20 DAYLIGHT, SUNLIGHT AND OVERSHADOWING

20.1 Introduction

20.1.1 This Chapter, prepared by Arup, reports the likely effects of the Proposed Development in terms of Daylight, Sunlight and Overshadowing in the context of the Site and surrounding area.

20.1.2 This Chapter (and its associated appendices) is not intended to be read as a standalone assessment and reference should be made to the front end of this ES (Chapters 1 – 6), as well as the final chapters, 'Summary of Residual and Cumulative Effects' and 'Conclusions' (Chapters 21 - 22). All figures are included as Appendix 20.4.

20.2 Legislation, Policy and Guidance

20.2.1 The relevant legislation, policy and guidance are listed below, with details provided in Appendix 20.1.

Legislative Framework

20.2.2 There is no UK legislation relating to daylight and sunlight.

Planning Policy

20.2.3 Daylight, sunlight and overshadowing issues are important considerations during the planning process. There is no direct reference to quantities of daylight, sunlight and overshadowing in national or local planning policy statements and guiding documents.

20.2.4 Some of the key aspects relating to daylight, sunlight and overshadowing that are included in planning and guidance documents are summarised in Appendix 20.1. These are directly or indirectly linked to consideration of daylight, sunlight and overshadowing and emphasise their importance. The guidelines examined are:

- Future Wales: The National Plan 2040 (February 2021)
- Planning Policy Wales (Edition 11, February 2021)
- Cardiff Local Development Plan 2006 – 2026 (Adopted January 2016)
- City of Cardiff Council 'Tall Buildings Supplementary Planning Guidance' (2017)

Guidance

20.2.5 The applicable guidance is summarised as follows:

- Building Research Establishment (BRE) 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice' (2011)
- British Standard (BS) 8206-2:2008: 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'

20.3 Assessment Methodology and Significance Criteria

Scope of the Assessment

20.3.1 The assessment will consider the following potential impacts in relation to the operational phase of the Proposed Development:

- impact on daylight access of the existing residential properties due to physical obstruction;
- impact on daylight access of the Proposed Development itself;
- solar access (external overshadowing) of the existing outdoor amenity spaces that can be affected by the Proposed Development;
- solar access (external overshadowing) of the proposed outdoor amenity spaces within the Proposed Development.

Effects Not Considered within the Scope

20.3.2 The assessment will be carried out for the operational phase (completed) Proposed Development. The construction phase activities, and interim effects during this phase will not be included as they are considered to be short term and the full impact will only be experienced once the construction is completed.

Extent of the Study Area

20.3.3 The study area will include the two elements which comprise the hybrid planning application for the Proposed Development: The Atlantic Wharf, Butetown Masterplan (outline planning) and the arena and hotel (full planning).

Consultation Undertaken to Date

20.3.4 Table 20.1 provides a summary of the consultation activities undertaken in support of the preparation of this Chapter.

Table 20.1: Summary of Consultation Undertaken to Date			
Organisation	**Individual(s)**	**Meeting Date and other forms of Consultation**	**Summary of Outcome of Discussion**
Cardiff Council			Awaiting feedback
Cardiff Council	Justin Jones	Meeting on 1st July 2021	Proposed approach and methodology for sunlight and daylight assessment was discussed and accepted.

Assessment Methodology

20.3.5 The method of baseline data collection and assessment is in accordance with current guidance and industry best practice. Full details are provided in Appendix 20.1.

20.3.6 Local Authorities typically consider planning applications with reference to the Building Research Establishment (BRE) guidelines '*Site Layout Planning for Daylight and Sunlight. A Guide to Good Practice*', document reference BR209 (Littlefair, 2011) which is the primary authority on this matter, providing the criteria and methodology for assessment of daylight and sunlight. This document in turn makes reference to the British Standard BS 8206 Part 2 2008 *'Lighting for buildings- Part 2: Code of Practice for Daylighting*'. The Daylight, Sunlight and Overshadowing assessment has been carried out with reference to both the BRE document and BS 8206-2:2008.

20.3.7 The BRE report advises that daylight should be assessed for the main habitable rooms of neighbouring residential properties. These are identified as living rooms, kitchens, and bedrooms. Bathrooms, toilets, storerooms, circulation areas and garages need not be considered.

20.3.8 The BRE report proposes several methods for calculating daylight, with two most commonly relied upon. These involve the measurement of the vertical sky component (VSC) and the average daylight factor (ADF).

20.3.9 The VSC calculation is a general test of the potential for daylight to a building, measuring the light available on the outside pane of windows. Compliance is recommended for living spaces which include living rooms, kitchens and bedrooms.

20.3.10 If VSC is greater than 27% then enough skylight should still be reaching the window of the existing building. Any reduction below this level should be kept to a minimum.

20.3.11 With the new development in place, if VSC is less than 27% and less than 0.8 times its former value, occupants of the existing building will notice the reduction in the amount of skylight.

20.3.12 Where VSC is between 15-27% special measures such as larger windows or changes to room layout may be required to ensure adequate daylight is provided.

20.3.13 Where VSC is 5-15% it is very difficult to provide adequate daylight unless very large windows are used.

20.3.14 The ADF calculation assesses the average levels of daylight within a room through a window and takes into the account the VSC value, the size and number of the windows, the size of the room and the use to which the room is put. ADF assesses the actual light distribution within a defined room area whereas the VSC considers the potential light.

20.3.15 There is no general requirement to assess ADF values, other than for neighbouring residential buildings. ADF is calculated only in instances where the minimum requirement for VSC is not achieved for a particular façade. Compliance is recommended for living spaces which include living rooms, kitchens and bedrooms. BRE guidelines recommends the minimum ADF level targets of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms.

20.3.16 For the overshadowing assessment of external spaces, BR209 criteria have been used. These recommend that at least half of the amenity areas should receive are least two hours of sunlight on 21st March.

20.3.17 The EIA has been based on a widely used and accepted 'significance matrix assessment approach' which is based on the characteristics of the impact (magnitude and nature) and the sensitivity of the receptor. The detail of how this methodology is specifically applied to the daylight and sunlight assessment, taking into account the above discussion, has been described in the following sub-section.

Significance Criteria

20.3.18 Major effects, where accepted limits or standards are exceeded have been determined as significant in EIA terms.

20.3.19 Moderate effects, within accepted limits or standards, but close to reaching the relevant threshold may be determined as significant, although there may be scenarios

where such effects are considered not significant based on the specific circumstances being considered and professional judgement.

20.3.20 Minor effects, well within accepted limits or standards, or negligible effects, have been determined as not significant.

20.3.21 Impact magnitude and receptor sensitivity are combined as shown in Table 20.2 to determine the significance of the impacts. Further details on magnitude and sensitivity are provided in Appendix 20.2.

20.3.22 Where there is a range of impact significances it is acceptable to select one, or both if the impact is not certain.

Table 20.2 Matrix for Evaluating Significance

		Magnitude of Change				
		Very Low	**Low**	**Medium**	**High**	**Very High**
Sensitivity	**Very Low**	Negligible	Negligible	Negligible	Negligible	Negligible
	Low	Negligible	Negligible	Negligible	Minor	Moderate/ Minor
	Medium	Negligible	Negligible	Minor/Moderate	Moderate	Major
	High	Negligible	Minor	Moderate	Moderate / Major	Major
	Very High	Negligible	Moderate /Minor	Major/moderate	Major	Major

20.4 Baseline Conditions

20.4.1 There are several existing residential properties within the scope of this assessment which can be described as sensitive receptors. For reference these are identified in Figure 20.1, see Appendix 20.4). Refer to Appendix 20.2 for a full description of the sensitivity criteria.

20.4.2 Existing properties have been considered sensitive receptors for daylight access (Figure 20.1).

20.4.3 Existing outdoor areas have been considered sensitive receptors for overshadowing of external spaces (Figure 20.41).

Sensitive Receptors

20.4.4 A full description classification of receptor sensitivity is provided in Appendix 20.2. Note that high rise residential buildings are considered "high" sensitivity and low rise residential are considered "medium" sensitivity.

Existing Residential Properties – E1 (Bute Street)

20.4.5 These properties are located along Bute Street (frontage) and Lloyd George Avenue (back). They are typically three storeys high with the ground floor as commercial space. The assessment is focussed on the façade facing Lloyd George Avenue and the Proposed Development.

20.4.6 These properties have been assessed as receptors of medium sensitivity.

Existing Residential Properties – E2 (Lloyd George Avenue)

20.4.7 These properties are located along Lloyd George Avenue (front) and Schooner Way (back). They are typically three to four storeys. The assessment is focussed on the façades facing Schooner Way and Hemingway Road.

20.4.8 These properties have been assessed as receptors of medium sensitivity.

Existing Residential Properties – E3 (Lloyd George Avenue, North)

20.4.9 These properties are located along Lloyd George Avenue (front) and facing Silurian Park (back). They are typically three to four storeys. The assessment is focussed on the façades facing Silurian Park and Ffordd Garthorne.

20.4.10 These properties have been assessed as receptors of medium sensitivity.

Existing Residential Properties – E4 (Halliard Court)

20.4.11 These are typically three storey residential properties located at Halliard Court. The assessment is focused on the façades facing southeast and northeast (towards Schooner Way).

20.4.12 These properties have been assessed as receptors of medium sensitivity.

Existing Residential Properties – E5 (Schooner Way)

20.4.13 These are three storey residential properties on Schooner Way (front) with the back facing the Proposed Development (south façade). The assessment is focussed on the south façade.

20.4.14 These properties have been assessed as receptors of medium sensitivity.

Existing Residential Properties – E6 (Galleon Way)

20.4.15 These properties located along Galleon Way comprise of four blocks. The assessment has been focused on all the façades facing the Proposed Development:

A - six to seven storeys, west façade assessed.

B - eight storeys, north and west façade assessed.

C - six to seven storeys, west façade assessed.

D - seven storeys, north and west façade assessed.

20.4.16 These properties have been assessed as receptors of high sensitivity.

Existing outdoor space – O1 (Silurian Park South)

20.4.17 The portion of Silurian Park south of Glanhowny Way has been assessed.

20.4.18 This outdoor space has been assessed as a receptor of high sensitivity.

Existing outdoor space – O2 (Halliard Court)

20.4.19 Outdoor spaces at Halliard Court comprises residential gardens and surrounding outdoor amenity space. Gardens belonging to existing properties south of Halliard Court have been assessed. Open spaces south of Halliard Court as well as the open courtyard in the middle of Halliard Court have also been assessed.

20.4.20 These outdoor spaces have been assessed as receptors of medium sensitivity.

Existing outdoor space – O3 (Schooner Drive South)

20.4.21 Residential gardens belonging to properties at Schooner Drive (south side) have been assessed.

20.4.22 These outdoor spaces have been assessed as receptors of medium sensitivity.

Limitations

20.4.23 The VSC assessment has been carried out to determine impact on daylight for sensitive receptors (existing residential buildings). In instances where the minimum VSC requirement is not achieved a further ADF assessment is carried out only if the sensitive receptor is impacted by portion of the masterplan at detailed planning stage (Arena or Hotel).

20.4.24 An ADF assessment has not been carried out on sensitive receptors impacted by parts of the Butetown Masterplan under outline planning application. The outline planning application is considered to be illustrative and subject to change, so a detailed assessment of impact is not considered appropriate. Instead, a significance range is provided for any sensitive receptors which have a moderate of higher impact.

20.4.25 The assessment of ADF requires more detailed information than that of VSC: it is dependent on building massing, façade details such as window sizes and glazing type, the interior arrangement of rooms and their type. In the case of existing properties, the ADF assessments have relied on estimated parameters based on the available information for its calculation and there is, accordingly, a reduced level of certainty with its results. Further details are provided in Appendix 20.3.

20.5 Assessment of Effects

Design Solutions and Assumptions

20.5.1 The impact of the Proposed Development on the environment in terms of daylight and sunlight access will progressively increase as the construction proceeds to completion. The full impact of the scheme will be experienced once the construction is completed; therefore, the construction impact analyses have been carried out for the completed development.

20.5.2 In general, impacts on daylight and sunlight are direct and permanent, since they are primarily related to the massing and density of the Proposed Development.

20.5.3 Note that the illustrative masterplan has been provided at massing level of detail (with no detail on façade layout, entrances etc.) therefore a daylight assessment (VSC) has been carried out on all the façade areas of proposed residential buildings.

20.5.4 A detailed landscape strategy has not been provided for the illustrative masterplan, therefore an external overshadowing assessment has been carried out on all parts of external spaces deemed to be public realm. In reality some of these areas may be functional areas (e.g. car parking) and may not need to be included in the assessment.

Assessment of Effects for Sensitive Receptors

Existing Properties – Daylight

Existing Residential Properties – E1 (Bute Street)

20.5.5 The following assessment refers to the side of the building facing Lloyd George Avenue and the Proposed Development.

20.5.6 The east facing components of the façade (the longer sections) assess VSC as greater than 27% and more than 80% of its baseline value.

20.5.7 The north facing (shorter sections) show a VSC of 15-27% and more than 80% of its baseline value. These sections of façade are unlikely to be connected to living spaces.

20.5.8 This indicates a **low** impact and of **negligible** significance.

Existing Residential Properties – E2 (Lloyd George Avenue)

20.5.9 The assessment is focussed on the façades facing Schooner Way and Hemingway Road.

20.5.10 The façade facing Schooner Way has a VSC of 15-27% but less than 80% of its baseline value.

20.5.11 A further ADF assessment has been carried out to determine significance for this façade as it is impacted by the Arena which is part of the detailed masterplan.

20.5.12 The ADF assessment identified 44 kitchens and 52 bedrooms located along this façade. Further details are provided in Appendix 20.3.

20.5.13 Under baseline conditions (existing) all the bedrooms complied with the ADF criteria but two kitchens (2%) were below the ADF criteria.

20.5.14 With the Proposed Development in place, all rooms deemed to be bedrooms achieve the target minimum ADF requirement.

20.5.15 With the Proposed Development in place, 4% (four rooms) of the kitchens do not achieve the minimum ADF requirement. This is only an additional two rooms (2%) compared to the baseline.

20.5.16 Since this façade does not meet VSC criteria but does meet ADF criteria for the majority of the adjoining living spaces it has been given an impact magnitude of **medium** and a **minor-moderate** significance for this façade.

20.5.17 The façade facing Hemingway Road has a VSC of 15-27% but less than 80% of its baseline value. A further ADF calculation has not been carried out for this façade as it is impacted by the outline planning part of the masterplan.

20.5.18 An exact impact magnitude and consequent significance cannot be determined at this stage and should be examined further at later stages. This facade will have between **medium** to **high** impact resulting in **minor/moderate** to **major** impact.

Existing Residential Properties – E3 (Lloyd George Avenue, North)

20.5.19 The assessment is focussed on the façades facing Silurian Park and Ffordd Garthorne.

20.5.20 The façade facing Silurian Park has some limited areas with VSC of 15-27%. The majority of the façade where windows are located is a VSC of 27% or more. The façade has a VSC of 80% or more of its baseline value.

20.5.21 The facade facing Ffordd Garthorne has a VSC of above 27% and more than 80% of its baseline value.

20.5.22 This indicates a **low impact** and of **negligible** significance.

Existing Residential Properties – E4 (Halliard Court)

20.5.23 The assessment is focused on the façades facing southeast and northeast (towards Schooner Way). All façades are above the minimum values of 27% for VSC and are above 80% of the baseline values indicating **very low impact** and **negligible** significance.

Existing Residential Properties – E5 (Schooner Way)

20.5.24 The assessment is focussed on the south façade.

20.5.25 The south façade has a VSC of 15-27% in some areas however the VSC is more than 80% of its baseline value.

20.5.26 This indicates a **low impact** and of **negligible** significance.

Existing Residential Properties – E6 (Galleon Way)

20.5.27 The assessment has been focused on all the facades facing the Proposed

Development.

20.5.28 A – The northwest façade has been assessed for this block. VSC is below 27% for the majority of this façade. Some areas (the corner areas) are below 15% VSC. Most of this façade is less than 80% of its baseline value. This does not meet minimum VSC requirements however a further ADF assessment has not been carried out to determine exact significance as the impact is from the illustrative Masterplan. The impact is deemed to be in the range of **high to very high** and of **moderate to major** significance. This should be further examined at later stages.

20.5.29 B - The northwest façade for this block has VSC between 15-27% and less than 80% of its baseline value for the lower half of the block.

20.5.30 The south facing façade has a VSC of 15-27% and less than 80% of its baseline value for the lower floors.

20.5.31 This does not meet minimum VSC requirements however a further ADF assessment has not been carried out to determine exact significance as the impact is from the illustrative Masterplan. The impact is deemed to be in the range of **high to very high** and of **moderate to major** significance. This should be further examined at later stages.

20.5.32 C - The north and west facing façades were assessed. Both façades show areas of VSC of 15-27%. However, the values are more than 80% of the baseline.

20.5.33 This indicates a **low impact** and of **minor** significance.

20.5.34 D - The west facing façade was assessed. The lower portion of the façade shows VSC of 15-27%. However, the values are more than 80% of the baseline.

20.5.35 This indicates a **low impact** and of **minor** significance.

Existing Open Spaces – External Overshading

Existing outdoor space – O1 (Silurian Park South)

20.5.36 The portion of Silurian Park south of Glanhowny Way has been assessed. All areas of the park have more than two hours of sun on 21st March.

20.5.37 This indicates **very low** impact and of **negligible** significance.

Existing outdoor space – O2 (Halliard Court)

20.5.38 Gardens belonging to existing properties south of Halliard Court have been assessed. All areas of the park have more than two hours of sun on March 21st.

20.5.39 Open spaces south of Halliard Court as well as the open courtyard in the middle of Halliard Court have also been assessed. All areas of the park have more than two hours of sun on 21st March.

20.5.40 This indicates a **very low** impact and of **negligible** significance.

Existing outdoor space – O3 (Schooner Drive South)

20.5.41 Residential gardens belonging to properties at Schooner Drive (north side) have been assessed. All areas of the park have more than two hours of sun on 21st March.

20.5.42 This indicates **a very low impact** and of **negligible** significance.

Assessment of Effects for the Proposed Development

20.5.43 Daylight is assessed using the following VSC criteria for the residential blocks of the Proposed Development.

- *A value of above 27% VSC (for the majority of a façade) is considered complaint with guidance.*
- *Values of 15-27% (for the significant portion of a façade) are considered marginal non-compliant.*
- *Facades with VSC less than 15% (for the significant portion of a façade) are considered non-compliant.*

20.5.44 Note that since there is no existing development for comparison, so the criteria of ensuring the new development is not less than 0.8 times its former value (for VSC) is not relevant. In addition, proposed residential buildings are part of the illustrative masterplan. As such an additional ADF assessment is not carried out for proposed residential buildings.

Proposed Development – Daylight

Proposed Residential Plot H1

20.5.45 The north and east façades are complaint and have a VSC above 27% for the full façade.

20.5.46 The south façade has marginal non-compliance, with a VSC of 15-27% for the majority of the façade. Daylight to this façade is mainly obstructed by proposed building K3. For this façade, any windows to living spaces may require special measures to ensure adequate daylight is provided.

20.5.47 The west façade has marginal non-compliance, with a VSC above 27% for most of the façade. Some lower floors have a VSC of 15-27%. This façade is mainly obstructed by proposed residential developments H3 and H4. For portions of this façade with a lower VSC, any windows to living spaces may require special measures to ensure adequate daylight is provided.

Proposed Residential Plot H2

20.5.48 The north and west façades have a VSC of above 27% for the majority of the façades. Some lower floors have a VSC between 15-27%. The north façade is obstructed by proposed residential plot H3 and the west façade is obstructed mainly by the arena. Lower floors (below level six) may require special measures for windows to living spaces to ensure adequate daylight is provided. These facades are deemed to have marginal non-compliance.

20.5.49 The south faced has marginal non-compliance, with the majority of the façade having a VSC of between 15-27%. The main obstruction is proposed hotel, K1. Windows to living spaces on the façade may require special measures to ensure adequate daylight is provided.

20.5.50 The east façade has a VSC of 15-27% for the majority of the façade. Some of the lower levels (below level four) on the lower block have a VSC below 15%. It will be difficult to provide adequate daylight to living spaces in these areas. The main obstructions for this façade are the proposed buildings H1 and K3. This façade is deemed to be non-compliant.

Proposed Residential Plot H3

20.5.51 The north façade has marginal non-compliance. VSC is above 27% for the majority of the façades. Some lower floors have a VSC of between 15-27%. The north façade is obstructed by proposed residential plot H4.

20.5.52 The east facade is non-compliant. The upper portion of the east façade (above level 3) has a VSC of between 15-27%. The lower floors have a VSC below 15%. This façade is obstructed by residential block K1.

20.5.53 The south façade is non-compliant. The upper portion of the south façade mainly has a VSC between 15-27%. Some portions of the lower floors have a VSC below 15%. This façade is obstructed by residential block K2.

20.5.54 The west facade has marginal non-compliance. The west façade has a VSC of mainly between 15-27%. The higher block has a VSC of above 27% for the west facing façade.

20.5.55 For portions of the façade with VSC between 15-27%, windows to living spaces may require special measures to provide adequate daylight. It will be difficult to provide adequate daylight for portions of the facade with VSC less than 15%.

Proposed Residential Plot H4

20.5.56 The north and west façades are complaint and have a VSC above 27% for the full façade.

20.5.57 The east facing façade is non-compliant. It has a VSC of about 27% for the upper portion of the façade. The portion of the façade below the overhang performs less well. The lower floor has a VSC of between 15-27% and the upper floor (level two) has a VSC of below 15%. This façade is obstructed mainly by proposed residential block H1.

20.5.58 The south façade has non-compliance, it has a VSC of 15-27% for the majority of the façade. The lower portion of the façade (below level two) for the bigger block has a VSC below 15% for a proportion of it. This façade is obstructed by proposed residential blocks K2 and K3.

20.5.59 For portions of the façade with a VSC of between 15-27%, windows to living spaces may require special measures to provide adequate daylight. It will be difficult to provide adequate daylight for portions of the facade with VSC less than 15%.

Proposed Development – External Overshadowing

Outdoor Areas for Proposed Residential Plot H1

20.5.60 Outdoor spaces around the proposed residential plot H1 have been assessed for external overshowing. More than 50% of the outdoor areas have more than two hours of sun on 21st March.

20.5.61 This area is compliant for external overshadowing.

Outdoor Areas for Proposed Residential Plot H2-H4

20.5.62 Outdoor spaces around the proposed residential plots H2 - H4 have been assessed for external overshowing. More than 50% of the outdoor areas have more than two hours of sun on 21st March.

20.5.63 This area is compliant for external overshadowing.

20.5.64 It should be noted that outdoor space directly north of the residential blocks receives the least number of sun hours. This area will be less suitable for long term dwelling.

Proposed Event Square

20.5.65 The proposed event square ('Atlantic Square') south of the Arena has been assessed for external overshowing. More than 50% of the outdoor areas have more than two hours of sun on 21st March.

20.5.66 This area is compliant for external overshadowing.

20.6 Mitigation

Existing Properties – Daylight

20.6.1 Mitigation measures to avoid, reduce or offset the consequences of the Proposed Development have not been considered in this assessment.

20.6.2 Where significance impacts are moderate or lower, consideration of mitigation measures is not required.

20.6.3 Only the illustrative Masterplan has resulted as having a significant impact on sensitive receptors. Significance has been given as a range at this stage (moderate to major) for these cases.

20.6.4 Impacts on daylight and sunlight are, by their nature, difficult to mitigate. More options are open for the mitigation of impacts on buildings when they are still in the design stage, as is the case with the Proposed Development being at an outline stage.

Existing Open Spaces – External Overshading

20.6.5 Given that any daylight or sunlight effect will be negligible for external overshadowing on existing open spaces, mitigation measures are not considered necessary.

Proposed Development – Daylight

20.6.6 The daylight assessment has shown that some facades of proposed residential buildings have marginal-non-compliance or non-compliance with the daylight criteria (VSC levels below recommendations).

20.6.7 Mitigation measures have not been considered at this stage of design as these buildings are part of the outline planning application. At later stages mitigations should be incorporated to improve conditions (such as changes to room layout or larger windows). further discussion of this is provided in the conclusions.

Proposed Development – External Overshadowing

20.6.8 Given that sunlight effect will be negligible for external overshadowing on the Proposed Development, mitigation measures are not considered necessary.

20.7 Residual Effects

20.7.1 Given that mitigation measures have not been considered in the assessment in the existing surrounding residential properties, residual effects will be the same as those reported in Section 20.5.

20.8 Assessment of Cumulative Effects

20.8.1 Of the potential cumulative schemes that have been considered in Chapter 5 (Approach to Environmental Impact Assessment, Section 5.6.9) of the EIA, none were deemed

sufficiently close enough to significant receptors or the Proposed Development to have a cumulative impact on daylight and sunlight.

20.8.2 As such no inter-cumulative effects or intra-cumulative effects have been included in the daylight and sunlight assessments.

20.9 Conclusion

20.9.1 This Section provides the conclusions of the impact assessment of the Proposed Development on access to levels of daylight and sunlight for existing and new residential properties in the Site, as well as overshadowing of external spaces.

Existing Properties – Daylight

20.9.2 There are several existing residential properties (considered sensitive receptors) within the borders of the potential impact area of the Proposed Development.

20.9.3 The assessment summary for daylight on these existing residential properties is shown in Table 20.3.

Table 20.3 Summary of Daylight Assessment of Existing Buildings

Summary Description of the Identified Impact	Sensitivity of Receptor	Impact Magnitude	Nature of the Impact	Significance
E1 - Bute Street Properties	Medium	Low	Permanent, Direct	Negligible
E2 - Lloyd George Avenue properties				
Schooner Way Façade	Medium	High	Permanent, Direct	Minor/moderate
Hemingway Road Facade	Medium	medium to very high (no ADF carried out)	Permanent, Direct	Minor/moderate to major
E3 - Lloyd George Avenue properties (North)	Medium	Low	Permanent, Direct	Negligible
E4 – Halliard Court properties	Medium	very low	Permanent, Direct	Negligible
E5 – Schooner Way properties	Medium	Medium	Permanent, Direct	Negligible
E6 – Galleon Way properties (North)				
A	High	medium to very high (no ADF carried out)	Permanent, Direct	Moderate-Major to major
B	High	medium to very high	Permanent, Direct	Moderate-Major to major

		(no ADF carried out)		
C	High	Low	Permanent, Direct	Minor
D	High	Low	Permanent, Direct	Minor

20.9.4 The impact of the Proposed development is found to be in "Negligible Significance" category on the existing residential properties E1 (Bute Street Properties), E3 (Lloyd George Avenue properties (North)) and E4 (Halliard Court properties) and E5 (Schooner Way properties).

20.9.5 Potentially significant adverse environmental impacts have been identified for some areas of these buildings as summarised below.

Minor/Moderate Significance

20.9.6 E2 (Lloyd George Avenue), Schooner Way facade. Daylight levels are potentially affected by the Proposed Development (specifically by the Arena which is part of the detailed masterplan) on this façade. The impact is considered to be minor/moderate.

20.9.7 Of the ninety-six rooms assessed, two of the existing rooms (deemed to be kitchens) are adversely impacted by the Proposed Development.

20.9.8 It should be noted that detailed information (e.g. the size and number of the windows, the size of the room and the room usage) was required to carry out the assessment for this property. Assumptions were made for these properties based on the best available information. As such there will be some sensitivity to these assumptions and their resulting impact. Appendix 20.3 illustrates the impact of adjusting some of these assumptions (such as framing and visible light).

Minor/Moderate to Major

20.9.1 E2 (Lloyd George Avenue), Hemingway Road Façade and E6 (Galleon Way Properties) A and B. Daylight levels are adversely affected by the Proposed Development on these properties.

20.9.2 They are specifically impacted by the illustrative masterplan (outline planning) and the assessment has determined an impact range of moderate to major for all of them.

20.9.3 Mitigation measures may be considered at later stages of design that will reduce the impact of the Proposed Development. Mitigation measures can include adjustments to form, massing, and layout of the Proposed Development.

20.9.4 Detailed daylight assessments may also be carried out (such as an ADF assessment) in order to determine a more specific impact at a later stage. The impact on daylight may also be considered cumulatively with other environmental impacts (e.g. wind, acoustics) to determine a complete view on the effect of the Proposed Development.

Existing Outdoor Spaces – External Overshadowing

20.9.5 There are several existing outdoor spaces (considered sensitive receptors) within the borders of the potential impact area of the Proposed Development.

20.9.6 The assessment summary of overshowing on existing outdoor spaces is shown in Table 20.4.

Table 20.4 Summary of External Overshadowing of Existing Outdoor Spaces

Summary Description of the Identified Impact	Sensitivity of Receptor	Impact Magnitude	Nature of the Impact	Significance
Silurian Park South	High	very low	Permanent, Direct	Negligible
Halliad Court Open Space	Medium	very low	Permanent, Direct	Negligible
Residential Gardens Schooner Drive North	Medium	very low	Permanent, Direct	Negligible
Residential Gardens Schooner Drive South	Medium	Low	Permanent, Direct	Negligible

20.9.7 No adverse environmental impacts have been identified for any of the existing outdoor spaces as a result of the Proposed Development.

Proposed Residential Buildings – Daylight

20.9.8 VSC was used for assessment of proposed residential buildings.

20.9.9 The overall compliance of different façades for the proposed residential blocks is shown in Table 20.5.

Table 20.5: Summary of Compliance of Proposed Residential Blocks				
	Compliance			
Block	**North façade**	**East façade**	**South façade**	**West façade**
Proposed Residential Plot H1	Compliant	Compliant	Marginal non-compliance	Marginal non-compliance
Proposed Residential Plot H2	Marginal non-compliance	*Non-compliance*	Marginal non-compliance	Marginal non-compliance
Proposed Residential Plot H3	Marginal non-compliance	*Non-compliance*	*Non-compliance*	Marginal non-compliance
Proposed Residential Plot H4	Compliant	*Non-compliance*	*non-compliance*	Compliant

20.9.10 For facades that have marginal non-compliance, relatively straightforward design measures, not affecting building massing, could be made during detailed design stages. This may include measures such as:

- *larger windows or increased visible light transmission or*
- *changes to room layout.*

20.9.11 For facades that are non-compliant, more significant measures may be considered if they are connected to living spaces (e.g., living rooms, bedrooms and kitchens). Measures may include:

- *changes to massing such as providing cutbacks in the design of buildings that obstruct daylight,*
- *adjustments to location of obstructing buildings or*
- *changes to building usage e.g., lower floors with less daylight may be used for commercial purposes.*

20.9.12 Mitigation measures can be developed and incorporated at more detailed stages of design.

Proposed outdoor spaces – external overshadowing

20.9.13 The overall compliance of proposed outdoor spaces is shown in Table 20.6.

Table 20.6: Summary of Compliance of Proposed Outdoor Spaces	
Block	**Compliance**
Outdoor Areas for Proposed Residential Plot H1	Compliant
Outdoor Areas for Proposed Residential Plot H2-H4	Compliant
Proposed Square *	Compliant

20.9.14 All external amenity spaces were assessed to be in compliance with the guidelines.