



Noise, Dust and Vibration Management Plan

Wallgrove Redevelopment

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1 Introduction

This management plan contains environmental management objectives, mitigation measures, monitoring and reporting requirements relating to noise, vibration and air quality. This sub plan has been prepared by Hanson Construction Materials Pty Ltd for the Wallgrove Redevelopment Project.

This Plan identifies baseline (minimum) mitigation measures required for all sectors and outlines control measures that will be adopted during the construction stages of the project.

1.1 Objectives

The objective of the Air Quality Management and Monitoring Plan is to:

- Manage noise-creating activities to minimise noise pollution
- Minimise vibration effects for the amenity of residents
- Construct the works in a manner that minimises dust emissions from the site, including wind-blown and traffic-generated dust.
- Comply with relevant statutory requirements including the site's Environmental Protection Licence (EPL) as issued by the NSW EPA;
- Identify the relevant activities which could contribute to adverse air quality impacts;
- Describe the practical mitigation measures and best management practices that will be implemented to prevent or mitigate impacts on the air quality within the local area; and
- Provide an organised and systematic approach to effectively address and monitor air quality impacts associated with the project.

1.2 Applicable Legislation

Hanson, its employees and contractors will comply with all Commonwealth and State legislation that apply to the project. Legislation relevant to dust management is summarised in **Table 1**.

Table 1: Relevant Legislation		
Relevant Legislation	Scope	Administering Body
Protection of the Environment (Operations) Act, 1997	This legislation is regulated by the DECCW for Scheduled Activities listed in Schedule 1 of the POEO Act in relation to air, water pollution and waste management.	NSW Department of Environment, Climate Change and Water

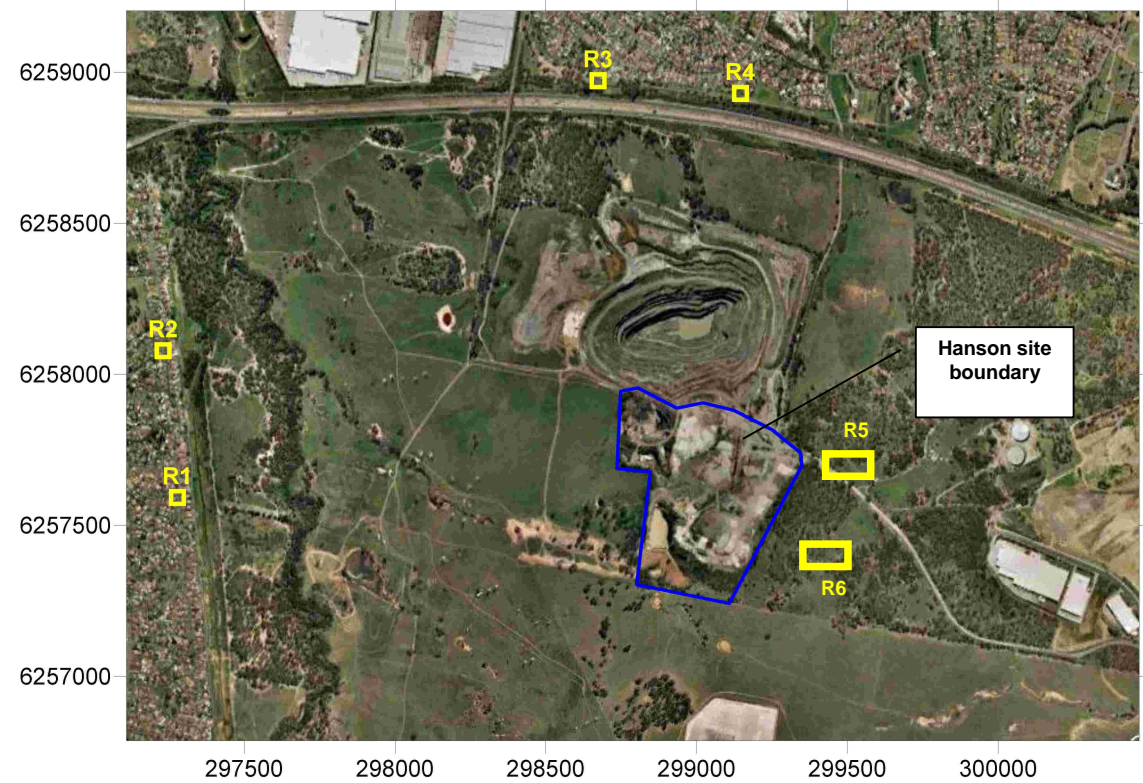
Table 1: Relevant Legislation		
Relevant Legislation	Scope	Administering Body
National Environmental Protection Measure (NEPM) for Ambient Air Quality	The Air NEPM was adopted by all States and Territories in Australia in 1998 and sets uniform standards for ambient air quality, including particles as PM ₁₀ . The NEPM has been varied to add an advisory PM _{2.5} standard.	Environment Protection and Heritage Council

2 Sensitive Receptors

A representative sample of the nearest potentially affected sensitive receptors, as identified within the Project's Development Application, are presented in **Table 3** including property identifier, dwelling locations and coordinates. The locations of the nearest sensitive receptors are illustrated in Figure 1..

Table 3: Nearest Potentially Affected Representative Sensitive Receptors				
Residence Identifier	Address	Distance/Direction from Project	MGA Coordinates	
			East (m)	North (m)
R1	Fantail Crescent, Erskine Park	1.5km west	297278	6257592
R2	Swamphen Street, Erskine Park	1.5km west	297231	6258078
R3	Tod Place, Minchinbury	1.1km north	298673	6258972
R4	Bergin Place, Minchinbury	1.1km north	299145	6258930
R5	Industrial warehouse	100m north-east	299422	6257840
R6	Industrial warehouse	200m east	299426	6257378

Figure 1: Location of the project and representative sensitive receptors



(Coordinates in MGA56 Datum Image Courtesy of Sinclair Knight Merz / Google Earth Images)

3 Noise and Vibration

3.1 Project Noise Goals

Table 2 summarises the applicable noise limits for the site. Importantly, these limits relate to residential land uses only and the approval does not include limits for neighbouring industrial sites (existing or proposed).

Table 2 Noise Limits

Location	Day	Evening	Night	
	LAeq, 15minute	LAeq, 15minute	LAeq, 15minute	LA1, 1minute
Michinbury (south) Mb3 Agrafe Place	45	45	45	57
Erskine Oark (north) EN! Warbler Street	35	35	35	57
Erskine Park (south) ES2 Fantail Crescent	35	35	35	57

Notes: 1. Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary, to determine compliance with the LAeq(15 minute) noise limits in the above table. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.

2. The noise emission limits identified in the above table apply under meteorological conditions of:
- Wind speeds of up to 3m/s at 10 metres above ground level; or
 - Temperature inversion conditions of up to 30C/100m, and wind speeds of up to 2m/s at 10 metres above ground level

While it is not anticipated over the course of the works, if Hanson anticipates construction activities may exceed the maximum noise level at a residential location, we will ensure community notification procedures are followed prior to the activity taking place as outlined in the CEMP and in consultation with Project Management Team. These will be outlined in the Construction Method Statements (CMS). This will include, at a minimum, community notification requirements outlined in the DECCW Interim Construction Noise Guideline July 2009.

4 Noise Management Measures

Whilst the noise impact assessment part of the Environmental Assessment documentation did not identify any impacts, it is prudent to apply good practice noise management to ensure site emissions are not unnecessarily excessive.

The main management measure is to ensure noise emission factors of plant and machinery is consistent with industry practice and that used in noise predictions (Heggies report of November 2006). This includes maintaining plant in good working order and using appropriate muffling devices as relevant. For proposed night time operations, plant using warning alarms or sirens will be designed to ensure emission levels do not cause exceedance of the Project Approval limits. This may require that such alarms are variable level based alarms and or broad band noise alarms as opposed to the traditional tonal alarms.

Other measures include advertising a community information line on the Proponent's website for complaints reporting and prompt response to community complaints and feedback.

4.1 Intermediate locations

Given the relative distance buffer and shielding effects between the site and residences, intermediate noise monitoring locations will be used to capture site dominated noise data and used to extrapolate noise levels for residential locations. This is a technique that DECCW support as noted in the consent limit table earlier and as per Chapter 11 of the Industrial Noise Policy. The intermediate monitoring locations Hanson site

Boundary 8 will include the western and northern site boundaries, the specific locations will be defined by activities at site during the time of monitoring.

4.2 Monitoring parameters, instrumentation and procedures

It is critical that an adequate quantity of data and observations are recorded during each monitoring event to be able to conclusively determine compliance with the Project Approval noise limits. To do this the following noise metrics and parameters will be captured and quantified as a minimum at each monitoring location:

- L_{min} – the minimum sound pressure level during the monitoring period;
- $L_{90,15minute}$ – the noise level present for 90% of the measurement period, often referred to as the background noise level;
- $L_{eq,15minute}$ – the equivalent continuous noise level over a 15 minute period, often referred to as the average noise level;
- $L_{10,15minute}$ – the noise level present for 10% of the measurement period, often referred to as the average of maximum noise levels;
- $L_{1,1minute}$ - the noise level present for 1% of the measurement period, and is often similar in value to the maximum noise level; and
- L_{max} – the maximum sound pressure level during the monitoring period.

The noise monitoring instrument must accord with Type 1 meters as per Australian Standard 1259 and include 1/1 or 1/3 Octave band filter. The instrument must be calibrated prior to and at the end of each monitoring session, and be within its NATA certified calibration period.

In capturing the above, the attendant will observe and document what portion of the noise reading is dominated affected or otherwise influenced by site related noise. A noise monitoring proforma sheet is provided in Appendix A and will be used for each monitoring site.

The metrological conditions during the hour of the monitoring will be noted on the monitoring sheet. The weather parameters will be captured by the on site meteorological station or a suitable station near by. The wind speed, wind direction and any rain fall data will be reported along with the atmospheric stability class determined by analysis of sigma-theta data where available. The time of noise monitoring will include day, evening and night periods as relevant to the operations of the site. The measurements will be operator attended 15 minute samples at each location for each of the day, evening and night assessment period as relevant to operations. The daytime, evening and night periods are 7am to 6pm, 6pm to 10pm and 10pm to 7am respectively.

A suitably qualified or trained person must undertake the monitoring and be familiar with this protocol.

4.3 Determination of compliance

As described earlier, the captured data and its quality must be capable of allowing a trained acoustician to deduce whether noise from site satisfies the relevant noise limits at residences. In doing this, the following steps will be used:

- The direct measurements captured at residences will be used to establish whether total noise levels are above or below limits;
- Where total noise levels as measured at residences are below limits, it will be concluded that the site satisfies its obligations under the Project Approval, without needing to quantify the sites contribution; and
- Where total noise levels as measured at residences are above limits, the site's contribution will be quantified either directly at the residences through audible site noise fluctuations or by extrapolation from measurements at intermediate locations.

4.4 Vibration

Due to the distance of the nearest receptors, vibration from earth work machinery will pose a low risk in the Wallgrove redevelopment.

No blasting is expected to be conducted on site. If any high risk activities are identified on site, such as blasting, an individual method statement will be developed as per the ***Environmental Aspect Register***.

5 Air Quality

6 Project Air Quality Goals

The project has set the below criteria as goals to limited the amount of dust emissions generated. The project should not cause additional exceedances of the criteria listed in **Table** , **Table** and **Table** at any residence on, or on more than 25 percent of, any privately owned land.

Table 4: Long term impact assessment criteria for particulate matter

Pollutant	Averaging period	Criterion	Source
Total suspended particulate (TSP) matter	Annual	90 µg/m ³	DECCW, 2005
Particulate matter < 10 µm (PM ₁₀)	Annual	30 µg/m ³	DECCW, 2005

Table 5: Short term impact assessment criteria for particulate matter

Pollutant	Averaging period	Criterion	Source
Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³	DECCW, 2005

Table 6: Long term impact assessment criteria for deposited dust				
Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	Source
Deposited dust	Annual	2 g/m ² /month	4 g/m ² /month	DECCW, 2005

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS 3580.10.1-1991: [Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method](#).

7 Air Quality Impacts

The following activities have been identified as key areas for potential dust generation:

- Movement of heavy vehicles on unsealed roads within the site (wheel generated dust);
- Movement of mobile plant (front end loaders, excavators, dump trucks, scrapers, compactors);
- Earthworks and removal of trees and shrubs
- Crushing and screening of aggregate;
- Materials handling and conveying;
- Wind erosion of stockpiles / exposed areas; and

It is therefore these principal activities where dust management measures should be directed.

The following table provides a summary of these activities that can cause noise, vibration and/or air quality impacts to off-site receptors;

Activity	Air Quality	Noise	Vibration
Vehicle transport on sealed roads	Emissions	✓	x
Vehicle transport on unsealed roads	Emissions, Dust	✓	x
Clearing and Grubbing	Dust	✓	x
Hammering	Dust	✓	✓
Rock Breaking	Dust	✓	✓
Construction	Dust	✓	✓
Earthmoving Plant	Dust, Emissions	✓	x
Generators	Dust, Emissions	✓	x

Table 7: Noise, Air Quality and Vibration generating activities

7.1 Dust Management Measures

Strategies to minimise dust will include the following measures:

- Regular watering of unsealed roads, exposed surfaces and stockpiles; a water cart log book to be kept up to date as evidence of regular watering;
- Use of chemical dust suppressants on unsealed roads and exposed surfaces;
- Unsealed areas which will be subject to high levels of traffic movements are to be covered with an appropriate ground cover, such as 40mm aggregate, grass or wood chip.
- Employee induction to ensure awareness of dust management measures;
- The height of any stockpile of any material must not exceed 5 metres in height;
- All active stockpiles are to be appropriately wetted down to minimise the generation of dust;
- All inactive stockpiles must be covered with material such as a tarpaulin or spray coating to prevent wind generated dust;
- Mobile plant movement will be restricted to designated routes and standing areas;
- Vehicle speeds will be controlled on site (10 km/h) to minimise dust generation and also for safety reasons;
- All trucks entering or leaving the site with loads shall have their loads covered;
- A wheel wash or grid will be used between unsealed and sealed road sections to ensure trucks associated with the project will not track dirt onto the public road network;
- In the event that dirt is tracked onto public roads, this shall be removed immediately upon this being sighted,

8 Air Quality Monitoring

Before commencing work on site the contractor is to put in place noise, vibration and air quality management devices and advise the Project Manager. The Project Manager and the Construction Manager will undertake a joint inspection of the devices to ensure that appropriate measures are in place.

Joint inspections of the devices are to occur before any significant new works take place. The contractor shall regularly review the works to ensure compliance with this sub plan.

The Project Manager will undertake regular inspections of the devices and monitor compliance with the requirements of this sub plan. The results of these inspections will be reported in the Construction Compliance Reports.

Ambient air quality monitoring will be conducted to evaluate compliance with the project air quality goals established.

All air quality monitoring will be conducted in accordance with the following Australian Standards:

- *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DECCW, 2005);
- AS 2922-1987 *Ambient Air - Guide for the Siting of Sampling Units*.

8.1.1 Dust Deposition Monitoring

Monitoring for dust deposition will be conducted using a minimum of three dust deposition gauges, in accordance with the following Australian Standard.

- AS 3580.10.1-2003 *Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method* (DECCW Method AM-19).

The frequency of monitoring of this parameter should be on a one-month continuous basis.

8.1.2 Continuous PM₁₀ Monitoring

Monitoring of PM₁₀ will be conducted on a continuous basis, with the provision for notification of concentration trigger levels at which dust management actions must be taken.

Whereas compliance monitoring is typically conducted using tapered element oscillating microbalance monitors (TEOMs) and beta attenuation monitors (BAMs), continuous monitoring for operational dust management purposes may use more economical and portable monitoring systems.

Suitable technologies for the above task have been identified as the E-BAM, E-sampler, DustTrak, DustScan, OSIRIS/TOPAS or GRIMM Sampler. One advantage of such samplers is that several are able to operate effectively without dedicated air conditioned enclosures, and using solar power. They are thus able to be used at locations remote from power sources.

It is highlighted that the technique to be used should have telemetry capabilities such that trigger levels may be easily notified to the Site Manager and/or other operational staff (e.g. via SMS).

8.1.3 Concentration Trigger Levels

To assist with the reactive management of particulate matter emissions from the project, a relationship between short-term (15-minute average) and long term (24-hour average) PM₁₀ concentrations should be established.

With regard to PM₁₀, the project aims to meet the DoP/DECCW 24-hour average criterion of 50 µg/m³.

The relationship between 15-minute peak and 24-hour mean average PM₁₀ concentrations has been evaluated based on monitoring conducted within the mining and extractive industry.

To reduce the frequency of alarming, two consecutive 15-minute observations in excess of 90 µg/m³ is suggested as the interim Investigation Level alarm. The adoption of this interim investigation level anticipated to capture likely 24-hour average exceedance events, while reducing the quantity of 'false' alarms to a minimum.

15-minute average PM₁₀ concentrations approaching 200 µg/m³ are considered likely to be associated with an exceedance of the 24-hour average PM₁₀ criterion of 50 µg/m³.

Thus, if the recorded 15-minute average PM₁₀ concentration exceeds the Investigation Level attempts to identify the contributing source of emissions should be made.

Contributing sources can be identified through the review of corresponding meteorological data (wind speed, wind direction) and a knowledge of current site activities.

If the Investigation Level continues to be exceeded in the following 15-minute average concentration, and site sources have been identified as being significant contributors, appropriate

dust mitigation measures (use of water suppression / varying or ceasing operations) should be applied.

Should the recorded 15-minute average PM_{10} concentrations exceed an Action Level of $200 \mu g/m^3$ and meteorological conditions suggest that site activities may be the dominant contributor, the likely operational source(s) should be identified and dust mitigation measures or cessation of activities being applied immediately.

The continuous PM_{10} monitor shall be configured to send an alert SMS message to the accountable staff when 15-minute PM_{10} concentrations exceed both the Investigation and Action Levels described above. Wind speed and direction shall either be reported within the alert message, or shall be verified as soon as is practicable following SMS notification.

In summary, the following notification levels shall be reported via SMS to accountable staff:

- Investigation Level – Two consecutive 15-minute average PM_{10} concentrations in excess of $90 \mu g/m^3$.
- Action Level – Single 15-minute average PM_{10} concentration in excess of $200 \mu g/m^3$.

These are considered to be interim levels and the ratio between peak 15-minute and 24-hour average PM_{10} concentrations will be better understood as the available monitoring data set expands.

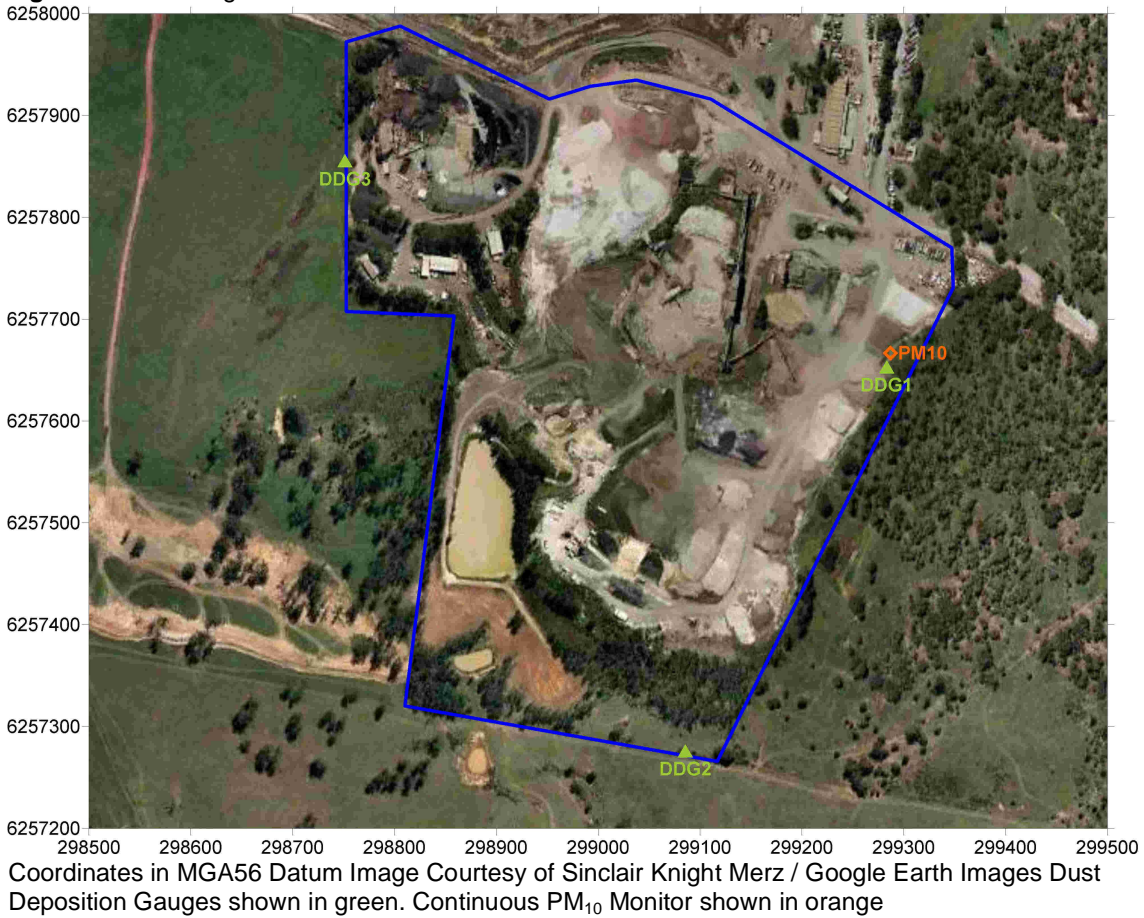
Consequently, the relationship between peak short term and average daily concentrations of PM_{10} should be routinely reviewed, on a minimum annual basis or after a significant exceedance event.

Review of the site Investigation and Action Levels should be conducted by a suitably qualified air quality practitioner.

8.1.4 Monitoring Locations

Following a review of suitable monitoring locations, the following monitoring locations have been identified, as shown in **Figure 2**.

Figure 2: Monitoring Locations



The coordinates of the suggested monitoring locations are presented in **Table 8**.

Table 8: Locations of Air Quality Monitoring Instruments			
Instrument Identifier	Description	MGA Coordinates	
		East (m)	North (m)
DDG1	Dust Deposition Gauge – Eastern Boundary	299283	6257653
DDG2	Dust Deposition Gauge – Southern Boundary	299098	6257306
DDG3	Dust Deposition Gauge – Western Boundary	298751	6257856
PM10	Continuous PM ₁₀ Monitor – Eastern Boundary	299287	6257667

9 Reporting

9.1 Incidents

Identification of an incident will be triggered by:

- Notification by continuous monitoring that trigger levels have been exceeded; or
- A dust complaint from adjacent neighbours; or
- Evidence of unacceptable visible fugitive emissions on the site and/or leaving the site.

Upon identification of an incident, one or more of the following corrective actions will be implemented by the Site Manager, as appropriate:

- Identification of any significant sources of emissions by visual inspections and if required, modification of activities/processes;
- Investigation of complaints received and identification of the issue. If requested, air quality monitoring will be conducted at the complainant's property;
- Increased water spraying or other dust suppression measures (foam at crusher) being applied to areas generating dust; and
- Cessation of works in the event of excessive dust generation due to extreme weather conditions (e.g. high wind events).

All complaints will be documented by the Site Manager on the complaints register, along with the corrective action undertaken. An approved Complaints Register Proforma will be used consistent with that used for Air Quality monitoring and the broader environmental performance monitoring.

9.2 Frequency

In accordance with Schedule 5 of the Project Approval, the Proponent will provide regular reporting on the environmental noise performance of the project. Given the relatively low risk of impact, the monitoring and associated reporting will occur on an annual basis and form part of the site's broader environmental performance reporting.

9.3 Roles and responsibilities

The Site Manager will be responsible for implementation and maintenance of this Noise Monitoring Program and ensuring that all personnel working on the site are familiar with it. Reporting relationships are outlined in the organisation chart which is located in the overall environmental management plan.

9.4 Training and Awareness

The Site Manager will be responsible for ensuring that environmental training and awareness programs are provided to all staff. Specific attention will be made to incident management and reporting, use of plant and equipment, dust control, and complaints management.

Staff and contractors will be required to participate in an induction programme so that an acceptable level of environmental awareness is achieved prior to work commencing. This induction programme will be directed to assist in minimising any on-site and off-site environmental problems. The Site Manager shall maintain records on site of environmental training undertaken for all employees, detailing the type and purpose of the training.

9.5 Review Period

This monitoring program will be reviewed annually and incorporate changes relevant to any modifications to the project.

Environmental Aspect Register			
Environmental Impacts	Summary Control Measures		
	Prior to Construction	During Construction	Legislative Requirements
Noise	<p>Low noise plant selected</p> <p>Background noise measurements will be monitored to establish a baseline</p> <p>Any excessively loud activities will be scheduled to avoid early morning period when the daytime noise environment is most sensitive.</p> <p>Workshop, delivery and excavator activities limited to working hours* Regular toolbox talks addressing noise issues</p> <p>Liaison (by MMLP) with community to ensure awareness of the mechanism to lodge a complaint or feedback*</p>	<ol style="list-style-type: none"> 1. All equipment maintained in good working order* 2. Residential class mufflers and engine shrouds to be used where applicable.* 3. Likelihood of producing low noise emissions should be considered when selecting plant and other equipment.* 4. Construction activities and site equipment to be undertaken in accordance with AS 2436 'guide to Noise Control on Construction, Maintenance and Demolition sites'. 5. Appropriate use of all plant and equipment with reasonable practices applied, including no extended periods of 'revving', idling or warming up in proximity to existing residential receivers. 6. A speed limit of 50km/hr to be adopted for heavy vehicles operating on haul roads. 7. All site vehicles and machine will be switched off or throttled down to a minimum when not in use.* 8. A noise barrier surrounding the micro tunnelling section may be constructed after considering impacts to local residents.* 9. Construction sites will be located considering the distance of primary noise sources from local residences, and placement of solid structures between noise sources and sensitive receptors as much as possible.* 10. Materials dropped from heights will be minimised* 11. Machines found to produce excessive noise emissions compared to normal industry expectations will be removed from site or stood 	<p>POEO Act</p>

		<p>down until repairs are made.*</p> <p>12. Reversing alarms will be minimised as appropriate to maintain adequate health and safety.*</p> <p>13. Noise complaints will be investigated immediately and</p>	
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Vibration	<p>Identify sensitive receptors nearby</p> <p>Regular toolbox talks addressing vibration issues</p>	<p>Locate excavator activities as far away from residential premises as practicable.*</p> <p>Selection of appropriate plant minimising ground vibrations*</p> <p>Building condition surveys to be undertaken prior to commencement of vibration generating works. Will include video and photographic dilapidation indexing.*</p> <p>In the event of blasting or pile driving being required on-site, specific Blasting and/or Pile Driving Activity Method Statements clearly stating vibration abatement measures will be prepared.*</p> <p>Vibration complaints will be investigated immediately and monitoring conducted at the potentially affected location with a report generated within three to five working days*</p>	POEO Act
Air Quality	<p>Regular toolbox talks addressing air quality issues</p>	<p>Dampening with water will be applied to internal unsealed access roadways and work areas (application rates to be determined based on atmospheric conditions and the intensity of construction operations).*</p>	POEO Act

		<p>At the joining of unsealed and sealed roads, the area will be routinely swept by the contractor to remove deposited material that could generate dust. The application of a chemical stabilising agent to unsealed haul roads and stockpile areas may be required where water application rates prove insufficient or there is a limited supply of water.</p> <p>Site rehabilitation will be undertaken as soon as practicable.</p> <p>Disturbed areas will be stabilised as soon as practicable to prevent or minimise wind-blown dust.</p> <p>On-site speed limits will be enforced for all construction vehicles at the site.*</p> <p>Vehicle and machinery movements during construction will be restricted to designated areas, on sealed or stabilised roads at all times where possible/practicable.*</p> <p>Spillage of materials on roads or pathways will be cleaned up promptly in accordance with spill procedures.*</p> <p>Rumble grids and/or wheel wash facilities may be provided at the site exit onto sealed roads to remove mud and dust from vehicles.</p> <p>Vehicles transporting spoil and materials will be covered immediately after loading to prevent wind blown dust emissions and spillages. A minimum of 700mm of vertical space shall exist between the top of the load and the top of the trailer on all uncovered loads.*</p> <p>Tailgates of road transport trucks will be securely fixed prior to loading and immediately after</p>	
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		<p>unloading. Construction plant and equipment will be well maintained and regularly serviced</p> <p>Rubbish will not be burnt on site.</p> <p>Construction along the pipeline to be completed in small sections to minimise the area of disturbance at any one time. Each section will be constructed and stabilised prior to starting the next section.*</p> <p>Construction vehicles will be maintained in accordance with manufacturer's requirements to minimise emissions.*</p> <p>Stockpiles will be maintained to a suitable height, width and slope and placed in areas protected from the wind and away from public places where practicable.*</p> <p>If visible dust is generated and being blown towards surrounding residences the work should cease in that particular area and mitigation measures implemented.*</p> <p>Residents in the vicinity of any works shall be notified of timing of the works.*</p> <p>Unused equipment will be shut down or engine load reduced.*</p> <p>Soil stockpiles shall be seeded or otherwise stabilised to reduce potential for wind erosion and promote stability*</p>	
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10 Revision History

Rev	Revised By	Reviewed & Approved By	Date	Description/Summary of Changes
0	J. Lardis	D. Driver		