

LOFTE

**KINGSWAY CITY SHOPPING CENTRE
SHORT STAY APARTMENTS**

SPP 5.4 NOISE MANAGEMENT PLAN

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**SPP 5.4 NOISE MANAGEMENT PLAN
KINGSWAY CITY SHOPPING CENTRE
SHORT STAY APARTMENTS**

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FOR

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1. INTRODUCTION

Herring Storer Acoustics were commissioned through Lofte to carry out an acoustic study with regards to traffic related noise for the proposed Kingsway City Shopping Centre Short Stay Apartments residential development located at Kingsway City Shopping Centre on the corner of Hepburn Avenue and Wanneroo Road.

The purpose of the study was to:

- Assess the noise that would be received within the development area from vehicles travelling on Wanneroo Road and for future traffic volumes.
- Compare the results with accepted criteria and if exceedances exist, develop the framework for the management of noise.

Note, whilst Hepburn Avenue is flagged as a trigger road under State Planning Policy 5.4, this specific development is outside 200m and as a result noise would be dominated by Wanneroo Road.

2. SUMMARY

The noise modelling indicates that noise received at the proposed development from vehicles travelling along Wanneroo Road in the future (2044) would exceed the Western Australian Planning Commission (WAPC) State Planning Policy (SPP) 5.4 "Road and Rail Transport Noise and Freight Considerations In Land Use Planning" "day time limit" criteria as the highest calculated noise level at a façade is 59 dB $L_{Aeq(day)}$ and as a result "Quiet House" Design listed in Appendix A is required.

3. ACOUSTIC CRITERIA

3.1 NOISE

The Western Australian Planning Commission (WAPC) released on 6th September 2019 State Planning Policy 5.4 "Road and Rail Noise". The requirements of State Planning Policy 5.4 are outlined below.

POLICY APPLICATION (Section 4)

When and where it applies (Section 4.1)

SPP 5.4 applies to the preparation and assessment of planning instruments, including region and local planning schemes; planning strategies, structure plans; subdivision and development proposals in Western Australia, where there is proposed:

- a) noise-sensitive land-use within the policy's trigger distance of a transport corridor as specified in **Table 1**.*
- b) New or major upgrades of roads as specified in **Table 1** and maps (**Schedule 1, 2 and 3**); or*
- c) New railways or major upgrades of railways as specified in maps (**Schedule 1, 2 and 3**); or any other works that increase capacity for rail vehicle storage or movement and will result in an increased level of noise.*

Policy trigger distances (Section 4.1.2)

Table 1 identifies the State’s transport corridors and the trigger distances to which the policy applies.

The designation of land within the trigger distances outlined in **Table 1** should not be interpreted to imply that land is affected by noise and/or that areas outside the trigger distances are un-affected by noise.

Where any part of the lot is within the specified trigger distance, an assessment against the policy is required to determine the likely level of transport noise and management/mitigation required. An initial screening assessment (**guidelines: Table 2: noise exposure forecast**) will determine if the lot is affected and to what extent.”

TABLE 1: TRANSPORT CORRIDOR CLASSIFICATION AND TRIGGER DISTANCES

Transport corridor classification	Trigger distance	Distance measured from
Roads		
Strategic freight and major traffic routes Roads as defined by Perth and Peel Planning Frameworks and/or roads with either 500 or more Class 7 to 12 Austroads vehicles per day, and/or 50,000 per day traffic volume	300 metres	Road carriageway edge
Other significant freight/traffic routes These are generally any State administered road and/or local government road identified as being a future State administered road (red road) and other roads that meet the criteria of either >=23,000 daily traffic count (averaged equivalent to 25,000 vehicles passenger car units under region schemes)	200 metres	Road carriageway edge
Passenger railways		
	100 metres	Centreline of the closest track
Freight railways		
	200 metres	Centreline of the closest track

Proponents are advised to consult with the decision making authority as site specific conditions (significant differences in ground levels, extreme noise levels) may influence the noise mitigation measures required, that may extend beyond the trigger distance.

POLICY MEASURES (Section 6)

The policy applies a performance-based approach to the management and mitigation of transport noise. The policy measures and resultant noise mitigation will be influenced by the function of the transport corridor and the type and intensity of the land-use proposed. Where there is risk of future land-use conflict in close proximity to strategic freight routes, a precautionary approach should be applied. Planning should also consider other broader planning policies. This is to ensure a balanced approach takes into consideration reasonable and practical considerations.

Noise Targets (Section 6.1)

Table 2 sets out noise targets that are to be achieved by proposals under which the policy applies. Where exceeded, an assessment is required to determine the likely level of transport noise and management/mitigation required.

In the application of the noise targets the objective is to achieve:

- indoor noise levels as specified in **Table 2** in noise sensitive areas (for example, bedrooms and living rooms of houses, and school classrooms); and
- a reasonable degree of acoustic amenity for outdoor living areas on each residential lot. For non-residential noise-sensitive developments, for example schools and child care centres the design of outdoor areas should take into consideration the noise target.

It is recognised that in some instances, it may not be reasonable and/or practicable to meet the outdoor noise targets. Where transport noise is above the noise targets, measures are expected to be implemented that balance reasonable and practicable considerations with the need to achieve acceptable noise protection outcomes.

TABLE 2: NOISE TARGETS

Proposals	New/Upgrade	Noise Targets		
		Outdoor		Indoor
		Day ($L_{Aeq}(\text{Day})$ dB) (6 am-10 pm)	Night ($L_{Aeq}(\text{Night})$ dB) (10 pm-6 am)	(L_{Aeq} dB)
Noise-sensitive land-use and/or development	New noise sensitive land use and/or development within the trigger distance of an existing/proposed transport corridor	55	50	L_{Aeq} (Day) 40(Living and work areas) L_{Aeq} (Night) 35 (bedrooms)
Roads	New	55	50	N/A
	Upgrade	60	55	N/A
Railways	New	55	50	N/A
	Upgrade	60	55	N/A

Notes:

- The noise target is to be measured at one metre from the most exposed, habitable façade of the proposed building, which has the greatest exposure to the noise-source. A habitable room has the same meaning as defined in State Planning Policy 3.1 Residential Design Codes.
- For all noise-sensitive land-use and/or development, indoor noise targets for other room usages may be reasonably drawn from Table 1 of Australian Standard/New Zealand Standard AS/NZS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors (as amended) for each relevant time period.
- The 5dB difference in the criteria between new and upgrade infrastructure proposals acknowledges the challenges in achieving noise level reduction where existing infrastructure is surrounded by existing noise-sensitive development.
- Outdoor targets are to be met at all outdoor areas as far as is reasonable and practical to do so using the various noise mitigation measures outlined in the guidelines. For example, it is likely unreasonable for a transport infrastructure provider to achieve the outdoor targets at more than 1 or 2 floors of an adjacent development with direct line of sight to the traffic.

Noise Exposure Forecast (Section 6.2)

When it is determined that SPP 5.4 applies to a planning proposal as outlined in Section 4, proponents and/or decision makers are required to undertake a preliminary assessment using **Table 2**: noise exposure forecast in the guidelines. This will provide an estimate of the potential noise impacts on noise-sensitive land-use and/or development within the trigger distance of a specified transport corridor. The outcomes of the initial assessment will determine whether:

- no further measures are required.
- noise-sensitive land-use and/or development is acceptable subject to deemed-to-comply mitigation measures; or
- noise-sensitive land-use and/or development is not recommended. Any noise-sensitive land-use and/or development is subject to mitigation measures outlined in a noise management plan.”

4. ACOUSTIC ENVIRONMENT

The noise measurements were conducted on 21 March 2024 over a short term period during peak hour to determine the L_{A10} noise level.

Utilising this measurement, reference to the DEFRA publication has been sought and the difference between the $L_{A10,18hr}$ and the $L_{Aeq,8hr}$ and the $L_{Aeq,16hr}$ has been calculated. The results of the measurement and the determination of the $L_{Aeq(Day)}$ and $L_{Aeq(Night)}$ are shown in Table 3.

Noise measurements were conducted with a Larson Davis 831 Sound Level Meter. The Sound Level Meter was calibrated prior to and after use with a Bruel and Kjaer 4230 Calibrator. All equipment used is currently NATA laboratory calibrated. Calibration certificates are available on request.

TABLE 3 : SUMMARY OF MEASURED NOISE LEVELS

Measurement Location	Measured/Calculated Noise Level, dB(A)		
	L_{A10}	$L_{Aeq, day (6am\ to\ 10pm)}$	$L_{Aeq, night (10pm\ to\ 6am)}$
Wanneroo Road; Kingsway City Shopping Centre	72.1	68.5	61.4

5. MODELLING

To determine the noise levels from traffic on Wanneroo Road, acoustic modelling was carried out using Sound Plan, using the Calculation of Road Traffic Noise (CoRTN)¹ algorithms.

The input data for the model included:

- Topographical and cadastral data supplied by client.
- Existing road layout.
- Traffic Data provided from MRWA Traffic Map (Shown in Appendix B)
- Adjustments as listed in Table 5.

¹ Calculation of Road Traffic Noise UK Department of Transport 1987

TABLE 4 - NOISE MODELLING INPUT DATA*

Parameter	Wanneroo Road (Current) 2020	Wanneroo Road (Future) 2044
Traffic Volumes	35,690 vpd	57,400 vpd
Percentage traffic 0600 – 2400 hours (Assumed)	94%	94%
Heavy Vehicles (%) (Assumed)	9.7%	9.7%
Speed (km/hr)	70 km/hr	70 km/hr
Road Surface	Dense Graded Asphalt	Dense Graded Asphalt

*Extrapolated to 2044 based on an assumed 2% per annum increase.

TABLE 5 – ADJUSTMENTS FOR NOISE MODELLING

Description	Value
Façade Reflection Adjustment	+2.5 dB
Conversion from L_{A10} (18 hour) to L_{Aeq} (16 hour) (Day)	-3.6 dB

6. TRAFFIC NOISE ASSESSMENT

Using the data contained in Tables 3, 4 and 5, modelling was carried out under existing conditions for calibration. The Sound Plan model for the site has been set up for the 2044 scenario as defined in Table 4. The following assumptions have been made:

- 18 hour traffic count will be 94% of daily figures.
- Noise model calibrated to measured noise level as per Table 3.
- The same diurnal relationship will exist in the future between the L_{A10} (18 hour) and the L_{Aeq} parameters; and
- 2.5 dB(A) has been added to the results for façade reflection.

The noise requirements based on the above have been listed in Appendix A.

It is noted that these requirements pertain to acoustic requirements only, with regard to *State Planning Policy 5.4*, and may be superseded by other requirements (BAL, Thermal, etc).

7. CONCLUSION

In accordance with the WAPC Planning Policy 5.4, an assessment of the noise that would be received within the development located at the Kingsway City Shopping Centre Short Stay Apartments, from vehicles travelling on Wanneroo Road has been undertaken.

In accordance with the Policy, the following would be the acoustic criteria applicable to this project:

External

Day	55 dB(A) L_{Aeq}
Night	50 dB(A) L_{Aeq}

Internal

Sleeping Areas	35 dB(A) $L_{Aeq(night)}$
Living Areas	40 dB(A) $L_{Aeq(day)}$

It is noted that walls of the development would be required to be constructed of either masonry or tilt up concrete panel and to be confirmed at detailed design stage. If a lightweight construction or similar is desirable, investigation into constructions that would meet the requirement of State Planning Policy 5.4 would have to be undertaken.

The results of the acoustic assessment indicate that noise received at the development from future traffic, exceed external noise level criteria. Therefore, noise amelioration in the form of quiet house design listed in Appendix A, as well as notifications on the title is required.

It is noted that there is no allocated communal outdoor living area for the development and thus noise at some of the western facing balconies would exceed the noise level specified in State Planning Policy 5.4 for outdoor living areas. Despite this, given of the development it may not be considered practicable to meet the target.

APPENDIX A

BUILDING REQUIREMENTS

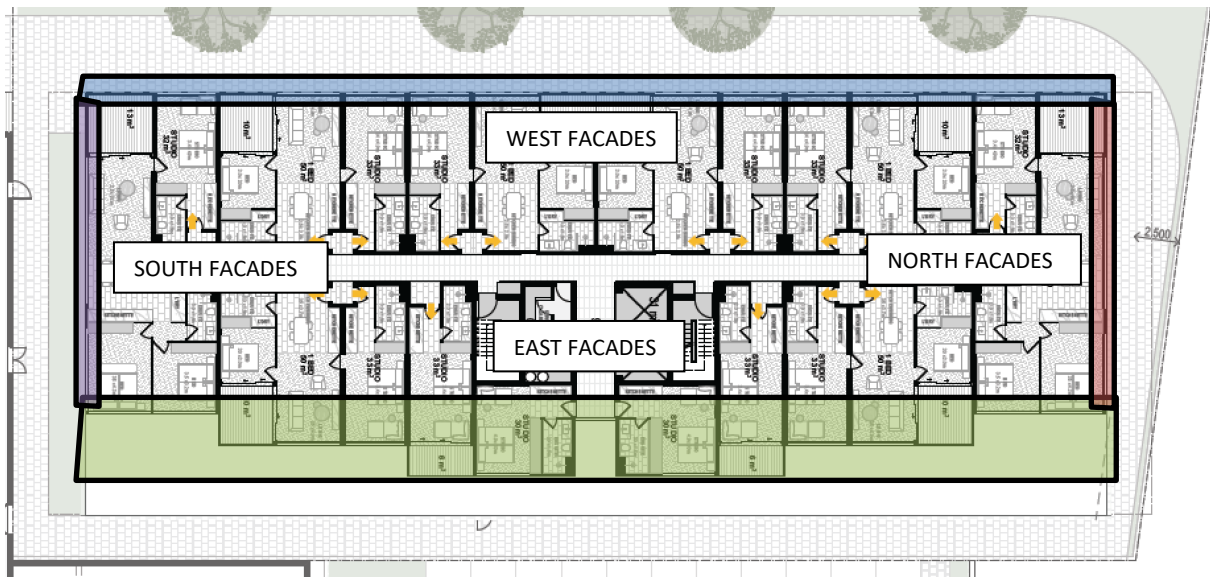
Calculated Noise Levels and Required R_w and C_{tr} Ratings for Glazing						
Location	Floors	Level dB $L_{Aeq(Day)}$	Required $R_w + C_{tr}$			
			0.4 Window: Floor Ratio*		0.6 Window: Floor Ratio*	
			Bedroom	Living Area	Bedroom	Living Area
East Facades	G to 2	59	28	23	30	23
	3+	52	30	24	32	26
North Facades	All Floors	56	26	23	28	23
South Facades	G to 4	55	23	23	23	23
	5+	56	26	23	28	23
East Facades	All Floors	<50	23	23	23	23

Notes: Locations are referenced as per figure below.

The required R_w rating can be reduced by reducing the area of glazing.

Requirements pertain to only acoustic advice in regard to *State Planning Policy 5.4* and may be superseded by other requirements (BAL, Thermal, etc).

Unlisted Elements would comply given standard construction.



APPENDIX B

MRWA Traffic Flows

Hourly Volume

Wanneroo Rd (H035)

2020/21
Monday to Friday

North of Hepburn Av (SLK 14.10)

	All Vehicles			Heavy Vehicles							
	N	NB	S	SB	Both	N	NB	S	SB	Both	%
00:00		70		46	116		5		3	8	6.9
01:00		33		38	71		2		3	5	7.0
02:00		30		23	53		1		4	5	9.4
03:00		30		43	73		2		7	9	12.3
04:00		114		112	226		7		16	23	10.2
05:00		385		444	829		42		77	119	14.4
06:00		610		1638	2248		69		302	371	16.5
07:00		991		1872	2863		99		182	281	9.8
08:00		1228		1618	2846		118		169	287	10.1
09:00		1011		1091	2102		115		129	244	11.6
10:00		990		935	1925		128		115	243	12.6
11:00		1047		957	2004		142		110	252	12.6
12:00		1079		937	2016		135		112	247	12.3
13:00		1081		934	2015		128		112	240	11.9
14:00		1287		1033	2320		159		104	263	11.3
15:00		1669		1150	2819		159		92	251	8.9
16:00		1752		1226	2978		126		90	216	7.3
17:00		1715		1032	2747		94		65	159	5.8
18:00		1093		766	1859		54		40	94	5.1
19:00		657		553	1210		30		22	52	4.3
20:00		507		309	816		16		15	31	3.4
21:00		415		332	747		15		16	31	4.1
22:00		257		195	452		8		8	16	3.5
23:00		153		112	265		6		7	13	4.9
TOTAL		18204		17486	35690		1660		1800	3460	9.7



Peak Statistics

AM	TIME	08:00	06:45	07:30	11:30	06:00	06:15
	VOL	1228	1914	2924	146	302	387
PM	TIME	16:15	16:00	16:15	14:15	12:30	14:15
	VOL	1773	1226	2978	166	120	269

