



## **Landscape & Rehabilitation Management Plan**

**Mt SHAMROCK QUARRY,  
PAKENHAM**

**JANUARY, 2008**

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### Attachments

1. Quarry Operational Area – Rehabilitation Plan – Dwg. L1a,
2. Non-quarry Operational Area: Landscape Plan Planting Phase A – Dwg. L2a,
3. Non-quarry Operational Area: Landscape Plan Planting Phase B – Dwg.L3a, and
4. Non-quarry Operational Area: Landscape Plan Planting Phase C – Dwg.L4a,

## 1.0 INTRODUCTION

This Landscape & Rehabilitation Management Plan (LRMP) has been prepared as part of the rehabilitation strategy for the extension of the Readymix Mt Shamrock Quarry. It is designed to specifically address issues relating to maintenance activities associated with landscaping and rehabilitation of quarry and non-quarry operational areas, as identified in section 9 of the Landscape and Rehabilitation Report appended to the Work Plan for the variation to Work Authority No. 174 submitted as part of the Environmental Effects Statement for that variation prepared in May, 2005.

A planning permit was issued to Readymix in June, 2007, allowing the extension to proceed subject to conditions. It is a requirement of the planning permit that an Environmental Management Plan (EMP) be prepared which will incorporate the management requirements for the site. As part of the EMP, the following landscape and rehabilitation management strategies and monitoring systems in this LRMP are outlined for incorporation within the EMP implementation program.

This LRMP complements, and should be read in conjunction with, ERM's Landscape and Rehabilitation Report (January, 2005) appended to the Work Plan in Volume 1 of the Technical Supplement to the EES.

### 1.1 *Summary of Landscape and Rehabilitation Strategy*

Rehabilitation will respond to each of the four stages of extraction to treat batters, benching, quarry floors, plant, hardstand and stockpile areas, and water collection points (wetlands). At the completion of all quarrying activities, it is proposed that the site be reviewed to ascertain plant losses. Replanting as part of the ongoing monitoring and maintenance will continue for a period of **12 months** after completion of extraction after which the planting will rely on natural regeneration.

### 1.2 *Accompanying Drawings*

This LRMP is to be read in conjunction with the following plans of the development prepared by ERM for Mt Shamrock Quarry:

5. Quarry Operational Area – Rehabilitation Plan – Dwg. L1a,
6. Non-quarry Operational Area: Landscape Plan Planting Phase A – Dwg. L2a,
7. Non-quarry Operational Area: Landscape Plan Planting Phase B – Dwg.L3a, and
8. Non-quarry Operational Area: Landscape Plan Planting Phase C – Dwg.L4a,

as amended to comply with planning permit Condition 8. The amended complying plans are attached to this LRMP.

### 1.3 *Guidelines*

It is the responsibility of the quarry operators to ensure that they are aware of legislation, guidelines and other relevant requirements relating to their activities. It is also the responsibility of the operator to ensure that the requirements of legislation and the particular requirements of this LRMP are followed throughout the construction / planting rehabilitation, management phases of the project.

### 1.4 *Local Ordinances*

Works on site shall comply with all Corporations, Municipal, or other Local By-Laws and Regulations.

## **1.5 Codes, Standards, Permits and Regulations**

All work shall comply with current relevant Codes, Australian Standards, Permit requirements and Regulations currently in operation for the respective works types.

## **2.0 MONITORING, REPORTING & REVIEW**

### **2.1 Rehabilitation Manager**

A Rehabilitation (“Rehab”) Manager is to be appointed with responsibility for the following:

- Ensuring any contractors and staff are aware of the LRMP and its requirements;
- Carrying out any monitoring, testing and corrective actions;
- Reporting and reviews as specified in this LRMP;
- Land management practices undertaken;
- Rehabilitation works completed;
- Complaints received and properly recorded and actioned;
- Non-conformances and corrective actions; and
- Results of site inspections.

The Rehab Manager may change as the project progresses through the detailed design, quarrying/planting stages, to the on-going management phases, during rehabilitation.

### **2.2 Reporting**

The Rehab Manager will submit land management reports to the Quarry Manager on a biannual (6-monthly) basis during the quarrying phase. These reports will summarise the implementation of the LRMP and will include:

- Land management practices undertaken
- Rehabilitation works completed
- Complaints received
- Non-conformances and corrective actions
- Results of site inspections
- Results of water quality testing.

and consider environmental impacts and processes including:

- Health of existing indigenous vegetation
- Recruitment of indigenous vegetation into rehabilitation areas
- Weed invasion
- Erosion
- Water Quality.

Land management reports should be prepared every two years from the commencement of rehabilitation. These reports will include:

- Land management practices undertaken
- Health of existing indigenous vegetation
- Recruitment of indigenous vegetation into rehabilitation areas
- Complaints received
- Non-conformances and corrective actions

- Results of site inspections and water quality testing
- Proposed alterations to the LRMP in line with the current best practice.

### **2.3 Complaints Register**

Any complaints received from the public regarding land management issues associated with the conservation and rehabilitation components of the quarry's activities will be recorded by the Rehab Manager in the Environmental Complaint Form, and listed in the site's Complaints Register. The minimum details to be recorded will include:

- Date and time of alleged incident.
- Nature of the complaint.
- Name, telephone and address of complainant.
- Investigation or actions initiated.
- Response / mitigation measures undertaken / additional monitoring.

The Complaints Register will be kept throughout the quarrying, planting and rehabilitation and ongoing land management phases.

### **2.4 Non Conformance and Corrective Actions**

Non-conformances may be identified through the process of monitoring, the complaints register, site inspections and site audits or through the LRMP review process. It is the responsibility of the Rehab Manager to ensure that these non-conformances and required corrective actions are documented and corrective actions implemented within a reasonable time frame.

### **2.5 Soil Testing**

Where testing of soils for contaminants is indicated, sampling will be done by trained personnel and analysis conducted by an analytical laboratory that is NATA accredited for each analysis. Results will be evaluated against the requirements of State Environment Protection Policy (Prevention and Management of Contamination of Land) and any associated standards referenced in the SEPP (as applicable).

### **2.6 LRMP Review**

It will be necessary to review and revise the LRMP to ensure that it contains up to date and relevant land management practices during the course of the rehabilitation. The Quarry Manager and nominated management personnel will review the LRMP prior to commencement of each stage of the rehabilitation operations, and biannually (6-monthly) thereafter following the LRMP reports outlined above.

All reviews will be documented, records maintained and both record of reviews and minutes of review meeting(s) will be retained. A summary of the outcomes of each review will be communicated to all relevant staff. A copy of the draft reviewed EMP will be submitted to the Environmental reference Committee (ERC) for its comments before finalisation.

## 3.0 SITE AND SURROUNDS

### 3.1 Location

The Mt Shamrock Quarry is located approximately 5km to the north of Pakenham township. The site is accessed from Mt Shamrock Road. The work authority incorporates approximately 122Ha with areas surrounding the quarry generally cleared and used for rural lifestyle purposes.

### 3.2 Vegetation

Vegetation selected for rehabilitation in the quarry operation includes species listed under the following EVC classifications (EVC Mapping of Port Phillip and Westernport):

- EVC16 – Lowland Forest
- EVC45 – Shrubby Foothill Forest
- EVC128 – Grassy Forest

*Refer Biosis Report Proposed Extension of the Mt Shamrock Quarry, Pakenham: Vegetation and Habitat Assessment (Ecology), February, 2005.*

## 4.0 OPERATIONAL MANAGEMENT STRATEGIES

The purpose of these strategies is to provide a practical system for the ongoing management of the site. They are used to achieve the following objectives:

- To ensure that vehicles entering or leaving the site do not contaminate or spread weed seeds to either this site or to other properties;
- To conserve the existing conservation areas.

### 4.1 Vehicle Management

Adopt the following practices to lessen the possibility of importing or exporting weed seeds on vehicles entering or leaving the site.

Vehicles entering and leaving the quarry operational area, and not travelling outside that area, do not have to be inspected or washed down. The following recommendations are based upon a set of similar recommendations within the 'Queensland Guideline for limiting weed seed spread', *Queensland Weed Seed Spread Project*, July 2000, p5-6.

Machinery, vehicles and equipment in the following recommendations refers to equipment used during:

- Rehabilitation works / clearing / farm operations.
- Vehicles involved in land management. (Patrolling tracks, tractors and farm equipment).

It is **not** the intention of this guideline to include vehicles that simply travel from constructed asphalt roads to the quarry.

#### 4.1.1 Inspection of Vehicles

- Inspection of machinery and vehicles coming from infested or unknown areas

- Determine inspection requirements for vehicles, machinery and equipment moving between jobs, districts
- Establish contacts with relevant authorised officers within the Department of Sustainability and Environment (DSE) and local government
- Request that all contract vehicles and machinery are inspected prior to arrival on site
- Develop inspection procedures and locations to suit industry and environmental requirements
- Establish and maintain a register of vehicles, machinery and equipment inspected.

#### **4.1.2 Clean Down of Machinery, Vehicles and Equipment**

- Determine appropriate cleaning practices for vehicles, machinery and equipment moving between jobs, districts
- Clean down machinery, vehicles and equipment from contaminated or unknown areas in accordance with established practices above, prior to arrival on site
- Clean down all machinery before departing site, at an on-site clean down facility
- Locate clean down facilities away from water courses, in an area that can be monitored for future germination
- Avoid moving machinery in wet conditions where clay removal is difficult
- Develop work practices which avoid contamination of vehicles and machinery and prevent the spread or introduction of additional weed seeds. Ensure contractors conform to these practices
- Develop remedial action plans for controlling isolated weed outbreaks that occur within the work project area.

#### **4.1.3 Use of Public Roads and Pathways**

Where public roads and pathways are used, the Rehab Manager shall ensure they are maintained free of earth, rock or other materials that may fall from plant and equipment. All such material dropped onto public roads and pathways shall be properly removed and cleared.

#### **4.1.4 Provision of Public Safety**

The Rehab Manager shall ensure adequate provision is made for the safety of the public by providing suitable temporary barriers, fencing, ramps, warning signs, lighting and any other protective devices at all locations of potential risk.

All necessary measures shall be taken to protect the health of persons on or within the vicinity of the site from conditions that are or may be dangerous to health, including the noxious effect of dust, fumes, or other hazards.

### **4.2 Topsoil Scraping and Stockpiling**

Existing site topsoil that is to be re-used on site shall be stockpiled within the works boundary, in an area that will not be subject to traffic or other compaction. The stockpile is not to be located on areas of native vegetation to be retained, or within the drip-line of existing trees.

Consideration should be given to bulkage factor, settling and some natural spreading of the topsoil into adjacent areas. The stockpile should be turned every six (6) weeks, to prevent

compaction, protect and improve the organic component of the topsoil, and control weed colonisation.

### 4.3 Weed and Vermin Control

A weed control program will be implemented focussing on noxious weeds utilising a combination knock-down and pre-emergent herbicide . Noxious weed eradication in the area to be planted will be an ongoing requirement.

During the plant establishment and maintenance phase, weeds will be kept clear of individual plants through the use of a mulch ring and spot spraying. The mulch shall be located within a diameter of 1m of tree seedlings. Refer *Quarry Operational Area – Rehabilitation Plan – Drawing L1a*.

The following weeds are common in various locations within the subject site. They require special monitoring and removal.

Tradescantia	<i>Tradescantia albiflora</i>
Crack Willow	<i>Salix x. rubens</i>
Blackberry	<i>Rubus fruticosus spp. Agg.</i>
Yorkshire Fog Grass	<i>Holcus lanatus</i>
Flatweed	<i>Hypochoeris radicata</i>
Sweet Vernal Grass	<i>Anthoxanthum odoratum</i>

In addition, local Landcare groups have identified priority weeds to be targeted for control, as follows:

Blackberry	<i>Rubus fruticosus spp. Agg.</i>
Thistles – Scotch/slender/variegated	<i>Onopordum acanthium</i>
Ragwort	<i>Senecio jacobaea</i>
Capeweed	<i>Arctotheca calendula</i>
Cape Broom	<i>Gensita monspessulana</i>
Willow	<i>Salix spp.</i>
Hawthorn	<i>Crataegus monogyna</i>

All methods of control should be selected having regard to current best practice, published guidelines and (as required) in consultation with DSE staff.

Records will be kept to monitor the location, type and extent of all weed infestation. Used as a reference, these records can be used over time to establish the most appropriate and effective means of control for this site.

#### 4.3.1 Herbicide Use

Any areas to be planted, which have been colonised by noxious weed species, should be herbicide treated with a non-residual knock-down herbicide at a minimum of twice prior to planting.

Spraying of herbicides is not recommended near drainage lines. It is recommended that cut and paint methods be used on woody weeds in these areas.

**NOTE: The application of herbicides must be undertaken by a contractor or trained quarry personnel with a valid licence, Agricultural Chemical Users Permit (ACUP) as required, and in accordance with the manufacturer's recommendations for concentration of herbicide and frequency of application.**

#### 4.4 Existing Vegetation Management

Aside from control of weed species as listed above, maintenance should include:

- Monitoring health of retained and planted vegetation and checking for pests and diseases,
- Treatment of disease or other infestation in vegetation, as necessary and as approved in consultation with DSE, and
- Control of pest animal species.

Management measures include:

- Dead or fallen timber should not be moved from the site, as it may form breeding or roosting habitat for native fauna, or a source of food for birds or invertebrates.
- Protect vegetation liable to damage with suitable temporary guards or protective enclosures for the duration of work under the contract and remove once all planting is completed. Enclosures should be at a minimum on the outer edge of the canopy drip line for trees and at the boundary of zones as shown on the drawings or confirmed on site.
- To protect existing vegetation, take necessary precautions, including the following:
  - Do not store, stockpile, dump or otherwise place under or near vegetation any bulk materials or harmful materials such as oil, paint, other chemicals, excavated material, even if for short periods.
  - Prevent wind blown materials, such as cement, from harming vegetation.
  - Prevent damage to tree bark.
  - Do not attach stays, guys and the like to existing trees.
  - Do not remove topsoil from within the drip line of trees unless otherwise specified. If it is necessary to excavate within the drip line, use hand methods such that root systems are preserved intact and undamaged. Open up excavations under tree canopies for as short a period as possible.
  - Do not cut any roots exceeding 50mm diameter unless permitted by the Rehab Manager. Where it is necessary to cut tree roots, use a chainsaw or similar

means so that cutting causes minimal disturbance. Immediately after cutting, paint roots with an approved root-inducing hormone.

- Avoid compaction of the ground, especially under trees. If the soil does become compacted loosen by coring 40 mm diameter holes 450 mm deep at 600 mm centres. Backfill holes with coarse river sand mixed with slow release fertiliser and water in.

#### 4.5 Seed Collection

Seed collection from on-site indigenous vegetation is to be undertaken by a qualified specialist in indigenous revegetation. Collected seed will be supplemented by seed collected off-site. Supplementary seed must be sourced locally, and be collected in accordance the necessary permits. *Refer to the DSE Landcare Notes and Information Series for guidelines on seed collection, labelling, drying, and storage.*

Collection should conform to the requirements of any necessary permits, and collection should not exceed more than 5% of available cutting material or 10% of the seed on any one plant, from a maximum of 25% of the plants of that species in the area; this will ensure that sufficient quantities of seed are left as a food source for local insects and small animals, and that enough seed remains to allow for natural regeneration.

Manual collection methods should be used unless other methods can be applied to appropriate species with minimal disturbance to the existing vegetation.

Only mature fruit should be gathered; immature fruits, buds and flowers should be left to ripen. Seed should not be gathered from isolated specimens or very small vegetation stands. At no time should the viability of the existing vegetation community to regenerate be put at risk.

Sufficient time must be allowed for seed collection, as species ripen at different times throughout the year, and poor seasonal weather may limit availability of certain species.

Collection of seed from all species listed below may take a period of up to two years.

##### *Trees*

Manna Gum	<i>(Eucalyptus viminalis)</i>
White Messmate	<i>(Eucalyptus globiodes)</i>
Swamp Gum	<i>(Eucalyptus ovata)</i>
Messmate Stringybark	<i>(Eucalyptus obliqua)</i>
Narrow-leafed Peppermint	<i>(Eucalyptus radiata)</i>
Green Scentbark	<i>(Eucalyptus fulgens)</i>
Swamp Paperbark	<i>(Melaleuca ericifolia)</i>
Scented Paperbark	<i>(Melaleuca squarrose)</i>
Blackwood	<i>(Acacia melanoxylon)</i>
Silver Wattle	<i>(Acacia dealbata)</i>
Myrtle Wattle	<i>(Acacia myrtifolia)</i>
Common Dogwood	<i>(Cassinia aculeate)</i>

##### *Shrubs*

Woolly Tea-Tree	<i>(Leptospermum lanigerum)</i>
Common Heath	<i>(Epacris impressa)</i>
Yellow Hakea	<i>(Hakea nodosa)</i>
Golden Bush-Pea	<i>(Pultenea gunni)</i>
Hedge Wattle	<i>(Acacia paradoxa)</i>

*Grasses, Sedges and Groundcovers*

Tall Sedge	<i>(Carex appressa)</i>
Knob Sedge	<i>(Carex inversa )</i>
Kidney weed	<i>(Dichondra repens)</i>
Black Anther Flax Lily	<i>(Dianella revolute)</i>
Rough Tree Fern	<i>(Cyanthea australis)</i>
Common Ground Fern	<i>(Calchlaena dubia)</i>
Hop Goodenia	<i>(Goodenia ovata)</i>
Sword Tussock Grass	<i>(Poa ensiformis)</i>
Common Tussock Grass	<i>(Poa labillardieri)</i>
Grey Tussock Grass	<i>(Poa seiberiana)</i>

Quantities collected are to be determined by the collector, taking into account:

- seasonal condition
- timing of works
- available seed
- required density of seeding and seed viability of each species
- the area to be rehabilitated.

#### **4.6 Topsoil Spreading**

Existing site topsoil, sourced from onsite stockpiles established prior to excavation, will spread over the quarry floor to a minimum depth of 200mm to provide a growing medium for indigenous vegetation and exotic grasses. Timing is to be determined to maximise the viability and germination of the indigenous seed collected and minimise weed invasion.

#### **4.7 Hydro- Seeding**

Hydro-seeding or other soil stabilisation/seeding/mulching methods should be undertaken by a qualified specialist in indigenous revegetation, in consultation with Landscape Contractors. Timing is to be coordinated with the spreading of topsoil, to maximise the viability and germination of the indigenous seed collected and minimise weed invasion.

#### **4.8 Setting Out Works**

Readymix shall be responsible for accurately setting out the works prior to breaking any soil and for checking the works in progress.

#### **4.9 Fencing and Signage**

A cyclone mesh fence is to be located at the perimeter of the proposed Works Authority Boundary. Signage is to be attached to the fence at 100 metre intervals, stating:

**DANGER: DO NOT ENTER**  
**Quarrying Pits within**  
**Unstable Surfaces and Steep Grades**

Signage is to be constructed of powder-coated steel sheet, minimum dimensions 350mm x 500mm, bolted at two points to fencing posts. Text is to be black on a yellow background. Internal to this a farm fence (post and wire) is to be constructed along planting areas as specified to restrict vehicular damage.

#### **4.10 Supervision**

The Rehab Manager or nominated quarry staff shall be present at the site of works at all times. Nominated representatives shall have had experience in executing work equal in nature and magnitude to the work described in this Plan.

Contractors shall designate in writing to the Quarry Manager the name of their approved representative who shall have authority to direct work and to whom site instructions will be given by the Quarry Manager of his nominee.

Contractors shall also designate how they will have authority over any subcontractors, and who will issue instructions to any subcontractors.

Contractors shall keep one full set of drawings and specifications on site at all times to be available for inspection by the Rehab Manager or his/her nominee, or Inspectors from authorities with jurisdiction over the works. The drawings shall be adequately protected to sustain the documents in a clear and readable form for the duration of the works.

#### **4.11 Cleaning Up**

All equipment and debris will be removed from the site at the completion each stage of planting. The site shall be left tidy. During the implementation of planting piles of rubbish shall be removed leaving the site in a tidy condition at the end of each working day.

#### **4.12 Erosion Control**

Areas susceptible to erosion will be treated with approved erosion control techniques. The specific technique will be dependant on site conditions but may include hydromulching, erosion control matting or other approved techniques. *Refer to EPA Guidelines, eg. "Doing it Right on Subdivisions", Publication No. 960, September, 2004.*

#### **4.13 Maintenance during Plant Establishment Period - 52 weeks**

Maintenance during the Plant Establishment Period should include the care of the landscaped areas by accepted horticultural practices, as well as rectifying any defects that become apparent in the works. This shall include, but shall not be limited to, the following items where and as required:

- Weed control,
- pest management,
- replacement of plants,
- monitoring of fences & signs,
- cultivation, and
- maintaining the site in a neat & tidy manner.

## 5.0 ONGOING & POST OPERATIONS MANAGEMENT

Readymix shall continue to monitor and maintain the site, however, plant replacement will be undertaken solely for visual screening reasons. The landscape will operate as a “natural” system and is expected to be self sustaining, similar to surrounding forest environments.

Ongoing maintenance, monitoring and rectification will include, but will not be limited to:

- Maintenance of the surface of site access tracks
- Maintenance of all fences and signage
- Pruning branches overhanging and imposing on access tracks
- Monitoring and control of weeds as necessary, ensuring weed controllers have attended a DSE ‘Farm Chemical User Course’ or equivalent and have appropriate ACUP and other relevant permits
- Monitoring health of retained and planted vegetation and checking for pests and diseases
- Monitoring stability of berms and berm walls
- Replant terrestrial planted areas which that have failed and provide significant gaps in the horizon line
- Regrading necessitated by erosion, washouts
- Treatment of disease or other infestation in vegetation, as necessary and as approved in consultation with DSE.
- Control of pest animal species.

If the site is sold in the future, the responsibility for ongoing maintenance should form part of the contract of sale.

## 6.0 CONCLUSION

The LRMP is a flexible document that allows for the continued monitoring and improvement of land management and remediation strategies throughout each stage of quarrying. Its use, together with good site management practices, should ensure successful rehabilitation of this site.

# **Attachments**