LRD at Castlepark, Castlelands, Mallow, Co. Cork

Daylight & Sunlight Assessment

Project Ref: 20468

Client: Reside (Castlepark) Ltd.

Date: 11/10/2024

BPC ENGINEERS

BUILDING PERFORMANCE CONSULTING

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Glossary

Illuminance
A measure of the amount of light falling on a surface, usually measured in lux.

Target illuminance (E_T)
Illuminance from daylight that should be achieved for at least half of annual daylight hours across a specified fraction of the reference plane in a daylit space.

Minimum target illuminance (E_{TM})
Illuminance from daylight that should be achieved for at least half of annual daylight hours across 95% of the reference plane in spaces with vertical and/or inclined daylight apertures.

Daylight factor (D)
Ratio of total daylight illuminance at a reference point on the working plane within a space to outdoor illuminance on a horizontal plane due to an unobstructed CIE standard overcast sky. Thus a 1% DF would mean that the indoor illuminance at that point in the space would be one hundredth the outdoor unobstructed horizontal illuminance.

Daylight, natural light
Part of global solar radiation capable of causing a visual sensation. (CIE, 2020) (Combined skylight and sunlight.)

No sky line
The outline on the working plane of the area from which no sky can be seen.

Obstruction Angle
The angular altitude of the top of an obstruction above the horizontal, measured from a reference point in a vertical plane in a section perpendicular to the vertical plane.

Skylight
Part of *diffuse* sky radiation capable of causing a visual sensation. (CIE, 2020)

Sunlight
Part of direct solar radiation capable of causing a visual sensation. (CIE, 2020)

Annual Probable Sunlight Hours (APSH)
The long-term average of the total number of hours during the year in which direct sunlight reaches the unobstructed ground (when clouds are considered).

Winter Probable Sunlight Hours (WPSH)
The long-term average of the total number of hours between the 21st of September and the 21st of March in which direct sunlight reaches the unobstructed ground (when clouds are considered).

Vertical Sky Component (VSC)
Ratio of that part of illuminance, at a point on a given vertical plane, that is received directly from a sky of assumed or known luminance distribution (usually CIE standard overcast sky), 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.

Reference plane or working plane
Horizontal, vertical or inclined plane in which a visual task lies. Normally the working plane may be taken to be horizontal, 0.85 m above the floor in houses and factories, 0.7 m above the floor in offices.

Spatial Daylight Autonomy (sDA)

Spatial Daylight Autonomy (sDA) is a metric describing annual sufficiency of ambient daylight levels in interior environments. It is defined as the percent of an analysis area that meets a minimum daylight illuminance level for a specified fraction of the operating/daylight hours per year. The sDA value is expressed as a percentage of area.

Executive Summary

This report provides information on the daylight and sunlight analysis undertaken for the proposed LRD at Castlepark, Castlelands, Mallow, Co. Cork.

The development will consist of the construction of 469 no. residential units (comprising a mix of 1, 2, 3, and 4 bed semi-detached houses, detached houses, townhouses, and duplex/apartment units), a creche, an interpretive centre and all associated ancillary site development works.

The analysis shows that the proposed development will have a negligible impact on surrounding buildings with respect to:

- Access to skylight
- Access to sunlight, and
- Sunlight to gardens/open spaces.

The internal daylight provision was tested for all duplex and apartment units in the proposed development. All rooms meet the minimum recommendations for internal daylight provision (median illuminance) as set out in the BRE Guide and BS EN 17037 (UK National Annex).

Access to sunlight was also tested for the duplex and apartment units. All units meet the BRE criterion for access to sunlight.

Sunlight to all communal amenity spaces and the creche amenity space in the proposed development was assessed. The analysis shows that all open spaces receive more than 2 hours of sunlight on March 21st. Therefore, the proposed amenity spaces meet the BRE's recommendation for sunlight to open spaces and should appear adequately sunlit throughout the year.

Overall, the development has been designed with due consideration for daylight and sunlight and meets the recommendations as set out in the BRE Guide – BR 209 "Site Layout Planning for Daylight and Sunlight, A guide to good practice" (2022) and BS EN 17037.

Contents

1 Introduction

Site layout planning to achieve good daylighting and sunlighting, within buildings and in the open spaces around them is an important aspect in designing new buildings or developments. Daylight animates an interior and makes it attractive and interesting, as well as providing light to work or read by. Good daylight and sunlight can contribute to making a building energy-efficient; they can reduce the need for electric lighting, while winter solar gain can reduce heating requirements.

This report provides information on the daylight and sunlight analysis undertaken for the proposed LRD at Castlepark, Castlelands, Mallow, Co. Cork.

The proposed development site is adjacent to the existing Castlepark housing estate. It is predominantly a greenfield site but there is a small brownfield portion, where previous construction works had begun circa 2007/2008 as part of the previous Castlelands development. The surrounding area is mainly characterised by low density suburban development, with agricultural land located to the east of the site.

The development will consist of the construction of 469 no. residential units (comprising a mix of 1, 2, 3, and 4 bed semi-detached houses, detached houses, townhouses, and duplex/apartment units), a creche, an interpretive centre/cafe and all associated ancillary site development works.

The analysis and assessments in this report have been carried in line with the recommendations of BRE's "Site Layout Planning for daylight and sunlight, a Guide to good practice" (BRE Building Technology Group, 2022) and BS EN 17037. The aforementioned BRE guide is also known as BRE Guide BR 209 and may be referenced as such or simply as the "BRE Guide" hereafter in this document.

This report assesses the proposed development's impact on daylight and sunlight to the existing buildings using the following methods and metrics:

- Light from the sky via Vertical Sky Component (VSC)
- Sunlight to Gardens/Open Spaces (2hr sunlight test.)

The report also assesses access to daylight and sunlight for the proposed development by means of:

- Target Illuminance (E_T)/Spatial Daylight Autonomy (sDA)
- 1.5hr sunlight exposure test
- Sunlight to Gardens/Open Spaces

Additionally, Appendix C provides shadow images for the existing site and proposed development.

2 Site Description

2.1 Location & Context

The site is a greenfield site located approximately 1km east of Mallow Town Centre, in the Castlelands area. The surrounding area is primarily characterized by low density suburban housing and agricultural land. The existing Castlepark housing estate is located predominantly to the west of the proposed site.

Figure 1: Site Plan

Figure 2: Aerial View of Site (Background image credit: Google Maps) [Site boundary is only indicative. Refer to architectural drawings for accurate site boundary details.]

2.2 Proposed Development

The development will consist of the construction of 469 no. residential units (comprising a mix of 1, 2, 3, and 4 bed semi-detached houses, detached houses, townhouses, and duplex/apartment units), a creche, an interpretive centre/cafe and all associated ancillary site development works, including vehicular access, parking, footpaths, drainage and amenity areas at Castlepark, Castlelands (townland), St Jospeh's Road, Mallow, Co. Cork.

2.3 Sensitive Receptors

The BRE guide states that when assessing the potential effects of a proposed development on existing buildings, only those windows and rooms that have a 'reasonable expectation' of daylight and sunlight need to be considered. Windows and rooms which meet these criteria are considered to be 'sensitive receptors'. Paragraph 2.2.2 of the BRE guide clarifies what are considered sensitive receptors with respect to sunlight and daylight as follows:

"The guidelines given here are intended for use for rooms in adjoining dwellings where daylight is required, including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed. The guidelines may also be applied to any existing non-domestic building where the occupants have a reasonable expectation of daylight; this would normally include schools, hospitals, hotels and hostels, small workshops and some offices."

Outdoor amenity spaces which have a reasonable expectation of sunlight, whether they are private gardens, communal open spaces or outdoor public amenity areas, are also considered sensitive receptors.

Properties with sensitive receptors that may be affected by the proposed development are highlighted in Table 1 below.

Table 1: Assessed Neighbouring Properties

Neighbouring Properties Location Map	Legend
 (Background Image/Map credit: https://www.eircode.ie/)	Site Boundary Assessed Neighbouring Properties Notes: *Site boundary is only indicative. Refer to architectural drawings for accurate site boundary details.*

3 Methodology & Assessment Criteria

The analyses and assessments are based on the guidelines set out in the BRE guide (BR 209) "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" (BRE Building Technology Group, 2022). This guide is intended to be used in conjunction with interior lighting recommendations in BS EN 17037 Daylight in buildings, and in the CIBSE publication LG 10 Daylighting – a guide for designers.

It should also be noted that although the BRE guide gives numerical guidelines, "*these should be interpreted flexibly since natural lighting is only one of many factors in site layout design.*" (BRE Building Technology Group, 2022)

Advanced lighting simulation software is used to perform the analysis. The software combines 3D modelling capabilities with a suite of programs which employ advanced ray-tracing. The software fully meets all relevant guidelines set out in the BRE Guide BR209. The software has the ability to perform annual simulations based on hourly climatic data. This type of simulation is used for the assessment of internal daylight provision in new buildings (discussed in section 3.2.)

Throughout this report an effort will be made to differentiate between metrics used to assess skylight only, sunlight only or a combination of both - daylight. As defined in the glossary of the BRE Guide, "Daylight" is an umbrella term that includes both skylight and sunlight—the diffuse and direct components of light from the sky respectively. Unfortunately, the terms daylight and skylight are often used interchangeably but this report will aim to specify when daylight specifically refers to skylight or when it also encompasses sunlight.

The following sub-sections outline the methodology and assessment criteria used.

3.1 Existing Buildings

The impact of the proposed development on the existing buildings (sensitive receptors only) with respect to daylight is assessed using the following methodologies. The methodologies are grouped into sub-sections based on whether they are "Light from the sky" analysis or "Sunlighting" analysis.

3.1.1 Light from the Sky

3.1.1.1 Obstruction Angle Check

The BRE guide states that:

"Loss of light to existing windows need not be analysed if the distance of each part of the proposed development from the existing window is three or more times its height above the centre of the existing window. In these cases the loss of light will be small." (BRE Building Technology Group, 2022)

Therefore, in Figure , if the distance s1 was at least 3 times greater than h1, loss of light to the existing windows would not need to be analysed.

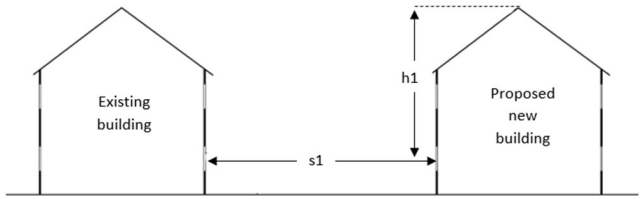

Figure 3: Spacing-to-Height Ratio

If the development is taller or closer than this, then the obstruction angle of the new development can be checked, where the obstruction angle is the angle subtended by the new development at the level of the centre of the lowest window in the existing building.

"If this angle is less than 25° for the whole of the development then it is unlikely to have a substantial effect on the diffuse skylight enjoyed by the existing building." (BRE Building Technology Group, 2022)

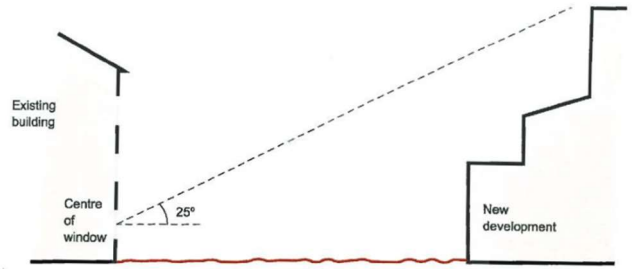

Figure 4: Obstruction Angle Check (25 Degree Line Test)

The obstruction angle is measured from the 3D CAD model. This check is suitable for existing windows where the proposed development is directly opposite an existing window, i.e. proposed development is cut by a vertical section drawn perpendicular to the window.

If, for any part of the new development, this angle is more than 25°, a more detailed check is needed to find the loss of skylight to the existing building. This may also be required in cases where the existing windows are not opposite the proposed development.

3.1.1.2 Vertical Sky Component (VSC)

Any reduction in the total amount of skylight for the existing properties can be calculated by finding the VSC at the centre of each main window. The Vertical Sky Component (VSC) is the ratio of the direct sky illuminance at the vertical reference point, to the simultaneous illuminance on an unobstructed horizontal plane. Reflected light is not included.

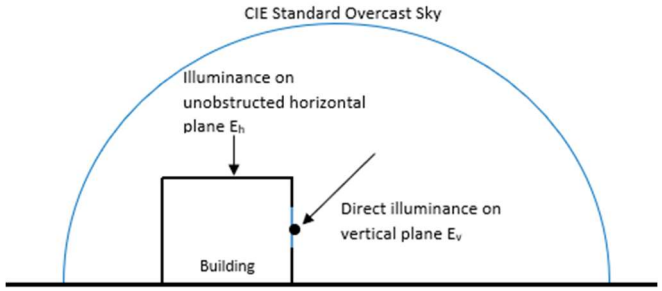

Figure 5: Vertical Sky Component

In the case of a floor-to-ceiling window such as a patio door, a point 1.6 m above ground (or balcony level for an upper storey) on the centre line of the window is used. The reference point is in the external plane of the window wall. Windows to bathrooms, toilets, storerooms, circulation areas and garages are not analysed.

Note that because the CIE standard overcast sky model is used, VSC is independent of orientation and location. (It is a *skylight* metric.)

The diffuse daylighting of any existing building may be adversely affected if:

"the VSC measured at the centre of an existing main window [or 1.6m above bottom of glazed door] is less than 27%, and less than 0.8 times its former value." (BRE Building Technology Group, 2022)

3.1.1.3 No Sky Line

While VSC provides an indication of skylight availability, it does not provide any information on the distribution of light within a space. In addition to external obstructions, the distribution of daylight within a space is dependent on window sizes and positioning, and room layouts. The no sky line divides points on the working plane which can and cannot see the sky.

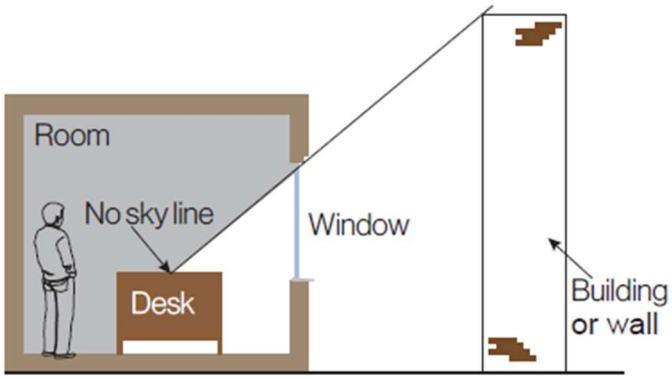

Figure 6: No Sky Line [courtesy (BRE Building Technology Group, 2022)]

Areas beyond the no sky line, since they receive no direct daylight, usually look dark and gloomy compared with the rest of the room.

Where room layouts are known, the impact on the daylighting distribution in the existing building should be found by plotting the no sky line in each of the main rooms.

The diffuse daylighting of an existing building may be adversely affected if:

"the area of the working plane in a room which can receive direct skylight is reduced to less than 0.80 times its former value." (BRE Building Technology Group, 2022)

(Room layouts for neighbouring buildings are often not readily available, hence VSC is often the only analysis performed.)

3.1.2 Sunlighting

"In designing a new development or extension to a building, care should be taken to safeguard the access to sunlight both for existing dwellings, and for any nearby non-domestic buildings where there is a particular requirement for sunlight." (BRE Building Technology Group, 2022)

Obstruction to sunlight may become an issue if:

- Some part of a new development is situated within 90° of due south of a main window wall of an existing building.
- In the section drawn perpendicular to this existing window wall, the new development subtends an angle greater than 25° to the horizontal measured from the centre of the lowest window to a main living room.

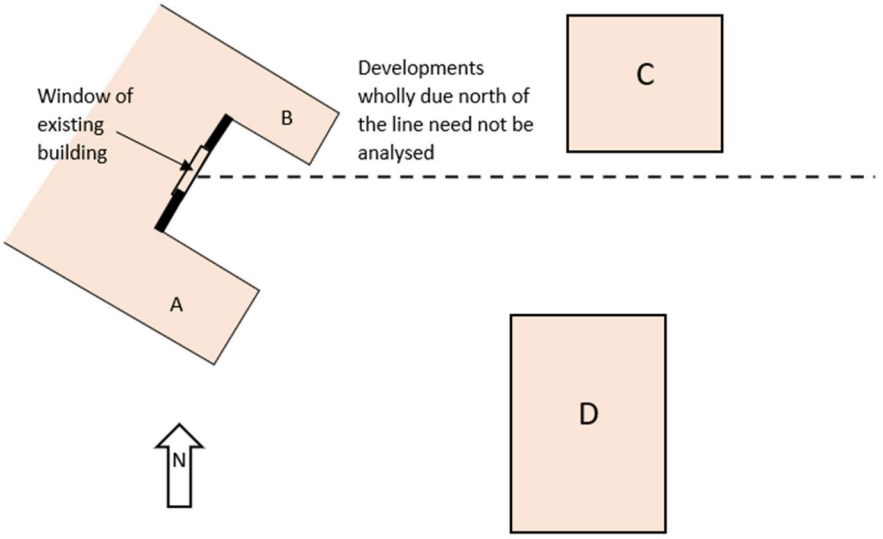

Figure 7: Sunlight Analysis Scenarios for Existing Buildings

No sunlight check is required on the existing window for proposed extension B and new building C, as they lie within 90° of due north of the window. The impact on

sunlight to the existing window should be checked for proposed extension A, and new building D if it subtends more than 25° to the horizontal, measured in section from the centre of the window.

To assess loss of sunlight to an existing building, it is suggested that all main living rooms of dwellings, and conservatories, should be checked if they have a window facing within 90° of due south.

3.1.2.1 Probable Sunlight Hours

To calculate the loss of sunlight to an existing building over the year, the annual probable sunlight hours (APSH) metric can be used. "*Here 'probable sunlight hours' means the total number of hours in the year that the sun is expected to shine on unobstructed ground, allowing for average levels of cloudiness for the location in question (based on sunshine probability data). The sunlight reaching a window is quantified as a percentage of this unobstructed annual total.*" (BRE Building Technology Group, 2022)

Sunlight to an existing dwelling may be adversely affected if the centre of a main living room window (which faces within 90° of due south):

- receives less than 25% of annual probable sunlight hours (APSH) and less than 0.80 times its former annual value.
- or less than 5% of annual probable sunlight hours between 21 September and 21 March (often referred to as winter probable sunlight hours - WPSH) and less than 0.80 times its former value during that period;
- and also has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

3.1.2.2 Basic Assessment

It is not always necessary to do a full calculation using Annual Probable Sunlight Hours APSH (section 3.1.2.1). The same "spacing-to-height ratio" and "obstruction angle" checks discussed in section 3.1.1.1 can be used to determine if a more detailed calculation is necessary or not. Additionally, depending on the VSC and orientation of the existing windows an APSH assessment may not be required. The recommendation for safeguarding sunlight to existing neighbouring buildings will be met if:

- *"the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window [see Figure] (note: obstructions within 90° of due north of the existing window need not count here).*
- *The window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal [Figure]. Again, obstructions within 90° of due north of the existing window need not be counted.*
- *The window wall faces within 20° of due south and the reference point has a VSC of 27% or more."* (BRE Building Technology Group, 2022)

3.1.3 Sunlight to Existing Gardens & Open Spaces

Good site layout planning for daylight and sunlight should not limit itself to providing natural lighting inside buildings. Sunlight in the spaces between buildings has an important impact on the overall appearance and ambience of a development.

"It is recommended that for it 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 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21 March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable." (BRE Building Technology Group, 2022)

3.1.3.1 Shadow Plots

The BRE guide states:

"Where a large building is proposed which may affect a number of gardens or open spaces it is often illustrative to plot a shadow plan showing the location of shadows at different times of day and year."

3.1.4 Impact Classification

Appendix H of the BRE Guide – "Environmental Impact Assessment" states that the impact of a new building on its surroundings can be classified as negligible, minor, moderate or major adverse. Where the loss of skylight or sunlight fully meets the guidelines in the BRE guide, the impact is assessed as negligible or minor adverse. Where the loss of skylight or sunlight does not meet the BRE guidelines, the impact is assessed as minor, moderate or major adverse.

Table 2 provides a more detailed description of the impact classification.

Table 2: Environmental Impact Assessment: Impact Classification

Negligible impact	• *Loss of light well within guidelines,* ***or*** • *only a small number of windows losing light (within the guidelines)* ***or*** • *limited area of open space losing light (within the guidelines)*

Minor adverse impact (a)	• *Loss of light only just within guidelines* ***and***
	  ○ *a larger number of windows are affected* ***or***
	  ○ *larger area of open space is affected (within the guidelines)*

Minor adverse impact (b)	• *only a small number of windows or limited open space areas are affected* • *the loss of light is only marginally outside the guidelines* • *an affected room has other sources of skylight or sunlight* • *the affected building or open space only has a low level requirement for skylight or sunlight* • *there are particular reasons why an alternative, less stringent, guideline should be applied*
Major adverse impact	• *large number of windows or large open space areas are affected* • *the loss of light is substantially outside the guidelines* • *all the windows in a particular property are affected* • *the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight (living rooms / playground)*

A moderate adverse impact falls somewhere between the criteria for *"Minor Adverse Impact (b)"* and *"Major Adverse Impact".*

3.2 New Buildings

The daylight provision was also checked for the proposed development.

3.2.1 Light from the Sky

Section 2.1.8 of the BRE Guide states that:

"Daylight provision in new rooms may be checked using either of the methods in BS EN 17037 Daylight in Buildings: direct prediction of illuminance levels using hourly climate data, or the use of the daylight factor (D)".

Both methods are measures of the overall amount of daylight in a space.

The daylight factor (D) method addresses daylight provision as a ratio of unobstructed external illuminance under overcast sky conditions. This method involves calculating the daylight factor (D) that would be exceeded over half of the room, i.e. the median daylight factor (this is not the same as the average daylight factor used in the previous standard, BS8206-2). The recommended daylight factor values are location specific. This method will not be discussed in any more detail in this report as the illuminance method is the preferred option.

3.2.1.1 Illuminance Method (Target Illuminance E_T)

The illuminance method "*involves using climatic data for the location of the site (via the use of an appropriate, typical or average year, weather file within the software) to calculate the illuminance from daylight at each point on an assessment grid on the reference plane at an at least hourly interval for a typical year."* (BRE Building Technology Group, 2022)

"A target illuminance (E_T) should be achieved across at least half of the reference plane in a daylit space for at least half of the daylight hours. Another target illuminance (E_{TM}) should also be achieved across 95% of the reference plane for at least half of the daylight hours; this is the minimum target illuminance to be achieved towards the back of the room." (BRE Building Technology Group, 2022)

(Note that since hourly climatic data is used based on the location of the site, location and orientation are accounted for. The target illuminance can therefore be considered a *daylight* metric, i.e. incorporating both skylight and sunlight.)

BS EN 17037 gives three levels of recommendation for daylight provision in interior spaces: minimum, medium and high. For compliance with the standard, a daylit space should achieve the minimum level of recommendation.

Table 3 gives the target illuminances for side lit rooms. Different targets, given in Table A2 of BS EN 17037, apply in spaces with horizontal rooflights.

Table 3: EN 17037 Target Illuminances

Level of recommendation	Target illuminance E_T (lx) for half of assessment grid	Target illuminance E_{TM} (lx) for 95% of assessment grid
Minimum	300	100
Medium	500	300
High	750	500

The guidance contained in BR 209 is intended to be used with BS EN 17037 and its UK National Annex. The UK National Annex gives specific minimum recommendations for habitable rooms in dwellings in the UK. Although Ireland adopted EN17037 directly as IS EN EN17037, it is expected that all councils in Ireland will adopt the UK National Annex recommendations. The Dubin City Council Development Plan 2022-2028 states:

"is important to note that no amendments were made to [the IS EN 17037] document and unlike 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).[…] These limitations make it unsuitable for use in planning policy or during planning applications. BR 209 must still be used for this purpose."

Even if a predominantly daylit appearance is not achievable for a room in a dwelling, the National Annex NA recommends that the target illuminance values given in Table 4 are exceeded over 50% of the points on a reference plane 0.85 m above the floor, for at least half of the daylight hours.

Table 4: BS EN 17037 NA Target Illuminances for dwellings

Room type	Target illuminance E_T (lx)
Bedroom	100
Living Room	150
Kitchen	200

Where one room in a dwelling serves more than a single purpose, it is recommended that the target illuminance is that for the room type with the highest value – for example, in a space that combines a living room and a kitchen the target illuminance is recommended to be 200 lx.

However, it is recommended that local authorities use discretion here. For example:
"The target for a living room could be used for a combined living/dining/kitchen area if the kitchens are not treated as habitable spaces." (BRE Building Technology Group, 2022). This may be appropriate in instances where small internal kitchens are unavoidable in apartment developments.

The minimum target illuminance level to be achieved across 95% of the reference plane within a space need not be applied to rooms in dwellings.

To avoid any confusion, the targets in Table 4 are those used for the purposes of this analysis.

The illuminance method is detailed and calculation intensive. It can take some time to process depending on the software, detail of the calculation model and the available computing power hence why the daylight factor (D) method may be preferred by some. However, it can provide additional information beyond the limits of the Daylight Factor method due to the use of hourly climate data.

There are a few ways the results of this type of analysis can be presented. One method is to report the % *area* of the reference plane exceeding the target illuminance E_T (for half of the daylight hours.) (This area should be greater than 50% to meet the BS EN 17037 recommendations.) This is equivalent to Spatial Daylight Autonomy (sDA)[1]. BR209 recommends reporting the median illuminance (exceeded over 50% of the reference plane) as this enables comparison with the different recommendations in BS EN 17037. It says that "*As an optional extra, the proportional area of the reference plane exceeding a particular target value may be presented".* It should be noted that the calculation methodology and results are the same in both instances. It is only the *presented* result that differs. For completeness, the results will be presented in both ways, i.e. both of the below metrics will be presented:

- The ***median illuminance*** (the illuminance exceeded over 50% of the reference plane).
- The ***% area*** of the reference plane exceeding a particular target illuminance (lux).

The presentation of the internal daylight provision results and how the various metrics are related are discussed in more detail in Appendix D.

[1] Some additional information on sDA is provided in Appendix D.

The settings used in the computational model for the illuminance calculations are outlined below:

- The reference/working plane is taken to be 0.85m above the floor.
- The grid spacing is 0.1m.
- A band of 0.3m from the walls is excluded from the grid.
- Window frame factor is set to 15-20%.
- The glazing transmittance (normal) was set to 0.70.
- The glazing maintenance factor is set to 96% (This accounts for the reduction in glazing transmittance due to dirt; 4% loss of daylight compared with clean glazing [in line with BRE guidance for a suburban environment].)
- The illuminance calculations take account of light which has been reflected from both external and internal surfaces. In the absence of detailed information on surface reflectances the recommended default reflectances from BR209 2022 have been used. These are detailed in Table 5 below.

Table 5: Surface Reflectances

Surface Type	Reflectance
Interior walls	0.50
Floors	0.20
Ceilings	0.70
Exterior walls and obstructions	0.20
Exterior Ground	0.20

Table 6: Balcony Glazing Properties

Surface Type	Properties
Balcony Glazing	Transmittance: 0.80 Refractive Index: 1.52

3.2.2 Sunlighting

For interiors, access to sunlight can be quantified based on the methodology set out in BS EN 17037.

"In general a dwelling, or non-domestic building that has a particular requirement for sunlight, will appear reasonably sunlit provided:

- *at least one main window wall faces within 90° of due south and*
- *a habitable room, preferably a main living room, can receive a total of at least 1.5 hours of sunlight on 21 March. This is assessed at the inside centre of the window(s); sunlight received by different windows can be added provided they occur at different times and sunlight hours are not double counted.*

Where groups of dwellings are planned, site layout design should aim to maximise the number of dwellings with a main living room that meets the above recommendations." (BRE Building Technology Group, 2022)

There are 3 levels of recommendation provided in EN 17037 relating to sunlight to a room:

- 1.5 hours is the minimum level,
- 3 hours is the medium level, and
- 4 hours is the high level.

For dwellings, as outlined above, at least one habitable room, preferably a main living room, should meet the minimum criterion.

3.2.3 Sunlight to Proposed Open Spaces

The BRE Guide recommends:

"*That for it 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 21 March."*

The communal open spaces and amenity space associated with the creche are analysed and assessed against the above criterion.

4 Analysis

4.1 Overview of Computational Models

3D models of the existing the proposed schemes were created. The existing and analysed (surrounding) models are based on 2D drawings provided by the architect supplemented by Google Street Maps and OS maps. The proposed model is based on the 2D CAD drawings provided by the architect.

In the following figures the building colours correspond to the following:

- Grey elements are the surrounding buildings (not analysed).
- Beige/buff elements represent the existing surrounding buildings that are analysed.
- The green elements are any existing buildings on the proposed site that will be demolished or significantly altered, and
- The blue elements are the buildings in the proposed development.

Figure 3: Existing Model (Plan View)

Figure 4: Proposed Model (Plan View)

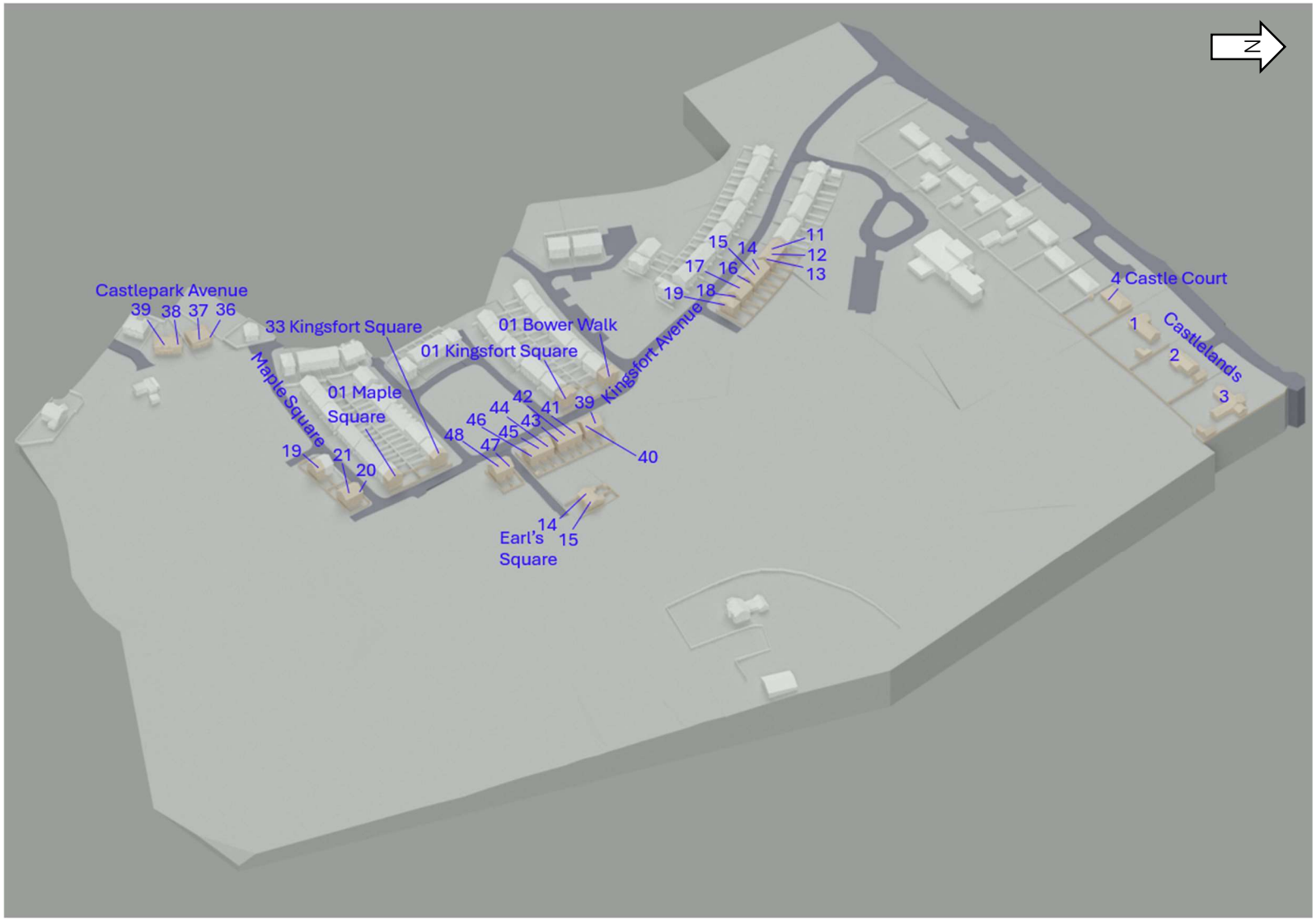

Figure 5: Existing Model (Perspective View Looking West)

Figure 6: Proposed Model (Perspective View Looking West)

4.2 Existing Buildings

4.2.1 Preliminary Analysis of Sensitive Receptors

Not all of the neighbouring dwellings highlighted in Table 1 require detailed analysis. Based on a visual assessment, access to daylight for most of these properties will not be adversely affected by the proposed development because of the low height of the buildings in the proposed development and their distance from most of the existing neighbouring properties. Some neighbouring properties will not be affected as they will have no view of the proposed development due to dense evergreen trees/hedges surrounding the properties. Castlelands House is one such property. (See Table 1 for location.)

4.2.1.1 Castlelands House

Castlelands House is located within fully mature gardens and is surrounded by tall evergreen hedging. The planting around Castlelands House will prevent any view of the proposed development and any adverse impact of the proposed development on daylight to this property.

In any case, even without the surrounding hedges the proposed development will have a negligible impact on Castlelands House as the distance of any property within the proposed development from any existing window at Castlelands House is three or more times its height above the centre of the relevant existing window.

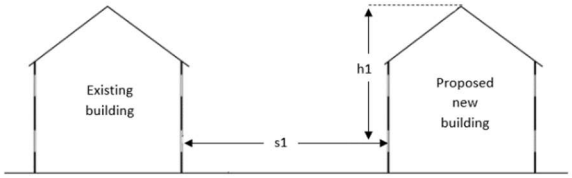

Figure 3: Spacing-to-Height Ratio. S1 > 3 x h1 for any property in the proposed development with respect to Castlelands House.

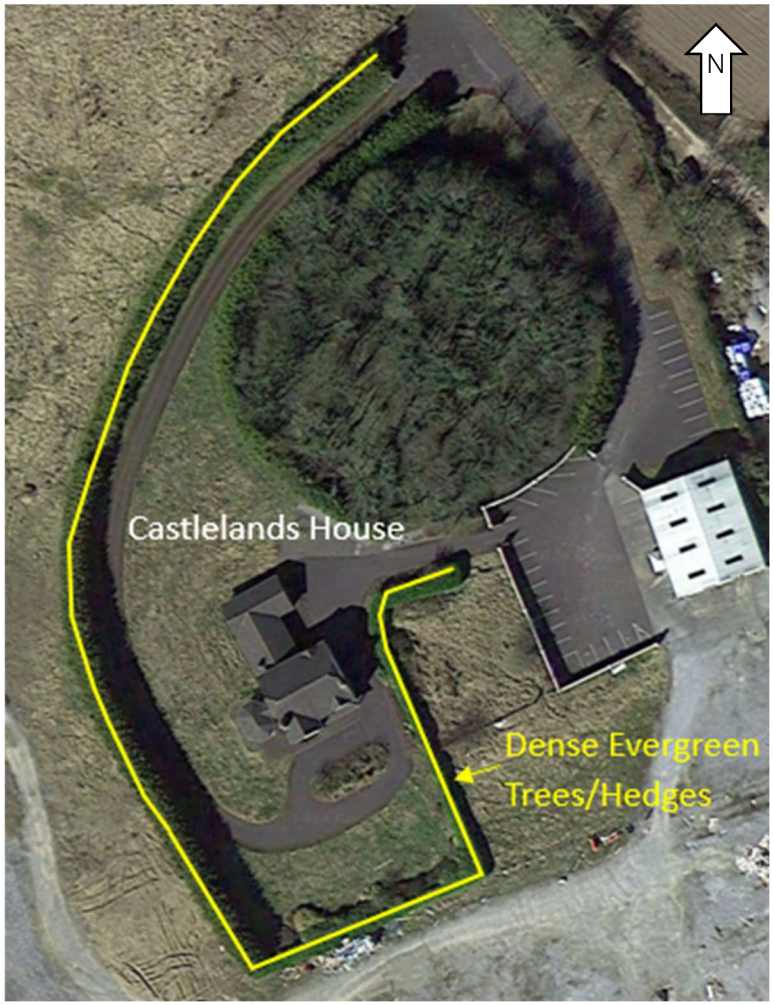

Figure 7: Castlelands House - Dense Evergreen Hedge at Boundary

4.2.2 VSC Analysis

VSC analysis has been performed for the closest neighbouring properties which have a view of the proposed development. Some assumptions had to be made for window positions at the rear of these properties where adequate information could not be gleaned from available resources. Where assumptions had to be made, multiple VSC points are spaced evenly across each facade facing the proposed development or estimates of window (or glazed door) locations were made based on visual evidence from similar neighbouring properties. The VSC points for each property are shown in the following figures. (The VSC points are at the centre of each window or 1.6m above floor level for glazed doors.)

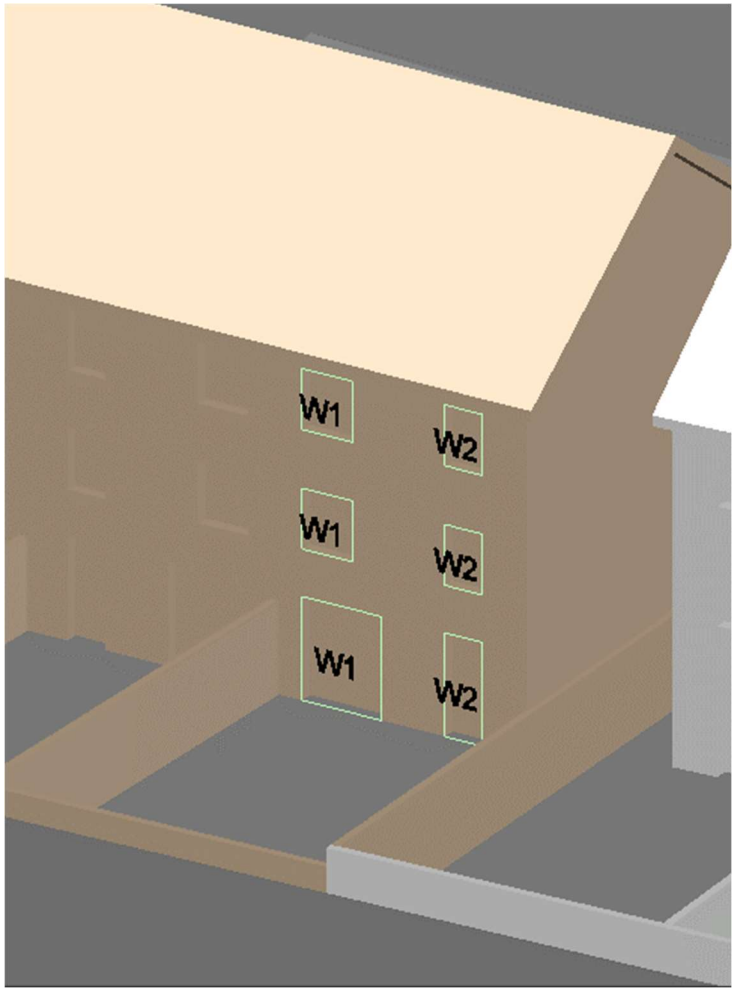

Figure 8: 11 Kingsfort Avenue (Rear - view from northeast)

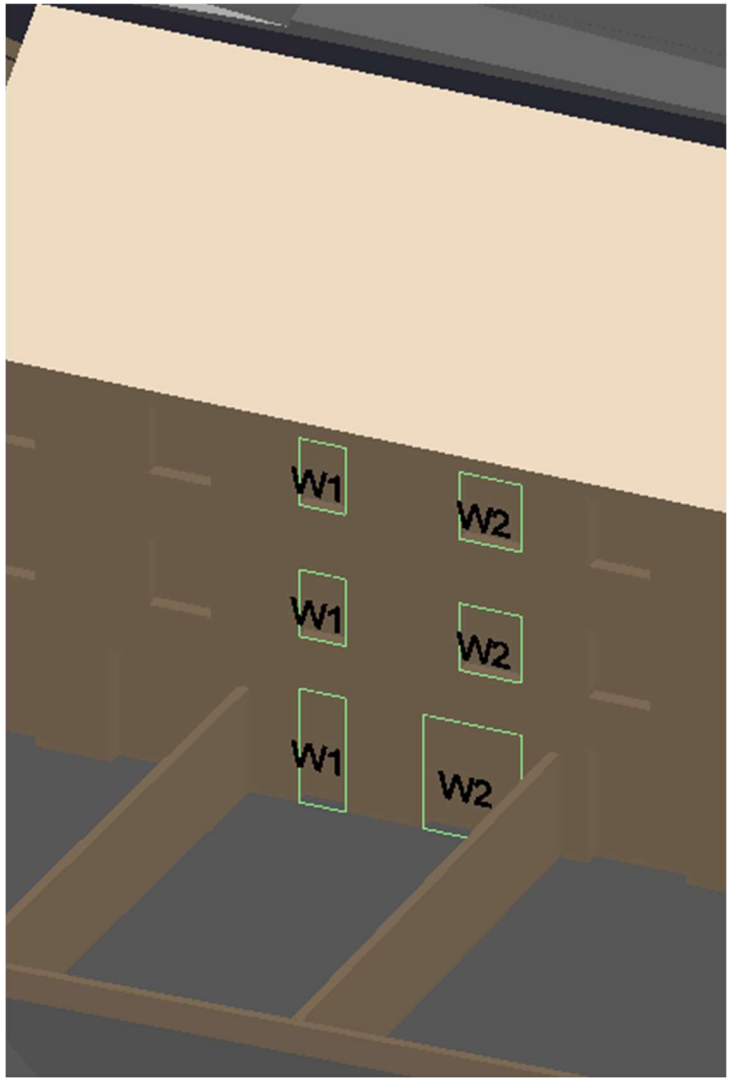

Figure 9: 12 Kingsfort Avenue (Rear - view from northeast)

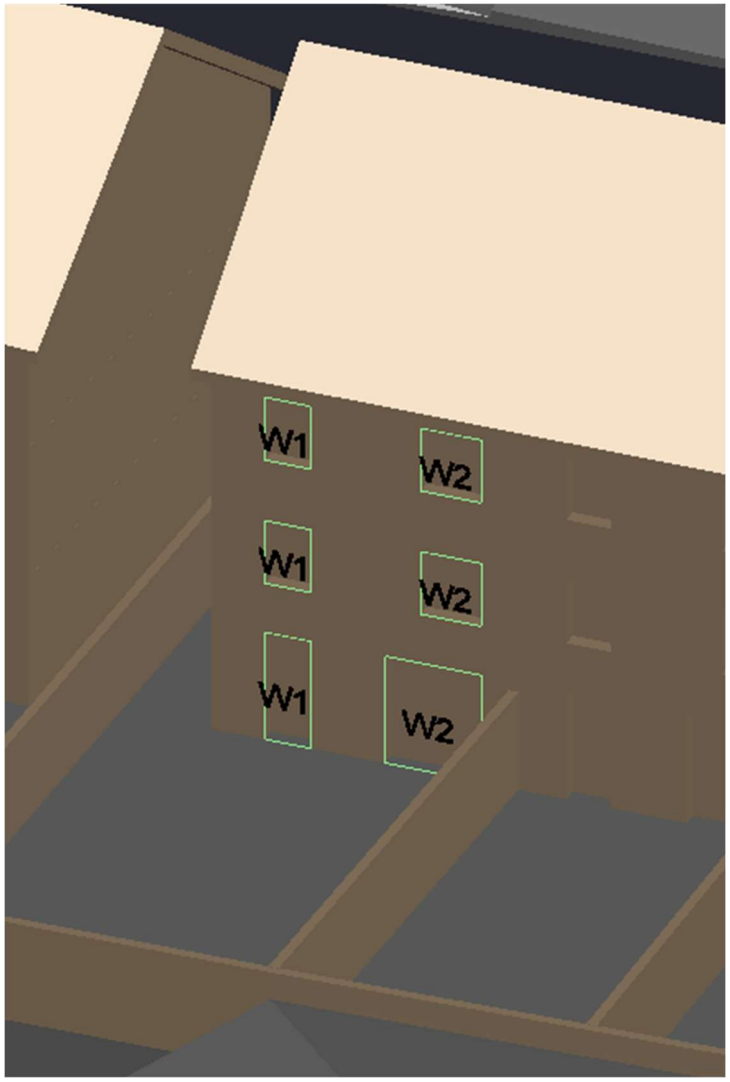

Figure 10: 13 Kingsfort Avenue (Rear - view from northeast)

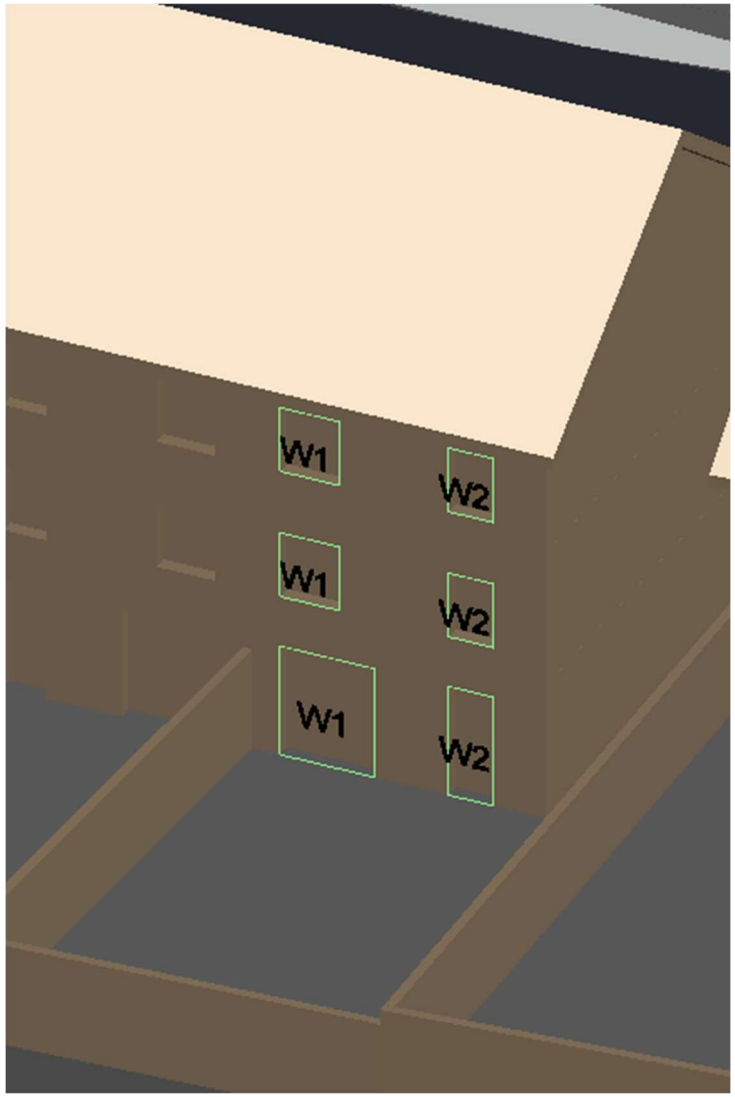

Figure 11: 14 Kingsfort Avenue (Rear - view from northeast)

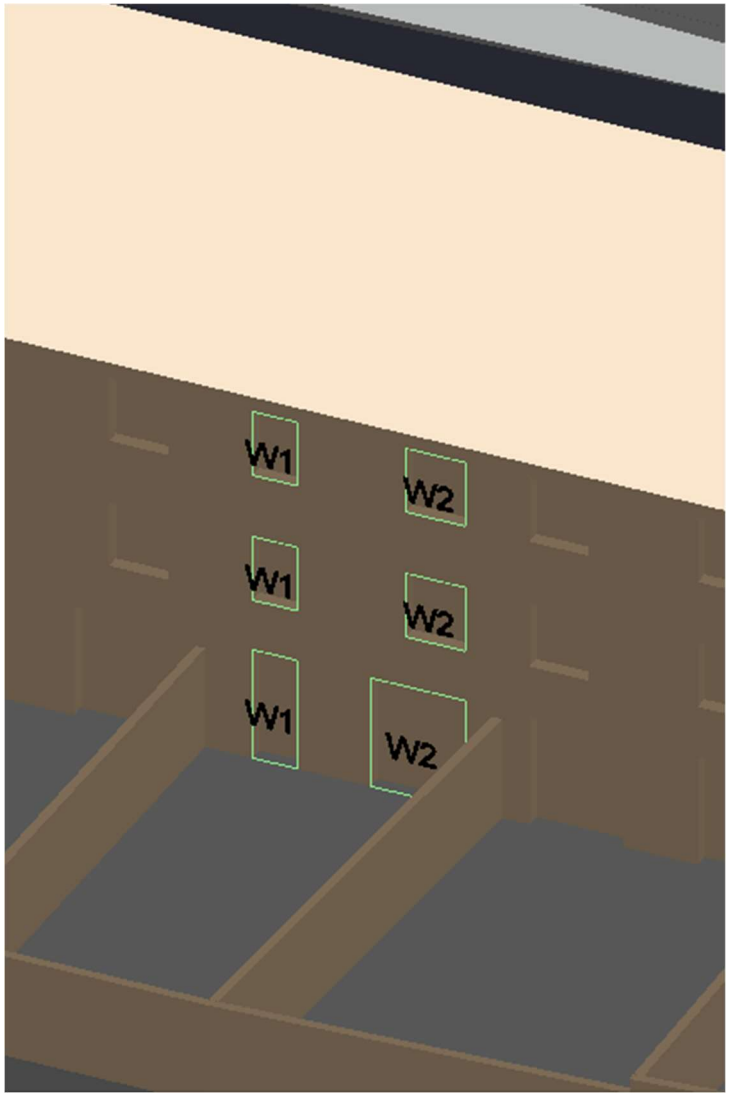

Figure 12: 15 Kingsfort Avenue (Rear - view from northeast)

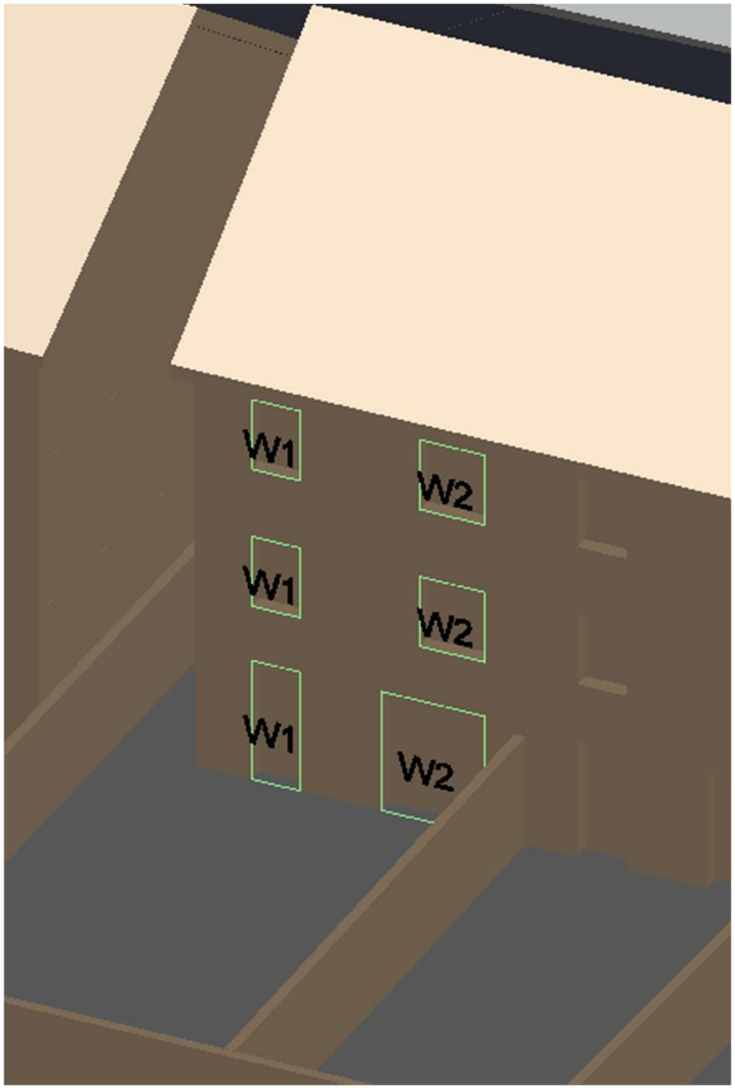

Figure 13: 16 Kingsfort Avenue (Rear - view from northeast)

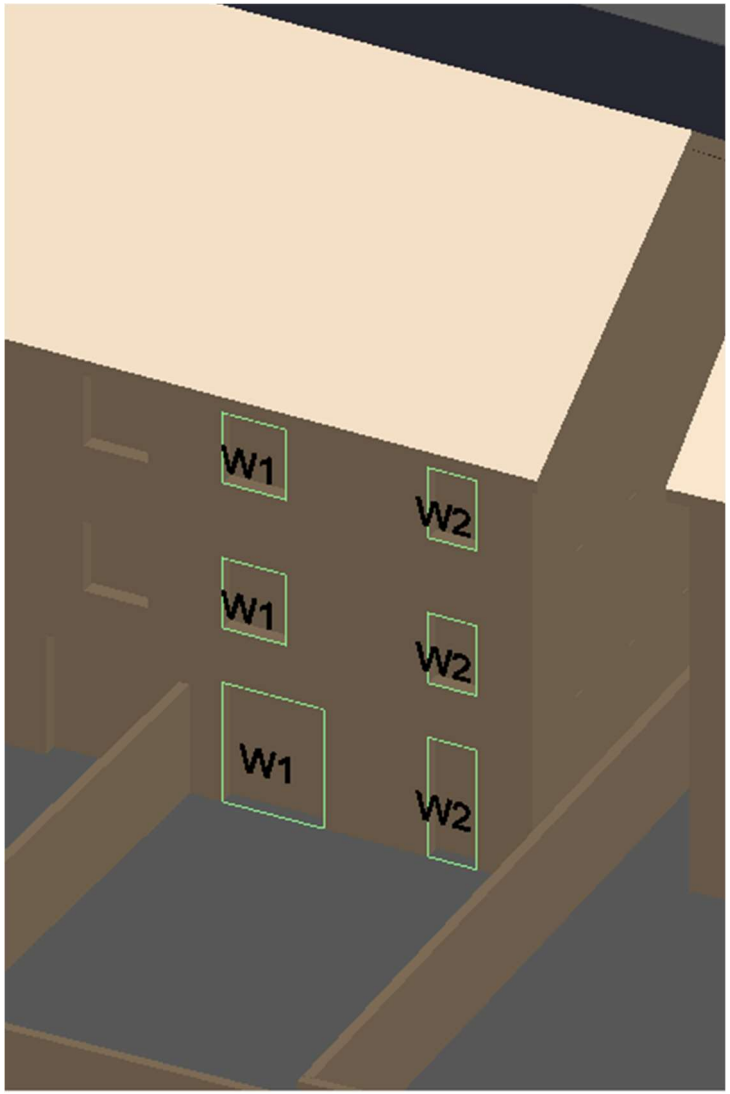

Figure 14: 17 Kingsfort Avenue (Rear - view from northeast)

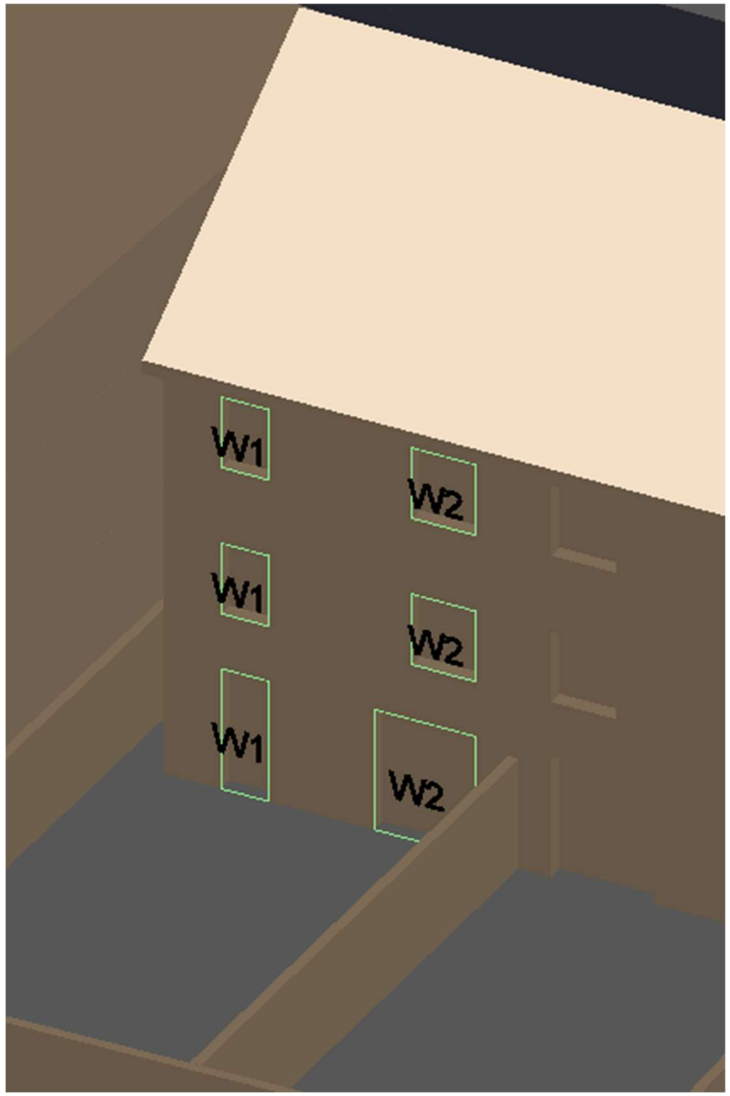

Figure 15: 18 Kingsfort Avenue (Rear - view from northeast)

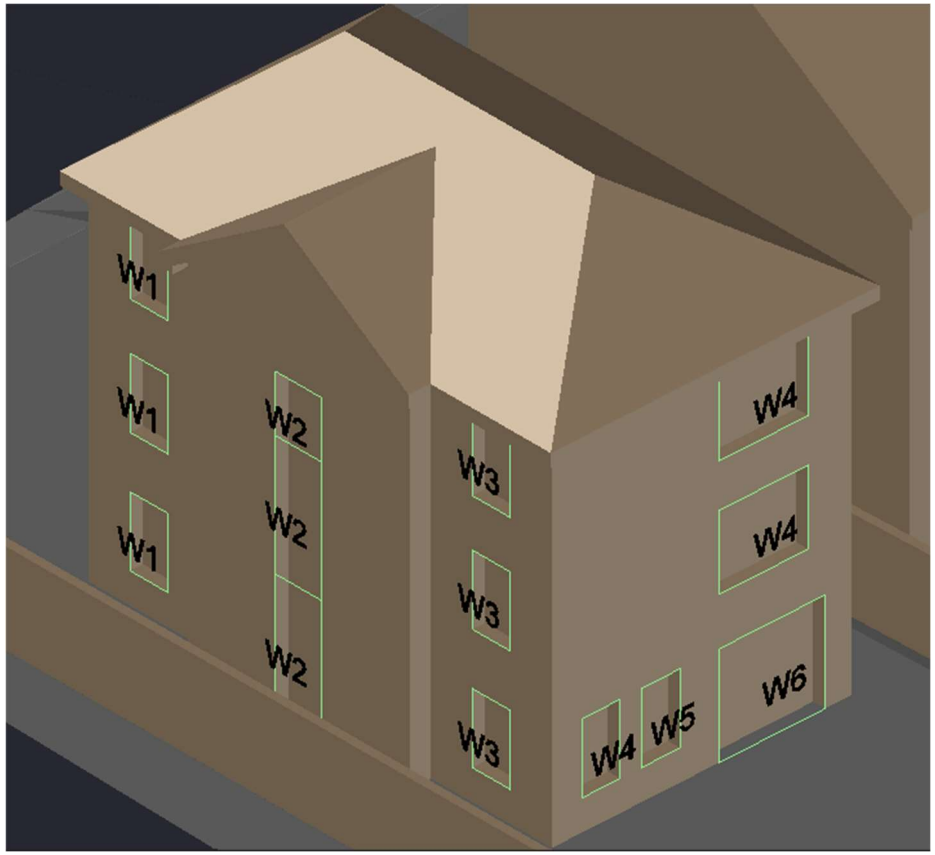

Figure 16: 19 Kingsfort Avenue (Rear & Side - view from northeast)

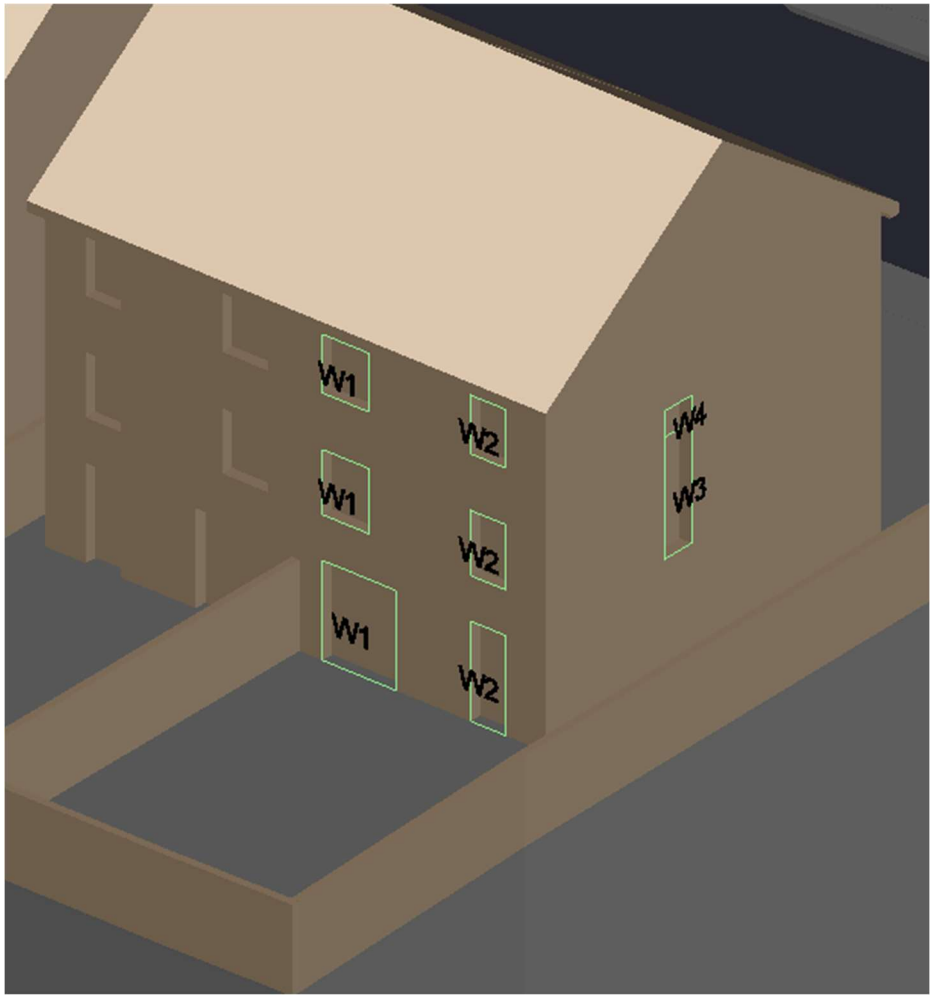

Figure 17: 39 Kingsfort Avenue (Rear & Side - view from northeast)

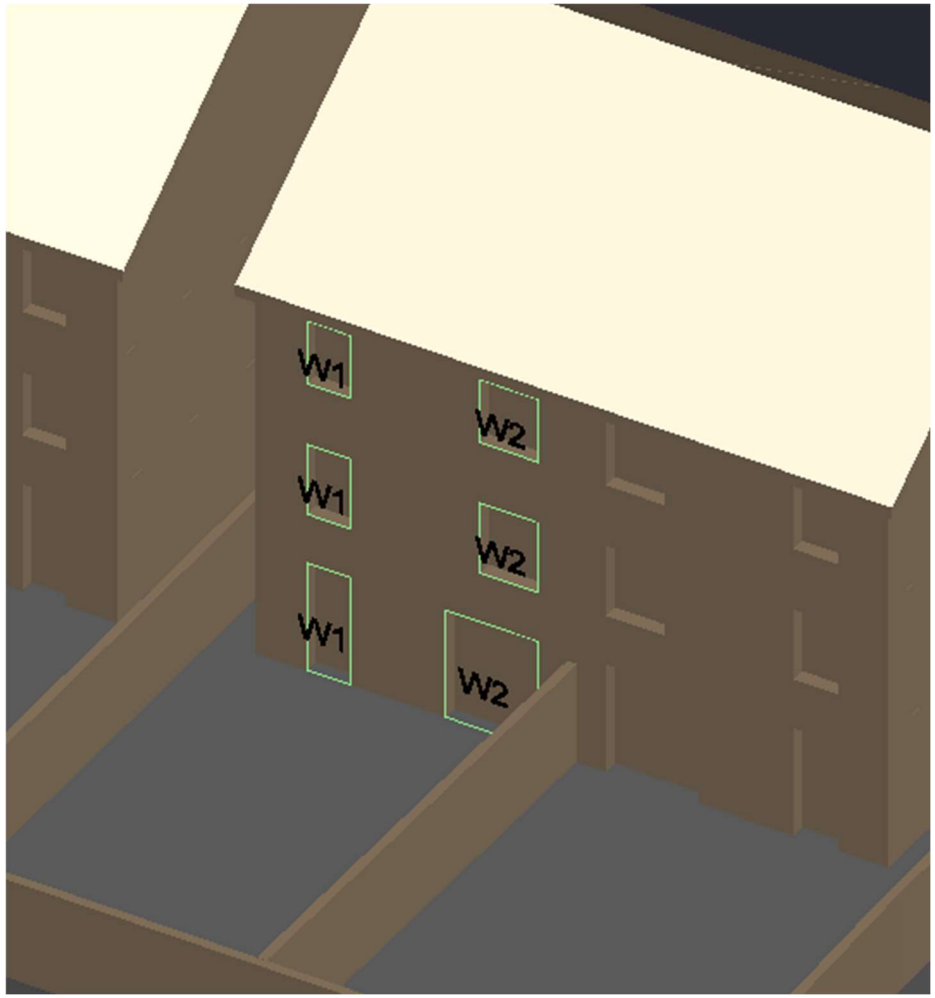

Figure 18: 40 Kingsfort Avenue (Rear - view from northeast)

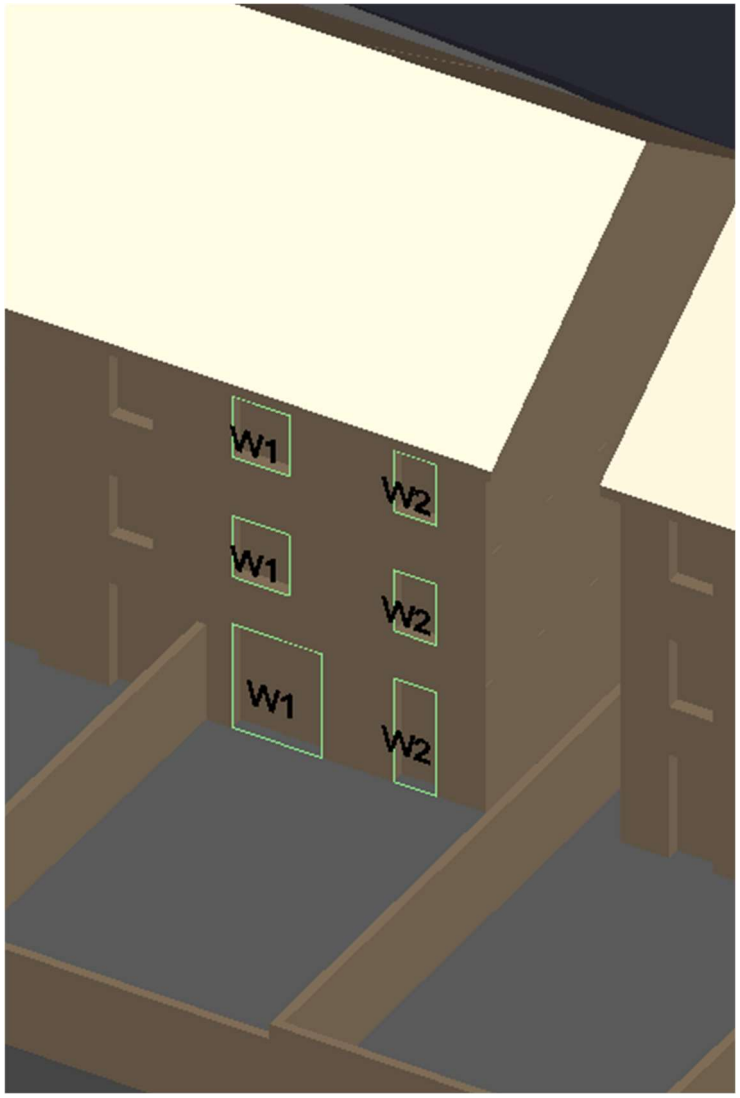

Figure 19: 41 Kingsfort Avenue (Rear - view from northeast)

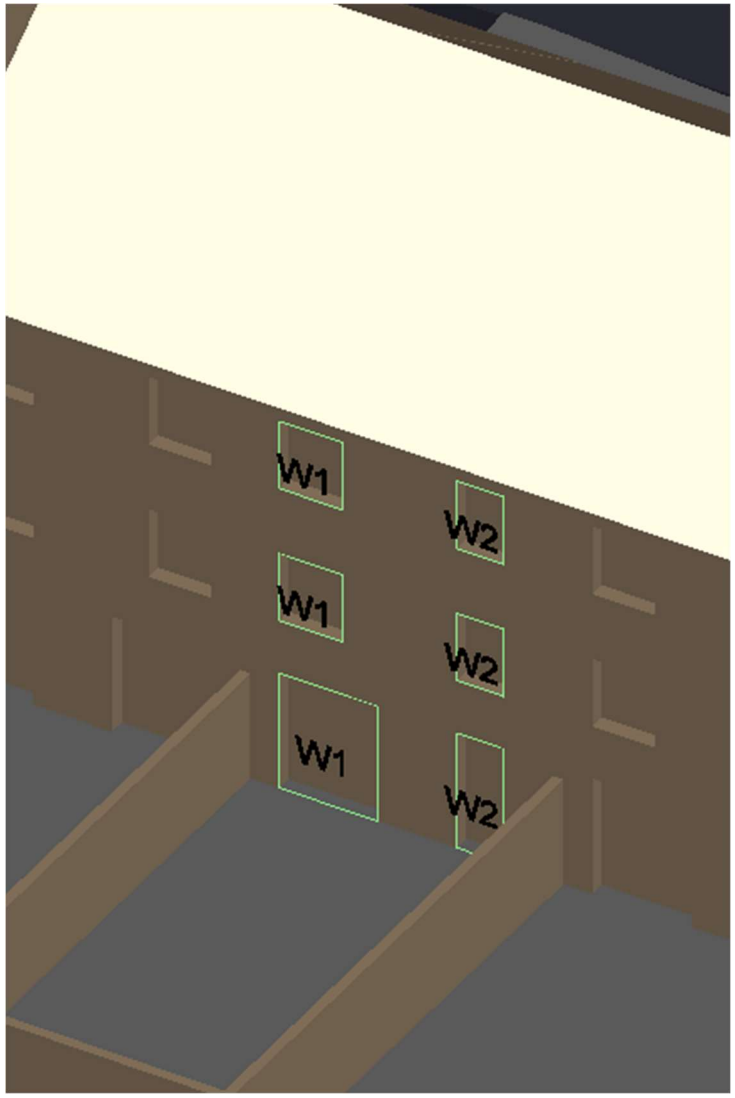

Figure 20: 42 Kingsfort Avenue (Rear - view from northeast)

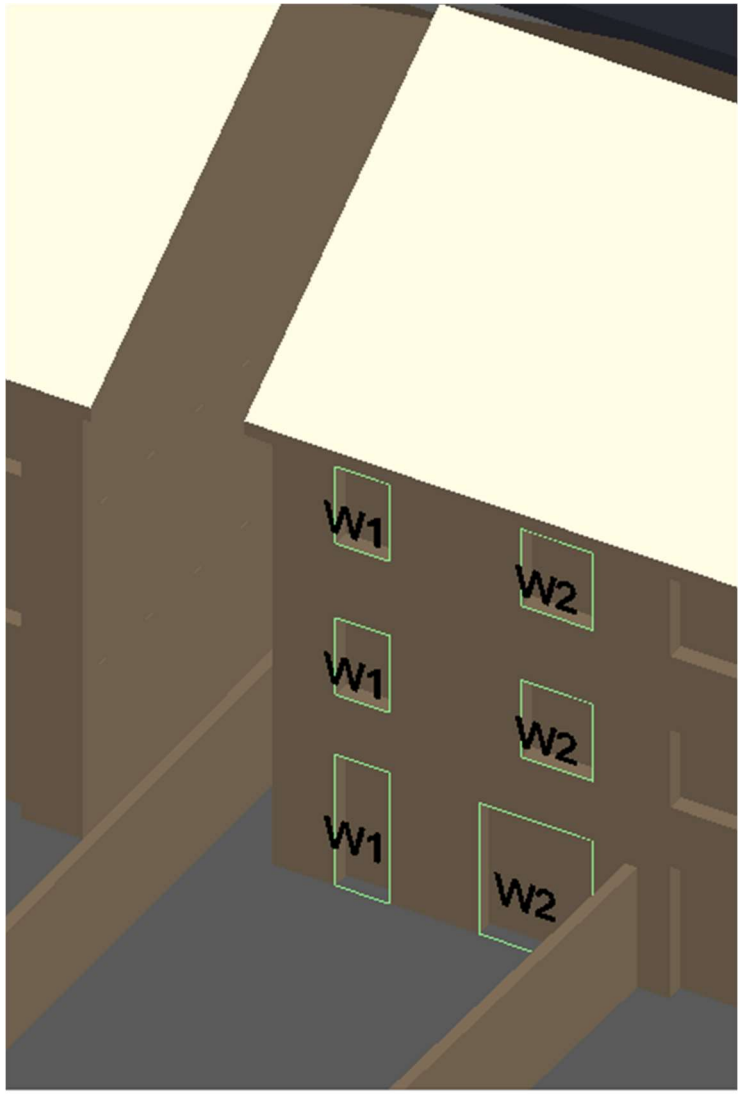

Figure 21: 43 Kingsfort Avenue (Rear - view from northeast)

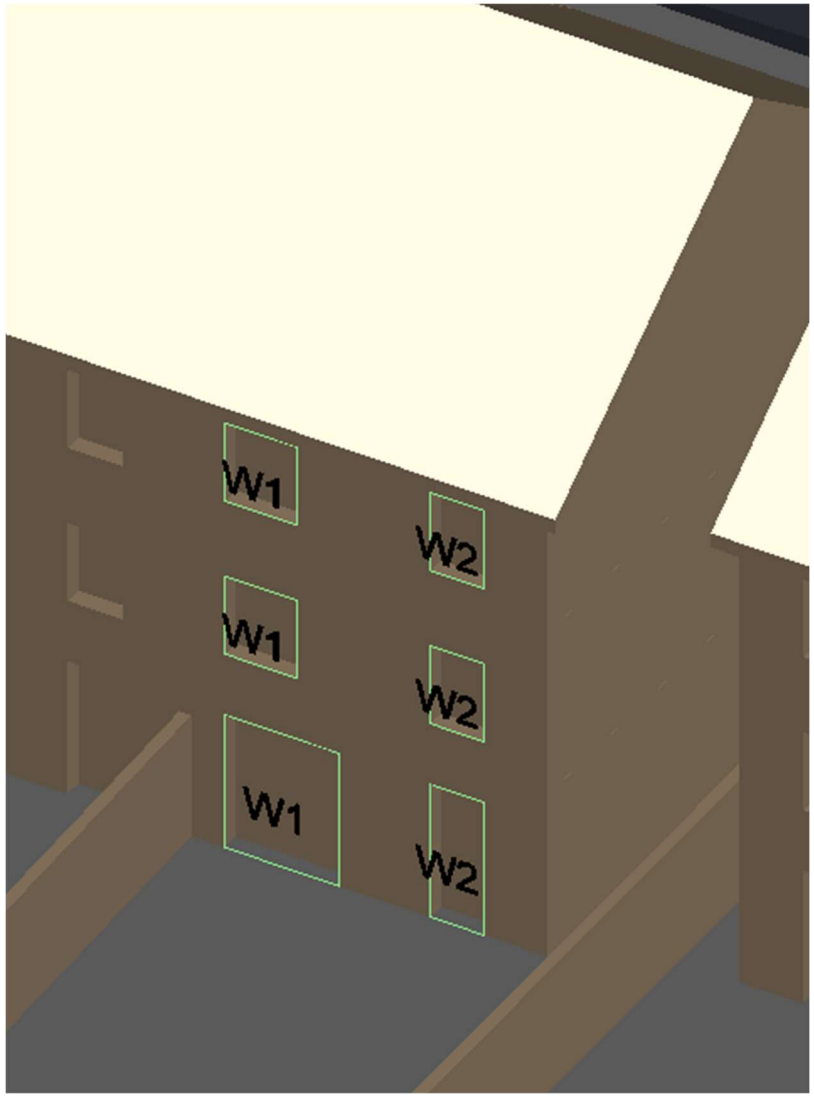

Figure 22: 44 Kingsfort Avenue (Rear - view from northeast)

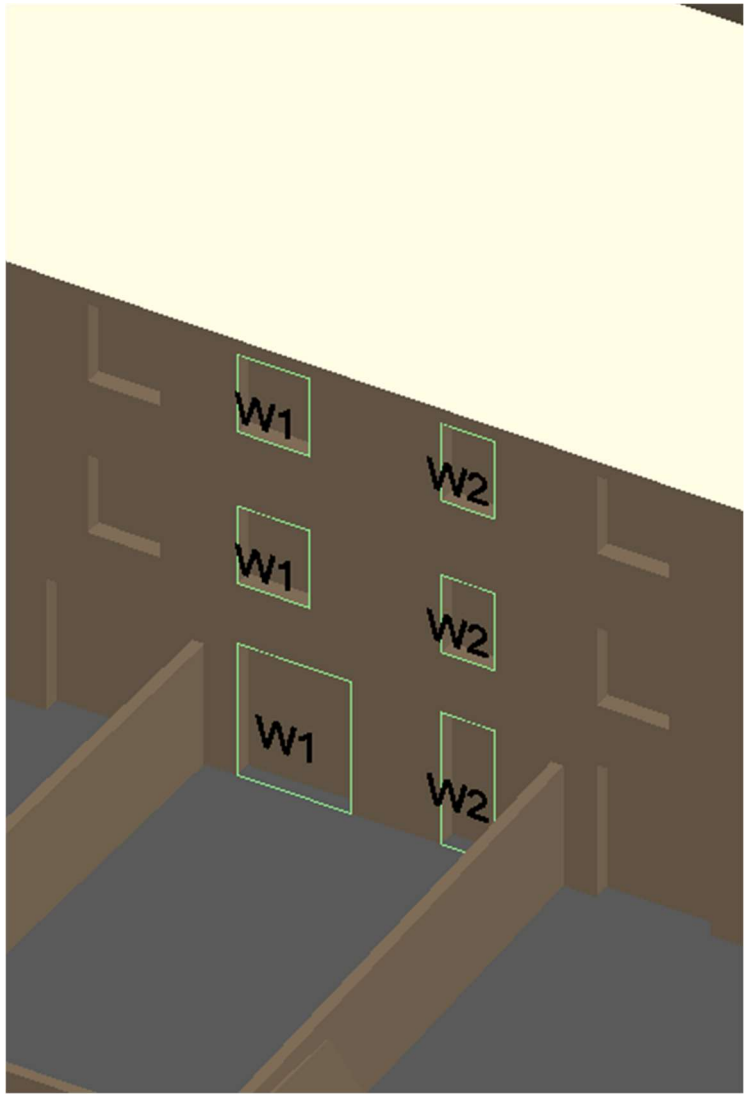

Figure 23: 45 Kingsfort Avenue (Rear - view from northeast)

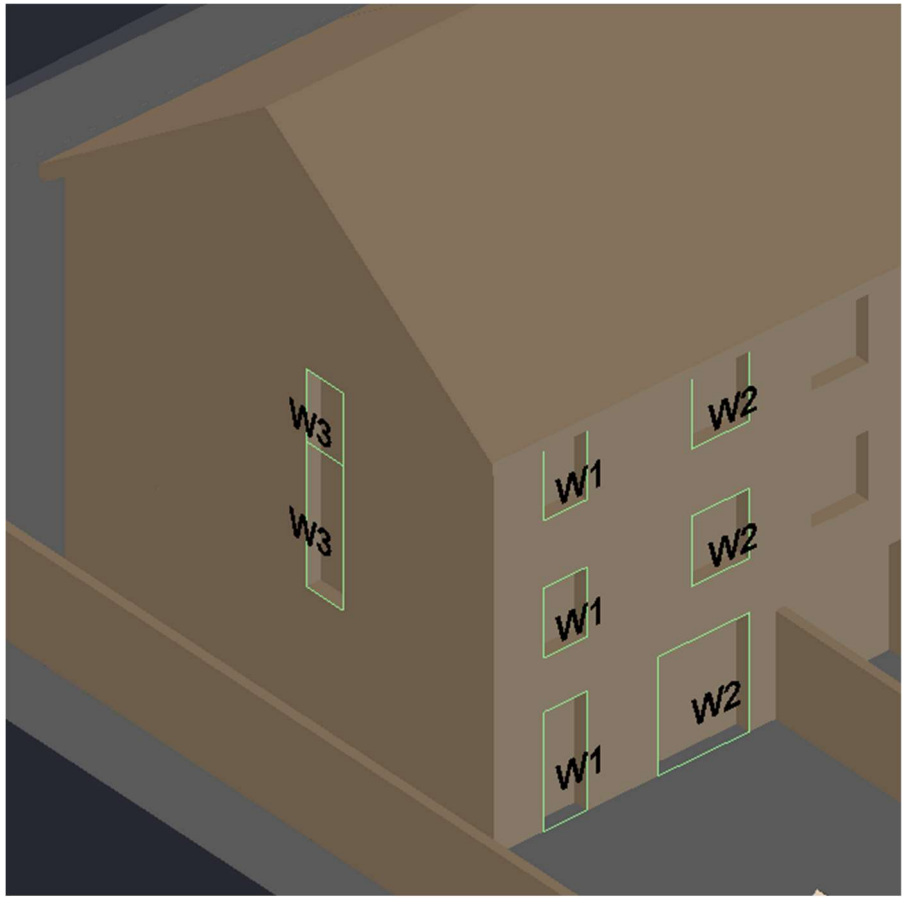

Figure 24: 46 Kingsfort Avenue (Rear & Side - view from northeast)

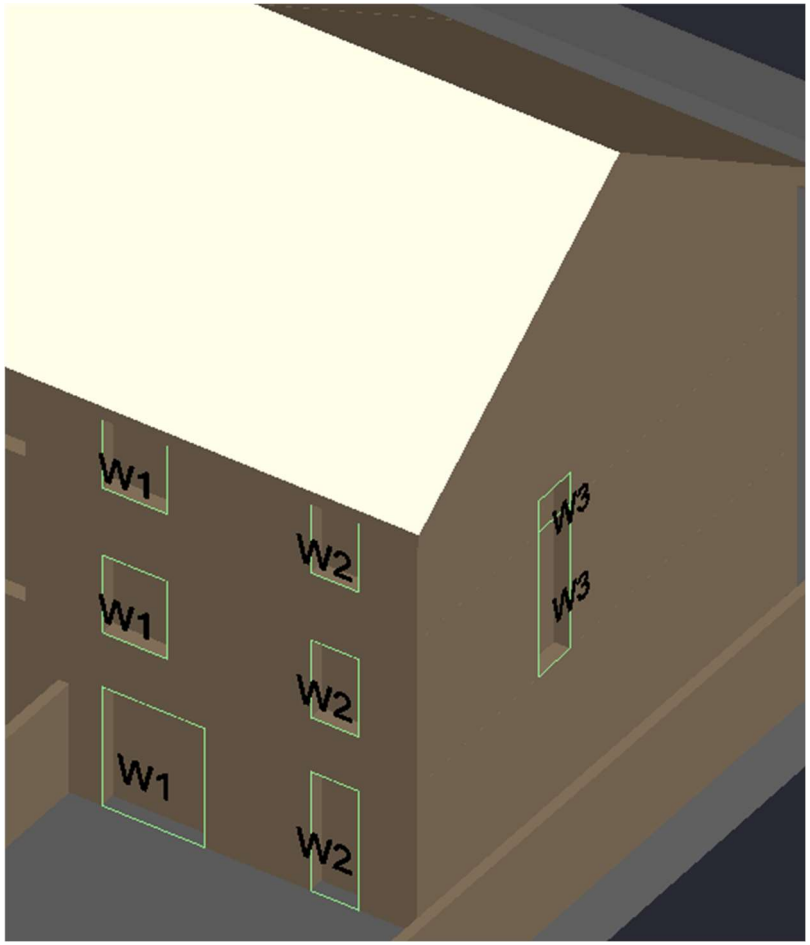

Figure 25: 47 Kingsfort Avenue (Rear - view from Northeast)

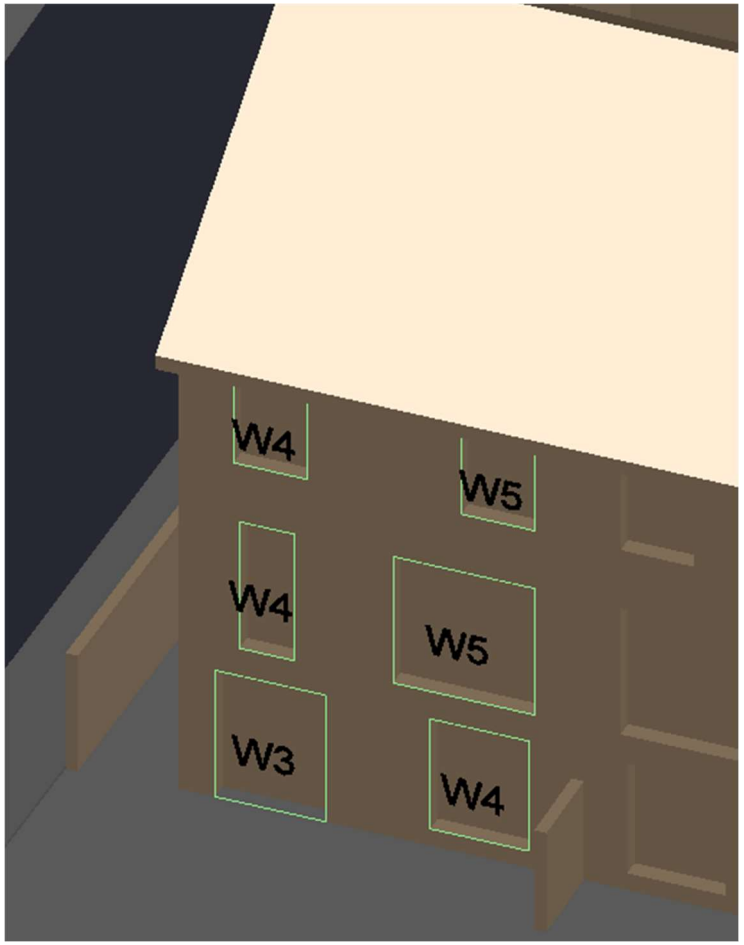

Figure 26: 47 Kingsfort Avenue (Front - view from southwest)

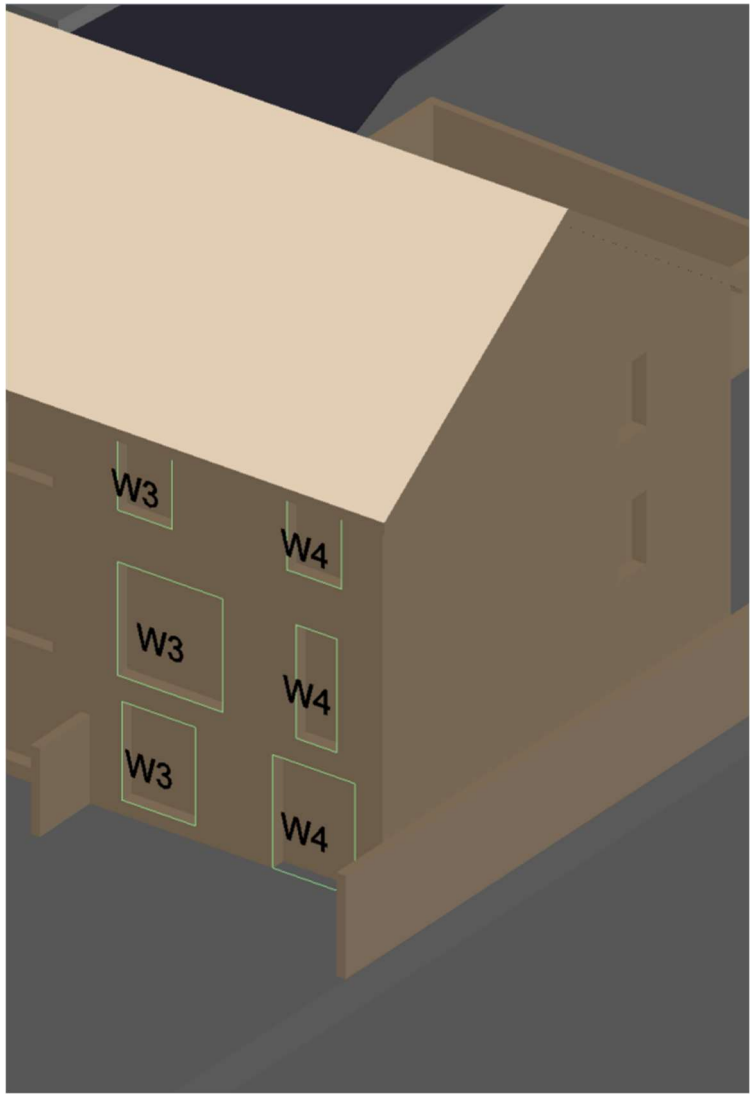

Figure 27: 48 Kingsfort Avenue (Front - view from southwest)

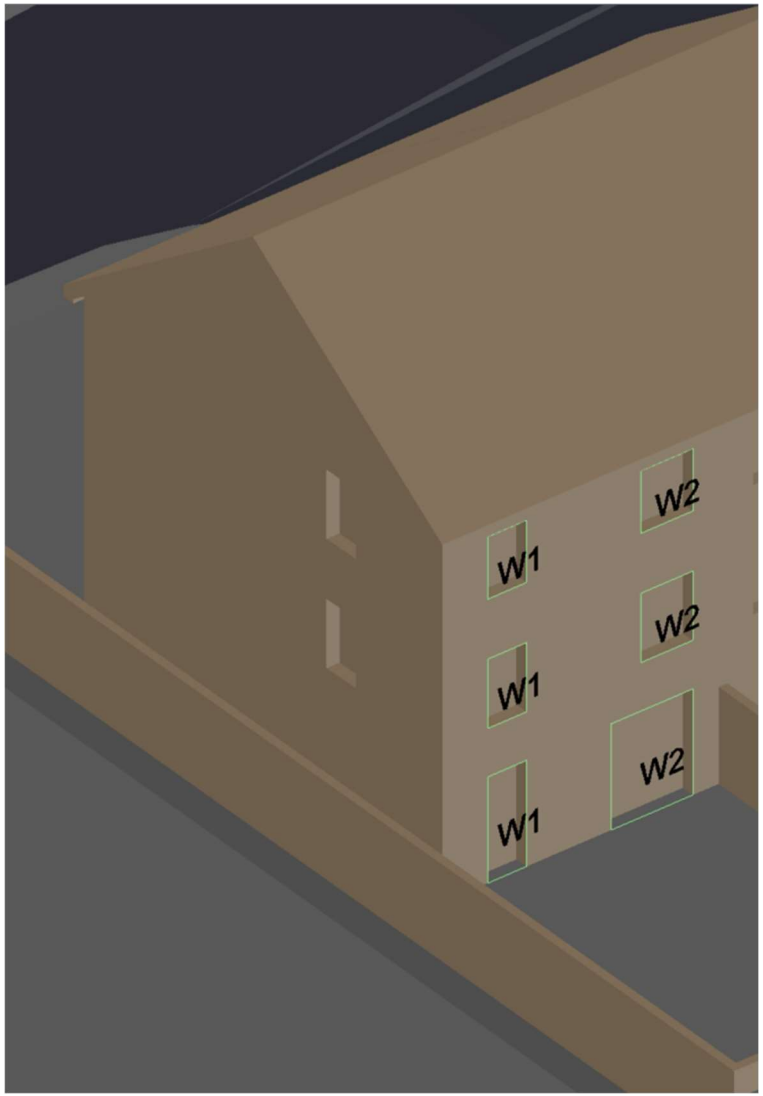

Figure 28: 48 Kingsfort Avenue (Rear - view from northeast)

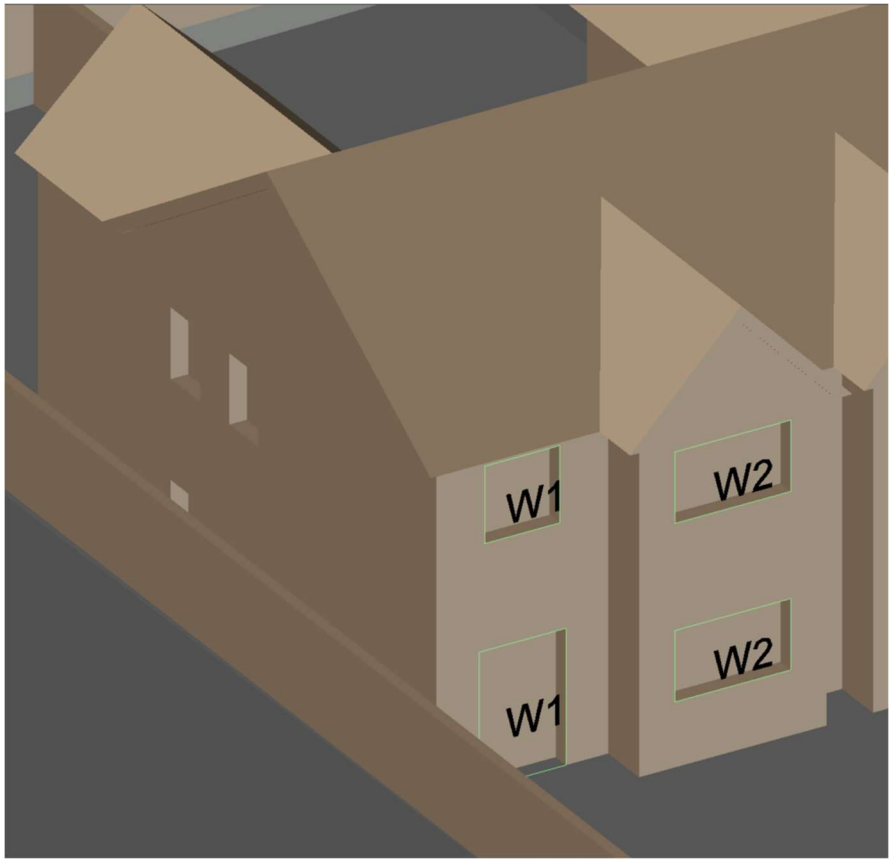

Figure 29: 14 Earl's Square (Front - view from southeast)

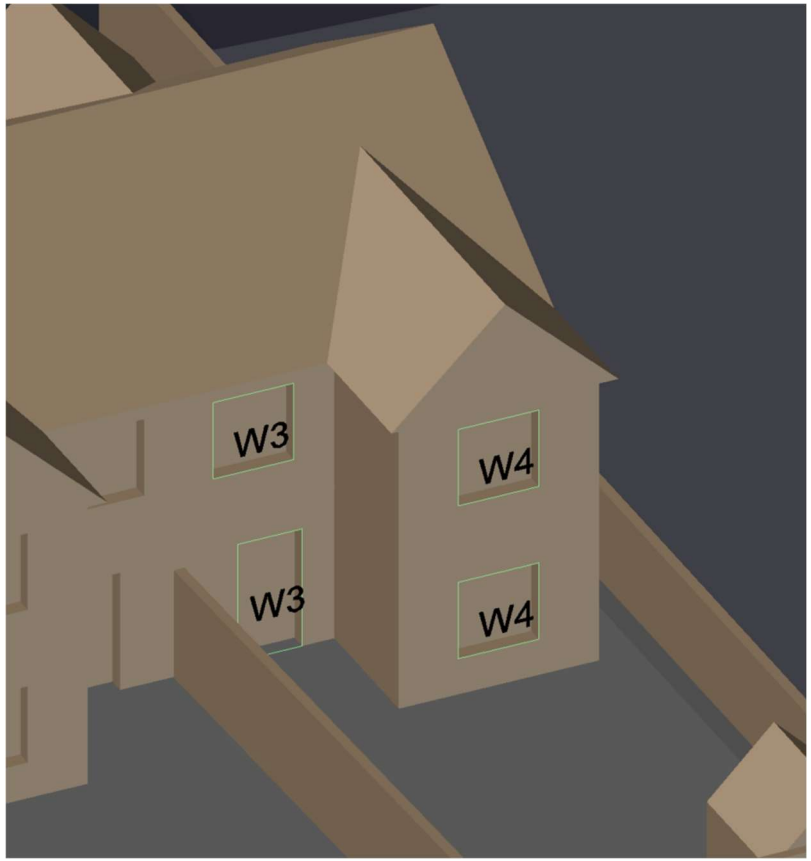

Figure 30: 14 Earl's Square (Rear - view from northwest)

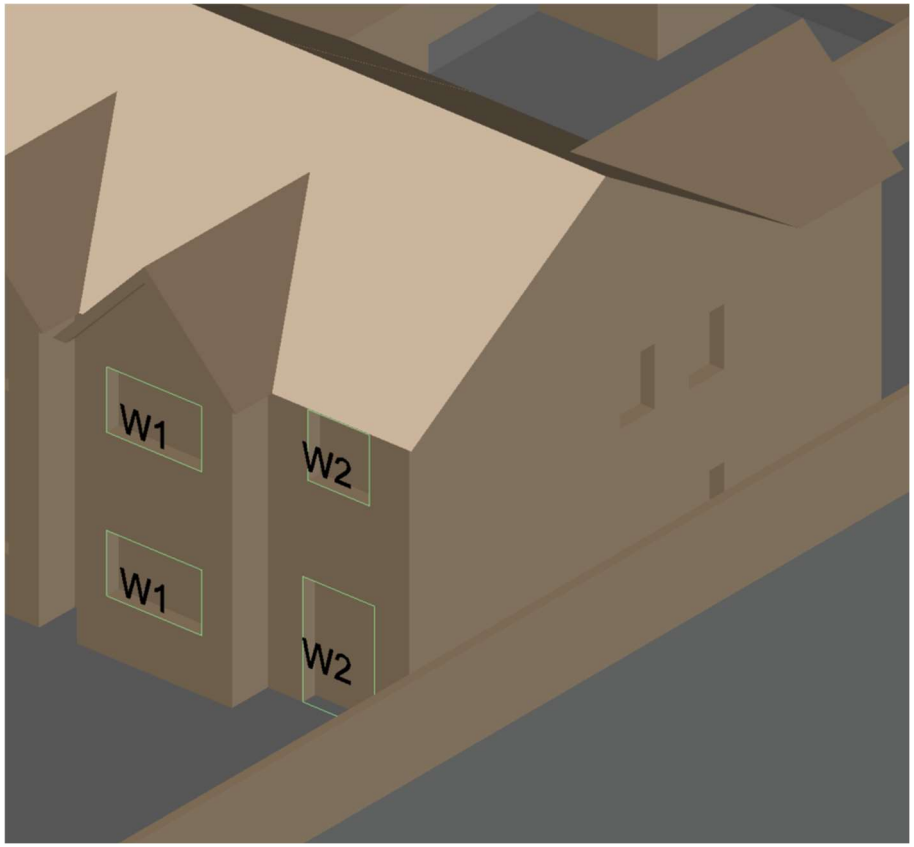

Figure 31: 15 Earl's Square (Front - view from southeast)

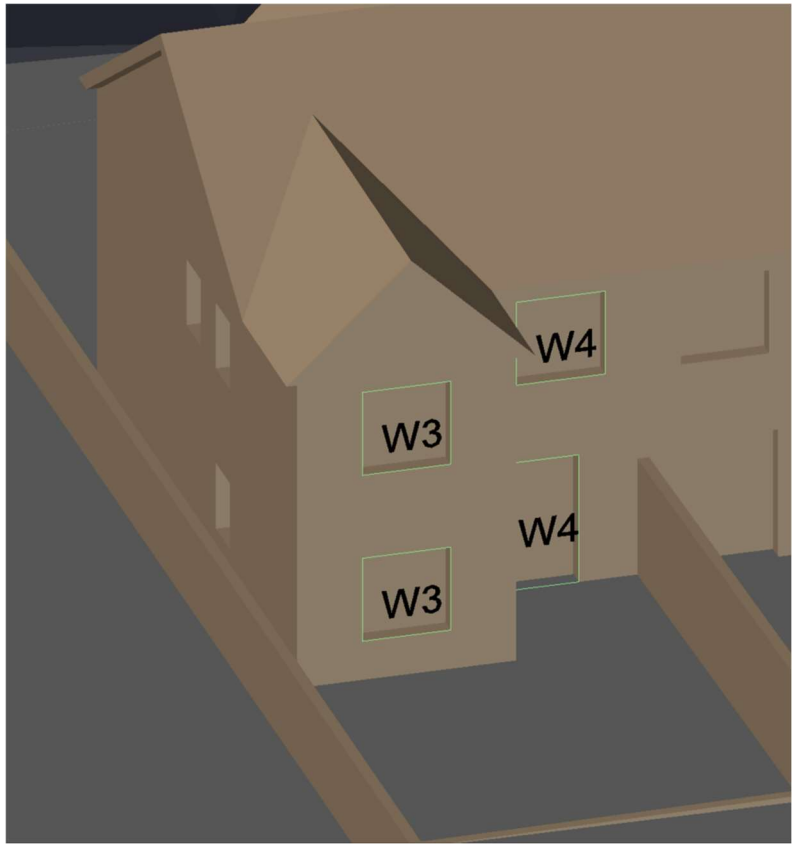

Figure 32: 15 Earl's Square (Rear - view from northwest)

Figure 33: 19 Maple Square (Front - view from southwest)

Figure 34: 19 Maple Square (Rear- view from southeast)

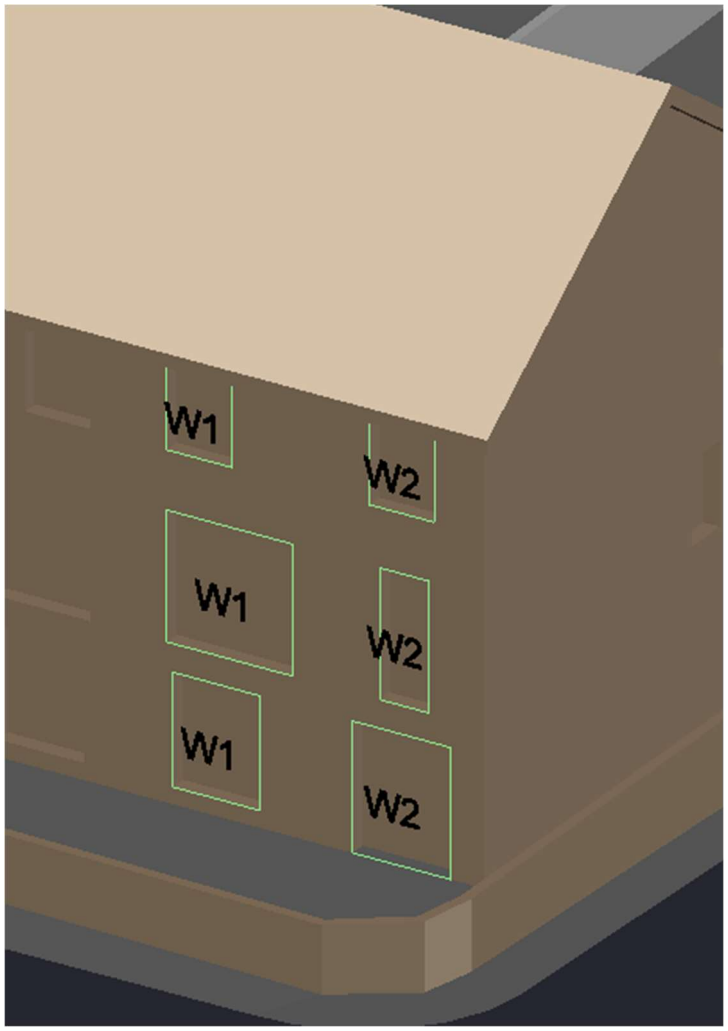

Figure 35: 20 Maple Square (Front - view from northeast)

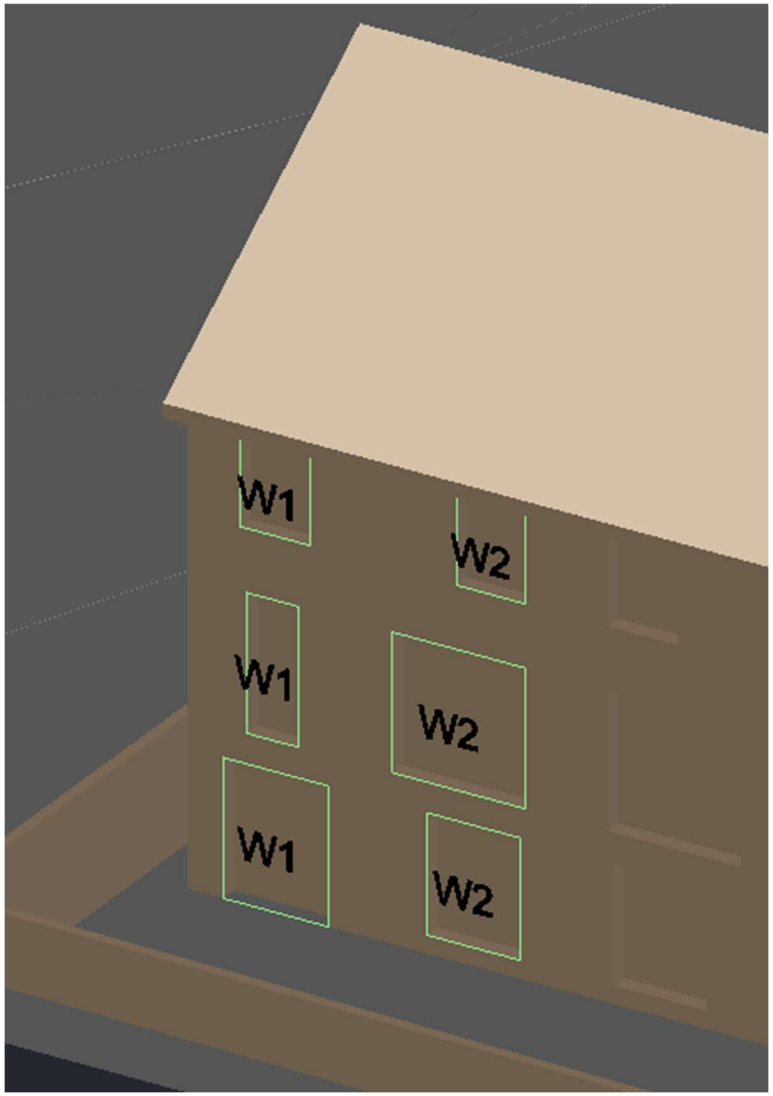

Figure 36: 21 Maple Square (Front - view from northeast)

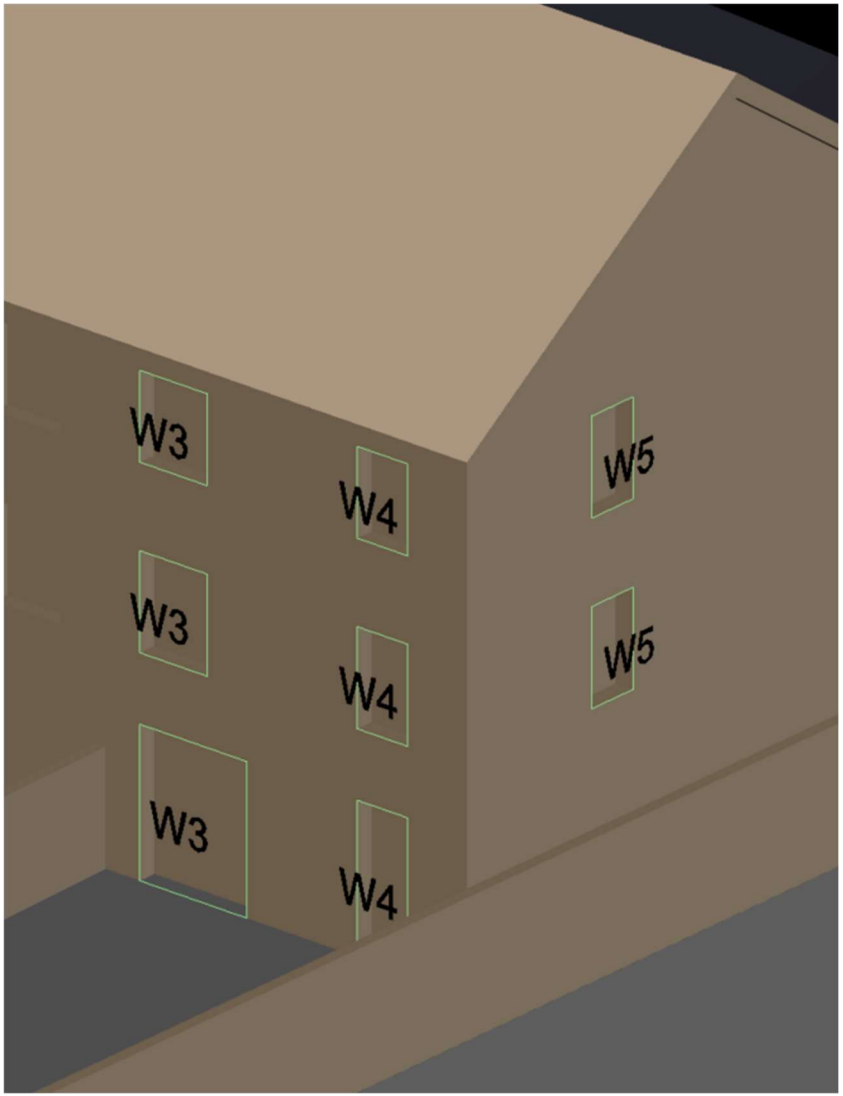

Figure 37: 21 Maple Square (Rear - view from southwest)

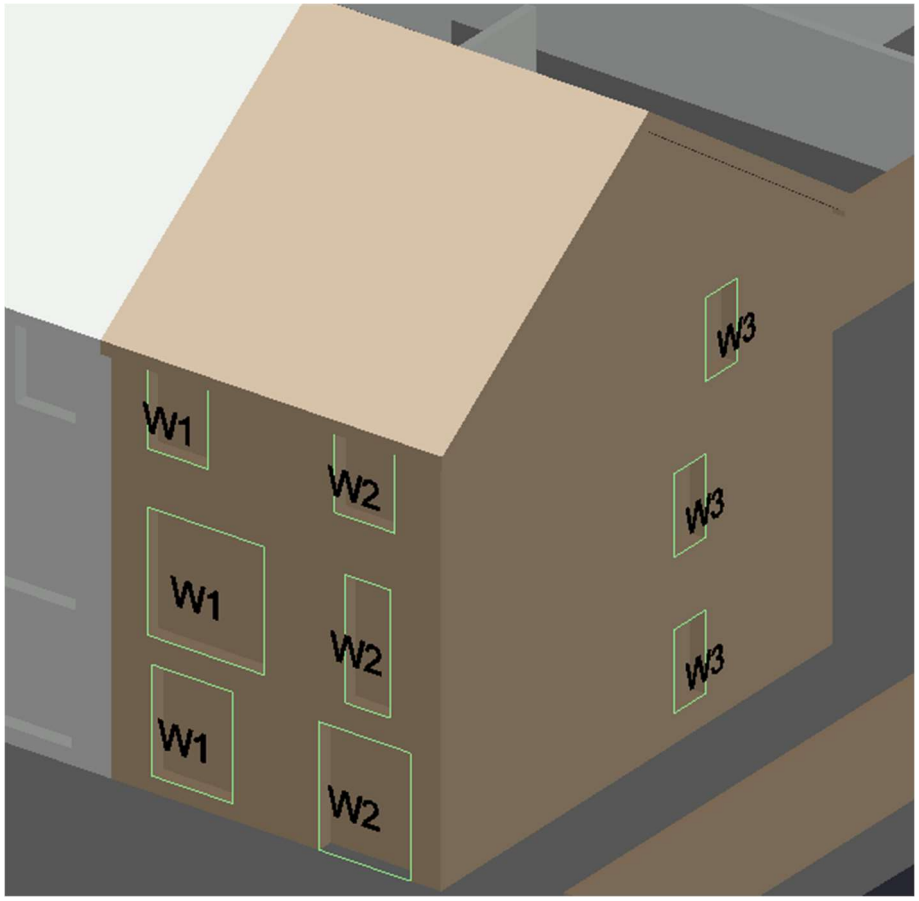

Figure 38: 1 Maple Square (Front - view from southeast)

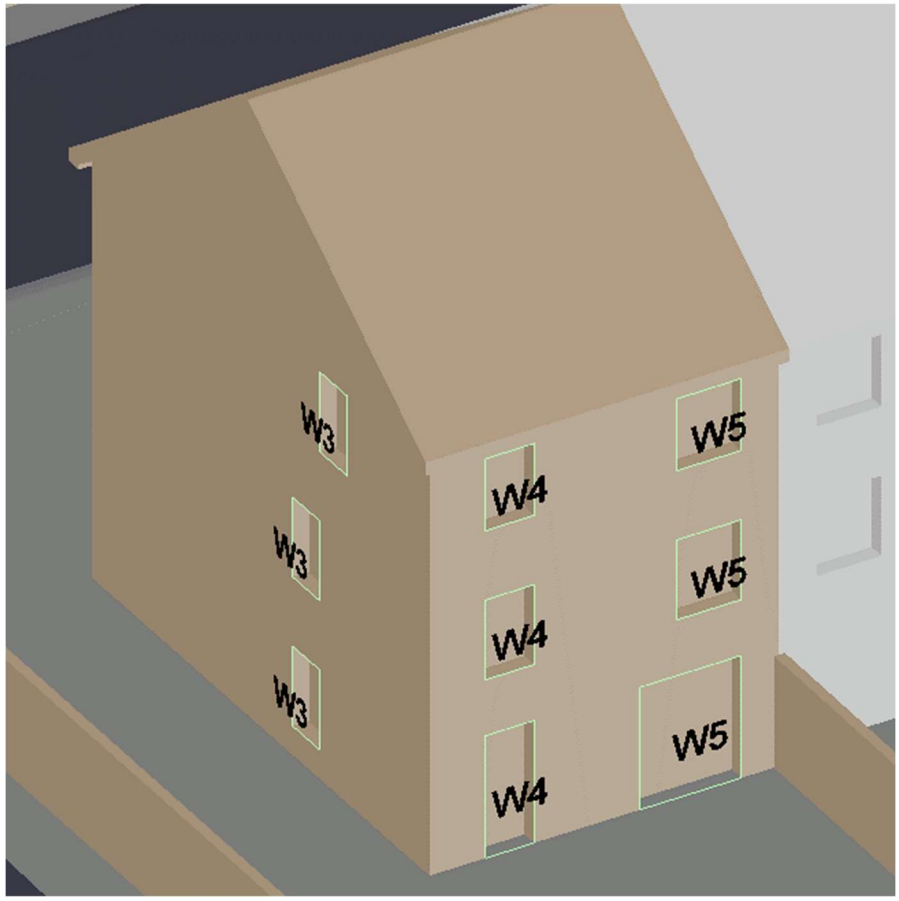

Figure 39: 1 Maple Square (Rear - view from northwest)

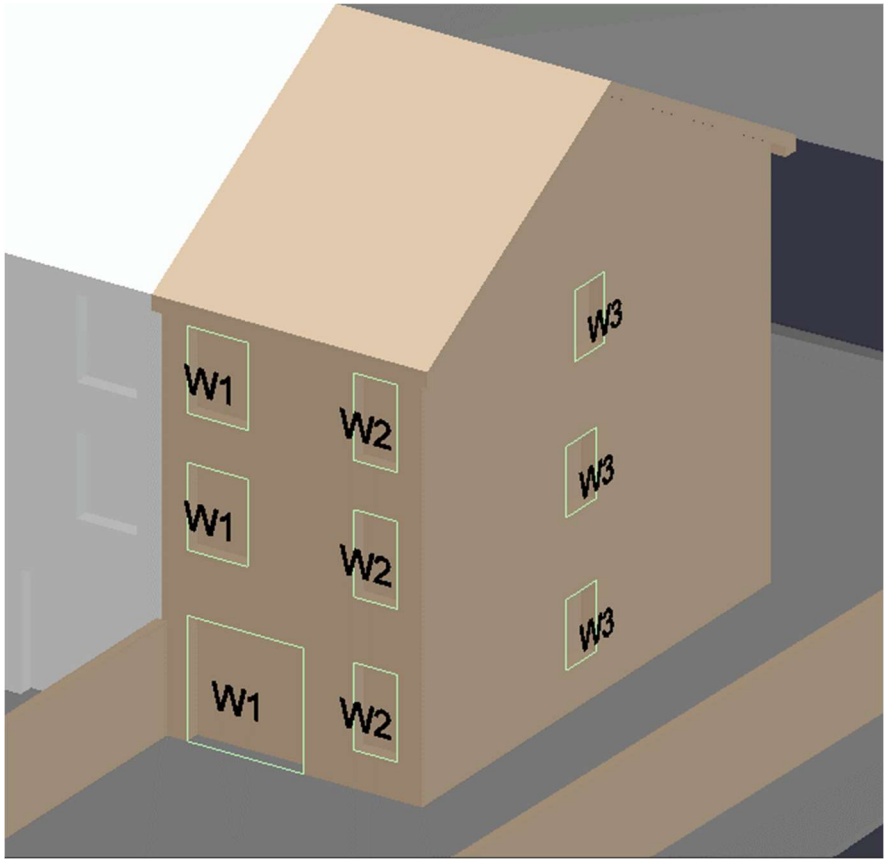

Figure 40: 33 Kingsfort Square (Rear - View from southeast)

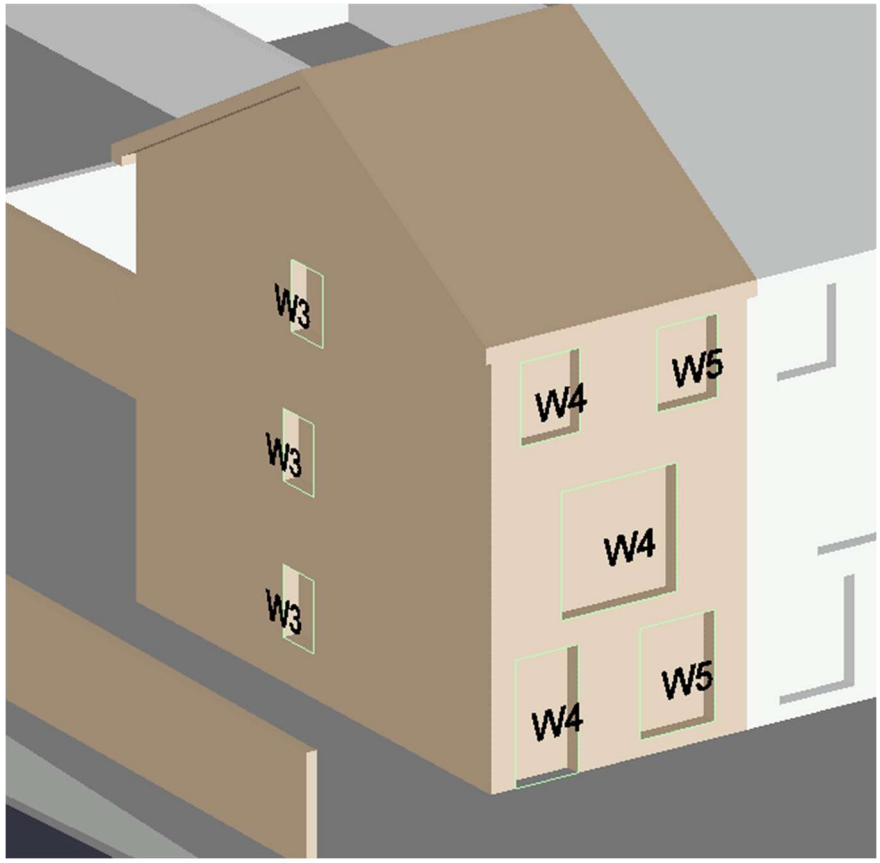

Figure 41: 33 Kingsfort Square (Front – View from northwest)

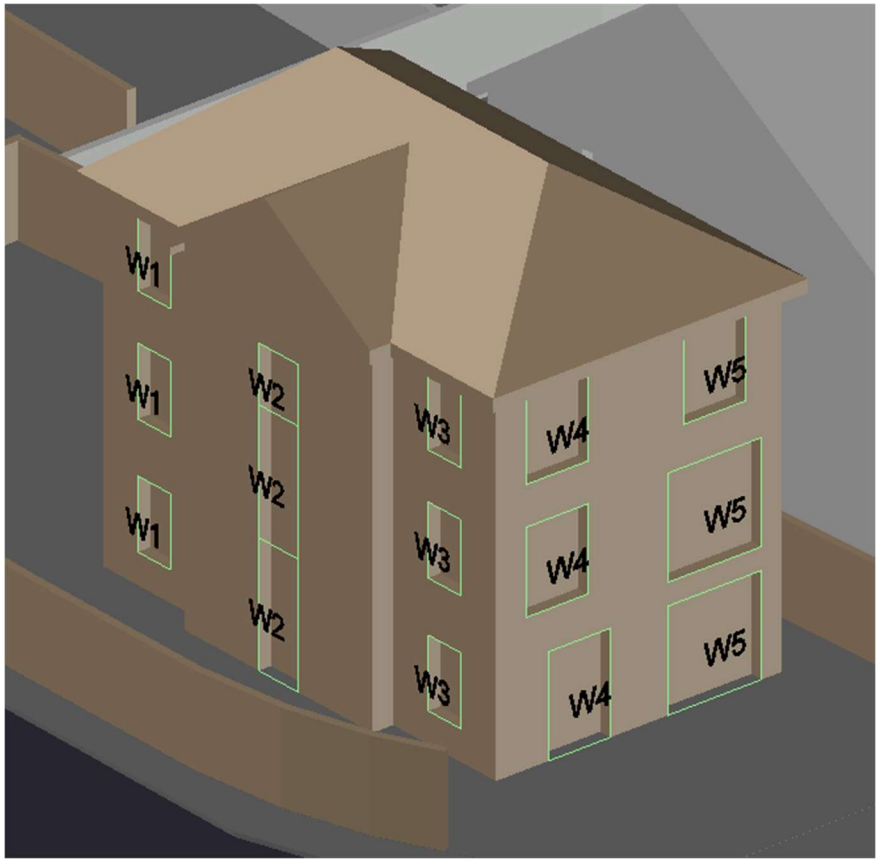

Figure 42: 1 Bower Walk (View from northwest)

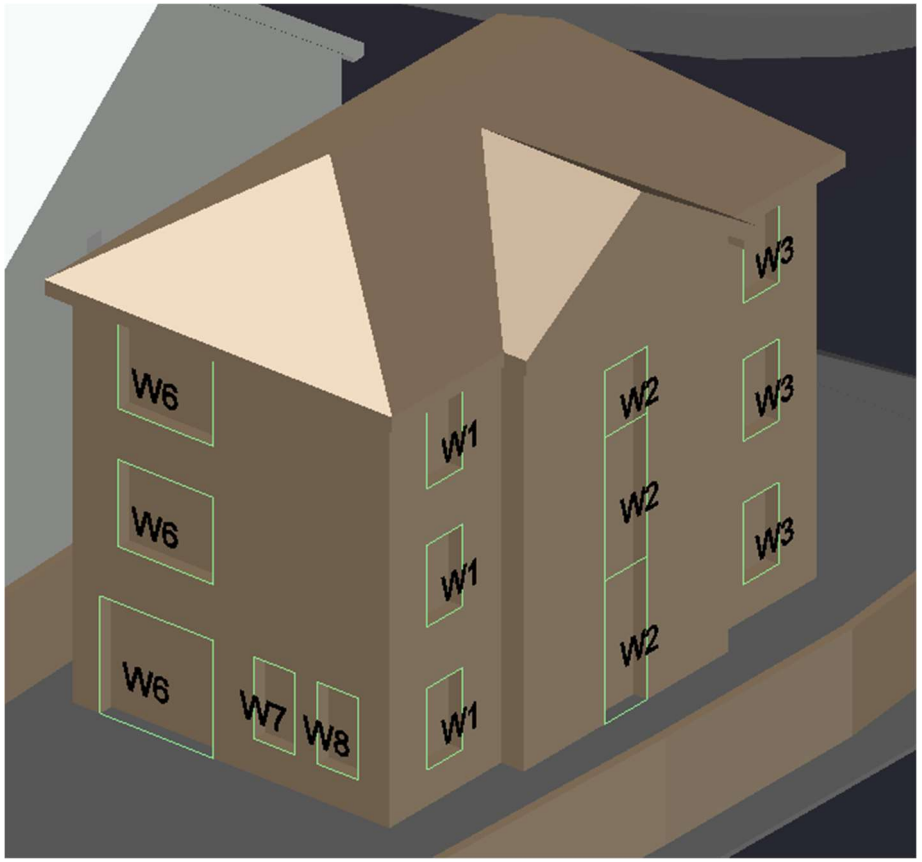

Figure 43: 1 Bower Walk (View from southeast)

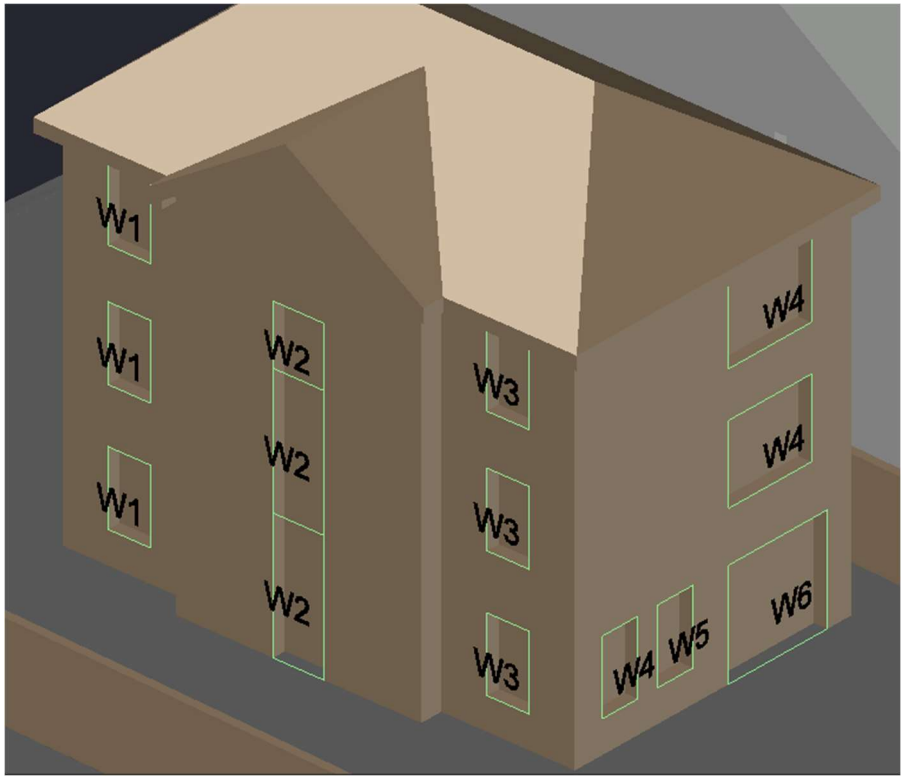

Figure 44: 1 Kingsfort Square (View from northeast)

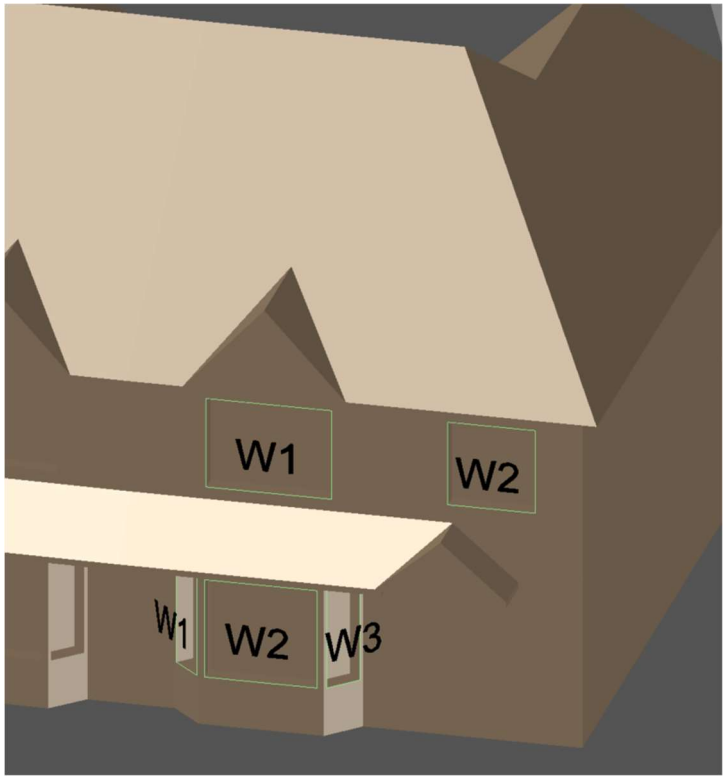

Figure 45: 36 Castlepark Avenue (View from northeast)

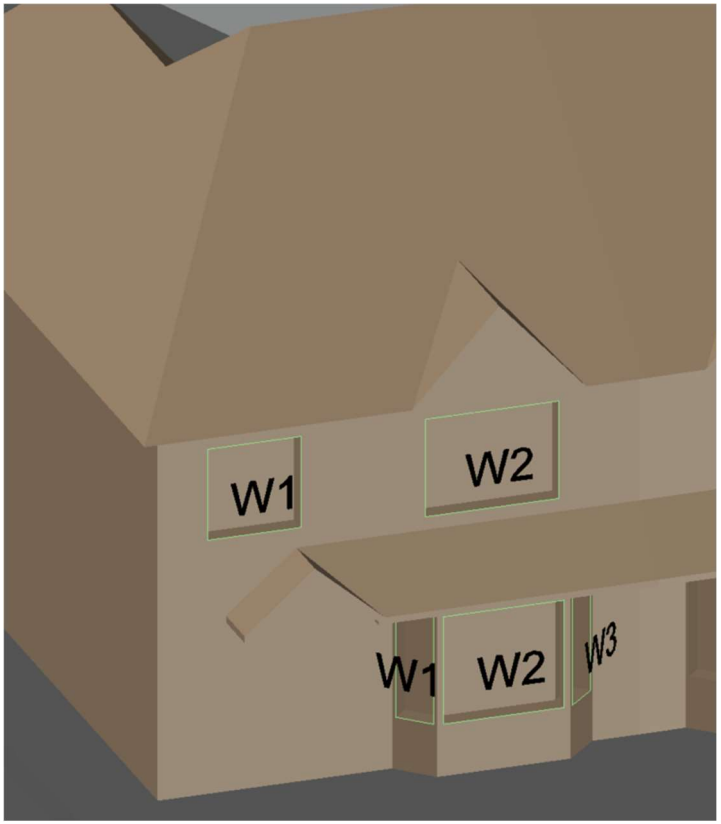

Figure 46: 37 Castlepark Avenue (View from northeast)

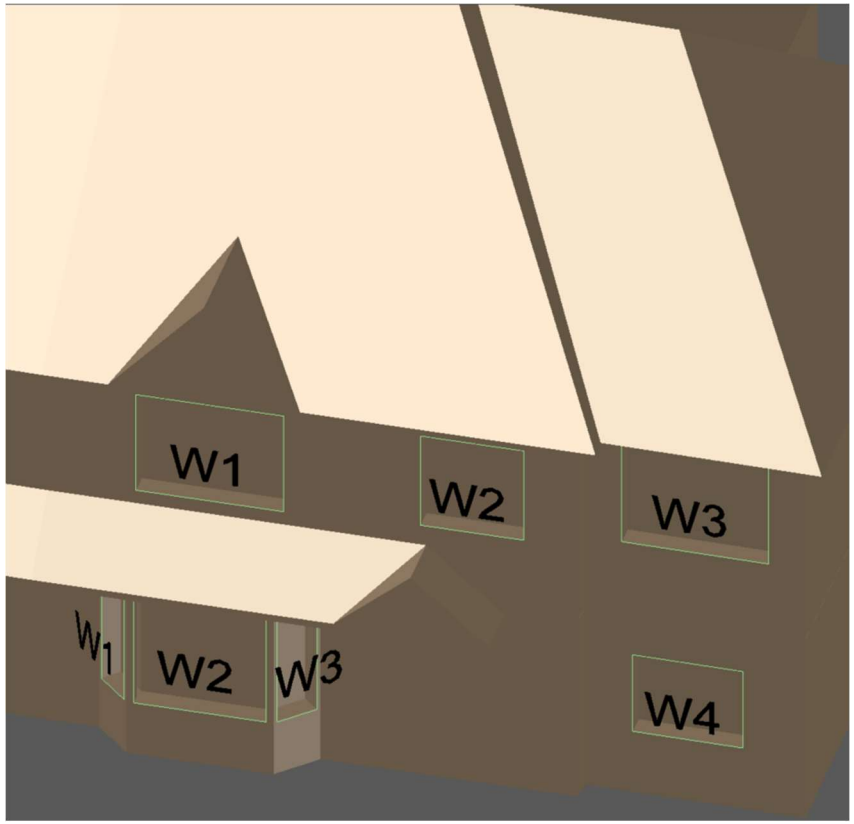

Figure 47: 38 Castlepark Avenue (View from east)

Figure 48: 39 Castlepark Avenue (View from east)

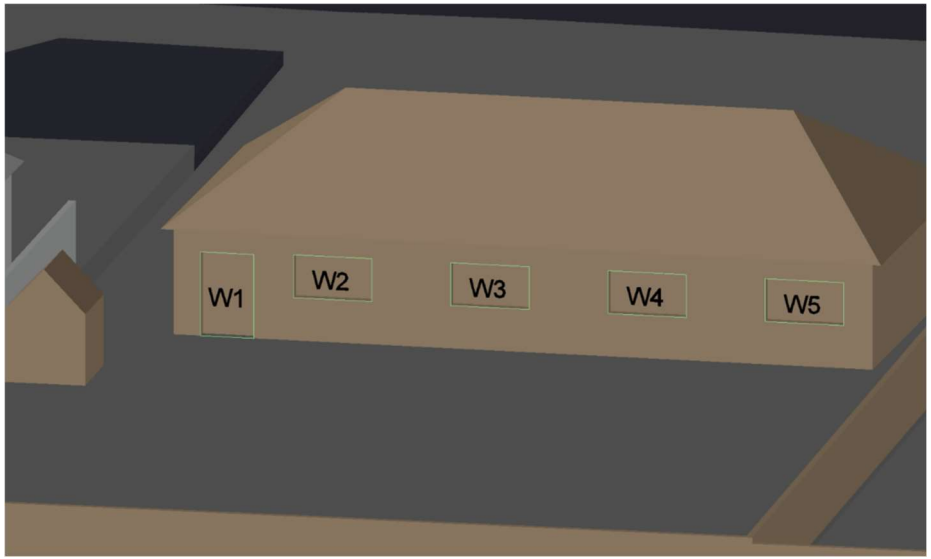

Figure 49: 4 Castle Court (View from southeast)

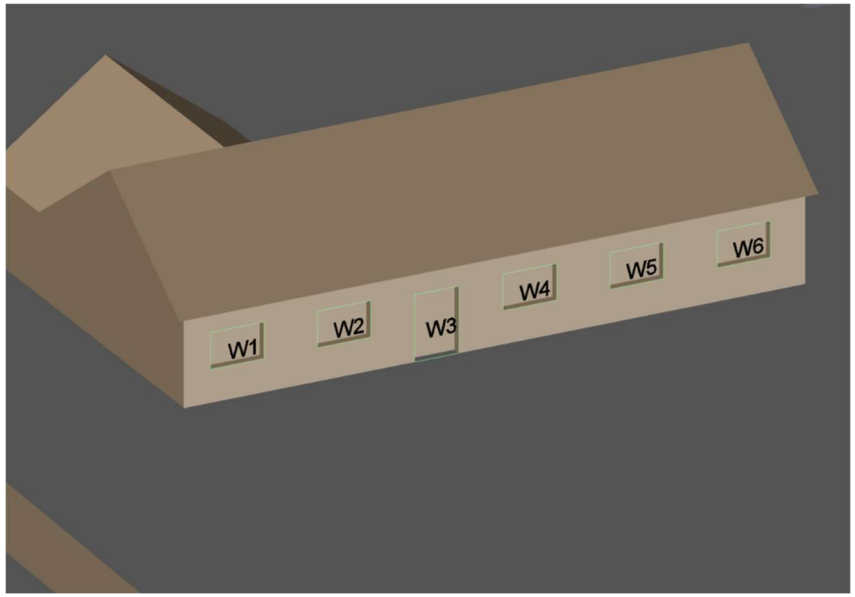

Figure 50: 1 Castlelands (View from southeast)

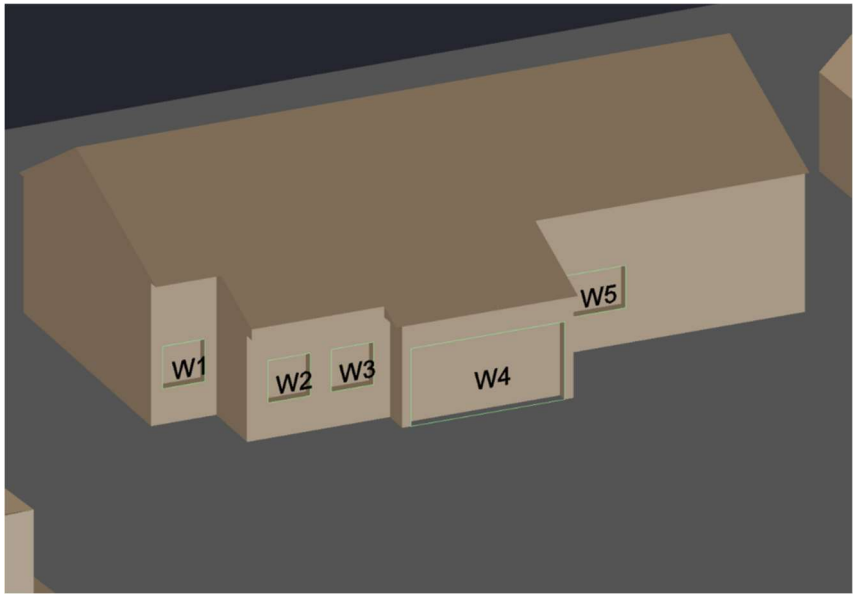

Figure 51: 2 Castlelands (View from southeast)

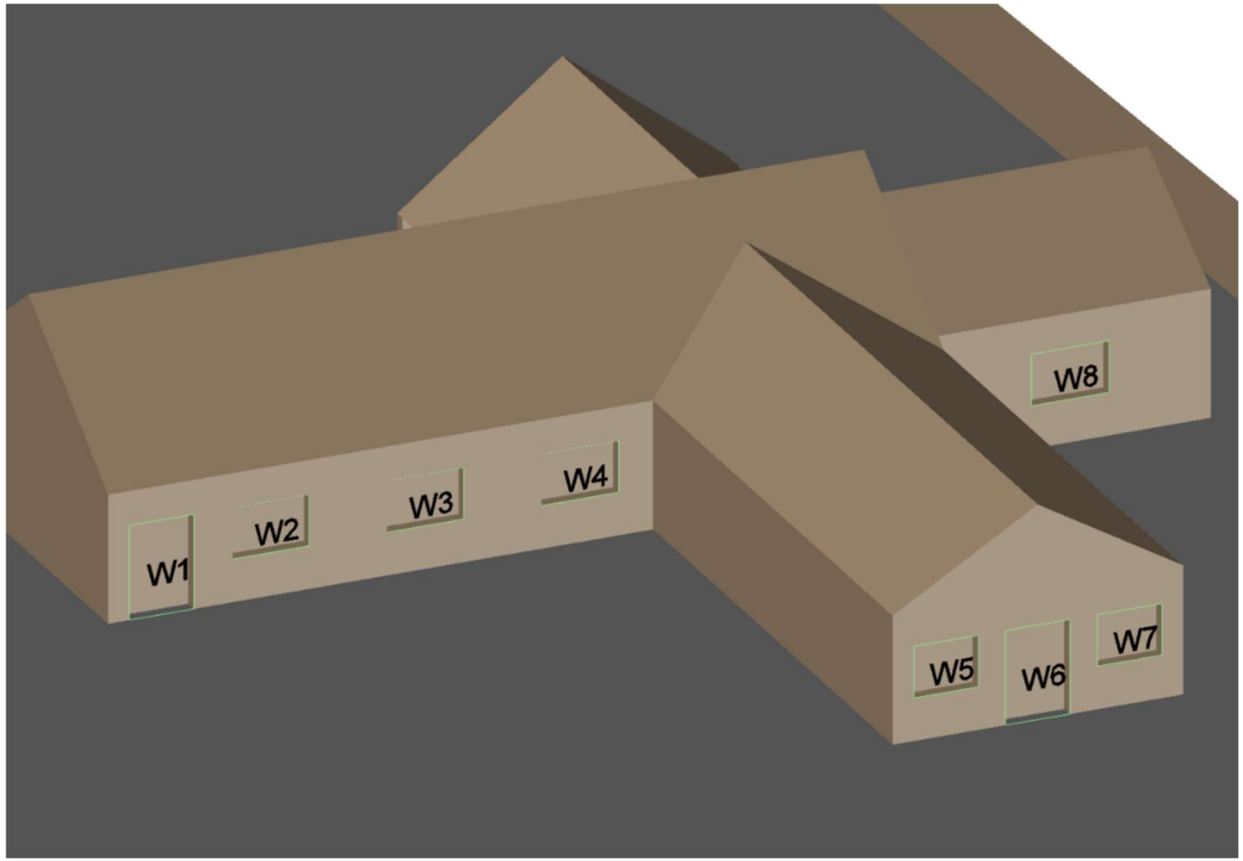

Figure 52: 3 Castlelands (View from southeast)

Table 7: VSC Results Summary

Property	Number of Windows Tested	Windows that meet BRE Guidelines	
		No.	%
1 Maple Square	15	15	100%
19 Maple Square	14	14	100%
20 Maple Square	12	12	100%
21 Maple Square	14	14	100%
15 Earl's Square	8	8	100%
14 Earl's Square	8	8	100%
33 Kingsfort Square	14	14	100%
1 Kingsfort Square	14	14	100%
1 Bower Walk	20	20	100%
11 Kingsfort Avenue	6	6	100%
12 Kingsfort Avenue	6	6	100%
13 Kingsfort Avenue	6	6	100%
14 Kingsfort Avenue	6	6	100%
15 Kingsfort Avenue	6	6	100%
16 Kingsfort Avenue	6	6	100%
17 Kingsfort Avenue	6	6	100%
18 Kingsfort Avenue	6	6	100%
19 Kingsfort Avenue	14	14	100%

Table 8: VSC Results Summary Cont.

Property	Number of Windows Tested	Windows that meet BRE Guidelines	
		No.	%
39 Kingsfort Avenue	8	8	100%
40 Kingsfort Avenue	6	6	100%
41 Kingsfort Avenue	6	6	100%
42 Kingsfort Avenue	6	6	100%
43 Kingsfort Avenue	6	6	100%
44 Kingsfort Avenue	6	6	100%
45 Kingsfort Avenue	6	6	100%
46 Kingsfort Avenue	8	8	100%
47 Kingsfort Avenue	14	14	100%
48 Kingsfort Avenue	14	14	100%
36 Castlepark Avenue	5	5	100%
37 Castlepark Avenue	5	5	100%
38 Castlepark Avenue	7	7	100%
39 Castlepark Avenue	5	5	100%
4 Castle Court	5	5	100%
1 Castlelands	6	6	100%
2 Castlelands	5	5	100%
7 Casltelands	8	8	100%
Total	**307**	**307**	**100%**

All windows tested have VSC values greater than 27% or a VSC value no less than 0.8 times its former value with the proposed development in place.

The results meet the recommendations of the BRE Guide and show that the proposed development will have a negligible impact on skylight to the neighbouring dwellings.

Table 9: VSC Results

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
11 Kingsfort Avenue					
Ground	W1	Existing	32.04	1.00	YES
		Proposed	32.04		
	W2	Existing	33.94	0.99	YES
		Proposed	33.60		
First	W1	Existing	37.91	0.97	YES
		Proposed	36.94		
	W2	Existing	37.90	0.98	YES
		Proposed	37.06		
Second	W1	Existing	35.86	0.99	YES
		Proposed	35.33		
	W2	Existing	35.88	0.99	YES
		Proposed	35.41		

Table 10: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
12 Kingsfort Avenue					
Ground	W1	Existing	31.93	1.00	YES
		Proposed	31.79		
	W2	Existing	32.07	0.98	YES
		Proposed	31.34		
First	W1	Existing	37.97	0.97	YES
		Proposed	36.70		
	W2	Existing	37.93	0.97	YES
		Proposed	36.84		
Second	W1	Existing	35.91	0.98	YES
		Proposed	35.22		
	W2	Existing	35.88	0.98	YES
		Proposed	35.29		

Table 11: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
13 Kingsfort Avenue					
Ground	W1	Existing	35.02	0.94	YES
		Proposed	32.85		
	W2	Existing	32.36	0.93	YES
		Proposed	30.18		
First	W1	Existing	38.08	0.95	YES
		Proposed	36.36		
	W2	Existing	38.01	0.96	YES
		Proposed	36.56		
Second	W1	Existing	36.02	0.97	YES
		Proposed	35.08		
	W2	Existing	35.94	0.98	YES
		Proposed	35.15		

Table 12: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
14 Kingsfort Avenue					
Ground	W1	Existing	32.46	0.92	YES
		Proposed	29.73		
	W2	Existing	34.35	0.90	YES
		Proposed	31.03		
First	W1	Existing	38.14	0.92	YES
		Proposed	35.14		
	W2	Existing	38.14	0.93	YES
		Proposed	35.49		
Second	W1	Existing	36.05	0.95	YES
		Proposed	34.41		
	W2	Existing	36.06	0.96	YES
		Proposed	34.59		

Table 13: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
15 Kingsfort Avenue					
Ground	W1	Existing	31.80	0.91	YES
		Proposed	28.94		
	W2	Existing	31.95	0.90	YES
		Proposed	28.72		
First	W1	Existing	38.18	0.91	YES
		Proposed	34.69		
	W2	Existing	38.16	0.91	YES
		Proposed	34.91		
Second	W1	Existing	36.09	0.95	YES
		Proposed	34.22		
	W2	Existing	36.07	0.95	YES
		Proposed	34.32		

Table 14: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
16 Kingsfort Avenue					
Ground	W1	Existing	34.84	0.89	YES
		Proposed	31.02		
	W2	Existing	32.61	0.88	YES
		Proposed	28.77		
First	W1	Existing	38.23	0.90	YES
		Proposed	34.53		
	W2	Existing	38.21	0.90	YES
		Proposed	34.58		
Second	W1	Existing	36.16	0.95	YES
		Proposed	34.24		
	W2	Existing	36.11	0.95	YES
		Proposed	34.20		

Table 15: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
17 Kingsfort Avenue					
Ground	W1	Existing	32.37	0.89	YES
		Proposed	28.93		
	W2	Existing	33.47	0.87	YES
		Proposed	29.03		
First	W1	Existing	38.26	0.90	YES
		Proposed	34.28		
	W2	Existing	38.30	0.89	YES
		Proposed	34.26		
Second	W1	Existing	36.14	0.95	YES
		Proposed	34.17		
	W2	Existing	36.17	0.94	YES
		Proposed	34.13		

Table 16: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
18 Kingsfort Avenue					
Ground	W1	Existing	33.91	0.85	YES
		Proposed	28.86		
	W2	Existing	32.61	0.88	YES
		Proposed	28.65		
First	W1	Existing	37.79	0.89	YES
		Proposed	33.79		
	W2	Existing	38.23	0.90	YES
		Proposed	34.25		
Second	W1	Existing	35.93	0.95	YES
		Proposed	34.16		
	W2	Existing	36.13	0.95	YES
		Proposed	34.20		

Table 17: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
19 Kingsfort Avenue					
Ground	W1	Existing	32.12	1.00	YES
		Proposed	32.11		
	W2	Existing	29.25	1.00	YES
		Proposed	29.21		
	W3	Existing	31.88	1.00	YES
		Proposed	31.79		
	W4	Existing	37.00	0.86	YES
		Proposed	32.00		
	W5	Existing	37.25	0.85	YES
		Proposed	31.70		
	W6	Existing	35.30	0.84	YES
		Proposed	29.76		
First	W1	Existing	37.58	0.99	YES
		Proposed	37.09		
	W2	Existing	38.75	0.98	YES
		Proposed	38.15		
	W3	Existing	37.74	0.98	YES
		Proposed	37.10		
	W4	Existing	38.44	0.89	YES
		Proposed	34.29		

Table 18: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
19 Kingsfort Avenue					
Second	W1	Existing	35.06	0.99	YES
		Proposed	34.79		
	W2	Existing	38.76	0.99	YES
		Proposed	38.37		
	W3	Existing	35.13	0.99	YES
		Proposed	34.78		
	W4	Existing	36.13	0.95	YES
		Proposed	34.48		

Table 19: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
39 Kingsfort Avenue					
Ground	W1	Existing	36.15	0.75	YES
		Proposed	27.12		
	W2	Existing	37.28	0.75	YES
		Proposed	28.09		
First	W1	Existing	38.58	0.81	YES
		Proposed	31.16		
	W2	Existing	38.63	0.83	YES
		Proposed	31.97		
	W3	Existing	38.05	0.78	YES
		Proposed	29.59		
	W4	Existing	38.35	0.88	YES
		Proposed	33.79		
Second	W1	Existing	36.44	0.89	YES
		Proposed	32.34		
	W2	Existing	36.49	0.90	YES
		Proposed	32.77		

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Table 20: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
40 Kingsfort Avenue					
Ground	W1	Existing	36.82	0.75	YES
		Proposed	27.61		
	W2	Existing	35.81	0.75	YES
		Proposed	27.00		
First	W1	Existing	38.58	0.81	YES
		Proposed	31.17		
	W2	Existing	38.57	0.80	YES
		Proposed	30.76		
Second	W1	Existing	36.47	0.89	YES
		Proposed	32.51		
	W2	Existing	36.44	0.88	YES
		Proposed	32.17		

Table 21: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
41 Kingsfort Avenue					
Ground	W1	Existing	32.27	0.84	YES
		Proposed	27.23		
	W2	Existing	34.00	0.83	YES
		Proposed	28.15		
First	W1	Existing	38.29	0.90	YES
		Proposed	34.28		
	W2	Existing	38.32	0.88	YES
		Proposed	33.81		
Second	W1	Existing	36.28	0.93	YES
		Proposed	33.92		
	W2	Existing	36.30	0.93	YES
		Proposed	33.73		

Table 22: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
42 Kingsfort Avenue					
Ground	W1	Existing	32.10	0.91	YES
		Proposed	29.35		
	W2	Existing	31.47	0.93	YES
		Proposed	29.28		
First	W1	Existing	38.29	0.90	YES
		Proposed	34.64		
	W2	Existing	38.28	0.90	YES
		Proposed	34.49		
Second	W1	Existing	36.28	0.94	YES
		Proposed	34.23		
	W2	Existing	36.28	0.94	YES
		Proposed	34.08		

Table 23: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
43 Kingsfort Avenue					
Ground	W1	Existing	33.91	0.92	YES
		Proposed	31.08		
	W2	Existing	32.06	0.94	YES
		Proposed	30.20		
First	W1	Existing	38.36	0.90	YES
		Proposed	34.70		
	W2	Existing	38.31	0.91	YES
		Proposed	34.69		
Second	W1	Existing	36.35	0.95	YES
		Proposed	34.45		
	W2	Existing	36.29	0.95	YES
		Proposed	34.32		

Table 24: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
44 Kingsfort Avenue					
Ground	W1	Existing	31.24	0.81	YES
		Proposed	25.43		
	W2	Existing	33.17	0.85	YES
		Proposed	28.19		
First	W1	Existing	38.32	0.85	YES
		Proposed	32.71		
	W2	Existing	38.29	0.87	YES
		Proposed	33.25		
Second	W1	Existing	36.28	0.94	YES
		Proposed	34.12		
	W2	Existing	36.27	0.94	YES
		Proposed	34.11		

Table 25: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
45 Kingsfort Avenue					
Ground	W1	Existing	31.77	0.83	YES
		Proposed	26.34		
	W2	Existing	31.68	0.82	YES
		Proposed	25.93		
First	W1	Existing	38.39	0.88	YES
		Proposed	33.96		
	W2	Existing	38.35	0.86	YES
		Proposed	32.95		
Second	W1	Existing	36.34	0.95	YES
		Proposed	34.58		
	W2	Existing	36.32	0.94	YES
		Proposed	34.23		

Table 26: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
46 Kingsfort Avenue					
Ground	W1	Existing	34.59	0.90	YES
		Proposed	31.22		
	W2	Existing	32.35	0.90	YES
		Proposed	29.19		
First	W1	Existing	38.49	0.91	YES
		Proposed	35.19		
	W2	Existing	38.42	0.90	YES
		Proposed	34.66		
	W3	Existing	33.73	0.97	YES
		Proposed	32.83		
Second	W1	Existing	36.41	0.96	YES
		Proposed	34.90		
	W2	Existing	36.35	0.96	YES
		Proposed	34.72		
	W3	Existing	36.00	0.99	YES
		Proposed	35.55		

Table 27: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
47 Kingsfort Avenue					
Ground	W1	Existing	32.58	0.87	YES
		Proposed	28.32		
	W2	Existing	34.79	0.88	YES
		Proposed	30.51		
	W3	Existing	36.54	1.00	YES
		Proposed	36.49		
	W4	Existing	35.86	1.00	YES
		Proposed	35.81		
First	W1	Existing	38.48	0.89	YES
		Proposed	34.17		
	W2	Existing	38.47	0.89	YES
		Proposed	34.30		
	W3	Existing	31.72	0.96	YES
		Proposed	30.54		
	W4	Existing	37.54	1.00	YES
		Proposed	37.50		
	W5	Existing	37.46	1.00	YES
		Proposed	37.39		

Table 28: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
47 Kingsfort Avenue					
Second	W1	Existing	36.28	0.95	YES
		Proposed	34.52		
	W2	Existing	36.30	0.95	YES
		Proposed	34.48		
	W3	Existing	33.60	0.97	YES
		Proposed	32.74		
	W4	Existing	35.49	1.00	YES
		Proposed	35.48		
	W5	Existing	35.43	1.00	YES
		Proposed	35.41		

Table 29: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
48 Kingsfort Avenue					
Ground	W1	Existing	34.39	0.88	YES
		Proposed	30.25		
	W2	Existing	32.59	0.87	YES
		Proposed	28.38		
	W3	Existing	35.63	0.99	YES
		Proposed	35.37		
	W4	Existing	35.17	0.98	YES
		Proposed	34.54		

Table 30: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
48 Kingsfort Avenue					
First	W1	Existing	38.60	0.89	YES
		Proposed	34.54		
	W2	Existing	38.51	0.89	YES
		Proposed	34.39		
	W3	Existing	37.40	0.99	YES
		Proposed	37.17		
	W4	Existing	37.38	0.98	YES
		Proposed	36.59		
Second	W1	Existing	36.37	0.95	YES
		Proposed	34.51		
	W2	Existing	36.29	0.95	YES
		Proposed	34.51		
	W3	Existing	35.42	1.00	YES
		Proposed	35.38		
	W4	Existing	35.45	0.99	YES
		Proposed	35.21		

Table 31: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
14 Earl's Square					
Ground	W1	Existing	32.32	0.99	YES
		Proposed	32.08		
	W2	Existing	38.57	0.98	YES
		Proposed	37.63		
	W3	Existing	21.75	0.87	YES
		Proposed	18.97		
	W4	Existing	34.89	0.86	YES
		Proposed	29.93		
First	W1	Existing	35.10	0.98	YES
		Proposed	34.41		
	W2	Existing	38.72	0.99	YES
		Proposed	38.17		
	W3	Existing	30.93	0.88	YES
		Proposed	27.34		
	W4	Existing	37.80	0.88	YES
		Proposed	33.34		

Table 32: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
15 Earl's Square					
Ground	W1	Existing	38.54	0.97	YES
		Proposed	37.50		
	W2	Existing	33.08	0.97	YES
		Proposed	31.98		
	W3	Existing	35.43	0.84	YES
		Proposed	29.79		
	W4	Existing	22.19	0.86	YES
		Proposed	19.03		
First	W1	Existing	38.72	0.99	YES
		Proposed	38.24		
	W2	Existing	35.23	0.98	YES
		Proposed	34.67		
	W3	Existing	37.90	0.88	YES
		Proposed	33.24		
	W4	Existing	30.81	0.89	YES
		Proposed	27.30		

Table 33: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
19 Maple Square					
Ground	W1	Existing	35.79	0.97	YES
		Proposed	34.85		
	W2	Existing	34.12	0.98	YES
		Proposed	33.59		
	W3	Existing	30.49	0.94	YES
		Proposed	28.57		
	W4	Existing	30.97	0.93	YES
		Proposed	28.71		
First	W1	Existing	38.19	0.97	YES
		Proposed	36.93		
	W2	Existing	38.36	0.96	YES
		Proposed	36.82		
	W3	Existing	39.45	0.79	YES
		Proposed	31.28		
	W4	Existing	35.31	0.92	YES
		Proposed	32.32		
	W5	Existing	34.70	0.93	YES
		Proposed	32.24		

Table 34: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
19 Maple Square					
Second	W1	Existing	35.71	0.99	YES
		Proposed	35.27		
	W2	Existing	35.83	0.99	YES
		Proposed	35.33		
	W3	Existing	39.20	0.96	YES
		Proposed	37.58		
	W4	Existing	34.13	0.97	YES
		Proposed	32.95		
	W5	Existing	33.69	0.97	YES
		Proposed	32.59		

Table 35: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
20 Maple Square					
Ground	W1	Existing	35.85	0.89	YES
		Proposed	31.75		
	W2	Existing	34.56	0.89	YES
		Proposed	30.60		
First	W1	Existing	38.66	0.89	YES
		Proposed	34.45		
	W2	Existing	38.64	0.88	YES
		Proposed	33.87		
Second	W1	Existing	35.85	0.93	YES
		Proposed	33.24		
	W2	Existing	35.85	0.91	YES
		Proposed	32.79		

Table 36: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
21 Maple Square					
Ground	W1	Existing	33.41	0.92	YES
		Proposed	30.59		
	W2	Existing	35.73	0.90	YES
		Proposed	32.13		
First	W1	Existing	38.77	0.92	YES
		Proposed	35.63		
	W2	Existing	38.70	0.91	YES
		Proposed	35.08		
Second	W1	Existing	35.95	0.95	YES
		Proposed	34.01		
	W2	Existing	35.87	0.94	YES
		Proposed	33.55		

Table 37: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
1 Maple Square					
Ground	W1	Existing	35.19	0.96	YES
		Proposed	33.90		
	W2	Existing	35.43	0.96	YES
		Proposed	33.84		
	W3	Existing	34.43	0.83	YES
		Proposed	28.71		
	W4	Existing	31.34	0.95	YES
		Proposed	29.80		
	W5	Existing	29.24	0.95	YES
		Proposed	27.76		
First	W1	Existing	36.66	0.97	YES
		Proposed	35.70		
	W2	Existing	36.98	0.97	YES
		Proposed	35.74		
	W3	Existing	38.69	0.82	YES
		Proposed	31.70		
	W4	Existing	34.27	0.96	YES
		Proposed	32.77		
	W5	Existing	33.67	0.96	YES
		Proposed	32.49		

Table 38: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
1 Maple Square					
Second	W1	Existing	35.27	0.98	YES
		Proposed	34.74		
	W2	Existing	35.39	0.98	YES
		Proposed	34.68		
	W3	Existing	38.66	0.89	YES
		Proposed	34.22		
	W4	Existing	33.46	0.97	YES
		Proposed	32.47		
	W5	Existing	33.09	0.98	YES
		Proposed	32.30		

Table 39: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
33 Kingsfort Square					
Ground	W1	Existing	31.34	0.95	YES
		Proposed	29.86		
	W2	Existing	34.54	0.95	YES
		Proposed	32.82		
	W3	Existing	34.59	0.84	YES
		Proposed	29.16		
	W4	Existing	35.16	0.99	YES
		Proposed	34.65		
	W5	Existing	35.42	0.99	YES
		Proposed	34.97		

Table 40: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
33 Kingsfort Square					
First	W1	Existing	36.44	0.96	YES
		Proposed	34.98		
	W2	Existing	36.84	0.95	YES
		Proposed	35.12		
	W3	Existing	37.81	0.85	YES
		Proposed	32.03		
	W4	Existing	36.17	0.99	YES
		Proposed	35.81		
Second	W1	Existing	35.90	0.98	YES
		Proposed	35.03		
	W2	Existing	36.17	0.97	YES
		Proposed	35.14		
	W3	Existing	38.11	0.91	YES
		Proposed	34.60		
	W4	Existing	35.12	0.99	YES
		Proposed	34.89		
	W5	Existing	35.16	0.99	YES
		Proposed	34.97		

Table 41: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
1 Bower Walk					
Ground	W1	Existing	34.02	0.92	YES
		Proposed	31.19		
	W2	Existing	33.83	0.94	YES
		Proposed	31.93		
	W3	Existing	33.88	0.93	YES
		Proposed	31.34		
	W4	Existing	37.39	0.97	YES
		Proposed	36.30		
	W5	Existing	37.10	0.97	YES
		Proposed	36.11		
	W6	Existing	31.23	0.99	YES
		Proposed	30.87		
	W7	Existing	32.66	0.99	YES
		Proposed	32.18		
	W8	Existing	32.81	0.99	YES
		Proposed	32.35		
First	W1	Existing	36.98	0.92	YES
		Proposed	33.90		
	W2	Existing	38.17	0.91	YES
		Proposed	34.84		
	W3	Existing	37.18	0.91	YES
		Proposed	33.97		
	W4	Existing	38.00	0.98	YES
		Proposed	37.25		
	W5	Existing	37.95	0.98	YES
		Proposed	37.31		
	W6	Existing	34.73	0.99	YES
		Proposed	34.38		

Table 42: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
1 Bower Walk					
Second	W1	Existing	34.57	0.96	YES
		Proposed	33.17		
	W2	Existing	38.26	0.95	YES
		Proposed	36.44		
	W3	Existing	34.69	0.96	YES
		Proposed	33.22		
	W4	Existing	36.04	0.99	YES
		Proposed	35.67		
	W5	Existing	36.00	0.99	YES
		Proposed	35.67		
	W6	Existing	34.22	1.00	YES
		Proposed	34.06		

Table 43: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
1 Kingsfort Square					
Ground	W1	Existing	31.27	0.97	YES
		Proposed	30.28		
	W2	Existing	32.42	0.97	YES
		Proposed	31.42		
	W3	Existing	32.73	0.95	YES
		Proposed	31.20		
	W4	Existing	33.31	0.97	YES
		Proposed	32.22		
	W5	Existing	33.16	0.97	YES
		Proposed	32.09		
	W6	Existing	31.80	0.97	YES
		Proposed	30.99		
First	W1	Existing	33.71	0.97	YES
		Proposed	32.79		
	W2	Existing	35.22	0.97	YES
		Proposed	34.06		
	W3	Existing	34.91	0.96	YES
		Proposed	33.65		
	W4	Existing	35.04	0.98	YES
		Proposed	34.41		

Table 44: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
1 Kingsfort Square					
Second	W1	Existing	32.64	0.98	YES
		Proposed	32.13		
	W2	Existing	36.21	0.98	YES
		Proposed	35.51		
	W3	Existing	33.32	0.98	YES
		Proposed	32.66		
	W4	Existing	34.37	0.99	YES
		Proposed	34.03		

Table 45: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
36 Castlepark Avenue					
Ground	W1	Existing	34.73	0.92	YES
		Proposed	31.86		
	W2	Existing	22.60	0.96	YES
		Proposed	21.67		
	W3	Existing	24.40	0.87	YES
		Proposed	21.28		
First	W1	Existing	36.75	0.95	YES
		Proposed	34.81		
	W2	Existing	35.44	0.95	YES
		Proposed	33.66		

Table 46: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
37 Castlepark Avenue					
Ground	W1	Existing	25.94	0.87	YES
		Proposed	22.65		
	W2	Existing	35.03	0.91	YES
		Proposed	31.78		
	W3	Existing	21.97	0.94	YES
		Proposed	20.74		
First	W1	Existing	35.92	0.93	YES
		Proposed	33.55		
	W2	Existing	36.94	0.94	YES
		Proposed	34.77		

Table 47: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
38 Castlepark Avenue					
Ground	W1	Existing	35.79	0.92	YES
		Proposed	32.75		
	W2	Existing	24.89	0.87	YES
		Proposed	21.60		
	W3	Existing	37.48	0.90	YES
		Proposed	33.67		
	W4	Existing	24.40	0.96	YES
		Proposed	23.41		
First	W1	Existing	37.77	0.95	YES
		Proposed	35.77		
	W2	Existing	36.59	0.94	YES
		Proposed	34.28		
	W3	Existing	35.94	0.93	YES
		Proposed	33.43		

Table 48: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
39 Castlepark Avenue					
Ground	W1	Existing	25.98	0.98	YES
		Proposed	25.37		
	W2	Existing	35.77	0.93	YES
		Proposed	33.38		
	W3	Existing	23.49	0.88	YES
		Proposed	20.63		
First	W1	Existing	36.70	0.97	YES
		Proposed	35.44		
	W2	Existing	37.81	0.96	YES
		Proposed	36.23		

Table 49: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
4 Castle Court					
Ground	W1	Existing	34.50	0.98	YES
		Proposed	33.66		
	W2	Existing	36.13	0.97	YES
		Proposed	35.03		
	W3	Existing	36.82	0.97	YES
		Proposed	35.63		
	W4	Existing	37.00	0.97	YES
		Proposed	35.78		
	W5	Existing	36.90	0.97	YES
		Proposed	35.77		

Table 50: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
1 Castlelands					
Ground	W1	Existing	37.36	0.94	YES
		Proposed	35.27		
	W2	Existing	37.27	0.94	YES
		Proposed	35.10		
	W3	Existing	37.27	0.94	YES
		Proposed	35.21		
	W4	Existing	36.95	0.94	YES
		Proposed	34.85		
	W5	Existing	36.54	0.95	YES
		Proposed	34.67		
	W6	Existing	35.95	0.96	YES
		Proposed	34.46		

Table 51: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
2 Castlelands					
Ground	W1	Existing	27.94	0.92	YES
		Proposed	25.72		
	W2	Existing	36.77	0.91	YES
		Proposed	33.43		
	W3	Existing	33.33	0.90	YES
		Proposed	29.99		
	W4	Existing	37.44	0.91	YES
		Proposed	34.12		
	W5	Existing	32.80	0.91	YES
		Proposed	29.89		

Table 52: VSC Results Cont.

Floor Ref.	Window Ref.		VSC	Pr/Ex	Meets BRE Criteria
3 Casltelands					
Ground	W1	Existing	37.08	0.94	YES
		Proposed	34.67		
	W2	Existing	37.30	0.93	YES
		Proposed	34.79		
	W3	Existing	36.31	0.93	YES
		Proposed	33.93		
	W4	Existing	32.47	0.93	YES
		Proposed	30.30		
	W5	Existing	37.04	0.91	YES
		Proposed	33.88		
	W6	Existing	35.63	0.92	YES
		Proposed	32.91		
	W7	Existing	36.01	0.93	YES
		Proposed	33.39		
	W8	Existing	34.34	0.99	YES
		Proposed	34.05		

4.2.3 Impact on Sunlight to Existing Buildings

No detailed sunlight analysis to the neighbouring dwellings is required for number of reasons:

1. The majority of windows tested using VSC analysis have VSC values greater than 27% with the new development in place, indicating that there will be a negligible impact on sunlight to the existing dwellings, and/or
2. The neighbouring windows face within 90° of due north (indicating that the APSH/WPSH criteria will not be met for the existing or proposed scenarios.)

4.2.4 Impact on Sunlight to Neighbouring Gardens

The sunlight availability was checked for the neighbouring dwellings main gardens, as necessary. The main gardens at the following properties, which are in closest proximity to the proposed development, were tested:

- 17 Kingsfort Avenue
- 18 Kingsfort Avenue
- 19 Kingsfort Avenue
- 39 Kingsfort Avenue
- 40 Kingsfort Avenue
- 41 Kingsfort Avenue
- 42 Kingsfort Avenue
- 43 Kingsfort Avenue
- 44 Kingsfort Avenue
- 45 Kingsfort Avenue
- 46 Kingsfort Avenue
- 47 Kingsfort Avenue
- 48 Kingsfort Avenue
- 14 Earl's Square
- 15 Earl's Square
- 19 Maple Square
- 4 Castle Court
- 1 Castlelands
- 2 Castlelands
- 3 Castlelands

The garden areas were estimated from site plans, supplemented by OS and Google Maps. The gardens analysed are shown in the following figures. (North is vertically up for all figures.)

Legend	
	< 2hrs for Existing & Proposed
	> 2hrs for Existing & Proposed
	Loss
	Gain

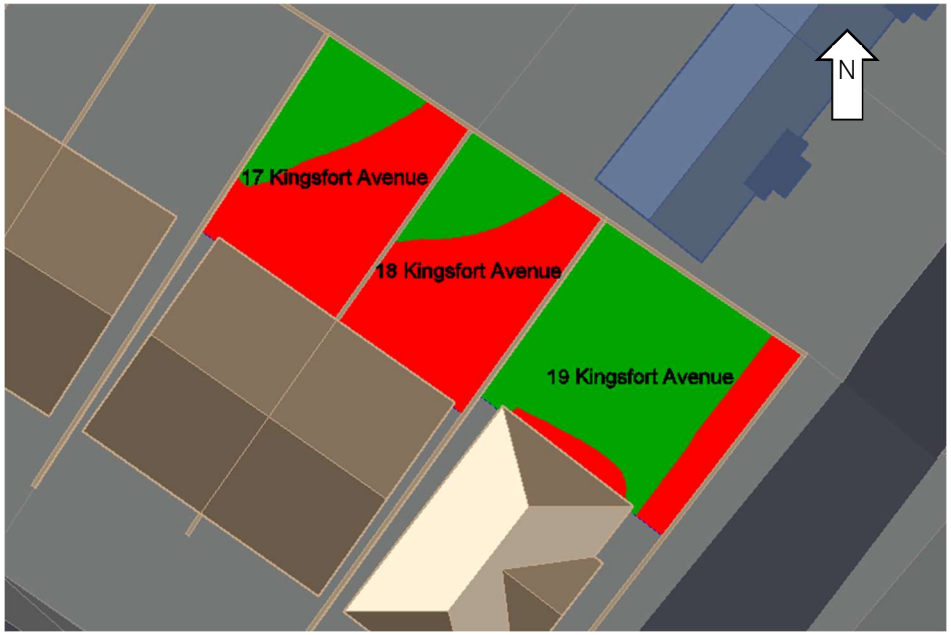

Figure 53: Sunlight to Garden Test – 17-19 Kingsfort Avenue

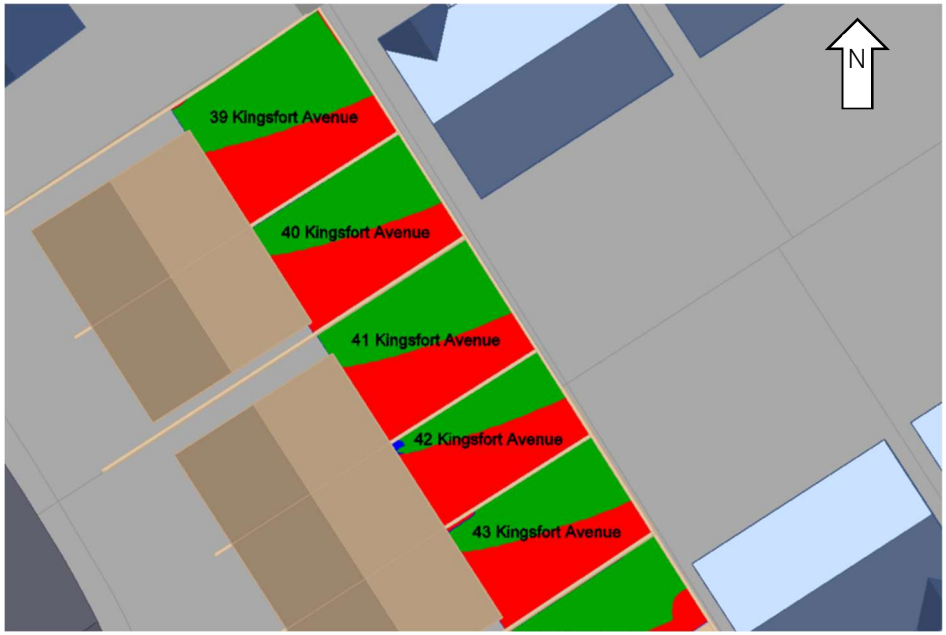

Figure 54: Sunlight to Garden Test – 39-43 Kingsfort Avenue

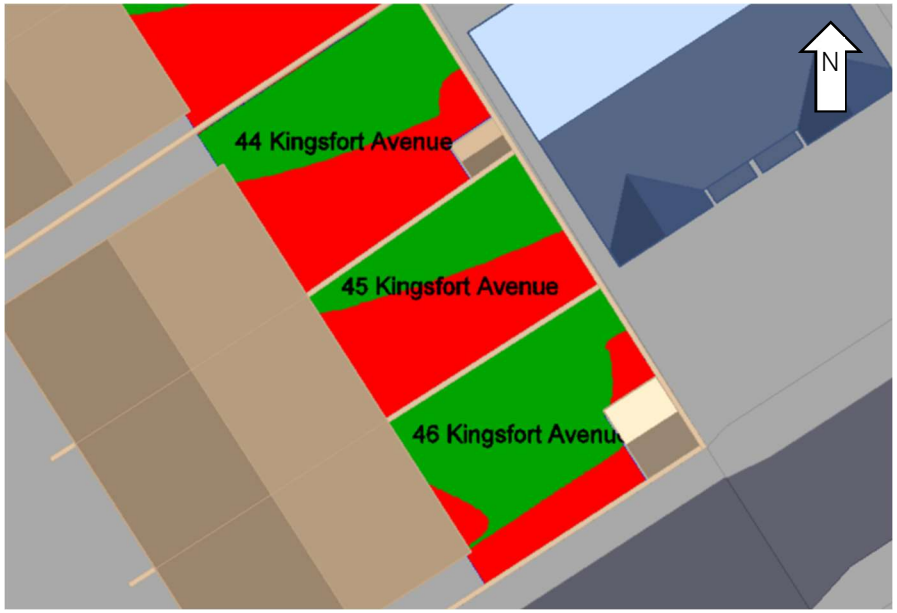

Figure 55: Sunlight to Garden Test – 44-46 Kingsfort Avenue

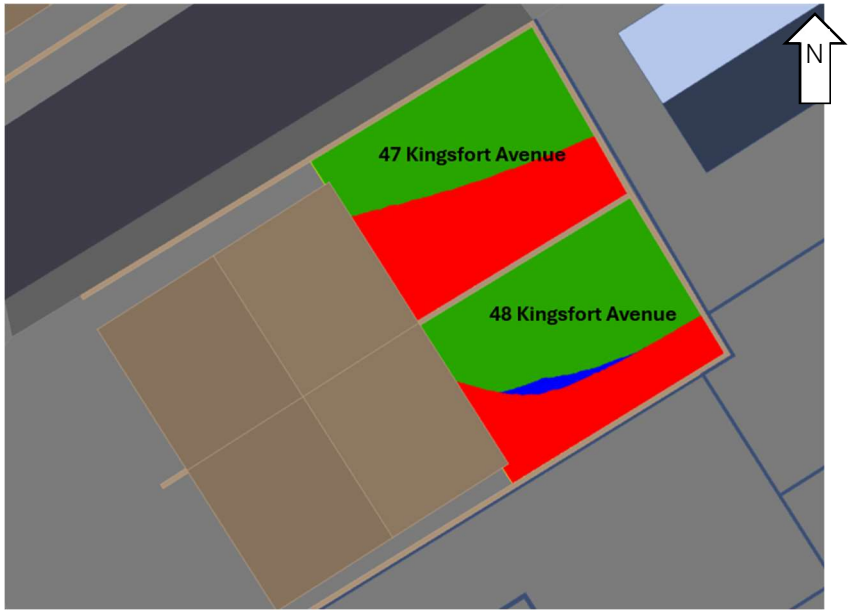

Figure 56: Sunlight to Garden Test – 47-48 Kingsfort Avenue

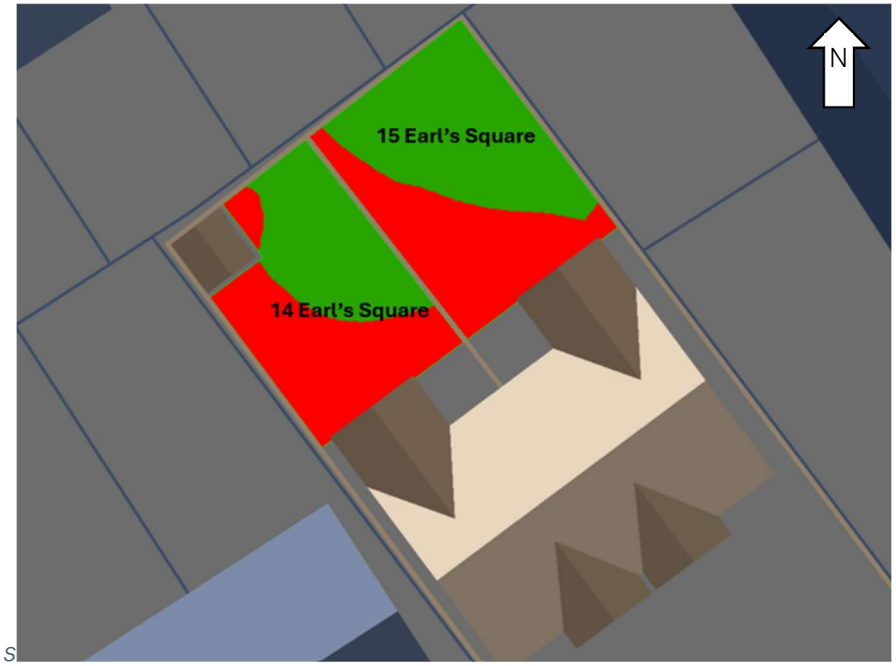

Figure 57: Sunlight to Garden Test – 14-15 Earl's Square

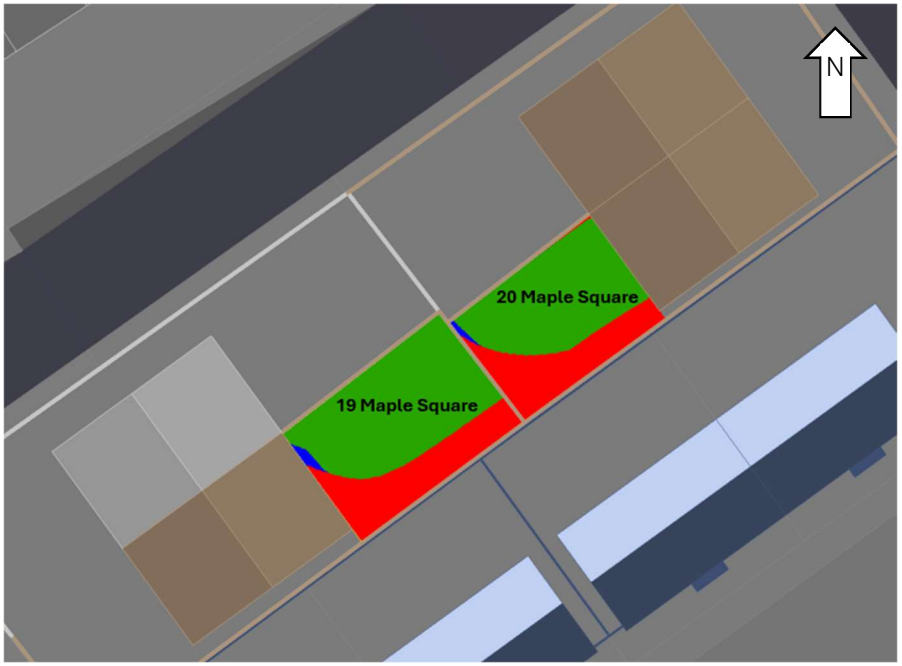

Figure 58: Sunlight to Garden Test – 19-20 Maple Square

Figure 59: Sunlight to Garden Test – 4 Castle Court & 1-3 Castlelands

Table 53: Sunlight to Amenity - Neighbour Analysis Results

Floor Ref	Amenity Ref		Amenity Area	Lit Area Existing	Lit Area Proposed	Pr/Ex	Meets BRE Criteria
17 Kingsfort Avenue							
Ground	A1	Area m2	85.68	26.91	26.91	1.00	YES
		Percentage		31%	31%		
18 Kingsfort Avenue							
Ground	A1	Area m2	81.63	19.79	19.79	1.00	YES
		Percentage		24%	24%		
19 Kingsfort Avenue							
Ground	A1	Area m2	114.75	89.96	89.96	1.00	YES
		Percentage		78%	78%		
39 Kingsfort Avenue							
Ground	A1	Area m2	89.14	49.55	49.54	1.00	YES
		Percentage		56%	56%		
40 Kingsfort Avenue							
Ground	A1	Area m2	75.93	37.44	37.44	1.00	YES
		Percentage		49%	49%		
41 Kingsfort Avenue							
Ground	A1	Area m2	81.04	42.24	42.24	1.00	YES
		Percentage		52%	52%		
42 Kingsfort Avenue							
Ground	A1	Area m2	60.73	22.27	21.73	0.98	YES
		Percentage		37%	36%		
43 Kingsfort Avenue							
Ground	A1	Area m2	70.83	33.22	33.15	1.00	YES
		Percentage		47%	47%		

Table 54: Sunlight to Amenity - Neighbour Analysis Results

Floor Ref	Amenity Ref		Amenity Area	Lit Area Existing	Lit Area Proposed	Pr/Ex	Meets BRE Criteria
44 Kingsfort Avenue							
Ground	A1	Area m2	77.54	39.35	39.31	1.00	YES
		Percentage		51%	51%		
45 Kingsfort Avenue							
Ground	A1	Area m2	63.22	24.47	24.47	1.00	YES
		Percentage		39%	39%		
46 Kingsfort Avenue							
Ground	A1	Area m2	70.37	51.09	51.09	1.00	YES
		Percentage		73%	73%		
47 Kingsfort Avenue							
Ground	A1	Area m2	79.86	42.05	42.05	1.00	YES
		Percentage		53%	53%		
48 Kingsfort Avenue							
Ground	A1	Area m2	74.81	50.02	48.29	0.97	YES
		Percentage		67%	65%		
14 Earl's Square							
Ground	A1	Area m2	66.96	30.07	30.07	1.00	YES
		Percentage		45%	45%		
15 Earl's Square							
Ground	A1	Area m2	82.30	46.28	45.82	0.99	YES
		Percentage		56%	56%		

Table 55: Sunlight to Amenity - Neighbour Analysis Results

Floor Ref	Amenity Ref		Amenity Area	Lit Area Existing	Lit Area Proposed	Pr/Ex	Meets BRE Criteria
19 Maple Square							
Ground	A1	Area m2	84.91	58.77	55.27	0.94	YES
		Percentage		69%	65%		
4 Castle Court							
Ground	A1	Area m2	691.10	665.45	665.45	1.00	YES
		Percentage		96%	96%		
1 Castlelands							
Ground	A1	Area m2	756.98	734.66	734.17	1.00	YES
		Percentage		97%	97%		
2 Castlelands							
Ground	A1	Area m2	806.24	777.73	776.71	1.00	YES
		Percentage		96%	96%		
3 Castlelands							
Ground	A1	Area m2	696.30	670.66	661.50	0.99	YES
		Percentage		96%	95%		

Based on the results, there will be a negligible impact on sunlight to neighbouring gardens due to the proposed development.

Proposed Development

4.2.5 Daylight Analysis for Proposed Development

The daylight provision in the duplex and apartment units in the proposed development was checked using the target illuminance (E_T) method. The results are presented in the following tables. (See 0 for the illuminance contours images and room labels.)

Table 56: Median Illuminance Results Summary

Property	Number of Rooms Tested	Rooms satisfying Criteria		Rooms not satisfying Criteria
		No.	%	
469-468 J2-K2	5	5	100%	0
460-461 J2-K2	5	5	100%	0
446-447 J2-K2	5	5	100%	0
438-439 J2-K2	5	5	100%	0
428-429 J2-K2	5	5	100%	0
432-433 J2-K2	5	5	100%	0
418-419 J2-K2	5	5	100%	0
416-417 J2-K2	5	5	100%	0
380-381 J2-K2	5	5	100%	0
390-391 J2-K2	5	5	100%	0
406-407 J2-K2	5	5	100%	0
364-365 J2-K2	5	5	100%	0
378-379 J2-K2	5	5	100%	0
362-363 J2-K2	5	5	100%	0
322-323 J2-K2	5	5	100%	0
336-337 J2-K2	5	5	100%	0
350-351 J2-K2	5	5	100%	0
462-463 J1-K1	5	5	100%	0
466-467 J1-K1	5	5	100%	0
464-465 J1-K1	5	5	100%	0
454-455 J1-K1	5	5	100%	0
452-453 J1-K1	5	5	100%	0
450-451 J1-K1	5	5	100%	0
456-457 J1-K1	5	5	100%	0
440-441 J1-K1	5	5	100%	0
442-443 J1-K1	5	5	100%	0
444-445 J1-K1	5	5	100%	0
430-431 J1-K1	5	5	100%	0
424-425 J1-K1	5	5	100%	0
422-423 J1-K1	5	5	100%	0

Table 57: Median Illuminance Results Summary Cont.

Property	Number of Rooms Tested	Rooms satisfying Criteria		Rooms not satisfying Criteria
		No.	%	
420-421 J1-K1	5	5	100%	0
404-405 J1-K1	5	5	100%	0
402-403 J1-K1	5	5	100%	0
398-399 J1-K1	5	5	100%	0
400-401 J1-K1	5	5	100%	0
394-395 J1-K1	5	5	100%	0
396-397 J1-K1	5	5	100%	0
392-393 J1-K1	5	5	100%	0
386-387 J1-K1	5	5	100%	0
384-385 J1-K1	5	5	100%	0
382-383 J1-K1	5	5	100%	0
374-375 J1-K1	5	5	100%	0
376-377 J1-K1	5	5	100%	0
366-367 J1-K1	5	5	100%	0
368-369 J1-K1	5	5	100%	0
360-361 J1-K1	5	5	100%	0
358-359 J1-K1	5	5	100%	0
356-357 J1-K1	5	5	100%	0
354-355 J1-K1	5	5	100%	0
348-349 J1-K1	5	5	100%	0
346-347 J1-K1	5	5	100%	0
340-341 J1-K1	5	5	100%	0
338-339 J1-K1	5	5	100%	0
330-331 J1-K1	5	5	100%	0
332-333 J1-K1	5	5	100%	0
326-327 J1-K1	5	5	100%	0
328-329 J1-K1	5	5	100%	0
324-325 J1-K1	5	5	100%	0
412-413 J1-K1	5	5	100%	0
410-411 J1-K1	5	5	100%	0
414-415 J1-K1	5	5	100%	0
458-459 J3-K3	5	5	100%	0
448-449 J3-K3	5	5	100%	0
426-427 J3-K3	5	5	100%	0
388-389 J3-K3	5	5	100%	0

Table 58: Median Illuminance Results Summary Cont.

Property	Number of Rooms Tested	Rooms satisfying Criteria		Rooms not satisfying Criteria
		No.	%	
408-409 J3-K3	5	5	100%	0
370-371 J3-K3	5	5	100%	0
334-335 J3-K3	5	5	100%	0
352-353 J3-K3	5	5	100%	0
372-373 J3-K3	5	5	100%	0
344-345 J3-K3	5	5	100%	0
342-343 J3-K3	5	5	100%	0
260-261 M1-N1	5	5	100%	0
266-267 M1-N1	5	5	100%	0
252-253 M1-N1	5	5	100%	0
258-259 M1-N1	5	5	100%	0
264-265 M2-N2	5	5	100%	0
262-263 M2-N2	5	5	100%	0
256-257 M2-N2	5	5	100%	0
254-255 M2-N2	5	5	100%	0
250-251 M2-N2	5	5	100%	0
248-249 M3-N3	5	5	100%	0
Total	**410**	**410**	**100%**	**0**

The results show that all rooms tested in the duplex and apartment units meet the BRE's minimum recommendations for internal daylight provision in dwellings.

Table 59: Illuminance Results – Duplex Block 248-249 M3-N3 & 250-251 M2-N2

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
248-249 M3-N3									
Ground	R1	KD	410	86%	200	50%	50%	4380	YES
	R2	Bedroom	688	100%	100	50%	50%	4380	YES
First	R1	LKD	694	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	351	100%	100	50%	50%	4380	YES
	R2	Bedroom	981	100%	100	50%	50%	4380	YES
250-251 M2-N2									
Ground	R1	KD	223	54%	200	50%	50%	4380	YES
	R2	Bedroom	309	100%	100	50%	50%	4380	YES
First	R1	LKD	241	68%	200	50%	50%	4380	YES
Second	R1	Bedroom	247	100%	100	50%	50%	4380	YES
	R2	Bedroom	383	100%	100	50%	50%	4380	YES

Table 60: Illuminance Results – Duplex Block 252-253 M1-N1, 254-255 M2-N2 & 256-257 M2-N2

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
252-253 M1-N1									
Ground	R1	KD	216	52%	200	50%	50%	4380	YES
	R2	Bedroom	325	100%	100	50%	50%	4380	YES
First	R1	LKD	255	70%	200	50%	50%	4380	YES
Second	R1	Bedroom	230	100%	100	50%	50%	4380	YES
	R2	Bedroom	524	100%	100	50%	50%	4380	YES
254-255 M2-N2									
Ground	R1	KD	209	54%	200	50%	50%	4380	YES
	R2	Bedroom	307	100%	100	50%	50%	4380	YES
First	R1	LKD	238	64%	200	50%	50%	4380	YES
Second	R1	Bedroom	244	100%	100	50%	50%	4380	YES
	R2	Bedroom	381	100%	100	50%	50%	4380	YES
256-257 M2-N2									
Ground	R1	KD	229	58%	200	50%	50%	4380	YES
	R2	Bedroom	315	100%	100	50%	50%	4380	YES
First	R1	LKD	257	73%	200	50%	50%	4380	YES
Second	R1	Bedroom	231	100%	100	50%	50%	4380	YES
	R2	Bedroom	401	100%	100	50%	50%	4380	YES

Table 61: Illuminance Results – Duplex Block 258-259 M1-N1, 260-261 M1-N1 & 262-263 M2-N2

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
258-259 M1-N1									
Ground	R1	KD	227	54%	200	50%	50%	4380	YES
	R2	Bedroom	319	100%	100	50%	50%	4380	YES
First	R1	LKD	245	72%	200	50%	50%	4380	YES
Second	R1	Bedroom	247	100%	100	50%	50%	4380	YES
	R2	Bedroom	496	100%	100	50%	50%	4380	YES
260-261 M1-N1									
Ground	R1	KD	236	56%	200	50%	50%	4380	YES
	R2	Bedroom	330	100%	100	50%	50%	4380	YES
First	R1	LKD	264	73%	200	50%	50%	4380	YES
Second	R1	Bedroom	235	100%	100	50%	50%	4380	YES
	R2	Bedroom	522	100%	100	50%	50%	4380	YES
262-263 M2-N2									
Ground	R1	KD	230	58%	200	50%	50%	4380	YES
	R2	Bedroom	308	100%	100	50%	50%	4380	YES
First	R1	LKD	236	65%	200	50%	50%	4380	YES
Second	R1	Bedroom	245	100%	100	50%	50%	4380	YES
	R2	Bedroom	382	100%	100	50%	50%	4380	YES

Table 62: Illuminance Results – Duplex Block 264-265 M2-N2 & 266-267 M1-N1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
264-265 M2-N2									
Ground	R1	KD	245	61%	200	50%	50%	4380	YES
	R2	Bedroom	325	100%	100	50%	50%	4380	YES
First	R1	LKD	251	71%	200	50%	50%	4380	YES
Second	R1	Bedroom	235	100%	100	50%	50%	4380	YES
	R2	Bedroom	406	100%	100	50%	50%	4380	YES
266-267 M1-N1									
Ground	R1	KD	228	57%	200	50%	50%	4380	YES
	R2	Bedroom	331	100%	100	50%	50%	4380	YES
First	R1	LKD	254	75%	200	50%	50%	4380	YES
Second	R1	Bedroom	248	100%	100	50%	50%	4380	YES
	R2	Bedroom	509	100%	100	50%	50%	4380	YES

Table 63: Illuminance Results – Duplex Block 322-323 J2-K2 & 324-327 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
322-323 J2-K2									
Ground	R1	LKD	1000	100%	200	50%	50%	4380	YES
	R2	Bedroom	523	100%	100	50%	50%	4380	YES
First	R1	LKD	680	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1545	100%	100	50%	50%	4380	YES
	R2	Bedroom	733	100%	100	50%	50%	4380	YES
324-325 J1-K1									
Ground	R1	LKD	438	100%	200	50%	50%	4380	YES
	R2	Bedroom	256	100%	100	50%	50%	4380	YES
First	R1	LKD	314	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	715	100%	100	50%	50%	4380	YES
	R2	Bedroom	348	100%	100	50%	50%	4380	YES
326-327 J1-K1									
Ground	R1	LKD	430	100%	200	50%	50%	4380	YES
	R2	Bedroom	259	100%	100	50%	50%	4380	YES
First	R1	LKD	318	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	684	100%	100	50%	50%	4380	YES
	R2	Bedroom	342	100%	100	50%	50%	4380	YES

Table 64: Illuminance Results – Duplex Block 328-333 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
328-329 J1-K1									
Ground	R1	LKD	441	100%	200	50%	50%	4380	YES
	R2	Bedroom	250	100%	100	50%	50%	4380	YES
First	R1	LKD	326	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	714	100%	100	50%	50%	4380	YES
	R2	Bedroom	344	100%	100	50%	50%	4380	YES
330-331 J1-K1									
Ground	R1	LKD	430	100%	200	50%	50%	4380	YES
	R2	Bedroom	252	100%	100	50%	50%	4380	YES
First	R1	LKD	314	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	683	100%	100	50%	50%	4380	YES
	R2	Bedroom	339	100%	100	50%	50%	4380	YES
332-333 J1-K1									
Ground	R1	LKD	446	100%	200	50%	50%	4380	YES
	R2	Bedroom	250	100%	100	50%	50%	4380	YES
First	R1	LKD	328	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	716	100%	100	50%	50%	4380	YES
	R2	Bedroom	343	100%	100	50%	50%	4380	YES

Table 65: Illuminance Results – Duplex Block 334-335 J3-K3, 336-337 J2-K2 & 338-339 J1-K1S

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
334-335 J3-K3									
Ground	R1	LKD	560	100%	200	50%	50%	4380	YES
	R2	Bedroom	245	100%	100	50%	50%	4380	YES
First	R1	LKD	423	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	895	100%	100	50%	50%	4380	YES
	R2	Bedroom	337	100%	100	50%	50%	4380	YES
336-337 J2-K2									
Ground	R1	LKD	940	100%	200	50%	50%	4380	YES
	R2	Bedroom	657	100%	100	50%	50%	4380	YES
First	R1	LKD	790	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1520	100%	100	50%	50%	4380	YES
	R2	Bedroom	921	100%	100	50%	50%	4380	YES
338-339 J1-K1									
Ground	R1	LKD	236	59%	200	50%	50%	4380	YES
	R2	Bedroom	278	100%	100	50%	50%	4380	YES
First	R1	LKD	266	77%	200	50%	50%	4380	YES
Second	R1	Bedroom	590	100%	100	50%	50%	4380	YES
	R2	Bedroom	374	100%	100	50%	50%	4380	YES

Table 66: Illuminance Results – Apartment 340-341 J1-K1 & 342-345 J3-K3

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
340-341 J1-K1									
Ground	R1	LKD	282	70%	200	50%	50%	4380	YES
	R2	Bedroom	279	100%	100	50%	50%	4380	YES
First	R1	LKD	298	99%	200	50%	50%	4380	YES
Second	R1	Bedroom	594	100%	100	50%	50%	4380	YES
	R2	Bedroom	373	100%	100	50%	50%	4380	YES
342-343 J3-K3									
Ground	R1	LKD	395	91%	200	50%	50%	4380	YES
	R2	Bedroom	270	100%	100	50%	50%	4380	YES
First	R1	LKD	353	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	733	100%	100	50%	50%	4380	YES
	R2	Bedroom	371	100%	100	50%	50%	4380	YES
344-345 J3-K3									
Ground	R1	LKD	482	100%	200	50%	50%	4380	YES
	R2	Bedroom	275	100%	100	50%	50%	4380	YES
First	R1	LKD	383	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	859	100%	100	50%	50%	4380	YES
	R2	Bedroom	373	100%	100	50%	50%	4380	YES

Table 67: Illuminance Results – Apartment 346-351 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
346-347 J1-K1									
Ground	R1	LKD	299	77%	200	50%	50%	4380	YES
	R2	Bedroom	269	100%	100	50%	50%	4380	YES
First	R1	LKD	297	96%	200	50%	50%	4380	YES
Second	R1	Bedroom	606	100%	100	50%	50%	4380	YES
	R2	Bedroom	369	100%	100	50%	50%	4380	YES
348-349 J1-K1									
Ground	R1	LKD	291	70%	200	50%	50%	4380	YES
	R2	Bedroom	273	100%	100	50%	50%	4380	YES
First	R1	LKD	300	95%	200	50%	50%	4380	YES
Second	R1	Bedroom	600	100%	100	50%	50%	4380	YES
	R2	Bedroom	370	100%	100	50%	50%	4380	YES
350-351 J2-K2									
Ground	R1	LKD	520	100%	200	50%	50%	4380	YES
	R2	Bedroom	477	100%	100	50%	50%	4380	YES
First	R1	LKD	475	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1067	100%	100	50%	50%	4380	YES
	R2	Bedroom	675	100%	100	50%	50%	4380	YES

Table 68: Illuminance Results – Apartment 352-353 J3-K3 & 354-357 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
352-353 J3-K3									
Ground	R1	LKD	485	100%	200	50%	50%	4380	YES
	R2	Bedroom	223	100%	100	50%	50%	4380	YES
First	R1	LKD	405	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	889	100%	100	50%	50%	4380	YES
	R2	Bedroom	328	100%	100	50%	50%	4380	YES
354-355 J1-K1									
Ground	R1	LKD	388	96%	200	50%	50%	4380	YES
	R2	Bedroom	222	100%	100	50%	50%	4380	YES
First	R1	LKD	307	99%	200	50%	50%	4380	YES
Second	R1	Bedroom	709	100%	100	50%	50%	4380	YES
	R2	Bedroom	329	100%	100	50%	50%	4380	YES
356-357 J1-K1									
Ground	R1	LKD	382	96%	200	50%	50%	4380	YES
	R2	Bedroom	233	100%	100	50%	50%	4380	YES
First	R1	LKD	298	99%	200	50%	50%	4380	YES
Second	R1	Bedroom	678	100%	100	50%	50%	4380	YES
	R2	Bedroom	329	100%	100	50%	50%	4380	YES

Table 69: Illuminance Results – Apartment 358-363 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
358-359 J1-K1									
Ground	R1	LKD	395	96%	200	50%	50%	4380	YES
	R2	Bedroom	234	100%	100	50%	50%	4380	YES
First	R1	LKD	314	99%	200	50%	50%	4380	YES
Second	R1	Bedroom	709	100%	100	50%	50%	4380	YES
	R2	Bedroom	335	100%	100	50%	50%	4380	YES
360-361 J1-K1									
Ground	R1	LKD	385	95%	200	50%	50%	4380	YES
	R2	Bedroom	237	100%	100	50%	50%	4380	YES
First	R1	LKD	301	99%	200	50%	50%	4380	YES
Second	R1	Bedroom	678	100%	100	50%	50%	4380	YES
	R2	Bedroom	333	100%	100	50%	50%	4380	YES
362-363 J2-K2									
Ground	R1	LKD	958	100%	200	50%	50%	4380	YES
	R2	Bedroom	522	100%	100	50%	50%	4380	YES
First	R1	LKD	675	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1535	100%	100	50%	50%	4380	YES
	R2	Bedroom	733	100%	100	50%	50%	4380	YES

Table 70: Illuminance Results – Apartment 364-365 J2-K2 & 366-369 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
364-365 J2-K2									
Ground	R1	LKD	611	100%	200	50%	50%	4380	YES
	R2	Bedroom	605	100%	100	50%	50%	4380	YES
First	R1	LKD	561	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1027	100%	100	50%	50%	4380	YES
	R2	Bedroom	801	100%	100	50%	50%	4380	YES
366-367 J1-K1									
Ground	R1	LKD	297	76%	200	50%	50%	4380	YES
	R2	Bedroom	360	100%	100	50%	50%	4380	YES
First	R1	LKD	334	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	518	100%	100	50%	50%	4380	YES
	R2	Bedroom	452	100%	100	50%	50%	4380	YES
368-369 J1-K1									
Ground	R1	LKD	290	75%	200	50%	50%	4380	YES
	R2	Bedroom	352	100%	100	50%	50%	4380	YES
First	R1	LKD	314	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	509	100%	100	50%	50%	4380	YES
	R2	Bedroom	448	100%	100	50%	50%	4380	YES

Table 71: Illuminance Results – Apartment 370-373 J3-K3 & 374-375 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
370-371 J3-K3									
Ground	R1	LKD	477	99%	200	50%	50%	4380	YES
	R2	Bedroom	358	100%	100	50%	50%	4380	YES
First	R1	LKD	436	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	775	100%	100	50%	50%	4380	YES
	R2	Bedroom	458	100%	100	50%	50%	4380	YES
372-373 J3-K3									
Ground	R1	LKD	385	95%	200	50%	50%	4380	YES
	R2	Bedroom	350	100%	100	50%	50%	4380	YES
First	R1	LKD	382	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	641	100%	100	50%	50%	4380	YES
	R2	Bedroom	444	100%	100	50%	50%	4380	YES
374-375 J1-K1									
Ground	R1	LKD	298	76%	200	50%	50%	4380	YES
	R2	Bedroom	352	100%	100	50%	50%	4380	YES
First	R1	LKD	331	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	522	100%	100	50%	50%	4380	YES
	R2	Bedroom	455	100%	100	50%	50%	4380	YES

Table 72: Illuminance Results – Apartment 376-377 J1-K1 & 378-381 J2-K2

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
376-377 J1-K1									
Ground	R1	LKD	286	72%	200	50%	50%	4380	YES
	R2	Bedroom	351	100%	100	50%	50%	4380	YES
First	R1	LKD	312	99%	200	50%	50%	4380	YES
Second	R1	Bedroom	510	100%	100	50%	50%	4380	YES
	R2	Bedroom	448	100%	100	50%	50%	4380	YES
378-379 J2-K2									
Ground	R1	LKD	925	100%	200	50%	50%	4380	YES
	R2	Bedroom	861	100%	100	50%	50%	4380	YES
First	R1	LKD	791	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1231	100%	100	50%	50%	4380	YES
	R2	Bedroom	1076	100%	100	50%	50%	4380	YES
380-381 J2-K2									
Ground	R1	LKD	1041	100%	200	50%	50%	4380	YES
	R2	Bedroom	678	100%	100	50%	50%	4380	YES
First	R1	LKD	811	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1527	100%	100	50%	50%	4380	YES
	R2	Bedroom	933	100%	100	50%	50%	4380	YES

Table 73: Illuminance Results – Apartment 382-387 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
382-383 J1-K1									
Ground	R1	LKD	331	82%	200	50%	50%	4380	YES
	R2	Bedroom	306	100%	100	50%	50%	4380	YES
First	R1	LKD	314	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	611	100%	100	50%	50%	4380	YES
	R2	Bedroom	387	100%	100	50%	50%	4380	YES
384-385 J1-K1									
Ground	R1	LKD	351	84%	200	50%	50%	4380	YES
	R2	Bedroom	308	100%	100	50%	50%	4380	YES
First	R1	LKD	325	99%	200	50%	50%	4380	YES
Second	R1	Bedroom	610	100%	100	50%	50%	4380	YES
	R2	Bedroom	390	100%	100	50%	50%	4380	YES
386-387 J1-K1									
Ground	R1	LKD	322	78%	200	50%	50%	4380	YES
	R2	Bedroom	302	100%	100	50%	50%	4380	YES
First	R1	LKD	301	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	616	100%	100	50%	50%	4380	YES
	R2	Bedroom	389	100%	100	50%	50%	4380	YES

Table 74: Illuminance Results – Apartment 388-389 J3-K3, 390-391 J2-K2 & 392-393 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
388-389 J3-K3									
Ground	R1	LKD	353	78%	200	50%	50%	4380	YES
	R2	Bedroom	275	100%	100	50%	50%	4380	YES
First	R1	LKD	394	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	788	100%	100	50%	50%	4380	YES
	R2	Bedroom	389	100%	100	50%	50%	4380	YES
390-391 J2-K2									
Ground	R1	LKD	634	100%	200	50%	50%	4380	YES
	R2	Bedroom	515	100%	100	50%	50%	4380	YES
First	R1	LKD	579	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1301	100%	100	50%	50%	4380	YES
	R2	Bedroom	726	100%	100	50%	50%	4380	YES
392-393 J1-K1									
Ground	R1	LKD	271	85%	200	50%	50%	4380	YES
	R2	Bedroom	326	100%	100	50%	50%	4380	YES
First	R1	LKD	308	99%	200	50%	50%	4380	YES
Second	R1	Bedroom	693	100%	100	50%	50%	4380	YES
	R2	Bedroom	344	100%	100	50%	50%	4380	YES

Table 75: Illuminance Results – Apartment 394-399 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
394-395 J1-K1									
Ground	R1	LKD	361	92%	200	50%	50%	4380	YES
	R2	Bedroom	264	100%	100	50%	50%	4380	YES
First	R1	LKD	311	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	671	100%	100	50%	50%	4380	YES
	R2	Bedroom	339	100%	100	50%	50%	4380	YES
396-397 J1-K1									
Ground	R1	LKD	401	98%	200	50%	50%	4380	YES
	R2	Bedroom	251	100%	100	50%	50%	4380	YES
First	R1	LKD	323	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	704	100%	100	50%	50%	4380	YES
	R2	Bedroom	341	100%	100	50%	50%	4380	YES
398-399 J1-K1									
Ground	R1	LKD	379	96%	200	50%	50%	4380	YES
	R2	Bedroom	231	100%	100	50%	50%	4380	YES
First	R1	LKD	303	99%	200	50%	50%	4380	YES
Second	R1	Bedroom	670	100%	100	50%	50%	4380	YES
	R2	Bedroom	335	100%	100	50%	50%	4380	YES

Table 76: Illuminance Results – Apartment 400-405 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
400-401 J1-K1									
Ground	R1	LKD	352	89%	200	50%	50%	4380	YES
	R2	Bedroom	236	100%	100	50%	50%	4380	YES
First	R1	LKD	306	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	687	100%	100	50%	50%	4380	YES
	R2	Bedroom	338	100%	100	50%	50%	4380	YES
402-403 J1-K1									
Ground	R1	LKD	290	70%	200	50%	50%	4380	YES
	R2	Bedroom	245	100%	100	50%	50%	4380	YES
First	R1	LKD	277	92%	200	50%	50%	4380	YES
Second	R1	Bedroom	651	100%	100	50%	50%	4380	YES
	R2	Bedroom	334	100%	100	50%	50%	4380	YES
404-405 J1-K1									
Ground	R1	LKD	271	70%	200	50%	50%	4380	YES
	R2	Bedroom	250	100%	100	50%	50%	4380	YES
First	R1	LKD	263	83%	200	50%	50%	4380	YES
Second	R1	Bedroom	650	100%	100	50%	50%	4380	YES
	R2	Bedroom	333	100%	100	50%	50%	4380	YES

Table 77: Illuminance Results – Apartment 406-407 J2-K2, 408-409 J3-K3 & 410-411 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
406-407 J2-K2									
Ground	R1	LKD	896	100%	200	50%	50%	4380	YES
	R2	Bedroom	523	100%	100	50%	50%	4380	YES
First	R1	LKD	670	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1529	100%	100	50%	50%	4380	YES
	R2	Bedroom	731	100%	100	50%	50%	4380	YES
408-409 J3-K3									
Ground	R1	LKD	341	85%	200	50%	50%	4380	YES
	R2	Bedroom	348	100%	100	50%	50%	4380	YES
First	R1	LKD	393	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	673	100%	100	50%	50%	4380	YES
	R2	Bedroom	438	100%	100	50%	50%	4380	YES
410-411 J1-K1									
Ground	R1	LKD	272	70%	200	50%	50%	4380	YES
	R2	Bedroom	354	100%	100	50%	50%	4380	YES
First	R1	LKD	305	99%	200	50%	50%	4380	YES
Second	R1	Bedroom	508	100%	100	50%	50%	4380	YES
	R2	Bedroom	445	100%	100	50%	50%	4380	YES

Table 78: Illuminance Results – Apartment 412-415 J1-K1 & 416-417 J2-K2

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
412-413 J1-K1									
Ground	R1	LKD	294	75%	200	50%	50%	4380	YES
	R2	Bedroom	354	100%	100	50%	50%	4380	YES
First	R1	LKD	330	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	520	100%	100	50%	50%	4380	YES
	R2	Bedroom	454	100%	100	50%	50%	4380	YES
414-415 J1-K1									
Ground	R1	LKD	196	50%	200	50%	50%	4380	YES
	R2	Bedroom	259	100%	100	50%	50%	4380	YES
First	R1	LKD	221	66%	200	50%	50%	4380	YES
Second	R1	Bedroom	384	100%	100	50%	50%	4380	YES
	R2	Bedroom	343	100%	100	50%	50%	4380	YES
416-417 J2-K2									
Ground	R1	LKD	919	100%	200	50%	50%	4380	YES
	R2	Bedroom	867	100%	100	50%	50%	4380	YES
First	R1	LKD	794	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1223	100%	100	50%	50%	4380	YES
	R2	Bedroom	1083	100%	100	50%	50%	4380	YES

Table 79: Illuminance Results – Apartment 418-419 J2-K2 & 420-423 J1-K1.

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
418-419 J2-K2									
Ground	R1	LKD	790	100%	200	50%	50%	4380	YES
	R2	Bedroom	465	100%	100	50%	50%	4380	YES
First	R1	LKD	612	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1308	100%	100	50%	50%	4380	YES
	R2	Bedroom	711	100%	100	50%	50%	4380	YES
420-421 J1-K1									
Ground	R1	LKD	438	100%	200	50%	50%	4380	YES
	R2	Bedroom	245	100%	100	50%	50%	4380	YES
First	R1	LKD	314	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	716	100%	100	50%	50%	4380	YES
	R2	Bedroom	336	100%	100	50%	50%	4380	YES
422-423 J1-K1									
Ground	R1	LKD	442	100%	200	50%	50%	4380	YES
	R2	Bedroom	232	100%	100	50%	50%	4380	YES
First	R1	LKD	326	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	715	100%	100	50%	50%	4380	YES
	R2	Bedroom	333	100%	100	50%	50%	4380	YES

Table 80: Illuminance Results – Apartment 424-425 J1-K1, 426-427 J3-K3 & 428-429 J2-K2.

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
424-425 J1-K1									
Ground	R1	LKD	429	100%	200	50%	50%	4380	YES
	R2	Bedroom	234	100%	100	50%	50%	4380	YES
First	R1	LKD	311	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	684	100%	100	50%	50%	4380	YES
	R2	Bedroom	329	100%	100	50%	50%	4380	YES
426-427 J3-K3									
Ground	R1	LKD	552	100%	200	50%	50%	4380	YES
	R2	Bedroom	234	100%	100	50%	50%	4380	YES
First	R1	LKD	458	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1067	100%	100	50%	50%	4380	YES
	R2	Bedroom	333	100%	100	50%	50%	4380	YES
428-429 J2-K2									
Ground	R1	LKD	454	97%	200	50%	50%	4380	YES
	R2	Bedroom	548	100%	100	50%	50%	4380	YES
First	R1	LKD	469	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	981	100%	100	50%	50%	4380	YES
	R2	Bedroom	792	100%	100	50%	50%	4380	YES

Table 81: Illuminance Results – Apartment 430-431 J1-K1, 432-439 J2-K2.

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
430-431 J1-K1									
Ground	R1	LKD	230	59%	200	50%	50%	4380	YES
	R2	Bedroom	334	100%	100	50%	50%	4380	YES
First	R1	LKD	289	95%	200	50%	50%	4380	YES
Second	R1	Bedroom	506	100%	100	50%	50%	4380	YES
	R2	Bedroom	445	100%	100	50%	50%	4380	YES
432-433 J2-K2									
Ground	R1	LKD	926	100%	200	50%	50%	4380	YES
	R2	Bedroom	837	100%	100	50%	50%	4380	YES
First	R1	LKD	779	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1218	100%	100	50%	50%	4380	YES
	R2	Bedroom	1076	100%	100	50%	50%	4380	YES
438-439 J2-K2									
Ground	R1	LKD	1066	100%	200	50%	50%	4380	YES
	R2	Bedroom	662	100%	100	50%	50%	4380	YES
First	R1	LKD	802	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1534	100%	100	50%	50%	4380	YES
	R2	Bedroom	934	100%	100	50%	50%	4380	YES

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Table 82: Illuminance Results – Apartment 440-445 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
440-441 J1-K1									
Ground	R1	LKD	343	91%	200	50%	50%	4380	YES
	R2	Bedroom	283	100%	100	50%	50%	4380	YES
First	R1	LKD	308	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	624	100%	100	50%	50%	4380	YES
	R2	Bedroom	379	100%	100	50%	50%	4380	YES
442-443 J1-K1									
Ground	R1	LKD	342	88%	200	50%	50%	4380	YES
	R2	Bedroom	282	100%	100	50%	50%	4380	YES
First	R1	LKD	317	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	623	100%	100	50%	50%	4380	YES
	R2	Bedroom	386	100%	100	50%	50%	4380	YES
444-445 J1-K1									
Ground	R1	LKD	273	67%	200	50%	50%	4380	YES
	R2	Bedroom	287	100%	100	50%	50%	4380	YES
First	R1	LKD	278	92%	200	50%	50%	4380	YES
Second	R1	Bedroom	605	100%	100	50%	50%	4380	YES
	R2	Bedroom	380	100%	100	50%	50%	4380	YES

Table 83: Illuminance Results – Apartment 446-447 J2-K2, 448-449 J3-K3 & 450-451 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
446-447 J2-K2									
Ground	R1	LKD	595	100%	200	50%	50%	4380	YES
	R2	Bedroom	519	100%	100	50%	50%	4380	YES
First	R1	LKD	515	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1081	100%	100	50%	50%	4380	YES
	R2	Bedroom	690	100%	100	50%	50%	4380	YES
448-449 J3-K3									
Ground	R1	LKD	516	100%	200	50%	50%	4380	YES
	R2	Bedroom	253	100%	100	50%	50%	4380	YES
First	R1	LKD	415	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	894	100%	100	50%	50%	4380	YES
	R2	Bedroom	331	100%	100	50%	50%	4380	YES
450-451 J1-K1									
Ground	R1	LKD	441	100%	200	50%	50%	4380	YES
	R2	Bedroom	253	100%	100	50%	50%	4380	YES
First	R1	LKD	331	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	716	100%	100	50%	50%	4380	YES
	R2	Bedroom	336	100%	100	50%	50%	4380	YES

Table 84: Illuminance Results – Apartment 452-457 J1-K1.

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
452-453 J1-K1									
Ground	R1	LKD	424	100%	200	50%	50%	4380	YES
	R2	Bedroom	253	100%	100	50%	50%	4380	YES
First	R1	LKD	313	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	681	100%	100	50%	50%	4380	YES
	R2	Bedroom	329	100%	100	50%	50%	4380	YES
454-455 J1-K1									
Ground	R1	LKD	439	100%	200	50%	50%	4380	YES
	R2	Bedroom	255	100%	100	50%	50%	4380	YES
First	R1	LKD	332	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	714	100%	100	50%	50%	4380	YES
	R2	Bedroom	336	100%	100	50%	50%	4380	YES
456-457 J1-K1									
Ground	R1	LKD	423	100%	200	50%	50%	4380	YES
	R2	Bedroom	260	100%	100	50%	50%	4380	YES
First	R1	LKD	317	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	679	100%	100	50%	50%	4380	YES
	R2	Bedroom	331	100%	100	50%	50%	4380	YES

Table 85: Illuminance Results – Apartment 458-459 J3-K3, 460-461 J2-K2 & 462-463 J1-K1

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
458-459 J3-K3									
Ground	R1	LKD	564	100%	200	50%	50%	4380	YES
	R2	Bedroom	263	100%	100	50%	50%	4380	YES
First	R1	LKD	457	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1061	100%	100	50%	50%	4380	YES
	R2	Bedroom	340	100%	100	50%	50%	4380	YES
460-461 J2-K2									
Ground	R1	LKD	555	100%	200	50%	50%	4380	YES
	R2	Bedroom	590	100%	100	50%	50%	4380	YES
First	R1	LKD	541	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1003	100%	100	50%	50%	4380	YES
	R2	Bedroom	800	100%	100	50%	50%	4380	YES
462-463 J1-K1									
Ground	R1	LKD	234	59%	200	50%	50%	4380	YES
	R2	Bedroom	350	100%	100	50%	50%	4380	YES
First	R1	LKD	310	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	515	100%	100	50%	50%	4380	YES
	R2	Bedroom	450	100%	100	50%	50%	4380	YES

Table 86: Illuminance Results – Apartment 464-467 J1-K1, 468-469 J2-K2.

Floor Ref	Room Ref	Room Use	Median Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
					Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
464-465 J1-K1									
Ground	R1	LKD	251	63%	200	50%	50%	4380	YES
	R2	Bedroom	350	100%	100	50%	50%	4380	YES
First	R1	LKD	304	99%	200	50%	50%	4380	YES
Second	R1	Bedroom	501	100%	100	50%	50%	4380	YES
	R2	Bedroom	438	100%	100	50%	50%	4380	YES
466-467 J1-K1									
Ground	R1	LKD	277	72%	200	50%	50%	4380	YES
	R2	Bedroom	351	100%	100	50%	50%	4380	YES
First	R1	LKD	313	99%	200	50%	50%	4380	YES
Second	R1	Bedroom	502	100%	100	50%	50%	4380	YES
	R2	Bedroom	442	100%	100	50%	50%	4380	YES
468-469 J2-K2									
Ground	R1	LKD	912	100%	200	50%	50%	4380	YES
	R2	Bedroom	835	100%	100	50%	50%	4380	YES
First	R1	LKD	783	100%	200	50%	50%	4380	YES
Second	R1	Bedroom	1198	100%	100	50%	50%	4380	YES
	R2	Bedroom	1058	100%	100	50%	50%	4380	YES

4.2.6 Sunlight Analysis for Proposed Development

The access to sunlight for duplex and apartment units in the proposed development was checked based on the guidance and recommendations in BR209 and EN 17037. (With respect to the overall site, visual analysis of the units and site layout shows that the majority of units have a main window wall facing within 90° of due south.)

EN 17037 recommends that a habitable room, preferably a main living room, can receive a total of at least 1.5 hours of sunlight on 21 March. Sunlight received by different windows can be added provided they occur at different times and sunlight hours are not double counted. (Note that although it is preferable that a main living room meets the criterion, the criterion is also met if any habitable room, e.g. kitchen or bedroom, meets the criterion.) All duplex and apartment units were tested against the above criterion. A summary of the results is shown in the following tables.

Table 87: Summary of Sunlight Exposure for Duplex & Apartment Units

Property	Number of Rooms Tested	Rating				No. of Rooms Satisfying Criteria	No. Of Unit	No. of Units Satisfying Criteria	Meets Overall Criteria
		High	Medium	Minimum	Failed				
248-249 M3-N3	5	5	0	0	0	5	2	2	YES
250-251 M2-N2	5	3	0	0	2	3	2	2	YES
252-253 M1-N1	5	2	1	0	2	3	2	2	YES
254-255 M2-N2	5	3	0	0	2	3	2	2	YES
256-257 M2-N2	5	3	0	0	2	3	2	2	YES
258-259 M1-N1	5	3	0	0	2	3	2	2	YES
260-261 M1-N1	5	3	0	0	2	3	2	2	YES
262-263 M2-N2	5	2	1	0	2	3	2	2	YES
264-265 M2-N2	5	3	0	0	2	3	2	2	YES
266-267 M1-N1	5	3	0	0	2	3	2	2	YES
322-323 J2-K2	5	4	1	0	0	5	2	2	YES
324-325 J1-K1	5	3	0	0	2	3	2	2	YES
326-327 J1-K1	5	3	0	0	2	3	2	2	YES
328-329 J1-K1	5	3	0	0	2	3	2	2	YES
330-331 J1-K1	5	3	0	0	2	3	2	2	YES

Table 88: Summary of Sunlight Exposure for Duplex & Apartment Units Cont.

Property	Number of Rooms Tested	Rating				No. of Rooms Satisfying Criteria	No. Of Unit	No. of Units Satisfying Criteria	Meets Overall Criteria
		High	Medium	Minimum	Failed				
332-333 J1-K1	5	3	0	0	2	3	2	2	YES
334-335 J3-K3	5	3	0	0	2	3	2	2	YES
336-337 J2-K2	5	5	0	0	0	5	2	2	YES
338-339 J1-K1	5	2	0	2	1	4	2	2	YES
340-341 J1-K1	5	2	0	3	0	5	2	2	YES
342-343 J3-K3	5	2	1	2	0	5	2	2	YES
344-345 J3-K3	5	3	0	2	0	5	2	2	YES
346-347 J1-K1	5	2	1	2	0	5	2	2	YES
348-349 J1-K1	5	2	1	2	0	5	2	2	YES
350-351 J2-K2	5	2	0	2	1	4	2	2	YES
352-353 J3-K3	5	3	0	0	2	3	2	2	YES
354-355 J1-K1	5	3	0	0	2	3	2	2	YES
356-357 J1-K1	5	3	0	0	2	3	2	2	YES
358-359 J1-K1	5	3	0	0	2	3	2	2	YES
360-361 J1-K1	5	3	0	0	2	3	2	2	YES
362-363 J2-K2	5	4	1	0	0	5	2	2	YES
364-365 J2-K2	5	3	0	1	1	4	2	2	YES
366-367 J1-K1	5	3	0	2	0	5	2	2	YES
368-369 J1-K1	5	3	0	1	1	4	2	2	YES
370-371 J3-K3	5	5	0	0	0	5	2	2	YES
372-373 J3-K3	5	3	0	1	1	4	2	2	YES
374-375 J1-K1	5	3	0	2	0	5	2	2	YES
376-377 J1-K1	5	3	0	1	1	4	2	2	YES
378-379 J2-K2	5	5	0	0	0	5	2	2	YES
380-381 J2-K2	5	5	0	0	0	5	2	2	YES

Table 89: Summary of Sunlight Exposure for Duplex & Apartment Units Cont.

Property	Number of Rooms Tested	Rating				No. of Rooms Satisfying Criteria	No. Of Unit	No. of Units Satisfying Criteria	Meets Overall Criteria
		High	Medium	Minimum	Failed				
382-383 J1-K1	5	2	1	2	0	5	2	2	YES
384-385 J1-K1	5	3	0	2	0	5	2	2	YES
386-387 J1-K1	5	2	1	2	0	5	2	2	YES
388-389 J3-K3	5	2	1	2	0	5	2	2	YES
390-391 J2-K2	5	3	0	2	0	5	2	2	YES
392-393 J1-K1	5	3	0	0	2	3	2	2	YES
394-395 J1-K1	5	3	0	0	2	3	2	2	YES
396-397 J1-K1	5	3	0	0	2	3	2	2	YES
398-399 J1-K1	5	3	0	0	2	3	2	2	YES
400-401 J1-K1	5	3	0	0	2	3	2	2	YES
402-403 J1-K1	5	3	0	0	2	3	2	2	YES
404-405 J1-K1	5	3	0	0	2	3	2	2	YES
406-407 J2-K2	5	5	0	0	0	5	2	2	YES
408-409 J3-K3	5	3	0	1	1	4	2	2	YES
410-411 J1-K1	5	3	0	1	1	4	2	2	YES
412-413 J1-K1	5	2	1	2	0	5	2	2	YES
414-415 J1-K1	5	3	0	1	1	4	2	2	YES
416-417 J2-K2	5	5	0	0	0	5	2	2	YES
418-419 J2-K2	5	3	0	1	1	4	2	2	YES
420-421 J1-K1	5	3	0	0	2	3	2	2	YES
422-423 J1-K1	5	3	0	0	2	3	2	2	YES
424-425 J1-K1	5	3	0	0	2	3	2	2	YES
426-427 J3-K3	5	3	0	0	2	3	2	2	YES
428-429 J2-K2	5	2	1	1	1	4	2	2	YES
430-431 J1-K1	5	2	1	1	1	4	2	2	YES

Table 90: Summary of Sunlight Exposure for all Duplex & Apartment Units Cont.

Property	Number of Rooms Tested	Rating				No. of Rooms Satisfying Criteria	No. Of Unit	No. of Units Satisfying Criteria	Meets Overall Criteria
		High	Medium	Minimum	Failed				
432-433 J2-K2	5	5	0	0	0	5	2	2	YES
438-439 J2-K2	5	5	0	0	0	5	2	2	YES
440-441 J1-K1	5	2	1	2	0	5	2	2	YES
442-443 J1-K1	5	3	0	2	0	5	2	2	YES
444-445 J1-K1	5	2	1	1	1	4	2	2	YES
446-447 J2-K2	5	2	0	2	1	4	2	2	YES
448-449 J3-K3	5	3	0	0	2	3	2	2	YES
450-451 J1-K1	5	3	0	0	2	3	2	2	YES
452-453 J1-K1	5	3	0	0	2	3	2	2	YES
454-455 J1-K1	5	3	0	0	2	3	2	2	YES
456-457 J1-K1	5	3	0	0	2	3	2	2	YES
458-459 J3-K3	5	3	0	0	2	3	2	2	YES
460-461 J2-K2	5	3	0	1	1	4	2	2	YES
462-463 J1-K1	5	3	0	2	0	5	2	2	YES
464-465 J1-K1	5	3	0	1	1	4	2	2	YES
466-467 J1-K1	5	3	0	1	1	4	2	2	YES
469-468 J2-K2	5	5	0	0	0	5	2	2	YES
Total	**410**	**251**	**15**	**53**	**91**	**319**	**164**	**164**	

All units meet the criterion for access to sunlight. A detailed breakdown of the solar exposure results is provided in Appendix B..

4.2.7 Sunlight to Proposed Amenity Spaces

The BRE guide recommends:

"That for it 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 21 March."

The main communal open spaces and the open space associated with the creche were analysed.

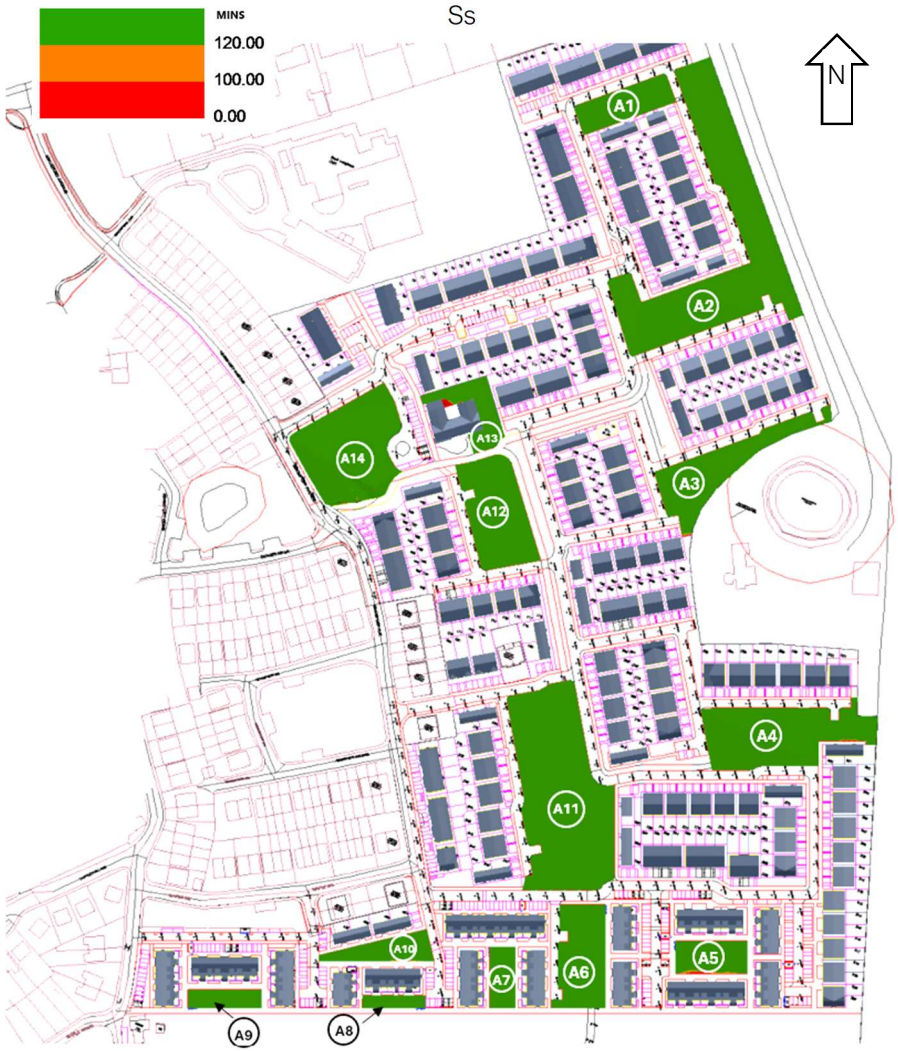


Figure 60: Proposed Open Spaces 2hr Sunlight Test (Whole Site)

Figure 61: Proposed Open Space A1 & A2 - 2hr Sunlight Test

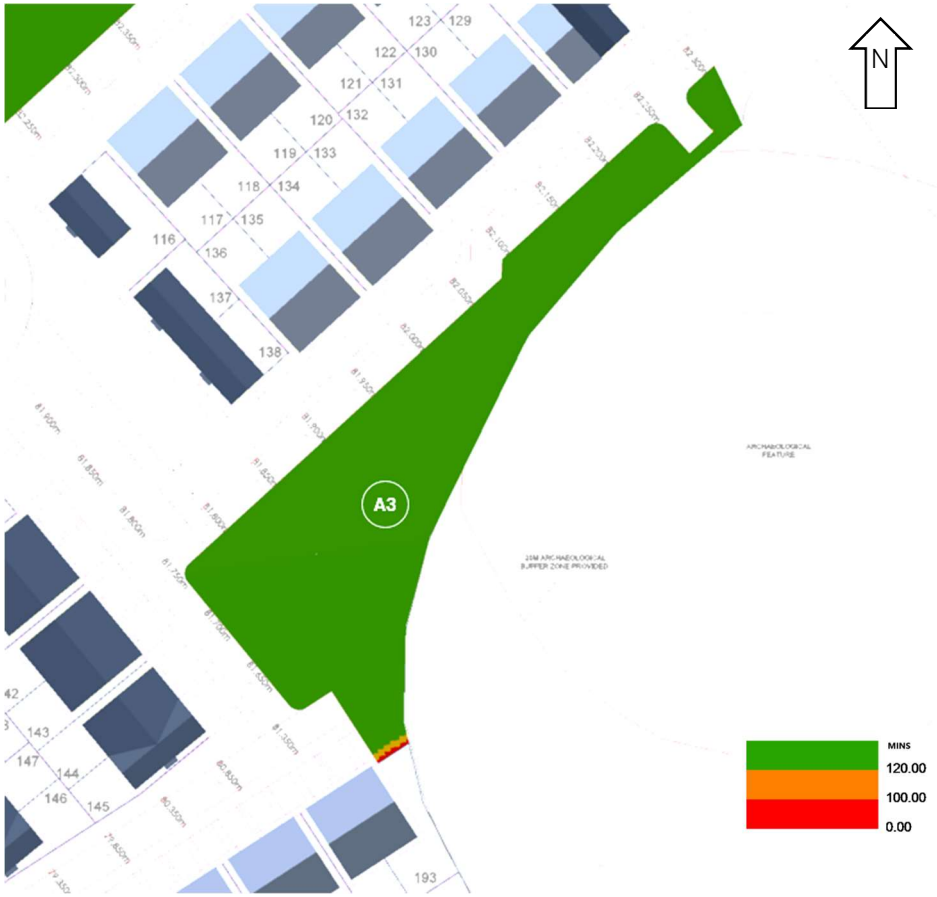


Figure 62: Proposed Open Space A3 - 2hr Sunlight Test

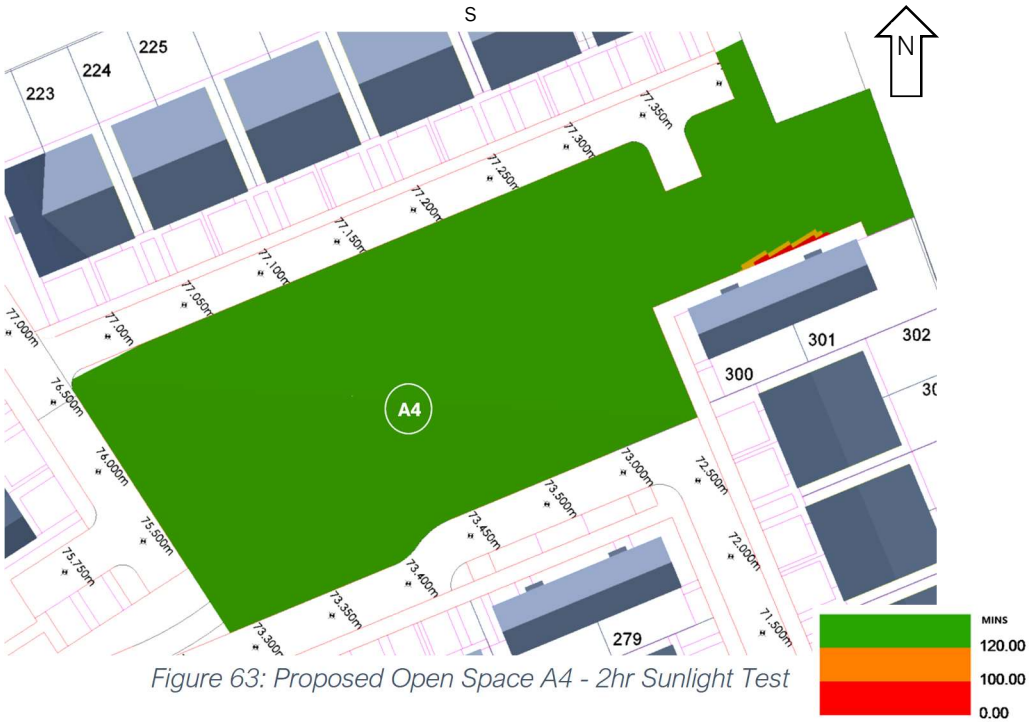


Figure 63: Proposed Open Space A4 - 2hr Sunlight Test

Figure 64: Proposed Open Space A5 - 2hr Sunlight Test

Figure 65: Proposed Open Space A6 & A7 - 2hr Sunlight Test

Figure 66: Proposed Open Space A8 & A10 - 2hr Sunlight Test

Figure 67: Proposed Open Space A9 - 2hr Sunlight Test

Figure 68: Proposed Open Space A11 - 2hr Sunlight Test

Figure 69: Proposed Open Space A12, A13 & A14 - 2hr Sunlight Test

Table 91: Open Spaces 2hr Sunlight Test Results

Open Space	Area (m^2)	2hr Sun Area (m^2)	% Area	Meets Criteria
A1	1026.868	1026.868	100.00%	Yes
A2	5754.122	5754.122	100.00%	Yes
A3	1865.717	1857.086	99.54%	Yes
A4	2909.533	2899.052	99.64%	Yes
A5	798.1583	763.3181	95.63%	Yes
A6	1611.778	1611.778	100.00%	Yes
A7	533.0035	533.0035	100.00%	Yes
A8	281.8897	281.8897	100.00%	Yes
A9	465.9118	465.9118	100.00%	Yes
A10	740.6466	731.8865	98.82%	Yes
A11	5447.223	5432.066	99.72%	Yes
A12	2108.103	2108.103	100.00%	Yes
A13	812.0521	787.2596	96.95%	Yes
A14	2992.397	2989.338	99.90%	Yes

The results show that all of the open spaces should receive more than 2 hours of sunlight on March 21st. Therefore, the proposed open spaces meet the BRE's recommendation for sunlight and should appear adequately sunlit throughout the year.

Trees/Shrubs, including the existing trees, have not been modelled because the shadows they produce are almost impossible to predict and "*the dappled shade of a tree is more pleasant than the deep shadow of a building (this applies particularly to deciduous trees).*" (BRE Building Technology Group, 2022) As per the BRE guidance, in assessing the impact of buildings on sunlight in gardens, trees are not normally included in the calculation unless a dense belt of evergreens is specifically planned. Nevertheless, the location for planting trees should be chosen with care. "*The aim should normally be to have some areas of partial shade under trees while leaving other parts of the garden or amenity area in full sun.*" (BRE Building Technology Group, 2022)

5 Conclusion

The results show that the proposed development will have a negligible impact on surrounding buildings with respect to:

- access to skylight,
- access to sunlight, and
- sunlight to gardens/open spaces.

All rooms tested in the proposed development meet the minimum recommendations for internal daylight provision (median illuminance) as set out in the BRE Guide and BS EN 17037 (UK National Annex). All of the duplex and apartment units meet the minimum recommendation for sunlight.

All communal amenity spaces and the creche amenity space in the proposed development should receive more than 2 hours of sunlight on March 21st. Therefore, the proposed amenity spaces meet the BRE's recommendation for sunlight to open spaces and should appear adequately sunlit throughout the year.

Overall, the development has been designed with due consideration for sunlight and daylight and meets the recommendations as set out in the BRE Guide – BR 209 "Site Layout Planning for Daylight and Sunlight, A guide to good practice (2022)".

Appendix A Proposed Illuminance Contours (with Room & Window Legends)

A.1 Duplex Block G1-G2 & G3-G4

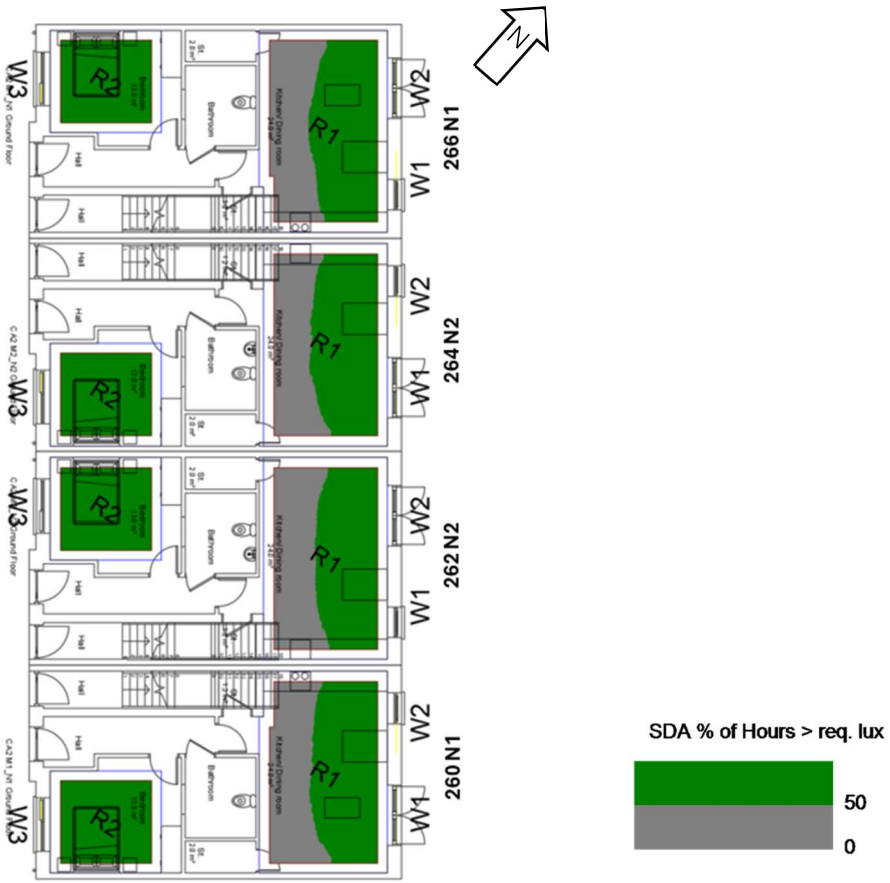


Figure 70: Duplex Unit 260-266 N1 & 262-264 N2 Ground Floor sDA Contours

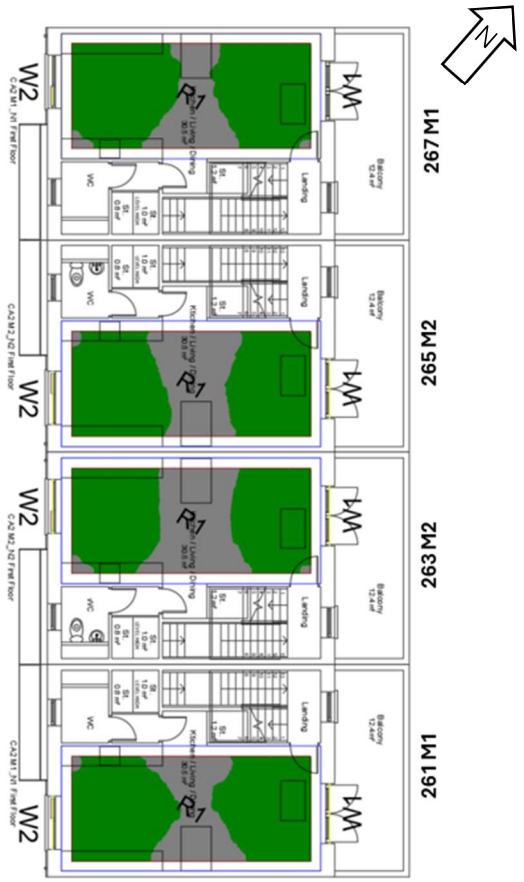


Figure 71: Duplex Unit 261-267 M1 & 263-265 M2 First Floor sDA Contours

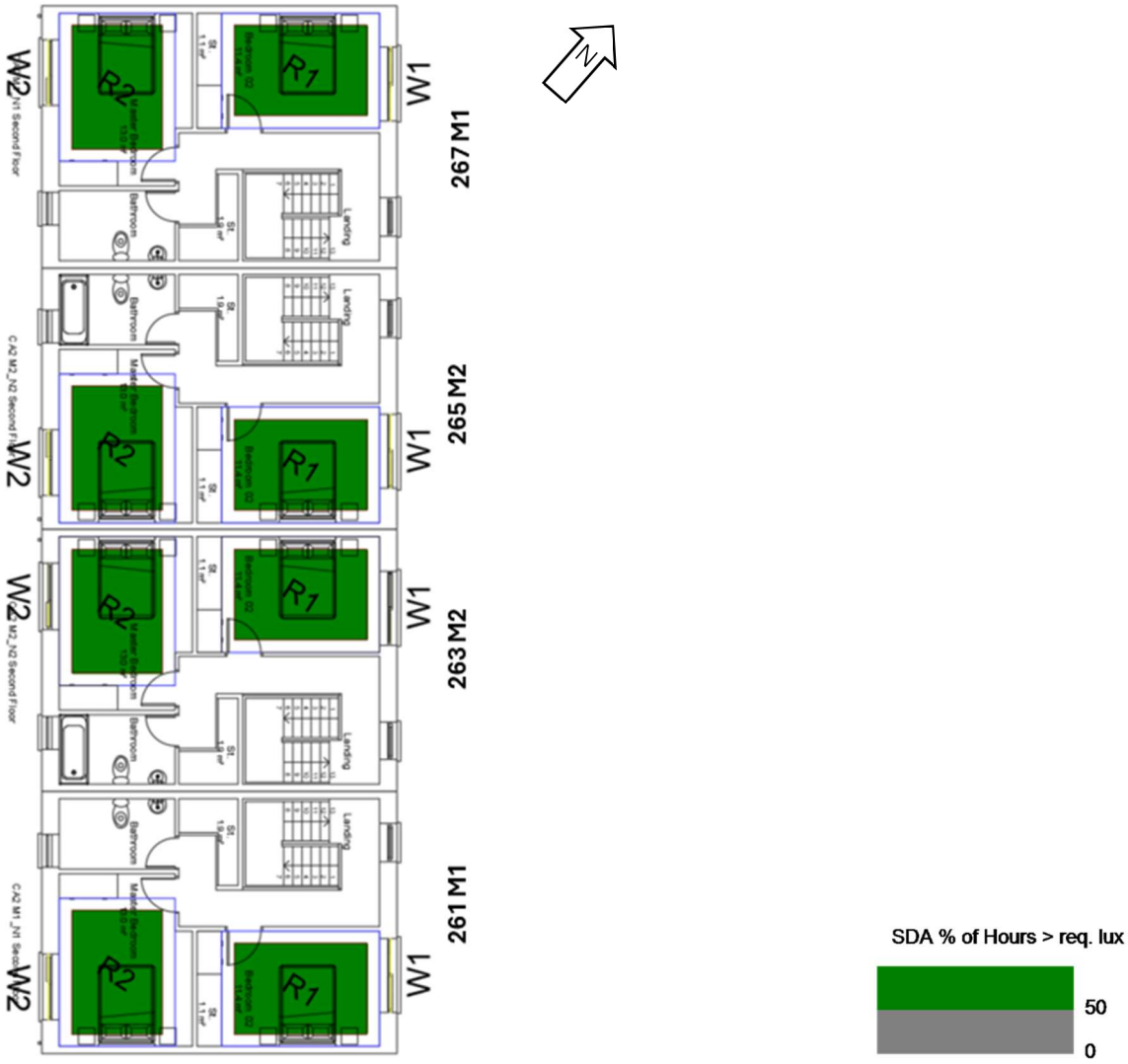


Figure 72: Duplex Unit 261-267 M1 & 263-265 M2 Second Floor sDA Contours

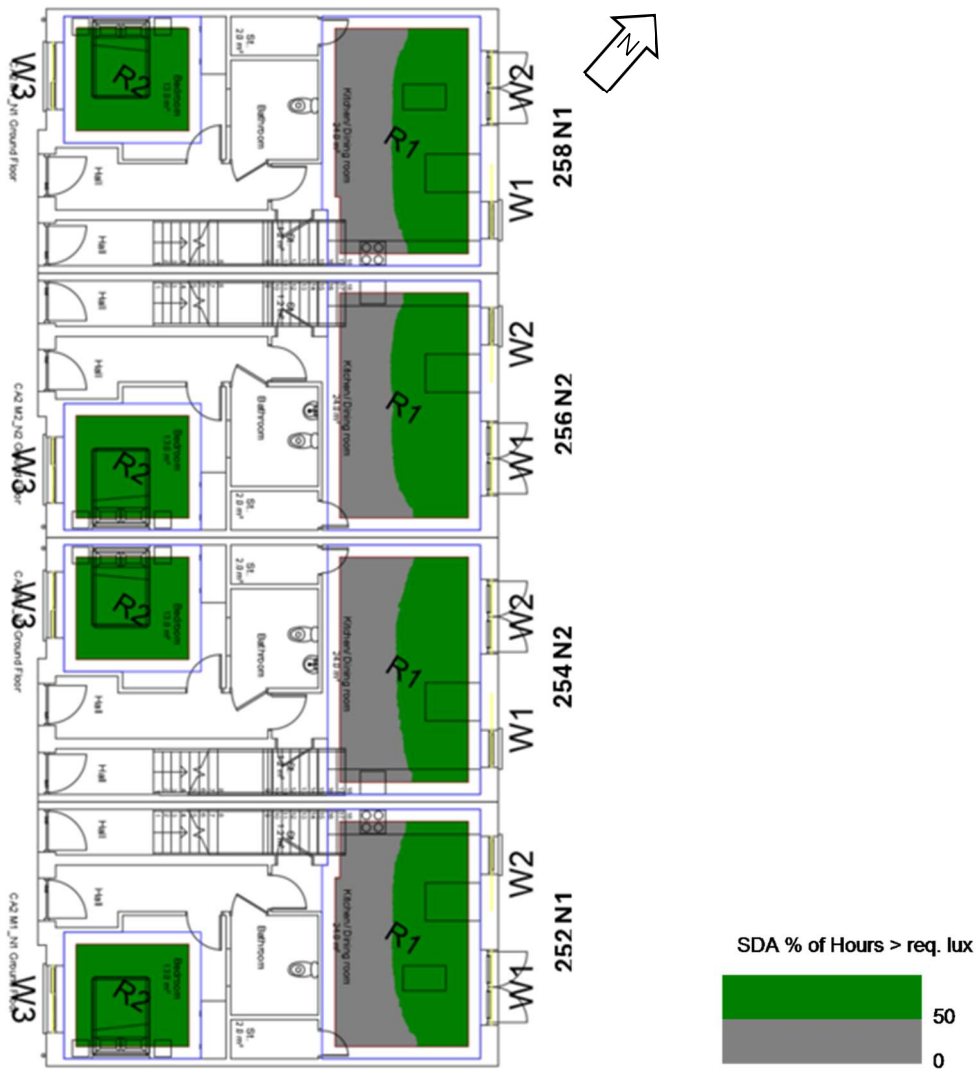


Figure 73: Duplex Unit 252-258 N1 & 254-256 N2 Ground Floor sDA Contours

Figure 74: Duplex Unit 253-259 M1 & 255-257 M2 First Floor sDA Contours

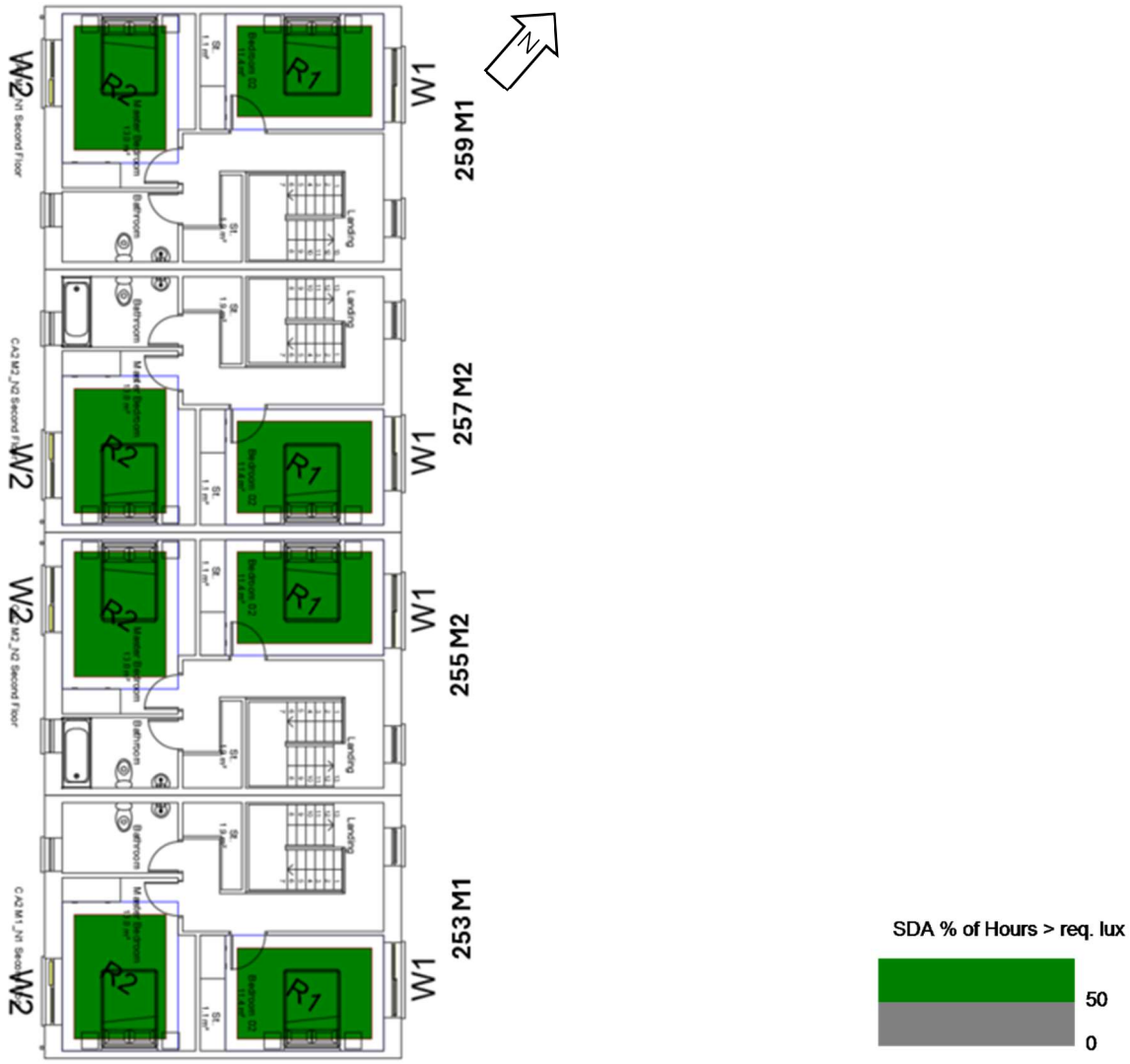


Figure 75: Duplex Unit 253-259 M1 & 255-257 M2 Second Floor sDA Contours

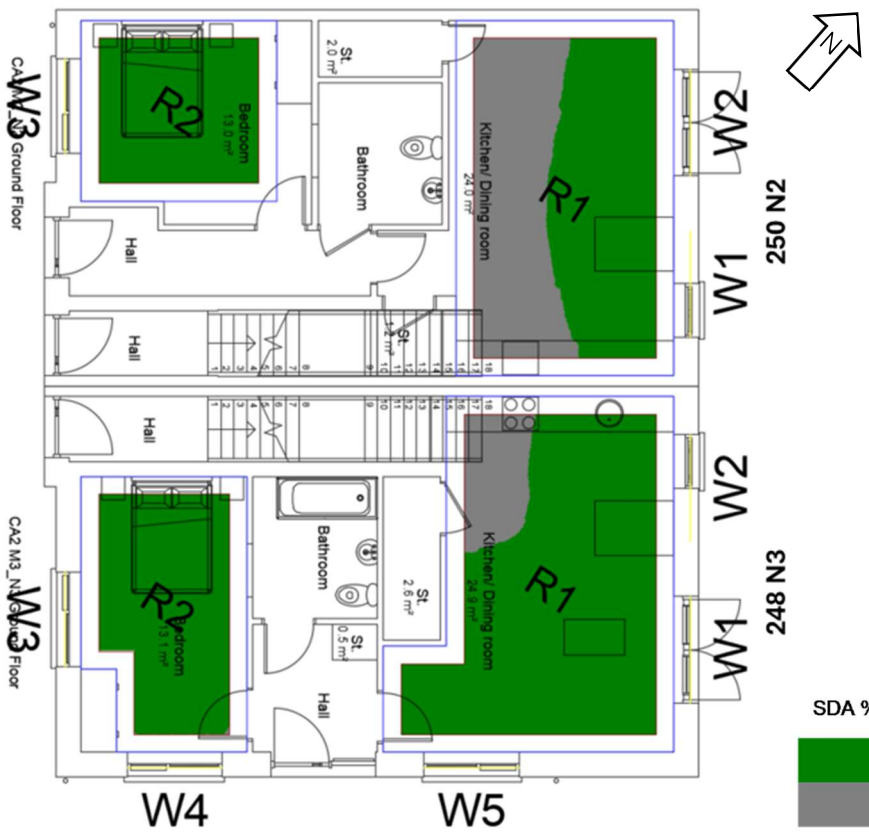


Figure 76: Duplex Unit 248N3 & 250 N2 Ground Floor sDA Contours

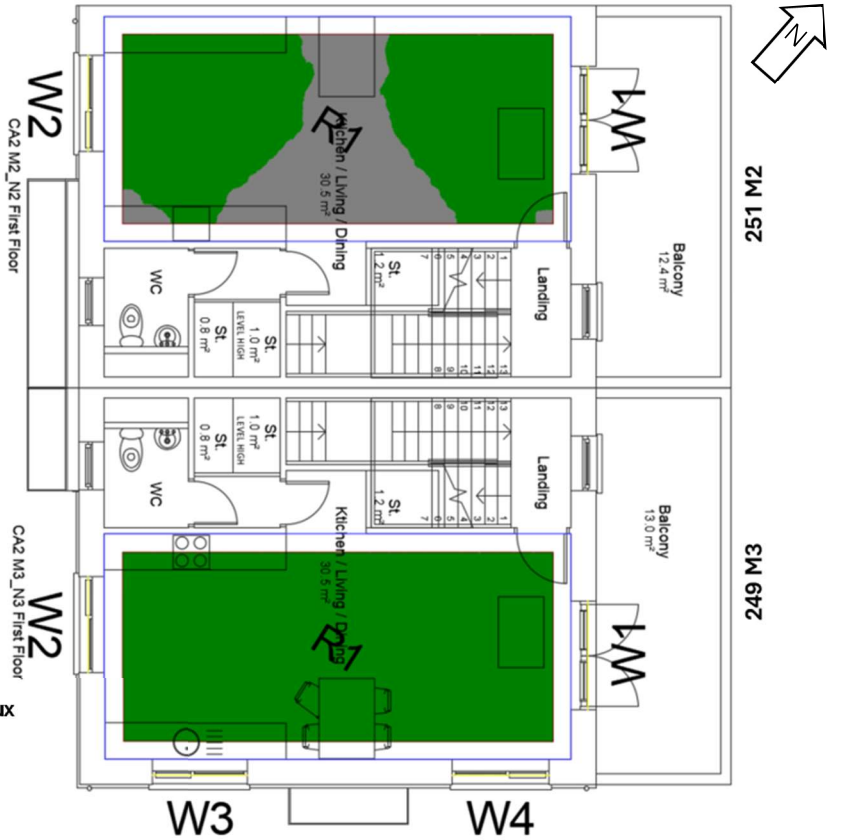


Figure 77: Duplex Unit 249 M3 & 251 M2 First Floor sDA Contours

A.2 Apartment Block J1-K1, J2-K2 & J3-K3

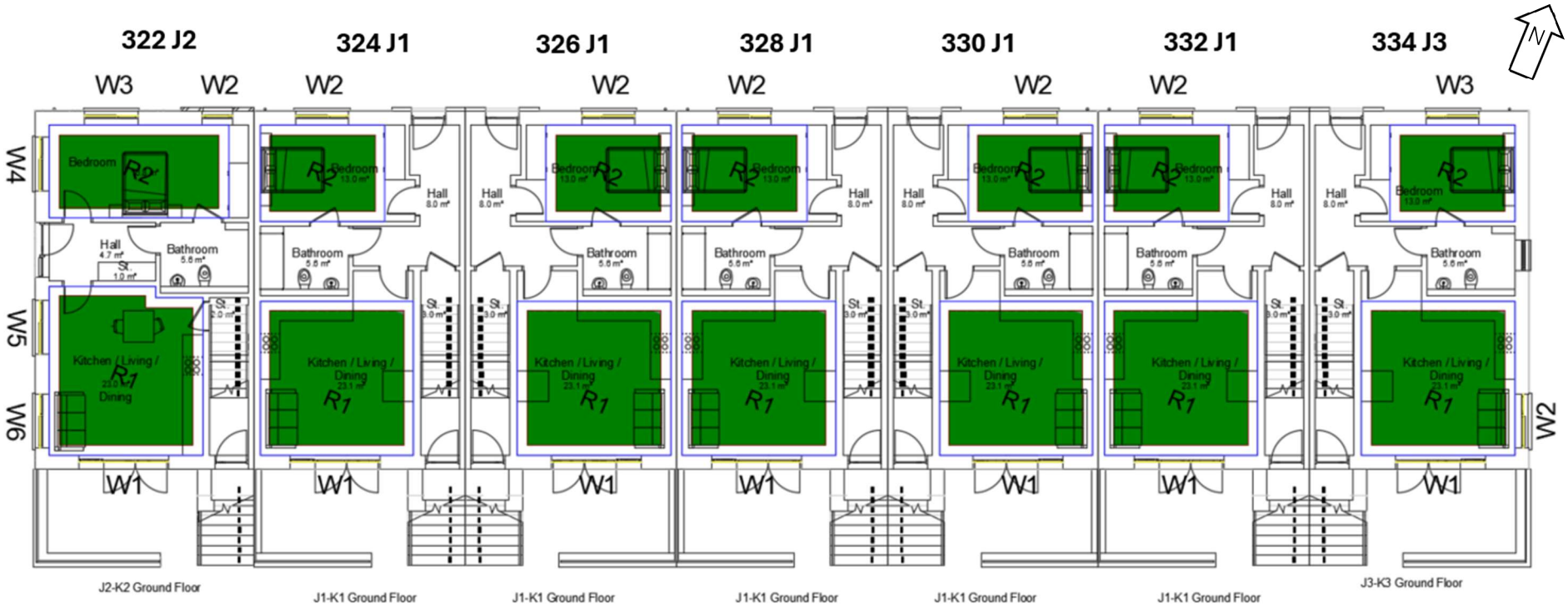


Figure 78: Apartment324-332 J1, 322 J2 & 334 J3 Ground Floor sDA Contours

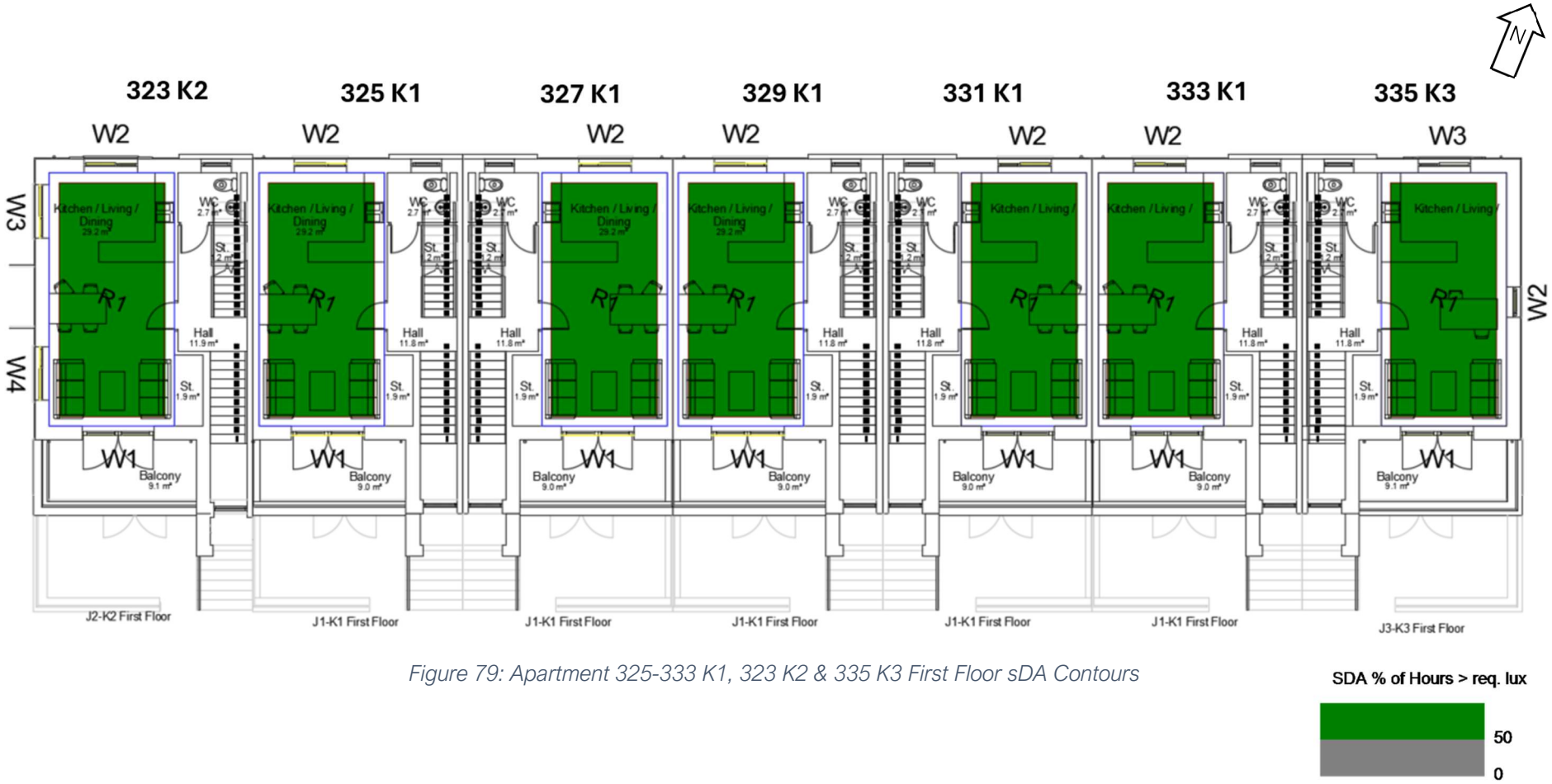


Figure 79: Apartment 325-333 K1, 323 K2 & 335 K3 First Floor sDA Contours

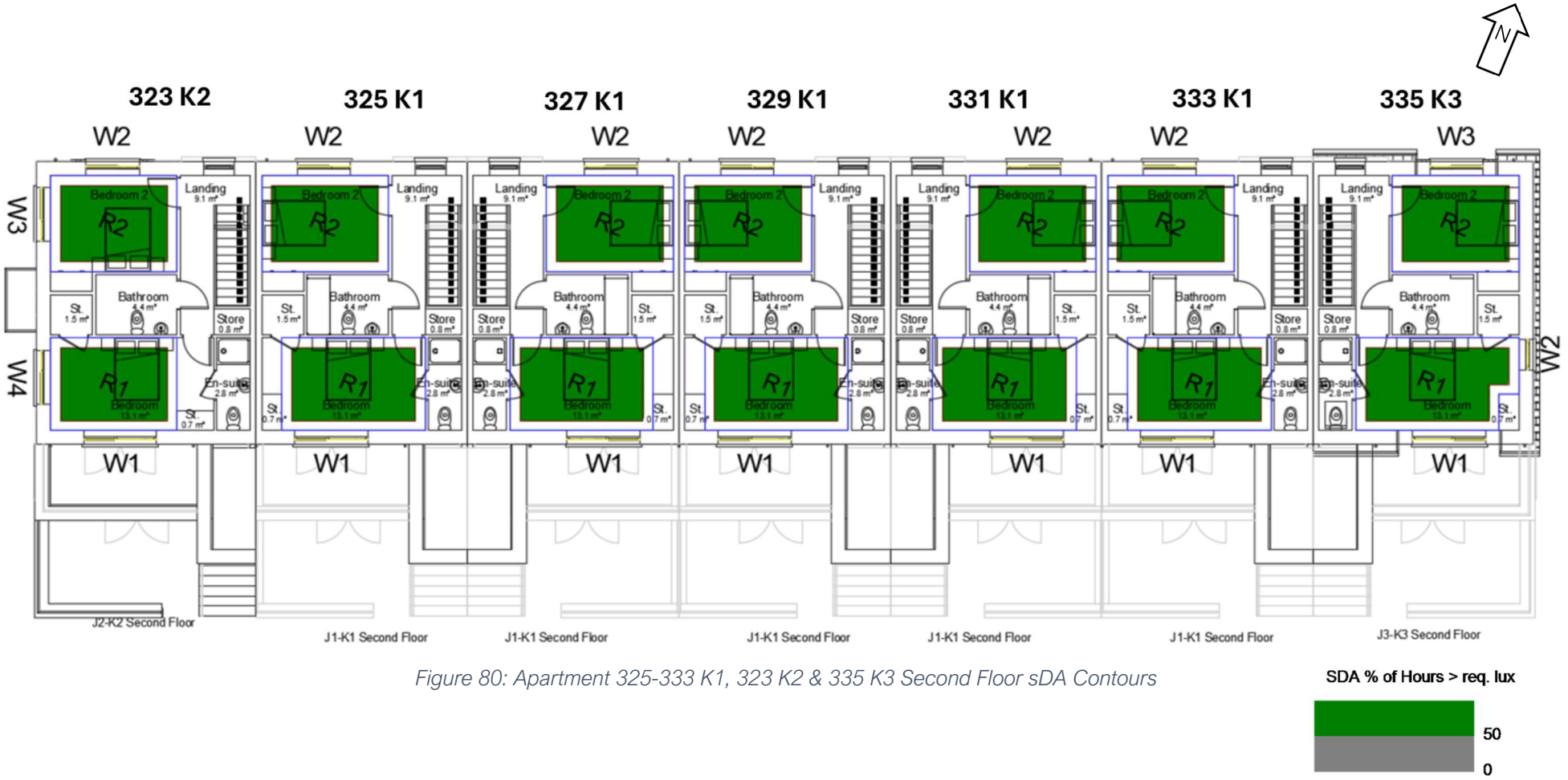
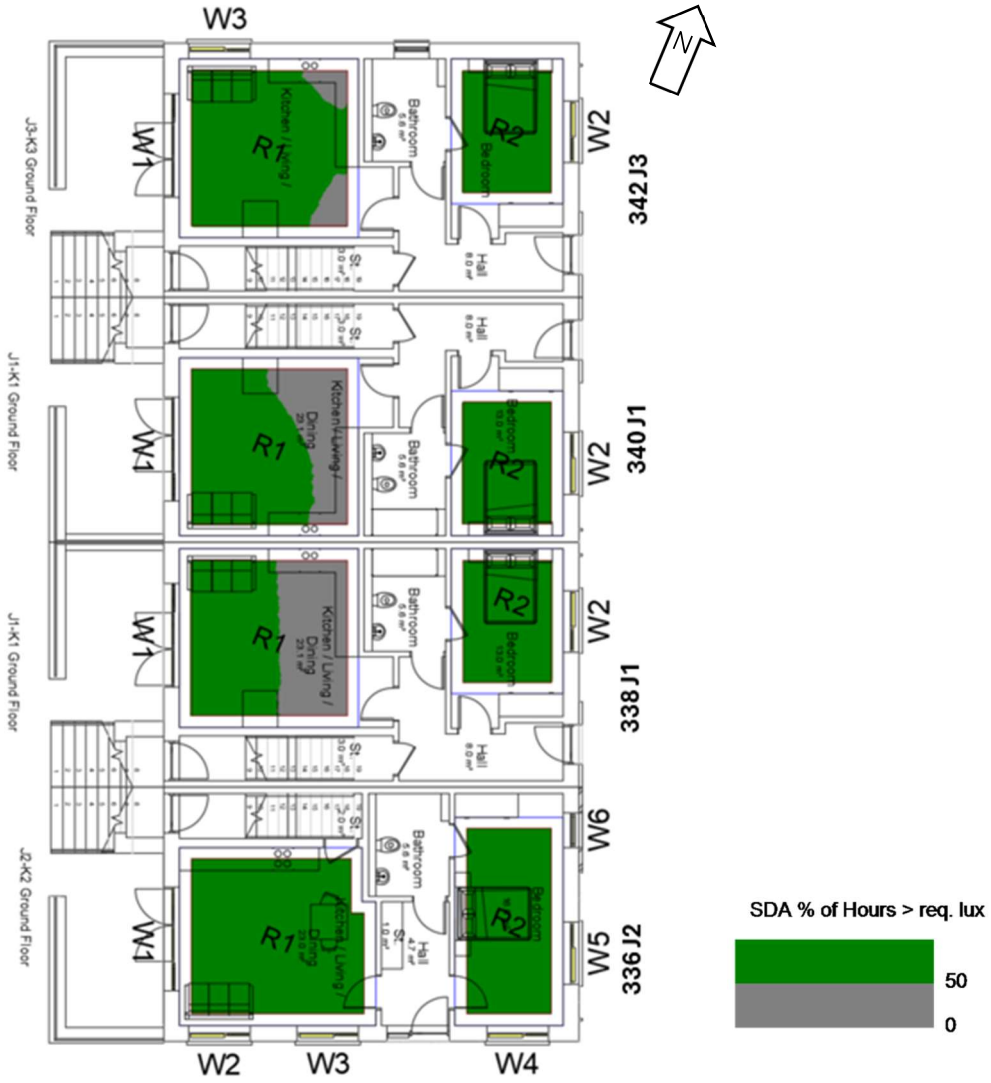


Figure 80: Apartment 325-333 K1, 323 K2 & 335 K3 Second Floor sDA Contours



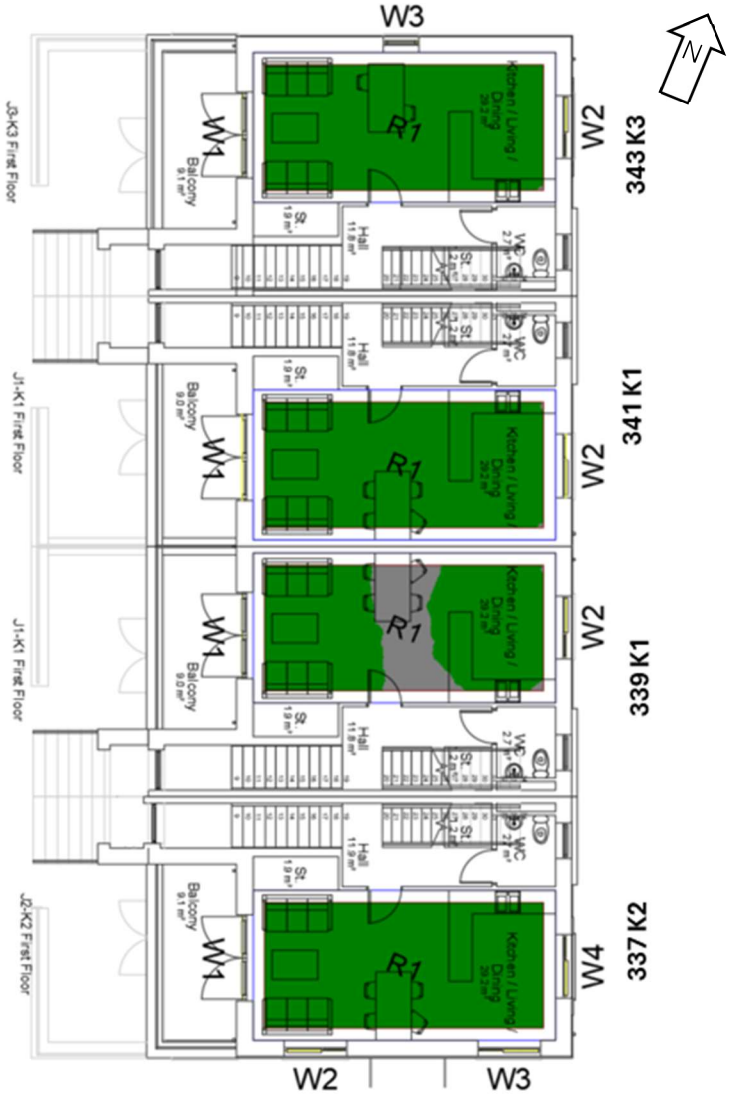


Figure 81: Apartment 338-340 J1, 336 J2 & 342 J3 Ground Floor sDA Contours

Figure 82: Apartment 339-341 K1, 337 K2 & 343 K3 First Floor sDA Contours

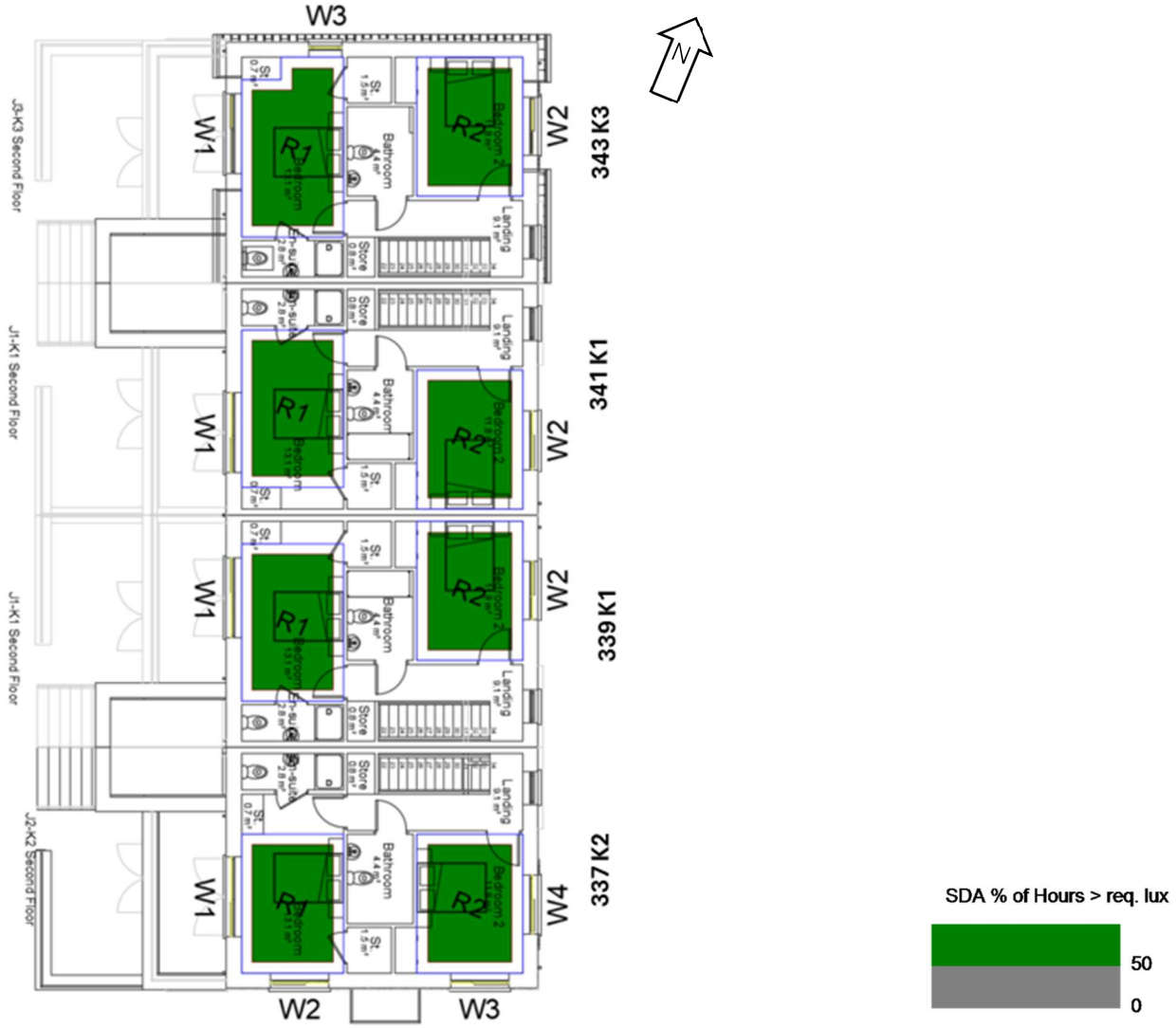


Figure 83: Apartment 339-341 K1, 337 K2 & 343 K3 Second Floor sDA Contours

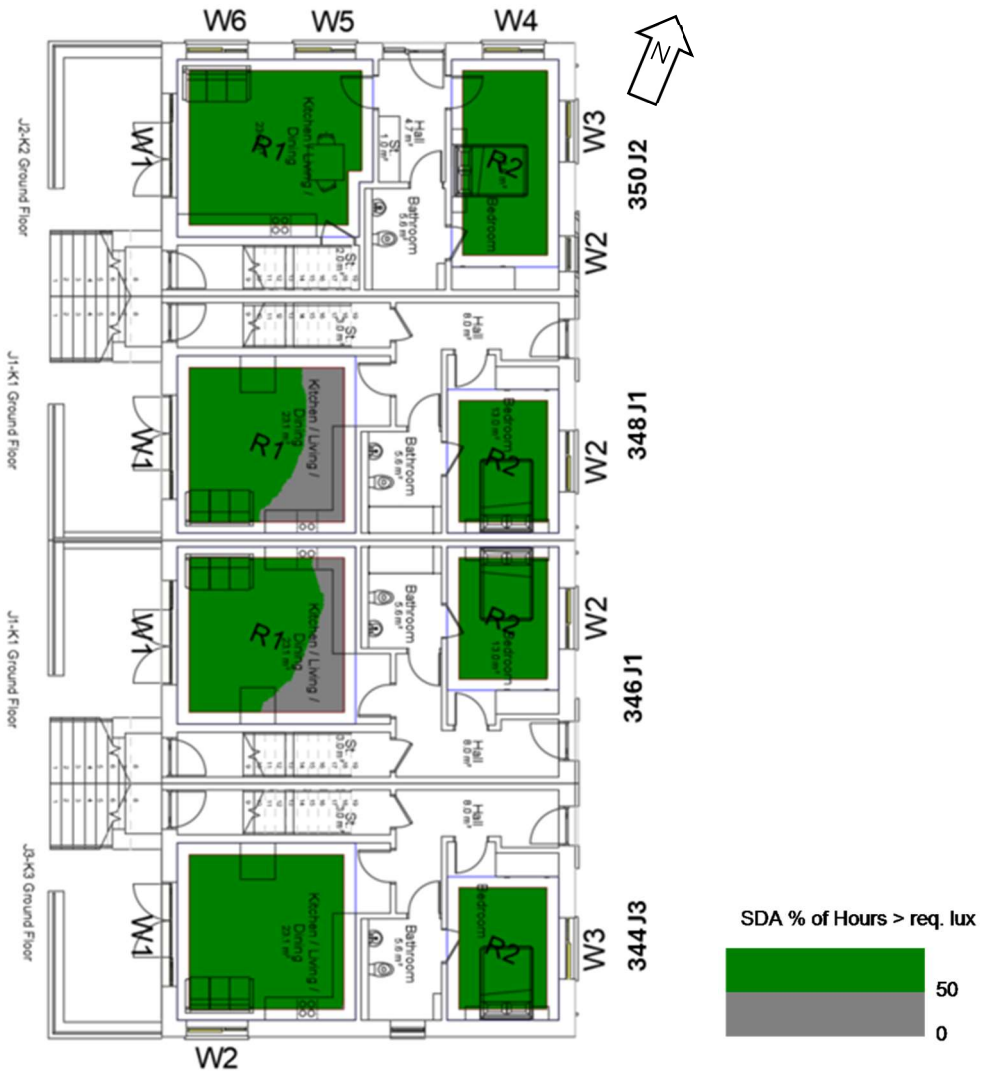


Figure 84: Apartment 346-348 J1, 350 J2 & 344 J3 Ground Floor sDA Contours

Figure 85: Apartment 347-349 K1, 351 K2 & 345 K3 First Floor sDA Contours

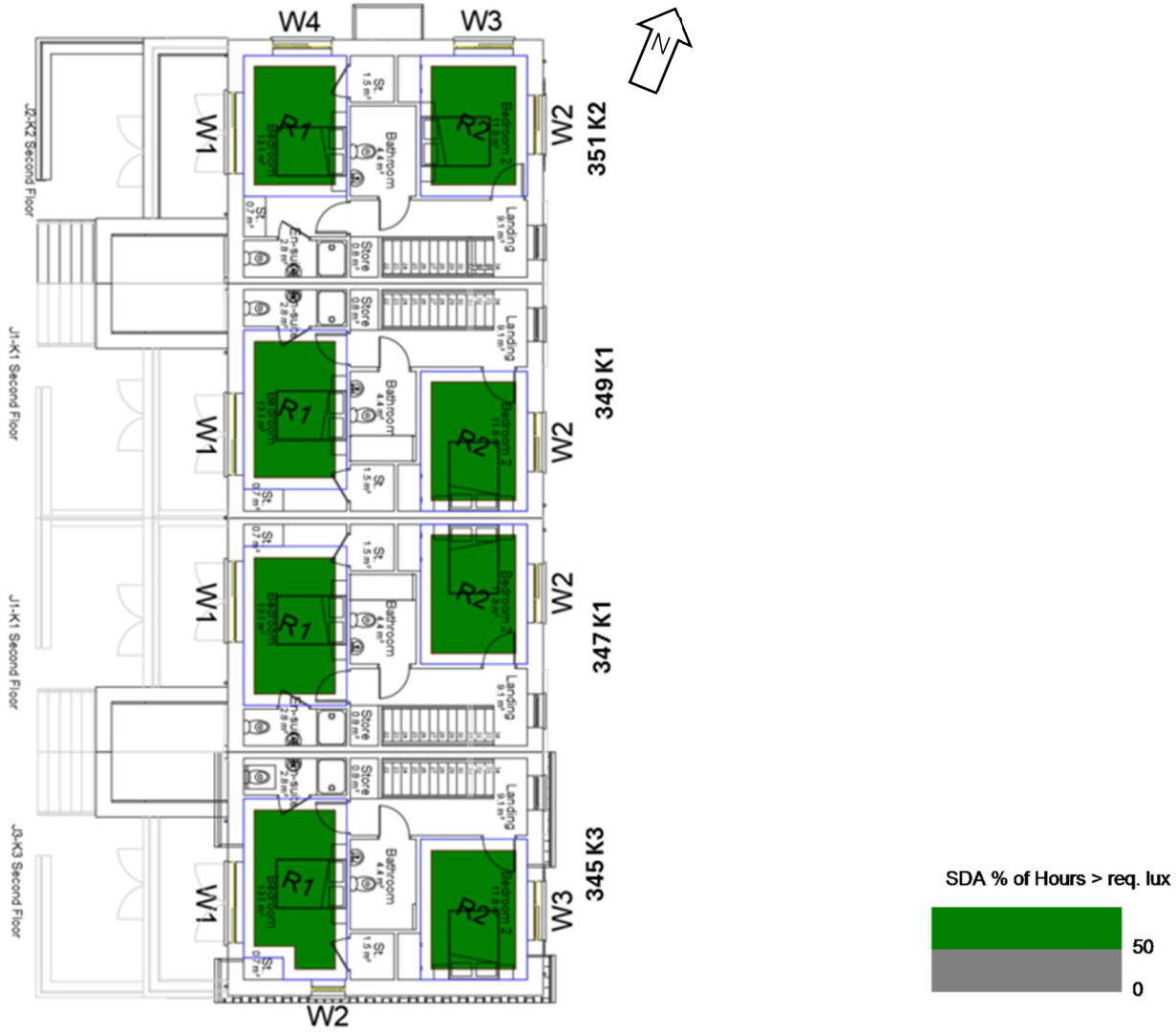


Figure 86: Apartment 347-349 K1, 351 K2 & 345 K3 Second Floor sDA Contours

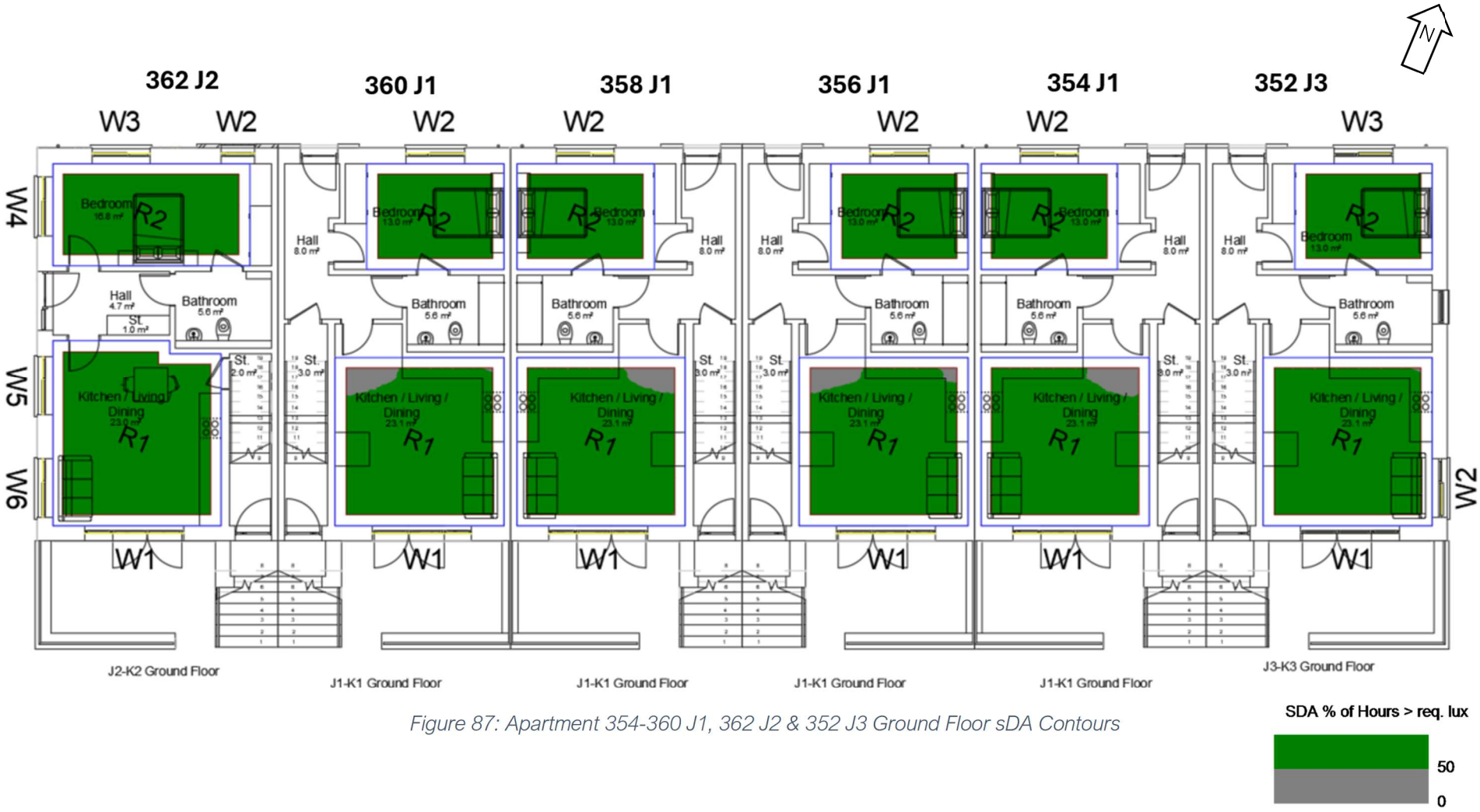


Figure 87: Apartment 354-360 J1, 362 J2 & 352 J3 Ground Floor sDA Contours

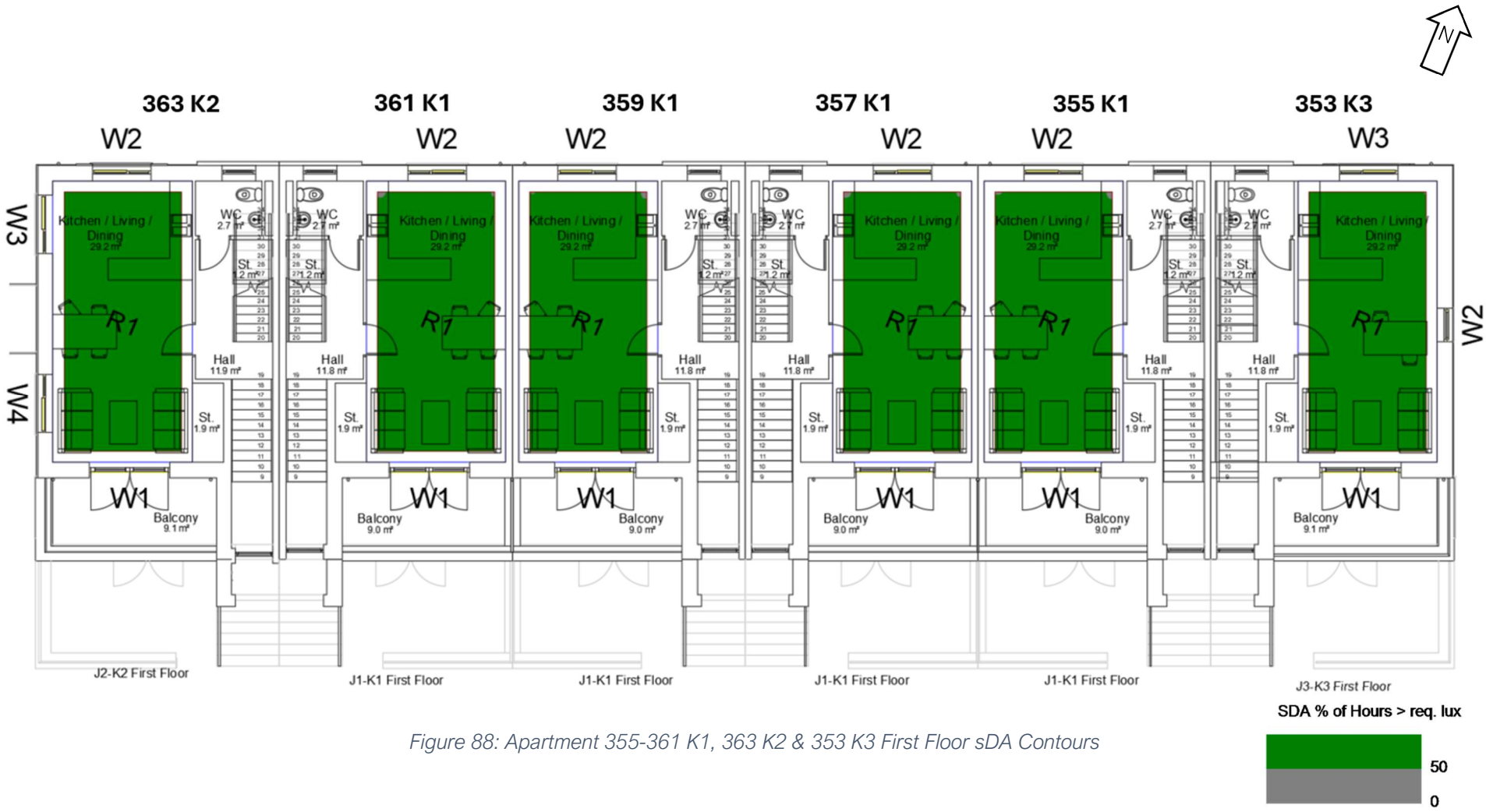


Figure 88: Apartment 355-361 K1, 363 K2 & 353 K3 First Floor sDA Contours

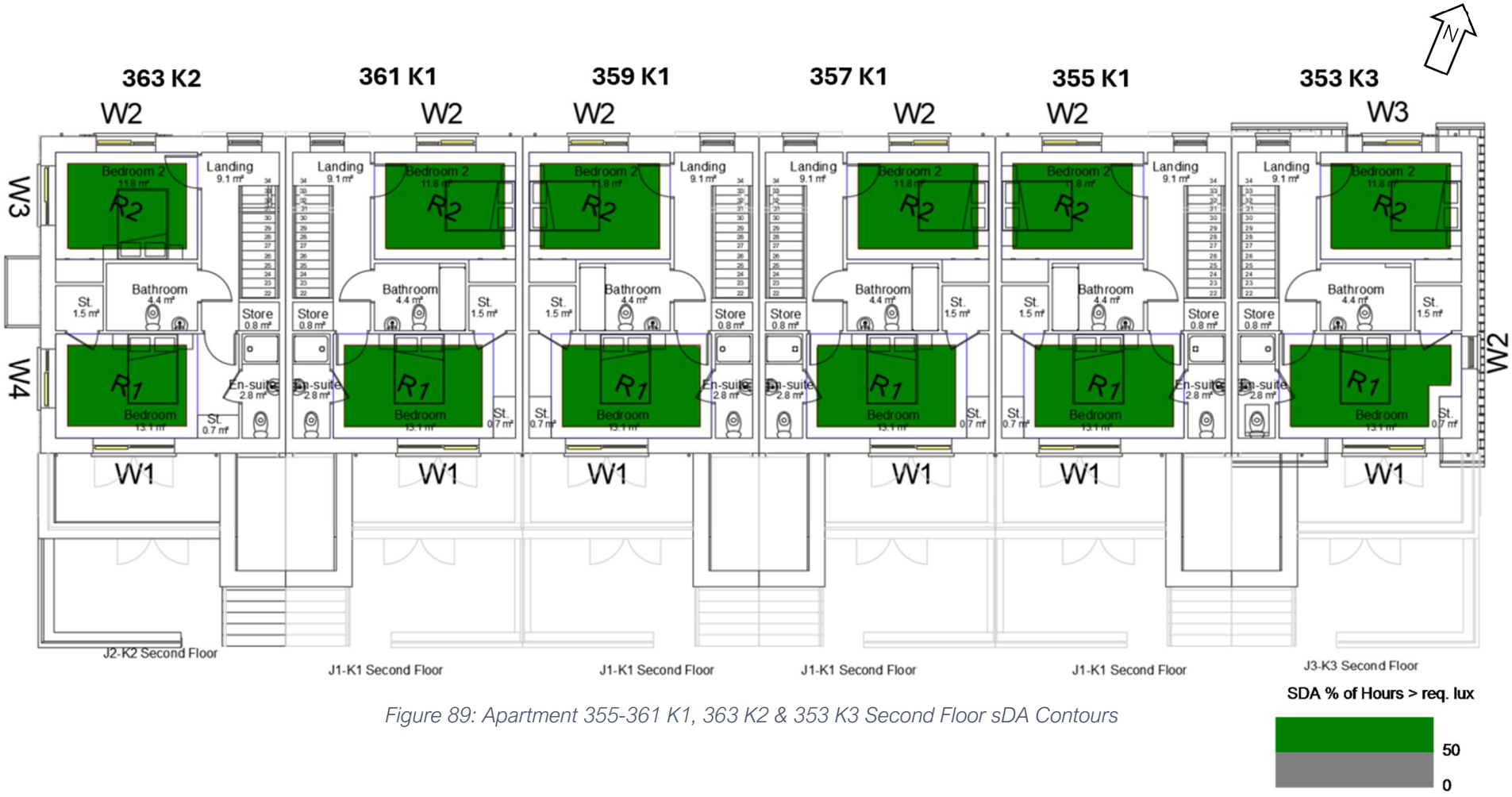


Figure 89: Apartment 355-361 K1, 363 K2 & 353 K3 Second Floor sDA Contours

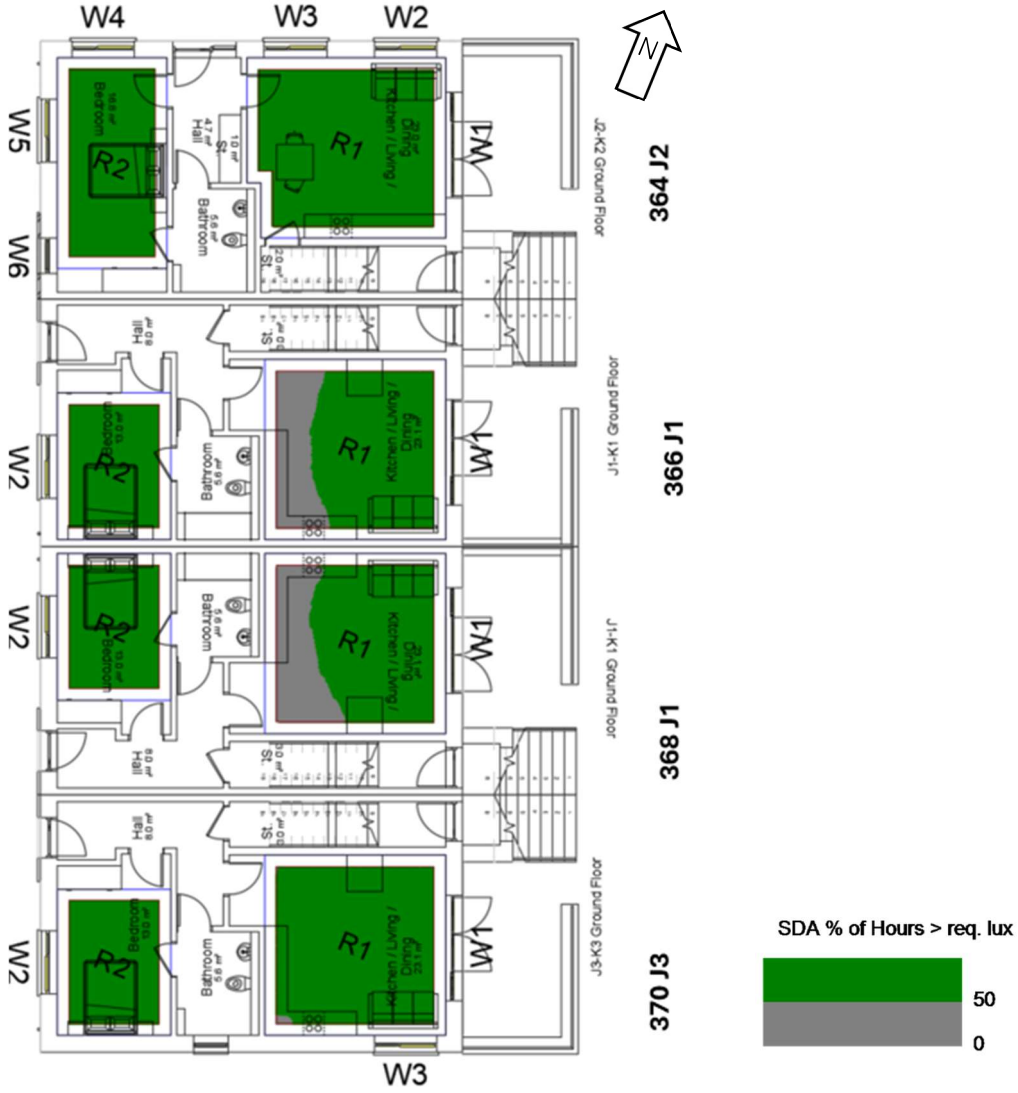


Figure 90: Apartment 368-366 J1, 364 J2 & 370 J3 Ground Floor sDA Contours

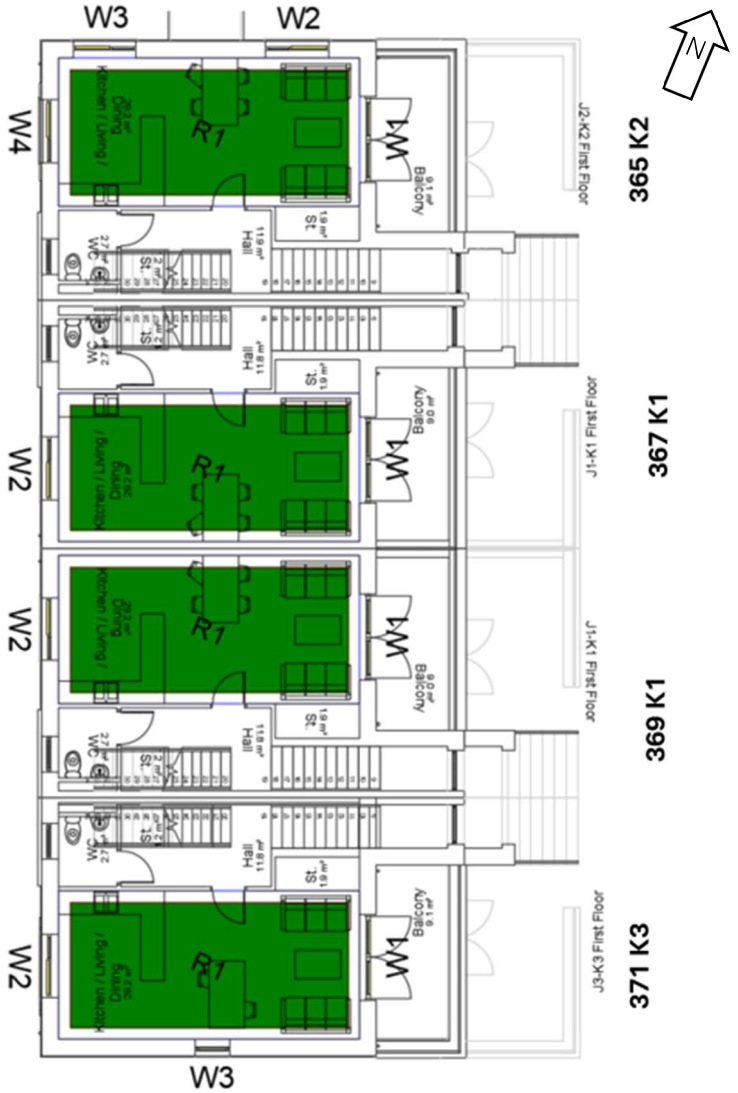


Figure 91: Apartment 369-367 K1, 365 K2 & 371 K3 First Floor sDA Contours

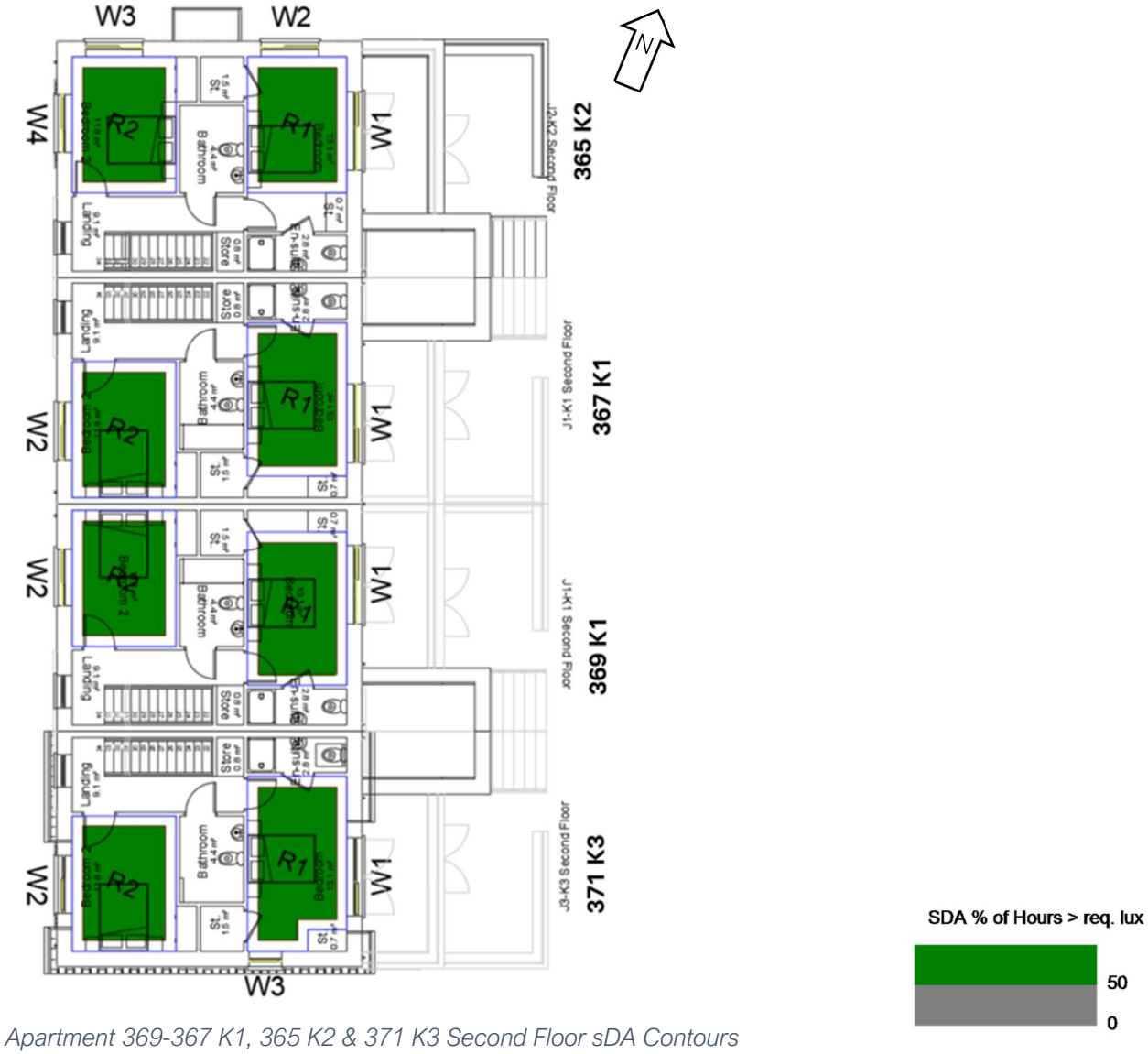


Figure 92: Apartment 369-367 K1, 365 K2 & 371 K3 Second Floor sDA Contours

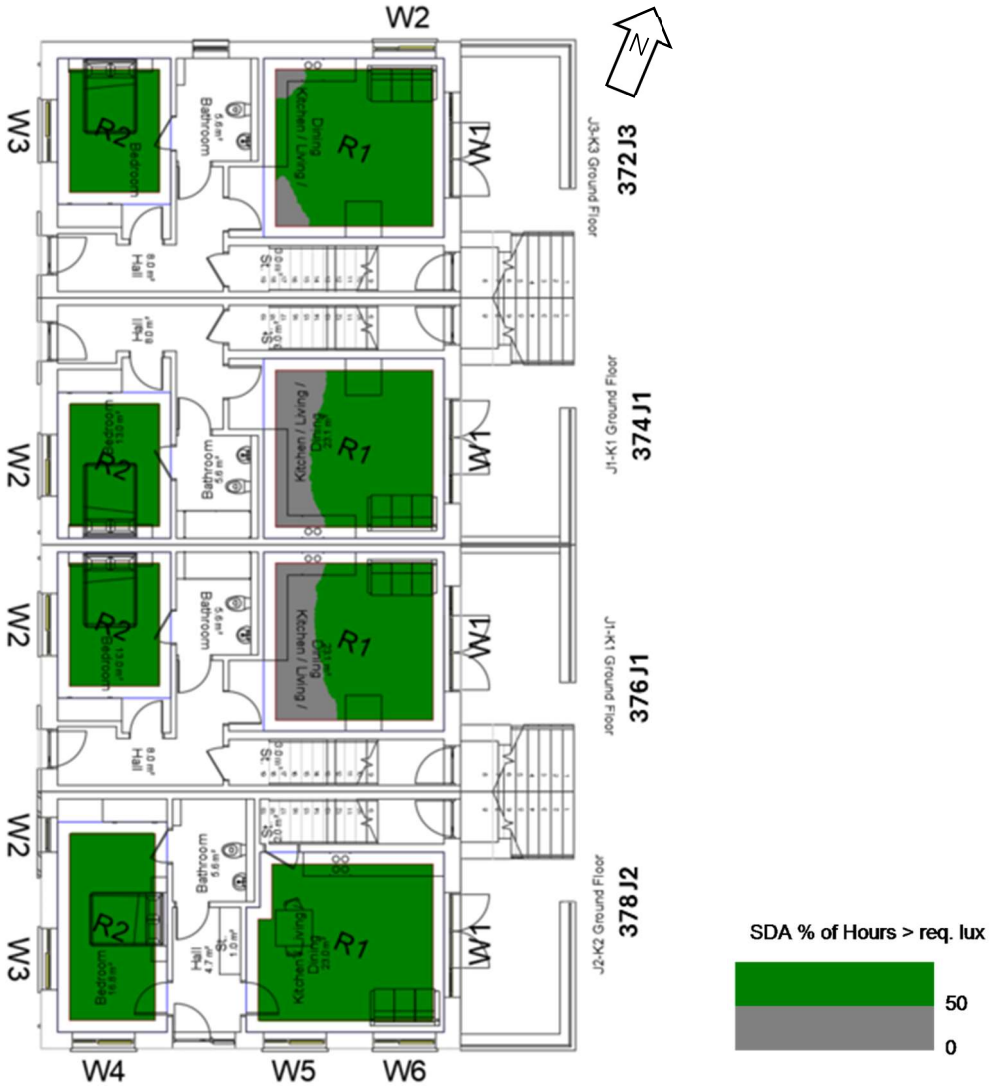


Figure 93: Apartment 376-374 J1, 378 J2 & 372 J3 Ground Floor sDA Contours

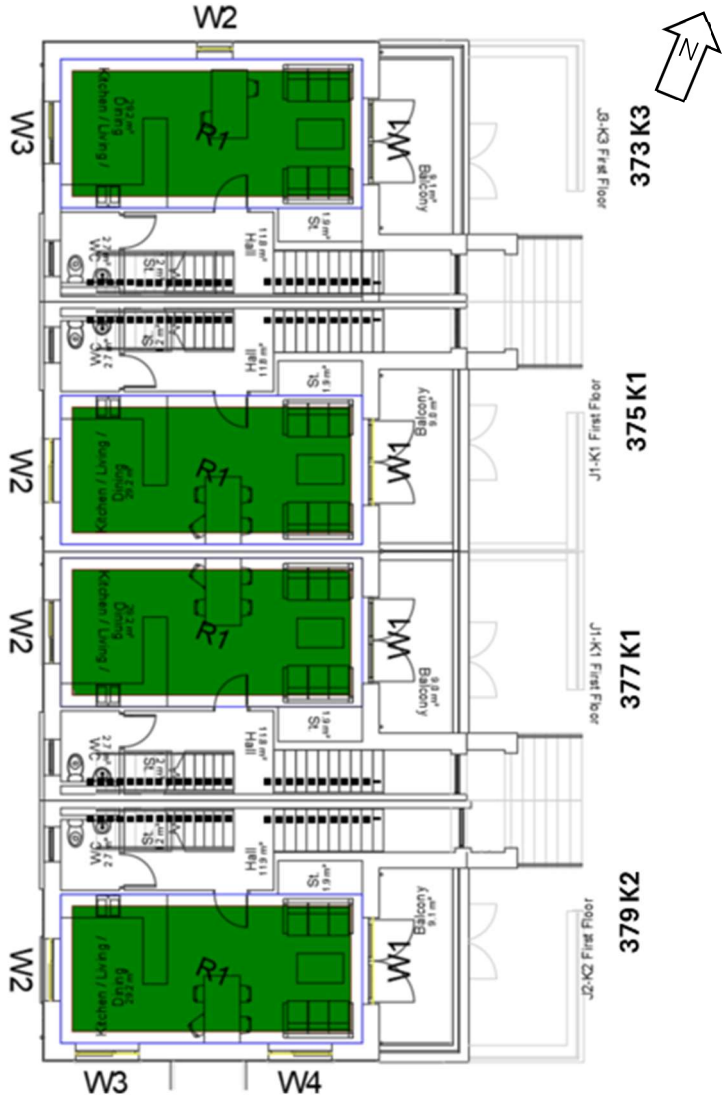


Figure 94: Apartment 377-375 K1, 379 K2 & 373 K3 First Floor sDA Contours

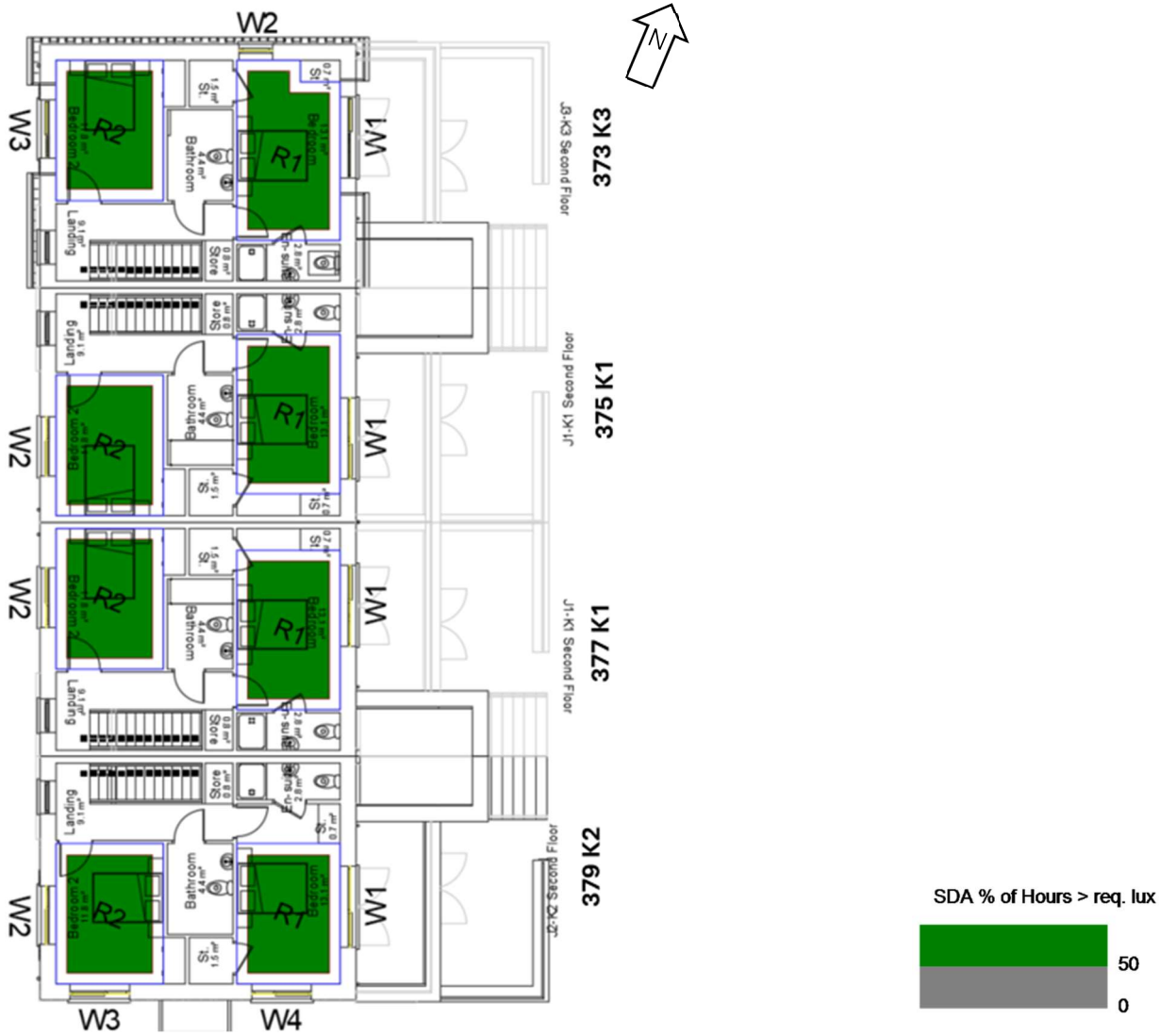
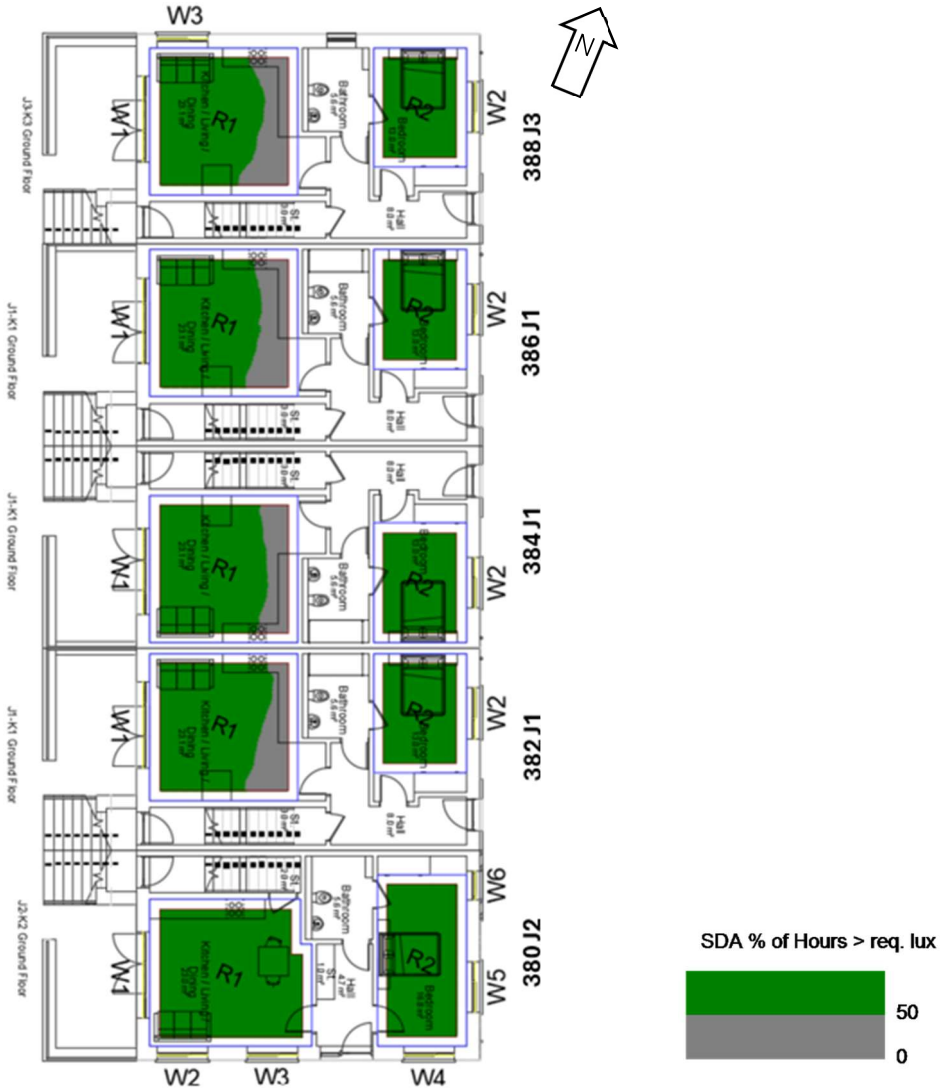


Figure 95: Apartment 377-375 K1, 379 K2 & 373 K3 Second Floor sDA Contours



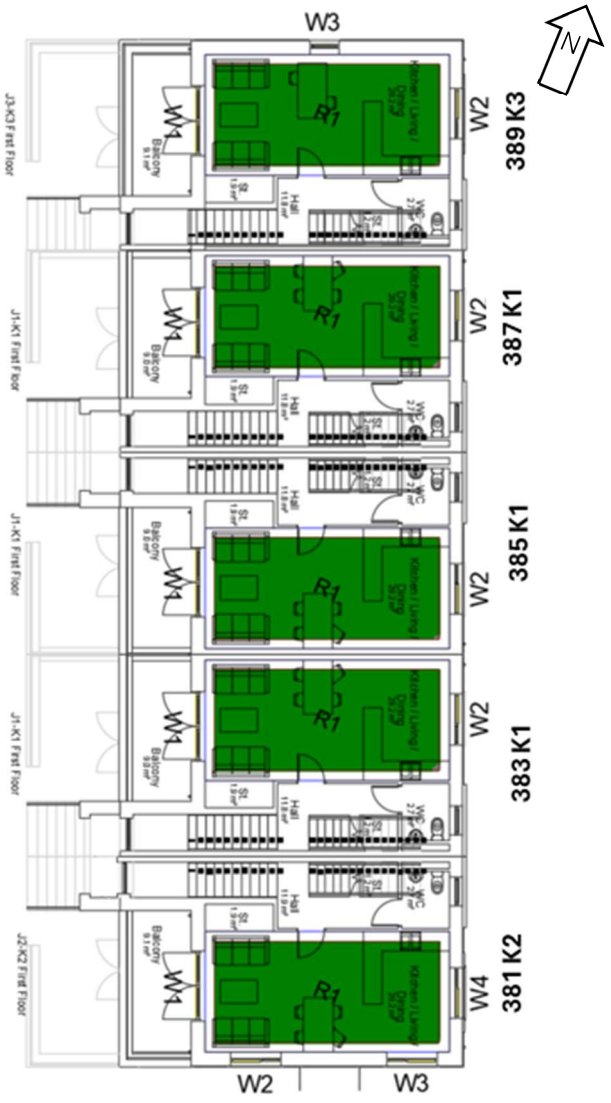


Figure 96: Apartment 382-386 J1, 380 J2 & 388 J3 Ground Floor sDA Contours

Figure 97: Apartment 383-387 K1, 381 K2 & 389 K3 First Floor sDA Contours

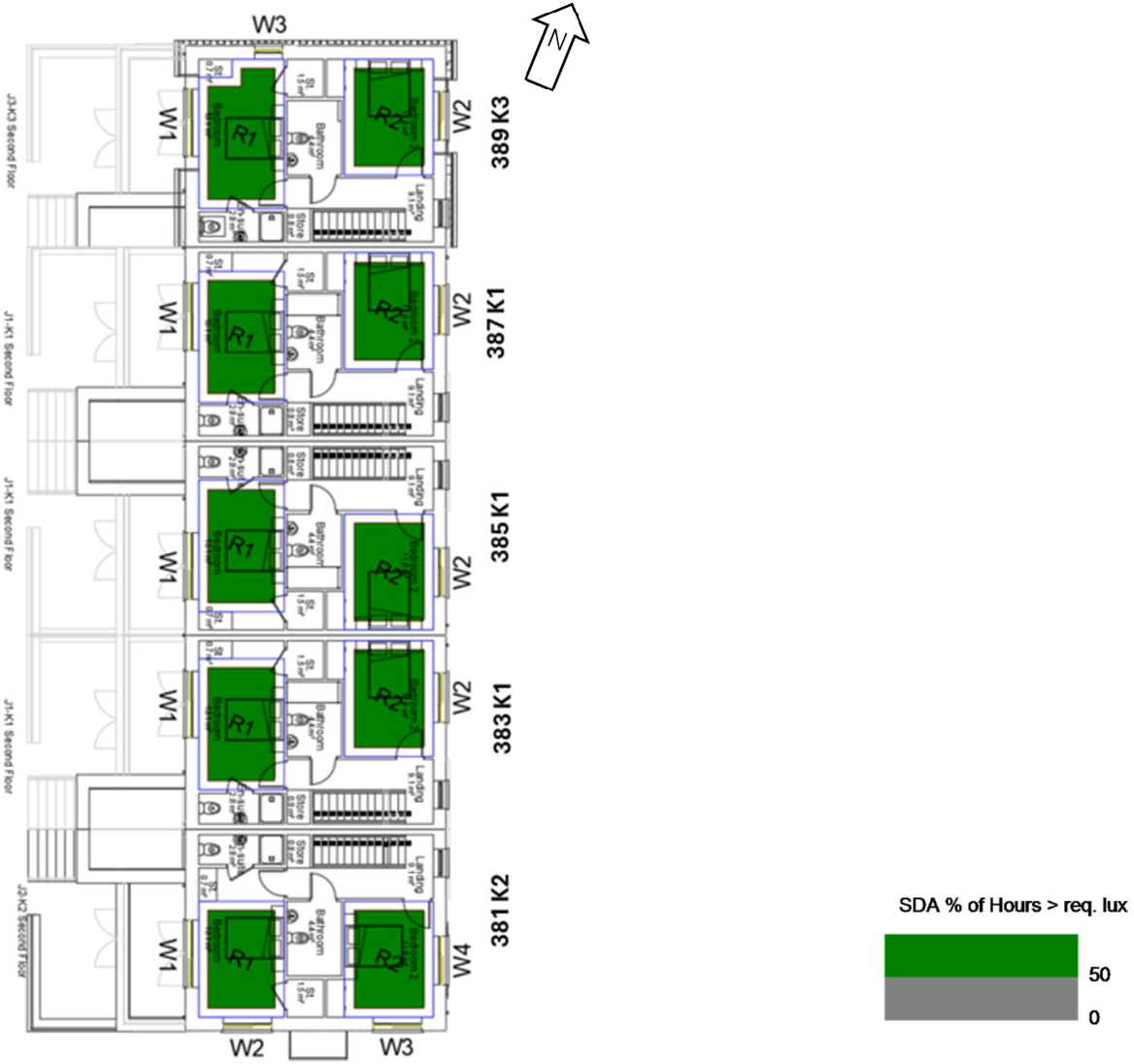


Figure 98: Apartment 383-387 K1, 381 K2 & 389 K3 Second Floor sDA Contours

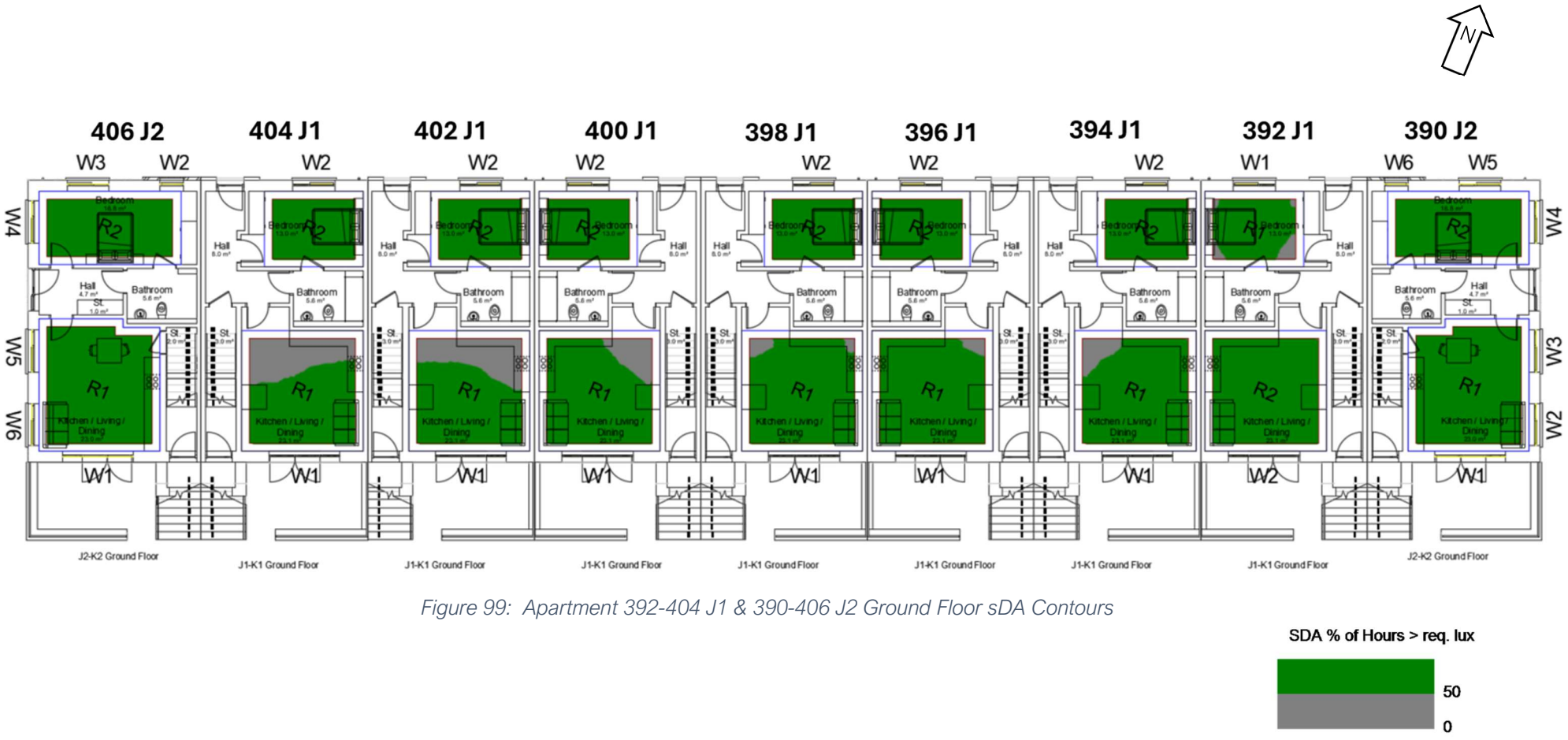


Figure 99: Apartment 392-404 J1 & 390-406 J2 Ground Floor sDA Contours

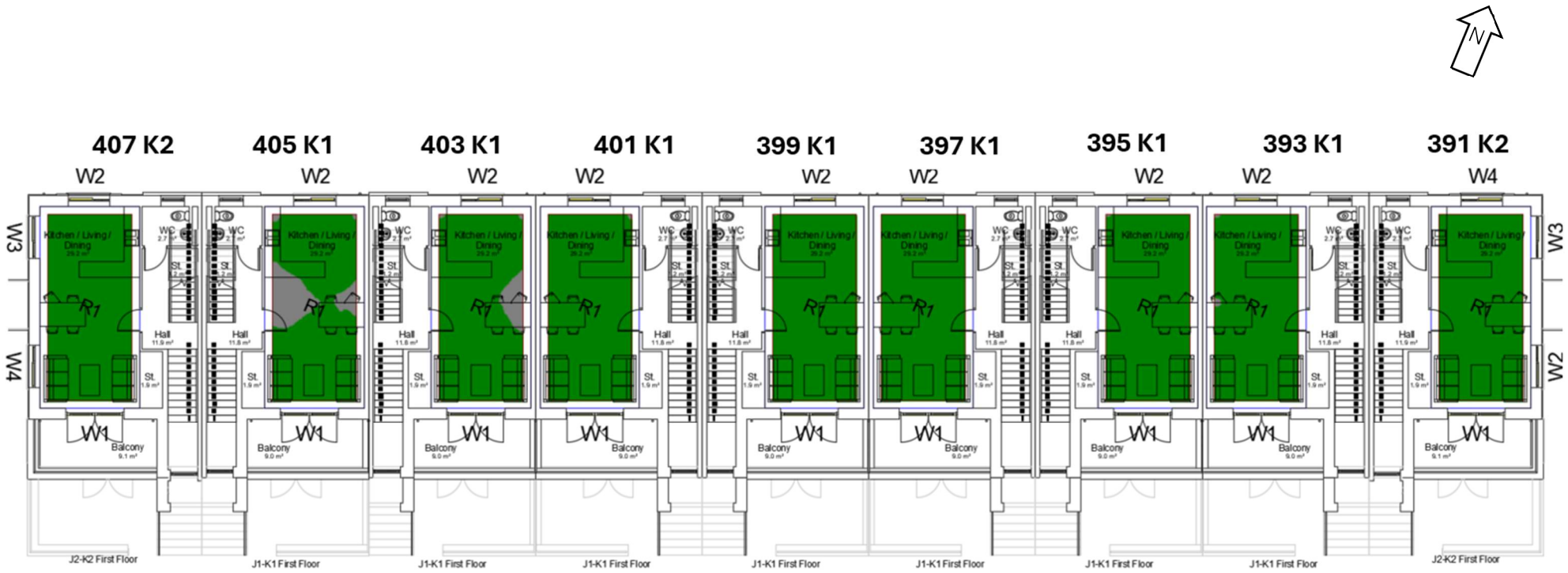


Figure 100: Apartment 393-405 K1 & 391-407 K2 First Floor sDA Contours

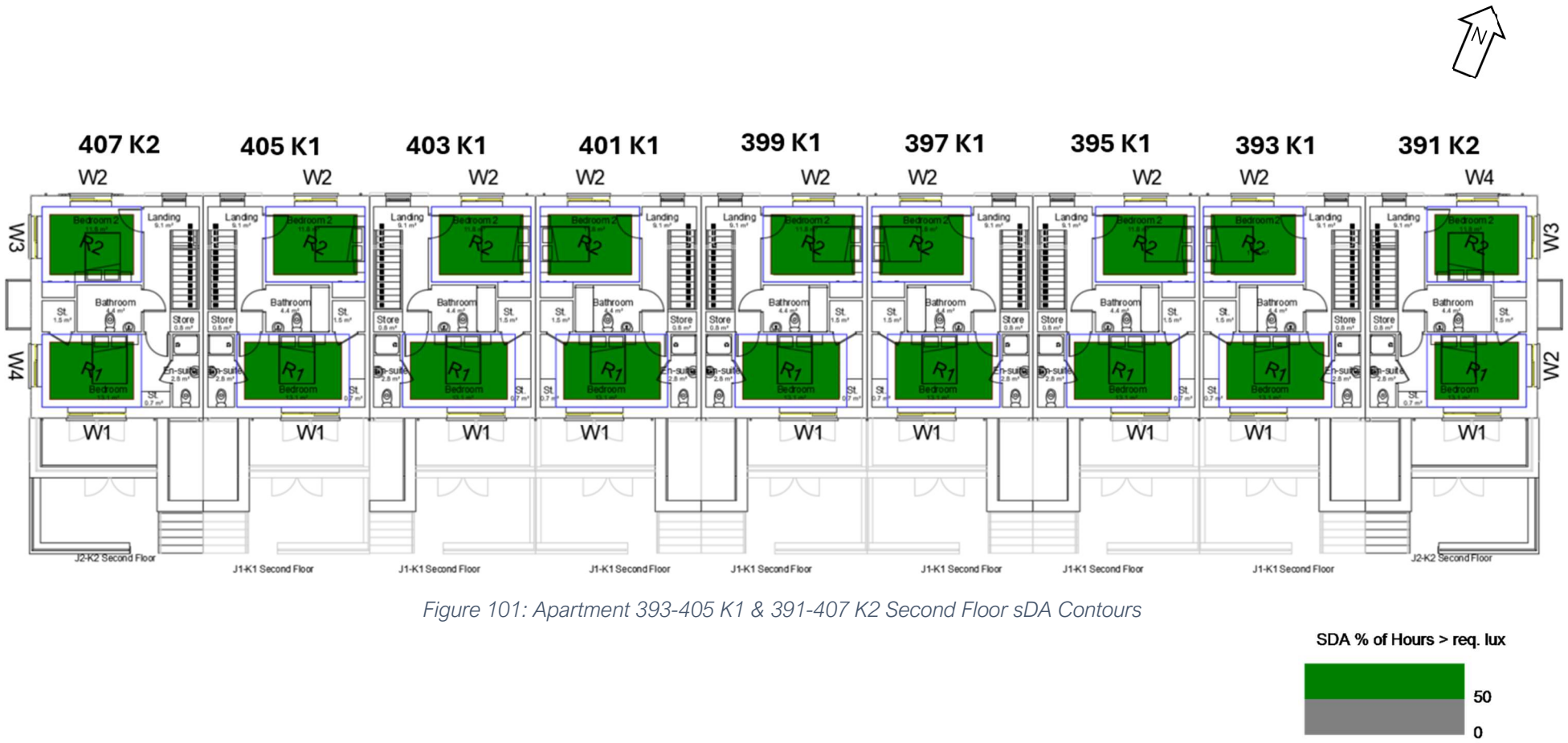


Figure 101: Apartment 393-405 K1 & 391-407 K2 Second Floor sDA Contours

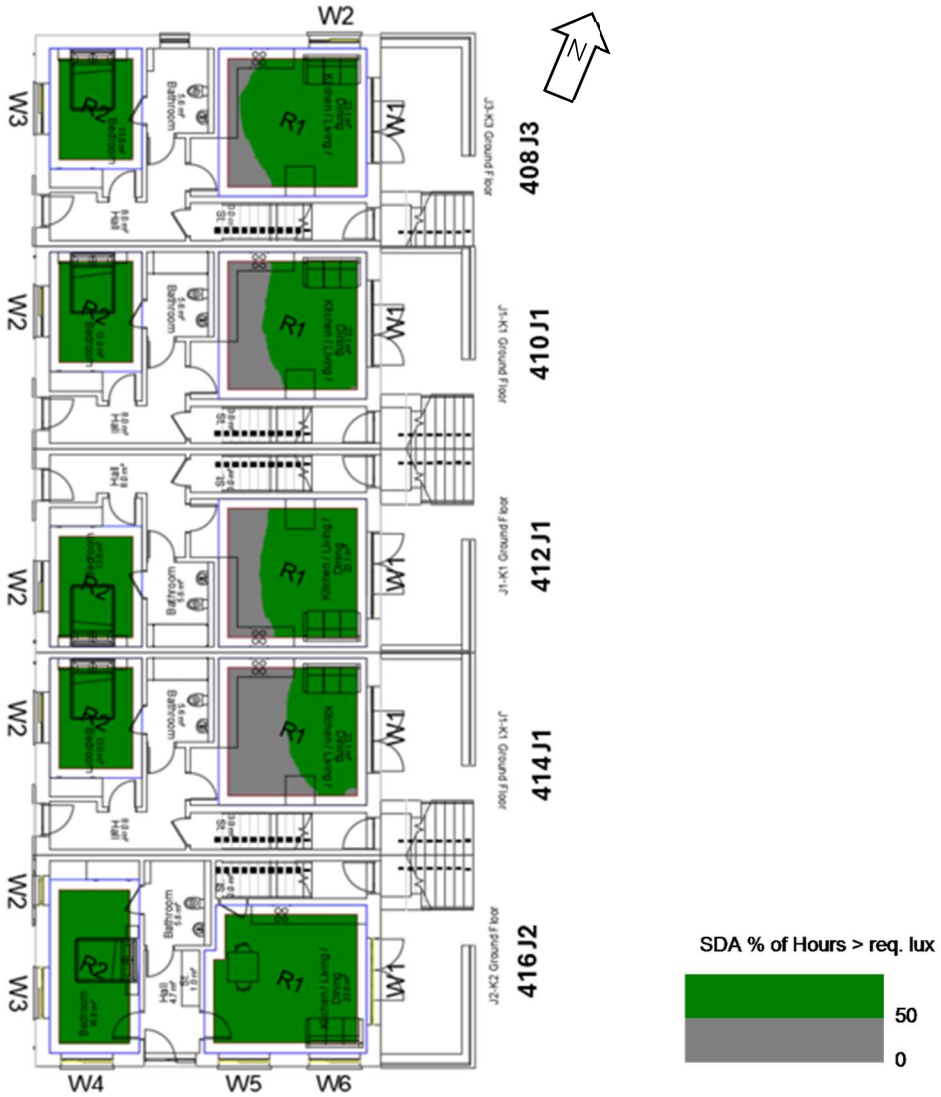


Figure 102: Apartment 410-414J1, 41 J2 & 408J3 Ground Floor sDA Contours

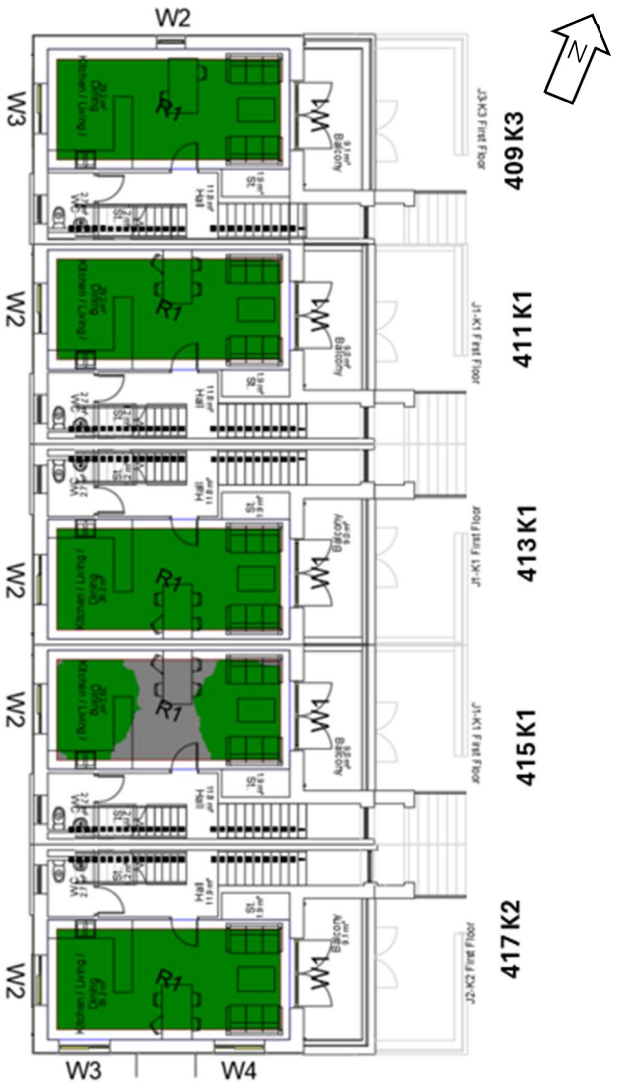


Figure 103: Apartment 411-415K1, 417K2 & 409K3 Firsts Floor sDA Contour

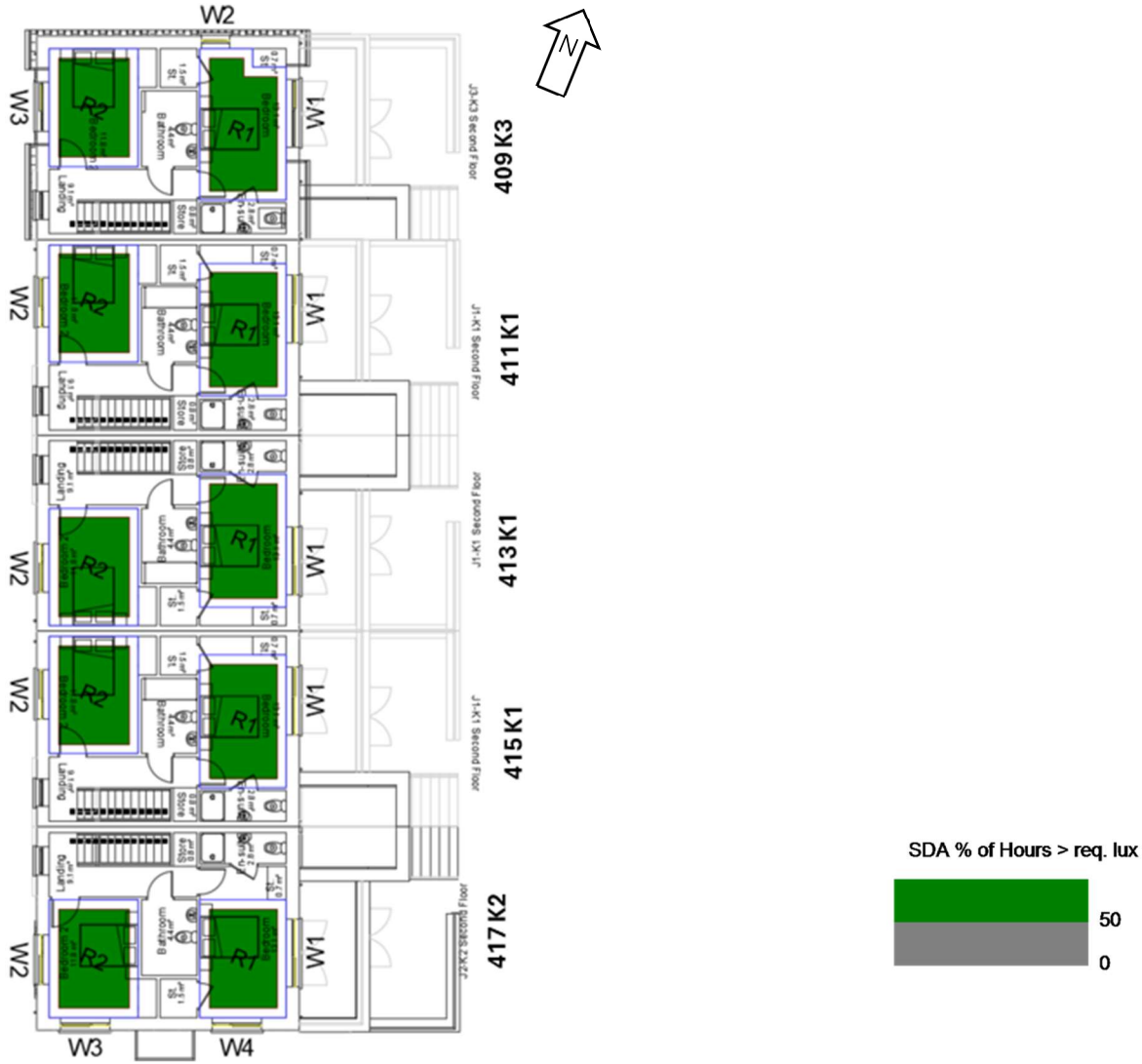


Figure 104: Apartment 411-415 K1, 417 K2 & 409 K3 Second Floor sDA Contour

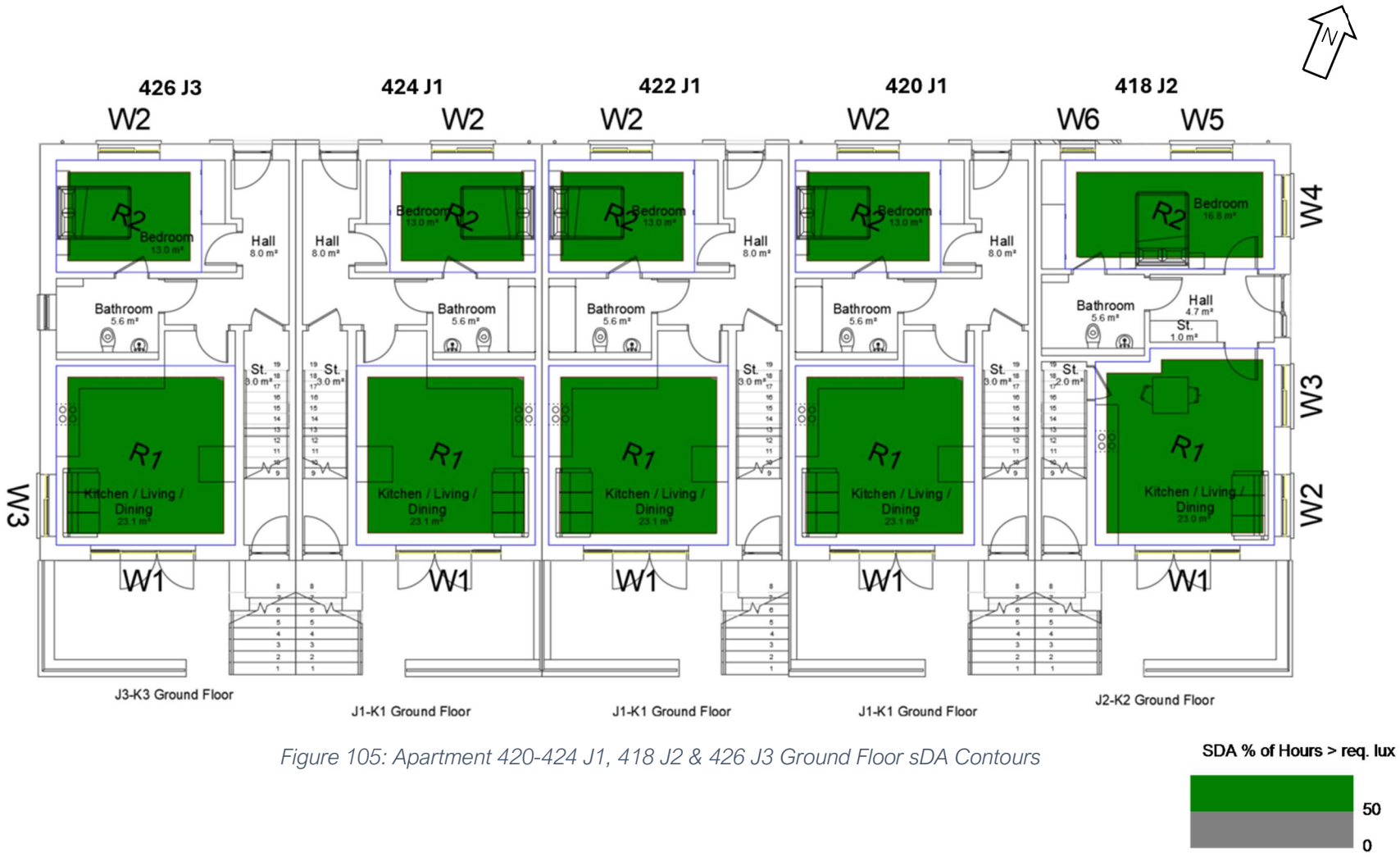


Figure 105: Apartment 420-424 J1, 418 J2 & 426 J3 Ground Floor sDA Contours

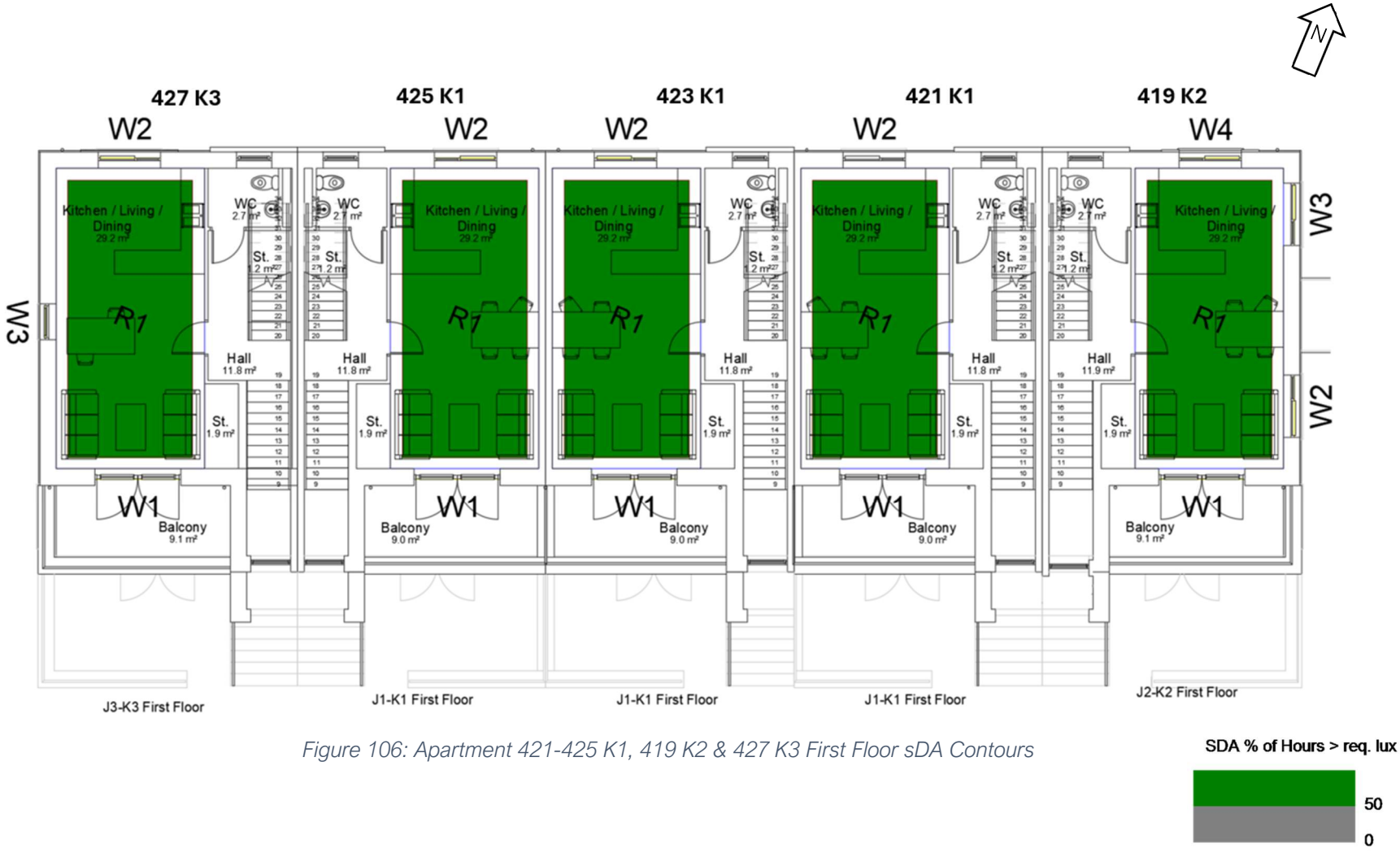


Figure 106: Apartment 421-425 K1, 419 K2 & 427 K3 First Floor sDA Contours

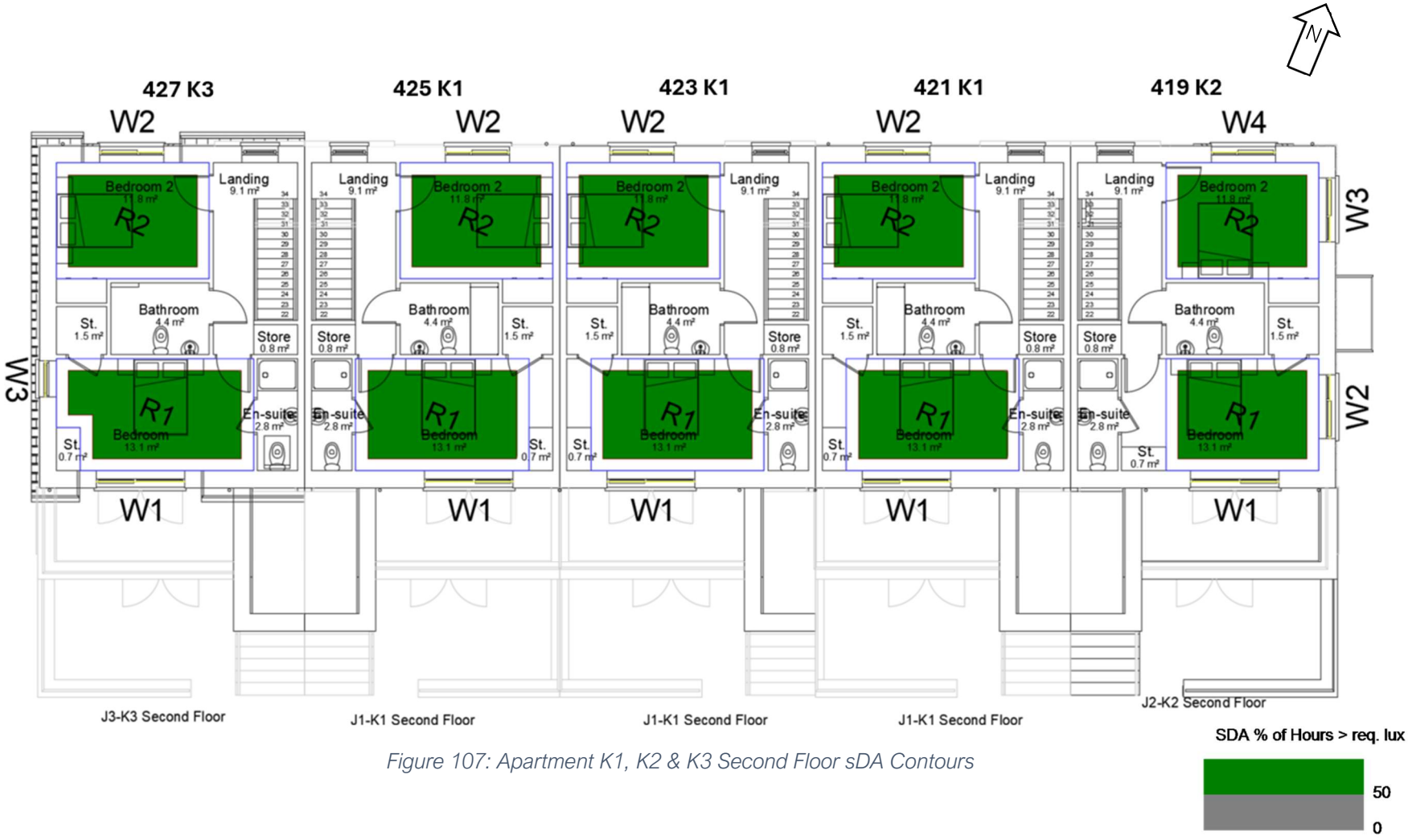


Figure 107: Apartment K1, K2 & K3 Second Floor sDA Contours

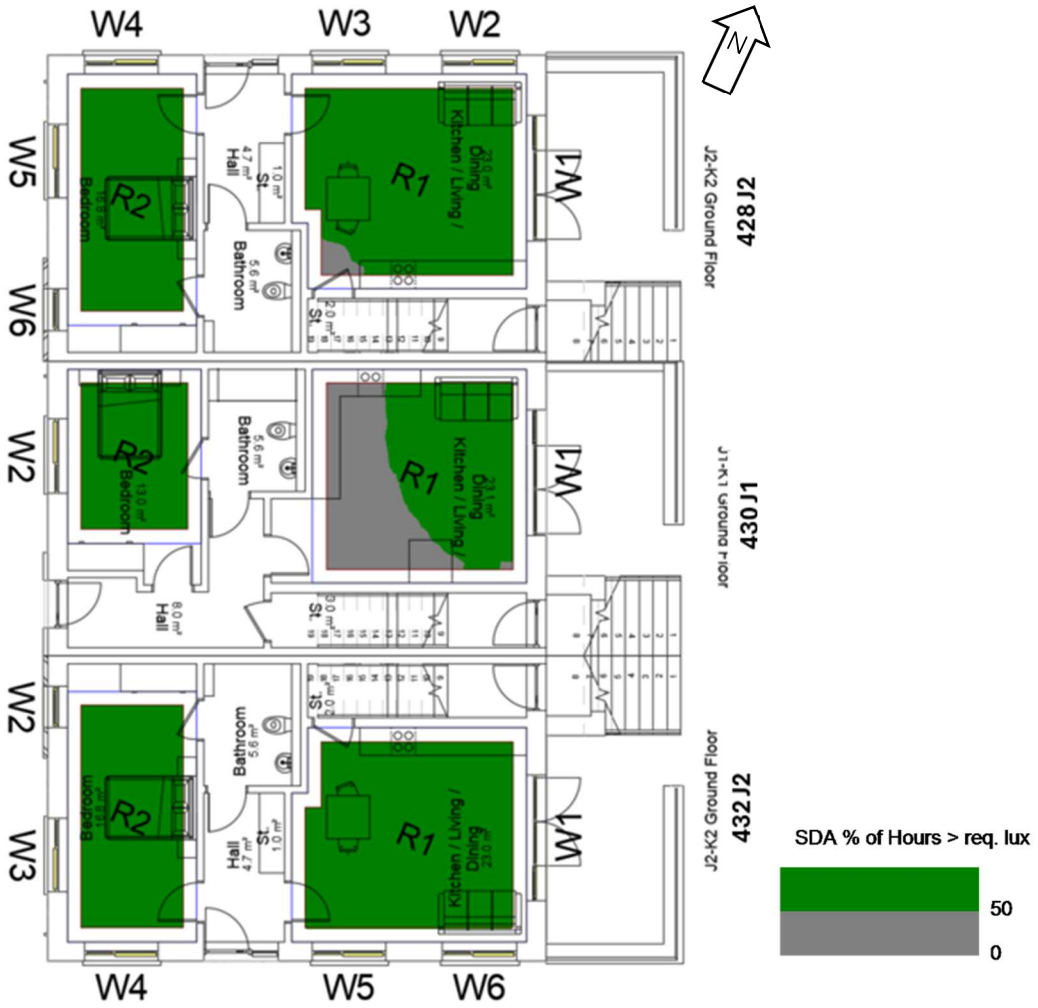


Figure 108: Apartment 430 J1 & 428-432 J2 Ground Floor sDA Contours

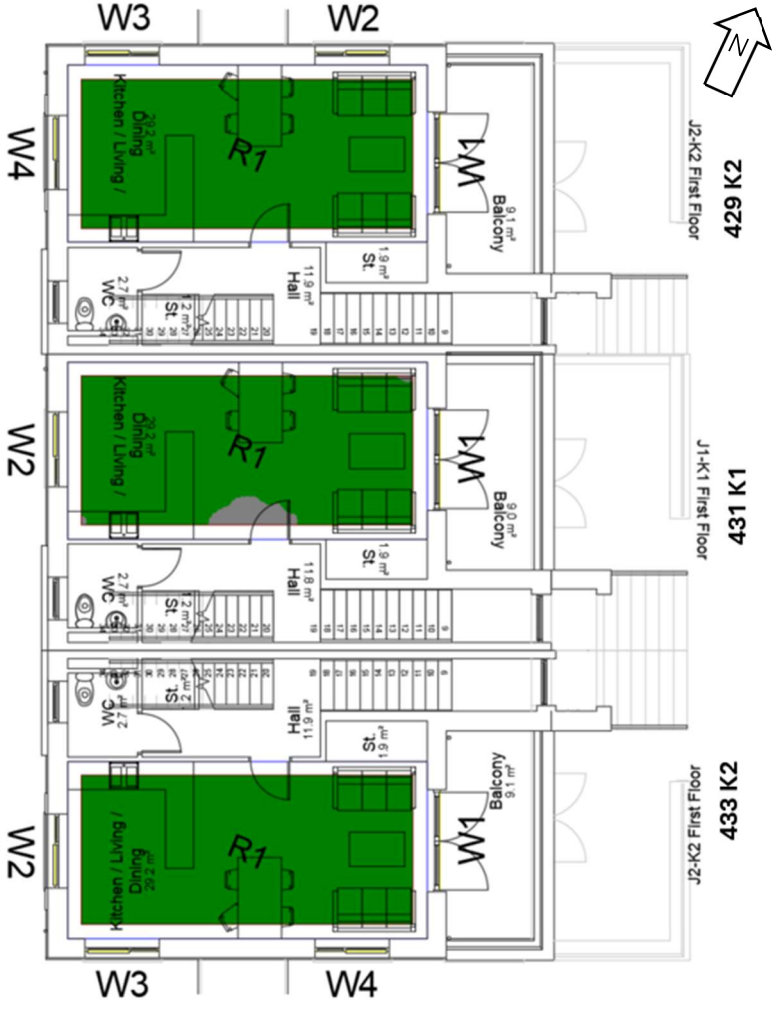


Figure 109: Apartment 431 K1 & 429-433 K2 First Floor sDA Contours

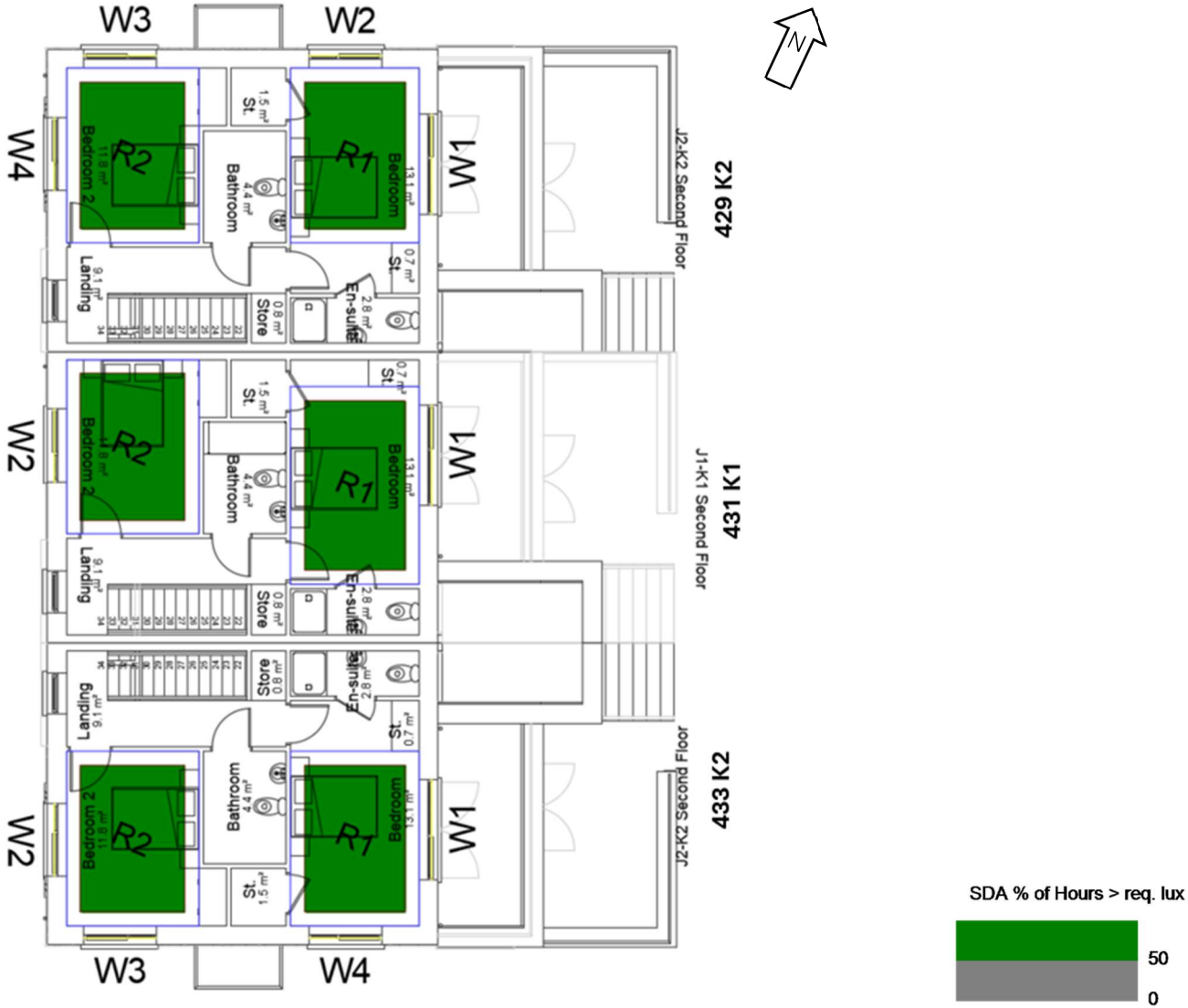


Figure 110: Apartment 431 K1 & 429-433 K2 Second Floor sDA Contours

Figure 111: Apartment 440-444 J1 & 438-447 J2 Ground Floor sDA Contours

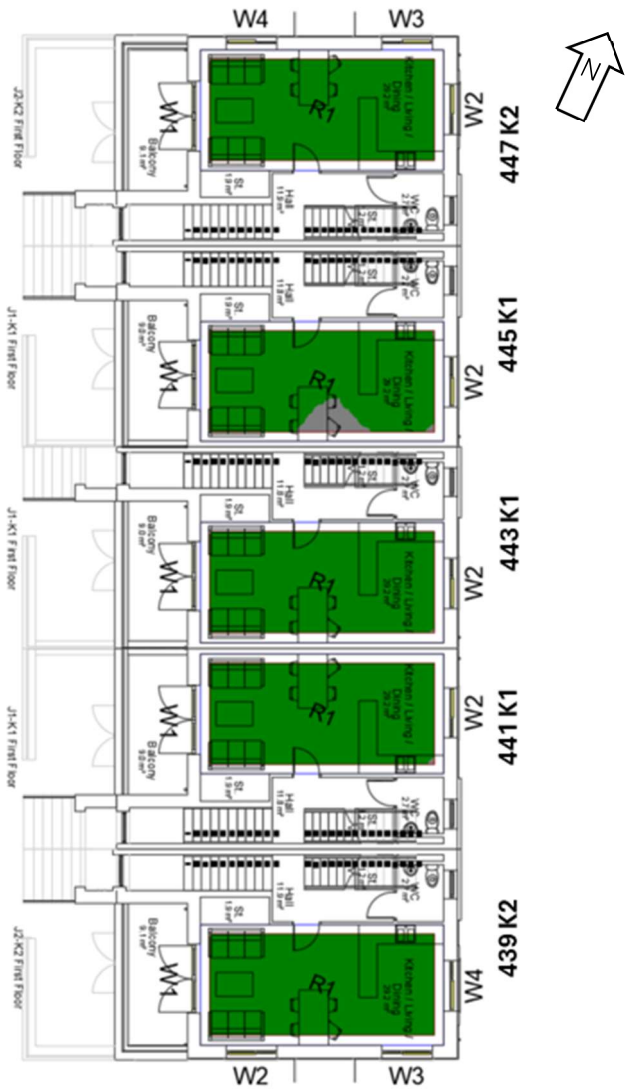


Figure 112: Apartment 441-445 K1 & 439-447 K2 First Floor sDA Contours

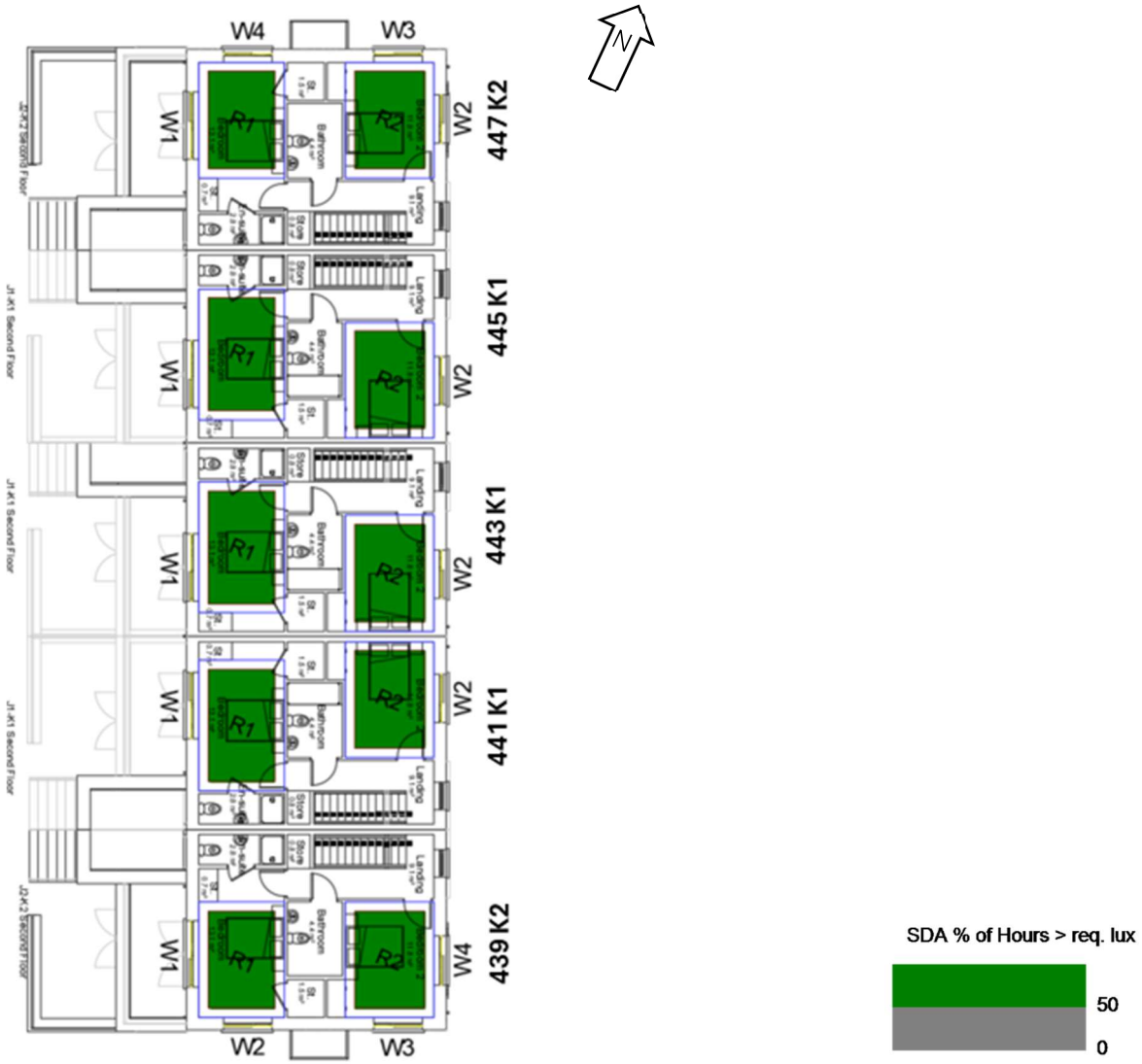


Figure 113: Apartment 441-445 K1 & 439-447 K2 Second Floor sDA Contours

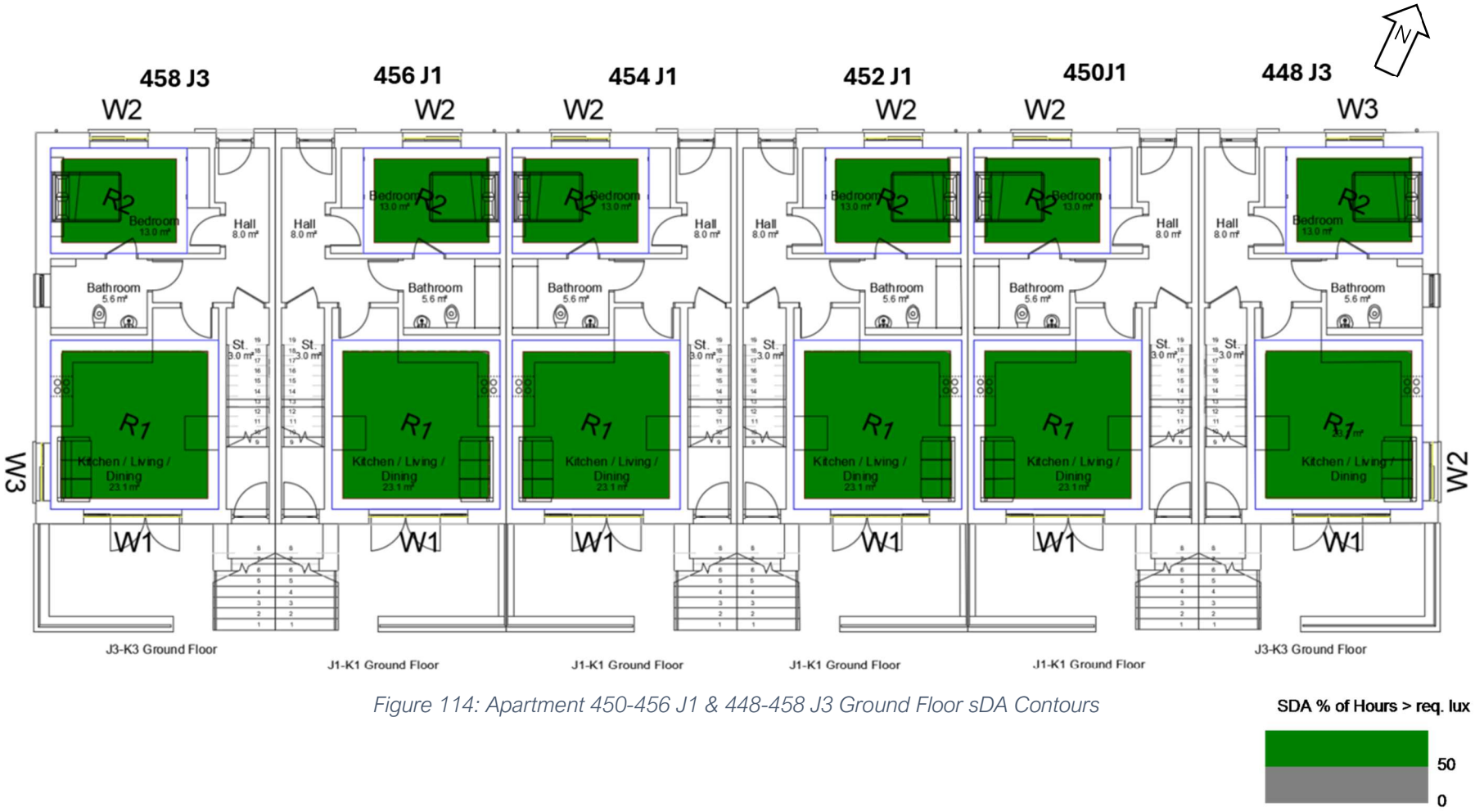


Figure 114: Apartment 450-456 J1 & 448-458 J3 Ground Floor sDA Contours

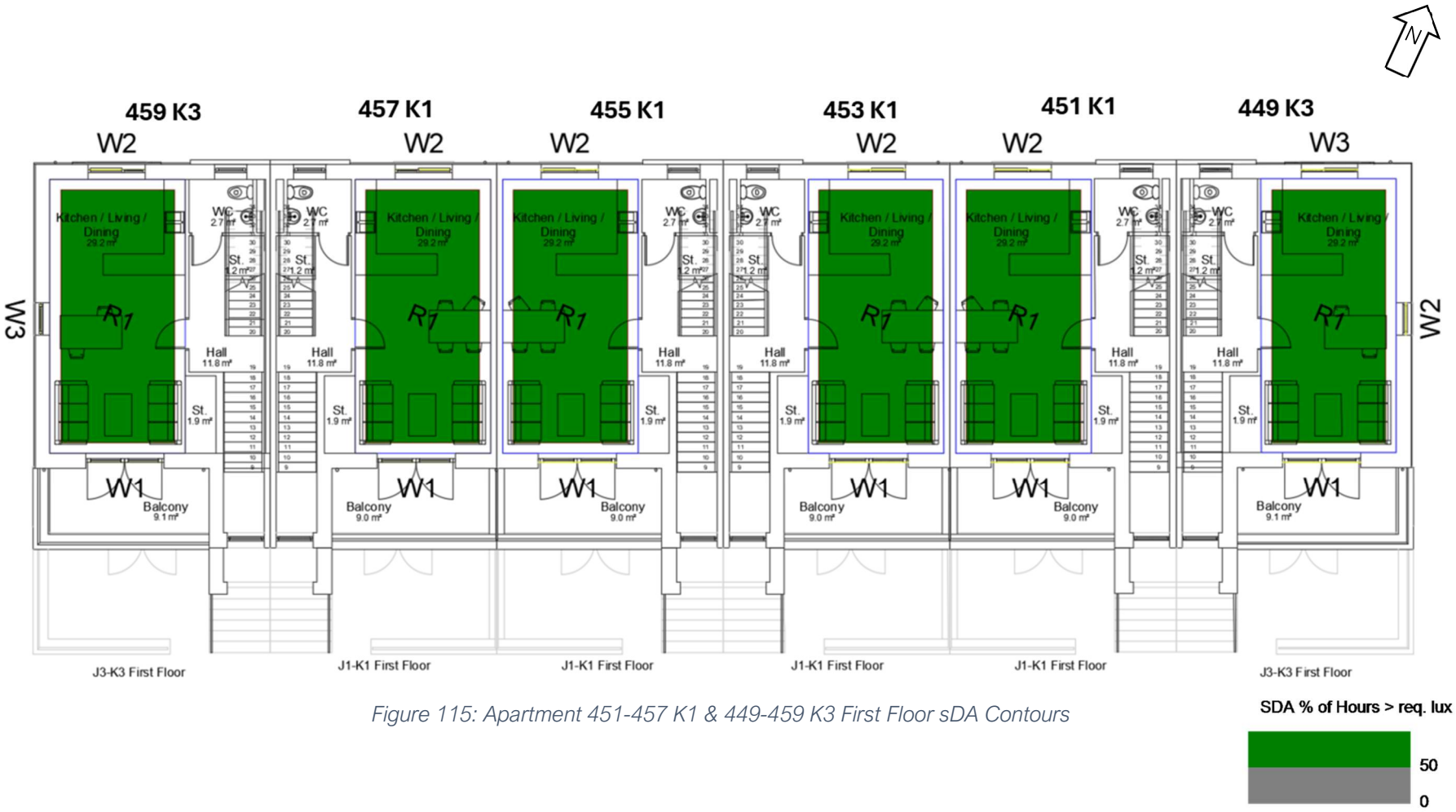


Figure 115: Apartment 451-457 K1 & 449-459 K3 First Floor sDA Contours

Figure 116: Apartment 451-457 K1 & 449-459 K3 Second Floor sDA Contours

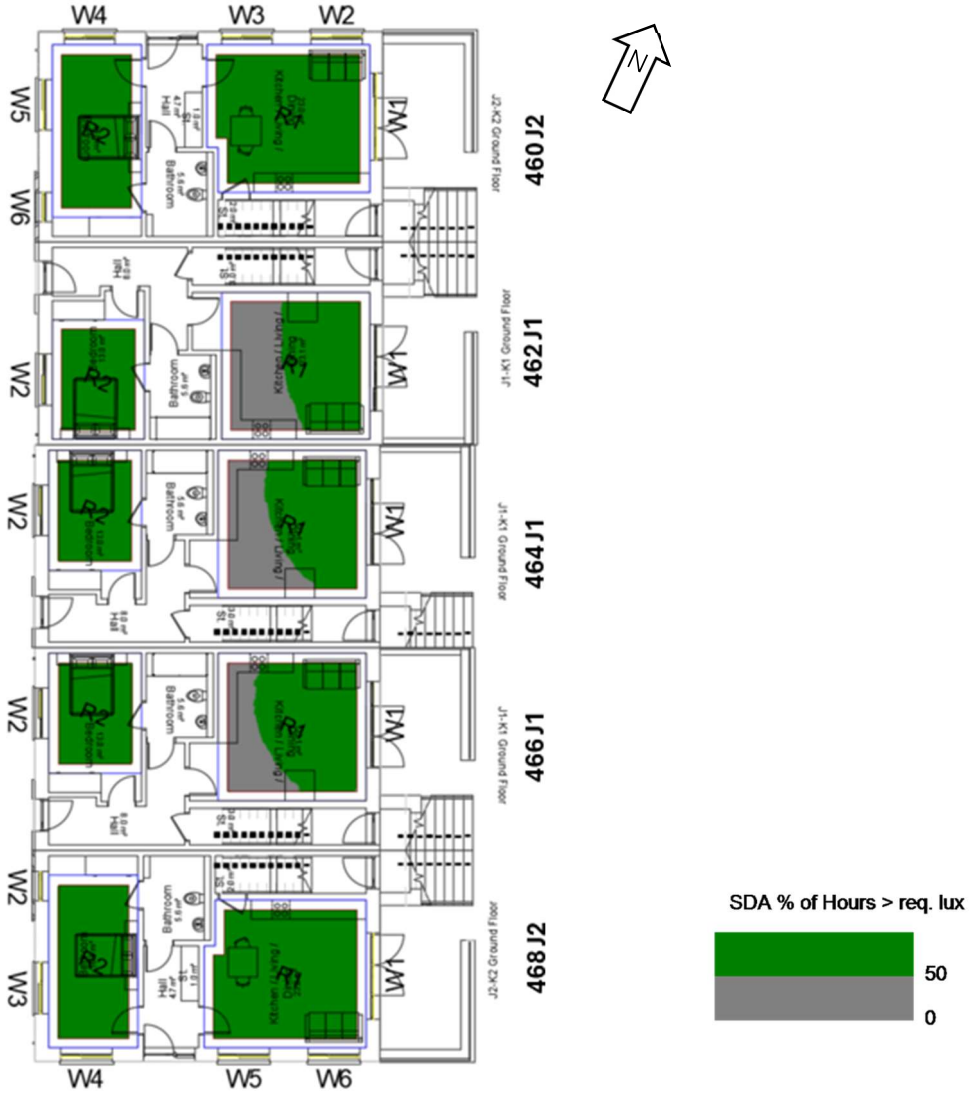


Figure 117: Apartment 462-466 J1 & 460-468 J2 Ground Floor sDA Contours

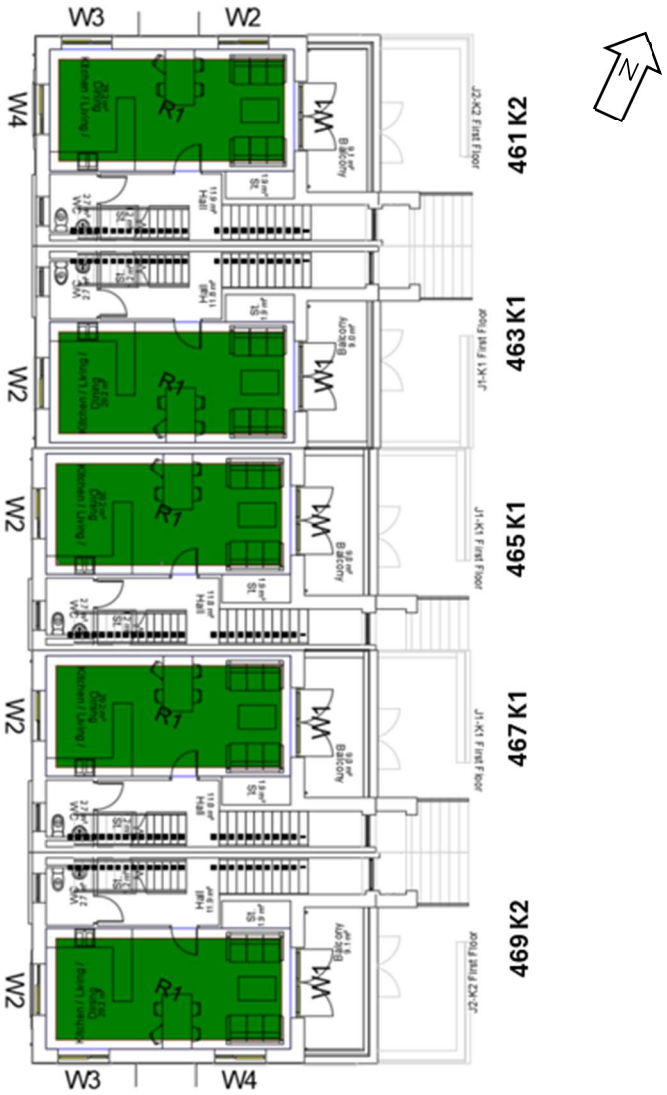


Figure 118: Apartment K1 & 461-469 K2 First Floor sDA Contours

Figure 119: Apartment 463-467 K1 & 461-469 K2 Second Floor sDA Contours

Appendix B Solar Exposure - Detailed Results

Understanding the Tables

- In the following tables, the *units* (apartments or duplexes) that fail the solar exposure test are highlighted.
- For a unit to fail, *all* rooms in that unit must fail the test. (If any habitable room meets the criterion, then the criterion for that unit is met, regardless if some rooms fail.)
- The last row for each room is the sunlight exposure for the room, which is the sum of sunlight exposure for each window to that room at non-concurrent times.
- The window and room labels from Appendix A should be used as the legend for the tables.

B.1 Duplex Blocks

Table 92: Duplex Unit 248-249 M3-N3 & 250-251 M2-N2 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
248-249 M3-N3								
Ground	R1	248 M3	Residential	KD	W1	58°N	0.5	
					W2	58°N	0	
					W5	148°	6.2	
							6.2	High
Ground	R2		Residential	Bedroom	W3	238°	4.9	
					W4	148°	6.2	
							9.4	High
First	R1	249 N3	Residential	LKD	W1	58°N	1.2	
					W2	238°	4.9	
					W3	148°	6.2	
					W4	148°	6.2	
							9.4	High
Second	R1		Residential	Bedroom	W3	148°	6.2	
							6.2	High
Second	R2		Residential	Bedroom	W1	238°	4.9	
					W2	148°	6.2	
							9.4	High
250-251 M2-N2								
Ground	R1	250 M2	Residential	KD	W1	58°N	0	
					W2	58°N	0.6	
							0.6	Failed
Ground	R2		Residential	Bedroom	W3	238°	4.3	
							4.3	High
First	R1	251 N2	Residential	LKD	W1	58°N	1.2	
					W2	238°	4.9	
							6	High
Second	R1		Residential	Bedroom	W1	58°N	1.2	
							1.2	Failed
Second	R2		Residential	Bedroom	W2	238°	4.9	
							4.9	High

Table 93: Duplex Unit 252-253 M1-N1 & 254-255 M2-N2 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
252-253 M1-N1								
Ground	R1	252 M1	Residential	KD	W1	58°N	1.2	
					W2	58°N	0	
							1.2	Failed
Ground	R2		Residential	Bedroom	W3	238°	3.7	
							3.7	Medium
First	R1	253 N1	Residential	LKD	W1	58°N	1.2	
					W2	238°	4.2	
							5.3	High
Second	R1		Residential	Bedroom	W1	58°N	1.2	
							1.2	Failed
Second	R2		Residential	Bedroom	W2	238°	4.9	
							4.9	High
254-255 M2-N2								
Ground	R1	254 M2	Residential	KD	W1	58°N	0	
					W2	58°N	1	
							1	Failed
Ground	R2		Residential	Bedroom	W3	238°	4.7	
							4.7	High
First	R1	255 N2	Residential	LKD	W1	58°N	1.2	
					W2	238°	4.9	
							6	High
Second	R1		Residential	Bedroom	W1	58°N	1.2	
							1.2	Failed
Second	R2		Residential	Bedroom	W2	238°	4.9	
							4.9	High

Table 94: Duplex Unit 256-257 M2-N2 & 258-259 M1-N1Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
256-257 M2-N2								
Ground	R1	256 M2	Residential	KD	W1	58°N	0.9	
					W2	58°N	0	
							0.9	Failed
Ground	R2		Residential	Bedroom	W3	238°	4.9	
							4.9	High
First	R1	257 N2	Residential	LKD	W1	58°N	1.2	
					W2	238°	4.9	
							6	High
Second	R1		Residential	Bedroom	W1	58°N	1.2	
							1.2	Failed
Second	R2		Residential	Bedroom	W2	238°	4.9	
							4.9	High
258-259 M1-N1								
Ground	R1	258 M1	Residential	KD	W1	58°N	0	
					W2	58°N	0.9	
							0.9	Failed
Ground	R2		Residential	Bedroom	W3	238°	4.7	
							4.7	High
First	R1	259 N1	Residential	LKD	W1	58°N	1.2	
					W2	238°	4.9	
							6	High
Second	R1		Residential	Bedroom	W1	58°N	1.2	
							1.2	Failed
Second	R2		Residential	Bedroom	W2	238°	4.9	
							4.9	High

Table 95: Duplex Unit 260-261 M1-N1 & 262-263 M2-N2 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
260-261 M1-N1								
Ground	R1	260 M1	Residential	KD	W1	58°N	0.9	
					W2	58°N	0	
							0.9	Failed
Ground	R2		Residential	Bedroom	W3	238°	4.1	
							4.1	High
First	R1	261 N1	Residential	LKD	W1	58°N	1.2	
					W2	238°	4.6	
							5.8	High
Second	R1		Residential	Bedroom	W1	58°N	1.2	
							1.2	Failed
Second	R2		Residential	Bedroom	W2	238°	4.9	
							4.9	High
262-263 M2-N2								
Ground	R1	262 M2	Residential	KD	W1	58°N	0	
					W2	58°N	0.9	
							0.9	Failed
Ground	R2		Residential	Bedroom	W3	238°	3.6	
							3.6	Medium
First	R1	263 N2	Residential	LKD	W1	58°N	1.2	
					W2	238°	4.9	
							6	High
Second	R1		Residential	Bedroom	W1	58°N	1.2	
							1.2	Failed
Second	R2		Residential	Bedroom	W2	238°	4.9	
							4.9	High

Table 96: Duplex 264-265 M2-N2 & 266-267 M1-N1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
264-265 M2-N2								
Ground	R1	**264 M2**	Residential	KD	W1	58°N	1.1	
					W2	58°N	0	
							1.1	Failed
Ground	R2		Residential	Bedroom	W3	238°	4.9	
							4.9	High
First	R1	**265 N2**	Residential	LKD	W1	58°N	1.2	
					W2	238°	4.9	
							6	High
Second	R1		Residential	Bedroom	W1	58°N	1.2	
							1.2	Failed
Second	R2		Residential	Bedroom	W2	238°	4.9	
							4.9	High
266-267 M1-N1								
Ground	R1	**266 M1**	Residential	KD	W1	58°N	0	
					W2	58°N	1.1	
							1.1	Failed
Ground	R2		Residential	Bedroom	W3	238°	4.7	
							4.7	High
First	R1	**267 N1**	Residential	LKD	W1	58°N	1.2	
					W2	238°	4.9	
							6	High
Second	R1		Residential	Bedroom	W1	58°N	1.2	
							1.2	Failed
Second	R2		Residential	Bedroom	W2	238°	4.9	
							4.9	High

B.2 Apartment Blocks

Table 97: Apartment 322-323 J2-K2 & 324-325 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
322-323 J2-K2								
Ground	R1	322 J2	Residential	LKD	W1	158°	7.3	
					W5	248°	3.6	
					W6	248°	3.6	
							8.5	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
					W3	338°N	0	
					W4	248°	3.6	
							3.6	Medium
First	R1	323 K2	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
					W3	248°	4.1	
					W4	248°	4.2	
							7.7	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
					W4	248°	4.4	
							9.4	High
Second	R2		Residential	Bedroom	W2	338°N	0	
					W3	248°	4.4	
							4.4	High
324-325 J1-K1								
Ground	R1	324 J1	Residential	LKD	W1	158°	7	
							7	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	325 K1	Residential	LKD	W1	158°	5.3	
					W2	338°N	0	
							5.3	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed

Table 98: Apartment 326-327 J1-K1 & 328-329 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
326-327 J1-K1								
Ground	R1	326 J1	Residential	LKD	W1	158°	6.3	
							6.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	327 K1	Residential	LKD	W1	158°	6.2	
					W2	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
328-329 J1-K1								
Ground	R1	328 J1	Residential	LKD	W1	158°	7.3	
							7.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	329 K1	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
							5.7	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed

Table 99: Apartment 330-333 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
330-331 J1-K1								
Ground	R1	**330 J1**	Residential	LKD	W1	158°	6.3	
							6.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**331 K1**	Residential	LKD	W1	158°	6.2	
					W2	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
332-333 J1-K1								
Ground	R1	**332 J1**	Residential	LKD	W1	158°	7.3	
							7.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**333 K1**	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
							5.7	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed

Table 100: Apartment 334-335 J3-K3 & 336-337 J2-K2 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
334-335 J3-K3								
Ground	R1	**334 J3**	Residential	LKD	W1	158°	6.3	
					W2	68°N	1.7	
							6.3	High
Ground	R2		Residential	Bedroom	W3	338°N	0	
							0	Failed
First	R1	**335 K3**	Residential	LKD	W1	158°	6.2	
					W2	68°N	0.5	
					W3	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
					W2	68°N	0.6	
							7.3	High
Second	R2		Residential	Bedroom	W3	338°N	0	
							0	Failed
336-337 J2-K2								
Ground	R1	**336 J2**	Residential	LKD	W1	248°	4.1	
					W2	158°	6.8	
					W3	158°	6.8	
							8.7	High
Ground	R2		Residential	Bedroom	W4	158°	6.3	
					W5	68°N	1.7	
					W6	68°N	0.1	
							6.3	High
First	R1	**337 K2**	Residential	LKD	W1	248°	4.7	
					W2	158°	6.8	
					W3	158°	6.8	
					W4	68°N	1.7	
							9.4	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
					W2	158°	6.8	
							9.4	High
Second	R2		Residential	Bedroom	W3	158°	6.8	
					W4	68°N	1.7	
							6.8	High

Table 101: Apartment 338-341 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
338-339 J1-K1								
Ground	R1	338 J1	Residential	LKD	W1	248°	1.3	
							1.3	Failed
Ground	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
First	R1	339 K1	Residential	LKD	W1	248°	2.9	
					W2	68°N	1.7	
							4.6	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
340-341 J1-K1								
Ground	R1	340 J1	Residential	LKD	W1	248°	2.6	
							2.6	Minimum
Ground	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
First	R1	341 K1	Residential	LKD	W1	248°	4.7	
					W2	68°N	1.7	
							6.4	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum

Table 102: Apartment 342-345 J3-K3 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
342-343 J3-K3								
Ground	R1	342 J3	Residential	LKD	W1	248°	3.8	
					W3	338°N	0	
							3.8	Medium
Ground	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
First	R1	343 K3	Residential	LKD	W1	248°	4.2	
					W2	68°N	1.7	
					W3	338°N	0	
							5.9	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
					W3	338°N	0	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
344-345 J3-K3								
Ground	R1	344 J3	Residential	LKD	W1	248°	4.8	
					W2	158°	3.7	
							6.2	High
Ground	R2		Residential	Bedroom	W3	68°N	1.7	
							1.7	Minimum
First	R1	345 K3	Residential	LKD	W1	248°	4.7	
					W2	158°	1.6	
					W3	68°N	1.7	
							6.4	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
					W2	158°	5.4	
							8.9	High
Second	R2		Residential	Bedroom	W3	68°N	1.7	
							1.7	Minimum

Table 103: Apartment 346-349 J1-K1Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
346-347 J1-K1								
Ground	R1	**346 J1**	Residential	LKD	W1	248°	3.8	
							3.8	Medium
Ground	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
First	R1	**347 K1**	Residential	LKD	W1	248°	4.2	
					W2	68°N	1.7	
							5.9	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
348-349 J1-K1								
Ground	R1	**348 J1**	Residential	LKD	W1	248°	4	
							4	Medium
Ground	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
First	R1	**349 K1**	Residential	LKD	W1	248°	4.7	
					W2	68°N	1.7	
							6.3	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum

Table 104: Apartment 350-351 J2-K2 & 352-353 J3-K3 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
350-351 J2-K2								
Ground	R1	**350 J2**	Residential	LKD	W1	248°	1.3	
					W5	338°N	0	
					W6	338°N	0	
							1.3	Failed
Ground	R2		Residential	Bedroom	W2	68°N	0.1	
					W3	68°N	1.7	
					W4	338°N	0	
							1.7	Minimum
First	R1	**351 K2**	Residential	LKD	W1	248°	2.8	
					W2	68°N	1.7	
					W3	338°N	0	
					W4	338°N	0	
							4.4	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
					W4	338°N	0	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
					W3	338°N	0	
							1.7	Minimum
352-353 J3-K3								
Ground	R1	**352 J3**	Residential	LKD	W1	158°	5.8	
					W2	68°N	0.8	
							5.8	High
Ground	R2		Residential	Bedroom	W3	338°N	0	
							0	Failed
First	R1	**353 K3**	Residential	LKD	W1	158°	6.2	
					W2	68°N	0.4	
					W3	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
					W2	68°N	0.6	
							7.3	High
Second	R2		Residential	Bedroom	W3	338°N	0	
							0	Failed

Table 105: Apartment 354-357 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
354-355 J1-K1								
Ground	R1	**354 J1**	Residential	LKD	W1	158°	7.3	
							7.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**355 K1**	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
							5.7	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
356-357 J1-K1								
Ground	R1	**356 J1**	Residential	LKD	W1	158°	6.3	
							6.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**357 K1**	Residential	LKD	W1	158°	6.2	
					W2	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed

Table 106: Apartment 358-361 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
358-359 J1-K1								
Ground	R1	**358 J1**	Residential	LKD	W1	158°	7.3	
							7.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**359 K1**	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
							5.7	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
360-361 J1-K1								
Ground	R1	**360 J1**	Residential	LKD	W1	158°	6.3	
							6.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**361 K1**	Residential	LKD	W1	158°	6.2	
					W2	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed

Table 107: Apartment 362-365 J2-K2 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
362-363 J2-K2								
Ground	R1	362 J2	Residential	LKD	W1	158°	7.3	
					W5	248°	3.9	
					W6	248°	3.9	
							8.9	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
					W3	338°N	0	
					W4	248°	3.9	
							3.9	Medium
First	R1	363 K2	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
					W3	248°	4.4	
					W4	248°	4.4	
							7.9	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
					W4	248°	4.4	
							9.4	High
Second	R2		Residential	Bedroom	W2	338°N	0	
					W3	248°	4.4	
							4.4	High
364-365 J2-K2								
Ground	R1	364 J2	Residential	LKD	W1	68°N	1	
					W2	338°N	0	
					W3	338°N	0	
							1	Failed
Ground	R2		Residential	Bedroom	W4	338°N	0	
					W5	248°	4.4	
					W6	248°	3.2	
							4.4	High
First	R1	365 K2	Residential	LKD	W1	68°N	0	
					W2	338°N	0	
					W3	338°N	0	
					W4	248°	4.4	
							4.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
					W2	338°N	0	
							2.2	Minimum
Second	R2		Residential	Bedroom	W3	338°N	0	
					W4	248°	4.4	
							4.4	High

Table 108: Apartment 366-369 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
366-367 J1-K1								
Ground	R1	366 J1	Residential	LKD	W1	68°N	2.3	
							2.3	Minimum
Ground	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
First	R1	367 K1	Residential	LKD	W1	68°N	2.2	
					W2	248°	4.4	
							6.5	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
							2.2	Minimum
Second	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
368-369 J1-K1								
Ground	R1	386 J1	Residential	LKD	W1	68°N	1	
							1	Failed
Ground	R2		Residential	Bedroom	W2	248°	4.3	
							4.3	High
First	R1	369 K1	Residential	LKD	W1	68°N	0	
					W2	248°	4.4	
							4.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
							2.2	Minimum
Second	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High

Table 109: Apartment 370-373 J3-K3 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
370-371 J3-K3								
Ground	R1	**370 J3**	Residential	LKD	W1	68°N	2.3	
					W3	158°	4.3	
							4.3	High
Ground	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
First	R1	**371 K3**	Residential	LKD	W1	68°N	2.2	
					W2	248°	4.4	
					W3	158°	4.1	
							8.1	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
					W3	158°	5.4	
							5.9	High
Second	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
372-373 J3-K3								
Ground	R1	**372 J3**	Residential	LKD	W1	68°N	0.9	
					W2	338°N	0	
							0.9	Failed
Ground	R2		Residential	Bedroom	W3	248°	4.4	
							4.4	High
First	R1	**373 K3**	Residential	LKD	W1	68°N	0	
					W2	338°N	0	
					W3	248°	4.4	
							4.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
					W2	338°N	0	
							2.2	Minimum
Second	R2		Residential	Bedroom	W3	248°	4.4	
							4.4	High

Table 110: Apartment 374-377 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
374-375 J1-K1								
Ground	R1	**374 J1**	Residential	LKD	W1	68°N	2.3	
							2.3	Minimum
Ground	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
First	R1	**375 K1**	Residential	LKD	W1	68°N	2.2	
					W2	248°	4.4	
							6.5	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
							2.2	Minimum
Second	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
376-377 J1-K1								
Ground	R1	**376 J1**	Residential	LKD	W1	68°N	1	
							1	Failed
Ground	R2		Residential	Bedroom	W2	248°	4.3	
							4.3	High
First	R1	**377 K1**	Residential	LKD	W1	68°N	0	
					W2	248°	4.4	
							4.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
							2.2	Minimum
Second	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High

Table 111: Apartment 378-381 J2-K2 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
378-379 J2-K2								
Ground	R1	378 J2	Residential	LKD	W1	68°N	2.3	
					W5	158°	5.9	
					W6	158°	6.8	
							6.8	High
Ground	R2		Residential	Bedroom	W2	248°	3.2	
					W3	248°	4.4	
					W4	158°	6.8	
							9.4	High
First	R1	379 K2	Residential	LKD	W1	68°N	2.2	
					W2	248°	4.4	
					W3	158°	6.8	
					W4	158°	6.8	
							9.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
					W4	158°	6.8	
							6.8	High
Second	R2		Residential	Bedroom	W2	248°	4.4	
					W3	158°	6.8	
							9.4	High
380-381 J2-K2								
Ground	R1	380 J2	Residential	LKD	W1	248°	4.5	
					W2	158°	6.8	
					W3	158°	6.8	
							9.1	High
Ground	R2		Residential	Bedroom	W4	158°	6.3	
					W5	68°N	1.7	
					W6	68°N	0.1	
							6.3	High
First	R1	381 K2	Residential	LKD	W1	248°	4.7	
					W2	158°	6.8	
					W3	158°	6.8	
					W4	68°N	1.7	
							9.4	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
					W2	158°	6.8	
							9.4	High
Second	R2		Residential	Bedroom	W3	158°	6.8	
					W4	68°N	1.7	
							6.8	High

Table 112: Apartment 382-385 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
382-383 J1-K1								
Ground	R1	382 J1	Residential	LKD	W1	248°	3.5	
							3.5	Medium
Ground	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
First	R1	383 K1	Residential	LKD	W1	248°	4.2	
					W2	68°N	1.7	
							5.9	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
384-385 J1-K1								
Ground	R1	384 J1	Residential	LKD	W1	248°	4.5	
							4.5	High
Ground	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
First	R1	385 K1	Residential	LKD	W1	248°	4.7	
					W2	68°N	1.7	
							6.4	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum

Table 113: Apartment 386-387 J1-K1 & 388-389 J3-K3 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
386-387 J1-K1								
Ground	R1	**386 J1**	Residential	LKD	W1	248°	3.5	
							3.5	Medium
Ground	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
First	R1	**387 K1**	Residential	LKD	W1	248°	4.2	
					W2	68°N	1.7	
							5.9	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
388-389 J3-K3								
Ground	R1	**388 J3**	Residential	LKD	W1	248°	3.7	
					W3	338°N	0	
							3.7	Medium
Ground	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
First	R1	**389 K3**	Residential	LKD	W1	248°	4.2	
					W2	68°N	1.7	
					W3	338°N	0	
							5.9	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
					W3	338°N	0	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum

Table 114: Apartment 390-391 J2-K2 & 392-393 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
390-391 J2-K2								
Ground	R1	**390 J2**	Residential	LKD	W1	158°	5.3	
					W2	68°N	1.7	
					W3	68°N	1.7	
							5.3	High
Ground	R2		Residential	Bedroom	W4	68°N	1.5	
					W5	338°N	0	
					W6	338°N	0	
							1.5	Minimum
First	R1	**391 K2**	Residential	LKD	W1	158°	6.2	
					W2	68°N	1.7	
					W3	68°N	1.7	
					W4	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
					W2	68°N	1.7	
							7.3	High
Second	R2		Residential	Bedroom	W3	68°N	1.7	
					W4	338°N	0	
							1.7	Minimum
392-393 J1-K1								
Ground	R1	**392 J1**	Residential	LKD	W1	338°N	0	
							0	Failed
Ground	R2		Residential	Bedroom	W2	158°	5.5	
							5.5	High
First	R1	**393 K1**	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
							5.7	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed

Table 115: Apartment 394-397 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
394-395 J1-K1								
Ground	R1	**394 J1**	Residential	LKD	W1	158°	4.6	
							4.6	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**395 K1**	Residential	LKD	W1	158°	6.2	
					W2	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
396-397 J1-K1								
Ground	R1	**396 J1**	Residential	LKD	W1	158°	6.9	
							6.9	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**397 K1**	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
							5.7	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed

Table 116: Apartment 398-401 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
398-399 J1-K1								
Ground	R1	**398 J1**	Residential	LKD	W1	158°	6	
							6	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**399 K1**	Residential	LKD	W1	158°	6.2	
					W2	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
400-401 J1-K1								
Ground	R1	**400 J1**	Residential	LKD	W1	158°	7.3	
							7.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**401 K1**	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
							5.7	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed

Table 117: Apartment 402-405 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
402-403 J1-K1								
Ground	R1	**402 J1**	Residential	LKD	W1	158°	6.3	
							6.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**403 K1**	Residential	LKD	W1	158°	6.2	
					W2	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
404-405 J1-K1								
Ground	R1	**404 J1**	Residential	LKD	W1	158°	4.1	
							4.1	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**405 K1**	Residential	LKD	W1	158°	4.6	
					W2	338°N	0	
							4.6	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed

Table 118: Apartment 406-407 J2-K2 & 408-409 J3-K3 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
406-407 J2-K2								
Ground	R1	**406 J2**	Residential	LKD	W1	158°	5.4	
					W5	248°	4.3	
					W6	248°	4.4	
							7.4	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
					W3	338°N	0	
					W4	248°	4.4	
							4.4	High
First	R1	**407 K2**	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
					W3	248°	4.4	
					W4	248°	4.4	
							7.9	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
					W4	248°	4.4	
							9.4	High
Second	R2		Residential	Bedroom	W2	338°N	0	
					W3	248°	4.4	
							4.4	High
408-409 J3-K3								
Ground	R1	**408 J3**	Residential	LKD	W1	68°N	1	
					W2	338°N	0	
							1	Failed
Ground	R2		Residential	Bedroom	W3	248°	4.4	
							4.4	High
First	R1	**409 K3**	Residential	LKD	W1	68°N	0	
					W2	338°N	0	
					W3	248°	4.4	
							4.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
					W2	338°N	0	
							2.2	Minimum
Second	R2		Residential	Bedroom	W3	248°	4.4	
							4.4	High

Table 119: Apartment 410-413 J1-K1Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
410-411 J1-K1								
Ground	R1	**410 J1**	Residential	LKD	W1	68°N	1	
							1	Failed
Ground	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
First	R1	**411 K1**	Residential	LKD	W1	68°N	0	
					W2	248°	4.4	
							4.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
							2.2	Minimum
Second	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
412-413 J1-K1								
Ground	R1	**412 J1**	Residential	LKD	W1	68°N	2.3	
							2.3	Minimum
Ground	R2		Residential	Bedroom	W2	248°	3.9	
							3.9	Medium
First	R1	**413 K1**	Residential	LKD	W1	68°N	2.2	
					W2	248°	4.4	
							6.5	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
							2.2	Minimum
Second	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High

Table 120: Apartment 414-415 J1-K1 & 416-417 J2-K2 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
414-415 J1-K1								
Ground	R1	**414 J1**	Residential	LKD	W1	68°N	1	
							1	Failed
Ground	R2		Residential	Bedroom	W2	248°	4.1	
							4.1	High
First	R1	**415 K1**	Residential	LKD	W1	68°N	0.9	
					W2	248°	3.5	
							4.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
							2.2	Minimum
Second	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
416-417 J2-K2								
Ground	R1	**416 J2**	Residential	LKD	W1	68°N	2.3	
					W5	158°	5.9	
					W6	158°	6.8	
							6.8	High
Ground	R2		Residential	Bedroom	W2	248°	3.2	
					W3	248°	4.4	
					W4	158°	6.8	
							9.4	High
First	R1	**417 K2**	Residential	LKD	W1	68°N	2.2	
					W2	248°	4.4	
					W3	158°	6.8	
					W4	158°	6.8	
							9.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
					W4	158°	6.8	
							6.8	High
Second	R2		Residential	Bedroom	W2	248°	4.4	
					W3	158°	6.8	
							9.4	High

Table 121: Apartment 418-419 J2-K2 & 420-421 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
418-419 J2-K2								
Ground	R1	**418 J2**	Residential	LKD	W1	158°	6.3	
					W2	68°N	1.7	
					W3	68°N	1.7	
							6.3	High
Ground	R2		Residential	Bedroom	W4	68°N	1.3	
					W5	338°N	0	
					W6	338°N	0	
							1.3	Failed
First	R1	**419 K2**	Residential	LKD	W1	158°	6.2	
					W2	68°N	1.7	
					W3	68°N	1.7	
					W4	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
					W2	68°N	1.7	
							7.3	High
Second	R2		Residential	Bedroom	W3	68°N	1.7	
					W4	338°N	0	
							1.7	Minimum
420-421 J1-K1								
Ground	R1	**420 J1**	Residential	LKD	W1	158°	7	
							7	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**421 K1**	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
							5.7	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed

Table 122: Apartment 422-425 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
422-423 J1-K1								
Ground	R1	**422 J1**	Residential	LKD	W1	158°	7.3	
							7.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**423 K1**	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
							5.7	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
424-425 J1-K1								
Ground	R1	**424 J1**	Residential	LKD	W1	158°	6.3	
							6.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**425 K1**	Residential	LKD	W1	158°	6.2	
					W2	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed

Table 123: Apartment 426-427 J3-K3 & 428-429 J2-K2 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
426-427 J3-K3								
Ground	R1	426 J3	Residential	LKD	W1	158°	7.3	
					W3	248°	2.3	
							7.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	427 K3	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
					W3	248°	2.5	
							6.8	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
					W3	248°	3.5	
							9.4	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
428-429 J2-K2								
Ground	R1	428 J2	Residential	LKD	W1	68°N	1	
					W2	338°N	0	
					W3	338°N	0	
							1	Failed
Ground	R2		Residential	Bedroom	W4	338°N	0	
					W5	248°	3.6	
					W6	248°	2.5	
							3.6	Medium
First	R1	429 K2	Residential	LKD	W1	68°N	0	
					W2	338°N	0	
					W3	338°N	0	
					W4	248°	4.3	
							4.3	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
					W2	338°N	0	
							2.2	Minimum
Second	R2		Residential	Bedroom	W3	338°N	0	
					W4	248°	4.4	
							4.4	High

Table 124: Apartment 430-431 J1-K1 & 432-433 J2-K2 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
430-431 J1-K1								
Ground	R1	430 J1	Residential	LKD	W1	68°N	1	
							1	Failed
Ground	R2		Residential	Bedroom	W2	248°	3.7	
							3.7	Medium
First	R1	431 K1	Residential	LKD	W1	68°N	0	
					W2	248°	4.3	
							4.3	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
							2.2	Minimum
Second	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
432-433 J2-K2								
Ground	R1	432 J2	Residential	LKD	W1	68°N	2.3	
					W5	158°	5.9	
					W6	158°	6.8	
							6.8	High
Ground	R2		Residential	Bedroom	W2	248°	2.5	
					W3	248°	3.7	
					W4	158°	6.8	
							8.8	High
First	R1	433 K2	Residential	LKD	W1	68°N	2.2	
					W2	248°	4.4	
					W3	158°	6.8	
					W4	158°	6.8	
							9.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
					W4	158°	6.8	
							6.8	High
Second	R2		Residential	Bedroom	W2	248°	4.4	
					W3	158°	6.8	
							9.4	High

Table 125: Apartment 438439 J2-K2 & 440-441 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
438-439 J2-K2								
Ground	R1	**438 J2**	Residential	LKD	W1	248°	4.8	
					W2	158°	6.8	
					W3	158°	6.8	
							9.4	High
Ground	R2		Residential	Bedroom	W4	158°	6.3	
					W5	68°N	1.7	
					W6	68°N	0.1	
							6.3	High
First	R1	**439 K2**	Residential	LKD	W1	248°	4.7	
					W2	158°	6.8	
					W3	158°	6.8	
					W4	68°N	1.7	
							9.4	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
					W2	158°	6.8	
							9.4	High
Second	R2		Residential	Bedroom	W3	158°	6.8	
					W4	68°N	1.7	
							6.8	High
440-441 J1-K1								
Ground	R1	**440 J1**	Residential	LKD	W1	248°	3.8	
							3.8	Medium
Ground	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
First	R1	**441 K1**	Residential	LKD	W1	248°	4.2	
					W2	68°N	1.7	
							5.9	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum

Table 126: Apartment 442-445 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
442-443 J1-K1								
Ground	R1	**442 J1**	Residential	LKD	W1	248°	4.5	
							4.5	High
Ground	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
First	R1	**443 K1**	Residential	LKD	W1	248°	4.7	
					W2	68°N	1.7	
							6.4	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum
444-445 J1-K1								
Ground	R1	**444 J1**	Residential	LKD	W1	248°	3.2	
							3.2	Medium
Ground	R2		Residential	Bedroom	W2	68°N	1.4	
							1.4	Failed
First	R1	**445 K1**	Residential	LKD	W1	248°	4.2	
					W2	68°N	1.7	
							5.9	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
							1.7	Minimum

Table 127: Apartment 446-447 J2-K2 & 448-449 J3-K3 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
446-447 J2-K2								
Ground	R1	446 J2	Residential	LKD	W1	248°	1.9	
					W5	338°N	0	
					W6	338°N	0	
							1.9	Minimum
Ground	R2		Residential	Bedroom	W2	68°N	0	
					W3	68°N	1.4	
					W4	338°N	0	
							1.4	Failed
First	R1	447 K2	Residential	LKD	W1	248°	4.2	
					W2	68°N	1.7	
					W3	338°N	0	
					W4	338°N	0	
							5.9	High
Second	R1		Residential	Bedroom	W1	248°	4.7	
					W4	338°N	0	
							4.7	High
Second	R2		Residential	Bedroom	W2	68°N	1.7	
					W3	338°N	0	
							1.7	Minimum
448-449 J3-K3								
Ground	R1	448 J3	Residential	LKD	W1	157°	5.4	
					W2	67°N	0.6	
							5.4	High
Ground	R2		Residential	Bedroom	W3	337°N	0	
							0	Failed
First	R1	449 K3	Residential	LKD	W1	157°	6	
					W2	67°N	0.2	
					W3	337°N	0	
							6	High
Second	R1		Residential	Bedroom	W1	157°	7.3	
					W2	67°N	0.6	
							7.3	High
Second	R2		Residential	Bedroom	W3	337°N	0	
							0	Failed

Table 128: Apartment 450-453 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
450-451 J1-K1								
Ground	R1	450 J1	Residential	LKD	W1	157°	7.3	
							7.3	High
Ground	R2		Residential	Bedroom	W2	337°N	0	
							0	Failed
First	R1	451 K1	Residential	LKD	W1	157°	5.7	
					W2	337°N	0	
							5.7	High
Second	R1		Residential	Bedroom	W1	157°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	337°N	0	
							0	Failed
452-453 J1-K1								
Ground	R1	452 J1	Residential	LKD	W1	157°	6.3	
							6.3	High
Ground	R2		Residential	Bedroom	W2	337°N	0	
							0	Failed
First	R1	453 K1	Residential	LKD	W1	157°	6.2	
					W2	337°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	157°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	337°N	0	
							0	Failed

Table 129: Apartment 454-457 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
454-455 J1-K1								
Ground	R1	**454 J1**	Residential	LKD	W1	158°	7.3	
							7.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**455 K1**	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
							5.7	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
456-457 J1-K1								
Ground	R1	**456 J1**	Residential	LKD	W1	158°	6.3	
							6.3	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**457 K1**	Residential	LKD	W1	158°	6.2	
					W2	338°N	0	
							6.2	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
							7.3	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed

Table 130: Apartment 458-459 J3-K3 & 460-461 J2-K2 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
458-459 J3-K3								
Ground	R1	**458 J3**	Residential	LKD	W1	158°	7.3	
					W3	248°	2.7	
							7.7	High
Ground	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
First	R1	**459 K3**	Residential	LKD	W1	158°	5.7	
					W2	338°N	0	
					W3	248°	2.8	
							7.1	High
Second	R1		Residential	Bedroom	W1	158°	7.3	
					W3	248°	3.5	
							9.4	High
Second	R2		Residential	Bedroom	W2	338°N	0	
							0	Failed
460-461 J2-K2								
Ground	R1	**460 J2**	Residential	LKD	W1	68°N	0.6	
					W2	338°N	0	
					W3	338°N	0	
							0.6	Failed
Ground	R2		Residential	Bedroom	W4	338°N	0	
					W5	248°	4.3	
					W6	248°	3.1	
							4.3	High
First	R1	**461 K2**	Residential	LKD	W1	68°N	0	
					W2	338°N	0	
					W3	338°N	0	
					W4	248°	4.4	
							4.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
					W2	338°N	0	
							2.2	Minimum
Second	R2		Residential	Bedroom	W3	338°N	0	
					W4	248°	4.4	
							4.4	High

Table 131: Apartment 462-465 J1-K1 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
462-463 J1-K1								
Ground	R1	**462 J1**	Residential	LKD	W1	68°N	2.3	
							2.3	Minimum
Ground	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
First	R1	**463 1**	Residential	LKD	W1	68°N	2.2	
					W2	248°	4.4	
							6.5	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
							2.2	Minimum
Second	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
464-465 J1-K1								
Ground	R1	**464 J1**	Residential	LKD	W1	68°N	1	
							1	Failed
Ground	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
First	R1	**465 K1**	Residential	LKD	W1	68°N	0	
					W2	248°	4.4	
							4.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
							2.2	Minimum
Second	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High

Table 132: Apartment 466-467 J1-K1 & 468-469 J2-K2 Sunlight Exposure Results

Floor Ref	Room Ref	Room Attribute (Unit)	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure	Rating
466-467 J1-K1								
Ground	R1	**466 J1**	Residential	LKD	W1	68°N	1	
							1	Failed
Ground	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
First	R1	**467 K1**	Residential	LKD	W1	68°N	0	
					W2	248°	4.4	
							4.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
							2.2	Minimum
Second	R2		Residential	Bedroom	W2	248°	4.4	
							4.4	High
469-468 J2-K2								
Ground	R1	**469 J2**	Residential	LKD	W1	68°N	2.3	
					W5	158°	5.9	
					W6	158°	6.8	
							6.8	High
Ground	R2		Residential	Bedroom	W2	248°	3.2	
					W3	248°	4.4	
					W4	158°	6.8	
							9.4	High
First	R1	**468 K2**	Residential	LKD	W1	68°N	2.2	
					W2	248°	4.4	
					W3	158°	6.8	
					W4	158°	6.8	
							9.4	High
Second	R1		Residential	Bedroom	W1	68°N	2.2	
					W4	158°	6.8	
							6.8	High
Second	R2		Residential	Bedroom	W2	248°	4.4	
					W3	158°	6.8	
							9.4	High

Appendix C Shadow Images

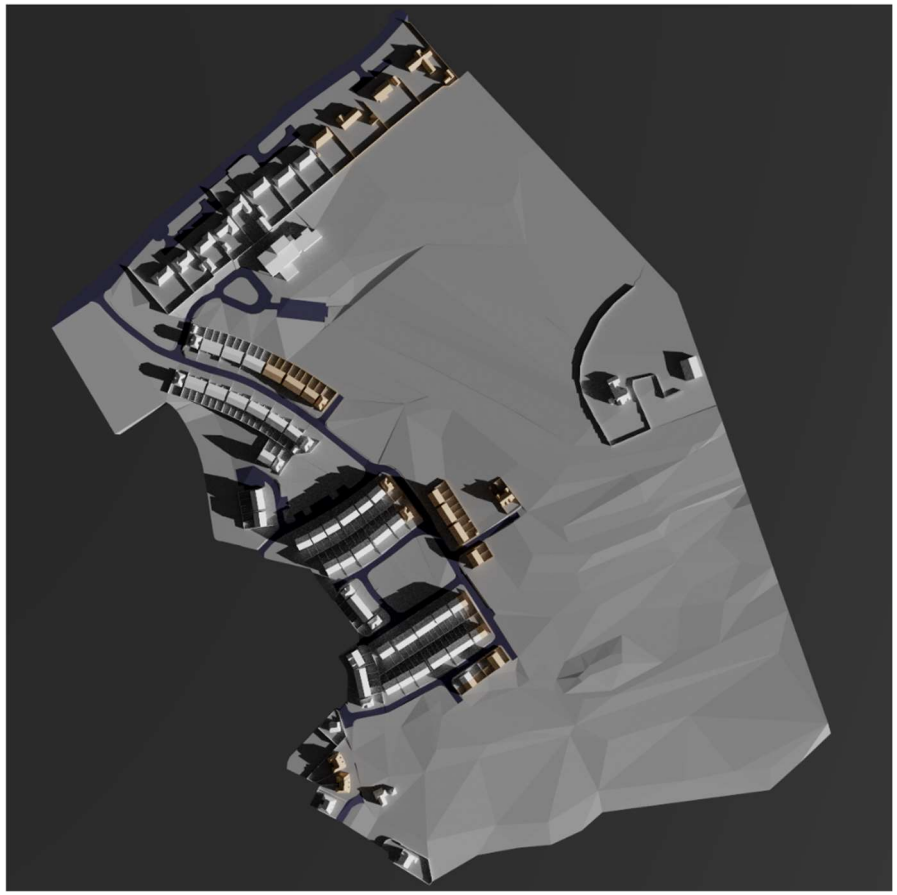
'Before' and 'after' shadow plots are used to show the difference that the proposed building makes. "*In interpreting the impact of such differences, it must be borne in mind that nearly all structures will create areas of new shadow, and some degree of transient overshadowing of a space is to be expected.*" (BRE Building Technology Group, 2022)

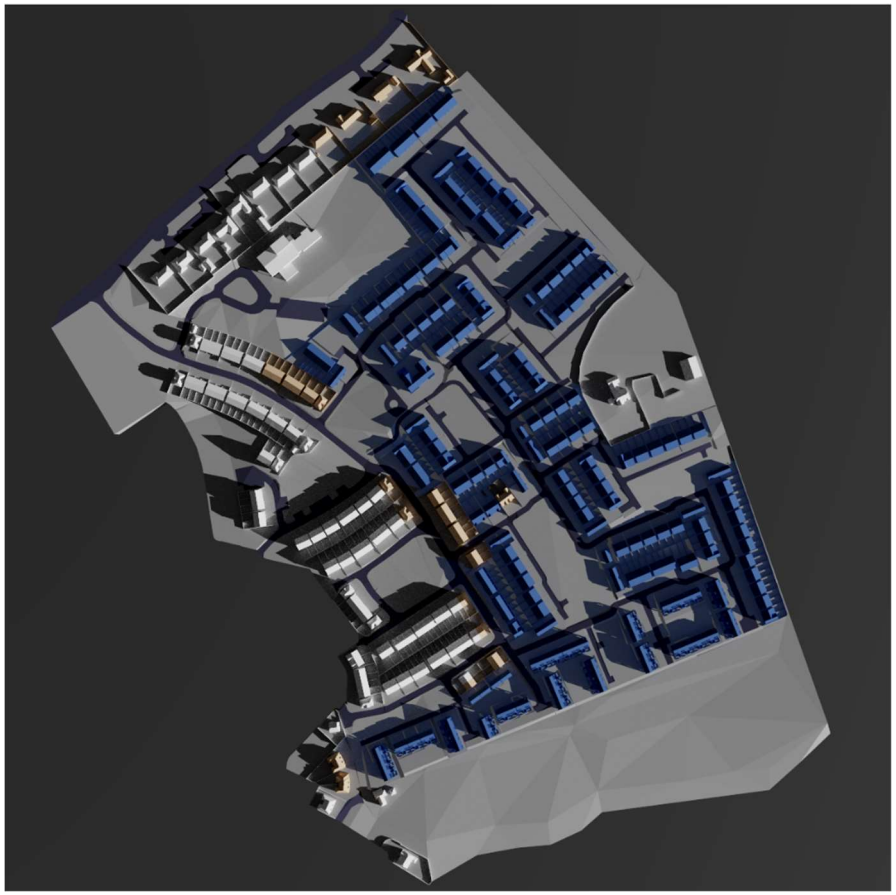
Shadow plots were created for March 21st and June 21st. March 21st is the equinox and as such provides the average level of shadowing that can be expected. June 21st is a summertime plot and represents the best case for shadow. (December 21st has not been plotted as at this time of year even low buildings will cast long shadows. In a built-up area, it is common for large areas of the ground to be in shadow in December.)

The shadow plots are purely illustrative (as opposed to other quantitative or quantitative metrics used in the analysis).

C.1 March 21st

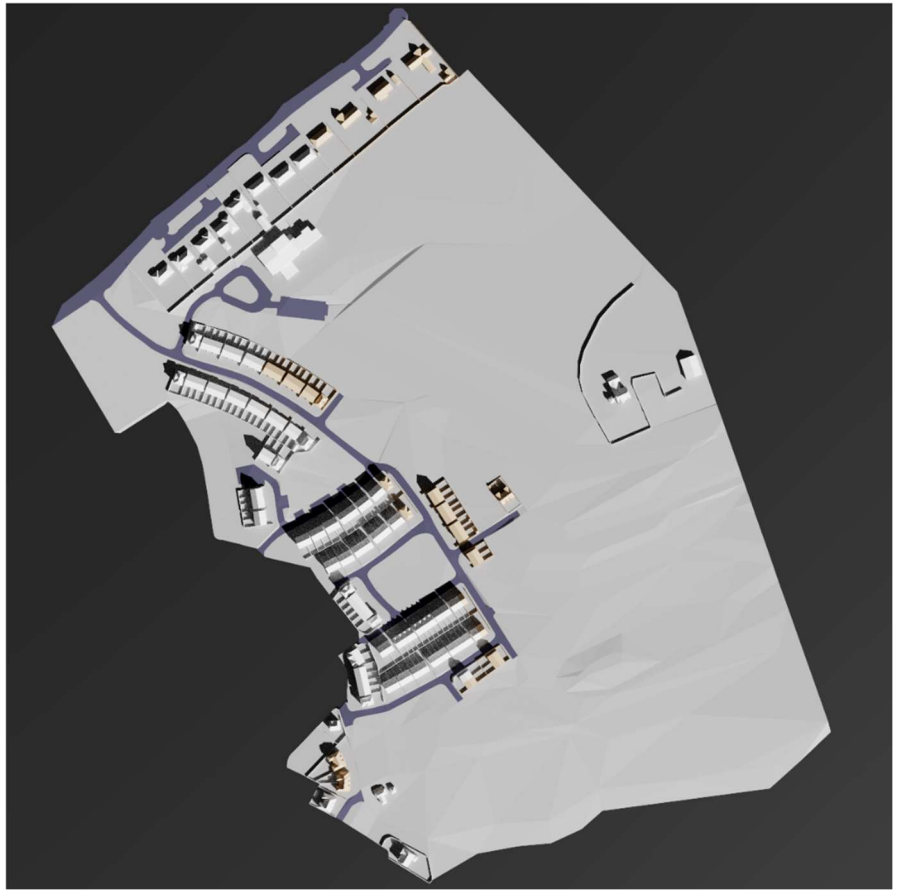
	Existing	Proposed
March 21st - 08:00 (UTC)	20468-CAS2-BPC-XX-ZZ-M3-P5-01 EXISTING-21-Mar 08-00	20468-CAS2-BPC-XX-ZZ-M3-P5-01 PROPOSED-21-Mar 08-00



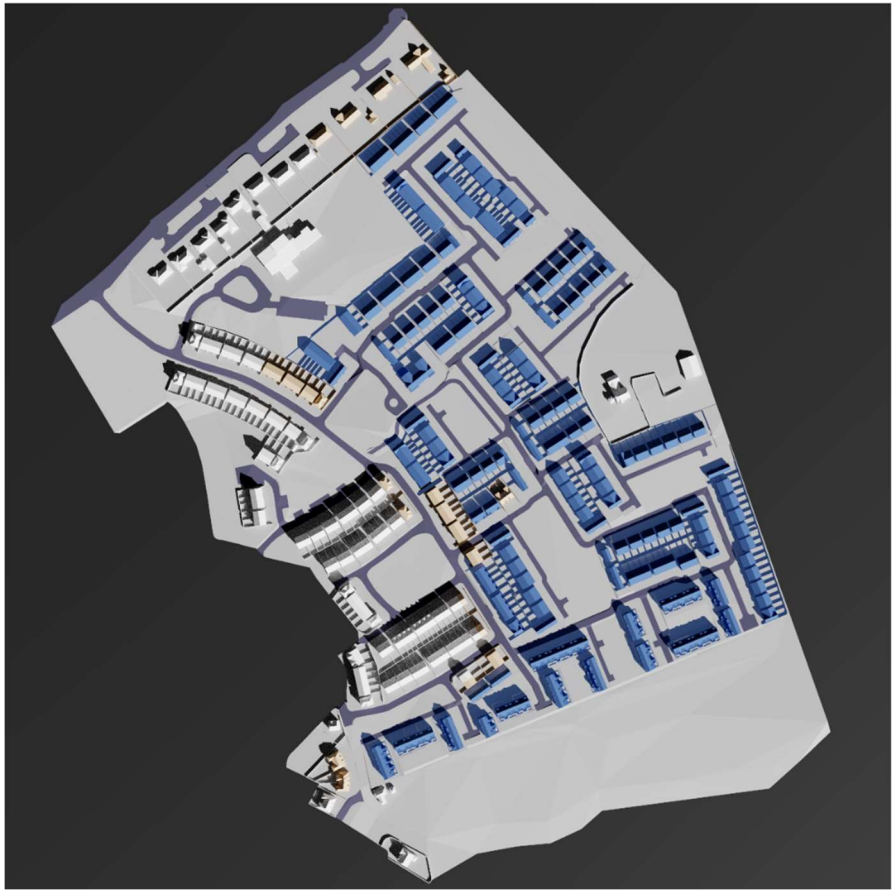


March 21st – 10:00 (UTC)

20468-CAS2-BPC-XX-ZZ-M3-P5-01
EXISTING-21-Mar 10-00

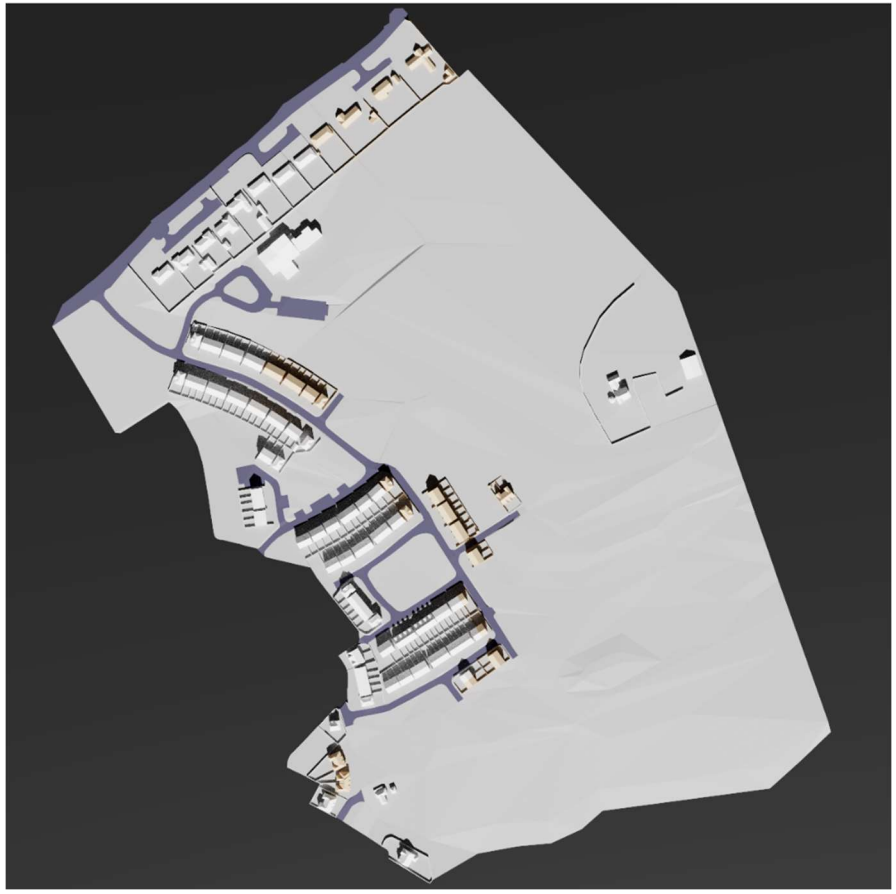


20468-CAS2-BPC-XX-ZZ-M3-P5-01
PROPOSED-21-Mar 10-00

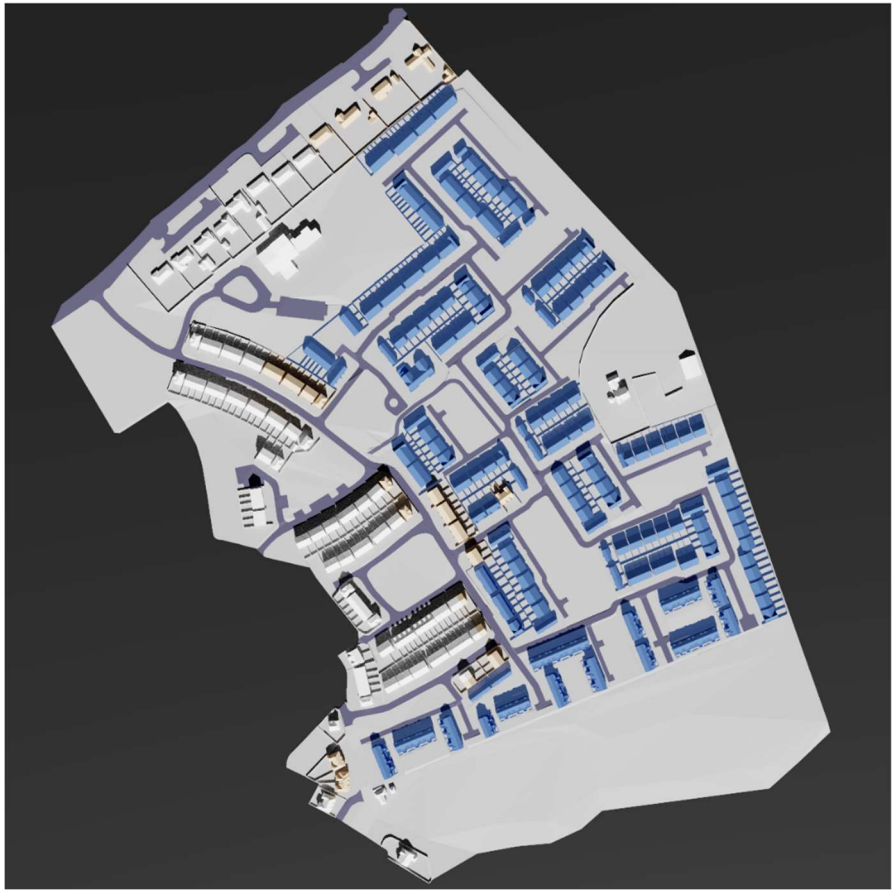


March 21st - 12:00 (UTC)

20468-CAS2-BPC-XX-ZZ-M3-P5-01
EXISTING-21-Mar 12-00

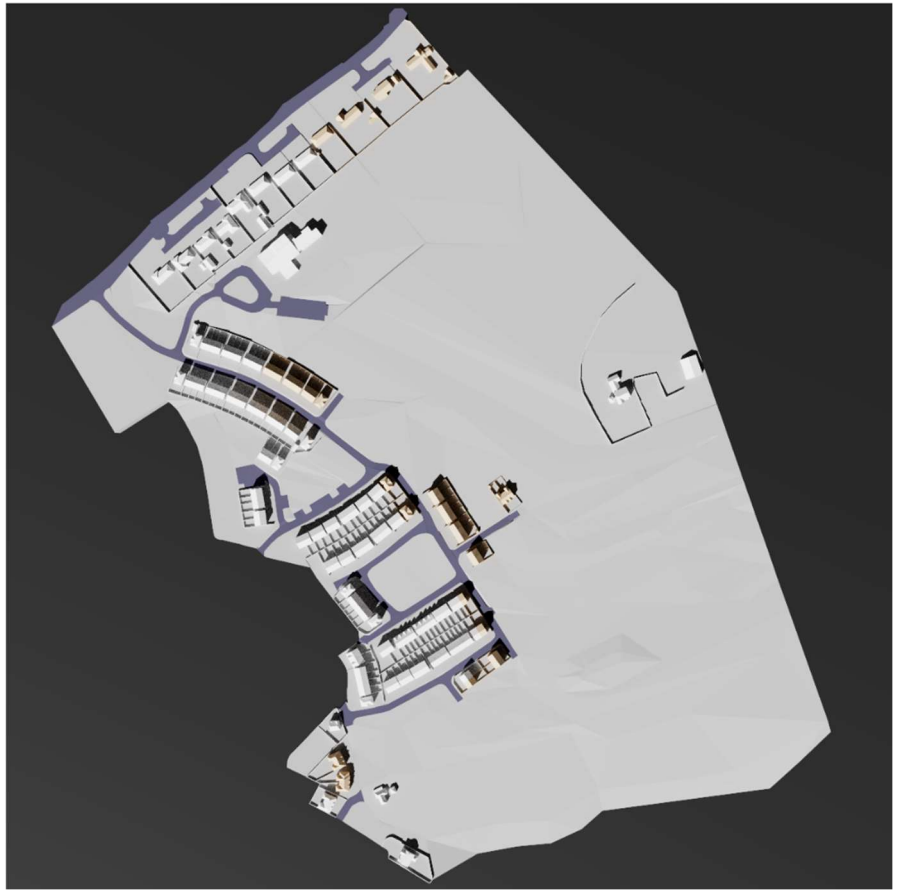


20468-CAS2-BPC-XX-ZZ-M3-P5-01
PROPOSED-21-Mar 12-00



March 21st - 14:00 (UTC)

20468-CAS2-BPC-XX-ZZ-M3-P5-01
EXISTING-21-Mar 14-00



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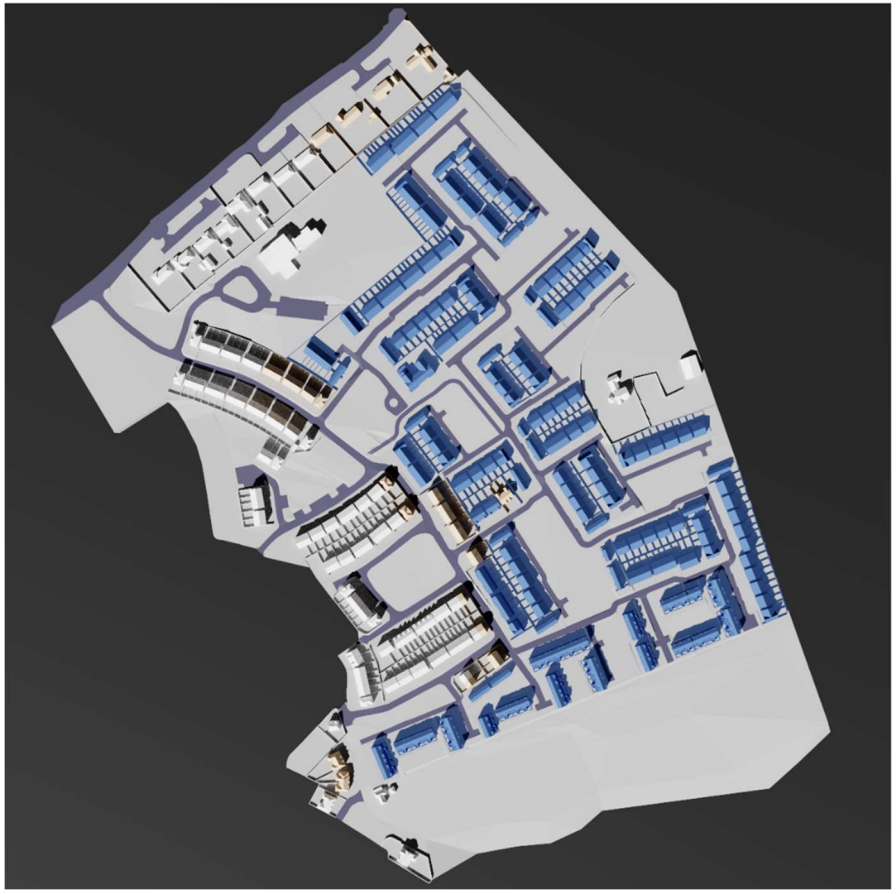
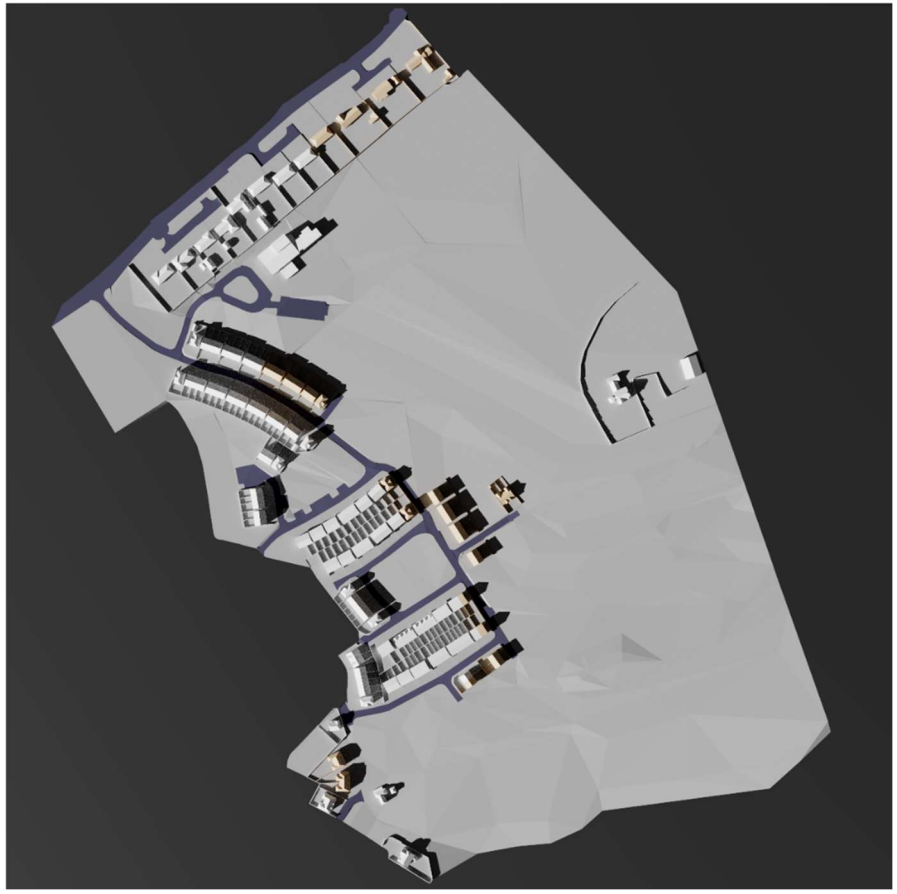
PROPOSED-21-Mar 14-00



March 21st - 16:00 (UTC)

20468-CAS2-BPC-XX-ZZ-M3-P5-01
EXISTING-21-Mar 16-00



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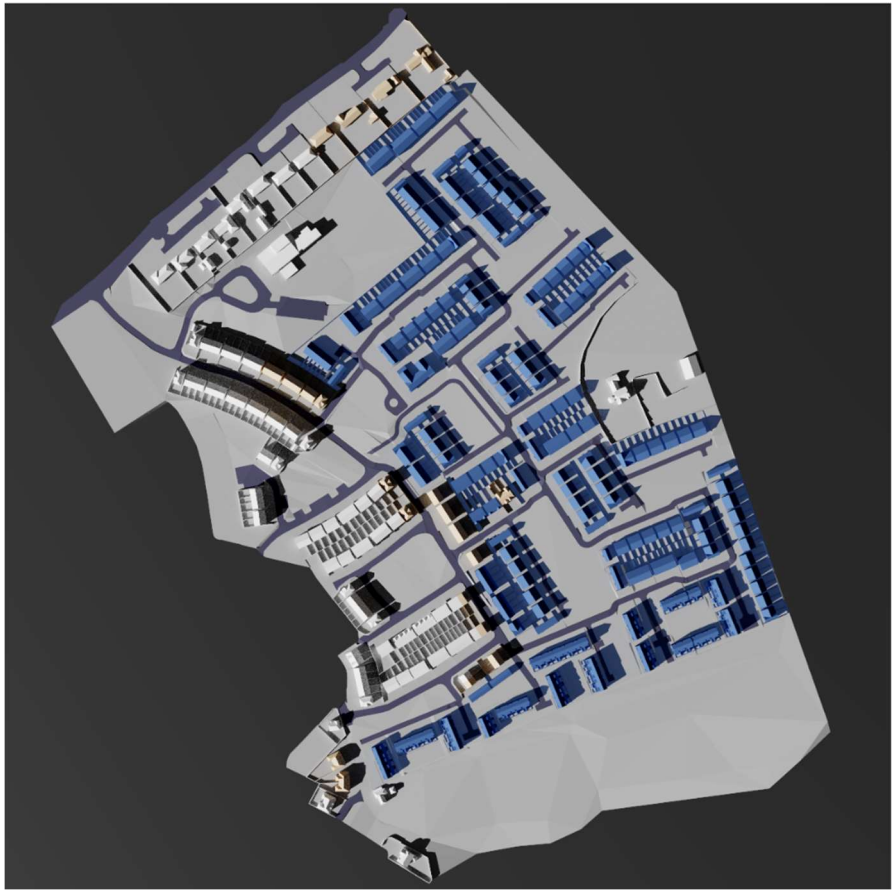
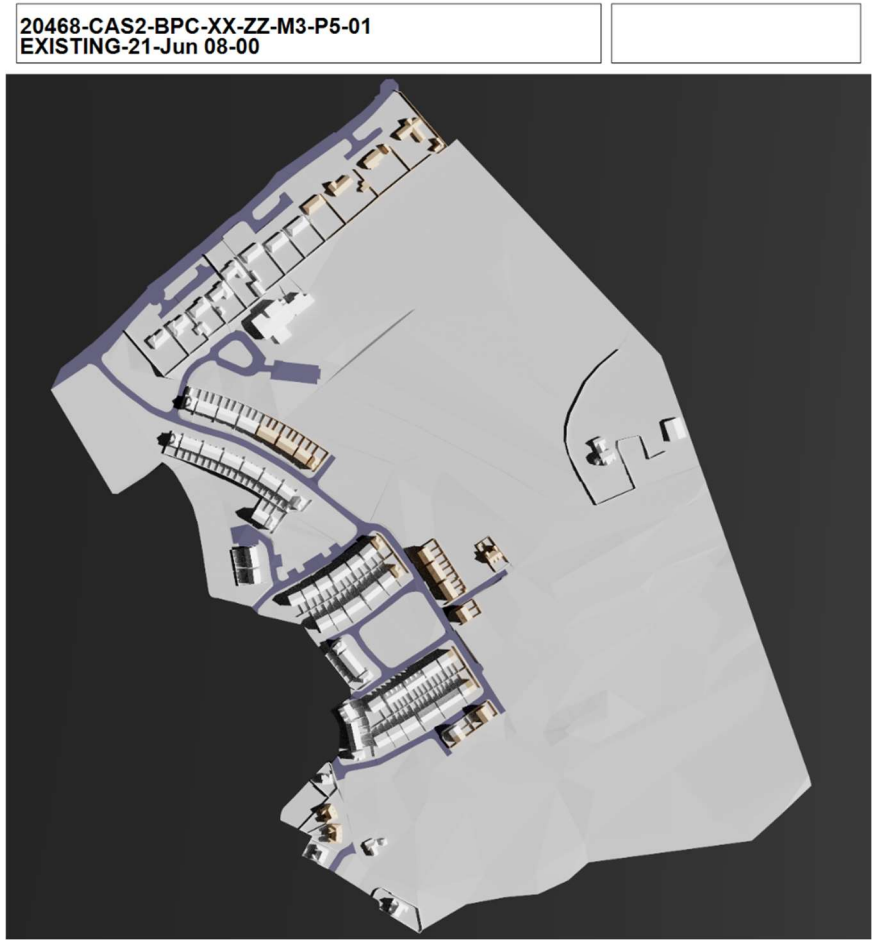
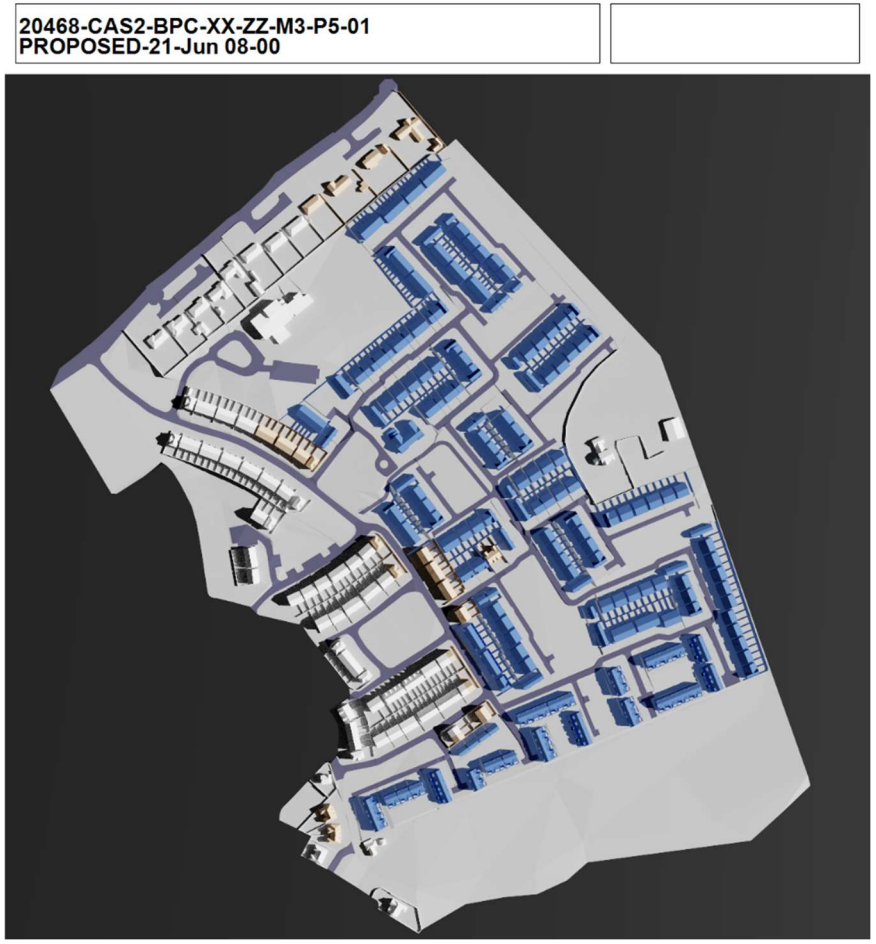
PROPOSED-21-Mar 16-00

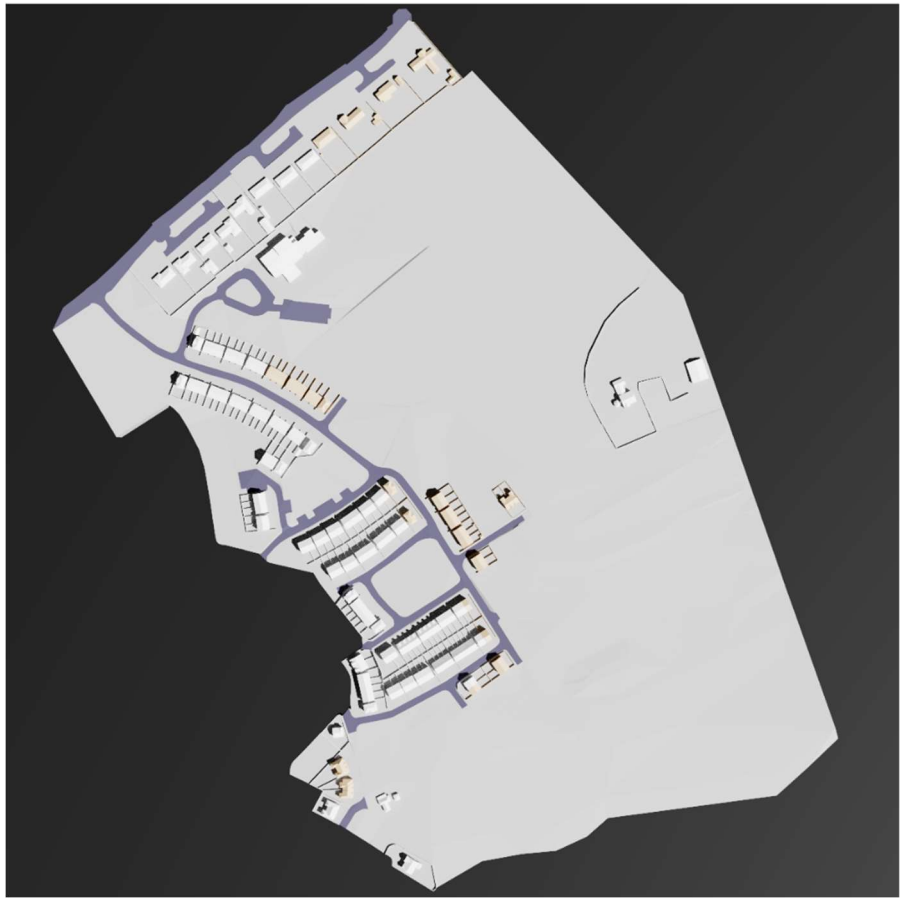


C.2 June 21st

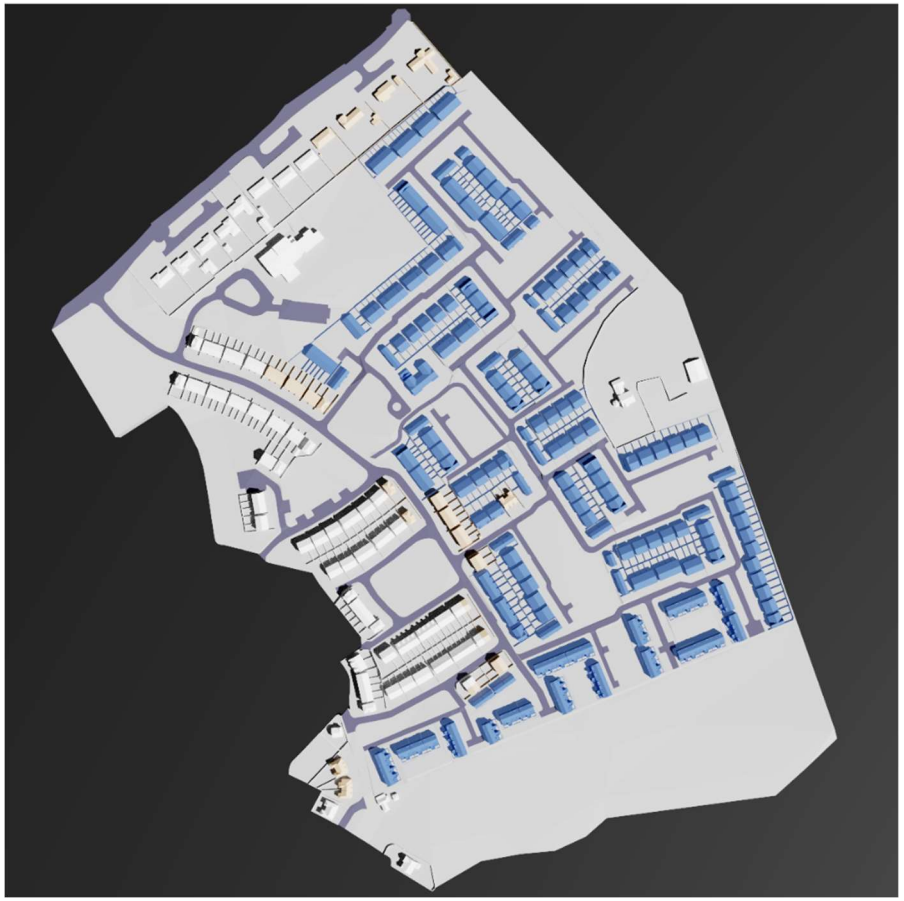
	Existing	Proposed
June 21st - 8:00 (UTC+1)		

June 21st - 10:00 (UTC+1)

20468-CAS2-BPC-XX-ZZ-M3-P5-01
EXISTING-21-Jun 10-00

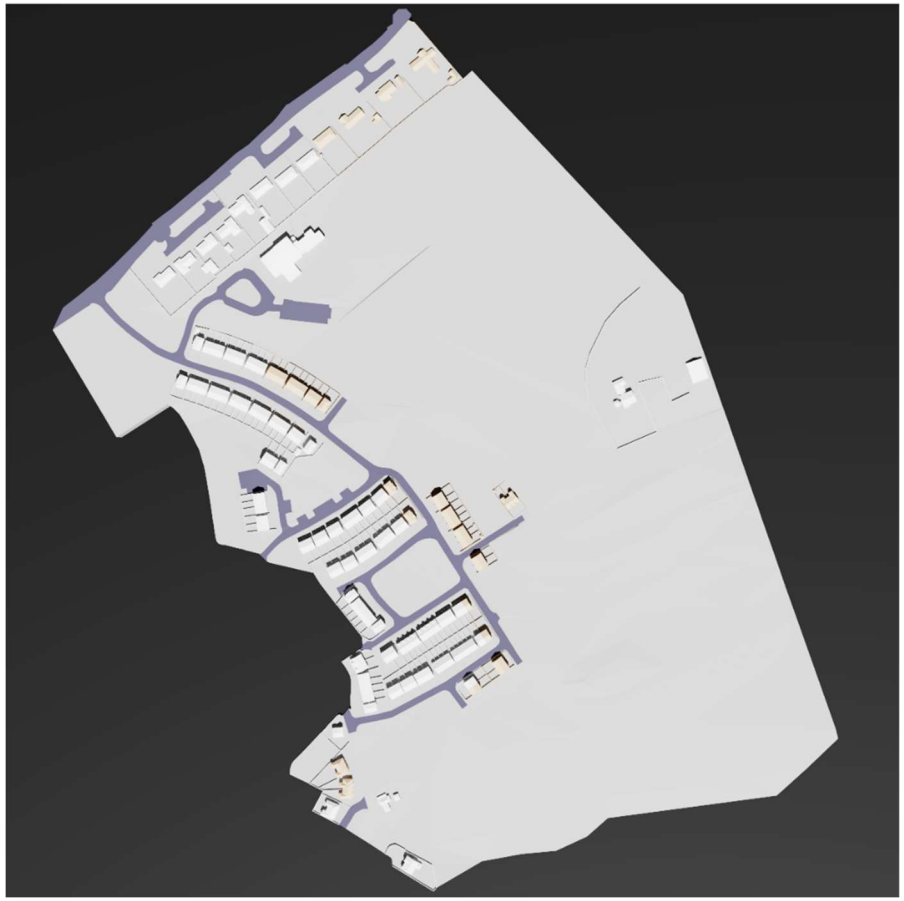


20468-CAS2-BPC-XX-ZZ-M3-P5-01
PROPOSED-21-Jun 10-00

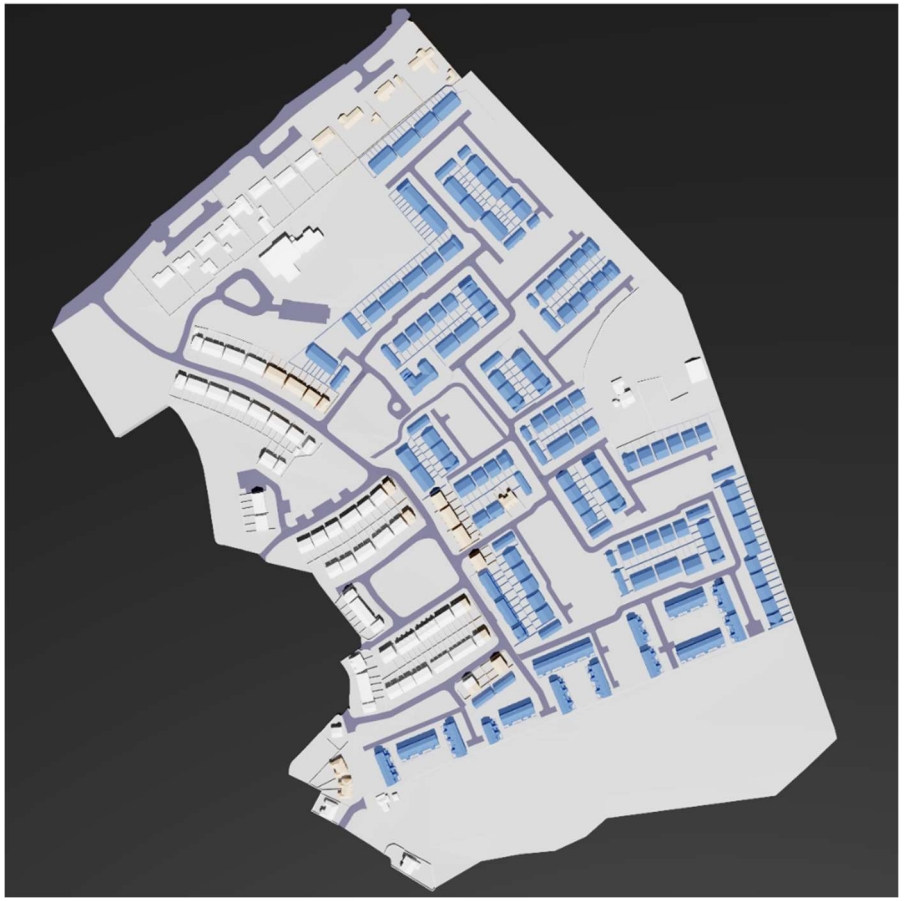


June 21st - 12:00 (UTC+1)

20468-CAS2-BPC-XX-ZZ-M3-P5-01
EXISTING-21-Jun 12-00

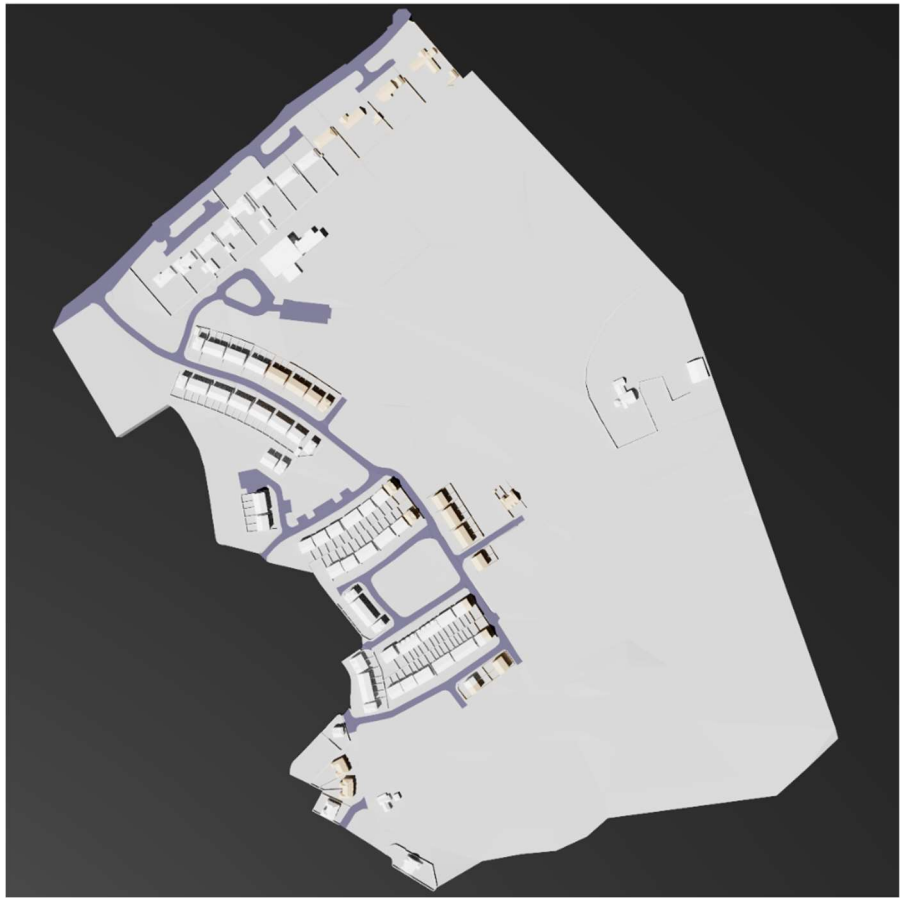


20468-CAS2-BPC-XX-ZZ-M3-P5-01
PROPOSED-21-Jun 12-00



June 21st - 14:00 (UTC+1)

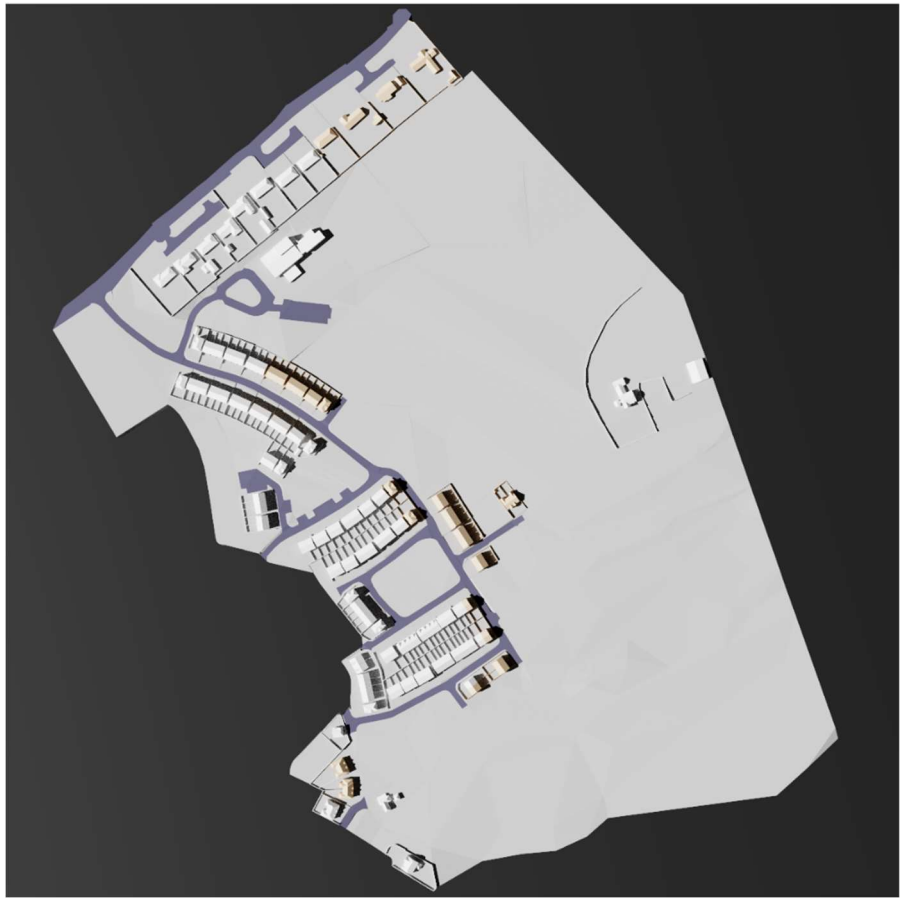
20468-CAS2-BPC-XX-ZZ-M3-P5-01
EXISTING-21-Jun 14-00



20468-CAS2-BPC-XX-ZZ-M3-P5-01
PROPOSED-21-Jun 14-00

June 21st - 16:00 (UTC+1)

20468-CAS2-BPC-XX-ZZ-M3-P5-01
EXISTING-21-Jun 16-00



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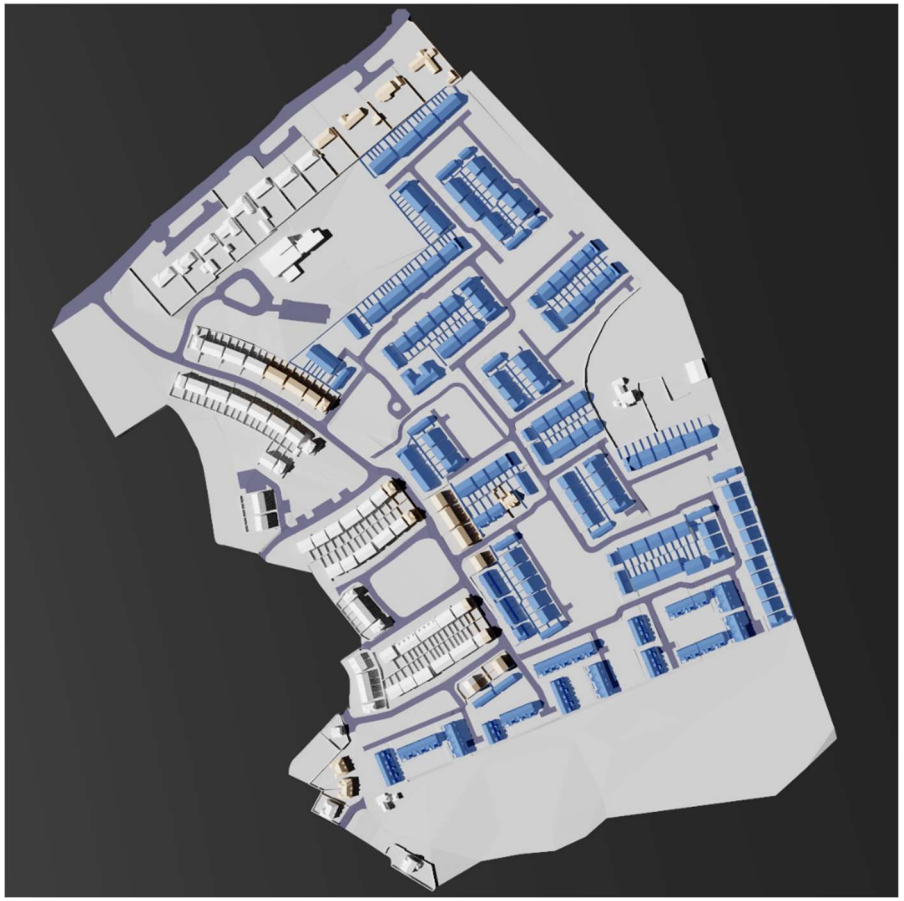
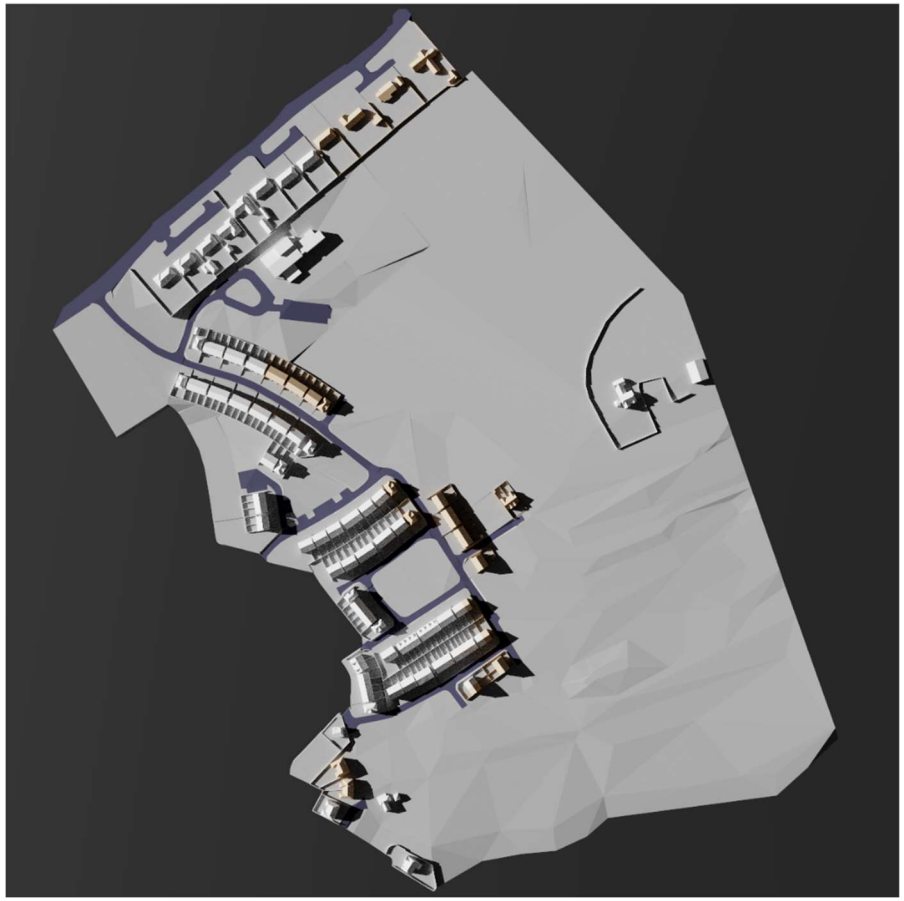
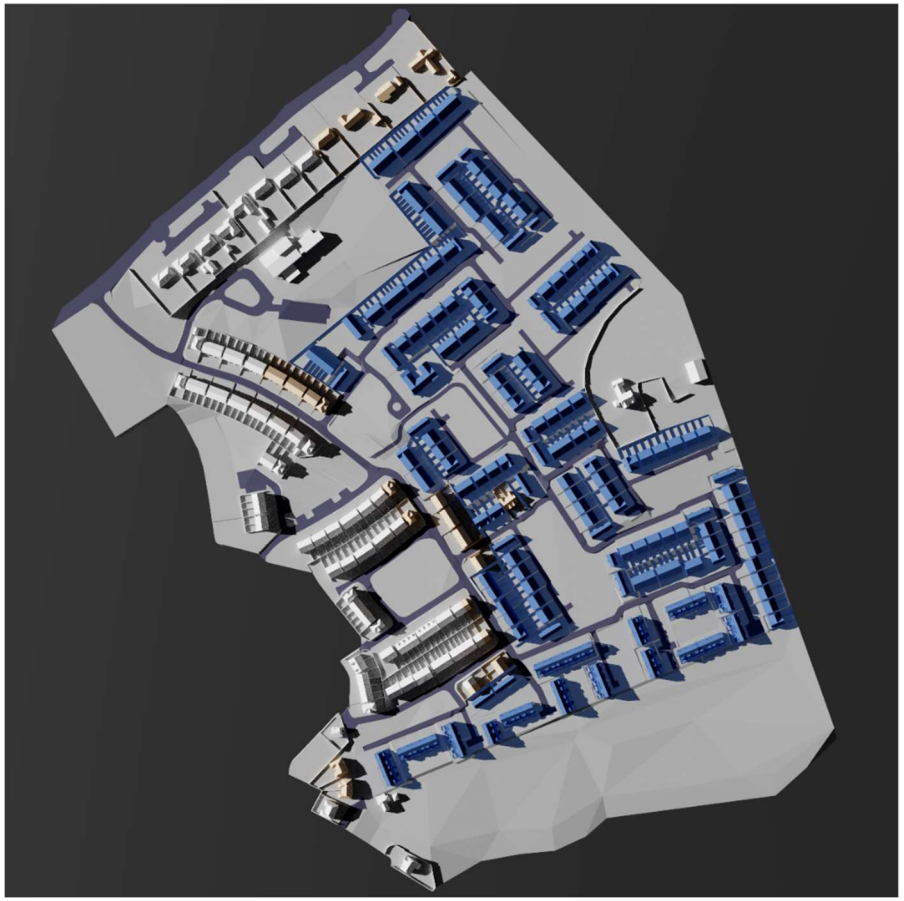


June 21st – 18:00 (UTC+1)

20468-CAS2-BPC-XX-ZZ-M3-P5-01
EXISTING-21-Jun 18-00



20468-CAS2-BPC-XX-ZZ-M3-P5-01
PROPOSED-21-Jun 18-00



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Appendix D Interior daylighting recommendations & sDA

As discussed in section 3.2, there are numbers of ways the interior daylighting results can be presented. BR209 recommends reporting the median illuminance (exceeded over 50% of the reference plane) as this enables comparison with the different recommendations in BS EN 17037. Another method, which may be included as an "optional extra", is to report the % *area* of the reference plane exceeding the target illuminance E_T (for half of the daylight hours.) This is equivalent to Spatial Daylight Autonomy (sDA).

Daylight Autonomy (DA) is a daylight availability metric that corresponds to the percentage of time when a target illuminance at a point in a space is met. *Spatial* Daylight Autonomy (sDA) is "*An annual daylighting metric that quantifies the fraction of the area within a space for which the daylight autonomy exceeds a specified value.*" (Illuminating Engineering Society, 2022). If the defined threshold is set based upon electric lighting criteria, a higher sDA yields greater *autonomy* from electric lighting.

In basic terms, sDA is the percentage of the reference plane meeting a target illuminance for a specified amount of time. It is often presented in a format similar to that shown below:

- $sDA_{300,50\%} \geq 55\%$, means 300lux should be achieved for 50% of the time across at least 55% of the reference plane,
- $sDA_{150,50\%} \geq 60\%$, means 150lux should be achieved for 50% of the time across at least 60% of the reference plane, etc.

So the illuminance targets 'E_T' in BS EN 17037 could also be presented in sDA format. Remembering that the illuminance targets 'E_T' are for 50% of the reference plane for 50% of daylight hours, the targets could be presented as follows:

Table 133: Equivalent sDA for Target Illuminance E_T

Room type	Target illuminance E_T (lx)	Target sDA (sDA lux / % time) > % area
Bedroom	100	$sDA_{100,50\%} > 50\%$
Living Room	150	$sDA_{150,50\%} > 50\%$
Kitchen	200	$sDA_{200,50\%} > 50\%$

6 Bibliography

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