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Environmental Noise Assessment

532 Canning Highway, Attadale

Melville Motors Service Centre Expansion

Reference: 22087499-01

Prepared for:
Melville Motors Pty Ltd

Report: 22087499-01

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Date:	Rev	Description	Prepared By	Verified
25-Aug-22	0	Issued to Client	Matt Moyle	Terry George

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1 INTRODUCTION

It is proposed to expand an existing motor vehicle sales and service centre at 532 Canning Highway, Attadale (Refer *Figure 1-1*). The expansion that forms part of this Development Application is related to the service workshop only, which will be increased in scale with additional vehicle service and storage capacity, including a basement parking area. While the centre has been in operation for some time, the additional scale and nature of the proposal and the proximity to noise sensitive premises, warrants a noise impact assessment. The nearest noise sensitive premises are located to the north, south and east of the subject site. Mixed use and commercial premises are also noted close to the site.

Noise sources considered were those determined to be most critical being associated with the mechanical plant, carpark noise and operation of the workshop, as emitted via the proposed roller doors. Noise from these items was assessed against the prescribed standards of the *Environmental Protection (Noise) Regulations 1997* by way of noise modelling.

Figure 1-1 Site Locality

The service centre component is proposed to operate Monday to Friday 7.30am – 5.00pm & Saturday 8.00am – 12.00pm. The site layout of the development is depicted in *Figure 1-2*.

Figure 1-2 Development Site & Ground Floor Plan

Site drawings used in this assessment are included in *Appendix A*.

Appendix C contains a description of some of the terminology used throughout this report.

2 CRITERIA

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations).

Regulation 7 defines the prescribed standard for noise emissions as follows:

"7. (1) Noise emitted from any premises or public place when received at other premises –

a) must not cause or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and

b) Must be free of:

i. Tonality;

ii. Impulsiveness; and

iii. Modulation".

A "…noise emission is taken to *significantly contribute to* a level of noise if the noise emission exceeds a value which is 5 dB below the assigned level…"

Tonality, impulsiveness and modulation are defined in Regulation 9. Noise is to be taken to be free of these characteristics if:

a) The characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and

b) The noise emission complies with the standard after the adjustments of *Table 2-1* are made to the noise emission as measured at the point of reception.

Table 2-1 Adjustments for Intrusive Characteristics

Tonality	Modulation	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB

Note: The above are cumulative to a maximum of 15dB.

The baseline assigned levels (prescribed standards) are specified in Regulation 8 and are shown in *Table 2-2*.

Table 2-2 Baseline Assigned Noise Levels

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor
Commercial	All hours	60	75	80

1. ***highly sensitive area*** means that area (if any) of noise sensitive premises comprising —
   (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
   (b) any other part of the premises within 15 metres of that building or that part of the building;

The influencing factor was calculated for the nearest noise sensitive premises. As per the relevant Planning Scheme map, the subject site is amongst "Centre" zoning noted to be within a commercial precinct with nearby mixed-use lots to the immediate west across Hislop Road and Canning Highway, with some being residential (refer *Appendix B*).

The Regulations consider a major road to have more than 15,000 vehicles per day and therefore Canning Highway is considered a major road (39,902 weekday vehicles per day - 2019 traffic count site #0645).

The combined traffic and land use influencing factors for all residences has been calculated with the residences grouped into A (North), B (South) and C (East) as shown in *Table 2-3* to *Table 2-5.*

Table 2-3 Influencing Factor Calculation – Group A (North) Residences

Description	Within 100 metre Radius	Within 450 metre Radius	Total
Commercial Land	41% / 2.1 dB	8% / 0.4 dB	2.5 dB
Major Road	-	Canning Hwy	2 dB
Total			**5 dB**

Table 2-4 Influencing Factor Calculation – Group B (South) Residences

Description	Within 100 metre Radius	Within 450 metre Radius	Total
Commercial Land	38% / 1.9 dB	8% / 0.4 dB	2.3 dB
Major Road	Canning Hwy	Canning Hwy	6 dB
Total			**8 dB**

Table 2-5 Influencing Factor Calculation – Group C (East) Residences

Description	Within 100 metre Radius	Within 450 metre Radius	Total
Commercial Land	46% / 2.3 dB	8% / 0.4 dB	2.7 dB
Major Road	Canning Hwy	Canning Hwy	6 dB
Total			**9 dB**

Table 2-6 shows the relevant L_{A10}, L_{A1} and L_{Amax} assigned levels (including the influencing factors).

Table 2-6 Assigned Noise Levels

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Group A (North) 11 Hislop Road	0700 to 1900 hours Monday to Saturday (Day)	50	60	70
	0900 to 1900 hours Sunday and public holidays (Sunday)	45	55	70
	1900 to 2200 hours all days (Evening)	45	55	60
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	40	50	60
Group B (South) 543 & 547 Canning Hwy	0700 to 1900 hours Monday to Saturday (Day)	53	63	73
	0900 to 1900 hours Sunday and public holidays (Sunday)	48	58	73
	1900 to 2200 hours all days (Evening)	48	58	63
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	43	53	63
Group C (East) 13-17 Groves Avenue Apts	0700 to 1900 hours Monday to Saturday (Day)	54	64	74
	0900 to 1900 hours Sunday and public holidays (Sunday)	49	59	74
	1900 to 2200 hours all days (Evening)	49	59	64
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	44	54	64
Commercial	All hours	60	75	80

It is noted the assigned noise levels are statistical levels and therefore the period over which they are determined is important. The Regulations define the Representative Assessment Period (RAP) as *a period of time of not less than 15 minutes, and not exceeding 4 hours*, which is determined by an *inspector* or *authorised person* to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission. An *inspector* or *authorised person* is a person appointed

under Sections 87 & 88 of the *Environmental Protection Act 1986* and include Local Government Environmental Health Officers and Officers from the Department of Environment Regulation. Acoustic consultants or other environmental consultants are not appointed as an *inspector* or *authorised person*. Therefore, whilst this assessment is based on a 4 hours RAP, which is assumed to be appropriate given the nature of the operations, this is to be used for guidance only.

2.1 Vehicles on Site

The majority of the expansion car park will be for vehicle storage and therefore is considered low impact given the infrequent use of bays. Some car door closing noise is assessed in the most critical locations.

3 METHODOLOGY

Computer modelling was undertaken, using the software *SoundPLAN 8.2* with the ISO 9613 algorithms (ISO 17354 compliant) selected. These algorithms have been selected as they include the influence of wind. Input data required in the model are:

- Meteorological Information;
- Topographical data;
- Ground Absorption; and
- Source sound power levels.

3.1 Meteorological Information

Meteorological information utilised is provided in *Table 3-1* and is considered to represent worst-case conditions for noise propagation. At wind speeds greater than those shown, sound propagation may be further enhanced, however background noise from the wind itself and from local vegetation is likely to be elevated and dominate the ambient noise levels.

Table 3-1 Modelling Meteorological Conditions

Parameter	Day (0700-1900)	Night (1900-0700)
Temperature (°C)	20	15
Humidity (%)	50	50
Wind Speed (m/s)	Up to 5m/s	Up to 5m/s
Wind Direction*	All	All

* Note that the modelling package used allows for all wind directions to be modelled simultaneously.

It is generally considered that compliance with the assigned noise levels needs to be demonstrated for 98% of the time, during the day and night periods, for the month of the year in which the worst-case weather conditions prevail. In most cases, the above conditions occur for more than 2% of the time and therefore must be satisfied.

3.2 Topographical Data

Topographical data was adapted from *Google*, Streetview images and proposed plans. Existing buildings have also been included as these can provide barrier attenuation when located between a source and receiver, much the same as a hill, as well as also providing reflection paths. A wall of varying heights has been included along the east boundary.

3.3 Ground Absorption

Ground absorption varies from a value of 0 to 1, with 0 being for an acoustically reflective ground (e.g. water or bitumen) and 1 for acoustically absorbent ground (e.g. grass). A value of 0.1 has been used for road and commercial areas, and 0.6 has been used for the remaining areas.

3.4 Source Sound Levels

Note that as the development is at DA stage, the source levels assumed are based on measurements and assessments of similar projects. The sound power levels used in the modelling are provided in *Table 3-2*.

Table 3-2 Source Sound Power Levels, dB

Description	Octave Band Centre Frequency (Hz)								Overall dB(A)
	63	125	250	500	1k	2k	4k	8k	
Roller Door 6m x 4.5m Workshop Noise, L_{10}	61	68	68	72	73	72	69	60	**78**
Roller Door 6m x 4.5m Hammering/Impact tool Noise, L_{Max}	89	85	81	81	83	91	91	86	**96**
Evap Air Rooftop Unit	-	81	75	76	73	70	63	-	**78**
Car Door Closing, L_{Max}	71	74	77	81	80	78	72	61	**84**

With regards to the above, please note the following:

- The model assumes all roller doors are open as a conservative scenario;
- Noise levels are based on measured levels of similar workshop operations. The L_{A10} source includes typical workshop noise elements for car service centres, while the L_{Amax} source includes intermittent use of high impact tools.
- Two evaporative air conditioning units are assumed at 1m above roof level, centrally located.

Two assessment scenarios are considered as follows:

1. L_{A10} Noise – Roller Doors open on workshop and plant source levels per *Table 3-2*.
2. L_{Amax} Noise – Car door noise in critical bays and Roller Doors open on workshop with maximum source levels per *Table 3-2*.

An image of the noise model overview is shown in *Figure 3-1*.

Figure 3-1 2D Image of Noise Model

4 RESULTS AND ASSESSMENT

4.1 Scenario 1 – L_{A10}

Table 4-1 provides the results for the L_{A10} scenario with the service centre operating with air conditioners in use and all roller doors open – which is considered conservative. *Figure 4-1* provides the noise contour plots for the scenario at first floor level. Given the proposed hours of operation, only the daytime assigned level is relevant for assessment.

Table 4-1 Predicted Noise Levels, Scenario 1: L_{A10} dB

Location	Mechanical Plant	Via Roller Doors		Combined	Day Assigned Level	Exceedence
		East	West			
Mixed Use - 11 Hislop Rd (GF)	26	11	34	**35**	60	*Complies*
Mixed Use - 11 Hislop Rd (1F)	29	11	35	**36**	50	*Complies*
Mixed Use - 11 Hislop Rd (2F)	30	10	35	**36**	50	*Complies*
543 Canning Hwy	27	16	17	**28**	53	*Complies*
547 Canning Hwy	26	30	8	**32**	53	*Complies*
Residential East 1 (1F)	26	20	18	**27**	54	*Complies*
Residential East 1 (1F)	27	26	6	**30**	54	*Complies*
Residential East 2 (1F)	18	18	4	**21**	54	*Complies*
Residential East 2 (1F)	20	25	4	**26**	54	*Complies*
Residential East 3 (1F)	30	38	7	**38**	54	*Complies*
Residential East 4 (1F)	29	37	7	**37**	54	*Complies*
Residential East 4 (1F)	30	37	6	**38**	54	*Complies*
Commercial East	29	35	8	**36**	60	*Complies*
Commercial West	31	7	39	**40**	60	*Complies*

The most critical receiving premises is at 11 Hislop Road, where the first and second storeys are residential premises, with a predicted level of 36 dB L_{A10}. No intrusive characteristics are considered applicable for this source type, being an average level recorded over a long period of vehicle service tasks and also considering the surrounding existing traffic and commercial noise during the day. Therefore, the predicted level is compliant at the worst-case noise sensitive receptors. Compliance is also achieved at nearest commercial boundaries.

Figure 4-1 Workshop Noise First Floor (4.2m AGL), dB L_{A10}

Predicted Noise level

	= 40
	= 45
	= 50
	= 55
	= 60

Legend

- Receiver
- Roller Door
- Mech Source

N

Scale 1:1100

0 5 10 20 30 m

Project No: 22087499
Consultant: MM
Date: 24/08/2022
Algorithm: ISO 9613
SoundPLAN Version: 8.2

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4.2 Scenario 2 – L_{Amax}

Table 4-2 provides the results for the L_{Amax} scenario, being representative of short-term noise events of higher relative magnitude such as use of impact and ratchet tools, hammering and the like. This scenario also includes car door noise in the nearest service and storage bays. *Figure 4-2* displays the noise contour plot for this scenario at first floor level, being most critical. Given the proposed hours of operation, only the daytime assigned level is relevant, once again.

Table 4-2 Predicted Noise Levels, Scenario 2: L_{Amax} dB

Location	High Impact Events Via Roller Doors	Car Door Closing Noise	Maximum Adjusted Level	Day Assigned Level	Calculated Exceedence
Mixed Use - 11 Hislop Rd (GF)	52	56	**66**	80	*Complies*
Mixed Use - 11 Hislop Rd (1F)	53	55	**65**	70	*Complies*
Mixed Use - 11 Hislop Rd (2F)	53	53	**63**	70	*Complies*
543 Canning Hwy	35	29	**45**	73	*Complies*
547 Canning Hwy	48	28	**58**	73	*Complies*
Residential East 1 (1F)	36	54	**64**	74	*Complies*
Residential East 1 (1F)	41	52	**62**	74	*Complies*
Residential East 2 (1F)	35	53	**63**	74	*Complies*
Residential East 2 (1F)	40	50	**50**	74	*Complies*
Residential East 3 (1F)	55	50	**65**	74	*Complies*
Residential East 4 (1F)	54	49	**64**	74	*Complies*
Residential East 4 (1F)	54	54	**64**	74	*Complies*
Commercial East	53	42	**63**	80	*Complies*
Commercial West	57	46	**67**	80	*Complies*

It is considered reasonable that car door closures and impact noises from the workshop may be impulsive at times, therefore the levels have been adjusted by +10 dB in accordance with the Regulations.

The assessment demonstrates that compliance is readily achieved at all nearest noise sensitive and commercial receivers.

Figure 4-2 Workshop Intermittent Noise, First Floor (4.2m AGL), dB L_{Amax}

Predicted Noise level

	= 50
	= 55
	= 60
	= 65
	= 70

Legend

- Receiver
- Roller Door
- Mech Source

N

Scale 1:1100

0 5 10 20 30 m

Project No: 22087499
Consultant: MM
Date: 24/08/2022
Algorithm: ISO 9613
SoundPLAN Version: 8.2

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5 CONCLUSION

The proposed service centre expansion at Melville Motors, 532 Canning Highway, Attadale is predicted to comply with assigned noise levels, determined in accordance with the *Environmental Protection (Noise) Regulations 1997*, during the proposed hours of operation.

Noise control measures are not necessary for compliance, however management should aim to maintain compliance by encouraging quiet work practices. The following general advice should be considered by management:

- It would be considered good practice to incorporate a perforated *Anticon* type insulation to the underside of the workshop roof sheeting. Such *Anticon* insulation will provide thermal benefits and selecting one with a perforated foil finish (rather than solid foil finish) will also minimise the reverberant levels within the workshop and assist in minimising environmental noise emissions.
- Fabrication work using loud power tools such as angle grinders and hammers should always occur inside the workshop.
- Idling of engines at high revs should be done within the workshop where practical.
- Where possible, if work needs to occur outside of the workshop, it should be restricted to the western side of the shed to shield residences to the east. Whilst compliance is probably more critical to the neighbouring commercial, the chance of complaint is considered low.
- The surface of the undercroft/basement parking area should be brushed concrete to avoid tyre squeal.
- Where the concrete is to be sealed within the service workshop, a product such as Aquron 1000 by Markham is understood be suitable and no contribute to tyre squeal.
- External workshop speakers or radios should not be permitted unless they are required for emergency systems.
- Drainage grates to be plastic or metal with rubber gasket and secured to avoid excess banging.
- Adopting a “buy-quiet” approach to purchasing service equipment such as lifts, hoists and power tools.

Appendix A

Site Plans

N

PROPOSED - LOCATION PLAN

SCALE: 1 : 300

PROPOSED MELVILLE MOTORS SHOWROOM EXPANSION

LOCATION:532, CANNING HIGHWAY, ATTADALE, WA 6156

FOR:MELVILLE MOTORS

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S2-A3
1 : 300 @ A1

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EXISTING - SITE & GROUND FLOOR PLAN

SCALE: 1 : 250

PROPOSED MELVILLE MOTORS SHOWROOM EXPANSION

LOCATION:532, CANNING HIGHWAY, ATTADALE, WA 6156

FOR:MELVILLE MOTORS

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BASEMENT FLOOR PLAN

SCALE: 1 : 250

PROPOSED MELVILLE MOTORS SHOWROOM EXPANSION

LOCATION:532, CANNING HIGHWAY, ATTADALE, WA 6156

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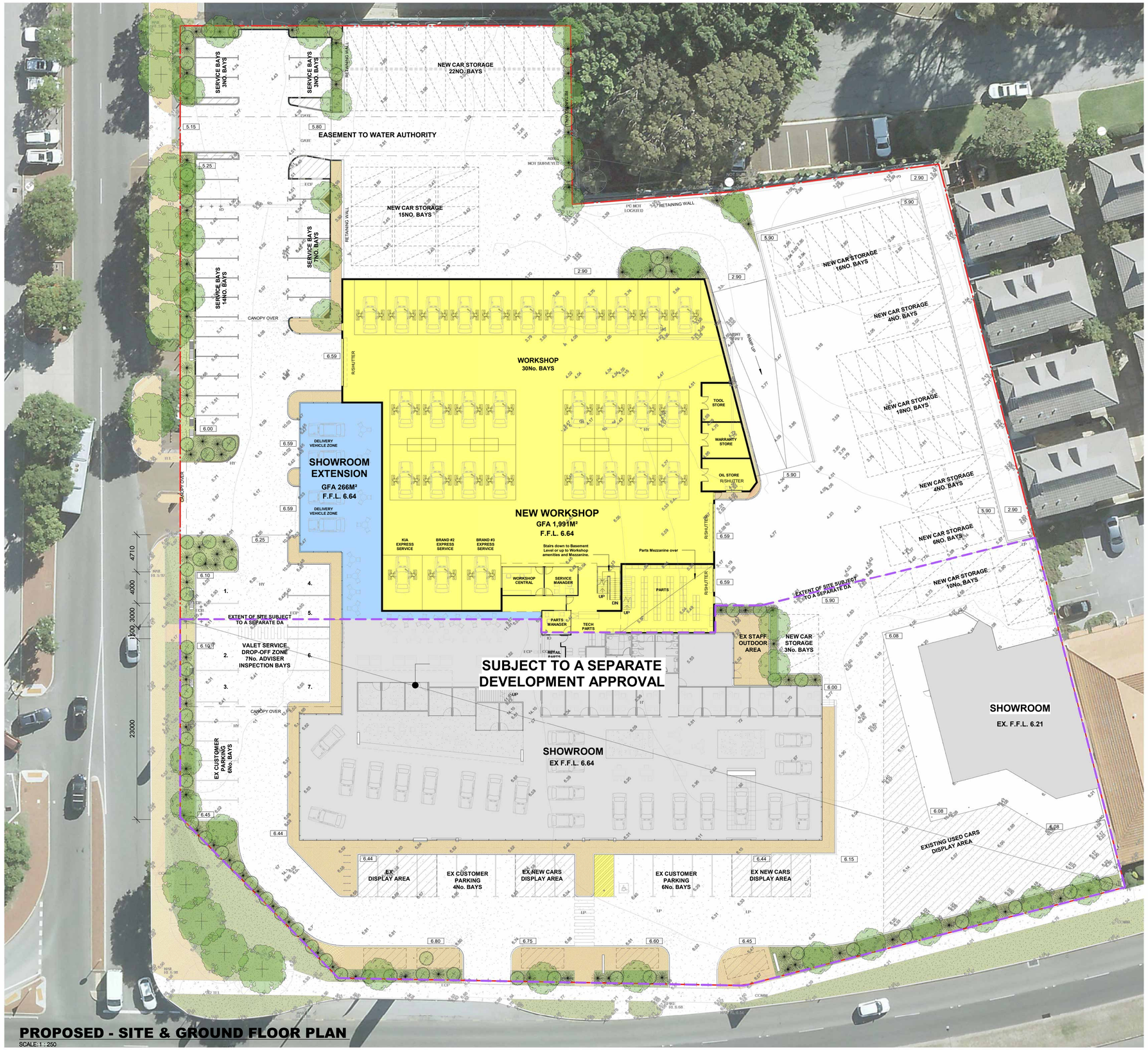


PROPOSED - SITE & GROUND FLOOR PLAN

SCALE:1 : 250

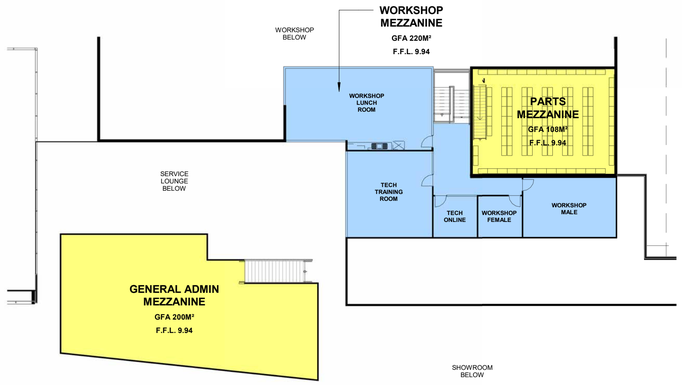
SITE CRITERIA

1. Site Area	
a. Land Area	**11,641m²**
2. Gross Floor Areas	
a. Workshop - Proposed	1,991m²
b. Showroom Extension - Proposed	226m²
c. Main Showroom - Proposed	1,674m²
d. Minor Showroom - Modified	339m²
3. Car Display Areas	
a. Internal - KIA	525m²
b. Internal - Brand#2	293m²
c. Internal - Nissan	397m²
d. Internal - Used Cars	216m²
e. External Display	598m²
Total	**2,029m²**
4. Carparking Required	
a. Display - 1/100m²	5.98 Cars
b. Employees - 0.5/employee	21.50 Cars
c. Workshop - 3/Bay	90.00 Cars
Total Car required	**117.98 Cars**
4. Carparking Provided	
Total Car provided	**91 Cars**

Landscaping
A. Hard Landscaping
Defined as paved walkways either open or covered.
B. Soft Landscaping
Defined as vegetative landscaping.

Gross Floor Area : GFA
A. All Floor Areas on this plan are shown as GROSS FLOOR AREA.
Unless otherwise noted as Nett Floor Area
B. Definition of Gross Floor Area is defined as:
i/ GROSS FLOOR AREA OF TENANCY:
Gross Floor Area of an individual Tenancy is defined as the area contained between the centre line of common tenancy walls and the outside edge of external walls.
ii/ GROSS FLOOR AREA OF A BUILDING
Gross Floor Area of a Building is defined as the total area contained between the outside edge of external walls

Nett Floor Area : NFA
A. Nett Floor Area of a Tenancy on this plan is defined as the area between external or tenancy dividing walls.
B. This area is inclusive of toilets if the toilets are exclusive to the Tenancy.



MEZZANINE FLOOR PLAN

SCALE:1 : 250

PROPOSED MELVILLE MOTORS SHOWROOM EXPANSION

LOCATION:532, CANNING HIGHWAY, ATTADALE, WA 6156

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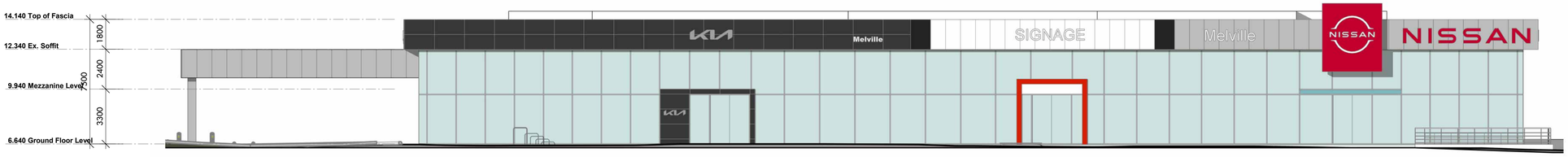
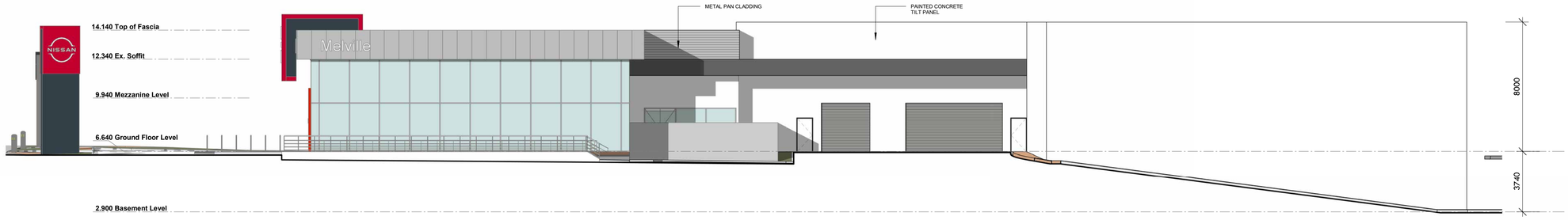


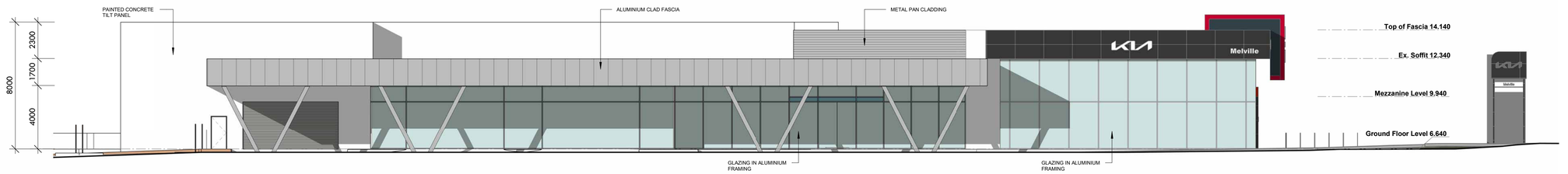
SOUTH ELEVATION - SHOWROOM

SCALE:1 : 150



EAST ELEVATION

SCALE:1 : 150



HISLOP ROAD (WEST) ELEVATION

SCALE:1 : 150

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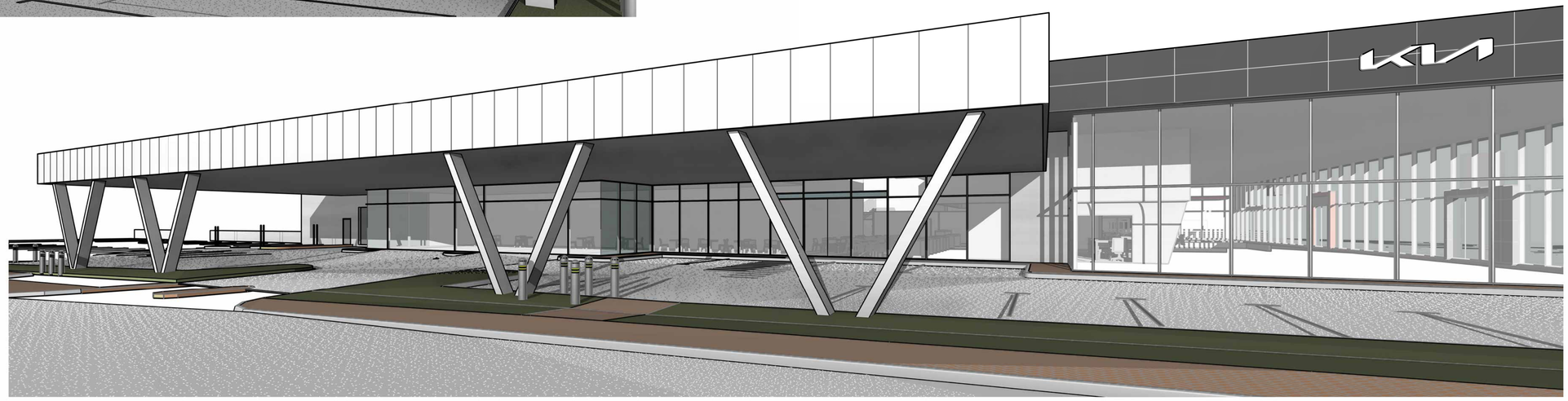

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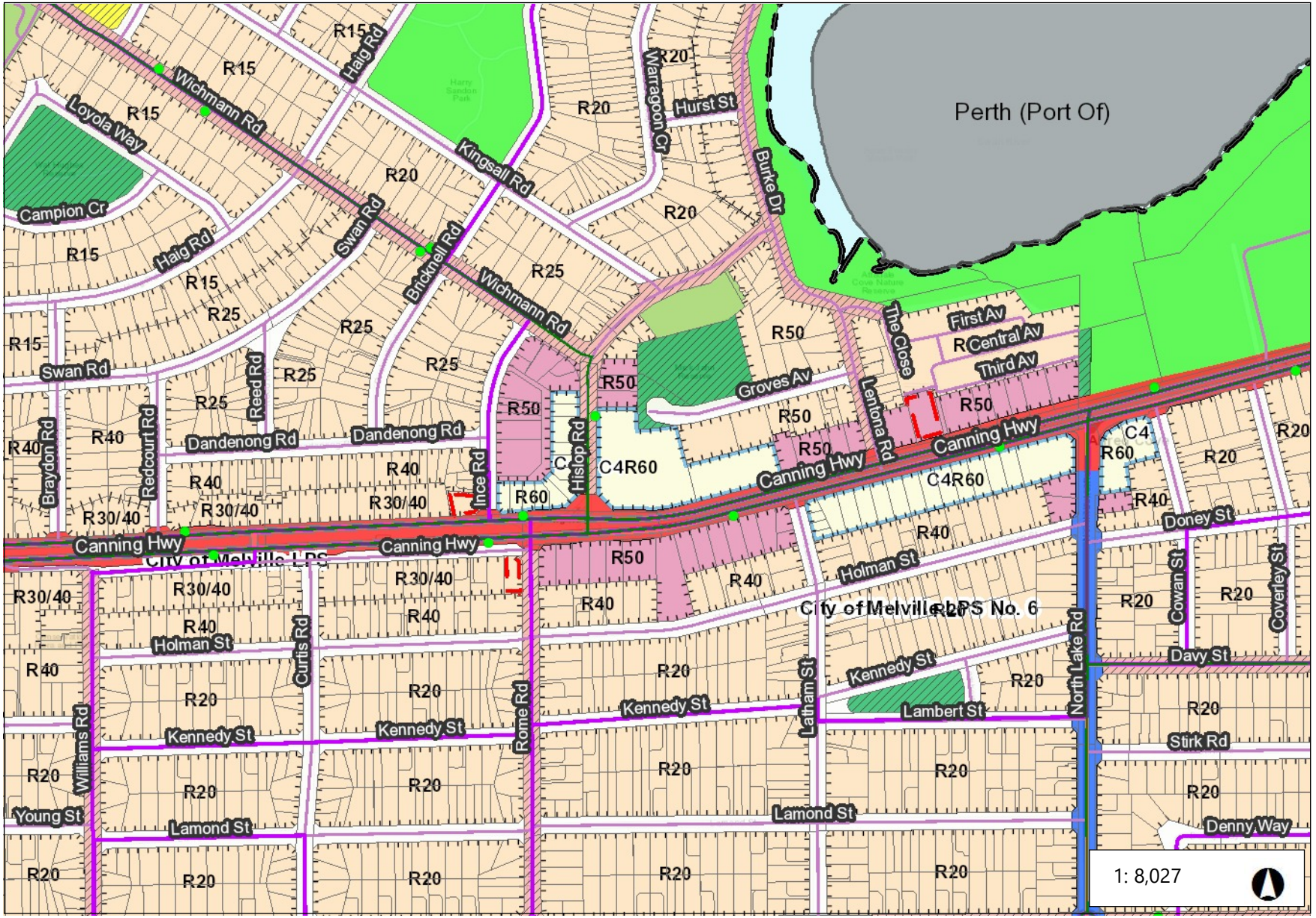
Appendix B

Zoning Map

Department of Planning, Lands and Heritage

Local Planning Scheme No. 6



0.4 0 0.20 0.4 Kilometers

Date produced: 23-Aug-2022

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THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Cadastre
- Local Planning Scheme Boundary
- R-Code Boundary

Local Planning Scheme Zones

- Centre
- Local distributor road
- Local road
- Mixed use
- Private clubs, institutions and place of worship
- Public open space
- Public purposes
- Residential

Region Scheme Reserves

- Other regional roads
- Parks and recreation
- Primary regional roads
- Waterways

- Public Transport Authority Stops (PTA-001)
- Public Transport Authority Service Routes (PTA-002)
- School Bus Services Routes (PTA-004)

Freeways & Highways

- StateHighway, Sealed

Notes

Appendix C

Terminology

The following is an explanation of the terminology used throughout this report.

Decibel (dB)
The decibel is the unit that describes the sound pressure and sound power levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

A-Weighting
An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A dB.

Sound Power Level (L_w)
Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure levels at known distances. Noise modelling incorporates source sound power levels as part of the input data.

Sound Pressure Level (L_p)
The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

L_{ASlow}
This is the noise level in decibels, obtained using the A frequency weighting and the S time weighting as specified in AS1259.1-1990. Unless assessing modulation, all measurements use the slow time weighting characteristic.

L_{AFast}
This is the noise level in decibels, obtained using the A frequency weighting and the F time weighting as specified in AS1259.1-1990. This is used when assessing the presence of modulation only.

L_{APeak}
This is the maximum reading in decibels using the A frequency weighting and P time weighting AS1259.1-1990.

L_{Amax}
An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

L_{A1}
An L_{A1} level is the A-weighted noise level which is exceeded for one percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

L_{A10}
An L_{A10} level is the A-weighted noise level which is exceeded for 10 percent of the measurement period and is considered to represent the "*intrusive*" noise level.

L_{Aeq}
The equivalent steady state A-weighted sound level ("equal energy") in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the "average" noise level.

L_{A90}
An L_{A90} level is the A-weighted noise level which is exceeded for 90 percent of the measurement period and is considered to represent the "*background*" noise level.

One-Third-Octave Band
Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20 000 Hz inclusive.

L_{Amax} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time.

L_{A1} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 1% of the representative assessment period.

L_{A10} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 10% of the representative assessment period.

Tonal Noise
A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

the presence in the noise emission of tonal characteristics where the difference between -

(a) the A-weighted sound pressure level in any one-third octave band; and

(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

This is relatively common in most noise sources.

Modulating Noise
A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

a variation in the emission of noise that —

(a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;

(b) is present for at least 10% of the representative.

Impulsive Noise
An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness is:

a variation in the emission of a noise where the difference between $L_{A\ peak}$ and $L_{A\ Max\ slow}$ is more than 15 dB when determined for a single representative event;

Major Road
Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

Secondary / Minor Road
Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

Influencing Factor (IF)

$$= \frac{1}{10}(\%\ \text{Type A}_{100} + \%\ \text{Type A}_{450}) + \frac{1}{20}(\%\ \text{Type B}_{100} + \%\ \text{Type B}_{450})$$

where :

$\%\ \text{Type A}_{100}$ = the percentage of industrial land within a 100m radius of the premises receiving the noise

$\%\ \text{Type A}_{450}$ = the percentage of industrial land within a 450m radius of the premises receiving the noise

$\%\ \text{Type B}_{100}$ = the percentage of commercial land within a 100m radius of the premises receiving the noise

$\%\ \text{Type B}_{450}$ = the percentage of commercial land within a 450m radius of the premises receiving the noise

+ Traffic Factor (maximum of 6 dB)

= 2 for each secondary road within 100m

= 2 for each major road within 450m

= 6 for each major road within 100m

Representative Assessment Period
Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

Background Noise
Background noise or residual noise is the noise level from sources other than the source of concern. When measuring environmental noise, residual sound is often a problem. One reason is that regulations often require that the noise from different types of sources be dealt with separately. This separation, e.g. of traffic noise from industrial noise, is often difficult to accomplish in practice. Another reason is that the measurements are normally carried out outdoors. Wind-induced noise, directly on the microphone and indirectly on trees, buildings, etc., may also affect the result. The character of these noise sources can make it difficult or even impossible to carry out any corrections.

Ambient Noise
Means the level of noise from all sources, including background noise from near and far and the source of interest.

Specific Noise
Relates to the component of the ambient noise that is of interest. This can be referred to as the noise of concern or the noise of interest.

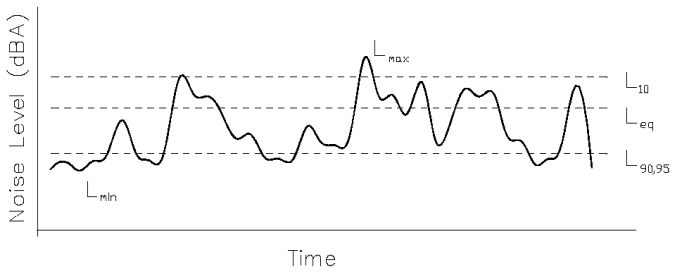
Peak Component Particle Velocity (PCPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

Peak Particle Velocity (PPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

RMS Component Particle Velocity (PCPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Peak Particle Velocity (PPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Chart of Noise Level Descriptors



Typical Noise Levels