

GABRIELS HEARNE FARRELL



# ACOUSTIC REPORT DEVELOPMENT APPLICATION REVISION 1

## 10-40 BAYVIEW TERRACE, CLAREMONT MIXED USE DEVELOPMENT

31<sup>st</sup> May 2023



For

HAMES SHARLEY

LEVEL 3, 712 Hay St Mall PERTH WA 6000

## **EXECUTIVE SUMMARY**

Gabriels Hearne Farrell Pty Ltd were commissioned to undertake an acoustic assessment of the mixed-use development at 10-40 Bay View Terrace in Claremont. The acoustic assessment confirms that the proposed development is compliant with the relevant acoustic planning policies and regulations:

#### State Planning Policy 5.4 'Road and Rail Noise'

A traffic noise and rail noise assessment has been undertaken in accordance with State Planning Policy 5.4. The assessment indicates that the forecast traffic and rail noise level (Year 2041) at the site falls below the outdoor 'Noise Targets' of State Planning Policy 5.4. As such, the building envelope of the proposed mixed-use development does not need to address traffic noise or rail noise.

#### Part F5 'Sound transmission and Insulation' of NCC 2019 (Amendment 1)

The report provides the preliminary acoustic requirements of NCC 2019 applicable to the sole-occupancy units.

#### **Environmental Protection (Noise) Regulations 1997**

A preliminary review of the environmental noise emissions suggests that compliance with the 'Assigned Levels' of the Environmental Protection (Noise) Regulations 1997 is possible. At this early stage of the project the recommended noise control strategies are as follows:

#### Mechanical services

- 1) Selection of condensing units and exhaust fans with the lowest Sound Power Level available.;
- 2) The condensing units to incorporate a 'night mode' or similar to achieve a total/combined Sound Power Level of no greater than 87 dB(A) between 10 pm and 7 am. If this is not possible then acoustic screening will be required on the eastern side of the roof plant areas;
- 3) Selection of kitchen and toilet exhaust fans with variable speed fans; and,
- 4) In-line attenuators on the basement carpark supply and exhaust fans.
- 5) Prior to the lodgement of the Building Permit, the noise emissions from the specified mechanical services shall be undertaken to ensure the proposed equipment is compliant with the 'Assigned Levels'.

#### Delivery/loading bay

6) Any delivery vehicles / trucks accessing the Walt Dribble Lane loading bay during the overnight period (10 pm to 7 am, and until 9 am on Sundays) shall switch off their vehicles whilst unloading takes place. It is recommended that signage be installed at the loading bay instructing the drivers of this requirement.

#### Food/beverage/hospitality uses within the mixed-use development

- 7) The predicted noise emissions from the ground floor alfresco dining areas and the Level 7 dining balcony are compliant with the 'Assigned Levels' for all time periods;
- 8) If a future food and beverage tenant proposes amplified music louder than low level background music (eg live entertainment), it will be the responsibility of the tenant to prepare an acoustic report for their proposed operations (this will be necessary for the Liquor Licence application).
- 9) Glass bottles and cans shall not be empties into the bins between 10 pm and 7 am (and prior to 9 am on Sundays and Public Holidays).

#### Noise intrusion from the existing entertainment/hospitality uses (Claremont Hotel and The Ave)

An assessment of noise intrusion from the existing entertainment/hospitality uses has been undertaken to determine the minimum required sound reduction for the façade for the purpose of complying with the internally adjusted 'Assigned Level' of L<sub>10</sub> 29 dB(A) within the hotel suites and apartments. The glazing on the west facades of the proposed development shall achieve a sound reduction of between  $R_w 39$  ( $R_w + C_{tr} 35$ ) and  $R_w 30$  ( $R_w + C_{tr} 28$ ).

Report Version	Author	Comment	Date
1	Benjamin Farrell	Updated DA report following comments from	31 <sup>st</sup> May 2023
		Hames Sharley	



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#### ATTACHMENTS

- APPENDIX A Traffic noise monitoring data
- APPENDIX B Traffic noise contour plans
- APPENDIX C Part F5 'Transmission and Insulation' of NCC 2019 Acoustic marked-up plans
- APPENDIX D Noise contour plans Environmental noise emissions
- APPENDIX E Low-frequency noise monitoring data (break-out from Claremont Hotel)
- APPENDIX F Noise prediction of noise break-out from the Claremont Hotel
- APPENDIX G External glazing acoustic specification for controlling noise intrusion from existing entertainment/hospitality uses.

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1	Benjamin Farrell	Updated DA report following comments from Hames Sharley	31 <sup>st</sup> May 2023



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#### 1. INTRODUCTION

This Acoustic Report addresses the relevant planning acoustic issues applicable to the proposed mixeduse development at 10-40 Bay View Terrace Claremont, at the Development Application stage. This report is based on the design drawings issued May 2, 2023.

This report addresses the mandatory acoustic requirements for this project including:

- Traffic noise intrusion (compliance with State Planning Policy 5.4);
- Part F5 'Sound Transmission and Insulation of NCC 2019 (Amendment 1); and,
- Environmental noise emissions (compliance with the Environmental Protection (Noise) Regulations 1997.

The report also gives consideration to the potential noise intrusion from the existing hospitality venues in the area.

#### 2. **PROJECT DESCRIPTION**

The proposed mixed-use development will be located at 10-40 Bay View Terrace, in Claremont. The existing site consists of a range of commercial uses, mainly retail in nature. The proposed development will consists of the following elements:

- A basement below ground level consisting of carparking, and services such as fire-pumps and other infrastructure. The basement will be accessed via a ramp off the rear laneway (Walt Drabble Lane);
- The ground floor level will be predominately commercial tenancies (retail, food and beverage, etc), much like the existing site;
- Level 1 and 2 consists of hotel suites/rooms on the Bay View Terrace side of the development, and commercial tenancies and common areas for the remainder of the level;
- Levels 3 to 6 consists of 'build to rent' apartments, positioned to the eastern half of the site; and,
- Level 7 contains the hotel reception and restaurant/bar, and six large apartments.

#### 3. TRAFFIC NOISE AND RAIL NOISE INTRUSION (STATE PLANNING POLICY 5.4)

As per Figure 1 on the following page, the proposed site falls within the trigger zones of State Planning Policy 5.4 '*Road and Rail Transport Noise and Freight Considerations in Land Use Planning*'. The trigger zones are:

- Stirling Highway; and,
- The Perth to Fremantle Rail line (Claremont Train Station).

An extensive traffic noise assessment for the noise sensitive spaces of the development has been carried out, in full accordance with the State Planning Policy 5.4. The following methodology was undertaken:

- Traffic noise level monitoring was undertaken in proximity to Stirling Highway;
- The LAeq(Day) and LAeq(Night) levels were obtained from the measured data;
- A 3D noise model of the proposed development and the surrounding area was created within the SoundPLAN 9.0 software. Traffic noise sources were incorporated into the model, and calibrated to match the measured/determined L<sub>Aeq</sub> levels;
- The calibrated traffic noise levels (L<sub>Aeq(Day)</sub> and L<sub>Aeq(Night)</sub>) were then adjusted for future traffic flows (20 year horizon, year 2041) in accordance with State Planning Policy 5.4; and,
- The noise model was then used to determine the relevant traffic noise levels reaching the façade of the hotel and apartment suites.

The review of rail noise is addressed in Section 3.2 of this report.



Figure 1 – Excerpt from PlanWA mapping tool (State Planning Policy 5.4 layer)

#### 3.1 Noise Targets

Section 6.1 of State Planning Policy 5.4 establishes the following Noise Targets applicable to the hotel suites and apartments:

Time of day	Outdoor Noise Target	Indoor Noise Target (Design Sound Level of AS 2107:2016)
Day (6 am – 10 pm)	L <sub>eq(Day)</sub> 55 dB(A)	L <sub>eq(Day)</sub> 40 dB(A)
Night (10 pm – 6 am)	L <sub>eq(Night)</sub> 50 dB(A)	L <sub>eq(Night)</sub> 35 dB(A)

Table 1 - Noise level criteria from State Planning Policy 5.4

In relation to the outdoor noise targets, the objective of the policy is to achieve:

- Acceptable indoor noise levels in noise sensitive areas (eg sleeping areas and living rooms of the hotel suites and apartments) and,
- A reasonable degree of acoustic amenity in at least one outdoor living area on each residential lot.

#### 3.2 Rail noise associated with the Perth to Fremantle rail line

The Claremont Train Station recently underwent an upgrade, inclusive new rail infrastructure (eg turnback given that Claremont Train Station is the end of the line in relation to the Forrestfield-Airport Link). As part of the Claremont Station project, the Public Transport Authority (PTA) commissioned SLR Acoustics to undertake detailed noise modelling of the upgraded station, taking into account the turn back and increased rail services associated with the airport link.

Given that extensive rail noise modelling in accordance with State Planning Policy 5.4 had already been undertaken by the PTA, our firm requested the LAeq (Day) and LAeq (Night) noise contour results in order to determine the future/forecast rail noise levels at the development site (10-40 Bay View Terrace). Jelena Sostaric (Environmental Officer from the PTA Environmental Services Branch) provided the requested SPP 5.4 rail noise contours, which are presented in Figure 2 and 3 on the following page. Dr Luke Zoontjens from SLR Acoustics clarified that the rail noise contours were generated at a height of 9 metres

above local ground level, which is suitable for a multi-storey development consisting of three storeys or more.



Figure 2 - LAeq Day forecast rail noise levels provided by the PTA



Figure 3 - LAeq Night forecast rail noise levels provided by the PTA

The forecast  $L_{Aeq(Day)}$  and  $L_{Aeq(Night)}$  rail noise contours provided by the PTA confirm that the rail noise levels at the development site are below the Outdoor Noise Targets established within State Planning Policy 5.4. Therefore, no further consideration of rail noise is required, meaning that the façades of the hotel suites and apartments do not need to be upgraded to address rail noise intrusion.

#### 3.2 Traffic noise level measurements

Traffic noise monitoring of Stirling Highway was undertaken in accordance with State Planning Policy 5.4, between Monday March 6 and Thursday March 9, 2023. The noise monitoring was conducted using an ARL Ngara Black noise monitor (Serial No. 8781C2). This equipment has been NATA calibrated, and was field calibrated prior to and following the monitoring period, with no drift in calibration evident.

The noise monitor was positioned at 14.8 metres south of Stirling Highway, in the park area near the intersection of Leura Avenue (refer to Figure 4 below). This measurement location was selected as it has full, unobstructed line-of-sight with Stirling Highway, which would allow the noise model to be properly calibrated to the measured traffic noise levels. Unfortunately there was no suitable location to measure Stirling Highway traffic noise levels at the development site itself due to too many line-of-sight obstructions.



Figure 4 – Noise monitor location (traffic noise)

A photograph of the noise monitor is provided in Figure 5.



Figure 5 - Photograph of the noise monitor in relation to Stirling Highway

#### 3.2.1 Measured traffic noise levels

As stated previously, the traffic noise monitoring was conducted at 14.8 metres south of Stirling Highway, between Monday March 6 and Thursday March 9, 2023. Fine weather and calm wind conditions persisted throughout the monitoring period. The full noise level data is presented in a chart in Appendix A.

The measured LAeq(Day) and LAeq(Night) levels are provided in Table 2.

Time of day	Measured traffic noise levels
Day (6 am – 10 pm)	L <sub>eq(Day)</sub> 64.3 dB(A)
Night (10 pm – 6 am)	L <sub>eq(Night)</sub> 57.0 dB(A)

Table 2 – Current/existing LAeq(Day) and LAeq(Night) levels at the monitoring location

#### 3.3 Calibration of traffic noise model

A traffic noise model was prepared within the SoundPLAN 9.0 software, in accordance with State Planning Policy 5.4 'Road and Rail Noise'. The software inputs utilised for the assessment are summarised below.

#### 3.3.1 Topography

Topographical data for the development site and the surrounding areas was input into the noise model based on land contour information obtained from the Locate webtool (Landgate).

#### 3.3.2 Ground absorption

All roads, carparking areas, and the like were input into the model as acoustically reflective surfaces (Ground Absorption of 0).

#### 3.3.3 Road traffic noise source

Table 3 outlines the parameters used to model the current traffic noise emissions.

Parameter	Stirling Highway, west of Leura Ave
Road surface	Dense Graded Asphalt
Vehicle speed	60 km/hr
Existing/validation traffic flow -	East bound – 14,800
2021	West bound - 16,000
(24 hour volume)	
Percentage of heavy vehicles	5.4%

Table 3 - Traffic noise source parameters used for the calibration model

The traffic noise sources were entered into the noise model in accordance with Appendix 2 'Noise Assessment Methodology' of the SPP 5.4 Implementation Guidelines:

- Each traffic noise source was input using the three-string method, with passenger vehicles at 0.5 metres above the road surface, heavy vehicle engines at 1.5 metres above the road surface, and heavy vehicle exhausts at 3.6 metres above the road surface;
- A -8.0 dB correction has been applied to heavy vehicle exhausts, and a -0.8 dB correction for heavy vehicle engines; and,
- DEFRA conversions to convert the CoRTN LA10,18hr noise levels to LAeq noise levels.

#### 3.3.4 Calibrated noise model

The traffic noise model was calibrated to the measured  $L_{Aeq(Day)}$  level of 64.3 dB(A) at the noise monitoring location. The associated noise contour plan is presented in Appendix B (Scenario 1A – Current  $L_{Aeq(Day)}$  traffic noise levels). Please note this is calibrated to the noise monitor location, and therefore the noise contours do not include the +2.5 dB correction for façade reflection (however the noise model does include acoustic reflections off the surrounding existing buildings).

#### 3.4 Forecast noise exposure (Stirling Highway traffic noise)

Following calibration of the existing traffic noise levels, the noise model was updated to:

• Include the proposed mixed-use development at 10-40 Bay View Terrace. The buildings were input into the noise model based on the architectural drawings prepared by Hames Sharley. Point

receivers were input into the noise model at various façade locations such that specific noise levels could be determined at each floor level.

• Adjust the traffic noise sources to account for future traffic flows (Year 2041). This is discussed further in Section 3.4.1.

#### 3.4.1 Increase in traffic noise based on future traffic flows

Main Roads Western Australia provided the existing/validation traffic volumes (Year 2021) and the forecast traffic volumes for the Year 2041 (provided by Scott Hazebroek, Transport Modelling Analyst, Reference No. 42528 – March 8, 2023). This data allows the traffic noise model to be adjusted for future traffic flows as required by State Planning Policy 5.4.

Table 4 outlines the existing and forecast traffic flow data provided by MRWA.

Road	Existing traffic volumes (2021 validation)	Forecast traffic volumes (2041)	Resultant increase in traffic noise levels
Stirling Highway	East bound – 14,800 West bound – 16,000	East bound – 18,200 West bound – 19,000	0.82 dB

Table 4 – Future traffic volumes

#### 3.4.2 Noise modelling results

The Scenario 1B noise contour plan in Appendix B illustrates the predicted  $L_{Aeq (Day)}$  traffic noise levels, taking into account the future traffic volumes (year 2041) and incorporating the proposed buildings. The noise contours are generated at a height of 25 metres above ground level, which represents the noise level at sixth floor level. The specific noise levels noted in Appendix B are taken from the point receivers assigned to the proposed buildings within the noise model, which demonstrate the resultant traffic noise reaching the various floor levels.

The Scenario 1B results indicate that the forecast (2041)  $L_{Aeq(Day)}$  noise levels at all facades are below the Day Outdoor Noise Target of 55 dB(A). It is apparent that the multi-storey buildings directly abutting Stirling Highway (eg Bunnings) provide acoustic screening that blocks line-of-sight between the traffic noise source and the apartment tower façade.

The Scenario 1C noise contour plan in Appendix B illustrates the  $L_{Aeq (Night)}$  traffic noise levels, taking into account the future traffic volumes (year 2041). The Scenario 1C results confirm that the forecast (2041)  $L_{Aeq(Night)}$  noise levels at all facades are below the Night Outdoor Noise Target of 50 dB(A).

The traffic noise modelling undertaken in accordance with State Planning Policy 5.4 confirms that the traffic noise emissions from Stirling Highway are compliant with the Outdoor Noise Targets, therefore an assessment of traffic noise intrusion is not required.

#### 3.5 Traffic noise from Leura Avenue and Gugeri St

Leura Avenue and Gugeri Street are not trigger roads under State Planning Policy 5.4. However, we are aware that Section 5.3 'Acoustic Considerations' of the DRAFT 'Town of Claremont Town Centre Precinct Structure Plan' recommends that noise sensitive development within 50 metres of Leura Avenue and Guguri St be reviewed in terms of traffic noise intrusion.

Figure 6 on the following page illustrates that only a very small portion of the development site is located within 50 metres of Gugeri St (the yellow portion at the north-east corner of the development site). In Section 6 of this report recommendations have been made to provide upgraded external glazing (a sound reduction of  $R_w$  39) in this location in order to reduce noise intrusion from the nearby Claremont Hotel. This glazing will also address any traffic noise associated with Gugeri Street.



Figure 6 – Portion of the development site within 50 metres of Gugeri St and Leura Ave

## 4. PART F5 'SOUND TRANSMISSION AND INSULATION' OF THE NCC

The hotel suites and apartments within the development shall comply with Part F5 'Sound Transmission and Insulation' of NCC 2019 (Amendment 1).

#### 4.1 Walls around the sole-occupancy units

The hotel suites and apartments are deemed to be Class 3 *Sole-occupancy units*. The minimum acoustic requirements for perimeter walls surrounding the *sole-occupancy units* are summarised in Table 5.

Please note that the BCA defines a 'habitable room' as including a bed room, living room, lounge room, music room, kitchen, dining room, sewing room, study, playroom, family room, home theatre, and sunroom. The definition of a 'habitable room' specifically <u>excludes</u> a bathroom, laundry, WC, pantry, walk-in robe, corridor, hallway, lobby, clothes-drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods.

Situation	NCC Part F5 requirement
Walls separating the sole-occupancy units	R <sub>w</sub> +C <sub>tr</sub> 50
Walls separating a bathroom, WC, laundry, or kitchen of one sole-	R <sub>w</sub> + C <sub>tr</sub> 50 +
occupancy unit from a habitable room of another sole-occupancy	Discontinuous construction
unit	
Walls to public corridors, lobbies, stairs, or parts of a different	R <sub>w</sub> 50
classification	
Walls to lifts and plant rooms (inclusive of risers incorporating major	R <sub>w</sub> + C <sub>tr</sub> 50 +
ductwork)	Discontinuous construction
Walls between ducts/risers and habitable rooms of the sole-	R <sub>w</sub> + C <sub>tr</sub> 40
occupancy unit	
Walls between ducts/risers and non-habitable rooms of the sole-	R <sub>w</sub> + C <sub>tr</sub> 25
occupancy unit	

Table 5 - NCC Part F5 requirements for walls around the sole-occupancy units

The marked-up plans in Appendix C identify where the various acoustic ratings apply.

The walls around the *sole-occupancy units* must extend full-height to the underside of the concrete slab. On the top floor, if it is not practical to extend the walls to the underside of the roof sheeting then the ceilings shall be upgraded to two layers of fire-rated plasterboard with minimum R2.0 90 mm glasswool insulation over.

#### 4.2 Floors of the sole-occupancy units

The BCA Part F5.4(a) sets out the acoustic requirement for the floors of the *sole occupancy units* in terms of both air-borne and structure-borne (impact) noise transmission. The requirements are:

- Airborne sound insulation rating  $R_w + C_{tr} 50$ ; and,
- Impact sound insulation rating
- $L'_{nT,w}$  not greater than 62 dB(A).

These requirements also apply to the floors of the *sole-occupancy units* located above parts of another classification (ie the floor separating the Level 1 hotel suites from the retail tenancies below).

The BCA establishes the following deemed-to-satisfy floor constructions for achieving the above requirements:

- Minimum 200 mm solid concrete slab with carpet on underlay; or,
- Minimum 150 mm concrete slab + 28 mm furring channels on resilient mounts + 65 mm fibrous insulation (density > 8 kg/m<sup>3</sup>) + 13 mm plasterboard ceiling.

Specification F5.2 of the BCA does not allow services to be chased into concrete or masonry elements. As such, soil, waste, and water supply pipes <u>must not</u> be embedded or encased in the concrete slab. These pipes are permitted to penetrate through the concrete slab provided appropriate collars and flexible sealant are used.

NOTE – An impact noise rating of  $L'_{nTw}$  62 represents a basic level of impact noise control, and therefore footfall noise and movement of furniture will still be clearly audible within the apartments. Where possible, an impact noise rating of  $L'_{nTw}$  < 55 should be used as a design target in order to achieve a greater degree of amenity. In our experience it is easier to achieve lower impact noise transmission with floating timber floors compared to tiled flooring. Options for achieving the impact noise target of  $L'_{nTw}$  < 55 design target includes:

- Tiled or floating timber floor with a 5 mm resilient acoustic underlay, such as Embleton Impactamat or Regupol 4519;
- Use an acoustic vinyl floor such as Tarkett Tapiflex Excellence 80 or IQ Granit Acoustic; or,
- 6 mm Cork flooring.

Note – The concrete slab thickness does not generally have a significant influence on the required impact isolation treatments.

#### 4.3 Doors of the sole-occupancy units

As per Clause F5.5(b) of the BCA, the entry doors to each sole-occupancy unit shall achieve a minimum sound reduction of  $R_w$  30. This can be achieved by specifying 50 mm solid core doors with full-perimeter heavy duty acoustic seals (eg Raven Rp 24 and Rp38 seals). Door grilles <u>are not</u> permitted in these doors.

#### 5. ENVIRONMENTAL NOISE EMISSIONS

The noise emissions from the proposed development to the surrounding premises must comply with the Environmental Protection (Noise) Regulations 1997. These regulations establish the 'Assigned Levels' which are the noise levels that shall not be exceeded at the surrounding properties.

The nearest noise sensitive premises are the existing residences east of Leura Ave (on Mary St); and the apartments at Claremont Quarter. The apartments and hotel suites within the proposed development are also deemed to be noise sensitive.

#### 5.1 Assigned Levels

#### 5.1.1 Assigned Levels for Claremont Quarter apartments

The following 'Assigned Levels' are applicable at the Claremont Quarter Apartments. This is based on an *Influencing Factor* of 9 dB:

- Major Road within the 450 m circle (Stirling Highway with over 30,000 vpd) = 2 dB
- Secondary Road within the 100 m circle (Gugeri St with over 8,000 vpd) = 2 dB.
- 62% of the 100 m circle and 30% of the 450 m circle consist of commercial land-use = 5 dB

Part of premises receiving noise	Part of premises Time of day eceiving noise		Assigned Level (dB)			
		L <sub>A10</sub>	L <sub>A1</sub>	L <sub>A max</sub>		
Noise Sensitive Premises: highly sensitive area	7 am to 7 pm Monday to Saturday	54	64	74		
(eg within 15 metres of a house)						
	9 am to 7 pm Sunday and public	49	59	74		
	holidays					
	7 pm to 10 pm all days	49	59	64		
	10 pm to 7 am Monday to Saturday and 10 pm to 9 am on Sundays and public holidays	44	54	64		

Table 6– Assigned Levels for the Claremont Quarter apartments

The *Influencing Factor* of 9 dB also applies to the apartments and hotel suites within the proposed mixeduse development, and therefore the 'Assigned Levels' in Table 6 are also relevant. The determination of this *Influencing Factor* is summarised below:

- Major Road within the 450 m circle (Stirling Highway with over 30,000 vpd) = 2 dB
- Secondary Road within the 100 m circle (Gugeri St with over 15,500 vpd) = 2 dB.
- 75% of the 100 m circle and 19% of the 450 m circle consist of commercial land-use = 5 dB

#### 5.1.2 Assigned Levels for the residences on Mary St

The 'Assigned Levels' applicable at the residences on Mary St located to the east of the proposed development are provided in Table 7. This is based on an *Influencing Factor* of 6 dB:

• Major Road within the 450 m circle (Stirling Highway with over 30,000 vpd) = 2 dB

- Secondary Road within the 100 m circle (Leura Ave with over 9,700 vpd) = 2 dB.
- 26% of the 100 m circle and 17% of the 450 m circle consist of commercial land-use = 2 dB

Part of premises receiving noise	Time of day	Assigned Level (dB)			
		L <sub>A10</sub>	L <sub>A1</sub>	L <sub>A max</sub>	
Noise Sensitive Premises: highly sensitive area	7 am to 7 pm Monday to Saturday	51	61	71	
(eg within 15 metres of a house)					
	9 am to 7 pm Sunday and public holidays	46	56	71	
	7 pm to 10 pm all days	46	56	61	
	10 pm to 7 am Monday to Saturday and 10 pm to 9 am on Sundays and public holidays	41	51	61	

Table 7- Assigned Levels for the residences on Mary St

#### 5.1.3 Assigned Levels for the commercial premises

The 'Assigned Levels' for commercial premises is provided in Table 8 below.

Type of premises receiving noise	Time of day	Assigned Level (df		Assigned Level (dB)		IB)
		L <sub>A10</sub>	L <sub>A1</sub>	L <sub>A max</sub>		
Commercial premises	All hours	60	75	80		

Table 8 - Assigned Levels for commercial premises

The previous tables refer to three types of 'Assigned Levels':

L<sub>Amax</sub> - the noise level which is not to be exceeded at any time.

 $L_{A1}$  - the noise level which is not to be exceeded for more than 1% of the time (eg for more than 36 seconds in 1 hour).

 $L_{A10}$  - the noise level which is not to be exceed for more than 10% of the time (eg for more than 6 minutes in 1 hour).

#### 5.1.4 Noise Character

Regulation 7(b) requires that the noise emission must be 'free' of annoying characteristics, namely tonality (eg whining, droning), modulation (like a siren), and impulsiveness (eg thumping). Where noise emissions do exhibit the above noise characteristics, an adjustment is made to the measured/calculated noise level (in accordance with Regulation 9):

- Tonality 5 dB is added to the measured/calculated level
- Modulation 5 dB is added to the measured/calculated level
- Impulsiveness 10 dB is added to the measured/calculated level

#### 5.2 Noise emissions from mechanical services

At this early stage of the project the mechanical services have not been designed, selected or specified. However, an indicative assessment of noise emission from the condensing units has been undertaken using the SoundPLAN 9.0 software, utilising the *concawe* algorithm. The assessment has been based on the following noise modelling inputs.

#### 5.2.1 Meteorological conditions

The meteorological conditions used for the noise modelling is outlined below. These are considered the worst-case for noise propagation, and are taken from the document titled EPA Guidance for the Assessment of Environmental Factors – No.8 Environmental Noise:

- Temperature 20°C.
- Relative Humidity 50%
- Pasquil Stability Class
- Wind 4 m/s in all directions

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#### 5.2.2 Condensing unit noise levels

We have been advised that the condensing units will be located on the roof of the apartment tower. For the purpose of this indicative assessment it has been assumed that the total/combined Sound Power Level of the condensing units will be 90 dB(A), as per Table 9.

Frequency (Hz)	63	125	250	500	1k	2k	4k	dB(A)
Condensing units Total/combined - Sound Power level	94	93	91	89	84	80	75	90

Table 9 – Sound Power Level of the condensing units

#### 5.2.3 Resultant noise levels at the noise sensitive premises

The results of the noise modelling are provided on the Scenario 3 noise contour plan in Appendix D. The noise contours are generated at a height of 1.5 metres above ground level, however the noise levels at the Claremont Quarter apartments have been retrieved from point receivers positioned at the various floor levels of the apartments.

A summary of the results is provided below:

Receiver location	Calculated noise level	Adjusted noise level including the +5 dB penalty for tonality	'Assigned Level (L <sub>10</sub> ) during the night period	Compliance
Claremont Quarter Apartments	L <sub>10</sub> 39 dB(A)	L <sub>10</sub> 44 dB(A)	L <sub>10</sub> 44 dB(A)	YES
Mary St residences	L <sub>10</sub> 39 dB(A)	L <sub>10</sub> 44 dB(A)	L <sub>10</sub> 41 dB(A)	NO, minor exceedence

Table 10 - Predicted noise emissions from the mechanical services

The following conclusions can be drawn from the above noise modelling results:

- During the daytime and evening periods, the total/combined Sound Power Level of the condensing units shall not exceed 92 dB(A);
- During the night period (10 pm to 7 am, and until 9 am on Sundays and Public Holidays), the total/combined Sound Power Level of the condensing units shall not exceed 87 dB(A); and,
- If the above Sound Power Levels cannot be met, then acoustic screening shall be provided along the eastern side of the condenser deck to further reduce noise transmission to the residences.

#### 5.3 Delivery vehicles

Delivery vehicles accessing the commercial tenancies and hotel will access the site via Walt Drabble Lane. As per Figure 7 on the following page, a loading bay is proposed directly adjacent/parallel to the laneway. Given that Walt Drabble Lane is a one-way street, the delivery vehicles will forward into and out of the bay, thus avoiding the use of reversing beepers.

The noise from vehicles on publicly accessible roads <u>is not</u> governed by the Environmental Protection (Noise) Regulations 1997. However, if a delivery vehicle is idling within the loading bay which is located

within the lot boundary, the noise emissions from the vehicle shall comply with the 'Assigned Levels' of the Environmental Protection (Noise) Regulations 1997.



Figure 7 – Location of loading bay for delivery vehicles

An assessment of potential noise emissions from a medium sized rigid truck has been modelled.

#### 5.3.1 Delivery vehicle Sound Power Level

The following Sound Power Level has been used for the assessment of a delivery vehicle idling within the loading bay. This is based on noise level measurements conducted at a truck depot near Perth airport.

Frequency (Hz)	63	125	250	500	1k	2k	4k	dB(A)
Rigid truck idling - Sound Power level	99	94	91	90	86	82	76	91

Table 11 - Sound Power Level of rigid truck idling

#### 5.3.2 Predicted noise emissions from truck reversing at loading dock

The Scenario 4 noise contour plan in Appendix D illustrates the potential noise emissions from a truck idling within the loading bay. The noise contours are generated at 1.5 metres above ground level. The results are summarised in Table 12 below:

Receiver location	Calculated noise level	Adjusted noise level including the +5 dB penalty for tonality	'Assigned Level (L <sub>10</sub> ) during the night period	Compliance
Claremont Quarter Apartments	L <sub>10</sub> 24 dB(A)	L <sub>10</sub> 29 dB(A)	L <sub>10</sub> 44 dB(A)	YES
Mary St residences	L <sub>10</sub> <35 dB(A)	L <sub>10</sub> <35 dB(A)	L <sub>10</sub> 41 dB(A)	YES
Closest apartment to the loading bay (this development)	L <sub>10</sub> 43 dB(A)	L <sub>10</sub> 48 dB(A)	L <sub>10</sub> 44 dB(A)	NO

Table 12 – Predicted noise emissions from a truck idling at the loading bay

The noise modelling suggests that the noise emissions from delivery vehicles to surrounding premises will comply with the 'Assigned Levels' at all time periods. In relation to the noise transmission to the apartments on the east facade of the proposed development, the noise modelling suggests compliance will be achieved for all time periods, except for at night between 10 pm and 7 am. It is therefore suggested that signage be installed at the loading bay instructing drivers to turn-off their vehicles whilst stationary between the hours of 10 pm and 7 am (and prior to 9 am on Sundays and Public Holidays).

#### 5.4 Waste collection

Regulation 14A of the Environmental Protection (Noise) Regulations 1997 addresses the noise emissions associated with waste collection. Fundamentally, waste collection activities are exempt from complying with the 'Assigned Levels', provided the collection only occurs between the hours of 7 am and 7 pm Monday to Saturday, and between 9 am and 7 pm on Sundays and Public Holidays. This is on the basis that:

- The works are carried out in the quietest reasonable and practicable manner; and,
- The equipment used to carry out the works is the quietest reasonably available.

We understand that the proposed waste collection for this project is intended to be carried out within the hours stated above. In the event that a future waste collection provider wishes to carry out their services outside of the hours stated above, they will need to prepare their own noise management plan in accordance with Regulation 14A.

# 5.5 Noise emissions from patrons on the hotel balcony and within the alfresco dining areas of the F&B tenancies

An indicative assessment of the potential crowd noise emissions from the external areas has been modelled, based on the following assumptions:

- A total of 30 patrons on the hotel balcony (1 person per m<sup>2</sup>). It is assumed that 1/3<sup>rd</sup> of these patrons is speaking with a 'raised voice' simultaneously.
- The proponent has advised that tenancies T4, T9, T10, and T11 will likely be food and beverage tenancies, with some alfresco seating outside (similar to the existing Dolce Bellissimo Restaurant). It has been assumed that a total of 39 patrons will be located within the street alfresco seating, and that 1/3<sup>rd</sup> of these patrons will be speaking with a 'raised voice' simultaneously.
- A 'raised voice' has a sound pressure level of 66 dB(A) at 1 metre.

#### 5.5.1 Noise modelling results

The Scenario 5 noise contour plan in Appendix D illustrates the potential noise emissions from patrons in the external areas. The noise contours are generated at 1.5 metres above ground level, however the specific noise level results are taken from the point receivers attached to the buildings within the noise model. The results are summarised in Table 13 below:

Receiver location	Calculated noise level	Adjusted noise level #	'Assigned Level (L <sub>10</sub> ) Evenings (7 pm to 10 pm) and Sundays	Compliance
Claremont	L <sub>10</sub> 39 dB(A)	L <sub>10</sub> 39 dB(A)	L <sub>10</sub> 49 dB(A)	YES
Quarter				
Apartments				
Mary St	L <sub>10</sub> < 20 dB(A)	L <sub>10</sub> < 20dB(A)	L <sub>10</sub> 46 dB(A)	YES
residences				
Closest	L <sub>10</sub> 44 dB(A)	L <sub>10</sub> 44 dB(A)	L <sub>10</sub> 49 dB(A)	YES
apartment to				
Level 7 balcony				
(this				
development)				
Hotel suite (this	L <sub>10</sub> 44 dB(A)	L <sub>10</sub> 44 dB(A)	L <sub>10</sub> 49 dB(A)	YES
development)				

Table 13 - Predicted noise emissions from external patrons

# - Crowd noise does not generally exhibit any annoying characteristics as defined in the regulations (ie tonality penalty does not apply).

The predicted noise levels from patrons in the external areas are compliant with the relevant 'Assigned Levels'. Furthermore, the resultant noise levels will comply after 10 pm at night – although this is an unlikely scenario given that most of the food and beverage tenancies will close prior to 10 pm.

## 6. NOISE INTRUSION FROM EXISTING HOSPITALITY VENUES

Under the Environmental Protection (Noise) Regulations 1997, it is on the onus of the noise emitter to ensure that their noise emissions are compliant with the 'Assigned Levels'. However, the *draft* 'Town Centre Precinct Structure Plan' prepared by the Town of Claremont recommends that new noise sensitive developments give consideration to noise intrusion from existing 'lifestyle uses' including cafes, restaurants, shops, hotels, and entertainment venues.

The proposed mixed-use development is located in the vicinity of the Claremont Hotel and 'The Ave' (Club Bay View).

#### 6.1 On-site noise monitoring of entertainment noise

A noise monitor was installed on-site between Friday March 10 and the morning of Tuesday March 13, 2023, in order to ascertain the level of entertainment noise present in the area. The noise monitoring was conducted using an ARL Ngara Black noise monitor (Serial No. 8781C2). This equipment has been NATA calibrated, and was field calibrated prior to and following the monitoring period, with no drift in calibration evident.

The noise monitor was installed on the roof of No. 24 Bay View Terrace, positioned close to the existing parapet wall. This location was selected as it is the only area of roof with safe access. The noise monitor location is illustrated in Figure 8 below.

![](_page_16_Picture_10.jpeg)

Figure 8 – Noise monitor location

The measured statistical noise levels are presented in Figure 9 below (15 minute intervals). The statistical noise levels are defined as follows:

Ambient noise moitoring - Roof of 24 Bayview Terrace (north-west corner)

- L<sub>max</sub> The maximum noise level recorded within the 15 minute interval.
- L<sub>10</sub> The noise level exceeded for 10% of the 15 minute interval.
- $L_{eq}$  The average noise level over the 15 minute interval.
- L<sub>90</sub> Considered to be the 'background' noise level.

Statistical noise levels, 15 minute intervals 90 85 80 75 70 65 dB(A), 15 min 60 SPL 55 50 45 40 35 -- Lmax L10 30 :30 3:30 00:1 00 00:0 1:00 00-1:30 SUNDAY MARCH 12 FRIDAY SATURDAY MONDAY MARCH 10 MARCH 13

Figure 9

In addition to storing noise level data, the noise monitor also recorded audio which allows for noise source identification. Following our analysis of the noise level data and audio files, the following conclusions can be drawn:

- The majority of the maximum noise levels (L<sub>max</sub>) are the result of vehicles driving along Bay View Terrace. However, during the evening and night periods some of the L<sub>max</sub> events were the result of people laughing and shouting whilst walking along Bay View Terrace.
- Crowd noise emissions from the Claremont Hotel is clearly audible on the Friday and Saturday evenings, mainly after 6 pm.
- Amplified music break-out from the Claremont Hotel is clearly in the evenings. The loudest music break-out occurred between 10 pm and midnight on the Friday night, which appeared to be associated with an event in the first floor Function Room (external bi-fold doors were likely to be open). The measured noise level between 10 and 11 pm on the Friday was Leq 56 to 57 dB(A).
- We understand that The Ave/Club Bay View was only open between 8 pm and 2 am on Sunday March 12 during the monitoring period. Low frequency 'bass beat' was just audible between 11 pm and 2 am. Crowd noise emissions were not audible from The Ave/Club Bay View.

#### 6.2 Low-frequency noise level data

The noise logger charts in Appendix E provide the a-weighted third-octave noise levels between 50 Hz and 125 Hz throughout the noise monitoring period. This data provides an insight into the low-frequency (ie bass beat) noise emissions from the Claremont Hotel and Club Bay View. The data clearly shows the presence of low-frequency music in the evening periods, particularly on the Friday night after 10 pm.

#### 6.3 Assessment of entertainment/hospitality noise intrusion

The resultant noise level at the various façades of the proposed mixed-use development as a result of noise emissions from the Claremont Hotel has been estimated via 3D noise modelling. The noise model was prepared within the SoundPLAN 9.0 software, using the following inputs:

- The first floor function room bi-fold doors of the Claremont Hotel were included in the model. The noise source was calibrated to the octave band noise levels measured between 10 pm and 11 pm on Friday March 10, 2023. This was achieved by placing a noise receiver into the 3D model in the same location as the noise monitor.
- Noise receiver positions were included within the noise model at each floor level of the proposed building. The intention was to determine the resultant noise level across the various façades.

The Scenario 6 noise contour plan in Appendix F illustrates the potential noise emissions from the Claremont Hotel Function Room (bi-folds open). The noise contours are generated at 7 metres above ground level, indicative of the noise levels at second floor level of the proposed mixed-use development.

The resultant noise levels at the proposed façades are outlined below:

- The noise levels at the façades of the Level 2 and 3 hotel suites facing Bay View Terrace ranges from 60 dB(A) down to 51 dB(A).
- The highest resultant noise level at the west façade of the apartments is 56 dB(A).

#### 6.4 Recommended façade specification

The design intention is to control the entertainment/hospitality noise intrusion into the hotel suites and apartments, to achieve compliance with the internally adjusted 'Assigned Level' of  $L_{10}$  29 dB(A). This criteria is derived from the night (after 10 pm) 'Assigned Level' of  $L_{10}$  44 dB(A), minus the 15 dB correction in accordance with Regulation 19(4)(a).

Octave-band noise intrusion assessments have been undertaken based on the following factors:

- The external octave-band noise level at the façade of the space;
- The size of the external glazing to each space; and,
- The likely room finishes and furnishings within the internal spaces.

The minimum recommended acoustic specification for the façades are outlined below.

#### 6.4.1 External glazing

The minimum sound reduction performance  $(R_w / R_w + C_{tr})$  for the external glazing of the hotel suites and the apartments is identified in Appendix G. Please note that the acoustic specification is for the glazing suite in its entirety, inclusive of the glass, framing, and seals. Glass only performance data <u>must not</u> be used for the purpose of acceptance and approvals.

Some of the hotel suites and apartments located close to the Claremont Hotel require a glazing system which achieves a minimum sound reduction of  $R_w$  39 ( $R_w + C_{tr}$  35). It is easier to achieve this requirement with fixed glazing and hinged doors compared to sliding doors.

NOTE – If the budget permits it is recommended that  $R_w$  39 ( $R_w$  +  $C_{tr}$  35) glazing is provided for all of the Level 1 and Level 2 hotel suites facing Bay View Terrace in order to reduce noise intrusion from people laughing/shouting in the late night periods.

#### 6.4.2 Non-glazed façade elements

All of the non-glazed façade elements of the hotel suites and apartments on the west and north facades shall be specified to achieve a minimum sound reduction of  $R_w + C_{tr} 45$ . This can be achieved by the following construction systems:

- Minimum 150 mm thick concrete wall system; or,
- A lightweight wall consisting of 9 mm fibre-cement cladding + top-hats + 92 mm studs with R2.5 glasswool batts + 2 layers of 13 mm plasterboard.

If you have any queries regarding this information please call the undersigned on 9474 5966.

Regards,

Benjamin Farrell Director M.A.A.S.

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#### ATTACHMENTS

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- APPENDIX A Traffic noise monitoring data
- APPENDIX B Traffic noise contour plans
  - APPENDIX C Part F5 'Transmission and Insulation' of NCC 2019 Acoustic marked-up plans
- APPENDIX D Noise contour plans Environmental noise emissions
- APPENDIX E Low-frequency noise monitoring data (break-out from Claremont Hotel)
- APPENDIX F Noise prediction of noise break-out from the Claremont Hotel
- APPENDIX G External glazing acoustic specification for controlling noise intrusion from existing entertainment/hospitality uses.

## **APPENDIX A**

![](_page_20_Figure_1.jpeg)

![](_page_21_Figure_0.jpeg)

SCENARIO 1A - CURRENT LAEQ(DAY) TRAFFIC NOISE LEVELS (STIRLING HIGHWAY) NOISE MODEL CALIBRATED TO TRAFFIC NOISE LEVEL MEASUREMENTS

![](_page_22_Figure_0.jpeg)

SCENARIO 1B - FORECAST YEAR 2041 LAEQ(DAY) TRAFFIC NOISE LEVELS (STIRLING HIGHWAY)

![](_page_23_Figure_0.jpeg)

SCENARIO 1C - FORECAST YEAR 2041 LAEQ(NIGHT) TRAFFIC NOISE LEVELS (STIRLING HIGHWAY)

## APPENDIX C PART F5 ACOUSTIC REQUIREMENTS OF THE BCA/NCC

#### Rw + Ctr 50 WALL DISCONTINUOUS CONSTRUCTION

(eg 2 LAYERS OF 13 mm FIRE-RATED PLASTERBOARD + 64 mm STUDS WITH 75 mm GLASSWOOL + 20 mm GAP + 64 MM STUDS + 2 LAYERS OF 13 mm FIRE-RATED PLASTERBOARD; OR, 1 LAYER OF 16 mm FYRCHEK + 76 mm STUDS WITH 75 mm GLASSWOOL + 20 mm GAP + 76 mm STUDS WITH 75 mm GLASSWOOL + 1 LAYER OF 16 mm FYRCHEK)

#### Rw + Ctr 50 WALL CONSTRUCTION

(eg 2 LAYERS OF CSR EC08 IMPACT + 92 mm RONDO QUIETSTUDS WITH 75 mm GLASSWOOL + 2 LAYERS OF CSR EC08 IMPACT; OR THE CONSTRUCTIONS OUTLINED ABOVE)

#### Rw 50 WALL CONSTRUCTION

(eg 2 LAYERS OF 13 mm PLASTERBOARD + 76 mm STUDS WITH 75 mm GLASSWOOL + 2 LAYERS OF 13 mm PLASTERBOARD; OR, 2 LAYERS 13 mm FYRCHEK + 92 mm STUDS WITH 90 mm GLASSWOOL + 1 LAYER OF 13 mm FYRCHEK)

#### Rw + Ctr 40 DUCT/RISER

(eg SOIL/WASTE PIPE LAGGED WITH PYROTEK SOUNDLAG 4525 + GAP + 64 mm STUDS WITH 75 mm GLASSWOOL + 13 mm PLASTERBOARD)

#### IIIIIIIII Rw + Ctr 25 DUCT/RISER

(eg SOIL/WASTE PIPE LAGGED WITH PYROTEK SOUNDLAG 4525 + GAP + 64 mm STUDS WITH 13 mm PLASTERBOARD; OR UNLAGGED PIPES + GAP + 64 mm STUDS WITH 75 mm GLASSWOOL + 13 mm PLASTERBOARD)

#### Rw 30 DOOR

(eg 50 mm SOLID CORE DOOR WITH FULL-PERIMETER ACOUSTIC SEALS, DOOR GRILLES ARE NOT PERMITTED

![](_page_24_Figure_13.jpeg)

 $\bigcirc$ 

## APPENDIX C PART F5 ACOUSTIC REQUIREMENTS OF THE BCA/NCC

# Rw + Ctr 50 WALL DISCONTINUOUS

(eg 2 LAYERS OF 13 mm FIRE-RATED PLASTERBOARD + 64 mm STUDS WITH 75 mm GLASSWOOL + 20 mm GAP + 64 MM STUDS + 2 LAYERS OF 13 mm FIRE-RATED PLASTERBOARD; OR, 1 LAYER OF 16 mm FYRCHEK + 76 mm STUDS WITH 75 mm GLASSWOOL + 20 mm GAP + 76 mm STUDS WITH 75 mm GLASSWOOL + 1 LAYER OF 16 mm FYRCHEK)

![](_page_25_Figure_3.jpeg)

**APARTMENTS (GENERALLY) - LEVEL 3 TO 6** 

![](_page_26_Figure_0.jpeg)

SCENARIO 3 - NOISE EMISSIONS FROM ROOF-TOP MECHANICAL SERVICES (ie CONDENSERS) - TOTAL/COMBINED SOUND POWER LEVEL OF 90 dB(A) - NO ACOUSTIC SCREENING AROUND THE CONDENSING UNITS

![](_page_27_Figure_0.jpeg)

SCENARIO 4 - RIGID TRUCK IDLING AT LOADING BAY - SOUND POWER LEVEL OF 91 dB(A)

![](_page_28_Figure_0.jpeg)

SCENARIO 5 - NOISE EMISSIONS FROM PATRONS IN EXTERNAL DINING AREAS - 30 PEOPLE ON THE LEVEL 7 HOTEL RESTAURANT BALCONY - A TOTAL OF 39 PEOPLE IN THE ALFRESCO DINING AREAS OF THE GROUND FLOOR FOOD AND BEVERAGE TENANCIES

![](_page_29_Figure_1.jpeg)

Ambient noise monitoring - Roof of 24 Bayview Terrace (north-west corner) Low-frequency analysis (50 Hz to 125 Hz)

Friday night, March 10 to 11, 2023

![](_page_30_Figure_0.jpeg)

#### Ambient noise monitoring - Roof of 24 Bayview Terrace (north-west corner) Low-frequency analysis (50 Hz to 125 Hz)

Saturday night, March 11 to 12, 2023

![](_page_31_Figure_0.jpeg)

#### Ambient noise monitoring - Roof of 24 Bayview Terrace (north-west corner) Low-frequency analysis (50 Hz to 125 Hz)

Sunday night, March 12 to 13, 2023

![](_page_32_Figure_0.jpeg)

#### Ambient noise monitoring - Roof of 24 Bayview Terrace (north-west corner) Low-frequency analysis (50 Hz to 125 Hz)

Monday night, March 13 to 14, 2023

![](_page_33_Figure_0.jpeg)

![](_page_33_Figure_1.jpeg)

SCENARIO 6 - INDICATIVE NOISE BREAK-OUT FROM THE FUNCTION ROOM OF THE CLAREMONT HOTEL (BI-FOLD DOORS OPEN)

- DOMINATED BY AMPLIFIED MUSIC (DJ ENTERTAINMENT WITHIN FUNCTION ROOM)

## APPENDIX G

#### MINIMUM SOUND REDUCTION REQUIREMENTS FOR THE EXTERNAL GLAZING FOR CONTROLLING NOISE INTRUSION FROM THE CLAREMONT HOTEL (FIRST FLOOR FUNCTION ROOM)

#### THESE GLAZING REQUIREMENTS ARE TO CONTINUE AROUND THE NORTHERN FACADE FOR THESE PARTICULAR REQUIREMENTS

![](_page_34_Figure_3.jpeg)

Shopfront Brickwork Steel Shopfront /-Windows \* Doors Indicative Location of Existing Heritage Building to be

> Α Rw 30 (Rw+Ctr 28) GLAZING (eg DOUBLE GLAZED SLIDING DOORS CONSISTING OF 6/12/6 OR SINGLE 6.38 mm LAMINATED GLASS)

Fixed Louvers or

Steel Canopy Finished

- В Rw 33 (Rw+Ctr 31) GLAZING (eg DOUBLE GLAZED SLIDING DOORS CONSISTING OF 6.5 mm VLAM HUSH GLASS + MIN 8 mm GAP + 5 mm TOUGHENED; OR FIXED GLASS OR HINGED DOORS WITH 10.38 mm VLAM HUSH GLASS)
- С Rw 39 (Rw+Ctr 35) GLAZING (eg SHUCO ASS39 SLIDING DOOR CONSISTING OF 10.5 mm VLAM HUSH GLASS + 16 mm ARGON + 6 mm GLASS; OR DOUBLE GLAZED HINGED DOOR WITH ONE PANE OF 10.5 mm VLAM HUSH GLASS AND ONE PANE OF 6 mm GLASS WITH ACOUSTIC SEALS)

NOTE 1 - IF THE BUDGET PERMITS, IT IS RECOMMENDED THAT THE TYPE C GLAZING (Rw 39) IS PROVIDED FOR ALL THE LEVEL 1 AND 2 HOTEL SUITES FRONTING BAY VIEW TERRACE IN ORDER TO CONTROL UNLEGISLATED NOISE SUCH AS PEOPLE LAUGHING AND SHOUTING.

NOTE 2 - THE EXTERNAL GLAZING ON THE EAST FACADES AND THE SOUTH FACADES IS RECOMMENDED TO BE SPECIFIED WITH A SOUND REDUCTION OF Rw 30.

NOTE 3 - THE GLAZING ACOUSTIC REQUIREMENTS ALSO APPLY TO THE ENSUITES OF THE HOTEL SUITES FRONTING BAY VIEW TERRACE.

THE WEST FACING GLAZING OF THE HOTEL ROOMS/SUITES BEHIND (THE SUITES EAST OF THE COURTYARD) IS TO BE SPECIFIED AS TYPE B GLAZING (ie MINIMUM Rw 33)

![](_page_34_Picture_12.jpeg)