



# HITCHCOCK ROAD SAND EXTRACTION AND REHABILITATION PROJECT, MAROOTA

## NOISE MANAGEMENT PLAN



**PF Formation**

## **HITCHCOCK ROAD MAROOTA**

**Sand Extraction and Rehabilitation Project**

# **NOISE MANAGEMENT PLAN**

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**Hitchcock Road sand extraction and rehabilitation project Maroota  
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## Terms and abbreviations

| <b>Term:</b>                 | <b>Definition</b>   |
|------------------------------|---|
| AEMR                         | Annual Environmental Management Report  |
| AHD                          | Australian Height Datum. The standard reference level used to express the relative elevation of various features. A height given in metres AHD is essentially the height above sea level.                                   |
| Ambient                      | The background level at a specific location, being a composite of all sources.  |
| Annual Average Daily Traffic | Annual average daily traffic volume representing the total traffic in both directions at a specified location calculated from mechanically obtained axle counts.  |
| Background Noise Level       | The ambient sound pressure noise level in the absence of the sound under investigation exceeded for 90 percent of the measurement period. Normally equated to the average minimum A-weighted sound pressure level.          |
| Batter                       | The side slope of walls, embankments and cuttings or the degree of such slope, usually expressed as a ratio of horizontal distance to one vertical height.  |
| Buffer                       | A physical barrier, structure or width of land which encloses, partially encloses or defines a particular environment. It serves to minimise the impacts of non-desirable external influences on the adjoining environment. |
| Bund Wall                    | A wall erected to prevent the escape of various emissions into the environment (liquids, noise or views).   |
| Conservation                 | The management of resources in a way that will benefit both present and future generations.   |
| Council                      | The Hills Shire Council.  |
| Day                          | The period from 7.00am to 6.00pm on Monday to Saturday and 8.00am to 6.00pm on Sunday and public holidays.  |
| dBA                          | Decibels using the A-weighted scale measured according to the frequency of the human ear.   |
| DECC                         | NSW Department of Environment and Climate Change.   |
| Decibel                      | A scale unit used in the comparison of powers and levels of sound energy. The number of decibels is ten times the logarithm to the base of ten of the ratio of the powers.  |
| Department                   | NSW Department of Planning.   |
| Director-General             | Director-General of the Department of Planning or delegate.   |
| DPI                          | NSW Department of Primary Industries  |
| DWE                          | NSW Department of Water and Energy  |

| Term:   | Definition  |
|---|---|
| EA  | Environmental Assessment of the project entitled <i>Hitchcock Road Sand Extraction and Rehabilitation Project Environmental Assessment and Appendices</i> (3 volumes) dated November 2007, prepared by DFA Consultants, including the response to submissions and Preferred Project Report.   |
| Ecology   | The relationship between living things and their environment.   |
| Ecologically Sustainable Development                  | Using, conserving and enhancing the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.   |
| Ecosystem   | A functional unit of energy transfer and nutrient cycling in a given place. It includes all relationships within the biotic community and between the biotic components of the system.  |
| Emission  | Discharge of a substance to the environment.  |
| Environment   | A term for all the conditions (physical, chemical, biological and social) in which an organism or group of organisms, including humans, exists.   |
| Environmental Assessment (EA)                         | A formal description of a project and an assessment of its likely impact on the physical, social and economic environment. It includes an evaluation of alternatives and an overall justification of the project. The EA is used as a vehicle to facilitate public comment and as the basis for analysing the project with respect to granting approval under relevant legislation. |
| Environment Protection Licence                        | A licence that allows pollution of the environment under controlled conditions regulated by the Department of Environment and Climate Change.   |
| EMP   | Environmental Management Plan   |
| EP&A Act  | <i>Environmental Planning and Assessment Act 1979.</i>  |
| EP&A Regulation                                       | <i>Environmental Planning and Assessment Regulation 2000.</i>   |
| EPL   | <i>Environmental Protection Licence issued under the Protection of the Environment Operations Act 1997.</i>   |
| Equivalent Continuous Sound Level (L <sub>Aeq</sub> ) | The constant sound level which when operating over the same time interval as a fluctuating sound over an extended time, is equivalent to the same sound energy.   |
| Evening   | The period from 6.00pm to 10.00pm.  |
| Excavate  | Dig into natural material and remove using specialist machinery.  |
| Extraction  | A term referring to the removal of material from the earth synonymous with quarrying.   |
| Extraction area                                       | The land described as the extraction area in Appendix 1 of the Project Approval.  |

| <b>Term:</b>             | <b>Definition</b>   |
|--------------------------|---|
| Frequency                | Similar to the pitch of a musical note in sound pressure fluctuations of cycles per second (Hertz). Most sounds comprise a composite of frequencies of varying sound pressure levels in the range of 20 Hertz to 20,000 Hertz.                            |
| Front-end loader         | Machine used to lift and place soil, earth, rocks and other materials within an extraction site or to load products into trucks.  |
| Gradient                 | Rate of change of a given variable with distance, such as temperature or elevation.   |
| g/m <sup>2</sup> /month  | grams per square metre per month  |
| Greenhouse effect        | Changes in climate that could occur due to increases in atmospheric concentrations of certain gases.  |
| Impact                   | The effect of human-induced action on the environment.  |
| Infrastructure           | Supporting installations and services supplying the needs of a project.   |
| Land                     | Land means the whole of a lot or contiguous lots owned by the same landowner in a current plan registered at the Land Titles Office at the date of the approval.  |
| Landform                 | A specific feature of the landscape or the general shape of the land.   |
| Mitigation measures      | Measures put in place to reduce an impact.  |
| Modelling                | Use of mathematical equations to simulate and predict real events and processes.  |
| Monitoring               | Regular measurement of components of the environment to understand their condition and establish if necessary standards are being met.  |
| Minister                 | NSW Minister for Planning or delegate.  |
| Night                    | The period from 10.00pm to 7.00am on Monday to Saturday and 10.00pm to 8.00am on Sunday and public holidays/  |
| Privately owned land     | Land not owned by a public agency or the proponent or its related companies.  |
| Preferred Project Report | The proponent's Preferred Project Report dated September 2008 prepared by DFA Consultants as modified in the Proponent's email to the Department of Planning on 18 November 2008.   |
| Process plant            | Equipment used to clean and separate sand into various sizes.   |
| Project                  | The development as described in the EA.   |
| Proponent                | PF Formation or its successors in title.  |
| Receptor                 | An environmental modelling term used to describe a map reference point where the impact is predicted. A sensitive receptor is a home, work place, school or other place where people spend some time. An elevated receptor is a point above ground level. |

| <b>Term:</b>             | <b>Definition</b>  |
|--------------------------|--|
| Rehabilitation           | Preparation of a final landform following extraction and its stabilisation with vegetation.  |
| Response to Submissions  | The proponent's response to issues raised in submissions dated March 2008 prepared by DFA Consultants and subsequent submissions to the Department of Planning dated 27 August 2008. |
| RL                       | Reduced level, usually in metres to an arbitrary datum.  |
| RTA                      | NSW Roads and Traffic Authority  |
| Sand                     | Sediment comprising particles ranging between 0.063mm and 2mm.   |
| Sandstone                | A fine grained rock of sedimentary origin composed primarily of sand-sized particles (0.06 to 2 mm).   |
| Stakeholder              | An individual or group with an interest in the proposal.   |
| Statement of Commitments | The proponent's commitments in Appendix 3 of the Project Approval.   |
| Stockpile                | Mound used to store material.  |
| Stormwater               | Rainwater which runs off catchments following rain events. The untreated water is carried into creeks, rivers and lakes.   |
| Strategy A, Strategy B   | The alternative rehabilitation proposals described in the Preferred Project Report.  |
| Topography               | The physical relief and contours of the area.  |
| TSC Act                  | NSW Threatened Species Conservation Act.   |
| Wash plant               | Equipment designed to wash unwanted sized materials from the product.  |

*Chapter One***INTRODUCTION**

**Approval Condition 8** of **Schedule 3** requires the preparation and implementation of a noise management plan. This is to include details of the way in which the noise performance of the project would be monitored together with a noise monitoring protocol for evaluating compliance with the relevant noise limits in the approval. It is also to include an assessment (including modelling) of additional reasonable and feasible noise mitigation measures that would be implemented to ensure that noise emissions at all stages of the project comply with the noise impact criteria in **Table 2.1**.

Noise relating to the project would be generated from two principal sources: on-site activities including extraction of sand, transport to the slurry plant and processing; and on-road transport of the product to market by truck along adjacent public roads. Both these could potentially have impacts on adjacent residential and other properties. Noise generated by activities relating to the Hitchcock Road site would also have cumulative impacts in combination with that generated by local sand mining activities undertaken by other operators.

Noise monitoring of site-related activities has been undertaken and regularly reported for the past ten years. A long term data set is therefore available. No complaints about noise have been received from the local community over the monitoring period.

Current monitoring procedures and reporting protocols will be amended, where necessary, to reflect the requirements of the relevant approval conditions.

## Chapter Two

**APPROVAL REQUIREMENTS**

The approval contains a number of conditions relating to the monitoring and management of potential noise impacts. These are:

**Schedule 3 Condition 5 Operational noise assessment criteria**

The proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in **Table 2.1** at any residence or on more than 25 percent of any privately-owned land.

**Table 2.1 Noise impact assessment criteria**

| Noise assessment location  | Day                           | Night                        |                            |
|----------------------------|-------------------------------|------------------------------|----------------------------|
|                            | L <sub>Aeq</sub> (15 minute)  | L <sub>Aeq</sub> (15 minute) | L <sub>A1</sub> (1 minute) |
| R1 - Hammond               | 41                            | 35                           | 45                         |
| R2 - Hitchcock             | 40                            | 35                           | 45                         |
| R3 - Pignataro             | 42                            | 35                           | 45                         |
| R4 - Camilleri             | 40                            | 35                           | 45                         |
| R5 – Maroota public school | 36(L <sub>Aeq</sub> (1 hour)) | N/A                          | N/A                        |
| R6 - Portelli              | 39                            | 35                           | 45                         |
| R7 - Young                 | 39                            | 35                           | 45                         |
| R8 - Tomatola              | 39                            | 35                           | 45                         |

**Table 2.1 Notes**

- To determine compliance with the L<sub>Aeq</sub>(15 minute) noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impracticable, alternative means of determining compliance may be accepted (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 level where applicable.
- To determine compliance with the L<sub>A1</sub>(1 minute) limit, noise from the project is to be measured at one metre from the dwelling façade.
- The noise limits apply under meteorological conditions of:
  - wind speed up to 3m/s at 10m above ground level;
  - temperature inversion conditions of up to 3 degrees C and wind speed up to 2m/s at 10m above the ground;
 where the wind velocity and temperature gradients are determined to be relevant to the project site in accordance with the NSW Industrial Noise Policy.
- The Director-General may relax the noise limits in **Table 2.1** for any property where the proponent has an agreement with the relevant owners to generate higher noise levels and the proponent has advised the Department in writing of the terms of this agreement.

**Schedule 3 Condition 6 Cumulative noise criteria**

The proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other extractive industries does not exceed the following amenity criteria on any privately owned land, to the satisfaction of the Director-General.

- $L_{Aeq(11\text{ hour})}$  50 dB(A) – Day
- $L_{Aeq(4\text{ hour})}$  45 dB(A) – Evening
- $L_{Aeq(9\text{ hour})}$  40 dB(A) – Night

**Schedule 3 Condition 7 Operating hours**

The proponent shall comply with the operating hours in **Table 2.2**.

**Table 2.2 Operating hours**

| Activity  | Day                        | Time             |
|---|----------------------------|------------------|
| Construction  | Monday - Friday            | 7.00am to 6.00pm |
|   | Saturday                   | 8.00am to 1.00pm |
|   | Sunday and public holidays | None             |
| Quarrying and processing including overburden removal | Monday – Saturday          | 7.00am to 6.00pm |
|   | Sunday and public holidays | None             |
| Product transportation                                | Monday – Saturday          | 6.00am to 6.00pm |
|   | Sunday and public holidays | None             |
| Maintenance   | Monday – Saturday          | 7.00am to 6.00pm |
|   | Sunday and public holidays | None             |

**Table 2.2 Notes**

- *Product transportation prior to 7.00am is restricted as per **Condition 9 of Schedule 2**.*
- *Maintenance activities may be conducted outside the hours in **Table 2.2** provided that the activities are not audible at any residence beyond the boundary of the site.*
- *This condition does not apply to the delivery of material if that delivery is required by police or other authorities for safety reasons and/or the operation or personnel or equipment are endangered. In such circumstances, notification is to be provided to DECC and the affected residents as soon as possible or within a reasonable period in the case of emergency.*

**Schedule 3 Condition 8 Noise management plan**

The proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan shall be prepared in consultation with DECC and include details of how the noise performance of the project would be monitored and include a noise monitoring protocol for evaluating compliance with the relevant noise limits in this approval. It is also to include an assessment (including modelling) of additional reasonable and feasible noise mitigation measures that would be implemented to ensure that noise emissions at all stages of the project comply with the noise impact criteria in **Table 2.1**.

*Note: The EA predicted that receiver locations R5, R6, R9 and R10 would exceed the applicable noise criteria by between 2 and 5 decibels during worst case operations.*

**Schedule 3 Condition 9**

If the additional noise mitigation measures identified in Condition 8 are not able to reduce noise levels to within 2 decibels of the impact assessment criteria in **Table 2.1** then, upon receiving a written request from the applicable landowner, the Proponent shall implement additional noise mitigation measures such as double glazing, insulation and/or air conditioning at any residence on the land in consultation with the landowner. These additional mitigation measures must be reasonable and feasible.

If, within 3 months of receiving the request from the landowner, the Proponent and the landowner cannot agree on the measures to be implemented or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.

*Chapter Three*

**OBJECTIVES OF THE PLAN**

The objectives of the noise management plan are to minimise the impacts of noise resulting from quarry operations and related truck movements on the local community and achieve compliance with all relevant legislation, approval conditions and guideline assessment criteria.

*Chapter Four***STAKEHOLDER CONSULTATION**

Stakeholders include government agencies and authorities including the Department of Planning, Department of Environment and Climate Change and the Hills Shire Council and members of the community particularly Maroota landowners and residents who may be directly affected by the impacts of the operations on the Hitchcock Road site.

Consultation with these stakeholders will be undertaken in four ways:

- Direct contact with the relevant government authorities in the preparation of the monitoring programs and management plans required for the assessment of the environmental performance of site operations and subsequent review and assessment of the various reports detailing this performance.
- Direct contact with those members of the community as required to provide information on site activities in areas where they could be affected.
- Indirect contact with the local community and other interested parties by provision of all relevant project documentation and monitoring data on the PF Formation website in compliance with **Conditions 10 and 11 of Schedule 5** of the Project Approval.
- Establishment of a Community Consultative Committee as required by **Condition 9 of Schedule 5** of the Project Approval. This will be the continuation of the existing Liaison and Review Committee which meets twice a year to review the status of operations on the site and respond to community concerns. The committee comprises representatives of the Hills Shire Council and PF Formation, community members and occasional invited members of relevant government agencies. It is chaired by a representative of the Hills Shire Council.

*Chapter Five***COMPLAINTS MANAGEMENT**

Activities on the site and the transport of the extracted material from it have the potential to result in impacts on the local community. These may give rise to complaints regarding the project. It is important that any complaints received are handled and addressed in an appropriate manner. The following complaints management procedure will be followed:

- Each complaint received will be recorded on the complaints register. This will include details of the complainant, the nature of the complaint and the date and time received;
- The nature of the complaint will be addressed by the Site Manager/Environmental Manager and any measures required to mitigate its effects identified and implemented;
- The appropriate record sheet will be signed-off by the relevant manager once the identified measures are completed;
- Monitoring will be undertaken, if necessary, to confirm the source of the complaint and its subsequent mitigation;
- A copy of the relevant complaints record will be made available to the CCC and the complainant, on request. A summary of all complaints received, if any, will be presented at each CCC meeting and reported in the relevant AEMR. and
- A copy of the complaints register will be provided to the Department of Environment and Climate Change as part of the annual licence reporting.

*Chapter Six***DISPUTE RESOLUTION**

**Condition 1** of **Schedule 4** requires that if environmental monitoring indicates that impacts generated by the project are greater than the relevant assessment criteria, the Director-General and the affected landowners and/or existing or future tenants must be notified and the relevant monitoring results provided to these parties until the results show that the project is complying with the relevant criteria.

**Condition 2** of **Schedule 4** enables a landowner of privately owned land who believed that quarry operations are exceeding the impact assessment criteria to request PF Formation in writing for an independent review of the impacts of the project. If the Director-General is satisfied that an independent review is warranted, PF Formation will undertake the following within 3 months of the Director-General's advice:

- consult the landowner to determine the nature of their concerns;
- commission a suitably qualified, independent specialist, approved by the Director-General to conduct monitoring on the land to determine whether the project is complying with the relevant criteria in Schedule 3 and identify the source(s) and scale of any impact on the land and the contribution of the project to that impact; and
- provide a copy of the independent report to the Director-General and the landowner.

If the independent review determines that the quarry operations are complying with the relevant criteria in **Schedule 3**, PF Formation will discontinue the review following approval of the Director-General.

If the independent review determines that the quarry operations are not complying with the relevant criteria in **Schedule 3** and that these operations are primarily responsible for the non-compliance, PF Formation will undertake the following:

- implement all reasonable and feasible measures, in consultation with the landowner, to ensure that the project complies with the relevant criteria; and
- conduct further monitoring to determine whether these measures ensure compliance; or
- secure an agreement with the landowner to allow exceedances of the relevant criteria in Schedule 3.

If additional monitoring subsequently determines that the quarry operations are complying with the relevant criteria in Schedule 3, PF Formation will discontinue the review following approval of the Director-General. If an agreement with the landowner cannot be achieved, PF Formation or the landowner may refer the matter to the Director-General for resolution. If the matter cannot be resolved within 21 days, the Director-General will refer the matter to an Independent Dispute Resolution Process. This process is shown on **Figure 6.1**.

INDEPENDENT DISPUTE RESOLUTION PROCESS (INDICATIVE ONLY)

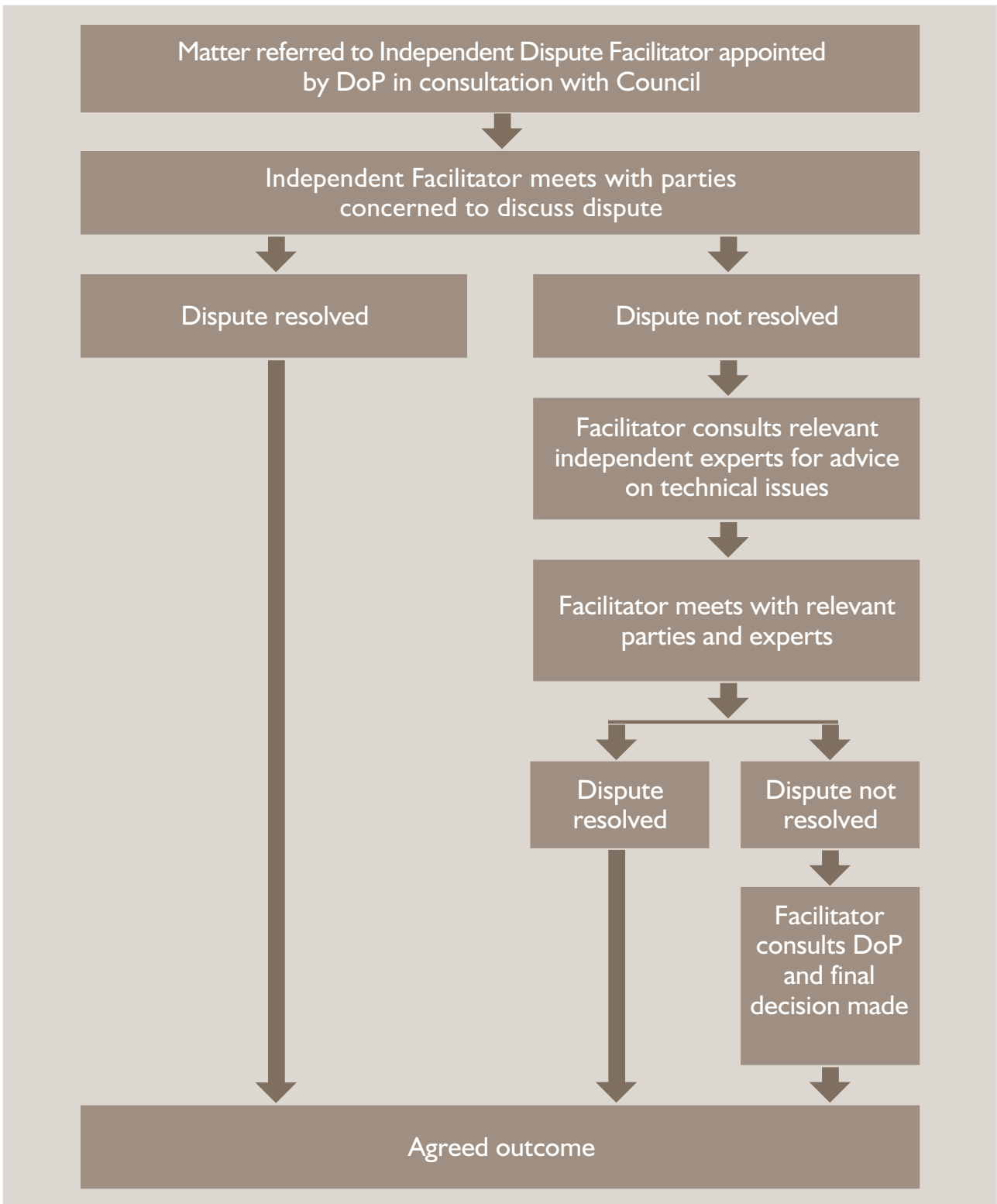


Figure 6.1  
INDEPENDENT DISPUTE RESOLUTION PROCESS

If the results of the independent review are disputed by the landowner, either PF Formation or the landowner may refer the matter to the Director-General for resolution. If the matter cannot be resolved within 21 days, the Director-General will refer the matter to an Independent Dispute Resolution Process.

*Chapter Seven***MANAGEMENT OF CUMULATIVE IMPACTS**

A number of other sand extraction operations take place on sites in the Maroota area adjacent to the Hitchcock Road site. This leads to cumulative impacts relating predominantly to operational noise, generation of air pollutants and truck movements.

The present approval is based on no increase in activity on the Hitchcock Road site, both annual extraction totals and truck movements being limited to the same level as the previous consent. Cumulative noise impacts are limited by specific assessment criteria (see **Condition 6** in **Schedule 3**) and a limit on total daily truck movements. Similar limits apply to other sand extraction operations in the area.

The amenity criterion in the Industrial Noise Policy requires that the LAeq (period) level does not exceed the specified acceptable or maximum noise level appropriate for the particular locality and land use. This is aimed at restricting the potential increase in amenity noise levels known as background creep.

The potential for the simultaneous operation of adjoining developments to exceed the acceptable and maximum noise amenity criteria has been assessed on a worst case scenario basis by adding the intrusive noise levels from the recently approved Lot 198 project and the Hitchcock Road proposal together with the approved noise limits from the licence conditions for Dixon Sands and HB Maroota. This assumes that all projects simultaneously emit their maximum noise levels to a common receiver during non-adverse or adverse weather conditions.

This assessment indicated that the cumulative noise emissions of the development at Hitchcock Road and its adjoining developments would be below the relevant acceptable amenity criteria for industrial noise during the daytime and night time periods at all nine assessment locations.

Cumulative noise emissions generated by the proposal and adjoining developments would be below the relevant acceptable amenity criteria for industrial noise (non-transport) impacts during the daytime and night time periods at all assessment locations.

If the re-modelling of the cumulative noise impacts of sand mining operations at Maroota indicated that the appropriate criterion was expected to be exceeded at any of the nominated locations, an assessment would be carried out to determine the source of the increase and if this was found to be the result of activities on the Hitchcock Road site, an action plan would be prepared and implemented to reduce noise impacts to a level where compliance with the criterion was achieved.

*Chapter Eight***NOISE MONITORING PROCEDURES****8.1 Introduction**

PF Formation has conducted operator-attended noise measurements on a monthly basis at four residential locations adjacent to the Hitchcock Road site since April 1996. In addition, unattended noise logging was undertaken in August 1995, January 1999 and July 2004 at up to ten locations in the vicinity of the site.

In general, noise measurement procedures were guided by the requirements of AS 1055-1989, *Acoustics - Description and Measurement of Environmental Noise* and the *NSW Industrial Noise Policy* (INP) (Department of Environment and Conservation 2000).

All acoustic instrumentation employed throughout the monitoring program was designed to comply with the requirements of AS 1259.2-1990, *Sound Level Meters* and carries current NATA or manufacturer calibration certificates. Instrument calibration was checked before and after each measurement survey, with the variation in calibrated levels not exceeding  $\pm 0.5$  dBA.

**8.2 Operational noise assessment criteria**

Noise assessment criteria relating to the operation of the Hitchcock Road site and the process plant on Lot 198 DP752025 are contained in **Condition 6 of Schedule 3** of the Project Approval and comply with relevant DECC guidelines. PF Formation will operate the project in a manner that ensures that noise generated by the quarry does not exceed the criteria set out in **Table 8.1** at nominated monitoring locations.

**Table 8.1 Noise impact assessment criteria**

| Noise assessment location <sup>1</sup> | Day                           | Night                        |                            |
|--|-------------------------------|------------------------------|----------------------------|
|  | L <sub>Aeq</sub> (15 minute)  | L <sub>Aeq</sub> (15 minute) | L <sub>A1</sub> (1 minute) |
| R1 - Hammond                           | 41                            | 35                           | 45                         |
| R2 - Hitchcock                         | 40                            | 35                           | 45                         |
| R5 - Pignataro                         | 42                            | 35                           | 45                         |
| R6 - Camilleri                         | 40                            | 35                           | 45                         |
| R7 - Maroota public school             | 36(L <sub>Aeq</sub> (1 hour)) | N/A                          | N/A                        |
| R8 - Portelli                          | 39                            | 35                           | 45                         |
| R9 - Young                             | 39                            | 35                           | 45                         |
| R2 - Tornatola                         | 39                            | 35                           | 45                         |

Note 1: The identifying numbers for the assessment locations have been changed from those in **Table 2.1** in order to be consistent with those shown in **Figure 4.7** in the EA.

**Table 8.1 Notes**

- *To determine compliance with the  $L_{Aeq(15\text{ minute})}$  noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impracticable, alternative means of determining compliance may be accepted (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 level where applicable.*
- *To determine compliance with the  $L_{A1(1\text{ minute})}$  limit, noise from the project is to be measured at one metre from the dwelling façade.*
- *The noise limits apply under meteorological conditions of:*
  - *wind speed up to 3m/s at 10m above ground level;*
  - *temperature inversion conditions of up to 3 degrees C and wind speed up to 2m/s at 10m above the ground;**where the wind velocity and temperature gradients are determined to be relevant to the project site in accordance with the NSW Industrial Noise Policy.*
- *The Director-General may relax the noise limits in **Table 8.1** for any property where the proponent has an agreement with the relevant owners to generate higher noise levels and the proponent has advised the Department in writing of the terms of this agreement.*

**8.3 Noise sources and controls**

Noise would be generated on those parts of the site where extraction and subsequent rehabilitation is taking place in addition to that generated by the process plant at fixed locations and truck movements along the internal haul road. Noise would vary depending on the location of some of these activities at any one time. Noise levels would be similar to those currently experienced as the scale and intensity of the development would not change.

Noise would also be generated by the movement of trucks transporting the product to market along the public roads adjacent to the site.

The following operational procedures will be adopted to control the generation of noise from site-related activities.

- Hours of operation identified in **Condition 7** of **Schedule 3** will be strictly observed, No trucks or equipment will enter the site before 6.00am or leave after 6.00pm and the number entering or leaving the site between 6.00am and 7.00am will be restricted to 10 per day.
- Extraction and processing activities will only be undertaken between 7.00am and 6.00pm Monday to Saturday with no operations on Sunday and public holidays.
- All equipment used on site will be regularly serviced and monitored to ensure that the sound power levels for each unit of plant and equipment remains at or below the level set out in **Table 8.2**.
- Panels and covers of silenced plant will be kept shut and plant and equipment switched off when not in use.
- A speed limit of 20 kph will apply to truck movements on the internal haul road which will be regularly regraded to limit body noise from empty trucks travelling on this road.

- The use of reversing alarms will be limited to that required for safety reasons.

**Table 8.2 Plant and equipment sound power levels (dBA 10<sup>-12</sup>Watts)<sup>1</sup>**

| Description         | 1/1 octave band centre frequency (Hz) |     |     |     |     |     |     |     |     |     | Overall SWL |
|---------------------|---------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------|
|                     | 31                                    | 63  | 125 | 250 | 500 | 1k  | 2k  | 4k  | 8k  | 16k |             |
| CAT D9L Dozer       | 109                                   | 111 | 120 | 119 | 120 | 114 | 114 | 119 | 106 | 104 | 120         |
| CAT 730 Dump Truck  | 104                                   | 124 | 125 | 119 | 117 | 112 | 108 | 104 | 106 | 104 | 117         |
| CAT 330CL Excavator | 102                                   | 119 | 120 | 108 | 111 | 102 | 102 | 100 | 100 | 92  | 110         |
| CAT 633D Scraper    | 123                                   | 118 | 123 | 122 | 119 | 116 | 116 | 111 | 112 | 103 | 121         |
| CAT D6D Dozer       | 110                                   | 123 | 114 | 109 | 110 | 111 | 108 | 116 | 107 | 99  | 118         |
| CAT 966F Loader     | 105                                   | 113 | 116 | 108 | 110 | 109 | 108 | 100 | 94  | 90  | 113         |
| Slurry Plant        | 117                                   | 113 | 109 | 105 | 106 | 106 | 103 | 102 | 97  | 91  | 110         |

Note 1: Noise measurement procedures were undertaken in compliance with the requirements of *AS 2012-1999 Acoustics – Measurement of airborne noise emitted by earth-moving machinery and agricultural tractors – stationary test conditions*.

Source: Richard Heggie Associates 2004

## 8.4 Monitoring programs

The proposed monitoring programs and procedures including locations, methods, frequency, and reporting are described in **Chapter 9**.

## 8.5 Response to non-compliance

If an exceedance of the noise assessment criteria set out in **Table 8.1** is identified, the following procedures will be instituted:

### Confirmation of exceedance

A check will be made of the monitoring data to confirm that an error has not been made in recording or analysing the result. If this is the case, the process will continue to the next stage. If any uncertainty arises in relation to the available results, further monitoring will be undertaken to confirm the outcome of the assessment.

**Reporting non-compliance**

Exceedance of the relevant criterion by less than 5dB(A) will require the preparation of a corrective action plan. Details of the proposed corrective actions will be made available to the relevant parties. If requested by the Director-General, PF Formation will commission an independent consultant to undertake a review of site operations and/or truck movements together with their noise-related impacts and incorporate any recommendations into the corrective action plan.

If the exceedance of the relevant criterion is in excess of 5dB(A), the results of the independent review, if requested by the Director-General, will be used as the basis for establishing an acceptable agreement between PF Formation and the affected landowner. This may comprise the initiation of a corrective action plan or the preparation of an agreement between PF Formation and the affected landowner over continued exceedance of the noise criterion.

**Corrective action**

Noise at the site of the measured exceedance will be reassessed. If additional measurements indicate no exceedance of the relevant criterion, no further action will be undertaken but the site will be identified in the event of a future non-compliance. If the new measurements confirm the exceedance of the criterion, further action will be required.

PF Formation will prepare a plan of action to return the noise impacts of site operations and/or truck movements to compliance. This will document the corrective measures to be undertaken, frequency and scale of these measures and the results expected from their implementation. Details of the action plan will be included in the relevant AEMR and will be reported to the Director-General and DECC, if required. The affected landowner or resident will also be notified of the action plan.

**Continuing monitoring and assessment**

Noise at the site of the measured exceedance will be reassessed during and following the implementation of the corrective measures in order to demonstrate a return to compliance with the relevant criteria. PF Formation will provide quarterly monitoring results to the affected landowner or resident and the DECC until the results show a consistent return to compliance. During this period, regular consultation will be maintained with the affected landowner or resident to assist in determining the effectiveness of the corrective measures.

If the noise levels continue to exceed the nominated criteria at a particular location, PF Formation will attempt to develop an agreement with the landowner for signed acceptance of the exceedance of the relevant noise criterion. The agreement will specify a noise level below which the agreement would cease to apply.

PF Formation will notify the affected landowner, the Director-General, the DECC and other government agencies together with local stakeholders of a return to compliance following the successful implementation of the action plan or, alternatively, the establishment of an agreement between PF Formation and the affected landowner.

**Continued non-compliance**

If exceedance of the relevant noise criterion continues and PF Formation is unable to achieve an agreement with the affected landowner, the situation will be referred to the Director-General and an Independent Dispute Resolution Process, as set out in **Condition 1** of **Schedule 4** of the Project Approval, will be instituted.

### Reporting

The recorded exceedance, corrective actions and noise reassessment will be reported to the CCC and included in the relevant AEMR.

## 8.6 Responsibilities

PF Formation is responsible for the management of the project in a manner which achieves the environmental outcomes set out in the approval conditions. The project team members responsible for the implementation of the EMP have been nominated although these may be changed with approval over the life of the approval. Their responsibilities are:

*Site manager* - responsible for the day to day activities on the extraction and process sites.

*Environmental manager* - responsible for the environmental management of the activities on the extraction and process sites.

Each person with responsibilities (as identified above) will hold a controlled copy of the EMP.

Site inspections during operations, the assessment of environmental impacts and the performance of mitigation measures will be carried out regularly by a nominated *environmental officer*. Such inspections will be documented in a standard format and a copy submitted to the *site manager*. Issues arising from these inspections will be addressed immediately. Overall environmental performance will be addressed at management meetings as appropriate.

All persons undertaking any form of work on the site subject to the EMP will be required to attend a site-specific induction. This will provide instruction in the environmental rules, procedures and processes applying to their activities on the site including those necessary to limit noise to acceptable levels.

*Chapter Nine***MONITORING AND REPORTING****9.1 Introduction**

Noise monitoring will be undertaken by PF Formation to demonstrate that measured levels are in compliance with the noise assessment criteria set out in **Table 9.1**. Attended monitoring will be undertaken at appropriate locations at quarterly intervals during day time, evening and night time periods. Unattended monitoring will be undertaken every two years incorporating all DECC measurement periods.

**9.2 Monitoring locations**

Due to the circumstances prevailing at Maroota where a number of sand operations are undertaken by separate companies within a relatively small area, noise monitoring locations need to be carefully chosen in order to identify the noise generated by the activities on one specific site as accurately as possible.

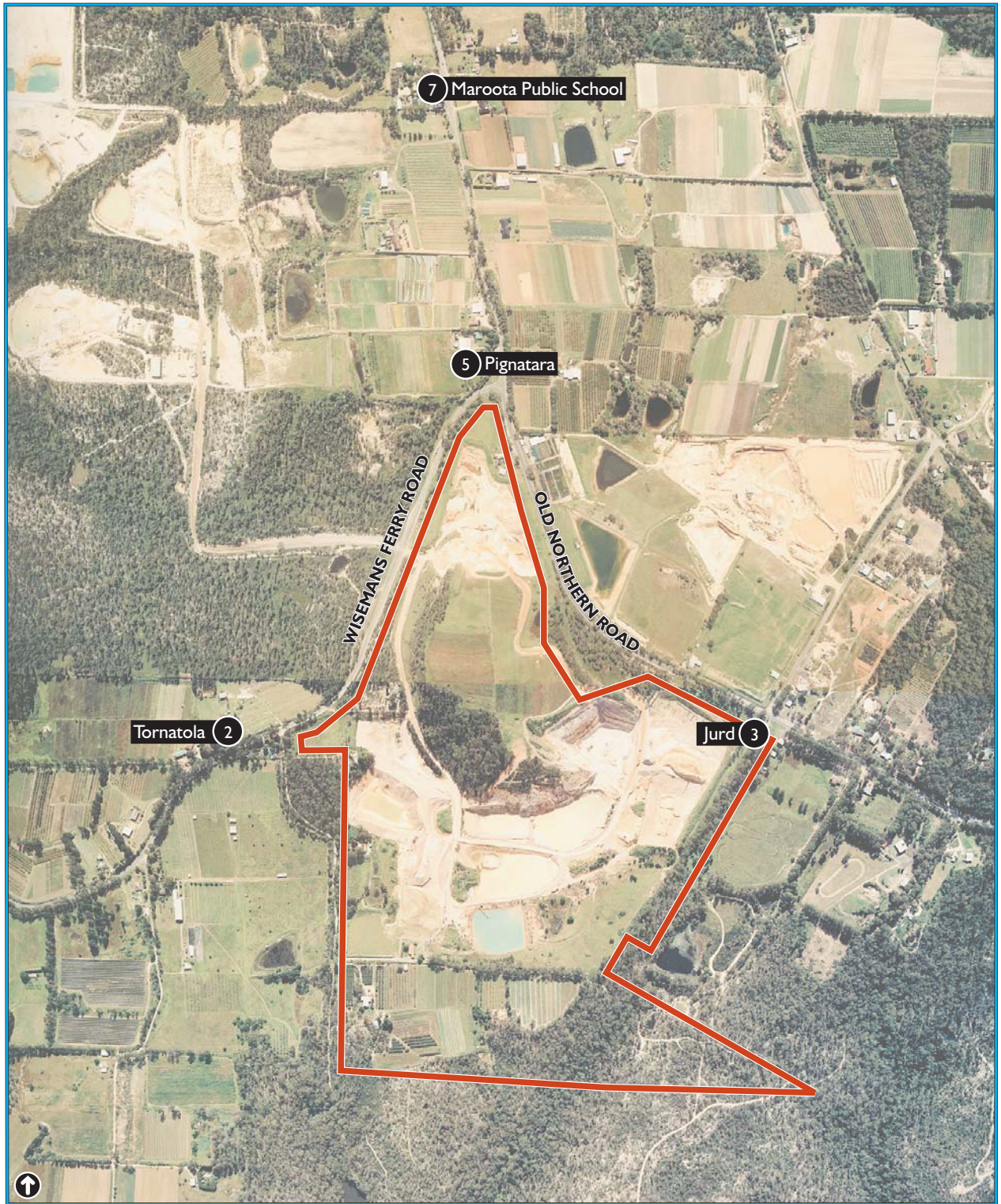
Appropriate monitoring locations have therefore been chosen at residences as close to the operations on the Hitchcock Road site as possible where the influence of adjacent sand extraction activities can be expected to be minimal while rejecting those which are closer to other extraction sites where the influence of activities on the Hitchcock Road site will be minimal. Such locations are also subject to noise monitoring requirements of the relevant conditions applying to other sand extraction operations and are consequently monitored and reported.

Noise impacts have also been monitored at four locations around the boundary of the Hitchcock Road site for ten years allowing trends to be examined over a lengthy period. It is therefore appropriate to continue to monitor noise at these locations if this remains feasible. The monitoring locations chosen are listed in **Table 9.1** and shown on **Figure 9.1**.

**Table 9.1 Noise impact assessment monitoring locations**

| Noise assessment location  | Day                           | Night <sup>1</sup>           |                            |
|----------------------------|-------------------------------|------------------------------|----------------------------|
|                            | L <sub>Aeq</sub> (15 minute)  | L <sub>Aeq</sub> (15 minute) | L <sub>A1</sub> (1 minute) |
| R2 - Tornatola             | 39                            | 35                           | 45                         |
| R3 - Jurd                  | 39                            | 35                           | 45                         |
| R5 - Pignataro             | 42                            | 35                           | 45                         |
| R7 – Maroota public school | 36(L <sub>Aeq</sub> (1 hour)) | N/A                          | N/A                        |

Note 1: Night time is defined as the period between 10.00pm and 7.00am. Activities on the site start at 6.00am and are completed by 6.00pm. There is no activity on the site during the evening period.



**Figure 9.1**

NOISE IMPACT ASSESSMENT MONITORING LOCATIONS

Scale  
 0 500 Metres

— Hitchcock Road site boundary

⑨ Monitoring locations

### 9.3 Noise measurements

The following noise parameters will be measured at the nominated monitoring locations.

- $L_{Aeq(15 \text{ minute})}$  noise level measured at an appropriate free-field location close to the façade of the relevant residence or other building during day time and evening hours.
- $L_{Aeq(1 \text{ minute})}$  noise level measured at an appropriate free-field location close to the façade of the relevant residence during night time hours.

Monitoring will not take place when the wind speed exceeds 3m/s at 10m above ground level or when it can be inferred that a temperature inversion exists with a strength greater than 3 degree C per 100m.

### 9.4 Monitoring frequency

Attended noise monitoring will be undertaken at the locations specified in **Table 9.1** at quarterly intervals during day time, and night time (6.00am to 7.00am) periods during operating hours. Unattended monitoring will be undertaken every two years incorporating all DECC measurement periods.

Noise monitoring will also be undertaken in response to a genuine complaint about noise impacts at a specific residence or property.

The frequency of attended monitoring is the same as currently practiced at the site. Given the absence of noise-related complaints over an extended period (10 years) and the prospect of this situation continuing, PF Formation will apply to the Director-General and DECC for a reduction in the frequency of such monitoring.

### 9.5 Data recording and reporting

The following data will be recorded at each noise monitoring location:

- Date and time-period over which the measurements were taken.
- Brief description of weather conditions during the monitoring period to be supplemented by data from the on-site weather station.
- Identification of the instrumentation used and confirmation that the meter was calibrated prior to use.
- Notes and comments on noise sources during the monitoring period.
- Name and signature of the person conducting the measurements.

The results of noise monitoring will be presented in the relevant AEMR. This will include an analysis of the monitoring results against the criteria listed in **Table 9.1**, previous monitoring results and predictions made in the EA dated November 2007. Trends in noise levels will be identified and any non-compliance noted. A summary of the noise monitoring results will be made available on the PF Formation website. This will be updated at regular intervals.

The recording of an exceedance of noise criteria identified in **Table 9.1** will trigger the procedures described in **Chapter 6**.

## References

Collin C. Donges and Associates Pty Limited. (1996) *Development Application. Proposed Extension of Sand Extraction, Haul Road Construction and Agricultural Land Rehabilitation on Land Containing and Surrounding the Maroota Trigonometrical Reserve, Maroota, Baulkham Hills*, Prepared for PF Formation.

Department of Environment and Conservation (2000), *NSW Industrial Noise Policy*.

DFA Consultants Pty Ltd (1998), *Maroota Trigonometrical Reserve Sand Extraction and Rehabilitation Project – Environmental Management Plan*, Prepared for PF Formation.

DFA Consultants Pty Ltd (1999), *Maroota Trigonometrical Reserve Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 1998/1999* Prepared for PF Formation.

DFA Consultants Pty Ltd (2000), *Maroota Trigonometrical Reserve Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 1999/2000* Prepared for PF Formation.

DFA Consultants Pty Ltd (2001), *Maroota Trigonometrical Reserve Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2000/2001* Prepared for PF Formation.

DFA Consultants Pty Ltd (2002), *Maroota Trigonometrical Reserve Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2001/2002* Prepared for PF Formation.

DFA Consultants Pty Ltd (2003), *Maroota Trigonometrical Reserve Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2002/2003* Prepared for PF Formation.

DFA Consultants Pty Ltd (2004), *Hitchcock Road Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2003/2004* Prepared for PF Formation.

DFA Consultants Pty Ltd (2005), *Hitchcock Road Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2004/2005* Prepared for PF Formation.

DFA Consultants Pty Ltd (2006), *Hitchcock Road Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2005/2006* Prepared for PF Formation.

DFA Consultants Pty Ltd (2007), *Hitchcock Road Sand Extraction and Rehabilitation Project Maroota – Environmental Assessment (Three volumes)* Prepared for PF Formation.

DFA Consultants Pty Ltd (2007), *Hitchcock Road Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2006/2007* Prepared for PF Formation.

DFA Consultants Pty Ltd (2008), *Hitchcock Road and Lot 1 Old Northern Road Sand Extraction and Rehabilitation Projects – Environmental Management Plan, Audit Report 2007/2008* Prepared for PF Formation.