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URPS

290 Unley Road Hyde Park Development

Traffic Noise Intrusion (MBS0-10) Assessment

50B-24-0095-TRP-79112-0

4 November 2024

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1 Introduction

Vipac Engineers and Scientists (Vipac) was engaged to conduct an acoustic assessment of the proposed 5-story development at 290 Unley Road, Hyde Park, SA 5061. The subject development is primarily residential, with a café on the ground level facing onto Unley Road.

This report provides construction recommendations which are predicted to satisfy the requirements of Minister's Building Standard 010 (MBS-010) with respect to noise ingress into habitable areas of the development.

2 References

[1] Ministerial Building Standard 010 – Construction requirements for the control of external sound, 2023 (MBS 010)

[2] The Planning & Design Code, SA (The Code)

[3] Architectural documentation, provided by URPS, dated 25/10/2024.

3 Background

The proposed development is located at 290 Unley Road, Hyde Park, consisting of 2,3 and 4 bedroom apartments, on floors 1-4. The ground floor consists of a commercial tenancy (café), carparking, services and storage areas.

Figure 3-1 details the location of the site in relation to Unley Road and the Noise and Air Emissions Overlay.

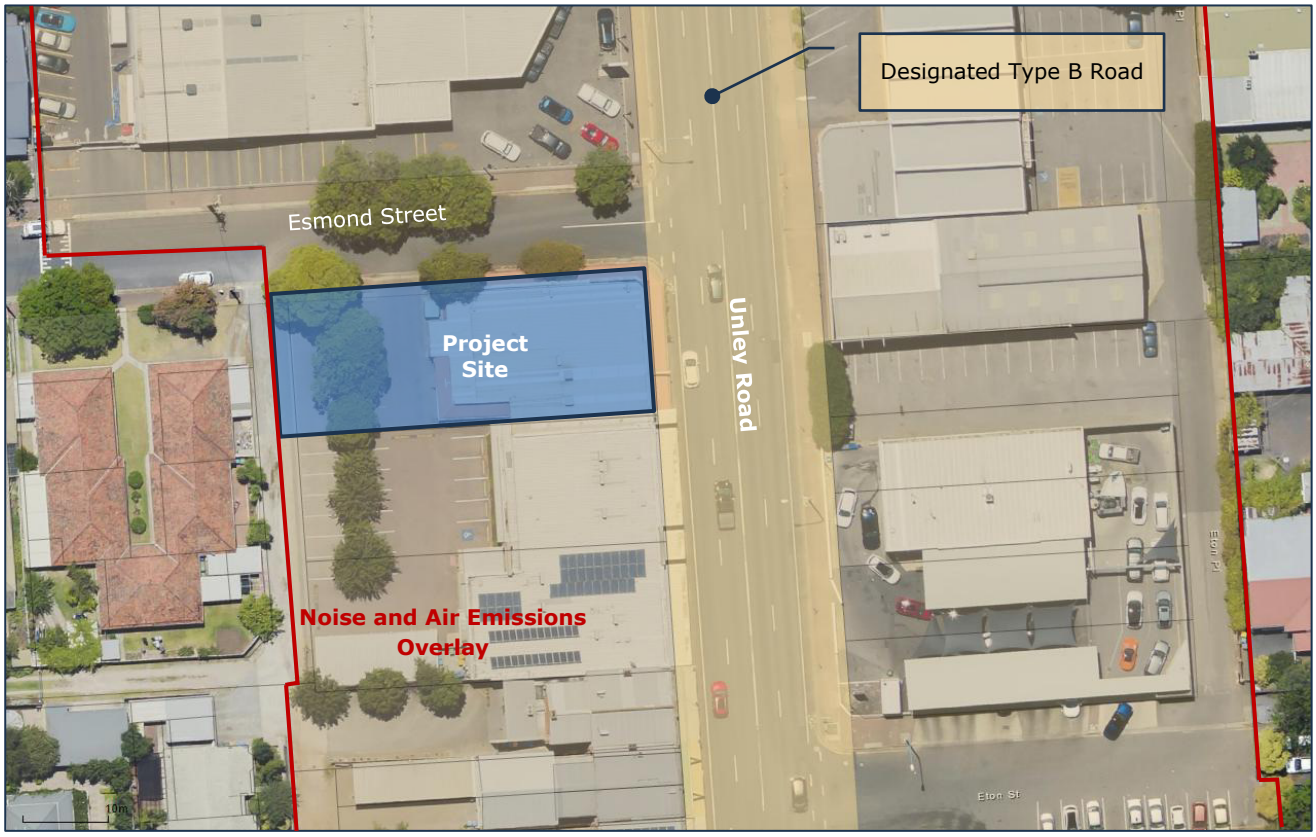

Figure 3-1: Location of Proposed Development Relative to Unley Road and Noise and Air Emissions Overlay.

4 Ministerial Building Specification (MBS 010)

4.1 MBS 010 Requirements

The proposed development is located within the SA Planning Noise and Air Emissions Overlay which requires the application of MBS 010 [1]. MBS 010 provides recommended construction specifications and methods to control noise ingress into residential buildings for occupant amenity.

MBS 010 requires assessment of the following:

- Mixed Land Use Area
- Aircraft Noise Intrusion
- Road and Rail Noise Intrusion

For each assessment MBS 010 provides methodology to determine the appropriate Sound Exposure Category (SEC), the corresponding acoustic separation performance requirements and construction specifications.

The development site is not located near a rail line or within an ANEF 20 or greater (aircraft noise exposure) contour and therefore assessment of rail or aircraft noise is not required.

4.1.1 Mixed Land Use

The development site is located in the Noise and Air Emissions Overlay; therefore, the Mixed Land Use requirements are applicable and the default minimum Sound Exposure Category for the development is SEC 1.

4.1.2 Road Noise

Road noise requires assessment based on the proximity of dwellings to Type A, B and R Roads, as defined by PlanSA SA Property and Planning Atlas (SAPPA).

The development is located approximately 9m from the centre of Unley Road (2m from the edge of the road), which is a designated Type B road. The scheduled speed limit on Unley Road is 60km/hr.

4.2 Acoustic Predictions

The SEC ratings for the facade of the proposed development have been calculated using Soundplan 8.2 noise prediction software.

The SoundPLAN model predicted the noise levels on the external façade of each habitable room of the development, allowing for shielding and reflections from the development and neighbouring buildings. Unley Road was modelled as a line source, which was calibrated such that the average noise level (L_{Aeq}) at a distance of 10m from the source was 68db(A), with a spectrum complying with the requirements detailed in Appendix A of MBS-010 [1]. The predictions used the ISO 9613-2 algorithm.

Results of the predictive noise assessment are marked on the floorplans in Appendix A, which detail the predicted noise levels and related SEC ratings for each section of façade. The mark-ups of the plans are to be used in conjunction with Section 6.2 of this report.

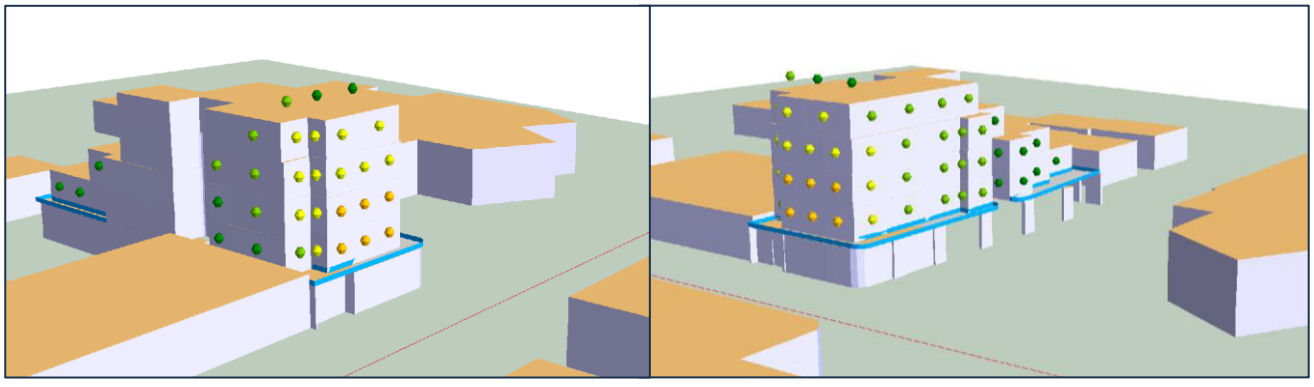

Figure 4-1: Overview of SoundPLAN acoustic model

4.3 Sound Exposure Category Requirements

The acoustic performance requirements, in terms or R_w or R_w+C_{tr}, for each SEC rating, are detailed in MBS 010 [1] and are reproduced in Table 4-1, with the required performance of external windows and glazed doors shown in Table 4-2.

Table 4-1 Minimum Airborne Sound Attenuation Ratings (R_w and R_w+C_{tr}) for Habitable Rooms

Sound Exposure Category (SEC)	Building element	Acoustic requirements
1	External walls	$R_w + C_{tr} \geq$ **40** for all habitable rooms
	Windows and external glass doors	Refer to Table 4-2
	Mechanical ventilation systems	$R_w \geq$ **25**
2	Ground Floor	$R_w + C_{tr} \geq$ **45** for all habitable rooms
	External Walls	$R_w + C_{tr} \geq$ **45** for all habitable rooms
	Windows and external glass doors	Refer to Table 4-2
	External doors other than external glass doors	$R_w \geq$ **27** for all habitable rooms
	Roof and ceilings of bedrooms	$R_w + C_{tr} \geq$ **35**
	Mechanical ventilation systems	$R_w \geq$ **25**
3	Ground Floor	$R_w + C_{tr} \geq$ **50** for all habitable rooms
	External Walls	$R_w + C_{tr} \geq$ **50** for all habitable rooms
	Windows and external glass doors	Refer to Table 4-2
	External doors other than external glass doors	$R_w \geq$ **30** for all habitable rooms
	Roof and ceilings	$R_w + C_{tr} \geq$ **40** for bedrooms $R_w + C_{tr} \geq$ **35** for bedrooms
	Mechanical ventilation systems	$R_w \geq$ **30**

Table 4-2: Minimum Airborne (R_w+C_{tr}) Requirements for Closed Windows and External Glass Doors to Habitable Rooms

Room	Area of window and external glass doors as a percentage of the floor area of the room	Sound Exposure Category R_w+C_{tr}		
		SEC 1	SEC 2	SEC 3
Bedrooms, and *non-habitable* rooms attached to bedrooms (e.g. ensuites, walk-in wardrobes)	≤ 20%	25	28	30
	20% - 40%	28	30	32
	40% - 60%	30	32	34
	60% - 80%	32	34	35
	≥ 80%	34	35	PS
***Habitable rooms*, other than bedrooms and enclosed kitchens, and attached *non-habitable rooms* (e.g. pantries)**	≤ 20%	22	25	28
	20% - 40%	25	28	30
	40% - 60%	28	30	32
	60% - 80%	30	32	34
	≥ 80%	32	34	35

4.4 Construction Requirements

Vipac notes the architectural drawings currently do not provide the overall façade construction and internal lining details. Therefore, based on our experience with similar projects and the deemed-to-satisfy provisions in MBS-010 [1], we have provided indicative minimum wall, glazing, door, and roof constructions to achieve predicted compliance with acoustic requirements of the Ministerial Building Standard 010.

4.4.1 Floors

The suspended floor of the 1st floor apartments is assumed to be of concrete construction. A minimum slab thickness of 150mm is compliant with the requirements of MBS-010 [1].

There is no requirement in MBS-010 relating to the intermediate floor constructions (i.e. floors between tenancies).

4.4.2 External Walls

To achieve the required $R_w + C_{tr}$ performance indicated in Table 4-1, external walls must comply with a suitable construction technique known to achieve the required rating, as specified in Table 4-3, below. Constructions that differ from the specifications detailed in Table 4-3 should be reviewed by an acoustic consultant during the detailed design phase of the project.

Table 4-3: Acceptable Forms of Construction for External Walls

Required acoustic performance:	**Acceptable form of construction:**
$R_w + C_{tr} \geq 40$	(A) One row of 90mm studs at 600 centres with: - 9.5mm hardboard, 9mm fibre cement sheeting or 11mm fibre cement weatherboard cladding fixed to the outside of studs; and - Not less than 75mm thick glass or mineral wool insulation, having a minimum density of 11 kg/m3, or 75mm thick polyester insulation with a density of 14 kg/m³, positioned between the studs; and - Two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs; or (B) One row of 90mm studs at 600 centres with: - Steel channels fixed to the outside of the studs; and - One layer of 19mm board cladding fixed to the outside of the channels and 6mm fibre cement sheets fixed to the inside of the channels; and - Not less than 75mm thick glass or mineral wool insulation, having a minimum density of 11 kg/m3, or 75mm thick polyester insulation with a density of 14 kg/m³, positioned between the studs; and - One layer of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.

Required acoustic performance:	Acceptable form of construction:
$R_w + C_{tr} \geq 45$	(A) One row of 90mm studs at 600 centres with: - Resilient steel channels fixed to the outside of the stud; and - 9.5mm hardboard, 9mm fibre cement sheeting or 11mm fibre cement weatherboard cladding fixed to the outside of the channels; and - Not less than 75mm thick glass or mineral wool insulation, having a minimum density of 11 kg/m3, or 75mm thick polyester insulation with a density of 14 kg/m³, positioned between the studs; and - Two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs; or (B) One row of 90mm studs at 600 centres with: - Resilient steel channels fixed to the outside of the stud; and - One layer of 19mm board cladding fixed to the outside of the channels and 6mm fibre cement sheets fixed to the inside of the channels; and - Not less than 75mm thick glass or mineral wool insulation, having a minimum density of 11 kg/m3, or 75mm thick polyester insulation with a density of 14 kg/m³, positioned between the studs; and - Two layer of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.
$R_w + C_{tr} \geq 50$	(A) Two leaves of 110 clay masonry with: - a 50mm cavity between the masonry leaves; and - 50mm thick glass wool insulation with a density of 11kg/m³ or 50mm thick polyester insulation with a density of 20 kg/m³ in the cavity; or (B) Two leaves of 110 clay masonry with: - a 50mm cavity between the masonry leaves; and - 50mm thick glass or mineral wool insulation with a density of 11kg/m³ or 75mm thick polyester insulation with a density of 20 kg/m³ in the cavity; and - One layer of 13mm plasterboard battened 50mm from the inside face; or (C) One leaf of 90mm thick brick masonry with: - a row of 70mm x 35mm timber studs or 64mm steel studs at 600mm centres; and - a 25mm cavity between the studs and the masonry; and - 75mm thick glass or mineral wool insulation with a density of 11kg/m³ or50mm thick polyester insulation with a density of 14 kg/m³ positioned between the studs; and - one layer of 10mm plasterboard fixed to the inside face. (D) Single leaf of 220mm clay brick with: - 13mm render on the outside face; and - one layer of 13mm plasterboard fixed to the inside face

4.4.3 Roof and Ceiling

The roof of the development has an SEC 1 rating, which does not have a specific construction requirement in the MBS 010 standard.

However, based on previous experience, we note that the following construction is predicted to be sufficient from an acoustic perspective:

- 0.55m standard profiled metal roofing with minimum 100mm, 22kg/m^3 fibreglass or equivalent insulation between the purlins and ceiling of 1 layer of 10mm plasterboard.

4.4.4 External Glazing (Including Glass Doors)

The typical apartment floorplans, as specified in [3] have been assessed in accordance with the requirements of Section 4.3 of this report. The architectural drawings [3] do not include room descriptions, therefore, Vipac have used the following notation: Bedroom 1 refers to bedrooms with an ensuite bathroom; the remaining bedrooms in each apartment differentiated by the bedroom's relative positions, north (N) or south (S).

The area of windows and external glazed doors as a percentage of floor area has been calculated for each of the apartment types. Using the SEC rating (detailed in Appendix A), the applicable sound insulation requirements can be determined for each façade using Table 4-4.

Table 4-4: Acoustic Insulation Requirements of Windows and External Glazed Doors by Apartment Type

Room Type	Window to Floor Area Percentage Category	Glazed acoustic performance (R_w+C_{tr})		
		SEC 1	SEC 2	SEC 3
Apartment 1.1				
Bedroom 1	< 20%	25	28	30
Living/Kitchen	60% - 80%	30	32	34
Apartment 1.2, 1.3				
Bedroom 1	20% - 40%	28	30	32
Bedroom 2	60% - 80%	32	34	35
Living/Kitchen	20% - 40%	25	28	30
Apartment 1.4				
Bedroom 1	20% - 40%	28	30	32
Bedroom 2 (N)	40% - 60%	30	32	34
Bedroom 3 (S)	20% - 40%	28	30	32
Living/Kitchen	40% - 60%	28	30	32
Apartment 2.1				
Bedroom 1	40% - 60%	30	32	34
Bedroom 2 (N)	60% - 80%	32	34	35
Bedroom 3 (S)	20% - 40%	28	30	32
Living/Kitchen	40% - 60%	28	30	32
Apartment 2.2				
Bedroom 1	20% - 40%	28	30	32
Bedroom 2	60% - 80%	32	34	35
Living/Kitchen	20% - 40%	25	28	30
Apartment 2.3				
Bedroom 1	40% - 60%	30	32	34
Bedroom 2 (N)	40% - 60%	30	32	34

Room Type	Window to Floor Area Percentage Category	Glazed acoustic performance (R_w+C_{tr})		
		SEC 1	SEC 2	SEC 3
Bedroom 3 (S)	20% - 40%	28	30	32
Living/Kitchen	40% - 60%	28	30	32
Apartment 3.1				
Bedroom 1	20% - 40%	28	30	32
Bedroom 2 (N)	60% - 80%	32	34	35
Bedroom 3 (S)	20% - 40%	28	30	32
Living/Kitchen	20% - 40%	25	28	30
Apartment 3.2				
Bedroom 1	40% - 60%	30	32	34
Bedroom 2 (N)	40% - 60%	30	32	34
Bedroom 3 (S)	20% - 40%	28	30	32
Living/Kitchen	40% - 60%	28	30	32
Apartment 4.1				
Bedroom 1	40% - 60%	30	32	34
Bedroom 2 (N)	20% - 40%	28	30	32
Bedroom 3 (S)	20% - 40%	28	30	32
Living/Kitchen	40% - 60%	28	30	32
Lounge 2	40% - 60%	28	30	32

To achieve the required R_w+C_{tr} performance indicated in Table 4-4, the following glazing configurations are recommended:

Table 4-5: Acceptable Forms of Construction for Windows and External Glass Doors

Required acoustic performance:	Glazing type:	Acceptable form of construction:
$R_w + C_{tr} \geq 22$	Windows:	3mm thick monolithic glass with sliding or double hung type opening
$R_w + C_{tr} \geq 25$	Windows:	3mm thick monolithic glass with hinged or awning type opening only
$R_w + C_{tr} \geq 28$	Windows:	6mm thick monolithic or laminated glass with sliding or double hung type opening
	External glass doors:	6mm thick monolithic or laminated glass sliding door
$R_w + C_{tr} \geq 30$	Windows:	6mm thick monolithic or laminated glass with awning type opening
	External glass doors:	6mm thick monolithic or laminated glass side hinged door, or 10mm thick monolithic or laminated glass sliding door

Required acoustic performance:	Glazing type:	Acceptable form of construction:
$R_w + C_{tr} \geq 32$	Windows:	10mm thick monolithic or laminated glass with awning type opening
	External glass doors:	10mm thick monolithic or laminated glass side-hung door
R_w + Ctr ≥ 34	Windows:	10.5mm thick laminated glass with awning type opening
	External glass doors:	12.5mm thick laminated glass for sliding type openings
$R_w + C_{tr} \geq 35$	Windows:	12.5mm thick laminated glass within awning type openings

Note: Table 4-5, above, has been reproduced (including R_w+C_{tr} ratings) from Table 5.1 of MBS 010 [1].

To achieve the R_W+C_{tr} ratings required by Table 4-5;

a) Windows must be:

i) One of the window types listed in Table 4-5 that meets the R_W+C_{tr} level required by Table 4-4, with seals fitted to each edge of the openable window to restrict air infiltration; or

ii) a window type that has been verified by the manufacturer as having the R_W+C_{tr} level required by Table 4-4.

b) External glazed doors must be:

i) one of the door types listed in Table 4-5 that meets the $R_W + C_{tr}$ level required by Table 4-4, with seals fitted to each edge of the door to restrict air infiltration and glazing set and sealed in an airtight, non-hardening sealant or a soft elastomer gasket or glazing tape; or

ii) a door type that has been verified by the manufacturer as having the $R_W + C_{tr}$ level required by Table 4-4.

c) A seal required to meet (a), (b) may be a foam or rubber compressible strip or a fibrous seal with vinyl fin interleaf or the like (brush type seals do not comply).

Where double glazing is required for thermal insulation, the acoustic separation performance of the glazing must be in accordance with the minimum defined in Table 4-5.

Where fixed glazing is installed, alternative ventilation should be provided meeting the requirements. This may require installation of mechanical ventilation or an air conditioning system complying with AS 1668.2-2012.

4.4.5 General Recommendations

Non-habitable rooms adjoining habitable rooms, such as ensuite bathrooms or walk in robes, which are bounded by a part of the building facade exposed to a designated sound source must either:

(a) be completely separated from the habitable room with walls and doors having an R_w of not less than 40, and any doors therein having an R_w of not less than 30; or

(b) be included in the habitable room and with the same minimum construction requirements.

Sheeting materials, such as plasterboard or the like must be installed as follows:

- If two layers are required, the second layer must be fastened over the first layer so that the joints do not coincide with those of the first layer; and
- Have all joints between sheets or between sheets and any adjoining construction, taped and filled solid.

Penetrations through parts of the building envelope subject to a Sound Exposure Category (SEC) must meet the following:

- Where a part of the building envelope has a sound exposure category, any plant or service, such as an air-conditioning unit, ventilation device or ductwork that passes through that part, or any permanent opening in that part, must not diminish the R_w+C_{tr} of the part.

Penetrations of the building envelope by pipes, ducts, or conduits or the like must have all gaps caulked or filled with mortar.

4.4.6 Ventilation

MBS 010 requires that where natural ventilation is provided through windows and doors, the windows and doors must comply with the insulation requirements for windows and doors in Section 4.4.4.

5 Summary

Vipac Engineers and Scientists was engaged to conduct an acoustic assessment of the proposed development at 290 Unley Road, Hyde Park.

The proposed development has been assessed against the Ministerial Building Standard 010. By adhering to the recommendations within this report the building is predicted to satisfy the relevant provisions of MBS 010.

Appendix A Façade Noise Levels


Client: URPS
Project No: 50B-24-0095
URPS
290 Unley Road
Hyde Park SA
MBS-010 Assessment
1st Floor
Noise level
in dB(A)
<= 59 (NA)
59 < <= 63 (SEC 1)
63 < <= 67 (SEC 2)
67 < <= 71 (SEC 3)
71 < <= 75 (SEC 4)
75 < (SEC 5)
Signs and symbols
Facade point
Main building
Balcony Area
Line source
Scale 1:250
ViPAC
Engineers & Scientists


Client: URPS
Project No: 50B-24-0095
URPS
290 Unley Road
Hyde Park SA
MBS-010 Assessment
2nd Floor
Noise level
in dB(A)
<= 59 (NA)
59 < <= 63 (SEC 1)
63 < <= 67 (SEC 2)
67 < <= 71 (SEC 3)
71 < <= 75 (SEC 4)
75 < (SEC 5)
Signs and symbols
Facade point
Main building
Balcony Area
Line source
Scale 1:250
ViPAC
Engineers & Scientists


Client: URPS
Project No: 50B-24-0095
URPS
290 Unley Road
Hyde Park SA
MBS-010 Assessment
3rd Floor
Noise level
in dB(A)
<= 59 (NA)
59 < <= 63 (SEC 1)
63 < <= 67 (SEC 2)
67 < <= 71 (SEC 3)
71 < <= 75 (SEC 4)
75 < (SEC 5)
Signs and symbols
Facade point
Main building
Balcony Area
Line source
Scale 1:250
ViPAC
Engineers & Scientists


BALCONY
3 BED
56 m²
LOUNGE 2
KITCHEN
LIVING
4.1 (3 BED 2 LIVING)
3 BED
A: 210 m²
ENS.
WIR
PANTRY
BATH
BED 3
SERVICES
A: 9 m²
CIRCULATION
A: 11 m²
BIN CHUTES
CORE
A: 19 m²
LAUNDRY
BED 2
Scale 1:250
0
2.5
5
10
m
N
Client: URPS
Project No: 50B-24-0095
URPS
290 Unley Road
Hyde Park SA
MBS-010 Assessment
4th Floor
Noise level
in dB(A)
<= 59 (NA)
59 < <= 63 (SEC 1)
63 < <= 67 (SEC 2)
67 < <= 71 (SEC 3)
71 < <= 75 (SEC 4)
75 < (SEC 5)
Signs and symbols
Facade point
Main building
Balcony Area
Line source
ViPAC
Engineers & Scientists