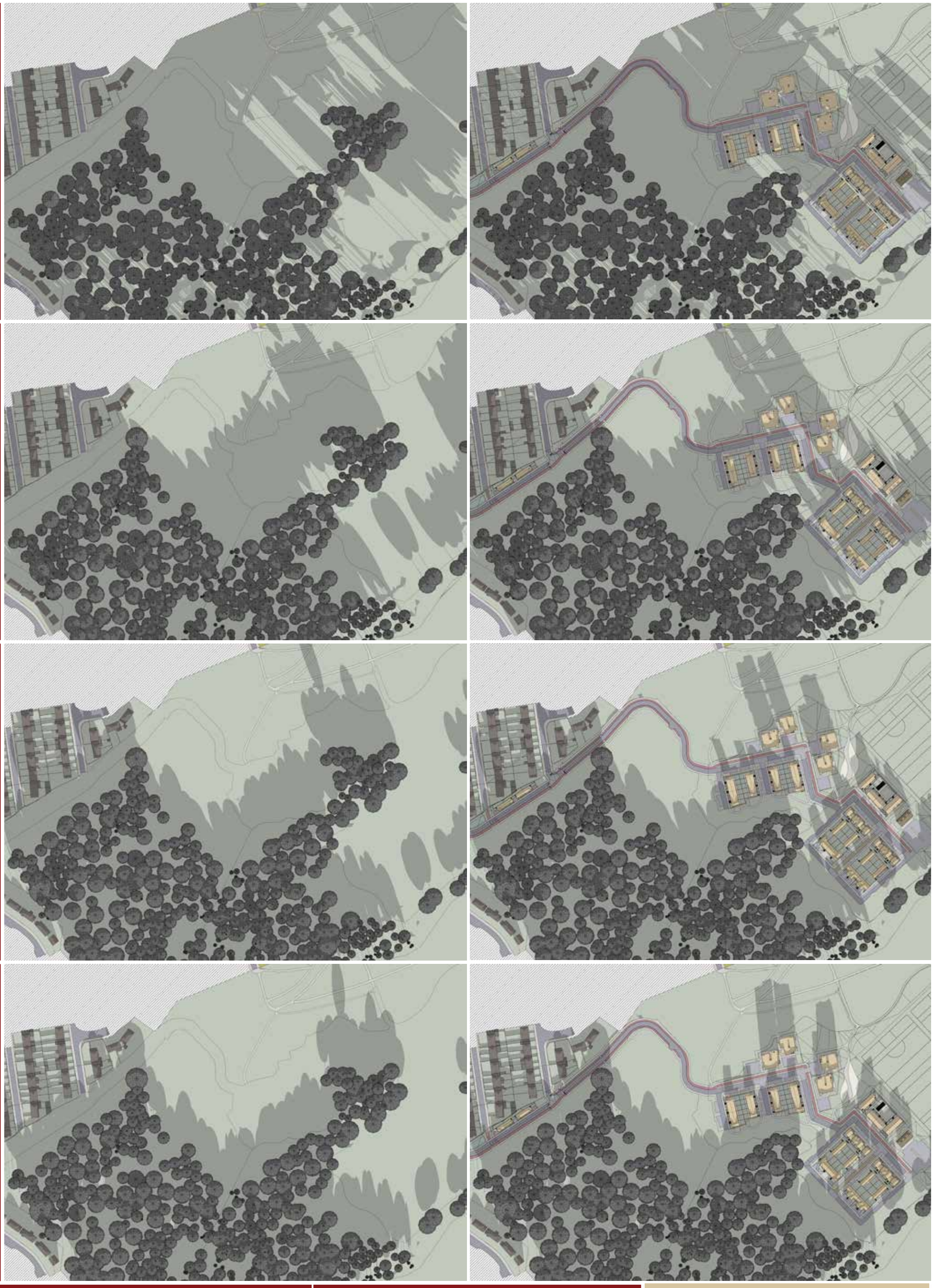
Baseline	Proposed
June 21st 18:00	
June 21st 19:00	
June 21st 20:00	
June 21st 21:00	



	Project: Rathcoole Housing – Part 10 Application	**Proposed**
June 21st Sunrise 5:04 | Sunset 21:49	**Applicant: South Dublin County Council**	3D DESIGN BUREAU

N

Baseline	Proposed
December 21st 9:00	
December 21st 10:00	
December 21st 11:00	
December 21st 12:00	



B.3 Shadow Study 21 December	Project: Rathcoole Housing – Part 10 Application	Proposed
December 21st Sunrise 8:45 | Sunset 16:00	Applicant: South Dublin County Council	3D DESIGN BUREAU

N

Baseline	Proposed
December 21st 13:00	
December 21st 14:00	
December 21st 15:00	
December 21st 16:00	

	Project: Rathcoole Housing – Part 10 Application	**Proposed**
December 21st Sunrise 8:45 | Sunset 16:00	**Applicant: South Dublin County Council**	3D DESIGN BUREAU

C.0 Scheme Performance

C.1 Proposed Floor Plans

C.1.1 Proposed Duplex Floor Plans - Plot A3

Figure C.1: Plot A3 - Site Location

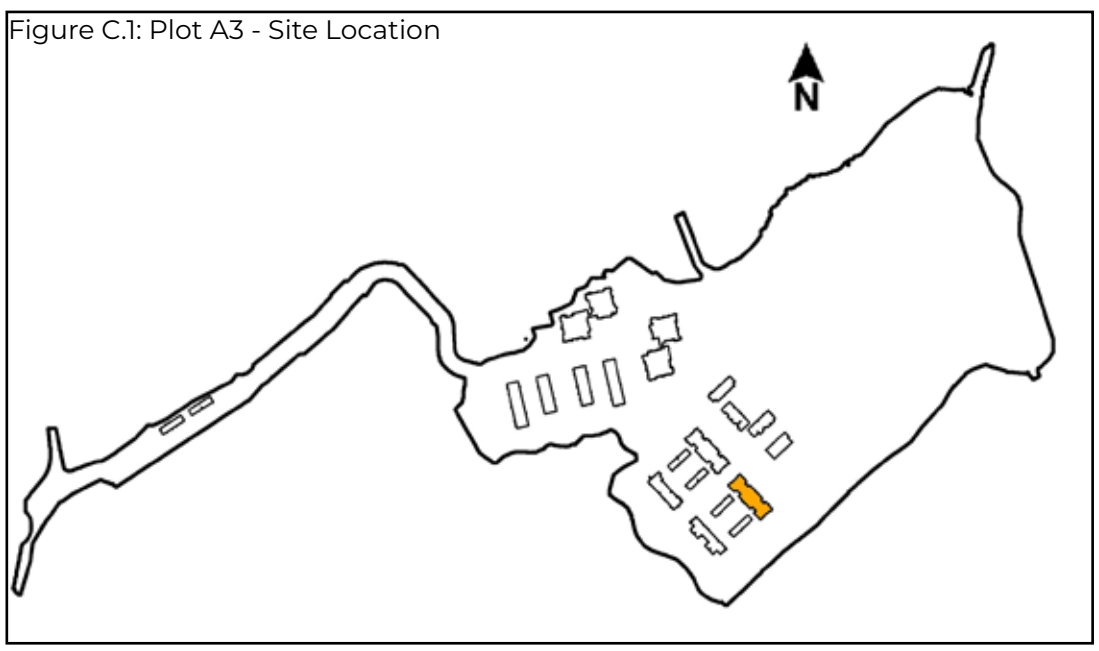


Figure C.2: Plot A3- Level 00

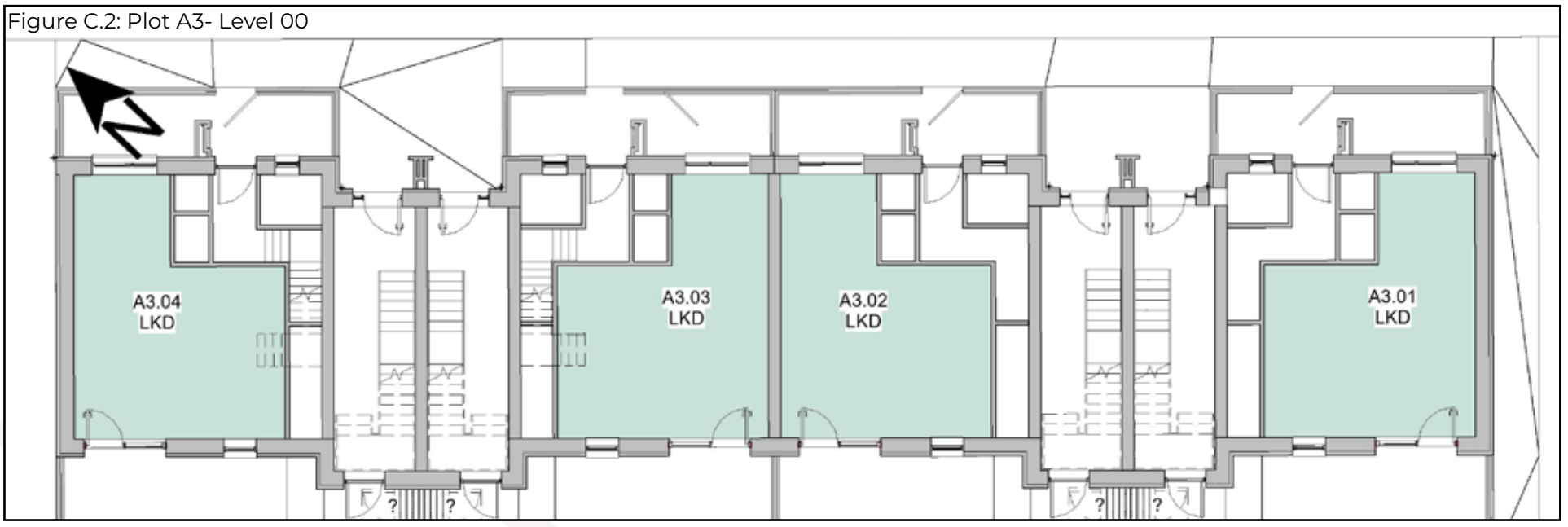
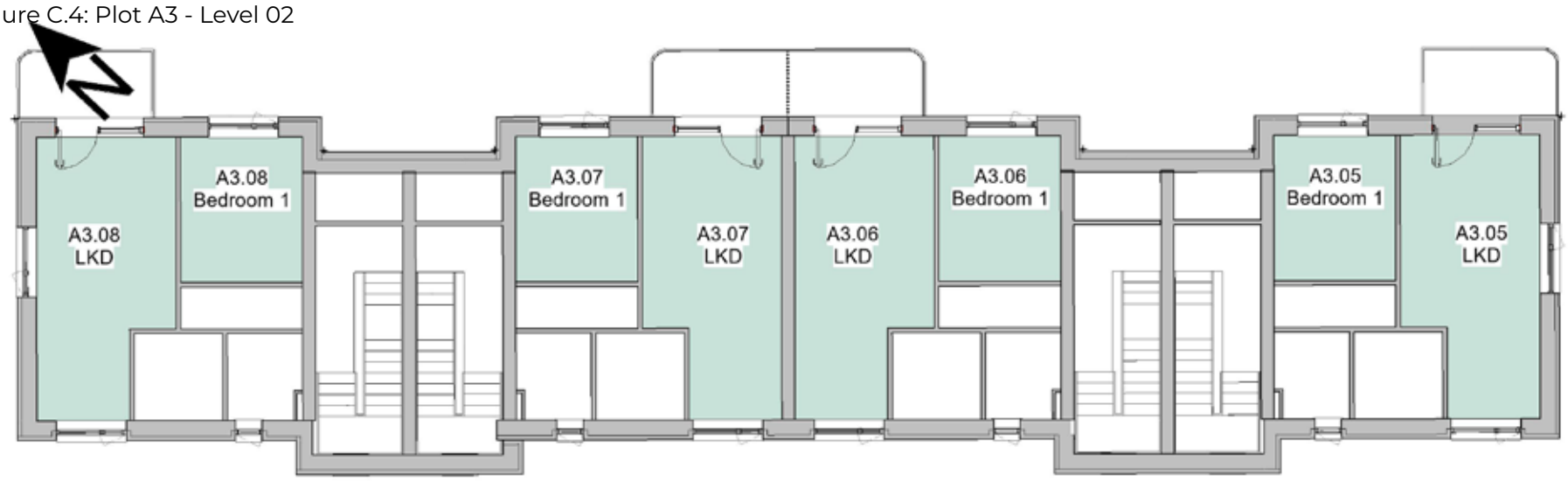


Figure C.3: Plot A3 - Level 01



Figure C.4: Plot A3 - Level 02



C.1.2 Proposed Duplex Floor Plans - Plot A4

Figure C.5: Plot A4 - Site Location

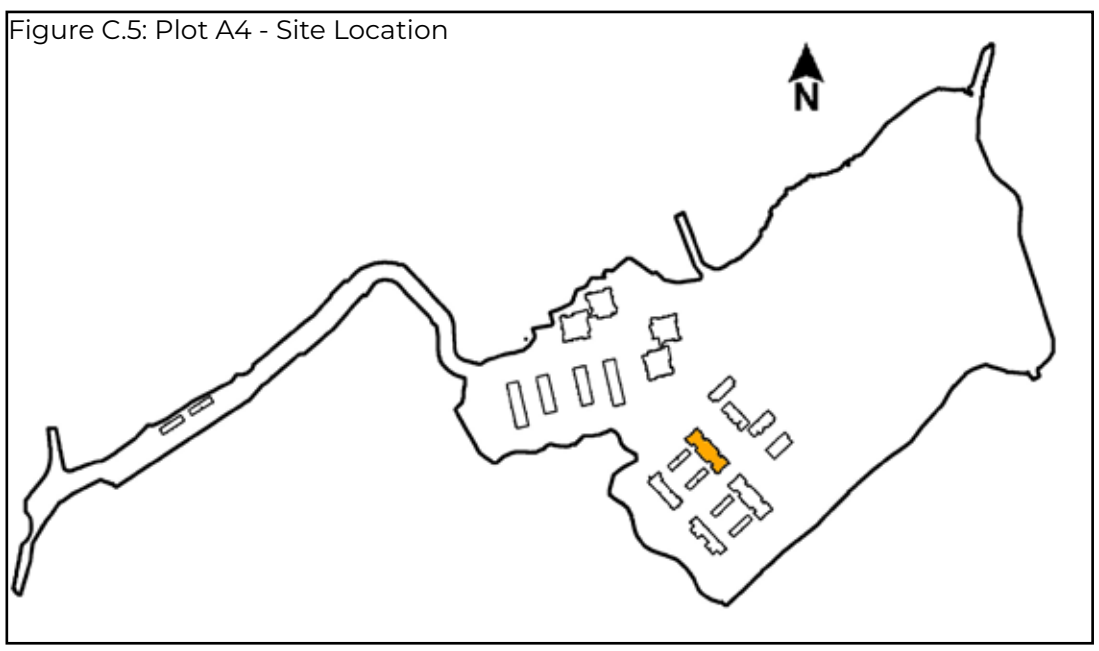


Figure C.6: Plot A4 - Level 00

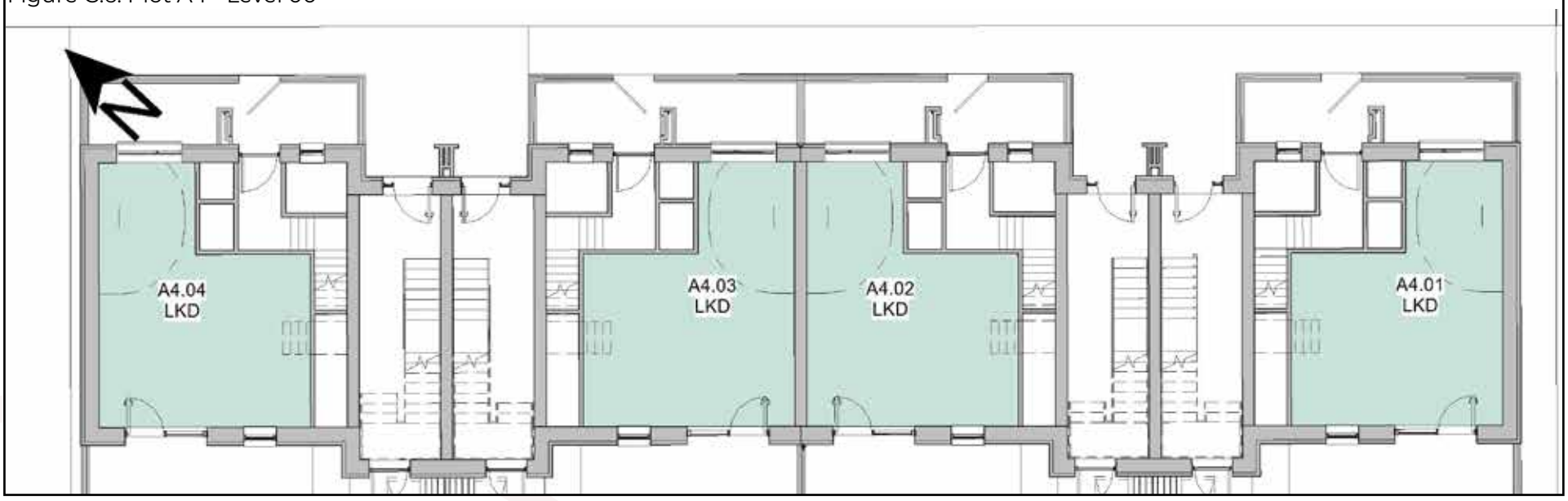


Figure C.7: Plot A4 - Level 01

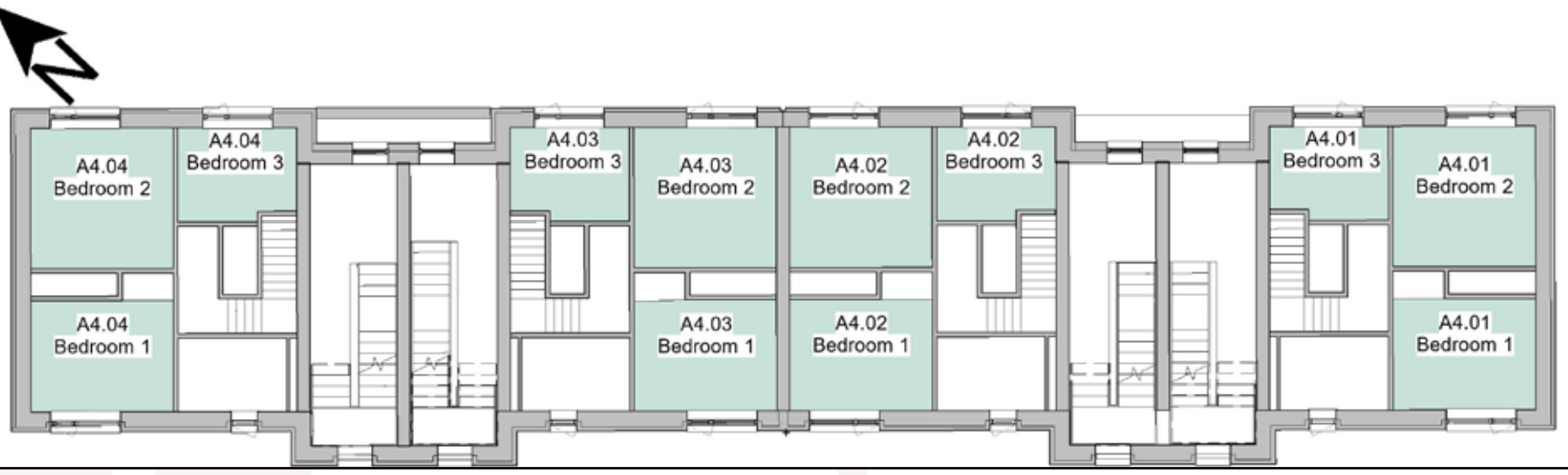
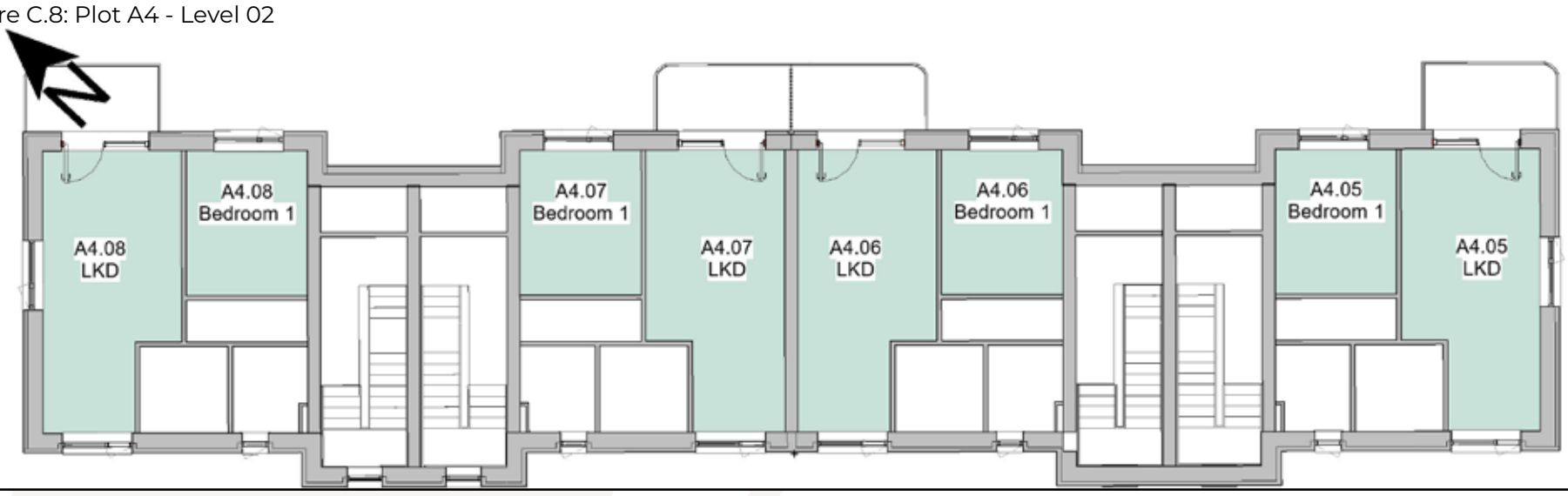


Figure C.8: Plot A4 - Level 02



C.1.3 Proposed Apartment Floor Plans - Plot D1

Figure C.9: Plot D1 - Site Location

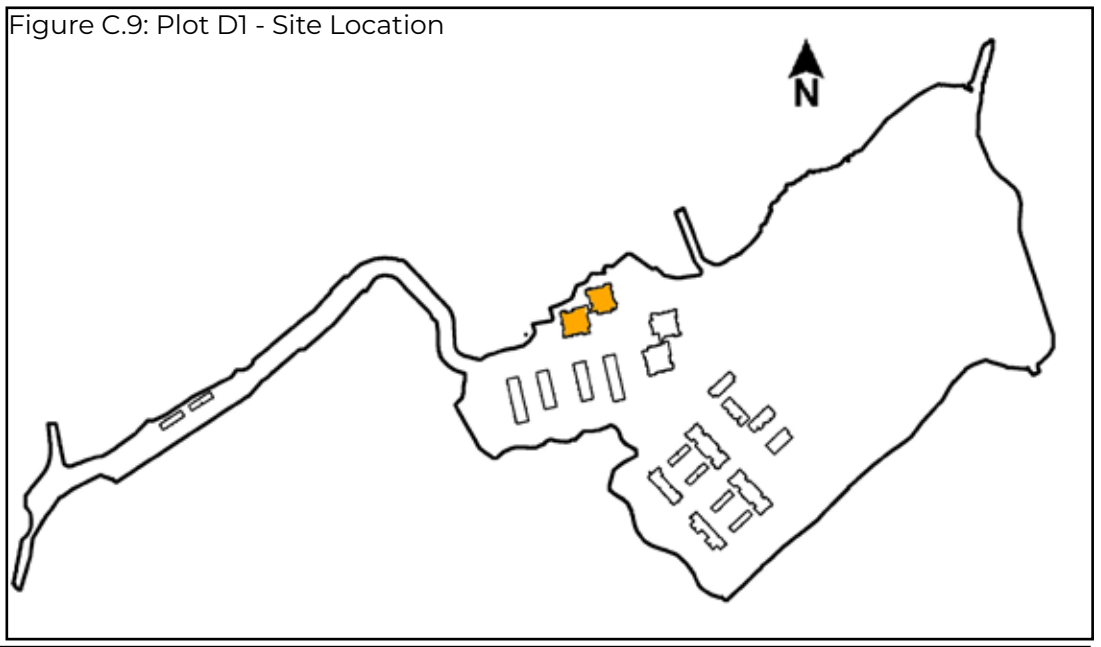


Figure C.10: Plot D1 - Level 00



Figure C.11: Plot D1 - Level 01

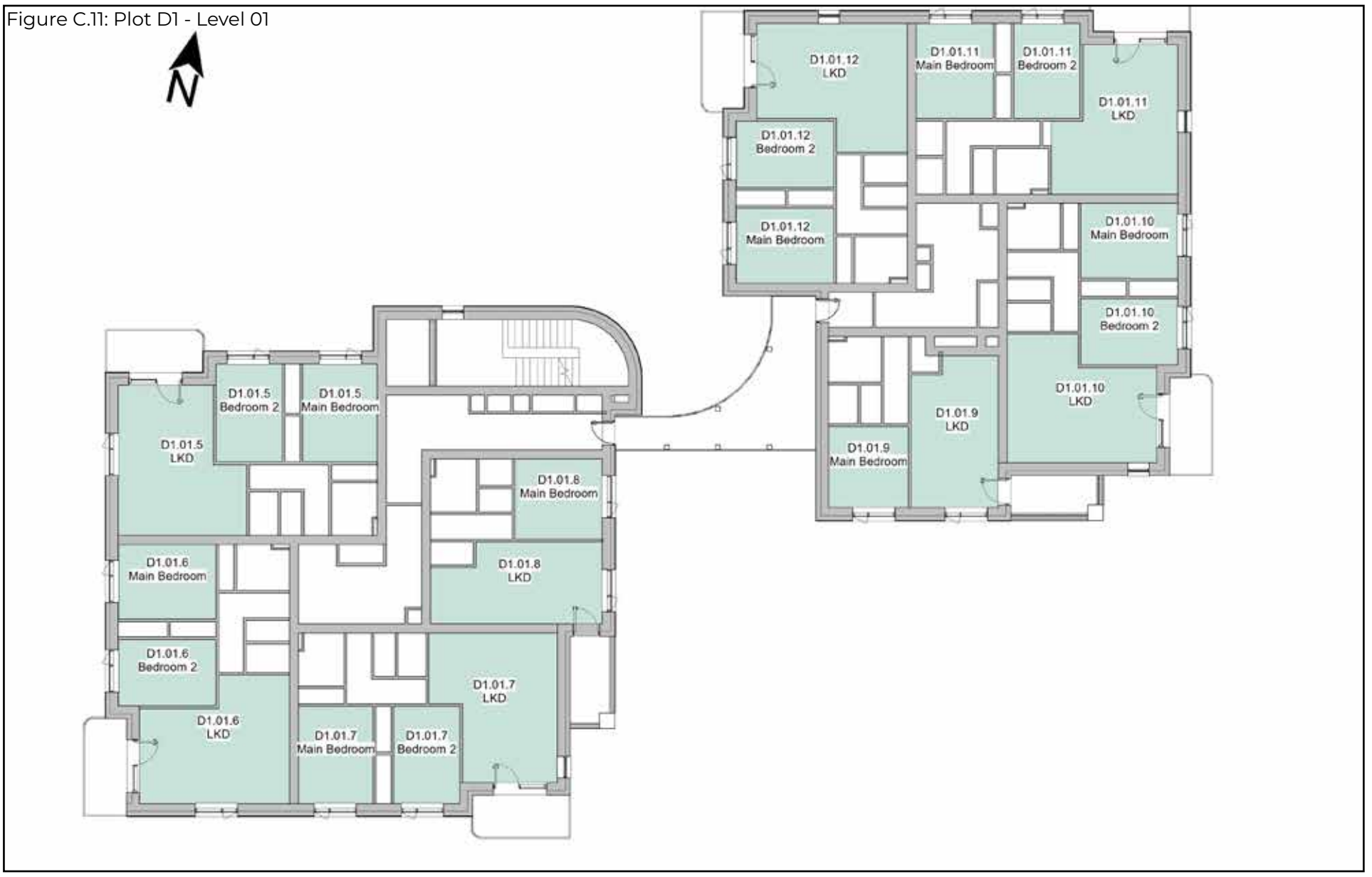


Figure C.12: Plot D1 - Level 02



Figure C.13: Plot D1 - Level 03

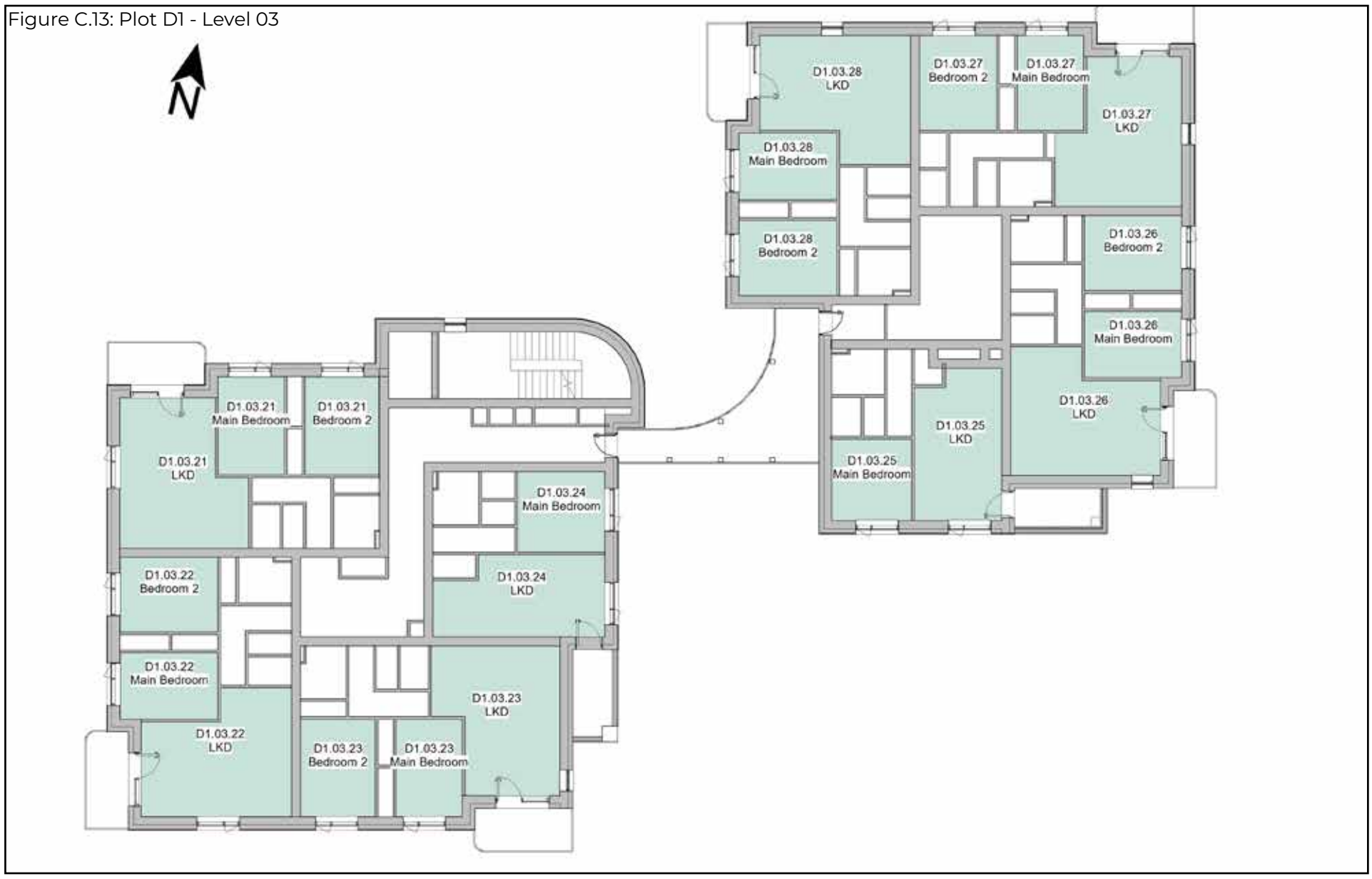
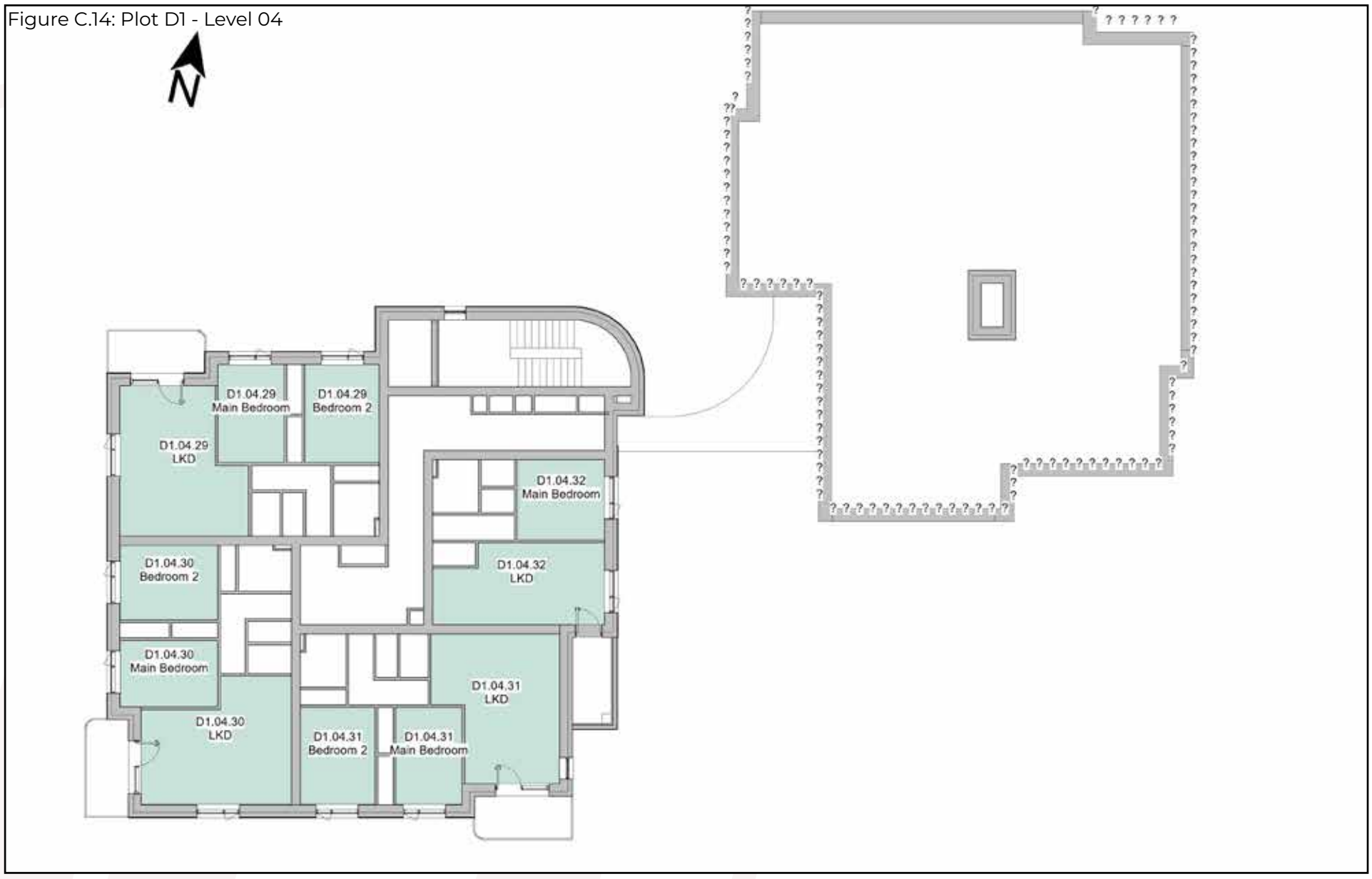


Figure C.14: Plot D1 - Level 04



C.1.4 Proposed Apartment Floor Plans - Plot D2

Figure C.15: Plot D2 - Site Location

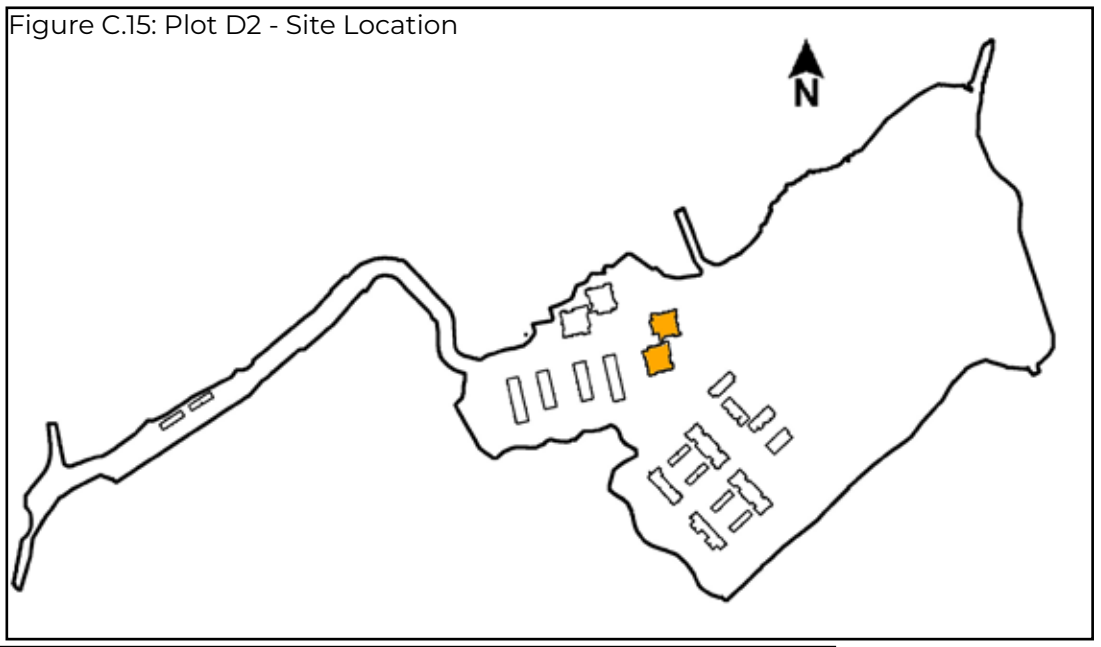


Figure C.16: Plot D2 - Level 00

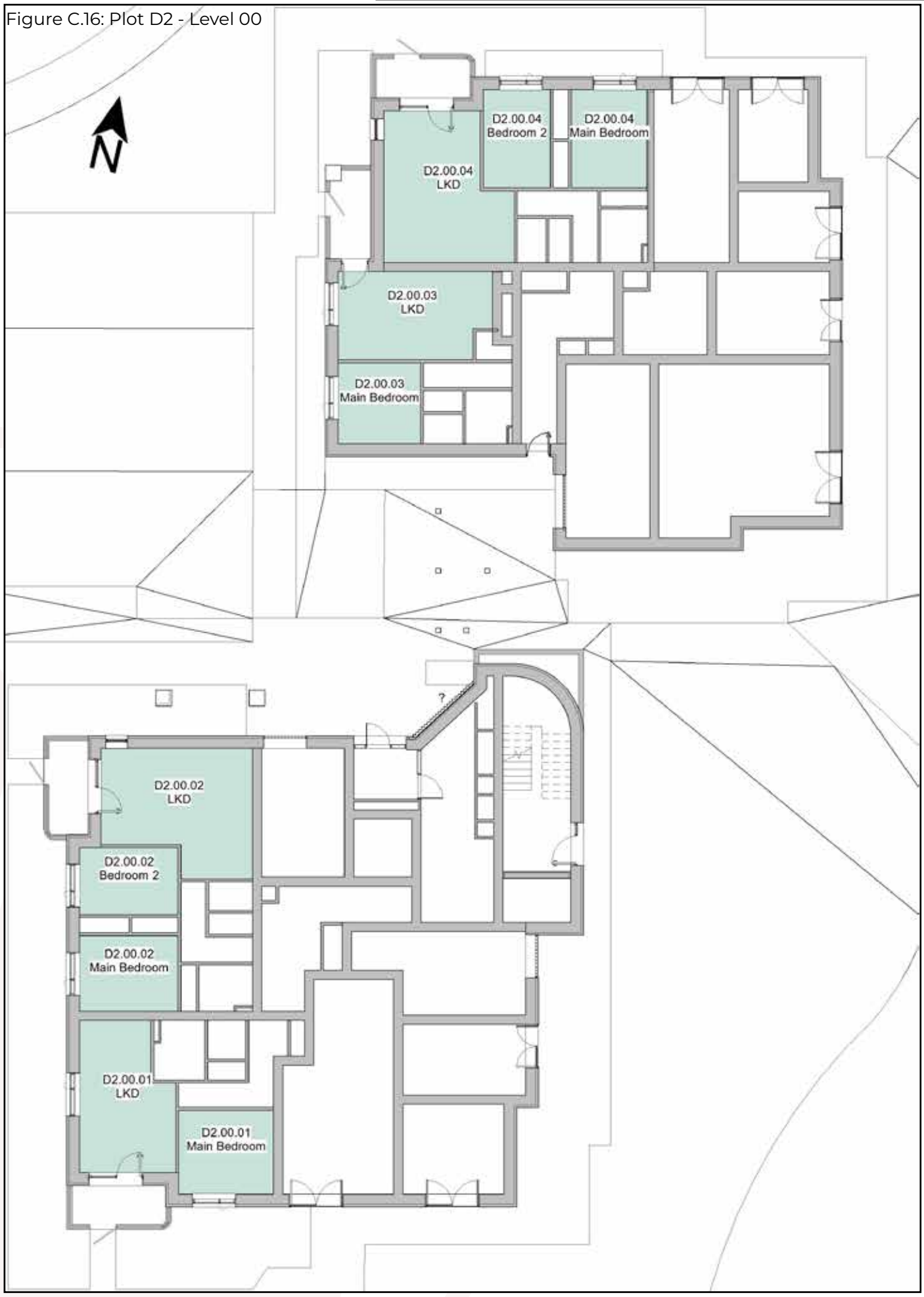


Figure C.17: Plot D2 - Level 01

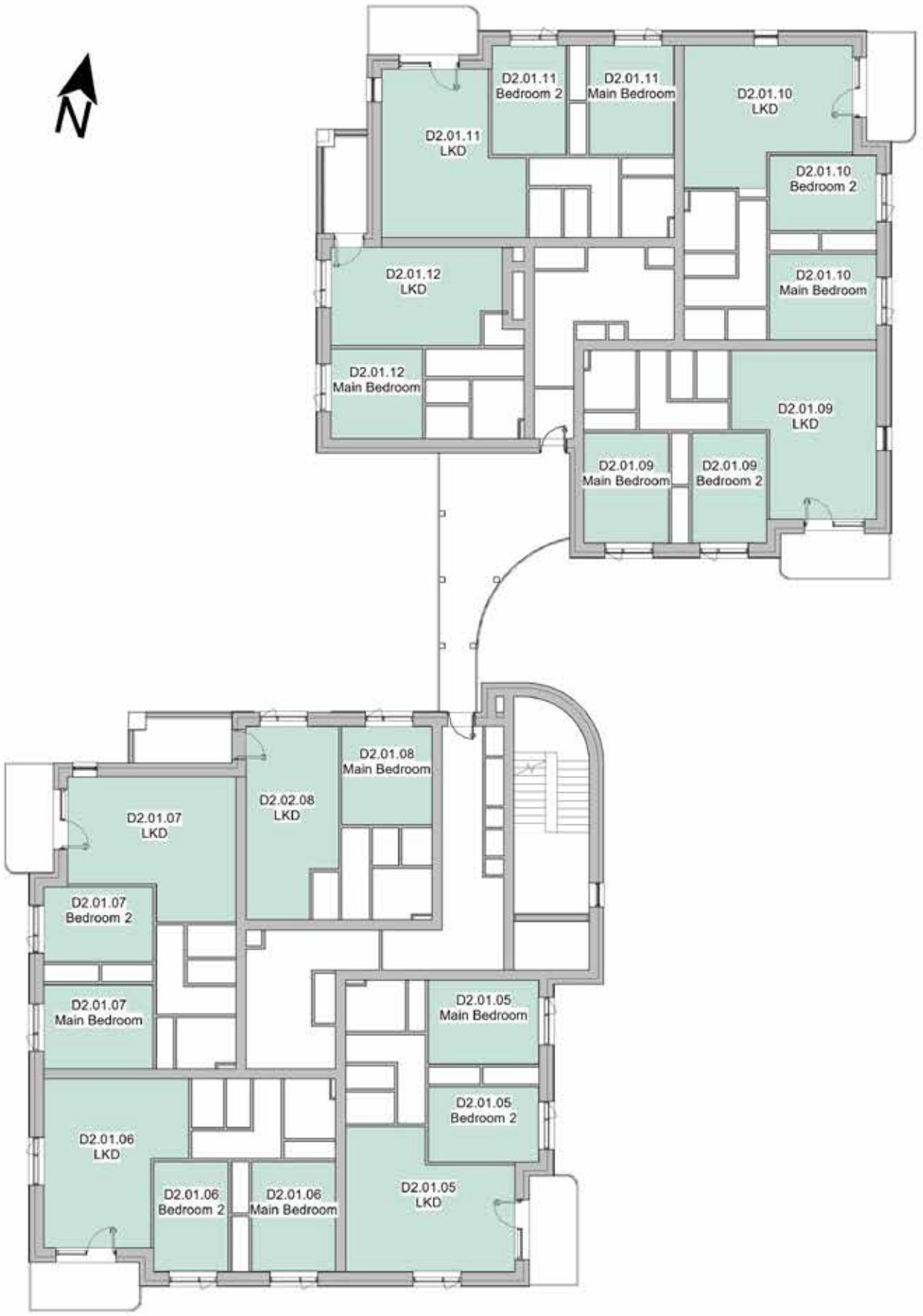


Figure C.18: Plot D2 - Level 02

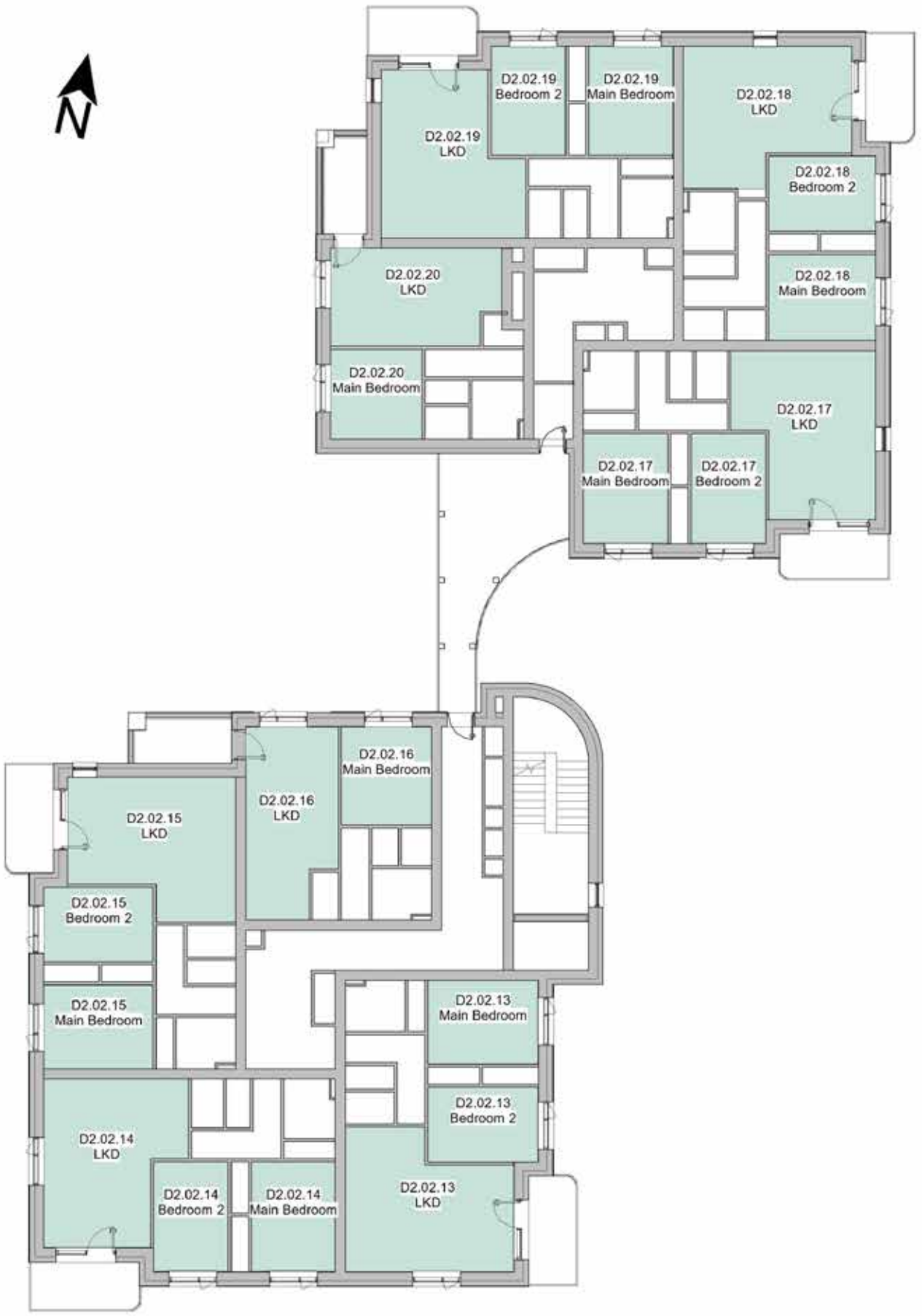
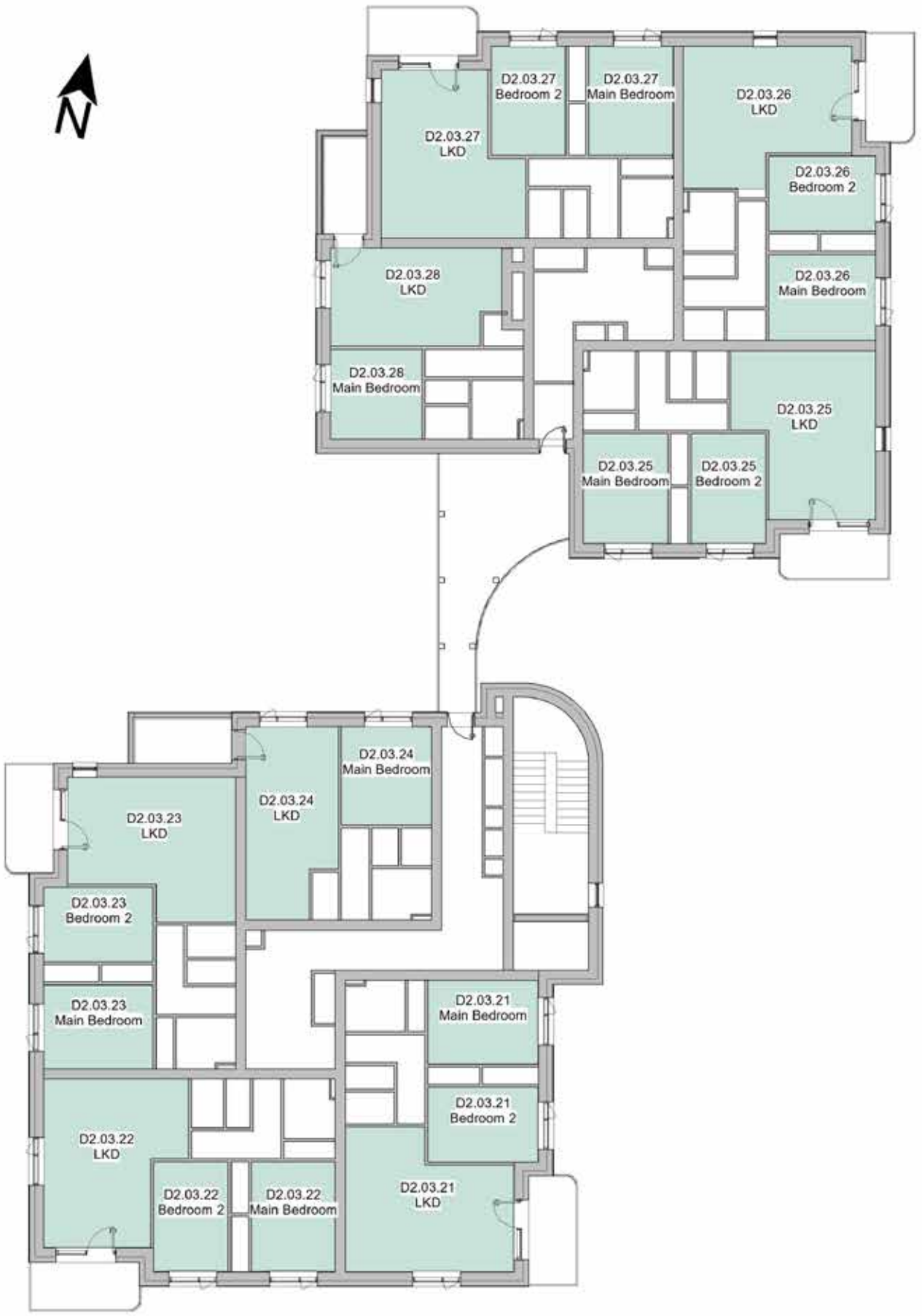


Figure C.19: Plot D2 - Level 03



C.1.5 Proposed Duplex (Age Friendly Housing) Floor Plans - Plot BZ

Figure C.20: Plot BZ - Site Location

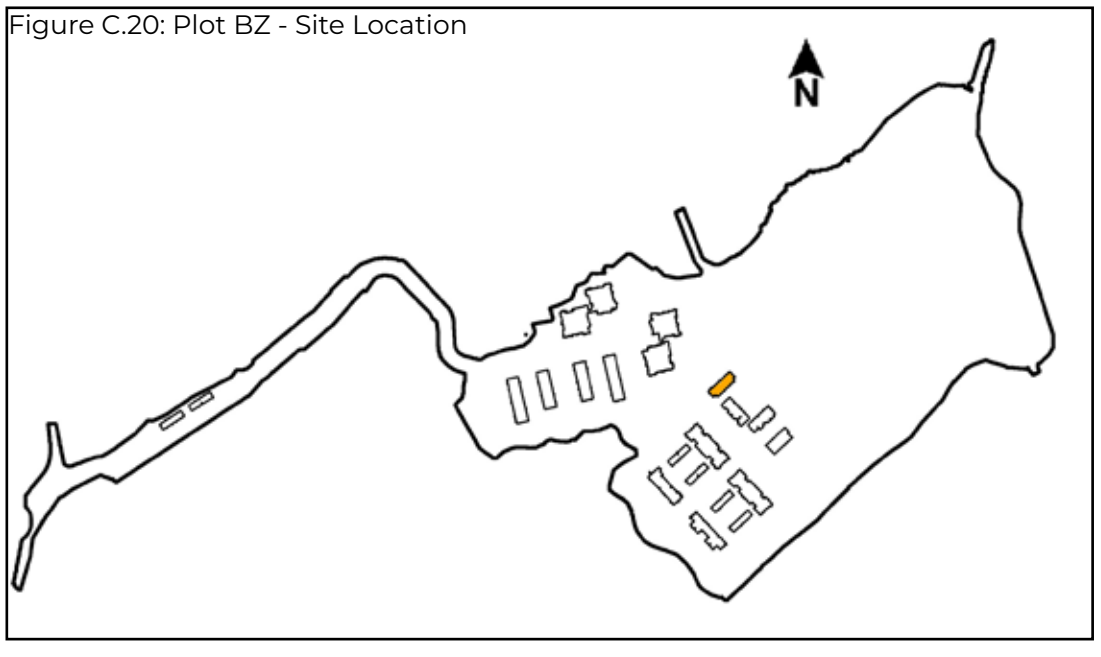


Figure C.21: Plot BZ - Level 00

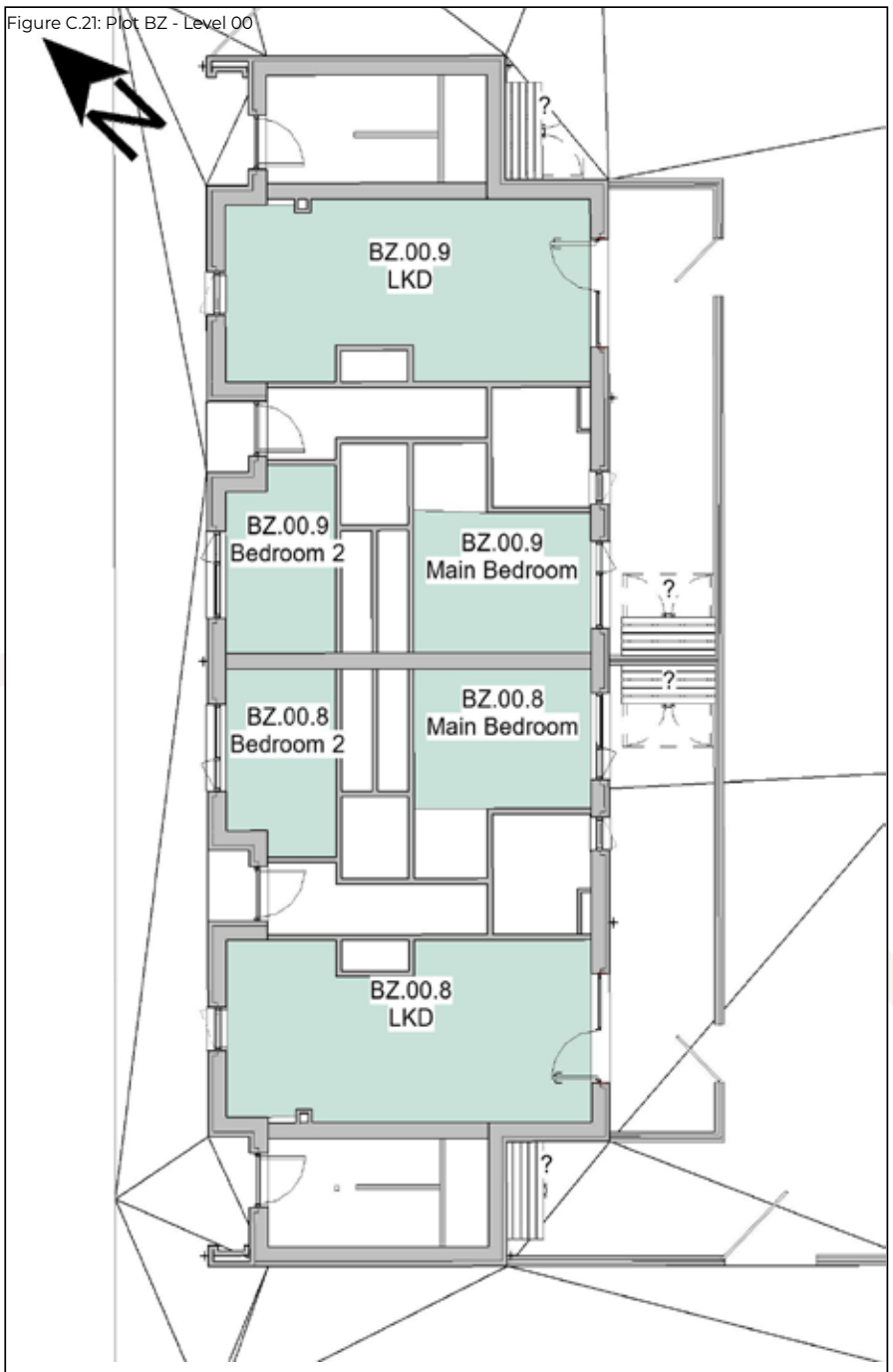
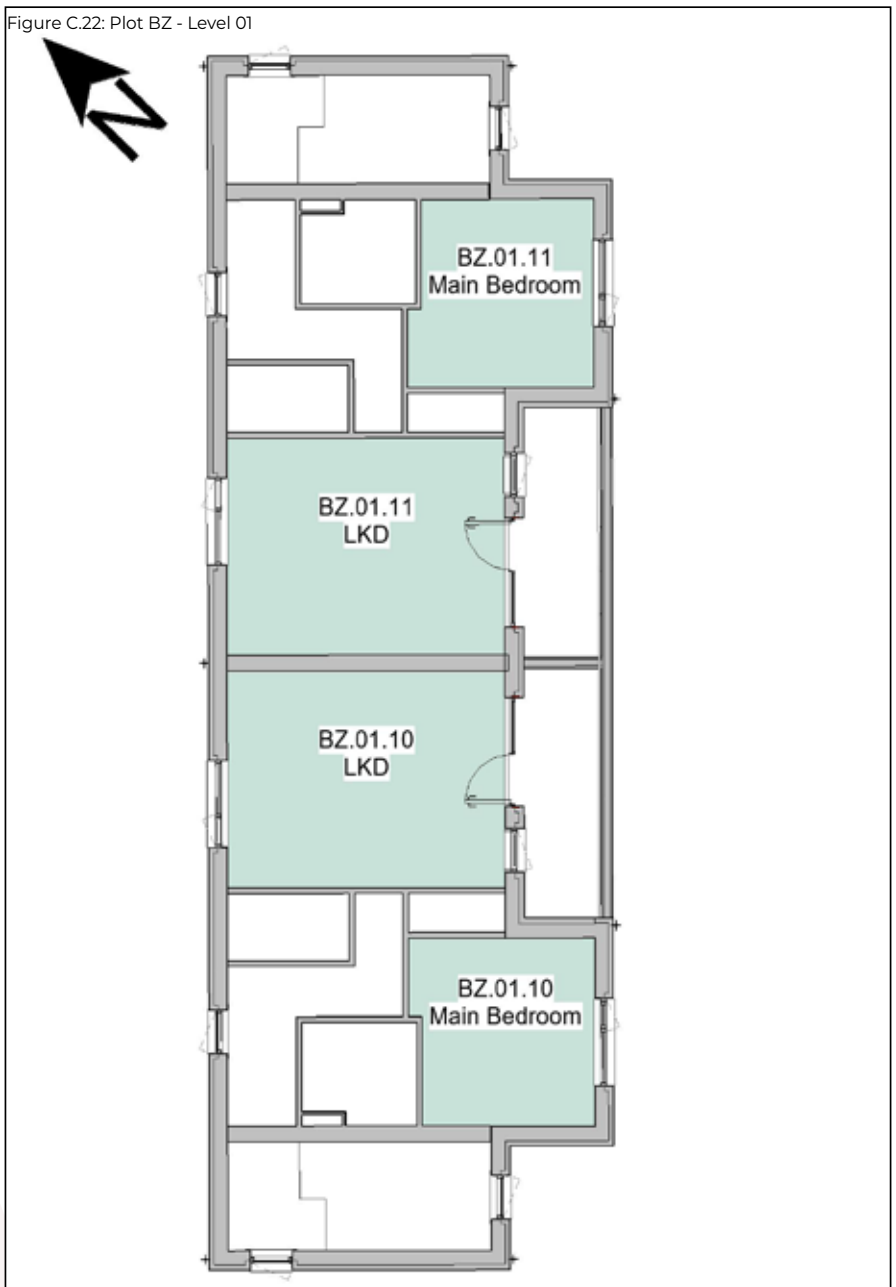


Figure C.22: Plot BZ - Level 01



C.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. C.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 at least 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 at least 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 at least 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.

C.2.1 SDA Results: Plot A3

Table No. C.2.1 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation ≥50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
A3.01	LKD	200	100%	99%	Compliant
A3.01	Bedroom 1	100	100%	100%	Compliant
A3.01	Bedroom 2	100	100%	100%	Compliant
A3.01	Bedroom 3	100	100%	100%	Compliant
A3.02	LKD	200	100%	100%	Compliant
A3.02	Bedroom 1	100	100%	100%	Compliant
A3.02	Bedroom 2	100	100%	100%	Compliant
A3.02	Bedroom 3	100	100%	100%	Compliant
A3.03	LKD	200	100%	100%	Compliant
A3.03	Bedroom 1	100	100%	100%	Compliant
A3.03	Bedroom 2	100	100%	100%	Compliant
A3.03	Bedroom 3	100	100%	100%	Compliant
A3.04	LKD	200	100%	100%	Compliant
A3.04	Bedroom 1	100	100%	100%	Compliant
A3.04	Bedroom 2	100	100%	100%	Compliant
A3.04	Bedroom 3	100	100%	100%	Compliant
A3.05	Bedroom 1	100	100%	100%	Compliant
A3.05	LKD	200	100%	100%	Compliant
A3.06	Bedroom 1	100	100%	100%	Compliant
A3.06	LKD	200	100%	100%	Compliant
A3.07	Bedroom 1	100	100%	100%	Compliant
A3.07	LKD	200	100%	100%	Compliant
A3.08	Bedroom 1	100	100%	100%	Compliant
A3.08	LKD	200	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.

** 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 / assessed units can be found in section 3.2.1 on page 20.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.2.2 SDA Results: Plot A4

Table No. C.2.2 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation ≥50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
A4.01	LKD	200	100%	100%	Compliant
A4.01	Bedroom 1	100	100%	100%	Compliant
A4.01	Bedroom 2	100	100%	100%	Compliant
A4.01	Bedroom 3	100	100%	100%	Compliant
A4.02	LKD	200	100%	100%	Compliant
A4.02	Bedroom 1	100	100%	100%	Compliant
A4.02	Bedroom 2	100	100%	100%	Compliant
A4.02	Bedroom 3	100	100%	100%	Compliant
A4.03	LKD	200	99%	97%	Compliant
A4.03	Bedroom 1	100	100%	100%	Compliant
A4.03	Bedroom 2	100	100%	100%	Compliant
A4.03	Bedroom 3	100	100%	100%	Compliant
A4.04	LKD	200	100%	97%	Compliant
A4.04	Bedroom 1	100	100%	100%	Compliant
A4.04	Bedroom 2	100	100%	100%	Compliant
A4.04	Bedroom 3	100	100%	100%	Compliant
A4.05	Bedroom 1	100	100%	100%	Compliant
A4.05	LKD	200	100%	100%	Compliant
A4.06	Bedroom 1	100	100%	100%	Compliant
A4.06	LKD	200	100%	100%	Compliant
A4.07	Bedroom 1	100	100%	100%	Compliant
A4.07	LKD	200	100%	100%	Compliant
A4.08	Bedroom 1	100	100%	100%	Compliant
A4.08	LKD	200	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.

** 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 / assessed units can be found in section 3.2.1 on page 20.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.2.3 SDA Results: Plot D1 (level 00 and 01)

Table No. C.2.3 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation ≥50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
D1.00.1	LKD	200	100%	100%	Compliant
D1.00.1	Main Bedroom	100	100%	100%	Compliant
D1.00.2	Bedroom 2	100	100%	100%	Compliant
D1.00.2	LKD	200	90%	73%	Compliant
D1.00.2	Main Bedroom	100	100%	100%	Compliant
D1.00.3	LKD	200	87%	76%	Compliant
D1.00.3	Main Bedroom	100	100%	100%	Compliant
D1.00.4	Bedroom 2	100	100%	100%	Compliant
D1.00.4	LKD	200	78%	65%	Compliant
D1.00.4	Main Bedroom	100	100%	100%	Compliant
D1.01.5	Bedroom 2	100	100%	100%	Compliant
D1.01.5	LKD	200	100%	92%	Compliant
D1.01.5	Main Bedroom	100	100%	100%	Compliant
D1.01.6	Bedroom 2	100	100%	100%	Compliant
D1.01.6	LKD	200	100%	100%	Compliant
D1.01.6	Main Bedroom	100	100%	100%	Compliant
D1.01.7	Bedroom 2	100	100%	100%	Compliant
D1.01.7	LKD	200	88%	85%	Compliant
D1.01.7	Main Bedroom	100	100%	100%	Compliant
D1.01.8	LKD	200	54%	51%	Compliant
D1.01.8	Main Bedroom	100	100%	100%	Compliant
D1.01.9	LKD	200	83%	75%	Compliant
D1.01.9	Main Bedroom	100	100%	100%	Compliant
D1.01.10	Bedroom 2	100	100%	100%	Compliant
D1.01.10	LKD	200	74%	64%	Compliant
D1.01.10	Main Bedroom	100	100%	100%	Compliant
D1.01.11	Bedroom 2	100	100%	100%	Compliant
D1.01.11	LKD	200	84%	63%	Compliant
D1.01.11	Main Bedroom	100	100%	100%	Compliant
D1.01.12	Bedroom 2	100	100%	100%	Compliant
D1.01.12	LKD	200	74%	59%	Compliant
D1.01.12	Main Bedroom	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.

** 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 / assessed units can be found in section 3.2.1 on page 20.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.2.4 SDA Results: Plot D1 (level 02)

Table No. C.2.4 - SDA Results:

Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation ≥50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
D1.02.13	Bedroom 2	100	100%	100%	Compliant
D1.02.13	LKD	200	100%	98%	Compliant
D1.02.13	Main Bedroom	100	100%	100%	Compliant
D1.02.14	Bedroom 2	100	100%	100%	Compliant
D1.02.14	LKD	200	100%	100%	Compliant
D1.02.14	Main Bedroom	100	100%	100%	Compliant
D1.02.15	Bedroom 2	100	100%	100%	Compliant
D1.02.15	LKD	200	94%	90%	Compliant
D1.02.15	Main Bedroom	100	100%	100%	Compliant
D1.02.16	LKD	200	58%	57%	Compliant
D1.02.16	Main Bedroom	100	100%	100%	Compliant
D1.02.17	LKD	200	89%	84%	Compliant
D1.02.17	Main Bedroom	100	100%	100%	Compliant
D1.02.18	Bedroom 2	100	100%	100%	Compliant
D1.02.18	LKD	200	80%	76%	Compliant
D1.02.18	Main Bedroom	100	100%	100%	Compliant
D1.02.19	Bedroom 2	100	100%	100%	Compliant
D1.02.19	LKD	200	87%	76%	Compliant
D1.02.19	Main Bedroom	100	100%	100%	Compliant
D1.02.20	Bedroom 2	100	100%	100%	Compliant
D1.02.20	LKD	200	82%	67%	Compliant
D1.02.20	Main Bedroom	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.

** 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 assessed units can be found in section 3.2.1 on page 20.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.2.5 SDA Results: Plot D1 (level 03 and 04)

Table No. C.2.5 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation ≥50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
D1.03.21	Bedroom 2	100	100%	100%	Compliant
D1.03.21	LKD	200	100%	100%	Compliant
D1.03.21	Main Bedroom	100	100%	100%	Compliant
D1.03.22	Bedroom 2	100	100%	100%	Compliant
D1.03.22	LKD	200	100%	100%	Compliant
D1.03.22	Main Bedroom	100	100%	100%	Compliant
D1.03.23	Bedroom 2	100	100%	100%	Compliant
D1.03.23	LKD	200	96%	93%	Compliant
D1.03.23	Main Bedroom	100	100%	100%	Compliant
D1.03.24	LKD	200	67%	65%	Compliant
D1.03.24	Main Bedroom	100	100%	100%	Compliant
D1.03.25	LKD	200	100%	95%	Compliant
D1.03.25	Main Bedroom	100	100%	100%	Compliant
D1.03.26	Bedroom 2	100	100%	100%	Compliant
D1.03.26	LKD	200	88%	88%	Compliant
D1.03.26	Main Bedroom	100	100%	100%	Compliant
D1.03.27	Bedroom 2	100	100%	100%	Compliant
D1.03.27	LKD	200	93%	91%	Compliant
D1.03.27	Main Bedroom	100	100%	100%	Compliant
D1.03.28	Bedroom 2	100	100%	100%	Compliant
D1.03.28	LKD	200	94%	87%	Compliant
D1.03.28	Main Bedroom	100	100%	100%	Compliant
D1.04.29	Bedroom 2	100	100%	100%	Compliant
D1.04.29	LKD	200	100%	100%	Compliant
D1.04.29	Main Bedroom	100	100%	100%	Compliant
D1.04.30	Bedroom 2	100	100%	100%	Compliant
D1.04.30	LKD	200	100%	100%	Compliant
D1.04.30	Main Bedroom	100	100%	100%	Compliant
D1.04.31	Bedroom 2	100	100%	100%	Compliant
D1.04.31	LKD	200	99%	98%	Compliant
D1.04.31	Main Bedroom	100	100%	100%	Compliant
D1.04.32	LKD	200	77%	76%	Compliant
D1.04.32	Main Bedroom	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.

** 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 assessed units can be found in section 3.2.1 on page 20.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.2.6 SDA Results: Plot D2 (level 00 and 01)

Table No. C.2.6 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation ≥50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
D2.00.01	LKD	200	100%	100%	Compliant
D2.00.01	Main Bedroom	100	100%	100%	Compliant
D2.00.02	Bedroom 2	100	100%	100%	Compliant
D2.00.02	LKD	200	59%	50%	Compliant
D2.00.02	Main Bedroom	100	100%	100%	Compliant
D2.00.03	LKD	200	65%	60%	Compliant
D2.00.03	Main Bedroom	100	100%	100%	Compliant
D2.00.04	Bedroom 2	100	100%	100%	Compliant
D2.00.04	LKD	200	57%	52%	Compliant
D2.00.04	Main Bedroom	100	100%	100%	Compliant
D2.01.05	Bedroom 2	100	100%	100%	Compliant
D2.01.05	LKD	200	100%	98%	Compliant
D2.01.05	Main Bedroom	100	100%	100%	Compliant
D2.01.06	Bedroom 2	100	100%	100%	Compliant
D2.01.06	LKD	200	100%	100%	Compliant
D2.01.06	Main Bedroom	100	100%	100%	Compliant
D2.01.07	Bedroom 2	100	100%	100%	Compliant
D2.01.07	LKD	200	61%	55%	Compliant
D2.01.07	Main Bedroom	100	100%	100%	Compliant
D2.01.08	LKD	200	39%	38%	Non-compliant
D2.01.08	Main Bedroom	100	92%	90%	Compliant
D2.01.09	Bedroom 2	100	100%	100%	Compliant
D2.01.09	LKD	200	95%	76%	Compliant
D2.01.09	Main Bedroom	100	100%	100%	Compliant
D2.01.10	Bedroom 2	100	100%	100%	Compliant
D2.01.10	LKD	200	87%	75%	Compliant
D2.01.10	Main Bedroom	100	100%	100%	Compliant
D2.01.11	Bedroom 2	100	100%	100%	Compliant
D2.01.11	LKD	200	52%	50%	Compliant
D2.01.11	Main Bedroom	100	100%	100%	Compliant
D2.01.12	LKD	200	61%	59%	Compliant
D2.01.12	Main Bedroom	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.

** 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 assessed units can be found in section 3.2.1 on page 20.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.2.7 SDA Results: Plot D2 (level 02)

Table No. C.2.7 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation ≥50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
D2.02.13	Bedroom 2	100	100%	100%	Compliant
D2.02.13	LKD	200	100%	100%	Compliant
D2.02.13	Main Bedroom	100	100%	100%	Compliant
D2.02.14	Bedroom 2	100	100%	100%	Compliant
D2.02.14	LKD	200	100%	100%	Compliant
D2.02.14	Main Bedroom	100	100%	100%	Compliant
D2.02.15	Bedroom 2	100	100%	100%	Compliant
D2.02.15	LKD	200	79%	74%	Compliant
D2.02.15	Main Bedroom	100	100%	100%	Compliant
D2.02.16	LKD	200	44%	43%	Non-compliant
D2.02.16	Main Bedroom	100	100%	100%	Compliant
D2.02.17	Bedroom 2	100	100%	100%	Compliant
D2.02.17	LKD	200	98%	96%	Compliant
D2.02.17	Main Bedroom	100	100%	100%	Compliant
D2.02.18	Bedroom 2	100	100%	100%	Compliant
D2.02.18	LKD	200	88%	87%	Compliant
D2.02.18	Main Bedroom	100	100%	100%	Compliant
D2.02.19	Bedroom 2	100	100%	100%	Compliant
D2.02.19	LKD	200	54%	52%	Compliant
D2.02.19	Main Bedroom	100	100%	100%	Compliant
D2.02.20	LKD	200	69%	66%	Compliant
D2.02.20	Main Bedroom	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.

** 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 assessed units can be found in section 3.2.1 on page 20.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.2.8 SDA Results: Plot D2 (level 03)

Table No. C.2.8 - SDA Results:

Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation ≥50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
D2.03.21	Bedroom 2	100	100%	100%	Compliant
D2.03.21	LKD	200	100%	100%	Compliant
D2.03.21	Main Bedroom	100	100%	100%	Compliant
D2.03.22	Bedroom 2	100	100%	100%	Compliant
D2.03.22	LKD	200	100%	100%	Compliant
D2.03.22	Main Bedroom	100	100%	100%	Compliant
D2.03.23	Bedroom 2	100	100%	100%	Compliant
D2.03.23	LKD	200	90%	87%	Compliant
D2.03.23	Main Bedroom	100	100%	100%	Compliant
D2.03.24	LKD	200	57%	55%	Compliant
D2.03.24	Main Bedroom	100	100%	100%	Compliant
D2.03.25	Bedroom 2	100	100%	100%	Compliant
D2.03.25	LKD	200	100%	100%	Compliant
D2.03.25	Main Bedroom	100	100%	100%	Compliant
D2.03.26	Bedroom 2	100	100%	100%	Compliant
D2.03.26	LKD	200	96%	95%	Compliant
D2.03.26	Main Bedroom	100	100%	100%	Compliant
D2.03.27	Bedroom 2	100	100%	100%	Compliant
D2.03.27	LKD	200	76%	67%	Compliant
D2.03.27	Main Bedroom	100	100%	100%	Compliant
D2.03.28	LKD	200	81%	77%	Compliant
D2.03.28	Main Bedroom	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.

** 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 assessed units can be found in section 3.2.1 on page 20.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.2.9 SDA Results: Plot BZ- Age Friendly Living- Apartment units

Table No. C.2.9 - SDA Results:

Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation ≥50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
BZ.00.8	Bedroom 2	100	100%	100%	Compliant
BZ.00.8	LKD	200	90%	52%	Compliant
BZ.00.8	Main Bedroom	100	100%	100%	Compliant
BZ.00.9	Bedroom 2	100	100%	100%	Compliant
BZ.00.9	LKD	200	98%	78%	Compliant
BZ.00.9	Main Bedroom	100	100%	100%	Compliant
BZ.01.10	LKD	200	100%	100%	Compliant
BZ.01.10	Main Bedroom	100	100%	100%	Compliant
BZ.01.11	LKD	200	100%	100%	Compliant
BZ.01.11	Main Bedroom	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.

** 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 assessed units can be found in section 3.2.1 on page 20.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.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. C.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 categorises 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*
- At least 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 categorises 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.

C.3.1 SE Results: Plot A3

Table No. C.3.1 - Sunlight Exposure Results:							
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**
A3.01	LKD	4.80	High	-	5.80	High	Compliant
A3.01	Bedroom 1	5.80	High	Compliant	5.80	High	Compliant
A3.01	Bedroom 2	1.20	Below Minimum	-	1.20	Below Minimum	-
A3.01	Bedroom 3	0.50	Below Minimum	-	0.50	Below Minimum	-
A3.02	LKD	6.80	High	Compliant	6.80	High	Compliant
A3.02	Bedroom 1	6.20	High	-	6.20	High	-
A3.02	Bedroom 2	1.20	Below Minimum	-	1.20	Below Minimum	-
A3.02	Bedroom 3	1.20	Below Minimum	-	1.20	Below Minimum	-
A3.03	LKD	6.60	High	Compliant	6.60	High	Compliant
A3.03	Bedroom 1	6.10	High	-	6.10	High	-
A3.03	Bedroom 2	0.50	Below Minimum	-	0.50	Below Minimum	-
A3.03	Bedroom 3	0.50	Below Minimum	-	0.50	Below Minimum	-
A3.04	LKD	6.00	High	-	6.80	High	Compliant
A3.04	Bedroom 1	6.10	High	Compliant	6.10	High	-
A3.04	Bedroom 2	1.10	Below Minimum	-	1.10	Below Minimum	-
A3.04	Bedroom 3	1.10	Below Minimum	-	1.10	Below Minimum	-
A3.05	Bedroom 1	1.20	Below Minimum	-	1.20	Below Minimum	-
A3.05	LKD	9.40	High	Compliant	9.40	High	Compliant
A3.06	Bedroom 1	1.20	Below Minimum	-	1.20	Below Minimum	-
A3.06	LKD	7.30	High	Compliant	7.30	High	Compliant
A3.07	Bedroom 1	1.20	Below Minimum	-	1.20	Below Minimum	-
A3.07	LKD	7.20	High	Compliant	7.20	High	Compliant
A3.08	Bedroom 1	1.20	Below Minimum	-	1.20	Below Minimum	-
A3.08	LKD	7.30	High	Compliant	7.30	High	Compliant

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.
** Section 3.1 of 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 3.2.2 on page 21.
*** For the interpretation of levels of Sunlight Exposure please refer to “E.3 Definition of Levels of Sunlight Exposure” on page 91.
For floor plans of the assessed units please refer to section C.1 on page 37.

C.3.2 SE Results: Plot A4

Table No. C.3.2 - Sunlight Exposure Results:							
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**
A4.01	LKD	5.10	High	-	6.00	High	Compliant
A4.01	Bedroom 1	5.90	High	Compliant	5.90	High	-
A4.01	Bedroom 2	0.80	Below Minimum	-	1.20	Below Minimum	-
A4.01	Bedroom 3	0.50	Below Minimum	-	0.50	Below Minimum	-
A4.02	LKD	6.60	High	Compliant	6.60	High	Compliant
A4.02	Bedroom 1	6.20	High	-	6.20	High	-
A4.02	Bedroom 2	1.20	Below Minimum	-	1.20	Below Minimum	-
A4.02	Bedroom 3	1.20	Below Minimum	-	1.20	Below Minimum	-
A4.03	LKD	6.40	High	Compliant	6.40	High	Compliant
A4.03	Bedroom 1	6.10	High	-	6.10	High	-
A4.03	Bedroom 2	0.50	Below Minimum	-	0.50	Below Minimum	-
A4.03	Bedroom 3	0.50	Below Minimum	-	0.50	Below Minimum	-
A4.04	LKD	4.60	High	-	6.70	High	Compliant
A4.04	Bedroom 1	6.10	High	Compliant	6.10	High	-
A4.04	Bedroom 2	1.10	Below Minimum	-	1.10	Below Minimum	-
A4.04	Bedroom 3	1.10	Below Minimum	-	1.10	Below Minimum	-
A4.05	Bedroom 1	1.20	Below Minimum	-	1.20	Below Minimum	-
A4.05	LKD	9.40	High	Compliant	9.40	High	Compliant
A4.06	Bedroom 1	1.20	Below Minimum	-	1.20	Below Minimum	-
A4.06	LKD	7.30	High	Compliant	7.30	High	Compliant
A4.07	Bedroom 1	1.20	Below Minimum	-	1.20	Below Minimum	-
A4.07	LKD	7.30	High	Compliant	7.30	High	Compliant
A4.08	Bedroom 1	1.20	Below Minimum	-	1.20	Below Minimum	-
A4.08	LKD	7.30	High	Compliant	7.30	High	Compliant

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

** Section 3.1 of 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 3.2.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to “E.3 Definition of Levels of Sunlight Exposure” on page 91.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.3.3 SE Results: Plot D1 (level 00 and 01)

Table No. C.3.3 - Sunlight Exposure Results:

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**
D1.00.1	LKD	8.50	High	Compliant	9.40	High	Compliant
D1.00.1	Main Bedroom	4.00	High	-	4.00	High	-
D1.00.2	Bedroom 2	8.10	High	-	8.30	High	-
D1.00.2	LKD	5.50	High	-	5.50	High	-
D1.00.2	Main Bedroom	8.40	High	Compliant	8.40	High	Compliant
D1.00.3	LKD	6.50	High	Compliant	6.50	High	Compliant
D1.00.3	Main Bedroom	6.10	High	-	6.10	High	-
D1.00.4	Bedroom 2	1.80	Minimum	-	1.80	Minimum	-
D1.00.4	LKD	5.00	High	Compliant	5.00	High	Compliant
D1.00.4	Main Bedroom	2.60	Minimum	-	2.60	Minimum	-
D1.01.5	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.01.5	LKD	4.60	High	Compliant	4.60	High	Compliant
D1.01.5	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.01.6	Bedroom 2	4.00	High	-	4.00	High	-
D1.01.6	LKD	9.40	High	Compliant	9.40	High	Compliant
D1.01.6	Main Bedroom	4.60	High	-	4.60	High	-
D1.01.7	Bedroom 2	8.40	High	Compliant	8.40	High	Compliant
D1.01.7	LKD	2.60	Minimum	-	2.60	Minimum	-
D1.01.7	Main Bedroom	8.40	High	Compliant	8.40	High	Compliant
D1.01.8	LKD	3.20	Medium	Compliant	3.20	Medium	Compliant
D1.01.8	Main Bedroom	3.20	Medium	Compliant	3.20	Medium	Compliant
D1.01.9	LKD	6.90	High	Compliant	6.90	High	Compliant
D1.01.9	Main Bedroom	6.60	High	-	6.60	High	-
D1.01.10	Bedroom 2	2.30	Minimum	-	2.30	Minimum	-
D1.01.10	LKD	5.50	High	Compliant	5.50	High	Compliant
D1.01.10	Main Bedroom	3.20	Medium	-	3.20	Medium	-
D1.01.11	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.01.11	LKD	2.50	Minimum	Compliant	2.50	Minimum	Compliant
D1.01.11	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.01.12	Bedroom 2	1.40	Below Minimum	-	1.40	Below Minimum	-
D1.01.12	LKD	2.20	Minimum	Compliant	2.20	Minimum	Compliant
D1.01.12	Main Bedroom	0.50	Below Minimum	-	0.50	Below Minimum	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.
** Section 3.1 of 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 3.2.2 on page 21.
*** For the interpretation of levels of Sunlight Exposure please refer to “E.3 Definition of Levels of Sunlight Exposure” on page 91.
For floor plans of the assessed units please refer to section C.1 on page 37.

C.3.4 SE Results: Plot D1 (level 02)

Table No. C.3.4 - Sunlight Exposure Results:

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**
D1.02.13	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.02.13	LKD	4.60	High	Compliant	4.60	High	Compliant
D1.02.13	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.02.14	Bedroom 2	4.60	High	-	4.60	High	-
D1.02.14	LKD	9.40	High	Compliant	9.40	High	Compliant
D1.02.14	Main Bedroom	4.00	High	-	4.00	High	-
D1.02.15	Bedroom 2	8.40	High	Compliant	8.40	High	Compliant
D1.02.15	LKD	2.60	Minimum	-	2.60	Minimum	-
D1.02.15	Main Bedroom	8.40	High	Compliant	8.40	High	Compliant
D1.02.16	LKD	3.20	Medium	Compliant	3.20	Medium	Compliant
D1.02.16	Main Bedroom	3.20	Medium	Compliant	3.20	Medium	Compliant
D1.02.17	LKD	7.40	High	Compliant	7.40	High	Compliant
D1.02.17	Main Bedroom	6.80	High	-	6.80	High	-
D1.02.18	Bedroom 2	3.20	Medium	-	3.20	Medium	-
D1.02.18	LKD	5.90	High	Compliant	5.90	High	Compliant
D1.02.18	Main Bedroom	2.50	Minimum	-	2.50	Minimum	-
D1.02.19	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.02.19	LKD	2.50	Minimum	Compliant	2.50	Minimum	Compliant
D1.02.19	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.02.20	Bedroom 2	1.00	Below Minimum	-	1.00	Below Minimum	-
D1.02.20	LKD	2.20	Minimum	Compliant	2.20	Minimum	Compliant
D1.02.20	Main Bedroom	1.60	Minimum	-	1.60	Minimum	-

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

** Section 3.1 of 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 3.2.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to “E.3 Definition of Levels of Sunlight Exposure” on page 91.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.3.5 SE Results: Plot D1 (level 03 and 04)

Table No. C.3.5 - Sunlight Exposure Results:

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**
D1.03.21	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.03.21	LKD	4.60	High	Compliant	4.60	High	Compliant
D1.03.21	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.03.22	Bedroom 2	4.60	High	-	4.60	High	-
D1.03.22	LKD	9.40	High	Compliant	9.40	High	Compliant
D1.03.22	Main Bedroom	4.00	High	-	4.00	High	-
D1.03.23	Bedroom 2	8.40	High	Compliant	8.40	High	Compliant
D1.03.23	LKD	2.60	Minimum	-	2.60	Minimum	-
D1.03.23	Main Bedroom	8.40	High	Compliant	8.40	High	Compliant
D1.03.24	LKD	3.20	Medium	Compliant	3.20	Medium	Compliant
D1.03.24	Main Bedroom	3.20	Medium	Compliant	3.20	Medium	Compliant
D1.03.25	LKD	8.10	High	Compliant	8.10	High	Compliant
D1.03.25	Main Bedroom	7.70	High	-	7.70	High	-
D1.03.26	Bedroom 2	3.20	Medium	-	3.20	Medium	-
D1.03.26	LKD	7.60	High	Compliant	7.60	High	Compliant
D1.03.26	Main Bedroom	3.20	Medium	-	3.20	Medium	-
D1.03.27	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.03.27	LKD	2.40	Minimum	Compliant	2.40	Minimum	Compliant
D1.03.27	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.03.28	Bedroom 2	1.30	Below Minimum	-	1.30	Below Minimum	-
D1.03.28	LKD	3.80	Medium	Compliant	3.80	Medium	Compliant
D1.03.28	Main Bedroom	1.90	Minimum	-	1.90	Minimum	-
D1.04.29	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.04.29	LKD	4.60	High	Compliant	4.60	High	Compliant
D1.04.29	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D1.04.30	Bedroom 2	4.60	High	-	4.60	High	-
D1.04.30	LKD	9.40	High	Compliant	9.40	High	Compliant
D1.04.30	Main Bedroom	4.60	High	-	4.60	High	-
D1.04.31	Bedroom 2	8.40	High	Compliant	8.40	High	Compliant
D1.04.31	LKD	7.30	High	-	7.30	High	-
D1.04.31	Main Bedroom	8.40	High	Compliant	8.40	High	Compliant
D1.04.32	LKD	4.40	High	Compliant	4.40	High	Compliant
D1.04.32	Main Bedroom	3.20	Medium	-	3.20	Medium	-

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

** Section 3.1 of 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 3.2.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to “E.3 Definition of Levels of Sunlight Exposure” on page 91.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.3.6 SE Results: Plot D2 (level 00 and 01)

Table No. C.3.6 - Sunlight Exposure Results:

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**
D2.00.01	LKD	7.70	High	Compliant	9.00	High	Compliant
D2.00.01	Main Bedroom	6.20	High	-	8.50	High	-
D2.00.02	Bedroom 2	4.50	High	Compliant	4.50	High	Compliant
D2.00.02	LKD	2.60	Minimum	-	2.60	Minimum	-
D2.00.02	Main Bedroom	4.50	High	Compliant	4.50	High	Compliant
D2.00.03	LKD	4.70	High	Compliant	4.70	High	Compliant
D2.00.03	Main Bedroom	3.50	Medium	-	3.50	Medium	-
D2.00.04	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
D2.00.04	LKD	2.40	Minimum	Compliant	2.40	Minimum	Compliant
D2.00.04	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D2.01.05	Bedroom 2	1.70	Minimum	-	2.40	Minimum	-
D2.01.05	LKD	8.40	High	Compliant	8.40	High	Compliant
D2.01.05	Main Bedroom	3.20	Medium	-	3.20	Medium	-
D2.01.06	Bedroom 2	6.80	High	-	8.00	High	-
D2.01.06	LKD	6.40	High	-	6.70	High	-
D2.01.06	Main Bedroom	7.80	High	Compliant	8.40	High	Compliant
D2.01.07	Bedroom 2	4.60	High	Compliant	4.60	High	Compliant
D2.01.07	LKD	2.20	Minimum	-	2.20	Minimum	-
D2.01.07	Main Bedroom	4.60	High	Compliant	4.60	High	Compliant
D2.01.08	LKD	0.20	Below Minimum	Non-Compliant	0.20	Below Minimum	Non-Compliant
D2.01.08	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D2.01.09	Bedroom 2	5.20	High	Compliant	5.20	High	Compliant
D2.01.09	LKD	2.90	Minimum	-	2.90	Minimum	-
D2.01.09	Main Bedroom	4.30	High	-	4.30	High	-
D2.01.10	Bedroom 2	3.20	Medium	Compliant	3.20	Medium	Compliant
D2.01.10	LKD	2.20	Minimum	-	2.20	Minimum	-
D2.01.10	Main Bedroom	3.20	Medium	Compliant	3.20	Medium	Compliant
D2.01.11	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
D2.01.11	LKD	2.30	Minimum	Compliant	2.30	Minimum	Compliant
D2.01.11	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D2.01.12	LKD	4.60	High	Compliant	4.60	High	Compliant
D2.01.12	Main Bedroom	4.60	High	Compliant	4.60	High	Compliant

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

** Section 3.1 of 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 3.2.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to “E.3 Definition of Levels of Sunlight Exposure” on page 91.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.3.7 SE Results: Plot D2 (level 02)

Table No. C.3.7 - Sunlight Exposure Results:

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**
D2.02.13	Bedroom 2	2.40	Minimum	-	2.40	Minimum	-
D2.02.13	LKD	8.40	High	Compliant	8.40	High	Compliant
D2.02.13	Main Bedroom	3.20	Medium	-	3.20	Medium	-
D2.02.14	Bedroom 2	8.00	High	-	8.00	High	-
D2.02.14	LKD	6.70	High	-	6.70	High	-
D2.02.14	Main Bedroom	8.40	High	Compliant	8.40	High	Compliant
D2.02.15	Bedroom 2	4.60	High	Compliant	4.60	High	Compliant
D2.02.15	LKD	2.20	Minimum	-	2.20	Minimum	-
D2.02.15	Main Bedroom	4.60	High	Compliant	4.60	High	Compliant
D2.02.16	LKD	0.20	Below Minimum	Non-Compliant	0.20	Below Minimum	Non-Compliant
D2.02.16	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D2.02.17	Bedroom 2	5.90	High	Compliant	5.90	High	Compliant
D2.02.17	LKD	2.90	Minimum	-	2.90	Minimum	-
D2.02.17	Main Bedroom	4.60	High	-	4.60	High	-
D2.02.18	Bedroom 2	3.20	Medium	Compliant	3.20	Medium	Compliant
D2.02.18	LKD	2.10	Minimum	-	2.10	Minimum	-
D2.02.18	Main Bedroom	3.20	Medium	Compliant	3.20	Medium	Compliant
D2.02.19	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
D2.02.19	LKD	2.30	Minimum	Compliant	2.30	Minimum	Compliant
D2.02.19	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D2.02.20	LKD	4.60	High	Compliant	4.60	High	Compliant
D2.02.20	Main Bedroom	4.60	High	Compliant	4.60	High	Compliant

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

** Section 3.1 of 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 3.2.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to “E.3 Definition of Levels of Sunlight Exposure” on page 91.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.3.8 SE Results: Plot D2 (level 03)

Table No. C.3.8 - Sunlight Exposure Results:

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**
D2.03.21	Bedroom 2	3.20	Medium	-	3.20	Medium	-
D2.03.21	LKD	8.40	High	Compliant	8.40	High	Compliant
D2.03.21	Main Bedroom	3.20	Medium	-	3.20	Medium	-
D2.03.22	Bedroom 2	8.40	High	-	8.40	High	-
D2.03.22	LKD	9.20	High	Compliant	9.20	High	Compliant
D2.03.22	Main Bedroom	8.40	High	-	8.40	High	-
D2.03.23	Bedroom 2	4.60	High	Compliant	4.60	High	Compliant
D2.03.23	LKD	3.70	Medium	-	3.70	Medium	-
D2.03.23	Main Bedroom	4.60	High	Compliant	4.60	High	Compliant
D2.03.24	LKD	0.30	Below Minimum	Non-Compliant	0.30	Below Minimum	Non-Compliant
D2.03.24	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D2.03.25	Bedroom 2	8.50	High	Compliant	8.50	High	Compliant
D2.03.25	LKD	7.50	High	-	7.50	High	-
D2.03.25	Main Bedroom	7.80	High	-	7.80	High	-
D2.03.26	Bedroom 2	3.20	Medium	Compliant	3.20	Medium	Compliant
D2.03.26	LKD	2.10	Minimum	-	2.10	Minimum	-
D2.03.26	Main Bedroom	3.20	Medium	Compliant	3.20	Medium	Compliant
D2.03.27	Bedroom 2	0.00	Below Minimum	-	0.00	Below Minimum	-
D2.03.27	LKD	4.00	High	Compliant	4.00	High	Compliant
D2.03.27	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
D2.03.28	LKD	4.60	High	Compliant	4.60	High	Compliant
D2.03.28	Main Bedroom	4.60	High	Compliant	4.60	High	Compliant

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

** Section 3.1 of 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 3.2.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to “E.3 Definition of Levels of Sunlight Exposure” on page 91.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.3.9 SE Results: Plot BZ- Age Friendly Living- Apartment units

Table No. C.3.9 - Sunlight Exposure Results:

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**
BZ.00.8	Bedroom 2	0.70	Below Minimum	-	1.10	Below Minimum	-
BZ.00.8	LKD	3.00	Medium	-	4.00	High	-
BZ.00.8	Main Bedroom	3.40	Medium	Compliant	6.50	High	Compliant
BZ.00.9	Bedroom 2	0.70	Below Minimum	-	1.10	Below Minimum	-
BZ.00.9	LKD	3.50	Medium	-	6.50	High	Compliant
BZ.00.9	Main Bedroom	4.20	High	Compliant	6.50	High	Compliant
BZ.01.10	LKD	3.30	Medium	-	3.30	Medium	-
BZ.01.10	Main Bedroom	6.30	High	Compliant	6.40	High	Compliant
BZ.01.11	LKD	3.20	Medium	-	3.20	Medium	-
BZ.01.11	Main Bedroom	6.40	High	Compliant	6.40	High	Compliant

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

** Section 3.1 of 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 3.2.2 on page 21.

*** For the interpretation of levels of Sunlight Exposure please refer to “E.3 Definition of Levels of Sunlight Exposure” on page 91.

For floor plans of the assessed units please refer to section C.1 on page 37.

C.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. C.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

Section 3.3.17 of 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.

C.4.1 Sun On Ground in Proposed Outdoor Amenity Areas

Table No. C.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*
POS	Public Open Space	99.84%	50.00%	BRE Compliant	Yes
COS 1	Communal Open Space 1	80.01%	50.00%	BRE Compliant	Yes
COS 2	Communal Open Space 2	73.46%	50.00%	BRE Compliant	Yes
COS 3	Communal Open Space 3	100.00%	50.00%	BRE Compliant	Yes
COS 4	Communal Open Space 4	100.00%	50.00%	BRE Compliant	Yes
COS 5	Communal Open Space 5	95.87%	50.00%	BRE Compliant	Yes

* Section 3.3.17 of the BRE Guidelines recommends that for a garden or amenity to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on March 21st.

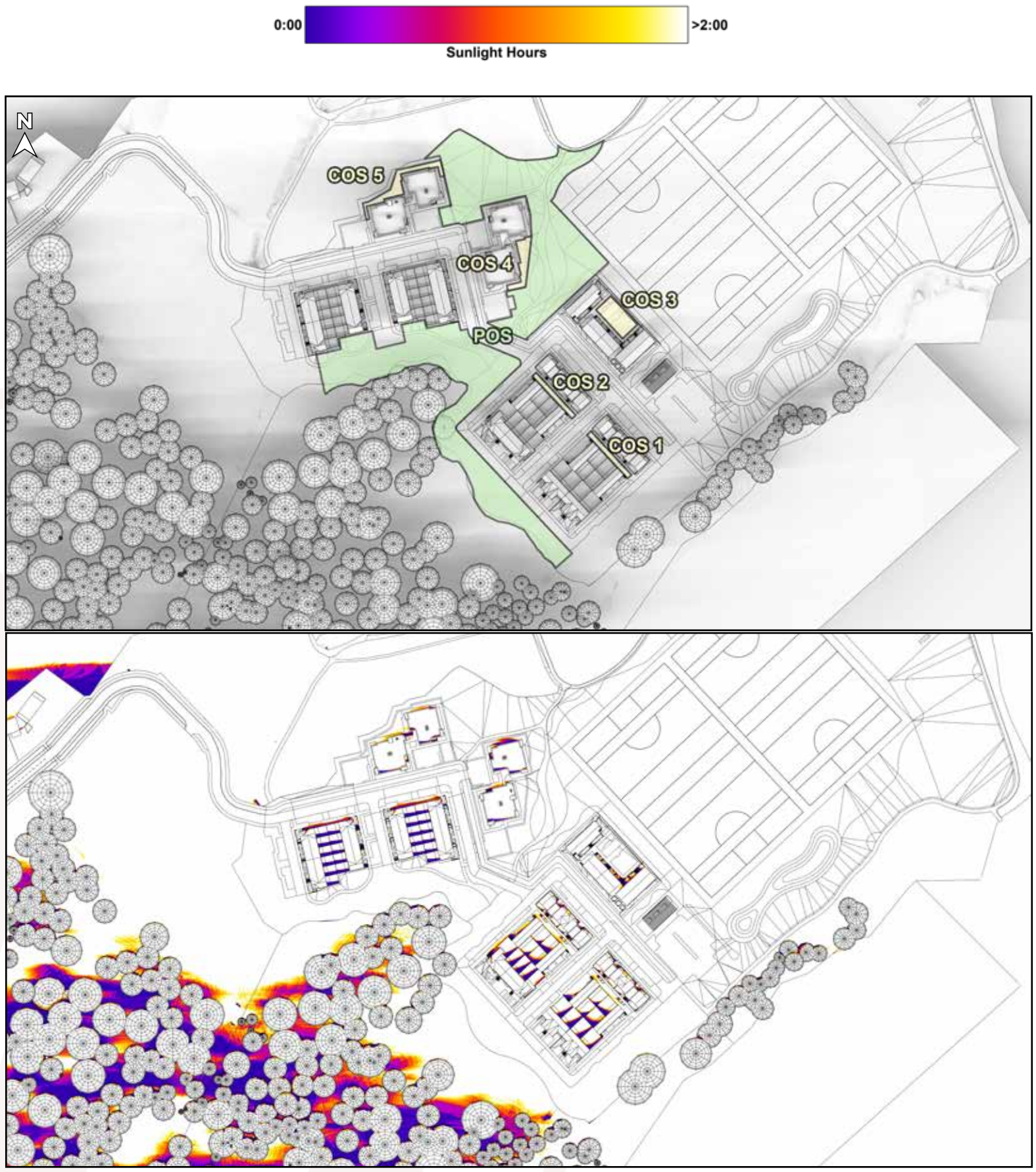


Figure C.23: Indication of the amenity areas that have been analysed (L), Area capable of receiving 2 hours of sunlight on March 21st shown in white (R)

D.0 Supplementary Study Results

D.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. 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 be 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.

Table Example. D.1 - Supplementary Scheme Performance SDA (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 (With 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 (With 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.

D.1.1 Supplementary SDA Results (I.S. EN 17037 criteria): Plot A3

Table No. D.1.1 - 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*	
A3.01	LKD	100%	100%	82%	100%	Compliant
A3.01	Bedroom 1	100%	100%	100%	100%	Compliant
A3.01	Bedroom 2	59%	100%	42%	100%	Trees affecting compliance
A3.01	Bedroom 3	100%	100%	100%	100%	Compliant
A3.02	LKD	97%	100%	94%	100%	Compliant
A3.02	Bedroom 1	100%	100%	100%	100%	Compliant
A3.02	Bedroom 2	38%	100%	32%	100%	Non-compliant
A3.02	Bedroom 3	100%	100%	100%	100%	Compliant
A3.03	LKD	97%	100%	94%	100%	Compliant
A3.03	Bedroom 1	100%	100%	100%	100%	Compliant
A3.03	Bedroom 2	40%	100%	31%	100%	Non-compliant
A3.03	Bedroom 3	100%	100%	100%	100%	Compliant
A3.04	LKD	100%	100%	87%	100%	Compliant
A3.04	Bedroom 1	100%	100%	100%	100%	Compliant
A3.04	Bedroom 2	60%	100%	44%	100%	Trees affecting compliance
A3.04	Bedroom 3	100%	100%	100%	100%	Compliant
A3.05	Bedroom 1	98%	100%	98%	100%	Compliant
A3.05	LKD	100%	100%	100%	100%	Compliant
A3.06	Bedroom 1	100%	100%	98%	100%	Compliant
A3.06	LKD	100%	100%	100%	100%	Compliant
A3.07	Bedroom 1	100%	100%	100%	100%	Compliant
A3.07	LKD	100%	100%	100%	100%	Compliant
A3.08	Bedroom 1	100%	100%	100%	100%	Compliant
A3.08	LKD	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.
For floor plans of the assessed units please refer to section C.1 on page 37.

D.1.2 Supplementary SDA Results (I.S. EN 17037 criteria): Plot A4

Table No. D.1.2 - 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*	
A4.01	LKD	100%	100%	95%	100%	Compliant
A4.01	Bedroom 1	100%	100%	100%	100%	Compliant
A4.01	Bedroom 2	63%	100%	42%	100%	Trees affecting compliance
A4.01	Bedroom 3	100%	100%	100%	100%	Compliant
A4.02	LKD	96%	100%	93%	100%	Compliant
A4.02	Bedroom 1	100%	100%	100%	100%	Compliant
A4.02	Bedroom 2	43%	100%	37%	100%	Non-compliant
A4.02	Bedroom 3	100%	100%	100%	100%	Compliant
A4.03	LKD	84%	100%	81%	100%	Compliant
A4.03	Bedroom 1	100%	100%	100%	100%	Compliant
A4.03	Bedroom 2	42%	100%	40%	100%	Non-compliant
A4.03	Bedroom 3	100%	100%	100%	100%	Compliant
A4.04	LKD	100%	100%	71%	100%	Compliant
A4.04	Bedroom 1	100%	100%	100%	100%	Compliant
A4.04	Bedroom 2	47%	100%	41%	100%	Non-compliant
A4.04	Bedroom 3	100%	100%	100%	100%	Compliant
A4.05	Bedroom 1	100%	100%	100%	100%	Compliant
A4.05	LKD	100%	100%	100%	100%	Compliant
A4.06	Bedroom 1	100%	100%	100%	100%	Compliant
A4.06	LKD	100%	100%	100%	100%	Compliant
A4.07	Bedroom 1	100%	100%	100%	100%	Compliant
A4.07	LKD	100%	100%	100%	100%	Compliant
A4.08	Bedroom 1	100%	100%	100%	100%	Compliant
A4.08	LKD	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.
For floor plans of the assessed units please refer to section C.1 on page 37.

D.1.3 Supplementary SDA Results (I.S. EN 17037 criteria): Plot D1 (level 00 and 01)

Table No. D.1.3 - 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*	
D1.00.1	LKD	100%	100%	100%	100%	Compliant
D1.00.1	Main Bedroom	99%	100%	98%	100%	Compliant
D1.00.2	Bedroom 2	100%	100%	100%	100%	Compliant
D1.00.2	LKD	61%	100%	49%	100%	Trees affecting compliance
D1.00.2	Main Bedroom	100%	100%	100%	100%	Compliant
D1.00.3	LKD	62%	100%	56%	100%	Compliant
D1.00.3	Main Bedroom	100%	100%	100%	100%	Compliant
D1.00.4	Bedroom 2	100%	100%	100%	100%	Compliant
D1.00.4	LKD	46%	100%	41%	99%	Non-compliant
D1.00.4	Main Bedroom	100%	100%	96%	100%	Compliant
D1.01.5	Bedroom 2	76%	100%	61%	100%	Compliant
D1.01.5	LKD	78%	100%	66%	100%	Compliant
D1.01.5	Main Bedroom	60%	100%	51%	100%	Compliant
D1.01.6	Bedroom 2	100%	100%	100%	100%	Compliant
D1.01.6	LKD	100%	100%	99%	100%	Compliant
D1.01.6	Main Bedroom	100%	100%	100%	100%	Compliant
D1.01.7	Bedroom 2	100%	100%	100%	100%	Compliant
D1.01.7	LKD	58%	100%	53%	100%	Compliant
D1.01.7	Main Bedroom	100%	100%	100%	100%	Compliant
D1.01.8	LKD	35%	89%	35%	84%	Non-compliant
D1.01.8	Main Bedroom	32%	100%	29%	100%	Non-compliant
D1.01.9	LKD	57%	100%	55%	100%	Compliant
D1.01.9	Main Bedroom	100%	100%	100%	100%	Compliant
D1.01.10	Bedroom 2	100%	100%	97%	100%	Compliant
D1.01.10	LKD	44%	100%	41%	100%	Non-compliant
D1.01.10	Main Bedroom	99%	100%	89%	100%	Compliant
D1.01.11	Bedroom 2	93%	100%	47%	100%	Trees affecting compliance
D1.01.11	LKD	56%	100%	43%	100%	Trees affecting compliance
D1.01.11	Main Bedroom	81%	100%	39%	100%	Trees affecting compliance
D1.01.12	Bedroom 2	72%	100%	57%	100%	Compliant
D1.01.12	LKD	52%	100%	36%	100%	Trees affecting compliance
D1.01.12	Main Bedroom	54%	100%	44%	100%	Trees affecting compliance

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.
For floor plans of the assessed units please refer to section C.1 on page 37.

D.1.4 Supplementary SDA Results (I.S. EN 17037 criteria): Plot D1 (level 02)

Table No. D.1.4 - 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*	
D1.02.13	Bedroom 2	68%	100%	56%	100%	Compliant
D1.02.13	LKD	82%	100%	72%	100%	Compliant
D1.02.13	Main Bedroom	83%	100%	67%	100%	Compliant
D1.02.14	Bedroom 2	100%	100%	100%	100%	Compliant
D1.02.14	LKD	100%	100%	100%	100%	Compliant
D1.02.14	Main Bedroom	100%	100%	100%	100%	Compliant
D1.02.15	Bedroom 2	100%	100%	100%	100%	Compliant
D1.02.15	LKD	64%	100%	57%	100%	Compliant
D1.02.15	Main Bedroom	100%	100%	100%	100%	Compliant
D1.02.16	LKD	40%	97%	40%	95%	Non-compliant
D1.02.16	Main Bedroom	42%	100%	39%	100%	Non-compliant
D1.02.17	LKD	64%	100%	59%	100%	Compliant
D1.02.17	Main Bedroom	100%	100%	100%	100%	Compliant
D1.02.18	Bedroom 2	99%	100%	99%	100%	Compliant
D1.02.18	LKD	47%	100%	45%	100%	Non-compliant
D1.02.18	Main Bedroom	100%	100%	100%	100%	Compliant
D1.02.19	Bedroom 2	91%	100%	68%	100%	Compliant
D1.02.19	LKD	58%	100%	55%	100%	Compliant
D1.02.19	Main Bedroom	100%	100%	78%	100%	Compliant
D1.02.20	Bedroom 2	60%	100%	53%	100%	Compliant
D1.02.20	LKD	54%	100%	47%	100%	Trees affecting compliance
D1.02.20	Main Bedroom	83%	100%	70%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.
For floor plans of the assessed units please refer to section C.1 on page 37.

D.1.5 Supplementary SDA Results (I.S. EN 17037 criteria): Plot D1 (level 03 and 04)

Table No. D.1.5 - 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*	
D1.03.21	Bedroom 2	74%	100%	67%	100%	Compliant
D1.03.21	LKD	86%	100%	76%	100%	Compliant
D1.03.21	Main Bedroom	100%	100%	83%	100%	Compliant
D1.03.22	Bedroom 2	100%	100%	100%	100%	Compliant
D1.03.22	LKD	100%	100%	100%	100%	Compliant
D1.03.22	Main Bedroom	100%	100%	100%	100%	Compliant
D1.03.23	Bedroom 2	100%	100%	100%	100%	Compliant
D1.03.23	LKD	65%	100%	61%	100%	Compliant
D1.03.23	Main Bedroom	100%	100%	100%	100%	Compliant
D1.03.24	LKD	45%	100%	44%	100%	Non-compliant
D1.03.24	Main Bedroom	67%	100%	64%	100%	Compliant
D1.03.25	LKD	74%	100%	71%	100%	Compliant
D1.03.25	Main Bedroom	100%	100%	100%	100%	Compliant
D1.03.26	Bedroom 2	100%	100%	100%	100%	Compliant
D1.03.26	LKD	60%	100%	59%	100%	Compliant
D1.03.26	Main Bedroom	100%	100%	100%	100%	Compliant
D1.03.27	Bedroom 2	95%	100%	84%	100%	Compliant
D1.03.27	LKD	62%	100%	61%	100%	Compliant
D1.03.27	Main Bedroom	100%	100%	97%	100%	Compliant
D1.03.28	Bedroom 2	68%	100%	57%	100%	Compliant
D1.03.28	LKD	61%	100%	59%	100%	Compliant
D1.03.28	Main Bedroom	95%	100%	76%	100%	Compliant
D1.04.29	Bedroom 2	73%	100%	68%	100%	Compliant
D1.04.29	LKD	92%	100%	87%	100%	Compliant
D1.04.29	Main Bedroom	98%	100%	83%	100%	Compliant
D1.04.30	Bedroom 2	100%	100%	100%	100%	Compliant
D1.04.30	LKD	100%	100%	100%	100%	Compliant
D1.04.30	Main Bedroom	100%	100%	100%	100%	Compliant
D1.04.31	Bedroom 2	100%	100%	100%	100%	Compliant
D1.04.31	LKD	86%	100%	80%	100%	Compliant
D1.04.31	Main Bedroom	100%	100%	100%	100%	Compliant
D1.04.32	LKD	53%	100%	53%	100%	Compliant
D1.04.32	Main Bedroom	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.
For floor plans of the assessed units please refer to section C.1 on page 37.

D.1.6 Supplementary SDA Results (I.S. EN 17037 criteria): Plot D2 (level 00 and 01)

Table No. D.1.6 - 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*	
D2.00.01	LKD	100%	100%	100%	100%	Compliant
D2.00.01	Main Bedroom	100%	100%	100%	100%	Compliant
D2.00.02	Bedroom 2	100%	100%	98%	100%	Compliant
D2.00.02	LKD	39%	100%	30%	94%	Non-compliant
D2.00.02	Main Bedroom	100%	100%	99%	100%	Compliant
D2.00.03	LKD	45%	100%	41%	100%	Non-compliant
D2.00.03	Main Bedroom	100%	100%	100%	100%	Compliant
D2.00.04	Bedroom 2	100%	100%	83%	100%	Compliant
D2.00.04	LKD	36%	99%	32%	98%	Non-compliant
D2.00.04	Main Bedroom	97%	100%	76%	100%	Compliant
D2.01.05	Bedroom 2	100%	100%	78%	100%	Compliant
D2.01.05	LKD	97%	100%	80%	100%	Compliant
D2.01.05	Main Bedroom	97%	100%	67%	100%	Compliant
D2.01.06	Bedroom 2	100%	100%	100%	100%	Compliant
D2.01.06	LKD	100%	100%	98%	100%	Compliant
D2.01.06	Main Bedroom	100%	100%	100%	100%	Compliant
D2.01.07	Bedroom 2	100%	100%	100%	100%	Compliant
D2.01.07	LKD	40%	100%	37%	98%	Non-compliant
D2.01.07	Main Bedroom	100%	100%	100%	100%	Compliant
D2.01.08	LKD	24%	76%	24%	74%	Non-compliant
D2.01.08	Main Bedroom	21%	94%	21%	90%	Non-compliant
D2.01.09	Bedroom 2	97%	100%	82%	100%	Compliant
D2.01.09	LKD	65%	100%	56%	100%	Compliant
D2.01.09	Main Bedroom	64%	100%	59%	100%	Compliant
D2.01.10	Bedroom 2	100%	100%	100%	100%	Compliant
D2.01.10	LKD	59%	100%	55%	100%	Compliant
D2.01.10	Main Bedroom	100%	100%	93%	100%	Compliant
D2.01.11	Bedroom 2	85%	100%	70%	100%	Compliant
D2.01.11	LKD	33%	99%	31%	96%	Non-compliant
D2.01.11	Main Bedroom	79%	100%	67%	100%	Compliant
D2.01.12	LKD	41%	100%	38%	100%	Non-compliant
D2.01.12	Main Bedroom	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.
For floor plans of the assessed units please refer to section C.1 on page 37.

D.1.7 Supplementary SDA Results (I.S. EN 17037 criteria): Plot D2 (level 02)

Table No. D.1.7 - 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*	
D2.02.13	Bedroom 2	100%	100%	100%	100%	Compliant
D2.02.13	LKD	99%	100%	97%	100%	Compliant
D2.02.13	Main Bedroom	100%	100%	97%	100%	Compliant
D2.02.14	Bedroom 2	100%	100%	100%	100%	Compliant
D2.02.14	LKD	100%	100%	100%	100%	Compliant
D2.02.14	Main Bedroom	100%	100%	100%	100%	Compliant
D2.02.15	Bedroom 2	100%	100%	100%	100%	Compliant
D2.02.15	LKD	47%	100%	44%	100%	Non-compliant
D2.02.15	Main Bedroom	100%	100%	100%	100%	Compliant
D2.02.16	LKD	31%	81%	30%	80%	Non-compliant
D2.02.16	Main Bedroom	28%	100%	28%	100%	Non-compliant
D2.02.17	Bedroom 2	98%	100%	95%	100%	Compliant
D2.02.17	LKD	68%	100%	67%	100%	Compliant
D2.02.17	Main Bedroom	79%	100%	67%	100%	Compliant
D2.02.18	Bedroom 2	100%	100%	100%	100%	Compliant
D2.02.18	LKD	60%	100%	59%	100%	Compliant
D2.02.18	Main Bedroom	100%	100%	100%	100%	Compliant
D2.02.19	Bedroom 2	87%	100%	80%	100%	Compliant
D2.02.19	LKD	36%	99%	34%	98%	Non-compliant
D2.02.19	Main Bedroom	79%	100%	74%	100%	Compliant
D2.02.20	LKD	49%	100%	47%	100%	Non-compliant
D2.02.20	Main Bedroom	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.
For floor plans of the assessed units please refer to section C.1 on page 37.

D.1.8 Supplementary SDA Results (I.S. EN 17037 criteria): Plot D2 (level 03)

Table No. D.1.8 - 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*	
D2.03.21	Bedroom 2	100%	100%	100%	100%	Compliant
D2.03.21	LKD	100%	100%	100%	100%	Compliant
D2.03.21	Main Bedroom	100%	100%	100%	100%	Compliant
D2.03.22	Bedroom 2	100%	100%	100%	100%	Compliant
D2.03.22	LKD	100%	100%	100%	100%	Compliant
D2.03.22	Main Bedroom	100%	100%	100%	100%	Compliant
D2.03.23	Bedroom 2	100%	100%	100%	100%	Compliant
D2.03.23	LKD	58%	100%	57%	100%	Compliant
D2.03.23	Main Bedroom	100%	100%	100%	100%	Compliant
D2.03.24	LKD	40%	92%	40%	90%	Non-compliant
D2.03.24	Main Bedroom	47%	100%	46%	100%	Non-compliant
D2.03.25	Bedroom 2	100%	100%	100%	100%	Compliant
D2.03.25	LKD	91%	100%	88%	100%	Compliant
D2.03.25	Main Bedroom	91%	100%	87%	100%	Compliant
D2.03.26	Bedroom 2	100%	100%	100%	100%	Compliant
D2.03.26	LKD	67%	100%	66%	100%	Compliant
D2.03.26	Main Bedroom	100%	100%	100%	100%	Compliant
D2.03.27	Bedroom 2	95%	100%	85%	100%	Compliant
D2.03.27	LKD	46%	100%	46%	100%	Non-compliant
D2.03.27	Main Bedroom	86%	100%	77%	100%	Compliant
D2.03.28	LKD	56%	100%	54%	100%	Compliant
D2.03.28	Main Bedroom	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.
For floor plans of the assessed units please refer to section C.1 on page 37.

D.1.9 Supplementary SDA Results (I.S. EN 17037 criteria): Plot BZ- Age Friendly Living- Apartment units

Table No. D.1.9 - 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*	
BZ.00.8	Bedroom 2	100%	100%	100%	100%	Compliant
BZ.00.8	LKD	49%	100%	29%	100%	Non-compliant
BZ.00.8	Main Bedroom	100%	100%	58%	100%	Compliant
BZ.00.9	Bedroom 2	100%	100%	100%	100%	Compliant
BZ.00.9	LKD	82%	100%	43%	100%	Trees affecting compliance
BZ.00.9	Main Bedroom	100%	100%	65%	100%	Compliant
BZ.01.10	LKD	100%	100%	100%	100%	Compliant
BZ.01.10	Main Bedroom	100%	100%	97%	100%	Compliant
BZ.01.11	LKD	100%	100%	100%	100%	Compliant
BZ.01.11	Main Bedroom	100%	100%	97%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 16.
For floor plans of the assessed units please refer to section C.1 on page 37.

D.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. D.2 - Supplementary Scheme Performance NSL			
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, section 2.2.10 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.

D.2.1 Supplementary NSL Results: Plot A3

Table No. D.2.1 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
A3.01	LKD	99%	Yes
A3.01	Bedroom 1	97%	Yes
A3.01	Bedroom 2	97%	Yes
A3.01	Bedroom 3	98%	Yes
A3.02	LKD	100%	Yes
A3.02	Bedroom 1	98%	Yes
A3.02	Bedroom 2	97%	Yes
A3.02	Bedroom 3	99%	Yes
A3.03	LKD	99%	Yes
A3.03	Bedroom 1	97%	Yes
A3.03	Bedroom 2	97%	Yes
A3.03	Bedroom 3	98%	Yes
A3.04	LKD	100%	Yes
A3.04	Bedroom 1	97%	Yes
A3.04	Bedroom 2	100%	Yes
A3.04	Bedroom 3	99%	Yes
A3.05	Bedroom 1	99%	Yes
A3.05	LKD	100%	Yes
A3.06	Bedroom 1	99%	Yes
A3.06	LKD	100%	Yes
A3.07	Bedroom 1	99%	Yes
A3.07	LKD	100%	Yes
A3.08	Bedroom 1	99%	Yes
A3.08	LKD	100%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 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 C.1 on page 37.

D.2.2 Supplementary NSL Results: Plot A4

Table No. D.2.2 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
A4.01	LKD	99%	Yes
A4.01	Bedroom 1	97%	Yes
A4.01	Bedroom 2	97%	Yes
A4.01	Bedroom 3	98%	Yes
A4.02	LKD	100%	Yes
A4.02	Bedroom 1	97%	Yes
A4.02	Bedroom 2	97%	Yes
A4.02	Bedroom 3	98%	Yes
A4.03	LKD	99%	Yes
A4.03	Bedroom 1	97%	Yes
A4.03	Bedroom 2	97%	Yes
A4.03	Bedroom 3	98%	Yes
A4.04	LKD	100%	Yes
A4.04	Bedroom 1	97%	Yes
A4.04	Bedroom 2	98%	Yes
A4.04	Bedroom 3	98%	Yes
A4.05	Bedroom 1	99%	Yes
A4.05	LKD	100%	Yes
A4.06	Bedroom 1	99%	Yes
A4.06	LKD	100%	Yes
A4.07	Bedroom 1	99%	Yes
A4.07	LKD	100%	Yes
A4.08	Bedroom 1	99%	Yes
A4.08	LKD	100%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 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 C.1 on page 37.

D.2.3 Supplementary NSL Results: Plot D1 (level 00 and 01)

Table No. D.2.3 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
D1.00.1	LKD	100%	Yes
D1.00.1	Main Bedroom	97%	Yes
D1.00.2	Bedroom 2	100%	Yes
D1.00.2	LKD	97%	Yes
D1.00.2	Main Bedroom	99%	Yes
D1.00.3	LKD	100%	Yes
D1.00.3	Main Bedroom	98%	Yes
D1.00.4	Bedroom 2	99%	Yes
D1.00.4	LKD	92%	Yes
D1.00.4	Main Bedroom	99%	Yes
D1.01.5	Bedroom 2	99%	Yes
D1.01.5	LKD	100%	Yes
D1.01.5	Main Bedroom	98%	Yes
D1.01.6	Bedroom 2	100%	Yes
D1.01.6	LKD	100%	Yes
D1.01.6	Main Bedroom	99%	Yes
D1.01.7	Bedroom 2	100%	Yes
D1.01.7	LKD	98%	Yes
D1.01.7	Main Bedroom	99%	Yes
D1.01.8	LKD	99%	Yes
D1.01.8	Main Bedroom	72%	No
D1.01.9	LKD	100%	Yes
D1.01.9	Main Bedroom	98%	Yes
D1.01.10	Bedroom 2	99%	Yes
D1.01.10	LKD	95%	Yes
D1.01.10	Main Bedroom	99%	Yes
D1.01.11	Bedroom 2	99%	Yes
D1.01.11	LKD	100%	Yes
D1.01.11	Main Bedroom	99%	Yes
D1.01.12	Bedroom 2	99%	Yes
D1.01.12	LKD	100%	Yes
D1.01.12	Main Bedroom	98%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 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 C.1 on page 37.

D.2.4 Supplementary NSL Results: Plot D1 (level 02)

Table No. D.2.4 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
D1.02.13	Bedroom 2	97%	Yes
D1.02.13	LKD	100%	Yes
D1.02.13	Main Bedroom	99%	Yes
D1.02.14	Bedroom 2	99%	Yes
D1.02.14	LKD	100%	Yes
D1.02.14	Main Bedroom	99%	Yes
D1.02.15	Bedroom 2	99%	Yes
D1.02.15	LKD	98%	Yes
D1.02.15	Main Bedroom	100%	Yes
D1.02.16	LKD	99%	Yes
D1.02.16	Main Bedroom	79%	No
D1.02.17	LKD	100%	Yes
D1.02.17	Main Bedroom	98%	Yes
D1.02.18	Bedroom 2	99%	Yes
D1.02.18	LKD	98%	Yes
D1.02.18	Main Bedroom	99%	Yes
D1.02.19	Bedroom 2	99%	Yes
D1.02.19	LKD	100%	Yes
D1.02.19	Main Bedroom	99%	Yes
D1.02.20	Bedroom 2	97%	Yes
D1.02.20	LKD	99%	Yes
D1.02.20	Main Bedroom	98%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 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 C.1 on page 37.

D.2.5 Supplementary NSL Results: Plot D1 (level 03 and 04)

Table No. D.2.5 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
D1.03.21	Bedroom 2	98%	Yes
D1.03.21	LKD	100%	Yes
D1.03.21	Main Bedroom	99%	Yes
D1.03.22	Bedroom 2	99%	Yes
D1.03.22	LKD	100%	Yes
D1.03.22	Main Bedroom	99%	Yes
D1.03.23	Bedroom 2	99%	Yes
D1.03.23	LKD	98%	Yes
D1.03.23	Main Bedroom	99%	Yes
D1.03.24	LKD	100%	Yes
D1.03.24	Main Bedroom	98%	Yes
D1.03.25	LKD	100%	Yes
D1.03.25	Main Bedroom	98%	Yes
D1.03.26	Bedroom 2	99%	Yes
D1.03.26	LKD	98%	Yes
D1.03.26	Main Bedroom	99%	Yes
D1.03.27	Bedroom 2	99%	Yes
D1.03.27	LKD	100%	Yes
D1.03.27	Main Bedroom	99%	Yes
D1.03.28	Bedroom 2	98%	Yes
D1.03.28	LKD	100%	Yes
D1.03.28	Main Bedroom	99%	Yes
D1.04.29	Bedroom 2	97%	Yes
D1.04.29	LKD	100%	Yes
D1.04.29	Main Bedroom	99%	Yes
D1.04.30	Bedroom 2	99%	Yes
D1.04.30	LKD	100%	Yes
D1.04.30	Main Bedroom	99%	Yes
D1.04.31	Bedroom 2	99%	Yes
D1.04.31	LKD	98%	Yes
D1.04.31	Main Bedroom	99%	Yes
D1.04.32	LKD	99%	Yes
D1.04.32	Main Bedroom	98%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 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 C.1 on page 37.

D.2.6 Supplementary NSL Results: Plot D2 (level 00 and 01)

Table No. D.2.6 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
D2.00.01	LKD	100%	Yes
D2.00.01	Main Bedroom	97%	Yes
D2.00.02	Bedroom 2	99%	Yes
D2.00.02	LKD	96%	Yes
D2.00.02	Main Bedroom	99%	Yes
D2.00.03	LKD	97%	Yes
D2.00.03	Main Bedroom	98%	Yes
D2.00.04	Bedroom 2	99%	Yes
D2.00.04	LKD	96%	Yes
D2.00.04	Main Bedroom	98%	Yes
D2.01.05	Bedroom 2	99%	Yes
D2.01.05	LKD	100%	Yes
D2.01.05	Main Bedroom	98%	Yes
D2.01.06	Bedroom 2	100%	Yes
D2.01.06	LKD	100%	Yes
D2.01.06	Main Bedroom	100%	Yes
D2.01.07	Bedroom 2	99%	Yes
D2.01.07	LKD	94%	Yes
D2.01.07	Main Bedroom	99%	Yes
D2.01.08	LKD	95%	Yes
D2.01.08	Main Bedroom	63%	No
D2.01.09	Bedroom 2	97%	Yes
D2.01.09	LKD	99%	Yes
D2.01.09	Main Bedroom	88%	Yes
D2.01.10	Bedroom 2	99%	Yes
D2.01.10	LKD	100%	Yes
D2.01.10	Main Bedroom	99%	Yes
D2.01.11	Bedroom 2	99%	Yes
D2.01.11	LKD	96%	Yes
D2.01.11	Main Bedroom	99%	Yes
D2.01.12	LKD	98%	Yes
D2.01.12	Main Bedroom	98%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 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 C.1 on page 37.

D.2.7 Supplementary NSL Results: Plot D2 (level 02)

Table No. D.2.7 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
D2.02.13	Bedroom 2	99%	Yes
D2.02.13	LKD	100%	Yes
D2.02.13	Main Bedroom	98%	Yes
D2.02.14	Bedroom 2	99%	Yes
D2.02.14	LKD	100%	Yes
D2.02.14	Main Bedroom	99%	Yes
D2.02.15	Bedroom 2	99%	Yes
D2.02.15	LKD	98%	Yes
D2.02.15	Main Bedroom	99%	Yes
D2.02.16	LKD	97%	Yes
D2.02.16	Main Bedroom	73%	No
D2.02.17	Bedroom 2	99%	Yes
D2.02.17	LKD	100%	Yes
D2.02.17	Main Bedroom	91%	Yes
D2.02.18	Bedroom 2	99%	Yes
D2.02.18	LKD	100%	Yes
D2.02.18	Main Bedroom	99%	Yes
D2.02.19	Bedroom 2	99%	Yes
D2.02.19	LKD	97%	Yes
D2.02.19	Main Bedroom	99%	Yes
D2.02.20	LKD	99%	Yes
D2.02.20	Main Bedroom	98%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 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 C.1 on page 37.

D.2.8 Supplementary NSL Results: Plot D2 (level 03)

Table No. D.2.8 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
D2.03.21	Bedroom 2	99%	Yes
D2.03.21	LKD	100%	Yes
D2.03.21	Main Bedroom	98%	Yes
D2.03.22	Bedroom 2	99%	Yes
D2.03.22	LKD	100%	Yes
D2.03.22	Main Bedroom	99%	Yes
D2.03.23	Bedroom 2	99%	Yes
D2.03.23	LKD	98%	Yes
D2.03.23	Main Bedroom	99%	Yes
D2.03.24	LKD	99%	Yes
D2.03.24	Main Bedroom	98%	Yes
D2.03.25	Bedroom 2	99%	Yes
D2.03.25	LKD	100%	Yes
D2.03.25	Main Bedroom	97%	Yes
D2.03.26	Bedroom 2	99%	Yes
D2.03.26	LKD	100%	Yes
D2.03.26	Main Bedroom	99%	Yes
D2.03.27	Bedroom 2	99%	Yes
D2.03.27	LKD	98%	Yes
D2.03.27	Main Bedroom	99%	Yes
D2.03.28	LKD	100%	Yes
D2.03.28	Main Bedroom	98%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 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 C.1 on page 37.

D.2.9 Supplementary NSL Results: Plot BZ- Age Friendly Living- Apartment units

Table No. D.2.9 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
BZ.00.8	Bedroom 2	97%	Yes
BZ.00.8	LKD	96%	Yes
BZ.00.8	Main Bedroom	99%	Yes
BZ.00.9	Bedroom 2	97%	Yes
BZ.00.9	LKD	99%	Yes
BZ.00.9	Main Bedroom	99%	Yes
BZ.01.10	LKD	100%	Yes
BZ.01.10	Main Bedroom	98%	Yes
BZ.01.11	LKD	100%	Yes
BZ.01.11	Main Bedroom	98%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 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 C.1 on page 37.

E.0 Glossary

E.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 10.

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 one-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, section 3.2.9 of the BRE Guidelines suggest that windows with an orientation within 90 degrees of due north need not 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.

Average Sun Hours (ASH)
Assessment of the average possible sun hours received in an area over a given date.

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.

E.2 Definition of Effects

Section H3 and H4 of the BRE Guidelines states that:

"Adverse impacts occur when there is a significant decrease in the amount of skylight and sunlight reaching an existing building where it is required, or in the amount of sunlight reaching an open space. The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied."

As such, planning authorities should consider a range of localised factors when making decisions. The terminology suggested in section H6 of the BRE Guidelines is listed below, whilst the assessment of impact should depend on a combination of factors. The BRE Guidelines (section H2) also state:

"Where a new development affects a number of existing buildings or open spaces, the clearest approach is usually to assess the impact on each one separately. It is also clearer to assess skylight and sunlight impacts separately."

Taking this advice, 3DDB have categorised the level of effect on each window/room/open space on an individual basis. In quantifying the levels of effect, 3DDB have assigned numerical values to the levels of compliance with the BRE recommendations. By applying a numerical logic to the terminology used in defining the levels of effect there is no ambiguity regarding how the levels of effect have been categorised within this report.

The list of definitions given below is taken from '*Appendix H: Environmental impact assessment*' of the BR 209 with a clear indication of how they have been applied in the context of this report.

Negligible
For the purposes of this Sunlight and Daylight Assessment Report a '*Negligible*' level of effect will be stated if the level of effect is within the criteria as recommended in the BRE Guidelines and the applied target value has been achieved.

Minor Adverse
For the purposes of this Sunlight and Daylight Assessment Report, a '*Minor Adverse*' level of effect will be stated if the level of effect is marginally outside of the criteria as stated in the BRE Guidelines. Typically a '*Minor Adverse*' level of effect will be applied if the level of daylight or sunlight is reduced to equal or greater than 80% and less than 100% of the applied target value.

Moderate Adverse
For the purposes of this Sunlight and Daylight Assessment Report, a 'Moderate Adverse' level of effect will be stated if the level of daylight or sunlight is reduced to equal or greater than 50% and less than 80% of the applied target value. '*Moderate Adverse*' levels of effect are quite typical in instances where a proposed development is planned on an under-developed plot of land.

Major Adverse
An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment. For the purposes of this Sunlight and Daylight Assessment Report a '*Major Adverse*' level of effect will be stated if the proposed development reduces the availability of daylight or sunlight of a neighbouring property to significantly below a baseline level. A '*Major Adverse*' level of effect will be stated if the level of daylight or sunlight is reduced to less than 50% of the applied target value.

Beneficial Impact
In relation to sunlight or daylight access, it is conceivable that a proposed development could yield positive effects on the neighbouring properties. In such circumstances the development would typically involve a reduction to the size or scale of built form (e.g. such as the demolition of a building or the removal of a large belt of evergreen trees, which might result in an increase in light access). Where such improvements occur, a '*Beneficial Impact*' will only be stated if the ratio of change is greater than 1.20 (an improvement of 20%). Should less perceptible improvements occur a '*Negligible*' level of effect will be stated.

Not Applicable (n.a.)
In instances where a baseline value is particularly low, levels of effects can appear exaggerated. To mitigate such occurrences, if the baseline value in the VSC, APSH/WPSH or SOG studies is below 1%, 3DDB have categorised the level of effect as n.a. (not applicable).

Averaged Windows (-)
If it can be determined or reasonably assumed that multiple windows are servicing the same room, each window will be assessed and a weighted average will be calculated. In such instances the level of effect for the room will be stated, but the level of effect for the individual windows contributing towards the average will be left blank in the table. This will be indicated in the tables with the dash symbol. (-)

E.3 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 "C.3 Sunlight Exposure (SE) in Proposed Units" on page 57. 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 of a proposed unit 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 at least 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.

F.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.

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 8 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 [sic – likely intended to reference BS EN 17037], 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.*"

While the 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 "2.3 Quantitative Impact Assessment Overview" on page 13 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.

Planning Design Standards for Apartments: Guidelines for Planning Authorities (2025)

In July 2025, the Department of Housing, Local Government and Heritage published an updated guidance document for new apartments, *'Planning Design Standards for Apartments: Guidelines for Planning Authorities, 2025'*. This document, which may be referred to by the simplified name *'Apartment Guidelines'*, supersedes the previous guidance document for apartments '*Sustainable Urban Housing: Design Standards for New Apartments, 2023*'.

Unlike the 2023 edition, the current Apartment Guidelines do not directly reference any specific guidance document for daylight and sunlight. Instead, they refer to '*Sustainable Residential Development and Compact Settlements Guidelines (2024)*':

"The provision of acceptable levels of natural light in new apartment developments is an important planning consideration, as it contributes to the liveability and amenity enjoyed by apartment residents. It is also important to safeguard against a detrimental impact on the amenity of other sensitive occupiers of adjacent properties. Section 5.3.7 of the SRDCSGs outlines requirements for the provision of acceptable levels of daylight in new residential developments and adjoining properties." (emphasis added.)

The relevant section of '*Sustainable Residential Development and Compact Settlements Guidelines*' (SRDCGS), 5.3.7, is referenced in the following section of this report.

Paragraph 6.7 of the superseded 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."

Although the above requirement has been removed from the 2025 apartment guidelines, the request remains in some local authority development plans. As such, the design team may still provide a rationale and/or compensatory design solutions for instances where daylight and/or sunlight recommendations have not been achieved.

Note: Section 3.2 of the '*Urban Development and Building Height Guidelines 2018*', provides similar guidance as the '*2023 apartment guidelines'* as referenced 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 its second edition, first published in 2011. Since then, a third 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 now referenced in BR 209 edition 3 is BS EN 17037.

Sustainable Residential Development and Compact Settlements Guidelines (2024)

Often referred to as "The Compact Growth Guidelines" this document advises on compact growth principles as a means to promote sustainable development, efficient land use, and infrastructure while minimizing sprawl and environmental degradation, contributing to sustainable urban growth, enhance liveability and support broader planning objectives.

In regard to daylight, section 5.3.7 states:

"The provision of acceptable levels of daylight in new residential developments is an important planning consideration, in the interests of ensuring a high quality living environment for future residents. It is also important to safeguard against a detrimental impact on the amenity of other sensitive occupiers of adjacent properties.

(a) The potential for poor daylight performance in a proposed development or for a material impact on neighbouring properties will generally arise in cases where the buildings are close together, where higher buildings are involved, or where there are other obstructions to daylight. Planning authorities do not need to undertake a detailed technical assessment in relation to daylight performance in all cases. It should be clear from the assessment of architectural drawings (including sections) in the case of low-rise housing with good separation from existing and proposed buildings that undue impact would not arise, and planning authorities may apply a level of discretion in this regard.

(b) In cases where a technical assessment of daylight performance is considered by the planning authority to be necessary regard should be had to quantitative performance approaches to daylight provision outlined in guides like A New European Standard for Daylighting in Buildings IS EN 17037:2018, UK National Annex BS EN 17037:2019 and the associated BRE Guide 209 2022 Edition (June 2022), or any relevant future standards or guidance specific to the Irish context.

In drawing conclusions in relation to daylight performance, planning authorities must weigh up the overall quality of the design and layout of the scheme and the measures proposed to maximise daylight provision, against the location of the site and the general presumption in favour of increased scales of urban residential development. Poor performance may arise due to design constraints associated with the site or location and there is a need to balance 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."

The Compact Growth Guidelines should be applied within statutory development plans and during the consideration of individual planning applications. Flexibility in interpretation allows planning authorities to tailor recommendations to specific local contexts and planning objectives.

South Dublin County Development Plan 2022-2028

The guidance provided in the South Dublin County Development Plan 2022-2028 references the 2nd Edition of the BRE Guidelines (BR 209-2011) and BS 8206-2:2008. The 2nd edition of the BRE Guidelines (BR 209-2011) has been withdrawn and replaced with the 3rd edition (BR 209-2022). BR 209-2011 used target values and criteria set out in BS 8206-2:2008 which has also been withdrawn and replaced with EN 17037. The 3rd edition of the BRE Guidelines (BR 209-2022) takes guidance from BS EN 17037.

Section 12.6.7 of the South Dublin County Development Plan states:

"Residential Developments shall be guided by the quantitative performance approaches and recommendations under the 'Site Layout Planning for Daylight and Sunlight' (2nd edition): A Guideline to Good Practice (BRE 2011) and BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting' or any updated guidance."

As the South Dublin County Development Plan allows for consideration of any updated or subsequent guidance, the 3rd edition of the BRE Guidelines (BR 209-2022) has been used as the primary guiding document for this report.

Guidelines / Standards 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.

Impact on the Surrounding Properties

Impact to daylight is assessed through a Vertical Sky Component (VSC) on all relevant surrounding windows: A VSC impact assessment is typically conducted, where appropriate, on the relevant surrounding windows determined by the BRE decision chart as illustrated in Figure 2.1 on page 8.

Impact to daylight can be further assessed through a No Sky Line (NSL) on surrounding properties: Section D3 of the BRE Guidelines recommends a No Sky Line study "where room layouts are known". Consequently, NSL assessments are typically conducted only on properties where detailed floor plans have been provided.

Impact to sunlight in neighbouring properties is assessed through an Annual Probable Sunlight Hours (APSH) and Winter Probable Sunlight Hours (WPSH) on all relevant surrounding windows: An APSH/WPSH impact assessment is typically conducted, where appropriate, on the relevant surrounding windows/rooms that have an orientation within 90° of due south.

Impact to sunlight in neighbouring gardens and/or amenity areas is assessed through a Sunlight on Ground (SOG) assessment in all surrounding amenity spaces: A SOG impact assessment is typically carried out, where appropriate, on the neighbouring gardens/ amenity spaces located within close proximity and to the north of the subject site.

Performance of the Proposed Development

Target Illuminance in all habitable rooms: A target illuminance assessment, also known as a Spatial Daylight Autonomy (SDA) assessment. The two recommended methodologies for this assessment are detailed in section 2.5.1 on page 16. In a scheme performance assessment, the SDA is typically calculated for the habitable rooms of the proposed development. A supplementary SDA assessment may also be conducted under the criteria of IS EN 17037.

When conducting a scheme performance assessment for sunlight in the habitable rooms of the proposed development, Sunlight Exposure (SE) is the relevant metric.

Sunlight on Ground (SOG) in all amenity spaces: A SOG assessment is typically carried out, for the amenity spaces of the proposed development.

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