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Client: Annandale Developments Limited

Daylight and Sunlight Assessment for the Development at No. 86 Annandale Avenue, Bognor Regis PO21 2EX

August 2018

ARUN DISTRICT COUNCIL BR/231/19/PL

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Contents

1 Background and Scope of Appraisal 1

2 The Site and Development Proposals 2
- 2.1 Site Location 2
- 2.2 The Development 2

3 Policy and Guidance 3
- 3.1 National Planning Policy 3
- 3.2 Regional Planning Policy 3
- 3.3 Local Planning Policy 3
- 3.4 Best Practice Guidance 3

4 Assessment Techniques 5
- 4.1 Background 5
- 4.2 Vertical Sky Component (VSC) 6
- 4.3 No Sky Line 6
- 4.4 Overshadowing 7
- 4.5 Annual Probable Sunlight Hours 8
- 4.6 Average Daylight Factor 8

5 Assessment Methodology 10
- 5.1 Method of Baseline Data Collation 10
- 5.2 Identification of Key Sensitive Receptors 10
- 5.3 Numerical Modelling 12
- 5.4 Calculation Assumptions 12
- 5.5 Assessment criteria 14

6 Discussion of Daylighting Impacts 15
- 6.1 Vertical Sky Component Assessment 15
- 6.2 No Sky Line Assessment 16
- 6.3 Summary of Daylighting Impacts 17

7 Sunlight and Overshadowing Analysis 18
- 7.1 Annual Probable Sunlight Hours Assessment 18
- 7.2 Sun on the Ground 19
- 7.3 Transient Overshadowing 21
- 7.4 Solar Glare 21

8 Conclusions 22

A Appendices 23

1 Background and Scope of Appraisal

Herrington Consulting has been commissioned by Annandale Developments Limited. to assess the potential impact of the proposed development at No. 86 Annandale Avenue, Bognor Regis PO21 2EX, in relation to daylight, sunlight and overshadowing on the neighbouring buildings. The key objectives of the assessment are to:

- assess the baseline conditions at the site;
- analyse the potential impacts of the development on the daylight and sunlight currently received by the neighbouring buildings;
- assess these impacts in line with any relevant planning policies and best practice guidance.

ARUN DISTRICT COUNCIL BR/231/19/PL

2 The Site and Development Proposals

2.1 Site Location

The site is located in the town of Bognor Regis in West Sussex and is situated within district of Arun. The location of the site is shown in Figure 2.1 and the site plan included in Appendix A.1 of this report gives a more detailed reference to the site location and layout.

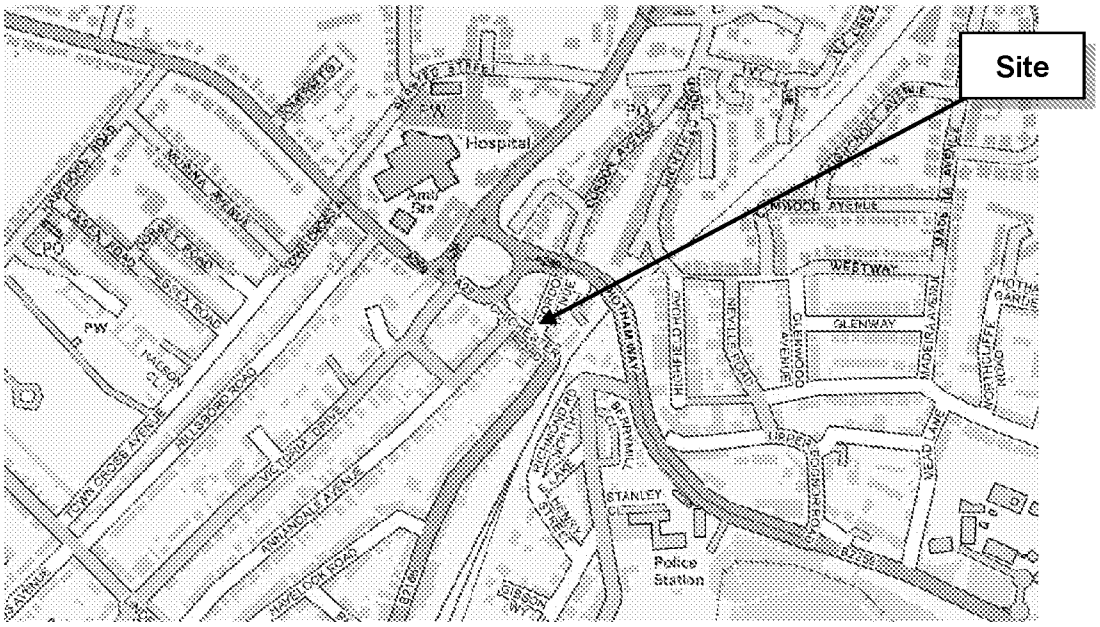


Figure 2.1 – Location map (Contains Ordnance Survey data © Crown copyright and database right 2011)

2.2 The Development

The proposal for development is to extend the existing ground floor extension by two additional storeys. Drawings of the proposed scheme are included in Appendix A.1 of this report.

3 Policy and Guidance

3.1 National Planning Policy

National Planning Policy Framework (Revised July 2018)

Paragraph 123 on 'Achieving appropriate densities' states that *"c) local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards)."*

3.2 Regional Planning Policy

West Sussex Country Council

There is currently no planning policy relating to daylight and sunlight provided by West Sussex County Council.

3.3 Local Planning Policy

Arun Local Plan 2011-2031 (2018)

Policy D DM1 on 'Aspects of form and design quality' states that "*when considering any application for development the Council will have regard to … 3) Impact. Have minimal impact to users and occupiers of nearby property and land. For example, by avoiding significant loss of sunlight, privacy and outlook and unacceptable noise and disturbance*" and, "*8. Solar Gain. Within the constraints of the site and local context development proposals should, maximise sunlight and passive solar energy.*"

In addition, Paragraph 13.4.3 on 'Extensions & Alterations' in 'Design' states that "*extensions and alterations to existing buildings should be designed to… ensure adequate natural light within the building, garden and amenity space.*"

3.4 Best Practice Guidance

In the absence of official national planning guidance / legislation on daylight and sunlight, the most recognised guidance document is published by the Building Research Establishment and entitled 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice', Second Edition, 2011; herein referred to as the 'BRE Guidelines'.

The BRE Guidelines are not mandatory and themselves state that they should not be used as an instrument of planning policy, however in practice they are heavily relied upon as they provide a good guide to approach, methodology and evaluation of daylight and sunlight impacts.

ARUN DISTRICT COUNCIL BR/231/19/PL

In conjunction with the BRE Guidelines further guidance is given within the British Standard (BS) 8206-2:2008: 'Lighting for buildings - Part 2: Code of practice for daylighting'.

In this assessment, the BRE Guidelines have been used to establish the extent to which the Proposed Development meets current best practice guidelines. In cases where the Development is likely to reduce light to key windows the study has compared results against the BRE criteria.

Whilst the BRE Guidelines provide numerical guidance for daylight, sunlight and overshadowing, these criteria should not be seen as absolute targets since, as the document states, the intention of the guide is to help rather than constrain the designer. The Guide is not an instrument of planning policy, therefore whilst the methods given are technically robust, it is acknowledged that some level of flexibility should be applied where appropriate.

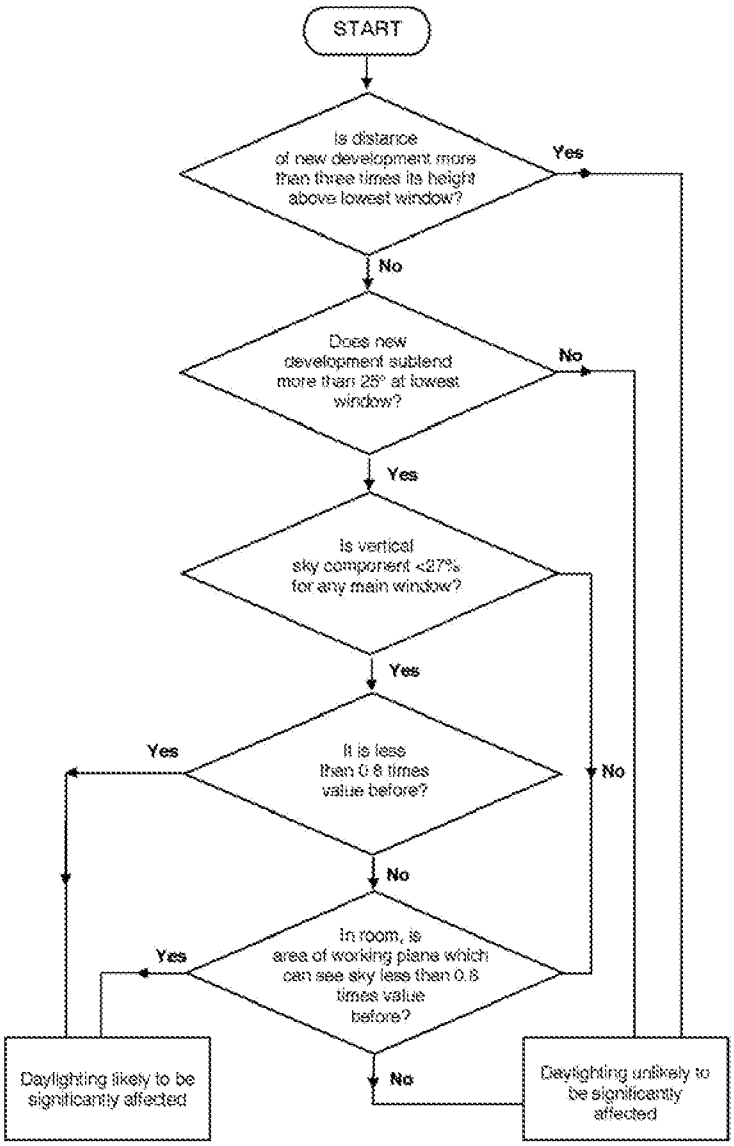
ARUN DISTRICT COUNCIL BR/231/19/PL

4 Assessment Techniques

4.1 Background

Natural light refers to both daylight and sunlight. However, a distinction between these two concepts is required for the purpose of analysis and quantification of natural light in buildings. In this assessment, the term '*Daylight*' is used for natural light where the source is the sky in overcast conditions, whilst '*Sunlight*' refers specifically to the light coming directly from the sun.

The primary objective of this assessment is to quantify the impacts of the proposed development on the adjacent building[s] and therefore the methods employed by this study are focussed on this objective. These methodologies are described in the following sections of this report and follow the hierarchical approach set out by the BRE Guidelines. The 'decision chart' outlining this process (Figure 20 of the Guidelines) has been reproduced below.



The BRE guidelines are intended for use for rooms in adjoining dwellings. They may also be applied to any existing non-domestic buildings where the occupants have a reasonable expectation of daylight, which could include schools, hospitals, hotels and offices. For dwellings, it states that living rooms, dining rooms and kitchens should be assessed. Bedrooms should also be checked, although it states that they are less important. Other rooms, such as bathrooms, toilets, storerooms, circulation areas and garages need not be assessed.

4.2 Vertical Sky Component (VSC)

The Vertical Sky Component (VSC) calculation is the ratio of the direct sky illuminance falling on the outside of a window, to the simultaneous horizontal illuminance under an unobstructed sky. The standard CIE (Commission Internationale d'Éclairage) Overcast Sky is used and the ratio is expressed as a percentage. For example, a window that has an unobstructed view over open fields would benefit from the maximum VSC, which would be close to 40%. For a window to be considered as having a reasonable amount of skylight reaching it, the BRE Guidelines suggests that a minimum VSC value of 27% should be achieved. When assessing the impact of a new development on an existing building the BRE Guidelines sets out the following specific requirement:

If the VSC with the new development in place is both less than 27% and less than 0.8 times its former value, then the reduction in light to the window is likely to be noticeable.

This means that a reduction in the VSC value of up to 20% its former value would be acceptable and thus the impact would be considered negligible. It is important to note that the VSC is a simple geometrical calculation, which provides an early indication of the potential for daylight entering the space. It does not, however, assess or quantify the actual daylight levels inside the rooms.

4.3 No Sky Line

The No Sky Line, or sometimes referred to as No Sky View method, describes the distribution of daylight within rooms by calculating the area of the 'working plane', which can receive a direct view of the sky. The working plane height is generally set at 850mm above floor level within a residential property and 700mm within a commercial property.

The BRE Guidelines state that if following the construction of a new development the No Sky Line moves such that the area of existing room that does not receive direct skylight is reduced to less than 0.8 times its former value, the impact will be noticeable to the occupants. This is also true if the No Sky Line encroaches onto key areas like kitchen sinks and worktops.

One benefit of the daylight distribution test is that the resulting contour plans show where the light falls within a room, both in the existing and proposed conditions, and a judgment may be made as to whether the room will retain light to a reasonable depth.

This method can only be accurately used to examine the impact of new development on the daylight distribution within existing buildings when the internal room layout is known. However, in

circumstances where the internal layout and dimensions of the affected room are not known, best estimates are used.

4.4 Overshadowing

The BRE Guidance suggests that where new development may affect one or more amenity areas, then analysis can be undertaken to quantify the loss of sunlight resulting from overshadowing. Typical examples of areas that could be considered as open spaces or amenity areas are main back gardens of houses, allotments, parks and playing fields, children's playgrounds, outdoor swimming pools, sitting-out areas, such as in public squares and focal points for views, such as a group of monuments or fountains.

Sun Hours on Ground

The BRE Guidelines recommend that for a garden or amenity area to appear adequately sunlit throughout the year, at least 50% of an amenity area should receive at least 2 hours of sunlight on 21st March. The BRE Guidelines also suggest that if, as a result of a new development, an existing garden or amenity area does not meet these guidelines, and the area which can receive some sun on the 21st March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable.

When undertaking this analysis, sunlight from an altitude of 10° or less has been ignored as this is likely to be obscured by planting and undulations in the surrounding topography. Driveways and hard standing for cars is also usually left out of the area used for this calculation. Fences or walls less than 1.5 metres high are also ignored. Front gardens which are relatively small and visible from public footpaths are omitted with only main back gardens needing to be analysed.

The Guidelines also state that "normally, trees and shrubs need not be included, partly because their shapes are almost impossible to predict, and partly because the dappled shade of a tree is more pleasant than a deep shadow of a building". This is especially the case for deciduous trees, which provide welcome shade in the summer whilst allowing sunlight to penetrate during the winter months.

Transient Overshadowing

The BRE Guidelines suggest that where large buildings are proposed, which may affect a number of open spaces or amenity areas, it is useful and illustrative to plot a shadow plan to show the location of shadows at different times of the day and at key times during the year. Typically, the 21st March, the 21st June, and 21st December are used to represent the annual variance of sun position, noting that the position of the sun in the sky during the spring equinox (21st March) is equivalent to that of the autumn equinox.

The BRE Guidelines provide no criteria for the significance of transitory overshadowing other than to suggest that by establishing the different times of day and year when shadow would be cast over surrounding areas, provides an indication as to the significance of the likely effect of a new

ARUN DISTRICT COUNCIL BR/231/19/PL

development. The assessment of transient overshadowing effects is therefore based upon expert judgment, taking into consideration the likely effects of the various baseline conditions and comparing them with the likely significant transient overshadowing effects of the redevelopment proposals.

4.5 Annual Probable Sunlight Hours

It is also possible to quantify the amount of sunlight available to a new development and the recognised methodology for undertaking this analysis is the Annual Probable Sunlight Hours (APSH) method.

In the case of sunlight, the assessment is equally applied to adjoining dwellings and any existing non-domestic buildings where there is a particular requirement for sunlight. The BRE Guidelines set out a hierarchy of tests to determine whether the proposed development will have a significant impact. These are set out in order of complexity below:

Test 1 – Assess whether the windows to main living rooms and conservatories of the buildings surrounding the site are situated within 90° of due south. Obstruction to sunlight may become an issue if some part of the new development is situated within 90° of due south of a main window wall of an existing building.

Test 2 - Draw a section perpendicular from the centre of the window in any window walls identified by Test 1. If the angle subtended between the horizontal line drawn from the centre of the lowest window of the existing building and the proposed development is less than 25°, then the proposed development is unlikely to have a substantial effect on the direct sunlight enjoyed by the existing window.

Test 3 – If the window wall faces within 20° of due south and the reference point has a VSC of 27% or more, then the room is considered to receive sufficient sunlight.

Test 4 – If all of the above tests have been failed, then a more detailed analysis is required to determine the obstruction level to the existing building. In such cases, the BRE Guidance recommends the use of the Annual Probable Sunlight Hours (APSH) test to assess the impact on the availability of sunlight. To pass this test the centre point of the window will need to receive more than one quarter of APSH, including at least 5% APSH in the winter months between 21st September and the 21st March. The BRE Guidelines state that if 'post-development' the available sunlight hours are both less than the amount above and less than 0.8 times their 'pre-development' value, either over the whole year or just within the winter months, then the occupants of the existing building will notice the loss of sunlight. In addition, if the overall annual loss is greater than 4% of APSH, the room may appear colder and less pleasant.

4.6 Average Daylight Factor

The Average Daylight Factor (ADF) method calculates the average illuminance within a room as a proportion of the illuminance available to an unobstructed point outdoors under a sky of known luminance and luminance distribution. This is the most detailed of the daylight calculations and

ARUN DISTRICT COUNCIL BR/231/19/PL

considers the physical nature of the room behind the window, including; window transmittance, and surface reflectivity.

This method of quantifying the availability of daylight within a room does, however, require the internal layout to be known and is generally only used for establishing daylight provision in new rooms. The BRE Guide sets out the following guidelines for the assessment of the ADF:

If a predominantly daylit appearance is required, then the ADF should be 5% or more if there is no supplementary electric lighting, or 2% or more if supplementary electric lighting is provided. In dwellings, the following minimum average daylight factors should be achieved: 1% in bedrooms, 1.5% in living rooms and 2% in kitchens.

5 Assessment Methodology

5.1 Method of Baseline Data Collation

The following data and information has been used to inform this study:

- OS Mastermap mapping
- Scheme drawings in AutoCAD format (Provided by AM Design Architects – July 2018)
- Photographic information collected (Provided by Robert Tutton Town Planning Consultants Ltd and Annandale Developments Ltd – July & August 2018)
- Internal room and window measurements within No. 84 Annandale Avenue (Provided by Annandale Developments Ltd – August 2018)*
- Aerial photography (Google Maps and Bing)

5.2 Identification of Key Sensitive Receptors

The BRE Guidelines are intended for use for rooms and adjoining dwellings where daylight is required, including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, storerooms circulation areas and garages are not deemed as requiring daylight and therefore are not identified as sensitive receptors. The BRE document also states that the guidelines may also be applied to any non-domestic building where the occupants have a reasonable expectation of daylight. This would normally include schools, hospitals, hotels, hostels, small workshops and some offices.

The first step in this process is to determine the key sensitive receptors, i.e. which windows may be affected by the proposed development. Key receptors are those windows that face, or are located broadly perpendicular to the proposed development.

If a window falls into this category, the second step is to measure the obstruction angle. This is the angle at the level of the centre of the lowest window between the horizontal plane and the line joining the highest point of nearest obstruction formed from any part of the proposed development. If this angle is less than 25° then it is unlikely to have a substantial effect on the diffuse daylight enjoyed by the existing window and the window is not deemed to be a sensitive receptor. A graphical representation of the 25° rule is illustrated in Figure 5.1 below.

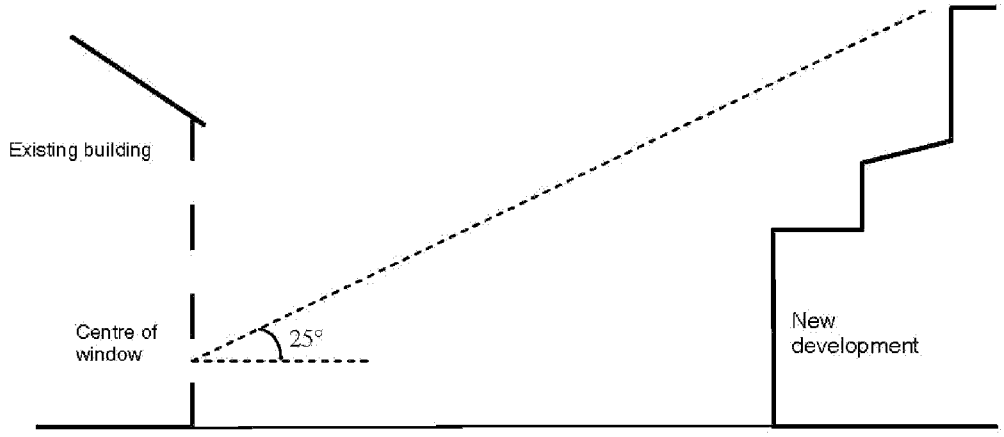


Figure 5.1 – Graphical representation of the 25° Rule (indicative buildings used for illustration purposes only)

As part of this assessment a digital three-dimensional model of the study area has been created for both the 'pre' and 'post' development scenarios. Images of these models are shown by the drawings appended to this report.

Using the 3D model, it is possible to identify all windows having an obstruction angle no greater than 25°. Impacts to these windows are therefore deemed to be negligible in line with the criteria set out within the BRE Guidelines.

There are, however, circumstances where the 25°*degree* rule is not wholly appropriate, for example where the development facing the window does not create a uniform obstruction along the skyline, or where the proposals are not directly adjacent to the receptor window. In these situations, professional judgement is used to differentiate between windows that require more detailed analysis and those that will clearly not be impacted. Where any level of uncertainty exists, the window is taken forward for detailed analysis.

Windows serving non-habitable spaces are not included within the assessment as these are not identified by planning policy or by the BRE Guidelines to be sensitive to changes in daylight and sunlight. Therefore, as part of the identification of sensitive receptor process, the use of each room is, where possible, established and windows serving non-habitable spaces such as toilets, store rooms, stairwells and circulation spaces are identified.

Windows serving rooms within commercial premises are assumed to be non-habitable and in accordance with the BRE Guidelines are not identified as sensitive receptors. However, there are special cases where it can be assumed that some non-domestic uses could be deemed to have a reasonable expectation of daylight and therefore could be taken forward for more detailed analysis. Typically, these could be school classrooms, hospital wards, art studios etc, but professional judgement is generally relied upon to determine this and where considered appropriate, windows serving commercial premises are included.

Drawings showing the location of all sensitive receptors that have been assessed as part of this study are included in Appendix A.2 of this report.

In summary, habitable rooms in the following residential buildings have been identified as potential sensitive receptors and have therefore been tested.

- No. 82 Annandale Avenue
- No. 84 Annandale Avenue
- No. 125 Longford Road
- No. 127 Longford Road
- No. 129 Longford Road
- No. 131 Longford Road

It is important to note that externally, there are two windows and a partly glazed door on the side elevation which appear to serve the ground floor kitchen of No. 84 Annandale Avenue. However, photographic evidence has shown that internally, only the central, larger window is in use and provides light to this room. Therefore, the smaller window and partly-glazed door are not in use and do not provide light to this kitchen and thus have not been included in our assessment.

5.3 Numerical Modelling

The numerical analysis used in this assessment has been undertaken using the Waldrum Tools (Version 4.0.0.4) software package.

5.4 Calculation Assumptions

The following assumptions have been made when undertaking the analysis:

- When assessing the VSC the calculation is based on the centre point of the window position

- When assessing the ADF for internal rooms and in the absence of specific information, the following parameters are assumed:

  - For existing buildings, the glazing type is assumed to be double glazing with a light transmittance value of 0.68 (value for double glazed unit not per pane).
  - Correction factor for frames and glazing bars = 0.8
  - Where information from the designer is not available, the following values are used to derive the Maintenance Factor applied to the transmittance values.

ARUN DISTRICT COUNCIL BR/231/19/PL

Location / setting	Building type (Residential – good maintenance)	Exposure (normal)	Special exposure	Maintenance Factor
Urban	8%	x 1.0	x 1.0	0.92
Rural / suburban	4%	x 1.0	x 1.0	0.96

Table 5.1 – Parameters used for deriving Maintenance Factor (refer to BS 8206-2:2008 Tables A3, A4 and A5

- The reflectance values used in the ADF analysis of neighbouring buildings are based on typical values for internal surfaces. Where information on internal finishes is not available, the default value of 0.5 prescribed by the BRE Guidelines is adopted.

- Where information on internal room layouts of adjacent properties is not known, best estimates as to room layout and size have been made in order to undertake No Skyline analysis.

- Where the internal arrangements and room uses have been estimated, it should be noted that this has no bearing upon the tests for VSC or APSH because the reference point is at the centre of the window being tested and windows have been accurately drawn from the survey information. It is relevant to the daylight distribution assessment, but in the absence of suitable plans, estimation is a conventional approach.

- In areas where survey data has not been provided or needs to be supplemented with additional information, photographs, OS mapping and brick counts have been used in the process of building the 3D model of the surrounding and existing buildings.

- When analysing the effect of the new building on the existing buildings, the shading effect of the existing trees has been ignored. This is the recommended practice where deciduous trees that do not form a dense belt or tree line are present (BRE Guidelines – Appendix H). This is because daylight is at its scarcest and most valuable in the winter when most trees will not be in leaf.

- In situations where windows are deeply set-back beneath balconies or other overhanging features, it is common for these rooms to have low VSC values as a result of the obstruction caused by the balcony. It widely accepted and acknowledged within the BRE Guidelines that the presence of balconies can mask the impact of a proposed development when using the VSC test and therefore the Guidelines suggest that the window should be tested both 'with' and 'without' the balcony in place. If the ratio of change with the development in place, but with the balconies removed, remains above 0.8, then it can be concluded that it is the presence of the balcony rather than the introduction of a new building that is the main factor in the relative loss of light.

5.5 Assessment criteria

The numerical assessment criteria specified within the BRE Guidelines is designed to identify the threshold at which point a change in daylight or sunlight would become 'noticeable' to the occupants. Consequently, where the results of the daylight/sunlight analysis demonstrate compliance with the BRE criteria it can be concluded that the impact will be negligible.

However, a point that should be stressed here is that 'noticeable' does not necessarily equate to 'unacceptable' and the BRE's standard target values should not always be considered as pass/fail criteria. Whilst the BRE Guidelines provide numerical guidance for daylight, sunlight and overshadowing, these criteria should not be seen as absolute targets since, as the document states, the intention of the guide is to help rather than constrain the designer. The Guide is not an instrument of planning policy, therefore whilst the methods given are technically robust, it is acknowledged that some level of flexibility should be applied where appropriate.

Consequently, based on the numerical assessment criteria set out with the BRE Guidelines and the use of professional judgment, the following assessment criteria have been established and are used in describing the impacts of the proposed development.

Significance	Description	Typical Change Ratio
Negligible	No alteration or a small alteration from the existing scenario. Results demonstrate full compliance with the BRE assessment criteria and therefore occupants are unlikely to notice any change.	1.0 to 0.8
Minor adverse	An alteration from the existing scenario which may be marginally noticeable to the occupant. This may include a marginal infringement of the numerical levels suggested in the BRE Guidelines, which should be viewed in context. A typical change ratio for this level of significance would be 0.7	0.7 to 0.8
Moderate adverse	An alteration from the existing scenario which may cause a moderate noticeable change to the occupant. This may consist of a moderate infringement of the numerical BRE assessment criteria with	0.6 to 0.7
Major adverse	An alteration from the existing scenario which may cause a major noticeable change to the occupant. This may consist of a significant infringement of the numerical BRE assessment criteria.	Less than 0.6

Table 5.2 – Daylight & Sunlight Impact Descriptors

6 Discussion of Daylighting Impacts

Based on the results of the numerical analysis summarised in Appendix A.3 it is possible to draw conclusions as to the impacts that the proposed development will have on the neighbouring buildings. These are based on the principal numerical tests that are discussed below.

6.1 Vertical Sky Component Assessment

The BRE Guidelines operate on the general principle where the retained VSC is 27% or greater, or where the VSC is below 27% and is not reduced to less than 0.8 times its former value, then the reduction in daylight is unlikely to be noticeable to the building's occupants and thus the impact can be deemed negligible.

The results of the VSC analysis are summarised below.

Receptor Address	No. of windows tested	No. passing BRE test (negligible impact)	Transgression		
			Minor adverse	Moderate adverse	Major adverse
82 Annandale Avenue	12	12	0	0	0
84 Annandale Avenue	7	6	0	1	0
125 Longford Road	2	2	0	0	0
127 Longford Road	2	2	0	0	0
129 Longford Road	2	2	0	0	0
131 Longford Road	2	2	0	0	0
Total	**27**	**26**	**0**	**1**	**0**

Table 6.1 – Results of Vertical Sky Component (VSC) Analysis

Inspection of the results of this test show that all of windows, excluding one, either retain a VSC value greater than 27% post development, or have a ratio of change that is 0.8 or above and therefore are fully compliant. Consequently, in line with the assessment criteria set out within the BRE Guidelines it is possible to conclude that the impact will be **negligible**.

There is one window situated on the ground floor of No. 84 Annandale Avenue that is showing a transgressional result, however, whilst a reduction in VSC of this magnitude does indicate a potentially 'noticeable' change, the BRE Guidelines are quite clear in stating that this does not necessarily mean that the degree of change is unacceptable.

When this window is examined in detail, it is evident that this is a side window to a kitchen which is served by one other window and a glazed door on the rear façade of the property. Consequently, the results of the VSC analysis in isolation are not necessarily indicative of the

impact of the daylighting levels within the room itself. One of the ways in which the BRE Guidelines recommends quantifying the potential impact in this situation is to take the average VSC value for the room under both the existing and proposed scenarios and base the ratio of change on the averaged ratio of change value.

In this instance, when the average of the four windows that serve this room is calculated, the 'existing' scenario VSC is 30.47% and the mean 'proposed' VSC total is 27.12% This results in a ratio of change of 0.89, which is above the 0.8 BRE Guideline value. This therefore demonstrates that when the impact on the room itself is examined in detail, the reduction in daylight will be within the permitted tolerances set out within the guidelines.

6.2 No Sky Line Assessment

In order to pass the No Sky Line Assessment, the BRE Guidelines state that the area of the working plane within the room that has a view of the sky should not be reduced to less than 0.8 times its former value as a result of new development. One benefit of the daylight distribution test is that the resulting contour plans show where the light falls within a room, both in the existing and proposed conditions, and a judgement may be made as to whether the room will retain light to a reasonable depth.

The dimensions and layouts of the rooms within No. 84 Annandale Avenue have been reproduced from measurements provided by Annandale Developments Ltd. For those rooms where such information was not available for No. 82 Annandale Avenue and No. 125-131 Longford Road, an estimate of the room dimension and layout has been made.

The results of the No Sky Line/Daylight Distribution analysis are summarised below.

Receptor Address	No. of rooms tested	No. passing BRE test (negligible impact)	Transgression		
			Minor adverse	Moderate adverse	Major adverse
82 Annandale Avenue	5	5	0	0	0
84 Annandale Avenue	4	4	0	0	0
125 Longford Road	2	2	0	0	0
127 Longford Road	2	2	0	0	0
129 Longford Road	2	2	0	0	0
131 Longford Road	2	2	0	0	0
Total	**17**	**17**	**0**	**0**	**0**

Table 6.2 – Results of No Sky Line (NSL) Analysis

From the results summarised in Table 6.2, it can be seen that as a result of the proposed development, the impact on the daylight distribution within the assessed rooms will be negligible. The reduction in the area of the working plane that has a direct view of the sky will be less than 20% therefore occupants are unlikely to notice any change.

6.3 Summary of Daylighting Impacts

From the results of the daylight analysis, it is evident that there will be a reduction in the amount of daylight reaching the windows of the buildings that surround the development site. However, when the magnitude of this reduction is considered for each room, it is evident that this will be within the acceptable limits set out within the BRE Guidelines. Consequently, it is possible to conclude that any changes to the daylight received by the habitable rooms of the neighbouring buildings will not be significant and are unlikely to be noticeable to the occupants.

7 Sunlight and Overshadowing Analysis

7.1 Annual Probable Sunlight Hours Assessment

Whilst the application of the four-stage assessment outlined in Section 4.5 allows the use of the more simplistic tests (Tests 1 to 3) to be used where applicable, when using a computational numerical model, it is a more robust and efficient approach to test all windows using the most detailed methodology.

It should also be noted that where rooms have windows on more than one elevation, it is acceptable to sum the non-coincident sunlight hours to achieve a 'room total'. This approach is acknowledged by the BRE Guidelines and facilitates a greater understanding of the sunlight received within a room by taking into account the fact that some windows will receive sunlight at different times during the day.

The assessment requirements for the APSH test, as set out in the BRE Guidelines, have been reiterated below. For the assessment to conclude that the sunlighting of the existing dwelling could be adversely affected, all three of the following tests need to have been failed:

Test A - Does the window receive less than 25% of the APSH, or less than 5% the APSH between 21st September and 21st March?

Test B - Does the assessed window receive less than 0.8 times its former sunlight hours during either the 'whole year' or 'winter' period?

Test C - Is the reduction in sunlight received over the whole of the year greater than 4% of the APSH?

However, these tests are only applicable to windows that face within 90 degrees of due south. When the orientation of the windows identified as being sensitive receptors is examined, it is evident that 17 out of the 27 windows assessed face within 90 degrees of due north. Consequently, in line with the guidelines and assessment methodologies set out within the BRE document, the analysis of sunlight impacts is not required for those windows and they have been excluded from Table 7.1 below.

The APSH test has been carried out and the detailed results of the analysis and model outputs are included in Appendix A.3 and a summary of the results are shown in Table 7.1 below.

Receptor Address	No. of windows tested	No. of rooms tested	Test A		Test B	Test C	No. of windows passing at least one test
			Windows passing	Rooms passing			
82 Annandale Avenue	4	2	4	2	4	4	4
84 Annandale Avenue	6	4	6	4	6	5	6
125 Longford Road	*North Facing*						
127 Longford Road	*North Facing*						
129 Longford Road	*North Facing*						
131 Longford Road	*North Facing*						
Totals	**10**	**6**	**10**	**6**	**10**	**9**	**10**

Table 7.1 – Results of APSH Analysis

When examining the results of the three sunlight tests described above, it is first necessary to understand why there are three separate tests and more importantly, why it is not necessary to pass all three to demonstrate that there is no adverse impact. The BRE Guidelines clearly state that for the proposed development to be considered to have an adverse effect on the available sunlight to neighbouring windows, all three tests would need to have been failed.

This is because sunlight is not assessed in terms of its contribution to the overall lighting levels within the room. The value attributed to sunlight is its transient presence and the way in which it can make a room appear bright and cheerful. There are also therapeutic values associated with sunlight and therefore it can be seen that these are not quantitative metrics that can be assessed using a single pass/fail criteria test. It is also necessary to understand that the amount of sunlight received by a window is strongly influenced by the orientation of the window elevation and any surrounding obstructions.

As a consequence of these factors, the assessment methodology embodied within the three separate tests allows the change in sunlight to be assessed in terms of the magnitude of change, absolute change and the retained level of sunlight. To conclude that a new development has no adverse impact, all that is required is for one of the three tests to be passed.

When the results of the APSH analysis summarised in Table 7.1 are inspected, it can be seen that all windows and rooms pass at least two of the three sunlight tests. Consequently, it has been demonstrated that the proposed scheme will have a negligible impact on neighbouring buildings.

7.2 Sun on the Ground

The BRE Guidelines acknowledge that good site layout planning for daylight and sunlight should not limit itself to providing good natural light inside buildings. Sunlight in the space between buildings has an important effect on the overall appearance and ambiance of a development. The worst situation is to have significant areas on which the sun does not shine for a large part of the year. These areas would, in general, be damp, chilly and uninviting.

The 2011 BRE Guidelines suggest that the Spring Equinox (21st March) is a suitable date for the assessment and therefore using the specialist software described in Section 5.3, the path of the sun is tracked to determine where the sun would reach the ground and where it would not.

The BRE guidelines recommend that at least half of a garden or amenity area should receive at least 2 hours of sunlight on March 21st or the area which receives 2 hours of direct sunlight should not be reduced to less than 0.8 times its former value (i.e. there should be no more than a 20% reduction).

Typical examples of areas that could be considered as open spaces or amenity areas are main back gardens of houses, allotments, parks and playing fields, children's playgrounds, outdoor swimming pools, sitting-out areas, such as in public squares and focal points for views.

The rear gardens of the following properties have been identified as sensitive amenity areas and the results of the sun on the ground analysis are summarised in Table 7.2.

- No. 82 Annandale Avenue
- No. 84 Annandale Avenue
- No. 125 Longford Road
- No. 129 Longford Road

The graphical results of the overshadowing analysis are included in Appendix A.2.

Amenity area	Percentage of area lit for 2 hours or more on the 21st March		Ratio of change	Compliant with BRE criteria?
	Existing	Proposed		
No. 82 Annandale Avenue	98%	98%	n/a	Yes
No. 84 Annandale Avenue	96%	96%	n/a	Yes
No. 125 Longford Road	62%	62%	n/a	Yes
No. 129 Longford Road	67%	67%	n/a	Yes

Table 7.2 – Results of the Sun on Ground analysis

From the above results, it can be seen that with the proposed scheme in place, all of the neighbouring amenity areas benefit from two hours of more of direct sunlight to well over 50% of their area on the 21st March. It can also be seen that with the proposed development in place, there will be no reduction in the areas currently lit for two hours or more. Consequently, it can be concluded that the proposed development will not result in a noticeable increase in overshadowing to the neighbouring gardens.

7.3 Transient Overshadowing

Where amenity areas are used at specific times of day or year, it is useful and illustrative to comment on the overshadowing that will occur throughout the day and at different times of the year. However, with traditional rear gardens and public open spaces that are potentially used all year round, it is acknowledged by the BRE Guidelines that the 21st March equinox is used, as this represents a much worst case than an assessment during the summer when shadows are shorter and impacts of new development are less magnified.

It is also worth highlighting that whilst the BRE Guidelines do not provide any thresholds or assessment criteria for overshadowing analysis carried out at any date other than the 21st March. All that is quoted in the Guidelines is an acknowledgement that some degree of transient overshadowing should be expected from new development. Consequently, unless there is a specific reason to assess overshadowing at a specific time of day, the use of transient shadow plots is not recommended by the BRE Guidelines.

In this situation, it is not considered that any of the amenity areas that are potentially affected by the proposed development would be described as being sensitive to overshadowing at any particular time of day. Consequently, transient overshadowing is not considered appropriate for this assessment.

7.4 Solar Glare

Solar glare or dazzle can affect neighbouring buildings and pose potential hazards for road users under certain circumstances. The BRE Guidelines highlight two particular cases where this can be a problem; these being where there are large areas of reflective glass or cladding on the façade, or where large areas of glass or cladding slope back such that high-altitude sunlight can be reflected along the ground.

When the proposed design is considered, it can be seen that the building does not slope back, nor does it include large areas of reflective glass or cladding. Given the building design and the BRE Guideline's stance on this matter, it is not considered necessary or appropriate to incorporate an analysis of solar glare.

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8 Conclusions

The detailed analysis undertaken as part of this assessment has examined the impact of the proposed development on the amount of daylight enjoyed by the neighbouring buildings. In line with the assessment criteria prescribed by the BRE Guideline, it has been shown that the reduction in daylighting to the windows of the neighbouring buildings is less than the value that is considered to represent a notable impact.

The assessment of the impact of the proposed development on the sunlight enjoyed by the neighbouring buildings has also shown that whilst there will be a reduction in the number of probable sunlight hours enjoyed by these windows, this reduction is again within the limits prescribed by the BRE Guidelines as being acceptable.

In summary, the development proposals have been appraised in line with the guidelines set out in the BRE document. When assessed against the criteria for establishing whether the proposed development will have a significant impact, it has been possible to conclude that the development will not result in a notable reduction in the amount of either daylight or sunlight enjoyed by the neighbouring buildings.

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A Appendices

A.1 Appendix A.1 – Scheme Drawings

A.2 Appendix A.2 – Graphical Model Outputs

A.3 Appendix A.3 – Tabulated Results for Daylight & Sunlight Calculations

Appendix A.1 – Scheme Drawings

ARUN DISTRICT COUNCIL BR/231/19/PL

PROPOSED NORTH WEST ELEVATION 1:100

PROPOSED SOUTH EAST ELEVATION 1:100

PROPOSED NORTH EAST ELEVATION 1:100

PROPOSED SOUTH WEST ELEVATION 1:100

AMdesign

ARCHITECTURE DESIGN DEVELOPMENT

Leeza Aldis-Hobbs ARB RIBA SPAB

[redacted]

PROJECT

86 ANNANDALE AVE
BOGNOR REGIS
WEST SUSSEX
PO21 2EX

PROJECT STAGE

PLANNING

DRAWING

PROPOSED ELEVATIONS

DRAWING No 248/05

REVISION A

SCALE 1:100 DRAWN LA

DATE JAN 2018 CHECKED

LETTER	REVISION	DATE

This scheme is subject to town planning and all other necessary consents. All dimesions and levels to be checked on site. This drawing is to be read in conjunction with other relevant drawings and documents. Report all discrepancies to the Architect before work commences.

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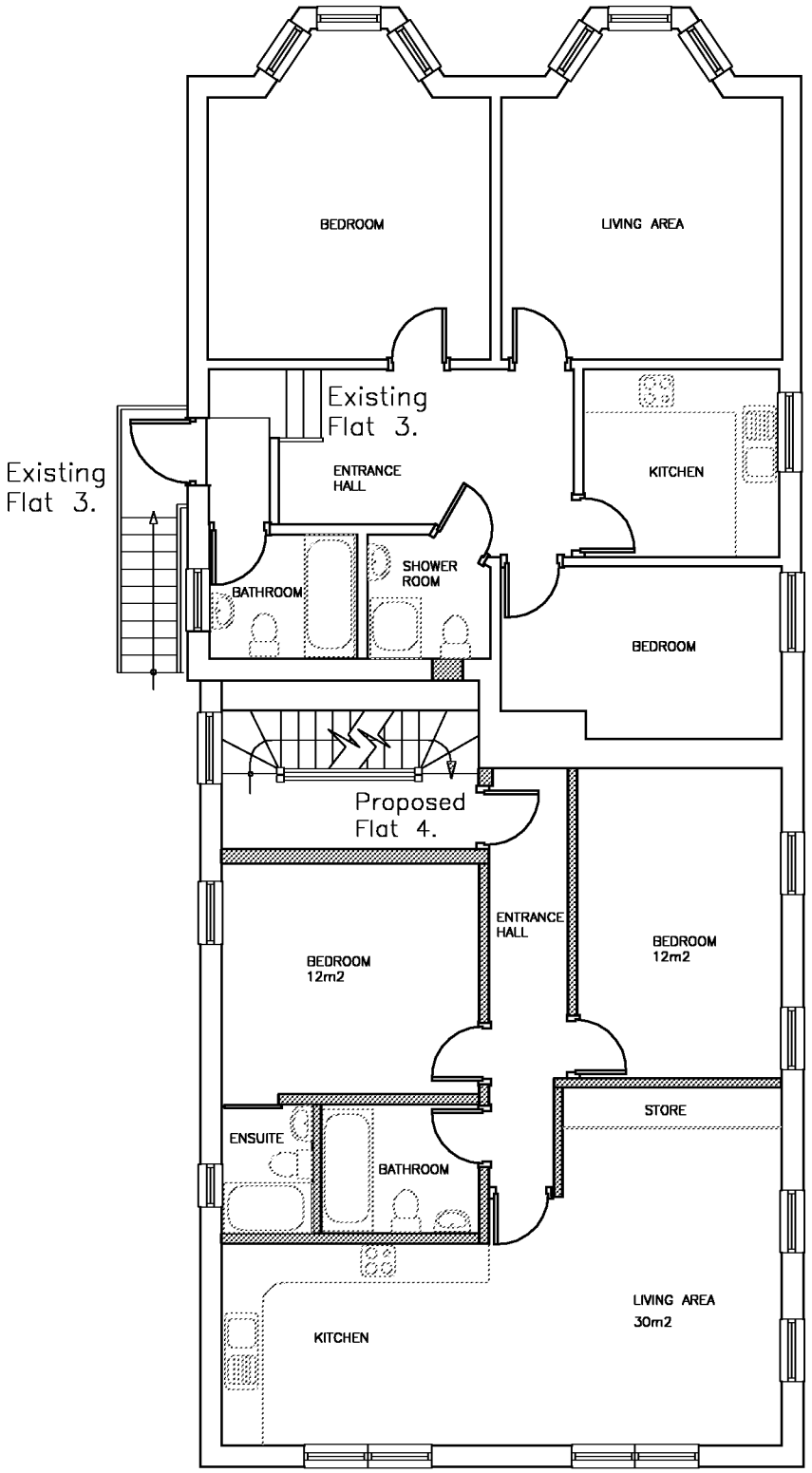
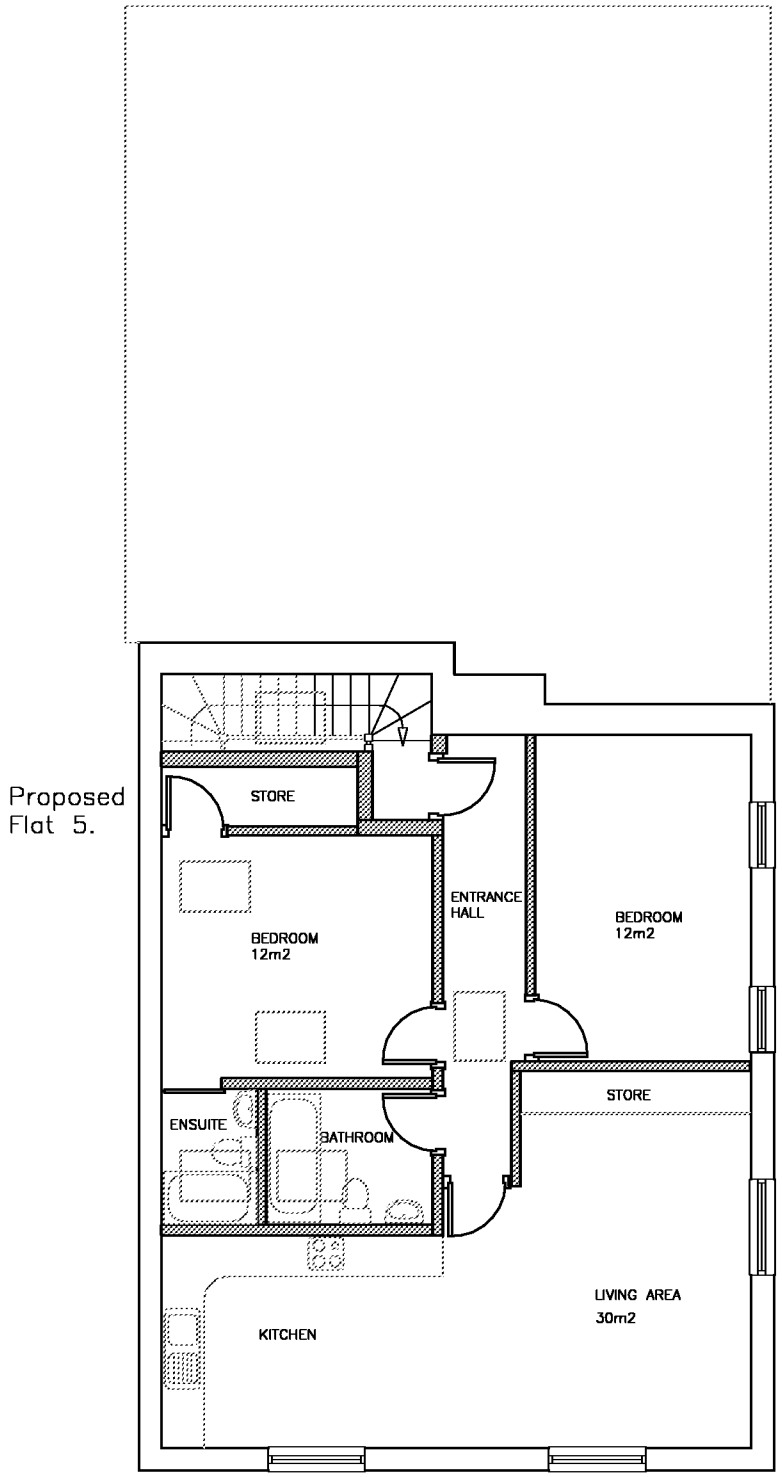


PROPOSED FIRST FLOOR PLAN 1:100



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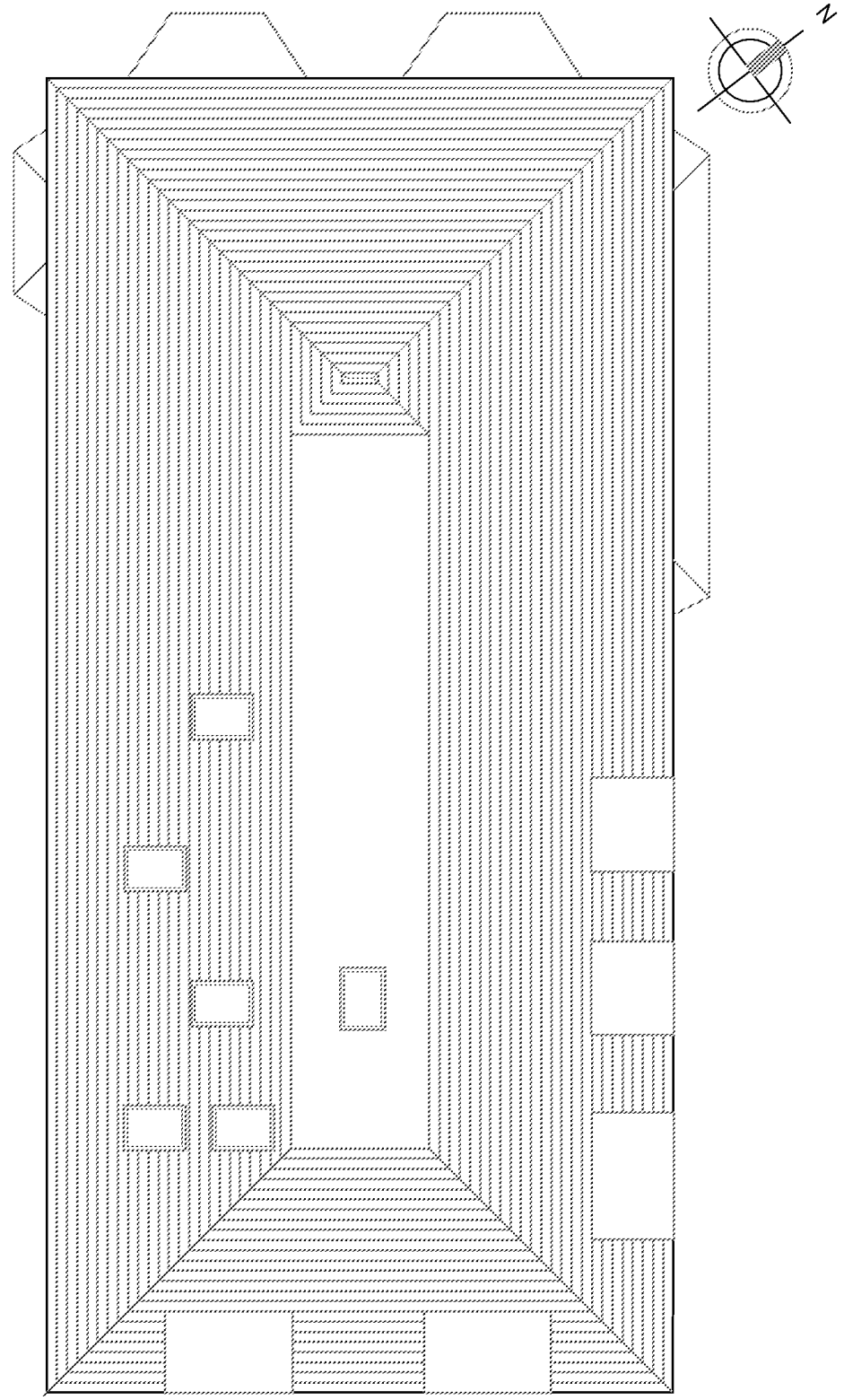

PROPOSED ROOF PLAN 1:100

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ARCHITECTURE DESIGN DEVELOPMENT
Leeza Aldis-Hobbs ARB RIBA SPAB
[redacted]

PROJECT
86 ANNANDALE AVE
BOGNOR REGIS
WEST SUSSEX
PO21 2EX
PROJECT STAGE
PLANNING

DRAWING
PROPOSED PLANS

DRAWING No 247/04
REVISION A

SCALE 1:100
DRAWN LA
DATE FEB 2018
CHECKED

LETTER	REVISION	DATE

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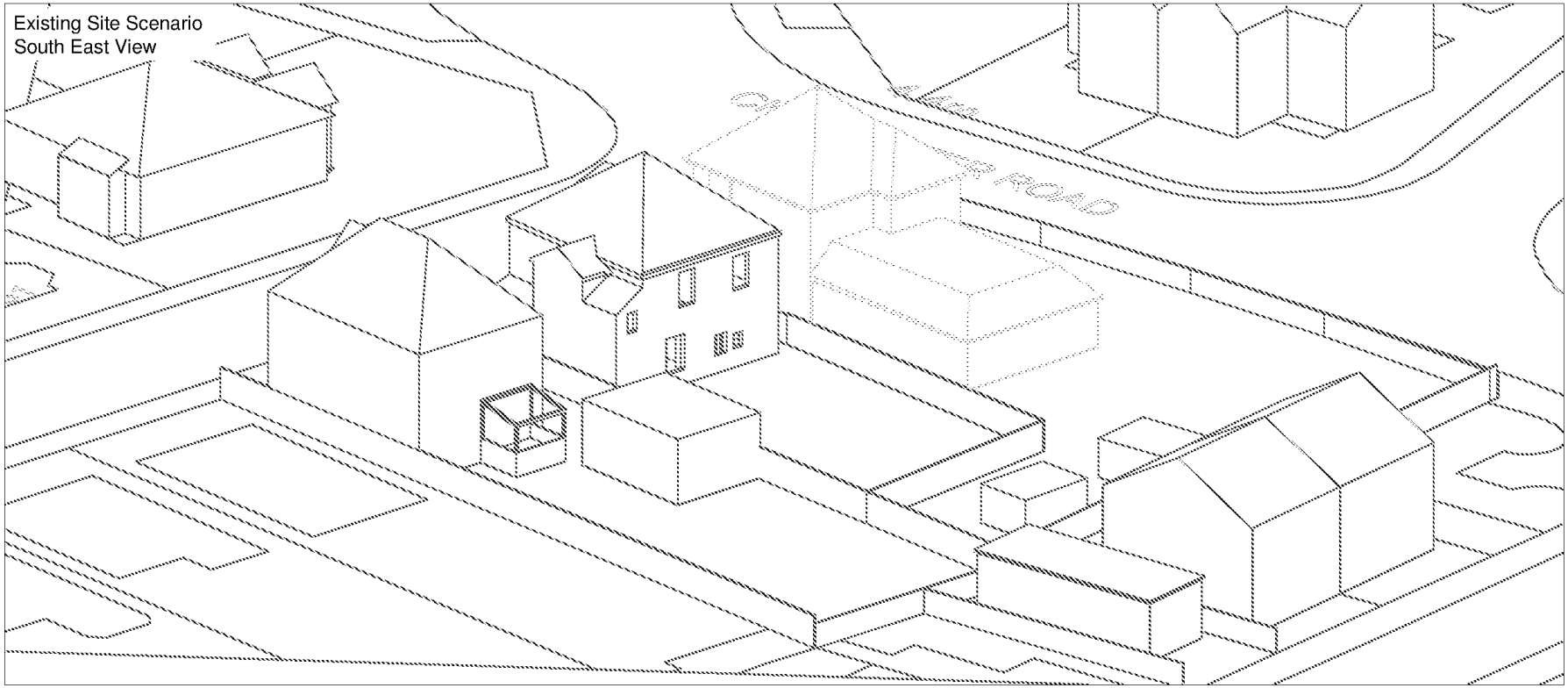
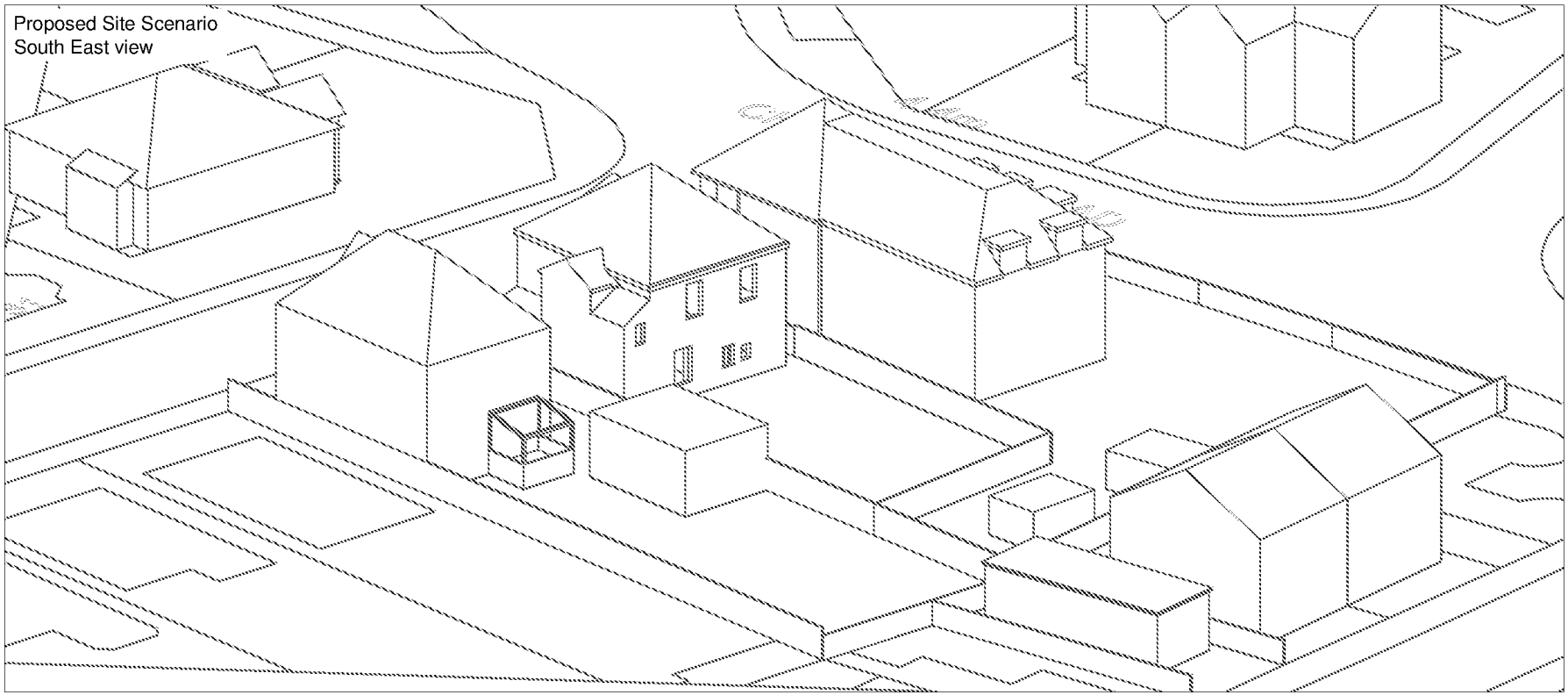
Appendix A.2 – Graphical Model Outputs

Existing Site Scenario
South East View



Proposed Site Scenario
South East view



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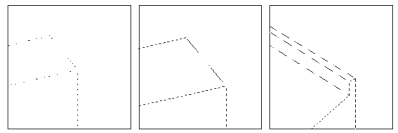
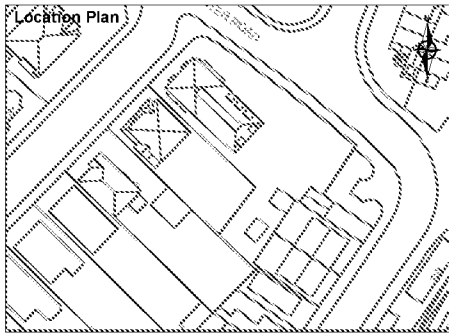
Legend



Location Plan



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DWG REF.
3D Model - Existing & Proposed Site Scenarios.

DWG No.
2138_01

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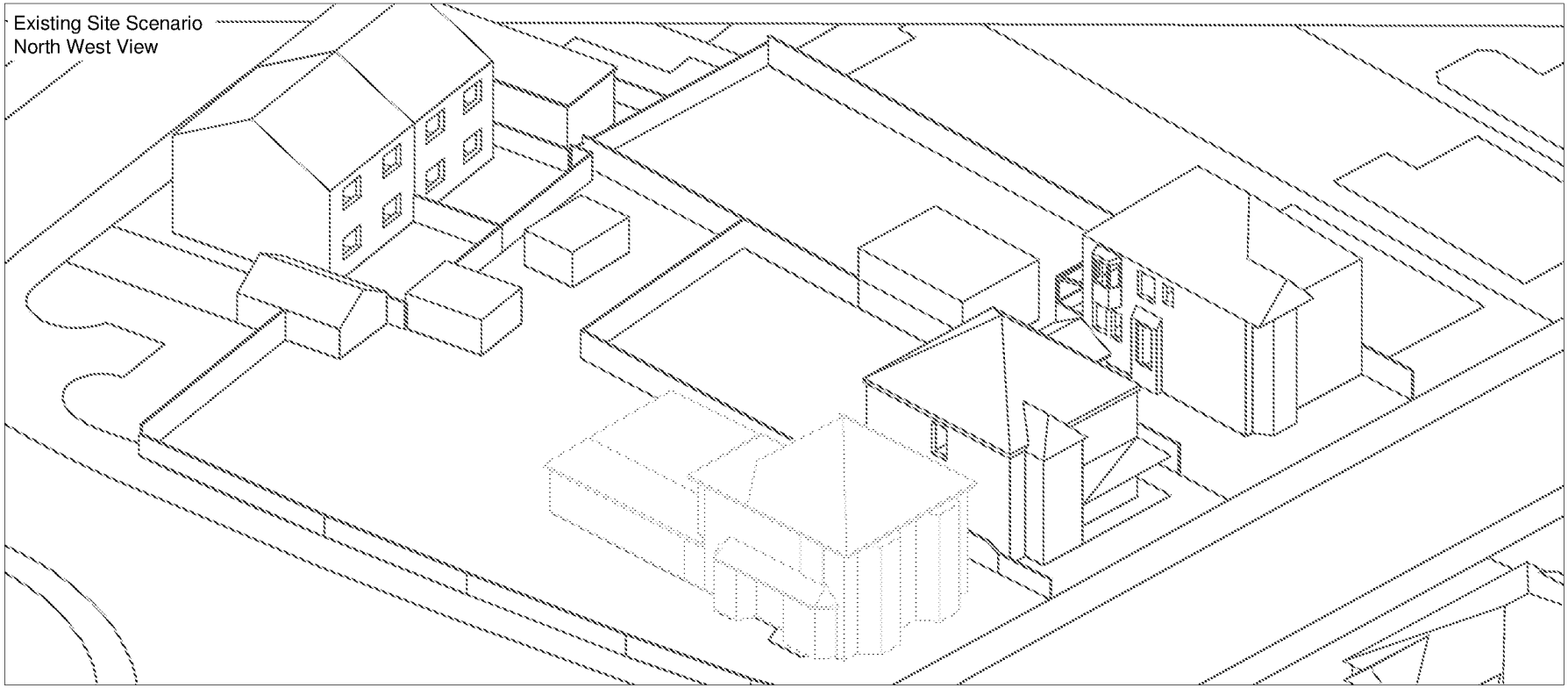
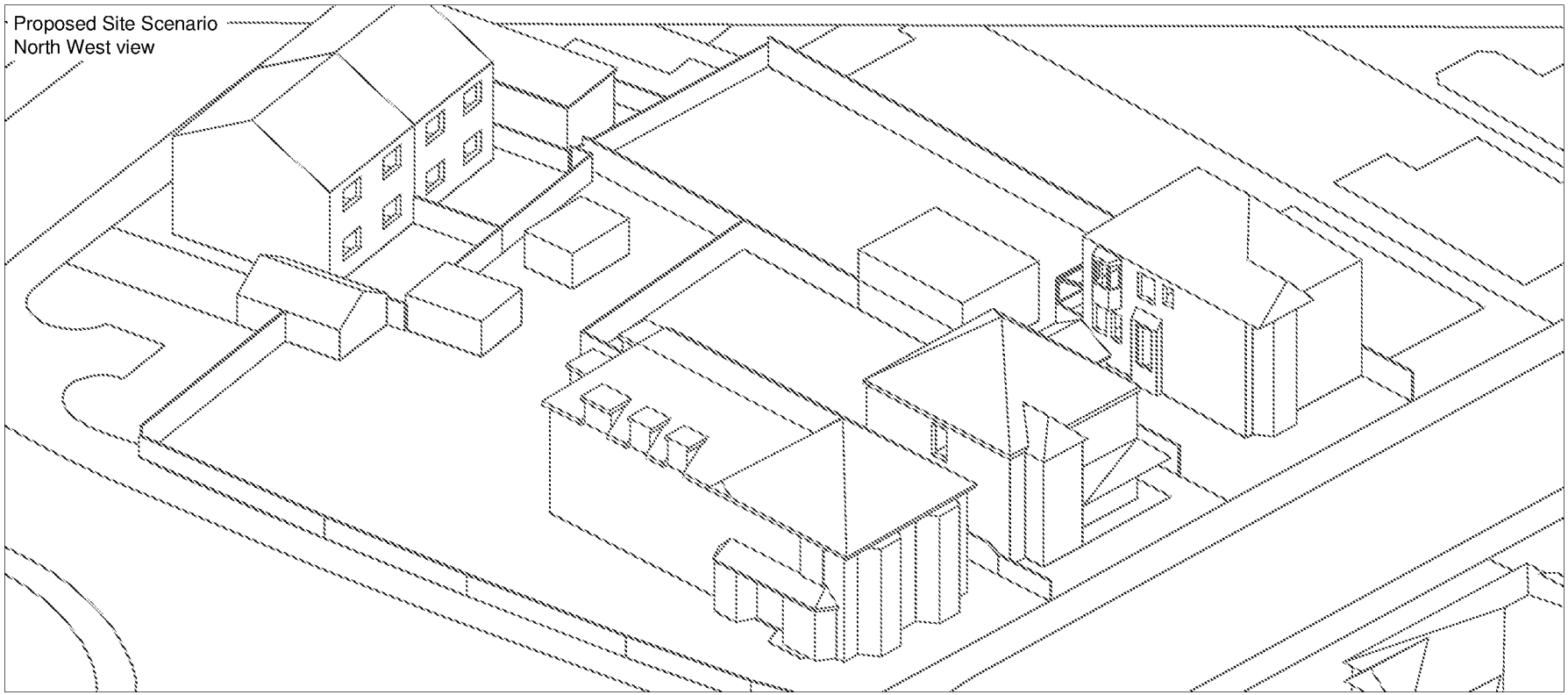
Existing Site Scenario
North West View



Proposed Site Scenario
North West view



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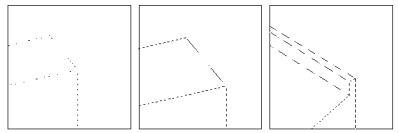
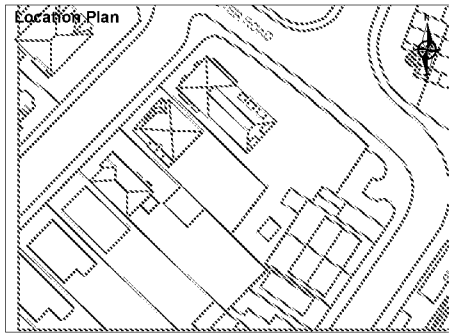


Existing Buildings | Proposed Buildings | Surrounding Buildings

Location Plan



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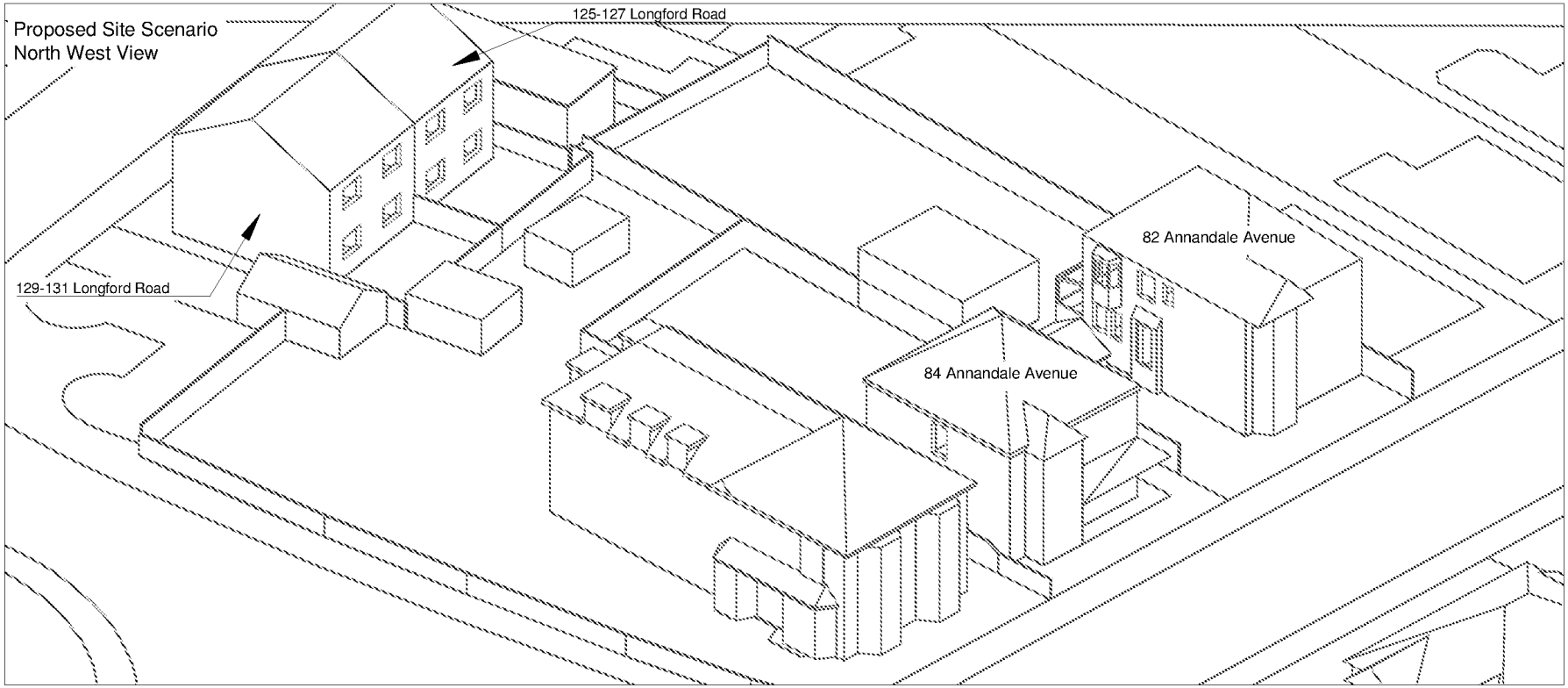

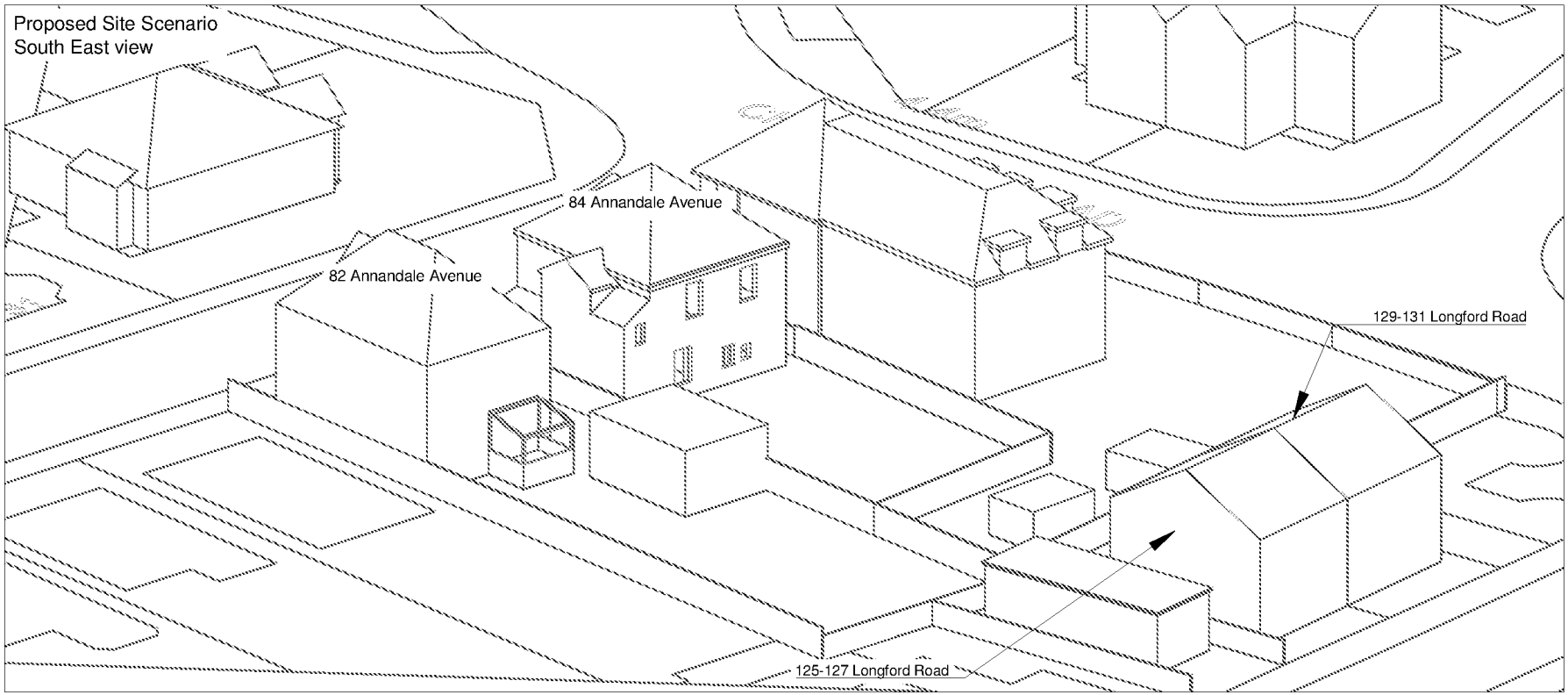

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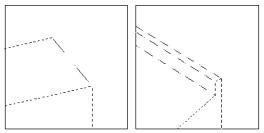

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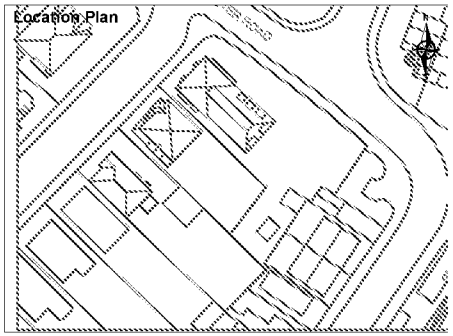

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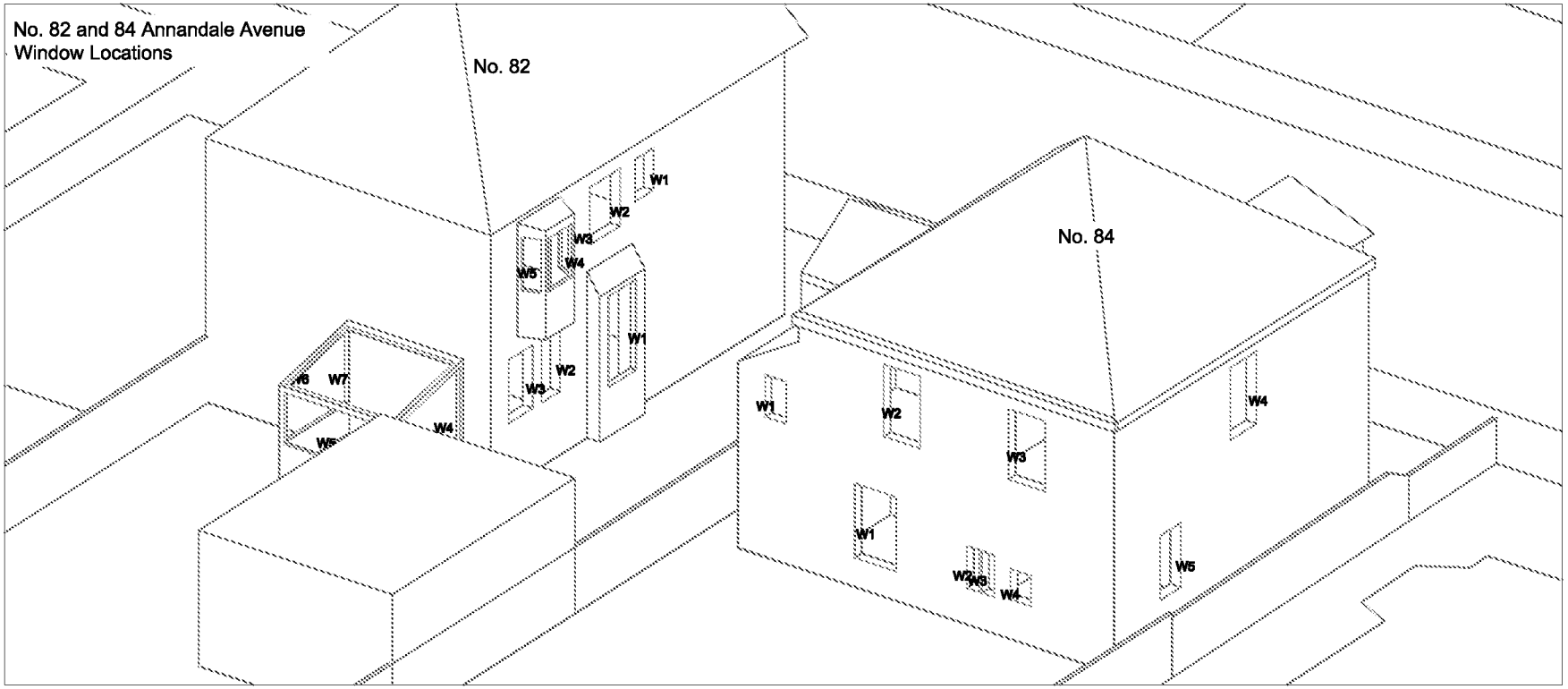

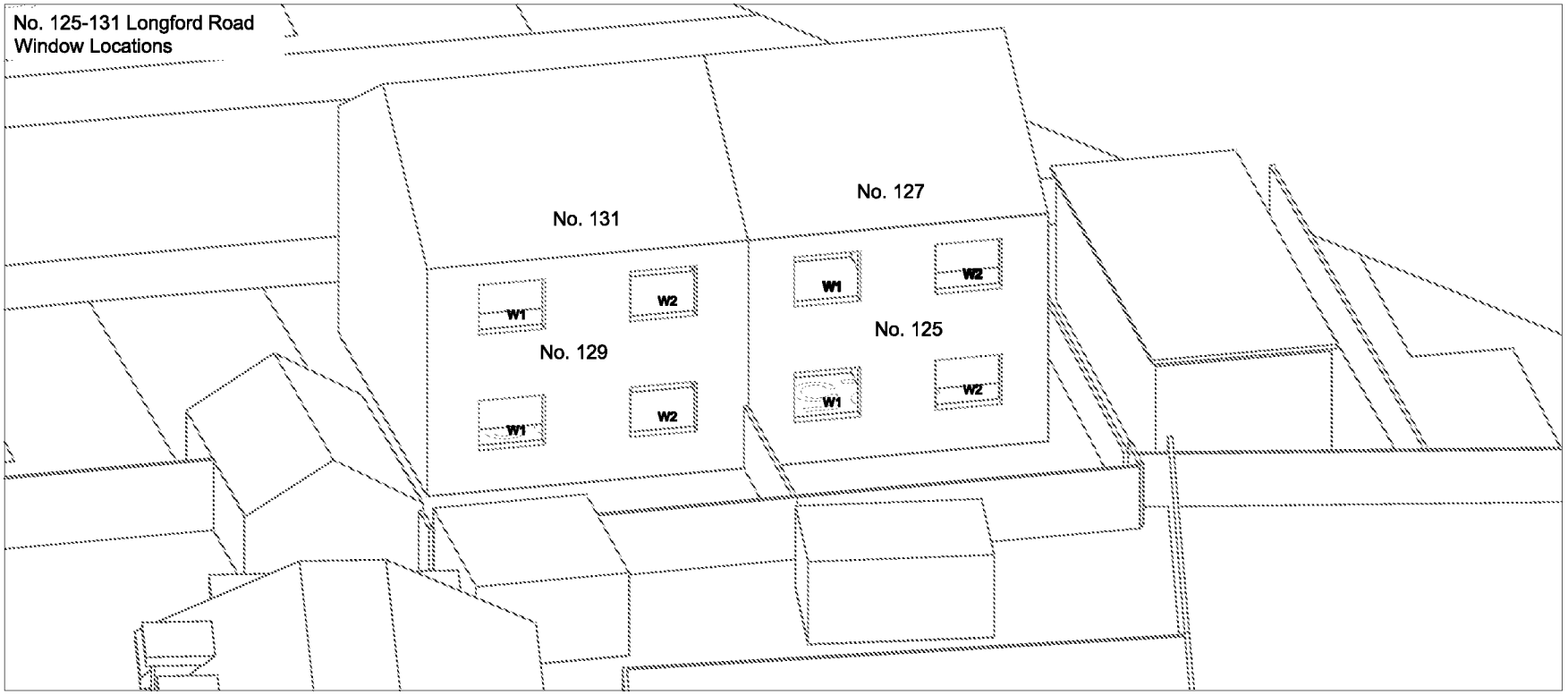

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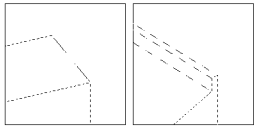
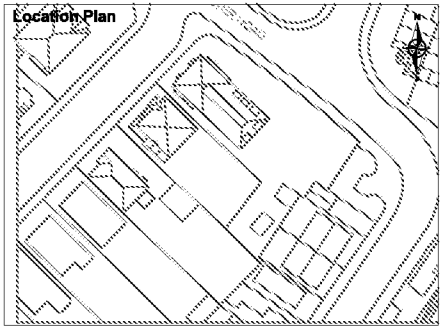


Proposed Buildings Surrounding Buildings

Location Plan



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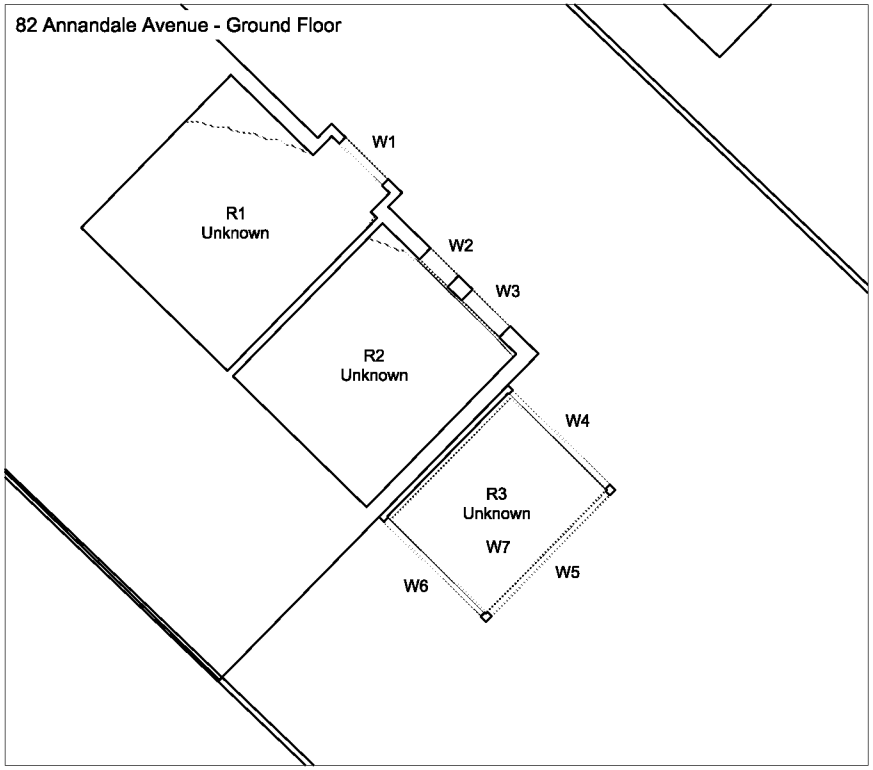
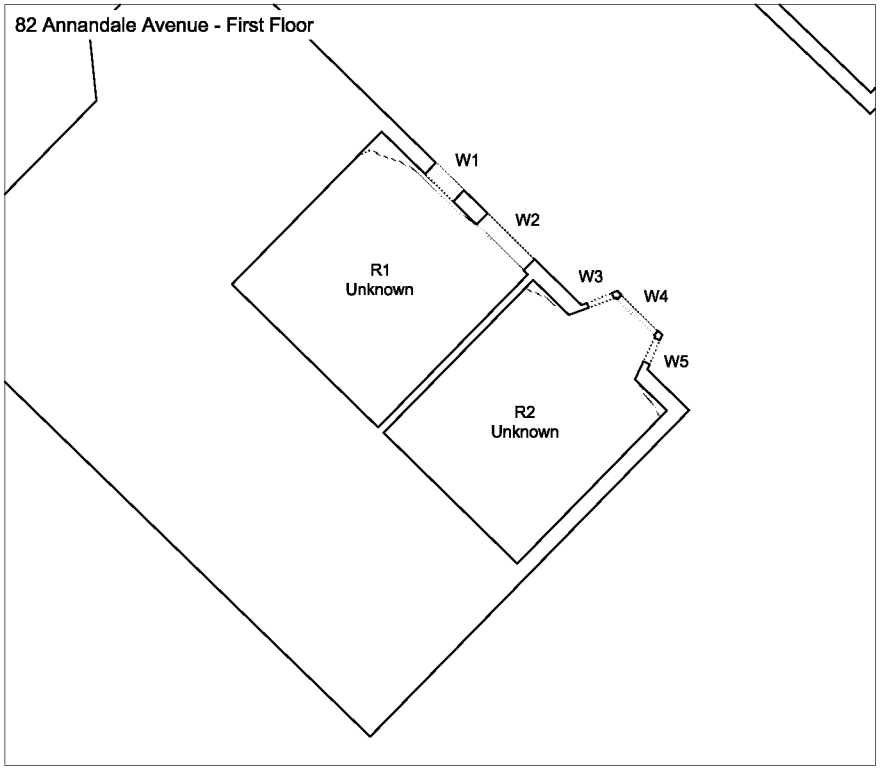
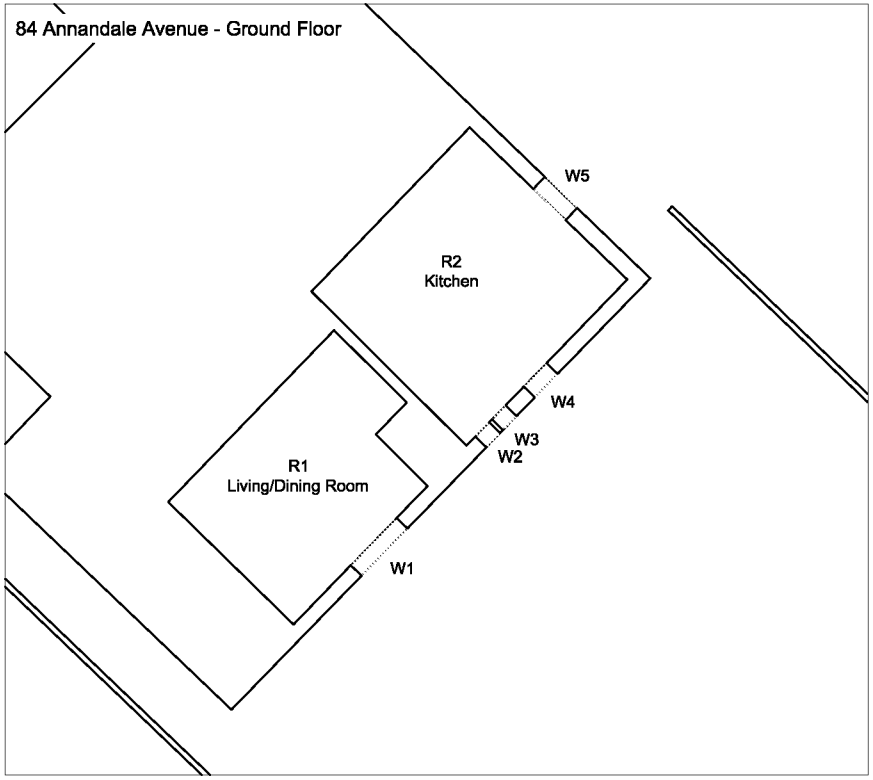


82 Annandale Avenue - First Floor



84 Annandale Avenue - Ground Floor



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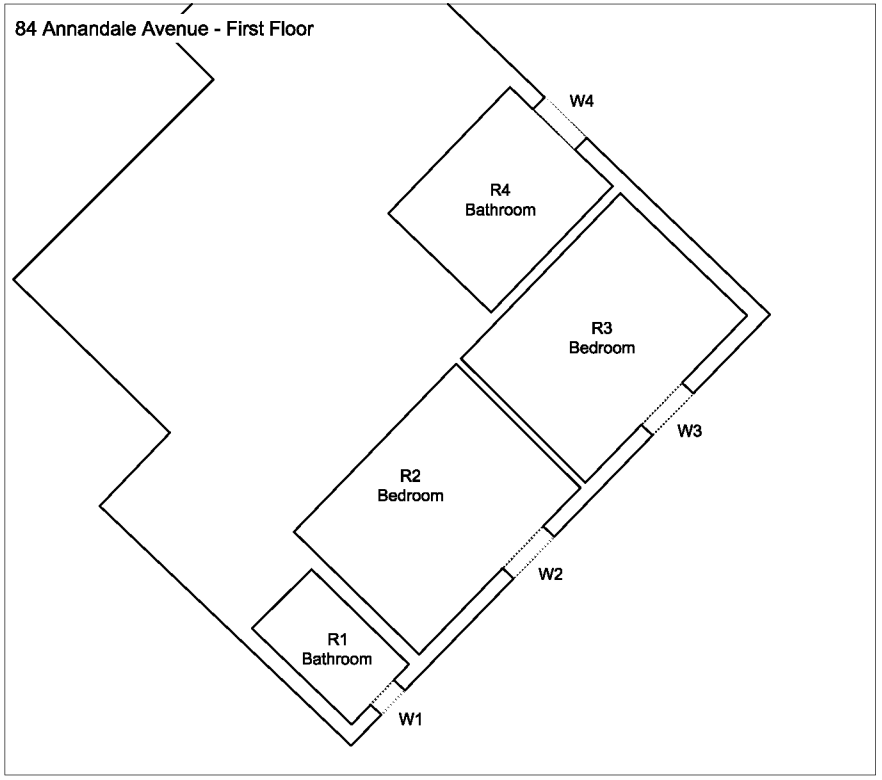

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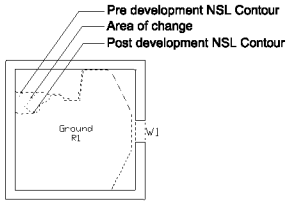
Legend



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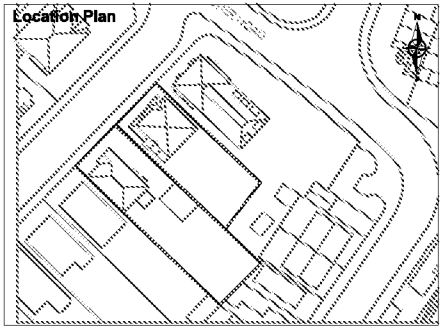

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NSL contours.

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82 and 84 Annandale Avenue - Amenity Areas

84 Annandale Avenue

82 Annandale Avenue

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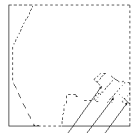
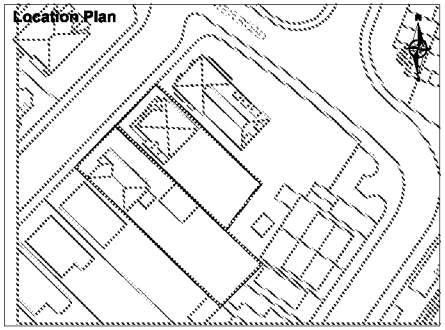


2hr Sun on ground contour (post development)

Area of change

2hr Sun-on-ground contour (pre-development)

Location Plan



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PROJECT

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DWG REF.

NSL contours.

DWG No.

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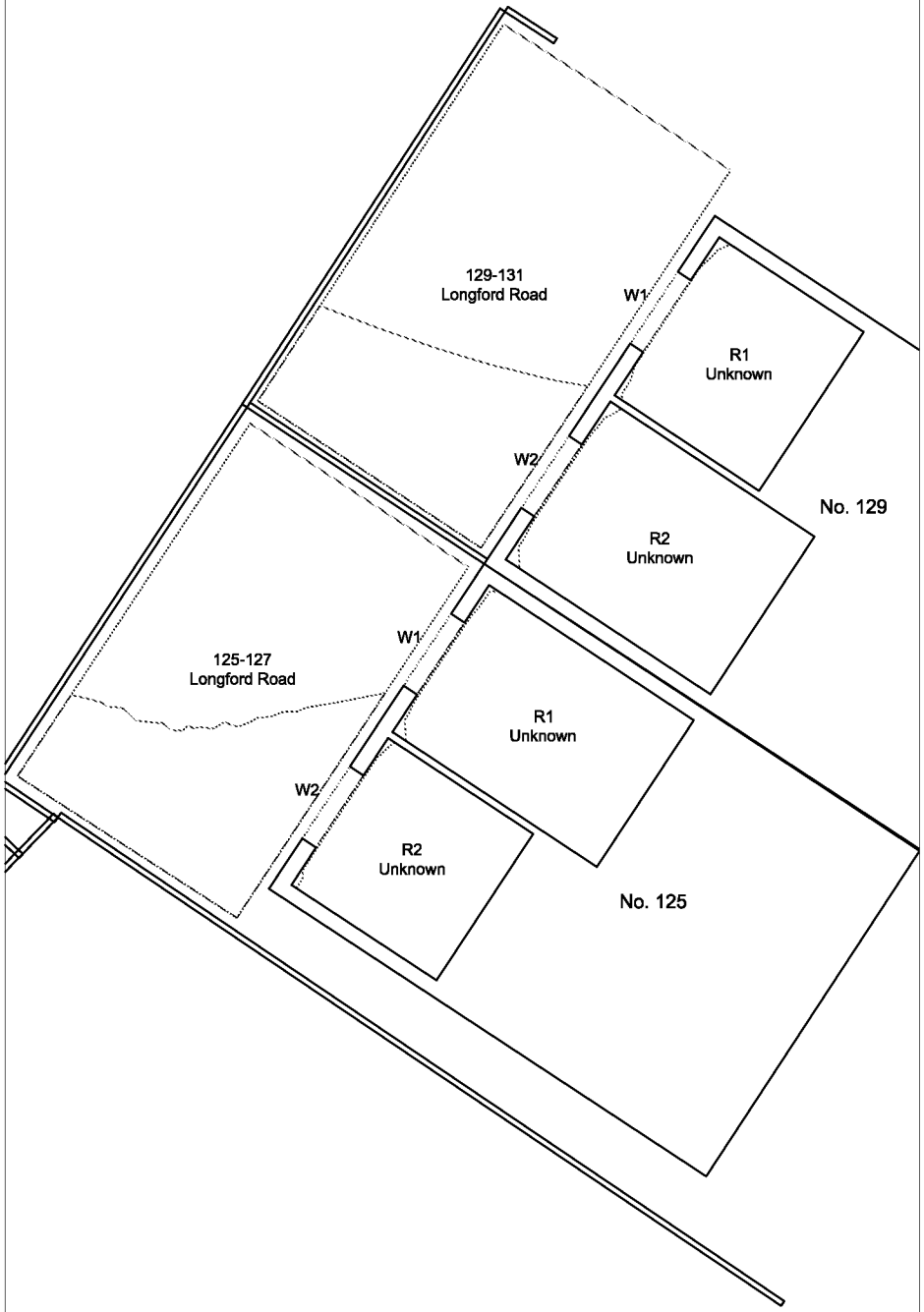
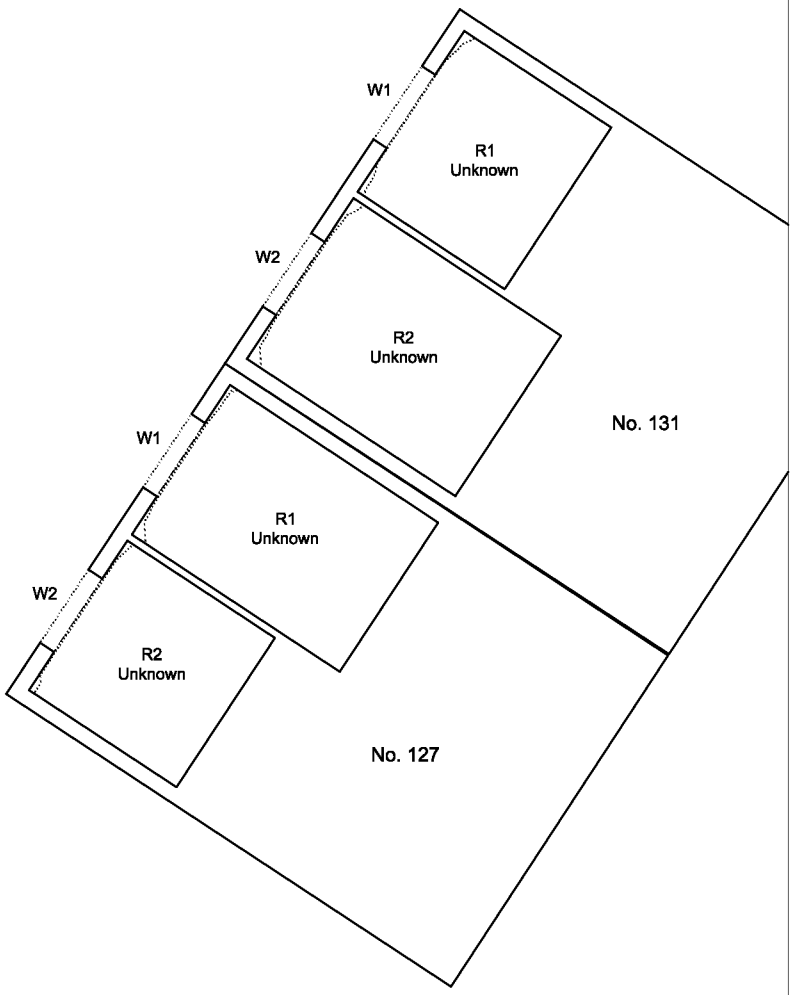
125 and 129 Longford Road - Ground Floor



127 and 131 Longford Road - First Floor



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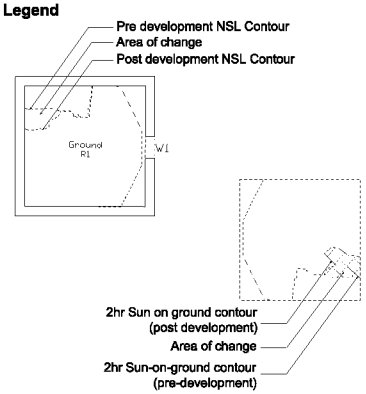
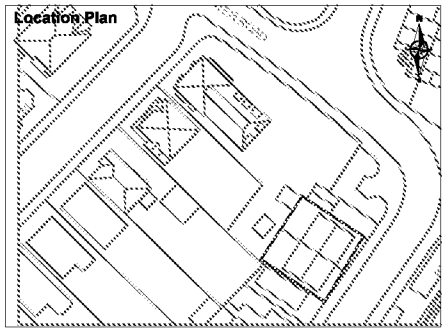
Legend



Location Plan



Rev	Description	Date
00	First issue	13/08/2018

CLIENT
Annandale Development Ltd

PROJECT
Annandale Avenue, Bognor Regis

SCALE	PROJ REF	ANALYST	DRAWN BY
Not to scale	2138	KB	VK

DWG REF.
NSL contours.
2hr SoG amenity contours.

DWG No.
2138 - 07

ARUN DISTRICT COUNCIL BR/231/19/PL

Appendix A.3 – Tabulated Results for Daylight and Sunlight Calculations

Project Name: Annandale Avenue, Bognor Regis
Project No: 21.18
Report title: 25° Daylight & SPSH Vertical Assessment to Neighbouring Windows and Rooms
Date of Analysis: 1/08/2018

Storey	Room No.	Property Type	Room Use	Window Ref		VSC	Pass	Meets BRE Criteria	Window Orientation	Annual Hours	Pass	Meets BRE Criteria	Winter Hours	Pass	Meets BRE Criteria	Sky Visible on Main Facade	Meets BRE Criteria	Sky Visible on Side Facade	Meets BRE Criteria
82 Annandale Avenue																			
Ground	R1	Residential	Unknown	W1	Existing	36.31	0.95	YES	44°N		*North*			*North*					
					Proposed	34.76													
																North	*North*	*North*	*North*
	R2	Residential	Unknown	W2	Existing	33.12	0.95	YES	44°N		*North*			*North*					
					Proposed	31.50													
				W3	Existing	33.55	0.95	YES	44°N		*North*			*North*					
					Proposed	31.89													
																North	*North*	*North*	*North*
	R3	Residential	Unknown	W4	Existing	30.40	0.94	YES	44°N		*North*			*North*					
					Proposed	28.85													
				W5	Existing	33.74	0.99	YES	134°	64	1.00	YES	23	1.00	YES				
					Proposed	33.71				64			23						
				W6	Existing	26.88	1.00	YES	224°	56	1.00	YES	24	1.00	YES				
					Proposed	26.88				56			24						
				W7	Existing	77.12	0.99	YES	134° Inc	83	0.98	YES	28	1.00	YES				
					Proposed	76.90				82			28						
																83		28	
										82			28			YES		YES	
First	R1	Residential	Unknown	W1	Existing	38.46	0.97	YES	44°N		*North*			*North*					
					Proposed	37.69													
				W2	Existing	38.04	0.97	YES	44°N		*North*			*North*					
					Proposed	37.20													
																North	*North*	*North*	*North*
	R2	Residential	Unknown	W3	Existing	39.73	0.99	YES	338°N		*North*			*North*					
					Proposed	38.49													
				W4	Existing	38.40	0.97	YES	44°N		*North*			*North*					
					Proposed	37.35													
				W5	Existing	33.68	0.98	YES	113°	34	0.97	YES	6	1.00	YES				
					Proposed	31.18				33			6						
																34		6	
										33			6			YES		YES	

Project Name: Annandale Avenue, Bognor Regis
Project No: 21-18
Report Title: VSC (Daylight & APSH) Hourly Assessment to Neighbouring Windows and Rooms
Date of Analysis: 1/08/2019

Storey	Room No.	Property Use	Room Use	Window No.		VSC	Ratio	Meets BRE Criteria	Window Orientation	Annual	Ratio	Meets BRE Criteria	Winter	Ratio	Meets BRE Criteria	Sill Height (m) Above Ground	Meets BRE Criteria	Lintel Height (m) Above Ground	Meets BRE Criteria
84 Annandale Avenue																			
Ground	R1	Residential	Living/Dining Room	W1	Existing	35.55	0.96	YES	134°	70	0.94	YES	22	1.00	YES				
					Proposed	34.18				66			22						
																70		22	
																66	YES	22	YES
	R2	Residential	Kitchen	W2	Existing	35.28	0.93	YES	134°	70	0.95	YES	23	1.00	YES				
					Proposed	33.02				67			23						
				W4	Existing	34.86	0.91	YES	134°	69	0.94	YES	23	1.00	YES				
					Proposed	32.04				65			23						
				W5	Existing	19.51	0.64	NO	44°N		*North*			*North*					
					Proposed	18.60													
				W3	Existing	35.23	0.93	YES	134°	70	0.95	YES	23	1.00	YES				
					Proposed	32.81				67			23						
			VSC Window Average:		***Existing***	***30.47***	***0.89***	***YES***								70		23	
					Proposed	***27.12***										67	YES	23	YES
First	R1	Residential	Bathroom	W1	Existing			n/a	134°			n/a			n/a				
			Non-habitable		Proposed														
																	n/a		n/a
	R2	Residential	Bedroom	W2	Existing	38.61	0.96	YES	134°	72	0.98	YES	25	1.00	YES				
					Proposed	37.45				71			25						
																72		25	
																71	YES	25	YES
	R3	Residential	Bedroom	W3	Existing	38.62	0.93	YES	134°	72	0.93	YES	25	1.00	YES				
					Proposed	36.09				67			25						
																72		25	
																67	YES	25	YES
	R4	Residential	Bathroom	W4	Existing			n/a	44°N			n/a			n/a				
			Non-habitable		Proposed														
																	n/a		n/a

Project Name: Greenfields Avenue, Bognor Regis
Project No: 21-18
Report Title: Vertical Daylight & APSH Sunlight Assessment to Neighbouring Windows and Rooms
Date of Analysis: 1/08/2019

Block Ref	Room No.	Property Use	Room Use	Window Ref		VSC	Result	Meets BRE Criteria	Window orientation	Annual Hours	Winter Hours	Annual APSH Sunlight	Winter APSH Sunlight	Meets BRE Criteria	Annual Hours	Winter Hours	Annual APSH Sunlight	Winter APSH Sunlight	Meets BRE Criteria
125 Longford Road																			
Ground	R1	Residential	Unknown	W1	Existing	36.85	0.98	YES	304°N	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*
					Proposed	36.37													
	R2	Residential	Unknown	W2	Existing	35.68	0.98	YES	304°N	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*
					Proposed	35.26													
127 Longford Road																			
First	R1	Residential	Unknown	W1	Existing	38.58	0.99	YES	304°N	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*
					Proposed	38.22													
	R2	Residential	Unknown	W2	Existing	38.42	0.99	YES	304°N	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*
					Proposed	38.30													
129 Longford Road																			
Ground	R1	Residential	Unknown	W1	Existing	36.15	0.98	YES	304°N	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*
					Proposed	35.45													
	R2	Residential	Unknown	W2	Existing	36.85	0.98	YES	304°N	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*
					Proposed	36.28													
131 Longford Road																			
First	R1	Residential	Unknown	W1	Existing	38.51	0.98	YES	304°N	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*
					Proposed	38.07													
	R2	Residential	Unknown	W2	Existing	38.38	0.98	YES	304°N	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*	*North*
					Proposed	38.14													

Project Name: Annandale Avenue, Bognor Regis
Project No.: 2.38
Report Title: RSL (Daylight Analysis to Neighbouring Rooms)
Date of Analysis: 13/08/2019

Floor No.	Room No.	Room Type	Room Use		Room Area	Lit Area Before	Lit Area Proposed	DF Ratio	Adequate Daylight
				82 Annandale Avenue					
Ground	R1	Residential	Unknown	Area m2	13.45	12.48	12.48		
				% of room		93%	93%	0.99	YES
	R2	Residential	Unknown	Area m2	11.72	11.48	11.48		
				% of room		98%	98%	1.00	YES
	R3	Residential	Unknown	Area m2	7.00	7.00	7.00		
				% of room		100%	100%	1.00	YES
First	R1	Residential	Unknown	Area m2	12.81	12.53	12.53		
				% of room		98%	98%	1.00	YES
	R2	Residential	Unknown	Area m2	12.70	12.57	12.57		
				% of room		99%	99%	0.99	YES
				84 Annandale Avenue					
Ground	R1	Residential	.iving/Dining Roon	Area m2	11.27	11.27	11.27		
				% of room		100%	100%	1.00	YES
	R2	Residential	Kitchen	Area m2	14.72	14.72	14.72		
				% of room		100%	100%	1.00	YES
First	R1	Residential	Bathroom	Area m2	3.36				
			Non-habitable	% of room					n/a
	R2	Residential	Bedroom	Area m2	11.96	11.96	11.96		
				% of room		100%	100%	1.00	YES
	R3	Residential	Bedroom	Area m2	11.90	11.90	11.90		
				% of room		100%	100%	1.00	YES
	R4	Residential	Bathroom	Area m2	7.32				
			Non-habitable	% of room					n/a
				125 Longford Road					
Ground	R1	Residential	Unknown	Area m2	13.02	12.85	12.85		
				% of room		99%	99%	1.00	YES
	R2	Residential	Unknown	Area m2	9.22	9.11	9.11		
				% of room		99%	99%	1.00	YES
				127 Longford Road					
First	R1	Residential	Unknown	Area m2	13.02	12.85	12.85		
				% of room		99%	99%	1.00	YES
	R2	Residential	Unknown	Area m2	9.22	9.11	9.11		
				% of room		99%	99%	1.00	YES
				129 Longford Road					
Ground	R1	Residential	Unknown	Area m2	9.93	9.80	9.80		
				% of room		99%	99%	1.00	YES
	R2	Residential	Unknown	Area m2	14.01	13.80	13.80		
				% of room		99%	99%	1.00	YES
				131 Longford Road					
First	R1	Residential	Unknown	Area m2	9.93	9.80	9.80		
				% of room		99%	99%	1.00	YES
	R2	Residential	Unknown	Area m2	14.01	13.80	13.80		
				% of room		99%	99%	1.00	YES

Project Name: Annandale Avenue, Bognor Regis
Project No: 2138
Report Title: 2hr Sun on Ground Assessment to Neighbouring Gardens on 21st March
Date of Analysis: 13/06/2018

Floor Ref	Amenity Ref		Amenity Area	Ht Area Existing	Ht Area Proposed	Ratio	Meets BRE Criteria
82 Annandale Avenue							
Ground	82 Annandale Avenue	Area m2 Percentage	269.06	263.15 98%	263.15 98%	1.00	YES
84 Annandale Avenue							
Ground	84 Annandale Avenue	Area m2 Percentage	212.94	205.30 96%	205.30 96%	1.00	YES
125 Longford Road							
Ground	125-127 Longford Road	Area m2 Percentage	33.26	20.58 62%	20.58 62%	1.00	YES
129 Longford Road							
Ground	129-131 Longford Road	Area m2 Percentage	36.60	24.59 67%	24.59 67%	1.00	YES