WILLIAM HOVELL DRIVE DUPLICATION

Road Traffic Noise Assessment

Prepared for:

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BASIS OF REPORT

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DOCUMENT CONTROL

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CONTENTS

DOCUMENT REFERENCES

TABLES

FIGURES

CONTENTS

APPENDICES

1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by SMEC Australia Pty Ltd (SMEC) to conduct a noise assessment of the proposed duplication of William Hovell Drive (WHD) between Drake Brockman Drive and John Gorton Drive (Coppins Crossing Road).

It is proposed to duplicate the existing alignment to provide two lanes each way for the entire alignment.

This report provides the outcomes of the assessment of the noise associated with road traffic on the upgraded WHD alignment.

A plan showing the location of the project is presented in **Figure 1**, along with the surrounding environs.

2 ACT Road Traffic Noise Criteria

2.1 Roads ACT "*Noise Management Guidelines*"

Road traffic noise criteria applicable to the project have been established in accordance with the Roads ACT "*Noise Management Guidelines*" ("the Guidelines") issued by Transport Canberra and City Services in 2018.

Section 7 of the Guidelines provides road traffic noise criteria for upgraded roads in existing areas. Specifically, the Guidelines stipulate:

> *"Proposed upgrades of arterial and major collector roads in established development areas must consider noise impacts on adjacent blocks. Road upgrades should be planned, designed and constructed to achieve noise levels at the receiver below the maximum levels set out in Table 1.3.*
>
> *Table 1.3 Traffic noise levels resulting from upgraded roads in existing areas of noise sensitive land use, expressed as LAeq dB(A) Daytime, Ground Level.*

Existing traffic noise level at adjacent buildings[1]	*Traffic noise level at adjacent buildings after road works completed*
> 60	*equal to existing level (Not greater than 65)*
55 - 60	*60*
< 55	*not more than 5 dB(A) above existing level*

1. *The traffic noise levels incorporate an allowance for reflection from the facade of the building under investigation. Measurements should be taken at one metre forward of the building facade. In cases where the building is not yet constructed, measurements should be taken at a distance of one metre in front of the proposed building facade, or one metre forward of the minimum set-backs required under the Territory Plan, and 2.5 dB(A) added to the measurement to allow for future facade reflection. Measurements should be taken at a height of 1.2 - 1.5 metres above ground level."*

and

> *"Proposals for upgraded roads in existing noise sensitive developed areas will require an assessment against the guidelines contained in Schedule 3.*
>
> *Schedule 3 Guidelines for upgraded roads in existing areas*

Objective	*Technique*	*Criteria*
To protect residents of existing areas from excessive increases in levels of traffic noise	*acoustic barrier between buildings and the road AND/OR acoustic treatment of existing buildings*	*traffic noise levels as set out in Table 1.3 measured at adjacent noise- sensitive land uses and based on the predicted maximum traffic flow* on the new or upgraded road.*

** Long-term traffic forecasts are available from EPD's Major Projects and Transport Unit"*

2.2 Development Codes

2.2.1 Single Dwelling Housing Development Code

Residential development within the Whitlam residential estate will be subject to the Single Dwelling Housing Development Code (SDHDC, effective 28 October 2016). Rule 42 of the SDHDC stipulates the following in regard to potential noise intrusion from external sources:

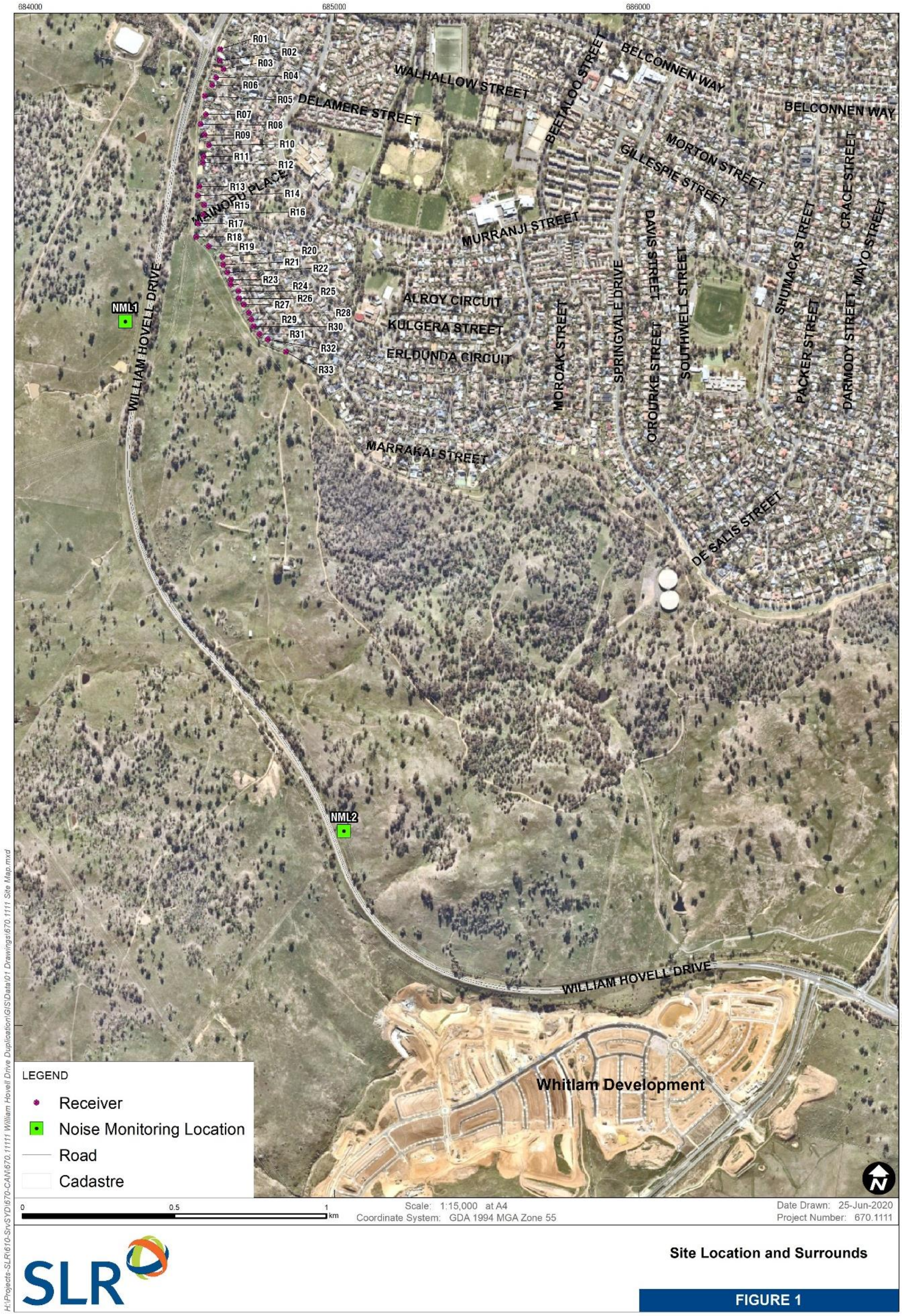
Rules	Criteria
5.4 Noise attenuation – external sources	
R42 This rule applies to all new dwellings (including in established areas), as well as extensions and alterations that add a habitable room exposed directly to the source of noise. Where a block has one or more of the following characteristics: i) identified in a precinct code as being potentially affected by noise from external sources ii) adjacent to a road carrying or forecast to carry traffic volumes greater than 12000 vehicles per day dwellings shall be constructed to comply with the following: a) dwelling located more than 20m from the nearside edge of a road carrying traffic volumes between 12,000 and 25,000 vpd – i) glazing is 6.38mm laminated glass or equivalent and fitted with acoustic seals other than brush seals ii) any external doors are solid core and fitted with acoustic seals other than brush seals b) dwelling located more than 40m from the nearside edge of a road carrying traffic volumes greater than 25,000 vpd – i) glazing is 10.38mm laminated glass or equivalent and fitted with acoustic seals other than brush seals ii) any external doors are solid core and fitted with acoustic seals other than brush seals c) in all other cases – i) AS/NZS 2107:2000 - Acoustics – Recommended design sound levels and reverberation times for building interiors (the relevant satisfactory recommended interior design sound level) ii) AS/NZS 3671 - Acoustics – Road Traffic Noise Intrusion Building Siting and Design.	C42 This rule applies to all new dwellings (including in established areas), as well as extensions and alterations that add a habitable room exposed directly to the source of noise. a) For other than road traffic noise - a noise management plan prepared by a member of the Australian Acoustical Society with experience in the assessment of noise, and endorsed by the EPA. The noise level immediately adjacent to the dwelling is assumed to be the relevant noise zone standard specified in the ACT Environment Protection Regulation 2005. The plan must indicate compliance with the relevant Australian standard. b) For road traffic noise - an acoustic assessment and noise management plan, prepared by a member of the Australian Acoustical Society with experience in the assessment of road traffic noise, and endorsed by the Transport Planning & Projects Section in ESDD. The plan must indicate compliance with the relevant Australian standard. Note: A condition of development approval may be imposed to ensure compliance with the endorsed noise management plan.

2.2.2 Whitlam Precinct Map and Code

The Whitlam Precinct Map and Code (WPM&C, effective 31 July 2021) contains information relating to allotments within the Whitlam residential estate that have been designated as affected by noise from external sources. Dwellings built on those allotments must be designed and constructed in accordance with the SDHDC, which give the proponent an option to use the "deemed-to-satisfy" constructions or undertake a specific noise intrusion assessment to determine construction requirements.

The affected allotments are those nearest to the William Hovell Drive and John Gorton Drive (Coppins Crossing Road) alignments.

Figure 1 Project Area and Surrounds



3 Existing Road Traffic Noise Environment

A noise monitoring survey was undertaken in order to establish the existing road traffic noise environment in the vicinity of the WHD alignment.

The existing noise environment is used to determine the target noise levels applicable to the project (see Section **4.4**) and to verify the road traffic noise model.

3.1 Monitoring Methodology

Unattended noise monitoring was undertaken at two locations (shown in **Figure 1**) from Friday 24 April to Tuesday 5 May 2020.

The microphone of each noise logger was positioned in the free-field (ie no reflective surfaces within 4 m other than the ground). The microphone height at Location 1 and Location 2 was approximately 2 m and 1.2 m respectively above the existing ground level.

The loggers was programmed to record A-weighted, fast response, statistical noise levels in 15-minute intervals.

3.2 Instrumentation

Table 1 shows the items of acoustic instrumentation used for the noise monitoring.

Table 1 Acoustic Instrumentation

Location	Instrument Type	Serial Number	Calibration Confirmation Level, dBA	
			Before Monitoring	After Monitoring
Location 1	ARL Type 316 Noise Logger	16-207-048	94.0	94.0
Location 2	ARL Type 316 Noise Logger	16-207-049	94.0	93.7
Both	SVAN SV30A Acoustic Calibrator	29013	--	--

The results at Location 1 indicated acoustic "drift" occurred during the latter part of the monitoring survey.

All items of acoustic instrumentation were designed to comply with Australian Standard (AS) IEC 61672.1 2004 "*Electroacoustics – Sound Level Meters*" and AS IEC 60942 2004 "*Electroacoustics – Sound calibrators*", and carried current NATA calibration certificates.

3.3 Weather during the Noise Monitoring Period

Although not strictly required by the Guidelines, it is common and appropriate to exclude noise data obtained during periods of weather unsuitable for the purpose of noise monitoring. Weather is generally considered to be adverse when periods of rainfall are greater than 0.5 mm and/or wind speeds are in excess of 5 m/s.

Weather data from the Bureau of Meteorology automated weather station at Canberra Airport was used to process the monitoring data. There were several periods of unsuitable weather during the noise monitoring period and those have been highlighted in the daily noise level graphs provided in **Appendices A** and **B** for Locations 1 and 2 respectively.

3.4 Noise Monitoring Results

The results from the noise monitoring have been analysed to establish the road traffic noise in terms of the daytime $L_{Aeq(15\ hour)}$ values as shown in **Table 2**.

Table 2 Existing Road Traffic Noise Levels - WHD

Measurement Location	Daytime[1] Noise Level, dBA $L_{Aeq(15\ hour)}$
Location 1	64.0[2]
Location 2	69.8

1. 7:00 am – 10:00 pm
2. Based on noise data during the first week of the monitoring period. The noise logger results during the second week indicated acoustic drift, which resulted in much lower noise levels than expected. Consequently, those results have been excluded.

The 24-hour daily noise level graphs of the monitoring have been presented in **Appendices A** and **B** for Locations 1 and 2 respectively.

4 Road Traffic Noise Modelling

4.1 Methodology

The Calculation of Road Traffic Noise 1988 (CoRTN) methodology was utilised to calculate existing road traffic noise at the noise monitoring locations and to predict future road traffic noise levels on land adjacent to the upgraded WHD alignment.

CoRTN incorporates the road design, the topography between the subject road and receptors, significant structures (eg buildings and noise barriers/fences) and traffic characteristics for the subject road (ie volume, composition, speed, and road surface type).

4.2 Modelling Inputs

The information shown in **Table 3** has been incorporated into the noise prediction model.

Table 3 Traffic Data used for Noise Modelling

Parameter	Value		
	2020 (Verification)	2020	2031
Traffic volume (AADT): Eastbound Westbound	 7,423[1] 8,703[1]	 9,616 8,980	 10,207 9,718
Heavy vehicles, % Eastbound Westbound	 3.2 6.6		
Vehicle speed, km/h[2]	80 - 90		
Road Surfaces: Existing Proposed - Westbound Eastbound	 14 mm stone chip seal (most of the WHD alignment) and Dense Graded Asphalt[3] Predominantly 50 mm AC14 + Prime (AMC00) + 7mm low cutter seal Predominantly Prime (AMC00) + 7 mm sprayed seal		

1. Existing traffic volumes (based on SCATs data) and appropriate scaling factors for future timeframes provided to SLR by SMEC.
2. As signposted.
3. Approximately 240 m west of the John Gorton Drive intersection and approximately 400 m south of the Drake Brockman intersection.

The corrections applied in the noise model to the different road surfaces are shown in **Table 4**.

Table 4 Road Surface Corrections

Road Surface	Relative Noise Level, dBA
14 mm stone chip seal	+3
Dense Graded Asphalt	0
50 mm AC14 + Prime (AMC00) + 7mm low cutter seal	+2
Prime (AMC00) + 7mm sprayed seal	+2

4.3 Road Traffic Volumes during the Noise Monitoring Period

The noise monitoring was undertaken during COVID-19 restrictions which is expected to have resulted in a fewer vehicles on WHD relative to “normal” conditions. However, the purpose of the monitoring was to enable a verified noise model to be established, based on SCATs traffic data obtained for the monitoring period.

Therefore, while fewer vehicles may result in lower measured noise levels which means the measured noise levels cannot be used to establish project target noise levels, this will not affect the model verification which is reliant upon the correlation of the measured noise levels and the traffic volumes at the time of the noise monitoring.

4.4 Noise Model Validation

The noise model for the existing alignment was verified by comparing the predicted road traffic noise levels in terms of the $L_{Aeq(15hour)}$ values, based on the parameters described in **Table 3**, with the measured values from the noise monitoring survey.

The prediction locations in the noise model were positioned to represent the location and height of the noise logger and microphone at the noise monitoring measurement locations (refer to **Figure 1**).

The predicted road traffic noise levels are shown in **Table 5**, along with the measured road traffic noise levels.

Table 5 Model Validation based on Measured and Calculated 2020 Road Traffic Noise Levels

Noise Level	Noise Level at Logger Location, dBA $L_{Aeq(15\ hour)}$	
	Location 1	Location 2
Measured	64.0	69.8
Predicted	64.6	67.9
Difference	-0.6	1.9

It can be seen in **Table 5** that the difference between the measured and predicted road traffic noise levels was within ±2 dBA, which is considered within the commonly accepted range of noise modelling accuracy.

Therefore, the noise model is be considered verified and suitable for use for predictions of future road traffic noise levels.

4.5 Predicted Road Traffic Noise Levels

The noise model was modified to include the 2020 and 2031 traffic volumes as provided in the project traffic report.

Predictions for a single storey building height was undertaken at 1.5 m and the predicted results include a +2.5 dBA reflection facade adjustment. Existing structures including fences and sheds were not included in the noise model.

The predicted traffic noise levels for 2020 are shown in **Table 6**. **Appendix C** provides the existing road traffic noise levels in contour form.

Based on the 2020 road traffic noise levels, and the criteria in the Guidelines (refer to **Section 2**), the target noise levels at the existing residential locations have been established and are shown in **Table 6**.

The validated model was further modified to incorporate the 2031 (ie "Ultimate") traffic volumes in **Table 3** to predict future road traffic noise levels. The predicted 2031 road traffic noise levels are shown in **Table 6**. **Appendix D** provides the existing road traffic noise levels in contour form.

Table 6 also provides the 'impact' assessment of the road traffic noise, ie locations where the target noise levels are predicted to be exceeded are highlighted, as well as a comparison of the noise levels at the receptors if the project did and did not proceed. This latter analysis is referred to as the "build versus no build" scenario.

It can be seen in **Table 6** that the predicted road traffic noise levels may exceed the target noise levels by up to 2 dBA at three locations, including the Whitlam residential estate development. The increase is due to the widening of the alignment and the increase in traffic volumes.

It is noted that the traffic noise level would increase naturally by approximately 0.3 dBA if the road upgrade did not occur, which is insignificant. The increase as a result of the project is generally less than 1 dBA at most receptors, which is also negligible. Therefore, it is reasonable to conclude that there are no significant noise impacts associated with the new project.

Nonetheless the criteria are exceeded at three locations, and consideration of mitigation in accordance with the Guidelines has be undertaken.

Table 6 2031 Future Road Traffic Noise Levels and Assessment

Receptor	Address	2020 Noise Level, dBA LAeq(15hour)	Target Level, dBA LAeq(1 hour)	2031 Noise Level, dBA LAeq(15 hour)		Predicted Increase, dBA	
				No build	Build	No build versus build[1]	2020 versus build[1]
01	12 Florina Place, Hawker	59	60	59	60	1.1	1.4
02	14 Florina Place, Hawker	59	60	59	59	-0.2	0.1
03	16 Florina Place, Hawker	55	60	55	56	0.2	0.5
04	17 Florina Place, Hawker	57	60	57	57	0.5	0.8
05	15 Florina Place, Hawker	57	60	57	58	1.2	1.5
06	13 Florina Place, Hawker	58	60	59	62	2.6	3.4
07	10 Kurundi Place, Hawker	56	60	56	58	2.3	2.6
08	12 Kurundi Place, Hawker	57	60	57	61	3.6	4.1
09	14 Kurundi Place, Hawker	55	60	56	58	2.3	2.6
10	15 Kurundi Place, Hawker	53	58	54	55	1.8	2.1
11	13 Kurundi Place, Hawker	55	60	56	58	1.9	2.2
12	11 Kurundi Place, Hawker	56	60	56	58	1.6	1.9
13	14 Mainoru Place, Hawker	58	60	59	60	1.0	1.3
14	16 Mainoru Place, Hawker	58	60	58	59	0.8	1.1
15	18 Mainoru Place, Hawker	56	60	57	57	0.6	0.9
16	21 Mainoru Place, Hawker	56	60	57	57	0.6	1.0
17	19 Mainoru Place, Hawker	57	60	58	58	0.8	1.1
18	17 Mainoru Place, Hawker	57	60	57	58	0.8	1.1
19	15 Mainoru Place, Hawker	55	60	55	55	0.6	0.9
20	14 Elsey Place, Hawker	53	58	53	54	0.6	0.9
21	16 Elsey Place, Hawker	53	58	53	54	0.8	1.0
22	18 Elsey Place, Hawker	53	58	53	54	0.6	0.9
23	20 Elsey Place, Hawker	53	58	53	54	0.7	1.0
24	22 Elsey Place, Hawker	53	58	53	54	0.6	0.9
25	24 Elsey Place, Hawker	52	57	52	53	0.6	0.9
26	26 Elsey Place, Hawker	52	57	53	53	0.4	0.9
27	28 Elsey Place, Hawker	52	57	52	52	0.4	0.8
28	30 Elsey Place, Hawker	51	56	51	52	0.6	1.0
29	32 Elsey Place, Hawker	51	56	52	52	0.4	0.8
30	34 Elsey Place, Hawker	51	56	51	52	0.4	0.7
31	36 Elsey Place, Hawker	51	56	51	51	0.5	0.6
32	38 Elsey Place, Hawker	50	55	50	50	0.1	0.5
33	16 Dungowan St, Hawker	48	53	49	49	0.4	0.9
34	Whitlam Estate	60	60	62	62	2.0	2.3

1, No mitigation

4.6 Noise Mitigation Treatments

The Guidelines suggest the following issues be taken into account when selecting noise mitigation measures:

- Technical feasibility,
- Visual Impact,
- Community preference,
- Cost, and
- Effectiveness.

The noise mitigation treatment options available are described in **Table 7**, together with their relative benefits and limitations.

Table 7 Road Traffic Noise Mitigation Treatments

Mitigation	Expected Reduction	Benefit	Limitation
Noise barriers/mounds	Up to -10 dBA	Effective for external and internal locations Good for receptors in groups	Relatively expensive, high visual impact
Low noise road pavement surface	-2.0 dBA – -4.5 dBA	Reduces noise at the source Lowers noise at external and internal locations No visual impact Good for receptors in groups	Expensive and requires regular maintenance and replacement[1]. Relatively poor reductions Effectiveness decreases for lower traffic speeds (relative to highways/motorways)
Building envelope treatments	> -20 dBA	Effective but only for internal receivers No visual impact	Does not address external noise Only effective when widows/doors are closed Difficult implementation
Reduce traffic speed and traffic volume	-1 dBA to -2 dBA	Reduces noise at the source Lowers noise at external and internal locations No visual impact Good for receptors in groups	Not feasible to change the purpose of the project (ie road upgrade to facilitate increased capacity and/or speed)

1. In relation to the sound reduction benefits of OGA, it is expected that the noise reduction benefit may be retained for up to five years before specific maintenance treatments, such as grinding/machining which may extend the 'acoustic life' of OGA by a further three years, or replacement would be required. Resurfacing of OGA generally occurs at approximately 10 years.

This assessment has considered road pavement surface and noise barrier treatments.

4.6.1 Roadside Noise Barriers

Longevity being preferred, it is expected that the most robust mitigation treatment would be road traffic noise barriers and these have been considered in accordance with Schedule 3 of the Guidelines, in order to reduce noise levels from the modified alignment at the receptors.

The road traffic noise barriers have been located as close to the road as possible to maximise effectiveness and to yield a lower barrier height.

The location and heights of the barriers can be seen in in **Appendix E** and **Appendix F**. Two barrier options for the northern end of the alignment have been considered. The barrier at the southern end of the alignment near to the Whitlam residential estate is also shown.

The predicted future 2031 road traffic noise levels including the reduction effect of the noise barriers are shown in **Table 8** and in **Appendix E** and **Appendix F** in noise contour form for noise barrier Option 1 and Option 2 respectively.

Table 8 shows that the use of either noise barrier option as noise mitigation is effective and is predicted to result in compliance with the project target noise levels at all receptor locations.

The noise contour maps in **Appendix E** and **Appendix F** also show that the future noise levels following the duplication project would not exceed the Target Noise Level of 60 dBA $L_{Aeq(15hour)}$ at the residential components of the Whitlam Estate. This indicates that compliance with the Guidelines would be achieved and no further noise mitigation would be required.

However, this outcome would conflict with the acoustic amenity requirements of the WPM&C and the SDHDC.

4.6.2 Road Pavement Surface

As an alternative to noise barriers, a low noise road pavement has been considered as a mitigation option. An Open Graded Asphalt (OGA) surface provides an additional -2 dBA noise reduction relative to the pavement surface proposed. A section of OGA approximately 1,410 m (starting at and heading west from the John Gorton Drive intersection) for both carriageways was incorporated into the model.

There are two existing residential locations in Hawker at the northern end of the WHD alignment where a noise reduction of -2 dBA is also required (13 Florina Place and 12 Kurundi Place). A section of OGA approximately 400 m (starting at and heading south from the Drake Brockman Drive intersection) for both carriageways was incorporated into the model.

The predicted 2031 road traffic noise levels including those sections of OGA pavement are also shown in **Table 8**, and in **Appendix G** in noise contour form. The extent of the OGA pavement surfacing required is also shown in **Appendix G**.

Table 8 shows that the use of OGA as noise mitigation is effective and is predicted to result in compliance with the project target noise levels at all receptor locations

In relation to the sound reduction benefits of OGA, it is expected that a -2 dB benefit may be retained for up to five years before specific maintenance treatments, such as grinding/machining which may extend the 'acoustic life' of OGA by a further three years, or replacement would be required. Resurfacing of OGA generally occurs at approximately 10 years.

Table 8 2031 Future Road Traffic Noise Levels and Assessment – with noise mitigation

Receptor	Target Noise Level, dBA LAeq(15 hour)	2031 Noise Level, dBA LAeq(15 hour)		
		Barrier Option 1	Barrier Option 2	OGA Road Surface
12 Florina Place, Hawker	60	60	60	60
14 Florina Place, Hawker	60	59	59	59
16 Florina Place, Hawker	60	55	55	55
17 Florina Place, Hawker	60	57	57	57
15 Florina Place, Hawker	60	57	58	58
13 Florina Place, Hawker	60	60	60	57
10 Kurundi Place, Hawker	60	57	58	57
12 Kurundi Place, Hawker	60	60	60	57
14 Kurundi Place, Hawker	60	58	57	57
15 Kurundi Place, Hawker	58	55	55	55
13 Kurundi Place, Hawker	60	58	57	58
11 Kurundi Place, Hawker	60	58	58	58
14 Mainoru Place, Hawker	60	60	60	60
16 Mainoru Place, Hawker	60	59	59	59
18 Mainoru Place, Hawker	60	57	57	57
21 Mainoru Place, Hawker	60	57	57	57
19 Mainoru Place, Hawker	60	58	58	58
17 Mainoru Place, Hawker	60	58	58	58
15 Mainoru Place, Hawker	60	56	56	56
14 Elsey Place, Hawker	58	54	54	54
16 Elsey Place, Hawker	58	54	54	54
18 Elsey Place, Hawker	58	54	54	54
20 Elsey Place, Hawker	58	54	54	54
22 Elsey Place, Hawker	58	54	54	54
24 Elsey Place, Hawker	57	53	53	53
26 Elsey Place, Hawker	57	53	53	53
28 Elsey Place, Hawker	57	52	52	52
30 Elsey Place, Hawker	56	52	52	52
32 Elsey Place, Hawker	56	52	52	52
34 Elsey Place, Hawker	56	52	52	52
36 Elsey Place, Hawker	56	51	51	51
38 Elsey Place, Hawker	55	51	51	51
16 Dungowan Street, Hawker	53	49	49	49
Whitlam Estate	60	60	60	58

5 Conclusion

A noise assessment of the proposed duplication of William Hovell Drive (WHD) between between Drake Brockman Drive and John Gorton Drive has been completed. The upgrade would result in two lanes in each direction.

Project Target Noise Levels were established for existing and future residential receptors in the vicinity of the WHD alignment in accordance with the Roads ACT "*Noise Management Guidelines*".

Road traffic noise from vehicles on the upgraded alignment was modelled to predict noise for the Year 2031.

The predictions showed that road traffic noise associated with the duplication would exceed the assessment criteria at two existing residential properties and the Whitlam residential estate development by up to 2 dBA.

In addition, a comparison of the noise levels at the receptors if the project did and did not proceed was also carried out. The increase as a result of the project is generally less than 1 dBA at most receptors, and therefore it would be reasonable to conclude that there are no significant noise impacts associated with the new project.

Noise mitigation treatments to achieve the assessment criteria were considered.

Noise barriers up to 2.5 m high would reduce noise at 'affected' receptors to levels compliant with the assessment criteria.

In addition, the use of a low noise pavement such as Open Graded Asphalt (OGA) for sections of the WHD alignment was found to result in compliance with the project Target Noise Levels and is the preferred mitigation approach. The extent of the OGA required is limited to sections at the north and south ends of the alignment where residential receptors will be closest.

Noise levels at the Whitlam residential estate including either of the noise mitigation options considered would comply with the assessment criteria, however there is an obligation to consider acoustic amenity provisions described in the Whitlam Precinct Map and Code and Single Dwelling Housing Development Code. It would be a matter for the relevant authority to address that conflict.