

PF FORMATION



## HITCHCOCK ROAD SAND EXTRACTION AND REHABILITATION PROJECT, MAROOTA

ENVIRONMENTAL STRATEGY PROGRAM  
January 2016



**PF Formation**

## **HITCHCOCK ROAD MAROOTA**

**Sand Extraction and Rehabilitation Project**

# **ENVIRONMENTAL STRATEGY**

Prepared by:

South East Environmental  
ABN 13 927 340 723  
197 Old Telegraph Road Maroota NSW 2756

<b>Document Reference</b>	<b>Version</b>	<b>Date</b>	<b>Prepared by</b>	<b>Reviewed by</b>	<b>Approved</b>
<b>EMS</b>	Version 1	2009	DFA Consultants	Peter Cummins	8/7/2009
<b>EMS</b>	Version 2	2011	PF Formation	Peter Cummins	15/11/2011
<b>EMS.01.1</b>	Version 3	2 <sup>nd</sup> January 2016	PF Formation	Peter Cummins	
<b>EMS.01.2 - Final</b>	Version 4	20 <sup>th</sup> May 2016	South East Environmental	Peter Cummins	21/7/2016

**Approval Date 21<sup>st</sup> July 2016**

**PF Formation**

1 Patricia Fay Drive  
Maroota, NSW 2756  
Telephone: (02) 4566 8257  
Facsimile: (02) 4566 8349

# **Hitchcock Road sand extraction and rehabilitation project, Maroota**

## **Environmental management strategy**

### **Contents list**

#### **Terms and abbreviations**

**Page Number**

## **Environmental strategy**

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Environmental management system</b>	<b>5</b>
2.1	Environmental policy	5
2.2	Environmental legislation, regulations and guidelines	6
2.3	Statutory planning	9
2.4	Ecologically sustainable development	10
2.4.1	The precautionary principle	10
2.4.2	Inter-generational equity	11
2.4.3	Conservation of biological diversity and ecological integrity	11
2.4.4	Improved valuation and pricing of environmental resources	11
2.4.5	Conclusion	12
2.5	Environmental objectives and targets	13
<b>3</b>	<b>Environmental management framework</b>	<b>15</b>
3.1	Organisational framework	15
3.2	Stakeholder consultation	15
3.2.1	General	15
3.2.2	Guidelines	17
3.2.3	Complaints management	17
3.2.4	Incident reporting	17
3.3	Environmental monitoring and evaluation	18
3.3.1	Monitoring program	18
3.3.2	Compliance review	18
3.3.3	Independent review	19
3.3.4	Amendments or variations to the EMP	19
3.3.5	Dispute resolution	20
3.3.6	Response to non-compliance	21
3.4	Environmental training	21
3.4.1	Qualifications	21
3.4.2	Training programs	22
<b>4</b>	<b>Operational environmental issues</b>	<b>23</b>
4.1	Introduction	23
4.2	Environmental issues	23
<b>5</b>	<b>Summary of environmental monitoring programs</b>	<b>27</b>
5.1	Introduction	27
5.2	Environmental monitoring programs	27
	<b>References</b>	<b>28</b>

## **APPENDICES**

- A     Operational procedures
- B     Membership of the Community Consultative Committee
- C     Dispute resolution process
- D     Statement of commitments

## Terms and abbreviations

Term:	Definition
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.
Airshed	Lower atmosphere within a defined geographic area.
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.
Annual Exceedance Probability (AEP)	The probability of a flood event exceeding a nominated level in a year. A one percent AEP is the probability of an event exceeding a nominated level in 100 years.
Aquifer	Geologic formation, group of formations, or part of a formation capable of transmitting and yielding economic quantities of water.
Archaeology	The scientific study of human history, particularly the relics and cultural remains of the distant past.
ARI	Average Recurrence Interval-average or expected period between exceedance of a flood.
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.
Bore	A cylindrical drill hole sunk into the ground from which water is pumped for use or monitoring.
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).
Catchment	The area drained by a stream or body of water or the area of land from which water is collected.
Clay	Very fine grained sediment, often defined as having a particle size less than 2 microns (0.002mm) in diameter.
Compaction	The process of compressing individual grains in a soil or sediment in response to pressure.



<b>Term:</b>	<b>Definition</b>
Conservation	The management of resources in a way that will benefit both present and future generations.
Contaminant	Any physical, chemical, biological or radiological substance or matter in water or soil that is not of natural origin.
Contamination	The degradation of the natural environment as a result of human activities.
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.
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 and Environment.
Director-General	Director-General of the Department of Planning and Environment or delegate.
DPI	NSW Department of Primary Industries
DW	NSW Department of Water
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.

<b>Term:</b>	<b>Definition</b>
Environment Protection Licence	A licence that allows pollution of the environment under controlled conditions regulated by the EPA.
EMP	Environmental Management Plan
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979.</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000.</i>
EPL	Environmental Protection Licence issued under the <i>Protection of the Environment Operations Act 1997</i> .
Equivalent Continuous Sound Level (LAeq)	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.
Erosion	The wearing away of the land surface by the action of water, wind and ice.
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.
Evapotranspiration	Loss of water from a land mass through transpiration from plants and evaporation from the soil.
Fauna	All animals including birds, reptiles, marsupials and fish.
Flora	All plants
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.
Friable	Easily crumbled.
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.
Groundwater	Subsurface water contained within the saturated zone.
Hawkesbury Sandstone	Prominent cliff-forming sandstone occurring across the Sydney basin.

Term:	Definition
Head (hydraulic head)	Energy contained in a water mass produced by elevation, pressure or velocity.
Heritage	Things of value which are inherited from the past.
Hydrocarbon	Any organic compound, gaseous, liquid or solid, consisting only of carbon and hydrogen.
Hydrogeology	The study of subsurface water in its geological context.
Impact	The effect of human-induced action on the environment.
Infiltration	The process of surface water soaking into the soil.
Infrastructure	Supporting installations and services supplying the needs of a project.
Introduced species	Plants and animals not native to Australia and known or thought to have been brought here by humans.
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.
µg/m <sup>3</sup>	micrograms per cubic metre
µs/cm	microsiemens per centimetre
micron	Unit of measure-one millionth of a metre.
mg/L	milligrams per litre
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 and Environment 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/
Observation well	A well constructed or utilised for the purpose of observing groundwater parameters such as water levels, pressure changes and water quality.
Palaeochannel	An ancient river bed, often filled with more recent sediments.
Perched water	Unconfined groundwater separated from an underlying body of groundwater by an unsaturated zone.



<b>Term:</b>	<b>Definition</b>
pH	A measure of acidity or alkalinity of a solution, numerically equal to 7 for neutral solution, increasing with increasing alkalinity and decreasing with increasing acidity. Originally stood for the words potential of hydrogen.
Piezometer	A pipe in which the elevation of the water level or potentiometric surface can be determined.
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.
Recharge	Addition of water to the zone of saturation; also the amount of water added.
Recovery	The difference between the observed water level during the recovery period after cessation of pumping and the water level measured immediately before pumping stopped.
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.
Rehabilitation	Preparation of a final landform following extraction and its stabilisation with vegetation.
Remnant vegetation	Native vegetation remaining after widespread clearing has taken place.
Resource	Potentially usable material in a defined area that can be economically extracted.
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.
RMS	NSW Roads and Maritime Services
Run-off	The proportion of precipitation discharged through surface water systems.
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).

<b>Term:</b>	<b>Definition</b>
Sedimentation basin	An area where runoff is ponded to allow sediment to be deposited. The longer the period that the runoff is held, the smaller the size of the sediment deposited. Such basins have to be regularly cleaned.
SHTW	Sydney Hinterland Transition Woodland
Silt	Sediment comprising most particles between 0.004mm and 0.063mm.
Species	Taxonomic grouping of organisms that are able to interbreed with each other but not with other species.
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.
Terrestrial	Relating to the land as distinct from air or water.
Tertiary	Geologic time at the beginning of the Cainozoic era, 65 to 2 million years ago, after the Cretaceous and before the Quaternary.
Topography	The physical relief and contours of the area.
Topsoil	The surface layer of a soil profile containing most of the organic material and viable life forms and seeds.
Total Dissolved Solids (TDS)	The dissolved mineral content of groundwater, commonly expressed in milligrams/Litre.
Total Suspended Solids	A measure of suspended solids concentrations in a water body and expressed in terms of mass per unit of volume.
Triassic	The earliest of the three periods that constitute the Mesozoic Era. Approximately between 230 and 180 million years before present.
TSC Act	NSW Threatened Species Conservation Act.
Turbidity	A measure of light penetration through a water column containing particles of matter in suspension.
Underflow	The volume of groundwater that flows through a cross sectional area of an aquifer. It depends on permeability and the prevailing gradient.
Unsaturated zone	That part of an aquifer between the land surface and water table.
Vegetation Offset	The conservation and enhancement program described in the Preferred Project Report to occur on the land shown on the plan in Appendix 5 of the Project Approval.

<b>Term:</b>	<b>Definition</b>
VENM	Virgin Excavated Natural Material as defined in the <i>Protection of the Environment Operations Act 1997</i> .
Wash plant	Equipment designed to wash unwanted sized materials from the product.
Water quality	Degree or lack of contamination.
Water table	The surface of saturation in an unconfined aquifer at which the pressure of the water is equal to that of the atmosphere.
Well	A hole sunk into the ground and completed for the abstraction or injection of water or for water observation purposes. Generally synonymous with bore.
1 in 100 Year Flood Level	The flood which occurs on average once every 100 years. Also known as the 100 year Average Recurrence Interval of a flood.

## Chapter One

# INTRODUCTION

The environmental strategy has been prepared for PF Formation to provide the basis for environmental management during the operational phase of the Hitchcock Road sand extraction and rehabilitation project and is in compliance with the requirements of **Condition 1** of **Schedule 5** of the project approval. Together with the subsequent environmental management plans (EMP), this is the principal focus for the environmental management of the project and will provide the basis for ensuring that compliance with the approval conditions is achieved.

The objective of the strategy and the EMPs is to set out procedures to ensure that sustainable management is achieved during the operational stages of the extraction project. The management procedures aim to prevent or mitigate the potential impacts identified in the environmental assessment (EA). More specifically, the objectives of this document are to:

- interpret the requirements of ecologically sustainable development (ESD) as it applies to this project;
- identify the mechanisms by which the requirements set out in the consent conditions will be met;
- identify appropriate mitigation measures that will be applied in order to minimise any adverse environmental effects;
- provide performance indicators, monitoring, and review procedures for all activities important to the environmental performance of the project;
- provide the mechanism for compliance with all relevant approvals, licences, consultations, agreements and legislation; and
- provide the mechanism for compliance with the requirements of the conditions set out in **Schedules 2** to **5** of the Project Approval and all relevant government agency guidelines, assign responsibilities and define reporting requirements.

The requirements of this EMP apply to all activities related to the operations on the site as described in the EA and all relevant subsequent documents prepared during the approval process.

**Condition 1** of **Schedule 5** of the project approval requires the environmental management strategy to:

- provide the strategic context for environmental management of the project;
- identify the statutory requirements that apply to the project;
- describe in general how the environmental performance of the project would be monitored and managed;

- describe the procedures that would be implemented to:
  - > keep the local community and relevant agencies informed about the construction, operation and environmental performance of the project;
  - > receive, handle, respond to, and record complaints;
  - > resolve any disputes that may arise during the life of the project;
  - > respond to any non-compliance;
  - > manage cumulative impacts; and
  - > respond to emergencies; and
- describe the role, responsibility, authority and accountability of the key personnel involved in the environmental management of the project.

The document is divided into three main parts:

- Environmental management system:

This section details the components of overall environmental management for the project including all relevant environmental policies, relevant environmental legislation, the principles of ESD and the environmental objectives developed for the project;

- EMP framework:

This provides the framework for the operational EMP including responsibilities, implementation, monitoring and auditing of the management procedures; and

- Operational and rehabilitation phase environmental issues:

This section sets out the procedures to be undertaken during the operation of the project and its subsequent rehabilitation to ensure that environmental considerations are appropriately incorporated.

The **development site** referred to in this document relates to all those properties from which sand and other materials is to be extracted plus that area which accommodates the process plant, workshop, offices and weighbridge. These are listed in **Table 1.1**.

While the EMP deals predominantly with activities taking place on the extraction area, the nature of the project requires that the materials derived from there are transported to the central processing plant on Lot 198 DP752025. Following processing, the products are transported directly to market from this location. Therefore issues which deal, for example, with traffic relate predominantly to activities generated on Lot 198. The location of the lots listed in **Table 1.1** is shown in **Figure 1.1**.

The environmental management plan complies with the requirements of **AS/NZS ISO 14001: 1996 Environmental management systems - Specification with guidance for use**. It is designed for the sole use of PF Formation in relation to their operations at the Hitchcock Road site at Old Northern Road, Maroota.

**Table 1.1 Land to which the EMP applies**

<b>Description</b>	<b>Owner</b>	<b>Area (Hectares)</b>
Lot 1 DP570966	PF Graham (No 2) Pty Ltd	6.080
Lot 2 DP570966	PF Graham (No 2) Pty Ltd	10.120
Lot 1 DP1013943 (formerly Maroota Trig Reserve No 6739)	The Crown (45 year lease held by the applicant)	1.012
Lots 1 and 2 DP1063296 (formerly Crown Roads)	PF Graham (No 2) Pty Ltd	0.850
Lot 2 DP233818	PF Graham (No 2) Pty Ltd	6.890
Lot 1 DP1091018	PF Graham (No 2) Pty Ltd	15.340
Lot 167 DP752039	PF Graham (No 2) Pty Ltd	16.190
Lot 214 DP752039	Flora Shelf Company Pty Ltd	16.190
Lot 1 DP223323	PF Graham (No 2) Pty Ltd	2.023
<b>Total-extraction area</b>		<b>74.695</b>
Lot 198 DP752025 (Process area)	PF Graham (No 2) Pty Ltd	33.504

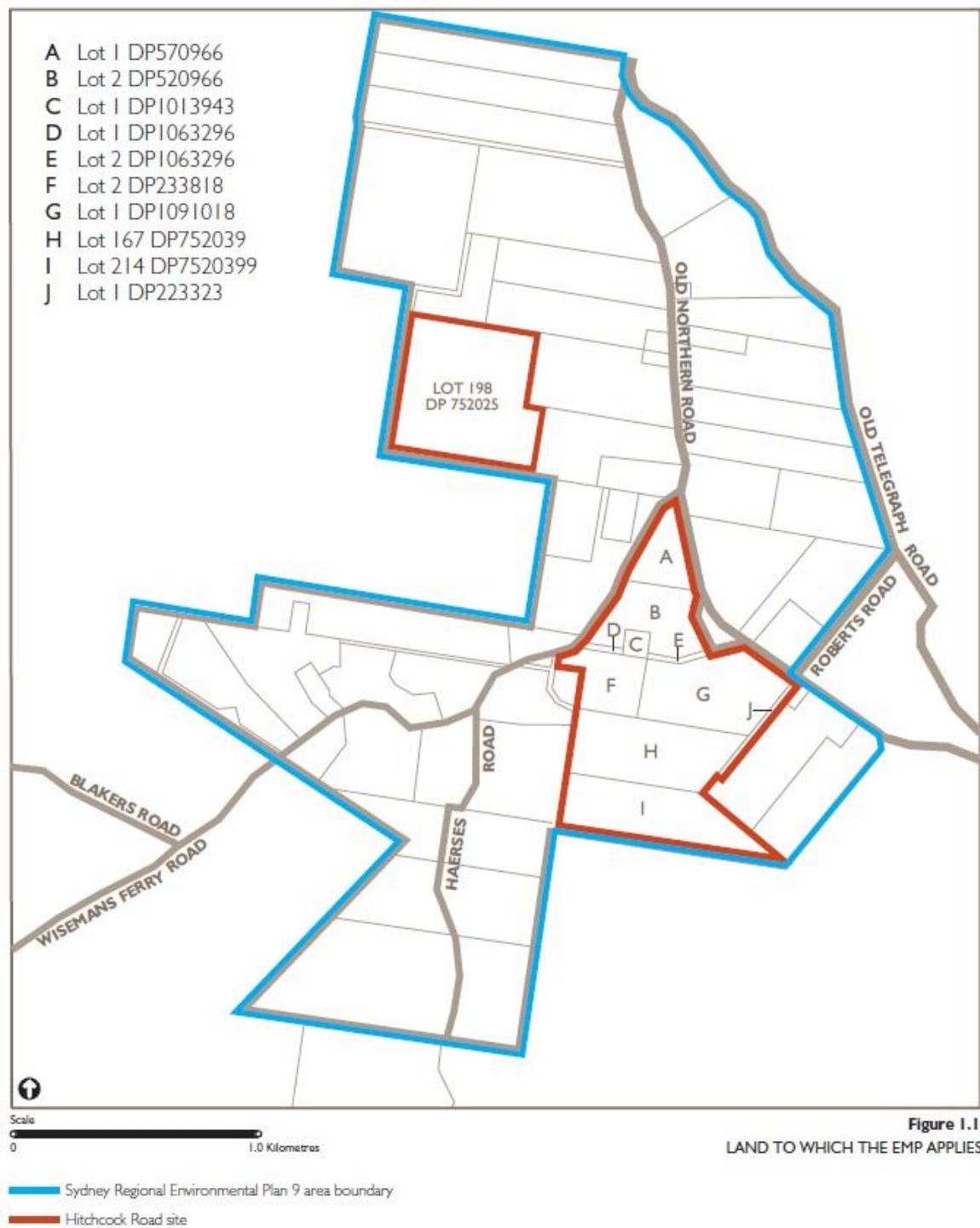
In compliance with the requirements of **Schedule 3** of the Project Approval, this document is accompanied by four others which make up the EMP for the Hitchcock Road Sand Extraction and Rehabilitation Project at Maroota:

- Noise management plan;
- Air quality monitoring program;
- Water management plan; and
- Landscape management plan.

These are collectively referred to as the EMP.

**Condition 2** of **Schedule 5** of the Project Approval requires the preparation of an Environmental Monitoring Program for the project. These are included in each of the individual management plans and are summarised at the end of this document.

Figure 1.1





## Chapter Two

# ENVIRONMENTAL MANAGEMENT SYSTEM

*The EMP forms an important part of the overall environmental management system for the Hitchcock Road Sand Extraction and Rehabilitation Project at Old Northern Road, Maroota. It provides the link between the environmental policies set out in the relevant legislation and other components of the environmental management system and the environmental objectives for the project.*

## 2.1 Environmental policy

PF Formation is committed to safeguarding the environment during the operation of the project and the rehabilitation of the site. The environmental policy is to:

- conduct activities taking into consideration the efficient use of energy and materials, the sustainable use of renewable resources and the minimisation of adverse environmental impacts (including noise, dust, other emissions and visual intrusion);
- ensure that the development occurs in an ecologically sustainable manner;
- search for and employ low-polluting technologies whenever reasonably practicable;
- adopt waste management practices which include source reduction, recycling and safe disposal;
- work closely and constructively with regulatory agencies, community interest groups and other institutions concerned with environmental issues;
- develop and maintain emergency procedures, in co-operation with the relevant agencies and community groups, for responding to major hazards;
- conserve and protect the natural environment and, where appropriate, adopt practices which preserve biodiversity;
- promote environmental awareness among staff and customers through specific training and awareness programmes.

Overall responsibility for the environmental management system for the project lies with PF Formation and that operator will be responsible for ensuring that work carried out meets the requirements of the environmental management system. This will include reporting regularly on compliance and performance, initiating independent audits as appropriate and ensuring that the implementation of this environmental management plan is undertaken in an appropriate manner. Generally, all employees on the project will take on a personal responsibility for environmental issues.

## 2.2 Environmental legislation, regulations and guidelines

The project is required to be carried out generally in accordance with the EA, preferred project report, statement of commitments and the conditions included in the project approval. If any inconsistency arises, the preferred project report will prevail over the EA and the conditions of approval will generally prevail to the extent of the inconsistency.

The EMP has been prepared taking into in consideration current relevant legislation and environmental guidelines in NSW.

This section outlines the legislation, regulations and guidelines applicable to the EMP as a whole.

The environmental manager for the operations (as defined in **Section 3.1**) will hold copies of those documents required for regular use.

The relevant legislation and regulations are listed below. Guideline documents, which provide the basis for the operational phase of the project, are also listed.

Legislation and guidelines identified for the project are listed (but not limited) to the following:

### ***Legislation and policies***

- *General*

- a) Environmental Planning and Assessment Act, 1979
- b) Protection of the Environment Operations Act, 1997
- c) Local Government Act, 1993
- d) Mining Act 1992
- e) Water Management Act 2000
- f) Water Management Amendment Act, 2008
- g) Environment Protection and Biodiversity Conservation Act 1999
- h) Sydney Regional Environmental Plan No 9 (Extractive Industry No 2)

- *Biophysical*

- a) Hills Development Control Plan 2012 (DCP 2012)
- c) Protection of the Environment Operations Act, 1997
- d) Protection of the Environment Operations (Clean Air) Regulation, 2002
- e) Fisheries Management Act, 1994
- f) Local Government Act, 1993
- g) National Parks and Wildlife Act, 1974

- h) Native Vegetation Act, 2003
- i) Ozone Protection Act, 1989
- k) Soil Conservation Act, 1938
- l) State Environmental Planning Policy No.46 - Protection and Management of Native Vegetation
- m) Sydney Regional Environmental Policy No 20 (Hawkesbury-Nepean River) as amended
- n) Threatened Species Conservation Act, 1995
- o) Threatened Species Conservation Amendment (Biodiversity Banking) Act 2006

- *Human Environment*

- a) Aboriginal Land Rights Act, 1983
- b) Hills Local Environmental Plan (LEP) 2012
- c) Crown Lands Act 1989
- d) Protection of the Environment Operations Act 1997
- e) Heritage Act, 1977
- f) Native Title Act, 1993 (Commonwealth)
- g) Native Title Act (New South Wales) 1994
- h) Occupational Health and Safety Act, 2000
- i) Occupational Health and Safety (Hazardous Substances) Regulation, 1996

*Waste*

- a) Dangerous Goods (Road and Rail Transport) Act, 1975
- b) Protection of the Environment Operations Act 1997
- c) Local Government Act, 1993
- d) Waste Avoidance and Resource Recovery Act, 2001

**Guidelines**

*Biophysical Environment*

- a) Australian Standards (dust deposition and suspended particulates) and other applicable guidelines.

- b) Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC, 2000).
- c) Construction Techniques for Sediment Pollution Control (Environment Protection Authority, 1991).
- d) Control of Erosion on Construction Sites (Department of Conservation, Forests and Lands 1987).
- f) Environmental Guidelines for Major Construction Sites. Best Practice Environmental Management Series (Environment Protection Authority, 1996).
- g) Guidelines for Groundwater Protection in Australia National Water Quality Management Strategy (ANZECC 2000)
- h) National Principles for the Protection of Water Ecosystems 1996
- i) Planning Guidelines for Native Vegetation Protection and Management in New South Wales (Department of Land and Water Conservation 1995)
- j) Provisional Water Quality Investigations Manual: Preferred Methods for Sampling and Analysis (Environment Protection Authority 1995)
- k) Rural Land Uses and Water Quality, National Water Quality Management Strategy (ANZECC 2000)
- l) Soil and Water Quality Management for Urban Development (NSW Department of Housing 1993)
- m) Urban Erosion and Sediment Control (Department of Conservation and Land Management 1992)
- n) Recovering bushland on the Cumberland Plain. Best practice guidelines for the management and restoration of bushland. (Department of Environment and Conservation 2005)
- *Human Environment*
  - a) Australian Standard AS2436 Guide to Noise Control on Construction, Maintenance and Demolition Sites 1981
  - b) Environment Protection Authority Environmental Noise Control Manual 2000
  - c) Environment Protection Authority Environmental Criteria for Road Traffic Noise 1999
  - d) Department of Environment and Conservation Industrial Noise Policy 2000
- *Waste*
  - a) Australian Standard AS1940 The Storage and Handling of Flammable and Combustible Liquids 1993
  - b) Environmental Guidelines: Assessment, Classification and Management of Non-liquid Waste (Environment Protection Authority 1997)

## **2.3 Statutory requirements**

Operations at the Hitchcock Road site will comply with the following statutory requirements:

### **Environmental Planning and Assessment Act 1979**

An environmental assessment (EA) has been completed for the Hitchcock Road Sand Extraction and Rehabilitation Project and Project Approval granted by the Minister for Planning and Environment. The Project Approval required the preparation of various documents and plans, namely:

- Environmental Management Strategy – this document;
- Survey Plan of the site boundaries;
- Maximum Extraction Depth Map;
- Noise Management Plan;
- Air Quality Monitoring Program;
- Water Management Plan; and
- Landscape Management Plan.

The relevant conditions in the approval are referenced in the management plans/monitoring programs and the implementation of each summarised at the end of this document.

### **Protection of Environment Operations Act 1997**

An Environment Protection Licence (EPL 3407) under the *Protection of Environment Operations Act 1997* applies to the Hitchcock Road site and Lot 198 DP752025. This is consistent with the Project Approval. The general terms of approval of the Environment Protection Authority are included in the Project Approval.

### **National Parks and Wildlife Act 1974**

No permits are required under this Act. However, all employees and contractors at the site will be made aware of their obligations to immediately report the presence of any sites, artefacts or values of Aboriginal heritage significance identified during the course of operations. Given the previous extent of clearing and the results of the investigations undertaken as part of the EA, it is unlikely that any of the above will be identified.

### **Threatened Species Conservation Act 1995**

The remnant forest communities on the site are not included as endangered on either the *Threatened Species Conservation Act 1995* or the *Environment Protection and Biodiversity Conservation Act 1999*. However, approximately 3.7 hectares of Sydney Hinterland Transition Woodland (SHTW) and a small area of another woodland community will be removed as part of the project. This will be offset by the progressive revegetation of some 7.9 hectares of the site with SHTW and 4.1 hectares of other appropriate woodland. Details of the offset strategy are included in the Landscape Management Plan.

*Tetratheca glandulosa* (a threatened flora species) is present on the site. The extraction area includes a buffer to the known locations of this species.

### **Noxious Weeds Act 1993**

Section 15 of this Act requires that the local control authority (The Hills Shire Council) is advised of the presence of any notifiable weeds on the site.

#### **Water Act 1912**

All four monitoring bores plus the dam in Lot 167 DP752039 are licensed under the Act to allow the use of piezometers for groundwater monitoring. Details of these licences are included in the AEMR.

#### **Hills Local Environmental Plan (LEP) 2012 and Hills Development Control Plan 2012 (DCP 2012)**

These local planning instruments control the development of the Hitchcock Road site and Lot 198 DP752025. These sites are also located within the area defined for inclusion within *Sydney Regional Environmental Plan 9* which was introduced to assist in the development of extractive resources located close to the Sydney Metropolitan area. The plan takes precedence over local planning instruments.

The sites are zoned Rural 1(b) under the LEP. Quarrying is permissible in this zone with development consent. The approved project generally complies with the requirements of the DCP.

#### **NSW Biodiversity strategy**

The EA prepared for the Hitchcock Road Sand Extraction and Rehabilitation Project determined that its development would be unlikely to have a significant impact on flora and fauna issues, although it recognised that an area of native woodland would need to be removed. This loss would be offset by the revegetation strategy described in the Landscape Management Plan. The development will be undertaken in compliance with the principles of ecologically sustainable development as required in the NSW Biodiversity Strategy. On-site operations will not have any impacts on downstream water courses.

## **2.4 Ecologically sustainable development**

PF Formation is committed to meeting the goals, principles and requirements of ESD. This will be a key component of the project throughout its operational phase.

The National Strategy for Ecologically Sustainable Development released in December 1992, describes ESD as:

*development which aims to meet the need of Australians today, while conserving our ecosystems for the benefit of future generations. To do this, we need to develop ways of using our economy in a way which maintains and, where possible, improves their range, variety and quality. At the same time we need to utilise those resources to develop industry and generate employment.*

The proposed development strikes a balance between extracting and transferring sand to the Sydney building industry and maintaining existing ecosystems. ESD is about decision making in an integrated manner considering long term implications not just for the local community but ultimately for the greater community.

### **2.4.1 The precautionary principle**

This principle is defined in the National Strategy for ESD as:

*where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*

Throughout the proposal for the Hitchcock Road site the anticipatory and precautionary approaches have been adopted. There is inevitably a risk with any development but with the history and understanding of sand mining readily available in the area, there is an increased level of certainty about the responses of the natural environment to the disturbance associated with the development. This limited uncertainty has been reduced with the implementation of the mitigation measures and monitoring programmes identified in the EA and is supported by the status reports prepared by the Hills Shire Council.

#### **2.4.2 Inter-generational equity**

This principle is defined as follows:

*The present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations*

Both existing and future generations will be influenced by the extended time frame of this development. In recognising that raw materials are not renewable, it is fundamental that resources within and surrounding Sydney are managed and developed to ensure current and future generations have access to the raw materials they need while limiting impacts on the natural environment. Ecologically sustainable development of non-renewable resources such as sand also embraces the concept of maximum resource utilisation. The concept of inter-generational equity would encourage existing operating sand mines, of which this is one, to be extended to obtain maximum resource from areas already disturbed.

The EA has been prepared on the basis that no part of the community is unacceptably disadvantaged and the area is appropriately rehabilitated to ensure that a viable land use is available following extraction. The mitigation and monitoring measures ensure that future generations are not disadvantaged as a result of this development.

#### **2.4.3 Conservation of biological diversity and ecological integrity**

This principle requires that:

*Measures which halt the loss of species and genetic diversity should be pursued*

The strategic approach to the management of plant and animal life is outlined in the EA. In addition all reasonable steps have been taken to ensure there are no long lasting effects on the environment.

#### **2.4.4 Improved valuation and pricing of environmental resources**

This principle means that:

*While prices for natural resources should be set to recover the full social and environmental costs for their use and extraction, many environmental values cannot be priced in monetary terms*

The extensive technical investigations incorporated in the EA and the monitoring costs both before and during this development have ensured that the saleable product will be fully priced and incorporate appropriate environmental protection measures. As outlined in the economic appraisal, sand must be obtained close to markets in order to minimise transport costs. This is an inherent control over pricing of this environmental resource because transport represents a high proportion of the cost of getting the material to



market. As resources closer to the Sydney market become either uneconomic to extract or unable to be extracted, they are replaced by resources further from Sydney which involves both higher economic and social costs in terms of additional trucks on the road for longer distances and times. Other forms of transport are uneconomic because of handling costs and the diversified locations of sales outlets.

#### **2.4.5 Conclusion**

This development has been designed to enable maximum extraction of sand to take place in both an efficient and environmentally responsible manner and thereby ensure the compatibility of the development with environmental sustainability and the well being of the community in the short and long term. The project is consistent with the goals and guidelines for ESD.

The principles of ESD as they apply to the project are summarised in the following section:

<b>Potential long term development impact</b>	<b>ESD based actions to mitigate potential long term impact</b>
Loss of prime agricultural land	<p>Careful stripping, stockpiling and rapid revegetation of topsoil followed by innovative rehabilitation of disturbed areas.</p> <p>About one third of the total area is currently suitable for agriculture. The end use land form will substantially increase the area of good agricultural land.</p> <p>Surface contouring and the reinstatement of a high quality soil substrate will improve final end use agricultural ground profiles.</p>
Depletion of quality of groundwater	<p>No surface runoff will be allowed to pass to groundwater beneath the Maroota Sand without first being filtered through a minimum of two metres of sand forming a buffer above the groundwater level.</p>
Depletion of discharge to downstream bushland areas	<p>No aspect of the extraction proposed is likely to alter present downstream spring seepage flows. Present surface flows from the site will remain essentially unaltered and, in the long term, will probably be improved.</p>
Depletion of ground waters	<p>The extraction will extend no deeper than two metres above the shallow aquifer groundwater level and will therefore be expected to have no influence on the volume of groundwater.</p> <p>Project staging and end use land form will probably result in an increased recharge to groundwater</p>
Reduction of vegetation and fauna habitat	<p>The planting of native vegetation and the re-creation of woodland communities will increase current habitat values.</p> <p>The revegetation of post extraction land areas on steeper grades with native species will increase regional habitat abundance.</p>
Loss of the rural character of Maroota	<p>End use landform will provide glimpses of undulating to slightly hilly agricultural/pasture lands. These will be viewed through stands of long established native vegetation. The rehabilitation will be carefully planned and overseen by a suitably qualified specialist.</p>

## 2.5 Environmental objectives and targets

Environmental objectives and targets have been developed for the project based on the principles of ESD, environmental legislation and the requirements of the approval conditions.

The primary environmental objectives of the Hitchcock Road sand extraction and rehabilitation project are:

- extract the available sand in a manner conforming with all relevant environmental legislation, regulations and guidelines
- rehabilitate the site and return the land to at least its present state of agricultural productivity
- re-establish existing vegetation communities on the site
- create a final landform aimed at maximising the charging and recharging of local groundwater resources

Targets for meeting the objectives are listed as performance criteria are summarised in **Table 2.1**.

**Table 2.1 Summary of environmental objectives and targets**

Environmental issue	Objective	Target
Noise and Vibration	Minimise the impact of operational noise and vibration and achieve compliance with all relevant legislation and guidelines	Operational noise does not exceed EPA guideline limits and vibration does not result in complaints or cause structural damage to local buildings and structures
Air Quality	Minimise and control all emissions to the air	Dust from site operations and maintenance complies with EPA specified air quality criteria. Vehicle and plant emissions comply with regulations
Access and Traffic	Minimise the impact of operational traffic on the local community	Total truck movements generated by all PF Formation operations in the Hills Shire are not to exceed 200 laden vehicle movements per day via the intersection of Wisemans Ferry Road and the haulage road
Erosion and Sediment Control	Minimise erosion, sedimentation and impacts on water quality of the local watercourses	Soil erosion control measures are incorporated in the site operational procedures. As the site is internally draining, operations will have no

**Hitchcock Road Sand Extraction and Rehabilitation Project Maroota**  
**Environmental strategy**

		impact on the hydrologic regime of downstream waterways
Water Management	Protection of local groundwater resources	Extraction to be no lower than 2m above the wet weather high groundwater level
Flora and Fauna	Minimise the risk of impacts to the natural environment (especially threatened species) and rehabilitate the site with an appropriate mix of local species	Areas of significant flora and fauna are protected. The site is successfully revegetated with the appropriate species in conformity with the approved Landscape Management Plan
Rehabilitation and vegetation offsets	Complete staged rehabilitation in conformity with the approved Landscape Management Plan.	The site is successfully rehabilitated within three years of the cessation of extraction.
Social Impact Management	Ensure that the impacts of the project on the local community are understood and where feasible minimised	Consider community feedback on issues relating to on-site operations in order to minimise negative community impacts.
Heritage	Ensure that items of Aboriginal archaeological or European heritage significance are recognised and protected or conserved during operations	Heritage items identified are protected
Visual Amenity	Minimise visual and amenity impacts on the community during project operations	No complaints received regarding visual impacts during project operations
Waste Management	Manage waste generated during operations in accordance with the preferred hierarchy of minimisation, reuse, recycling and disposal	Quantities of waste to disposal reduced and those to reuse increased. Wastes for disposal stored in appropriate areas and removed on a regular basis
Emergency Response	Ensure that appropriate procedures and training are in place to deal with emergencies	Maintain emergency response procedures and training up to date
<hr/>		
Hazard, Risk and Safety	Ensure that the handling and storage of dangerous goods on site does not result in pollution of the environment or cause harm to individuals	Storage and handling of hazardous materials complies with legislative requirements. All pollution incidents contained and cleaned up without impact on the environment or injury to personnel. All incidents recorded.

## Chapter Three

# ENVIRONMENTAL MANAGEMENT FRAMEWORK

*The environmental management plan (EMP) incorporates management procedures, an implementation plan, a monitoring program and an evaluation program to ensure that continuous improvement is achieved. Each aspect of the EMP is discussed in the following sections.*

### 3.1 Organisational framework

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 consent. Their responsibilities are:

**Quarry manager** - responsible for the day to day activities on the extraction and process sites. The site is managed Peter Watt (Quarry Manager) who has a Certificate III in Extractive Industry Operations from Illawarra TAFE and is the Mine Manager under the Department of Mineral Resources Mine Safety protocol. He is responsible to John Graham (Director of PF Formation) for the safe and efficient management of all site related operations.

**Environmental manager** - responsible for the environmental management of the activities on the extraction and process sites. Joshua Graham is the Environmental Manager. He has a Certificate IV in Extractive Industries Management and has recently completed a Diploma in Extractive Industries Management. He is responsible to John Graham for the environmental management of PF Formation operations at Maroota.

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** or the **environmental manager**. Such inspections will be documented in a standard format and a copy submitted to the **quarry manager**. Issues arising from these inspections will be addressed immediately. Overall environmental performance will be addressed at management meetings as appropriate.

### 3.2 Stakeholder consultation

#### 3.2.1 General

Consultation with agency stakeholders and the interested public has been undertaken on the basis of the activities listed in the EMP and within a series of environmental management plans and monitoring programs prepared and submitted to the Department of Planning and Environment (Department). These are listed in **Schedule 3** of the project approval and comprise:

- Noise management plan;
- Air quality monitoring program;
- Water management plan; and

- Landscape management plan.

Consultation with the relevant government agencies was undertaken throughout the preparation of the management plans and monitoring programs.

**Approval condition 5 of Schedule 5** requires PF Formation to prepare and submit to the Director-General, relevant agencies and the Community Consultative Committee (CCC) every twelve months of the date of approval, and annually thereafter an annual environmental management report (AEMR) which demonstrates that the overall performance and management of the operation is being undertaken in a satisfactory manner. The AEMR is to:

- identify the standards and performance measures that apply to the project;
- describe the works that will be carried out in the next 12 months;
- include a summary of the complaints received during the past year and compare this to the complaints received in previous years;
- include a summary of the monitoring results for the project during the past year;
- include an analysis of these monitoring results against the relevant;
  - > impact assessment criteria/limits;
  - > monitoring results from previous years; and
  - > predictions in the EA.
- Identify any trends in the monitoring results over the life of the project;
- Identify any non-compliance during the previous year; and
- Describe what actions were, or are being taken, to ensure compliance.

The overall environmental management of the sand extraction is subject to the requirements and conditions set out by various regulatory bodies and other nominated agencies. Consultation with these agencies is therefore an integral component of the ongoing management of the project. Community consultation has been and will also continue to be maintained for the duration of operations on the site. Feedback from the community will be achieved via the Community Consultative Committee (currently the Liaison and Review Committee) in conformity with **Condition 9 of Schedule 5**. The present membership of this group is listed in **Appendix B**.

Information on the environmental management of the project will be provided to stakeholders:

- copy of all relevant documents relating to the approval or amendment of any plan/strategy/program or the completion of the audits or the AEMR required under the approval (see **Section 3.3.3**) will be made available to the relevant agencies and to members of the public, on request, within one month of the approval;
- copy of the relevant documents will also be made available on the PF Formation website; and
- a summary of environmental monitoring results required under the approval will be made available on the PF Formation website, updated on a regular basis.

### **3.2.2 Guidelines**

During the preparation of the EMP consultation was maintained with representatives of the relevant Government agencies.

The EMP incorporates management procedures to meet the guidelines and comments provided by these agencies.

### **3.2.3 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.

All complaints received will be recorded in a register providing the following details:

- date of the complaint;
- name, address and telephone number of the complainant;
- nature of the complaint; and
- response action taken and date

Where appropriate, the complainant will be notified of the action taken.

### **3.2.4 Incident reporting**

PF Formation will notify the Department and all other relevant agencies of any exceedance of the limits/performance criteria in the approval or the occurrence of any incident that causes, or may cause, harm to the environment within 24 hours of detecting such an event/incidence.

PF Formation will provide the Department and all other relevant agencies with a written report within 6 days of notification. The report will include:

- date, time and nature of the exceedance/incident;
- cause, or likely cause, of the exceedance/incident;
- action taken to date; and
- proposed measures to address the exceedance/incident.

### **3.3 Environmental monitoring and evaluation**

The management procedures detailed in **Appendix A** include monitoring and reporting requirements for each identified strategy for an environmental issue. The overall environmental management strategy includes auditing of the EMP, provisions for making amendments to the EMP and provisions for registering complaints relating to environmental issues.

#### **3.3.1 Monitoring program**

Comprehensive programs of environmental monitoring have been undertaken on the site for over ten years providing the longest continuous data set available relating to sand extraction in Maroota. These data were summarised and reported annually to the Hills Shire Council and relevant government agencies. These programs have been amended to comply with the requirements of the approval conditions as set out in **Schedule 3**. They comprise:

- operational noise;
- air quality;
- surface water flow and quality; and
- groundwater level, flow and quality.

#### **3.3.2 Compliance Review**

The EMP requires periodic review to ensure that compliance with all elements of the plan is achieved and to establish whether its requirements are fully implemented and maintained. This will comprise both regular internal reviews and an independent environmental audit every three years.

The objectives of these reviews and audits are to:

- determine whether the plan has been properly implemented and continues to be adequately maintained at the site
- determine conformance with the plan
- provide the basis for improvement of environmental management during the project.

The internal reviews will involve thorough inspection of the operational areas and inspection of documentation such as the monthly environmental checklist. The management of the project will be compared against the procedures set out in this EMP by ensuring that at least annually the Environmental Operations Procedures and the Notice of Approval are reviewed and signed by the management team. This review and matters taken forward will be reported in the AEMR report documenting:



- the level of management achieved at the site for each environmental issue;
- instances of non-compliance with the EMP; and
- areas to be targeted for improvement.

### **3.3.3 Independent review**

The independent audit will be undertaken by a suitably qualified environmental consultant with expertise in flora and fauna assessment and quarry rehabilitation whose appointment has been approved by the Director-General. The audit will include:

- consultation with relevant government agencies;
- assessment of the environmental performance of the project and its effects on the surrounding environment;
- assessment of the compliance of the project with the relevant standards, performance measures and statutory requirements; and
- review of the adequacy of any strategic/plan/program required under this approval, and if necessary, recommend measures or actions to improve the environmental performance of the project, and/or any strategic/plan/program required under this approval.

A copy of the report prepared by the independent auditor(s) will be made available to the Director-General within 6 weeks of completion of the audit together with a response to any recommendations included in the document. The most recent audit was completed in 2014 and the matters raised have been taken into account in the preparation of this Strategy.

An approval requirement is that the independent audit report will be reviewed by PF Formation within 3 months of its submittal to the Director-General and, if necessary amendments will be made to:

- each of the environmental ,management and monitoring strategies/plans/programs in **Schedules 3** and **5** of the project approval; and
- sum of the vegetation offset bond (see **Schedule 3** of the Project Approval) considering:
  - > effects of inflation;
  - > any changes in the total area of disturbance; and
  - > performance of the vegetation offsets against the completion criteria of the rehabilitation and vegetation offset management plan.

Any amendments will require the approval of the Director-General.

### **3.3.4 Amendments or variations to the EMP outside the 3-yearly review**

The environmental management procedures outlined in the EMP may need to be amended during the course of the project. This may occur as a result of issues raised as a result of non-compliance or from circumstances varying from those envisaged during the initial assessment stages of the project.

A formal process is required for the introduction of any amendments to the EMP to ensure that their environmental implications are acceptable to all stakeholders. The use of a

prescribed procedure ensures that the integrity of the EMP is maintained and subsequent approval of any changes by the stakeholders is assured.

The procedure for proposed amendments or variations to the EMP is as follows:

- the **environmental manager** will be notified immediately of the necessity for any amendments. The reasons for the amendment will be explained and his approval sought. Once this is given, stakeholder concurrence is required
- once this approval is given, the EMP will be amended and the change recorded in the EMP Amendments/Variations Table.
- the amended EMP document is then signed off by the authorised personnel, including the **environmental manager**, and controlled copies of the document reissued. Superseded copies of the EMP will be recovered and recycled.

### **3.3.5 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 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 (see **Section 3.3.6**); 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 (see **Appendix C**).

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 (see **Appendix C**).

### **3.3.6 Response to non-compliance**

Appropriate management of non-compliance is required to ensure that consequent impacts are mitigated and that appropriate corrective and preventative actions are implemented where required. Non-compliance is any instance where the requirements of the EMP or its associated procedures are not achieved.

All instances of non-compliance will be reported to the **quarry manager** by the **environmental manager**. Where the non-compliance has caused the potential for, or actual environmental impact, every effort will be made to prevent or mitigate any environmental damage.

In reviewing the incident, documents will be reviewed to determine whether changes are required. The need for additional procedures will also be identified.

The **environmental manager** is required to produce a non-compliance report, which includes, but is not limited to, the following:

- a factual description of the non-compliance;
- an assessment of the causes of the non-compliance;
- all personnel involved;
- any actions taken in response to the non-compliance; and
- any changes required to the EMP.

The non-compliance will be discussed with the **quarry manager** and any necessary changes to operating procedures agreed. All non-compliances will be reported in the AEMR.

## **3.4 Environmental Training**

### **3.4.1 Qualifications**

All personnel directly involved in environmental management shall be appropriately qualified to undertake the tasks of the position to which they are appointed.

The **environmental manager** will be responsible for establishing the necessary criteria for each position and verifying the qualifications and experience of all environmental management personnel.

### **3.4.2 Training Programs**

#### *Induction Training*

All personnel employed on the project will be required to undertake an environmental management induction to the extent it relates to their position. The objectives of the induction are to:

- introduce the EMP and environmental management policies; and
- review all relevant environmental issues and controls for the project.

#### *General Training*

In addition to the induction program, personnel will be trained to provide the required knowledge, skills and awareness to ensure that all work is carried out in an environmentally sustainable manner. This will mainly be done by incorporating this training and discussion in quarterly employee meetings. All environment improvements that could be made are to be noted on their weekly checklist sheet.

## Chapter Four

# OPERATIONAL PHASE ENVIRONMENTAL ISSUES

## 4.1 Introduction

The project can be divided into three phases:

- Pre-operational during which various site works were put in place. These included the construction of the peripheral bunds and the water management system which is required for the operation of the site but does not involve extraction of sand for commercial purposes. Such operations involved the use of heavy machinery and are required to comply with all the criteria established to control the main extraction activities on the site. This stage has been completed for those areas where extraction has taken place under the existing consent.
- The operational phase which consists predominantly of the phased extraction of sand for processing and subsequent sale.
- Progressive rehabilitation of the site to an agreed ground profile with appropriately revegetated areas.

Each of these comprises one part of a continuous process employing similar activities and using the same machinery. They are therefore treated in this EMP as a single set of continuing activities.

During this operational phase, environmental issues will be addressed progressively to ensure that:

- the completed project complies with environmental performance criteria as prescribed in all applicable standards and legislation; and
- environmental impacts are fully evaluated and minimised.

Consultation will be undertaken with all relevant authorities including the Department and the EPA.

## 4.2 Environmental Issues

The following environmental issues require consideration during operational activities on the site:

### *i) Operational Noise*

During all stages of development, noise emissions that may arise as a result of project operations will be controlled in order to comply with the criteria set out in the approval conditions (**Schedule 3**) and the requirements of EPA. Best environmental management and work practices will be employed during both the construction and operational phases to ensure that any noise and vibration impacts are minimised at the nearest potentially affected sensitive receptors. These will include the following measures:

- construction of peripheral bund walls during the initial site establishment phase;
- operation of all mobile equipment behind these peripheral bunds at an increasing depth as the extraction progresses;
- fit all mobile equipment with residential grade muffler systems with the overall noise level checked on an annual basis to ensure that the lowest achievable emission level is maintained; and
- implementation of a program of environmental noise monitoring to identify any potential impacts and introduce mitigation measures as necessary.

*ii) Air Quality*

Ground disturbance, vehicle movement and material processing all have the potential to produce high levels of dust during dry or windy weather. Various means are available to minimise this occurrence and to comply with the criteria set out in the approval conditions (**Schedule 3**) and the requirements of EPA. These are:

- minimise vehicle movements required to transport the sand to the processing plant;
- ensure that all roadways or exposed areas subject to substantial use by vehicles are regularly watered during dry or windy weather. All operations should cease during periods of exceptionally high wind;
- vegetate all stockpiles of topsoil as soon as possible;
- undertake rehabilitation as soon as possible on completion of extraction from a particular phase of the project; and
- ensure that all payloads are covered on trucks leaving the site.

*ii) Water Management*

The objective of water management on the site is to ensure that there is zero net impact on the receiving waters up to the 1% AEP storm event for suspended solids, total phosphorus and total nitrogen. Management strategies need to ensure that the capacity to capture runoff from this storm is always available, other than during or within five working days of any rainfall events.

Operation of the site will provide an internal drainage system to ensure that all runoff generated on the site flows to an excavated pit or sediment retention basin. This will ensure that sediment is retained on site and quality maintained in the discharge waters. The resulting spillover from these basins will provide water flows equivalent to that experienced prior to extraction activities on the site. No flooding will therefore be introduced downstream

The natural flow of rainfall through infiltration to groundwater will be maintained by the pervious nature of the excavations.

*iii) Erosion and Sediment Control*

Most of the potential soil loss on the site would be the result of sheet or rill flow. Calculated soil losses from the works area (excluding batters) will vary between 35 and 228 tonnes per hectare per year depending on the erodibility of the subsoil material. However slope length can be reduced by the installation of earth banks (catch drains) anywhere where soil loss needs to be further reduced. There will however be no net transport of soil from the site. All sediment resulting from storm events and fines removed during the operational process are recovered from the settlement basins and reused for site rehabilitation.

Calculation of the required basin size adopted a storage capacity up to 300 m<sup>3</sup>/hectare based on capturing the whole of the 5-year ARI time of concentration (tc) storm event. The storage area provided addresses the requirement for a dam surface area greater than two percent of the area disturbed by the operations.

A review of design criteria for sediment basin design has shown that the EPA has developed an outcome based approach. This method recommends a sediment basin capacity of 150 m<sup>3</sup>/hectare. However, as no discharges are allowed from the site up to the 100 year ARI time of concentration event, and with rainfall intensities in excess of 16 mm per hour and Soil Hydrologic Group B soils, the required basin capacities exceed all current guidelines with 414 to 534 m<sup>3</sup>/hectare. The basin capacities for each of the catchments on the site are therefore:

- |                            |                      |
|----------------------------|----------------------|
| • northern (14.5 hectares) | 7,800 m <sup>3</sup> |
| • southern (42 hectares)   | 19,400m <sup>3</sup> |

In practice the disturbed areas within each catchment are likely to be rather smaller than initially indicated due to the influence of unforeseen factors during operations.

In this case the capacity of the appropriate basin will be correspondingly reduced or the current guidelines will be exceeded to an even greater extent.

*iv) Protection of Groundwater*

Shallow and deep aquifers are present on the site. Current policy of both the Department and the EPA is that extraction should not occur within two metres of the wet weather groundwater level.

The maximum depth of extraction can be varied to maintain a two metre buffer between it and the watertable. Since the depth of extraction will always maintain this substantial buffer zone, there will be no affect on the groundwater table, groundwater flow rates or groundwater quality. The excavations will however have the effect of increasing the potential for groundwater recharge within the site.

Contamination of the groundwater system with suspended solids is highly unlikely to occur due to the low velocity of the groundwater, the excellent filtering qualities of the soils and the relatively high concentrations of iron. The low/moderate vertical permeability of the soils also makes it difficult for fine particles to migrate into the groundwater system. Any effects on the groundwater system are therefore expected to be negligible.

*v) Flora and Fauna*

Most of the site has been previously cleared for agriculture and sand extraction. The investigations undertaken to develop an acceptable biodiversity offset strategy have determined that the potentially affected woodland on the site corresponds with a newly recognised community (Sydney Hinterland Transition Woodland) which is not listed on either



the *Threatened Species Conservation Act 1995* or the *Environment Protection and Biodiversity Conservation Act 1999*. A strategy has therefore been developed which reflects the need to offset the removal of part of this community (with some 29,000 hectares remaining and not currently reserved).

The area of extraction included in the approved development shown would result in the removal of an additional 2.9 hectares of Sydney Hinterland Transition Woodland (adjacent to the former Trigonometrical reserve). A further 0.8 hectares on Lot 1 DP223323 was originally thought to be part of this community but was subsequently excluded because it has an insufficient number of species. It is proposed to offset this clearing with revegetation and recreation of this community within a 7.9 hectare area on the western boundary of the site adjacent to a remnant of the same community located just beyond the boundary.

A total of seven rare plant species has also been identified in the area. Six are either at so great a distance from the extraction activities that there will be no impact on their conservation status. The remaining species (*Tetratheca glandulosa*) will be protected within a buffer zone. No rare or endangered flora are being removed by this Approval.

No threatened fauna species was found during the site survey although a total of sixteen has been identified as possibly occurring in the region. Habitat values on the site have been degraded for many years following earlier clearing and it is unlikely that any threatened or endangered species will be affected by the site activities.

*vi) Rehabilitation and vegetation offsets*

The rehabilitation of the site to a landform with an appropriate vegetation community is a key outcome of the development. This will inevitably lead to changes including the removal of some existing vegetation and the reshaping of the ground profile. It is important therefore that the rehabilitation of the site achieves the following:

- a landform that is sympathetic to the surrounding topography and avoids the introduction of a profile that is alien to the visual character of the area;
- avoids the introduction of unnaturally steep slopes within the constraints imposed by the availability of fill material;
- creates a substantial area suitable for the introduction/reintroduction of agricultural/horticultural activities;
- retains suitable gradients, where possible, that allow the site to drain to those watercourses feed by the site prior to extraction activities; and
- re-creation of native vegetation on all those areas not suitable or appropriate for other uses.

Site rehabilitation will be undertaken in stages closely following the phasing of extraction. Inevitably it will require amendment as the site operations reveal site characteristics that were not known at the start of the process. As a result the Landscape Management Plan will be subject to a process of continual review, amendment and approval.

## *Chapter Five*

# SUMMARY OF ENVIRONMENTAL MONITORING PROGRAMS

## 5.1 Introduction

The following provides a summary of each of the environmental monitoring programs included in the relevant management plans in response to the requirements of the conditions of the Project Approval dated 3 February 2009. These are described in more detail in the relevant management plans. Following consideration by EPA, these may be subsequently deleted or amended depending on circumstances at the site.

## 5.2 Monitoring programs

### Noise

- Attended monitoring undertaken in February; May; August and November at four locations.
- Unattended monitoring in August every three years at four locations if any evidence of exceedances or complaints are received.

### Air quality

- Deposited dust monitoring undertaken monthly at three locations.

### Surface water

- Water quality monitoring undertaken monthly when flow is present and following rainfall exceeding 50mm downstream of Lot 198 DP752025

### Groundwater

- Continuous water levels recorded and downloaded for annual reporting at four bores on the Hitchcock Road site and monthly manual recording of levels at PF167DAM.
- Groundwater quality monitoring from four bores on the Hitchcock Road site and two supply bores on Lot 198 DP752025 reported annually.

This program will be reviewed annually and amended if required,

## REFERENCES

ANZECC (1992), *Rural Land Uses and Water Quality*, National Water Quality Management Strategy.

ANZECC (1995), *Guidelines for Groundwater Protection in Australia*, National Water Quality Management Strategy.

ANZECC (2000), *Australian Water Quality Guidelines for Fresh and Marine Waters*.

Baulkham Hills Shire Council (2004), *Development Control Plan No 16: Extractive Industries*.

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 Conservation and Land Management (1992), *Urban Erosion and Sedimentation Control*.

Department of Conservation, Forests and Lands (1987), *Control of Erosion on Construction Sites*.

Department of Environment and Conservation (2003), *Recovering Bushland on the Cumberland Plain – Best Practice Guidelines for the Management and Restoration of Bushland*.

Department of Land and Water Conservation. Centre for Natural Resources (1998) *Maroota Groundwater Study, Stage 2 Final Draft*, CNR 9x.yyy.

Department of Land and Water Conservation. Resource Knowledge Branch; (2001) *Maroota Groundwater Study Technical Status Report*.

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.

Environment Protection Authority (1991), *Construction Techniques for Sediment Pollution Control*.

Environment Protection Authority (1994), *Environmental Noise Control Manual*

Environment Protection Authority (1995), *Provisional Water Quality Investigations Manual: Preferred Methods of Sampling and Analysis*.

Environment Protection Authority (1996), *Environmental Guidelines for Major Construction Sites: Best Practice Environmental Management Series*.

Environment Protection Authority (1997), *Environmental Guidelines: Assessment, Classification and Management of Non-liquid Waste*.

Environment Protection Authority (1997), *Environmental Guidelines: Assessment, Classification and Management of Liquid Waste*.

Environment Protection Authority (2001) *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW*.

Environment Protection Authority (2001) *Industrial Noise Policy Manual*

Landcom (2004) *Managing Urban Stormwater*

National Occupational Health and Safety Commission (1998), *Draft Approved Criteria for Classifying Hazardous Substances*, Revised Edition.

NSW Agriculture (1995) *Sydney Agricultural Land Classification Atlas*.

NSW Department of Housing (1993), *Soil and Water Management for Urban Development*.

NSW Department of Housing (1993), *Soil and Water Quality Management for Urban Development*.

Standards Australia 1991 AS 3580.10.1-1991: *Methods for Sampling and Analysis of Ambient Air – Determination of Particulates – Deposited Matter – Gravimetric Method*

## **HITCHCOCK ROAD MAROOTA**

### **3 Sand Extraction and Rehabilitation Project**

## **ENVIRONMENTAL STRATEGY**

# **APPENDIX A**

## **Environmental Operational Procedures**

- *Chapter A1*

## INTRODUCTION

The management measures set out in this set of procedures are those that will be implemented during the operational phase of the extraction project. They have been structured in the following manner:

- **Introduction** - provides a general description of the environmental issue and the objective of the management procedure
- **Legislation and guidelines** – lists relevant legislation and guidelines which apply to the management of the environmental issue
- **Management controls** – lists the strategies, actions, responsibilities, performance indicators, monitoring and reporting which are required to be implemented for the operational and rehabilitation phases of the project
- **Monitoring and reporting** – identifies those responsible for monitoring and reporting procedures

This appendix should be read in conjunction with the following:

- Noise management plan;
- Air quality monitoring program;
- Water management plan; and
- Landscape management plan.

Together, these make up the Environmental Management Plan for the Hitchcock Road Sand Extraction and Rehabilitation Project in compliance with the requirements of the Project Approval.

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 consent. Their responsibilities are:

**Quarry 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.

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** or the **environmental manager**. Such inspections will be documented in a standard format and a copy submitted to the **quarry manager**. Issues arising from these inspections will be addressed immediately. Overall environmental performance will be addressed at management meetings as appropriate.

- *Chapter A2*

## **NOISE MANAGEMENT**

### **A2.1 Introduction**

Extraction activities and vehicle movements associated with site operations have the potential to generate noise at adjacent properties. The objective of this environmental procedure is to ensure that compliance with all relevant legislation is achieved and to manage activities on the site in a manner which will minimise the potential impacts on the community.

### **A2.2 Legislation and guidelines**

Legislation and guidelines relevant to noise and vibration management include:

- *Environmental Protection Acts*
- Protection of the Environment Operations Act, 1997

Other statutory requirements may include Local Government, Environmental Planning and Assessment, Occupational Health and Safety and Mining Acts together with the Motor Traffic Regulations.

- *Guidelines and Standards*
- Environment Protection Authority Noise Control Manual (ENCM), 2000
- Environment Protection Authority Environmental Criteria for Road Traffic Noise, July 1999
- Department of Environment and Conservation Industrial Noise Policy 2000.
- Various Australian and International Standards in relation to noise and vibration measurement and assessment procedures.

The development operates in compliance with a licence under the Protection of the Environment Operations Act 1997.

It is the responsibility of the site operator to ensure that the relevant provisions of the incoming legislation and the appropriate guidelines are complied with in carrying out the development.



## A2.3 Management controls

### OPERATIONAL PHASE

#### Strategy 2.1: Ensure that the site operations are undertaken in a manner that minimises the impacts of noise and vibration.

Actions		Responsibility
2.1.1	Manage site activities so that any necessary high noise and vibration levels occur at times of least impact.	Quarry Manager
2.1.2	Advise neighbouring properties at least 24 hours in advance of the extent and expected duration of especially noisy activities.	Quarry Manager/ Environmental Manager
2.1.3	Undertake all site activities incorporating noise attenuation measures such as restricting working hours for certain works required close to sensitive receptors	Quarry Manager
2.1.4	Ensure that panels and covers of silenced plant are kept shut and plant and equipment switched off when not in use.	Quarry Manager
2.1.5	Ensure that mechanical equipment is silenced by the best practical means using current technology, prior to use. Noise suppression devices should be fitted according to manufacturer's instructions. Residential class mufflers should be used where possible. Noise control kits should be fitted to noisy mobile equipment and shrouds provided around stationary equipment where necessary.	Quarry Manager
2.1.6	Working hours will be limited to 7.00am to 6.00pm, Monday to Saturday and at no time on Sundays and public holidays. A maximum of ten laden vehicles will be permitted to enter and leave the site between the hours of 6.00am and 7.00am, Monday to Saturday, excluding Sundays and public holidays.	Quarry Manager
2.1.7	Arrange for all plant and equipment to be inspected regularly to ensure that it is well maintained to minimise noise emissions.	Quarry Manager
2.1.8	Conduct compliance monitoring of noise levels at the defined locations and keep records of measurements.	Environmental Manager
<b>Performance indicator</b>		Noise from operational activities does not exceed the guideline limits.
		Number of complaints received

<b>Monitoring</b>	Long term monitoring of noise levels during site operations at nominated receptors. Monitoring periods should be planned to occur during predicted noisy activities and at random. Results will be measured against baseline and OEH criteria and any exceedances noted.
<b>Reporting</b>	Annual reporting of noise levels, exceedances and complaints in the appropriate AEMR. Reports will include measures adopted to ensure that future exceedances/complaints do not occur. Monitoring results will be suitably summarised for posting on the PF Formation website.

---

#### **A2.4 Monitoring and reporting**

The Environmental Manager will be responsible for conducting and arranging noise monitoring for the assessment of impacts and determination of compliance. The Environmental Manager will compile the results and findings of the monitoring together with all complaints, responses and remedial action in relation to noise and vibration emissions from the site for inclusion in the AEMR.

- *Chapter A3*

## **AIR QUALITY MANAGEMENT**

### **A3.1 Introduction**

Extraction activities and vehicle movements associated with site operations will generate dust and exhaust emissions which may result in short term, localised degradation of air quality.

Relatively large areas of the site will be exposed at any one time with the consequent potential to result in the generation of dust. In addition, heavy vehicles used in the extraction operations have the potential to generate significant emissions if not managed appropriately.

The environmental management procedure aims to minimise the impact of dust and vehicle emissions on local air quality.

### **A3.2 Legislation and guidelines**

Legislation and guidelines relevant to air quality management include the following:

- *Environmental Protection Acts*
- Protection of the Environment Operations Act 1997

Other regulatory instruments may include current Local Government, Environmental Planning and Assessment, Occupational Health and Safety and Mining Acts.

- *Guidelines and Standards*
- National Environment Protection Council National Environment Protection Measures for Ambient Air Quality, 1998
- Environment Protection Authority Action for Air – The NSW Government's 25 Year Air Quality Management Plan, 1998
- Various Australian Standards in relation to dust deposition and particulate matter measurement and assessment procedures including the EPA's Approved Methods for the Sampling and Analysis of Air Pollutants.
- Environment Protection Authority, Approved Methods and Guidance for Modelling and Assessment of Air Pollutants in NSW 2001.

The development operates in compliance with a licence under the Protection of the Environment Operations Act 1997.

It is the responsibility of the site operator to ensure that the relevant provisions of the incoming legislation and the appropriate guidelines are complied with in carrying out the development.

### **A3.3 Management controls**

#### **OPERATIONAL PHASE**

#### **Strategy 3.1: Ensure that the site operations are undertaken in a manner that minimises and controls dust and vehicle emissions.**

<b>Actions</b>		<b>Responsibility</b>
3.1.1	Conduct ambient air quality monitoring at identified sites	Environmental Manager
3.1.2	Fit dust suppression equipment to all processing plant on site as required. This is to be regularly inspected and maintained in good working order at all times.	Quarry Manager/ Environmental Manager
3.1.3	Define haul road areas to prevent unnecessary vehicle movement into others	Quarry Manager
3.1.4	Keep all unsealed trafficable areas and working areas damp to minimise dust emissions by spraying regularly with a water cart, water sprays or sprinklers. Frequency of spraying to be determined based on weather conditions, soil erodibility and the observation of any visible dust.	Quarry Manager/ Environmental Manager
3.1.5	Apply speed controls to all unsealed areas (maximum speed of 20 km/h) and signpost accordingly.	Quarry Manager
3.1.6	Vegetate all semi-permanent stockpiles with suitable groundcover and water where necessary until the vegetation is well established.	Quarry Manager
3.1.7	Cease work on any extraction activity producing dust due to high winds that cannot be controlled by watering or other means. Work will not resume until the wind velocity decreases and any dust generation can be controlled by normal means.	Quarry Manager
3.1.8	Ensure that all loaded trucks leaving the site on Lot 198 DP595538 have their payloads fully covered by a suitable material to prevent spillage.	Quarry Manager
3.1.9	Construct dust screens such as earth bunds and vegetated barriers.	Quarry Manager
3.1.10	A mechanical road sweeping unit and water cart will be maintained for use as required to keep all roads including the intersection of the haul road and Wisemans Ferry Road free from deposited material.	Quarry Manager
3.1.11	No fires to be permitted on-site.	Quarry Manager

<b>Performance indicator</b>	Ambient air quality data compiled.  Dust generated from site activities to comply at all times with EPA specified air quality criteria.
<b>Monitoring</b>	Dust monitoring at identified locations.  Compilation of a complaints register.
<b>Reporting</b>	Annual reporting in the AEMR. Monitoring results will be suitably summarised for posting on the PF Formation website.

### Strategy 3.2: Minimise and control vehicle and plant exhaust emissions.

Actions		Responsibility
3.2.1	Inspect all exhausts from vehicles and plant/equipment to ensure that they are maintained at an acceptable level.	Quarry Manager
3.2.2	Regularly service all vehicles to ensure that exhaust emissions comply with the regulations. Maintain appropriate service records.	Quarry Manager
3.2.3	Identify any opportunities to minimise machinery use and ensure that all equipment used on the site is energy efficient.	Quarry Manager
<b>Performance Indicator</b>	Vehicle and plant emissions comply with the regulations.	
<b>Monitoring</b>	Regular vehicle and plant inspections.	
<b>Reporting</b>	Annual reporting of inspection results in the AEMR.	

#### **A3.4 Monitoring and reporting**

The Environmental Manager will be responsible for conducting and arranging dust deposition monitoring as well as vehicle and plant inspections for the assessment of impacts and determination of compliance. The Environmental Manager will compile the results and findings of the monitoring and inspections together with all complaints, responses and remedial action in relation to air emissions from the site. Annual monitoring will be reported in the AEMR.

-

- *Chapter A4*

## **ACCESS AND TRAFFIC**

### **A4.1 Introduction**

While the number of vehicle movements resulting from the activities on this site will not increase the total allowed for all sand extraction operations at Maroota, they will contribute to impacts along the two principal access roads, Old Northern Road and Wisemans Ferry Road. The objective of this environmental management procedure is therefore to minimise the impact of the traffic movements resulting from operations on the site.

### **A4.2 Legislation and guidelines**

Legislation and guidelines relevant to access and traffic management include the following:

- Protection of the Environment Operations Act 1997
- Environmental Planning and Assessment Act 1979
- Environmental Protection Authority (1994) *Environmental Noise Control Manual*

It is the responsibility of the site operator to ensure that the relevant provisions of this legislation and the appropriate guidelines are complied with in carrying out the development.

### **A4.3 Management controls**

#### **OPERATIONAL PHASE**

##### **Strategy 4.1: Minimise the impact of operational traffic on the local community.**

<b>Actions</b>		<b>Responsibility</b>
4.1.1	Ensure that the number of laden vehicle movements does not exceed a combined total of two hundred per day via the intersection of the haulage road and Wisemans Ferry Road. This is the total of laden vehicle movements allowed for PF Formation's combined extractive industry operations in The Hills Shire.	Quarry Manager/ Environmental Manager
4.1.2	Undertake operations involving the transportation of material on the site only between 6.00am and 6.00pm, Monday to Saturday.	Quarry Manager/ Environmental Manager
4.1.3	Allow a maximum of ten laden vehicles to enter and leave the site between 6.00am and 7.00am, Monday to Saturday only. Ensure that vehicles do not arrive at the site prior to 5.45am on any day.	Quarry Manager/ Environmental Manager
4.1.4	Ensure that all vehicle loads leaving the site are suitably covered.	Quarry Manager/ Environmental Manager
<b>Performance Indicator</b>		Minimum of complaints from the community.
<b>Monitoring</b>		Number and type of complaints received.  Weighbridge records of arrival and departure times.
<b>Reporting</b>		Annual report on complaints received.

### **A4.4 Monitoring and reporting**

The Environmental Manager will be responsible for the monitoring of complaints on traffic issues from the community. Annual reports will be compiled on community complaints and reported in the AEMR.



- *Chapter A5*

## **EROSION AND SEDIMENT CONTROL**

### **A5.1 Introduction**

Site operations and associated works have the potential to result in soil erosion and sedimentation of local creeks and other nearby waterways. Soil particles from exposed areas may be windblown or carried as suspended solids in stormwater runoff. However operation of the site will provide an internally draining system to ensure that all site runoff flows to an excavated pit or sediment retention basin. This will ensure that sediment is retained on site and quality of any discharge water is maintained. While extraction operations will result in an altered land form, the potential for runoff into the natural drainage lines will be maintained via the overflow of clean water from the sediment retention basins and on-site storage.

The retention basins will be capable of capturing the total runoff from the 100-year  $t_c$  storm event. These will ensure that sediment loads introduced to surface water runoff through the extraction process are retained and the resulting spillover from the basins will provide water flows equivalent to those experienced prior to the start of operations.

This environmental management procedure identifies the control measures required during the operational phase to minimise erosion and sedimentation and thus minimising impacts on water quality in the surrounding catchments.

### **A5.2 Legislation and guidelines**

Legislation and guidelines relevant to erosion and sediment control include:

- Protection of the Environment Operations Act 1997
- Water Management Act 2000
- Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC 2000)
- Managing Urban Stormwater - Construction Activities (Environment Protection Authority and NSW State Stormwater Co-ordinating Committee 1996)
- Construction Techniques for Sediment Pollution Control (Environment Protection Authority 1991)
- Environmental Guidelines for Major Construction Sites. Best Practice Environmental Management Series (Environment Protection Authority 1996)
- Control of Erosion on Construction Sites (Department of Conservation, Forests and Lands 1987)
- Soil and Water Management for Urban Development (Department of Housing 1993)

It is the responsibility of the site operator to ensure that the relevant provisions of this legislation and the appropriate guidelines are complied with in carrying out the development

### A5.3 Management controls

#### OPERATIONAL PHASE

##### Strategy 5.1: Provide for treatment of stormwater runoff from extraction areas, stockpiles and access roads.

Actions	Responsibility
5.1.1 Construct temporary erosion and sedimentation control structures such as detention basins and catch drains as appropriate to collect runoff from cleared land including extraction areas and access roads.	Quarry Manager/ Environmental Manager
5.1.2 Erect silt traps and erosion control fencing as appropriate along extraction area boundaries and drainage lines.	Quarry Manager/ Environmental Manager
5.1.3 Design sediment basins with a minimum storage capacity of 400 m <sup>3</sup> per hectare of catchment. Spillway capacity and stability will be designed as follows: <ul style="list-style-type: none"> <li>• life of less than 5 years, adopt the 20 year t<sub>c</sub> event</li> <li>• life between 5 and 10 years, adopt the 50 year t<sub>c</sub> event</li> <li>• life greater than 10 years, adopt the 100 year t<sub>c</sub> event.</li> </ul>	Quarry Manager
5.1.4 Undertake regular inspections to assess stormwater control measures and conduct routine inspections to ensure that compliance with best practice guidelines and relevant legislation is achieved.	Quarry Manager/ Environmental Manager
<b>Performance indicator</b>	Stormwater control measures are in place prior to commencement of extraction in the particular phase of development and are effective in reducing sedimentation to acceptable levels.
<b>Monitoring</b>	Review effectiveness of the stormwater basins and treatment methods during and following major rainfall events.
<b>Reporting</b>	Report on effectiveness of control measures once sedimentation works completed and then on an annual basis.

**Strategy 5.2: Plan site operations to minimise opportunities for soil erosion and sedimentation.**

Actions	Responsibility
5.2.1 Select locations for topsoil and material stockpiles on level ground and away from drainage lines. Install diversion drains up slope and sediment filter fences as appropriate	Quarry Manager/ Environmental Manager
5.2.2 Provide training to operational personnel on the importance of erosion control measures and inform drivers of the damage that can be caused by to the environment by heavy vehicles	Quarry Manager/ Environmental Manager
<b>Performance indicator</b>	Soil erosion control measures are incorporated in the operational activities on the site and are effective in reducing soil erosion.
<b>Monitoring</b>	Monitor suspended solid concentrations in stormwater runoff from the undisturbed parts of the site.
<b>Reporting</b>	Report on the effectiveness of soil erosion control measures prior to extraction.

**Strategy 5.3: Ensure that suspended solid levels in stormwater discharging from the site meets the guidelines for the protection of aquatic ecosystems (ANZECC 2000)**

Actions	Responsibility
5.3.1 Keep areas of exposed land to a minimum compatible with operational requirements.	Quarry Manager
5.3.2 Where practicable, provide silt fences to minimise erosion and sedimentation from exposed areas.	Quarry Manager/ Environmental Manager
5.3.3 Stabilise exposed areas that are not in use with an appropriate cover crop and water until well established.	Quarry Manager/ Environmental Manager
5.3.4 Construct sediment retention basins with a capacity of at least 300m <sup>3</sup> per hectare of catchment, which will necessitate regular cleaning out, and a minimum freeboard of one metre.	Quarry Manager

5.3.5	Monitor erosion and sediment controls regularly and immediately following a rainfall event. Clear sediment when the traps have collected 60% of the capacity of the basin or where sediment build-up is less than 300mm below the spillway crest. Remove sediment to a location where further pollution to downslope lands and waterways will not occur.	Quarry Manager/ Environmental Manager
5.3.6	Undertake maintenance of erosion and sediment controls when any deterioration is identified or when replacement is necessary.	Quarry Manager/ Environmental Manager
5.3.7	Reuse stored stormwater for dust control and the watering of site vegetation.	Quarry Manager/ Environmental Manager
5.3.8	Seed material stockpiles where these are to remain unused for a period in excess of four weeks. Water the area when required until the vegetation is well established.	Quarry Manager/ Environmental Manager
5.3.9	Control vehicle movement on the site by the identification of the haul road and current working areas.	Quarry Manager
<hr/>		
<b>Performance indicator</b>	Acceptable control of sedimentation and erosion is achieved so that suspended solids levels in any stormwater leaving the site does not exceed ANZECC guidelines or other regulatory requirements.	
<hr/>		
<b>Monitoring</b>	Monitor suspended solids levels in stormwater following rainfall events. Compare results with other appropriate locations.	
<hr/>		
<b>Reporting</b>	Report on suspended solid levels and performance of erosion and sedimentation control measures for inclusion in the relevant AEMR.	

#### **A5.4 Monitoring and reporting**

The Environmental Manager will be responsible for the monitoring of the effectiveness of the sediment and soil erosion control measures installed on-site, suspended solids levels in stormwater runoff and any off-site discharges. An annual report will be included in the AEMR.

- *Chapter A6*

## **WATER MANAGEMENT**

### **A6.1 Introduction**

Water is required for plant washing operations and the transport of sand in the form of slurry from the site to the central processing plant on Lot 198 DP595538. This is obtained from clean water dams at the end of a series of settling dams provided to remove sediment fines from the dirty wash water. This system recycles wash water from production and once in operation will not require an external source of water except for make-up to compensate for losses occurring during the process.

Clean water is sourced from the supply dams located on Lot 167 DP752039 and Lot 198 DP595538. The water from Lot 167 is mixed with extracted material in a hopper to form a sand slurry suitable for transportation by pipeline. The slurry is piped to the central processing plant on Lot 198 DP595538 where the water from Lot 198 is used in the production operations. Wash waters from this process are pumped back to settling dams on the site. These are treated to retain the suspended sediments which gradually settle out while the clear water is recycled. A clean water pipeline is used, if needed to balance the water from the two dams.

All process water is treated and recycled within a closed system. None is directly discharged from the site without passing through a treatment system. No significant changes in water quality or quantity of runoff discharged from the site will occur as a result of the development. The clean water balance pipe system will also assist in the storage of water to reduce discharges during storm events.

A key objective of the operations on the site is the protection of groundwater both from possible contamination with fines and to maintain its availability to downstream users. Shallow and deep aquifers are present on the site. A buffer zone of a minimum of two metres will be maintained above the wet weather high groundwater level. The excellent filtering qualities of the soils contained within the buffer zone make it difficult for fine particles to migrate into the groundwater system and any effects on its quality are likely to be negligible.

The only impact on groundwater availability is a sump on Lot 167 DP 752039 from which a maximum of 50ML per year is licensed for use in sand and gravel washing and irrigation. The effect of this extraction on groundwater availability is likely to be negligible and usage is significantly lower than required for agricultural use of the land.

The aims of this management procedure are to maintain water quality in adjacent waterways and protect the groundwater under the site from possible contamination and to maintain its availability for downstream users.

### **A6.2 Legislation and guidelines**

Legislation and guidelines relevant to water management include:

- Soil Conservation Act 1938
- Protection of the Environment Operations Act 1997
- Water Management Act 2000

- Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC 2000)
- Managing Urban Stormwater - Construction Activities (Environment Protection Authority and NSW State Stormwater Co-ordinating Committee 1996)
- Managing Urban Stormwater (Landcom 2007)
- Construction Techniques for Sediment Pollution Control (Environment Protection Authority 1991)
- Environmental Guidelines for Major Construction Sites. Best Practice Environmental Management Series (Environment Protection Authority 1996)
- Australian Drinking Water Guidelines (Volume 6) of the National Water Quality Management Strategy (National Health and Medical Research Council of Australia and New Zealand 1996)
- Soil and Water Management for Urban Development (Department of Housing 1993)

It is the responsibility of the site operator to ensure that the relevant provisions of this legislation and the appropriate guidelines are complied with in carrying out the development.

### A6.3 Management controls

#### OPERATIONAL PHASE

##### Strategy 6.1: Plan site operations to minimise potential impacts on groundwater

Actions	Responsibility
6.1.1 Restrict maximum depth of extraction to 2 metres above the wet weather high groundwater level as determined following at least 12 months site specific groundwater monitoring data.	Quarry Manager
6.1.2 Ensure that the groundwater is not breached or contaminated. In the event that either should occur, operations are to cease and the Department of Water and the Department of Planning consulted to determine the basis on which extraction may recommence.	Quarry Manager
6.1.3 The sediment retention basins are to accommodate the 100-year $t_c$ event with the minimum basin capacities as follows: <ul style="list-style-type: none"> <li>• Southern catchment (Basin 1) 19,400 m<sup>3</sup></li> <li>• Northern catchment (Basin 2) 7,800 m<sup>3</sup></li> </ul> <p>The volume of these basins can be varied depending on the extent of the area exposed for extraction within each catchment.</p>	Quarry Manager
6.1.4 Arrange for regular inspection of the capacity and stability of all retention basins and report on their effectiveness.	Quarry Manager/ Environmental Manager
6.1.5 Install a minimum of two groundwater monitoring bores. One should be located within or near the extraction area and another at some location within the site beyond the area of any direct extraction influence. The location of these bores is to meet the requirements of the Department of Water and the Department of Planning.	Quarry Manager/ Environmental Manager
<b>Performance indicator</b>	Maintenance of groundwater quality. Existing water levels and groundwater quality will be determined from data derived from the bores on the site.
<b>Monitoring</b>	Regular monitoring of water levels and water quality data from the on-site bores.

**Reporting**

Annual reporting of groundwater quality issues and assessment of impacts of site operations for inclusion in the AEMR.

---

**A6.4 Monitoring and reporting**

The Environmental Manager will be responsible for the monitoring of the effectiveness of the water management measures installed on-site. Annual reports will be prepared by consultants using information gathered throughout the reporting period by the Environmental manager. This report will be included in the AEMR.



- Chapter A7

## REHABILITATION AND VEGETATION OFFSET MANAGEMENT

### A7.1 Introduction

The aims of flora and fauna management are to minimise the net impact of the development on the natural environment of the site and its surrounding areas and to rehabilitate the areas disturbed by the works. Protecting native flora and fauna habitats is fundamental in maintaining the natural and aesthetic values of the site, limiting adverse impacts on the diversity of the region and maintaining the concept of ecologically sustainable development.

Most of the site has been cleared for agriculture and mining. In addition to the cleared areas there are three distinct communities occurring on the site. Their distribution is largely influenced by soil, rainfall, topography and aspect.

The most significant of these is the Sydney Hinterland Transition Woodland Shale/Sandstone Transition Forest (formerly considered to be Shale/Sandstone Transition Forest) which occupies a prominent area adjacent to the highest point on the site. This community is not listed on either the *Threatened Species Conservation Act 1995* or the *Environment Protection and Biodiversity Conservation Act 1999*. A strategy has therefore been developed which reflects the need to offset the removal of part of this community

The area of extraction included in the proposal will result in the removal of 3.7 hectares of Sydney Hinterland Transition Woodland (2.9 hectares adjacent to the former Trigonometrical reserve and 0.8 hectares on Lot 1 DP223323). The Approval requires revegetation and recreation of this community within a 7.9 hectare area on the western boundary of the site adjacent to a remnant of the same community located just beyond the boundary.

The offset strategy is to achieve an area of successfully recreated woodland community with similar characteristics to that to be removed. In total, the new community would ultimately cover at least twice the area of that to be removed. A series of criteria have been developed and are applied by an independent specialist to monitor whether the principle characteristics of the original community are being achieved. The criteria are set out in the Landscape Management Plan.

Targets would be set to be achieved at five year intervals and comparisons made with the condition of the vegetation removed. Where a value is not achieved at the appropriate time, it is indicative of a requirement for improved management of the program so that the overall goal can be achieved.

Monitoring the progress of the revegetation program would be undertaken on an annual basis (unless the consultants recommend otherwise) and include observational information in addition to the collection of data from random quadrats within each area of revegetation. This information would include position, using GPS, slope, aspect, landform, natural regeneration and fauna habitat values.

Annual surveys would become part of the established environmental audit process that has been established on the site for over ten years.

## **A7.2 Legislation and guidelines**

Legislation and guidelines relevant to rehabilitation are:

- Environmental Planning and Assessment Act 1979
- Local Government Act 1993
- National Parks and Wildlife Act 1974
- Native Vegetation 2003
- Water Management Act 2000
- Threatened Species Conservation Act 1995
- Best Practice Environmental Management in Mining – Rehabilitation and Revegetation (Australian Environment Protection Agency 1995)
- Recovering bushland on the Cumberland Plain – Best practice guidelines for the management and retention of bushland (Department of Environment and Conservation 2005)

It is the responsibility of the site operator to ensure that the relevant provisions of this legislation and the appropriate guidelines are complied with in carrying out the development.

### **A7.3 Management controls**

#### **OPERATIONAL PHASE**

##### **Strategy 7.1: Implement measures to ensure the protection of native vegetation, including threatened species.**

<b>Actions</b>		<b>Responsibility</b>
7.1.1	Clearly identify and mark out all areas which are not to be disturbed.	Quarry Manager/ Environmental Manager
7.1.2	Assess areas where trees are to be removed to determine the commercial value of any which are too large to mulch. Any with commercial value are to be marked and arrangements made for removal.	Environmental Manager
7.1.3	Prepare an assessment of the species mix of the Sydney Hinterland Transition Woodland and arrange for purchase or collection of seeds. Mulch vegetation removed from the area and stockpile for later use. This will initially be used on the peripheral bunds followed by other areas of the site where the regrowth of the species mix is to be undertaken. Protect young plants from predation by feral pests.	Environmental Manager
7.1.5	Restrict access to bushland to minimise the potential for damage. Suitably identify and mark out these areas to ensure that this prohibition is made clear.	Quarry Manager/ Environmental Manager
7.1.6	Separate topsoil for use in rehabilitation works.	Quarry Manager/ Environmental Manager
7.1.7	Incorporate flora and fauna issues (to the extent it is relevant) in the education program so that the site operatives are aware of the requirements of this EMP.	Environmental Manager
7.1.8	Once each extraction phase is complete, initiate the rehabilitation and revegetation program as set out in the Landscape management Plan.	Quarry Manager/ Environmental Manager
<b>Performance indicator</b>		All areas of significant flora and fauna habitat are protected prior to the start of extraction.
<b>Monitoring</b>		Ensure that the above are implemented prior to the commencement of extraction activities in the area.  Monitor condition of flora and fauna habitats on a regular basis.

## Reporting

A report with appropriate maps identifying the areas under rehabilitation and extraction activity is to be prepared.

Prepare an annual report on the status of the flora of the site for inclusion in the AEMR.

---

### **Strategy 7.2: Undertake the rehabilitation of the site to achieve an agreed and acceptable landform with appropriate planting.**

Actions	Responsibility
7.2.1      Mulch all suitable plant material for reuse on the site as a seed and planting medium. Store all topsoil in appropriately marked low stockpiles for reuse in locations as close as possible to their source. Care should be taken to ensure that this does not become contaminated with the seeds of exotic species and weeds.	Environmental Manager
7.2.2      Rehabilitate the site in stages leaving areas exposed for as short a time as possible. This should be undertaken in conformity with the approved Rehabilitation Plan with maximum final batter grades of 4(H):1 (V) on north and west facing slopes and 3(H):1 (V) on those facing south and east. Final slopes should be as gentle as possible depending on the availability of fill material.	Quarry Manager/ Environmental Manager
7.2.3      Sow all stockpiles and exposed areas where no activity is to take place for more than four weeks with an appropriate vegetation cover.	Quarry Manager/ Environmental Manager
7.2.4      Undertake revegetation of the site on the following basis: <ul style="list-style-type: none"> <li>• re-establish the Sydney Hinterland Transition Woodland using seed and mulch collected from the area</li> <li>• rehabilitate other areas to native species with a light sowing of cereal and allowing natural regeneration</li> <li>• lime, fertilise and sow areas where improved grass cover is required</li> <li>• suitably turf surfaces expected to experience high surface flows leaving the site</li> </ul>	Environmental Manager
7.2.5      Establish a maintenance program aimed at promoting and protecting the growth of the rehabilitated areas.	Quarry Manager/ Environmental Manager

---

<b>Performance Indicator</b>	Completion of site rehabilitation in conformity with the approved Landscape Management Plan.
<hr/>	
<b>Monitoring</b>	<p>Regular site inspections to ensure that the following is achieved:</p> <ul style="list-style-type: none"><li>• rate of rehabilitation is in conformity with the staging program</li><li>• conservation zones and rehabilitated areas are being appropriately maintained</li><li>• vegetative covers are being established</li><li>• site works such as bunding and the establishment of re-vegetated areas are progressing in accordance with the Landscape Management Plan</li><li>• all sensitive flora and fauna habitat is being adequately protected from damage</li></ul>
<hr/>	
<b>Reporting</b>	Reports of site inspections and annual reviews in the AEMR.

---

#### **A7.4 Monitoring and reporting**

The Environmental Manager will be responsible for monitoring the effectiveness of the measures included for the protection of native vegetation on the site and the progress of site rehabilitation. Annual reports will be prepared by the Environmental Manager for inclusion in the AEMR.

- *Chapter A8*

## **SOCIAL IMPACT MANAGEMENT**

### **A8.1 Introduction**

Large-scale mining activities inevitably have impacts on the local community, both positive and negative. Many potential impacts are assessed under other headings in this EMP. These include traffic, noise, air quality and the visual changes brought about by the mining. It is not proposed to repeat those here.

The consideration of social impacts must therefore include such factors as the community's perception of mining, whether it produces local benefits or otherwise and what is the nature of those effects. These are very difficult issues even to identify with any degree of certainty and they inevitably go well beyond what should be required in the context of a single project. Indeed even if the community could clearly identify the social impacts of sand mining, it would be very hard pressed to specify those resulting from the activities relating to a single operation within a number of similar ones.

It is also quite clear that it is not possible to measure such impacts independently of the individuals who make up the community as can be undertaken with the other effects listed above. The only source of responses in this area is the community. There are therefore two separate components to any exercise aimed at attempting to assess the kind of social impacts referred to here. These are as follows:

- ensuring that the community is as fully informed as possible about the nature of sand extraction and processing and the specific activities of the relevant operators; and
- providing a mechanism for response so that any issues which the community wishes to raise can be appreciated and any action taken, if required.

The aim of the social impact management procedure is to ensure that those issues considered by the community to be a consequence of sand extraction are recognised and, where appropriate, changes to operations on the site instituted to minimise any deleterious effects.

### **A8.2 Legislation and guidelines**

Legislation and guidelines relevant to social issues include:

- Environmental Planning and Assessment Act 1979
- Social Impact Assessment for Local Government: A Handbook for Councillors, Town Planners and Social Planners (Local Government and Shires Association and Office on Social Policy, NSW Government Social Policy Directorate, 1995)

It is the responsibility of the site operator to ensure that the relevant provisions of this legislation and the appropriate guidelines are complied with in carrying out the development.

### A8.3 Management controls

#### OPERATIONAL PHASE

##### Strategy 8.1: Consider community feedback in determining operating procedures to minimise negative impacts.

Actions		Responsibility
8.1.1	Maintain an <b>open door policy</b> . Widely publish contact phone number and provide an early response to all queries, comments and requests for information.	Quarry Manager/ Environmental Manager
8.1.2	Provide access to all relevant environmental management documentation and monitoring results on the PF Formation web site.	Environmental Manager
8.1.3	Organise and manage bi-annual meetings of the Community Consultative Committee to discuss issues in relation to environmental management of sand extraction on the site.	Environmental Manager
8.1.4	Establish a complaints register incorporating date and time, type of communication, contact details of the complainant, nature of the complaint and response taken.	Quarry Manager/ Environmental Manager
<b>Performance indicator</b>		Minimal complaints from the community.
<b>Monitoring</b>		Number and type of responses and complaints raised by the community and improved performance.
<b>Reporting</b>		Annual reporting of community responses and complaints together with an assessment of any changes put in place to minimise any future difficulties for inclusion in the AEMR.

### A8.4 Monitoring and reporting

The Environmental Manager will be responsible for the monitoring of the effectiveness of the measures included in response to community concerns. Annual reports will be prepared by the Environmental Manager for the AEMR.

- *Chapter A9*

## **HERITAGE MANAGEMENT**

### **A9.1 Introduction**

The aim of this archaeological and heritage management procedure is to ensure that items of Aboriginal and European archaeological significance are recognised and protected or conserved during the site operations. It provides a procedure to assist with this process.

An archaeological survey was undertaken for the EA. One open site, a scatter of five stone artefacts and two isolated stone artefacts were identified outside the development area. These will not be affected by the project.

While it is unlikely that any subsurface archaeological remains still exist on other parts of the site, it is important that the site staff is made aware of the potential to unearth relics.

### **A9.2 Legislation and guidelines**

Legislation and guidelines relevant to heritage include:

- Crown Lands Act 1989
- Environmental Planning and Assessment Act 1979
- Heritage Act 1977
- Local Government Act 1993
- National Parks and Wildlife Act 1974
- Native Title Act (New South Wales) 1994

It is the responsibility of the site operator to ensure that the relevant provisions of this legislation and the appropriate guidelines are complied with in carrying out the development.



### A9.3 Management controls

#### OPERATIONAL PHASE

##### Strategy 9.1: Protect items of heritage value during site operations.

Actions	Responsibility
9.1.1 Cease all work if an archaeological or heritage item is identified during extraction operations and consult the National Parks and Wildlife Service, the Deerubbin Aboriginal Land Council or the Heritage Office to determine any appropriate course of action prior to recommencement of the work. Obtain any required permits and submit together with supporting information. Notify the Hills Shire Council to ensure compliance with the conditions of approval.	Quarry Manager/ Environmental Manager
9.1.2 Undertake additional survey work required for submittal of application to destroy artefact scatters located in the later stages of the development. Comply with the reasonable requirements of the National Parks and Wildlife Service, the Deerubbin Aboriginal Land Council and the Heritage Office arising out of any additional studies and notify the Hills Shire Council to ensure compliance with the conditions of the approval.	Environmental Manager
<b>Performance Indicator</b>	Any item of heritage significance is protected during site operations.
<b>Monitoring</b>	The protection of any heritage items identified during site operations is to be monitored.
<b>Reporting</b>	Any heritage item identified during site operations is to be documented.

### A9.4 Monitoring and reporting

The Environmental Manager will be responsible for the reporting of any heritage items identified during the course of site activities. Annual reports will be prepared by the Environmental Manager.

- *Chapter A10*

## **VISUAL AMENITY MANAGEMENT**

### **A10.1 Introduction**

Activities associated with the extraction and processing of material from the site will occur in areas which may be visible to members of the local community and drivers using the peripheral public roads.

The objective of this environmental management procedure is to minimise visual and amenity impacts on the community during site activities.

### **A10.2 Legislation and guidelines**

There is no legislation that is directly applicable to visual amenity. While there is a substantial literature on methods of visual assessment there are no specific guidelines applicable to sand mining projects. The basic approach would appear to be the minimisation of mining activities from view during operations and the rehabilitation of the site to a landform which is sympathetic to its surroundings on completion of the works.

## **A10.3 Management controls**

### **OPERATIONAL PHASE**

**Strategy 10.1: Ensure that impacts on visual amenity are minimised during site activities and following completion.**

<b>Actions</b>	<b>Responsibility</b>
10.1.1 Clearly mark all vegetation to be retained.	Quarry Manager/ Environmental Manager
10.1.2 Construct peripheral bunding within the established setbacks. These should be a minimum of three metres high with slopes ranging from 3(H):1 (V) to 6(H):1 (V) depending on the location using overburden stripped from the site	Quarry Manager/ Environmental Manager
10.1.3 Undertake screen planting works to the peripheral areas to an agreed specification using mulch to allow for native plant regeneration. Reinforce this species mix using appropriate plantings at specified intervals.	Environmental Manager
10.1.4 Undertake a tree planting program within areas defined in the Landscape Management Plan to establish a dense plantation using an appropriate mix of species reflecting that of the existing community.	Environmental Manager
10.1.5 Re-establish the landform of the extraction areas to that shown in the Landscape Management Plan.	Quarry Manager
10.1.6 Complete the rehabilitation of the site in conformity with the proposals set out in the Landscape Management Plan.	Quarry Manager
10.1.7 Remove all temporary fencing when no longer required.	Quarry Manager
10.1.8 Re-establish vegetation in areas suitable for agricultural/horticultural uses.	Quarry Manager
10.1.9 Remove all site infrastructure including the slurry plant and its associated pipelines. Restore those areas affected by the plant and rehabilitate.	Quarry Manager
10.1.10 Remove all waste materials and dispose of in an appropriate manner.	Quarry Manager
10.1.11 Review Quarry Closure Plan and prepare proposals for future use of the area.	Quarry Manager

---

<b>Performance Indicator</b>	No complaints received regarding visual amenity during site operations and following completion.  Completion of the development in conformity with the requirements of the Rehabilitation Plan.
<b>Monitoring</b>	Ensure that the above actions are undertaken.
<b>Reporting</b>	Complaints from the community regarding visual amenity.  Compliance with the requirements of the Landscape Management Plan.

---

#### **A10.4 Monitoring and reporting**

The Quarry Manager and the Environmental Manager will be responsible for ensuring that the various environmental protection measures are installed and maintained in good condition. Annual reports will be prepared by the Quarry Manager on progress with the completion of their installation. The Environmental Manager is responsible for monitoring and reporting complaints regarding aesthetics and amenity received from the local community.

- *Chapter A11*

## **WASTE MANAGEMENT**

### **A11.1 Introduction**

Sand mining is rather different from many other developments in that it recycles a very high proportion of the waste produced during the process. This consists predominantly of overburden, which has to be removed to provide access to the useful material, and fines, which are a product of the process, required to provide a marketable product. Both these are returned to the site as backfill for rehabilitation which is one form of waste management. This is an intrinsic part of the extraction and rehabilitation process and will not be considered further under this heading.

In comparison the volume of other wastes is small. Solid waste will consist of a small amount of construction material offcuts, concrete, wood, paper and plastic, all in very small amounts. Liquids will include oils, paint and other chemical wastes, again in very small amounts. Solids are generally disposed of to landfill while most of the liquids are considered to be hazardous and must be transported to an appropriate liquid waste facility for recycling or disposal.

The objective of this environmental management procedure is to adopt an appropriate approach consistent with the preferred hierarchy of minimisation, reuse, recycling and finally disposal.

### **A11.2 Legislation and guidelines**

Legislation and guidelines relevant to waste management include:

- Protection of the Environment Operations Act 1997
- Local Government Act 1993
- Waste Avoidance and Resource Recovery Act 2001
- Environmentally Hazardous Chemicals Act 1985
- Environmental Guidelines: Assessment, Classification and Management of Non-Liquid Waste (Environment Protection Authority 1997)
- Landfill Disposal Of Industrial Wastes (Environment Protection Authority 1989)
- Australian Standard 1940 - The Storage and Handling of Flammable and Combustible Liquids 1993
- Australian Code for Transport and Storage of Dangerous Goods by Road and Rail (Commonwealth Government 1992)

It will be the responsibility of the site operators to ensure that the relevant provisions of the legislation and guidelines are complied with in carrying out the work on this development.

### A11.3 Management controls

#### OPERATIONAL PHASE

##### Strategy 11.1: Appropriate management and disposal of wastes generated during site operations.

Actions	Responsibility
11.1.1 Clearly delineate waste handling areas.	Quarry Manager
11.1.2 Define specific areas for the collection of materials for reuse and recycling and clearly label.	Quarry Manager
11.1.3 Process cleared vegetation on site for use as mulch within the landscape program.	Environmental Manager
11.1.4 Store all topsoil in stockpiles for later use in site rehabilitation.	Environmental Manager
11.1.5 Provide bins or skips for the collection and storage of recyclable material and waste. General construction waste will be stored in a skip located at the workshop on Lot 198 DP595538. Waste food will be removed on a daily basis and stored in a vermin proof bin for collection by waste contractor. Paper waste generated from site offices, plastics and glass are to be collected separately for recycling.	Quarry Manager
11.1.6 Separate hazardous wastes (including empty drums, rags, soil contaminated with oil) from non-hazardous wastes and manage in accordance with the relevant legislation.	Quarry Manager
11.1.7 Temporarily store liquid wastes (chemicals, oils and greases) in an appropriately bunded area and dispose of via a licensed contractor. Direct washdown water to an appropriate settlement basin if quality is acceptable. Otherwise, store and dispose as a liquid waste.	Quarry Manager
11.1.8 Retain copies of current licences of all waste removal contractors on site.	Quarry Manager
11.1.9 Keep all documentation relating to waste removal and disposal on file at the site. This documentation includes dockets for the removal and disposal of waste at a licensed facility.	Quarry Manager
11.1.10 Progressively separate and stockpile waste material in designated areas for collection. Adequately secure waste disposal areas to prevent access by wildlife.	Quarry Manager
11.1.11 Review all waste licences and monitor terms and conditions for compliance.	Environmental Manager

- |         |  |                       |
|---------|--|-----------------------|
| 11.1.12 | Recycle or dispose of any materials and waste remaining on the site following completion of extraction operations. All should be disposed of in an appropriate manner. | Environmental Manager |
|---------|--|-----------------------|

---

<b>Performance Indicator</b>	<p>Effective use of waste recycling area and maximisation of material reuse.</p> <p>Appropriate removal of all waste from the site on completion.</p>
------------------------------	---

---

<b>Monitoring</b>	Regular review of recycling opportunities, quantities and cost savings.
-------------------	---

---

<b>Reporting</b>	Annual report on waste management, reuse and recycling on the site.
------------------	---

---

#### **A11.4 Monitoring and reporting**

The Quarry Manager will be responsible for conducting regular waste audits, monitoring the currency of any waste disposal contracts and documentation relating to transport and disposal of wastes. The Quarry Manager will also monitor the quantities and costs/savings associated with the effective management of waste materials.

- *Chapter A12*

## **EMERGENCY RESPONSE MANAGEMENT**

### **A12.1 Introduction**

An emergency is an unforeseen occurrence, which requires an immediate reaction to prevent an environmental impact. Potential environmental emergencies during operations include uncontrolled spills of materials such as oil, chemicals, contaminated water or waste materials.

The objective of this environmental management procedure is to ensure that appropriate measures are in place to deal with an environmental emergency situation and to protect the safety of any person involved in an emergency.

### **A12.2 Legislation and guidelines**

Legislation and guidelines relevant to emergency situations includes:

- Dangerous Goods (Road and Rail Transport) Act 2008
- Occupational Health and Safety Act 2000
- Occupational Health and Safety Regulation 2001
- Protection of the Environment Operations Act 1997

It will be the responsibility of the site operators to ensure that the relevant provisions of the above legislation and guidelines are complied with in carrying out the work on this development.



## A12.3 Management controls

### OPERATIONAL PHASE

**Strategy 12.1: Ensure that procedures and controls are implemented to prevent, or if necessary, control any potential environmental emergency**

Actions		Responsibility
12.1.1	Ensure that all personnel on site during operations have been trained in appropriate procedures including site induction, materials handling and response procedures.	Quarry Manager
12.1.2	Develop and put in place emergency response procedures. Appoint appropriate individuals as emergency services liaison officers.	Quarry Manager
12.1.3	Establish an emergency response table listing contact details of all relevant parties required in an environmental emergency.	Quarry Manager
12.1.4	Establish a Register of Environmentally Hazardous Materials to be stored and used on site.	Quarry Manager
12.1.5	Ensure that appropriate safety and spill response equipment has been made available.	Quarry Manager
12.1.6	Clearly label all materials to be used and stored on site.	Quarry Manager
12.1.7	Review and update emergency response procedures bi-annually.	Quarry Manager
12.1.8	Ensure that appropriate safety and response equipment is available at all times.	Quarry Manager
<b>Performance indicator</b>		Emergency response procedures, controls and training adequate for potential emergencies.
<b>Monitoring</b>		Regular monitoring of response procedures and equipment.
<b>Reporting</b>		Annual report on incidents.

## A12.4 Monitoring and reporting

The Quarry Manager will be responsible for maintaining the currency of the emergency procedures and reporting on incidents.

- *Chapter A13*

## **HAZARD RISK AND SAFETY MANAGEMENT**

### **A13.1 Introduction**

Site operations will involve the handling and use of hazardous materials such as fuels, oils and chemicals. Such materials include those termed Dangerous Goods, under the Dangerous Goods Act 1975 as well as materials which if allowed to enter the environment can result in environmental degradation.

The objective of this environmental management procedure is to ensure that the handling and storage of dangerous goods on site does not result in pollution of the environment or cause harm to individuals.

### **A13.2 Legislation and guidelines**

Legislation and guidelines relevant to the storage and handling of dangerous goods include:

- Dangerous Goods Road and Rail Transport) Act 2008
- Protection of the Environment Operations Act 1997
- Environmental Guidelines: Assessment, Classification and Management of Non-Liquid Waste (Environment Protection Authority 1997)
- Approved Criteria for Classifying Hazardous Substances, Revised Edition (National Occupational Health and Safety Commission 1998)
- National Standard for the Storage and Handling of Dangerous Goods (National Occupational Health and Safety Commission 1998)
- National Code of Practice for the Storage and Handling of Dangerous Goods (National Occupational Health and Safety Commission 1998)

It will be the responsibility of the site operators to ensure that the relevant provisions of the above legislation and guidelines are complied with in carrying out the work on this development.

### A13.3 Management controls

#### OPERATIONAL PHASE

##### Strategy 13.1: Minimise the risks associated with the storage and handling of hazardous materials.

Actions	Responsibility
13.1.1 Obtain a licence to keep dangerous goods from WorkCover NSW for all materials stored on site which require licensing	Quarry Manager
13.1.2 Establish a Register of Hazardous Materials setting out details of quantities, storage and specific handling requirements for all relevant materials stored on site.	Quarry Manager/ Environmental Manager
13.1.3 Obtain Material Safety Data Sheets for all hazardous materials stored on site.	Quarry Manager/ Environmental Manager
13.1.4 Provide appropriate storage and secondary containment facilities for all hazardous materials stored on site. All bunded areas must be designed to contain at least 110% of the volume of materials permanently stored within the area. Temporary facilities should have drip trays.	Quarry Manager
13.1.5 Appoint a Safety Officer for the development.	Quarry Manager
13.1.6 Locate all flammable material storage areas at least ten metres from possible ignition sources.	Quarry Manager/ Environmental Manager
14.1.7 Clearly label the contents of all above ground storage areas.	Quarry Manager/ Environmental Manager
13.1.8 Secure all hazardous and dangerous goods storage areas and display appropriate signage. Segregate all incompatible material.	Quarry Manager/ Environmental Manager
13.1.9 Train all personnel in the handling and safety procedures required for the hazardous materials stored and used on site during Staff Safety Meetings.	Quarry Manager/ Environmental Manager
<b>Performance Indicator</b>	Storage and handling of hazardous materials complies with legislative requirements and demonstrates due diligence.

<b>Monitoring</b>	Regular review of compliance with legislative requirements for the storage and handling of hazardous materials.
<b>Reporting</b>	AEMR.

**Strategy 13.2: Ensure that procedures are implemented and facilities made available for clean up in the event of a pollution incident.**

<b>Actions</b>	<b>Responsibility</b>
13.2.1 Emergency Response Plan in place (see <b>Chapter 12</b> ).	Quarry Manager
13.2.2 Provide a mobile spill control kit containing appropriate absorbent materials, neutralising chemicals and other spill containment equipment.	Quarry Manager
13.2.3 Provide personal protective equipment and instruct personnel on its use.	Quarry Manager
13.2.4 Clean up any spills beyond the bunded area immediately and dispose of the contaminated material in an appropriate manner.	Quarry Manager
13.2.5 Contact the relevant authorities in the event of a leak or spill. Follow any instructions provided. Remediate any contamination to the satisfaction of the regulatory authorities.	Quarry Manager
13.2.6 Collect any spills or hazardous wastes that cannot be recycled and arrange for disposal by a licensed waste contractor. Maintain all records of waste removal on site.	Quarry Manager

<b>Performance Indicator</b>	All pollution incidents contained and cleaned up without impact on the environment or injury to personnel. All incidents recorded.
<b>Monitoring</b>	Stormwater and soil contamination monitoring undertaken following any spill and subsequent clean up.
<b>Reporting</b>	Report on all pollution events and the results of any clean up.



#### **A13.4 Monitoring and reporting**

The Quarry Manager and the Environmental Manager will be responsible for maintaining the currency of the Emergency Response Procedures and Register of Hazardous Materials, reporting on incidents and ensuring that audits and clean up monitoring are conducted.

## **HITCHCOCK ROAD MAROOTA**

### **4 Sand Extraction and Rehabilitation Project**

## **ENVIRONMENTAL STRATEGY**

## **APPENDIX B**

### **Membership of the Community Consultative Committee**

## **Appendix B    Membership of the Community Consultative Committee**

The present membership of the Liaison and Review Committee for the Hitchcock Road and Lot 198 Sand Extraction and Rehabilitation Projects in 2014 is listed below. This membership varies from time to time although the representation of Council, the community and PF Formation remains generally consistent. The committee is named the Community Consultative Committee.

### **The Hills Shire Council**

Kristine McKenzie – Chairperson  
Robert Buckham  
Daniel Giffney

### **Local community**

Marianne Sheumack  
Shaunagh Hitchcock  
Peter Harkins

### **Department of Environment and Climate Change**

David Gathercole

### **PF Formation**

John Graham  
Peter Cummins  
Joshua Graham



## **HITCHCOCK ROAD MAROOTA**

### **5 Sand Extraction and Rehabilitation Project**

#### **ENVIRONMENTAL STRATEGY**

## **APPENDIX C**

### **Dispute Resolution Process**

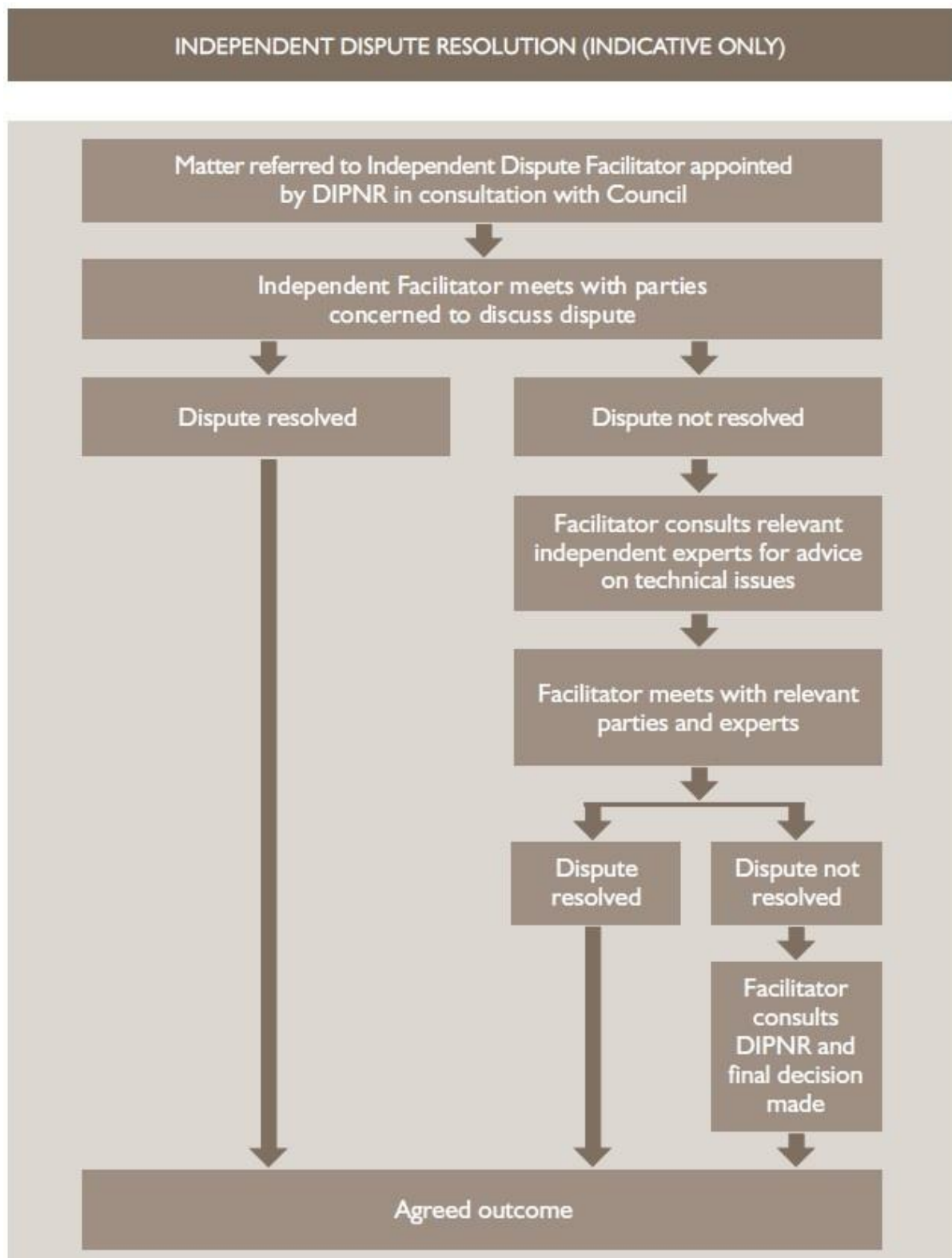


Figure C.1  
INDEPENDENT DISPUTE RESOLUTION PROCESS

## **HITCHCOCK ROAD MAROOTA**

### **6 Sand Extraction and Rehabilitation Project ENVIRONMENTAL STRATEGY**

## **APPENDIX D Statement of Commitments**

## Appendix D Statement of commitments

The Statement of Commitments is set out in **Table D1**. Many of the measures listed in the table as commitments are in accordance with Appendix 3 of the Approval.

**Table D1 Statement of Commitments**

Issue	Commitment	Location in the EA	
		Main Volume	Technical Paper
<b>Noise and Vibration (NV1)</b>	Site activities will be managed so that any necessary high noise and vibration levels occur at times of least impact.	<b>4.8</b>	<b>TP4</b>
<b>(NV2)</b>	All site activities will be undertaken incorporating noise attenuation measures such as restricting working hours for certain works required in the proximity of sensitive receptors.	<b>4.8.4</b>	<b>TP4</b>
<b>(NV3)</b>	All equipment used on site will be certified in relation to noise performance.	<b>4.8.4</b>	<b>TP4</b>
<b>(NV4)</b>	Panels and covers of silenced plant will be kept shut and plant and equipment switched off when not in use.	<b>4.8.4</b>	<b>TP4</b>
<b>(NV5)</b>	All mechanical equipment will be silenced by the best practical means using current technology, prior to use. Noise suppression devices will be fitted according to manufacturer's instructions. Noise control kits will be fitted to noisy mobile equipment and shrouds provided around stationary equipment where necessary.	<b>4.8.4</b>	<b>TP4</b>
<b>(NV6)</b>	Working will be limited to 07.00 to 18.00 hours, Monday to Saturday and at no time on Sundays and public holidays. A maximum of 10 laden vehicles will be permitted to enter and leave the site between the 06.00 and 07.00 hours, Monday to Saturday, excluding Sundays and public holidays.	<b>2.4.8 and 4.8.3</b>	<b>TP4</b>
<b>(NV7)</b>	All plant and equipment will be inspected regularly to ensure that it is well maintained to minimise noise emissions.	<b>4.8.4</b>	<b>TP4</b>
<b>(NV8)</b>	The L <sub>10</sub> noise level at the boundary of adjacent receivers where baseline data has been obtained will not normally exceed the noise emission criteria by more than 5 dB(A).	<b>4.8.3</b>	<b>TP4</b>
<b>(NV9)</b>	Compliance monitoring of noise levels will be undertaken and appropriate records of measurements kept.	<b>4.8.4</b>	<b>TP4</b>

<b>(NV10)</b>	The local community will be informed of the level and duration of noise to be expected during specific activities and phases of development when necessary. Communication of concerns to the Environmental Manager will be invited.	<b>4.16.3</b>	<b>TP4</b>
<b>Air Quality and greenhouse gas emissions</b>	Ambient air quality monitoring will be conducted at identified sites.	<b>4.9.3</b>	<b>TP5</b>
<b>(AQ1)</b>			
<b>(AQ2)</b>	Dust suppression equipment will be fitted to all processing plant on the site if necessary. This will be regularly inspected and maintained in good working order at all times.	<b>4.9.4</b>	<b>TP5</b>
<b>(AQ3)</b>	Trafficable areas will be defined to prevent unnecessary vehicle movement into other parts of the site.	<b>4.9.4</b>	<b>TP5</b>
<b>(AQ4)</b>	All unsealed trafficable areas and working areas will be kept damp by spraying regularly with a water cart, water sprays or sprinklers to minimise dust emissions. Frequency of spraying to be determined based on weather conditions, soil erodibility and the observation of any visible dust.	<b>4.9.4</b>	<b>TP5</b>
<b>(AQ5)</b>	Speed controls will be applied to all unsealed areas (maximum speed of 20 km/h) and signposted accordingly.	<b>4.9.4</b>	<b>TP5</b>
<b>(AQ6)</b>	All semi-permanent stockpiles will be vegetated with suitable groundcover and regularly watered until the vegetation is well established.	<b>4.9.4</b>	<b>TP5</b>
<b>(AQ7)</b>	Work on any extraction activity producing dust will cease due to high winds if control cannot be achieved by watering or other means. Work will not resume until the wind velocity decreases and any dust generation can be controlled by normal means.	<b>4.9.4</b>	<b>TP5</b>
<b>(AQ8)</b>	All loaded trucks leaving the weighbridge area on Lot 198 DP 752025 will have their payloads fully covered by a suitable material to prevent spillage.	<b>4.9.4</b>	<b>TP5</b>
<b>(AQ9)</b>	No fires will be permitted on-site without a permit.	<b>4.9.4</b>	<b>TP5</b>
<b>(AQ10)</b>	A mechanical road sweeping unit and water cart will be maintained for use as required to keep all roads including the intersection of the haul road and Wisemans Ferry Road free from deposited material.	<b>4.9.4</b>	<b>TP5</b>
<b>(AQ11)</b>	Exhausts from all vehicles and plant/equipment will be inspected to ensure that they are maintained at an acceptable level.	<b>4.9.4</b>	<b>TP5</b>
<b>(AQ12)</b>	All vehicles will be regularly serviced to ensure that exhaust emissions comply with the regulations. Appropriate service records will be maintained.	<b>4.9.4</b>	<b>TP5</b>

<b>(AQ13)</b>	Any opportunities to minimise machinery use and ensure that all equipment used on the site is energy efficient will be identified.	<b>4.9.4</b>	<b>TP5</b>
<b>Access and Traffic (AT1)</b>	If the sand slurry plant and transport system is unusable due to breakdown or during maintenance periods, trucks will be used for the transport of extractive material on a temporary basis. This will cease once the system is operating satisfactorily.	<b>2.4.6 and 2.4.7</b>	<b>TP3</b>
<b>(AT2)</b>	The number of laden vehicle movements will not exceed a combined total of two hundred per day via the intersection of the haulage road and Wisemans Ferry Road. This is the total of laden vehicle movements allowed for PF Formation's combined extractive industry operations in Baulkham Hills Shire.	<b>2.4.7</b>	<b>TP3</b>
<b>(AT3)</b>	Operations involving the transportation of material on the site will only be undertaken between 07.00 and 18.00 hours, Monday to Saturday.	<b>2.4.8</b>	<b>TP3</b>
<b>(AT4)</b>	A maximum of 10 laden vehicles will be allowed to enter and leave the site between 06.00 and 07.00 hours, Monday to Saturday only. Vehicles will not be allowed to arrive at the site prior to 05.45 hours on any day.	<b>2.4.8</b>	<b>TP3</b>
<b>Erosion and Sediment Control (ESC1)</b>	Soil and Water Management Plan will be reviewed and revised, if required.	<b>4.6.3</b>	<b>TP1</b>
<b>(ESC2)</b>	Temporary erosion and sedimentation control structures such as detention basins and catch drains will be constructed as appropriate to collect runoff from cleared land including extraction areas and access roads.	<b>2.7</b>	
<b>(ESC3)</b>	Silt traps and erosion control fencing will be erected as appropriate along extraction area boundaries and drainage lines.	<b>2.7</b>	
<b>(ESC4)</b>	Sediment basins with a minimum storage capacity of 400 m <sup>3</sup> per hectare of catchment will be constructed. Spillway capacity and stability will be designed as follows: <ul style="list-style-type: none"> <li>• life of less than 5 years, adopt the 20 year t<sub>c</sub> event;</li> <li>• life between 5 and 10 years, adopt the 50 year t<sub>c</sub> event; and</li> <li>• life greater than 10 years, adopt the 100 year t<sub>c</sub> event.</li> </ul>	<b>2.7 and 4.7.5</b>	
<b>(ESC5)</b>	Stormwater control measures will be assessed and routine inspections conducted to ensure that compliance with best practice guidelines and relevant legislation is achieved.	<b>4.7.5</b>	

<b>(ESC6)</b>	Locations for topsoil and material stockpiles will be selected on level ground and away from drainage lines. Diversion drains and sediment filter fences will be installed up slope as appropriate.	<b>4.6.3</b>	
<b>(ESC7)</b>	Training will be provided to operational personnel on the importance of erosion control measures and drivers informed of the damage that can be caused to the environment by heavy vehicles.	<b>4.6.3</b>	
<b>(ESC8)</b>	Areas of exposed land will be kept to a minimum compatible with operational requirements.	<b>4.6.3</b>	
<b>(ESC9)</b>	Exposed areas not in use will be stabilized with an appropriate cover crop and watered until well established.	<b>4.6.3</b>	
<b>(ESC10)</b>	Erosion and sediment controls will be monitored regularly and immediately following a rainfall event. Monitoring will take place initially on a weekly basis, then monthly once operating correctly. Sediment will be cleared when the traps have collected 60% of the capacity of the basin or where sediment buildup is less than 300 mm below the spillway crest. Sediment will be removed to a location where further pollution to downslope lands and waterways will not occur.	<b>4.6.3</b>	
<b>(ESC11)</b>	Maintenance of erosion and sediment controls will be undertaken when any deterioration is identified or when replacement is necessary.	<b>4.6.3</b>	
<b>(ESC12)</b>	Stored stormwater will be reused for dust control and the watering of site vegetation.	<b>4.6.3</b>	
<b>(ESC13)</b>	Soil stockpiles will be seeded where these are to remain unused for a period in excess of four weeks. The area will be watered until the vegetation is well established.	<b>4.6.3</b>	
<b>Water Management (WAM1)</b>	Maximum depth of extraction will be restricted to not less than two metres above the wet weather high groundwater level. (nominally 181 mAHD).	<b>2.4.3</b>	<b>TP2</b>
<b>(WAM2)</b>	The groundwater will not be breached or contaminated. In the event that either should occur, operations will cease in the affected area and the EPA consulted to determine the basis on which extraction may recommence.	<b>4.5.7</b>	<b>TP2</b>
<b>(WAM3)</b>	Retention basins will be designed to accommodate the 100-year $t_c$ event. The minimum basin capacities are: <ul style="list-style-type: none"> <li>Northern catchment 10,000 m<sup>3</sup></li> <li>Southern catchment 38,000 m<sup>3</sup></li> </ul> The volume of these basins can be varied depending on the extent of the area exposed for extraction within each catchment.	<b>2.5.3</b>	

**Hitchcock Road Sand Extraction and Rehabilitation Project Maroota**  
**Environmental strategy**

<b>(WAM4)</b>	All retention basins will be regularly inspected and an annual report prepared on their effectiveness.	<b>2.5.2</b>	
<b>(WAM5)</b>	A minimum of two groundwater monitoring bores will be installed. One will be located within or near the extraction area and another at some location within the site beyond the area of any direct extraction influence. The location of these bores will meet the requirements of the Department of Water and the Hills Shire Council. This was done in 2009.	<b>4.5.2</b>	<b>TP2</b>
<b>Flora and Fauna (FF1)</b>	All areas which are not to be disturbed will be clearly marked.	<b>2.8.2</b>	<b>TP6</b>
<b>(FF2)</b>	Topsoil will be separated and stored or use in rehabilitation works.	<b>2.6</b>	
<b>(FF3)</b>	An area of not less than 12 hectares will be identified, and indicated on the site survey. This will be identified as a revegetation area and access controlled.	<b>2.8</b>	<b>TP6</b>
<b>(FF4)</b>	Seed will be collected from the existing woodland communities (Sydney Hinterland Transition Woodland), stored under controlled conditions, made available for future broadcasting and a suitable proportion propagated to provide tubestock for revegetation.	<b>2.8</b>	<b>TP6</b>
<b>(FF5)</b>	Stored topsoil and that derived from suitable areas adjacent to the woodland communities will be spread over the defined revegetation area and seed broadcast over the site to augment the soil-borne native seed bank. Tube stock suitably protected against animal predation will also be used in appropriate locations.	<b>2.8.2</b>	
<b>(FF6)</b>	Access to bushland will be restricted to minimise the potential for damage. These areas will be fenced and signs erected to ensure that this prohibition is made clear.	<b>2.4.2</b>	<b>TP6</b>
<b>(FF7)</b>	Monthly visual inspections will be undertaken of the revegetating areas by the site Environmental Manager and the results reported annually as part of the regular environmental audit process.	<b>2.6</b>	<b>TP6</b>
<b>(FF8)</b>	Annual inspections will be undertaken by a biologist to assess progress based on the criteria set out in the amended management plan. Information required, where relevant includes position using GPS, slope, aspect, landform, soil type/geology, evidence of disturbance, condition, evidence of canopy recruitment, natural regeneration and fauna habitat values for the chosen quadrat.	<b>2.6</b>	<b>TP6</b>



**Hitchcock Road Sand Extraction and Rehabilitation Project Maroota**  
**Environmental strategy**

<b>(FF9)</b>	A revegetation plan will be developed describing the revegetation strategy for the site including: <ul style="list-style-type: none"> <li>• identification of areas to be revegetated;</li> <li>• topsoil storage requirements and methods of use;</li> <li>• site preparation methods;</li> <li>• techniques for planting including timing, use of mulch and watering;</li> <li>• species to be used in future planting to ensure that ground cover and shrub layer species are represented;</li> <li>• weed control methods; and erosion control methods.</li> </ul>	<b>2.6</b>	<b>TP6</b>
<b>(FF10)</b>	All management actions will be recorded including any subsequent outcomes observed during monitoring. This will include: <ul style="list-style-type: none"> <li>• details of the area worked;</li> <li>• type of work carried out;</li> <li>• problems encountered, if any; and</li> <li>• recommendations for necessary management changes.</li> </ul>	<b>2.6</b>	<b>TP6</b>
<b>(FF11)</b>	If the annual inspection by the independent specialist indicates that the revegetation of an area at least equal in extent to that of the existing community satisfies a majority of the ten year criteria, the equivalent area of that community will be removed to allow sand extraction to take place in that location. This occurred in 2014.	<b>2.6</b>	<b>TP6</b>
<b>(FF12)</b>	Revegetation of the defined areas will continue until the total area has been successfully completed.	<b>2.6</b>	<b>TP6</b>
<b>(FF13)</b>	If a majority of the criteria are not achieved by the agreed date and it is determined that this would be unlikely to occur even with additional management input, the existing community would remain until an amended offset strategy is identified. Criteria was achieved in 2014.	<b>2.6</b>	<b>TP6</b>
<b>(FF14)</b>	Flora and fauna issues will be incorporated in the education programme so that site operatives are aware of the requirements of the EMP.	<b>5.2.1</b>	<b>TP6</b>
<b>(FF15)</b>	Once each extraction phase is complete, the rehabilitation and revegetation programme will be initiated as set out in the Rehabilitation Strategy.	<b>2.8.2</b>	
<b>Rehabilitation (RH1)</b>	The Rehabilitation Plan will be reviewed and amended as necessary to reflect changing operational conditions. This will include a revised phasing plan and implementation programme.	<b>2.8.1</b>	
<b>(RH2)</b>	Setbacks to all roads and adjacent properties will be defined taking account of existing trees and other features. Programmes of mound construction and screen planting will be undertaken as required in the Rehabilitation Plan. All plant material used will reflect the species mix existing in the area.	<b>2.8.1</b>	

<b>(RH3)</b>	A staged seeding and planting programme will be undertaken as areas become available following completion of extraction and capping of sediment basins. This will be aimed at producing a dense plantation on the steeper slopes derived from the flora resources already established. The aim is to replicate as far as possible the mix and density of planting which is currently present.	<b>2.8.2 and 2.8.3</b>
<b>(RH4)</b>	All suitable plant material will be used on the site as a seed and planting medium. Topsoil will be stored in appropriately marked low stockpiles for reuse in locations as close as possible to their source. Care will be taken to ensure that this does not become contaminated with the seeds of exotic species and weeds.	<b>2.8.2</b>
<b>(RH5)</b>	The site will be rehabilitated in stages leaving areas exposed for as short a time as possible. This will be undertaken in conformity with the approved Rehabilitation Plan with maximum final batter grades of 4(H):1(V) on north and west facing slopes and 3(H):1(V) on those facing south and east. Final slopes will be as gentle as possible depending on the availability of fill material.	<b>2.8.1 and 2.8.2</b>
<b>(RH6)</b>	All soil stockpiles and exposed areas will be seeded with an appropriate vegetation cover where no activity is to take place for more than four weeks.	<b>2.8.2</b>
<b>(RH7)</b>	Revegetation of the site will be undertaken on the following basis: <ul style="list-style-type: none"> <li>• as far as possible re-establish the Sydney Hinterland Transition Woodland using seed and mulch collected from the area ;</li> <li>• rehabilitate other areas to native species with a light sowing of cereal and allowing natural regeneration;</li> <li>• rehabilitate the soil to achieve a full profile;</li> <li>• lime, fertilise and sow areas where improved grass cover is required; and</li> <li>• suitably turf surfaces expected to experience high surface flows leaving the site.</li> </ul>	<b>2.8.2 and 2.8.3</b>
<b>(RH8)</b>	A maintenance programme aimed at promoting and protecting the growth of the rehabilitated areas will be established.	<b>2.8.3</b>
<b>Social Impact Management (SIM1)</b>	Material concerning activities at the site will be prepared and published on the company's website which will allow the community and others to be informed about current news on the site.	<b>4.16.3</b>
<b>(SIM2)</b>	Regular bi-annual meetings of community representatives will be established to discuss issues in relation to sand extraction on the site.	<b>1.3.2 and 5.2.1</b>

**Hitchcock Road Sand Extraction and Rehabilitation Project Maroota**  
**Environmental strategy**

<b>(SIM2)</b>	A Complaints Register will be established incorporating date and time, type of communication, contact details of the complainant, nature of the complaint and response taken.	<b>1.3.2</b>	
<b>Heritage (H1)</b>	All work will cease in the area if an archaeological or heritage item is identified during extraction operations and the National Parks and Wildlife Service, the Deerubbin Aboriginal Land Council or the Heritage Office consulted to determine any appropriate course of action prior to recommencement of the work.	<b>4.11.3 And 5.2.2</b>	<b>TP7</b>
<b>(H2)</b>	Any additional survey work required for submittal of application to destroy artifact scatters located in the later stages of the development will be undertaken. Reasonable requirements of the National Parks and Wildlife Service, the Deerubbin Aboriginal Land Council and the Heritage Office arising out of any additional studies will be implemented.	<b>5.2.2</b>	<b>TP7</b>
<b>Visual Amenity (VA1)</b>	All vegetation to be retained will be clearly marked and protected with temporary fencing of an appropriate material and height.	<b>2.4.2</b>	<b>TP8</b>
<b>(VA2)</b>	Peripheral bunds will be constructed within the established setbacks where necessary to screen extraction activities. These will be a minimum of three metres high with slopes ranging from 3(H):1 (V) to 6(H):1 (V) depending on the location using overburden stripped from the site.	<b>2.4.3</b>	<b>TP8</b>
<b>(VA3)</b>	Screen planting works will be undertaken in the peripheral areas to an agreed specification using mulch to allow for native plant regeneration. This species mix will be reinforced using appropriate plantings at specified intervals.	<b>2.4.3</b>	<b>TP8</b>
<b>(VA4)</b>	A tree planting programme will be undertaken within the ten metre buffer zones and in other defined parts of the site to establish a dense plantation using an appropriate mix of species reflecting that of the existing community.	<b>2.8.2 and 2.8.3</b>	<b>TP8</b>
<b>(VA5)</b>	The final rehabilitated landform will be established in conformity with the Rehabilitation Plan.	<b>2.8.1</b>	<b>TP8</b>
<b>(VA6)</b>	All temporary fencing will be removed when no longer required.	<b>2.8.2</b>	
<b>(VA7)</b>	Vegetation in areas suitable for agricultural/horticultural uses will be re-established.	<b>2.8.3</b>	
<b>(VA8)</b>	All site infrastructure including the slurry plant and its associated pipelines will be removed. Those areas affected by the plant will be restored and rehabilitated.	<b>2.8.2</b>	

<b>(VA9)</b>	All waste materials will be removed and disposed of in an appropriate manner.	<b>4.15</b>
<b>(VA10)</b>	The final Rehabilitation Plan will be reviewed and proposals for future use of the site prepared.	<b>2.8.1</b>
<b>Waste Management (WSM1)</b>	Waste handling areas will be clearly delineated.	<b>4.15</b>
<b>(WSM2)</b>	Specific areas for the collection of materials for reuse and recycling will be defined and clearly labelled.	<b>4.15</b>
<b>(WSM3)</b>	Cleared vegetation will be used within the landscape programme.	<b>2.8.2</b>
<b>(WSM4)</b>	All topsoil will be stored in stockpiles for later use in site rehabilitation.	<b>2.8.2</b>
<b>(WSM5)</b>	Bins or skips will be provided for the collection and storage of recyclable material and waste. General construction waste will be stored in a skip located at the workshop on Lot 198 DP752025. Waste food will be removed and stored in a vermin proof bin for collection by a waste contractor. Paper waste generated from site offices, plastics and glass will be collected separately for recycling.	<b>5.2.2</b>
<b>(WSM6)</b>	Hazardous wastes (including empty drums, rags, soil contaminated with oil) will be separated from non-hazardous wastes and managed in accordance with the relevant legislation.	<b>5.2.2</b>
<b>(WSM7)</b>	Liquid wastes (chemicals, oils and greases) will be temporarily stored in an appropriately bunded area and disposed of via a licensed contractor. Wash down water will be directed to an appropriate settlement basin if quality is acceptable.	<b>5.2.2</b>
<b>(WSM8)</b>	Copies of current licences of all waste removal contractors on site will be retained.	<b>5.2.2</b>
<b>(WSM9)</b>	All documentation relating to waste removal and disposal will be retained on file at the site. This documentation will include dockets for the removal and disposal of waste at a licensed facility.	<b>5.2.2</b>
<b>(WSM10)</b>	Waste material will be progressively separated and stockpiled in designated areas for collection. Adequately secure waste disposal areas to prevent access by wildlife.	<b>5.2.2</b>
<b>(WSM11)</b>	All waste licences will be reviewed and terms and conditions for compliance monitored.	<b>5.2.2</b>
<b>(WSM12)</b>	Any materials and waste remaining on the site following completion of extraction operations will be recycled or sent for disposal. This will be either recycled or disposed of in an appropriate manner.	<b>5.2.2</b>

<b>Emergency Response (ER1)</b>	All personnel on site during operations will be trained in appropriate procedures including site induction, materials handling and response procedures.	
<b>(ER2)</b>	Emergency response procedures will be developed and put in place. Appropriate individuals will be appointed as emergency services liaison officers.	<b>5.3.3</b>
<b>(ER3)</b>	An emergency response table listing contact details of all relevant parties required in an environmental emergency will be prepared.	<b>5.3.3</b>
<b>(ER4)</b>	A Register of Environmentally Hazardous Materials to be stored and used on site will be established.	<b>5.3.3</b>
<b>(ER5)</b>	Appropriate safety and spill response equipment will be made available on site.	<b>5.3.3</b>
<b>(ER6)</b>	All materials to be used and stored on site will be clearly labelled.	<b>5.3.3</b>
<b>(ER7)</b>	Emergency response procedures will be reviewed and updated bi-annually.	<b>5.3.3</b>
<b>(ER8)</b>	Appropriate safety and response equipment will be available at all times.	<b>5.3.3</b>
<b>Hazard, Risk and Safety (HRS1)</b>	A licence to keep dangerous goods will be obtained from WorkCover NSW for all materials stored on site which require licensing.	<b>5.3.3</b>
<b>(HRS2)</b>	A Register of Hazardous Materials setting out details of quantities, storage and specific handling requirements for all relevant materials stored on site will be established.	<b>5.3.3</b>
<b>(HRS3)</b>	Material Safety Data Sheets for all hazardous materials stored on site will be obtained.	<b>5.3.3</b>
<b>(HRS4)</b>	Appropriate storage and secondary containment facilities for all hazardous materials stored on site will be provided. All bunded areas will be designed to contain at least 110% of the volume of materials stored within the area	<b>5.3.3</b>
<b>(HRS5)</b>	A Safety Officer will be appointed for the development.	<b>5.3.3</b>
<b>(HRS6)</b>	All flammable material storage areas will be located at least ten metres from possible ignition sources.	<b>5.3.3</b>
<b>(HRS7)</b>	Contents of all above ground storage areas will be clearly labelled.	<b>5.3.3</b>
<b>(HRS8)</b>	All hazardous and dangerous goods storage areas will be secured and appropriate signage displayed. All incompatible material will be segregated.	<b>5.3.3</b>

---

<b>(HRS9)</b>	All personnel will be trained in the handling and safety procedures required for the hazardous materials stored and used on site.	
<b>(HRS10)</b>	An Emergency Response Plan will be developed and put in place.	<b>5.3.3</b>
<b>(HRS11)</b>	A mobile spill control kit containing appropriate absorbent materials, neutralising chemicals and other spill containment equipment will be provided.	<b>5.3.3</b>
<b>(HRS12)</b>	Personal protective equipment will be provided and personnel instructed in its use.	<b>5.3.3</b>
<b>(HRS13)</b>	Any spills beyond the bunded area will be cleaned up immediately and the contaminated material disposed of in an appropriate manner.	<b>5.3.3</b>
<b>(HRS14)</b>	The relevant authorities will be contacted in the event of a leak or spill and any instructions followed. Any contamination will be remediated to the satisfaction of the regulatory authorities.	<b>5.3.3</b>
<b>(HRS15)</b>	Any spills or hazardous wastes that cannot be recycled will be collected and disposal by a licensed waste contractor arranged. All records of waste removal on site will be retained.	<b>5.3.3</b>

---