Daylight Sunlight Report

Lands at Former Ted Castles Site
and DunLeary House

Project No. A591

18th November 2021

OCSC
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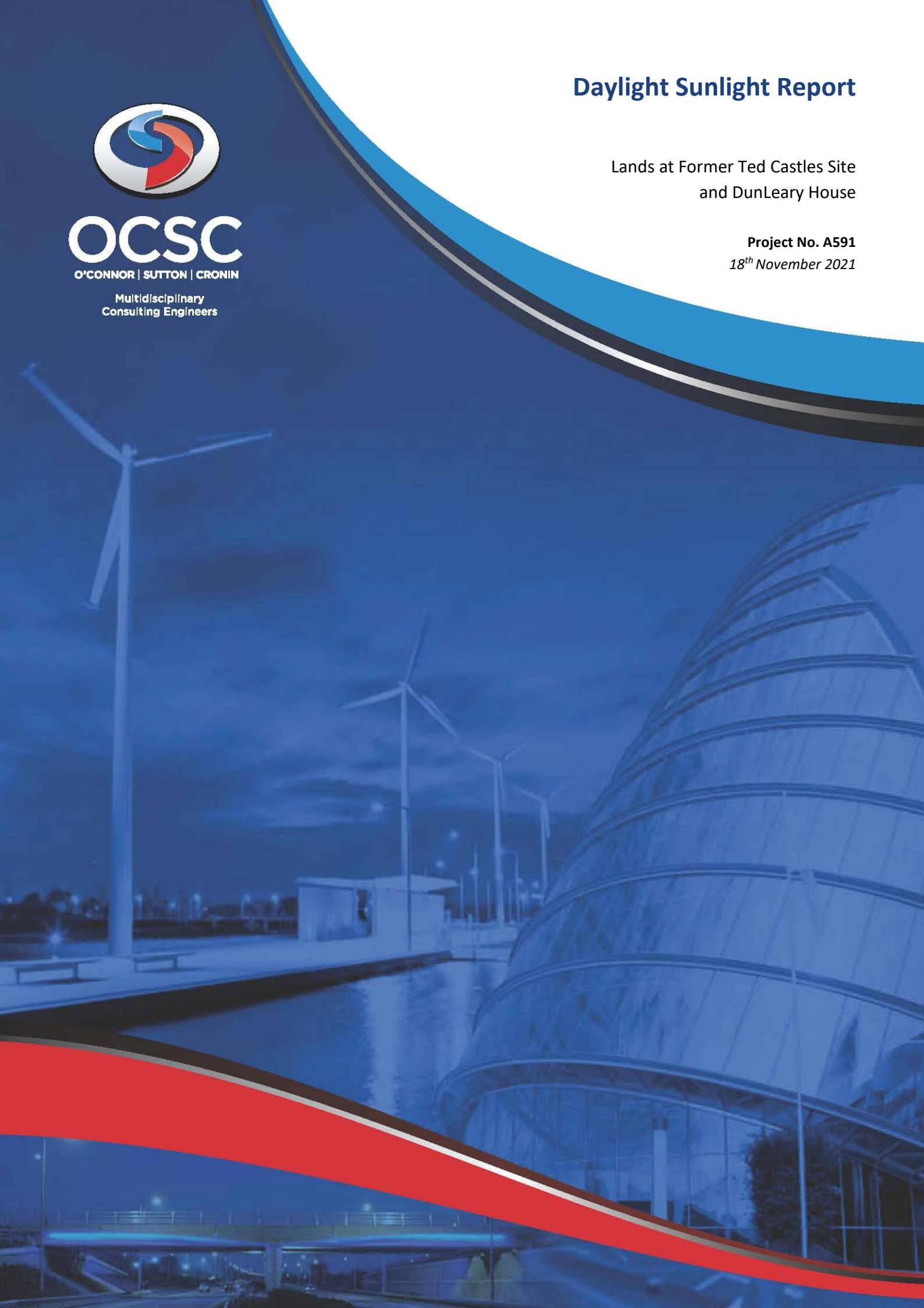

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EXECUTIVE SUMMARY

OCSC have been appointed to carry out a Daylight/ Sunlight study for the Lands at the former Ted Castles site and DunLeary House located at Old Dunleary Road, Cumberland Street, Dun Leary Hill, Dun Laoghaire, Co. Dublin.

The aim of the study is to record and analyse the results for the following:

- The daylight levels within the living, kitchen and bedroom areas of selected apartments, to give an indication of the expected daylight levels throughout the proposed development;
- The expected sunlight levels within the living room areas within the proposed development;
- The quality of amenity space, being provided as part of the development, in relation to sunlight;
- Any potential daylight or sunlight impact the proposed development may have on properties adjacent to the site.

It is important to note that the performance targets which are included should be used with a degree of flexibility as per the extract below from the BRE Guide:

"The advice given here is not mandatory and this document should <u>not be seen as an instrument of planning policy</u>. Its aim is to help rather than constrain the designer. Although it gives numerical guidelines these <u>should be interpreted flexibly</u> because natural lighting is only one of the many factors in site layout design."

<u>Internal daylight within the proposed development</u>

The analysis confirms that across the entire development excellent levels of internal daylight are achieved. The majority of apartments not only meet but greatly exceed the recommendations outlined within the BRE Guidelines and British Standard BS8206, achieving a 98.9 % compliance rate across the proposed apartments.

Sunlight to proposed development amenity spaces

In terms of sunlight access, excellent levels of sunlight are experienced across the proposed development. The communal amenity spaces and roof top terraces provided exceed the BRE guidelines for sunlight on the test day of 21st of March. Also, excellent levels of sunlight will be achieved during the summer.

Sunlight to windows within the proposed development

The annual probable sunlight hours assessment has shown that 46% of the main living room windows across the development achieve the recommended APSH values stated in the BRE Guidelines, while 48% of windows achieve the recommended values during the winter months, when sunlight is more valuable.

Impact to surrounding properties

The Vertical Sky Component analysis has shown that the surrounding properties will perceive an impact due to the proposed development over the existing scenario, this is normal due to the comparison between an empty or low density site and the construction of any new development higher than that. However, the Average Daylight Factor analysis shows that the adjacent properties will still achieve excellent levels of daylight in the majority of surrounding properties once the proposed development is built.

The annual probable sunlight hour (APSH) analysis has shown that the adjacent properties will still receive good levels of sunlight once the proposed development is constructed. Only two of the windows selected for analysis will perceive an impact on sunlight during the annual period. All selected windows meet the recommended APSH winter time values, when sunlight is more valuable.

In relation to overshadowing, negligible impact will be perceivable to adjacent open spaces.

The calculation methodology for daylight and sunlight is based on the British Research Establishments "Site Layout Planning for Daylight and Sunlight: A Good Practice Guide" by PJ Littlefair, 2011 Second Edition.

The difficulty in achieving the result set out by the BRE guidance in a city centre location is also recognised within planning guidance which has been published by the Irish Government. On page 43 of the Urban Design Manual 2009 the following advice is provided:

"Where design standards are to be used (such as the UK document Site Layout Planning for Daylight and Sunlight, published by the BRE), it should be acknowledged that for higher density proposals in urban areas it may not be possible to achieve the specified criteria, and standards may need to be adjusted locally to recognise the need for appropriate heights or street widths."

DAYLIGHT SUNLIGHT REPORT

INDEX **PAGE**

EXECUTIVE SUMMARY 3

1. INTRODUCTION 7

2. SITE DESCRIPTION 8

3. RELEVANT PLANNING POLICIES 10

4. PROPOSED BUILDING DESIGN 12

5. BRE GUIDELINES FOR DAYLIGHT AND SUNLIGHT 16

6. DAYLIGHT LEVELS WITHIN THE PROPOSED DEVELOPMENT 18

7. SUNLIGHT ASSESSMENT TO AMENITY SPACES WITHIN THE DEVELOPMENT 31

8. SUNLIGHT ASSESSMENT WITHIN THE PROPOSED DEVELOPMENT (APSH) 34

9. ASSESSING THE IMPACT ON SURROUNDING PROPERTIES 38

10. SUNLIGHT IMPACT ON ADJACENT PROPERTIES (APSH) 51

11. OVERSHADOWING IMPACT TO SURROUNDING OPEN SPACES 55

12. CONCLUSION 62

13. APPENDIX A 64

1. INTRODUCTION

OCSC have been appointed to carry out a Daylight/ Sunlight study for the Lands at the former Ted Castles site and DunLeary House located at Old Dunleary Road, Cumberland Street, Dun Leary Hill, Dun Laoghaire, Co. Dublin.

The aim of the study is to record and analyse the results for the following:

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- The expected sunlight levels within the living room areas within the proposed development;
- The quality of amenity space, being provided as part of the development, in relation to sunlight;
- Any potential daylight or sunlight impact the proposed development may have on properties adjacent to the site.

The calculation methodology for daylight and sunlight is based on the British Research Establishments "Site Layout Planning for Daylight and Sunlight: A Good Practice Guide" by PJ Littlefair, 2011 Second Edition.

2. SITE DESCRIPTION

The proposed development at the former Ted Castles site and DunLeary House (a proposed Protected Structure), Old Dun Leary Road, Cumberland Street and Dun Leary Hill, Dun Laoghaire will consist of:

- The provision of 146 no. apartment units (Build to Rent) and all associated ancillary facilities (including residential amenities) in a building with an overall height ranging from 6 storeys (with set backs from 4th & 5th storey) addressing Dun Leary Hill, to 5 and 8 storeys (with set back from 7th storey) addressing Old Dun Leary Road and 6-7 storeys (with set backs at 8th storey) addressing Cumberland Street. The proposal provides for private and communal open spaces in the form of balconies and terraces throughout.

- A retail unit (c.290m2) at ground floor level addressing Old Dun Leary Road and Cumberland Street

- The refurbishment, partial removal and adaptation of a 4 storey building on site known as "DunLeary House" (a proposed Protected Structure) to provide co-working office suites (c.247m2) at Levels 01,02 and 03. The works will include partial removal of original walls and floors, removal of non original extensions to DunLeary House, repointing and repair of brickwork and granite fabric, reinstatement of timber sash windows, removal of existing roof, removal; alteration and reinstatement of internal floor layouts, reinstatement of entrance point on DunLeary Hill, removal of non original level 00 and linking the existing building to the new development from level 00 to level 03 with the construction of 3 new floors of development (with set back at roof level) above the existing building. It is proposed to repair, reinstate and improve the existing boundary treatment to DunLeary House.

- Provision of 52 no. car parking spaces in total - 44 no. car parking spaces provided at level 00. At Cumberland Street 11 no. existing on street car parking spaces will be removed and 8 no. on street car parking spaces provided. Provision of 277 bicycle parking spaces (94 no. cycle parking spaces accommodated in bicycle stands and 183 no. long term bicycle parking spaces within a secure storage area) and 4 no. motorbike parking spaces, all at Level 00. A new vehicular entrance/cycle path (off the Old Dun Leary Road), ancillary plant areas, ESB substation and storage areas.

- Extensive hard and soft landscaping throughout, green roof, public lighting, signage, boundary treatments and public realm improvements.

- The demolition of the existing open fronted shed on site and all associated ancillary site services and site development works.

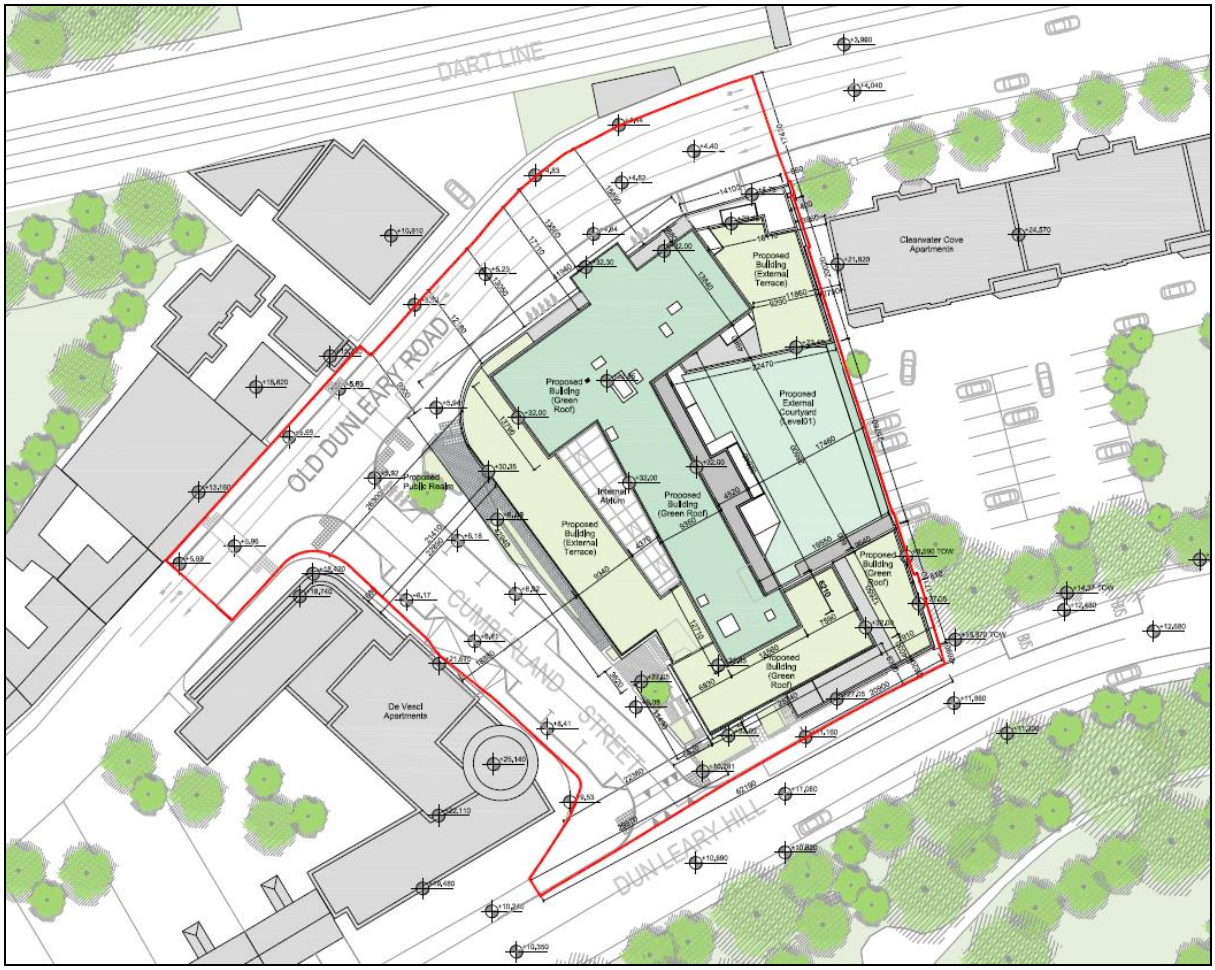

Figure 1 - Proposed Site Plan

3. RELEVANT PLANNING POLICIES

The following planning policies have been used as a point of reference within the daylight and sunlight assessment for the proposed development.

Relevant Planning Policy Number 1

The **Sustainable Urban Housing: Design Standards for New Apartments – Guidelines for Planning Authorities (December 2020)** outlines that *"Planning authorities should have regard to quantitative performance approaches to daylight provision outlined in guides like the BRE guide 'Site Layout Planning for Daylight and Sunlight' (2nd Edition) or BS 8206-2:2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting' when undertaken by development proposers which offer the capability to satisfy minimum standards of daylight provision*." They also outline that *"where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to a design constraint associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."*

Relevant Planning Policy Number 2

The **Dún Laoghaire-Rathdown Development Plan (2017-2023)** outlines that the following criteria will be taken into account when assessing applications *"levels of privacy and amenity, the relationship of buildings to one another, including considerations of overlooking, sunlight/daylight standards and the appropriate use of screening devices."*

Relevant Planning Policy Number 3

The **Sustainable Residential Development in Urban Areas, DoEHLG 2009** outlines that *"Overshadowing will generally only cause problems where buildings of significant height are involved or where new buildings are located very close to adjoining buildings. Planning authorities should require that daylight and shadow projection diagrams be submitted in all such proposals. The recommendations of "Site Layout Planning for Daylight and Sunlight: A Guide to good Practice" (BRE 1991) or BS 8206 "Lighting for Buildings, Part 2 1992: Code of Practice for Daylighting" should be*

followed in this regard."

Relevant Planning Policy Number 4

The **Urban Development and Building Heights – Guidelines for Planning Authorities (March 2018)** outlines the following

"At the scale of the site/building

• The form, massing and height of proposed developments should be carefully modulated so as to maximise access to natural daylight, ventilation and views and minimise overshadowing and loss of light.

• Appropriate and reasonable regard should be taken of quantitative performance approaches to daylight provision outlined in guides like the Building Research Establishment's 'Site Layout Planning for Daylight and Sunlight' (2nd edition) or BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'.

• Where a proposal may not be able to fully meet all the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, in respect of which the planning authority or An Bord Pleanála should apply their discretion, having regard to local factors including specific site constraints and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."

4. PROPOSED BUILDING DESIGN

In order to ensure that daylight levels were maximised for the proposed development at the former Ted Castles site, a number of key design strategies were analysed during concept design.

4.1. BUILDING MATERIAL SELECTION

The selection of materials play an important role in ambient daylight levels. The façade of the proposed development has been carefully selected to promote a sense of brightness and light and is composed of light brick. This will ensure light is reflected throughout the development. The inclusion of greenery to the amenity spaces will help to improve the sense of light and brightness within the apartments.

4.2. GLAZING TO WALL RATIO

The primary function of the glazing to wall ratio is to maximize daylight within the space while reducing solar gains within the proposed development. The other advantage in conjunction with appropriate materials is the more light coloured, reflective materials used externally, the more ambient daylight will be reflected to the surrounding areas. In addition, floor to ceiling heights have been maximised to further enhance the opportunity for improved daylight levels. Extensive analysis was undertaken on all building facades to ensure glazing widths were maximized to promote access to daylight. The image below illustrates the glazing to wall ratio of the proposed development.

Figure 2 – North Elevation Glazing to Wall Ratio

4.3. COURTYARD

Within the development, a high quality green courtyard has been included to allow occupants to spend quality time outdoors. It has been carefully designed and accommodates large areas of planting with sitting and playing areas. The courtyard will ensure a light, bright and airy amenity space for the occupants and will benefit them from exceptional views onto the diverse and ambient courtyard area as illustrated in Figure 3.

Figure 3 – Courtyard at Level 1

4.4. ROOF TERRACES

High quality terraces have been provided to 5th, 6th and 7th floor levels. The use of high quality materials have been implemented. Planting and sitting areas have been provided in order to allow occupants to enjoy quality time outdoors. The proposed landscaping will have year round planting with an ever changing experience. A hidden oasis with secluded sitting areas will be provided.

Within the 7th floor terrace there will be walks through the space that will allow residents to discover the 'pockets' within the space, as well as sitting and playing areas. The terrace spaces will have excellent views towards Dublin Bay and De Vesci Gardens. The high location of the terraces will enable the spaces to achieve excellent levels of sunlight.

Figure 4 – Locations of Roof Terraces

4.5. MASSING EVOLUTION FOR COMPLIANCE WITH DAYLIGHT AND SUNLIGHT

In order to ensure adequate daylight levels within the apartments a number of layouts and massing revisions were analysed. The position of bedrooms and living spaces were carefully analysed to ensure that daylight access to living spaces, where occupants spend most of their time, was maximized. Glazing levels were increased where possible, and positioning was closely evaluated. Balcony positions have also been carefully located to ensure maximum daylight penetration to the apartments below.

The following figures illustrate the evolution of the massing to maximise daylight levels and have minimal impact to adjacent properties. The final massing has been design to have the least impact to adjacent properties and improves the daylight levels within the proposed development.

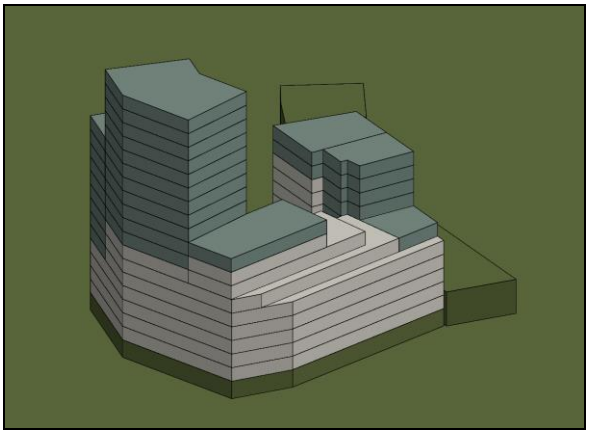

Figure 5 – Massing Rev 1

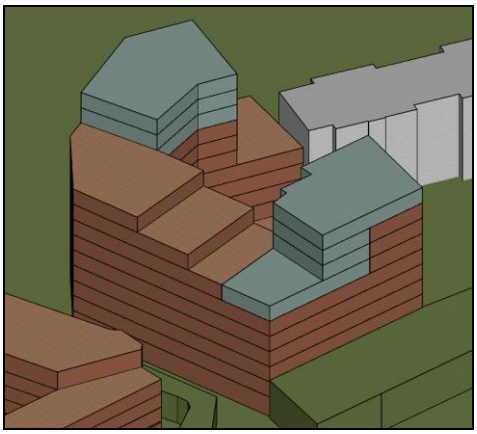

Figure 6 – Massing Rev 2

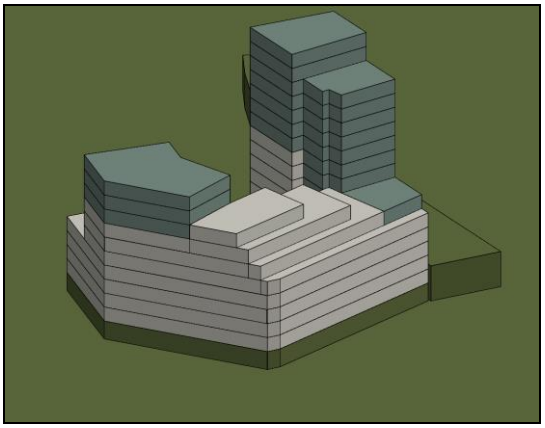

Figure 7 – Massing Rev 3

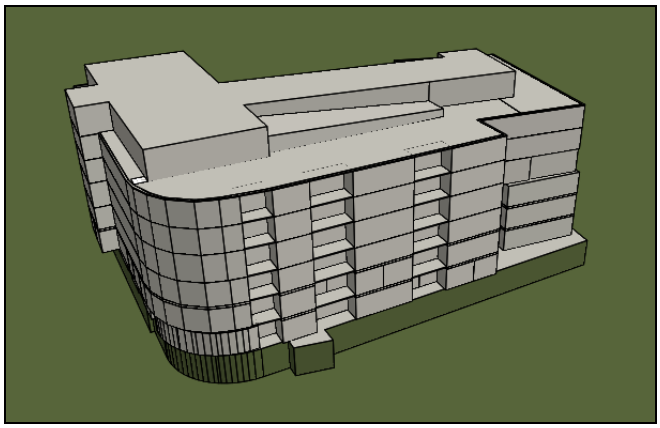

Figure 8 – Final Massing

5. BRE GUIDELINES FOR DAYLIGHT AND SUNLIGHT

The analysis of the development's potential and the quality of amenity for the new development, as well as for the surrounding properties once the scheme has been implemented, has been based on the Building Research Establishment (BRE) guidelines on "Site Layout Planning for Daylight and Sunlight. A Guide to Good Practice (Building Research Establishment Report, 2011)."

These guidelines provide the criteria and methodology for calculations pertaining to daylight and sunlight, and is the primary reference for this matter. The guide gives simple rules for analysing sites where the geometry of the surroundings is straightforward, supplementing them with graphical methods for complex sites.

However, it is important to note that the performance targets which are included should be used with a degree of flexibility as per the extract below from the BRE Guide:

"The advice given here is not mandatory and this document should <u>not be seen as an instrument of planning policy</u>. Its aim is to help rather than constrain the designer. Although it gives numerical guidelines these <u>should be interpreted flexibly</u> because natural lighting is only one of the many factors in site layout design."

BRE Guidelines refers to BS 8206[1] "Lighting for Buildings, Part 2 1992: Code of Practice for Daylighting" for guidance on the recommended internal daylight levels.

The difficulty in achieving the result set out by the BRE guidance in a city centre location is also recognised within planning guidance which has been published by the Irish Government. On page 43 of the Urban Design Manual 2009 the following advice is provided:

"Where design standards are to be used (such as the UK document Site Layout Planning for Daylight and Sunlight, published by the BRE), it should be acknowledged that for higher density proposals in

[1] The British Standard BS 8206: Part 2 (BS8206-02) has been withdrawn and replaced with IS EN 17037:2018 Daylight in Buildings. The BRE Guidelines and some planning policy guidelines continue to make reference to the BS 8206, this standard has been used throughout the report. A sample of 'worst case' rooms have been analysed under the requirements outlined within the new IS EN 17037 for reference and it is included within Appendix A.

urban areas it may not be possible to achieve the specified criteria, and standards may need to be adjusted locally to recognise the need for appropriate heights or street widths."

6. DAYLIGHT LEVELS WITHIN THE PROPOSED DEVELOPMENT

6.1. ASSESSMENT CRITERIA – INTERNAL DAYLIGHT

The method of calculation selected for the internal daylight analysis for this development is the Average Daylight Factor (ADF). This is the most detailed and thus most accurate method which considers not only the amount of sky visible from the vertical face of the window, but also the window size, room size and room use.

Architectural plans and elevations provided by Mola Architects formed the basis for the internal daylight assessment.

As previously stated, in order to quantify the quality of daylight within a space, BRE Guidelines refer to the British standards BS 8206, which sets out minimum daylight factors to be achieved in the various room types within new build residential units.

Table 2 **Minimum average daylight factor**

Room type	Minimum average daylight factor %
Bedrooms	1
Living rooms	1.5
Kitchens	2

Where one room serves more than one purpose, the minimum average daylight factor should be that for the room type with the highest value. For example, in a space which combines a living room and a kitchen the minimum average daylight factor should be 2%.

Figure 9 - BS 8206 – Table 2

BS 8206 outlines that for a room that serves more than one purpose, the minimum ADF should be that for the room type with the highest value. For example, in a combined living/kitchen spaces, the minimum recommended ADF value should be 2%.

However, targeting a minimum ADF of 2% in open space kitchen/living rooms, results in significant challenges while seeking to comply with all other elements of the Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities (December 2020) , which are as follows:

- Amenity spaces: the guidance set out in the Sustainable Urban Housing: Design Standards for New Apartment document states that private amenity spaces shall be provided in the

form of balconies at the upper levels. It is also stated that balconies are preferably accessed from living rooms. In order to achieve the 2% in living/ kitchen spaces balcony spaces would need to be removed at the lower floors.

- Floor to ceiling height: in order to achieve an ADF of 2%, the floor to ceiling heights would have to be increased on all levels which would have a planning height impact.
- Solar gains: with the removal of the balconies, increased floor to ceiling height and extensive glazing area there is a risk of overheating within the apartments.

In addition, it must be also noted that the apartments within the Ted Castles development contain a kitchen which is expected to be used mainly for food preparation rather than occupants spending a long period of time sitting in the kitchen area. Instead, occupants are expected to spend most of their time in the living room area.

Based on the above, it has been a typical approach and common industry practice to set a benchmark of 1.5% (BS 8206 recommended ADF for living rooms) for open plan spaces that contain a kitchen and a living space.

The ADF benchmark of 1.5% was set out for living/kitchen spaces within the proposed apartments of the Ted Castles development during the assessment carried out in the planning application submitted on June 2020 that was withdrawn in September. The assessment completed for this application indicated a pass rate of 100% when compared to the 1.5% ADF. The 2% ADF benchmark was also assessed for that application and showed a compliance rate of 98.9%. It should be noted that whether the 1.5% or the 2.0% ADF is set as the benchmark for compliance, the same level of daylight will be experienced within the scheme, with the only change being the benchmark to which the compliance rate is calculated.

However, for this final application report, the higher ADF benchmark of 2%, in line with BS 8206 has been utilised to calculate the percentage rate of compliance.

In order to analyse the daylight requirements for the development a detailed 3D model was constructed of the entire development, in the Integrated Environmental Solutions Virtual Environment (IES VE) software package. A number of computer simulations were then undertaken in the IES VE software package to ascertain the ADFs achieved within the dwellings of the proposed development.

6.2. DAYLIGHT RESULTS – INTERNAL DAYLIGHT APARTMENTS

In line with common industry approach, units presented at the lower levels have been selected for analysis. Units are selected at the lower levels on the basis that they will receive the lowest levels of daylight due to their location, obstruction and position within the development. Another factor in unit selection is the layout of the apartment. Room depth and location of balconies also play an important role when it comes to daylight penetration within the room. Different types of rooms across the lower levels have been analysed, prioritizing the deep plan and more obstructed rooms.

As previously outlined, the daylight analysis is completed within the IES software and all room results are tabulated. Where a room ADF result falls short of the compliance benchmark, the same apartment type directly above is also modelled to show if that room achieves the compliance benchmark in the above level. This process is reiterated on each level above until the compliance benchmark is achieved. Where units at the lower level achieve the compliance benchmark, it is taken that the same unit type directly above will also achieve the compliance benchmark and therefore, no further modelling is required.

Figure 10 illustrates an example of the rationale applied to calculate the percentage rate of compliance based on a sample of analysed rooms. The rooms highlighted in blue and identified with a text reference (A, B, C etc.) were selected for analysis. The results recorded for the assessed rooms will show as a pass or fail against the compliance benchmark. This pass or fail result is then applied to rooms with similar characteristics (room configuration, location or level of obstructions) and this rationale is shown in Figure 10, where rooms expected to receive a similar ADF result have been identified with a circle of the same colour.

The design and layout of each apartment type has been carefully considered with generous window openings being provided. Where the opportunity arises, rooms have been designed as dual aspect and bathroom and storage areas have been provided to the back of apartments to give living spaces greater access to daylight.

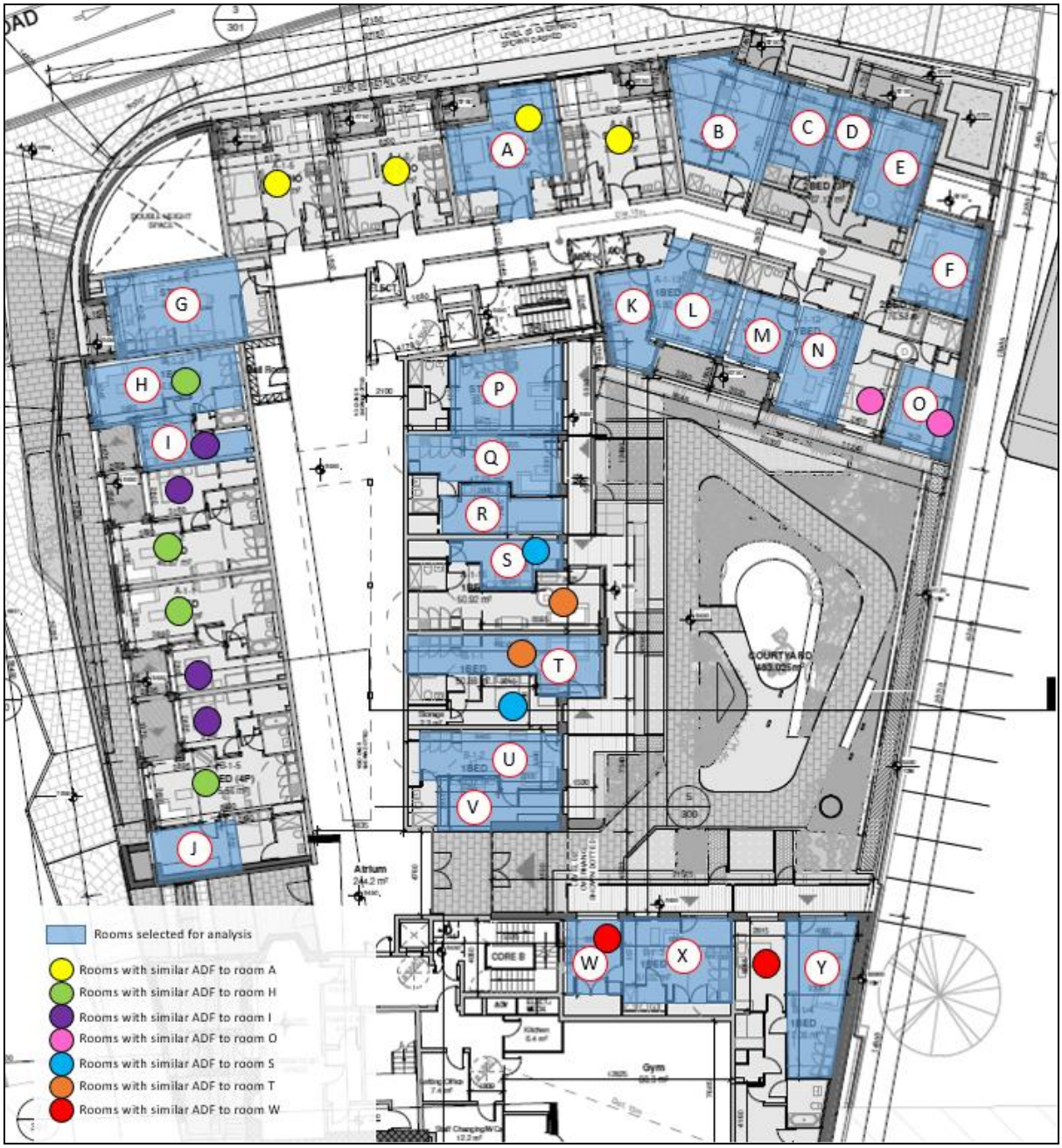

Figure 10 – Example of room's assumption Level 01

6.3. DAYLIGHT PARAMETERS

The surface reflectance values outlined in Table 1 have been used in the analysis.

Surface Type	Reflectance (%)
External Wall	40
Internal Partitions	70
Ceiling	70
Floor	40
Adjacent Buildings	40
Glazing Transmittance	70

Table 1 – Surface Reflectance Values

The ADF calculations are carried out in a working plane that lies 850mm above the floor and it is offset 500mm from the perimeter of the room. A grid of 250mm is used to calculate all different points within the room and the average of these points determines the ADF.

6.4. DAYLIGHT RESULTS – INTERNAL DAYLIGHT WITHIN PROPOSED APARTMENTS

This section outlines the apartments that were selected for assessment of internal daylight levels within the proposed Ted Castles residential development. The results of the analysis are outlined within the accompanying tables.

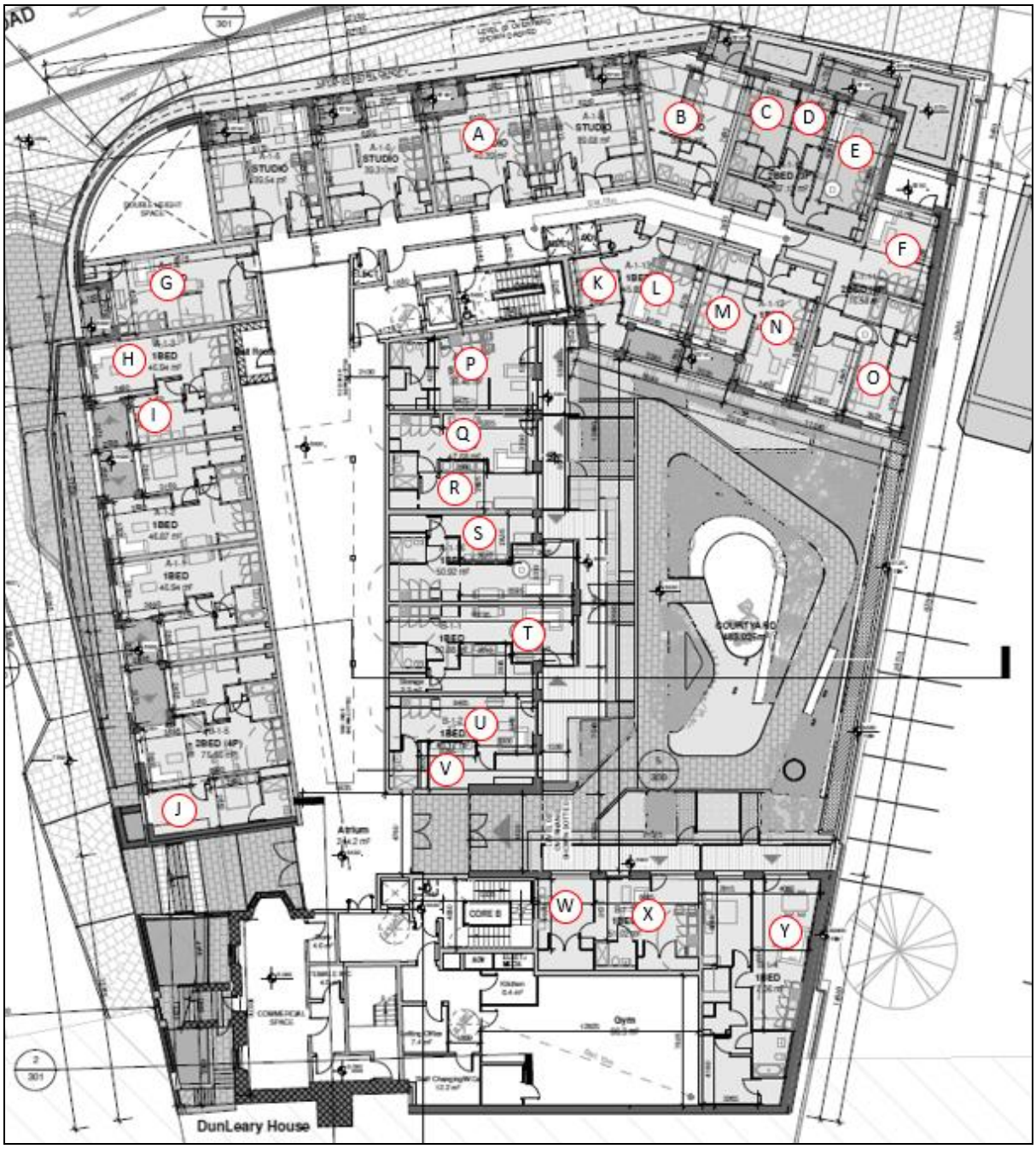

Figure 11 – Level 1 Assessed Units

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Studio	2.0	3.8	Y
B	Studio	2.0	4.2	Y
C	Bedroom	1.0	4.8	Y
D	Bedroom	1.0	3.0	Y
E	Living/Dining/Kitchen	2.0	3.2	Y
F	Living/Dining/Kitchen	2.0	2.0	Y
G	Studio	2.0	2.2	Y
H	Living/Dining/Kitchen	2.0	3.1	Y
I	Bedroom	1.0	2.3	Y
J	Bedroom	1.0	4.1	Y
K	Bedroom	1.0	1.9	Y
L	Living/Dining/Kitchen	2.0	1.6	N[2]
M	Bedroom	1.0	1.8	Y
N	Living/Dining/Kitchen	2.0	2.3	Y
O	Bedroom	1.0	3.9	Y
P	Studio	2.0	2.5	Y
Q	Living/Dining/Kitchen	2.0	1.6	N[3]
R	Bedroom	1.0	2.3	Y
S	Bedroom	1.0	1.7	Y
T	Living/Dining/Kitchen	2.0	2.1	Y
U	Living/Dining/Kitchen	2.0	2.0	Y
V	Bedroom	1.0	1.8	Y
W	Bedroom	1.0	3.1	Y
X	Living/Dining/Kitchen	2.0	3.5	Y
Y	Living/Dining/Kitchen	2.0	2.1	Y

Table 2 – Average Daylight Factor Results – Level 1 Assessed Units

[2 & 3] The shortfall in compliance within these units can be attributed to the location and size of the rooms. Both units are located in a corner area, which presents a higher level of obstruction. Also, both have a deep plan and a large size which makes harder to allow light penetration into the back part of the space. These units are not representative of any other room in the development.

Figure 12 – Level 2 Assessed Units

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/Dining/Kitchen	2.0	3.5	Y
B	Living/Dining/Kitchen	2.0	2.6	Y
C	Bedroom	1.0	5.5	Y
D	Living/Dining/Kitchen	2.0	6.2	Y
E	Bedroom	1.0	4.3	Y
F	Studio	2.0	4.9	Y
G	Living/Dining/Kitchen	2.0	3.7	Y
H	Living/Dining/Kitchen	2.0	2.2	Y
I	Bedroom	1.0	2.7	Y
J	Living/Dining/Kitchen	2.0	2.5	Y
K	Living/Dining/Kitchen	2.0	1.8	N[4]
L	Bedroom	1.0	1.8	Y
M	Living/Dining/Kitchen	2.0	2.3	Y
N	Bedroom	1.0	3.4	Y
O	Studio	2.0	2.0	Y
P	Bedroom	1.0	1.2	Y
Q	Living/Dining/Kitchen	2.0	2.7	Y
R	Living/Dining/Kitchen	2.0	2.7	Y
S	Bedroom	1.0	1.5	Y
T	Bedroom	1.0	4.4	Y
U	Living/Dining/Kitchen	2.0	2.5	Y
V	Bedroom	1.0	4.1	Y

Table 3 – Average Daylight Factor Results – Level 2 Assessed Units

[4] The shortfall in compliance within this unit can be attributed to the location and size of the room. The unit is located in a corner area, which presents a higher level of obstruction. Also, it presents a deep plan and a large size which makes harder to allow light penetration into the back part of the space. This unit is not representative of any other room in the development.

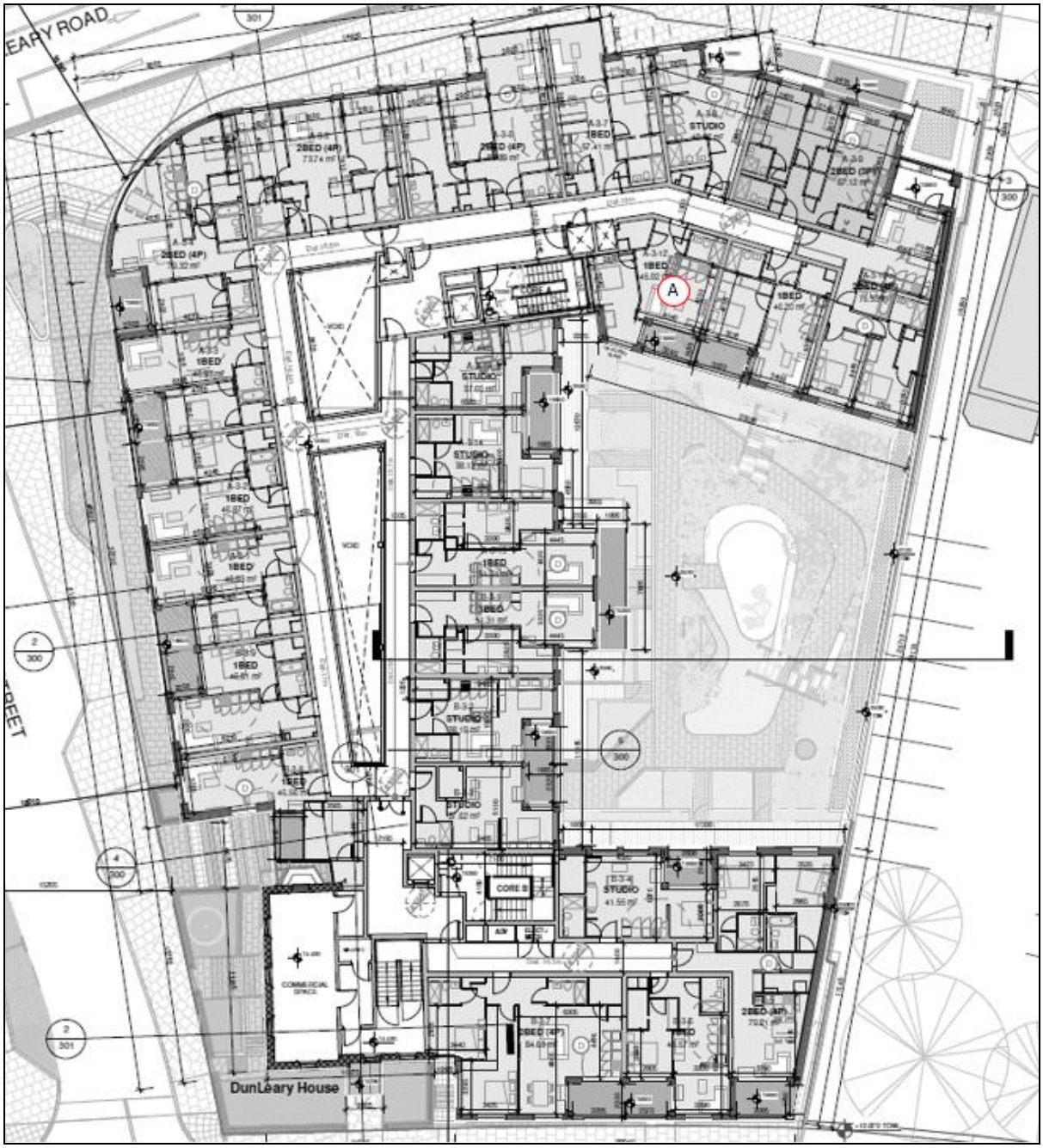

Figure 13 – Level 3 Assessed Units

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/Dining/Kitchen	2.0	2.0	Y

Table 4 – Average Daylight Factor Results – Level 3 Assessed Units

In summary, the vast majority of units not only meet but in the majority of cases exceed the Average Daylight Factor target recommended in BS 8206. Of the 291 rooms that comprise the development, only 3 fall slightly short of the BRE Guidelines and BS 8206 recommendations, therefore a 98.9% compliance rate is achieved across the development.

Total No. of Rooms	No. Living/ Kitchen Rooms Not Compliant with BS 8206 Guidelines (2.0% ADF)	No. Bedrooms Not Compliant with BS 8206 Guidelines (1.0% ADF)	Total No. Rooms Not Compliant with BS 8206 Guidelines	% of compliance with BS 8206
291	3	0	3	98.9%

Table 5 – Percentage of Compliance

As outlined in Section 6.1, for this final application report, an ADF benchmark of 2% for living/ kitchen spaces, in line with BS 8206 has been utilised to calculate the percentage rate of compliance. However, during the assessment completed for the application submitted in June 2020 that was withdrawn in September, a pass rate of 100% when compared to a 1.5% ADF benchmark for living/kitchens was achieved. The 2% ADF benchmark was also assessed at that stage and showed a compliance rate of 98.9% and this remains unchanged. It should be noted that whether the 1.5% or the 2.0% ADF is set as the benchmark for compliance, the same level of daylight will be experienced within the scheme, with the only change being the benchmark to which the compliance rate is calculated.

6.5. DAYLIGHT RESULTS – ROOMS WITHIN APARTMENTS FALLING BELOW COMPLIANCE AND COMPENSATORY MEASURES INTRODUCED

As previously stated, of the 291 rooms that comprise the development, only 3 fall slightly short of the BRE Guidelines and BS 8206 recommendations, therefore a 98.9% compliance rate is achieved across the development.

In order to demonstrate that excellent levels of daylight are achieved in those units falling slightly short of compliance, the following image illustrates the ADF levels being achieved throughout the 'worst case' living room/kitchen located in Level 01. As expected, daylight levels are excellent within close proximity to the external wall and begin to drop off as you move towards the kitchen area which are typically located to the rear of the open space. It must be noted that the apartments within the Ted Castles development contain a kitchen which is designed to be used mainly for food preparation rather than occupants spending a long time sitting in the kitchen area. Instead, occupants are expected to spend most of their time in the living room area, where daylight penetration will be more appreciated. Therefore, it can be stated that even though some rooms fall slightly short of the compliance target set, they will still receive excellent levels of daylight within the zone closest to the external wall, where sitting areas are located and where occupants are expected to spend the majority of their time.

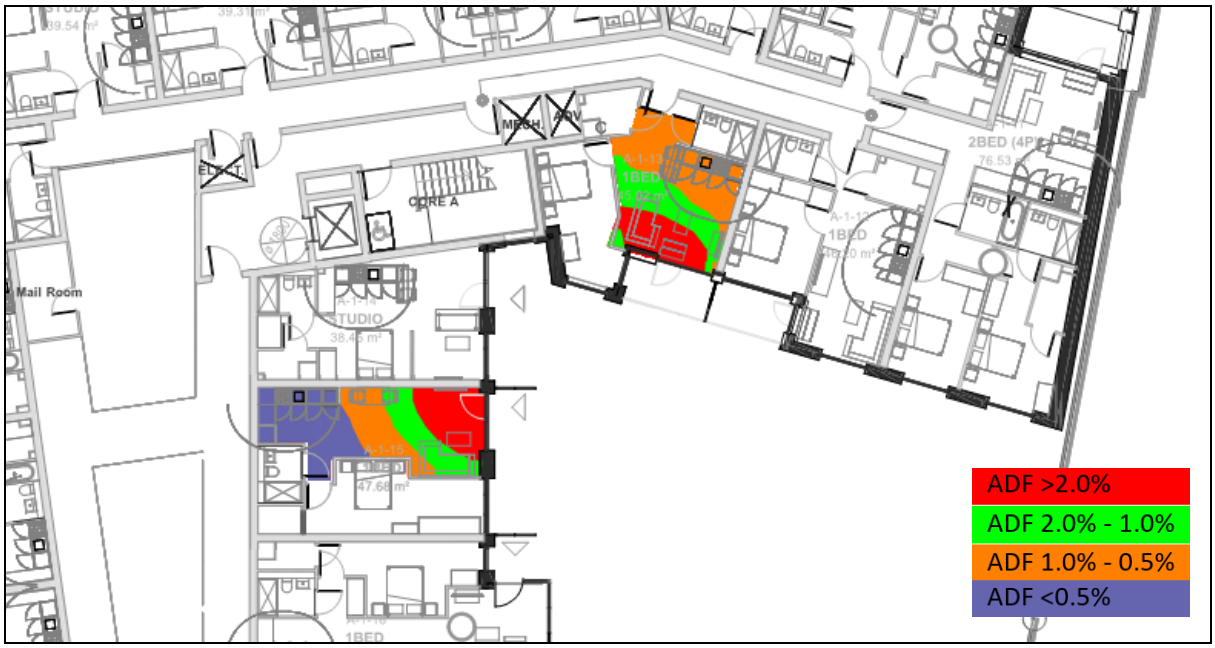

Figure 14 – Level 01 – 'Worst Case' Living/ Kitchen Rooms – Assessment with ADF Contours

It is worth emphasising again the fact that the guidelines for daylight are not mandatory and that the

Sustainable Urban Housing: Design Standards for New Apartments – Guidelines for Planning Authorities (December 2020) outlines that *"where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to a design constraint associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."*

In line with the objectives of the Sustainable Urban Housing: Design Standards for New Apartments, the proposed development seeks to balance ADF compliance with quality urban design and landscape. The proposed development seeks to deliver a high quality living environment through the provision of a high quality courtyard and roof top terraces, which residents can enjoy immediately adjacent to their homes. Additionally, the proposed development provides quality external private open space to all residential units, ensuring maximum opportunities to enjoy their residential living environment.

7. SUNLIGHT ASSESSMENT TO AMENITY SPACES WITHIN THE DEVELOPMENT

BRE Guidelines (2011) recommend that for external amenity spaces to appear adequately sunlit throughout the year, at least half of the garden or amenity space should receive at least two hours of sunlight on March 21st.

In order to show that sunlight levels within the development achieve compliance with current BRE Guidelines, a sunlight study has been carried out for the proposed development.

The image below illustrates the communal amenity spaces within the development.

Figure 15 – Communal Amenity Spaces

The red squares in Figure 16 highlight the areas that receive a minimum of 2 hours of sunlight on the 21st of March for the proposed development. It is evident at least 50% of the overall communal amenity spaces receive 2 hours or more of sunlight on March 21st, therefore compliance with BRE Guidelines is achieved.

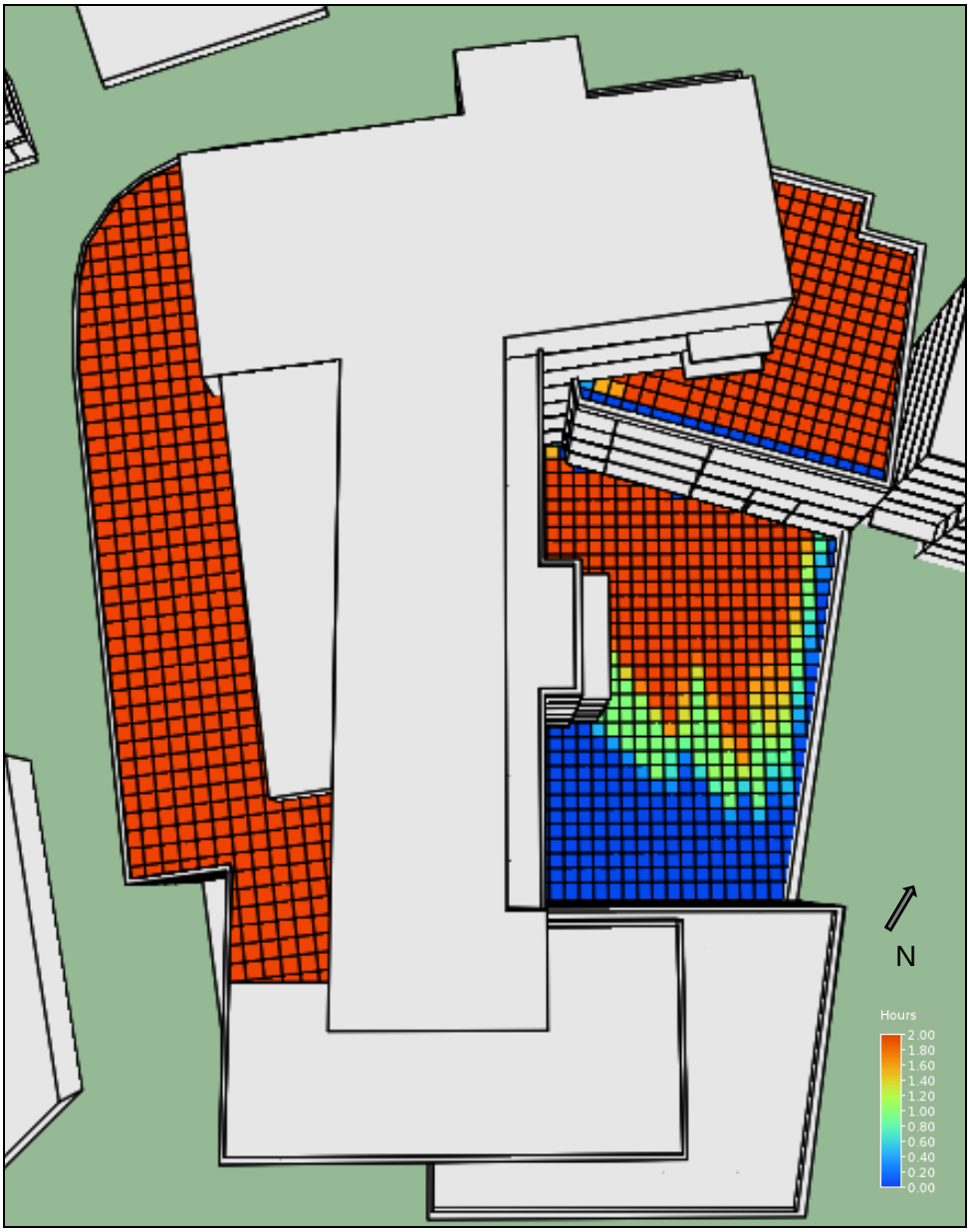

Figure 16 – Amenity Spaces - Hours of Sunlight on March 21st

The excellent daylight and sunlight access can also be attributed to the sunlight reflection from the building facades that have been carefully designed with light materials, thus creating comfortable and desirable spaces for the residents.

The sunlight access for the proposed development has also been assessed on June 21st, showing that summer sunlight access is excellent, with the majority of all residential amenity spaces achieving more than 2 hours of sunlight.

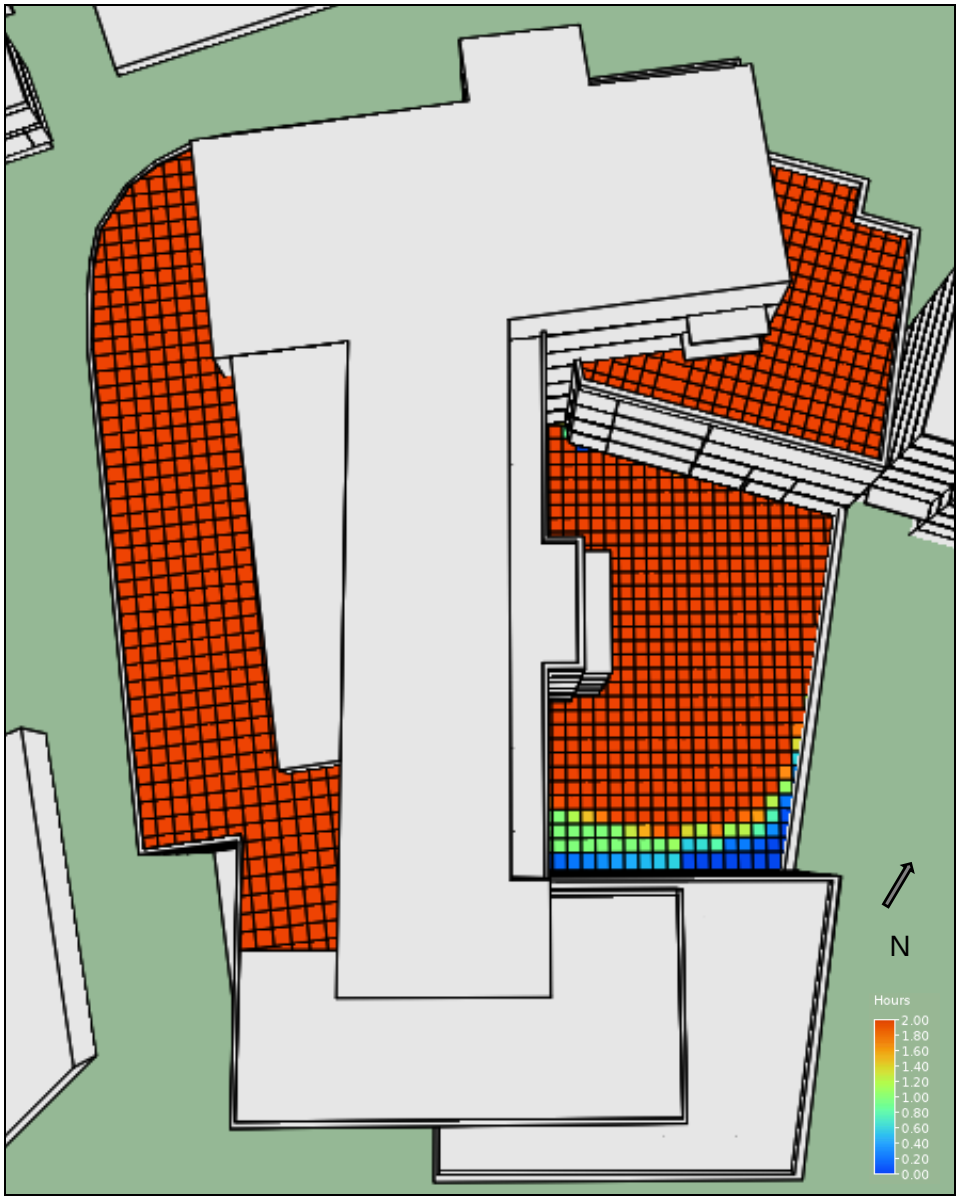

Figure 17 – Communal Amenity Spaces - Hours of Sunlight on June 21st

8. SUNLIGHT ASSESSMENT WITHIN THE PROPOSED DEVELOPMENT (APSH)

In order to determine the amount of sunlight that is received by windows within the proposed development, the Annual Probable Sunlight Hours (APSH) calculation method as outlined in BRE Guidelines has been used.

BRE Guidelines outline that in housing, the main requirement for sunlight is in living rooms, where it is valued at any time of the day but especially in the afternoon. BRE Guidelines also state that sunlight is less important in bedrooms and kitchens, therefore , all main living room windows within the development have been included within the analysis.

The recommendation set out in BRE Guidelines state that in order to show that adequate sunlight reaches windows within occupied rooms, the centre of at least one window to a main living room must receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months between 21st September and 21st March.

While the BRE criteria sets out these recommendations for living room windows to receive direct sunlight throughout the year, the guidance set out in the Sustainable Urban Housing: Design Standards for New Apartments states that balconies should adjoin and have a functional relationship with the main living areas of the apartment. They also state that it is preferable that balconies would be primarily accessed from living rooms, which can reduce the sunlight being received in some instances.

As the location of balconies have been designed to primarily comply with the apartment design guidelines, the amount of sunlight reaching these living room windows in some areas will naturally be reduced and achieving the recommended values within BRE Guidelines can become challenging.

The below table summarises the annual probable sunlight hours for the annual period and for the winter period based on the BRE recommendations.

	BRE Guidelines Check 1 APSH > 25% Annual Period	BRE Guidelines Check 2 APSH > 5% Winter Period
Percentage of Compliance	46%	48%

Table 6 – APSH Summary Table

The results from the analysis have shown that for the annual period, 46% of the living room windows achieve the recommended APSH values stated in the BRE Guidelines, while 48% of windows achieve the recommended values during the winter months, when sunlight is more valuable. The shortfall in compliance can be attributed to the projection of balconies in some areas, to the north facing windows and mainly to those units located within the courtyard.

It is important to note that even though the projection of balconies will impact the sunlight reaching the windows in some areas, it will provide occupants with an outdoor amenity space that will receive excellent levels of sunlight. In addition, BRE Guidelines outline the difficulty in achieving the recommended targets within apartments and they recommend to aim for a good design to minimise the number of dwellings that are only facing north, north east or north west, unless there is some compensating factors such as an appealing view to the north, which it is the case for the Ted Castles development, that in some instances will have views to the Dublin Bay. In addition, those units within the courtyard that fall short in compliance will have pleasant views into the high quality courtyard area.

It must be noted that the results within this report should be treated with certain degree of flexibility, based on the following statement in the BRE Guidelines:

"the guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design".

In addition, BS8206 states that *"the degree of satisfaction is related to the expectation of sunlight. If a room is necessarily north facing or if the building is in a densely-built urban area, the absence of sunlight is more acceptable than when its exclusion seems arbitrary".*

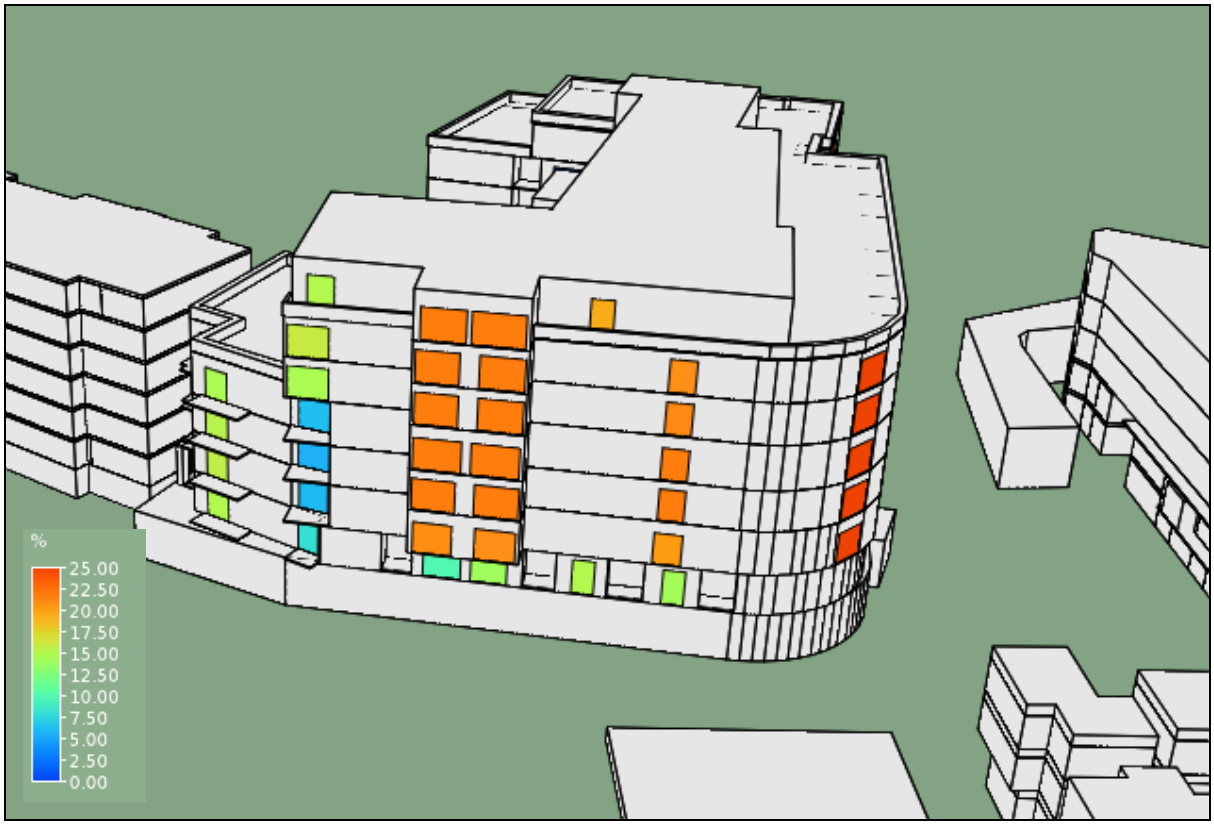

Figure 18 – Annual Probable Sunlight Hours – Annual Period – North Elevation

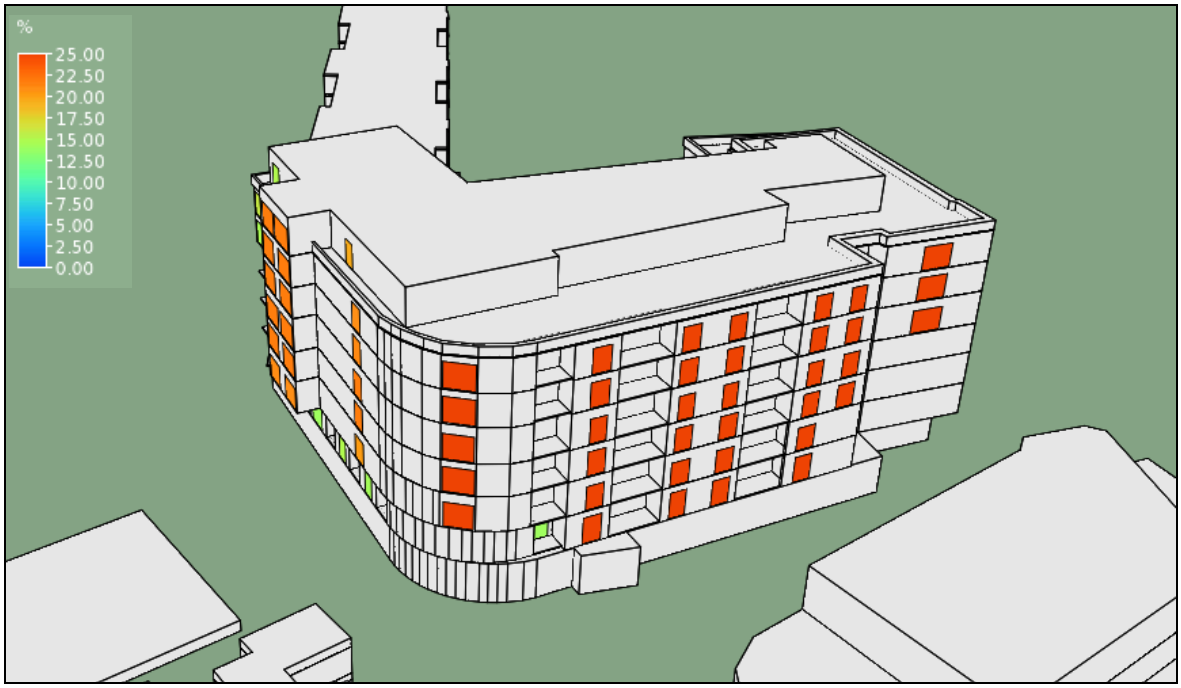

Figure 19 – Annual Probable Sunlight Hours – Annual Period – Northwest Elevation

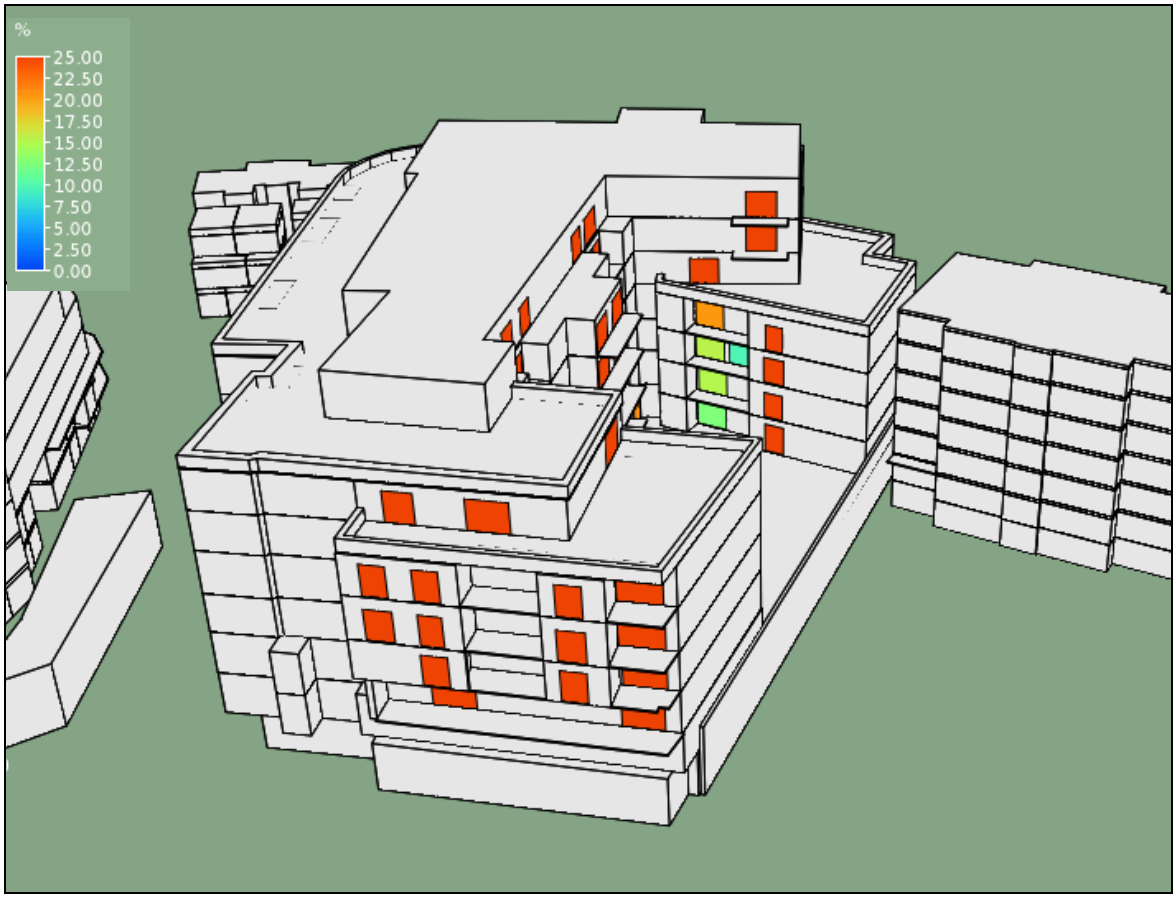

Figure 20 – Annual Probable Sunlight Hours – Annual Period – South Elevation

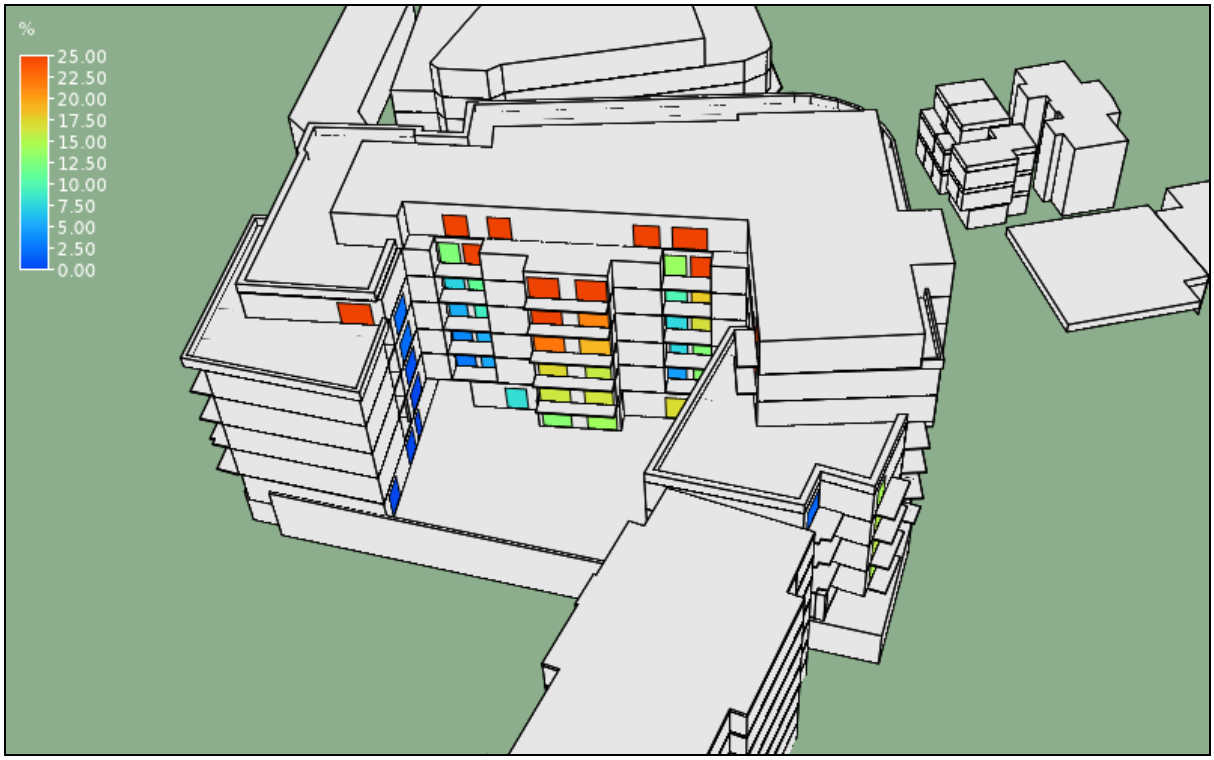

Figure 21 – Annual Probable Sunlight Hours – Annual Period – Northeast Elevation

9. ASSESSING THE IMPACT ON SURROUNDING PROPERTIES

9.1. DAYLIGHT & SUNLIGHT IMPACT METHODOLOGY

As per the BRE Guidelines it is important to safeguard the daylight to nearby buildings, from a proposed development, where a reasonable expectation of daylight is required. The flow matrix below outlines the criteria to be assessed, as per the BRE Guidelines, in order to ascertain any potential impact to adjacent buildings from the proposed development.

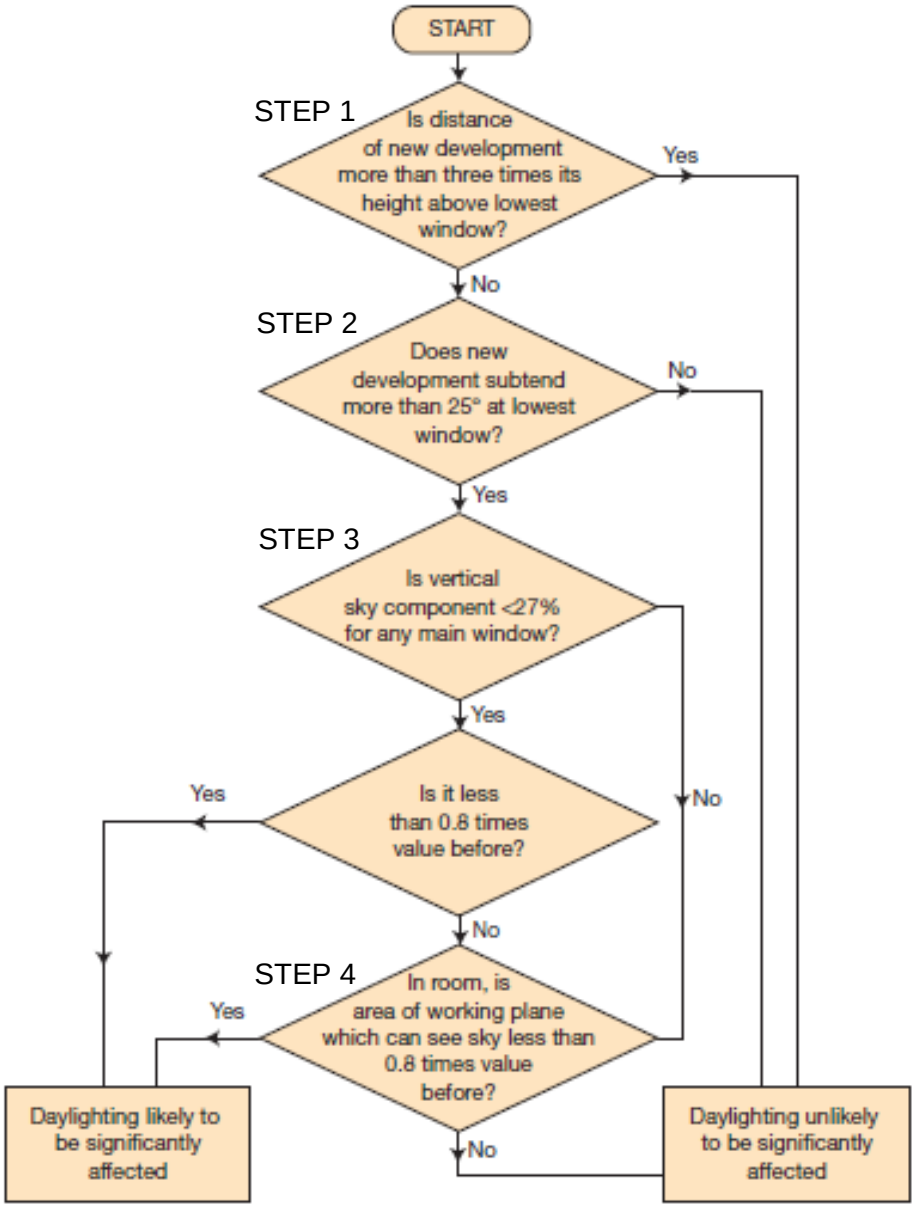

Figure 22 – Daylight Assessment Methodology

9.1.1 DISTANCE FROM THE PROPOSED DEVELOPMENT – STEP 1

As per the flow matrix, the loss of light to existing windows is not required to be analysed 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 windows. Otherwise, BRE guideline provide the following methods for assessing daylight availability.

9.1.2 25° LINE CRITERIA – STEP 2

In the first instance, if a proposed development falls beneath a 25° angle taken from a point 1.6 metres above ground level from any adjacent properties, then the BRE Guidelines say that no further analysis is required in relation to impact on surrounding properties as adequate skylight will still be available. If the proposed development extends beyond the 25° line then further analysis is required (Step 3).

9.1.3 VERTICAL SKY COMPONENT – STEP 3

The following method is known as the Vertical Sky Component (VSC). The 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 BRE Guide sets out two guidelines for the VSC:

- If the VSC at the centre of the existing window exceeds 27% with the new development in place, then enough sky light should still be reaching the existing window.
- If the VSC with the new development in place is both less than 27% and less than 80% its former value, then the reduction in light to the window is likely to be noticeable.
- This means that even if the VSC is less than 27%, as long as the VSC value is still greater than 80% of its former value, this 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. However, it does not assess or quantify the actual daylight levels inside the rooms. If the VSC standard is not met on any window, Step 4 is then followed

9.1.4 NO SKY LINE – STEP 4

This method is the No Sky Line or Daylight Distribution Method. This method assesses the change in position of the No Sky Line between the existing and proposed situations. It does take into account the number and size of windows to a room, but still does not give any qualitative or quantitative assessment of the light in the room, only where sky can or cannot be seen. Thus, as this method is limited, Step 3 is considered more appropriate.

9.1.5 AVERAGE DAYLIGHT FACTOR (ADF)

This last method is not outlined within the BRE Guidelines as one of the steps for assessing the impact to adjacent properties. However, this method not only considers the amount of sky visible from the vertical face of the window, but also the window size, room size and room use and where dimensions for the room to be assessed are available, this is an accurate method of assessment.

Therefore, even though this step is not outlined within the BRE Guidelines for assessment of adjacent properties, as the internal information for the adjacent properties was available and the previous steps have shown that some properties are perceived to experience an impact, this method has been used to demonstrate that the surrounding properties will continue to receive good levels of daylight with the proposed development in place.

Sections 9.2 and 9.3 on the following pages outline the details of the analysis undertaken.

9.2. IDENTIFYING SENSITIVE RECEPTORS

Prior to following the flow matrix, first the key sensitive receptors around the site need to be identified. According to the BRE Guide, sensitive receptors are described as:

- Habitable rooms in residential buildings, where the occupants have a reasonable expectation of daylight;
- Other sensitive receptors are gardens and open spaces on adjacent properties to the new scheme, excluding public footpaths, front gardens and car parks. In accordance with the BRE Guide, windows are selected as sensitive receptors on the basis of being a habitable room facing the proposed development.

Similarly, amenities and open spaces are selected on the basis of being in the immediate vicinity of the proposed development. The primary purpose of a daylight, sunlight and overshadowing assessment is to determine the likely loss of light to adjacent buildings resulting from the construction of the proposed development.

Therefore, in this case, the proposed development is identified as the potential source of impact. The sensitive receptors identified for this study are windows of habitable rooms facing the site where the occupants have a reasonable expectation of daylight. Table 7 identifies all sensitive receptors analysed, whilst Figure 23 identifies their location.

Development name
Salthill
Clearwater Cove
De Vesci House

Table 7 – Sensitive Receptors surrounding the proposed development at the former Ted Castles site

The image below identifies the location of the sensitive receptors.

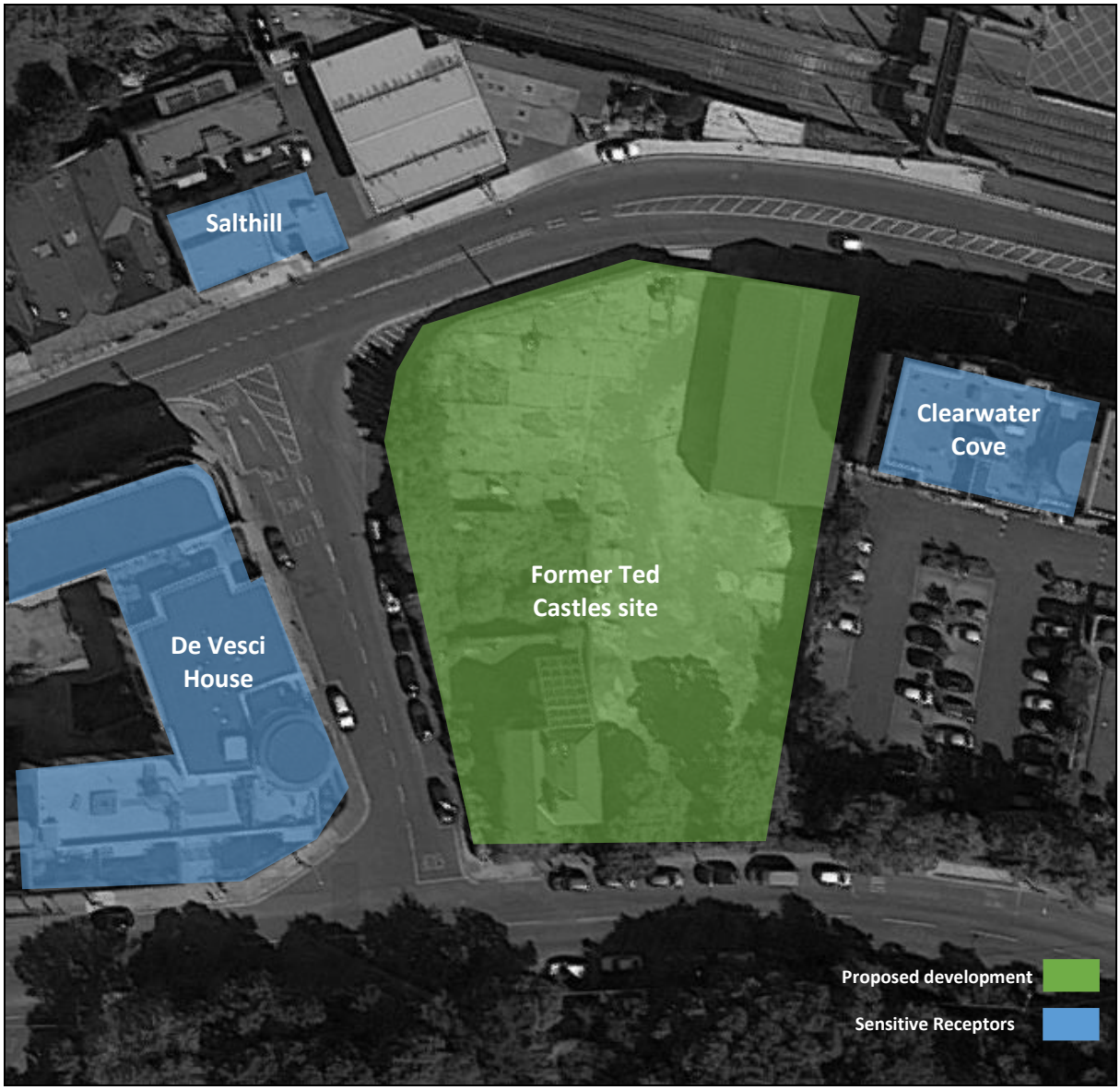

Figure 23 - Location of Sensitive Receptors

9.3. DAYLIGHT IMPACT ON SURROUNDING PROPERTIES

VSC

Due to the close proximity of the proposed development to the surrounding properties, the use of the 25° line was not deemed necessary and the analysis moved to the next step. Those windows more likely to perceive an impact due to their location or position against the proposed building were selected for analysis. The analysis has demonstrated that when comparing the VSC of the proposed development to the existing site, a daylight impact to the surrounding properties is perceived. This is normal due to the comparison between an empty or low density site and the construction of any new development higher than that.

The following images depict the windows tested and the subsequent tables outline the VSC results achieved.

Figure 24 – Sensitive receptors – De Vesci House

Figure 25 – Sensitive receptors – Salthill

Figure 26 – Sensitive receptors – Clearwater Cove

Window Ref.	VSC existing development (%)	VSC proposed development (%)	Meets BRE minimum required VSC >27%	VSC % of its former value	Meets BRE minimum required VSC >80% of its former value
1	24.2	12.3	N	51	N
2	23.6	11	N	47	N
3	25.8	12.9	N	50	N
4	30.4	16.6	N	55	N
5	24.1	17.3	N	72	N

Window Ref.	VSC existing development (%)	VSC proposed development (%)	Meets BRE minimum required VSC >27%	VSC % of its former value	Meets BRE minimum required VSC >80% of its former value
6	15.8	14.2	N	90	Y
7	25.4	15.1	N	59	N
8	23.7	13.1	N	55	N
9	37.6	24.3	N	65	N
10	23.4	9.9	N	42	N
11	35.1	19.8	N	56	N
12	33	19.0	N	58	N
13	33.0	24.8	N	75	N
14	34.4	28.3	Y	NA	NA
15	34.9	27.6	Y	NA	NA
16	35.4	26.7	N	75	N
17	36	25.1	N	70	N
18	37.3	27	Y	NA	NA
19	39.4	27	Y	NA	NA
20	39.2	25.6	N	65	N

Table 8 – Vertical Sky Component Results

ADF

In order to demonstrate that the surrounding properties will continue to receive good levels of daylight even though some properties will perceive an impact a more detailed method has been carried out. This method not only considers the amount of sky visible from the vertical face of the window, but also the window size, room size and room use. Where dimensions for the room to be assessed are available, this is an accurate method of assessment, subject to the information on the adjacent developments being correct. It gives guidance as to the qualitative and quantitative change in daylight and is related to the British Standard BS 8206 Part II. Parameters used for the calculations are outlined in Table 1.

This step is not recommended for assessing the impact to adjacent properties because typically there is not enough information of the surrounding properties, however, internal information for the adjacent properties was found in the planning file. The selected apartments assessed under the ADF method have shown that the units in questions will achieve excellent levels of daylight once the development is in place.

In order to give an idea of the expected daylight levels within the surrounding properties a sample of apartments have been selected for analysis. 'Worst case' apartments are the properties in close proximity to the proposed development and placed at the lower levels. In the case of Clearwater Cove, the only apartment with windows facing the proposed development is the top floor penthouse, therefore this apartment was selected for analysis.

Figure 27 – De Vesci House – Lower Ground Floor Rooms Selected for ADF Analysis

	ADF target (%)	Proposed ADF (%)	Meets ADF target
Liv/Kit/Din 1	2.0	2.7	Y
Liv/Kit/Din 2	2.0	2.0	Y
Bedroom 1	1.0	2.2	Y
Bedroom 2	1.0	2.1	Y
Liv/Kit/Din 3	2.0	2.0	Y
Bedroom 3	1.0	2.0	Y

Table 9 – Average Daylight Factor Results – De Vesci House Lower Ground Floor Rooms

Figure 28 – De Vesci House – Upper Ground Floor Rooms Selected for ADF Analysis

	ADF target (%)	Proposed ADF (%)	Meets ADF target
Liv/Kit/Din 1	2.0	2.1	Y
Bedroom 1	1.0	1.9	Y
Liv/Kit/Din 2	2.0	4.6	Y
Bedroom 2	1.0	1.9	Y

Table 10 – Average Daylight Factor Results – De Vesci House Upper Ground Floor Rooms

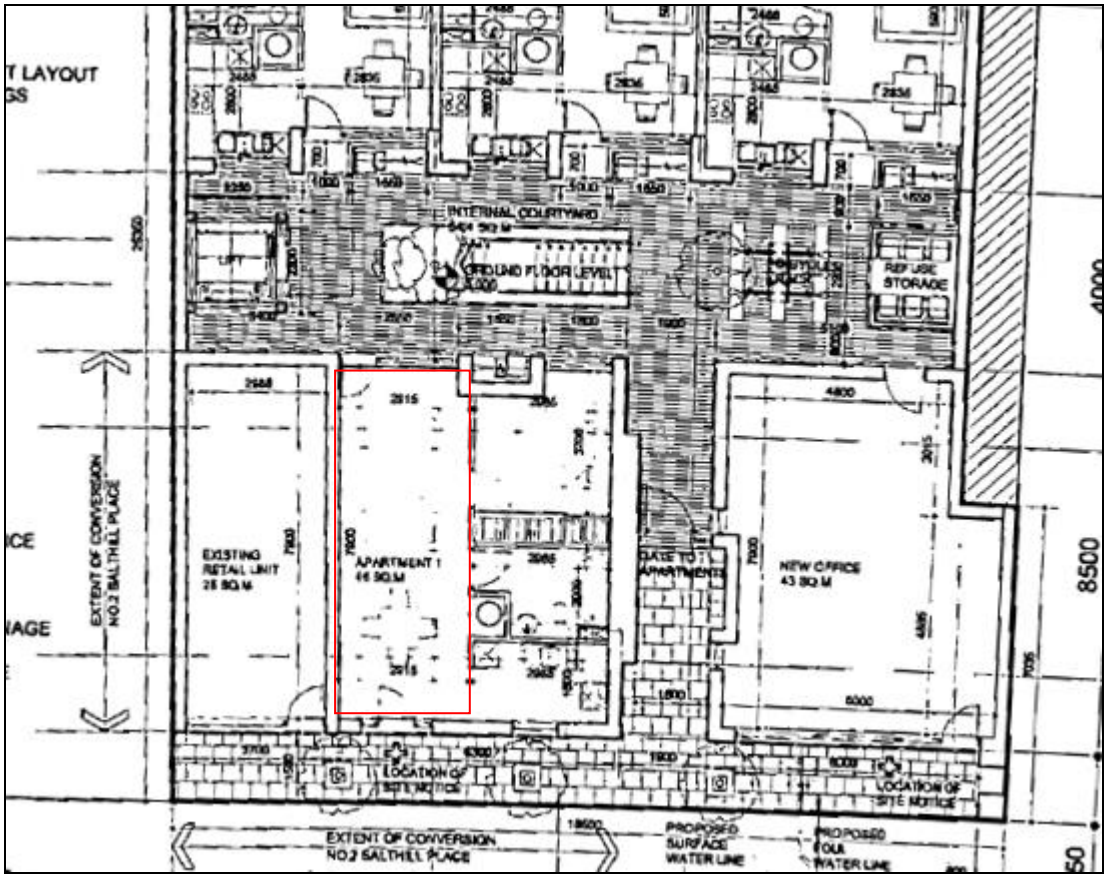

Figure 29 – Salthill – Ground Floor Rooms Selected for ADF Analysis

Since the main window to the ground floor apartment of Salthill is to the back of the property, and the VSC analysis has shown a minimal impact to this window, it can be stated that minimal impact will be perceived due to the proposed development and further analysis was not deemed necessary.

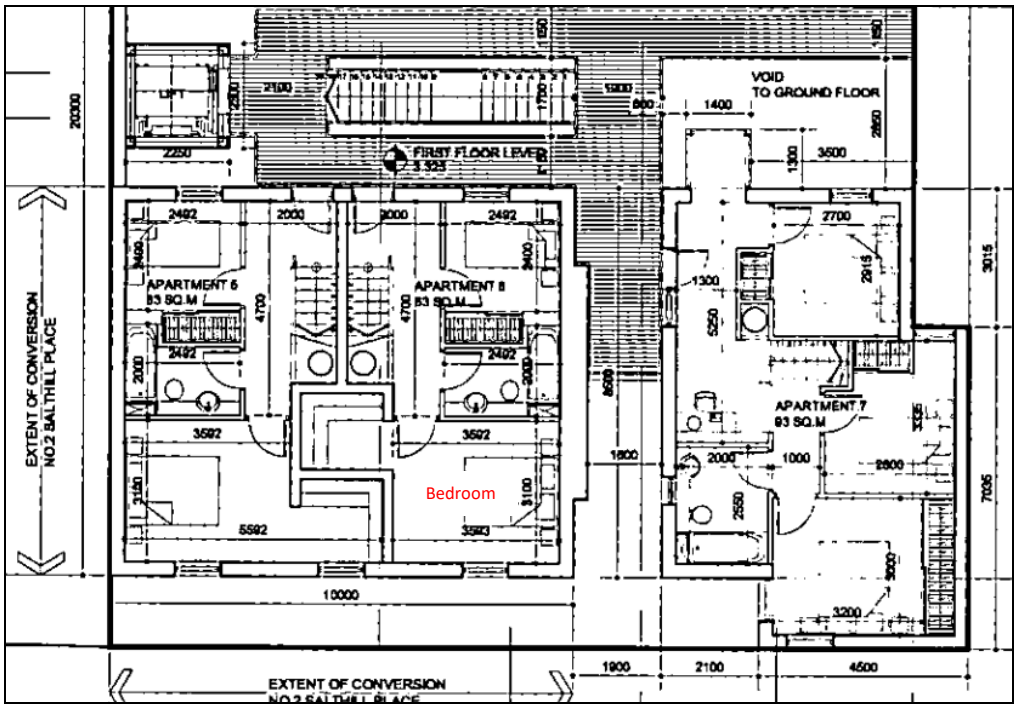

Figure 30 – Salthill – First Floor Rooms Selected for ADF Analysis

	ADF target (%)	Proposed ADF (%)	Meets ADF target
Bedroom	1.0	3.1	Y

Table 11 – Average Daylight Factor Results – Salthill First Floor Rooms

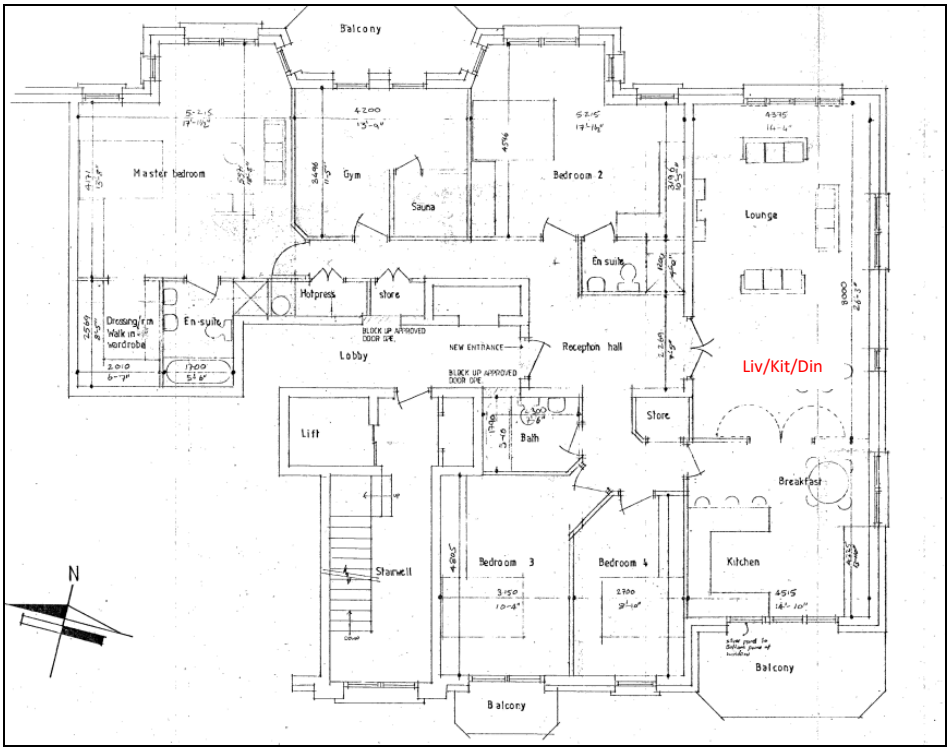

Figure 31 – Clearwater Cove – Penthouse Selected for ADF Analysis

	ADF target (%)	Proposed ADF (%)	Meets ADF target
Liv/ Kit / Din	2.0	4.5	Y

Table 12 – Average Daylight Factor Results – Clearwater Penthouse

All adjacent properties selected for analysis have achieved and in the majority of cases exceed the minimum ADF target set out. Therefore, excellent levels of daylight will still be achieved once the proposed development is constructed.

10. SUNLIGHT IMPACT ON ADJACENT PROPERTIES (APSH)

In order to assess the sunlight access within the adjacent properties of the Lands at the former Ted Castles development the Annual Probable Sunlight Hours (APSH) have been analysed.

BRE Guidelines outline that if a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window, then the sunlight of the existing dwelling may be adversely affected. This will be the case if the centre of the window:

- Receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between September 21st and March 21st
- Receives less than 80% its former sunlight hours during either period
- Has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours

Since BRE Guidelines outline that obstructions within 90° of due north of the existing windows are not required to be included, the properties selected for APSH analysis are the sensitive receptors located to the north, east and west of the proposed development.

It must be noted that BRE Guidelines states that to assess loss of sunlight to an existing building, it is suggested that all main living rooms of dwellings should be checked if they have a window facing within 90° of due south. BRE Guidelines also outlines that kitchen and bedrooms are less important, although care should be taken not to block too much sun.

In order to give indicative results on the sunlight impact to adjacent properties, living rooms in De Vesci House, Salthill and Clearwater Cove with a main window facing the proposed development have been selected for analysis in line with BRE Guidelines recommendations.

The Clearwater Cove penthouse living room is an open plan with windows to the north, west and south. As the main source of sunlight can be anticipated to be from the window facing south and since this window is not facing directly to the proposed development, further analysis was not

deemed necessary.

BRE Guidelines outline that if a living room has a main window facing 90° of due north, but a secondary window facing 90°of due south, then the secondary window should be checked. For the Salthill ground floor living room, as the main window is facing north, the secondary south facing window has been selected for analysis.

Figures 32, 33 and 34 highlight the windows selected for analysis and Table 13 summarises the percentage of APSH for the existing and proposed scenarios.

As previously outlined, it must be noted that the performance targets outlined within BRE Guidelines should be used with a degree of flexibility as outlined within the guide itself.

Figure 32 – Sensitive receptors – De Vesci House

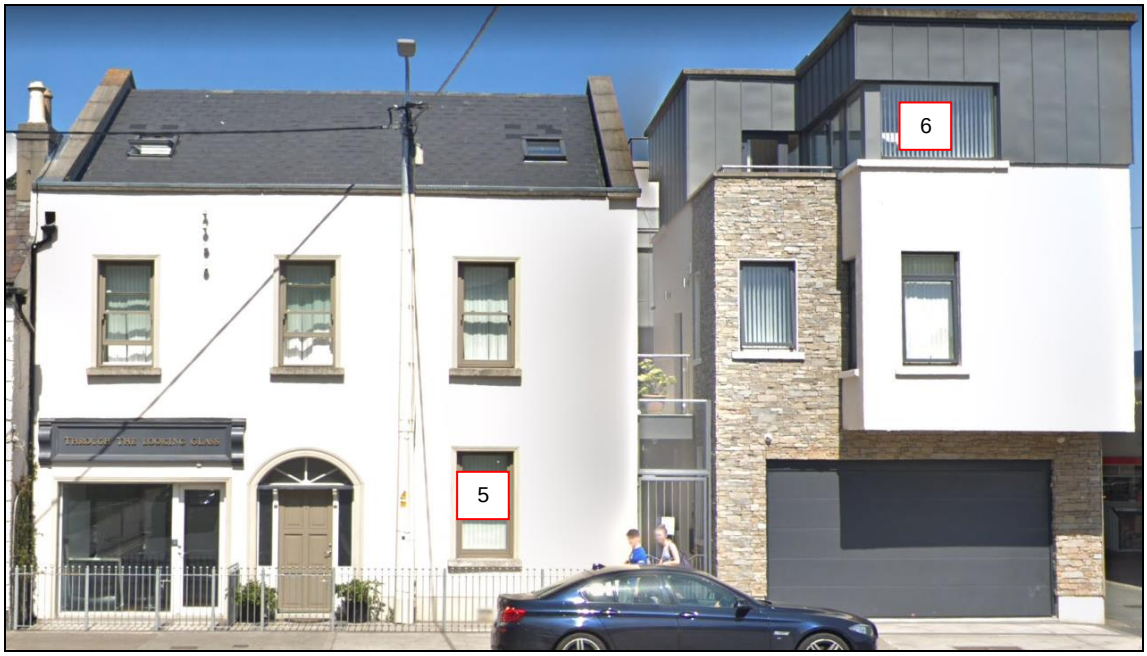

Figure 33 – Sensitive receptors – Salthill

Figure 34 – Sensitive receptors – Clearwater Cove

Window Ref.	APSH (%) - Existing development		APSH (%) - Proposed development		Meets minimum APSH values recommended in BRE Guidelines with the Proposed Development in place		Percentage of its former value (%)	
	Annual	Winter (Sep 21st – Mar 21st)	Annual	Winter (Sep 21st – Mar 21st)	Annual	Winter (Sep 21st – Mar 21st)	Annual	Winter (Sep 21st – Mar 21st)
1	14	3	5	3	N	N	36	100
2	18	5	18	5	N	Y	100	NA
3	22	5	13	4	N	N	60	80
4	30	12	26	12	Y	Y	NA	NA
5	58	20	41	17	Y	Y	NA	NA
6	67	30	47	24	Y	Y	NA	NA
7	No main window							
8	No main window							

Table 13 – Annual Probable Sunlight Hours Results

The analysis has shown that the majority of applicable windows will continue to receive APSH values in line with BRE recommendations once the proposed development is in place. Therefore, good levels of sunlight will still be perceived.

Only windows 1 and 3 will receive a sunlight impact due to the proposed development during the annual period. Both, window 1 and 3 will still receive the recommended winter time target values, when sunlight is more valuable.

The shortfall in sunlight to windows 1 and 3 is normal due to the comparison between a site with low height development and the construction of any new development higher than that.

Section 11 of this report assesses the overshadowing and sunlight impact showing that a negligible impact will be perceived by any adjacent open space. In conclusion, it can be stated that good levels of sunlight will still be achieved within the adjacent properties.

11. OVERSHADOWING IMPACT TO SURROUNDING OPEN SPACES

BRE Guidelines state that *"if a space is used all year round, the equinox (March 21st) is the best date for which to prepare shadow plots as it gives an average level of shadowing. Lengths of shadows at the autumn equinox (September 21st) will be the same as those for March 21st, so a separate set of plots for September is not required. However, clock times for September will be one hour later, because British Summer Times (BST)".*

BRE Guidelines identify gardens (usually the main back garden of a house) as sensitive receptors that must be selected for analysis in order to assess the impact that will be perceived once the proposed development takes place. The image below highlights in red the surrounding open spaces selected for overshadowing analysis.

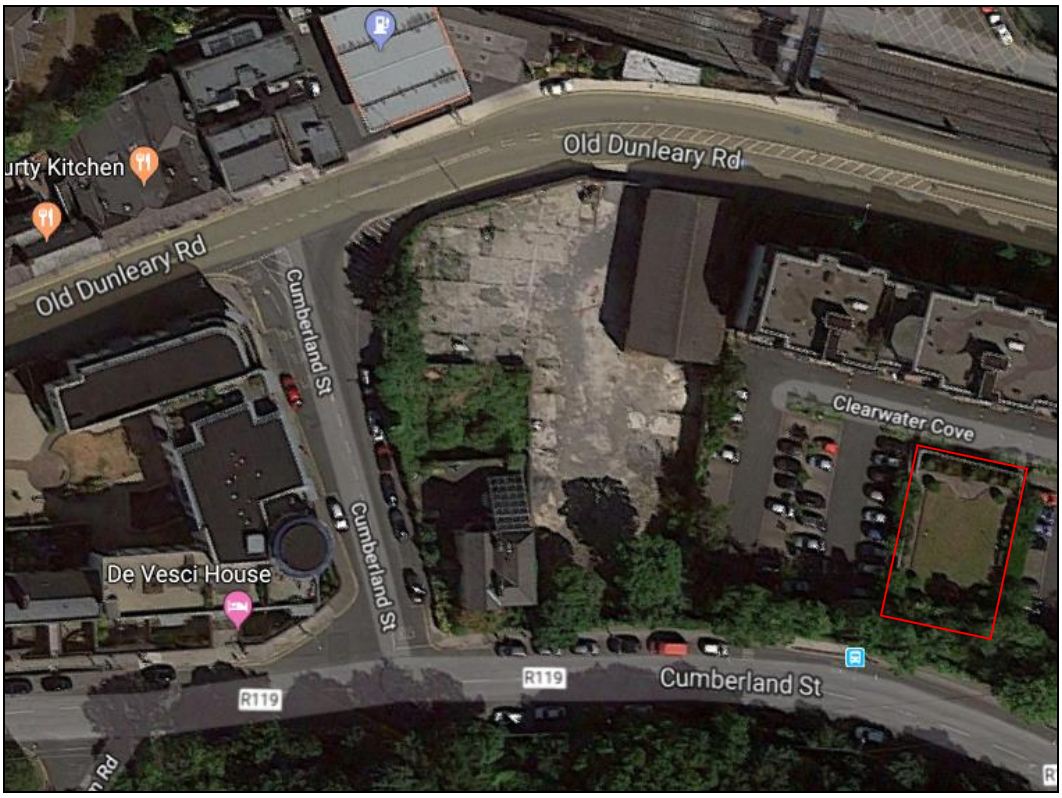

Figure 35 – Sensitive Surrounding Open Spaces

Based on the recommendations within the BRE Guidelines, March 21st has been used to create the overshadowing images. In addition, overshadowing images for June and December 21st have also been created to give an indication of the sunlight levels that will be received during the summer and winter months.

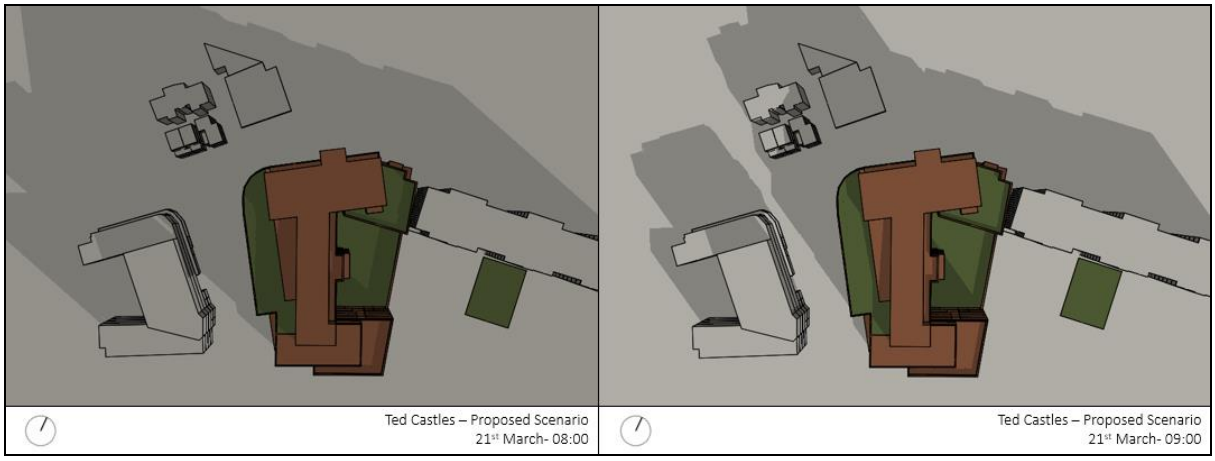

Figure 36 – Overshadowing Images on March 21st at 8 a.m. and 9 a.m.

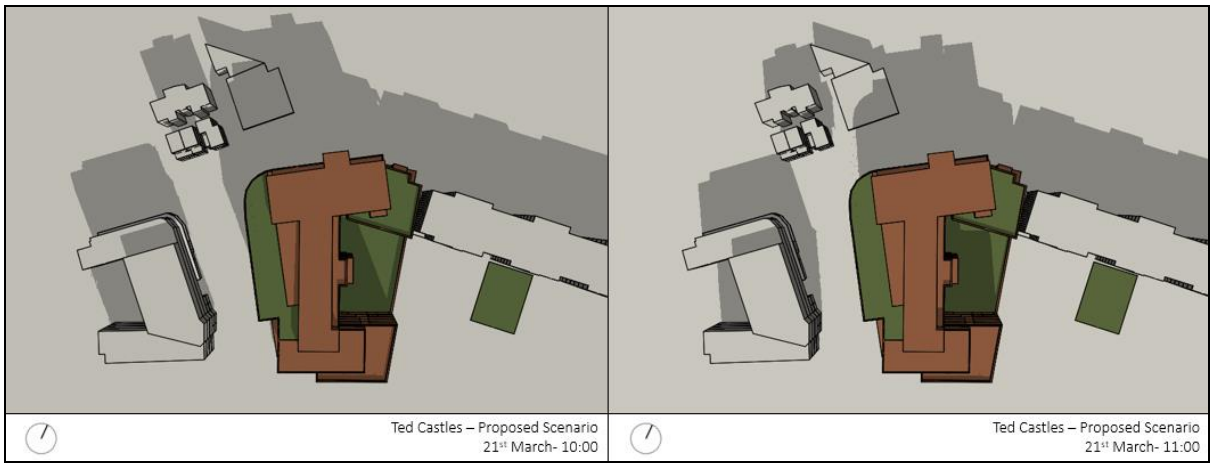

Figure 37 – Overshadowing Images on March 21st at 10 a.m. and 11 a.m.

Figure 38 – Overshadowing Images on March 21st at 12 p.m. and 1 p.m.

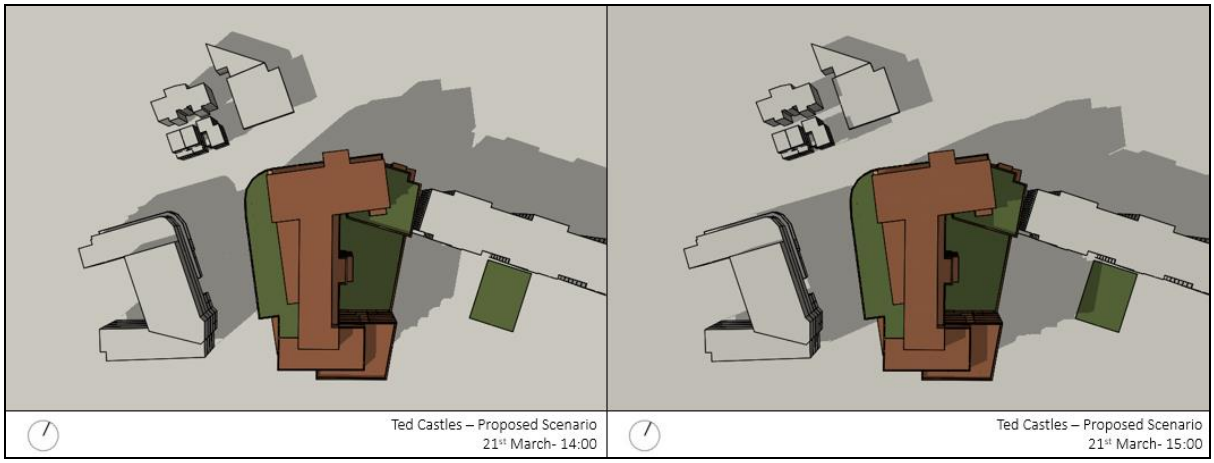

Figure 39 – Overshadowing Images on March 21st at 2 p.m. and 3 p.m.

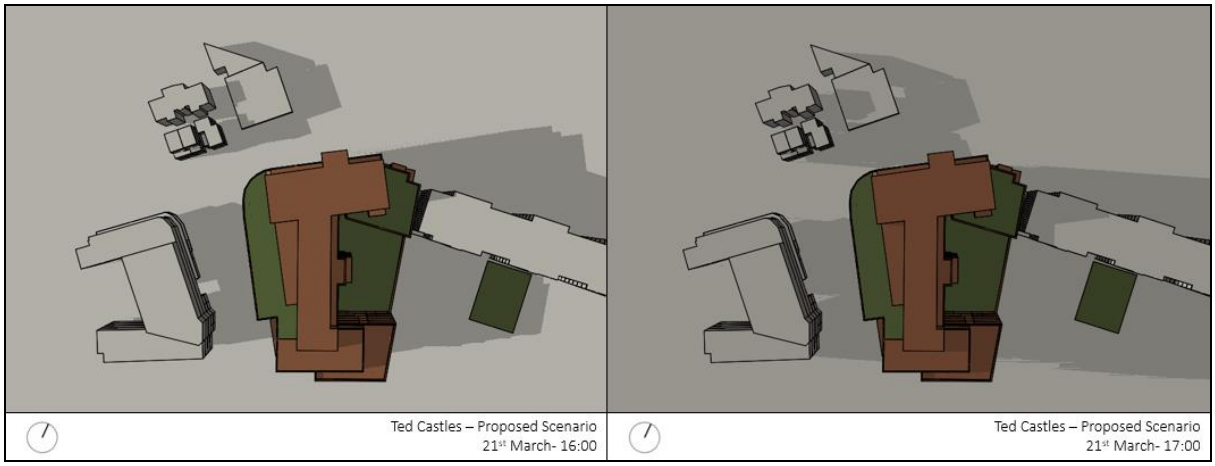

Figure 40 – Overshadowing Images on March 21st at 4 p.m. and 5 p.m.

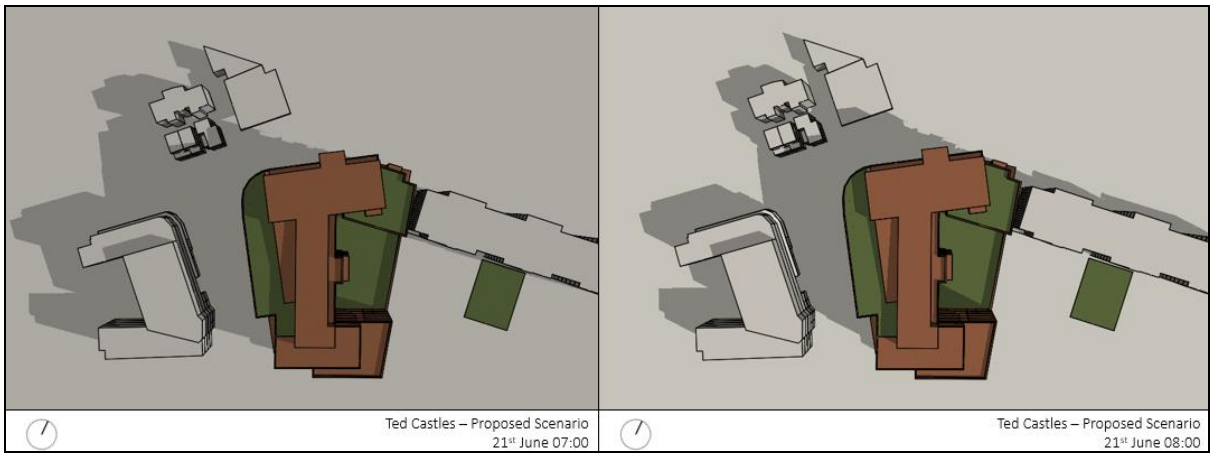

Figure 41 – Overshadowing Images on June 21st at 7 a.m. and 8 a.m.

Figure 42 – Overshadowing Images on June 21st at 9 a.m. and 10 a.m.

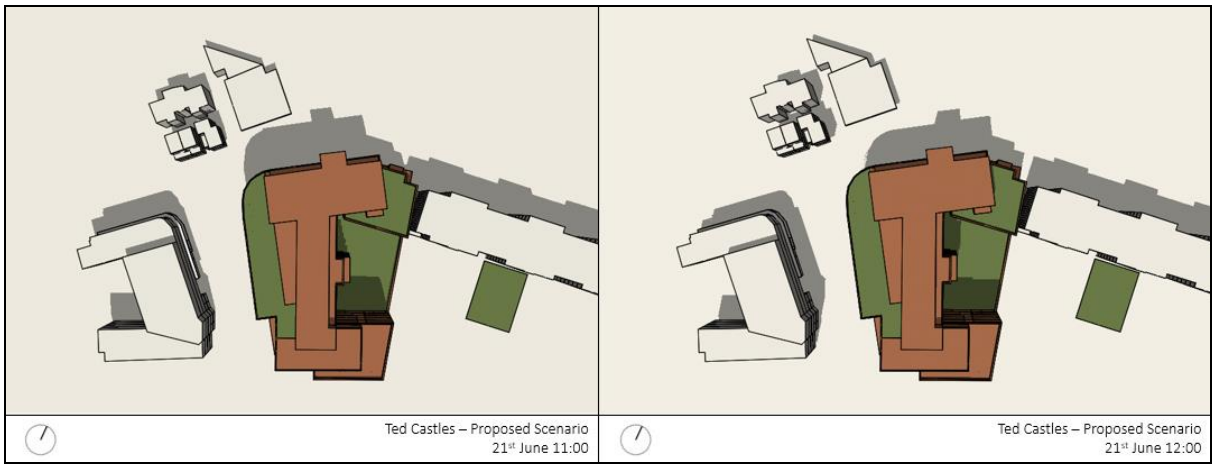

Figure 43 – Overshadowing Images on June 21st at 11 a.m. and 12 p.m.

Figure 44 – Overshadowing Images on June 21st at 1 p.m. and 2 p.m.

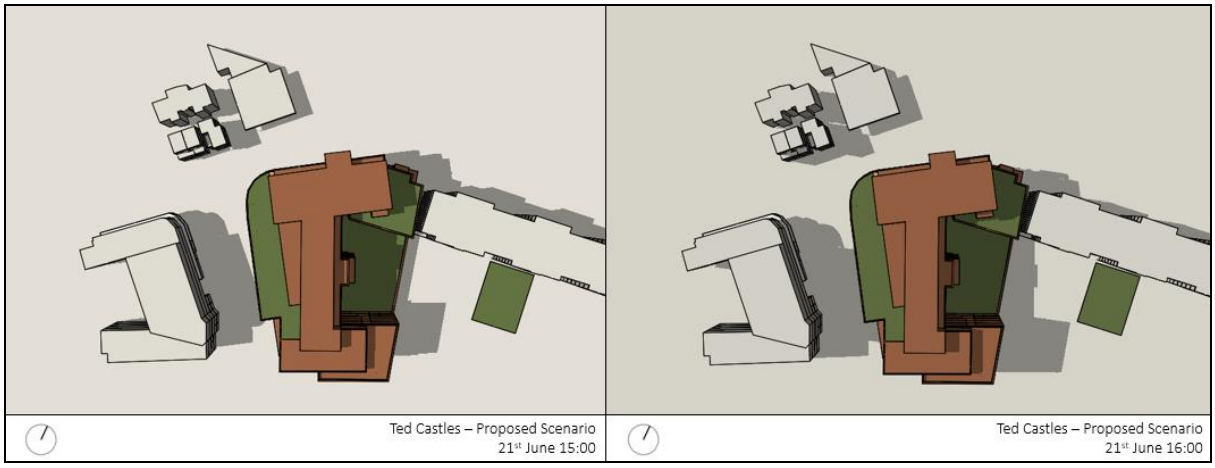

Figure 45 – Overshadowing Images on June 21st at 3 p.m. and 4 p.m.

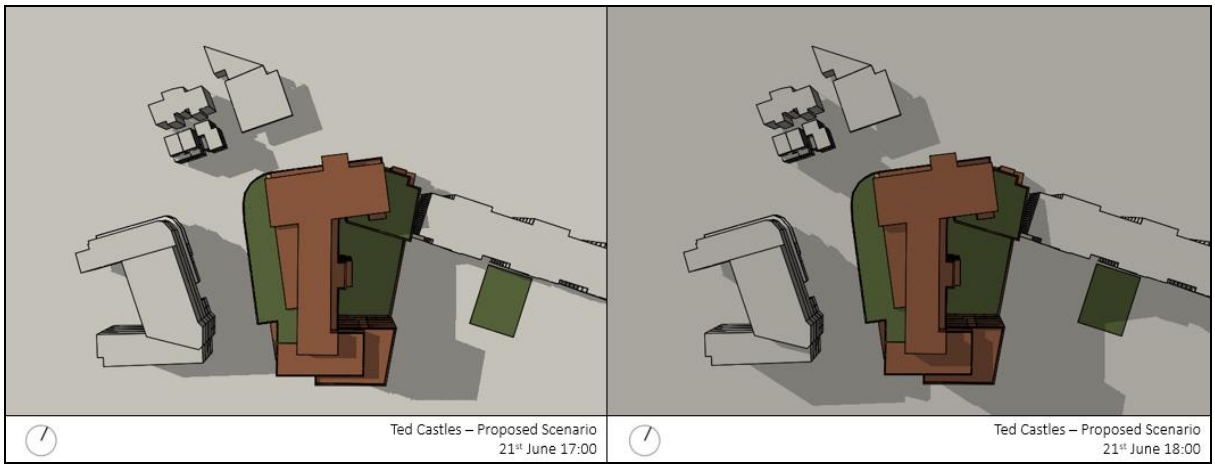

Figure 46 – Overshadowing Images on June 21st at 5 p.m. and 6 p.m.

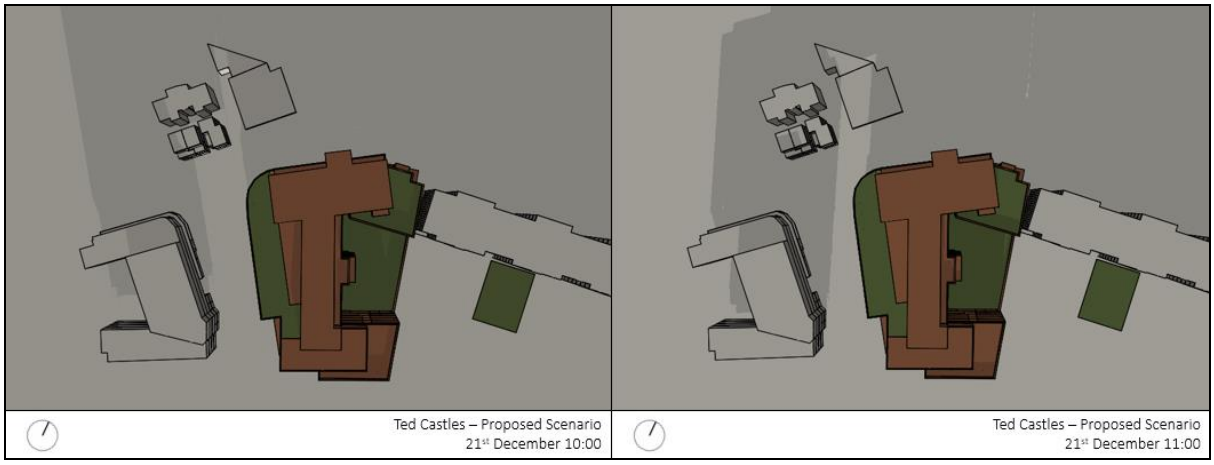

Figure 47 – Overshadowing Images on December 21st at 10 a.m. and 11 a.m.

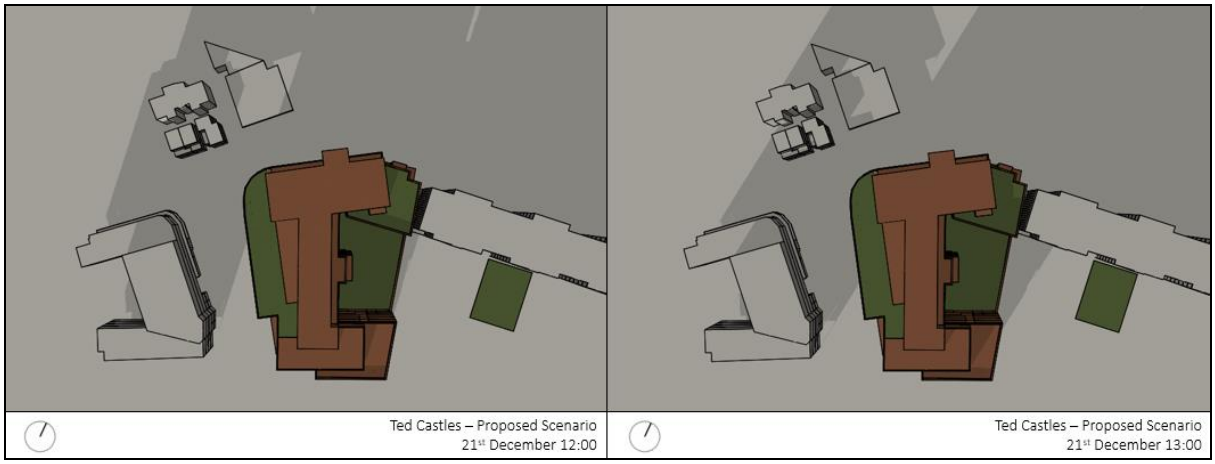

Figure 48 – Overshadowing Images on December 21st at 12 p.m. and 1 p.m.

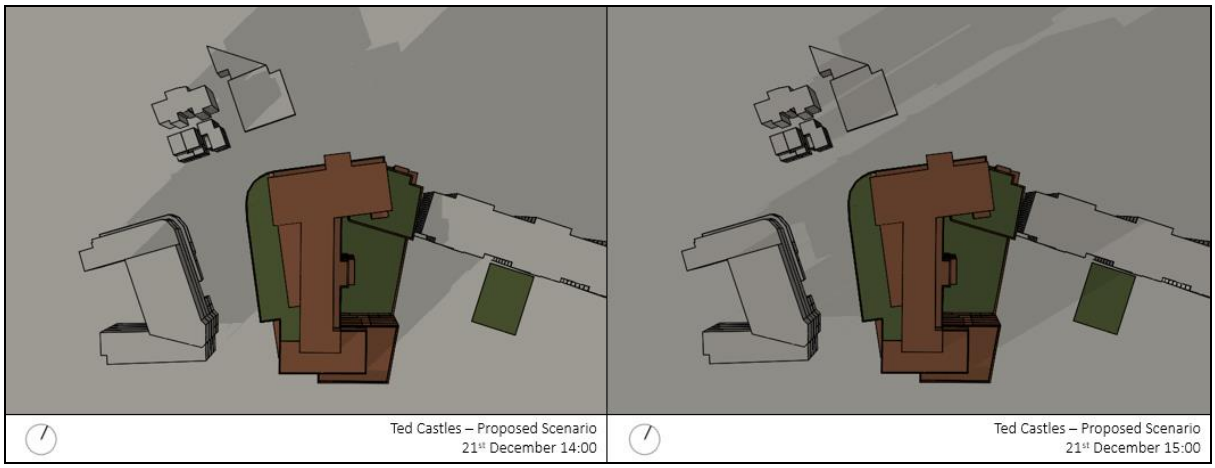

Figure 49 – Overshadowing Images on December 21st at 2 p.m. and 3 p.m.

From the overshadowing images, it is evident the rear gardens of the Clearwater Cove highlighted in red in Figure 35 will perceive an overshadowing impact after 4 p.m. on March 21st, therefore further analysis has been carried out.

The red squares in the below figure highlight the areas that receive a minimum of 2 hours of sunlight on the 21st of March for the proposed scenario. It is evident that the rear garden of the Clearwater Cove receives at least 2 hours of sunlight on March 21st with the proposed development in place, therefore it can be stated that negligible sunlight impact will be perceived due to the proposed development and compliance with BRE Guidelines is achieved.

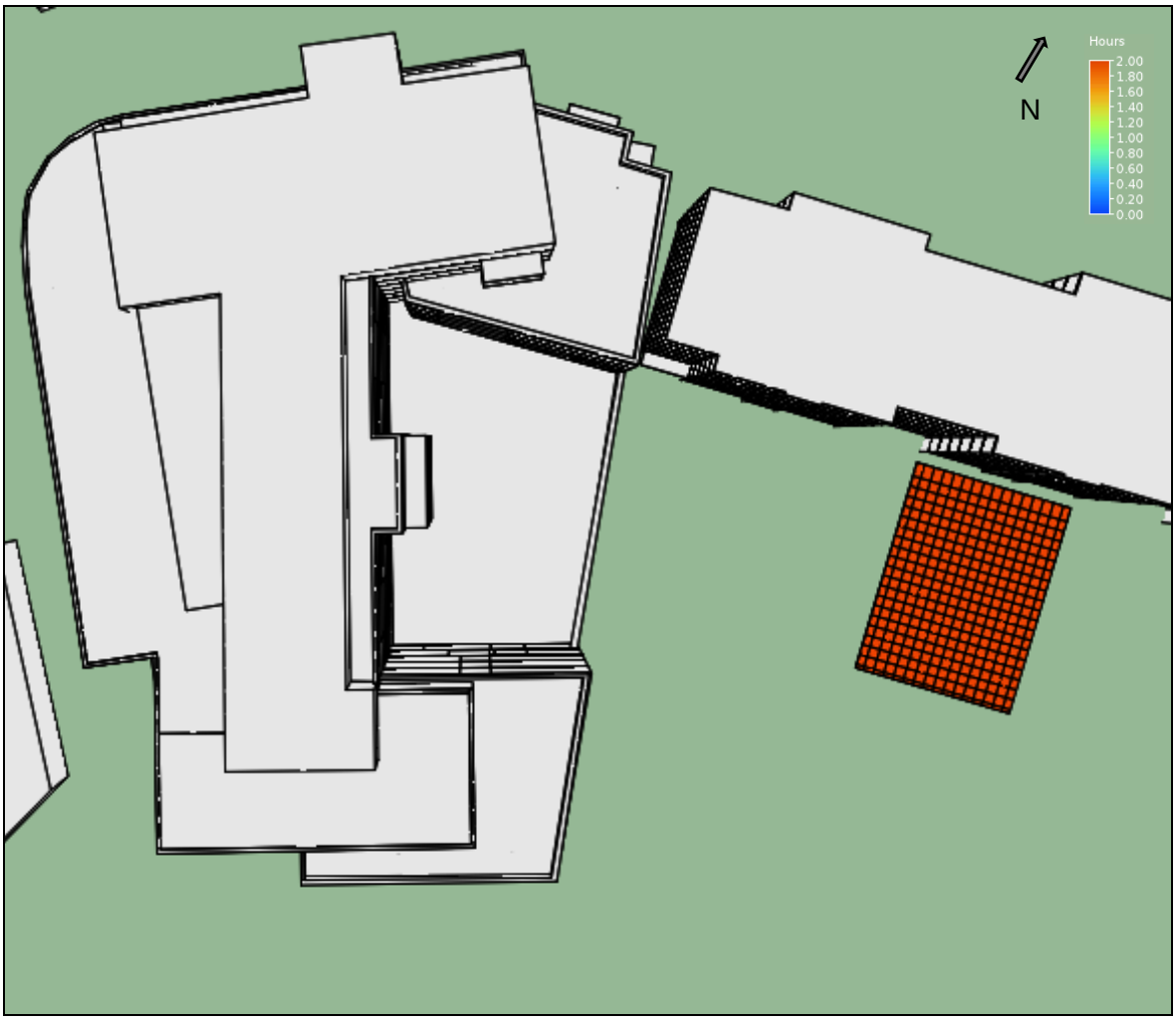

Figure 50 – Clearwater Cove Sunlight March 21st

12. CONCLUSION

The proposed development at the former Ted Castles site and DunLeary house has been analysed in order to determine the following:

- The daylight levels within the living, kitchen and bedroom areas of selected apartments, to give an indication of the expected daylight levels throughout the proposed development;
- The expected sunlight levels within the living room areas within the proposed development;
- The quality of amenity space, being provided as part of the development, in relation to sunlight;
- Any potential daylight or sunlight impact the proposed development may have on properties adjacent to the site.

Calculations and methodology used are in accordance with BRE Guidelines for daylight and sunlight and based on the British Research Establishments "Site Layout Planning for Daylight and Sunlight: A Good Practice Guide" by PJ Littlefair, 2011 Second Edition, however, the following should be reiterated as previously outlined:

"The advice given here is not mandatory and this document should <u>not be seen as an instrument of planning policy</u>. Its aim is to help rather that constrain the designer. Although it gives numeral guidelines these <u>should be interpreted flexibly</u> because natural lighting is only one of the many factors in site layout design"

The calculation methodology for daylight and sunlight is based on the British Research Establishments "Site Layout Planning for Daylight and Sunlight: A Good Practice Guide" by PJ Littlefair, 2011 Second Edition.

The difficulty in achieving the result set out by the BRE guidance in a city centre location is also recognised within planning guidance which has been published by the Irish Government. On page 43 of the Urban Design Manual 2009 the following advice is provided:

"Where design standards are to be used (such as the UK document Site Layout Planning for Daylight and Sunlight, published by the BRE), it should be acknowledged that for higher density proposals in

urban areas it may not be possible to achieve the specified criteria, and standards may need to be adjusted locally to recognise the need for appropriate heights or street widths."

Internal daylight within the proposed development

The analysis confirms that across the entire development excellent levels of internal daylight are achieved. The majority of apartments not only meet but greatly exceed the recommendations outlined within the BRE Guidelines and British Standard BS8206, achieving a 98.9 % compliance rate across the proposed apartments.

Sunlight to proposed development amenity spaces

In terms of sunlight access, excellent levels of sunlight are experienced across the proposed development. The communal amenity spaces and roof top terraces provided exceed the BRE guidelines for sunlight on the test day of 21st of March. Also, excellent levels of sunlight will be achieved during the summer.

Sunlight to windows within the proposed development

The annual probable sunlight hours assessment has shown that 46% of the main living room windows across the development achieve the recommended APSH values stated in the BRE Guidelines, while 48% of windows achieve the recommended values during the winter months, when sunlight is more valuable.

Impact to surrounding properties

The Vertical Sky Component analysis has shown that the surrounding properties will perceive an impact due to the proposed development over the existing scenario, this is normal due to the comparison between an empty or low density site and the construction of any new development higher than that. However, the Average Daylight Factor analysis shows that the adjacent properties will still achieve excellent levels of daylight in the majority of surrounding properties once the proposed development is built.

The annual probable sunlight hour (APSH) analysis has shown that the adjacent properties will still receive good levels of sunlight once the proposed development is constructed. Only two of the windows selected for analysis will perceive an impact on sunlight during the annual period. All selected windows meet the recommended APSH winter time values, when sunlight is more valuable. In relation to overshadowing, negligible impact will be perceivable to adjacent open spaces.

13. APPENDIX A

As previously outlined the British Standard BS 8206: Part 2 (BS8206-02) has been withdrawn and replaced with IS EN 17037:2018 Daylight in Buildings. However, since the BRE Guidelines and some planning policy guidelines continue to make reference to the BS 8206, this standard has been used throughout the report. However, this appendix analyses a sample of 'worst case' rooms under the requirements outlined within the new IS EN 17037 to give an indicator on the level of compliance that would be achieve if this Guidelines were applied.

There are two tests methods outlined within the IS EN 17037 Guidelines to analyse predicted daylight levels within spaces:

- Method 1: the first method assesses the predicted daylight factors across a reference plane at 850mm above floor level. The plane should see the target daylight factor of 2.0% being achieved over 95% of the space while a value of 0.7% is required in over 50% of the space. Those daylight factor values are based on Dublin for a fraction of half of daylight hours.

- Method 2: the second method applies minimum target illuminance targets to be achieved across of a reference plane set at 850mm above floor level. A minimum of 100lx is required to be achieved over 95% of the space while a value of 300lx is required in over 50% of the space. Local climatic data is used and the target illuminance values should be achieved for at least half of the available daylight hours (i.e. 2190 hours/year).

For this report the second method has been the one selected for analysis since it is based on climatic data for the whole year, therefore, this method is considered more accurate. The weather file used within the analysis was Dublin IWEC.

A sample of 'worst case' rooms located in Level 01 have been selected for analysis. In order to select the sample of rooms, those achieving some of the lowest ADF values outlined in Table 2 within Section 6.4 of this report have been assessed.

The new standard has introduced tests to analyse view out, sunlight exposure and glare in addition to predicted daylight. For the purposed of this appendix only the predicted daylight has been assessed.

Figure A.1 – Sample of 'Worst Case' Rooms - Level 1 Assessed Units

The below table summarises the recommendations of daylight provision. The minimum level has been targeted for the 'worst case' rooms.

Level of recommendation for vertical and inclined daylight opening	Target illuminance E_T lx	Fraction of space for target level $F_{plane,\%}$	Minimum target illuminance E_{TM} lx	Fraction of space for minimum target level $F_{plane,\%}$	Fraction of daylight hours $F_{time,\%}$
Minimum	300	50 %	100	95 %	50 %
Medium	500	50 %	300	95 %	50 %
High	750	50 %	500	95 %	50 %
NOTE Table A.3 gives target daylight factor (D_T) and minimum target daylight factor (D_{TM}) corresponding to target illuminance level and minimum target illuminance, respectively, for the CEN capital cities.					

Figure A.2 – Extract from IS EN 17037 on Illuminance Targets

Unit	Minimum Average Lux within the Room	Percentage of Space that Achieves Target Illuminance Level (E_T ≥300 lux)	Meets criteria – E_T ≥300 lux on more than 50% of Space	Percentage of Space that Achieves Target Minimum Illuminance Level (E_T ≥100 lux)	Meets criteria – E_T ≥100 lux on more than 95% of Space
L	382	100	Y	100	Y
Q	108	73	Y	100	Y
T	72	59	Y	83	N
U	95	52	Y	98	Y

Figure A.3 – Results for a Sample of Rooms based on IS EN 17037 Guidelines.

The analysis has shown that all analysed rooms will achieve the recommended values outlined within the new IS EN 17037 standard, with the exception of room T that falls slightly under the recommendations for the minimum illuminance target. As previously outlined, this assessment has been carried out only for reference purposes.

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