

SECTION 5

REHABILITATION PLAN



Snapper Mineral Sands Project Environmental Assessment

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>		
5	REHABILITATION PLAN	5-1	LIST OF FIGURES
5.1	REHABILITATION PRINCIPLES AND OBJECTIVES	5-1	Figure 5-1 Conceptual Cross Section Rehabilitated Mine Path
5.1.1	Rehabilitation Principles	5-1	
5.1.2	Rehabilitation Objectives	5-1	Figure 5-2 Conceptual Cross Section Rehabilitated Initial Water Dam, Initial Sand Residue Dam and Non-slurried Overburden Emplacement
5.2	REHABILITATION MATERIALS	5-1	
5.2.1	Topsoil	5-2	Figure 5-3 Conceptual Cross Section Rehabilitated Overburden Emplacements
5.2.2	Subsoil	5-2	
5.2.3	Non-Slurried Overburden	5-2	Figure 5-4 Conceptual Cross Section Rehabilitated Water Treatment Dam (Initial)
5.2.4	Slurried Overburden	5-2	
5.2.5	Sand Residues	5-2	Figure 5-5 Conceptual Cross Section Rehabilitated Final Depression
5.2.6	Backloaded MSP Process Waste	5-3	
5.3	CLIMATIC VARIATION AND REVEGETATION ACTIVITIES	5-3	
5.4	REHABILITATION OF MLA DISTURBANCE AREAS	5-3	
5.4.1	General Rehabilitation Practices and Measures	5-3	
5.4.2	Description and Justification of Final Landforms	5-5	
5.5	HAR AND ETL REHABILITATION	5-11	
5.6	REHABILITATION MONITORING	5-13	
5.7	LONG-TERM PROTECTION AND MANAGEMENT MEASURES	5-13	

5 REHABILITATION PLAN

This section outlines the rehabilitation plan for the Snapper Mine area. The final landform is justified and a detailed description of how the site would be progressively rehabilitated and the measures which would be put in place for the long-term protection and management of the site following cessation of mining is presented.

Final rehabilitation requirements would ultimately be formulated in consultation with key government authorities and other relevant stakeholders. In accordance with the *Mining Act, 1992*, rehabilitation would be subject to regulatory authority agreement and approval. The rehabilitation concepts presented below would therefore be provisional to allow for the consideration of the results of proposed investigations and consultation with regulatory agencies. The results of rehabilitation investigations and final rehabilitation proposals would be documented in the Snapper Mine MOP (Section 3.4.1) for approval prior to implementation.

5.1 REHABILITATION PRINCIPLES AND OBJECTIVES

5.1.1 Rehabilitation Principles

Principles to be implemented in the rehabilitation programme would include:

- preservation of existing vegetation and landforms where practicable;
- progressive campaign-based rehabilitation;
- passive drainage and flow diversion structures where required;
- where appropriate, the use of authorised hybrid cover crops to provide initial erosion protection on newly prepared (i.e. topsoiled) landforms prior to the establishment of long-term native vegetation;
- revegetated landforms to be contiguous with existing vegetation where practicable;
- fencing and/or bunding to selectively exclude livestock from rehabilitation areas;
- flexible rehabilitation concepts to allow for adjustments, based on investigations, to improve the programme; and
- annual rehabilitation programmes and budgets to be approved by site management.

5.1.2 Rehabilitation Objectives

Rehabilitation objectives would include:

- developing final landforms that are stable and generally consistent with the surrounding landscape;
- developing final landforms that are suitable for a final landuse determined in consultation with relevant landholders and regulatory authorities;
- implementing practices demonstrated to be effective by investigations at both the Snapper and Ginkgo Mines;
- managing mining and overburden handling to minimise reshaping, recontouring and material double handling; and
- progressive rehabilitation to make best use of favourable climatic conditions.

5.2 REHABILITATION MATERIALS

In accordance with the objective to develop landforms generally consistent with the surrounding landscape, it is proposed to use materials which are suitable as growth media for revegetation species that reflect the *in situ* properties (i.e. PRZ soil properties).

A Rehabilitation Materials Assessment has been conducted to analyse and assess the suitability of a range of materials that would be used for rehabilitation of the Snapper Mine (Appendix H). The assessment includes characterisation of the:

- surficial soil resources (i.e. the topsoil and subsoil to a depth of approximately 2 m) occurring within the study area to determine their suitability as rehabilitation growth media; and
- overburden materials within the study area to determine their suitability as rehabilitation growth media.

The Rehabilitation Materials Assessment also included a Saline Slurried Overburden Risk Assessment, which identified the risks associated with the rehabilitation and revegetation of the Snapper Mine site relevant to the use of saline slurry in the overburden emplacements (Section 4.15.1 and Appendix H).

A summary description of materials potentially available for use in rehabilitation and their suitability is provided below. Soil, landform unit and overburden types are defined in the Rehabilitation Materials Assessment (Appendix H).

5.2.1 Topsoil

Topsoil depths across the study area vary from 20-105 cm according to landform types. The shallowest topsoils occur on clayey plain landforms (average 30 cm depth) which occur over approximately 40-45% of the study area. Dune, dune slope and sandy sand-plain landform units, which together comprise approximately 50% of the study area, have greater topsoil depth generally in the range of 40-70 cm.

The topsoils have inherently low nutrient status which has been further depleted by land management practices (i.e. grazing) over many years. The topsoils generally have low to moderately high free lime content, are generally non-sodic, have low soil conductivity and pH, and provide a suitable growth medium for remnant vegetation (Appendix H). Topsoils are considered suitable for use as a rehabilitation growth medium.

An important feature defining the depth of available topsoil is a carbonate layer which is a zone of accumulation within the soil profile. This carbonate layer typically restricts root growth within soils of the region and is a significant influence governing the natural distribution of terrestrial plant species and ecological communities within the MDD Region (Sluiter, 2005). Where present, this layer is located immediately beneath the topsoil horizon. It is not considered suitable for use as a rehabilitation medium and, along with landform unit type, would be used to guide the depth of topsoil stripping operations (Appendix H).

The PRZ seldom includes more than the top 20 cm of the carbonate layer and in some cases it does not include it at all (i.e. *in situ* vegetation roots are primarily located in the topsoil above the carbonate layer) (Appendix H).

5.2.2 Subsoil

Subsoil material varies across the study area. Subsoil with low to moderate conductivity levels and low boron levels with moderate to good drainage characteristics, would be suitable for use as a rehabilitation growth medium. Elevated sodicity values for some subsoil types may necessitate the use of low to moderate rates of gypsum application in order to improve the permeability of this material (Appendix H). Subsoils with high soil conductivity, high pH, ESP and high boron levels including the carbonate layer described above would be placed below the PRZ and above the slurried overburden in the rehabilitated profile (Appendix H).

5.2.3 Non-Slurried Overburden

Overburden derived from the Woorinen and Shepparton Formations (Figure 2-1) have varying levels of soil conductivity, pH, boron and sodicity. Materials from these layers with potentially limiting characteristics would not be used as a rehabilitation growth medium (Appendix H).

The Loxton-Parilla Sands stratigraphic layer (located below the Woorinen and Shepparton Formations referred to above) has three major recognized units – the Upper Loxton-Parilla Sands, Mica Sands and the Lower Loxton-Parilla Sands. These units have varying sodicity or ESP values (i.e. sodic to highly sodic) and generally high sulphur levels, neutral to slightly alkaline pH, negligible boron levels and moderate conductivity levels. The use of this material, in particular the more clayey material, would be trialled as subsoil in rehabilitation growth media. Gypsum may be required to ameliorate calcium and magnesium deficiencies and to mitigate soil sodicity in this medium (Appendix H). Gypsum requirement investigations are discussed in Section 5.4.1.

5.2.4 Slurried Overburden

Due to the saline nature of the groundwater at the Snapper Mine site (Appendix A), the slurried overburden would be saline and generally unsuitable for use as a rehabilitation growth medium (Appendix H). To mitigate the potential effects of capillary rise, a strategy to cover slurried overburden material with at least 3 m of non-slurried material (including topsoil, subsoil and non-slurried overburden) or less should rehabilitation investigations (e.g. laboratory testwork, trials) indicate shallower depths do not increase the risks to revegetation posed by salinity would be implemented.

5.2.5 Sand Residues

The sand residues are the waste stream from the primary gravitational (i.e. physical) minerals separation process.

The sand residues would be saline owing to the presence of entrained saline groundwater and would be unsuitable for use as a rehabilitation growth medium (Appendix H).

5.2.6 Backloaded MSP Process Waste

A Process Waste Materials Assessment (Appendix I) has been prepared to assess the potential environmental impacts and describe management measures including those associated with the disposal of this waste at the Snapper Mine. Sections 4.2 and 4.5 provide an overview of the potential impacts and management and mitigation measures associated with the presence of monazite (a radioactive material that naturally occurs in heavy mineral sands deposits) in the process streams.

The backloaded MSP process waste would be placed on the sand residue beach and/or with overburden and would be covered under a minimum of 10 m (up to 35 m) of overburden (BEMAX, 2006c) and as such is not considered to be a rehabilitation medium.

5.3 CLIMATIC VARIATION AND REVEGETATION ACTIVITIES

As described in Section 4.1, the Snapper Mine is located within a persistently arid climatic zone. The average annual rainfall in the region is in the order of 250 mm. The rainfall is typically distributed uniformly throughout the year although variability is greater during summer and autumn.

Given the greater variability of summer and autumn rainfall, where practicable, the majority of Snapper Mine revegetation works would be scheduled to commence with direct seeding in late February and planting of tubestock following winter rainfall in June. However, revegetation works would also be undertaken on a campaign basis at any time during the year when climatic conditions are favourable.

The revegetation programme would use endemic plant species that would be well adapted to the local climate and natural climatic variability. In the event of a prolonged drought that precludes the successful establishment of these endemic species, further options may be explored with regulatory authorities to provide an alternative source of water for plant establishment.

5.4 REHABILITATION OF MLA DISTURBANCE AREAS

This section outlines the rehabilitation plan and concepts for final rehabilitation for the Snapper Mine MLA disturbance area.

5.4.1 General Rehabilitation Practices and Measures

Materials Handling

Campaign clearance of vegetation and stripping of rehabilitation growth media (i.e. suitable topsoil, subsoil and non-slurried overburden) would be undertaken ahead of the advancing mining operation.

Cleared vegetation would either be stockpiled adjacent to the mine path or directly placed on rehabilitation areas. BEMAX would use cleared vegetation to incorporate vegetative material into the rehabilitation growth media to enhance stability and to provide habitat features (e.g. hollows).

Suitable media would be stripped from areas to be disturbed and stockpiled in accordance with procedures to be detailed in the MOP (Section 3.4.1). Stripping of media would be undertaken progressively and stockpiling procedures would aim to minimise degradation of the stockpiled media. Handling procedures would include:

- quantification of rehabilitation growth media prior to commencement of stripping operation;
- characterisation of the suitability of rehabilitation growth media prior to stripping (particularly the presence and depth of the carbonate layer) (Appendix H);
- formulation of stripping guidelines including the nomination of appropriate depths, scheduling and locating areas to be stripped, as well as procedures for avoiding contamination of soils with material from the carbonate layer; and
- preference for the direct placement of rehabilitation growth media in a manner which maintains the long-term viability of the resource.

The following practices would be implemented to manage the long-term viability of stockpiles:

- storage of suitable topsoil, subsoil and non-slurried overburden in separate windrows located along the margin of the mine disturbance area;

- stockpiles would be constructed with a “rough” surface condition to reduce erosion hazard, improve drainage and promote revegetation; and
- stockpiles would be fertilised and seeded, if required, to maintain soil organic matter levels, soil structure and microbial activity.

Rehabilitation management measures relevant to overburden, sand residues and backloaded MSP process waste would be implemented as follows:

- overburden would be kept separate from topsoils and subsoils during handling, replacement and rehabilitation works;
- overburden stripping and handling would be undertaken within operation areas where surface runoff is contained;
- implementation of the proposed cover strategy for slurried materials as described above;
- surface runoff from sand residues would be controlled (e.g. directed to evaporation/sediment sumps);
- backloaded MSP process waste (Section 4.2) would be placed on the sand residue beach and/or with overburden and would be covered under a minimum of 10 m (up to 35 m) of overburden;
- the average concentration of radioactive material in the backfilled mine path would not exceed the average concentration of radioactive material in the original orebody; and
- disposal of backloaded MSP process waste would be undertaken in accordance with applicable health and safety and transport legislation (Section 4.2 and Appendix I).

Plant Species Selection

Suitable endemic plant species for revegetation of mine landforms and disturbance areas would be confirmed in consultation with the regulatory authorities and landholders. Trials would also be conducted to determine suitability on various types of rehabilitation growth media.

A total of approximately 145 plant species were identified in flora surveys (Appendix E). Of these, it is anticipated that a smaller number of species would be selected for inclusion in the initial rehabilitation programme and revegetation trials.

In consultation with regulatory authorities, additional species may be included over time as rehabilitation progresses and the results of on-going rehabilitation trials at both the Snapper and Ginkgo Mines become available.

Investigations, Studies and Trials

As a component of the rehabilitation programme, a number of trials would be undertaken to assess the effectiveness of rehabilitation techniques and the suitability of different plant species over the life of the Snapper Mine. Similar trials are being established at the Ginkgo Mine and the results would be applied to Snapper Mine rehabilitation where relevant.

Rehabilitation trials would be detailed in the MOP and would be likely to include:

- **Plant Species** – plant species selection options for types of rehabilitation growth media and revegetation of the slurried overburden emplacement.
- **Propagation Methods** – suitability of alternative propagation methods (direct seeding, mulching, nursery propagation and seedling planting).
- **Rehabilitation Media** – investigation into the suitability and appropriate depth of Loxton-Parilla Sand as a subsoil growth medium in the rehabilitation landscape.
- **Plant Establishment Requirements** – assessment of plant species establishment requirements including initial soil moisture, soil amelioration requirements.
- **Material Amelioration** – the use of gypsum to ameliorate sodicity and calcium and magnesium deficiencies and evaluation of the effect of a lack of zinc on the revegetation programme.
- **Cover Depths** – minimum non-slurried material cover depth required over slurried overburden material to minimise risks to revegetation posed by salinity.
- **Stability of Rehabilitated Landforms** – investigation into appropriate slopes including assessment of slope length, degree and material type erodibility.

The results from the trials would be used to revise components of the rehabilitation plan where relevant.

Aboriginal Artefacts

As described in Section 4.6 and Appendix B, Aboriginal artefacts located in Snapper Mine disturbance areas would be collected, properly curated and stored in the “Keeping Place” at Ginkgo Mine, and would be replaced within rehabilitated areas in consultation with local Aboriginal groups and the DEC.

Erosion and Sediment Control

The low rainfall and lack of defined drainage channels in the MLA area limits the potential for fluvial erosion and sedimentation. Notwithstanding, a SWMP would be developed for the Snapper Mine prior to construction in consultation with the relevant authorities, and would contain on-site water management measures including erosion and sediment control.

5.4.2 Description and Justification of Final Landforms

In developing the final landform design concepts, BEMAX has drawn on relevant experience from environmental management and impact assessment at the Ginkgo Mine.

Justification of Final Landform

The final landform design concepts presented below include consideration of the issues associated with the progressive development of the final landform over the Snapper Mine life, drawing on relevant experience from the Ginkgo Mine.

Final landform construction would be based on objectives for long-term stability, general consistency with the surrounding landscape and suitability for a final landuse determined in consultation with relevant landholders and regulatory authorities.

The proposed mining method for the Snapper Mine would involve placement of sand residues, overburden and soils at the rear of the dredge pond as mining advances. Where practicable, these materials would be direct-placed to reduce the requirement to double-handle these materials. This method also reduces the distance materials would otherwise be moved, allowing rehabilitation of the mine path to be effective and economically efficient.

The final landform concept for the mine path would result in a slightly mounded landform along the alignment of the mine path, which would be consistent with the surrounding landscape.

Operational requirements for the initial overburden emplacements, sand residue and water dams necessitate that these structures be located as close as practicable to the initial location of the dredge pond, but out of the mine path (given the insufficient area behind the dredge pond for replacement of material and the need to store water outside the construction pit during the construction period). These out-of-path landforms would have heights up to approximately 20 m, which would minimise the required surface disturbance area whilst maintaining appropriate slope length and runoff velocities (i.e. vegetation clearance would be minimised and the design of out-of-path final landforms would consider slope stability).

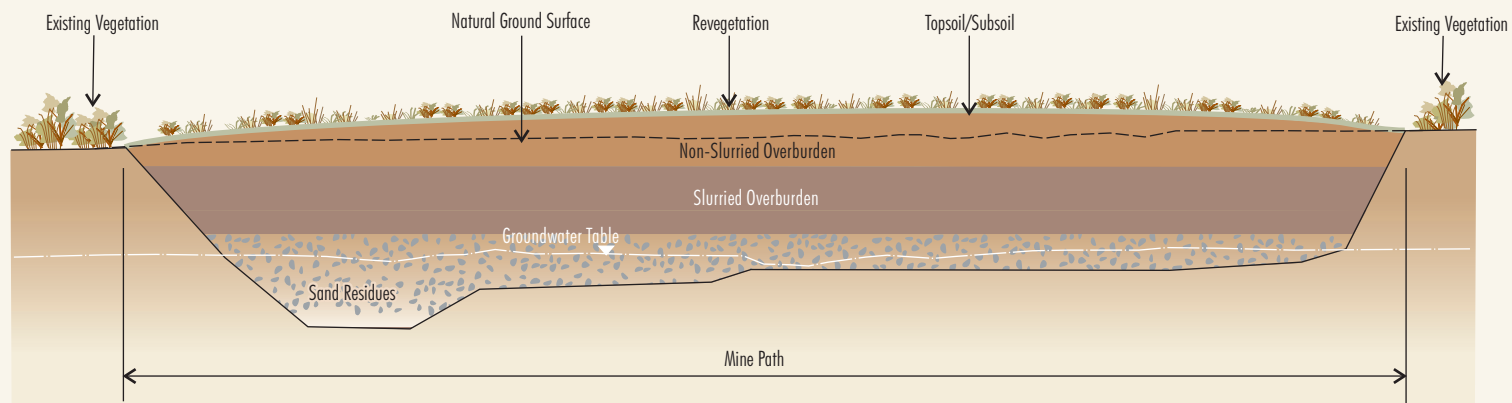
At the completion of mining, the final landform would include two final voids (associated with the final dredge pond and water disposal dam) (Figure 2-4). Mine planning would target minimising the size of the final voids as much as practicable.

Final landform concepts would be revised and refined throughout the Snapper Mine life, utilising the outcomes of on-going consultation with relevant regulatory authorities, stakeholders and the results of rehabilitation investigations. The final landform would also incorporate the mitigation measures identified to address risks to rehabilitation and revegetation associated with the use of saline slurried overburden (Appendix H). Materials assessed as suitable rehabilitation growth media (Section 5.2) would also be used in the final landform.

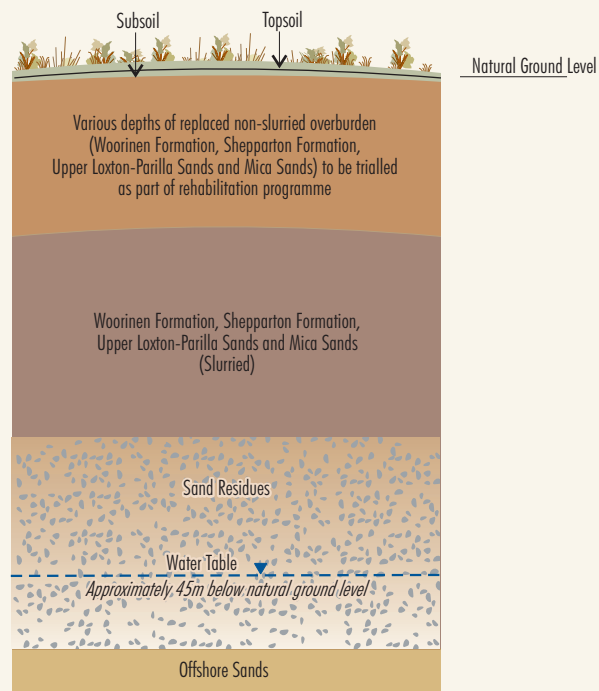
Upon consideration of the above, the final landform is justified.

Mine Path

In the process of stripping and replacing soil and overburden materials, some increase in the volume of these materials (i.e. swell) would be expected due to an increase in the number and size of pore (air) spaces between particles. It is estimated that the replaced materials would swell by approximately 7 to 10%. As a result, a slight increase in elevation of the backfilled mine path is expected. This increase would vary from 2 to 4.5 m over the pre-existing landform, depending on the topography. Over time, there would be some further minor settlement of the landform and the net result would be a slightly mounded landform along the alignment of the mine path (Figure 5-1).



CONCEPTUAL MINE PATH REHABILITATION CROSS SECTION



REHABILITATED MINE PATH CONCEPTUAL PROFILE

Initial Slurried Overburden Emplacement, Sand Residue Dam and Water Dam

Following the development of the dredge pond to operational design dimensions during the initial approximate six months of operation, the initial sand residue dam (Section 2.3.1.4), initial water dam (Section 2.3.1.4) and initial slurried overburden emplacement (Section 2.3.1.5) would no longer be required and would be rehabilitated.

The cover strategy discussed in Section 5.4.1 would be implemented for sand residues and slurried overburden. Figures 5-2 and 5-3 illustrate this concept.

Drainage on the top surfaces of the dams and the initial slurried overburden emplacement would be managed via a series of small shallow basins to maximise rainfall storage, infiltration and enhance vegetation establishment.

The height to the top surface of the rehabilitated dams and emplacements would be up to 20 m and the batters would have an approximate 1:4 slope or an appropriate alternative determined by slope and erodibility investigations. Landform design would be specified to meet criteria and standards developed following erodibility and landform design investigations (Section 5.4.1).

Initial Non-Slurried Overburden Emplacements

Two initial non-slurried overburden emplacements would be located to the north and south of the mine path (Figure 2-2 and Section 2.3.1.5).

Following the development of the dredge pond to operational design dimensions during the initial approximate six months of operations, the initial non-slurried overburden emplacements would no longer be required and would be rehabilitated (Figures 5-2 and 5-3). The non-slurried overburden emplacements would be covered with soil materials (e.g. subsoil and topsoil) to an appropriate depth (Figures 5-2 and 5-3).

Water Treatment Dams

The water treatment dams would comprise a series of clay-lined cells with walls approximately 4 m high (Section 2.3.1.9).

An initial water treatment dam would be located south of the mine path as shown on Figure 2-2. It would be decommissioned and rehabilitated as mining advances along the mine path. The fines materials would likely be saline owing to the presence of entrained saline groundwater and would be generally unsuitable for use as a rehabilitation medium. Accordingly, the fines materials within the initial water treatment dam would be covered using the same cover strategy as for sand residues and slurried and overburden (Figure 5-4).

The water treatment dams constructed within the mine path would be pushed down and rehabilitated as part of the rehabilitation of the mine path.

Water Disposal Dam

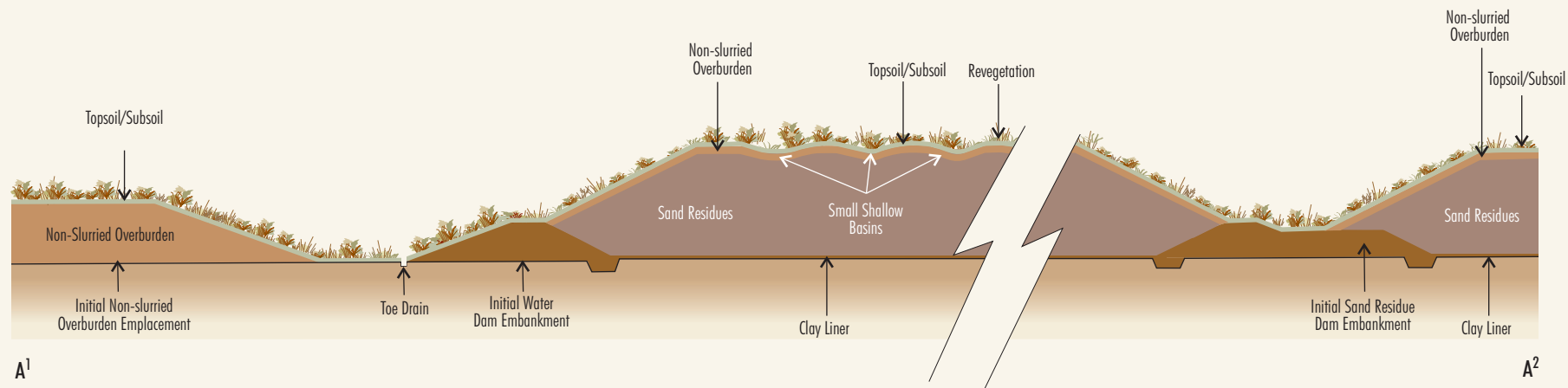
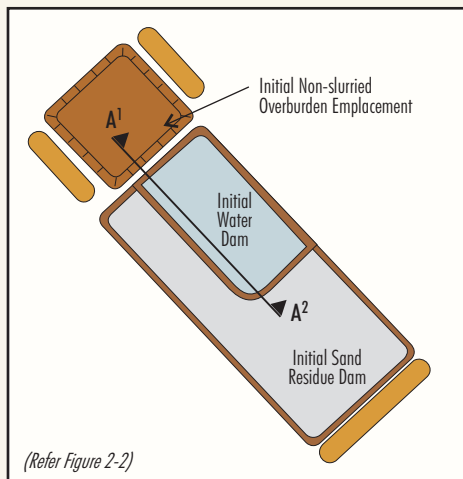
A water disposal dam would be constructed to allow excess water from dewatering activities to seep back to the groundwater table (Section 2.7.5). The water disposal dam would be located in the mine path as shown on Figure 2-3.

The water disposal dam would be decommissioned and rehabilitated after the completion of mining. After cessation of mining, the water disposal dam would empty and the salt-affected surfaces within the storage area would be covered using the same cover strategy as for sand residues and slurried overburden (Figure 2-14). The dam would be retained as a depression with batter slopes of approximately 1:4 or an appropriate alternative determined by slope and erodibility investigations.

Final Dredge Pond

The final dredge pond would be located at the northern end of the mine path at the cessation of mining (Year 16). The volume of the final dredge pond and the surrounding pit would approximate the volume of overburden material that was removed during construction of the initial starter pit (i.e. approximately 3.5 million cubic metres [Mm^3]).

The final dredge pond would be partially backfilled with overburden material pushed down from the pit walls and from the final overburden replacement area to a level some 2 to 4 m above the local groundwater table.



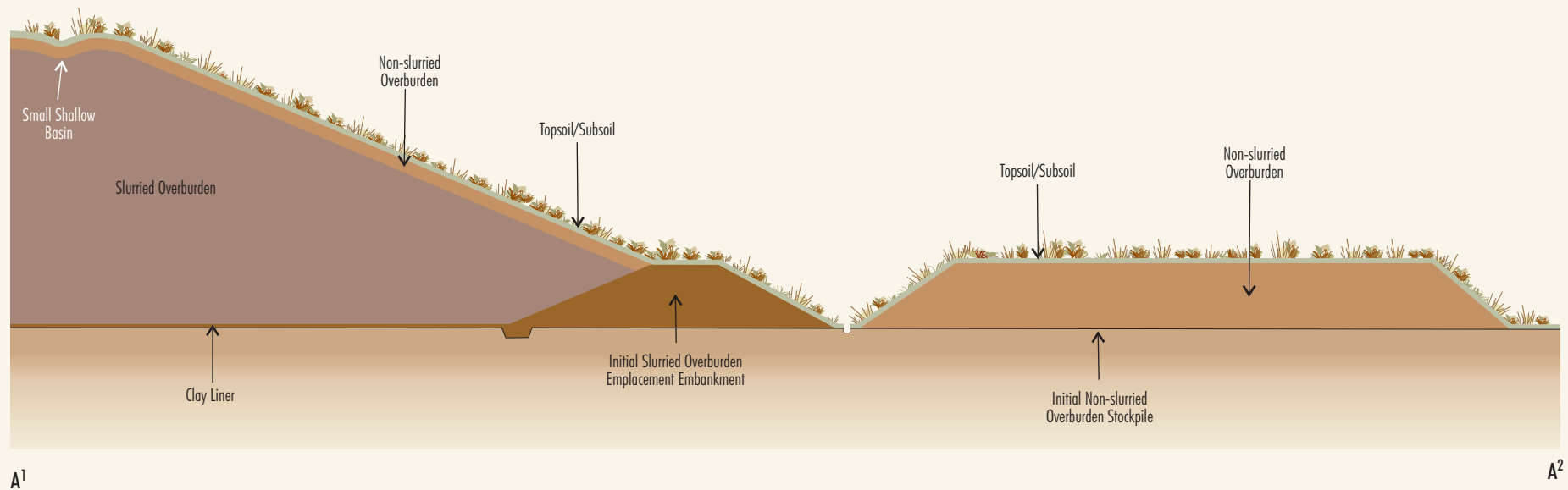
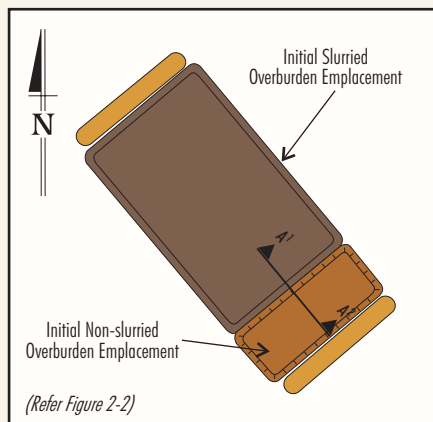
Not to Scale

SNAPPER MINERAL SANDS PROJECT

FIGURE 5-2

Conceptual Cross Section Rehabilitated
Initial Water Dam, Initial Sand Residue
Dam and Non-slurried
Overburden Emplacement





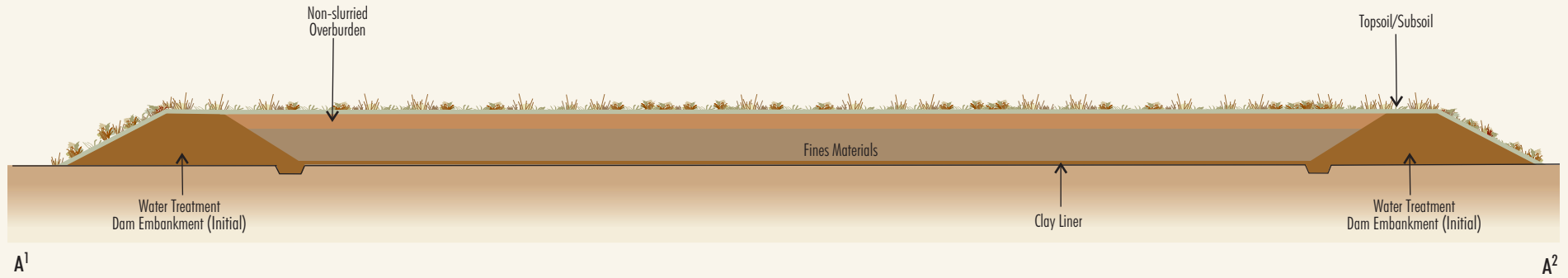
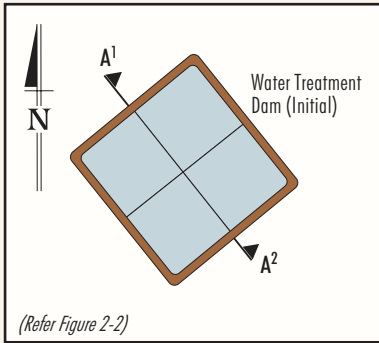
Not to Scale

SNAPPER MINERAL SANDS PROJECT

FIGURE 5-3

Conceptual Cross Section
Rehabilitated Overburden
Emplacements





The saline materials would be covered using the same cover strategy as for sand residues and slurried overburden (Figure 5-5). This would result in the formation of a final depression (Figure 5-5) similar in nature to the localised topographic depressions that occur in the region. The rehabilitated final depression would have maximum batter slopes of approximately 1:4 or an appropriate alternative determined by slope and erodibility investigations. These existing topographic depressions provide short-term surface water storage as well as infiltration and groundwater recharge.

Snapper Mine Roads

It is anticipated that Snapper Mine roads within the MLA area would be retained for use by landholders following the cessation of mining although this would be subject to consultation with relevant landholders during closure planning. During the mine life, some of these roads would be watered with saline groundwater to minimise dust emissions.

Surface water drainage from road surfaces would be collected by the surface water management system and directed to evaporation/sediment sumps. Groundwater salts collected in these sumps would be removed and deposited under overburden in the final depression and the sumps would be retained as permanent water management features.

Infrastructure located in the MLA area that would be removed following mining would include:

- administration and workshop buildings;
- the diesel storage facility and mineral concentrate stockpile area;
- electricity transmission facilities; and
- the borefields.

MLA Area Infrastructure

Hardstand areas that have been subject to dust suppression watering would be tested to determine salinity levels and, if required, rehabilitated by disposing salt contaminated materials with slurried overburden and/or sand residues overburden. Stockpiled rehabilitated media would then be applied as necessary and stabilised. Revegetation would be undertaken with suitable endemic plant species.

Rehabilitation of the borefields would include:

- removal of pumping and electrical infrastructure;
- plugging and capping of bores; and
- revegetation.

5.5 HAR AND ETL REHABILITATION

It is anticipated that the extensions of the ETL and HAR would be retained for alternative use by landholders or other interested parties following the cessation of mining. However, this would be subject to consultation with landholders and regulatory agencies during closure planning.

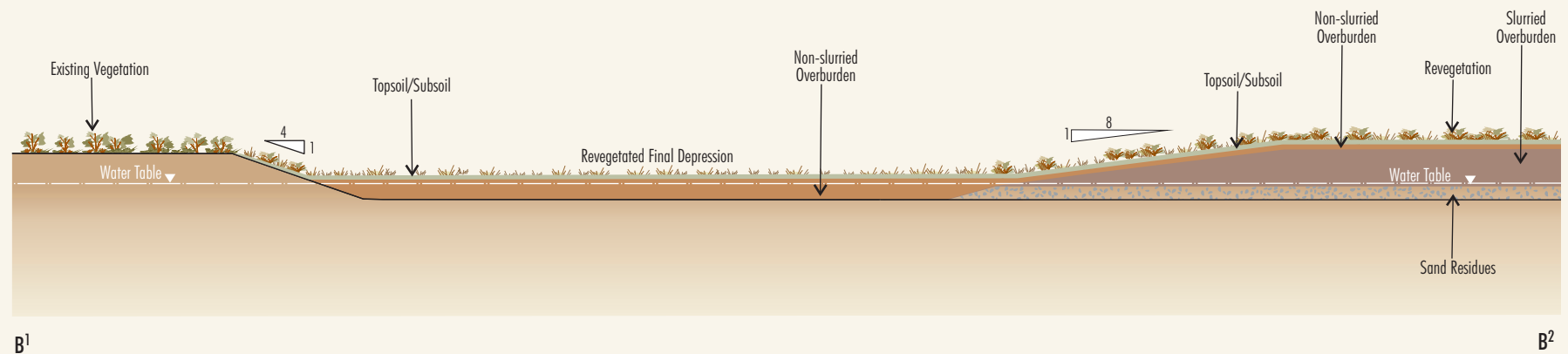
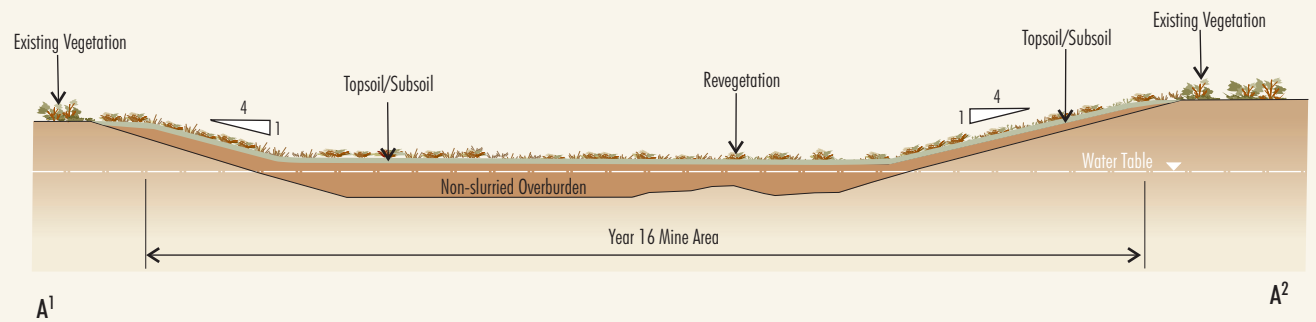
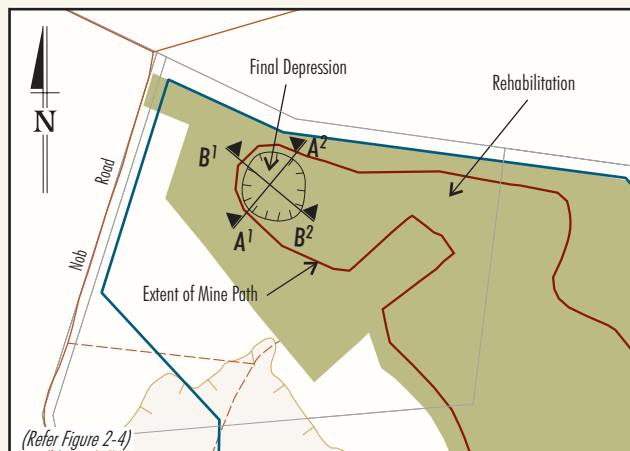
Following construction of the extension to the ETL and the HAR, rehabilitation objectives would include:

- clean-up of construction materials and any construction pads (e.g. around power pole sites);
- levelling of areas disturbed by earthmoving equipment;
- replacement of disturbed soils;
- where practicable, replacement of a portion of stripped vegetative material onto disturbance areas for soil stabilisation and to provide seed stock;
- management of weed species; and
- implementation of erosion and sediment control measures if required.

It is anticipated that the disturbance associated with the construction of linear Snapper Mine infrastructure would be limited in extent and specific revegetation activities would not be required. Natural regrowth of surrounding vegetation would be allowed and encouraged.

Three options exist for the ETL following cessation of the Snapper Mine, and would be determined during closure planning, viz.:

- retention of the ETL for another mineral sands mine or other alternative use;
- removal of the overhead conductors, earthwires and insulators for disposal and recycling, and retention of the power poles for future alternative use; or
- total removal of the ETL infrastructure including the poles



Not to Scale

SNAPPER MINERAL SANDS PROJECT

FIGURE 5-5

Conceptual Cross Section
Rehabilitated Final Depression



5.6 REHABILITATION MONITORING

A rehabilitation monitoring programme (including a photographic monitoring programme) would be developed to assess the performance of the rehabilitation areas. Monitoring results along with monitoring site locations, parameters and frequencies would be reviewed annually through the AEMR process (Section 3.4.1).

The parameters monitored during rehabilitation would be developed in consultation with DPI-MR and documented in the MOP. They would be used as indicators of rehabilitation performance. The rehabilitation reporting requirements associated with the MREMP framework, incorporating the MOP and AEMR, are addressed in Section 3.4.1.

On-going monitoring of rehabilitation would be conducted to assess:

- progression of rehabilitated land;
- effectiveness of rehabilitation techniques used; and
- performance of rehabilitation trials.

Information collected from monitoring would be incorporated into rehabilitation strategies, such as overburden cover strategy.

Radiation monitoring at the Snapper Mine would be described in the Snapper Mine LEMP and the RMP (Section 4.2.3), and would include:

- monitoring of background radiation levels to detect ambient dose equivalent microSieverts (μSv) in the environment prior to and during operation; and
- monitoring across the Snapper Mine site and at areas of higher radiation potential (e.g. mineral concentrate stockpiles and backloaded MSP process waste stockpile).

Radioactivity levels would be assessed to identify relevant requirements to keep levels below occupational health and safety and environmental exposure limits outlined in *Recommendations for Limiting Exposure to Ionizing Radiation and National Standard for Limiting Occupational Exposure to Ionizing Radiation* (ARPANSA and NOHSC, 2002) throughout the Snapper Mine operations.

5.7 LONG-TERM PROTECTION AND MANAGEMENT MEASURES

The long-term security of a landholding which may result from the comprehensive offset strategy is described in Section 4.9.3.

Upon cessation of mining operations, it would be expected that tenure of the mining lease would be maintained by BEMAX until such time as the relevant statutory requirements are achieved (e.g. fulfilment of mining lease conditions). BEMAX would then seek to relinquish the Snapper Mine mining lease.

Long-term protection and management measures for the site (following cessation of mining operations) would include:

- inclusion of infrastructure decommissioning and mine closure procedures within the MOP;
- development of a final landform that would be stable and generally consistent with the surrounding landscape;
- stock exclusion, where appropriate, so as to enhance native flora and fauna habitat;
- compliance with relevant regulatory requirements (e.g. mining lease conditions and EPL conditions) which remain relevant after the cessation of mining;
- revision and refinement of final landform concepts throughout the life of the Snapper Mine, utilising the outcomes of on-going consultation with relevant regulatory authorities, stakeholders and the results of investigations;
- continuation of site rehabilitation activities which would be detailed in the MOP until the mining lease is relinquished in consultation with the DPI-MR;
- continuation of reporting of environmental monitoring programme and environmental results which would be reported in the AEMR until the mining lease is relinquished in consultation with the DPI-MR; and
- annual reporting of progress towards rehabilitation objectives in the AEMR.

The rehabilitation reporting requirements associated with the MREMP framework, incorporating the MOP and AEMR, are described in Section 3.4.1.