

Response to Request for More Information.

Grahams Quarry has been operational for around 30 months. With exceptional quality of product and demand, the quarry has unexpectedly grown very fast. This enabled the business to create 15 new full time much needed employment positions for the Kyogle area. These positions have provided economic return to the local community. Due to the unexpected fast growth and need for product in this area, the business has outgrown its original haulage route.

The original haulage route includes a 90-year-old bridge with a 20t load limit at Cedar Point. This bridge is currently being assessed to see what needs to be done to upgrade/renew it so heavier loads can be transported across. Increasing the load limit on this bridge would also greatly benefit many other businesses that have to travel sometimes double the distance to avoid this bridge. This area is heavily surrounded by Forestry plantations which are currently travelling the long way to get the timber to their processing facilities.

This quarry has been designated a regional resource.

Grahams Quarry is now operating at an economic disadvantage because of this 90-year-old bridge.

As you already know, one solution for this business to keep providing exceptional product at an economical cost to customers and providing essential employment is to use Omagh Rd as a medium-term solution while the 90-year-old bridge is being assessed (which has already begun).

Residential amenity matters

1. Please refer to Noise assessment.

Engineering, road safety and capacity matters

2. Please refer to Kyogle Council assessment
3.
 - Please refer to Kyogle Council assessment.
 - Currently there is no limit on the number of empty trucks returning to the quarry via Omagh Rd. If this proposal is approved, the number of truck movements will decrease and therefore resulting in a safer road. Working hours at the quarry are from 7am to 6pm this allows 11 hours for up to 10 trucks to travel this route which is less than 1 truck per hour.
4. Yes, the haul route will be used by trucks delivering to the south.
5. Each delivery is assessed individually. If delivery is south of Kyogle the first option will be to do small loads over the Cedar Point bridge as this is the shortest route. If the delivery is to be a large quantity, it may be decided that Omagh Rd would be the most economical with the least amount of truck movements.

Currently, it takes more than 3 loaded trucks (10t) to deliver equivalent to 1 truck and

dog (33t) load.

We estimate that out of 10 truck and dogs on Omagh Rd that 50/50 would split either way at Summerland Way. 5 truck and dogs would travel south through the CBD and 5 truck and dogs travel North.

Currently, 16 trucks are travelling through the CBD to the north to deliver equivalent to what 5 Truck and Dog loads are capable of. The approval of the haulage route would decrease the amount of trucks travelling through Kyogle main street by 66%. Therefore, only 1/3rd of the trucks will travel through town after the approval of the haulage route.

Kyogle Council has made a notice of motion on the 8th of April to reduce emissions within the council. Less truck movements fits within this movement from council.

This is a medium-term solution for the haulage route.

Public Submissions

6. ● Intersections

- Mockharra Lane has adequate visibility in both directions. There are roughly three residents on Mockharra Lane, therefore, very little traffic uses this intersection. With the proposed DA modification, truck movements will be reduced making this an even safer intersection. Currently there is no limit to the number of empty trucks so they would be more likely to encounter an empty truck with current consent conditions.

- Omagh Rd/Anzac Dr intersection has been upgraded by NSW Government, as stated in the traffic assessment this intersection is well below capacity and has adequate visibility and turning lanes already provided. As mentioned above the proposed DA modification will result in less truck movements at this intersection.

● Road Alignment

Currently consent condition's allow unlimited empty trucks this would have a greater impact than up to 10 loaded trucks per day.

● Private Driveways

Private Driveways have all been approved by Kyogle council with sight taken into consideration when approved. Considering this application is reducing the truck movements, residents are far more likely to encounter a car with the car movements being 3 times more than proposed truck movements.

● Compatibility of all Road Users

The road is currently being used by our empty trucks with no issues regarding buses, children, cattle, pedestrians and cyclists. Grahams Quarry have not received any complaints about driver behavior on Omagh Rd, Anzac Drive or the Main street of Kyogle. All road users are responsible for using the road safely. As this DA modification will result in less truck movements on Omagh Rd there will be no implications for other road users.

● Enforced Traffic Management Plan

With our explanations above about trips south there is no need for a Revised Traffic Management Plan.

- Rural amenity and impact of Land Values

Please refer to noise assessment in regards to amenity.

The amenity impact to the residents of Omagh Rd and Anzac Dr will have less of an effect on them for the fact that the unrestricted trucks currently using these roads are empty (noisier) heading back to the quarry. This will stop if the haulage route is modified, up to 10 per day loaded trucks are far less noisy than unrestricted empty trucks. Therefore, there will be less trucks and less noise along Omagh Rd and Anzac Dr. All houses on Omagh road are 30 metres or more off the road with majority being at least 50 metres. Anzac drive already has an average of 3,000 vehicle movements per day, an increase of 10 vehicles won't have much of an impact on Amenity.

- Public Interest & Benefits

Kyogle has an approximate population of 8,820 people (2018) which has reduced from 9,220 since 2011, the town needs more industrial businesses to provide jobs for families who are looking to stay in the area and to relocate to the area. Local businesses provide families with an income to enable them to purchase houses and pay rates, support our local businesses and schools which keeps our shire going. 35 submissions of objection are 0.003% of the population of Kyogle. The benefits of the upgraded haulage route are to provide Council and customers with an exceptional quality product at an affordable and cost-effective delivery, this allows Council to spend rate payer's money more efficiently. This haulage route will result in less truck movement's resulting in less trucks on all roads and a reduction in emissions which is a benefit to everybody. Grahams Quarry supports the community by donating to many community events, since it began some of these events include Kyogle Fairmount Festival, Kyogle Junior Rugby League Football Club, Kyogle Senior Rugby League Club, Kyogle Bowlers Charity Day, Kyogle Rugby Union Club, Kyogle Show.

Grahams Quarry are willing to work with the community this is evident by offering to reduce the number of noisy empty trucks returning to the quarry.

Grahams Quarry would like to make comment about some of the claims being made in the submissions for the amendment to the DA condition 71.

- As mentioned in the application this solution is a medium-term solution. With the upgrade/Replacement of the 90-year-old Cedar point bridge being the long-term solution.
- Grahams quarry has never worked Sunday's. Staff records are kept to substantiate this.
- Grahams Quarry make deliveries all over the north coast. We have not received any driver behaviour complaints.
- The Traffic Assessment document used the latest traffic counts available from Kyogle Council at the time. Omagh road counts being as recent as August 2018.

- Our Traffic Management plan and Code of Conduct for Drivers prohibits drivers from forming Convoy's for any reason. This is enforced by management and has a disciplinary policy in place.
- Grahams Quarry currently pays a contribution to road maintenance.
- The federally funded black spot of Omagh Rd and Anzac drive received funding a number of years ago. The upgraded intersection is now a very safe intersection.
- Consultative Committee meeting condition had no time restraints on when and how often it had to meet. 2 meetings have been held 25th March 2019 and 24th June 2019. This project does not fit the criteria for a State Significant Project.
- The claim of 64 trucks in a 6hr period is simply untrue and unfeasible. Cedar point Quarry do not have enough trucks or man power.
- The main street of Kyogle forms a part of Australia's highway network which has no restrictions on heavy vehicles.
- If this modification is approved there will be no empty trucks returning to the quarry, this will mean less truck movements on the road for residents.
- \$100,000 from Kyogle Council has been allocated for Kyogle Council to assess the Cedar Point Bridge. With the intention of upgrading/replacing Cedar Point Bridge. These assessments have already begun on the 90-year-old bridge.
- Some of the records of the residents of trucks movements don't add up. In one submission they have complained to council about trucks travelling on the road before the day has accrued. Example according to one resident records on 20/4/18 they reported to Kyogle Council that on the 23/4/2018 there were 2 trucks and on the 24/4/2018 there were 8 trucks some with trailers. How would the resident know if there where trucks on the road on a day that hasn't even happened yet?
- Over the working hours of 7am to 6pm if 10 trucks travelled the road it would be less than 1 truck per hour.
- Grahams Quarry supports the community by donating to many community events. since it began some of these events include Kyogle Fairmount Festival, Kyogle Junior Rugby League Football Club, Kyogle Senior Rugby League Club, Kyogle Bowlers Charity Day, Kyogle Rugby Union Club, Kyogle Show.

If you have any questions please don't hesitate to contact Rodney Graham Grahams Quarry Director on 0429 321 982.

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**Noise Impact Assessment
Proposed Additional Haulage Route
Cedar Point Quarry
Edenville Road
Cedar Point NSW 2474**

Prepared for
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Prepared by
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26th August 2019**

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1 INTRODUCTION

Ambience Audio Services have been engaged by Stephen Fletcher & Associates to conduct a road traffic noise assessment for an additional haulage route for the Cedar Point Quarry at Edenville Rd, Cedar Point, via Kyogle NSW. The request is in response to correspondence from PLANIT Consulting (22/03/2019), on behalf of Kyogle Shire Council, to provide a noise impact assessment of the generated truck movements on the residential dwellings on the proposed additional haulage route.

The requirements of the noise impact assessment are copied below.

Residential amenity matters

1. Further analysis of likely impacts on the amenity of residential properties along the proposed haul route from additional heavy vehicle movements is required. Accordingly, you are requested to provide an assessment of noise impacts on residential amenity that are likely to be generated by truck movements along the proposed haulage route, particularly in regard to dwellings fronting Anzac Drive and Omagh Road. The noise impact assessment is to be undertaken in accordance with the NSW ECC&W *Road Noise Policy 2011* and by a suitably qualified and experienced person to determine the impacts of the additional haulage route on residential amenity. The report is also to identify any attenuation measures which may be required to maintain residential amenity to an acceptable level.

Scope of this assessment:

- Measurement of empty and loaded quarry trucks passby noise levels
- Comparison of empty and loaded passby noise levels
- Measurement of existing road traffic noise levels on Anzac Drive with simultaneous traffic count
- Obtain current traffic counts for Omagh Road and Anzac Drive
- Obtain existing and proposed quarry truck movements on Omagh Road and Anzac Drive
- Calculation of road traffic noise levels at closest residential dwellings to Omagh Road and Anzac Drive for existing and proposed quarry trucks
- Assessment of road traffic noise levels with criteria in the NSW Government Road Noise Policy 2011
- Recommendations for feasible noise mitigation measures if required
- Production of report

To assist with the interpretation of some of the terminology used in this report, Appendix A provides definitions of acoustic terms. Appendix B is a chart of everyday sound pressure levels.

2 DESCRIPTION OF SITE AND OPERATIONS

The Cedar Point Quarry is located within Lot 1 in DP 366036 and Lot 12 in DP 582916, Edenville Road, Cedar Point. The quarry received development consent in 2012 with permission to extract up to 47,000 cubic metres of material per calendar year with a total maximum of 2.021 million cubic metres. The quarry operates under Environment Protection Licence 20588 issued by the NSW Environment Protection Authority.

Hours of operation are defined in condition L6 of EPL 20588.

L6 Hours of operation

L6.1 Activities covered by this licence must only be conducted between the hours specified in the following table:

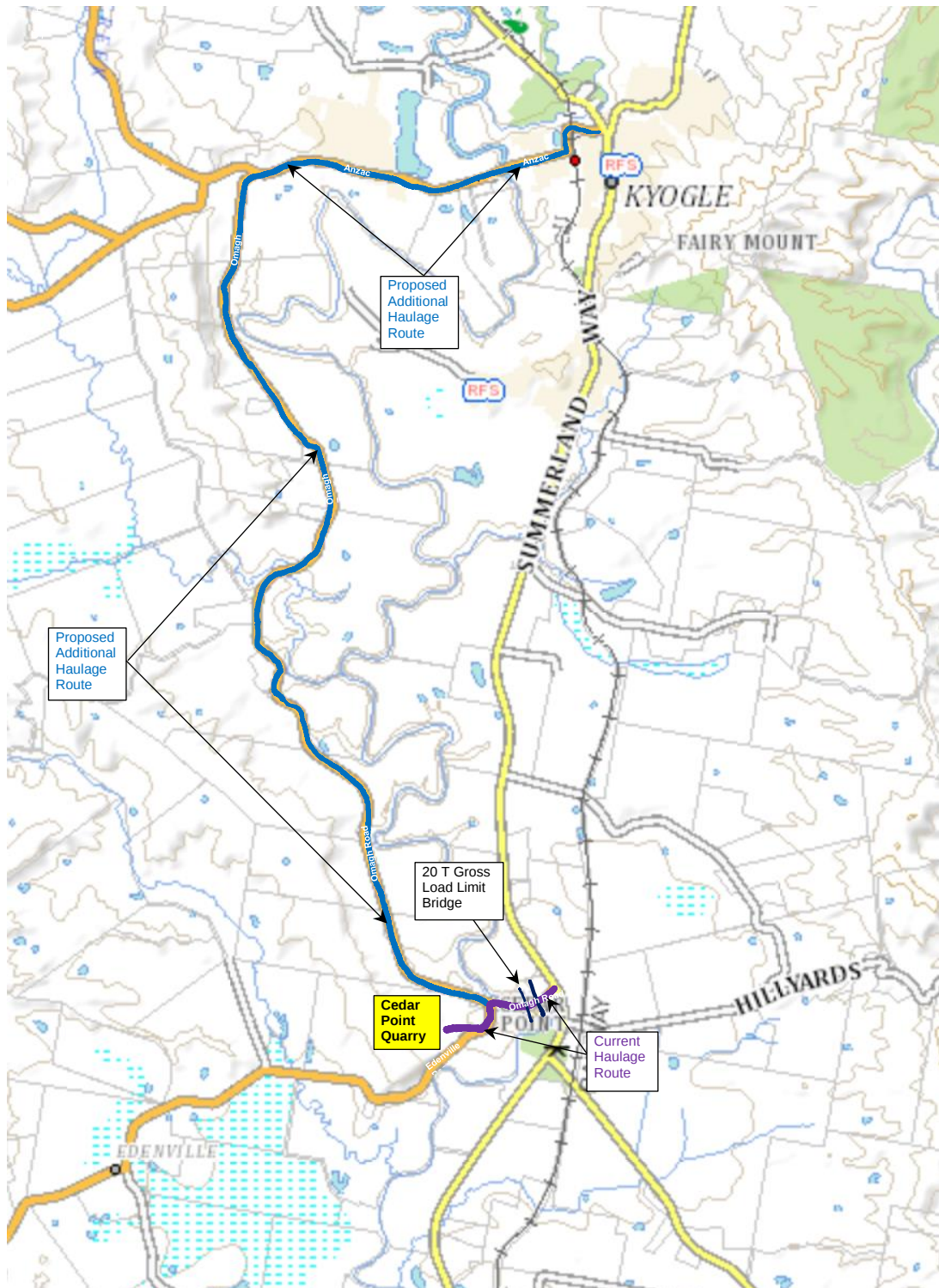
Activity	Monday to Friday	Saturday
Quarry Extraction	7:00am to 6:00pm	8:00am to 1:00pm
Crushing, Washing and Screening	8:00am to 5:00pm	8:00am to 1:00pm
Routine Maintenance	7:00am to 6:00pm	8:00am to 1:00pm
Vehicle Haulage	7:00am to 6:00pm	8:00am to 1:00pm
Blasting	10:00am to 3:00pm	No Blasting
Drilling	9:00am to 3:00pm	No Drilling

L6.2 Construction work and quarrying operations are not permitted on Sundays or Public Holidays

The current approved haulage route is via Edenville Road, right turn onto Omagh Road, then onto the Summerland Way where product is distributed to its destination. Omagh Road between Edenville Road and the Summerland Way was a 20 tonne gross load limit on the one lane bridge over the Richmond River.

There have been road pavement upgrades to Omagh Road and Anzac Drive since the opening of the quarry. The proposed additional haulage route is to turn left from Edenville Road onto Omagh Road, travel north on Omagh Road, turn right on to Anzac Drive and continue on to the Summerland Way north of the Kyogle CBD. This would allow higher payloads from the quarry and more efficient use of haulage trucks.

Figure 2.1 Current and Proposed Additional Haulage Route



3 QUARRY TRUCK NOISE LEVELS

A noise survey was conducted on the 24th of July 2019 to measure and compare noise levels from empty and loaded quarry trucks on a road surface similar to the proposed additional haulage route on Omagh Road.

3.1 Measurement Procedure

Table 3.1 Instrumentation

Instrument	Serial #	Calibration Date
Brüel and Kjær 2250L Sound Level Meter	3006868	July 2019
Brüel and Kjær Acoustical Calibrator model	2292735	October 2018

Measurements were made in general accordance with procedures laid down in:

1. Australian Standard AS 1055.1-1997: *'Acoustics - Description and measurement of environmental noise - General procedures'*
2. The NSW Government Noise Policy for Industry – Oct 2017

A Bruel & Kjaer outdoor microphone kit was fitted to the microphone on a calibrated Bruel & Kjaer 2250L integrating sound level meter at a height of 1.5m in an open field at a distance of 20m from the centre of the current haulage route on Omagh Road. This location was chosen as it was a similar in road surface to the proposed additional haulage route on the northern section of Omagh Rd.

The noise logger was set to record 1 second sampling periods with an 'A' frequency weighting and Fast response. At the end of the 1 hour monitoring period, data was downloaded into Bruel & Kjaer 7815 Noise Explorer environmental noise software and Microsoft Excel for analysis.

Markers were used during the recording to identify empty and loaded trucks as well as other acoustic events for further analysis.

The noise logger used during the noise survey conforms to Australian Standard 1259 "Acoustics - Sound Level Meters" (1990) as a Type 1 precision sound level meter and has an accuracy suitable for both field and laboratory use.

The logger's calibrations were checked before and after the measurement period with a Brüel and Kjær acoustical calibrator model 4231. No significant system drift occurred over the measurement period.

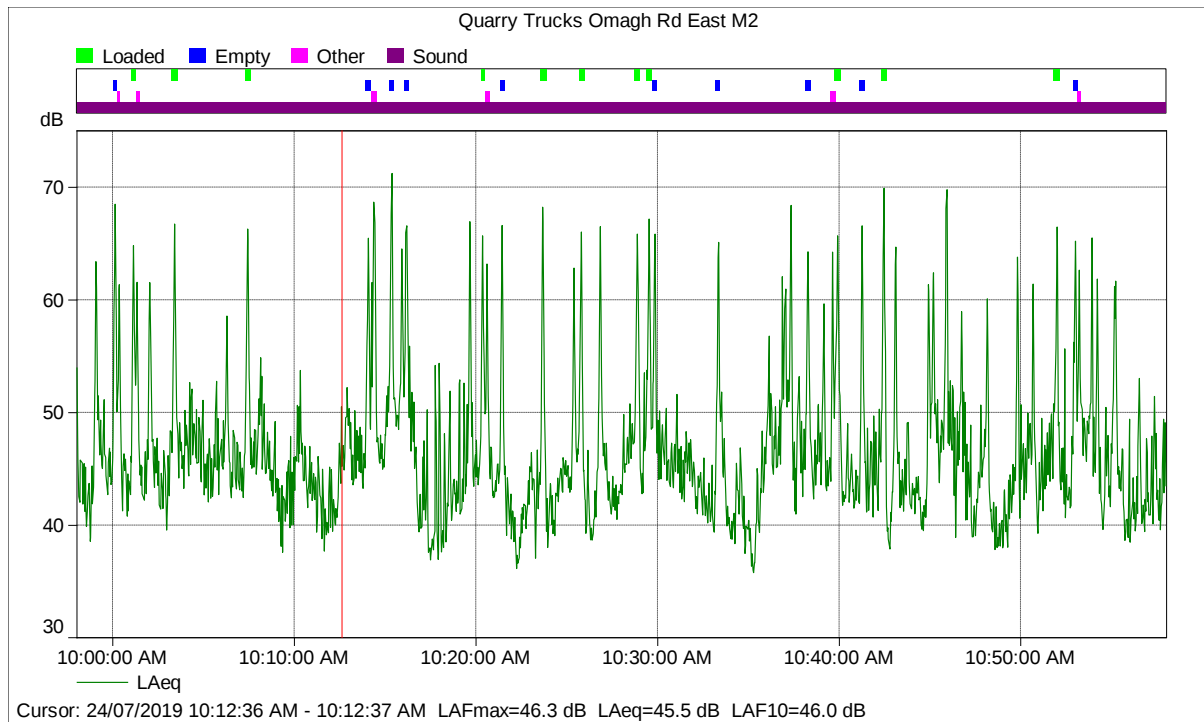
The noise logger and calibrator have been checked, adjusted and aligned to conform to the Brüel and Kjær factory specifications and issued with conformance certificates. The internal test equipment used is traceable to the National Measurement Laboratory at CSIRO, Lindfield, NSW.

3.2 Weather Conditions

Weather conditions were generally good for noise monitoring. Temperature was 23°C and relative humidity ranged from 44% at the start to 26% at the end. The wind was 0.5 – 2.5 m/s from the NW. There was no cloud cover and road conditions were dry.

3.3 Measurement Results

Graph 3.1 Measured Quarry Truck Noise Levels – 20m



The coloured bands at the top of the graph indicate the type and duration of acoustic events.

Table 3.2 Measured Noise Levels Quarry Trucks Passby 20m Summary

Quarry Trucks Passby 20m Summary - Logarithmically Averaged		
	Empty	Loaded
	L _{Aeq} (dB)	L _{Aeq} (dB)
By Make		
DAF	60.8	61.9
Fuso	59.8	60.0
Isuzu	60.7	59.6
UD	64.5	59.5
By Type		
Truck & Dog	64.2	61.9
Truck	60.3	59.5
All	61.3	60.6

Table 3.3 Measured Noise Levels Quarry Trucks Passby 20m Logged

Quarry Trucks Passby 20m 24/07/2019					
Start time	L _{AFmax} (dB(A))	L _{Aeq} (dBA)	Truck Model	Type	
10:00:02 AM	69.4	62.7			Empty
10:01:01 AM	65.3	59.3			Loaded
10:03:15 AM	67.5	59.2	UD		Loaded
10:07:17 AM	67.3	60.1	Fuso		Loaded
10:13:53 AM	74.3	62.4	Isuzu	Truck	Empty
10:15:14 AM	74.3	64.5	UD	Truck and Dog	Empty
10:16:04 AM	68.0	62.3	DAF	Truck and Dog	Loaded
10:20:17 AM	64.6	60.5	Isuzu	Truck	Empty
10:21:19 AM	67.6	60.6	Fuso	Truck	Loaded
10:23:32 AM	72.2	60.5	UD	Truck & Dog	Loaded
10:25:40 AM	60.8	58.7	UD	Truck	Loaded
10:28:45 AM	66.6	60.4	Fuso	Truck	Loaded
10:29:23 AM	68.3	60.6	DAF	Tuck & Dog	Empty
10:29:44 AM	66.9	59.8		Truck	Empty
10:33:11 AM	67.3	59.2	Isuzu	Truck	Empty
10:38:09 AM	64.7	58.5	DAF	Truck and Dog	Loaded
10:39:45 AM	66.4	58.6	Isuzu	Truck	Empty
10:41:06 AM	67.3	59.0	Fuso	Truck	Loaded
10:42:19 AM	72.9	62.9	DAF	Truck & Dog	Loaded
10:51:49 AM	67.2	59.5	Fuso	Truck	Empty
10:52:52 AM	66.5	59.6	Isuzu	Truck	Empty

3.4 Discussion of Measurement Results

Truck speeds were measured with a handheld radar. As this was a short section of road between the Edenville intersection and the one lane 20T gross limit bridge, average speeds were between 45 – 55 km/hr. Background noises were the distant Summerland Way, distant dogs barking, distant cattle and distant overhead aircraft. Local traffic cars and trucks (Other in Graph 3.1) have not been included in the calculations.

Generally, the truck noise levels were reasonably consistent. The UD truck and dog at 10:15am was observed to be partly on the shoulder of the road and contributed to the extra noise levels for this passby.

The empty and loaded trucks are similar in noise level. Body and suspension noise were more noticeable on the empty trucks and engine noise was more noticeable on the loaded trucks.

Different road conditions, road pavements, speed, gradient and driving behaviour will influence noise levels during passby. The trucks tested were typical of the fleet that uses the quarry. The DAF is European and the Fuso, Isuzu and UD are Japanese. Based on previous noise surveys at other quarries, the European and Japanese trucks tend to be quieter than the US makes such as Kenworth, Caterpillar and Mack. The truck and dog combinations had slightly higher noise levels than the body trucks.

4 EXISTING ROAD TRAFFIC NOISE LEVELS ANZAC DRIVE

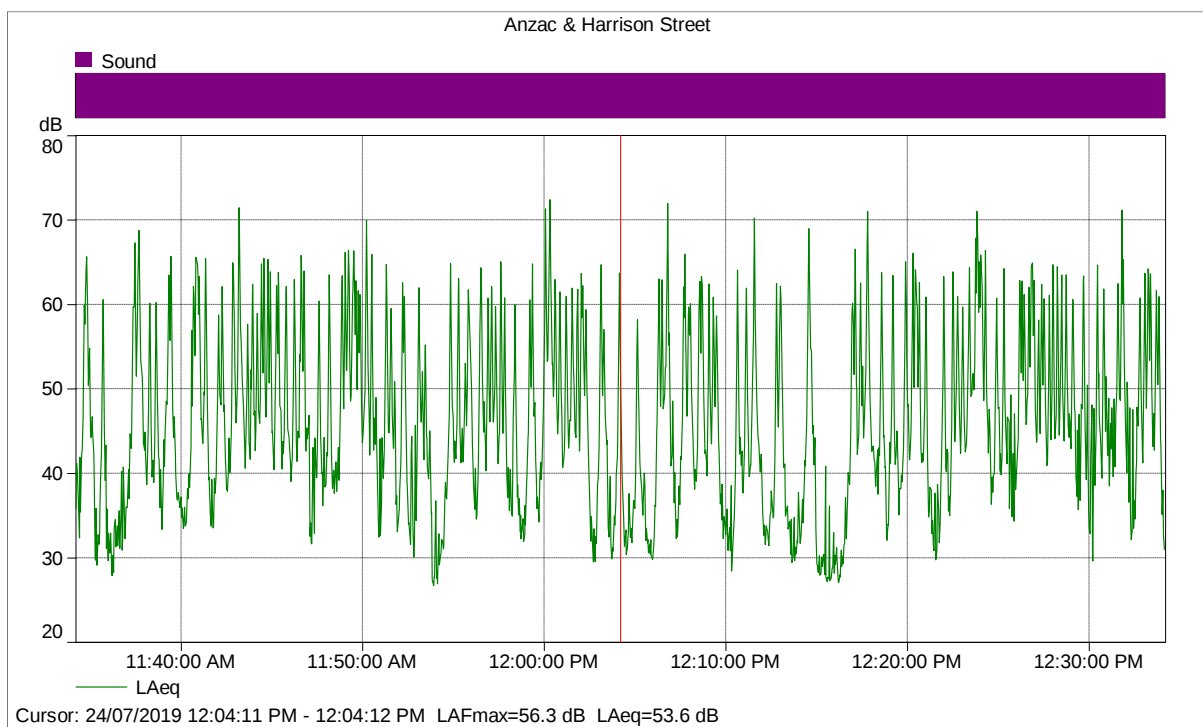
Acoustic measurements were conducted at 4 locations on Anzac Drive on the 24th of July 2019 to obtain real time data to compare to modelling data. Acoustic measurements were not conducted on Omagh Road due to the low traffic flows that tend to give greater variances in results.

The equipment set up and procedure was the same as used previously that day for the quarry truck noise survey. The equipment was field calibrated before the first measurement and at the end of the last measurement. No significant system drift occurred over the measurement period.

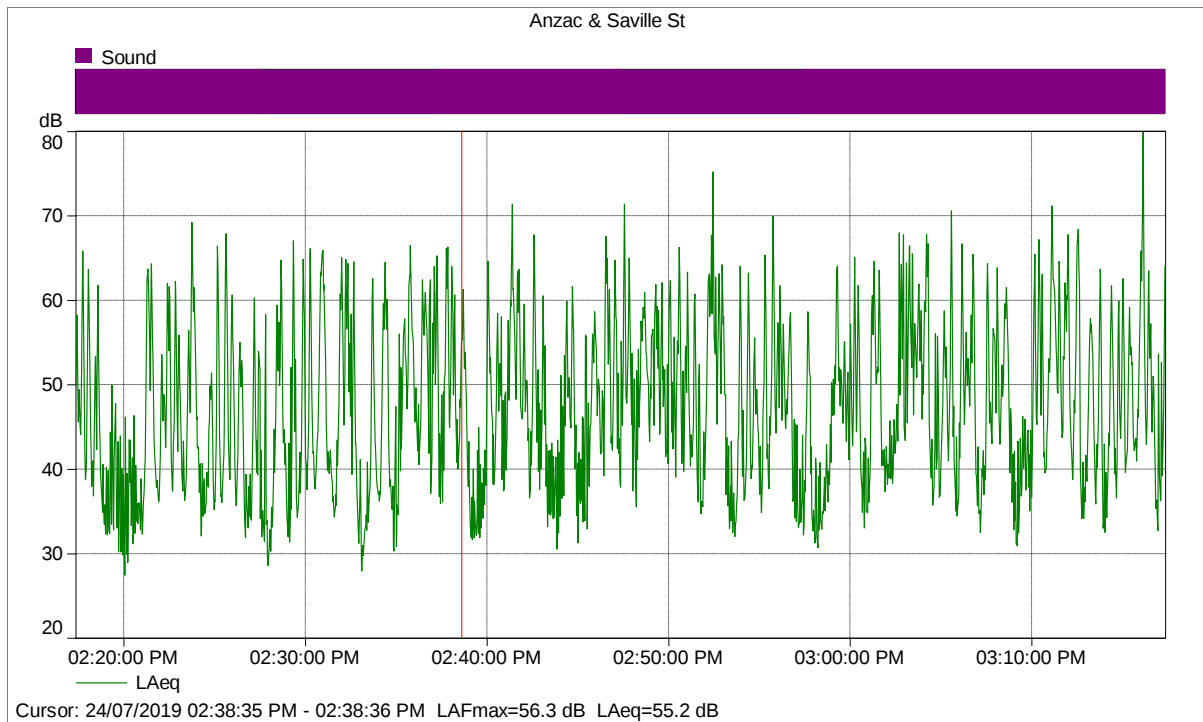
The location of each measurement location was chosen to minimise reflections from nearby vertical surfaces. A simultaneous traffic count was conducted with vehicles grouped into light and heavy vehicles.

4.1 Measurement Results

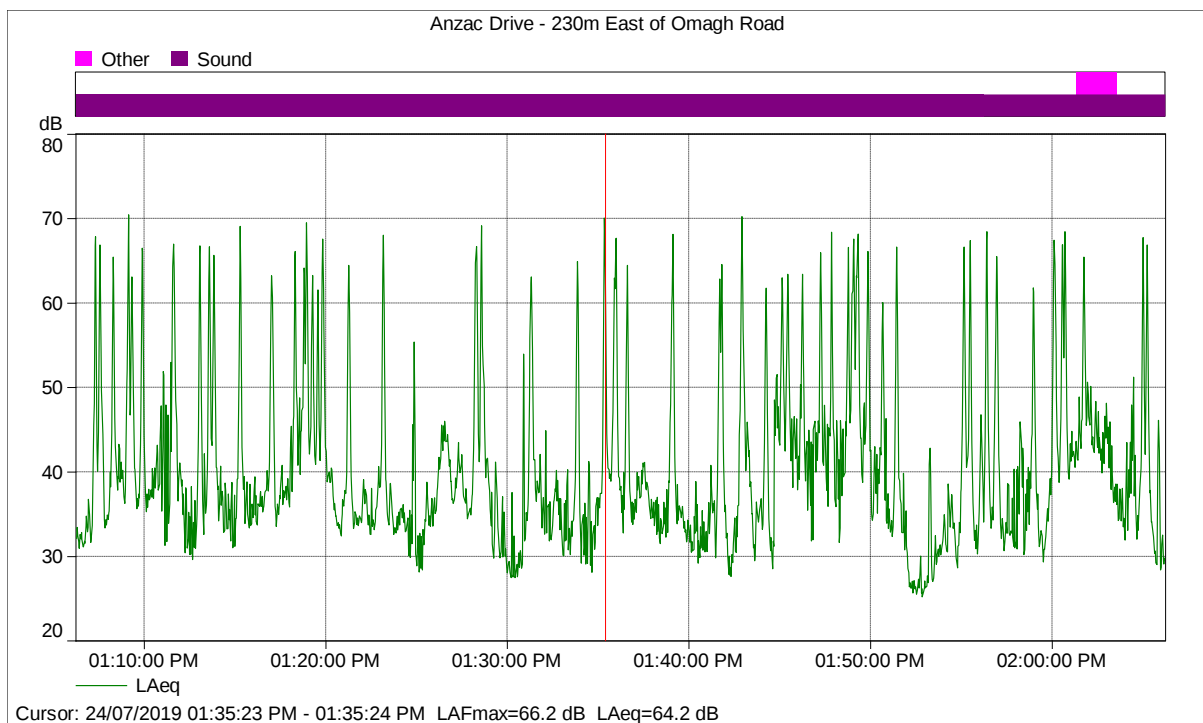
Graph 4.1 Anzac Drive (North Side)– Cnr of Harrison Street



Graph 4.2 Anzac Drive (North Side) – Cnr of Saville Street



Graph 4.3 Anzac Drive (North Side) – 230m East of Omagh Road



Graph 4.4 Anzac Drive (South Side) – Corner of Norton Street

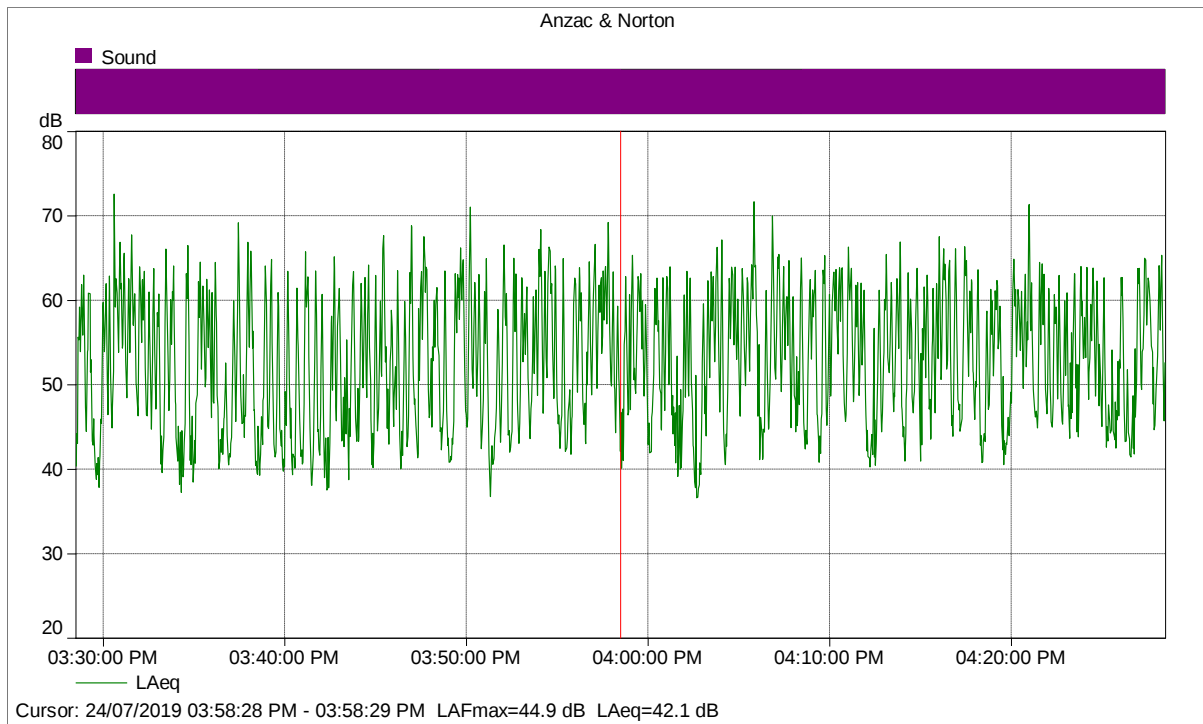


Table 4.1 Anzac Drive Road Traffic Measurements Summary

Anzac Drive Kyogle Road Traffic Measurements - 24/07/2019											
Location	Start Time	Duration	Light	Heavy	% Heavy	L _{Aeq,1 hr} (dBA)	Distance to Centre of Carriageway (m)	Posted Speed Limit (km/hr)	Estimated Average Speed (km/hr)	Weather	Notes
Cnr Harrison Street	11:36am	1 hour	161	4	2.5	55.9	20	50	55 - 60	25°C, 33%RH, calm, 0/8 cloud cover	Road traffic noise dominant, distant birds, distant overhead aircraft
230m east of Omagh Rd	1:06pm	1 hour	58	1	1.7	54.0	17	50	60 - 65	25°C, 40%RH, calm, 0/8 cloud cover	Road traffic noise dominant, distant birds, distant overhead aircraft, biplanes flying in formation
Cnr Saville St	2:17pm	1 hour	161	5	3.1	57.2	15	50	55 - 60	26°C, 28%RH, calm, 0/8 cloud cover	Road traffic noise dominant, birds, distant overhead light aircraft
Cnr Norton St	3:30pm	1 hour	299	15	5.0	58.1	17	50	50 - 55	22°C, 40%RH, 0.5-1m/s NW, 0/8 cloud cover	Road traffic noise dominant, mainly tyre noise

4.2 Discussion of Measurement Results

Vehicle speeds were measured with a handheld radar and the estimated average speed included in Table 4.1. It was noted from the radar measurements and the supplied traffic count data, that generally average speed is above the posted speed limit for the urban area.

It was observed that quite a few vehicles turned in and out of Saville Street which is shown in the reduced traffic count and noise levels for the measurement location 230m east of Omagh Road. There were several school buses turning in and out of Saville Street during the 1 hour measurement period.

Background noise sources such as distant birds and distant overhead aircraft did not have any significant influence on the road traffic noise levels.

5 NOISE CRITERIA

Assessment of noise impacts from additional heavy vehicles on the proposed haulage route will be assessed with criteria in the NSW Government Road Noise Policy (March 2011) (RNP). Assessment is to be conducted at 1m from the façade. A façade correction factor of 2.5 decibels is added to free field measurements.

5.1 Road Category

Omagh Rd and Anzac Drive are both classed as sub arterial roads. The noise assessment criteria for residential land uses is specified in Table 3 in Section 2.3.1 of the NSW RNP and copied below.

Table 3 Road traffic noise assessment criteria for residential land uses

Road category	Type of project/land use	Assessment criteria – dB(A)	
		Day (7 a.m.–10 p.m.)	Night (10 p.m.–7 a.m.)
Freeway/ arterial/ sub-arterial roads	1. 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)
	2. 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)
	3. Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments		
Local roads	4. Existing residences affected by noise from new local road corridors	L _{Aeq} , (1 hour) 55 (external)	L _{Aeq} , (1 hour) 50 (external)
	5. Existing residences affected by noise from redevelopment of existing local roads		
	6. Existing residences affected by additional traffic on existing local roads generated by land use developments		

5.2 Relative Increase

Table 6 in Section 2.4 of the RNP provides criteria on relative increases and is copied below.

Table 6 Relative Increase criteria for residential land uses

Road category	Type of project/development	Total traffic noise level increase – dB(A)	
		Day (7 a.m.–10 p.m.)	Night (10 p.m.– 7 a.m.)
Freeway/arterial/ sub-arterial roads and transitways	New road corridor/redevelopment of existing road/land use development with the potential to generate additional traffic on existing road	Existing traffic $L_{Aeq, (15 \text{ hour})} + 12 \text{ dB}$ (external)	Existing traffic $L_{Aeq, (9 \text{ hour})} + 12 \text{ dB}$ (external)

5.3 Existing Exceedances

Section 3.4.1 provides criteria when existing road traffic noise levels exceed the specified criteria.

For existing residences and other sensitive land uses affected by **additional traffic on existing roads generated by land use developments**, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.

6 PROPOSED ADDITIONAL HAULAGE ROUTE NOISE IMPACT

6.1 Modelling Parameters

Modelling was conducted in the Calculation of Road Traffic Noise (UK) (CoRTN) module of Environmental Noise Control V5 software. The latest road count data for each class of vehicle for each 24 hour period for Anzac Drive and Omagh Road was obtained from Kyogle Shire Council. The average 15 hour (7am – 10pm) traffic count for light (class 1-2) and heavy (class 3-12) vehicles was calculated from the supplied data. CoRTN is a UK model and is based on $L_{A10,18hr}$. Week day traffic only was used for calculations. The $L_{A10,15hr}$ was logarithmically derived from the $L_{A10,18hr}$ calculation. Three decibels was subtracted from the $L_{A10,15hr}$ to obtain the $L_{Aeq,15hr}$.

Data for existing and proposed quarry truck movements on Anzac Drive and Omagh road were supplied by Cedar Point Quarry.

Two typical locations of the closest facades on each road was chosen for comparison of existing and future quarry truck movements to give a typical and worst-case scenario for the closest dwellings on each road. The calculation parameters for each location is given in Table 6.1 below.

Table 6.1 CoRTN Calculation Parameters

Parameters for Calculation of Road Traffic Noise (UK) Method (CoRTN)				
	Anzac Drive		Omagh Rd	
Location	Norton St.	Harrison St.	Anzac Drive End	Edenville Rd End
Type of Carriageway	Urban single carriageway	Urban single carriageway	Sealed Rural Road	Sealed Rural Road
Posted Speed Limit (km/hr)	50	50	100	100
Estimated Speed (km/hr)	55	55	90	90
Portion of Absorbent Ground Between Carriageway and Façade (%)	75	75	90	90
Gradient %	0	3	0	0
Edge of Carriageway to Building Façade (m)	11.5	16.5	19.5	19.5
Observer Height (m)	1.5	1.5	1.5	1.5
Angle of View (°)	180	180	180	180
Building Façade Correction (dB)	2.5	2.5	2.5	2.5
Reflective surfaces on far side of road (dB)	1.5	1.5	0	0
Traffic Count Data Period (Weekdays only)	30/04/2019 - 29/05/2019	30/04/2019 - 29/05/2019	25/10/2018 - 13/11/2018	27/06/18 - 14/08/18

6.2 Modelling Results

Table 6.2 Anzac Drive – Cnr Norton Street

Existing Traffic Flows - Anzac Drive - Cnr Norton Street							
Typical Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
2740	312	10.2	5	3	10	5	61.3
Worst-Case Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
2740	337	11.0	10	8	15	15	61.5
Proposed Traffic Flows - Anzac Drive - Cnr Norton Street							
Typical Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
2740	307	10.1	10	8	0	0	61.2
Worst-Case Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
2740	335	10.9	15	13	10	8	61.4

Table 6.3 Anzac Drive – Cnr Harrison Street

Existing Traffic Flows - Anzac Drive - Cnr Harrison Street							
Typical Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
2324	238	9.3	5	3	10	5	59.5
Worst-Case Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
2324	263	10.2	10	8	15	15	59.7
Proposed Traffic Flows - Anzac Drive - Cnr Harrison Street							
Typical Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
2324	233	9.1	10	8	0	0	59.4
Worst-Case Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
2324	261	10.1	15	13	10	8	59.7

Table 6.4 Omagh Road – Anzac Drive End

Existing Traffic Flows - Omagh Road - Anzac Drive End							
Typical Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
263	24	8.4	na	na	10	5	48.1
Worst-Case Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
263	39	12.9	na	na	15	15	49.0
Proposed Traffic Flows - Omagh Road - Anzac Road End							
Typical Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
263	19	6.7	5	5	0	0	47.7
Worst-Case Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
263	19	6.7	5	5	0	0	47.7

Table 6.5 Omagh Road – Edenville Road End

Existing Traffic Flows - Omagh Road - Edenville Road End							
Typical Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
152	19	11.1	na	na	10	5	48.1
Worst-Case Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
152	34	18.3	na	na	15	15	49.5
Proposed Traffic Flows - Omagh Road - Edenville Road							
Typical Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
152	14	8.4	5	5	0	0	47.6
Worst-Case Quarry Truck Movements							
15hr (7am - 10pm)							
Light	Heavy	% Heavy	Quarry Trucks Loaded		Quarry Trucks Empty		L _{Aeq,15hr} (dBA)
			Truck Only	Truck and Dog	Truck Only	Truck and Dog	
152	14	8.4	5	5	0	0	47.6

Table 6.6 Comparison of Measured and Modelled Results

Comparison of Measured and Modelled Results Anzac Drive – No Façade Correction							
	Total	Light	Heavy	% Heavy	L _{Aeq,1 hr} (dBA)		
					Measured	Modelled	Difference
Cnr Harrison Street	165	161	4	2.5	55.9	55.5	-0.4
230m east of Omagh Rd	59	58	1	1.7	54	52.9	-1.1
Cnr Saville St	166	161	5	3.1	57.2	57.6	0.4
Cnr Norton St	314	299	15	5	58.1	58.9	0.8

6.3 Discussion of Results

The comparison of measured and modelled results (Table 6.6) gives good agreement with a range of ± 1 decibel.

The existing façade noise levels on Anzac Drive at the closest residential dwellings exceeds the NSW Road Noise Policy of 60 dB(A) L_{eq,15hr} by up to 1.5 decibels.

The change in noise levels for Anzac Drive in Tables 6.2 and 6.3 indicate a reduction of 0.1 decibels which would be imperceptible.

The existing façade noise levels on Omagh Road are well below the RNP criteria at the closest residential dwellings.

The change in noise levels for Omagh Road at the Anzac Drive end in Table 6.4 indicates a reduction of 0.4 decibels for the typical scenario which is a minimal change and a reduction of 1.3 decibels for the worst-case scenario which may be noticeable.

The change in noise levels for Omagh Road at the Edenville Road end in Table 6.5 indicates a reduction of 0.5 decibels for the typical scenario which is a minimal change and 1.9 decibels for the worst-case scenario which may be noticeable.

There is no relative increase with the proposed additional haulage route so the 12 decibel relative increase criteria does not apply.

7 SUMMARY AND CONCLUSION

A noise impact assessment was conducted to determine the noise impact of quarry trucks for a proposed additional haulage route for Cedar Point Quarry via Kyogle, on residential dwellings on the proposed additional haulage route.

Road traffic noise levels were assessed with criteria in the NSW Road Noise Policy (March 2011). Both Anzac Drive and Omagh Road are classed as sub arterial roads which were assessed with 15 hour period (7am-10pm) and 9 hour period (10pm-7am). The quarry only operates between 7am and 6pm so only the 15 hour period was assessed.

Acoustic measurements were conducted of empty and loaded quarry trucks in free-field conditions with calibrated noise monitoring equipment. A comparison of acoustic measurements of empty and loaded trucks indicated similar noise levels. Body and suspension noise were more noticeable on the empty trucks and engine noise was more noticeable on the loaded trucks.

The latest road count data for each class of vehicle for each 24 hour period for Anzac Drive and Omagh Road were obtained from Kyogle Shire Council.

Acoustic measurements of road traffic on Anzac Drive indicated that free-field noise levels were below 60 dB(A) $L_{eq,1hour}$ and gave similar results to modelling. Modelling indicated façade corrected levels at the closest residential dwellings exceeded the NSW Road Noise Policy criteria of 60 dB(A) $L_{eq,15 hour}$ by up to 1.5 decibels for existing traffic flows.

Modelling indicates that there will be a 0.1 decibel reduction in noise levels on Anzac Drive with the proposed additional haulage route, which would be imperceptible.

The existing façade noise levels on Omagh Road are well below the RNP criteria at the closest residential dwellings.

The change in noise levels for Omagh Road at the Anzac Drive end will be a reduction of 0.4 decibels for the typical scenario which is a minimal change and a reduction of 1.3 decibels for the worst-case scenario, which may be noticeable.

The change in noise levels for Omagh Road at the Edenville Road end will be a reduction of 0.5 decibels for the typical scenario which is a minimal change and a reduction of 1.9 decibels for the worst-case scenario, which may be noticeable.

Individual passby noise levels for light and heavy vehicles will be higher than the 15 hour logarithmically averaged noise levels.

There will be a reduction in road traffic noise levels on Anzac Drive and Omagh Rd with the proposed additional haulage route. The reduction will be imperceptible on Anzac Drive and may be noticeable on Omagh Road.

No noise mitigation measures are required.

A handwritten signature in black ink, appearing to read 'Garry Hall', written in a cursive style.

Garry Hall
Acoustic Consultant
Ambience Audio Services

APPENDIX A

Definitions of Terms

Sound pressure level (L_p): A measurable quantity of the size or amplitude of the pressure fluctuations (sound waves) above and below normal atmospheric pressure compared to a reference pressure. Sound pressure levels are measured in decibels whereas sound pressure is measured in pascals (N/m^2).

Decibels (dB): a ratio of energy flows. When used for sound measurement, it is the ratio between a measured quantity of sound pressure and an agreed reference sound pressure. The dB scale is logarithmic and uses the threshold of hearing of $20 \mu Pa$ (micro pascals) as the reference pressure. This reference level is defined as 0 dB.

Frequency (Hz): The number of pressure variations per second (cycles per second) is called the **frequency** of sound and is measured in **Hertz (Hz)**. The rumble of distant thunder has a low frequency, while a whistle has a high frequency. The normal range of hearing for a healthy young person extends from approximately 20Hz up to 20 000 Hz (20 kHz) while the range from the lowest to highest note on a piano is approximately 27.5 Hz to 4.2 kHz.

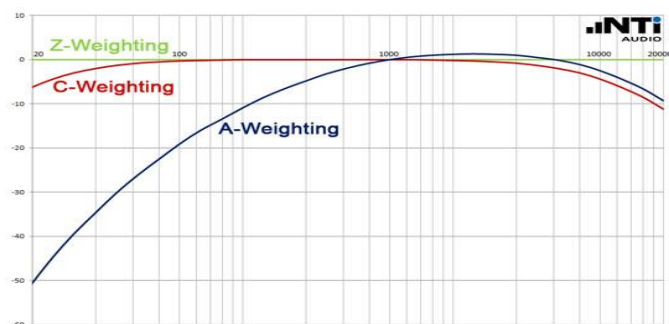
Spectral characteristics: The frequency content of noise.

Octave: a logarithmic unit for ratios between frequencies, with one octave corresponding to a doubling of frequency. For example, the frequency one octave above 40 Hz is 80 Hz.

1/3 Octave: a logarithmic unit of frequency ratio equal to one third of an octave.

“A” frequency weighting: The method of frequency weighting the electrical signal within a noise-measuring instrument to give a very approximate simulate to the human perception of loudness. The symbols for the noise parameters often include the letter “A” (e.g., L_{Aeq} , dBA) to indicate that frequency weighting has been included in the measurement. “A” weighting is most commonly used with regard to noise control issues, regulations and environmental standards.

“C” frequency weighting: The filters used in C weighting captures lower frequencies than A weighting as indicated in the chart below.



The A-weighting curve is used extensively for general purpose noise measurements but the C-weighting correlates better with the human response to high noise levels.

Fast, Slow and Impulse time weightings: Standardised root-mean-square (rms) averaging times to help define fluctuating noise levels. Impulsive noises have high peak levels with a very short duration (e.g., gun shot), or a sequence of such peaks. The 'Slow' time weighting averages the fluctuations over a one second time base whilst the 'Fast' time weighting averages the fluctuations over a one-eighth of a second time base. Environmental assessment standards usually specify the time weighting (**F**, **S**, or **I**) to be used.

L_{Aeq}: The A-weighted equivalent continuous noise level. A widely used noise descriptor which provides an average of the energy of a constant level of noise which is the same as the varying noise signal being measured. The time in which the measurement was sampled, is indicated with a subscripted number e.g. L_{Aeq, 15 minute} is a 15-minute sample.

Percentile Levels L_N: The sound pressure level that is exceeded for N per cent of the time over which a given sound is measured. e.g. L_{A90} is the A-weighted sound pressure level that is exceeded for 90% of the time over which a given sound is measured.

L_{A90} is commonly used to describe the **background noise level** for community noise assessments.

Ambient noise: The all-encompassing noise associated within a given environment. It is the composite of sounds from many sources, both near and far.

Extraneous noise: Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods and by events such as concerts or sporting events. Normal daily traffic is not to be considered extraneous.

Background noise: The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the L_{A90} descriptor, fast time weighting.

Intrusive Noise: Refers to noise that intrudes above the background level by more than 5 decibels.

Noise limits: Enforceable noise levels that appear in consents and licences. The noise limits are based on achievable noise levels, which the proponent has predicted can be met during the environmental assessment. Exceedance of the noise limits can result in the requirement for either the development of noise management plans or legal action.

References:

Measuring Sound Brüel and Kjær Sound & Vibration Measurements A/S
September 1984

Environmental Noise Brüel and Kjær Sound & Vibration Measurements A/S
2000, 2001

New South Wales Industrial Noise Policy NSW Environment Protection
Authority January 2000

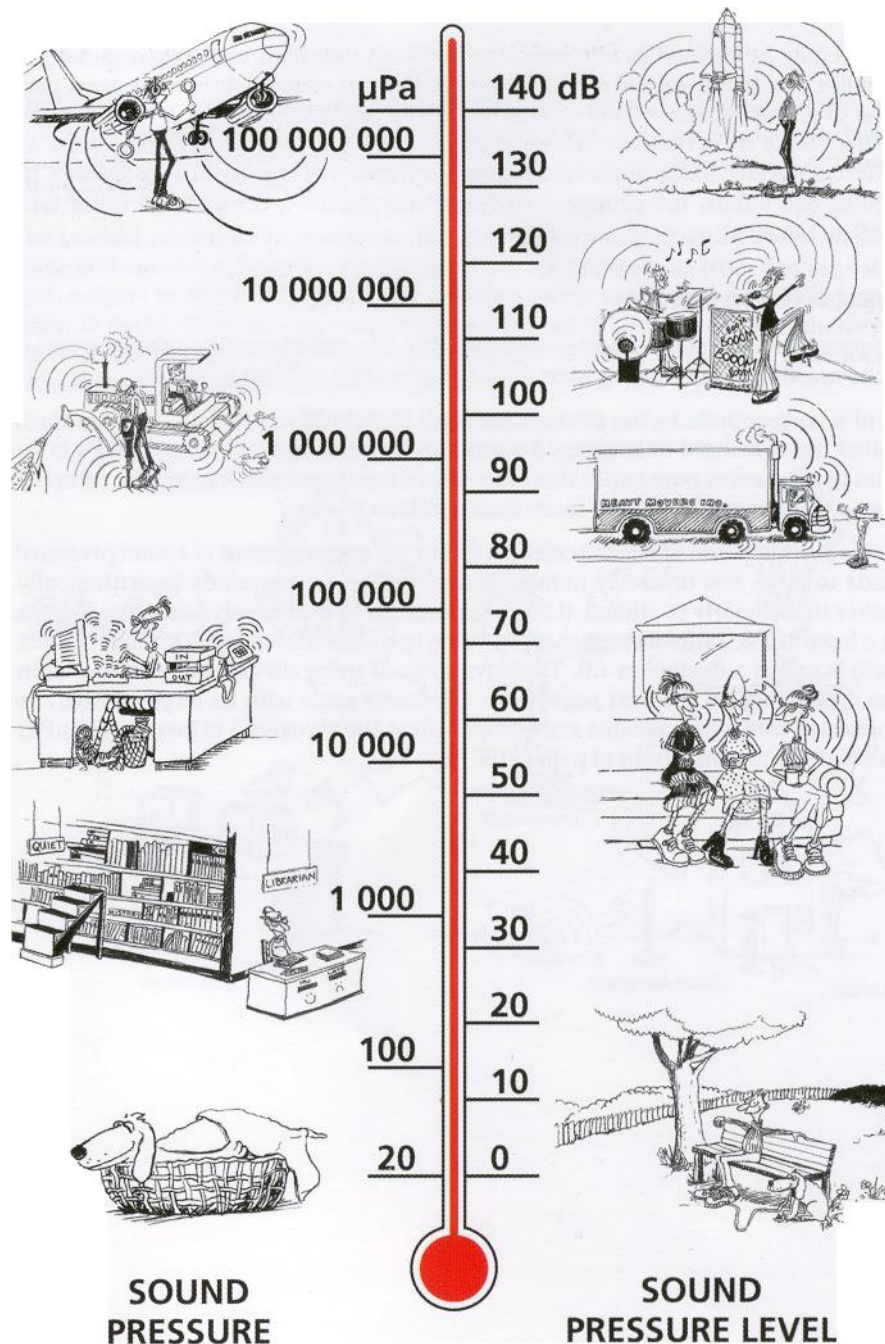
Australian Standard AS 3671 – 1989 *Acoustics – Road traffic noise intrusion –
Building siting and construction.*

Australian/New Zealand Standard AS/NZS 2107:2000 *Acoustics – Recommended
design sound levels and reverberation times for building interiors.*

<https://www.nti-audio.com/en/support/know-how/frequency-weightings-for-sound-level-measurements>

APPENDIX B

Comparison of Sound Pressure Levels



Our hearing covers a wide range of sound pressures – a ratio of over a million to one. The dB scale makes the numbers manageable.

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