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2-44 GRAINGER ROAD, WEST FOOTSCRAY

Acoustic Report

18 September 2023

Paintback Ltd C/- Davis Advisory

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40 YEARS 1982 - 2022 ACOUSTIC ENGINEERING EXCELLENCE

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Executive summary

Renzo Tonin & Associates undertook an acoustic assessment of the proposed paint recovery plant to be located at 2-44 Grainger Road, West Footscray (the Subject Facility), to assess noise from commercial operations.

We have been briefed by Davis Advisory to consider acoustics in relation to the proposed Paint Circular Economy HQ (PaCE HQ) project in West Footscray. The PaCE HQ project is described in Annexure D of the application, and our comments and findings are referrable to that project.

In conducting the acoustic assessment, Renzo Tonin & Associates has:

- Quantified relevant noise criteria: EPA 1826-P1 'Noise Protocol'
- Measured noise levels from operational activities and associated mechanical equipment at similar industrial facilities
- Analysed the noise monitoring and measurements
- Constructed a three-dimensional noise model of the Subject Facility, to assess various noise impacts (described below)
- Assessed and compared predicted levels to noise limits.

The outcomes of the acoustic assessment are:

- Noise levels from the representative mechanical services were found to conform at all times with EPA 1826-P1 'Noise Protocol' limits.
- Noise levels from anticipated delivery activities were found to conform at all times with EPA 1826-P1 limits.
- Noise levels from the warehouse/plant operations were found to conform at all times with EPA 1826-P1 limits, with the specific construction requirements detailed in Section 6.3.1.2. The specific construction requirements include wall and ceiling treatments to the warehouse. Such treatments are commonplace, and application is straight forward to design, during the design stage when more detailed information is available.

Based on the above, the PaCE HQ project is expected to conform with all nominated criteria, and on this basis, not unreasonably affect noise amenity in the area.

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1 Introduction

Renzo Tonin & Associates undertook an acoustic assessment of the proposed paint recovery plant to be located at 2-44 Grainger Road, West Footscray (the Subject Facility), to assess noise from commercial operations.

We have been briefed by DA to consider Acoustics in relation to the proposed PaCE HQ project in West Footscray. The PaCE HQ project is described in Annexure D of the application, and our comments and findings are referrable to that project.

The acoustic assessment has been based on drawings (detailed within this assessment) and information provided by the client.

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

2 Site overview

The Subject Facility is proposing operate Monday to Saturday from 7am to 6pm. Figure 1 and Table 1 present an overview of the Subject Facility surrounding land uses.

Table 1: Existing land uses surrounding the Subject Facility

Subject Facility	2-44 Grainger Road, West Footscray • Industrial 1 Zone (IN1Z) & Industrial 3 Zone (1N3Z)
North of the Subject Facility	Rail corridor 18 Newman Drive, Footscray • General Residential Zone -Schedule 1 (GRZ1) • Residential building approximately 120 metres from the Subject Facility's existing northern boundary, across rail corridor
East of the Subject Facility	268 Geelong Road, West Footscray • Industrial 1 Zone (IN1Z) • Fenner Conveyors – Industrial equipment supplier
South of the Subject Facility	46 Grainger Road, West Footscray • Industrial 3 Zone (IN3Z) • Mixed commercial showrooms / warehouses **R1 - 2 Robbs Road, West Footscray** • Industrial 3 Zone (IN3Z) • Residential building facade approximately 30 metres from the Subject Facility **R3 - 4 Robbs Road, West Footscray** • Industrial 3 Zone (IN3Z) • Residential building facade approximately 40 metres from the Subject Facility **R5 - 5 Hansen Street, West Footscray** • General Residential Zone -Schedule 1 (GRZ1) • Residential building facade approximately 90 metres from the Subject Facility
West of the Subject Facility	11 Braid Street, West Footscray • Industrial 3 Zone (IN3Z) • Keables P/L – Fastener supplier **R2 - 1 Robbs Road, West Footscray** • General Residential Zone -Schedule 1 (GRZ1) • Residential building facade approximately 75 metres from the Subject Facility **R4 - 3 Robbs Road, West Footscray** • General Residential Zone -Schedule 1 (GRZ1) • Residential building façade approximately 80 metres from the Subject Facility **R6 – 17 Braid Street, West Footscray** • General Residential Zone -Schedule 1 (GRZ1) • Residential building façade approximately 110 metres from the Subject Facility

Figure 1: Subject Site and Facility & surrounding unattended monitoring and attended measurement locations

3 Noise measurements

3.1 Unattended long-term noise monitoring

To quantify the existing noise levels in the area, Renzo Tonin & Associates conducted unattended noise monitoring as detailed below. We conducted door knocking, to seek permission to place the monitoring equipment within the private property (as a safe and secure location) for the duration, with both residents happy to provide access.

The monitor locations (L1 & L2) are shown in Figure 1 and described in Table 2 below. APPENDIX B presents graphs of the unattended monitored noise levels at each location.

Table 2: Noise monitoring locations

ID	Location	Details
L1	1 Robbs Road- Representative of the most affected residential receiver (at 2 Robbs Road) – Approximately 70m SSW from the front fence to rear boundary facade of Subject Facility	• Monitoring period: Thursday 6th October to Thursday 13th October 2022 • The microphone was set up 1.5 metres above ground level in the front yard, 3.5m in front of the bedroom window • Generally low wind and limited precipitation for the duration of the monitoring • The noise environment was dominated by traffic noise on Geelong Road
L2	4 Hansen Street (background measurement location) – Approximately 140m SW from the rear fence of Subject Facility with dwellings in between.	• Monitoring period: Thursday 6th October to Thursday 13th October 2022 • The microphone was set up 1.5 metres above ground level, set up such that topography blocked line of sight to the Subject Facility & other noise generating industry within the surrounding area • Generally low wind and limited precipitation for the duration of the monitoring • The noise environment was dominated by local wildlife and distant traffic on Geelong Road

Notes:
1. The monitors were set to record broadband and spectral noise descriptors, and audio for noise source verification
2. Weather data per Bureau of Meteorology's Laverton RAAF weather station.

Table 3 presents background noise levels relevant for derivation of noise limits.

Table 3: Period average background noise levels

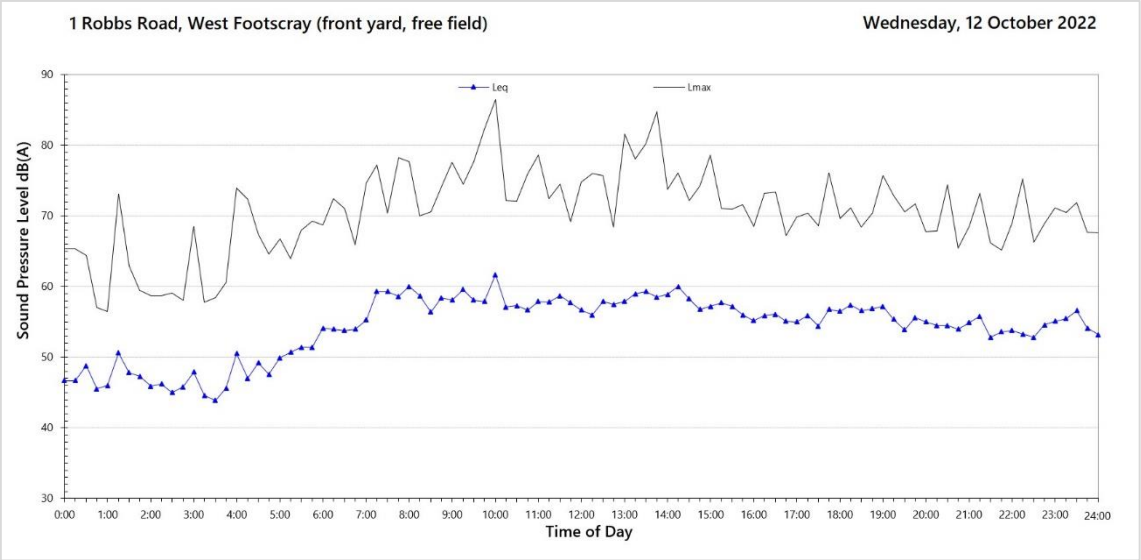
ID	Location	Representative period background noise level, L_{90} dB(A)		
		Day	Evening	Night
L1	1 Robbs Road, West Footscray	49	47	44
L2	4 Hansen Street, West Footscray	44	42	40

EPA 1826 Period Definitions:
Day: Monday-to-Saturday 7am-to-6pm; Sundays N/A
Evening: Monday-to-Saturday 6pm-to-10pm; Sundays 7am-to-10pm
Night: All days 10pm-to-7am

Notes: NTI XL2 Class 1 noise monitors were used for the campaign. The calibration of the device was checked in the field immediately before and after the measurement using a Brüel & Kjær Type 4231 calibrator; no drift in calibration was observed. The noise monitors conform with IEC 61672-1:2013 and IEC 61260-1:2014; the sound calibrator conforms with IEC 60942:2017, and all carry manufacturers certification or NATA certification detailing Standard conformance testing within the last two years and one year respectively.

Figure 2 shows an example daily profile of existing noise levels in the area at Location L1 (1 Robbs Road), which may be compared to predicted noise levels discussed in later sections of this report. APPENDIX B presents full noise profiles for each day of logging.

Figure 2: Example daily profile of existing noise levels in area



Note: APPENDIX B presents full noise profiles for each day of logging.

3.2 Offsite attended short-term noise measurements

To assist with identifying the existing noise sources in the area, Renzo Tonin & Associates conducted attended noise measurements on Thursday 6th October 2022 between 10:30am and 12:00pm. The measurement locations (A1 & A2) are shown in Figure 1 and described in Table 4 below.

These measurements have been conducted to provide a greater understanding of the surrounding environment and the potential impacts on the nearby residents to the Subject Facility. In this way, these measurements have confirmed that the noise levels recorded at the unattended monitoring location (L1) are not impacted by noise sources (i.e. industrial facilities within the area).

Table 4: Offsite noise measurement locations

ID	Location	Measurement Details[1]
A1	Corner of Grainger & Geelong Road	• Conducted on Thursday 6th October 2022 between 10:30am & 12pm • Measured noise level of 69 L_{eq} dB(A) and 59 L_{90} dB(A) • The microphone was set up 1.5 metres above ground level • The noise environment was dominated by traffic on Geelong Road
A2	Front of 17 Braid St, West Footscray	• Conducted on Thursday 6thOctober 2022 between 10:30am & 12pm • Measured noise level of 59 L_{eq} dB(A) and 55 L_{90} dB(A) • The microphone was set up 1.5 metres above ground level • The noise environment was dominated by local traffic & distant traffic on Geelong Road

Notes:
1. Measurements were set to record broadband and spectral noise descriptors, and audio for noise source verification
2. NTi XL2 sound level analysers were used for the measurement campaigns. The XL2 is a Class 1 instrument having accuracy suitable for field and laboratory use. The calibration of the device was checked in the field immediately before and after the measurement using a Brüel & Kjær Type 4231 calibrator; no drift in calibration was observed. The noise monitors conform with IEC 61672-1:2013 and IEC 61260-1:2014; the sound calibrator conforms with IEC 60942:2017, and; all carry manufacturers certification or NATA certification detailing Standard conformance testing within the last two years and one year respectively.

4 Noise sources

Renzo Tonin & Associates has used the following noise sources levels in our assessment. These levels are from measurements and database levels as provided by the client.

Table 5: Specific internal warehouse equipment/activity noise levels

Item	Equipment/activity	Noise level L_{eq} dB(A)
1	Bin Conveyor	75 dB(A) at 1m
2	Solvent RUNI Screw Compactor	100 dB(A) at 1m(i)
3	Inclined Auger (Solvent Based)	75 dB(A) at 1m
4	Inclined Auger (Water Based)	75 dB(A) at 1m
5	RUNI Screw Compactor	100 dB(A) at 1m(i)
6	Inclined Conveyor	75 dB(A) at 1m
7	Force Quad Shaft Shredder	76 dB(A) at 1m
8	Dewatering Screen 1	92 dB(A) at 1m
9	Dewatering Screen 2	92 dB(A) at 1m
10	Inclined Conveyor	75 dB(A) at 1m
11	Over-band Magnet Separator	50 dB(A) at 1m
12	Bi-Directional Conveyor	75 dB(A) at 1m
13	Inclined conveyor	75 dB(A) at 1m
14	Float Sink tank	80 dB(A) at 1m
15	Dewatering Auger	80 dB(A) at 1m
16	Granulator	105 dB(A) at 1m(i)
17	Friction Washer	105 dB(A) at 1m(i)
18	Horizontal Auger	75 dB(A) at 1m
19	Mechanical Dryer	110 dB(A) at 1m(t)
20	Blower	110 dB(A) at 1m(t)
21	Pre cleaner and Metal Detector	90 dB(A) at 1m
22	Blower	110 dB(A) at 1m(t)
23	Double Bagging Station	110 dB(A) at 1m(t)

Note (t) Where identified with (t), a 5dB 'tonality' adjustment has been applied, consistent with observed operational noise levels

(i) Where identified with (i), a 5dB 'impulsiveness' adjustment has been applied, consistent with observed operational noise levels

❖ All equipment/activity source levels are provided as broadband sound pressure levels at distance. Note that 1/3 octave band sound pressure levels (derived from these sound pressure levels at distance) have been used in this assessment.

Further to the above, ventilation equipment is understood to be required for the proposed operations. The following is understood to be the representative of the equipment that will be required. The noise levels have been taken from manufacturer technical data sheets.

Table 6: Ventilation equipment/activity noise levels

Description	Inlet noise level $L_{,eq}$ dB(A)
Supply fan – (x2) Fantech AP0714KP (operating continuously)	69 dB(A) at 3m
Exhaust fan – (x2) Fantech AP0804KE (operating continuously)	69 dB(A) at 3m
Runi exhaust fan – (x2) Fantech AP0404AE (operating continuously)	56 dB(A) at 3m

Table 7: Typical equipment/activity noise levels

Description	Noise level $L_{,eq}$ dB(A)
Outdoor air conditioner cassette (5 units assumed)	65 dB(A) at 1 metre
Forklift movement (continuous)	64 dB(A) at 5m
Small-scale exhaust fan (e.g. toilet, 5 units assumed)	57 dB(A) at 0.5 metres

5 Criteria

5.1 EPA 1826-P1 commercial noise limits

Within the Melbourne metropolitan region, noise from commercial plant and activities affecting residential properties is governed by the Victorian Part 1 of EPA Publication 1826 *'Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues'* (1826-P1), legislated by way of the Environment Protection Act 2017 (VIC); to protect beneficial domestic uses, in particular sleep during the night period.

EPA 1826-P1 noise limits are calculated from zoning and background noise levels measured within an area, in absence of intrusive commercial noise sources. Table 8 presents the applicable noise limits which have been calculated in accordance with the EPA 1826-P1.

Table 8: EPA 1826-P1 noise limits

Period	Zoning level, L_{eq} dB(A)	Background L_{90} dB(A)	Background classification	EPA 1826-P1 limit L_{eq} dB(A)
1 Robbs Road, West Footscray				
Day	*55*	*49*	*High Background*	**55**
Evening	*49*	*47*	*High Background*	**50**
Night	*44*	*44*	*High Background*	**47**
4 Hansen Street, West Footscray				
Day	*52*	*44*	*Neutral*	**52**
Evening	*46*	*42*	*Neutral*	**46**
Night	*41*	*40*	*High Background*	**43**

EPA 1826 Period Definitions:	Day:	Monday-to-Saturday 7am-to-6pm;	Sundays N/A
	Evening:	Monday-to-Saturday 6pm-to-10pm;	Sundays 7am-to-10pm
	Night:	All days 10pm-to-7am	

Notes: Background noise levels from L1 have been used for sensitive receivers that are directly affected by traffic noise from Geelong Road, while background noise levels from L2 have been used for all sensitive receivers that are shielded from traffic noise from Geelong Road.

EPA 1826-P1 noise limits are calculated from zoning and background noise levels measured within an area, in absence of intrusive commercial noise sources.

In addition, where applicable, the effective noise level is determined, for noise from commercial, industrial and trade premises, as a 30-min equivalent sound pressure level $L_{Aeq,30min}$ adjusted, where relevant for:

a. duration (A_{dur})

b. Noise character

   i. tonality (A_{tone}) ii. impulse (A_{imp}) iii. intermittency (A_{int})

   Measurement position

   i. reflection (A_{refl}) ii. indoor (A_{ind})

The Effective Noise Level (ENL) is calculated using the following equation:

$$\mathbf{ENL = L_{Aeq} + (A_{dur}) + (A_{tone}) + (A_{imp}) + (A_{int}) + (A_{refl}) + (A_{ind})}$$

6 Noise assessment

6.1 Internal reverberant noise build-up model (Odeon version 15)

An Odeon three-dimensional noise model, implementing the 'reflection-based scattering' method was built to calculate internal reverberant noise build-up within the Warehouse (Subject Facility) to provide detailed spectral information that was used to inform the Cadna-A environmental noise propagation model. The following inputs were included in the predictive model:

- Source locations were mapped using the layout shown in Table 5 and Figure 5.
- Source levels were inputted as 1/1 octave band sound power levels (from 1/3 octave band sound pressure levels)
- Receiver points were chosen along the periphery (i.e. walls and ceiling) throughout the warehouse.
- Warehouse construction materials:
  - ❖ Absorption coefficients are 1/1 octave band levels and based on materials detailed in 6.3.1.1 and 6.3.1.2.
  - ❖ Scattering coefficients for all materials set to 0.01 (considered conservative)
- 'Precision' calculation methodology (in accordance with ISO 3382-2:2008)

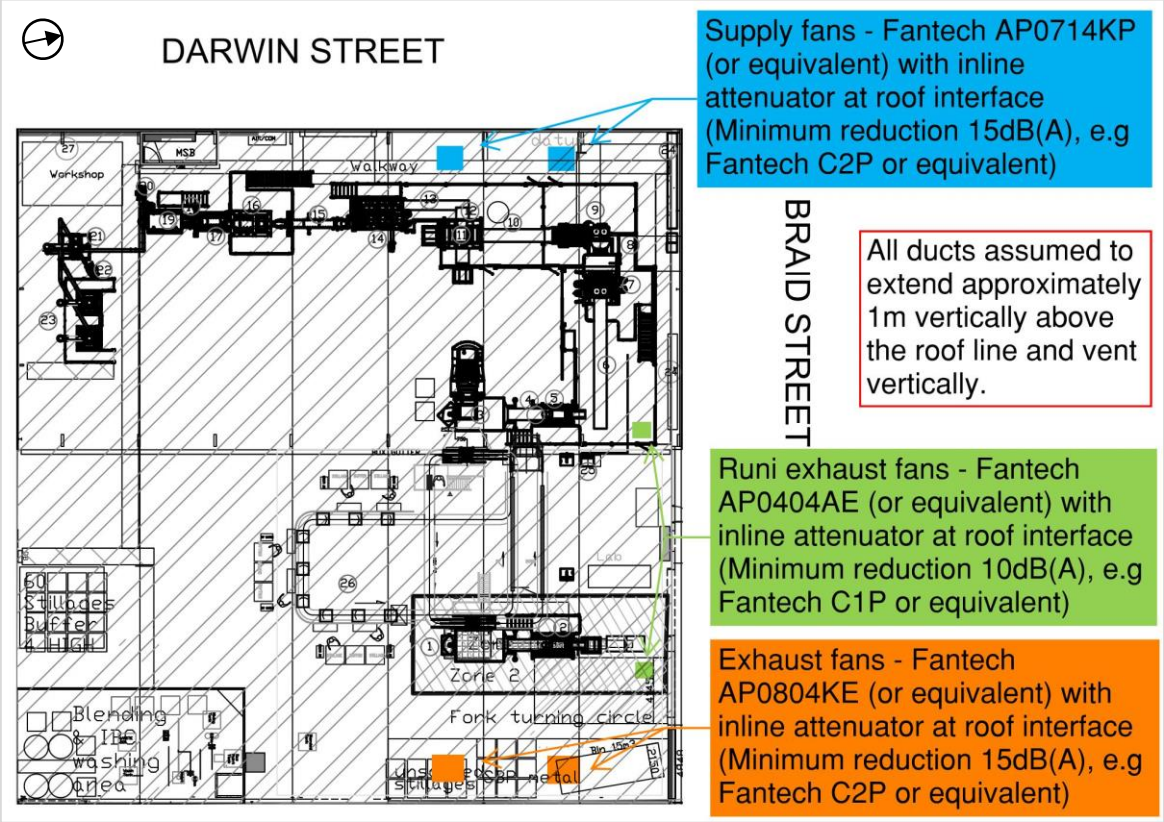
6.2 Noise propagation model (Cadna-A version 2023)

A Cadna-A three-dimensional noise model, implementing ISO 9613 noise propagation algorithms was built to calculate noise propagation from the Subject Facility to the nearest residential dwellings. The following propagation effects were included in the predictive model:

- Indicative locations of rooftop ventilation penetrations are shown in Table 6 and Figure 3.

  Mitigation of noise with distance, including geometrical spreading and air absorption (20°C, 70% RH & 3m/s wind)
- Reflections from buildings and environment (3 orders of reflection where used.)
- Barrier effects due to obstructions between noise sources and residential receivers
- Ground absorption effects (G= 0.25 was used, where G=0 is fully reflective and G=1 is fully absorptive)
- Local topographical changes (1-5m elevation contours taken from Datashare Vic, as open source data)

Figure 3: Required warehouse construction markup



6.3 Commercial noise assessment

6.3.1 Operational modelling scenarios and assumptions

Renzo Tonin & Associates have provided two scenarios, including a limited operations '**4-Day**' scenario, and a full capacity operations '**Busy Day**' scenario. The noise source locations are provided in Figure 5.

It is understood that the actual day-to-day operations are likely to be less intensive, however, to ensure the assessment is undertaken with a conservative approach (i.e. worst case), in accordance with EPA Pub. 1826 'Noise Protocol', Renzo Tonin assumes that during any 30-minute period, the follow noise sources and activities could occur.

'4-Day' scenario

- 1 x truck delivery to warehouse (semitrailer arrives, idles whilst unloading, leaves) (continuously over 30-minute period)
- 1 x truck collection in carpark (semitrailer arrives, idles whilst loading, leaves) (continuously over 30-minute period)
- 1 x forklift use (moving between warehouses) (continuously over 30-minute period)
- Warehouse / plant & equipment operations at limited capacity (only Item 1 to Item 12 from Table 5 operating) (continuously over 30-minute period)
- All mechanical equipment (i.e. Rooftop Ventilation equipment, AC's, toilet exhausts) operating at full capacity (continuously over 30-minute period)

'Busy Day' scenario

- 1 x truck delivery to warehouse (semitrailer arrives, idles whilst unloading, leaves) (continuously over 30-minute period)
- 1 x truck collection in carpark (semitrailer arrives, idles whilst loading, leaves) (continuously over 30-minute period)
- 1 x forklift use (moving between warehouses) (continuously over 30-minute period)
- Warehouse / plant & equipment operations at full capacity (all Items from Table 5 operating) (continuously over 30-minute period)
- All mechanical equipment (i.e. Rooftop Ventilation equipment, AC's, toilet exhausts) operating at full capacity (continuously over 30-minute period)

6.3.1.1 Existing warehouse construction

The following assumptions have been made with respect to the existing warehouse construction:

- Roller doors on the northern façade of the warehouse remain fully open (continuously open during any 30-minute period of the day for assessment purposes. This is considered worst case)(Note, typically this will only be used once per week for skip collection, otherwise they will remain closed).
- Roller door on the eastern façade of the warehouse remain fully open (continuously open during any 30-minute period of the day for assessment purposes. This is considered worst case)(Note, typically this will only be open when a forklift is entering or existing, otherwise they will remain closed).
- Roller door on the southern and western façade of the warehouse remain closed at all times, and will be permanently covered with [x2] layers of minimum 9mm FC sheeting (green section, see Figure 4).
- All warehouse windows are closed.
- Existing building construction material expected performance:

Metal clad roofing	Minimum 0.55mm BMT	R_w 17
Metal clad walls	Minimum 0.55mm BMT	R_w 17
Roller doors	Steel roller door with sealed gaps to prevent air flow	R_w 15
Reinforced glass windows	10mm wire reinforced glass	R_w 20

6.3.1.2 Required warehouse construction

Further to the above, initial acoustic modelling predictions indicate that additional acoustic attenuation is required. The follow assumptions have been made with respect to the minimum warehouse construction requirements:

- Required building construction material and expected performance:

Metal clad roofing	Minimum 0.55mm BMT, with underside lined with:	
	- 8kg Wavebar (red section, see Figure 4)	R_w 24
	- 4kg Wavebar (remaining roof)	R_w 22
Metal clad walls	Minimum 0.55mm BMT, with inside lined with:	
	- [x2] layers of minimum 9mm FC sheeting (green section, see Figure 4)	R_w 38

Figure 4: Required warehouse construction markup

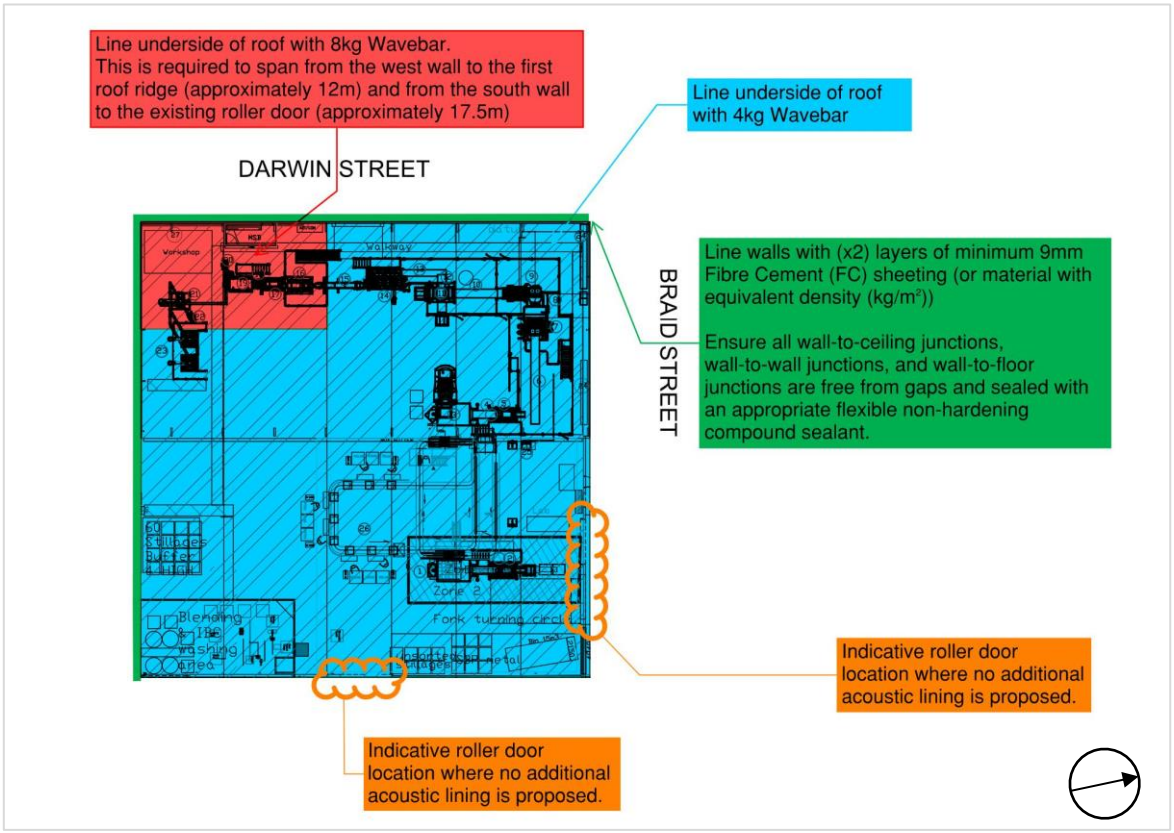
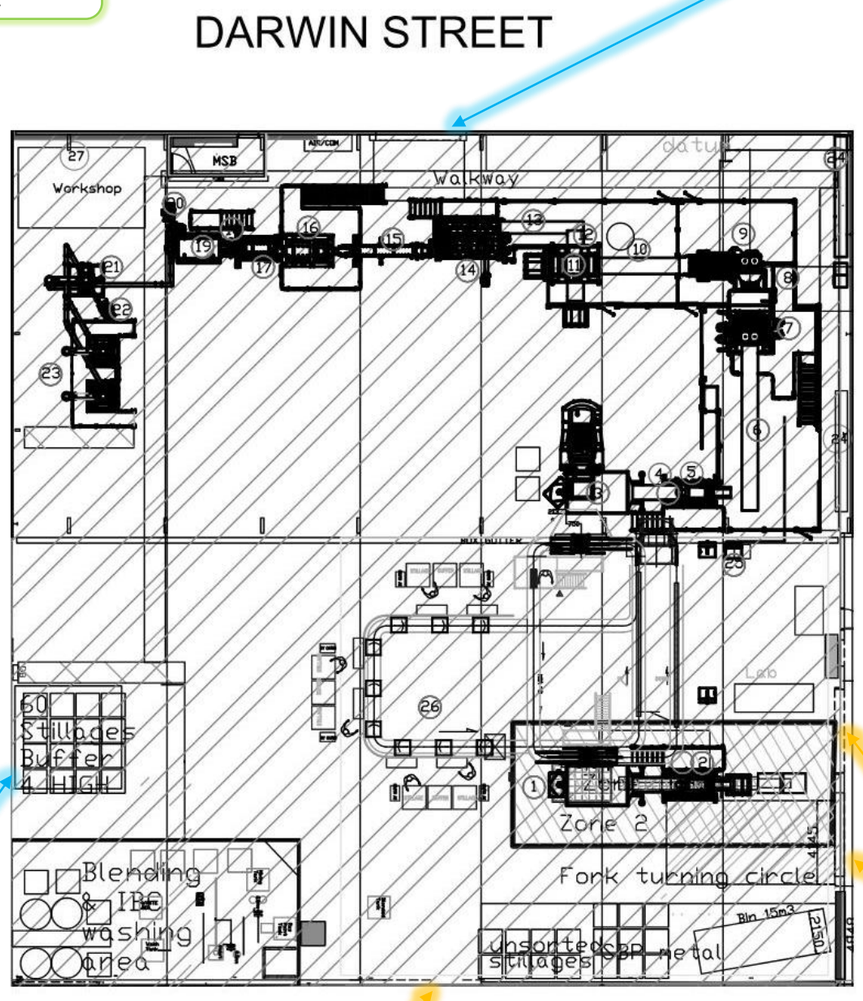


Figure 5: Main Processing Plant Warehouse Layout and sound source locations

Approximate direction of the most affected residential receiver (**R1**), located at 2 Robbs Road.

Existing Roller Door not to be used. To always remain closed. Shall be closed off with 2x9mm FC sheeting per Figure 4.



Noise source location for equipment Items 1 to 23 detailed below.

Item	Equipment/activity	Noise level L_{wA} dB(A)
1	Bin Conveyor	75 dB(A) at 1m
2	Solvent RUNI Screw Compactor	100 dB(A) at 1m(i)
3	Inclined Auger (Solvent Based)	75 dB(A) at 1m
4	Inclined Auger (Water Based)	75 dB(A) at 1m
5	RUNI Screw Compactor	100 dB(A) at 1m(i)
6	Inclined Conveyor	75 dB(A) at 1m
7	Force Quad Shaft Shredder	76 dB(A) at 1m
8	Dewatering Screen 1	92 dB(A) at 1m
9	Dewatering Screen 2	92 dB(A) at 1m
10	Inclined Conveyor	75 dB(A) at 1m
11	Over-band Magnet Separator	50 dB(A) at 1m
12	Bi-Directional Conveyor	75 dB(A) at 1m
13	Inclined conveyor	75 dB(A) at 1m
14	Float Sink tank	80 dB(A) at 1m
15	Dewatering Auger	80 dB(A) at 1m
16	Granulator	105 dB(A) at 1m(i)
17	Friction Washer	105 dB(A) at 1m(i)
18	Horizontal Auger	75 dB(A) at 1m
19	Mechanical Dryer	110 dB(A) at 1m(ii)
20	Blower	110 dB(A) at 1m(ii)
21	Pre cleaner and Metal Detector	90 dB(A) at 1m
22	Blower	110 dB(A) at 1m(ii)
23	Double Bagging Station	110 dB(A) at 1m(ii)

Existing Roller Door not to be used. To always remain closed. Shall be closed off with 2x9mm FC sheeting per Figure 3.

Roller door on the eastern façade of the warehouse remain fully open (continuously open during any 30-minute period of the day for assessment purposes. This is considered worst case)(Note, typically this will only be open when a forklift is entering or existing, otherwise they will remain closed).

Roller doors on the northern façade of the warehouse remain fully open (continuously open during any 30-minute period of the day for assessment purposes. This is considered worst case)(Note, typically this will only be used once per week for skip collection, otherwise they will remain closed).

Figure 6: Proposed General Site Layout and sound source locations

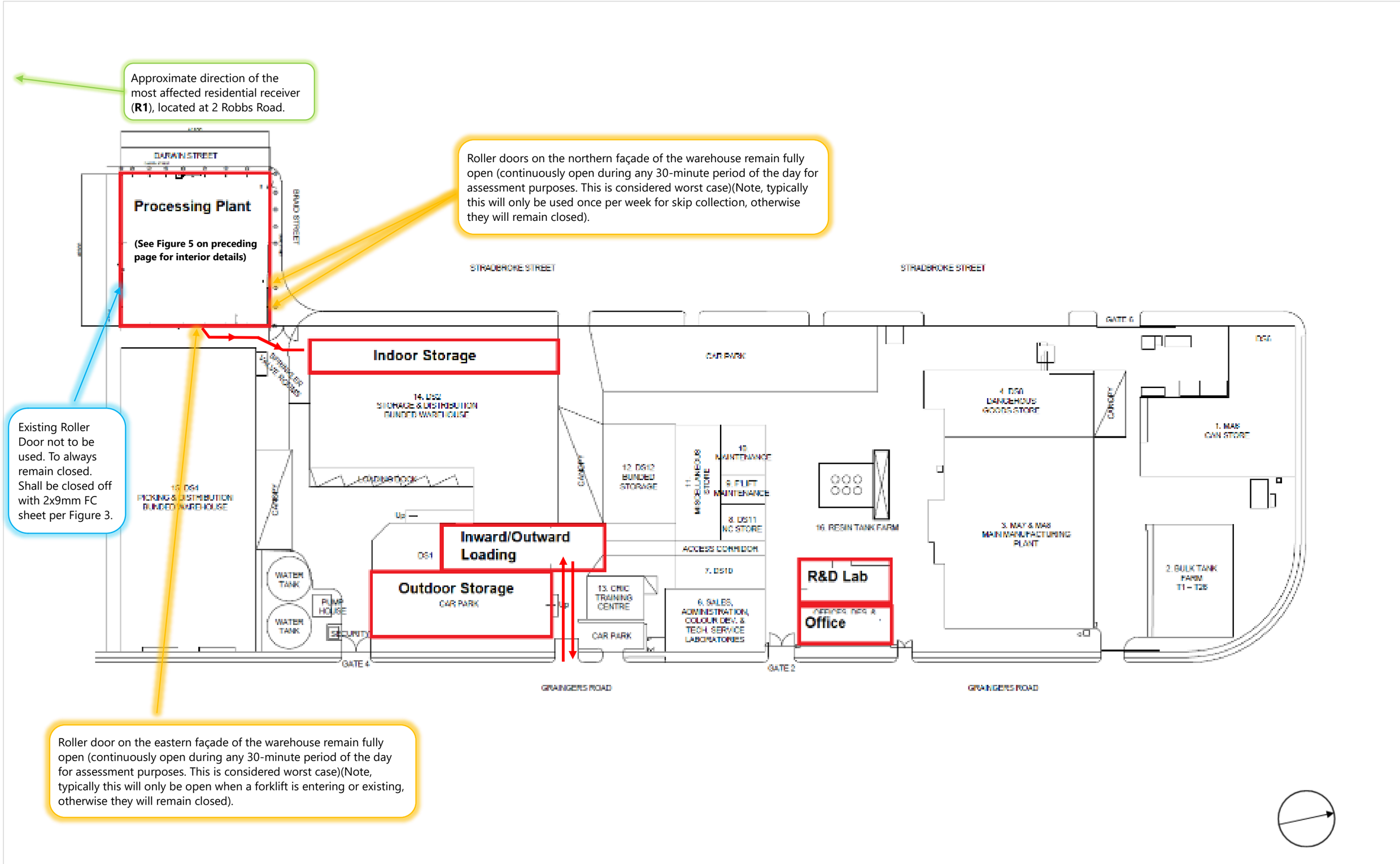


Table 9: Commercial noise assessment

Receiver ID, dwelling location and noise source(s)/activities[1,2]	Predicted Effective noise level (ENL) at dwelling, L_{eq} dB(A), Day[3]		Complies with EPA 1826-P1? Day
R1 – 2 Robbs Road, West Footscray	**'4-Day' scenario**	**'Busy Day' scenario**	**55 dB(A)**
Warehouse / plant & equipment operations	43	50	✓ / ✓
Truck deliveries, forklift use & carpark activities	36	36	✓ / ✓
All mechanical services	26	26	✓ / ✓
Cumulative noise level	**43**	**50**	✓ / ✓
R2 – 1 Robbs Road, West Footscray	**'4-Day' scenario**	**'Busy Day' scenario**	**55 dB(A)**
Warehouse / plant & equipment operations	37	44	✓ / ✓
Truck deliveries, forklift use & carpark activities	33	33	✓ / ✓
All mechanical services	21	21	✓ / ✓
Cumulative noise level	**38**	**44**	✓ / ✓
R3 – 4 Robbs Road, West Footscray	**'4-Day' scenario**	**'Busy Day' scenario**	**55 dB(A)**
Warehouse / plant & equipment operations	38	46	✓ / ✓
Truck deliveries, forklift use & carpark activities	33	33	✓ / ✓
All mechanical services	22	22	✓ / ✓
Cumulative noise level	**39**	**46**	✓ / ✓
R4 – 3 Robbs Road, West Footscray	**'4-Day' scenario**	**'Busy Day' scenario**	**55 dB(A)**
Warehouse / plant & equipment operations	35	43	✓ / ✓
Truck deliveries, forklift use & carpark activities	32	32	✓ / ✓
All mechanical services	21	21	✓ / ✓
Cumulative noise level	**37**	**43**	✓ / ✓
R5 – 5 Hansen Street, West Footscray	**'4-Day' scenario**	**'Busy Day' scenario**	**55 dB(A)**
Warehouse / plant & equipment operations	33	41	✓ / ✓
Truck deliveries, forklift use & carpark activities	35	35	✓ / ✓
All mechanical services	20	20	✓ / ✓
Cumulative noise level	**37**	**42**	✓ / ✓
R6 – 17 Braid St, West Footscray	**'4-Day' scenario**	**'Busy Day' scenario**	**55 dB(A)**
Warehouse / plant & equipment operations	36	44	✓ / ✓
Truck deliveries, forklift use & carpark activities	42	42	✓ / ✓
All mechanical services	32	32	✓ / ✓
Cumulative noise level	**43**	**46**	✓ / ✓

Note:
1. Noise levels at other more distant dwellings are lower than the noise levels presented above, as a result of greater distance from the Subject Development
2. Noise sources and activities per Section 6.3.1
3. Noise character adjustments for tonality and impulsiveness for identified items of equipment detailed in Table 5.

As shown, the proposed operations are predicted to comply with EPA 1826-P1 noise limits. The assessment provides two scenarios, with the **'Busy Day'** scenario as the worst case which assumes that all noise sources are operating simultaneously, while the '**4-Day**' scenario has been shown to be much quieter.

7 Conclusion

Renzo Tonin & Associates undertook an acoustic assessment of the proposed paint recovery plant to be located at 2-44 Grainger Road, West Footscray (the Subject Facility), to assess noise from commercial operations.

We have been briefed by Davis Advisory to consider acoustics in relation to the proposed Paint Circular Economy HQ (PaCE HQ) project in West Footscray. The PaCE HQ project is described in Annexure D of the application, and our comments and findings are referrable to that project.

In conducting the acoustic assessment, Renzo Tonin & Associates has:

- Quantified relevant noise criteria: EPA 1826-P1 'Noise Protocol'
- Measured noise levels from operational activities and associated mechanical equipment at similar industrial facilities
- Analysed the noise monitoring and measurements
- Constructed a three-dimensional noise model of the Subject Facility, to assess various noise impacts (described below)
- Assessed and compared predicted levels to noise limits.

The outcomes of the acoustic assessment are:

- Noise levels from the representative mechanical services were found to conform at all times with EPA 1826-P1 'Noise Protocol' limits.
- Noise levels from anticipated delivery activities were found to conform at all times with EPA 1826-P1 limits.
- Noise levels from the warehouse/plant operations were found to conform at all times with EPA 1826-P1 limits, with the specific construction requirements detailed in Section 6.3.1.2. The specific construction requirements include wall and ceiling treatments to the warehouse. Such treatments are commonplace, and application is straight forward to design, during the design stage when more detailed information is available.

Based on the above, the PaCE HQ project is expected to conform with all nominated criteria, and on this basis, not unreasonably affect noise amenity in the area.

APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Air-borne noise	Noise which is fundamentally transmitted by way of the air and can be attenuated by the use of barriers and walls placed physically between the noise source and receiver.		
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.		
Assessment period	The time period in which an assessment is made. e.g. Day 7am-6pm.		
Assessment Point	A location at which a noise or vibration measurement is taken or estimated.		
Attenuation	The reduction in the level of sound or vibration.		
A-weighting	A filter applied to the sound recording made by a microphone to approximate the response of the human ear.		
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L_{A90} noise level if measured as an overall level or an L_{90} noise level when measured in octave or third-octave bands.		
Barrier (Noise)	A natural or constructed physical barrier which impedes the propagation of sound and includes fences, walls, earth mounds or berms and buildings.		
Berm	Earth or overburden mound.		
Buffer	An area of land between a source and a noise-sensitive receiver and may be an open space or a noise-tolerant land use.		
Bund	A bund is an embankment or wall of brick, stone, concrete or other impervious material, which may form part or all of the perimeter of a compound.		
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of common sounds in our environment:		
	threshold of hearing	0 dB	The faintest sound we can hear, defined as 20 micro Pascal
		10 dB	Human breathing
	almost silent	20 dB	
		30 dB	Quiet bedroom or in a quiet national park location
	generally quiet	40 dB	Library
		50 dB	Typical office space or ambience in the city at night
	moderately loud	60 dB	CBD mall at lunch time
		70 dB	The sound of a car passing on the street
	loud	80 dB	Loud music played at home
		90 dB	The sound of a truck passing on the street
	very loud	100 dB	Indoor rock band concert
		110 dB	Operating a chainsaw or jackhammer
	extremely loud	120 dB	Jet plane take-off at 100m away
	threshold of pain	130 dB	
		140 dB	Military jet take-off at 25m away

dB(A)	A-weighted decibel. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies. The dB(C) level is not widely used but has some applications.
Diffraction	The distortion of sound waves caused when passing tangentially around solid objects.
EPA	Environment Protection Authority
Flanking	Flanking is the transfer of sound through paths around a building element rather than through the building element material directly. For example, sound travelling through a gap underneath a door or a gap at the top of a wall.
Fluctuating Noise	Noise that varies continuously to an appreciable extent over the period of observation.
Free-field	An environment in which there are no acoustic reflective surfaces. Free field noise measurements are carried out outdoors at least 3.5m from any acoustic reflecting structures other than the ground.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Heavy Vehicle	A truck, transporter or other vehicle with a gross weight above a specified level (for example: over 8 tonnes).
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L_{90} noise level expressed in units of dB(A).
L_{Aeq} or L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time, which would produce the same energy as a fluctuating sound level. When A-weighted, this is written as the L_{Aeq}.
L_{max}	The maximum sound pressure level measured over a given period. When A-weighted, this is usually written as the $L_{Amax.}$
L_{min}	The minimum sound pressure level measured over a given period. When A-weighted, this is usually written as the $L_{Amin.}$
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on. That is, the sound of 85 dB is four times or 400% the loudness of a sound of 65 dB.
Noise	Unwanted sound
Reflection	Sound wave reflected from a solid object obscuring its path.

R_w	Weighted Sound Reduction Index A measure of the sound insulation performance of a building element. It is measured in very controlled conditions in a laboratory. The term supersedes the value STC which was used in older versions of the Building Code of Australia. R_w is measured and calculated using the procedure in ISO 717-1. The related field measurement is the $D_{nT,w}$. The higher the value the better the acoustic performance of the building element.
R'_w	Weighted Apparent Sound Reduction Index. As for R_w but measured in-situ and therefore subject to the inherent accuracies involved in such a measurement. The higher the value the better the acoustic performance of the building element.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain L_{eq} sound levels over any period of time and can be used for predicting noise at various locations.
Sound absorption	The ability of a material to absorb sound energy by conversion to thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 pico watt.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone referenced to 20 mico Pascal.
Tonal Noise	Sound containing a prominent frequency and characterised by a definite pitch.

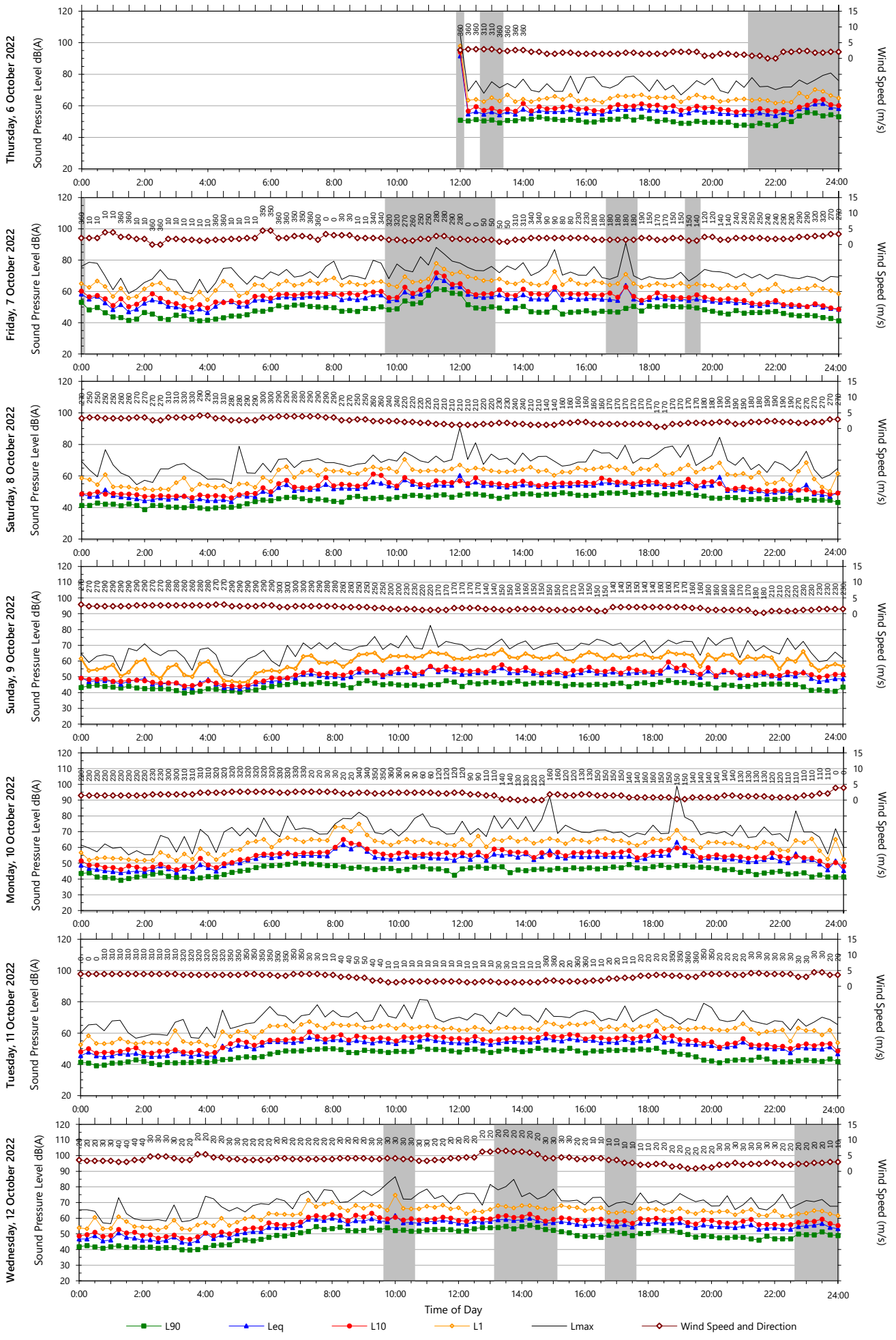
APPENDIX B Noise monitoring

B.1 L1 – 1 Robbs Road Resident's front yard

Greyed out periods in noise monitoring charts correspond to times of precipitation or excessive wind, referenced from Bureau of Meteorology Laverton RAAF Weather Station.

Unattended Monitoring Results

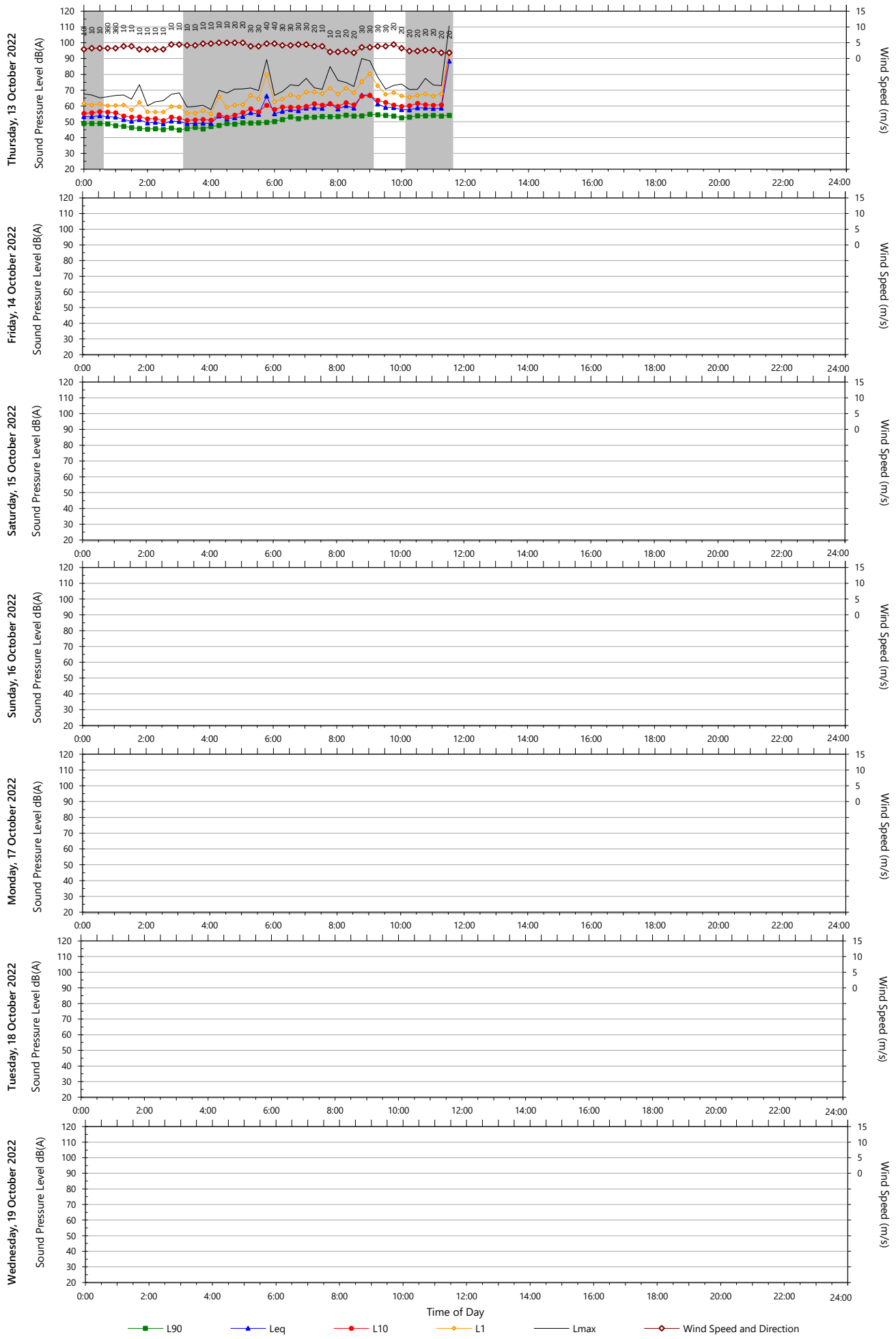
Location: 1 Robbs Road, West Footscray (front yard, free field)



Data File: 2022-10-06_SLM_001_123_Rpt_Report.txt

Template: QTE-26 Logger Graphs Program (r38)

Unattended Monitoring Results **Location: 1 Robbs Road, West Footscray (front yard, free field)**



Data File: 2022-10-06_SLM_001_123_Rpt_Report.txt

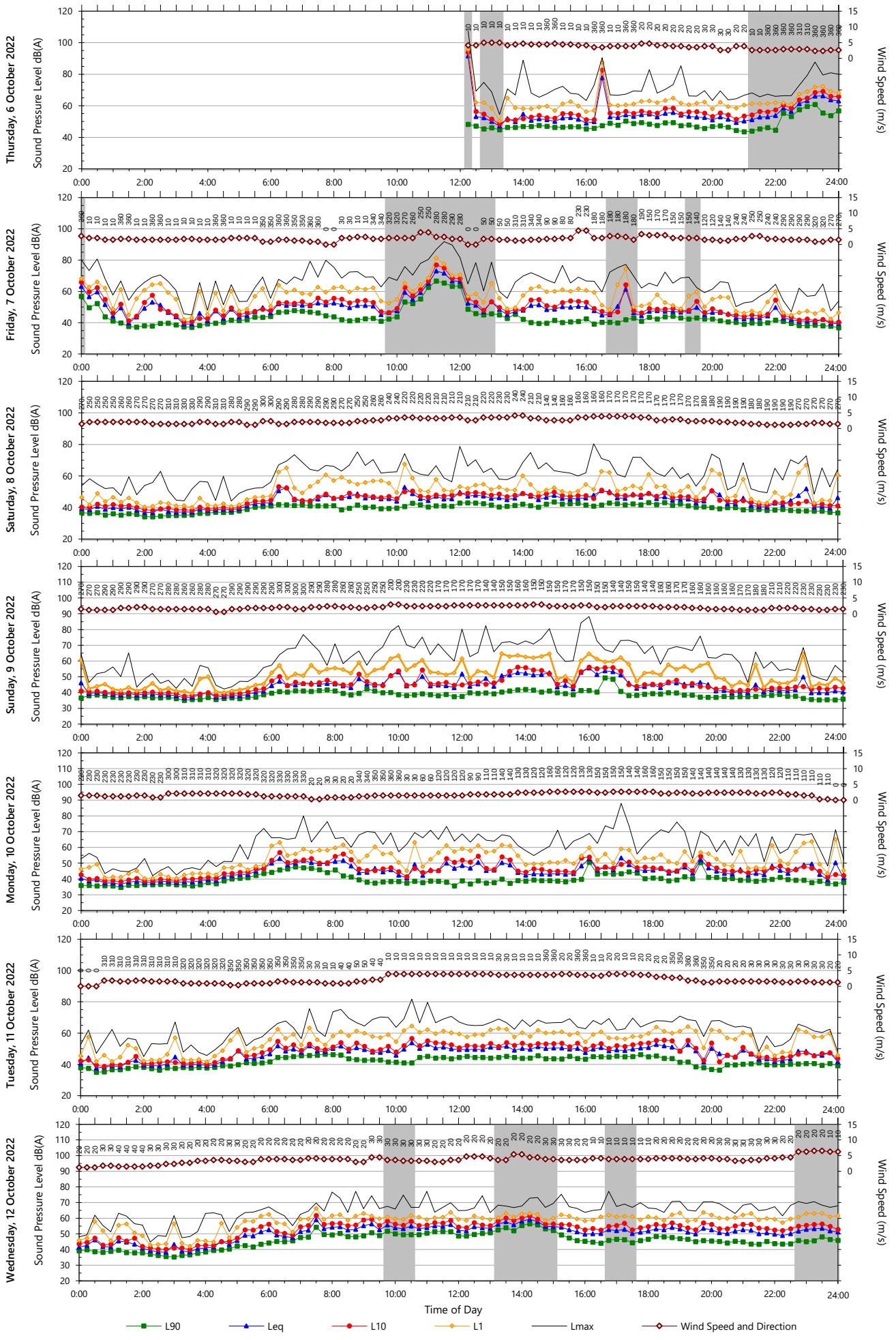
Template: QTE-26 Logger Graphs Program (r38)

B.2 L2 – 4 Hansen Street Resident's rear yard

Greyed out periods in noise monitoring charts correspond to times of precipitation or excessive wind, referenced from Bureau of Meteorology Laverton RAAF Weather Station.

Unattended Monitoring Results

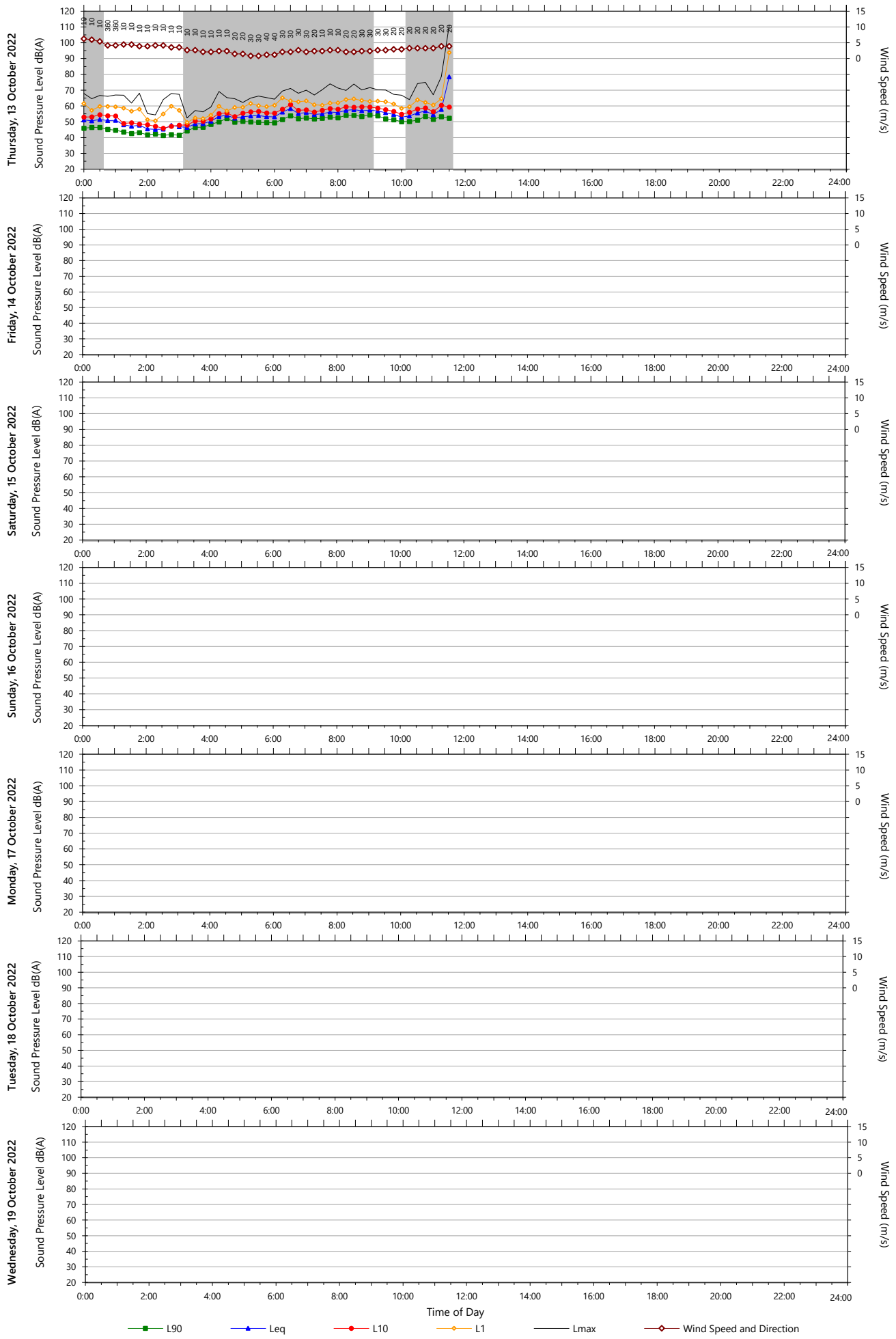
Location: 4 Hansen Street, West Footscray (rear yard, free field)



Data File: 2022-10-06_SLM_001_123_Rpt_Report.txt

Template: QTE-26 Logger Graphs Program (r38)

Unattended Monitoring Results **Location: 4 Hansen Street, West Footscray (rear yard, free field)**



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Template: QTE-26 Logger Graphs Program (r38)