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Project: 10-16 SELWYN STREET, ELSTERNWICK

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ADVERTISED PLAN

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1.0 INTRODUCTION

It is proposed to develop the site at 10-16 Selwyn Street, Elsternwick. The development proposal includes the construction of a new supermarket and residential apartments including basement car parking. The scheme also includes a place of assembly space at the north-west corner of the site.

Pace Development Group has engaged Marshall Day Acoustics Pty Ltd (MDA) to prepare an acoustic assessment for the town planning phase of the project.

This report provides details of relevant noise legislation and guidelines that apply to noise sources associated with the development, measurement surveys conducted on site and recommendations for noise control treatments where required.

A glossary of acoustic terms is provided in Appendix A.

1.1 Planning permit conditions

City of Glen Eira has issued a planning permit for the development (Permit Application #GE/DP-34187/2021) on 13 September 2022. The permit contains the following conditions relating to acoustics.

Acoustic attenuation measures

- 24 Before the endorsement of the Condition 1 plans, an Acoustic Report prepared by a suitably qualified acoustic engineer and to the satisfaction of the Responsible Authority must be submitted to and approved by the Responsible Authority. When approved, the report will be endorsed and will then form part of the permit. The report must prescribe the form of acoustic treatment to:
 - (a) Prescribe measures (whether acoustic treatment or management measures) necessary to protect nearby dwelling occupants and future residents within the building with a direct interface to commercial tenancies above, next to or below from associated commercial noise sources, including but not limited to loading dock and reversing beepers, supermarket, place of assembly (including patron and music noise), plant and equipment;
 - (b) Prescribe measures (whether acoustic treatment or management measures) necessary to address noise from use of the outdoor residential communal areas;
 - (c) Prescribe acoustic treatment to the mechanical plant equipment and ventilation mechanisms installed or constructed as part of the development.
- 28 Noise levels to and from the development must not exceed those required to be met under the Environment Protection Regulations 2021 and EPA Publication 1826.4 noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues, or any other equivalent or applicable State or relevant policy and should meet accepted sleep disturbance criteria, EPA Publication 1254.2 and any other relevant guideline or Australian Standard.

The above planning permit conditions are addressed in this report.

1.2 Revised scheme

The first iteration of this report has been endorsed on 1 December 2023. This report has been updated to reflect the revised scheme.







2.0 PROJECT AND SITE DESCRIPTION

2.1 Site location

The proposed development site is located at 10-16 Selwyn Street, Elsternwick and comprises the parcel of land as shown in the aerial photograph in Figure 1.

Figure 1: Subject site (Source: Nearmap)



The site is the former ABC Elsternwick site and currently occupied by Sholem Aleichem College. The land is bounded by the following:

- Sinclair Street to the north with residential dwellings beyond
- Residential dwellings to the east
- A laneway to the south with retail premises beyond
- Selwyn Street to the west with the Jewish Holocaust Museum and residential dwellings beyond.

The subject site and land to the west is zoned Mixed-Use Zone 1 (MUZ1). Land to the south is zoned Commercial Zone 1 (C1Z). Land to the north and east is zoned Residential Growth Zone 1 (RGZ1). Land to the north-west and further to the north is zoned Neighbourhood Residential Zone 1 (NRZ1). The relevant planning map is provided in Appendix B.



2.2 Project description

Key features of the proposed development are as follows:

- A supermarket and liquor store on the ground floor and mezzanine with supermarket offices and plantrooms on the mezzanine level. The proposed supermarket includes a loading dock accessed via Sinclair Street
- A shared loading dock will be accessed via a laneway to the south of the development
- Car parking is provided via four levels of basement car parking including refuse areas and building services plant rooms. The car park will be accessed via Selwyn Street
- Direct to boot (DTB) facility in basement 1
- A place of assembly is proposed on the corner of Selwyn Street and Sinclair Street on the ground floor and mezzanine level. Uses will include a function centre, hall, library, museum and restricted place of assembly (excluding gaming)
- Shop or food and drink premises on the ground floor
- Two residential towers (North and South) containing a total of 148 apartments.
- Communal areas on Level 1, Level 5 and Level 6
- Mechanical services on the roof.

The Town Planning Package drawings dated 3 May 2024, issued by Fender Katsalidis Architects have been reviewed as part of this assessment.

A full set of the development plans are provided in Appendix C for reference.





3.0 IDENTIFIED NOISE SOURCES

3.1 Noise from the development to surrounding residential dwellings

The following noise sources from the proposed development may affect surrounding properties:

- Supermarket loading dock (vehicle activity noise and loading/unloading/waste collection)
- Shared loading dock (vehicle activity noise and loading/unloading/waste collection)
- Mechanical services ventilation equipment associated with loading docks
- Mechanical services ventilation equipment associated with the car park
- Refrigeration equipment associated with the supermarket and liquor store
- Mechanical services equipment associated with residential dwellings
- Patron noise from shop or food and drink premises along Selwyn Street
- Music and patron noise from the function space of the place of assembly. It is understood that the function space will be used for semi-regular events including music and performance recitals, speakers and classes and multi-media events, and school assemblies
- Patron noise from external communal terrace areas on Level 1, 5 and 6.

3.2 Noise from the commercial components to apartments within the proposed development

The proposed residential component of the development has the potential to be subjected to noise from the following sources within the same development:

- Noise from the supermarket loading dock
- Mechanical services noise from equipment associated with the supermarket and the car park, and any other central plant
- Patron noise from shop or food and drink premises along Selwyn Street
- Music and patron noise from the place of assembly associated with the function space.



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4.0 NOISE LEGISLATION AND GUIDELINES

Various guidelines and legislation are used in Victoria to assess environmental noise.

4.1 Victorian legislation

The primary legislative instrument is the Environment Protection Act 2017 (EP Act), which includes a general environmental duty (GED) for all Victorians. Compliance with EP Act is mandatory.

Noise from commercial, industrial and trade premises, as well as music noise, is assessed under the EP Act and subordinate policy documents, namely:

- The Environment Protection Regulations 2021 (EP Regulations); and
- EPA Publication 1826 Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues (Noise Protocol).

The noise framework described above addresses a wide range of noise sources and considerations.

In situations where objective noise assessments are required for sources that are not directly addressed by the above, an effect and risk-based assessment is often carried out by referring to supplementary guidelines sourced from a range of sources such as interstate publications and established assessment precedents.

A summary of the relevant Victorian legislation and guidelines is provided in Table 1 and Appendix D for further details.

	Document	Overview					
	<i>Environment Protection Act 2017</i> (EP Act)	The EP Act provides the overarching legislative framework for the protection of the environment in Victoria. It does not specify noise limit values, but prohibits the emission of unreasonable or aggravated noise from non-residential premises.					
		The EP Act provides general definitions of unreasonable and aggravated noise; definitions that are specific to commercial, industrial and trade premises are provided in supporting publications (see below).					
		Part 3.2 of the EP Act outlines the general environmental duty (GED), which requires anyone engaging in an activity posing a risk of harm to human health and/or the environment from pollution to minimise those risks to prevent harm as far as reasonably practicable.					
		 Overview The EP Act provides the overarching legislative framework for the protection of the environment in Victoria. It does not specify noise limit values, but prohibits the emission of unreasonable or aggravated noise from non-residential premises. The EP Act provides general definitions of unreasonable and aggravated noise; definitions that are specific to commercial, industrial and trade premises are provided in supporting publications (see below). Part 3.2 of the EP Act outlines the general environmental duty (GED), which requires anyone engaging in an activity posing a risk of harm to human health and/or the environment from pollution to minimise those risks to prevent harm as far as reasonably practicable. Section 93 of the EP Act provides for the creation of an environmental reference standard (ERS) to be used to assess and report on environmental conditions in the whole or any part of Victoria. The ERS is primarily relevant to noise sources and environments that are not controlled by prescribed requirements (like the Noise Protocol). The objectives of the EP Regulations are to further the purposes of, and give effect to, the EP Act. The EP Regulations also define outdoor sensitive areas, commercial, industrial and trade premises, as well as indoor, outdoor and live entertainment venues and events. Part 5.3 of the EP Regulations sets out requirements that are specific to environmental noise. Division 1 states that the prediction, measurement, assessment or analysis of noise within a noise sensitive area for the purposes of the EP Regulations must be conducted in accordance with the Noise Protocol (see below). Division 3 stipulates requirements that are specific to commercial, industrial and trade premises. 					
	Environment Protection Regulations 2021	The objectives of the EP Regulations are to further the purposes of, and give effect to, the EP Act. The EP Regulations also define outdoor sensitiv					
	(EP Regulations)	outdoor and live entertainment venues and events.					
		Part 5.3 of the EP Regulations sets out requirements that are specific to environmental noise. Division 1 states that the prediction, measurement, assessment or analysis of noise within a noise sensitive area for the purposes of the EP Act or the EP Regulations must be conducted in accordance with the Noise Protocol (see below). Division 3 stipulates requirements that are specific to commercial, industrial and trade premises.					

Table 1: Relevant Victoria noise legislation and guidelines

Document	Overview
EPA Publication 1826.4 Noise limit and assessment protocol for the control of noise from	The Noise Protocol defines the method for setting the noise limits for new and existing commercial, industrial and trade premises and entertainment venues in Victoria.
commercial, industrial and trade premises and entertainment venues (Noise Protocol)	It also outlines the steps that must be followed to undertake an assessment (measurement or prediction) of the effective noise level within a noise sensitive area or at an alternative assessment location. A comparison between the effective noise level and the relevant noise limit or the relevant alternative assessment criterion will determine whether the noise that is emitted from the premises is unreasonable under the EP Regulations.
	The noise limits for commercial, industrial and trade premises are determined on the basis of land zoning and background noise levels, and are separately designated for day, evening and night periods.
Environment Reference Standard (ERS)	The ERS is made under Section 93 of the EP Act. The ERS sets out environmental values for ambient sound that are sought to be achieved and maintained in Victoria and standards to support those values. The indicators and objectives within the standard provide a benchmark for comparing desired outcomes to the actual state of the environment and a basis for assessing actual and potential risks to the environmental values.
	The ERS is not a compliance standard, and the values listed within the ERS for different land uses are explicitly not noise limits nor design criteria. The primary function of the ERS is to provide assessment and reporting benchmarks for environmental values.
	For this project, noise from mechanical services equipment, commercial vehicles accessing the site, loading bay activity, waste collections and music noise is addressed by the Noise Protocol, in which case the ERS would not apply.

4.2 General standards and guidelines

In situations where objective noise assessments are required for sources that are not directly addressed by the legislation and guidelines, an effect and risk-based assessment is often carried out by referring to supplementary guidelines sourced from a range of sources such as interstate publications and established assessment precedents.

Supplementary guidance relevant to the assessment of the proposal are provided in Table 2 and Appendix D.

Reference	Overview
NSW <i>Road Noise Policy</i> 2011 produced by the NSW Environmental Protection Agency (Sleep disturbance)	The NSW <i>Road Noise Policy</i> (the NSW policy) was published in 2011 by the NSW Department of Environment, Climate Change and Water. The policy strictly only applies in NSW, however, the provisions of the document are often referred to in Victoria for general guidance on potential sleep disturbance.
	Based on a review of research into sleep disturbance, the NSW policy nominates maximum external night-time noise levels at noise sensitive locations which are unlikely to disturb sleep.

Table 2: General standards and guidelines

	Reference	Overview				
DVE	MDA nominated criterion for mechanical equipment in mixed use developments	Overview Although compliance with the Noise Protocol is the mandatory criteria for commercial activities and mechanical services, previous experience with the amenity expected by residents in high quality mixed-use developments shows compliance with the Noise Protocol may not adequately account for all infrequent momentary impact noises transmitted internally through the building. This is because the Noise Protocol assessment methodology is based on the average noise of continuous or intermittent noise sources over a time period and may not account for infrequent momentary impact noise. For these noise sources which include lift operation, car park gate/roller door and large mechanical plant such as chillers, MDA nominates the following additional criterion based on the maximum noise level to be met inside habitable spaces, applicable to noise transmitted internally through the building structure from mechanical equipment: $L_{Armax} \le 25 dB$ (average of 10 measurements) inside habitable spaces. Risk-based noise criteria developed by MDA for the assessment of external patron areas of licensed venues (routinely adopted in Victoria, including assessment to inform matters before the Victorian Civil and Administrative Tribunal). The criteria are based on a combination of fixed value limits and allowable margins above background noise levels, defined separately for the day, evening and night periods. Contains relevant guidelines for a range of noise sources not covered by other policy or legislation documents as well as best practice measures for sources already covered by policy.				
P	LAN	OverviewAlthough compliance with the Noise Protocol is the mandatory criteria for commercial activities and mechanical services, previous experience with the amenity expected by residents in high quality mixed-use developments shows compliance with the Noise Protocol may not adequately account for all infrequent momentary impact noises transmitted internally through the building. This is because the Noise Protocol assessment methodology is based on the average noise of continuous or intermittent noise sources over a time period and may not account for infrequent momentary impact noise.For these noise sources which include lift operation, car park gate/roller door and large mechanical plant such as chillers, MDA nominates the following additional criterion based on the maximum noise level to be met inside habitable spaces, applicable to noise transmitted internally through the building structure from mechanical equipment: LAmax ≤ 25 dB (average of 10 measurements) inside habitable spaces.Risk-based noise criteria developed by MDA for the assessment of external patron areas of licensed venues (routinely adopted in Victoria, including assessment to inform matters before the Victorian Civil and Administrative Tribunal). The criteria are based on a combination of fixed value limits and allowable margins above background noise levels, defined separately for the day, evening and night periods.Contains relevant guidelines for a range of noise sources not covered by other policy or legislation documents as well as best practice measures for sources already covered by policy.Relevant sections for this proposal include guidance on deliveries and industrial waste collection.				
	Patron noise guidelines	Risk-based noise criteria developed by MDA for the assessment of external patron areas of licensed venues (routinely adopted in Victoria, including assessment to inform matters before the Victorian Civil and Administrative Tribunal). The criteria are based on a combination of fixed value limits and allowable margins above background noise levels, defined separately for the day, evening and night periods.				
	EPA Publication 1254.2 <i>Noise</i> <i>Control Guidelines</i> (EPA Publication 1254)	Contains relevant guidelines for a range of noise sources not covered by other policy or legislation documents as well as best practice measures for sources already covered by policy. Relevant sections for this proposal include guidance on deliveries and				
		industrial waste collection.				

The following acoustic issues, outside the scope of this assessment, should be considered separately during future detailed design phases:

- Internal building acoustic design such as intertenancy sound insulation and other considerations related to the National Construction Code (NCC) and Association of Australian Acoustical Consultants (AAAC) guidelines for apartments and townhouses
- Noise associated with construction activity
- Assessment in accordance with requirements of the Apartment Design Guidelines for Victoria.

4.3 General environmental duty

The general environmental duty (GED) is outlined in Part 3.2 of the EP Act.

The GED requires anyone engaging in an activity posing a risk of harm to human health and/or the environment from pollution (including noise) and waste, to minimise those risks to prevent harm as far as reasonably practicable. Commercial premises are therefore required to continue to review and eliminate or reduce the risk of harm from any emission of noise as far as reasonably practicable, even if they are compliant with the Noise Protocol.

The GED applies wherever there is a risk of harm, regardless of whether the noise emitted has caused complaints or caused harm to people or the environment.

The GED is applied first to eliminate or reduce the risk of harm to human health and the environment from noise so far as reasonably practicable. Any residual noise remaining after actions are taken to meet the GED is then managed as per the unreasonable noise definitions in Section 166 of the EP Act (i.e. complying with the Noise Protocol).

5.0 EXISTING NOISE ENVIRONMENT

The determination of applicable noise limits in accordance with the Noise Protocol is based on land zoning and existing background noise levels at a location representative of the nearest affected noise sensitive receivers.

Unattended noise measurements were taken at the subject site between 28 March 2018 and 4 April 2018 using two Rion NL-31 noise loggers fitted with weatherproof windshields.

The measurement locations are shown in Figure 2.

Measurement position 1 was located on the upper deck of the existing car park. The noise logger was positioned at the south end of the car park to avoid noise from a tree located at the north edge of the car park upper deck. This measurement position is considered representative of the noise levels at the residential properties on Sinclair Street, including the properties to the east immediately adjacent to the site.

Measurement position 2 was located on the roof of the existing building on the west site boundary. This measurement position is considered representative of the noise levels at the residential properties on Selwyn Street.

Both microphones were positioned at a height of approximately 1.5 m above the local floor level under free field conditions. Measurements were obtained using the 'F' response time and A-weighting frequency network. The equipment was checked before and after the survey and no significant calibration drifts were observed.







Figure 2: Noise survey measurement plan

The measured background noise levels over the monitoring period were arithmetically averaged over each time period and the lowest of these background noise levels are shown in Table 3. The lowest background noise levels were obtained from the noise monitor Position 1 in the eastern car park.

Table	3:	Measured	background	noise	levels	dB	
Table	٦.	Inicasureu	Dackground	noise	ICVCI3	, ub	LA9(

Period	Lowest average background noise level
Day	44
Evening	43
Night	37

These noise levels have been used to determine the noise limits in accordance with the Noise Protocol and the full derivation is provided in Appendix D3.





6.0 ASSESSMENT OF NOISE FROM COMMERCIAL, INDUSTRIAL AND TRADE PREMISES

6.1 Noise limits

The cumulative noise from all commercial on-site activities and commercial mechanical services must comply with the noise limits determined in accordance with the Noise Protocol at the nearest noise sensitive dwellings which include the proposed apartments that are part of the development.

Commercial noise associated with the supermarket must meet the noise limits outside habitable spaces of all existing neighbouring dwellings and future dwellings within the development itself. The external assessment is mandatory where facades to habitable spaces are openable, such as windows and balcony doors.

If the primary sound transmission path between a mechanical source and receiver is through a solid wall, floor or ceiling then the assessment point shall be located inside the affected dwelling in a sensitive room with the applicable internal noise level adjusted as follows:

- Adjustment of 20 dB if the building envelope meets or exceeds energy efficiency requirements set out in the Building Code of Australia 2006 (BCA 2006) including sealing requirements
- Adjustment of 15 dB if the building envelope does not meet energy efficiency requirements in the BCA 2006.

Taking the above requirements into consideration, Table 4 summarises the noise limits to be met by any commercial activity or equipment item.

Period	Day of week	Time period	Noise Protocol limit
Day	Monday-Saturday	0700-1800 hrs	52
Evening	Monday-Saturday	1800-2200 hrs	46
	Sunday, Public holidays	0700-2200 hrs	
Night	Monday- Sunday	2200-0700 hrs	41

Table 4: Noise limits for any commercial activity or equipment item, dB ENL

In addition to the above, the assessment of noise emissions from the site must include corrections for special audible character such as tonality, intermittency and impulsiveness. The noise assessment must include appropriate allowances for these factors and acoustic treatments must be designed accordingly.

6.2 Mechanical services equipment

6.2.1 Supermarket condenser plant – Roof South tower

Assessment

The condenser plant area (for equipment serving the supermarket and liquor store) will be located on the roof of the South tower as shown in Figure 3.

Figure 3: Supermarket roof South tower condenser plant area



It is understood the equipment in this location is likely to comprise the following:

- 2 No. Refrigeration air-cooled condensers
- 1 No. water-cooled chiller
- 1 No. Liquor store packaged refrigeration unit
- 1 No. Liquor store A/C condenser
- Associated compressors and pumps (TBC).

Noise level data of preliminary refrigeration equipment selections has been provided by Woolworths. Sound power levels for the refrigeration equipment are provided in Table 5.

Table 5: Noise level data for refrigeration equipment, dB L_w

Description		Octave band centre frequency						
	63	125	250	500	1k	2k	4k	Α
Refrigeration condensing units (Kirby WRC614BECA @ 680RPM)	85	84	82	78	73	67	61	79
Chiller (Omicron S4 HE LN 30.4)	88	79	79	82	82	82	76	87
Liquor store packaged refrigeration unit	76	80	88	83	78	71	62	85
Liquor store packaged a/c unit	87	82	79	79	76	71	64	81

Noise from the condenser plant area may potentially affect the following residences:

- Existing residences surrounding the site
- Apartments within the proposed development.





The condenser equipment will operate 24-hours per day, therefore the night-time noise limit must be complied with.

Mitigation requirements

In order to achieve compliance with the night-time noise limit, based on the equipment noise levels detailed in Table 5 the following mitigation measures are required:

- To control noise to the residential balconies on Level 09 of the North tower, the condenser plant area must have a solid acoustic barrier to the entire north elevation, extending at least 500 mm above the top (after installation) of the tallest item of equipment. The screen can be constructed using 9 mm compressed fibre cement sheet (or another material with equivalent mass of ≥15 kg/m²) fixed to the rear of architectural louvres. The barrier must extend fully down to the roof level with no gaps or openings. Suitable provision for drainage from the roof must be provided. The barrier must be a continuous element with no breaks or gaps
- To the remaining extents of the east, south and west elevations, acoustic louvres extending at least 500 mm above the top (after installation) of the tallest item of equipment are required
- The Kirby WRC condensers must be fan speed-limited to 680rpm during the evening and nighttime periods as defined in the EP Regulations
- The floor slab below the plant must be a minimum of 200 mm thick concrete with appropriate vibration isolation mounts fitted and an acoustic suspended ceiling installed to all apartments on the level below the plant.

6.2.2 General plant serving supermarket, residential component, place of assembly

Mechanical services equipment associated with the mixed-use development will include air conditioning, refrigeration plant, fans and heating/ventilation units. Detailed design information such as locations and specifications of significant mechanical services have not been confirmed at this stage.

For mechanical services equipment, the noise limits are generally achievable provided best practices are observed for the services design and installation, as follows:

- Suitable siting and selection of equipment with proven acceptable acoustic performance in similar applications
- Screening the line of sight between any exposed equipment and the facades of habitable spaces or external spaces, i.e. balconies
- Attenuation of significant mechanical noise sources such as the mechanical car parking systems, car park exhaust extraction fans (if any), loading dock ventilation plant and lift shaft ventilation fans
- Vibration isolation of all plant, including pumps and rotating equipment
- All walls, ceilings and floors of internal plantrooms adjacent to or below the apartments must have an uprated acoustic performance (i.e. higher than minimum NCC requirements)
- If required, proprietary methods of noise control such as the use of low noise equipment, duct attenuators, acoustic louvres, acoustic enclosures and barriers can be employed such that the noise limit is achieved.





During the detailed design stage, an acoustic analysis must be performed to determine the exact nature of the treatments required. To perform this analysis, the following information would be required for review:

- Equipment schedules and operating duties
- Manufacturer's noise level data
- Mechanical services drawings showing equipment locations.

6.3 Supermarket loading dock

The supermarket loading dock is located on the northern boundary of the development site, as shown in Figure 4.

Figure 4: Supermarket loading dock



The supermarket operator (Woolworths) has advised that the following weekly delivery vehicle volumes as shown in Table 6 are anticipated.

Table 6: Loading dock vehicle types and volumes per week

Vehicle type	Number per week
Medium rigid vehicle (MRV), 14.7m long	Up to 56 arrivals

A total of up to 56 truck arrivals are anticipated over a week period, comprising up to 8 truck movements per day.

This report has been prepared on the understanding that deliveries will occur during the day and evening period, i.e. 0700 to 2200 hrs, 7 days per week, and that no deliveries will occur outside this period.







The loading dock will incorporate a number of mitigation measures and operational requirements in order to achieve compliance with the relevant noise limits. Detailed calculations are presented in Appendix E.

6.3.1 Noise level data

Noise level data of delivery trucks and loading bay activity has been sourced from the MDA database. The MDA database is a comprehensive compilation of noise measurements performed by staff at MDA and includes noise levels (L_{Aeq}) of truck movements, loading activity and waste collections at similar sites.

Typical sound power levels based on the MDA data are provided in Table 7.

Description	Octave band centre frequency							
	63	125	250	500	1k	2k	4k	А
Waste collection truck/Semi trailer	103	99	97	96	96	95	91	101
Waste truck emptying bin	99	99	93	91	90	91	87	96
Medium Rigid Vehicle (MRV)	100	94	95	90	90	90	86	96
Van/Small rigid vehicle (SRV)	93	91	89	89	89	86	79	93
Compactor	78	77	76	77	85	84	76	89
Loading bay activity	88	87	81	75	74	70	66	80

Table 7: Waste vehicle, loading bay and truck delivery noise emission data, dB Lw

6.3.2 Mitigation measures

The following mitigation measures for activities associated with the loading dock are necessary to achieve compliance with the noise limits:

- Loading dock door to be a fold-up door with acoustic seals achieving R_w 25-30 (e.g. Mirage Doors)
- Loading dock door frame and mechanism to be vibration isolated from the building structure
- Loading dock will incorporate a turntable to enable delivery trucks and waste collection trucks to drive straight into the loading dock without the need to use reversing beepers. The turntable must be isolated from the building structure using resilient connections
- Loading dock to be treated with sound absorption material to control reverberation (e.g. 100 mm thick glasswool insulation with perforated metal facing)
- Isolated floor to loading area to control structure-borne noise to apartments due to trolleys, pallet trucks etc.
- 6.3.3 Operational requirements for deliveries, waste collection and compactor operation

The following operational requirements are necessary to achieve compliance with the noise limits:

- No trucks waiting in surrounding residential streets
- Trucks must drive in forwards and use the turntable. Reversing will not be permitted
- Delivery sequence
 - Truck approaches (loading dock door opens just prior to truck arrival)
 - Truck drives onto turntable and switches off engine immediately
 - Loading dock door closes fully

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- Turntable rotates
- Unloading (or waste collection) begins
- When ready to depart, truck engine is switched on
- Loading dock door opens
- Truck departs
- Loading dock door closes
- Unloading occurs using walker stacker forklifts (not driven forklifts)
- Selection of low noise emission plant
- Truck deliveries using a Medium Rigid Vehicle (MRV) can take place <u>only</u> during Daytime and Evening hours as defined in the EP Regulations, i.e. 0700-2200 hrs, 7 days per week
- Waste collections can take place <u>only</u> during Daytime hours as defined in the EP Regulations, i.e. Monday to Friday 0700-1800 hrs, Saturday 0700-1300 hrs
- No more than one delivery <u>or</u> one waste collection may occur during any 30-minute period
- No deliveries or waste collections can take place during Night-time hours as defined in the EP Regulations, i.e. 2200-0700 hrs, 7 days per week
- The waste compactor may not be used during Night-time hours in the EP Regulations, i.e. 2200-0700 hrs, 7 days per week.

6.4 Shared loading dock

It is recommended that the shared loading dock on the southern boundary of the development site adheres to the following hours of permitted use to reduce the likelihood of complaint from existing residential dwellings:

- 0700-2000 hrs Monday to Saturday
- 0900-2000 hrs Sunday and public holidays.

These recommendations are derived according to similar and comparable activities described in EPA Publication 1254.2 *Noise Control Guidelines*, such as Industrial Waste Collection.

6.5 Supermarket and BWS

A minimum 200 mm thick concrete slab shall be provided between the supermarket and apartments above.

Based on similar projects, the BOH area is subject to similar impact noise and other material handling noise and vibration as the loading dock area. Therefore, an isolated floor is required to the BOH area to control noise and vibration to the apartments above.

If any other area of the supermarket or BWS is subject to the same impact on a regular basis as the loading dock or BOH areas, it will also need an isolated floor. We consider a sudden drop of a loaded pallet from as little as 100 mm from a trolley jack to constitute impact onto the slab.





7.0 MUSIC NOISE ASSESSMENT

7.1 Music noise limits

7.1.1 External noise

Music associated with the place of assembly must comply with the noise limits derived in accordance with the Noise Protocol.

Music events in the place of assembly will not be permitted to take place during the night-time period and will only take place during day and evening periods as defined in the EP Regulations. On this basis, only the limits for 'Day' and 'Evening' periods as defined in the EP Regulations have been derived.

Specifically, this means that events featuring music must not take place during certain times, including after 2300 hrs Monday-Saturday (other than a public holiday), after 2200 hrs on Sundays or a public holiday and 2300 hrs on Sundays or a public holiday if either is preceding a public holiday. Note, the permit allows operation of the venue until midnight on Saturdays. Events can be held between 2300 hrs and midnight, but music must be turned off after 2300 hrs.

The day and evening music noise limits are outlined in Table 8. These limits apply externally at the neighbouring dwellings and open balconies of the apartments within the development.

Further information and the full derivation of the limits is contained in Appendix D3.

Table 8: External day and evening music noise limit, dB

Period	Measured background noise level, LA90	Music limit, LAeq
Day/Evening	43	48

7.1.2 Internal noise

The Noise Protocol specifies a procedure for indoor measurements to be made when either the main transmission path of music entering the sensitive room consists of a floor, ceiling or wall with no openings, or when an outdoor measurement does not represent the noise exposure within the sensitive room. This would apply to apartments within the development located above the place of assembly, and the nearest apartments on mezzanine level with fixed windows.

The internal noise limits based on the Noise Protocol are contained in Table 9.

Period	Internal music limit
Day/Evening	32

7.2 Music noise levels

It is understood that the place of assembly function space will be used for semi-regular events including music and performance recitals, speakers and classes and multi-media events, and school assemblies. For all types of events, music would need to be limited to unamplified (acoustic) or lightly amplified music, including providing background music for a function. Noisy live music events such as DJ's or amplified bands would not be permitted to take place due to the proximity to the noise sensitive areas within the development and existing neighbouring residents.

The maximum number of patrons allowed is 100 persons at all times except when used for school assemblies and school activities by Sholem Aleichem College; and 250 persons for school assemblies and school activities for the Sholem Aleichem College.

For the purpose of assessing compliance with the Noise Protocol, indicative music noise levels have been provided in Table 10. It should be noted that the music noise levels presented below do not

MARSHALL DAY O

contain significant levels of low frequency content (such as may be associated with music from a DJ and band).

	Octave Band Centre Frequency (Hz) / dB							
Description	63	125	250	500	1k	2k	4k	А
Jazz band, soft ballad, 3-piece L_{10}	75	90	87	82	68	69	63	83
Jazz band, soft ballad, 3-piece, L_{eq}	-	-	-	-	-	-	-	80

Table 10: Typical noise levels for lightly amplified live music, dB Lp,rev L10

7.3 Summary of mitigation measures

The following mitigation measures are necessary to achieve compliance with the Noise Protocol for music noise associated with the place of assembly:

- No music during the EP Regulations 'night-time' period
- Glazing of the place of assembly to achieve minimum R_w 40 (e.g. 6/12/7.52 mm laminated)
- Music to be limited to background music/lightly amplified (maximum L_{p,rev} 80-85 dB L_{A10})
- DJ's and heavily amplified bands will not be permitted
- Minimum R_w 30 doors to smoke lobby and internal function room doors
- External doors to have a minimum rating of R_w 30 and remain closed during performances. An air-lock should be incorporated if frequent access is required during performances
- Function space to incorporate sound absorption treatment to control reverberation
- A minimum 200 mm thick concrete slab and acoustic suspended plasterboard ceiling shall be provided between the place of assembly and apartments above.

7.4 Predicted music noise levels

7.4.1 External to the neighbouring dwellings

The predicted external music noise levels at the neighbouring dwellings due to music noise from the place of assembly are provided in Table 11.

Fable 11: Predicted externa	I music noise levels,	day/evening period, dB LAeq
-----------------------------	-----------------------	-----------------------------

External location	Predicted external noise level	Criteria	Comment
Outside dwellings	42	48	Achieves external EP Regulations limit for day/evening periods

The data contained in Table 11 demonstrates that music noise levels are predicted to comply with the noise limits externally outside habitable spaces during the day/evening period.





7.4.2 Internal to the dwelling

Internal noise levels have been calculated based on the recommended noise controls contained in Section 7.3 and are presented in Table 12.

Table 12:	Predicted	internal	music noise	levels, c	/veb	evening	period.	
TUNIC IZ.	Treatered	meena	music noise		uuy/	CVCIIIIS	periou,	UD LAeq

Internal location	Predicted internal noise level	Criteria	Comment
Habitable spaces	28	32	Achieves internal EP Regulations base limit for day/evening periods

The results in Table 12 demonstrate that music noise levels are predicted to comply with the noise limits internally for habitable spaces within the development with the recommended noise controls contained in Section 7.3 incorporated.

7.5 Scope for music events with higher noise levels

If music events with higher noise levels than those discussed above are desired, significant additional noise mitigation will be required in order to contain noise within the venue. Such mitigation is likely to involve creating a 'box-in-box' acoustic construction for the function space, whereby an independently isolated floor, ceiling and internal walls/wall linings are constructed.

Notwithstanding, given the location of the space and the proximity to residential dwellings, music events with high noise levels are unlikely to be practically feasible.







8.0 PATRON NOISE

8.1 Place of assembly - Function space

We understand that there will be no external/outdoor areas associated with the function space.

The requirements for the place of assembly are listed in Section 7.3 and include the following:

- Glazing of the place of assembly to achieve minimum R_w 40 (e.g. 6/12/7.52 mm laminated)
- External doors to remain closed during performances. An air-lock could be considered if frequent access is required during performances
- A minimum 200 mm thick concrete slab and acoustic suspended plasterboard ceiling shall be provided between the place of assembly and apartments above.

Based on the above, the building envelope is expected to adequately contain any patron noise associated with events. As such, patron noise associated with the function space has not been assessed in more detail.

8.2 General terrace spaces – Levels 1, 5 & 6

There are several communal terrace spaces in various locations on Level 1, Level 5 and Level 6. Whilst noise from these spaces is not governed by any particular legislation, it is recommended that some noise mitigation is provided to minimise noise impact to existing residences nearby and apartments within the development. This could be achieved by providing a solid balustrade (glazed or landscaped) to the perimeter of the spaces – the balustrades should be at a height of minimum 1500 mm AFFL.

Appropriate managerial controls should also be applied so that these areas are not used during the most noise-sensitive periods (e.g. 2200 hrs to 0700 hrs).

In addition, signage may be erected reminding residents of the nearby presence of nearby residents and to minimise noise accordingly.

8.3 Shop or food and drink premises

It is not known at this stage whether the two shop / food and drink premises along Selwyn Street will have any outdoor space (or any indoor space with the option to open to the exterior). Therefore, the following assessment has been provided for guidance.

MDA has extensive experience in the assessment of patron noise and has developed a set of proposed guidelines. These guidelines have been implemented on many projects to date.

This section presents a summary of the patron noise assessment as follows:

- The design target applicable to the use of any outdoor areas
- Noise data used to represent the behaviour of patrons in outdoor areas
- Predicted noise levels from patrons in outdoor areas.

8.3.1 Design targets

The derivation of the applicable semi-steady night-time design target for patron noise is summarised in Table 13, based on the method defined in Appendix D8 and the background noise data presented in Section 5.0. The design targets are based on protecting residential amenity and give an indication of the likely impact of predicted or measured patron noise levels at a noise-sensitive location such as a dwelling.

It is recommended that any external areas of the shop / food and drink premises do not operate during the night time. As such, only the day and evening design targets are provided.



Table 13: Patron	noise design	targets, dB	LAeq, 15 min
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Time period	Patron noise target
Day	54
Evening	53

8.3.2 Patron noise data

MDA has conducted noise level measurements in similar sized venues. For assessment purposes, typical food and drink premises patron noise levels have been provided in Table 14. The noise levels are based on 'Restaurant Dining' usage as described in Appendix F.

Table 14: Patron sound power level data – food and drink premises, dB L_{eq}

	Octave Band Centre Frequency (Hz)							
40 patrons	63	125	250	500	1k	2k	4k	Α
Semi-steady state component, dB L_{eq}	77	79	80	87	85	81	74	89

8.3.3 Predicted patron noise levels

A summary of the predicted semi-steady noise levels at the dwelling locations closest to the development is provided in Table 15. The objective of the predictions is to establish if predicted patron noise levels could achieve the design targets detailed in Section 8.3.1.

The prediction has been based on the location of the food and drink premises on the west side of the site, with possible external areas along Selwyn Street.

Table 15: Predicted steady state worst-case patron noise levels, dB LAeq, 15 minute

Receiver	Predicted Noise Level	Design target	Margin to design target
Ground floor,	50	54 (day)	-
19 Selwyn Street		53 (evening)	+1

Steady-state patron noise is expected to meet the patron noise design target during the day at the nearest existing noise sensitive location. The predicted noise levels are 1 dB above the patron noise design targets during the evening. According to the interpretation matrix in Appendix F, there is a low risk of patron noise disturbance associated with the possible outdoor area. As such, further mitigation measures are not deemed necessary.

9.0 NOISE FROM WASTE COLLECTIONS

It is recommended that the schedules and practices detailed in EPA Publication 1254.2 *Noise control guidelines* be adopted for waste collections on the site as follows:

- Refuse bins should be located at sites that provide minimal annoyance to residential premises
- Compaction should be carried out while the vehicle is moving
- Bottles should not be broken up at the collection site
- Routes which service predominantly residential areas should be altered regularly to reduce early morning disturbances
- Noisy verbal communication between operators should be avoided if possible.

The following schedule of acceptable times for waste collection is also provided in the *Noise control guidelines*:

One collection per week

6:30am-8pm Monday to Saturday

9am-8pm Sunday and public holidays

Two or more collections per week

7am-8pm Monday to Saturday

9am-8pm Sunday and public holidays



It should be noted that the operational requirements detailed in Section 6.3.3 take precedent with regard to supermarket waste collections.

10.0 NOISE FROM DOMESTIC MECHANICAL EQUIPMENT

Noise from fixed domestic plant such as air conditioning condensers located on apartment balconies and exhaust fans serving apartments must comply with requirements of the EP Regulations.

Part 5.3, Division 2 of the EP Regulations does not prescribe noise limits, but it does prescribe allowable hours of operation for the purposes of determining whether noise is 'unreasonable' at residential premises under Section 167(2) of the *Environment Protection Act 2018*.

The table of prescribed items and prohibited times is duplicated in Table 16 below.

Table 16: Prescribed items and prohibited times

Group	Prescribed items	Prohibited times
3	Heating equipment (including central heating, a hot water system or a heat pump, air conditioner or split system used for	Monday to Friday: before 7am and after 10pm.
	heating), a vacuum cleaner, swimming pool pump, spa pump, or a water pump (other than a pump being used to fill a header tank).	Weekends and public holidays: before 9am and after 10pm.
4	An air conditioner, evaporative cooler or split system used for cooling.	Monday to Friday: before 7am and after 11pm.
	(Not applicable at any time a heat health alert is in effect in the weather forecast district in which the item is located.)	Weekends and public holidays: before 9am and after 11pm.

Additional guidance on assessing noise from the operation of fixed domestic plant such as heaters and air conditioners is provided in EPA Victoria Publication 1973 *Noise Guideline: Assessing noise form residential equipment.* The guideline provides a recommendation that noise during daytime and



evening operation (non-prohibited hours) should not exceed the background noise level by more than 5 dB at a measurement point in the relevant area.

It is expected that the requirements are generally achievable, provided best practices are observed for the domestic services design and installation, as follows:

- Suitable siting and selection of equipment with proven acceptable acoustic performance in similar applications
- Screening the line of sight between any exposed equipment and the facades of habitable spaces.

11.0 MAXIMUM NOISE LEVELS AND SLEEP DISTURBANCE

Given loading dock activities will not be occurring during the night-time period, it is considered that potential sleep disturbance does not need to be considered.







12.0 CONCLUSION

It is proposed to construct a mixed-use development at 10-16 Selwyn Street, Elsternwick. The project includes construction of a supermarket, residential apartments and a place of assembly.

MDA has carried out an environmental noise assessment of the proposed development in accordance with the relevant Victorian EPA legislation, guidelines and accepted industry practice.

This assessment has been based on:

- Existing noise conditions determined from noise measurement surveys at the site
- Limits determined in accordance with the relevant Victorian EPA legislation, guidelines and accepted industry practice
- Noise modelling of the site and surrounding environment, accounting for typical worst-case atmospheric conditions which favour the propagation of noise.

It has been demonstrated that compliance with the relevant legislation can be achieved, provided the recommended noise controls are successfully implemented.

The following acoustic mitigation measures are recommended:

Mechanical plant

- The supermarket condenser plant area on the roof of the south tower shall incorporate acoustic louvres to the east, south and west elevations with a solid backing material behind the louvres on the north elevation where apartment balconies are located near the plant area.
- A minimum 200 mm thick concrete roof slab with appropriate vibration isolation mounts to the equipment shall be provided.
- Mechanical services associated with the development be reviewed during the detailed design process to confirm that compliance with the relevant noise criteria can be achieved

Loading dock

- The supermarket loading dock and BOH areas incorporate appropriate sound insulation and acoustic absorption treatments to minimise noise. Further details are noted in Section 6.3.2
- Loading dock activity adhere to detailed operational measures included in Section 6.3.3 to minimise noise
- Deliveries and waste collections associated with the development should comply with the schedules and practices nominated in EPA Publication 1254

Place of assembly

- Music noise associated with the place of assembly be limited to background music/lightly amplified music. If noisier events are desired, significant additional noise mitigation will be required (e.g. a 'box-in-box' acoustic construction for the function space).
- No music during the EP Regulations 'night-time' period
- A minimum 200 mm thick concrete slab and acoustic suspended plasterboard ceiling shall be provided between the place of assembly and apartments above
- Minimum acoustic performance of external doors and glazing as per Section 7.3

Outdoor communal areas

• Mitigation measures to control noise from the communal terraces are included in Section 8.2

Food and drink premises



• Any outdoor spaces associated with food and drink premises only operate during the day and evening period. All openable windows to indoor spaces should be closed during the night period.

The preliminary assessment indicates that all noise impacts associated with the proposed development can be adequately mitigated.





APPENDIX A GLOSSARY OF TERMINOLOGY

A-weighting	A set of frequency-dependent sound level adjustments that are used to better represent how humans hear sounds. Humans are less sensitive to low and very high frequency sounds.
	Sound levels using an "A" frequency weighting are expressed as dB L _A . Alternative ways of expressing A-weighted decibels are dBA or dB(A).
dB	Decibel. The unit of sound level.
ENL	The effective noise level from commercial, industrial or trade premises determined in accordance EPA Publication 1826.4 <i>Noise limit and assessment protocol for the control of noise from commercial, industry and trade premises and entertainment venues</i> . This is the L_{Aeq} noise level over a 30-minute period, adjusted for the character of the noise. Adjustments are made for tonality, intermittency and impulsiveness.
Frequency	Sound occurs over a range of frequencies, extending from the very low (e.g. thunder) to the very high (e.g. mosquito buzz). Measured in units of Hertz (Hz).
	Humans typically hear sounds between 20 Hz and 20 kHz. High frequency acuity naturally reduces with age most adults can hear up to 15 kHz.
Hertz (Hz)	The unit of frequency, named after Gustav Hertz (1887-1975). One hertz is one pressure cycle of sound per second.
	One thousand hertz – 1000 cycles per second – is a kilohertz (kHz).
L _{A10}	The A-weighted sound level exceeded for 10% of the measurement period, measured in dB. Commonly referred to as the average maximum noise level.
L _{A90}	The A-weighted sound level exceeded for 90 % of the measurement period, measured in dB. Commonly referred to as the background noise level.
L _{Aeq}	The equivalent continuous A-weighted sound level. Commonly referred to as the average sound level and is measured in dB.
L _{Amax}	The A-weighted maximum sound level. The highest sound level which occurs during the measurement period. Usually measured with a fast time–weighting i.e. L _{AFmax}
Lp	Sound pressure level. The sound level measured at distance from a source. Distinctly different from sound power level (L_W)
L _w	Sound Power Level. The calculated level of total sound power radiated by a sound source. Usually A-weighted i.e. $L_{\rm WA}$.
Octave band	The interval between one frequency and its double. Sound is divided into octave bands for analysis. The typical octave band centre frequencies are 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz and 4 kHz.
Rw	Weighted Sound Reduction Index. A single number system for quantifying the transmission loss through a building element. The measured transmission loss, in third octave bands from 100 Hz to 3.15 kHz, is compared to a standard reference contour to determine the single number value. Can only be measured in laboratory conditions
Sound insulation	The ability of a material or construction to reduce sound travelling through it.





APPENDIX B PLANNING MAP





APPENDIX C DEVELOPMENT PLANS



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BASEMENT 4 FLOOR PLAN

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APPENDIX D NOISE LEGISLATION AND GUIDELINES

D1 Environment Protection Act 2017

The *Environment Protection Act 2017* (EP Act) came into effect on 1 July 2021 and incorporates several subordinate documents relating to assessment of noise.

The EP Act also introduces a general environmental duty (GED), which requires anyone engaging in an activity posing a risk of harm to human health and/or the environment from pollution (including noise) and waste, to minimise those risks to prevent harm as far as reasonably practicable.

The legislative documents that prescribe noise limits are the *Environment Protection Regulations* 2021 (EP Regulations) and EPA Publication 1826.4 Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (Noise Protocol).

D2 Environment Protection Regulations 2021

Part 5.3 of the Environment Protection Regulations (the EP Regulations) addresses noise emissions from commercial, industrial and trade premises, which are defined as any premises except the following:

- (a) residential premises (other than common plant under the control of an owners corporation);
- (b) a street or road, including every carriageway, footpath, reservation and traffic island on any street or road;
- (c) a railway track used by rolling stock in connection with the provision of a freight service or passenger service—
 - (i) while travelling on a railway track or tramway track; or
 - (ii) while entering or exiting a siding, yard, depot or workshop;
- (d) a railway track used by rolling stock in connection with the provision of a passenger service, while in a siding, yard, depot or workshop and is—
 - *(i)* powering up to commence to be used in connection with the provision of a passenger service; or
 - *(ii)* shutting down after being used in connection with the provision of a passenger service;
- (e) the premises situated at Lower Esplanade, St Kilda and known as "Luna Park" and being the whole of the land more particularly described in Certificate of Title Volume 1204 Folio 109

Note: The maintenance, cleaning or loading of rolling stock stabled in a siding, yard, depot or workshop are included within the meaning of commercial, industrial and trade premises.

A noise sensitive area where the EP Regulations apply is defined as:

- (a) that part of the land within the boundary of a parcel of land that is—
 - (i) within 10 metres of the outside of the external walls of any of the following buildings—
 - (A) a dwelling (including a residential care facility but not including a caretaker's house);
 - (B) a residential building;
 - (C) a noise sensitive residential use; or

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- (ii) within 10 metres of the outside of the external walls of any dormitory, ward, bedroom or living room of one or more of the following buildings-
 - (A) a caretaker's house;
 - (B) a hospital;
 - (C) a hotel;
 - (D) a residential hotel;
 - (E) a motel;
 - (F) a specialist disability accommodation;
 - (G) a corrective institution;
 - (H) a tourist establishment:
 - (I) a retirement village;
 - (J) a residential village; or
- (iii) within 10 metres of the outside of the external walls of a classroom or any room in which learning occurs in the following buildings (during their operating hours)-
 - (A) a child care centre;
 - (B) a kindergarten;
 - (C) a primary school;
 - (D) a secondary school; or
- (b) subject to paragraph (c), in the case of a rural area only, that part of the land within the boundary of—
 - (i) a tourist establishment; or
 - (ii) a campground; or
 - (iii) a caravan park; or
- (c) despite paragraph (b), in the case of a rural area only, where an outdoor entertainment event or outdoor entertainment venue is being operated, that part of the land within the boundary of the following are not noise sensitive areas for the purposes of that event or venue-
 - (i) a tourist establishment;
 - (ii) a campground;
 - (iii) a caravan park;

Table 17 presents a summary of the relevant Divisions and Regulations from Part 5.3 – Noise.

Section	Description
Division 1, Regulation 113	States that a person who conducts a prediction, measurement, assessment or analysis of noise within a noise sensitive area for the purposes of the Act or these Regulations, must conduct the prediction, measurement, assessment or analysis in accordance with the Noise Protocol.
Division 2	Applies to noise from residential premises

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Section	Description					
Regulation 114	Provides a set of "prescribed items" and "prohibited times" for determining unreasonable noise from residential premises. For example, an air conditioner is a prescribed item that is prohibited before 7 am and after 11 pm Monday to Friday, and before 9 am and after 11 pm on weekends and public holidays. (A key exemption for this particular item is any time a heat health alert is in effect in the weather forecast district in which the item is located).					
Regulation 115	Describes aggravated noise from residential premises as noise from the Regulation 114 prescribed items during prohibited times likely resulting in harm to human health or the environment.					
Division 3	Applies to noise from commercial, industrial and trade premises					
Regulation 116	Defines the day, evening and night period as follows:					
	• Day: 0700 to 1800 hrs, Monday – Saturday					
	 Evening: 1800 to 2200 hrs, Monday – Saturday 0700 to 2200 hrs, Sunday and Public Holidays 					
	• Night: 2200 to 0700 hrs the next day, Monday – Sunday					
Regulation 117	In this Division, when the level of noise emitted from commercial, industrial and trade premises is assessed, the following sources of noise that could be expected at the proposed facility must not be taken into account:					
	Voices					
	Construction or demolition activity on building sites					
	Intruder, emergency or safety alarms or sirens					
	 Lawnmowing, mobile farm machinery (except for maintenance activities), scare and anti-hail guns, livestock on farms or frost fans 					
	Equipment used in relation to an emergency					
	Non-commercial vehicles (except for maintenance activities).					
Regulation 118	Defines noise as being unreasonable if it exceeds the Noise Protocol limits or the alternative assessment criteria that apply at an alternative assessment location.					
	Defines the lowest base noise limits as follows:					
	 Major urban area: Day: 45 dB ENL Evening: 40 dB ENL Night: 35 dB ENL 					
	 Rural area: Day: 45 dB ENL Evening: 37 dB ENL Night: 32 dB ENL 					
	The noise limit for commercial, industrial and trade premises for the night period must r exceed 55 dB ENL					
Regulation 119	If multiple existing or proposed premises emit noise that contributes to the effective noise level at a noise sensitive receiver, all reasonable steps must be taken by the premises' management to ensure the combined noise level does not exceed the noise limit.					
Regulation 120	This regulation essentially identifies that tonal aspects of noise must be considered when considering unreasonable noise for section $3(1)(a)(v)$ of the Act. The Noise Protocol provides a method of assessing tonal characteristics of noise from commercial, industrial and trade premises, with additional guidance on low frequency noise available in EPA Publication 1996 <i>Noise quideline – assessing low frequency noise</i> .					

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Section	Description				
Regulation 121	Noise emitted from commercial, industrial and trade premises is prescribed to be aggravated noise if it exceeds the noise limits by more than 15 dB, or the following if lower:				
	• 75 dB ENLduring the day,				
	• 70 dB ENLduring the evening, or				
	• 65 dB ENLduring the night.				
Division 4	Applies to noise from entertainment venues and outdoor entertainment events, including music noise from entertainment venues or events.				

D3 EPA Publication 1826 – The Noise Protocol

As per the Division 1, Regulation 113 of the EP Regulations, assessment of noise within a sensitive area must be conducted in accordance with EPA Victoria Publication 1826 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (the Noise Protocol). The Noise Protocol outlines the EPA's required approach to the determination of noise limits and to the measurement, prediction and analysis of noise.

Part I of the Noise Protocol provides noise limits for Commercial, industrial and trade premises.

Part II of the Noise Protocol provides noise limits for music noise entertainment venues and events.

D3.1 Part I Section A – Determining noise limits for commercial, industrial and trade premises

The Noise Protocol provides two methods for deriving the relevant noise limits, the Urban area method and the Rural area method. The Urban area method is applicable to this project.

Using the Urban area method, noise limits are calculated taking into account land 'zoning types' within a 70 m and 200 m radius of a noise sensitive building. Zoning types are categorised as type 1, 2 or 3 as defined in Annex A of the noise protocol. A prescribed formula is used to calculate a corresponding Zoning Level. In general, zone type designations are as follows:

- Type 1 for residential, rural, open space or similar zones;
- Type 2 for commercial, business, office and industrial 3 [light industry] zones; or
- Type 3 for industrial 1 and 2 [general industry] and similar zones.

Greater areas of type 2 and 3 land within a 200 m radius of a noise sensitive site result in higher Zoning Levels than a site with respectively larger areas of type 1 land.

The Noise Limit is equal to the 'zoning level' unless the background level at the noise sensitive site is categorised as low or high according to the Noise Protocol. If the background level is low or high, the Noise Limit is calculated from a formula taking into account the Zoning Level and the Background Level.

The land use zones of the noise generating site and the noise sensitive areas inform the noise limit applicable to a commercial or industrial site. The current land use zones around the subject site are shown in the planning map in Appendix B.

The limits are separately defined for the day, evening and night periods. The time periods are defined in the EP Regulations and summarised in Table 18.

Period	Day of week	Start time	End time
Day	Monday-Saturday	0700 hrs	1800 hrs
Evening	Monday-Saturday	1800 hrs	2200 hrs
	Sunday, Public holidays	0700 hrs	2200 hrs
Night	Monday-Sunday	2200 hrs	0700 hrs

Table 18: Noise Protocol Part I time periods

The relevant noise limits applicable to this development are derived in Table 19.

Period	Zoning Level, dB	Background noise level, dB L _{A90}	Background relative to zoning level	Noise Protocol limit, dB ENL
Day	52	44	Neutral	52
Evening	46	43	Neutral	46
Night	41	37	Neutral	41

Table 19: Noise Protocol commercial, industrial and trade noise limits, dB

D3.2 Part I Section B – Assessing noise from commercial, industrial and trade premises

Assessable noise from the proposed development that would exceed the noise limits would be prescribed to be unreasonable by the EP Regulations. Section 166 and 168 of the EP Act essentially places the onus of compliance on industry by prohibiting the emission of unreasonable and aggravated noise.

For this scenario, in accordance with the Noise Protocol, the noise limits apply up to 10 m from a dwelling, but within the property boundary.

Once a noise limit is established, an equivalent noise level (L_{Aeq}) due to the operation of the commercial premises is measured or predicted for a 30-minute operating period during the day, evening and night period as appropriate. If necessary, the L_{Aeq} noise level is adjusted for duration and noise character (tonality, impulsiveness and intermittency) to give the effective noise level (ENL). If the ENL exceeds the noise limit, then remedial action will be required.

Consideration must be given to existing and future noise sensitive areas, factors that influence the propagation of sound (including atmospheric effects) and the cumulative contribution of noise from multiple existing and proposed sites.

D3.3 Part II Section A - Noise limits for music from entertainment venues and events

Part II of the Noise Protocol provides noise limits for music noise entertainment venues and events.

The EP Regulations define an indoor entertainment venue as follows:

... any premises (other than residential premises or an outdoor entertainment venue), where music is played and includes a live music entertainment venue, hotel, tavern, cabaret, night club, discotheque, reception centre, skating rink, restaurant, cafe, health and fitness centre, recording and rehearsal studio, theatre, amusement park, amusement parlour, retail store, shop, public hall and club.

The noise limits for music noise from indoor entertainment venues that apply within the noise sensitive areas are as follows.

Time period		Noise limit
Day/Evening	Monday to Saturday (other than a public holiday) 0700 – 2300 hrs	Music noise (L_{Aeq}) not permitted to exceed background noise (L_{A90}) plus 5 dB
	Sunday or public holiday (other than if either is preceding a public holiday) 0900 – 2200 hrs	
	Sunday or public holiday (if either is preceding a public holiday) 0900 – 2300 hrs	
Night	Monday to Friday (other than a public holiday f or a day preceding a public holiday) e 2300 – 0700 hrs b	Music noise (L_{OCT10}) is not permitted to exceed the background noise level (L_{OCT90}) by more than 8 dB in any octave band
	Saturday or any day preceding a public holiday 2300 – 0900 hrs	(63Hz-4kHz) at a noise-sensitive area
	Sunday or public holiday (if either is preceding a public holiday) 2200 – 0700 hrs	

Table 20: Music noise criteria

Music events in the place of assembly will not be permitted to take place during night-time periods and will only take place during day and evening periods as defined in the EP Regulations. On this basis, only the limits for 'Day' and 'Evening' periods as defined in the EP Regulations have been derived.

The derived environmental music noise limits for the day and evening period for the site are shown in Table 21.

Table 21: Derived day and evening music noise limit, dB

Period	Measured background noise level, LA90	Music limit, L _{Aeq}
Day/Evening	43	48

D4 Environment Reference Standard

The Environment Reference Standard (ERS) is made under Section 93 of the EP Act. The ERS sets out environmental values for ambient sound that are sought to be achieved and maintained in Victoria and standards to support those values. The indicators and objectives (noise levels) within the ERS provide a benchmark for comparing desired outcomes to the actual state of the environment and a basis for assessing actual and potential risks to the environmental values.

Part 3 of the ERS discusses ambient sound.

Table 3.1 of the ERS, reproduced in Table 22, describes the environmental values of the ambient sound environment.

Environmental value	Description of environmental value
Sleep during the night	An ambient sound environment that supports sleep at night
Domestic and recreational activities	An ambient sound environment that supports recreational and domestic activities in a residential setting
Normal conversation	An ambient sound environment that allows for a normal conversation indoors without the need to raise voices
Child learning and development	An ambient sound environment that supports cognitive development and learning in children. (Unlikely to be applicable to this proposal as there are no existing kindergartens or schools proposed for the site or around the site)
Human tranquillity and enjoyment outdoors in natural areas	An ambient sound environment that allows for the appreciation and enjoyment of the environment for its natural condition and the restorative benefits of tranquil soundscapes in natural areas. (Not applicable within the township)
Musical entertainment	An ambient sound environment that recognises the community's demand for a wide range of musical entertainment. (Not applicable to the area around the site).

Table 22: Environmental values of the ambient sound environment

Table 3.2 and 3.3 of the ERS then quantifies objective ambient day and night noise levels for different land uses. The two tables have been amalgamated as per Table 23 which only shows the land use category and planning zone relevant to the proposed development.

Table 23: Land use categories, indicators and objectives for the ambient sound environment
--

Land use category	General description	Planning Zones	Outdoor indicators and objectives
Category II	Medium rise building form with a strong urban or commercial character. Typically contains	Mixed Use Zone (MUZ)	Day 0600 – 2200 hrs: 55 dB L _{Aeq,16h}
	mixed land uses including activity centres and larger consolidated sites, and an active public realm.		Night 2200 – 0600 hrs: 50 dB L _{Aeq,8h}

The ERS is not a compliance standard, and the noise levels listed within the ERS for different land uses are explicitly not noise limits nor design criteria. The primary function of the ERS is to provide assessment and reporting benchmarks for environmental values.

Section 60(1A) of the Planning and Environment Act 1987 states:

Before deciding on an application, the responsible authority, if the circumstances appear to so require, may consider—

•••

(f) any relevant environment reference standard within the meaning of the Environment Protection Act 2017;

The responsible authority must determine whether the circumstances of the application would require the ERS to be considered. Where they do, relevant environmental values, indicators and objectives should be considered.

EPA Publication 1992 *Guide to the Environment Reference Standard* provides information primarily for decision makers about how the ERS should be applied to support decision making, and how the environmental values, indicators and objectives for each element of the environment should be interpreted.

EPA Publication 1992 notes that when a decision-maker considers the ERS for a development proposal, the decision-maker would examine whether:

- the proposal would change the sound of the ambient environment
- sounds emitted from a proposal would adversely affect or pose a risk to the environmental values.

The Publication also notes that assessments should be proportionate to the scale of the proposal and the magnitude of potential harms.

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D5 Waste collection

EPA Victoria Publication 1254.2 *Noise Control Guidelines* provides the following recommendations for industrial waste collections:

- Refuse bins should be located at sites that provide minimal annoyance to residential premises
- Compaction should be carried out while the vehicle is moving
- Bottles should not be broken up at the collection site
- Routes which service predominantly residential areas should be altered regularly to reduce early morning disturbances
- Noisy verbal communication between operators should be avoided where possible.

The following schedule of acceptable times for waste collection is also provided:

One collection per week

6:30 am – 8 pm	Monday to Saturday		
9 am – 8 pm	Sunday and public holidays		

Two or more collections per week

7 am – 8 pm	Monday to Saturday
9 am – 8 pm	Sunday and public holidays

Where possible waste collection activities at proposed development should adhere to the above guidelines and procedures.

D6 Deliveries

EPA Victoria Publication 1254.2 *Noise Control Guidelines* states the following concerning store deliveries:

Where a residential area will be impacted by noise from deliveries, the deliveries should be inaudible in a habitable room of any residential premises (regardless of whether any door or window giving access to the room is open) outside the hours contained in the schedule.

Schedule: Deliveries to shops, supermarkets & service stations

7 am-10 pm Monday to Saturday

9 am-10 pm Sunday and Public Holidays.

Note: All ancillary motors or trucks should be turned off whilst making the delivery.

D7 Sleep Disturbance

The NSW Road Noise Policy 2011 produced by the NSW EPA, provides guidance on potential for sleep disturbance. While the Policy applies strictly only in NSW, the provisions of the document are often referred to in Victoria for general guidance on potential sleep disturbance.

The NSW policy notes that from the research on sleep disturbance to date it can be concluded that:

- maximum internal noise levels below 50–55 dB L_{Amax} are unlikely to awaken people from sleep
- one or two noise events per night, with maximum internal noise levels of 65–70 dB L_{Amax}, are not likely to affect health and wellbeing significantly.

D8 Patron noise

Noise from voices of patrons is not covered under any Victorian policy or general guideline.

There has been extensive discussion between members of the Association of Australian Acoustical Consultants (AAAC) regarding suitable criteria but consensus between members has not yet been reached.

In lieu of an established state policy or criterion, MDA has developed a set of design targets which have been referenced as part of numerous planning applications and VCAT hearings for proposed external patron noise areas.

The structure of the patron noise design targets is summarised in Table 24.

Description	Design Target	Purpose
Semi-steady noise levels L _{Aeq}	Day Period - 50 dB or background noise (L _{A90}) + 10 dB, whichever is higher	Amenity protection
	Evening Period - 45 dB or background noise (LA90) + 10 dB, whichever is higher	
	Night Period - 40 dB or background noise (L _{A90}) + 5 dB, whichever is higher	
Short-term maximum noise levels L _{Amax}	60-65 dB	Sleep disturbance protection

Table 24: Recommended design targets for night-time patron noise

The relevant design targets for the proposed development are shown in Table 25.

Table 25: Patron noise design targets, dB

Time period Measured background noise level, LA90		Patron noise target, LAeq, 15 min	
Day	44	54	
Evening	43	53	

For a theoretical assessment of a venue, the purpose of the proposed patron noise criteria is not to provide an absolute limit but to provide an indication of whether a venue has the potential to cause an unreasonable impact.

It is difficult to propose an absolute limit because unlike other noise sources (e.g. mechanical equipment), there is a large variation in patron noise and this variation is not always linked to the number of patrons.

The results of the analysis are interpreted as follows:

Predicted noise level	Likely impact
Meets the proposed criteria	There is a negligible or very low risk of patron noise disturbance associated with the site.
Above the design target level by up to 2 dB	There is a low risk of patron noise disturbance associated with the site.
Above the design target level by 3 to 5 dB	There is a low to moderate risk of patron noise disturbance associated with the site. The proposal should be assessed with measurements once it is operational to determine typical crowd noise levels from the venue. Provision should be made to adopt managerial controls and retrofit engineering controls if deemed necessary
Above the design target level by 5 to 8 dB	There is a moderate to high risk of patron noise disturbance associated with the site and engineering controls should be incorporated. Managerial controls should also be considered at the planning stage. Further measurements will be required once the development is operational to determine appropriate managerial controls
Above the design target level more than 8 dB	There is a high to very high risk of patron noise disturbance associated with the site and major changes to the design and/or operation of the proposed outdoor area will be required

APPENDIX E DETAILED SUPERMARKET LOADING DOCK CALCULATIONS

Table 26: Daytime operation

Activity	Predicted effective noise levels, ENL dB				
	19 Sinclair Street	16 Sinclair Street	77 Regent Street	58 Elizabeth Street	
Scenario: 1 waste collection or 1 MRV delivery within 30-min period					
1 Waste collection truck movement L_{wA}	101	101	101	101	
1 Medium rigid vehicle (MRV) movement L _{wA}	96	96	96	96	
Highest L _{wA}	101	101	101	101	
Distance correction	-33	-32	-41	-48	
Duration correction 27 seconds	-18	-18	-18	-18	
Screening/directivity	0	-5	0	-3	
Tonality correction	0	0	0	0	
Effective noise level	50	46	42	32	
Collection/bin empty	96	96	96	96	
Distance correction	-33	-32	-41	-48	
Duration correction	-15	-15	-15	-15	
Transmission loss of loading dock door	-20	-20	-20	-20	
Tonality correction	2	2	2	2	
Effective noise level	30	31	22	15	
Loading bay activity (full 30 minutes)	80	80	80	80	
Transmission loss of loading dock door	-20	-20	-20	-20	
Distance correction	-33	-32	-41	-48	
Effective noise level	27	28	19	12	
Effective noise level of compactor operation (full 30 minutes)	89	89	89	89	
Transmission loss of loading dock door	-20	-20	-20	-20	
Distance correction	-33	-32	-41	-48	
Effective noise level	36	37	28	21	
Total cumulative effective noise level	50	47	42	32	
Noise Protocol daytime limit	52	52	52	52	
Compliance?	Yes	Yes	Yes	Yes	

Table 27: Evening operation

Activity	Predicted effective noise levels, ENL dB						
	19 Sinclair Street	16 Sinclair Street	77 Regent Street	58 Elizabeth Street			
Scenario: 1 Medium rigid vehicle (MRV) delivery within 30-min period							
1 Medium rigid vehicle (MRV) movement L _{wA}	95	95	95	95			
Distance correction	-33	-32	-41	-48			
Duration correction 27 seconds	-18	-18	-18	-18			
Screening /directivity	0	-5	0	-3			
Tonality correction	0	0	0	0			
Effective noise level	44	40	36	26			
Loading bay activity (full 30 minutes)	80	80	80	80			
Transmission loss of loading dock door	-20	-20	-20	-20			
Distance correction	-33	-32	-41	-48			
Effective noise level	27	28	19	12			
Effective noise level of compactor operation (full 30 minutes)	89	89	89	89			
Transmission loss of loading dock door	-20	-20	-20	-20			
Distance correction	-33	-32	-41	-48			
Effective noise level	36	37	28	21			
Total cumulative effective noise level	45	42	37	27			
Noise Protocol evening limit	46	46	46	46			
Compliance?	Yes	Yes	Yes	Yes			

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APPENDIX F PATRON NOISE DATA

The noise of patron areas associated with dining and licensed venues is highly variable according to a wide range of factors including:

- The type of venue
- The function of the space within the venue (i.e. seated areas for dining or standing areas with a focus on alcohol consumption)
- Total crowd numbers
- The composition of the total patron numbers in terms of demographics and group sizes
- Weather
- Alcohol consumption
- Background noise levels
- The acoustic properties of the space.

Based on the above considerations, total patron noise emissions will vary significantly between different venues. Further, for a given venue patron noise emissions will vary from day to day and hour to hour according to these types of factors.

The individual and cumulative effect of these factors cannot be precisely calculated. Accordingly, to provide a practical basis for assessing the noise from proposed external areas, a simplified method has been developed to characterise the noise emissions of four broad categories of venue type for different number of patrons. The method is based on a single representative vocal effort to characterise the range of emissions of all individuals within the crowd.

It is assumed that a portion of the crowd may be speaking at any given point in time.

In practice, the vocal effort of each individual will vary across the crowd and throughout the assessment period. The portion of the crowd will also vary. The selected values are therefore not considered exact representations of a crowd's patterns. The values have been chosen to enable a simple relationship to be formulated which provides close agreement with patron noise measurements conducted at a range of venues.

Marshall Day Acoustics and other acoustic consultants in Melbourne have measured patron noise from several different venues. These measurements indicate a large variation in the noise levels of crowds. Variations are due to a number of factors including the situational context of the crowd.

For the purpose of predicting noise levels from a venue, external patron areas are categorised according to the descriptions outlined in Table 28. Reference sound power data for one person is detailed in the 2011 Hayne paper¹.

Area use category	Reference sound power data per one person		Area use definition		
	Equivalent	Maximum			
Vertical drinking ('worst-case' crowd)	88 dB L _{AW}	104 dB L _{AW}	Standing patrons drinking and talking Focus of activity on drinking and socialising		
Taverns with significant food offerings	83 dB L _{AW}	104 dB L _{AW}	Predominantly seated patrons, drinking, dining and talking Focus of activity on drinking, whilst dining and socialising		
Restaurant dining	78 dB Law	98 dB Law	Seated patrons, drinking, dining and talking Focus of activity on dining and socialising		
Small smoking areas (<40 patrons)	73 dB Law	98 dB Law	Patrons using area for smoking Focus of activity on smoking rather than socialising (data also includes outdoor areas with alcohol consumption)		

Table 28: Patron area use categories

Based on the above reference sound power data and measurements by Marshall Day Acoustics, a simplified empirical relationship to represent the total sound power level for which crowd numbers and character were varied has been derived for determining design equivalent and maximum sound power level as follows:

- Design equivalent sound power level derived by assuming that one third of the total crowd speaks continuously over the duration of the assessment period, and each of these speakers emit a constant total sound power level over the duration of the assessment period. In practice, the actual number of individuals speaking, the sound power emitted by each individual, and the temporal characteristics of each speaker will vary considerably over the assessment period. The derived values therefore do not represent the actual percentage of patrons speaking, or the emission of each patron, but simply represent the total sound power level for the number of patrons
- Design maximum sound power level derived by assuming that the maximum noise level occurs as a result of two (2) individuals simultaneously producing a maximum level. Smoking areas and restaurants are considered to have the same maximum sound power level characteristics, as are taverns with significant food offerings and vertical consumption crowds.

¹ Hayne et al 2011, 'Prediction of noise from small to medium sized crowds', in *Acoustics 2011: Breaking New Ground, Proceedings of the Annual Conference of the Australian Acoustical Society*, AAS Queensland Division 2011, Gold Coast, paper number 133.

Figure 5 provides the total equivalent sound power based on patron numbers.

Figure 5: Total equivalent sound power based on patron number

Table 29 provides the octave band spectral correction applied to the calculated patron sound power.

Table 29: Octave	band spectral correction, dB	
Table 29: Octave	band spectral correction, dB	

	Octave Band Centre Frequency (Hz)						
Source	63	125	250	500	1000	2000	4000
Spectral Correction	-12	-10	-9	-2	-4	-8	-15