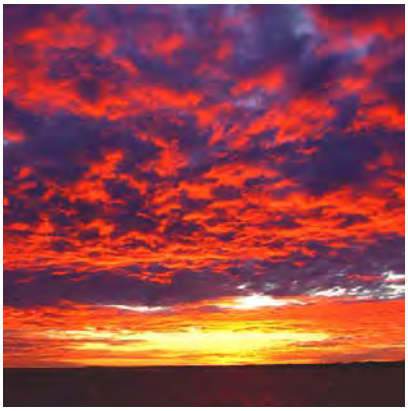
REHABILITATION ADDENDUM

Environmental Management Program
Lot 201 Great Northern Highway, Upper Swan



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Environmental Management Program
Lot 201 Great Northern Highway, Upper Swan

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1.0 INTRODUCTION

1.1 Background

In accordance with Ministerial Statement 658, condition M8.1:1 an Environmental Management Program (EMP) for Lot 201 Great Northern Highway, Upper Swan was submitted to the Department of Environment and Conservation (DEC) in November 2006. Comments on the EMP were received from the DEC in November 2006 (ref 976/04) (Appendix 1), which requested further information:

- Provide timing for the completion of rehabilitation
- Include rehabilitation milestones (completion of surface countering, placement of soil, planting of tubestock etc)
- indication how long after completion of mining the rehabilitation work will be completed.

1.2 Rehabilitation Addendum

Section 2 of this report addresses the DEC comments and now replaces Section 7.0 Rehabilitation of the EMP (Appendix 2).

1.3 Previous/Relevant Documentation

A Preliminary Decommissioning Plan has been developed for the Lot 201 and Part Lot 36 Great Northern Highway, which contained rehabilitation information for the site. This Plan has been endorsed by the DEC (January 2007, Ref Doc5113) (Appendix 3). Relevant sections have been incorporated into this Rehabilitation Addendum.

2.0 REHABILITATION

2.1 Overview

The objective of rehabilitation is to restore the site to a stable landform that is aesthetically acceptable and capable of supporting a viable end use comprising amenity lakes and grazing land. It should be noted that land-use prior to mining was grazing/ agricultural activities.

During mining, excavation of the clay deposit was undertaken in annual campaigns which are proposed to result in the creation of 4 pits, average a depth of 7m below the ground surface.

Rehabilitation of the site has included the stages described in the following sections.

2.2 Topsoil / Overburden Harvesting and Storage

Prior to the excavation, the topsoil (200 to 300mm deep) and overburden (approximately 4m deep) is skimmed from the site and stored in bunds on the perimeter of the excavation stage for later use in rehabilitation.

2.3 Landform and Lake Construction

The clay extraction sites will be re-contoured to create 4 shallow lakes. The lakes will be rehabilitated to create wetland habitats. Land surrounding the lakes is proposed for agricultural use such as stock grazing.

Following completion of excavation areas, overburden will be used to backfill selected areas not proposed to be included in the lake system. Topsoil will be replaced on the site and re-contouring will be undertaken once operations at the site are finished to ensure establishment of gentle gradients to accommodate the plant species chosen for revegetation.

The amenity lakes will have an average depth of 7m at the deepest point. The base of the lakes will therefore remain well above the permanent water table. Separation of the lakes from the water table will prevent potential impacts to groundwater quality.

The edge of the lakes will be contoured to a slope of 1:3 to 1:5 to maximise stability and provide a safer environment, and lined with a thin clay layer to prevent water seepage into the sandy strata below. The final lake design will be approved by the Shire of Swan.

2.4 Rehabilitation

2.4.1 Overview

The rehabilitation programme will begin after excavation ceases within each stage of the site to the greatest extent possible (i.e. without compromising drainage management and containment objectives). Backfilling will begin after each stage of excavation is completed with final contouring and vegetation planting at the end of site operations. It is estimated that earthworks will continue within Lot 201 (former Lot 11) for approximately 10 years.

In accordance with Ministerial Condition 658:M10.2 a Final Decommissioning Plan is required at least 12 months prior to the mining ceasing on site. The plan will include the following:

1. removal or if appropriate retention of plant and infrastructure in consultation with relevant stakeholders;

2. long-term management of ground and surface water systems;

3. rehabilitation of all disturbed areas to a standard suitable for the agreed new land use; and

4. identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.

A Landscape and Rehabilitation Plan has been prepared for Pt Lot 10 Great Northern Highway in 2000 by Ray Beldon. Information contained in that plan is provided below.

Particular attention will be given to ripping of the soil surface to assist with plant establishment by:

- controlling water movement and soil erosion;
- reducing sub-soil compaction; and
- facilitating the infiltration of water and root penetration.

2.4.2 Revegetation

Seeding and planting of tree seedlings will be undertaken during autumn prior to winter rains. Local native species will be used exclusively in the area surrounding the lakes and any lost seedlings will be replaced in the following winter.

Planting of vegetation to a distance of 20m from the edge of the lakes will act as a buffer and will assist with nutrient uptake, preventing accumulation in the wetlands and/or lakes. Aquatic vegetation will also be used to reduce nutrient levels further as well as

create a benthic community. Sedges such as *Baumea articulata* will be established given their affinity to clay soils and drought resistance and submergent species will also be introduced for habitat establishment within the lakes.

The following local native species have been identified in the surrounding areas (Belton, 2000), and are suggested for revegetation given their suitability for the soil type and hydrological regime (Table 1).

Table 1: Suggested Species for Revegetation

Scientific Name	Common Name
Trees	
Allocasuarina fraseriana	Common Sheoak
Eucalyptus accedens	Powderbark Wandoo
Eucalyptus calophylla	Marri
Eucalyptus rudis	Flooded Gum
Eucalyptus wandoo	Wandoo
Melaleuca rhaphiophylla	Freshwater Paperbark
Scrubs	
Acacia pulchella	Prickly Moses
Acacia saligna	Golden Wreath Wattle
Callistemon phoeniceus	Lesser Bottlebrush
Hakea trifurcate	Two Leaf Hakea
Hakea varia	Variable Leaf Hakea
Jacksonia furcellata	Grey Stinkwood
Jacksonia sternbergiana	Green Stinkwood
Viminaria juncea	Swishbush
Hardenbergia comptoniana	Native Wisteria
Hypocalumma robustum	White Myrtle
Aquatic Species	
Baumea articulata	Jointed Twig Rush
Eleocharis acuta	Spike Rush
Juncus pallidus	Pale Rush
Marsilea drummondii (submergent)	Nardoo
Villarsia albiflora (submergent)	Villarsia

To ensure success seedlings of all species will be planted and in addition, direct seeding of the shrub species will be carried out to increase density and ensure future generations of seedlings. The area will be densely planted to allow for deaths amongst seedlings. Density of seedlings will be as follows:

- Tree species – 1/10 per sqm
- Shrub species – 1/5 per sqm
- Rushed and sedges – 2 per sqm
- Submergent species – 2 per sqm

Rushes, sedges and submergents will be established in nodes around the edge of the lake and allowed to spread. Each node will be 10 sqm.

Seeds will be treated with smoke prior to broadcasting. Direct seedling planting will be carried out in June with the aquatic species planted in late spring. Weed control will be carried out before planting if necessary, and any follow up work will be carried out as required.

Pasture species will be planted in the remainder of the site to facilitate future use for stock grazing. This planting will also assist with surface stabilisation and prevent erosion and dust generation.

2.5 Completion Criteria

2.5.1 General

A completion criterion for the successful decommissioning and rehabilitation of the site has been defined as when the site becomes stable (i.e. No significant erosion evident and tree growth is maintained) and can be managed for its proposed land use.

The site will be assessed at least twice per year (following summer and winter) determine the progress of the rehabilitation and whether any maintenance work will be required in terms of erosion and revegetation. As previously noted, native species which have not survived will be replaced by the following winter.

Monitoring will continue until the site is determined to be in a stable condition. This will be determined in the Final Decommissioning Plan which will be developed at least 12 months prior to the anticipated date of decommissioning.

2.5.2 Conceptual Care and Maintenance Plan

Once the landform and rehabilitation works have been established ongoing care and maintenance will involve:

- Twice annual surveys of the site following summer and winter to assess if any soil erosion has occurred and to repair areas of significant damage.

- Twice annual vegetation surveys to assess the progress of the rehabilitation works by a qualified professional. These surveys will assess the success of the rehabilitation program and confirm if there have been any deaths of native species from the rehabilitation plantings. Native species which have not survived will be replaced the following winter.

- Weed presence will be visually monitored each winter/spring. Should any declared weeds be detected they will be removed in accordance with the methods recommended by the Western Australian Department of Agriculture.

RPS

APPENDIX I

DEC Correspondence Letter re: Review of Revised Environmental Management Program

Department of Environment

RECEIVED
27 NOV 2006

Your ref:
Our ref: 976/04
Enquiries: Ben Miles
Direct tel: 64675265

Craig O'Connor
Resources Manager
Austral Bricks
Locked Bag 100
Midland WA 6936

Dear Mr O'Connor

RE: REVIEW OF THE REVISED ENVIRONMENTAL MANAGEMENT PROGRAMS AND PERFORMANCE AND COMPLIANCE REPORTS FOR MINISTERIAL STATEMENTS 658 AND 659

I refer to the 2006 Performance and Compliance Report and the revised Environmental Management Programs (EMP) for Ministerial Statements 658 and 659 that were submitted by RPS Bowman Bishaw Gorham on behalf of Austral Brick to the Department on 10 November 2006.

The Department of Environment and Conservation Environmental Audit Section has reviewed the documents and concludes that the following conditions are "satisfactory to date".

Ministerial Statement 658

Condition	Status
M5.1 – Compliance Auditing	Satisfactory to date
P4 – Monitor critical parameters	Satisfactory to date

Ministerial Statement 659

Condition	Status
M5.1 – Compliance Auditing	Satisfactory to date
P4 – Monitor critical parameters	Satisfactory to date

The Environmental Audit Section was generally satisfied with the revised EMP's for Statement 658 and 659. However, further information is requested for Section 7.1 Rehabilitation Program for both plans. While the EMP's describe the final land use, no indication of timing for the completion of rehabilitation is given. It is recommended that Section 7.1 be revised to include rehabilitation milestones (completion of surface contouring, placement of topsoil, planting of tubestock, for example) and a statement highlighting how long after the completion of mining the rehabilitation working will be completed.

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The audit table for Ministerial Statement's 658 and 659 will be updated to reflect the advice contained in this letter.

If you have any queries regarding the content of this letter, please contact me on 6467 5265 or ben.miles@dec.wa.gov.au.

Yours sincerely

Ben Miles
Environmental Officer
Department of Environment and Conservation
23 November 2006

RPS

APPENDIX 2

Section 7 Rehabilitation from the Revised Environmental Management Program

7.0 REHABILITATION

Objective

To progressively restore the excavations to a landform that is aesthetically pleasing and function, i.e. capable of supporting a viable end use.

7.1 Rehabilitation Program

Austral Brick is committed to undertake progressive restoration of each stage following clay excavation at this site, to the greatest extent possible (i.e. without compromising drainage management and containment objectives).

Drainage control and, to a certain extent re-contouring of the pit, is instituted immediately on completion of each season's excavation campaign, prior to the onset of winter rains. Re-contouring of pit walls to acceptable grades is conducted for safety reasons.

The final land use planned at this time will be a number of "amenity lakes". The final configuration of the lakes will be determined in consultation with the City of Swan and the Swan River Trust. Conceptual rehabilitation plans are provides on Figures 4a and 4b.

Rehabilitation will be achieved with replacement and spreading of overburden, followed by re-spreading of topsoil, re-seeding with grasses and/or revegetation with trees and shrubs. Trees will be planted around the perimeter of the lakes to provide both shade and a screen from adjoining properties and road reserves. Disturbed areas surrounding the lakes will be planted with common mixed pasture species.

APPENDIX 3

DEC Approval Letter for Preliminary Decommissioning Plan

Department of
Environment and Conservation

Your ref: L99194
Our ref: Doc5113
Enquiries: 6467 5413
Phone: 6467 5413
Fax: 6364 6520
Email: alicia.edwards@dec.wa.gov.au

- 1 FEB 2007

Ms Kristen Bennetts
Managing Scientist
RPS Bowman Bishaw Gorham
GPO Box 465
SUBIACO WA 6904

Dear Kristen,

PRELIMINARY DECOMMISSIONING PLANS, STATEMENT 658 AND 659.

The following Plans prepared to meet the requirements of Condition 10-1 of Ministerial Statements 658 and 659 have been reviewed by the Department of Environment and Conservation (DEC) and are considered to be acceptable:

1. Preliminary Decommissioning Plan, Revision O, September 2006; and
2. Preliminary Decommissioning Plan, Revision O, September 2006.

Any changes to the Plans that substantially affect the targets/objectives require submittal for review and acceptance of the new version.

This advice has been forwarded to the Audit Section, which may monitor the implementation of the Plan.

Yours sincerely

for **Colin Murray**
Acting Director
Environmental Impact Assessment Division

30 January 2007