WILKINSON MURRAY

4 November 2015

WM Project Number: 13317
Our Ref: PP04112015_Ltr_JW
Email:jeff@deepriver.com.au

Mr Jeff Bulfin
Precise Planning
PO Box 426
NORTHBRIDGE NSW 1560

Dear Jeff

Re: 25 Martin Road Badgerys Creek - Response to EPA Noise Issues

Wilkinson Murray conducted a Noise Impact Assessment (NIA) for the proposed Resource Recovery Facility at 25 Martin Road, Badgerys Creek (Wilkinson Murray Report No. 13351 Version B). The NIA addressed the Secretary's Environmental Assessment Requirements (SEARs) for the project, and was conducted in general accordance with the NSW *Industrial Noise Policy (INP)*.

NSW Environment Protection Authority (EPA) have made the following request for further information, in relation to the NIA. Wilkinson Murray's response is presented below each comment.

1. *Comments*

   Background noise monitoring was carried out on the northern boundary of the site. This differs from the guidance in Table 3.1 of the NSW Industrial Noise Policy (INP) which states that the monitoring should be carried out at the most or potentially most-affected noise sensitive locations (i.e. surrounding residences). The EPA considers that the background noise level at some receivers more distant from Elizabeth Drive (e.g. R13, R14, R6 and R10 in Figure 2-1 of the Assessment) may be lower than the 41 dBA adopted for all receivers in the Assessment.

   Recommendation

   The EPA requires the proponent to provide further quantitative information to support the assertion that the background noise level is similar at all receivers.

WILKINSON MURRAY RESPONSE

The NIA presented unattended background noise measurements mid-way along northern boundary of the site. EPA were concerned that background noise levels more distant from Elizabeth Drive (eg. R13, R14, R6 and R10) may be lower than the 41dBA adopted in the NIA. As requested unattended noise monitoring was conducted near R14 (See Figure 1).

Figure 1 Noise Monitoring Locations

The unattended background noise monitoring was undertaken between 7 October and 14 October 2015.

The noise monitoring equipment used for this measurement consisted of an ARL 316 environmental noise logger set to A-weighted, fast response, continuously monitoring in 15-minute intervals. This equipment is capable of remotely monitoring and storing noise level descriptors for later detailed analysis. The equipment calibration was checked before and after the survey and no significant drift was noted.

The logger determines L_{A1}, L_{A10}, L_{A90} and L_{Aeq} levels of the ambient noise. L_{A1}, L_{A10} and L_{A90} are the levels exceeded for 1%, 10% and 90% of the sample time respectively (see Glossary of Acoustic Terms for definitions). The L_{A1} is indicative of maximum noise levels due to individual noise events. This is used for the assessment of sleep disturbance. The L_{A90} level is normally taken as the background noise level during the relevant period.

Detailed results are provided in graphical form in Appendix A. The graphs show measured values of L_{Aeq}, L_{A90}, L_{A10} and L_{A1} for each 15-minute monitoring period.

The results of noise measurements were processed in accordance with the procedures of the NSW EPA's *Industrial Noise Policy*. The results are presented in **Error! Reference source not found.**.

Table 1 Measured Ambient Noise Levels

Period	RBL* (dBA)	$L_{Aeq,period}$ (dBA)
Daytime 7.00am – 6.00pm	39	51
Evening 6.00pm – 10.00pm	32	44
Night Time 10.00pm – 7.00am	27	48

*** RBL –** The Rating Background Level.

The rating background level (RBL) conducted more distant from Elizabeth Drive during daytime were found to be marginally lower than those measured in the original NIA, by 2dB. As the RBL is marginally different the project specific noise levels for the projects need to be revised. Table 2 show the revised the project specific noise levels for the project based on the measured RBLs and the *INP* intrusive noise criterion.

Table 2 Revised Intrusive Noise Criteria

Location	Intrusive Noise Criteria $L_{Aeq,15min}$ (dBA)
R1	46
R2	46
R3	46
R4	46
R5	46
R6	44
R7	46
R8	46
R9	46
R10	44
R11	44
R12	44
R13	House demolished
R14	44
R15	44
R16	44
R17	44
R18	46

It should be noted that a new receiver has been added compared to the NIA, R18. R18 is the closest receiver potentially impacted by traffic noise from project traffic entering Martin Road from Elizabeth Drive. Also, the house identified as R13 has been demolished and therefore will not be considered further in this assessment. R9 is located within a large market garden property and is considered as a residential receiver even though it would appear to be more industrial / commercial in nature.

2. *Comments*

   The EPA understands that some operations are presently underway at the site, with the potential to influence the background noise monitoring results. The INP clearly states in Section 3.1 that background noise levels are to be measured without the subject development operating.

   Recommendation

   The EPA requires the proponent to demonstrate that no activities were occurring on the premises for the duration of the background noise monitoring period.

The noise monitoring data has been reviewed by Wilkinson Murray. The noise logger graphs, in our opinion, do not show signs of work on the site and our site notes for the noise logger have no indication of work occurring on site. The proponent of the development was requested to check his records if any work had occurred on site during our noise monitoring. Appendix B is a letter in response stating that no activity took place at the subject site during the measurement period. Additionally, this would appear to have been confirmed by the resent noise measurements which were not dissimilar to the initial noise logger data.

3. *Comments*

   The EPA notes that while the Assessment predicts compliance with noise goals, predicted operational noise levels at several receivers are equal to or very close to the 46 dBA project-specific noise level, following the application of feasible and reasonable mitigation measures as described in Section 4.3. The predicted noise contours in Figure 4-2 show noticeable acoustic shielding from what appear to be essentially acoustically transparent shade cloth/fabric structures near receivers R8 and R9, and from a small single level shed near receivers R12 and R13 (as observed via Google Street View 17/8/2015).

   Recommendation

   The EPA requires that the assessment details the modelled properties of these shielding structures, and what degree of acoustic shielding they provide, including allowances for flanking noise around barriers and structures.

4. *Recommendation*

   The EPA requires further information be provided in the Assessment on the locations and heights of the noise sources within the model, and how the predicted noise levels would change for differing noise source placement scenarios.

Our detailed response to these submission is presented in Appendix C.

5. *Recommendation*

   The EPA requires the Assessment address the road traffic noise impacts generated by the proposal, particularly for sensitive receivers along Martin Road.

Our detailed response to these submission is presented in Appendix D.

6. *Recommendation*

   The EPA requires the proponent to describe the use of flashing lights and noise devices that indicate for example the operation of plant and machinery on the premises and whether these have been included in the evaluation of noise and other environmental impacts.

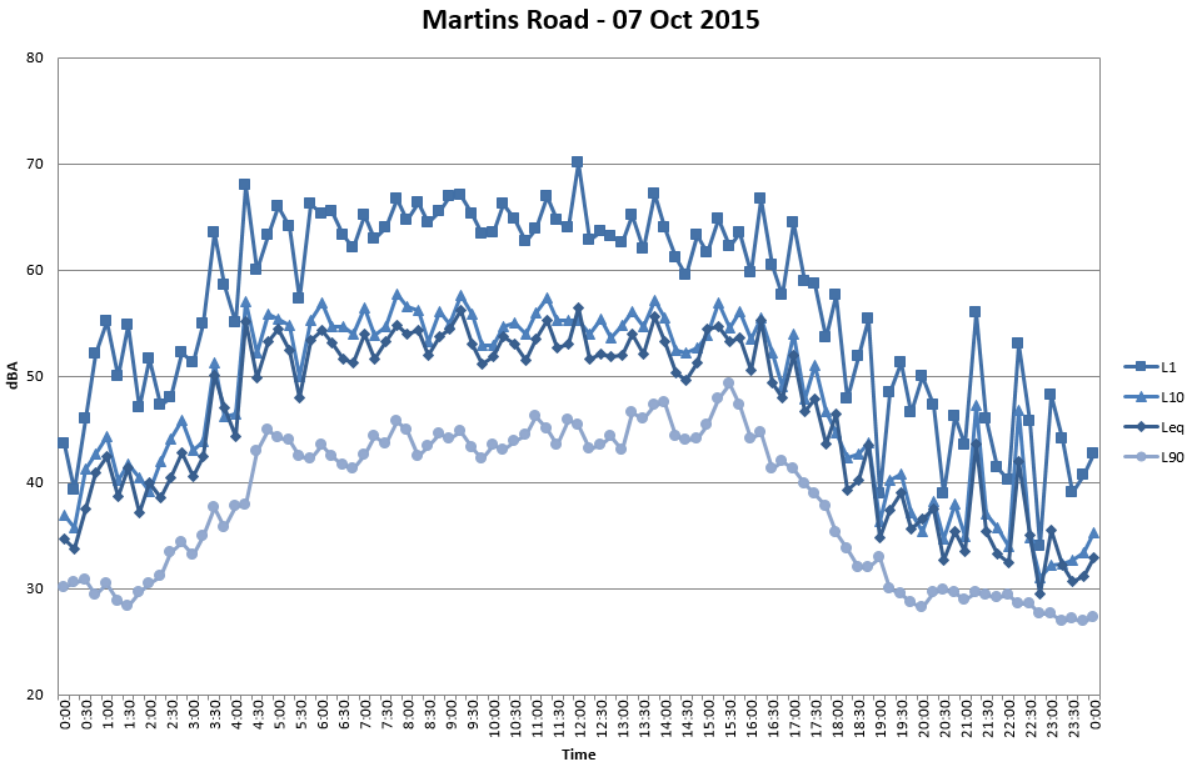
All movable plant and equipment require audible reversing alarms as part of Work Health and Safety legislation; as such, all plant and equipment operating on site will have reversing alarms. The sound power levels used for the noise calculations represent the plant operating which includes a small portion of time when it is reversing. Typically, noise from reversing alarms do not contribute significantly to the $L_{Aeq,15minute}$ operation of plant and equipment because it only operates for a very short period of time. The use of reversing alarms are typically more an issue for sleep disturbance assessments which was note included in the NIA as the site only operates during standard daytime operating hours.

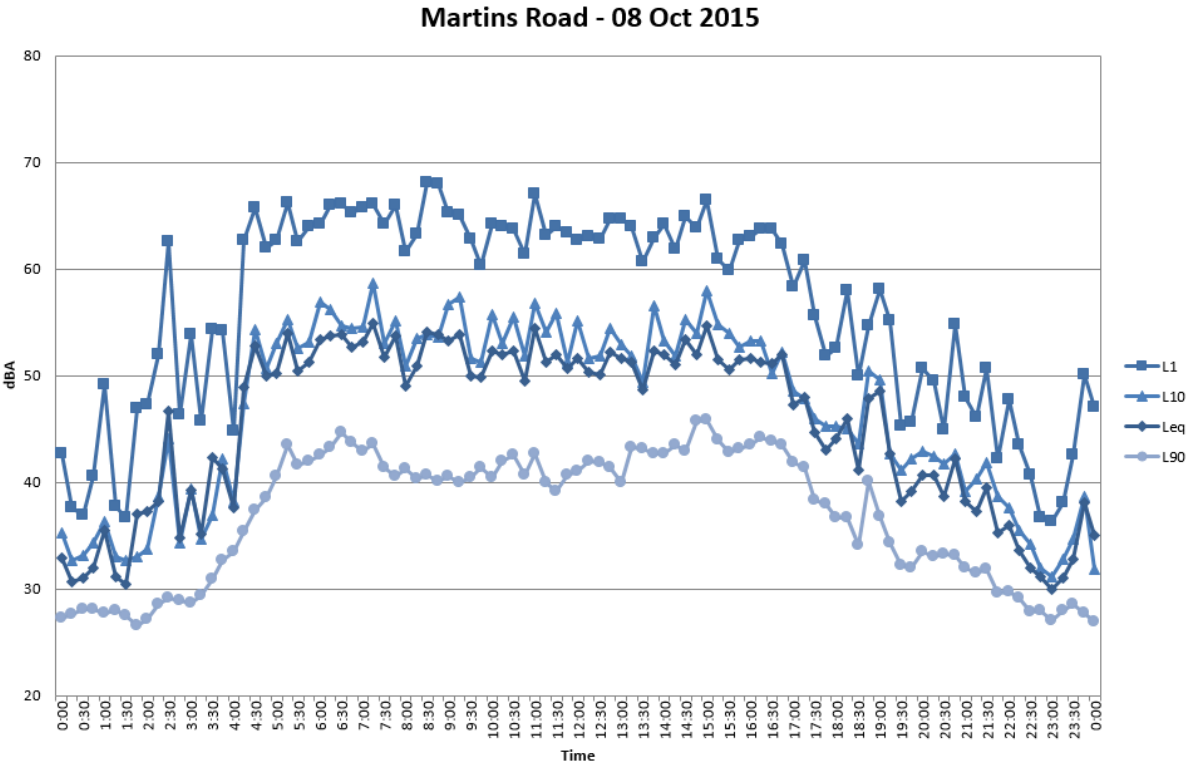
I trust this information is sufficient. Please contact us if you have any further queries.

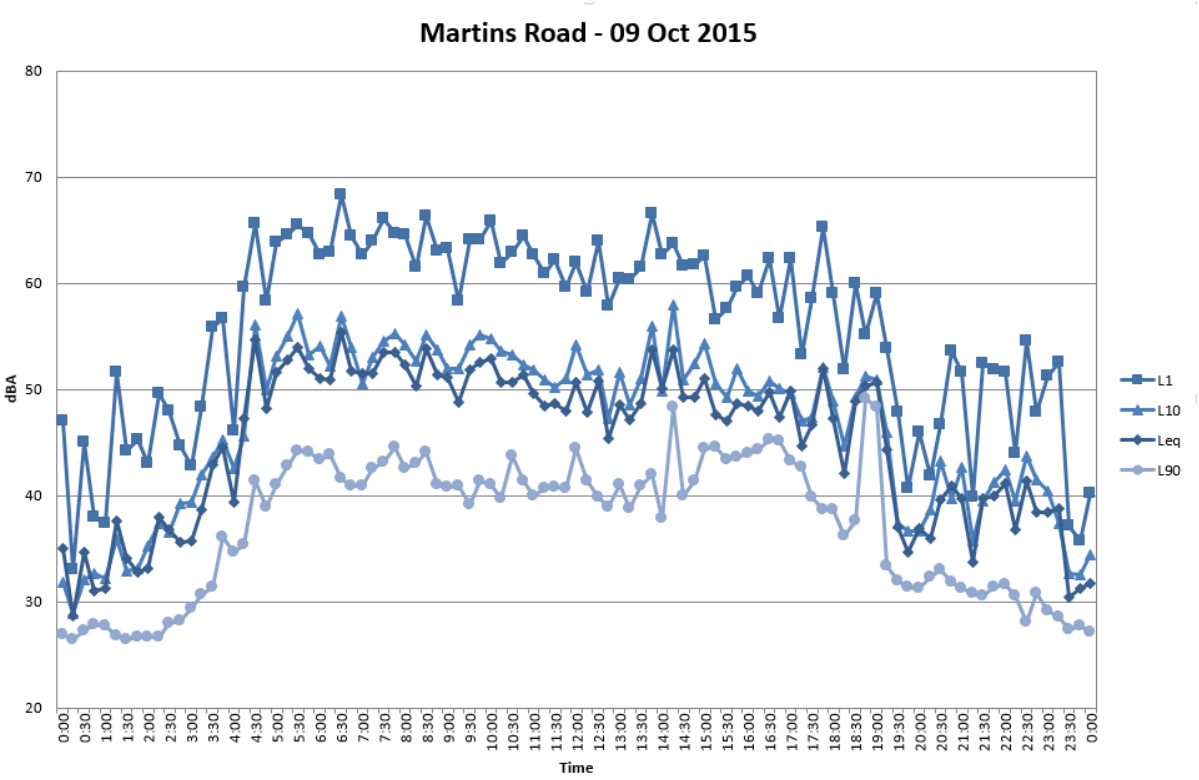
Yours faithfully
WILKINSON MURRAY

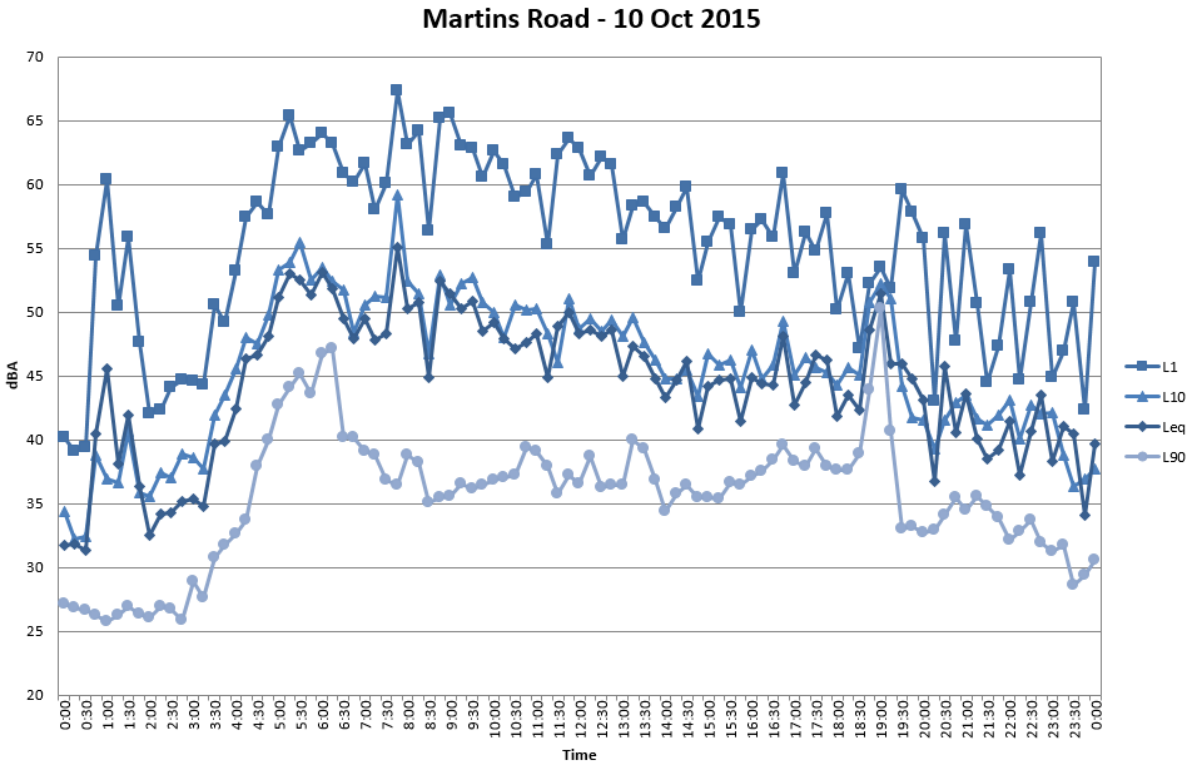
John Wassermann
Director

APPENDIX A – NOISE LOGGER GRAPHS






Martins Road - 09 Oct 2015
dBA
Time
L1
L10
Leq
L90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Time
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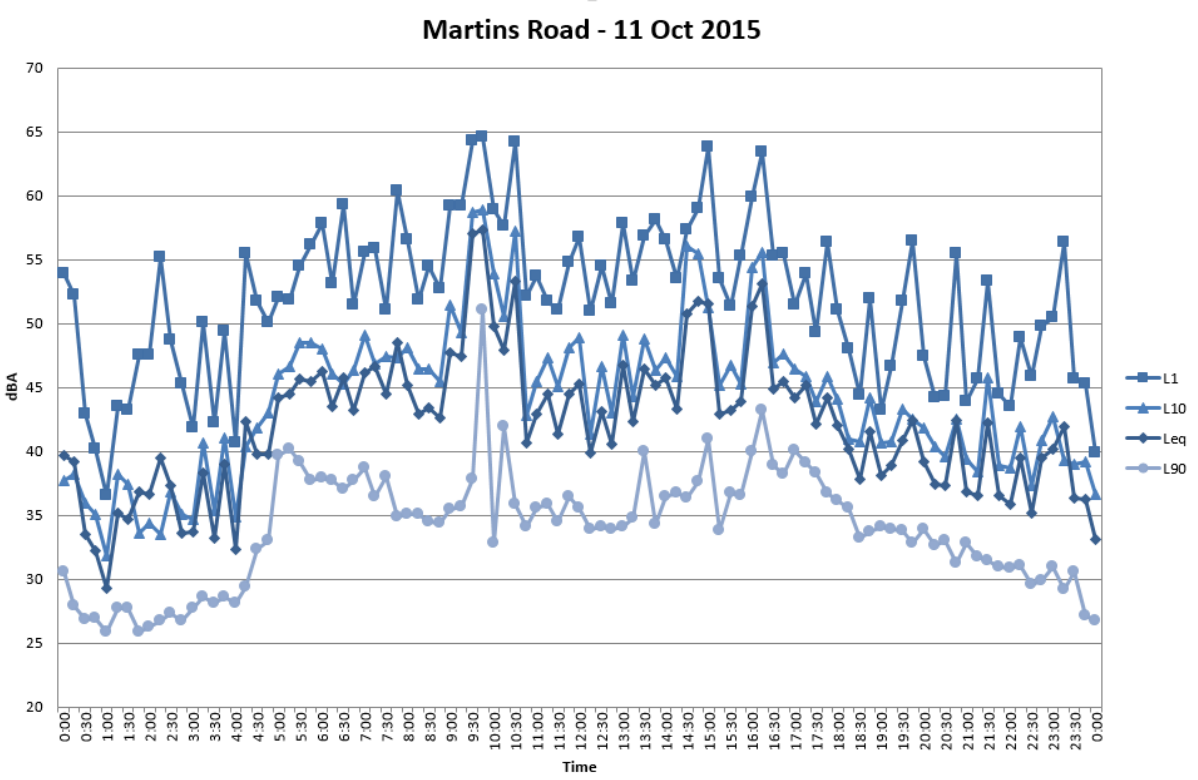
L10
Leq
L90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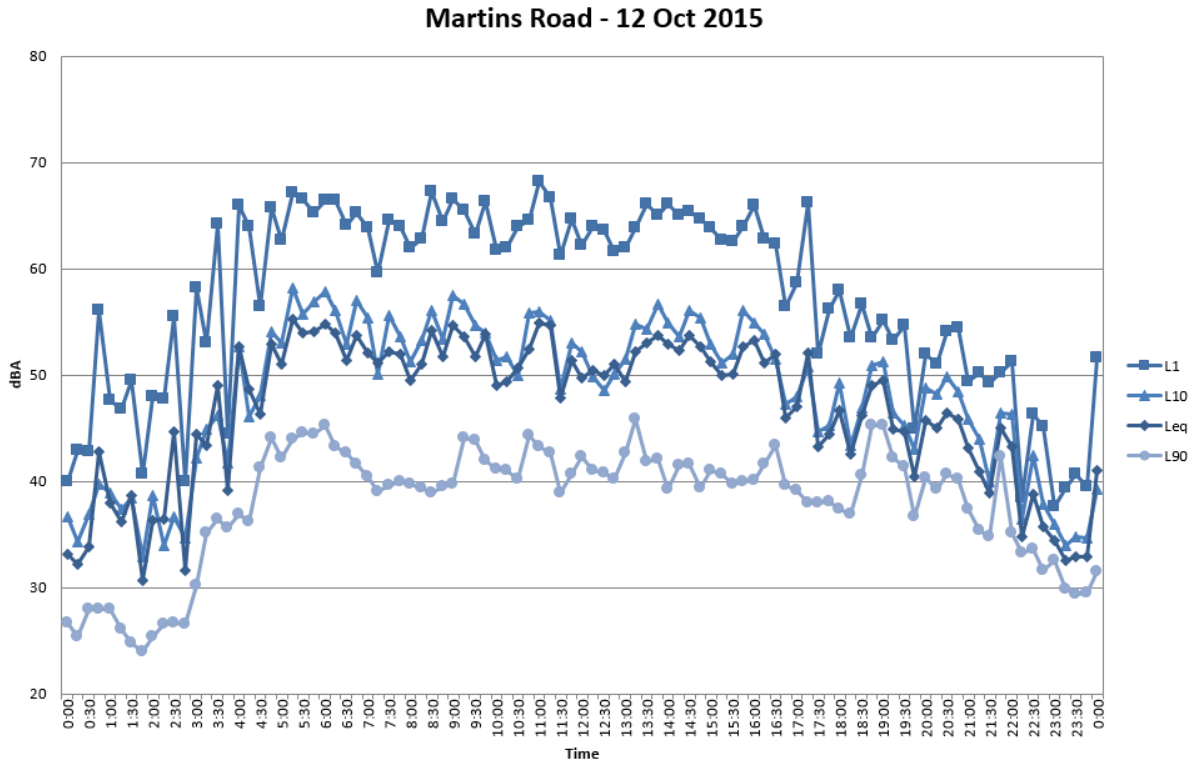
dBA
Time
L1
L10
Leq
L90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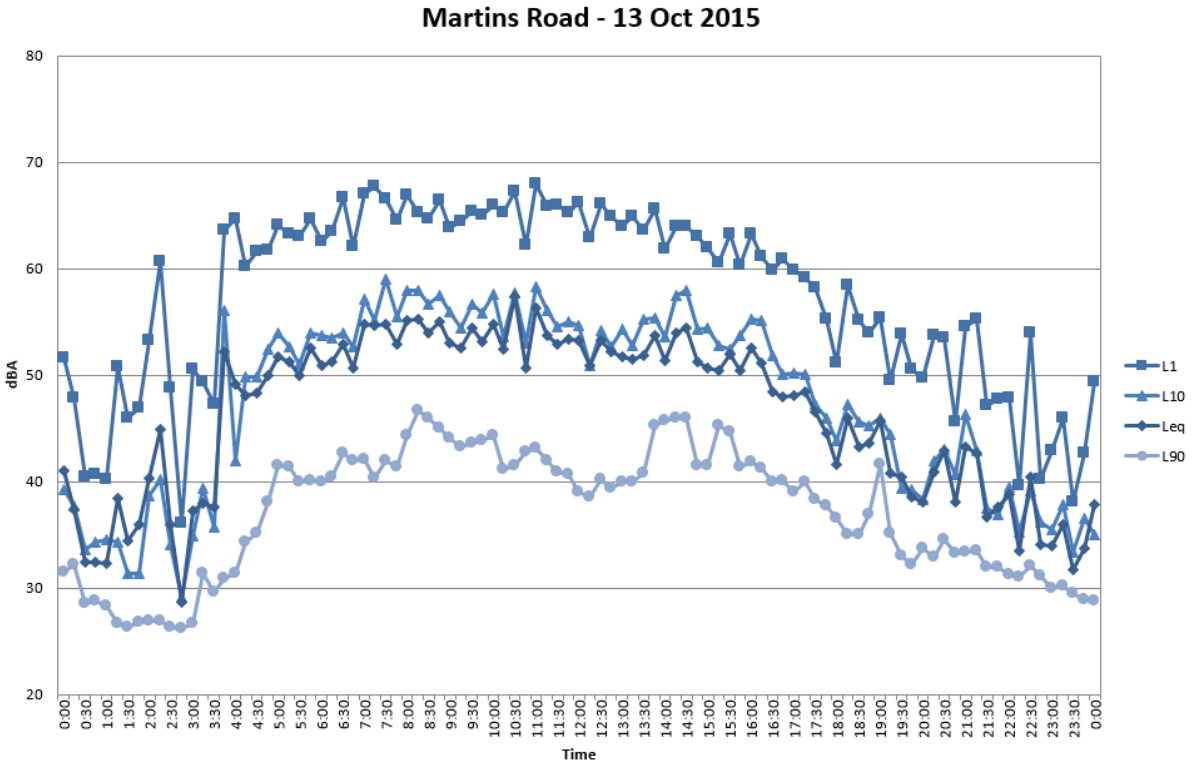
dBA
Time
L1
L10
Leq
L90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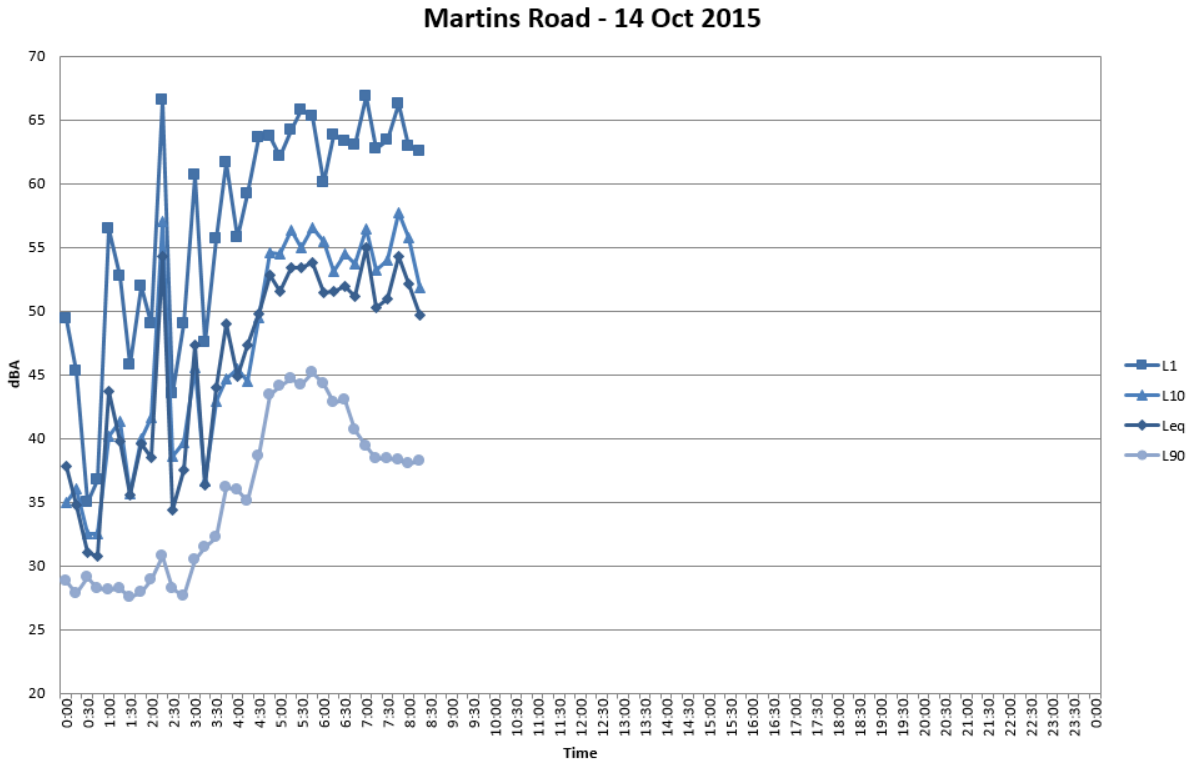
dBA
Time
L1
L10
Leq
L90


Martins Road - 14 Oct 2015
dBA
Time
L1
L10
Leq
L90

APPENDIX B – LETTER FROM MULGOA EXCAVATIONS PTY LTD

24 September 2015

Mulgoa Excavations Pty Ltd
122 Kingswood Road
ORCHARD HILLS NSW 2748

The Manager
Wilkinson Murray
Unit 2
123 Willoughby Road
CROWS NEST NSW 2065

Dear Sir or Madam:

25 Martin Road Badgerys Creek

I refer to your recent enquiry regarding work activity being undertaken at the above site.

I have checked our work diary and I can advise that no activity took place at the subject site between 8 July 2014 and 15 July 2014, inclusive.

I trust this is satisfactory.

Yours faithfully
MULGOA EXCAVATIONS PTY LTD

Daniel Buttigieg
Managing Director

APPENDIX C – REVISED NOISE CALCULATIONS

C.1 Background

The EPA required remodelling from the NIA as they were concerned that the model included shielding from acoustically transparent shade cloth structures and additional information was required on source heights and source locations.

Wilkinson Murray mistakenly assumed from aerial photography that the shade cloth structured were buildings. The modelling has been revised without the structures in place and using the revised site plans.

C.2 Noise Modelling

Noise predictions were calculated using the "CadnaA" noise modelling software with CONCAWE noise prediction algorithms. This software considers the following noise attenuation factors;

- distance;
- barrier effects from earth mounds and/ or site fencing;
- meteorological effects (Daytime D class);
- ground attenuation; and
- air absorption.

The sound power levels used in the noise modelling are presented in the NIA.

The noise modelling also considered considerable noise mitigation which was developed through an iterative noise modelling approach where reasonable and feasible noise mitigation has been identified. The following mitigation was used in the noise model (See Figures C-1);

- A 2.5m high acoustic barrier to be installed on the existing earth mound. Final height of 4.7m; and
- The existing 2m and 3m high Hebel fences were extended West up to the existing mound on the southern side and beyond the mound to the North.

C.3 Modelled Scenarios

The different operations within the site have been split into three scenarios for the purpose of noise modelling, namely:

C.3.1 Scenario 1 – Building Waste Delivery

This scenario considers a truck entering the site and unloading building waste adjacent to the temporary stockpile, with an excavator loading the crusher (See Figure C-1). It was assumed that all plant used in the noise model had a source level of 1.5m.

C.3.2 Scenario 2 – Building Waste Delivery – Stockpile A

This scenario considers the front end loader moving material from the temporary stockpile to the storage area and truck being loaded by the excavator (See Figure C-2).

C.3.3 Scenario 3 – Green Waste Delivery

This scenario considers a truck entering the site and unloading adjacent to the green waste stockpile, with a front end loader loading green waste into a shredder (See Figure C-3).

Noise Modelling Results

The results of the noise predictions are presented in Tables C-1, C-2 and C-3 and Figures C-3, C-4 and C-5.

Table C-1 Predicted Noise Levels, Scenario 1

Receiver	Predicted Noise Level, $L_{Aeq,(15min)}$	Criteria	Exceedance of Criteria
R1	37	46	-
R2	38	46	-
R3	34	46	-
R4	38	46	-
R5	38	46	-
R6	39	44	-
R7	42	46	-
R8	44	46	-
R9	49	46	3dB
R10	46	44	2dB
R11	44	44	-
R12	43	44	-
R14	43	44	-
R15	37	44	-
R16	37	44	-
R17	36	44	-
R18	47	46	1dB-

Table C-2 Predicted Noise Levels, Scenario 2

Receiver	Predicted Noise Level, $L_{Aeq,(15min)}$	Criteria	Exceedance of Criteria
R1	36	46	-
R2	35	46	-
R3	32	46	-
R4	35	46	-
R5	35	46	-
R6	37	44	-
R7	40	46	-
R8	41	46	-
R9	43	46	-
R10	41	44	-
R11	39	44	-
R12	38	44	-
R14	38	44	-
R15	33	44	-
R16	32	44	-
R17	32	44	-
R18	42	46	-

Table C-3 Predicted Noise Levels, Scenario 3

Receiver	Predicted Noise Level, $L_{Aeq,(15min)}$	Criteria	Exceedance of Criteria
R1	41	46	-
R2	38	46	-
R3	37	46	-
R4	44	46	-
R5	43	46	-
R6	42	44	-
R7	46	46	-
R8	45	46	-
R9	43	46	-
R10	40	44	-
R11	39	44	-
R12	41	44	-
R14	39	44	-
R15	33	44	-
R16	34	44	-
R17	36	44	-
R18	42	46	-

Noise emission from the site for the different scenarios, with all reasonable and feasible noise mitigation measures applied, generally complies with the project specific noise levels at all receivers apart from R9, R10 and R18.

R8 and R18 have an exceedance of less than 2dB of the project specific noise level. This exceedance is typically considered negligible and would not be discernable by the average listener.

R9 is the closest residential receiver to the site and a 3 dB exceedance of the project specific noise level is predicted from scenario 1 where the crusher is operating. There are a number of off shade cloth structures between our site and R9. As suggested by the EPA, all these structures have been deleted from the noise model and there is no shield in the model as a result of these structures. However, in reality these structures are likely to reduce noise levels in the order of 2-3dB. Taking such as loss into consideration would result, at worst, in a 1dB exceedance of the project-specific noise level which would be considered negligible and would not be discernable by the average listener.

Figure C-1 Site Plan showing Barriers & Source Locations – Scenario 1

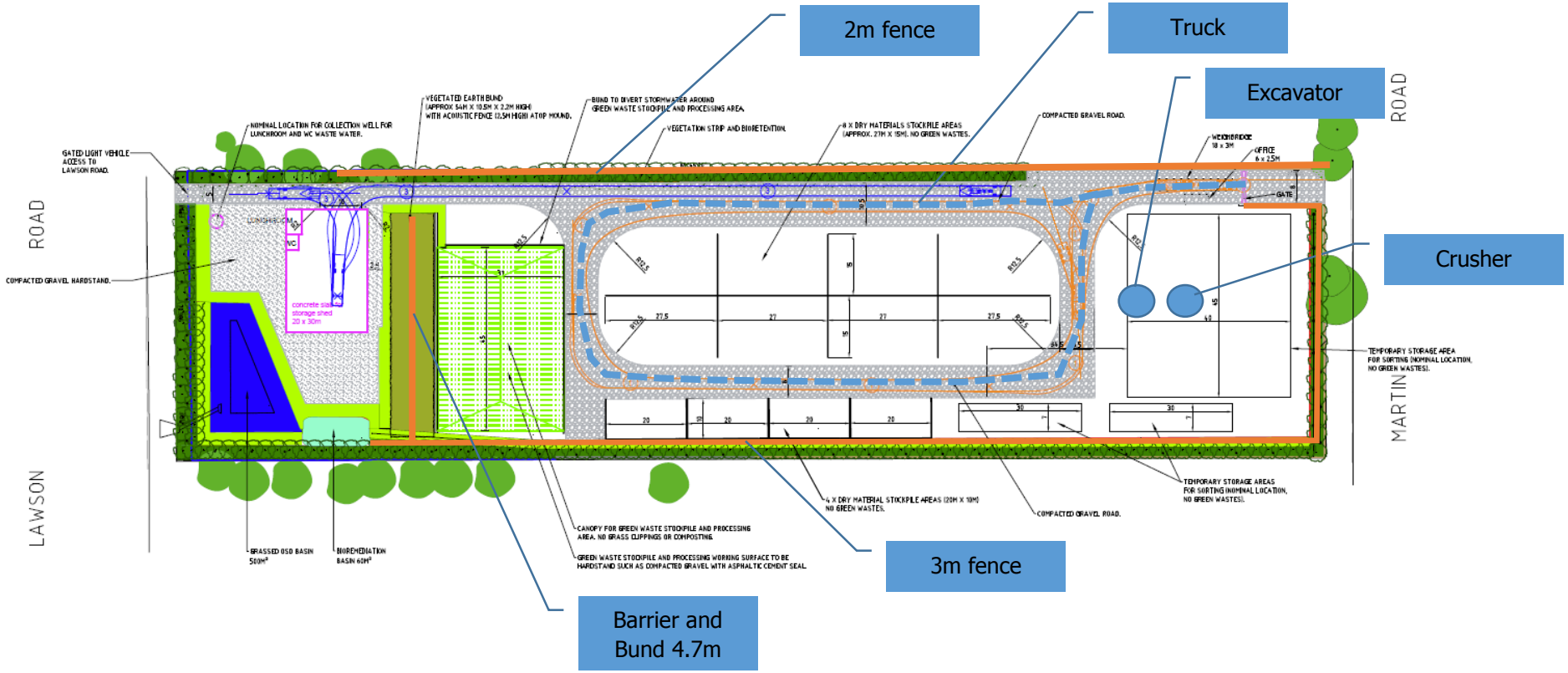


Figure C-2 Site Plan showing Barriers & Source Locations – Scenario 2

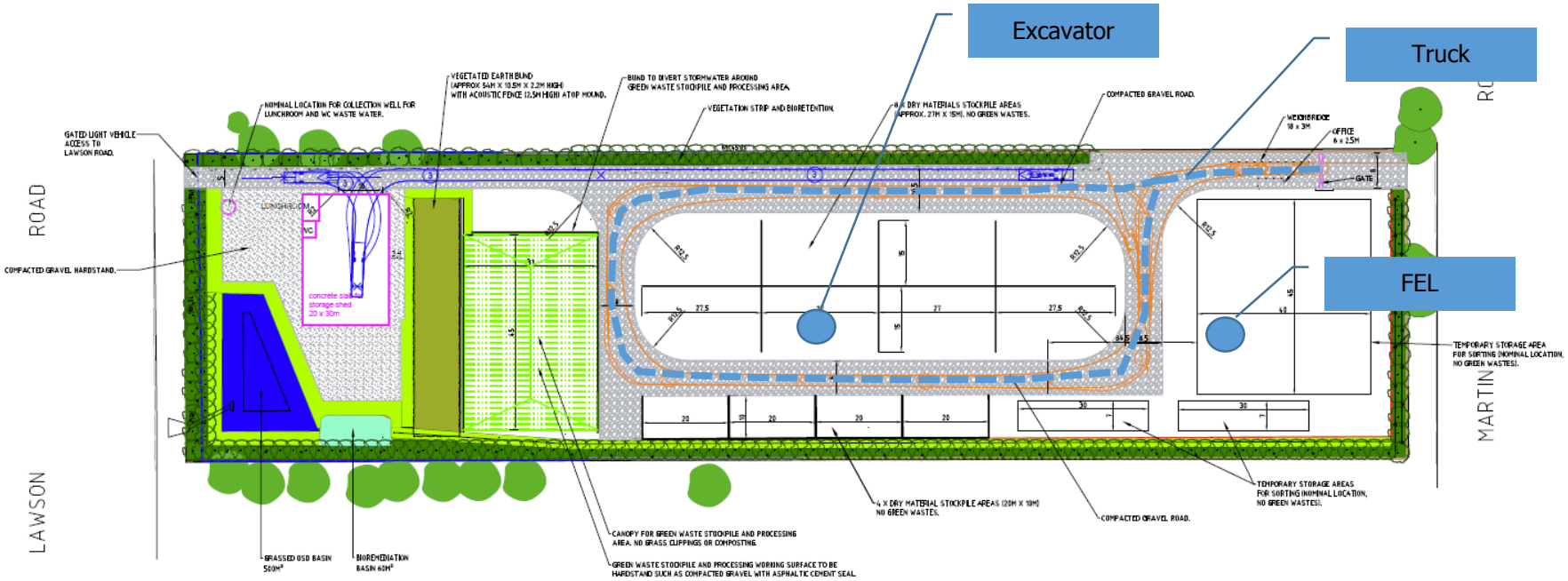


Figure C-3 Site Plan showing Barriers & Source Locations – Scenario 3

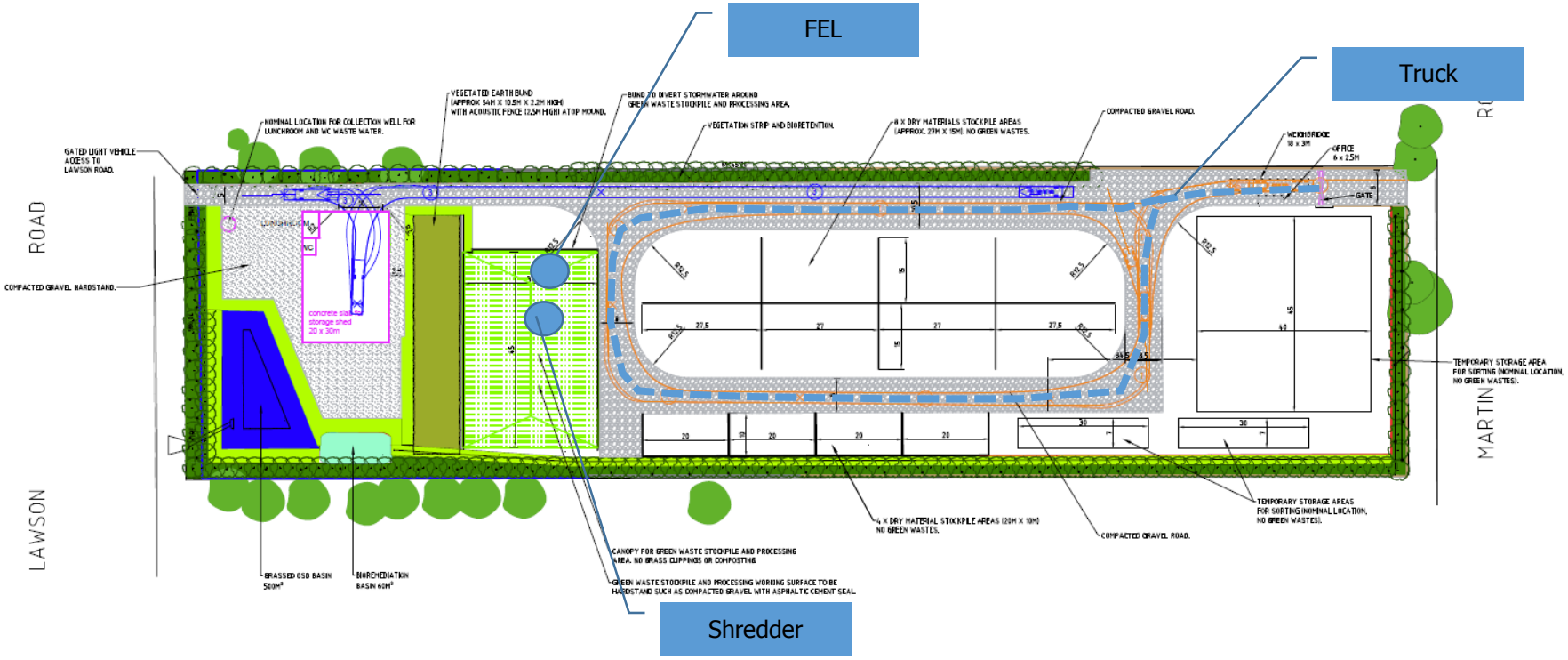


Figure C-1 Predicted Noise Contours – Scenario 1

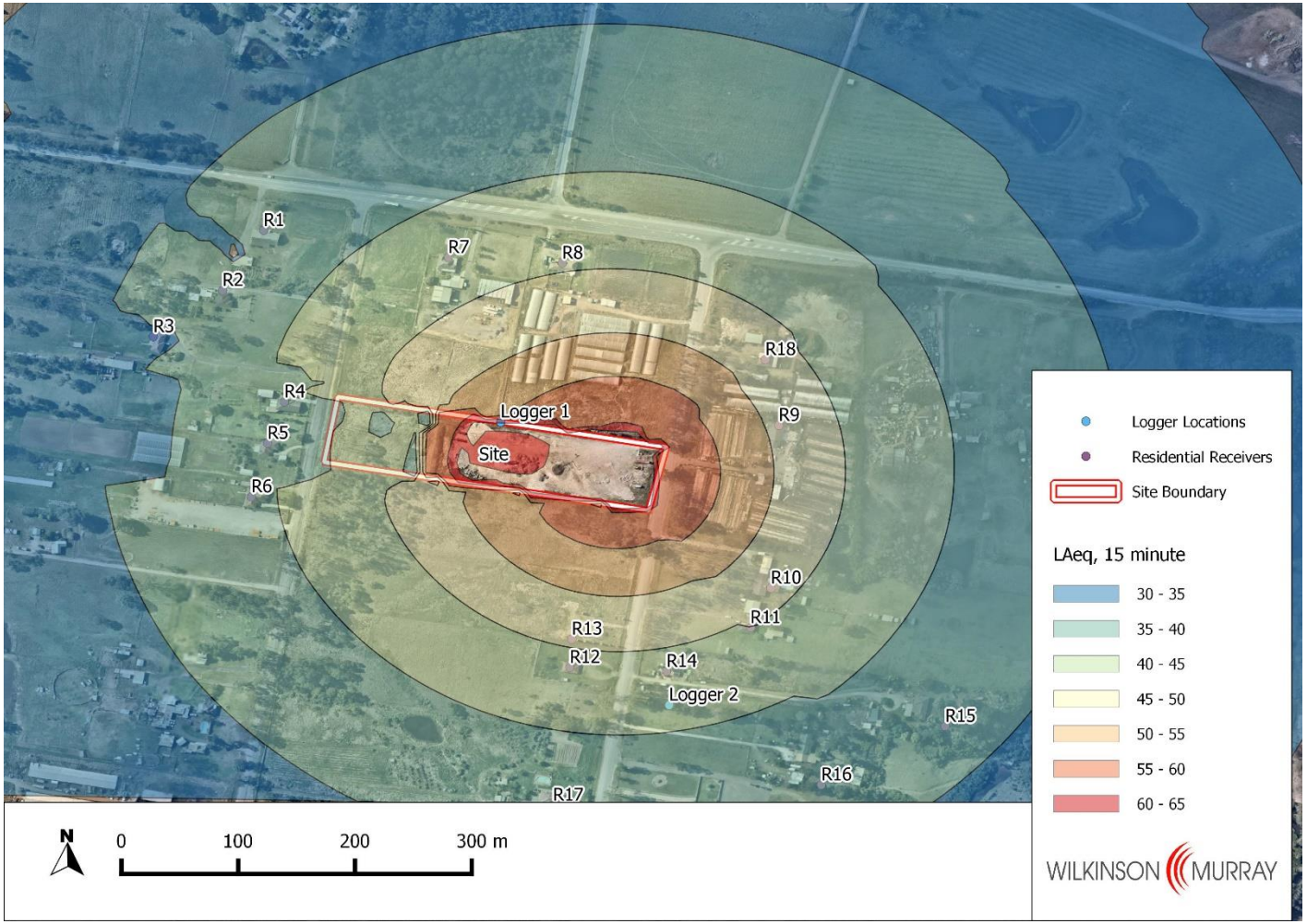


Figure C-2 Predicted Noise Contours – Scenario 2

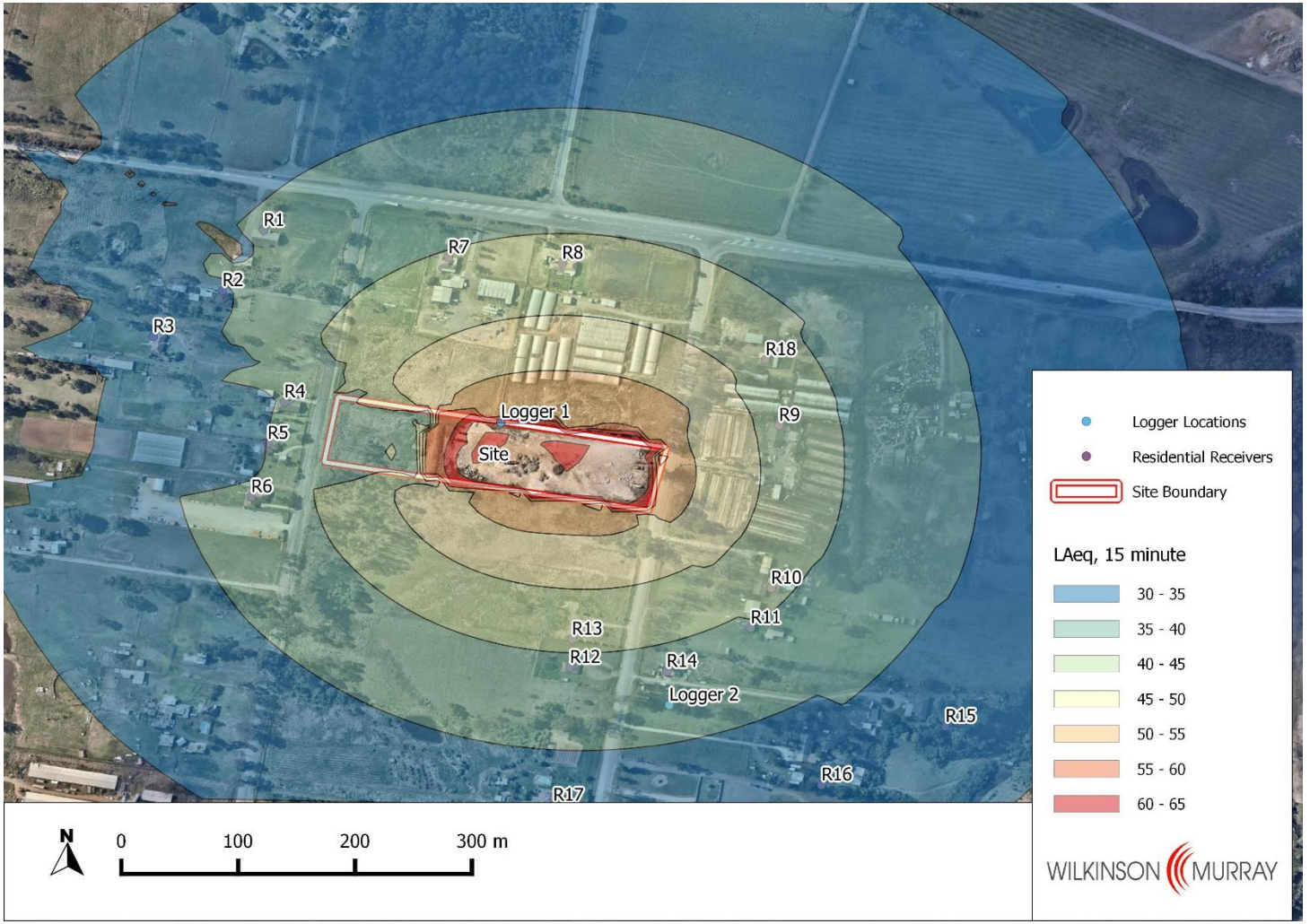
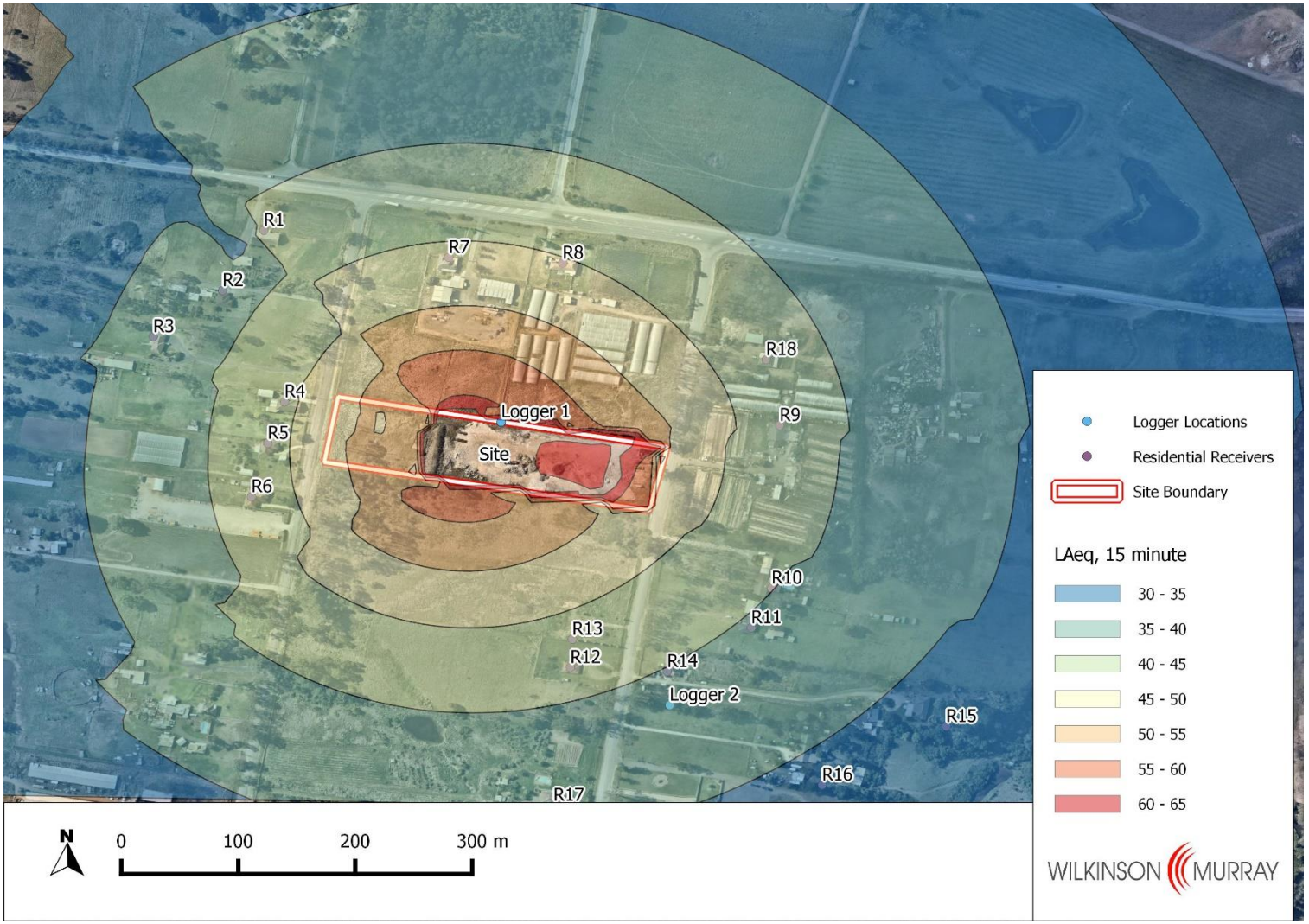


Figure C-3 Predicted Noise Contours – Scenario 3



APPENDIX D – TRFFIC NOISE ASSESSMENT

D.1 Traffic Noise Criteria

The *NSW Road Noise Policy (RNP)* provides guidance on assessing road traffic noise impacts from traffic generating developments. The *RNP* road traffic noise assessment criteria for residential land uses are presented in **Error! Reference source not found.**.

In addition to the criteria in Table D-1, the *RNP* advises that in cases where existing levels of road traffic noise exceed the applicable criteria, and that a development has the potential to increase road traffic noise levels; an increase of up to 2dBA represents a minor impact that is considered barely perceptible to the average person.

Table D-1 Road Traffic Noise Criteria for Residential Land Uses

Road Category	Type of project/land use	Assessment Criteria – dBA	
		Day (7am – 10pm)	Night (10pm – 7am)
Freeway/ arterial/ sub-arterial roads	Existing residences affected by noise from **new** freeway/arterial/sub-arterial road corridors	$L_{Aeq,15\ hour}$ 55 (external)	$L_{Aeq,9\ hour}$ 50 (external)
	Existing residences affected by noise from **redevelopment** of existing freeway/arterial/sub-arterial roads	$L_{Aeq,15\ hour}$ 60 (external)	$L_{Aeq,9\ hour}$ 55 (external)
	Existing residences affected by **additional traffic** on existing freeway/arterial/sub-arterial roads generated by land use developments		
Local roads	Existing residences affected by noise from **new** local road corridors	$L_{Aeq,1\ hour}$ 55 (external)	$L_{Aeq,1\ hour}$ 50 (external)
	Existing residences affected by noise from **redevelopment** of existing local roads		
	Existing residences affected by **additional traffic** on existing local roads generated by land use developments		

Note: Land use developers must meet internal noise goals in the Infrastructure SEPP (Department of Planning NSW 2007) for sensitive developments near busy roads.

Nearby residences most affected by traffic generated by the project are located along the Martin Road. Martin Road falls into a local road category.

As the site only operates during the day, the traffic noise criterion is 55 $L_{Aeq,1\ hour}$.

D.2 Traffic Noise Impacts

R18 is the most affected residential receiver by traffic generated by the project on Martin Road.

According to the Transport Impact Assessment for the project, prepared by Parking & Traffic Consultants, the project will generate approximately 12 truck visitations (24 movements) during weekdays and 9 visitations (18 movements) during Saturday. This essentially equates to 1-2 truck visitation per hour, involving 2-4 movements. Additionally, there are 5 staff members that access the site in the morning and afternoon.

Parking & Traffic Consultants conducted peak hour traffic survey. The following traffic volumes were measured for Martin Road:

- 81 movements / hour (morning); and
- 101 movements / hour (evening).

The speed limit on Martin Road is 50km/hr. It is assumed that 10% of these vehicles would be heavy vehicles.

D.2.1 Traffic Noise Prediction Methodology

Traffic noise levels have been predicted using the *Calculation of Road Traffic Noise (CoRTN)* model developed by the Welsh Office of the UK Department of Transport, 1988. The *CoRTN* method calculates the $L_{A10,18hr}$ noise level and takes into account the following factors:

- Traffic flow volumes;
- Average vehicle speed;
- Percentage of heavy vehicles;
- Gradient of road;
- Type of road pavement;
- Distance from receiver location to road;
- Angle of view;
- Building facade reflection correction; and
- Ground absorption.

D.2.2 Predicted Road Traffic Noise Levels at Nearby Receivers

The predicted increases in traffic noise levels at closest residential receivers (R18) along Martin Road is presented in Table D-2.

Table D-2 Predicted Road Traffic Noise Levels at R18 from Martin Road

Period	Distance (m)	Without Project	With Project	Increase
		Day ($L_{Aeq, 1hour}$ dBA)	Day ($L_{Aeq, 1hour}$ dBA)	
Morning	53	50.1	51.5	0.4
Evening	53	52.1	52.4	0.3

Review of Table D-2 indicates that the existing and future $L_{Aeq, 1hour}$ traffic noise levels at the most affected receivers along Martin Road are less than the *RNP* criterion, and that the predicted increases in traffic noise levels due to the project are well below 2dB and are therefore unlikely to be noticeable.