42-46 Unley Road Apartments

Environmental Noise Assessment

S8509C1

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1 INTRODUCTION

An environmental noise assessment has been prepared for the proposed mixed-use development at 42 to 46 Unley Road (the **Development**).

The Development comprises a seven-storey building, including a ground floor commercial tenancy and associated car park facility, and apartments on other floors. A cross-section of the Development is shown in Appendix A.

The assessment considers the environmental noise aspects of the Development. This includes:

- Noise ingress to the apartments and open space areas associated with mixed use, road traffic and rooftop bar music.
- Noise emissions associated with mechanical plant and car park activities to the noise sensitive receivers in the vicinity.

The Development is located within the Noise and Air Emissions Overlay of the South Australia Planning and Design Code (the **Code**). As such, the requirements of *the Ministerial Building Standard MBS 010 – Construction requirements for the control of external sound* (**MBS 010**) are mandatory for the Class 3 parts of the building. The Development is located near a major road and therefore road traffic assessments have been considered for the apartments. In addition, the Development is located near existing rooftop bar (27 Unley Road, Parkside) and therefore a music noise assessment has been conducted for the apartments.

The closest noise sensitive receivers to the Development are the residences across Unley Road to the east and across Irwin Lane to the west. An overview of the subject site and surrounding area is provided in Figure 1.

The assessment has been based on the following:

- *Enzo Caroscio Architecture* drawings for the Development, Job No: 22006, Drawing No: A2.00 to A2.07, A3.00 to A3.03, all dated 22 January 2025.
- Unattended noise measurements conducted on site from 31 January 2025 to 6 February 2025.
- The assumption that private rubbish collections will be limited to the times of the day where rubbish collection is defined to not constitute 'Local Nuisance' by the *Local Nuisance and Litter Control Act 2016*. These hours are Between 9:00 am and 7:00 pm on any Sunday or public holiday and between 7:00 am and 7:00 pm on any other day.

Figure 1: Development Location and closest Sensitive Receivers

2 PLANNING AND DESIGN CODE

The Development is located within Urban Corridor (Main Street) Zone of the South Australian Planning and Design Code (the **Code**). The closest receivers are located within the Urban Corridor (Main Street) Zone and Established Neighbourhood Zone of the Code.

The Code has been reviewed, and the provisions considered relevant to the assessment are included in Appendix B.

3 EXTERNAL NOISE INGRESS

The subject site is located within a noise attenuation area of the Noise and Air Emissions Overlay (the **Overlay**) of the Code. The provisions of the Overlay are detailed in Appendix B. In addition, the requirements of MBS 010 are mandatory at Building Rules Consent for the components of the development that are deemed a Class 2 Building under the Building Code of Australia.

3.1 Outdoor Noise

The Overlay requires that consideration be given to noise in private open space areas. As the proposed building fronts Unley Road (a high noise source), the following measures have been incorporated into the design to minimise noise on balconies:

- Most apartments include an opportunity to use a balcony that includes a frontage in a direction other than Unley Road.
- The apartments which only have a balcony fronting Unley Road have been set back to reduce noise on the balcony.
- The balconies include solid balustrades to reduce noise on the balcony, particularly when seated.

3.2 Ministerial Building Standard 010

3.2.1 Requirements

The Deemed-to-Satisfy approach of MBS 010 specifies acoustic treatment based on the Sound Exposure Category (**SEC**) of the facade. The SECs range from 1 to 5, with SEC 1 requiring the minimum level of acoustic treatment and SEC 5 requiring extensive treatment.

Unley road is designated as a 'Type B' road (the Road) with a posted speed limit of 60 km/h. The SECs for the facades exposed to the noise from Type B Road is determined based on the distance of the facade to the road corridor. Furthermore, the Urban Corridor (Main Street) Zone promotes a mixture of land uses, which invokes a minimum SEC 1 for all facades.

3.2.2 Assessment

The SECs applicable to the building facade have been determined by taking the highest SEC requirement of those applicable from the mixed use zone and the road.

Figure 2 shows the SECs that apply to the eastern facade of the Class 2 parts of the Development.

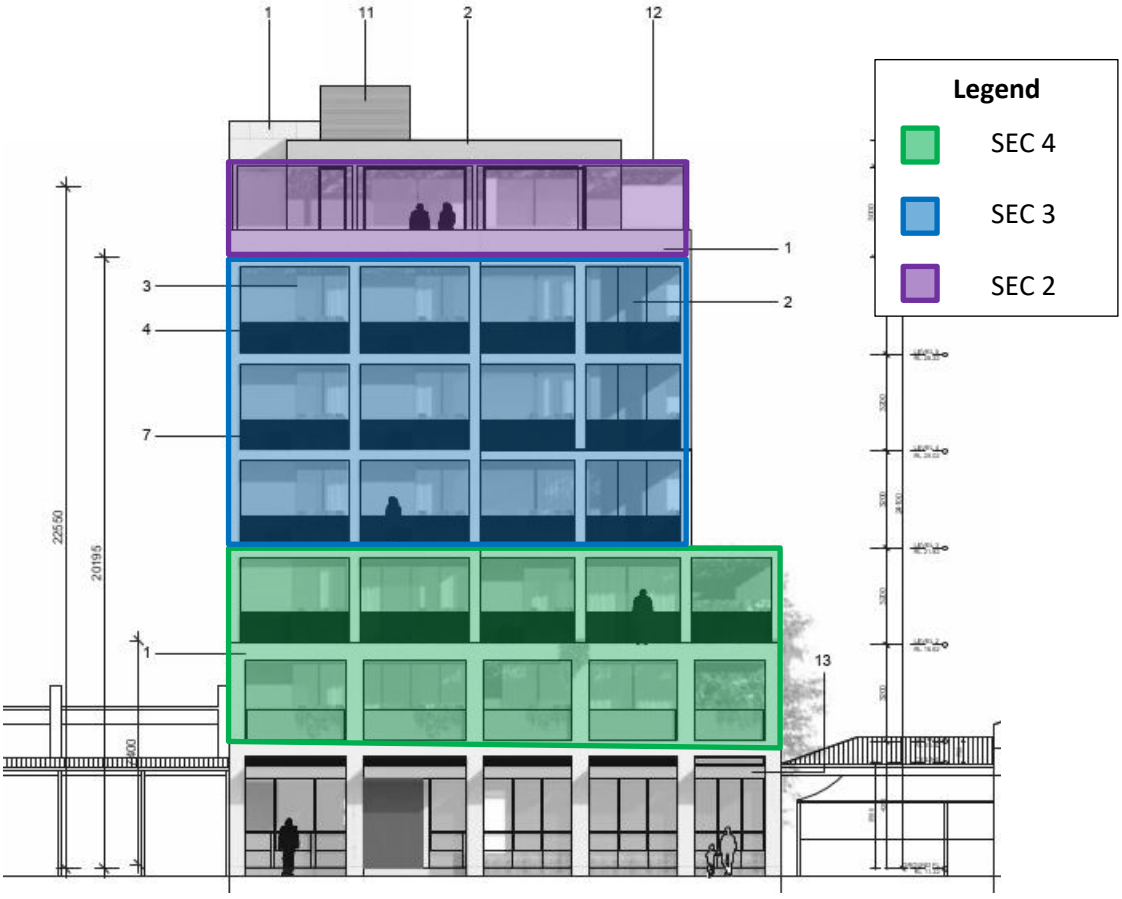


Figure 2: SECs for the eastern facades exposed to Designated Sound Sources

3.2.3 Construction Recommendations

Based upon the MBS010 requirements, the construction of building facade is required to achieve the acoustic performance requirements outlined in this section.

The following examples of upgrades to constructions are provided to achieve the minimum acoustic performance requirements of MBS 010, noting that alternative constructions that achieve the acoustic requirements could also be considered prior to building rules consent.

External Walls

Based on the SEC applicable to each external wall, Appendix C provides a markup of the corresponding minimum required acoustic rating. Table 1 provides upgraded external wall constructions that can comply with the required acoustic rating, noting that higher rated constructions may be used for walls exposed to lower SECs where required.

Table 1: Recommended External Wall Constructions

MBS 010 Acoustic Rating	Markup in Appendix C	Recommended Construction
SEC 1 $R_W + C_{tr} \geq 40$		• Fibre cement lightweight cladding: ○ minimum 9mm thick fibre cement cladding (such as Jamies Hardie *Axon*) ○ internal studs at 600mm centres with 25mm steel channels or 35mm battens fixed to the outside of the studs (total cavity width of at least 105mm) ○ 90mm thick glasswool or mineral wool insulation with density not less than 20 kg/m^3 ○ two layers of 13mm thick plasterboard lining
SEC 2 $R_W + C_{tr} \geq 45$		• Fibre cement lightweight cladding: ○ minimum 9mm thick fibre cement cladding (such as Jamies Hardie *Axon*) ○ internal studs at 600mm centres with 25mm steel channels or 35mm battens fixed to the outside of the studs (total cavity width of at least 105mm) ○ 90mm thick glasswool or mineral wool insulation with density not less than 20 kg/m^3 ○ two layers of 16mm thick fire-rated plasterboard lining

MBS 010 Acoustic Rating	Markup in Appendix C	Recommended Construction
SEC 3 and SEC 4 $R_W + C_{tr} \geq 50$	—	• Fibre cement lightweight cladding: ○ minimum 9mm thick fibre cement cladding (such as Jamies Hardie *Axon*) ○ one layer of minimum 10mm thick plasterboard ○ internal studs at 600mm centres with 25mm steel channels or 35mm battens fixed to the outside of the studs (total cavity width of at least 105mm) ○ 90mm thick glasswool or mineral wool insulation with density not less than 20 kg/m^3 ○ two layers of 16mm thick fire-rated plasterboard lining

Windows and External Glass Doors

The required thickness of glass windows and doors is dependent on the area of glazing compared to the floor area of the room, whether the room is habitable or a bedroom, as well as the SEC. Appendix C provides the minimum acoustic requirements for glazing. Based on the acoustic requirement, Deemed-to-Satisfy constructions are provided for windows in Table 2.

Table 2: Deemed-to-Satisfy Window Constructions

MBS 010 Acoustic Requirement	Markup in Appendix C	Windows	External glass doors
$R_W + C_{tr} \geq 28$	▲	6mm thick monolithic or laminated glass with sliding or double hung type opening	6mm thick monolithic or laminated glass sliding door
$R_W + C_{tr} \geq 30$	▲	6mm thick monolithic or laminated glass with awning type opening	6mm thick monolithic or laminated glass side-hung door or 10mm thick monolithic or laminated glass sliding door
$R_W + C_{tr} \geq 32$	▲	10mm thick monolithic or laminated glass with awning type opening	10mm thick monolithic or laminated glass side-hung door or 12.5mm thick laminated glass for sliding type openings
$R_W + C_{tr} \geq 34$	▲	10.5mm thick laminated glass with awning type opening	12.5mm thick laminated glass for sliding type openings

Other glazing options (double-glazed alternatives or opening arrangements) may be used provided they are installed in systems which achieve the minimum $R_W + C_{tr}$ ratings.

For all windows and external glazed doors, seals must be fitted to each edge of the openable section to restrict air infiltration. For the doors, glazing should be set and sealed in an airtight, non-hardening sealant or a soft elastomer glazing tape.

Mechanical Ventilation Systems

For the rooms within Levels 1 & 2 facing Unley road (SEC 4 exposed rooms shown in Figure 2), mechanical ventilation should be provided, achieving an R_W of at least 35 between indoor and outdoor areas and complying with Australian Standard AS 1668.2 - *The use of mechanical ventilation and air-conditioning in buildings*. The system should include:

a) relief air paths (or evaporative air conditioning) which is fully ducted to allow for the operation of the system with windows and external doors closed.
b) the fresh air (or make up air) inlets and where practicable exhaust air outlets should be at the building roof and not walls (away from the designated sound source).

For all other rooms, ventilation may be provided in the form of openable windows. If ventilation other than openable windows is proposed, it should achieve a minimum acoustic rating of R_W of at least 30 between indoor and outdoor areas. The rating can be achieved by incorporating acoustically lined ductwork to the system.

3.3 Music Noise Ingress

Noise monitoring was undertaken at the existing site, between 31 January to 6 February 2025. The location of the measurement equipment is shown in Figure 3.

Figure 3: Microphone Location

Audio recordings made during the noise monitoring have been used to determine if music noise from the rooftop bar (27 Unley Road, Parkside) was dominant at the logging location.

From the review of the noise monitoring data and the digital audio recordings on Friday and Saturday nights, the music from the rooftop bar was inaudible at the logging location. Therefore, it is determined that the music from the rooftop bar is not dominant at the Development and the measures incorporated to address mixed-use noise are sufficient.

4 NOISE EMISSION

4.1 Criteria

Performance Outcome (**PO**) 4.1 of the Interface between Land Uses module of the General Development Policies section of the Code specifically requires that noise from a development does not unreasonably impact the amenity of sensitive receivers (or lawfully approved sensitive receivers). The Deemed-to-Satisfy / Designated Performance Feature (**DTS/DPF**) for PO 4.1 references the Environment Protection (Commercial and Industrial Noise) Policy (the **Policy**).

As referenced by the Code, the Policy provides indicative noise levels to be achieved at noise sensitive receivers from noise sources such as mechanical plant and vehicle noise. The Policy is based on the World Health Organisation Guidelines for Community Noise to prevent community annoyance (1999), sleep disturbance and unreasonable interference and therefore compliance with the Policy is considered to satisfy the noise related provisions of the Code.

The goal noise levels to be achieved at sensitive receivers are based on the Code zones in which the noise source (the Development) and the noise receivers (the surrounding receivers) are located. The Policy also applies noise goals which are 5 dB(A) lower for a development, when assessed at existing receivers.

In this instance, the Policy provides the following goal noise levels:

- Residences within Urban Corridor (Main Street) Zone:
    - An equivalent noise level (L_{eq}) of 52 dB(A) during the day time (7:00am to 10:00pm).
    - An equivalent noise level (L_{eq}) of 45 dB(A) during the night time (10:00pm to 7:00am).

- Residences within Established Neighbourhood Zone:
    - An equivalent noise level (L_{eq}) of 50 dB(A) during the day time (7:00am to 10:00pm).
    - An equivalent noise level (L_{eq}) of 43 dB(A) during the night time (10:00pm to 7:00am).
    - A maximum noise level (L_{max}) of 60 dB(A) during the night time (10:00pm to 7:00am).

When measuring or predicting noise levels for comparison with the Policy, adjustments may be made for each 'annoying' characteristic of tonality, impulsiveness, intermittency, low frequency, or modulation of the noise sources. The characteristic must be considered dominant in the acoustic environment and therefore the application varies depending on the assessment location, time of day, the noise source being assessed and the predicted noise levels. The application of penalties is discussed further in Section 4.2

4.2 Assessment

4.2.1 Approach

The noise levels at the closest sensitive receivers from the Development have been predicted based on a range of previous noise measurements and observations at similar facilities, such as people talking as they vacate or approach their vehicles, the opening and closing of car doors, vehicles starting, vehicles idling, and vehicles moving into and accelerating away from parked positions.

As is typical at the Development Application stage of a project, final mechanical plant has not been selected. The assessment has therefore been based on the typical mechanical plant selections for comparable developments, as shown below:

- One AC unit for each apartment in locations shown in the drawings
- One Hot Water Plant

Sound power levels for the activities and equipment described above are provided in Appendix D.

It is recommended that the assessment of mechanical plant is updated if equipment sound power levels differ, or if the selected units change from those assumed in this assessment. Any subsequent assessment should ensure that criteria from the Policy are achieved when accounting for all the noise sources associated with the Development.

A noise model of the subject site and surrounding area has been developed using SoundPLAN software to predict the noise levels resulting at the closest receivers. The noise model considers the distance between noise sources and receivers, the sound power level generated by each noise source, the effects of acoustic screening, topography and meteorological conditions which are conducive to noise propagation (resulting in the highest noise level at receivers).

The model has been based on the following level of activity at the site, representative of worst-case activity in any 15-minute period period[1]:

- Day (7:00am to 10:00pm):
    - 6 vehicles movements into or out of the car park and corresponding general car park activity at the available car parks.
    - Continuous operation of the mechanical plant within the area shown in the drawings.
- Night (10:00pm to 7:00am):
    - 3 vehicles movements into or out of the car park and corresponding general car park activity at the available car parks.
    - Continuous operation of the mechanical plant within the area shown in the drawings.

Based on the level of activity described above, the noise criteria under the Policy are predicted to achieve the recommended levels without incorporating acoustic treatment to the site.

The predicted noise levels and the corresponding criteria are shown in Table 3.

Table 3: Highest Predicted Noise Levels

Location	Predicted Noise Level Day and Night	Day Criteria (7:00am to 10:00pm)	Night Criteria (10:00pm to 7:00am)
Receivers within Urban Corridor (Main Street) Zone	42 dB(A)	**52 dB(A)**	**45 dB(A)**
Receivers Established Neighbourhood Zone	43 dB(A)	**50 dB(A)**	**43 dB(A)**

Noise from the Development is dominated by mechanical plant noise. The noise may fluctuate to an extent, but it is not expected that this would occur in such a way or to an extent to warrant either a modulation or intermittency penalty under the Policy. Similarly, the noise is unlikely to comprise significant impulsive, low frequency or tonal components and therefore does not warrant a penalty for these characteristics under the Policy.

[1] The default assessment period of the Policy

The maximum noise levels have also been predicted for all existing sensitive receivers within the Established Neighbourhood Zone. Predicted maximum noise levels have been based on measurements at a variety of different similar sites and include noise sources such as car doors slamming and vehicles accelerating.

The predicted maximum instantaneous noise levels at any existing residence are no more than 60 dB(A), therefore achieving the maximum noise level (L_{max}) criterion of the Policy.

Based on the above, the noise from the Development is predicted to achieve the criteria provided by the Policy at all nearby noise sensitive receivers. Noise emissions from the Development will therefore satisfy DTS/DPF 4.1 of the *Interfaces between Land Uses* section of the Code, and by extension PO 4.1.

5 CONCLUSION

An environmental noise assessment has been prepared for the proposed mixed-use Development at 42 to 46 Unley Road.

The Development has been designed to minimise noise from road traffic, mixed use and rooftop bar music by incorporating measures to reduce noise in open space areas and at the facade of apartments.

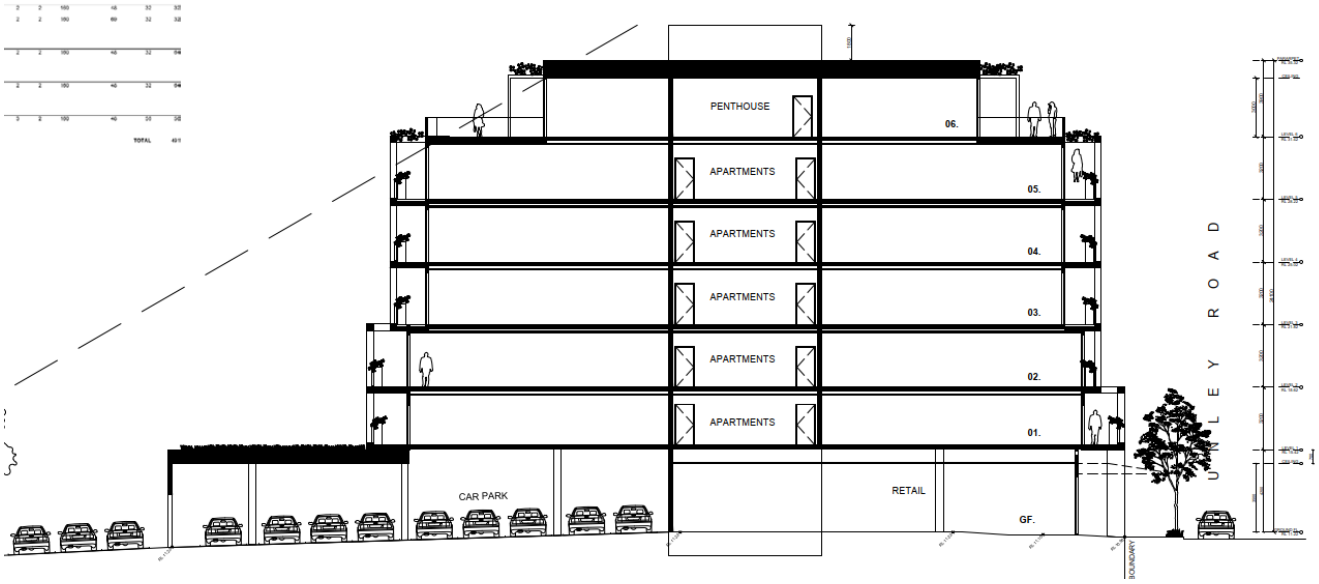
An environmental noise assessment for the noise generating activities of the Development has been conducted in accordance with Planning and Design Code and Environment Protection (Commercial and Industrial Noise) Policy 2023. The assessment has considered the noise at noise sensitive locations in the vicinity. Relevant assessment criteria have been established, and the Development has been shown to achieve the relevant criteria, without incorporating additional acoustic treatments to the site.

Based on the above, the Development will:

- Protect health and amenity of occupants from adverse impacts of noise and air emissions
- not unreasonably impact the amenity of sensitive receivers,

thereby achieving the relevant provisions of the *South Australian Planning and Design Code* related to environmental noise.

APPENDIX A: SECTION



APPENDIX B: PLANNING AND DESIGN CODE PROVISIONS

PART 3 – OVERLAYS

Noise and Air Emissions Overlay

Desired Outcome (DO)

DO 1 *Community health and amenity is protected from adverse impacts of noise and air emissions.*

Performance Outcome	***Deemed-to-Satisfy Criteria / Designated Performance Feature***
Siting and Design	
PO 1.1 *Sensitive receivers adjoining high noise and/or air pollution sources are designed and sited to shield sensitive receivers from the emission source using measures such as:* *(a) placing buildings containing non-sensitive receivers (such as retail and commercial) between the emission source and sensitive receivers* *(b) within individual buildings, placing rooms more sensitive to air quality and noise impacts (such as living rooms and bedrooms) further away from the emission source.* *(c) providing appropriate separation or erecting noise attenuation barriers, provided the requirements for safety, urban design and access can be met.* *(d) the use of building design elements such as podiums and jutting, deep or enclosed balconies (including with solid balustrades).*	*DTS/DPF 1.1* *Sensitive receivers satisfy all of the following:* *(a) do not adjoin a:* *(i) Designated Road: Type A* *(ii) Designated Road Corridor: Type B* *(iii) Designated Road: Type R* *(iv) Train Corridor* *(v) Tram Corridor* *(b) adjoining development incorporating music includes noise attenuation measures to achieve a noise level in any bedroom exposed to music noise (L10) less than:* *(i) 8 dB above the level of background noise (L90,15 min) in any octave band of the sound spectrum; and* *(ii) 5 dB(A) above the level of background noise (LA90,15 min) for the overall (sum of all octave bands) A-weighted levels.*
PO 1.3 *Development incorporating a sensitive receiver adjoining high noise and/or air pollution sources locates private open space (including ground level courtyards and balconies), common open space and outdoor play areas within educational facilities and child care facilities away from the emission source.*	*DTS/DPF 1.3* *Open space associated with a sensitive receiver is not adjoining any of the following:* *(a) Designated Road: Type A* *(b) Designated Road: Type B* *(c) Designated Road: Type R* *(d) Train Corridor* *(e) Tram Corridor* *(f) Development incorporating music.*

PART 4 – GENERAL DEVELOPMENT POLICIES

Interface between Land Uses

Desired Outcome (DO)

DO 1 *Development is located and designed to mitigate adverse effects on or from neighbouring and proximate land uses.*

<table>
<tr><th>Performance Outcome</th><th>Deemed-to-Satisfy Criteria / Designated Performance Feature</th></tr>
<tr><td colspan="2">General Land Use Compatibility</td></tr>
<tr><td>PO 1.2
Development adjacent to a site containing a sensitive receiver (or lawfully approved sensitive receiver) or zone primarily intended to accommodate sensitive receivers is designed to minimise adverse impacts.</td><td>DTS/DPF 1.2
None are applicable.</td></tr>
<tr><td colspan="2">Hours of Operation</td></tr>
<tr><td rowspan="4">PO 2.1
Non-residential development does not unreasonably impact the amenity of sensitive receivers (or lawfully approved sensitive receivers) or an adjacent zone primarily for sensitive receivers through its hours of operation having regard to:
(a) the nature of the development
(b) measures to mitigate off-site impacts.
(c) the extent to which the development is desired in the zone.
(d) measures that might be taken in an adjacent zone primarily for sensitive receivers that mitigate adverse impacts without unreasonably compromising the intended use of that land.</td><td>DTS/DPF 2.1
Development operating within the following hours:</td></tr>
<tr><td colspan="2"><table>
<tr><th>Class of Development</th><th>Hours of operation</th></tr>
<tr><td>sulting room</td><td>7am to 9pm, Monday to Friday
8am to 5pm, Saturday</td></tr>
<tr><td>ce</td><td>7am to 9pm, Monday to Friday
8am to 5pm, Saturday</td></tr>
<tr><td>, other than any one or bination of the following:
(a) restaurant
(b) cellar door in the Productive Rural Landscape Zone, Rural Zone or Rural Horticulture Zone</td><td>7am to 9pm, Monday to Friday
8am to 5pm, Saturday and Sunday</td></tr>
</table></td></tr>
</table>

Activities Generating Noise or Vibration	
PO 4.1 *Development that emits noise (other than music) does not unreasonably impact the amenity of sensitive receivers (or lawfully approved sensitive receivers).*	*DTS/DPF 4.1* *Noise that affects sensitive receivers achieves the relevant Environment Protection (Noise) Policy criteria.*
PO 4.2 *Areas for the on-site manoeuvring of service and delivery vehicles, plant and equipment,* *outdoor work spaces (and the like) are designed and sited to not unreasonably impact the amenity of adjacent sensitive receivers (or lawfully approved sensitive receivers) and zones primarily intended to accommodate sensitive receivers due to noise and vibration by adopting techniques including:* *(a) locating openings of buildings and associated services away from the interface with the adjacent sensitive receivers and zones primarily intended to accommodate sensitive receivers* *(b) when sited outdoors, locating such areas as far as practicable from adjacent sensitive receivers and zones primarily intended to accommodate sensitive receivers* *(c) housing plant and equipment within an enclosed structure or acoustic enclosure* *(d) providing a suitable acoustic barrier between the plant and / or equipment and the adjacent sensitive receiver boundary or zone.*	*DTS/DPF 4.2* *None are applicable.*

APPENDIX C: ACOUSTIC MARKUP

Level 1

Legend

External Walls

- $R_W + C_{tr} \geq 40$
- $R_W + C_{tr} \geq 45$
- $R_W + C_{tr} \geq 50$

Windows

- $R_W + C_{tr} \geq 28$
- $R_W + C_{tr} \geq 30$
- $R_W + C_{tr} \geq 32$
- $R_W + C_{tr} \geq 34$

Level 2

Legend

External Walls

- $R_W + C_{tr} \geq 40$
- $R_W + C_{tr} \geq 45$
- $R_W + C_{tr} \geq 50$

Windows

- $R_W + C_{tr} \geq 28$
- $R_W + C_{tr} \geq 30$
- $R_W + C_{tr} \geq 32$
- $R_W + C_{tr} \geq 34$

Level 3

Legend

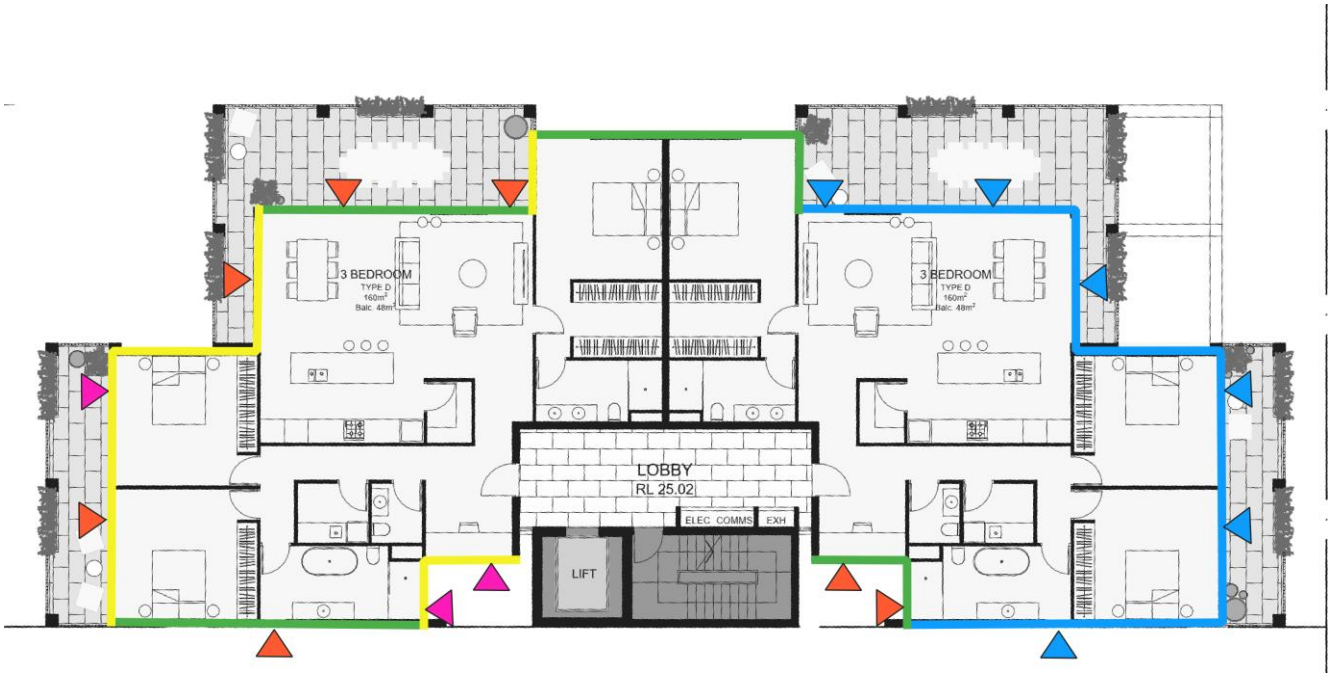
External Walls

- $R_W + C_{tr} \geq 40$
- $R_W + C_{tr} \geq 45$
- $R_W + C_{tr} \geq 50$

Windows

- $R_W + C_{tr} \geq 28$
- $R_W + C_{tr} \geq 30$
- $R_W + C_{tr} \geq 32$
- $R_W + C_{tr} \geq 34$

Level 4



Legend

External Walls

$R_W + C_{tr} \geq 40$

$R_W + C_{tr} \geq 45$

$R_W + C_{tr} \geq 50$

Windows

$R_W + C_{tr} \geq 28$

$R_W + C_{tr} \geq 30$

$R_W + C_{tr} \geq 32$

$R_W + C_{tr} \geq 34$

Level 5

Legend

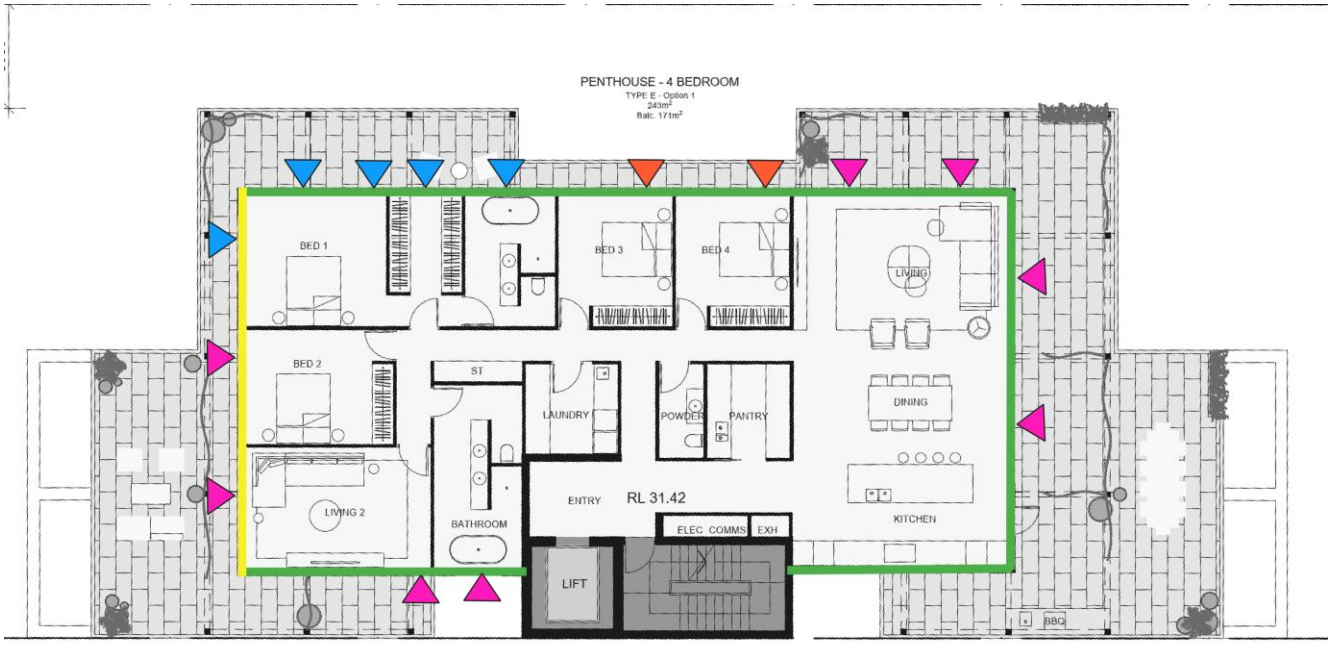
External Walls

- $R_W + C_{tr} \geq 40$
- $R_W + C_{tr} \geq 45$
- $R_W + C_{tr} \geq 50$

Windows

- $R_W + C_{tr} \geq 28$
- $R_W + C_{tr} \geq 30$
- $R_W + C_{tr} \geq 32$
- $R_W + C_{tr} \geq 34$

Level 6



Legend

External Walls

- $R_W + C_{tr} \geq 40$
- $R_W + C_{tr} \geq 45$
- $R_W + C_{tr} \geq 50$

Windows

- $R_W + C_{tr} \geq 28$
- $R_W + C_{tr} \geq 30$
- $R_W + C_{tr} \geq 32$
- $R_W + C_{tr} \geq 34$

APPENDIX D: NOISE LEVELS

Activity		Sound Power Level
Mechanical Plant	Air Conditioning Unit	73 dB(A)
	Hot water pump	83 dB(A)
Car Park	General Activity	83 dB(A)