

## 10.0 MICROCLIMATE – Daylight and Sunlight

### 10.1 Introduction

ARC Architectural Consultants Ltd has been retained by the Applicant to undertake this Sunlight and Daylight Access Analysis proposed SHD Scheme at lands known as “RB Central” at Rockbrook, Carmanhall Road, Sandyford Business District, Sandyford, Dublin 18. This chapter of the EIAR addresses the potential overshadowing impacts of the proposed development on the receiving environment surrounding the subject site. A separate stand-alone document also prepared by ARC addresses the internal sunlight and daylight conditions within the proposed development, which is enclosed with the application.

To date, it is understood that no standards or guidance documents (statutory or otherwise) on the subject of sunlight access to buildings or open spaces or daylight access to buildings have been prepared or published in Ireland. In the absence of guidance on the matter of sunlight and daylight access tailored to Irish climatic conditions, Irish practitioners tend to refer to the relevant *British Standard, BS 8206-2:2008: Lighting for buildings - Part 2: Code of practice for daylighting*. The standards for daylight and sunlight access in buildings (and the methodologies for assessment of same) suggested in the British Standard have been referenced in this Sunlight and Daylight Access Analysis.

The contents of PJ Littlefair’s 2011 revision of the 1991 publication *Site layout planning for daylight and sunlight: a guide to good practice* for the Building Research Establishment have also been considered in the preparation of the report in the interests of completeness.

Neither the British Standard nor the BRE Guide set out rigid standards or limits. The BRE Guide is preceded by the following very clear warning as to how the design advice contained therein should be used:

*“The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design.”* [Emphasis added.]

That the recommendations of the BRE Guide are not suitable for rigid application to all developments in all contexts is of particular importance in the context of national and local policies for the consolidation and densification of urban areas or when assessing applications for highly constrained sites (e.g. lands in close proximity or immediately to the south of residential lands).

### 10.2 Receiving Environment

The site of the proposed development forms part of the lands of the Rockbrook lands (i.e. the former Allegro site) in Sandyford, Dublin 18. Permission for the development of the Rockbrook lands (including the application site) was granted under DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205 - this permission has been amended and extended by subsequent applications.

The site is bounded to the west by the partially completed Sentinel building (Block C; six to fourteen storeys); and to the northwest, by the mixed use commercial and residential courtyard block at Grande Central (Block A; six to eleven storeys) at Blackthorn Drive. The South Central mixed use commercial and residential courtyard block (Block DS; six to eight storeys) at Blackthorn Drive is located to the north of the application site.

Figure 10.1 provides an overview of the location of the application site relative to neighbouring development.

The Applicant sought permission in February 2017 for the completion of 492 apartments in 3 no. fourteen storey blocks, including a retail unit, a café, and a crèche, together with all ancillary development, on the application site under DLRCC Reg. Ref. D16A/0697. Permission was refused by the Planning Authority and subsequently, on appeal, by An Bord Pleanála (ABP Ref. PL06D.248397) for similar reasons. One of three of An Bord Pleanála's reasons for refusal is particularly relevant to this Sunlight and Daylight Access Analysis and was considered in the preparation of this report. Reason No. 3 of An Bord Pleanála decision to refuse permission stated as follows:

*“It is considered, by reason of their design, siting, location and layout, that the proposed apartment blocks would result in an undue diminution in the availability of light to the existing apartments to the north, Blocks A and D, as compared to the previously approved development on this site, and would, therefore, seriously injure the residential amenities of neighbouring property and be contrary to the proper planning and sustainable development of the area.”*

The application site is bounded to the south by Carmanhall Road and to the east by the site of the recently permitted (ABP Reference: TC 06D.TC0009) five to fourteen storey residential development (i.e. the Tivway lands). The extensive Beacon Quarter complex is situated to the south of the site on the southern side of Carmanhall Road. While much of the lands to the south and east of the application site have been redeveloped with large scale commercial and high density residential developments, lands to the west of Blackthorn Drive are generally characterised by low rise commercial and industrial warehousing and surface car parking.

### **10.3 Characteristics of the Proposed Development**

The proposed development will comprise a mixed use development on a site located at the junction of Blackthorn Drive and Carmanhall Road, Sandyford Business Estate, Dublin 18. The development will consist of 2 no. residential blocks ranging in height from 5-14 storeys comprising a total of 428 no. apartments (including all balconies, terraces and roof gardens) arranged around two courtyards; communal and public open spaces including boulevards; 4 no. ground floor retail units; resident community uses and crèche with outdoor play area. The development will also include revisions to the existing basement levels including car and bicycle parking provision with new vehicular access from Carmanhall Road; apartment storage areas; waste storage areas; ESB substations and switch room and plant/service areas. The development will also include all piped infrastructure and ducting; green roofs; changes in level; internal roads and pathways; pedestrian access points; services provision; landscaping and boundary treatments and all associated site development and excavation works above and below ground.

## 10.4 Sunlight Access Impact Analysis

### 10.4.1 Study Methodology

#### 10.4.1.1 Context under Technical Guidance Documents

The relevant *British Standard, BS 8206-2:2008: Lighting for buildings - Part 2: Code of practice for daylighting*, recommends, at Section 5.3: Sunlight Duration, the following test for the assessment of sunlight access to residential accommodation: *“Interiors in which the occupants have a reasonable expectation of direct sunlight should receive at least 25% of probable sunlight hours... At least 5% of probable sunlight hours should be received during the winter months, between 21 September and 21 March. Sunlight is taken to enter an interior when it reaches one or more window reference points.”* *“Probable sunlight hours”* is described by the British Standard as meaning the *“long-term average of the total number of hours during the year in which direct sunlight reaches the unobstructed ground.”*

The BRE Guide states that *“Any reduction in sunlight access below this level should be kept to a minimum. If the available sunlight hours are both less than the amount above and less than 0.8 times their former value, either over the whole year or just in the winter months (21 September to 21 March), then the occupants of the existing building will notice the loss of sunlight ... The room may appear colder and less cheerful and less pleasant”*.

Section 3.3 of the Building Research Establishment’s *Site layout planning for daylight and sunlight: a guide to good practice* sets out design advice and recommendations for site layout planning to ensure good sunlight access to amenity spaces and to minimise the impact of new development on existing amenity spaces. The Guide suggests that, for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours sunlight at the equinox. The BRE Guide recommends that, as a rule of thumb, the centre of the space should receive at least two hours of sunlight on the 21st March in order to appear adequately sunlit throughout the year.

#### 10.4.1.2 Assessment Methodology for Sunlight Access

A three dimensional digital model of the proposed development, the parent permission and of existing buildings in the area was constructed by ARC Consultants based on drawings and three dimensional models supplied by the Design Team; and with reference to on-site, satellite and aerial photography and to the online planning register, where relevant. For the purposes of the assessment of potential cumulative impacts (see Section 10.4.3), it was assumed that the recently Tivway development (ABP Reference: TC 06D.TC0009) had been constructed on the site to the east. Using the digital model, shadows were cast by ARC at several times of the day at the summer and winter solstices, and at the equinox. An equinox occurs twice a year: the March or vernal equinox (typically in or around the 20th to 21st March) and the September or autumnal equinox (typically in or around the 21st to 23rd September). For the purposes of this analysis and with reference to the BRE Guide, shadows were cast at several times of the day on 21st March.

In determining whether or not to include existing and proposed substantial trees in the three dimensional model, ARC made reference to the BRE Guide (as updated in 2011), which states

that the “question of whether trees or fences should be included in the calculation depends upon the type of shade they produce. Normally trees and shrubs need not be included, and partly because the dappled shade of a tree is more pleasant than the deep shadow of a building (this applies especially to deciduous trees).” Given this, ARC did not show the shadows cast by trees on the shadow study diagrams.

The results are presented in shadow study diagrams associated with this report, included in Appendix 10. Three separate pages have been prepared for each time period on each representative date as follows:

- *Existing shadow baseline*: this page shows the shadows cast by the existing buildings only. Existing buildings surrounding the application site are shown in light grey, while existing buildings on the application site are shown in orange. The shadows cast are shown in a dark grey tone.
- *Permitted shadow environment*: this page shows the shadows cast by the existing buildings together with the shadows cast by the development permitted on the Rockbrook lands in 2005. The existing buildings surrounding the site are shown in light grey, while the permitted development on the application site is shown in mauve. The shadows cast are shown in a dark grey tone.
- *Proposed shadow environment*: this page shows the shadows cast by the existing buildings together with the shadows cast by the proposed development. The existing buildings surrounding the site are shown in light grey, while the proposed development on the application site is shown in blue. The shadows cast are shown in a dark grey tone.

In order to calculate sunlight access to rooms, ARC referenced the methodology outlined in *Appendix A: Indicators to calculate access to skylight, sunlight and solar radiation* of the BRE Guide. Using proprietary sunlight and daylight access analysis software, ARC analysed a sunpath diagram overlaid with a shading mask corresponding to the existing or proposed shadow environment (as appropriate) and the sunlight probability diagram for a latitude of 53° N (i.e. Dublin) for a reference point (i.e. the centre point) of each sample study window. The sunlight availability indicator has 100 spots on it. Each of these represents 1% of annual probable sunlight hours (APSH). The percentage of APSH at the reference point is found by counting up all the unobstructed spots.

#### 10.4.1.3 Definitions of Impacts on Sunlight Access

The assessment of impacts on sunlight access had regard to the *Guidelines on the Information to be Contained in Environmental Impact Statements* prepared by the Environmental Protection Agency (2002), and to Directive 2011/92/EU (as amended) on the assessment of the likely effects of certain public and private projects on the environment.

The list of definitions given below is taken from *Section 5: Glossary of Impacts* contained in the *Guidelines on the Information to be Contained in Environmental Impact Statements*<sup>1</sup> prepared by the Environmental Protection Agency.

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<sup>1</sup> ARC also had regard to the contents of the *Guidelines on information to be contained in Environmental Impact Assessment Reports DRAFT* (August 2017) in the preparation of this report. However, as this document has yet to be finalized, the 2002 Guidelines were used as the basis for the definition of impacts on sunlight access.

Some comment is also given below on what these definitions might imply in the case of impact on sunlight access. The definitions from the EPA document are in italics.

- *Imperceptible Impact: An impact capable of measurement but without noticeable consequences.* The definition implies that the development would cause a change in the sunlight received at a location, capable of measurement, but not noticeable. If the development caused no change in sunlight access, there could be no impact.
- *Slight Impact: An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.* For this definition to apply, the amount of sunlight received at a location would be changed by shadows cast by the development to an extent that is both capable of measurement and is noticeable to a minor degree. However, the shadow environment of the surrounding environment should remain largely unchanged.
- *Moderate Impact: An impact that alters the character of the environment in a manner that is consistent with emerging trends.* In this case, a development must bring about a change in the shadow environment of the area; and this change must be consistent with a pattern of change that is already taking place. This impact would occur where other developments were bringing about changes in sunlight access in the area.
- *Significant Impact: An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.* This impact would occur where the development overshadows a location to the effect that there is a significant change in the amount of direct sunlight received at that location.
- *Profound Impact: An impact which obliterates sensitive characteristics.* In terms of sunlight access, a development must cast shadows over a location, where sunlight access was previously enjoyed, to the extent that all access to sunlight is removed.

The range of possible impacts listed above deal largely with the extent of impact; and the extent of the impact of a development is usually proportional to the extent to which that development is large in scale and/or height and its proximity to the location. This proportionality may be modified by the extent to which the development is seen as culturally or socially acceptable, and on the interaction between the proposed development, the character of the existing shadow environment and the land use pattern of the receiving environment.

## **10.4.2 Potential Impact of the Proposed Development on Sunlight Access**

### **10.4.2.1 Construction Phase**

The potential impact of the construction phase of the proposed development on sunlight access is likely to be, initially, lesser than the impact of the completed development. As the proposed development nears completion, the impact of the emerging structure is likely to be similar in all material respects to that of the completed structure. It is noted that temporary structures and machinery (e.g. hoarding, scaffolding, cranes, etc.) will also cast shadows, although any additional impacts arising from temporary structures or machinery are likely to be temporary and minor.

#### 10.4.2.2 Operational Phase

All impacts described in this section will be permanent. Impacts described as “imperceptible” are considered to be neutral in character. Any reduction in sunlight access resulting in a “slight”, “moderate” and “significant” impact would usually be considered to be negative in character, unless otherwise indicated. Any increase in sunlight access resulting in a “slight”, “moderate” and “significant” impact would usually be considered to be positive in character, unless otherwise indicated.

The statistics of Met Eireann, the Irish Meteorological Service, indicate that the sunniest months in Ireland are May and June. During December, Dublin receives a mean daily duration of 1.7 hours of sunlight out of a potential 7.4 hours sunlight each day (i.e., only 22% of potential sunlight hours). This can be compared with a mean daily duration of 6.4 hours of sunlight out of a potential 16.7 hours each day received by Dublin during June (i.e., 38% of potential sunlight hours). Therefore, impacts caused by overshadowing are generally most noticeable during the summer months and least noticeable during the winter months. Due to the low angle of the sun in mid-winter, the shadow environment in all urban and suburban areas is generally dense throughout winter.

In assessing the impact of a development on sunlight access, the comments of PJ Littlefair in *Site layout planning for daylight and sunlight: a guide to good practice* (the BRE Guide) should be taken into consideration. The BRE Guide states that “*it must be borne in mind that nearly all structures will create areas of new shadow, and some degree of transient overshadowing of a space is to be expected.*”

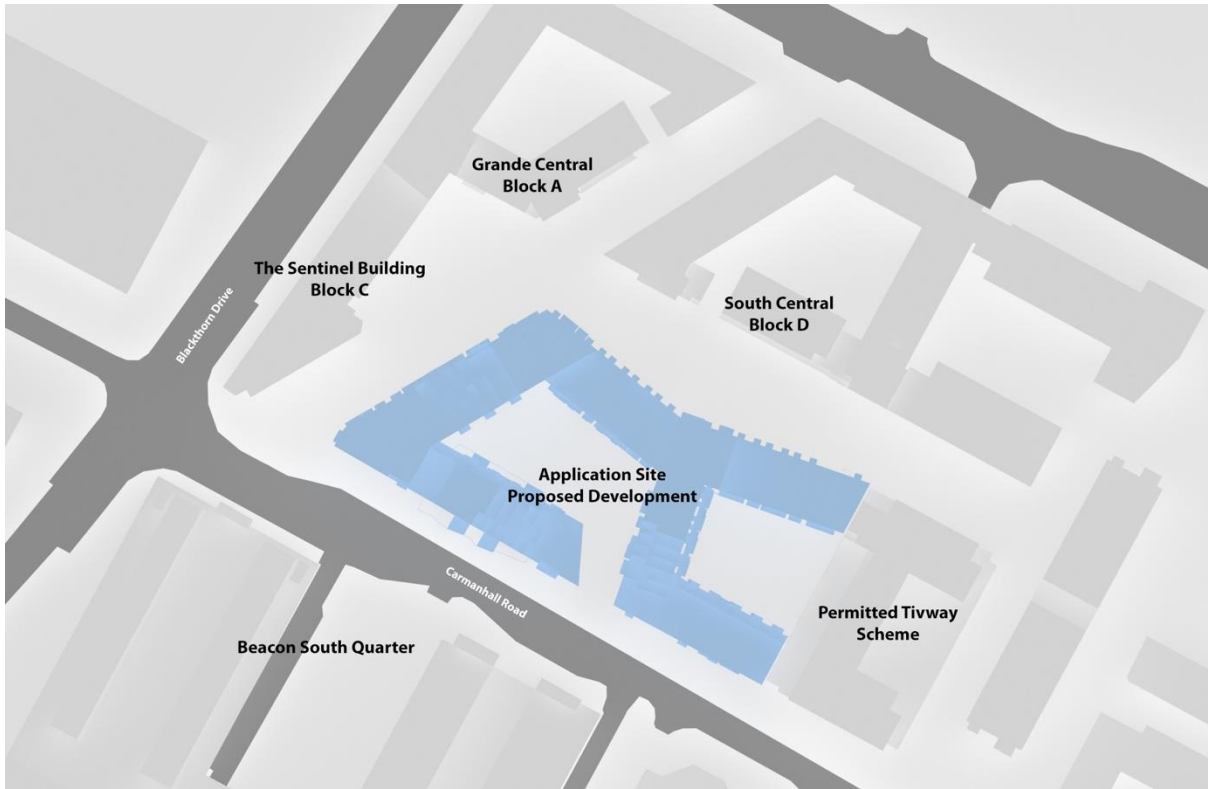


Figure 10.1: Overview map showing the location of the proposed development relative to neighbouring existing buildings

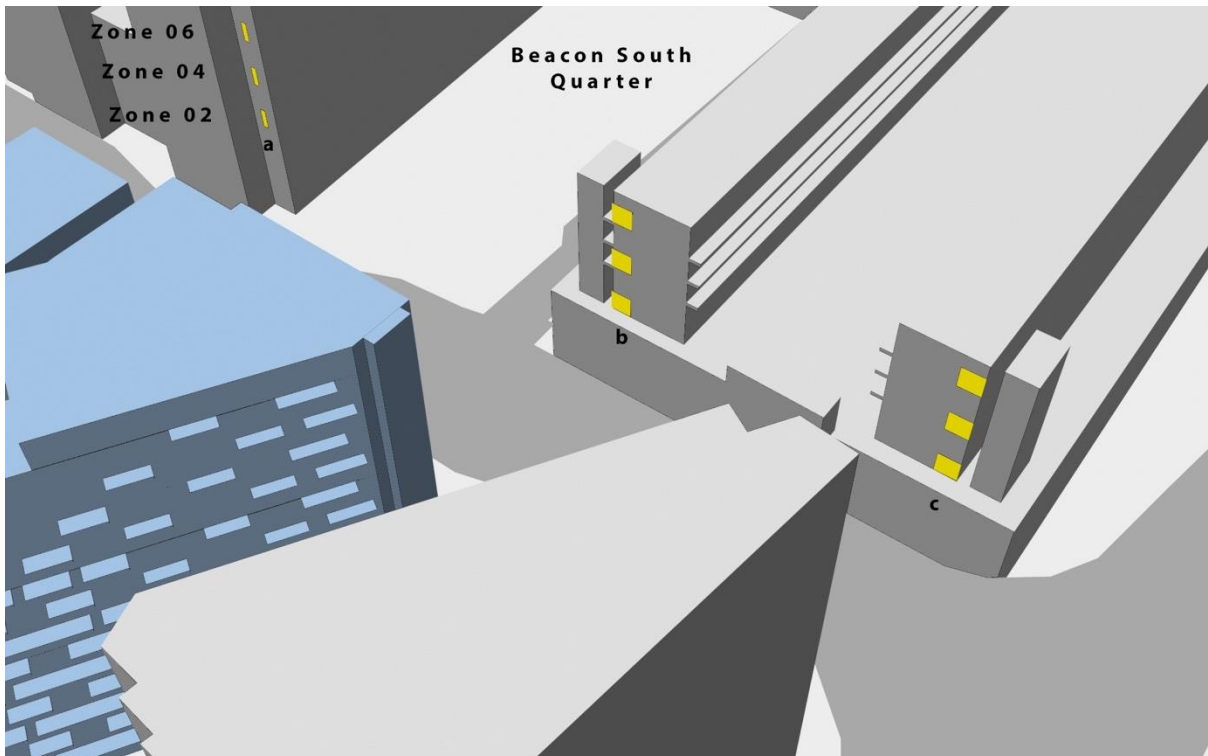


Figure 10.2: Locations of windows within neighbouring existing buildings studied as part of this analysis



Figure 10.3: Locations of windows within neighbouring existing buildings studied as part of this analysis

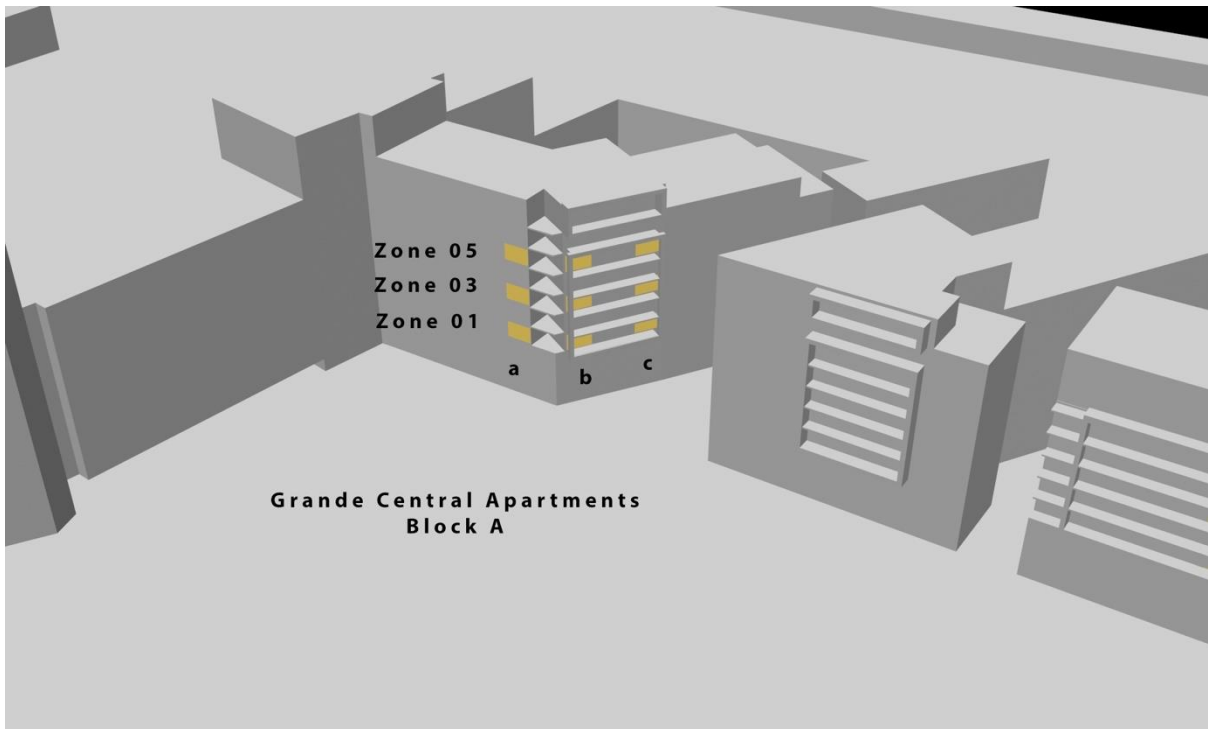


Figure 10.4: Locations of windows within neighbouring existing buildings studied as part of this analysis



#### **10.4.2.2.1 Overview of the potential impact of shadows cast by the proposed development on existing buildings on the Rockbrook lands and on lands outside the application site**

Having regard to the shape, layout and orientation of the application site, the potential of development on the application site to result in overshadowing of lands outside the application site is largely limited to the Rockbrook lands. Due to existing and permitted intervening development, the construction of the proposed development is unlikely to result in a material change to the shadow environment of other buildings at Carmanhall Road, Blackthorn Drive and beyond.

Given that the application site is now vacant, there is a potential for shadows cast by the proposed development to result in a considerable change in the existing shadow environment of the Rockbrook lands. However, it is likely that additional overshadowing of nearby buildings on the Rockbrook lands will be materially similar to or lesser than that which would have occurred if the development previously permitted on the application had been constructed (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205). Specifically, ARC's analysis did not indicate that the proposed development had the potential to result in *"an undue diminution in the availability of light to the existing apartments to the north, Blocks A and D, as compared to the previously approved development on this site"*, as had been the concern of An Bord Pleanála in relation to the development for which permission was sought on the site in 2016 (DLRCC Reg. Ref. D16A/0697; ABP Ref. PL06D.248397).

Similarly, there is a potential for the construction of the proposed development to result in a material improvement over the shadow environment of the vacant Tivway lands to the east over what was originally permitted under DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205. The layout of the development now proposed presents a large communal open space onto the adjoining Tivway lands to the east (i.e. rather than the north-south block permitted at the eastern edge of the Rockbrook lands under the 2005 scheme).

ARC's analysis, therefore, indicates that the potential impact of the proposed development is likely to be consistent with emerging trends for development in the area or "moderate" in extent.

#### **10.4.2.2.2 Detailed Analysis of the Potential Impact of Shadows Cast by the Proposed Development on Existing Buildings outside the application site**

This Chapter assesses the potential impact of the proposed development on all potential receptors surrounding the application site - these potential impacts are described in the Section 10.4.2.2.1. However, by way of example in order to illustrate briefly the findings outlined in the overview section, ARC conducted quantitative analysis of the potential for the proposed development to result in impacts on sunlight access to a representative sample of sensitive receptors (i.e. windows) in buildings in proximity to the application site (please see Figures 10.1 to 10.4 above).

The only Irish statutory guidance to provide advice on undertaking sunlight and daylight access impact analysis is set out in the *Advice Notes on Current Practice* prepared by the Environmental Protection Agency (2003), which accompany the

*Guidelines on the Information to be Contained in Environmental Impact Statements* prepared by the Environmental Protection Agency (2002). These Advice notes state: “Climate in an Environmental Impact Statement generally refers to the local climatological conditions or “microclimate” of an area, such as local wind flow, temperature, rainfall or solar radiation patterns ... it is important to identify receptors which may be particularly sensitive to climate change.” [Emphasis added.] Having regard to the Advice Notes, ARC undertook detailed quantitative analysis of those receptors particularly sensitive to changes in the sunlight environment in order to illustrate the empirical basis for the conclusions outlined in Section 10.4.2.2.1 above.

In identifying receptors particularly sensitive to changes in the shadow environment, ARC considered two factors:

- (i) *the use of receptors (i.e. buildings) surrounding the application site*: buildings in residential use (and, particularly, the living rooms of residences) would be considered to be sensitive to changes in the shadow environment;
- (ii) *the location of receptors relative to the application site*: as set out in section 3.2.2 of the BRE Guide “obstruction to sunlight may become an issue if some part of a new development is situated within 90° of due south of a main windows wall of an existing building” and if “in the section drawn perpendicular to this existing window wall, the new development subtends an angle greater than 25° to the horizontal measured from the centre of the lowest window to a main living room” (Emphasis added).

Given this, the receptors most sensitive to changes in the shadow environment as a result of the construction of development on the application site would be windows facing towards the proposal at low levels of accommodation with a reasonable expectation of sunlight<sup>2</sup> in buildings in residential use to the north of the site (i.e. low level windows in the Grande Central Apartments, Block A; and the South Central Apartments, Block D). Therefore, ARC identified a representative sample of windows at intervals across the low levels of accommodation in the southern and southeastern facades of Block A and in the southern facade of Block D for detailed quantitative analysis. This sample is considered to constitute a worst-case scenario.

In addition to this, given differences in site layout and in roof profile between the current proposal and the scheme permitted under the parent permission (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205), ARC also undertook detailed quantitative assessment of a number of representative samples of windows at intervals across upper levels of accommodation in the southern and southeastern facades of Block A and in the southern facade of Block D in the interests of completeness.

ARC referenced section 3.2.1 of the *Site layout planning for daylight and sunlight: a guide to good practice* (the BRE Guide), which provides as follows in relation to the assessment of the impact of development on sunlight access to existing buildings.

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<sup>2</sup> The BRE Guide does not identify a need to undertake detailed quantitative assessment of the impact of new development on existing buildings, which do not face within 90° of due south (i.e. such as the eastern facade of the Tivway scheme and the northern facade of Beacon South Quarter) and does not set out a recommended level of sunlight access for such windows. Given this, the below analysis focuses on windows facing within 90° of due south at South Central.

*“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 sunlighting 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 21 September and 21 March and*
- *receives less than 0.8 times its former sunlight hours during either period and*
- *has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.” [Emphasis added]*

The BRE Guide, at Appendix F: Setting Alternative Target Values for Skylight and Sunlight Access, goes on to state:

*“Sections 2.1, 2.2 and 2.3 give numerical target values in assessing how much light from the sky is blocked by obstructing buildings. These values are purely advisory and different targets may be used based on the special requirements of the proposed development or its location. Such alternative targets may be generated from the layout dimensions of existing development, or they may be derived from considering the internal layout and daylighting needs of the proposed development itself.*

*Sometimes there may be an extant planning permission for a site but the developer wants to change the design. In assessing the loss of light to existing windows nearby, a local authority may allow the ... annual probable sunlight hours (APSH) for the permitted scheme to be used as alternative benchmarks.” [Emphasis added.]*

Given this, ARC has referenced the annual probable sunlight hours received by the sample receptors at Blocks A and D under the parent permission (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205) as benchmarks for sunlight access.

#### **10.4.2.2.3 Results of the detailed quantitative analysis of the potential impact of shadows cast by the proposed development on existing buildings on the Rockbrook lands and on lands outside the application site**

The results of ARC’s analysis are set out in Table 10.1 below. This table indicates:

- The potential Annual Probable Sunlight Hours received by each sample receptor (i.e. window) under the existing scenario (i.e. the site is vacant); the permitted scenario (i.e. if the development contemplated for the site under the parent permission had been constructed); and the proposed scenario (i.e. if the development now proposed were constructed).

- Three columns for each scenario showing the potential Annual Probable Sunlight Hours over the course of the full year, over the summer period and over the winter period. While the recommendations of the British Standard and the BRE Guide (i.e. 25% Annual Probable Sunlight Hours over the course of the year, including 5% APSH during the winter period) do not set out a recommendation for the summer period, the results for the summer period have been included so that it is clear whether the sample receptor / window “receives less than 0.8 times its former sunlight hours during either period” in line with the requirements of Section 3.2.1 of the BRE Guide.
- A short comment for each sample receptor / window interpreting the results.

As set out in more detail in Table 10.1 below, ARC’s analysis indicates that the construction of the proposed development has the potential to reduce sunlight access to windows in the southeastern and southern facades of Block A and the southern facade of Block D opposing the application site below the level of sunlight access that these windows currently received in the absence of any development on the application site. However, ARC’s analysis indicates that the sample windows at Blocks A and D have the potential to receive a materially similar or greater amount of sunlight after the construction of the proposed development as these blocks would have done if the development envisaged for the application site under the parent permission (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205) had been constructed. Therefore, detailed quantitative analysis of a representative sample of windows indicates that the proposed development does not have the potential to result in “an undue diminution in the availability of light to the existing apartments to the north, Blocks A and D, as compared to the previously approved development on this site”, as had been the concern of An Bord Pleanála in relation to the development for which permission was sought on the site in 2016.

Under a worst case scenario, the potential impact of the proposed development on sunlight access to the Grande Central Apartments (Block A) and to the South Central Apartments (Block D) is considered to be consistent with emerging trends for development or “moderate” in extent.

**Table 10.1: Impact of the proposed development on sunlight access to sample windows in existing buildings in proximity to the application site**

Zone	Existing Probable Sunlight Hours Received			Permitted under Parent Permission (2005) Probable Sunlight Hours Received			Proposed Probable Sunlight Hours Received		
	Annual	Summer*	Winter*	Annual	Summer*	Winter*	Annual	Summer*	Winter*
<b>Grande Central - Rockbrook Block A</b>									
Zone 01a	67%	44%	23%	53%	44%	9%	49%	42%	7%

Zone	Existing Probable Sunlight Hours Received			Permitted under Parent Permission (2005) Probable Sunlight Hours Received			Proposed Probable Sunlight Hours Received		
	Annual	Summer*	Winter*	Annual	Summer*	Winter*	Annual	Summer*	Winter*
Block A Floor 01	<p><b>BRE recommendation met.</b>  This window has the potential to continue to receive a level of sunlight considerably in excess of the BRE recommendation of 25% Annual Probable Sunlight Hours (including 5% Annual Probable Sunlight Hours during the winter period) after the construction of the proposed development. The potential impact of the proposed development on this window is likely to range from “imperceptible” to “slight”.</p>								
Zone 01b Block A Floor 01	25%	8%	17%	14%	8%	6%	14%	8%	6%
	<p><b>Alternative target value achieved: No change over permitted scenario.</b>  This window has the potential receive the same amount of sunlight after the construction of the proposed development as it would have if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development over the existing scenario is, therefore, considered to be “moderate” in extent or consistent with emerging trends for development. The proposed development will have no potential impact over the permitted baseline for the application site.</p>								
Zone 01c Block A Floor 01	18%	5%	13%	8%	5%	3%	7%	5%	2%
	<p><b>Potential impact below BRE threshold for adverse impact.</b>  This window has the potential to receive slightly less sunlight after the construction of the proposed development than it would have if the development envisaged for the application site under the parent permission had been constructed. Given that the likely reduction in sunlight access to this window will not exceed 4% Annual Probable Sunlight Hours over the course of the year below the alternative target value (i.e. the permitted scenario), the potential impact of the proposed development on the permitted scenario does not fall within adverse ranges and is considered to be consistent with emerging trends for development in the area (i.e. “moderate”).</p>								
Zone 03a Block A Floor 03	70%	47%	23%	58%	47%	11%	56%	47%	9%
	<p><b>BRE recommendation met.</b>  This window has the potential to continue to receive a level of sunlight considerably in excess of the BRE recommendation of 25% Annual Probable Sunlight Hours (including 5% Annual Probable Sunlight Hours during the winter period) after the construction of the proposed development. The potential impact of the proposed development on this window is likely to range from “imperceptible” to “slight”.</p>								
Zone 03b	28%	12%	16%	21%	12%	9%	19%	12%	7%

Zone	Existing Probable Sunlight Hours Received			Permitted under Parent Permission (2005) Probable Sunlight Hours Received			Proposed Probable Sunlight Hours Received		
	Annual	Summer*	Winter*	Annual	Summer*	Winter*	Annual	Summer*	Winter*
Block A Floor 03	<p><b>Potential impact below BRE threshold for adverse impact.</b>  This window has the potential to receive slightly less sunlight after the construction of the proposed development than it would have if the development envisaged for the application site under the parent permission had been constructed. Given that the likely reduction in sunlight access to this window will not exceed 4% Annual Probable Sunlight Hours over the course of the year below the alternative target value (i.e. the permitted scenario), the potential impact of the proposed development on the permitted scenario does not fall within adverse ranges and is considered to be consistent with emerging trends for development in the area (i.e. “moderate”).</p>								
Zone 03c Block A Floor 03	23%	10%	13%	13%	10%	3%	14%	10%	4%
	<p><b>Alternative target value exceeded: Potential increase in sunlight access over permitted scenario.</b>  This window has the potential receive slightly more sunlight after the construction of the proposed development than it would have if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development over the existing scenario is, therefore, considered to be “moderate” in extent or consistent with emerging trends for development. The construction of the proposed development has to the potential to result in an “imperceptible” to “slight” positive impact over the permitted baseline for the application site.</p>								
Zone 05a Block A Floor 05	73%	50%	23%	66%	50%	16%	62%	50%	12%
	<p><b>BRE recommendation met.</b>  This window has the potential to continue to receive a level of sunlight considerably in excess of the BRE recommendation of 25% Annual Probable Sunlight Hours (including 5% Annual Probable Sunlight Hours during the winter period) after the construction of the proposed development. The potential impact of the proposed development on this window is likely to range from “imperceptible” to “slight”.</p>								
Zone 05b Block A Floor 05	36%	20%	16%	30%	20%	10%	29%	20%	9%
	<p><b>BRE recommendation met.</b>  This window has the potential to continue to receive a level of sunlight considerably in excess of the BRE recommendation of 25% Annual Probable Sunlight Hours (including 5% Annual Probable Sunlight Hours during the winter period) after the construction of the proposed development. The potential impact of the proposed development on this window is likely to range from “imperceptible” to “slight”.</p>								
Zone 05c	28%	12%	16%	22%	12%	10%	22%	12%	10%

Zone	Existing Probable Sunlight Hours Received			Permitted under Parent Permission (2005) Probable Sunlight Hours Received			Proposed Probable Sunlight Hours Received		
	Annual	Summer*	Winter*	Annual	Summer*	Winter*	Annual	Summer*	Winter*
Block A Floor 05	<p><b>Alternative target value achieved: No change over permitted scenario.</b></p> <p>This window has the potential receive the same amount of sunlight after the construction of the proposed development as it would have if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development over the existing scenario is, therefore, considered to be “moderate” in extent or consistent with emerging trends for development. The proposed development will have no potential impact over the permitted baseline for the application site.</p>								
<b>South Central - Rockbrook Block D</b>									
	61%	40%	21%	33%	32%	1%	33%	32%	1%
Zone 01a Block D Floor 01	<p><b>Alternative target value achieved: No change over permitted scenario.</b></p> <p>This window has the potential receive the same amount of sunlight after the construction of the proposed development as it would have if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development over the existing scenario is, therefore, considered to be “moderate” in extent or consistent with emerging trends for development. The proposed development will have no potential impact over the permitted baseline for the application site.</p>								
	31%	11%	21%	4%	1%	3%	4%	3%	1%
Zone 01b Block D Floor 01	<p><b>Materially similar target value achieved.</b></p> <p>This window has the potential to receive the same amount of sunlight over the course of the year after the construction of the proposed development as it would have if the development envisaged for the application site under the parent permission had been constructed, although the distribution of the Annual Probable Sunlight Hours over the winter and summer periods is predicted to change. The impact of the proposed development over the existing scenario is, therefore, considered to be “moderate” in extent or consistent with emerging trends for development.</p>								
Zone 01c	78%	54%	24%	44%	33%	11%	50%	40%	10%

Zone	Existing Probable Sunlight Hours Received			Permitted under Parent Permission (2005) Probable Sunlight Hours Received			Proposed Probable Sunlight Hours Received		
	Annual	Summer*	Winter*	Annual	Summer*	Winter*	Annual	Summer*	Winter*
Block D Floor 01	<p><b>Alternative target value exceeded: Potential increase in sunlight access over permitted scenario.</b></p> <p>This window has the potential receive slightly more sunlight after the construction of the proposed development than it would have if the development envisaged for the application site under the parent permission had been constructed. While the construction of the proposed development has the potential to result in a reduction in sunlight access from the existing scenario, that potential is not likely to fall within adverse ranges within the meaning of the BRE Guide. The potential impact of the proposed development over the existing scenario is, therefore, considered to be “imperceptible” to “slight” in extent. The construction of the proposed development has to the potential to result in an “imperceptible” to “slight” positive impact over the permitted baseline for the application site.</p>								
Zone 01d Block D Floor 01	36%	16%	20%	11%	4%	7%	9%	6%	3%
	<p><b>Materially similar target value achieved.</b></p> <p>This window has the potential to receive slightly less sunlight after the construction of the proposed development than it would have if the development envisaged for the application site under the parent permission had been constructed. However, given the amount of sunlight received by the sample window is considered to be materially similar to the amount received under the permitted scenario. Given this, the potential impact of the proposed development on the existing scenario is considered to be “moderate” or consistent with emerging trends for development.</p>								
Zone 03a Block D Floor 03	62%	41%	21%	38%	37%	1%	40%	36%	4%
	<p><b>Alternative target value exceeded: Potential increase in sunlight access over permitted scenario.</b></p> <p>This window has the potential receive slightly more sunlight after the construction of the proposed development than it would have if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development over the existing scenario is, therefore, considered to be “moderate” in extent or consistent with emerging trends for development. The construction of the proposed development has to the potential to result in an “imperceptible” to “slight” positive impact over the permitted baseline for the application site.</p>								
Zone 03b	33%	12%	21%	11%	6%	5%	11%	6%	5%



Zone	Existing Probable Sunlight Hours Received			Permitted under Parent Permission (2005) Probable Sunlight Hours Received			Proposed Probable Sunlight Hours Received		
	Annual	Summer*	Winter*	Annual	Summer*	Winter*	Annual	Summer*	Winter*
Block D Floor 03	<p><b>Alternative target value achieved: No change over permitted scenario.</b></p> <p>This window has the potential receive the same amount of sunlight after the construction of the proposed development as it would have if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development over the existing scenario is, therefore, considered to be “moderate” in extent or consistent with emerging trends for development. The proposed development will have no potential impact over the permitted baseline for the application site.</p>								
Zone 03c Block D Floor 03	80%	55%	25%	51%	40%	11%	57%	47%	10%
	<p><b>BRE recommendation met.</b></p> <p>This window has the potential to continue to receive a level of sunlight considerably in excess of the BRE recommendation of 25% Annual Probable Sunlight Hours (including 5% Annual Probable Sunlight Hours during the winter period) after the construction of the proposed development. The potential impact of the proposed development on this window is likely to range from “imperceptible” to “slight”.</p>								
Zone 03d Block D Floor 03	31%	12%	20%	13%	6%	7%	14%	7%	7%
	<p><b>Alternative target value exceeded: Potential increase in sunlight access over permitted scenario.</b></p> <p>This window has the potential receive slightly more sunlight after the construction of the proposed development than it would have if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development over the existing scenario is, therefore, considered to be “moderate” in extent or consistent with emerging trends for development. The construction of the proposed development has to the potential to result in an “imperceptible” positive impact over the permitted baseline for the application site.</p>								
Zone 05a Block D Floor 05	66%	44%	22%	51%	44%	7%	52%	43%	9%
	<p><b>BRE recommendation met.</b></p> <p>This window has the potential to continue to receive a level of sunlight considerably in excess of the BRE recommendation of 25% Annual Probable Sunlight Hours (including 5% Annual Probable Sunlight Hours during the winter period) after the construction of the proposed development. The potential impact of the proposed development on this window is likely to range from “imperceptible” to “slight”.</p>								
Zone 05b	26%	7%	19%	10%	5%	5%	12%	6%	6%

Zone	Existing Probable Sunlight Hours Received			Permitted under Parent Permission (2005) Probable Sunlight Hours Received			Proposed Probable Sunlight Hours Received		
	Annual	Summer*	Winter*	Annual	Summer*	Winter*	Annual	Summer*	Winter*
Block D Floor 05	<p><b>Alternative target value exceeded: Potential increase in sunlight access over permitted scenario.</b></p> <p>This window has the potential receive slightly more sunlight after the construction of the proposed development than it would have if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development over the existing scenario is, therefore, considered to be “moderate” in extent or consistent with emerging trends for development. The construction of the proposed development has to the potential to result in an “imperceptible” to “slight” positive impact over the permitted baseline for the application site.</p>								
Zone 05c Block D Floor 05	80%	55%	25%	60%	47%	13%	65%	51%	14%
	<p><b>BRE recommendation met.</b></p> <p>This window has the potential to continue to receive a level of sunlight considerably in excess of the BRE recommendation of 25% Annual Probable Sunlight Hours (including 5% Annual Probable Sunlight Hours during the winter period) after the construction of the proposed development. The potential impact of the proposed development on this window is likely to range from “imperceptible” to “slight”.</p>								
Zone 05d Block D Floor 05	31%	11%	21%	18%	8%	10%	18%	8%	10%
	<p><b>Alternative target value achieved: No change over permitted scenario.</b></p> <p>This window has the potential receive the same amount of sunlight after the construction of the proposed development as it would have if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development over the existing scenario is, therefore, considered to be “moderate” in extent or consistent with emerging trends for development. The proposed development will have no potential impact over the permitted baseline for the application site.</p>								

\* For the purposes of this calculation, summer is taken to mean the period between March and September, and winter is considered to be the period between September and March.

#### 10.4.2.3 ‘Do Nothing’ Scenario

In a “do nothing” scenario, the existing shadow environment will remain unchanged.

### 10.4.3 Potential Cumulative Impact of the Proposed Development

#### 10.4.3.1 Construction Phase

The potential impact of the construction phase of the proposed development, in combination with the permitted development on the Tivway lands (ABP Reference: TC 06D.TC0009), on sunlight access is likely to be, initially, lesser than the impact of the completed development. As the proposed development nears completion, the impact of the emerging structure is likely to be similar in all material respects to that of the completed structure in combination with the permitted development on the Tivway lands. It is noted that temporary structures and machinery (e.g. hoarding, scaffolding, cranes, etc.) will also cast shadows, although any additional impacts arising from temporary structures or machinery are likely to be temporary and minor.

#### 10.4.3.2 Operational Phase

The application site adjoins a vacant site between Carmanhall Road and Blackthorn Drive known as the Tivway lands. A proposal for a five to fourteen storey residential development (ABP Reference: TC 06D.TC0009) was recently permitted on these lands. The assessment of the potential cumulative impacts of the proposed development examines the impact of the development now proposed in combination with the development on the Tivway lands permitted under ABP Reference: TC 06D.TC0009.

A review of the Dun Laoghaire-Rathdown County Council online planning register did not identify any other developments for which permission has been granted, which, in combination with the development now proposed, would have the potential to result in material cumulative impacts on sunlight access to the area surrounding the application site, within the meaning of the *British Standard, BS 8206-2:2008: Lighting for buildings - Part 2: Code of practice for daylighting or Site layout planning for daylight and sunlight: a guide to good practice* (the BRE Guide).

All impacts described in this section will be permanent. Impacts described as “imperceptible” are considered to be neutral in character. Any reduction in sunlight access resulting in a “slight”, “moderate” and “significant” impact would usually be considered to be negative in character, unless otherwise indicated. Any increase in sunlight access resulting in a “slight”, “moderate” and “significant” impact would usually be considered to be positive in character, unless otherwise indicated.

The statistics of Met Eireann, the Irish Meteorological Service, indicate that the sunniest months in Ireland are May and June. During December, Dublin receives a mean daily duration of 1.7 hours of sunlight out of a potential 7.4 hours sunlight each day (i.e., only 22% of potential sunlight hours). This can be compared with a mean daily duration of 6.4 hours of sunlight out of a potential 16.7 hours each day received by Dublin during June (i.e., 38% of potential sunlight hours). Therefore, impacts caused by overshadowing are generally most noticeable during the summer months and least noticeable during the winter months. Due to the low angle of the sun in mid winter, the shadow environment in all urban and suburban areas is generally dense throughout winter.

In assessing the impact of a development on sunlight access, the comments of PJ Littlefair in *Site layout planning for daylight and sunlight: a guide to good practice* (the BRE Guide) should be taken into consideration. The BRE Guide states that *“it must be borne in mind that nearly all structures will create areas of new shadow, and some degree of transient overshadowing of a space is to be expected.”*

#### **10.4.3.2.1 Overview of the potential cumulative impact of shadows cast by the proposed development on existing buildings on the Rockbrook lands and on lands outside the application site**

Having regard to the shape, layout and orientation of the application site, the potential of development on the application site, in combination with the permitted development on the Tivway lands, to result in overshadowing of lands outside the application site is largely limited to the Rockbrook lands. Due to existing and permitted intervening development, the construction of the proposed development is unlikely to result in a material change to the shadow environment of other buildings at Carmanhall Road, Blackthorn Drive and beyond.

As outlined above, given that the application site is now vacant, there is a potential for shadows cast by the proposed development to result in a considerable change in the existing shadow environment of the Rockbrook lands. However, it is likely that the cumulative additional overshadowing of nearby buildings on the Rockbrook lands will be materially similar to or lesser than that which would have occurred if the development previously permitted on the application had been constructed (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205). Specifically, ARC’s analysis did not indicate that the proposed development had the potential to result in *“an undue diminution in the availability of light to the existing apartments to the north, Blocks A and D, as compared to the previously approved development on this site”* when considered in combination with the development permitted on the Tivway lands under ABP Reference: TC 06D.TC0009. Undue adverse impacts on lands to the north of the application site had been the concern of An Bord Pleanála in relation to the development for which permission was sought on the site in 2016 (DLRCC Reg. Ref. D16A/0697; ABP Ref. PL06D.248397).

There is a potential for the construction of the proposed development to result in a material improvement over the shadow environment of the Tivway Scheme to the east over what was originally permitted under DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205. The layout of the development now proposed presents a large communal open space onto the adjoining Tivway lands to the east (i.e. rather than the north-south block permitted at the eastern edge of the Rockbrook lands under the 2005 scheme). The layout now proposed has the potential to allow considerably more sunlight to reach the western facade of the recently permitted (ABP Reference: TC 06D.TC0009) five to fourteen storey residential development on the Tivway lands.

ARC’s analysis, therefore, indicates that the potential cumulative impact of the proposed development is likely to be consistent with emerging trends for development in the area or *“moderate”* in extent.

### 10.4.3.2.2 Detailed Analysis of the Potential Cumulative Impact of Shadows Cast by the Proposed Development on Existing Buildings outside the application site

This Chapter assesses the potential impact of the proposed development on all potential receptors surrounding the application site – these potential impacts are described in the Section 10.4.2.2.1. However, by way of example in order to illustrate briefly the findings outlined in the overview section, ARC conducted quantitative analysis of the potential for the proposed development to result in impacts on sunlight access to a representative sample of sensitive receptors (i.e. windows) in buildings in proximity to the application site (please see Figures 10.1 to 10.4 above).

The results of ARC’s analysis are set out in Table 10.2 below. This table indicates:

- The potential Annual Probable Sunlight Hours received by each sample receptor (i.e. window) under the existing scenario (i.e. the site is vacant); the permitted scenario (i.e. if the development contemplated for the site under the parent permission had been constructed); and the proposed scenario (i.e. if the development now proposed were constructed). For the purposes of this analysis, it was assumed that the recently Tivway development (ABP Reference: TC 06D.TC0009) had been constructed on the site to the east for all scenarios.
- Three columns for each scenario showing the potential Annual Probable Sunlight Hours over the course of the full year, over the summer period and over the winter period. While the recommendations of the British Standard and the BRE Guide (i.e. 25% Annual Probable Sunlight Hours over the course of the year, including 5% APSH during the winter period) do not set out a recommendation for the summer period, the results for the summer period have been included so that it is clear whether the sample receptor / window “receives less than 0.8 times its former sunlight hours during either period” in line with the requirements of Section 3.2.1 of the BRE Guide.
- While Table 10.1 includes a commentary on the set of results for each zone, Table 10.2 does not given that the results of both sets of analysis are so similar. Key differences in results are highlighted in the text below.

Please refer to Section 10.4.2.2.2 above for details of the methodology used in choosing sample rooms for analysis.

**Table 10.2: Potential Cumulative Impact of the proposed development on sunlight access to sample windows in existing buildings in proximity to the application site**

Zone	Existing + Permitted Tivway scheme Probable Sunlight Hours Received			Permitted under Parent Permission (2005) + Permitted Tivway scheme Probable Sunlight Hours Received			Proposed + Permitted Tivway scheme Probable Sunlight Hours Received		
	Annual	Summer*	Winter*	Annual	Summer*	Winter*	Annual	Summer*	Winter*
<b>Grande Central - Rockbrook Block A</b>									
Zone 01a Block A Floor 01	66%	44%	22%	53%	44%	9%	49%	42%	7%

Zone	Existing + Permitted Tivway scheme Probable Sunlight Hours Received			Permitted under Parent Permission (2005) + Permitted Tivway scheme Probable Sunlight Hours Received			Proposed + Permitted Tivway scheme Probable Sunlight Hours Received		
	Annual	Summer*	Winter*	Annual	Summer*	Winter*	Annual	Summer*	Winter*
Zone 01b Block A Floor 01	24%	8%	16%	14%	8%	6%	14%	8%	6%
Zone 01c Block A Floor 01	18%	5%	13%	8%	5%	3%	7%	5%	2%
Zone 03a Block A Floor 03	69%	47%	22%	58%	47%	11%	56%	47%	9%
Zone 03b Block A Floor 03	28%	12%	16%	21%	12%	9%	19%	12%	7%
Zone 03c Block A Floor 03	23%	10%	13%	13%	10%	3%	14%	10%	4%
Zone 05a Block A Floor 05	72%	50%	22%	66%	50%	16%	62%	50%	12%
Zone 05b Block A Floor 05	36%	20%	16%	30%	20%	10%	29%	20%	9%
Zone 05c Block A Floor 05	28%	12%	16%	22%	12%	10%	22%	12%	10%
<b>South Central - Rockbrook Block D</b>									
Zone 01a Block D Floor 01	60%	40%	20%	33%	32%	1%	33%	32%	1%
Zone 01b Block D Floor 01	28%	11%	17%	2%	1%	1%	3%	3%	0%
Zone 01c Block D Floor 01	66%	54%	12%	34%	32%	2%	41%	39%	2%

Zone	Existing + Permitted Tivway scheme Probable Sunlight Hours Received			Permitted under Parent Permission (2005) + Permitted Tivway scheme Probable Sunlight Hours Received			Proposed + Permitted Tivway scheme Probable Sunlight Hours Received		
	Annual	Summer*	Winter*	Annual	Summer*	Winter*	Annual	Summer*	Winter*
Zone 01d Block D Floor 01	29%	16%	13%	7%	4%	3%	6%	6%	0%
Zone 03a Block D Floor 03	62%	41%	21%	38%	37%	1%	40%	36%	4%
Zone 03b Block D Floor 03	30%	12%	18%	9%	6%	3%	10%	6%	4%
Zone 03c Block D Floor 03	72%	55%	17%	44%	40%	4%	50%	47%	3%
Zone 03d Block D Floor 03	28%	12%	16%	10%	6%	4%	12%	7%	5%
Zone 05a Block D Floor 05	66%	44%	22%	51%	44%	7%	52%	43%	9%
Zone 05b Block D Floor 05	23%	7%	16%	8%	5%	3%	11%	6%	5%
Zone 05c Block D Floor 05	75%	55%	20%	56%	47%	9%	61%	51%	10%
Zone 05d Block D Floor 05	28%	11%	18%	15%	8%	7%	16%	8%	8%

\* For the purposes of this calculation, summer is taken to mean the period between March and September, and winter is considered to be the period between September and March.

As set out in Table 10.2 above, ARC's analysis indicates that the construction of the proposed development, when considered in combination with the permitted development on the Tivway lands (ABP Reference: TC 06D.TC0009), has the potential to reduce sunlight access to windows in the southeastern and southern facades of Block A and the southern facade of Block D opposing the application site below the level of sunlight access that these windows currently received in the absence of any development on the application site.

However, ARC's analysis indicates that the sample windows at Blocks A and D have the potential to receive a materially similar or greater amount of sunlight after the construction of the proposed development as these blocks would have done if the development envisaged for the application site under the parent permission (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205) had been constructed.

In most cases, the potential impact of the proposed development on Blocks A and D is materially similar to the potential cumulative impact of the proposed development, when considered in combination with the permitted Tivway scheme, on these blocks. In the case of two units (Block D Zones 01c and 03c), the relevant studied windows have the potential to receive the level of sunlight recommended by the BRE Guide if the proposed development were constructed and the Tivway lands remained vacant, but would not if the impact of the shadows cast by both the proposed development and the permitted Tivway scheme are considered in combination. The cumulative impact of the proposed development and the permitted Tivway scheme means that these windows will be unlikely to receive 5% Annual Probable Sunlight Hours during the period between September and March after the construction of both developments. However, the potential cumulative impact of the development now proposed and the permitted Tivway scheme is in line with the potential cumulative impact of the development envisaged for the application site under the parent permission (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205) and the Tivway scheme.

Therefore, detailed quantitative analysis of a representative sample of windows did not indicate that the proposed development had the potential to result in *"an undue diminution in the availability of light to the existing apartments to the north, Blocks A and D, as compared to the previously approved development on this site"* when considered in combination with the development permitted on the Tivway lands under ABP Reference: TC 06D.TC0009. Undue adverse impacts on lands to the north of the application site had been the concern of An Bord Pleanála in relation to the development for which permission was sought on the site in 2016 (DLRCC Reg. Ref. D16A/0697; ABP Ref. PL06D.248397).

Under a worst case scenario, the potential cumulative impact of the proposed development on sunlight access to the Grande Central Apartments (Block A) and to the South Central Apartments (Block D) is considered to be consistent with emerging trends for development or "moderate" in extent.

#### **10.4.4 Avoidance, Remedial & Mitigation Measures**

The subject application proposes the major re-development of a brownfield site situated in an urban location characterised by medium and high density development. In these circumstances, during the construction or operational phases scope for mitigation measures, scope for mitigation measures, which would preserve a sustainable level of density, is limited.



## **10.4.5 Predicted Impact of the Proposed Development**

### **10.4.5.1 Construction Phase**

As no ameliorative, remedial or reductive measures are now proposed, the predicted impact of the construction phase of the proposed development on sunlight access will be as described under Section 10.4.2 above.

### **10.4.5.2 Operational Phase**

As no ameliorative, remedial or reductive measures are now proposed, the predicted impact of the operational phase of the proposed development on sunlight access will be as described under Section 10.4.2 above.

### **10.4.5.3 'Do Nothing' Scenario**

In a "do nothing" scenario, the existing shadow environment will remain unchanged.

## **10.5 Daylight Access Impact Analysis**

### **10.5.1 Study Methodology**

#### **10.5.1.1 Context under Technical Guidance Documents**

*BS 8206-2:2008: Lighting for buildings - Part 2: Code of practice for daylighting* states as follows at Section 8.2.1: Loss of Daylight to Existing Buildings:

*"The BRE Report sets out two guidelines regarding the vertical sky component.*

- a) If the vertical sky component at the centre of the existing window would exceed 27% with the new development in place, then enough skylight would still be reaching the existing window.*
- b) If the vertical sky component with the new development in place would be both less than 27% and less than 0.8 times its former value, then the area lit by the window would be likely to appear more gloomy, and electric lighting would be needed for more of the time."*

#### **10.5.1.2 Assessment Methodology for Daylight Access**

A three-dimensional digital model of the proposed development, the parent permission and of existing buildings in the area was constructed by ARC Consultants based on drawings and three dimensional models supplied by the Design Team; and with reference to on-site, satellite and aerial photography and to the online planning register, where relevant. For the purposes of the assessment of potential cumulative impacts (see Section 10.5.3), it was assumed that the recently Tivway development (ABP Reference: TC 06D.TC0009) had been constructed on the site to the east.

In assessing the impact of the proposed development on existing buildings, assumptions were made as to the use of the existing rooms, the size and layout of the interior of the rooms (informed, where possible, by drawings available on the Dublin City Council online planning register), the colour schemes (e.g. materials, reflectances, etc) used in the decoration of the walls, floor and ceiling of the room and the type of glazing used in the window openings. In all cases, rooms are assessed as excluding furniture and window treatments (e.g. curtains, blinds). Assumptions are also made as to the materials and reflectances of external surfaces.

In assessing the impact of the proposed development on existing buildings, ARC assessed the Vertical Sky Component of each window at a point at the centre of each window. Having regard to the extreme variability in sky luminance over the course of any given day depending on weather conditions and the changing seasons, in order for daylight factor to be a meaningful and comparable measure of daylight access, it is necessary to assume a particular luminance distribution for the sky when calculating Average Daylight Factor. This daylight access analysis uses the Commission Internationale de l'Eclairage (CIE) Standard Overcast Sky Distribution model in its calculations, which is the standard sky most commonly used in daylight access analysis.

### 10.5.1.3 Definitions of Impacts on Daylight Access

The assessment of impacts on daylight access had regard to the *Guidelines on the Information to be Contained in Environmental Impact Statements* prepared by the Environmental Protection Agency (2002), and to Directive 2011/92/EU (as amended) on the assessment of the likely effects of certain public and private projects on the environment.

The list of definitions given below is taken from *Section 5: Glossary of Impacts* contained in the *Guidelines on the Information to be Contained in Environmental Impact Statements*<sup>3</sup> prepared by the Environmental Protection Agency. Some comment is also given below on what these definitions might imply in the case of impact on daylight access. The definitions from the EPA document are in italics.

- *Imperceptible Impact: An impact capable of measurement but without noticeable consequences.* The definition implies that the development would cause a change in the daylight received at a location, capable of measurement, but not noticeable. If the development caused no reduction in daylight access, there could be no impact.
- *Slight Impact: An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.* For this definition to apply, the amount of daylight received at a location would be changed by the development to an extent that is both capable of measurement and is noticeable. Published guidance on daylight access suggests that a reduction in the amount of daylight received in a room only becomes noticeable if the average daylight factor in the room is reduced by one fifth.
- *Moderate Impact: An impact that alters the character of the environment in a manner that is consistent with emerging trends.* This would occur where there is a noticeable reduction in daylight received in a room and where this reduction is ongoing because of development already taking place in the area.

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<sup>3</sup> ARC also had regard to the contents of the *Guidelines on information to be contained in Environmental Impact Assessment Reports DRAFT* (August 2017) in the preparation of this report. However, as this document has yet to be finalized, the 2002 Guidelines were used as the basis for the definition of impacts on daylight access.

- *Significant Impact: An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.* In terms of daylight access, a development, to have a significant impact, must result in a diminution of daylight access to the extent that minimum standards for daylighting are not met and artificial lighting is required for part of the day.
- *Profound Impact: An impact which obliterates sensitive characteristics.* A profound impact would occur where a development would result in daylight received in a room falling well below the minimum standard for average daylight factor and where artificial lighting would be required in that room as the principal source of lighting all the time.

## **10.5.2 Potential Impact of the Proposed Development on Daylight Access**

The BRE Guide provides that *“The quantity and quality of daylight inside a room will be impaired if obstructing buildings are large in relation to their distance away”*. Generally speaking, new development is most likely to affect daylight access in existing buildings in close proximity to the application site.

### **10.5.2.1 Construction Phase**

The potential impact of the construction phase of the proposed development on daylight access is likely to be, initially, lesser than the impact of the completed development. As the proposed development nears completion, the impact of the emerging structure is likely to be similar in all material respects to that of the completed structure. It is noted that temporary structures and machinery (e.g. hoarding, scaffolding, cranes, etc.) may also result in a change to the existing daylight environment, although any additional impacts arising from temporary structures or machinery are likely to be temporary and minor.

### **10.5.2.2 Operational Phase**

All potential impacts described in Section 10.5.2 will be permanent. Impacts described as “imperceptible” are considered to be neutral in character. Any reduction in daylight access resulting in a “slight”, “moderate” and “significant” impact would usually be considered to be negative in character, unless otherwise indicated. Any increase in daylight access resulting in a “slight”, “moderate” and “significant” impact would usually be considered to be positive in character, unless otherwise indicated.

#### **10.5.2.2.1 Overview of the Potential Impact of the Proposed Development on Daylight Access to Existing Buildings on the Rockbrook lands and outside the application site**

The potential impact of the proposed development on daylight access within existing buildings is likely to be most significant in the case of existing buildings at close proximity with windows directly opposing the application site. Specifically, development on the application site has the potential to result in a reduction in daylight access to rooms in buildings opposing the application site, as would be expected where the major redevelopment of a vacant, brownfield site takes place. Having regard to planning precedent on the site and on the

surrounding Rockbrook lands and to statutory planning policy for densification for the urban area, the overall potential impact of the proposed development on these rooms is likely to be considered to be consistent with an emerging pattern of very high density development on strategic sites in the Sandyford area and, therefore, “moderate” in extent.

Given that the potential for development to result in impacts on daylight access diminishes with distance, ARC’s analysis indicates that the proposed development will have no potential to result in undue adverse impact on daylight access within buildings in the wider area surrounding the application site.

#### **10.5.2.2.2 Detailed quantitative analysis of the potential impact of the proposed development on daylight access within existing buildings on the Rockbrook lands and on lands outside the application site**

This Sunlight and Daylight Access Analysis assesses the potential impact of the proposed development to all potential receptors surrounding the application site - these potential impacts are described in Section 10.5.2.2.1 above. However, by way of example in order to illustrate briefly the findings outlined in the overview section, ARC conducted quantitative analysis of the potential for the proposed development to result in impacts on daylight access to a representative sample of sensitive receptors (i.e. rooms) in buildings in proximity to the application site (please see Figures 10.1-10.4 above).

The only Irish statutory guidance to provide advice on undertaking sunlight and daylight access impact analysis is set out in the *Advice Notes on Current Practice* prepared by the Environmental Protection Agency (2003), which accompany the *Guidelines on the Information to be Contained in Environmental Impact Statements* prepared by the Environmental Protection Agency (2002). These Advice notes state: “*Climate in an Environmental Impact Statement generally refers to the local climatological conditions or “microclimate” of an area, such as local wind flow, temperature, rainfall or solar radiation patterns ... it is important to identify receptors which may be particularly sensitive to climate change.*” [Emphasis added.]

Having regard to the Advice Notes, ARC undertook detailed quantitative analysis of those receptors particularly sensitive to changes in the daylight environment in order to provide an empirical basis for the conclusions outlined in Section 10.4.2.2.1 above.

In identifying receptors particularly sensitive to changes in the shadow environment, ARC considered two factors:

- (i) *the use of receptors (i.e. buildings) surrounding the application site*: buildings in residential use (and, particularly, habitable rooms within residences) would be considered to be sensitive to changes in the shadow environment;
- (ii) *the location of receptors relative to the application site*: as set out in section 2.2.21 of the BRE Guide “*If any part of a new building or extension, measured in vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends to an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected.*” (Emphasis added).

Given this, the receptors most sensitive to changes in the daylight environment as a result of the construction of development on the application site would be windows facing towards the proposal at low levels of accommodation in buildings in residential use in close proximity to the site (i.e. low level rooms in the Grande Central Apartments, Block A, and the South Central Apartments, Block D, facing towards the application site; rooms fronting north on to Carmanhall Road at Beacon South Quarter). Therefore, ARC identified a representative sample of windows at intervals across the low levels of accommodation at Rockbrook Blocks A and D and at Beacon South Quarter. This sample is considered to constitute a worst case scenario.

In addition to this, given differences in site layout and in roof profile between the current proposal and the scheme permitted under the parent permission (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205), ARC also undertook detailed quantitative assessment of a number of representative sample of windows at intervals across upper levels of accommodation in Rockbrook Blocks A and D and Beacon South Quarter in the interests of completeness.

In scoping the potential impact of the proposed development on neighbouring existing buildings, ARC measured Vertical Sky Component to sample windows in existing buildings (i) before the construction of the proposed development; (ii) after the construction of the permitted 2005 development; and (iii) after the construction of the proposed development<sup>4</sup>.

The impact of the proposed development on daylight access within existing and permitted buildings was measured with regard to Vertical Sky Component having regard to the BRE Guide, which very strongly advocates for the measurement of impacts on existing buildings using only Vertical Sky Component as follows:

*“In assessing the loss of light to an existing building, the VSC is generally recommended as the appropriate parameter to use. This is because the VSC depends only on obstruction, and is therefore a measure of the daylight environment as a whole. The average daylight factor (ADF) ... also depends on the room and window dimensions, the reflectances of interior surfaces and the type of glass, as well as the obstructions outside. It is an appropriate measure to use in new buildings because most of these factors are within the developer’s control.”<sup>5</sup>*

The Building Research Establishment’s *Site layout planning for daylight and sunlight: a guide to good practice* (the BRE Guide) defines Vertical Sky Component as the “Ratio of that part of illuminance, at a point on a given vertical plane, that is received directly from a CIE standard overcast sky, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Usually the ‘given vertical plane’ is the outside of a window wall.”

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<sup>4</sup> For the purposes of the assessment of potential cumulative impacts (see Section 10.5.3; Table 10.4), it was assumed that the recently Tivway development (ABP Reference: TC 06D.TC0009) had been constructed on the site to the east. The

<sup>5</sup> ARC does not agree that the impact of proposed development should only ever be measured using Vertical Sky Component. Adherence to the recommendations of the BRE Guide with regard to Vertical Sky Component have been shown to lead to densities of development, which would be very considerably too low to be sustainable and would be inconsistent with the local, regional and national statutory planning policy. For example, in order to achieve a Vertical Sky Component of 27% on ground floor windows, opposing eight storey residential buildings would have to be separated by a distance of 48 m. However, given that the parent permission for the Rockbrook lands sets out a very clear benchmark for development of the site from which alternative target values for Vertical Sky Component can be drawn, it was considered appropriate to assess the impact of the proposed development on neighbouring existing buildings with reference to Vertical Sky Component in this case.

Section 2.2.21 of the BRE Guide suggests that:

*“If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected. This will be the case if ...*

*the VSC measured at the centre of an existing main window is less than 27%, and less than 0.8 times its former value...”*

The BRE Guide, at Appendix F: Setting Alternative Target Values for Skylight and Sunlight Access, goes on to state:

*“Sections 2.1, 2.2 and 2.3 give numerical target values in assessing how much light from the sky is blocked by obstructing buildings. These values are purely advisory and different targets may be used based on the special requirements of the proposed development or its location. Such alternative targets may be generated from the layout dimensions of existing development, or they may be derived from considering the internal layout and daylighting needs of the proposed development itself.*

*Sometimes there may be an extant planning permission for a site but the developer wants to change the design. In assessing the loss of light to existing windows nearby, a local authority may allow the vertical sky component (VSC) ... for the permitted scheme to be used as alternative benchmarks.” [Emphasis added.]*

Given this, ARC has referenced the Vertical Sky Component received by the sample receptors under the parent permission (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205) as benchmarks for daylight access.

The results of ARC’s analysis are set out in Table 10.3 below. This table indicates:

- The potential Vertical Sky Component received by each sample receptor (i.e. window) under the existing scenario (i.e. the site is vacant); the permitted scenario (i.e. if the development contemplated for the site under the parent permission had been constructed); and the proposed scenario (i.e. if the development now proposed were constructed).
- A short comment for each sample receptor / window interpreting the results.

As set out in more detail in Table 10.3 below, ARC’s analysis indicates that the construction of the proposed development has the potential to reduce daylight access to windows in buildings opposing the application site at close proximity (i.e. Grande Central Apartments, Block A, and the South Central Apartments, Block D; windows fronting north on to Carmanhall Road at Beacon South Quarter) below the level of daylight access that these windows currently received in the absence of any development on the application site.

However, ARC’s analysis indicates that, overall, existing buildings surrounding the application have the potential to receive a materially similar amount of daylight after the construction of the proposed development as these blocks would have done if the development envisaged for the application site under the parent permission (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205) had been constructed<sup>6</sup>. In particular, having regard to the concerns raised by An Bord Pleanála in relation to the development for which permission was sought on the site in 2016, detailed quantitative analysis of a representative sample of windows indicates that the proposed development will not result in “*an undue diminution in the availability of light to the existing apartments to the north, Blocks A and D, as compared to the previously approved development on this site*”.

Under a worst-case scenario, the potential impact of the proposed development on daylight access to the Grande Central Apartments (Rockbrook Block A), to the South Central Apartments (Rockbrook Block D) and to Beacon South Quarter is considered to be consistent with emerging trends for development or “moderate” in extent.

**Table 10.3: Results of ARC’s analysis of the potential impact of the proposed development on daylight access (Vertical Sky Component) to windows within neighbouring existing buildings**

Zone	Vertical Sky Component		
	Existing	Permitted	Proposed
<b>Grande Central - Rockbrook Block A</b>			
	31.20%	21.70%	20.70%
Zone 01a Block A Floor 01	<p><b>No potential for material change from permitted scenario.</b>            The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is likely to be “moderate” in extent or consistent with emerging trends for development.</p>		
	12.00%	5.60%	5.40%
Zone 01b Block A Floor 01	<p><b>No potential for material change from permitted scenario.</b>            The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “moderate” in extent or consistent with emerging trends for development.</p>		

<sup>6</sup> Specifically, ARC’s detailed quantitative analysis indicated that Vertical Sky Component received by sample windows has the potential to vary by a minor degree (i.e. slightly higher or lower) from that which would have occurred if the parent permission (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205) had been constructed. In all cases, the VSC received by sample windows has the potential to exceed relevant benchmark values set by planning precedent on lands immediately surrounding the application site.

Zone	Vertical Sky Component		
	Existing	Permitted	Proposed
Zone 01c Block A Floor 01	9.70%	5.50%	5.60%
	<p><b>No potential for material change from permitted scenario.</b> While slightly higher, the VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is likely to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 03a Block A Floor 03	32.80%	25.20%	24.10%
	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is likely to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 03b Block A Floor 03	13.10%	7.50%	7.40%
	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is likely to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 03c Block A Floor 03	11.50%	7.80%	7.70%
	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is likely to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 05a	34.60%	28.80%	27.80%



Zone	Vertical Sky Component		
	Existing	Permitted	Proposed
Block A Floor 05	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. Given that the studied window is likely to receive a Vertical Sky Component in excess of the BRE Recommendation of 27% VSC after the construction of the proposed development, the potential impact of the proposal on daylight access is considered to range from “imperceptible” to “slight” in extent.</p>		
Zone 05b Block A Floor 05	16.00%	11.10%	11.10%
	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 05c Block A Floor 05	15.30%	12.30%	12.20%
	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is likely to be “moderate” in extent or consistent with emerging trends for development.</p>		
<b>South Central Block D</b>			
Zone 01a Block D Floor 01	32.70%	15.10%	15.80%
	<p><b>No potential for material change from permitted scenario. Alternative target value exceeded.</b> Although slightly higher, the VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 01b	17.30%	3.80%	2.90%

Zone	Vertical Sky Component		
	Existing	Permitted	Proposed
Block D Floor 01	<p><b>Potential impact consistent with emerging trends for development in the area.</b> While it is noted that the VSC received by this window after the construction of the proposed development has the potential to be slightly lower than the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed, it is noted that, after the construction of the proposed development, this window will continue to receive a level of VSC for considerably in excess of that recently permitted for the Tivway scheme (see Table 10.5 below). Given this, the impact of the proposed development is predicted to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 01c Block D Floor 01	37.30%	20.00%	20.30%
	<p><b>No potential for material change from permitted scenario. Alternative target value exceeded.</b> Although slightly higher, the VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 01d Block D Floor 01	18.50%	6.10%	3.90%
	<p><b>Potential impact consistent with emerging trends for development in the area.</b> While it is noted that the VSC received by this window after the construction of the proposed development has the potential to be slightly lower than the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed, it is noted that, after the construction of the proposed development, this window will continue to receive a level of VSC for considerably in excess of that recently permitted for the Tivway scheme (see Table 10.5 below). Given this, the impact of the proposed development is predicted to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 03a Block D Floor 03	33.70%	18.70%	19.30%
	<p><b>No potential for material change from permitted scenario. Alternative target value exceeded.</b> Although slightly higher, the VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “moderate” in extent or consistent with emerging trends for development.</p>		

Zone	Vertical Sky Component		
	Existing	Permitted	Proposed
Zone 03b Block D Floor 03	16.90%	4.60%	4.60%
	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is likely to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 03c Block D Floor 03	37.90%	22.10%	23.80%
	<p><b>No potential for material change from permitted scenario. Alternative target value exceeded.</b> Although slightly higher, the VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 03d Block D Floor 03	18.00%	6.70%	5.70%
	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is likely to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 05a Block D Floor 05	35.00%	23.40%	24.20%
	<p><b>No potential for material change from permitted scenario. Alternative target value exceeded.</b> Although slightly higher, the VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 05b Block D	16.10%	5.90%	6.80%

Zone	Vertical Sky Component		
	Existing	Permitted	Proposed
Floor 05	<p><b>No potential for material change from permitted scenario. Alternative target value exceeded.</b></p> <p>Although slightly higher, the VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 05c Block D Floor 05	38.40%	24.80%	28.20%
	<p><b>No potential for material change from permitted scenario. Alternative target value exceeded.</b></p> <p>Although slightly higher, the VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 05d Block D Floor 05	17.20%	7.60%	7.90%
	<p><b>No potential for material change from permitted scenario. Alternative target value exceeded.</b></p> <p>Although slightly higher, the VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “moderate” in extent or consistent with emerging trends for development.</p>		
<b>Beacon South Quarter</b>			
Zone 02a Beacon Sth Q Floor 02	25.20%	18.80%	17.30%
	<p><b>No potential for material change from permitted scenario.</b></p> <p>The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is likely to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 02b	31.70%	26.60%	21.40%

Zone	Vertical Sky Component		
	Existing	Permitted	Proposed
Beacon Sth Q Floor 02	<p><b>Potential impact consistent with emerging trends for development in the area.</b> The subject application proposes a change to the permitted layout of the Boulevard running from Carmanhall Road to Blackthorn Drive. It is noted that, as a result of this change, the VSC received by this window after the construction of the proposed development has the potential to be slightly lower than the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. However, it is noted that, after the construction of the proposed development, this window has the potential to continue to receive a level of VSC in excess of that received by other windows in Beacon South Quarter facing on to Carmanhall Road at this level of accommodation (e.g. see Zone 02a - Beacon Sth Q). Given this, the potential impact of the proposed development is considered to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 02c Beacon Sth Q Floor 02	32.60%	31.20%	30.10%
	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. Given that the studied window is likely to receive a Vertical Sky Component in excess of the BRE Recommendation of 27% VSC after the construction of the proposed development, the potential impact of the proposal on daylight access is considered to range from “imperceptible” to “slight” in extent.</p>		
Zone 04a Beacon Sth Q Floor 04	26.20%	21.70%	20.30%
	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is likely to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 04b	33.40%	29.70%	24.50%

Zone	Vertical Sky Component		
	Existing	Permitted	Proposed
Beacon Sth Q Floor 04	<p><b>Potential impact consistent with emerging trends for development in the area.</b> The subject application proposes a change to the permitted layout of the Boulevard running from Carmanhall Road to Blackthorn Drive. It is noted that, as a result of this change, the VSC received by this window after the construction of the proposed development has the potential to be slightly lower than the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. However, it is noted that, after the construction of the proposed development, this window has the potential to continue to receive a level of VSC in excess of that received by other windows in Beacon South Quarter facing on to Carmanhall Road at this level of accommodation (e.g. see Zone 04a - Beacon Sth Q). Given this, the potential impact of the proposed development is considered to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 04c Beacon Sth Q Floor 04	33.80%	32.60%	31.60%
	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. Given that the studied window is likely to receive a Vertical Sky Component in excess of the BRE Recommendation of 27% VSC after the construction of the proposed development, the potential impact of the proposal on daylight access is considered to range from “imperceptible” to “slight” in extent.</p>		
Zone 06a Beacon Sth Q Floor 06	27.10%	24.80%	23.20%
	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is likely to be “moderate” in extent or consistent with emerging trends for development.</p>		
Zone 06b	34.90%	32.70%	27.90%

Zone	Vertical Sky Component		
	Existing	Permitted	Proposed
Beacon Sth Q Floor 06	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. Given that the studied window is likely to receive a Vertical Sky Component in excess of the BRE Recommendation of 27% VSC after the construction of the proposed development, the potential impact of the proposal on daylight access is considered to range from “imperceptible” to “slight” in extent.</p>		
	34.70%	34.00%	33.10%
Zone 06c Beacon Sth Q Floor 06	<p><b>No potential for material change from permitted scenario.</b> The VSC received by this window after the construction of the proposed development has the potential to be materially similar to the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. Given that the studied window is likely to receive a Vertical Sky Component in excess of the BRE Recommendation of 27% VSC after the construction of the proposed development, the potential impact of the proposal on daylight access is considered to range from “imperceptible” to “slight” in extent.</p>		

### 10.5.2.3 Do Nothing Scenario

In a “do nothing” scenario, the existing daylight environment will remain unchanged.

## 10.5.3 Potential Cumulative Impact of the Proposed Development

### 10.5.3.1 Construction Phase

The potential cumulative impact of the construction phase of the proposed development on daylight access is likely to be, initially, lesser than the impact of the completed development. As the proposed development nears completion, the impact of the emerging structure is likely to be similar in all material respects to that of the completed structure. It is noted that temporary structures and machinery (e.g. hoarding, scaffolding, cranes, etc.) may also result in a change to the existing daylight environment, although any additional impacts arising from temporary structures or machinery are likely to be temporary and minor.

### 10.5.2.2 Operational Phase

The application site adjoins a vacant site between Carmanhall Road and Blackthorn Drive known as the Tivway lands. A proposal for a five to fourteen storey residential development (ABP Reference: TC 06D.TC0009) was recently permitted on these lands.

The assessment of the potential cumulative impacts of the proposed development examines the impact of the development now proposed in combination with the development on the Tivway lands permitted under ABP Reference: TC 06D.TC0009.

A review of the Dun Laoghaire-Rathdown County Council online planning register did not identify any other developments for which permission has been granted, which, in combination with the development now proposed, would have the potential to result in material cumulative impacts on daylight access to the area surrounding the application site, within the meaning of the *British Standard, BS 8206-2:2008: Lighting for buildings - Part 2: Code of practice for daylighting or Site layout planning for daylight and sunlight: a guide to good practice* (the BRE Guide).

All potential cumulative impacts described in Section 10.5.3 will be permanent. Impacts described as “imperceptible” are considered to be neutral in character. Any reduction in daylight access resulting in a “slight”, “moderate” and “significant” impact would usually be considered to be negative in character, unless otherwise indicated. Any increase in daylight access resulting in a “slight”, “moderate” and “significant” impact would usually be considered to be positive in character, unless otherwise indicated.

#### **10.5.3.2.1 Overview of the Potential Cumulative Impact of the Proposed Development on Daylight Access to Existing Buildings on the Rockbrook lands and outside the application site**

The potential cumulative impact of the proposed development on daylight access within existing buildings is likely to be most significant in the case of existing buildings at close proximity with windows directly opposing the application site. Specifically, development on the application site, when assessed in combination with the permitted development on the Tivway lands, has the potential to result in a reduction in daylight access to rooms in buildings opposing the application site, as would be expected where the major redevelopment of a vacant, brownfield site takes place. Having regard to planning precedent on the site and on the surrounding Rockbrook lands and to statutory planning policy for densification for the urban area, the overall potential impact of the proposed development on these rooms is likely to be considered to be consistent with an emerging pattern of very high density development on strategic sites in the Sandyford area and, therefore, “moderate” in extent.

Given that the potential for development to result in cumulative impacts (i.e. in combination with development on the Tivway lands) on daylight access diminishes with distance, ARC’s analysis indicates that the proposed development will have no potential to result in undue adverse cumulative impact on daylight access within buildings in the wider area surrounding the application site.



### 10.5.3.2.2 Detailed quantitative analysis of the potential cumulative impact of the proposed development on daylight access within existing buildings on the Rockbrook lands and on existing buildings outside the application site

This Sunlight and Daylight Access Analysis assesses the potential cumulative impact of the proposed development to all potential receptors surrounding the application site - these potential cumulative impacts are described in Section 10.5.2.2.1 above. However, by way of example in order to illustrate briefly the findings outlined in the overview section, ARC conducted quantitative analysis of the potential for the proposed development to result in impacts on daylight access to a representative sample of sensitive receptors (i.e. rooms) in buildings in proximity to the application site (please see Figures 10.1-10.4 above).

The results of ARC's analysis are set out in Table 10.4 below. This table indicates:

- The potential Vertical Sky Component received by each sample receptor (i.e. window) under the existing scenario (i.e. the site is vacant); the permitted scenario (i.e. if the development contemplated for the site under the parent permission had been constructed); and the proposed scenario (i.e. if the development now proposed were constructed). For the purposes of this analysis, it was assumed that the recently Tivway development (ABP Reference: TC 06D.TC0009) had been constructed on the site to the east for all scenarios.
- While Table 10.3 includes a commentary on the set of result for each zone, Table 10.4 does not, given that the results of both sets of analysis are so similar.

**Table 10.4: Results of ARC's analysis of the potential cumulative impact of the proposed development on daylight access (Vertical Sky Component) to windows within neighbouring existing buildings**

Zone	Vertical Sky Component		
	Existing + Permitted Tivway Scheme	Permitted + Permitted Tivway Scheme	Proposed + Permitted Tivway Scheme
<b>Grande Central - Rockbrook Block A</b>			
Zone 01a - Block A - Floor 01	30.70%	21.60%	20.70%
Zone 01b - Block A - Floor 01	10.90%	5.30%	5.40%
Zone 01c - Block A - Floor 01	9.50%	5.50%	5.40%
Zone 03a - Block A - Floor 03	32.40%	25.10%	24.10%
Zone 03b - Block A - Floor 03	12.20%	7.40%	7.40%
Zone 03c - Block A - Floor 03	11.30%	7.80%	7.70%
Zone 05a - Block A Floor 05	34.40%	28.80%	27.80%
Zone 05b - Block A - Floor 05	15.20%	11.00%	11.10%

Zone	Vertical Sky Component		
	Existing + Permitted Tivway Scheme	Permitted + Permitted Tivway Scheme	Proposed + Permitted Tivway Scheme
Zone 05c - Block A - Floor 05	15.30%	12.30%	12.20%
<b>South Central – Rockbrook Block D</b>			
Zone 01a - Block D - Floor 01	32.10%	15.00%	15.60%
Zone 01b - Block D - Floor 01	14.80%	3.20%	2.50%
Zone 01c - Block D - Floor 01	29.50%	14.60%	15.60%
Zone 01d - Block D - Floor 01	14.90%	4.60%	2.80%
Zone 03a - Block D - Floor 03	33.30%	18.70%	19.20%
Zone 03b - Block D - Floor 03	14.70%	4.20%	4.20%
Zone 03c - Block D - Floor 03	31.60%	17.70%	20.00%
Zone 03d - Block D - Floor 03	15.00%	5.50%	4.80%
Zone 05a - Block D - Floor 05	34.70%	23.40%	24.20%
Zone 05b - Block D - Floor 05	14.70%	5.60%	6.60%
Zone 05c - Block D - Floor 05	33.80%	21.60%	25.40%
Zone 05d - Block D - Floor 05	15.10%	6.70%	7.30%
<b>Beacon South Quarter</b>			
Zone 02a - Beacon Sth Q - Floor 02	25.20%	18.80%	17.30%
Zone 02b - Beacon Sth Q - Floor 02	31.40%	26.60%	21.30%
Zone 02c - Beacon Sth Q - Floor 02	32.50%	31.20%	30.10%
Zone 04a - Beacon Sth Q - Floor 04	26.20%	21.70%	20.30%
Zone 04b - Beacon Sth Q - Floor 04	33.10%	29.70%	24.40%
Zone 04c - Beacon Sth Q - Floor 04	33.60%	32.60%	31.60%

Zone	Vertical Sky Component		
	Existing + Permitted Tivway Scheme	Permitted + Permitted Tivway Scheme	Proposed + Permitted Tivway Scheme
Zone 06a - Beacon Sth Q - Floor 06	27.10%	24.80%	23.20%
Zone 06b - Beacon Sth Q - Floor 06	34.70%	32.60%	27.80%
Zone 06c - Beacon Sth Q - Floor 06	34.60%	34.00%	33.10%

As set out in Table 10.4 above, ARC’s analysis indicates that the construction of the proposed development, in combination with the permitted Tivway scheme, has the potential to reduce daylight access to windows in buildings opposing the application site at close proximity (i.e. Grande Central Apartments, Block A, and the South Central Apartments, Block D; and windows fronting north on to Carmanhall Road at Beacon South Quarter) below the level of daylight access that these windows currently received in the absence of any development on the application site. However, ARC’s assessment indicated that the potential impact of the proposed development on daylight access to neighbouring existing buildings is materially similar to the potential cumulative impact of the proposed development, when considered in combination with the permitted Tivway scheme.

ARC’s analysis indicates that, overall, existing buildings surrounding the application have the potential to receive a materially similar amount of daylight after the construction of the proposed development and the permitted Tivway scheme as these blocks would have done if the development envisaged for the application site under the parent permission (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205) had been constructed<sup>7</sup>. In particular, having regard to the concerns raised by An Bord Pleanála in relation to the development for which permission was sought on the site in 2016, detailed quantitative analysis of a representative sample of windows indicates that the proposed development will not result in *“an undue diminution in the availability of light to the existing apartments to the north, Blocks A and D, as compared to the previously approved development on this site”*.

Under a worst-case scenario, the potential cumulative impact of the proposed development on daylight access to the Grande Central Apartments (Rockbrook Block A), to the South Central Apartments (Rockbrook Block D) and to Beacon South Quarter is considered to be consistent with emerging trends for development or “moderate” in extent.

<sup>7</sup> Specifically, ARC’s detailed quantitative analysis indicated that Vertical Sky Component received by sample windows has the potential to vary by a minor degree (i.e. slightly higher or lower) from that which would have occurred if the parent permission (DLRCC Reg. Ref. D05A/1159; An Bord Pleanála Ref. PL06D.215205) had been constructed. In all cases, the VSC received by sample windows has the potential to exceed relevant benchmark values set by planning precedent on lands immediately surrounding the application site.

### **10.5.3.2.3 Detailed quantitative analysis of the potential cumulative impact of the proposed development on daylight access within buildings on the Rockbrook lands and on buildings yet to be constructed outside the application site**

In addition to assessing the potential cumulative impacts of the development now proposed and the permitted Tivway scheme, ARC also carried out detailed quantitative analysis of the potential cumulative impact of the proposed development on daylight access to sample windows within the yet to be constructed permitted Tivway scheme (ABP Reference: TC 06D.TC0009). The permitted Tivway scheme to the east of the application site would be obstructed considerably by the large block running north-south along the eastern edge of the Rockbrook lands permitted under the parent permission. The layout of the proposed development, which proposes a large central open space adjoining Tivway Block A, has the potential to facilitate a “significant” increase in daylight access to windows in proximity to and opposing the application site.

The results of ARC’s analysis are set out in Table 10.4 below. This table indicates:

- The potential Vertical Sky Component received by each sample receptor (i.e. window) under the existing scenario (i.e. the site is vacant); the permitted scenario (i.e. if the development contemplated for the site under the parent permission had been constructed); and the proposed scenario (i.e. if the development now proposed were constructed). For the purposes of this analysis, it was assumed that the recently Tivway development (ABP Reference: TC 06D.TC0009) had been constructed on the site to the east for all scenarios.
- A short comment for each sample receptor / window interpreting the results.

**Table 10.5: Results of ARC’s analysis of the potential cumulative impact of the proposed development on daylight access (Vertical Sky Component) to windows within neighbouring existing buildings**

Zone	Vertical Sky Component		
	Existing + Permitted Tivway Scheme	Permitted + Permitted Tivway Scheme	Proposed + Permitted Tivway Scheme
Zone 02a Tivway Floor 02	11.20%	0.10%	2.50%
	<p><b>Potential significant increase in daylight access over the permitted scenario</b>                      This VSC received by this window after the construction of the proposed development has the potential to be materially higher than the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “significant” in extent.</p>		
Zone 02b Tivway Floor 02	11.30%	0.20%	1.90%
	<p><b>Potential significant increase in daylight access over the permitted scenario</b>                      This VSC received by this window after the construction of the proposed development has the potential to be materially higher than the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “significant” in extent.</p>		
Zone 04a Tivway Floor 04	8.10%	0.60%	3.80%
	<p><b>Potential significant increase in daylight access over the permitted scenario</b>                      This VSC received by this window after the construction of the proposed development has the potential to be materially higher than the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “significant” in extent.</p>		
Zone 04b Tivway Floor 04	34.50%	11.70%	17.70%
	<p><b>Potential significant increase in daylight access over the permitted scenario</b>                      This VSC received by this window after the construction of the proposed development has the potential to be materially higher than the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “significant” in extent.</p>		
Zone 06a	8.80%	0.80%	4.70%

Tivway Floor 06	<p><b>Potential significant increase in daylight access over the permitted scenario</b>  This VSC received by this window after the construction of the proposed development has the potential to be materially higher than the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “significant” in extent.</p>		
Zone 06b Tivway Floor 06	36.10%	15.50%	30.10%
	<p><b>Potential significant increase in daylight access over the permitted scenario</b>  This VSC received by this window after the construction of the proposed development has the potential to be materially higher than the VSC that would have been received by this window if the development envisaged for the application site under the parent permission had been constructed. The potential impact of the proposed development is considered to be “significant” in extent.</p>		

#### 10.5.4 Avoidance, Remedial & Mitigation Measures

The subject application proposes the major re-development of a brownfield site situated in an urban location characterised by medium and high-density development. In these circumstances, during the construction or operational phases scope for mitigation measures, which would preserve a sustainable level of density, is limited.

#### 10.5.5 Predicted Impact of the Proposed Development

##### 10.5.5.1 Construction Phase

As no ameliorative, remedial or reductive measures are now proposed, the predicted impact of the proposed development on daylight access during the construction phase will be as described under Section 10.5.2 above.

##### 10.5.5.2 Operational Phase

As no ameliorative, remedial or reductive measures are now proposed, the predicted impact of the proposed development on daylight access during the operational phase will be as described under Section 10.5.2 above.

##### 10.5.5.4 Do Nothing Scenario

In a “do nothing” scenario, the existing daylight environment will remain unchanged.

#### 10.7 Monitoring

Monitoring of avoidance, remedial and mitigation measures is not relevant to the assessment of impacts on sunlight and daylight access in the case of the subject application.

## **10.8 Reinstatement**

Reinstatement is not relevant to the assessment of impacts on sunlight and daylight access in the case of the subject application. It is intended that the proposed development will be permanent.

## **10.9 Interactions**

As is always the case where a development will result in a change to the sunlight and daylight environment of an area, the impacts of the development on sunlight access will result in interactions with climate, population and human health, material assets and the landscape.

## **10.10 Difficulties Encountered in Compiling the Chapter**

As is the case in any urban area, it was neither possible nor practical for the Design Team to gain unfettered access to every parcel of private property within the study area surrounding the application site in order to carry out measured building survey. Therefore, while ARC has confidence that the three-dimensional model used in the assessment of the impact of the proposal on sunlight and daylight access achieves a high degree of accuracy, it should be noted that some level of assumption was necessary in completing the model.

The purpose of this report is to provide a general indication of sunlight and daylight performance and sunlight access before and after the construction of the proposed development on the basis of the assumptions outlined above and with reference to design tools set out in the guidance documents referenced above. ARC takes no responsibility for any errors introduced by the third-party proprietary sunlight and daylight analysis software used to perform the quantitative assessment.