Hanson

ABN: 90 009 679 734

Wagga Wagga Quarry

NOISE MANAGEMENT PLAN

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Document Control			
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GLOSSARY

dB - Decibel is a logarithmic unit used to describe the ratio of a signal level relative to a reference level and is used to describe sound pressure and sound power magnitudes.

A-weighting - refers to an adjustment made to the noise level reading to take into account the tonal composition of a noise relative to the ear's response to the various tones that make up the noise. A-weighting is done to make sure that the noise level reading properly reflects the loudness of the noise as perceived by the "average" human ear.

dB(A) – Decibel level with an applied A-weighting.

L_{Aeq} - The Equivalent Continuous Sound Level and has the same energy over the monitoring period as the actual noise environment.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{AN} - The level exceeded for N% of the monitoring time.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

L_{A50} – The L_{A50} level is the noise level which is exceeded for 50% of the sample period. During the sample period, the noise level is below the L_{A50} level for 50% of the time.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night-time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period **–** daytime, evening and night-time.

SWL (or Sound Power Level) – A logarithmic measure of source acoustic power expressed in dB. The sound power level is fixed and inherent to the source similar to how electric power is inherent to an electrical device. The resulting sound pressure level due to a given sound power level is dependent on various environmental factors such as distance, acoustic shielding, meteorological factors etc.

1 INTRODUCTION

This Noise Management Plan (NMP) has been prepared by Hanson Construction Materials Pty Ltd (Hanson) for the Wagga Wagga Quarry. The NMP is largely based on a document prepared by PAE Holmes in May 2012. This NMP is a second iteration of the document following review of the original NMP an effectively updates the version prepared in May 2012. The operation is a sand and gravel aggregate quarry located 5km north-west of Wagga Wagga, on Roach Road (Lot 2 DP 610795 and part of Lot B DP 381991), NSW. Under the Project Approval for Development Application 07_0069 – *Wagga Wagga Quarry Extension Project*, Hanson is required to compile a NMP for submission to the Director-General (now Secretary).

The NMP seeks to provide a summary of noise generating activities, outline the current noise control practices and recommend actions for reducing noise impacts at the nearby sensitive receptors. A noise monitoring program is outlined to cover the requirements for operational and traffic generated noise. All recommendations have been made in accordance with the requirements of the operations Project Approval issued by the Department of Planning (DoP) (now Department of Planning and Environment). Complaints and incident handling, performance indicators for noise impact reduction, training and awareness, roles and responsibilities and the revision procedure are summarised.

The NMP provides a working document for day-to-day management of the site which will assist with the operation complying with its approval requirements. An annual review of this document is necessary to ensure that noise management at the site remains effective for changing operations.

On site the quarry operations and current noise management practices were discussed with Site Manager Rod Thompson.

1.1 Objectives of the Management Plan

The objective of this NMP is to ensure that noise impacts are reduced to the lowest level feasible and reasonable to achieve, and as a minimum, to ensure that all relevant requirements set out in the development consent conditions, presented in Appendix A, are met. This will be achieved by implementation of management plan requirements outlined in **Table 1**.

Table 1: Management Plan Requirements

Management Plan Requirement	Section of this Report
Detailed Baseline Data	**2.3**
A description of relevant statutory requirements	**1.2**
A description of relevant limits or performance measures/criteria	**1.2**
A description of the specific performance indicators that are proposed to be used to judge the performance or guide the implementation of the project or any management measures	5
A description of measures that would be implemented to comply with the relevant statutory requirements, limits, or performance criteria/measures	3
A program to monitor and report on the impacts and environmental performance of the project	**4**
A program to monitor and report on the effectiveness of any management measures	**5.2**
A contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible	**3.2**
A program to investigate and implement ways to improve the environmental performance of the project over time	**5.5**
A protocol for managing and reporting any incidents, complaints, non-compliance with the conditions of this approval and statutory requirements and exceedances of the impact assessment criteria and/or performance criteria	**5.1**
A protocol for periodic review of the plan	**5.5**

Specifically the NMP must address the conditions outlined in **Table 2**.

Table 2: Noise Management Plan Requirements

Noise Management Plan Requirements	Section of this Report
Description of the measures that would be implemented to minimise noise emissions from the project, including project related transport.	**3.2**
A noise monitoring program that uses a combination of real-time and supplementary attended monitoring to evaluate the performance of the project.	**4**
Protocol for determining exceedances of the relevant conditions of this approval and investigating, notifying and mitigating identified exceedances in the relevant noise limits	3
Continual improvement program for investigating, implementing and reporting on reasonable and feasible measures to reduce noise generated by the project	5

1.2 Applicable Legislation, Standards and Criteria

This management plan complies with the following legislation:

- NSW Industrial Noise Policy (**EPA, 2000a**).
- Environmental Criteria for Road Traffic Noise (**NSW EPA 2000b**).
- Environmental Noise Management Manual (**RTA, 2001**).
- AS 1055.1, AS 1055.2 and 1055.3 Acoustics - Description and measurement of environmental noise.
- AS 2659.1 - Guide to the use of sound measuring equipment.
- AS 2659 - Sound level meters.
- The Project Approval.

The Project Approval states that the proponent shall ensure that the noise generated by the project during operation does not exceed the criteria in **Table 3**. 'Day' is defined as the hours between 6:00am and 6:00pm Mondays to Friday and 8:00am to 1:00pm on Saturday but does not include public holidays. Only a dewatering pump will run outside of these hours and it noise levels from this source must remain below background.

Table 3: Noise Impact Assessment Criteria, $L_{Aeq,\ 15\ min}$ dB(A)

Location	Day
Kulleroo 2	39
Riverglen	40
All other privately owned land	35

1.3 Project Overview

The site is located on a floodplain bordering the Murrumbidgee River and private land. The total area of the site is 200ha, 120ha of which is floodplain, 29ha encompasses the extraction area and 1.5ha is occupied by the plant and stockpile area. Access to the site is from Roach Road and McNickle Road off the Sturt Highway (refer to **Figure 1**).

The quarry is approved to transport 150,000 tonnes per annum of product from the site. The operational life of the quarry is expected to be in excess of 30 years. The quarry material will be extracted in a series of cells.

Overburden and topsoil will be removed from the extraction area. The material will be stockpiled in a series of bunds. Overburden will be placed back into exhausted cells for final rehabilitation.

Material is extracted from the reserves using a 40 tonne excavator. Raw material is transported to the crushing plant via two dump trucks each with a 35 tonne capacity. Aggregate stockpiles normally contain approximately 20,000 tonnes of aggregate for retail distribution.

At the processing plant the material is fed into a feed bin and is sent over a wash screen. This screen separates out the oversized material and sends it to a crusher. All the material is then sent over another screen that again separates out oversized material and returns it in a closed loop to the crusher. Material not oversized then goes to a third screen that sizes and separates the material in various grades. Material is then put into stockpiles via a front-end loader. The existing plant covers an area of approximately 200m x 200m and the highest component is the screen and bin structure.

The material is sold by loading into trucks via a front-end loader and quantified using a weighbridge. All processed material is hauled from the site, via a sealed access road (Roach Road) connecting to McNickle Road then Sturt Highway. Haul trucks are typically truck and dog configurations carrying 33 tonne payloads. The haul routes are either east or west along the Sturt highway.

Progressive reclamation of the quarried areas will be carried out by completing earthworks and covering the reclaimed area with topsoil and vegetation. The project seeks to recreate indigenous vegetation areas similar to those on the surrounding land. The excavated areas will naturally fill with water to create a series of dams.

The quarry is operated during the daytime (6:00am to 6:00pm) hours but the dewatering pump operates throughout the day and night. There are no other sources of industrial noise sources in the area.

2 NOISE IMPACTS

2.1 Identified Contributors to Noise Impacts

The following activities have been identified as having significant potential for creating noise and vibration impacts at the site.

- Quarry and rehabilitation activities.
- Processing product, particularly aggregate processing through screens.
- Transport activities, particularly reverse beepers on the mobile equipment.
- Dewatering pumps.

The only known noise complaint pertaining to the operation was made by the resident of Riverglen, who complained of the nuisance created by the mobile equipment reversing beepers. This complaint is described in further detail in **Section 5.1** as part of the complaints handling procedure.

2.2 Closest Sensitive Receptors

The locations of the closest sensitive receptors are identified in **Table 4**. The locations of these receptors relative to the site are shown in **Figure 1**. Kullaroo represents Kullaroo 1, as Kullaroo 2 has been demolished.

Table 4: Closest Sensitive Receptors to the Project Site

Residence ID	Distance to Site Boundary (km)	Distance to Processing Plant (km)	East (m) MGA Zone 55S	North (m) MGA Zone 55S
Kullaroo	0.2	1.7	527572	6117801
Sweetwater	0.2	1.4	528569	6117275
Riverglen	0.7	1.2	529831	6116625
Globine	0.5	1.0	527908	6115201
Pomigalarna	0.4	1.5	526301	6116493

The project site comprises of two mining lease areas, the old extraction area located to the north-north-west of the processing plant and the new extraction area located to north-north-east of the processing plant (**Figure 1**).

Figure 1: Site Map and Closest Sensitive Receptors

2.3 Quarry Expansion Noise Assessment

An Operational and Traffic Noise Impact Assessment was undertaken for extension of the quarry (**Heggies, 2009)**.

2.3.1 Operational Noise Impact Assessment

Within the Heggies Assessment ten noise modelling scenarios were developed for each of the stages of extraction, where the haul trucks and processing plant are operating in all scenarios. Modelling was undertaken using SoundPlan (V6.4). The results of modelling predictions show that noise levels for the project were found to be at acceptable levels for worst case conditions.

Heggies reported no exceedances of the Project Specific (INP Intrusive) Noise Assessment Criteria are predicted for any of the nine daytime Quarry Extension operation or the night-time dewatering pump scenarios under calm weather conditions. Exceedances were found at Kullaroo (up to 4dBA) and Riverglen (up to 5dBA) for the INP Intrusive Noise Assessment Criteria for a 3m/s source to receiver wind in the adverse weather conditions noise impact assessment.

In order to facilitate computation of the environmental noise emissions from the operation of the quarry, near-field noise measurements of the plant and equipment operations were carried out on-site by Heggies (4 November 2007 and 18 February 2008). The unattended noise survey was undertaken at Kullaroo, Sweetwater, Riverglen and approximately 1km north-east of Globine. Heggies reported that noise emissions from the quarry were discernible from Kullaroo and Riverglen but because the contribution of ambient noise was at least 5dBA lower than the

ambient L_{A90} background noise level at the all measurement locations, the influence of the existing quarry operation noise emissions on the background noise levels was negligible.

2.3.2 Traffic Noise Impact Assessment

The criteria of daytime road traffic noise assessment criteria for the Quarry extension is 60dBA $L_{Aeq\ (15min)}$ for Sturt Highway and 60dBA $L_{Aeq\ (1hour)}$ for McNickle Road and Roach Road as per the Heggies Assessment. Heggies reported traffic associated with the quarry would not lead to an increase in the existing traffic noise levels of more than 2dBA for all measured distances from the road. The prediction methodology took into account vehicle volume, speed, type, passby duration and façade reflection and assumes no intervening barriers or topography with all receiver having a full angle view of the road.

3 NOISE CONTROL PRACTICES

3.1 Current Operational Noise Management Measures

Identification of unacceptable noise impacts will be triggered by an operator's observation during operations or a noise complaint from adjacent neighbours. Identification of any significant sources of noise by investigation of operations will be undertaken and if required, activities and processes will be modified. Upon identification of an unacceptable noise impact, corrective actions are implemented by the Site Manager. The following is an overview of the current practices employed on site to reduce noise.

3.1.1 Hauling Vehicles

Speed limits are between the site office and Roach Road are maintained internally at 20km/h. The current speed limit of McNickle Road and Roach Road is 55 km/h. These limits are adhered to by all drivers accessing the site thereby lessening the likelihood of increased noise impacts from fast moving vehicles.

The haul road constructed for the new extraction area will create less internal traffic noise because it is designed to run the shorter distance between the processing plant and the extraction area.

3.1.2 Embankments

Embankments are established using the topsoil and overburden removed from the extraction zone at a height of 3.2 metres. The location of these bunds acts to block the direct line-of-sight to the nearest residence and will be completed before extraction takes place.

3.1.3 Mobile Equipment

All mobile equipment is turned off when not in use.

3.2 Noise Control Practises

The Noise Impact Assessment undertaken (**Heggies, 2009**) reported that the proposed expansion complies with the criteria under calm weather conditions and no additional mitigation measures were specified. Should there be complaints relating to noise, the source(s) of the noise will be investigated, assessed and further mitigation measures identified and implemented. The main noise impact identified in the Noise Impact Assessment was predicted to be from activities at the processing plant, not the extraction zone.

Table 4 outlines the noise management practices during operations and **Table 5** outlines the noise management practices for traffic off-site.

Table 5: Operational Noise Management Practices

Action	Timing	Performance Indicator	Responsibility for Implementation
Modify and cease operations in times of adverse conditions likely to enhance noise levels and contribute to high noise levels	Determine daily conditions from forecast provided by BOM forecast or onsite meteorological station	No complaints from nearby sensitive receptors	Site Manager
Employee induction to ensure awareness of noise management issues and measures	Throughout operations	Records of employee induction processes.	Site Manager
Evaluation of the practicability and effectiveness of modifying tonal reversing sound to broadband "squawker" beepers OR limit range of current reverse beepers to only reach immediate danger area	First six months of expansion	Use of modified reverse beeper proves both effective and economically viable	Site Manager
Machinery movement will be restricted to designated routes and standing areas	Throughout operations	No adverse complaints from nearby sensitive receptors	Site Manager
Noise generating equipment will only be used during less sensitive times of the day	Throughout operations.	No adverse complaints from nearby sensitive receptors	Site Manager
Introduce respite periods for noise intensive activities close to residences	Throughout operations	No adverse complaints from nearby sensitive receptors	Site Manager
Noise limiting practices employed with operating equipment (e.g. position idling trucks in appropriate areas, turn of engines when not in use)	Throughout operations	No adverse complaints from nearby sensitive receptors	Site Manager
When processing equipment is to be replaced, select equipment with lower noise emissions where feasible and reasonable and in accordance with best practice (i.e. efficient muffler design, electrical engines rather than internal combustion, acoustic enclosures fitted to new truck fleet)	Throughout Operations	No adverse complaints from nearby sensitive receptors	Operations Management
Evaluate the practicability and effectiveness of modifying processing plant equipment (i.e. sampling or lining metal trays, bins, screens).	First six months of expansion	Use of modified equipment proves both effective and economically viable	Site Manager
Equipment will be maintained in good working order to the manufacturers specification, be correctly configured and utilised.	Throughout operations	No adverse complaints from nearby sensitive receptors	Site Manager
Minimise the use of horns onsite, including not using horns for communication	Throughout operations	No adverse complaints from nearby sensitive receptors	Site Manager
Maintain community relations by informing neighbours of onsite activities, especially in times of extra ordinary activities.	Throughout operations	No adverse complaints from nearby sensitive receptors	Site Manager

Table 6: Traffic Noise Management Practices

Action	Timing	Performance Indicator	Responsibility for Implementation
Vehicle speeds will be controlled on site between office and public road (20 km/h) and on feeder roads (55km/h) to minimise noise impacts	Throughout operations	No adverse complaints from nearby sensitive receptors	Drivers / Site Manager
Reduce and avoid traffic on external roads before 7:00am where possible	Throughout operations	No adverse complaints from nearby sensitive receptors	Site Manager
Restrict use of engine (exhaust) breaking between the site and Sturt Highway, including provision for a signage to enhance community relations	Throughout operations	No adverse complaints from nearby sensitive receptors	Site Manager
Source: Updated after PAE Holmes (2012)			

4 NOISE MONITORING

The quarry noise monitoring program will be conducted by an independent qualified noise specialist for the purposes of monitoring for compliance with noise criteria and facilitating quarry noise management. Monitoring noise from quarry activities will be conducted using approved methodology:

- Australian Standard 1055-1997, Acoustics – Description and Measurement of Environmental Noise

A noise monitoring program that uses a combination of real-time and supplementary attended monitoring is required to evaluate the performance of the project (refer to **Table 2**). The purpose of the noise monitoring plan is to:

- Assess noise performance at the Quarry against the project specific criteria for noise.
- Ensure compliance with other statutory requirements.
- Assess and review community complaints.

Review of the monitoring program, including monitoring locations, will be necessary over the quarry life depending on the monitoring results and the source of complaints.

4.1 Real-time Unattended Monitoring

Monitoring will be carried out at the nearest sensitive receptors to operations to establish the project noise level at receptors for compliance purposes. Unattended real-time noise monitoring will be carried out using four noise monitors. **Figure 2** shows the proposed locations of the real time noise monitors, however they may be relocated as required. Real-time noise monitors will be configured such that when the criteria are exceeded, real time audio is captured for an appropriate duration to aid exceedance identification.

Figure 2: Site Map and Proposed Unattended Monitoring (N1-4)

In the proposed network, monitoring will be undertaken at Riverglen (N2), Sweetwater (N3) and Kullaroo (N4). Globine and Pomigalarna were not identified as locations for monitoring because the Noise Impact Assessment (**Heggies, 2009**) reported that these locations will experience noise impacts 10 dBA below the criteria for all 10 modelling scenarios.

In order to identify any potential exceedances during the unattended monitoring periods, the noise monitor, N1, will be placed as close as practical to the site boundary between the operations and the potentially most affected receiver to the operations. Where exceedances are recorded at N2, N3 and N4, the times of the exceedance will be cross checked against N1 to determine if it is likely noise sources from within the site are the cause.

The noise source for exceedances may also be determined using audio captured when the trigger is activated.

Riverglen is identified as the most critical sensitive receptor based on the results of the Noise Impact Assessment, the prevailing wind direction (easterly and westerly) and the past complaint received from this resident. The monitor at Riverglen (N2) will be a capable of measuring audio, to allow for further source identification.

Unattended Noise monitoring will be conducted upon commencement of each stage of the development to ensure public and regulatory confidence that the quarry adheres to noise criteria. Noise shall be monitored continuously over a representative seven day period at the beginning of each new development stage. Where exceedances are identified, monitoring will be repeated until such time as consistent compliance is achieved. The cause of the non-compliance will be investigated and if necessary, the monitoring schedule reviewed.

During the monitoring period, the Site Manager will ensure that the site's operations are typical of operations during that development stage.

4.2 Supplementary Attended Monitoring

Supplementary attended noise monitoring will be carried out during the unattended review monitoring. The purpose of attended monitoring is to characterise and establish the contribution of the Site to cumulative noise levels and identify potential exceedances and the source from which they occur. Attended noise monitoring will be undertaken at a minimum of two 15-minute periods during the regular hours of operation for the Quarry and include each of the assessment time periods.

Where the statutory limits in the Project Approval are exceeded by more than 2dB, this would be interpreted as a non-compliance. This would then be a trigger for further investigation and where necessary, supplementary attended monitoring. Attended monitoring will be used following the identification of an adverse noise event onsite, following an exceedance or in response to a complaint. The purpose of this supplementary monitoring is to refine work methods or techniques to minimise noise.

Noise will be monitored at the most critical time of day near the complainant and near the identified source of the impact. All attended noise monitoring is to be carried out by an independent appropriately qualified noise specialist. Records of routine equipment calibration and testing are to be maintained by the qualified noise specialist undertaking the monitoring.

4.3 Traffic Noise Monitoring

The Impact Assessment predicted worst-case traffic noise levels on all affected public roads over the life of the quarry are within the relevant criteria. Therefore monitoring of traffic noise on public roads is not proposed, although will be considered if noise issues or complaints occur in relation to these areas as part of the supplementary attended monitoring. In the case of a complaint from a neighbour, a real-time monitor will be utilised near the residence along the transport route. Where access to the subject property is not obtainable, a representative location will be utilised.

Monitoring will be carried out in accordance with procedures for measuring road traffic noise detailed within Appendix B3 of the NSW Road Noise Policy.

4.4 Noise Monitoring Procedure

4.4.1 Site Access

In order to undertake noise monitoring on private property, approval must be gained from property owners for site access. In accordance with the agreement between the property owner and site management, all agreed protocols will be followed when accessing privately owned land for the purposed of noise monitoring. Noise monitoring results will be made available directly to the landowner if requested.

4.4.2 Monitoring Records

When any monitoring is undertaken a clear record of the sampling will be recorded and kept on file, to include:

- Name of the person undertaking the survey.
- Check of calibration at the start and at the end of the survey using a hand-held calibrator.
- Location of the noise measurements.
- Prevailing weather conditions including comment of wind direction and intensity, degree

of cloud cover, temperature and humidity.

- Instrumentation details including serial number.
- Comments on the various noise sources comprising the prevailing noise environment, dominant noise sources, identification of noise sources from the quarry, whether the quarry noise is audible or inaudible and the noise characteristics (e.g. tonal, impulsive, intermittent or low frequency dominance).
- The noise meter shall be set to A-weighting, "fast" response. Noise parameters to be measured and recorded are L_{Amax}, L_{A1}, L_{A10}, L_{A90} and L_{Aeq} noise levels.

The keeping of clear records for sampling is important to ensure the reliability of the data collected. Due to the size of the operation it is not deemed necessary to prepare formal internal reports on this information.

4.4.3 Data Quality Control

The noise levels shall be recorded for each 15-minute interval during the monitoring period. Intervals for which the mean wind speed exceeds 5 m/s, or during which rain is recorded and identified to adversely affect the monitoring, shall be discarded in further analysis. Data exclusion will be carried out in accordance with the procedure in Appendix B of the INP. All data will be collated and be held in a central repository for a period of 7 years.

4.5 Meteorological Monitoring

The Project Approval states that a suitable meteorological station within the vicinity of the site is required. The parameters for measurement are rainfall, temperature and wind speed and direction. The weather station will be installed in accordance with:

- Australian Standard AS 2923-1987 Ambient Air – Guide for Measurement of Horizontal Wind for Air Quality Applications.

Currently an on-site weather station is sited above the old site office but is not maintained. The old site office was affected by recent flooding, so all office work is conducted out a temporary office building adjacent to the old site office. Plans to rebuild a staff office would include a 3 meter base to elevate the office from any further flooding impacts. This location represents an ideal location for the required meteorological station; the location is shown in **Figure 3**. Provided the buildings surrounding the station do not obstruct the air flow and significantly alter measured parameters.

4.6 Summary

Two forms of noise monitoring, real-time unattended monitoring and supplementary attended monitoring will be conducted at the site. Traffic noise monitoring was considered but deemed unnecessary (unless complaints are received) when the noise impact assessment results were considered. Meteorological monitoring is required onsite.

Real-time monitoring will be conducted at seven day intervals, at the commencement of each stage of the development by a qualified noise professional. Three monitors will be deployed at near-by sensitive receptors, with the capacity to measure audio during any identified exceedances. A further monitor will be deployed at the site boundary in order to determine the source of the noise.

Supplementary attended monitoring will be undertaken if the real-time monitoring indicates that there is an exceedance of more than 2dB at any of the monitored sensitive receptors.

Monitoring will also be carried out in response to noise-related complaints.

Table 7 presents a summary of noise monitoring procedures, duration and types.

Table 7: Noise Monitoring Summary

Type	Timing	Location	Duration	Person
Unattended Noise Monitoring	At commencement of each stage of the development	Nominated sensitive receivers	7 days (site must be operating normally during the monitoring period).	Person suitably experienced and qualified to conduct noise monitoring
Operator Attended Monitoring	At commencement of each stage of the development	Nominated sensitive receivers	Minimum of two 15 minute periods during hours of operation (site must be operating normally during the monitoring period).	Person suitably experienced and qualified to conduct noise monitoring
Operator Attended Monitoring	In response to complaints	Receiver where complaint was received	Minimum of two 15 minute periods during hours of operation (site must be operating normally during the monitoring period).	Person suitably experienced and qualified to conduct noise monitoring
Source: Updated after PAE Holmes (2012)				

Figure 3: Site Map and Proposed Meteorological Station Location

5 NOISE MANAGEMENT

5.1 Noise Incident and Complaints Handling

Response procedures will be activated by adverse noise impacts at a neighbouring property. The knowledge of noise problems will normally arrive from three sources:

- Community complaints from neighbouring landholders who contact the quarry when a perception of high noise levels exists.
- Results of noise monitoring.
- Observations from quarry operators and site management.

In situations where noise emission levels are perceived by neighbouring landholders or site personnel to be a problem, or the noise monitoring system (unattended and attended) results demonstrate noise levels approaching or exceeding relevant criteria. The following procedure must be undertaken when receiving, handling, responding and reporting community complaints:

- The Site Manager is to investigate the situation to determine the possible source of the noise.
- Where a problem source is found, the method of operation is to be altered, or controlled, or if possible the source is to be modified to reduce the impact.
- Monitoring of noise levels at the residence may be required if a noise source cannot be readily identified, or if the resident is not satisfied with the corrective action.
- Any corrective action is to be recorded and reported to the Site Manager, who is to keep a record of all significant actions.
- The Site Manager must be informed of any complaint and details must be recorded in the complaint register.

- The Site Manager must notify potentially affected residents if noise monitoring results indicate that the noise criteria are being exceeded due to the quarry. Affected residents will be notified of exceedances and the source of the impact in writing within 48 hours of detection and verification.

One complaint was recorded by Hanson Area Manager Anthony Giannasca, from Ruth Thompson of Riverglen on Poachers Road. The complaint pertained to the reversing noise of the machinery onsite and Ms Thompson requested noise monitoring be undertaken at her residence. Prompt response to this concern is imperative to maintaining good relations with the community.

A phone line will be maintained off-site during the hours of operation of the quarry. All complaints will be logged, the nature of the complaint determined and the time and date of the complaint. This will aid and a direct point of contact with the community.

5.2 Performance Indicators

In addition to the Noise Management goals stated in this plan, the effectiveness of the Noise Management Plan will be reviewed against the following performance indicators:

- Any noise incidents reported internally and effectively managed.
- No noise complaints from nearby receptors.

5.3 Training and Awareness

All employees and contractors, including haulage contractors, will be given adequate training in environmental awareness, legal responsibilities and noise control methods. These education programs will aim to encourage quiet work practices.

Personnel will be made aware of the sensitivity of the neighbouring community and the need to minimise noise on site, particularly between the operating hours of 6:00 am to 7:00 am. This may be via site induction, procedure and signage.

5.4 Roles and Responsibilities

The Site Manager is responsible for ensuring that the requirements of this management plan are implemented.

5.5 Revision Procedure

A review will be undertaken annually to assess the effectiveness of the noise control measures and their performance against the NMP objectives. A review should also occur when there are significant changes made to the operation. Any amendments to the Plan will be undertaken in consultation with the appropriate regulatory authorities.

6 REFERENCES

Australian Standard. AS 1055.1, AS 1055.2 and 1055.3 *Acoustics - Description and measurement of environmental noise*.

Australian Standard. AS 2659.1 - *Guide to the use of sound measuring equipment*.

Australian Standard. AS 2659 - *Sound level meters*.

Heggies. (2009). *Wagga Wagga Sand and Gravel Quarry Extension Operation and Traffic Noise Impact Assessment*. 18 August 2009.

NSW EPA (2000a). *Environmental Criteria for Road Traffic Noise*. Environmental Protection Authority.

NSW DECCW (2011) *NSW Road Noise Policy.* Department of Environment, Climate Change and Water

NSW EPA (2000b). *NSW Industrial Noise Policy*. Environment Protection Authority.

PAE Holmes (2012). *Wagga Wagga Quarry Noise Management Plan*. Prepared on behalf of Hanson Construction Materials Pty Ltd.

RTA (2001). *Environmental Noise Management Manual*. Roads and Traffic Authority.

APPENDIX A

Project Approval Conditions

NOISE

Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project during operation does not exceed the criteria in Table 1.

Table 1: Noise Impact Assessment Criteria {dB(A) L..,..o"-" v

Location	"Day
Kullaroo 2	39
Rivergten	40
All other privately owned land	35

Notes:

Receiver locations are as identified in the noise assessments presented in the EA and Addendum EA

Noise limits are to be measured in accordance with the relevant requirements, and exemptions (including certain meteoroJogl'cal conditions), of the NSW Industrial Noise Policy.

The noJsellmlts do not apply If the Proponent has an agreement w1th the relevant ownerls of these residences/land to generate higher noise levels, and the Proponent has advised the Department in wnting of the terms of this agreement.

• Day is defined as 6:00am to 6:00pm Mondays to Fridays. and 8:00am to 1:00pm on Saturdays. but does not Include public holidays.

Operating Hours

2. The Proponent shall comply with the operating hours in Table 2.

Table 2: Operating hours

Activity	*Day*	*Time*
All quarrying operations	Monday – Friday (except Public Holidays)	6.00 am to 6.00 pm
	Saturdays	8.00 am to 1.00 pm
	Sundays and Public Holidays	No activities
Transportation off-site	Monday – Friday (except Public Holidays)	6.00 am to 6.00 pm
	Saturdays	8.00 am to 1.00 pm
	Sundays and Public Holidays	No activities

However, the Proponent may, at any time, undertake maintenance activities and/or operate dewatering pumps, provided that the noise levels from the pumps remain below background noise levels at the most sensitive receiver.

Note: This condition does n0t apply to delivery of miileriBI if thai delivery is reqvired by polk;e or other avthorities tor safety reasons. and/or the operetion or personnel or eqvipment are endangered. In svch circumstances, notifeatlon ls to be provided to OEH and the affected rosidonts as soon as possible, or within a masonable period in the case of emergency.

Operating Conditions

3. The Proponent shall:
   (a) implement best practice noise management, including all reasonable an<l feasible noise mitigation measures to minimise the operational noise and traffic noise generated by the project; and
   (b) regularly assess the noise monitoring and meteorological forecasting data an<l relocate. modify, and/or stop operations on site to ensure compliance with the relevant conditions of this approval,

   to the satisfaction of the Director-General.

Noise Management Plan

4. The Proponent shall prepare an<liimplement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must:

(a) be prepared in consultation with OEH. and submitted for approval to the Director-General within 6 months ofthis approval: and

(b) include a:

- description of the measures that would be implemented lo minimise noise emissions from the project, including from project..related transport;
  noise monitoring program that uses a combination of real-time and supplementary attended monitoring lo evaluate the performance of the project;
- protocol for determining exceedances of the relevant conditions of this approval and investigating, notifying and mitigating identified exceedances of the relevant noise limits: and
  continual improvement program for investigating, implementing and reporting on reasonable and feasible measures to reduce noise generated by the project.