SECTION 1

INTRODUCTION

Snapper Mineral Sands Project Environmental Assessment

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1 INTRODUCTION

This document is an Environmental Assessment (EA) for the proposed development of the Snapper Mineral Sands Project (the Snapper Mine). The publicly listed company BEMAX Resources Limited (BEMAX) is the Proponent of the Snapper Mine.

The Snapper Mine is located in far western New South Wales (NSW), approximately 10 kilometres (km) to the south-west of BEMAX's Ginkgo Mineral Sands Project (the Ginkgo Mine) and approximately 170 km south of BEMAX's other operation in the region, the Broken Hill Mineral Separation Plant (the MSP) (Figure 1-1). The Snapper Mine includes the development of the Snapper mineral deposit, extensions of an existing electricity transmission line (ETL) and highway access road (HAR) and use of a mineral concentrate transport route from the mine to the MSP (Figure 1-1).

1.1 SNAPPER MINE OVERVIEW

1.1.1 Purpose of this Report

This EA has been prepared to accompany a Project Application made for the Snapper Mine, in accordance with Part 3A of the *Environmental Planning and Assessment Act, 1979* (EP&A Act). The Snapper Mine components described above comprise the Project Application area.

This EA considers the potential environmental impacts of the Snapper Mine in accordance with the Director-General's Requirements (DGRs) for the EA issued by the Department of Planning (DoP) on 17 August 2006 (Attachment 1). The DGRs were issued in accordance with the requirements of Part 3A of the EP&A Act and Part 1A of the *Environmental Planning and Assessment Regulation, 2000* (EP&A Regulation). Further detail on the DGRs is provided in Section 1.3.

1.1.2 Background

The following sub-sections provide a brief summary of the related existing BEMAX projects, as well as the exploration history of the Snapper Mine.

1.1.2.1 The Ginkgo Mine

The Ginkgo mineral sands orebody is the first BEMAX deposit to be mined in the Murray Basin of NSW, with mineral concentrates from the Ginkgo Mine being separated and treated at the MSP.

In September 2001, BEMAX submitted a Development Application (DA) for the Ginkgo Mine to the Minister for Urban Affairs and Planning. The DA was accompanied by the *Ginkgo Mineral Sands Project Environmental Impact Statement* (BEMAX, 2001a) (the Ginkgo Mine EIS). The Minister for Urban Affairs and Planning issued Development Consent on 30 January 2002. The Ginkgo Mine was commissioned in 2005. The Ginkgo Mine is located approximately 40 km west of the township of Pooncarie in western NSW and includes the mine located on Mining Lease (ML) 1504, a mineral concentrate transport route (transport route from the Ginkgo Mine to the MSP) and an ETL (Figure 1-1). The Ginkgo Mine Development Consent has been modified on three occasions: 2003, 2005 and 2006. An application to further modify the Development Consent was lodged with the DoP in December 2006.

1.1.2.2 The MSP

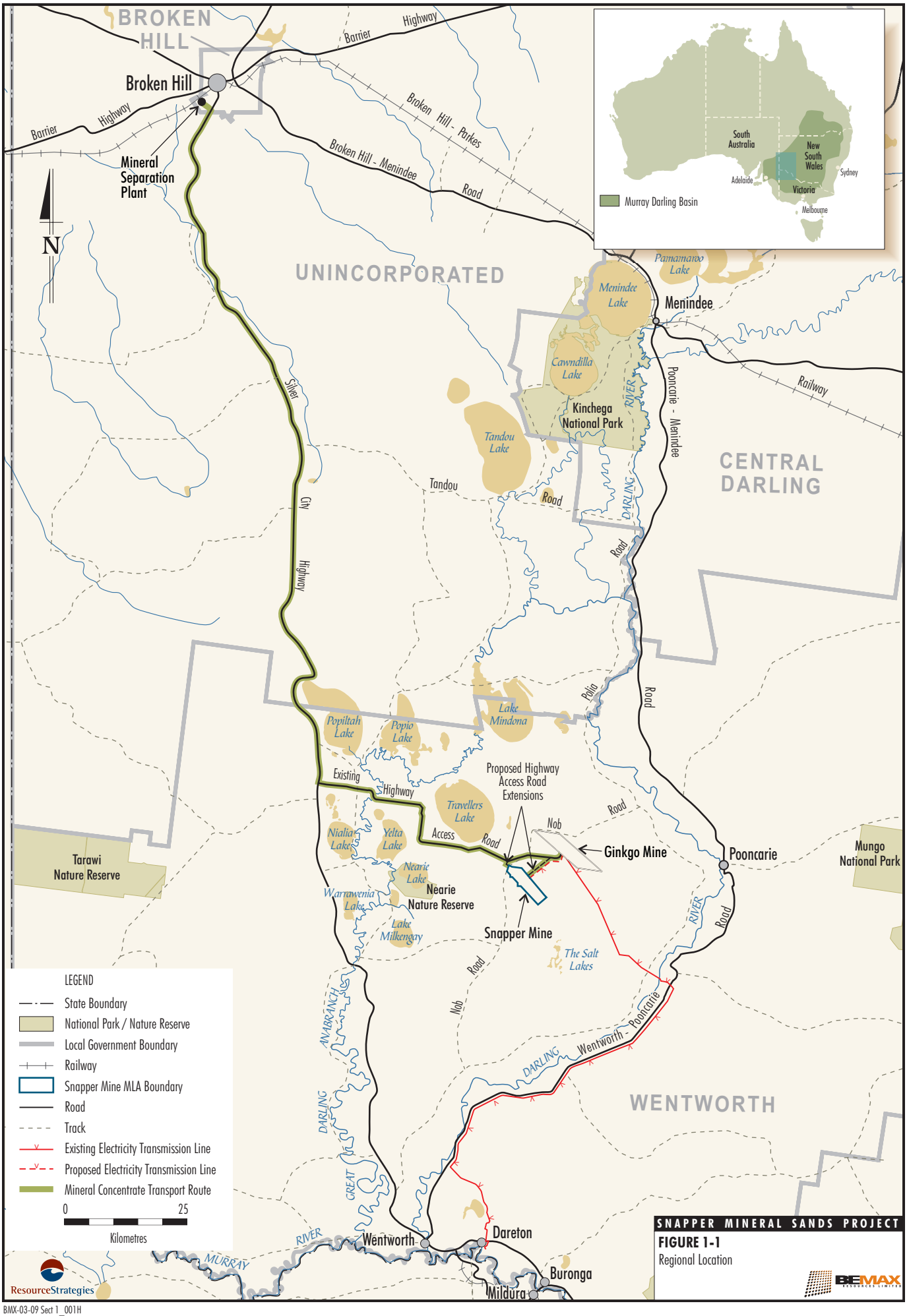
In November 2001, BEMAX submitted a DA and accompanying the *Broken Hill Mineral Separation Plant Environmental Impact Statement* (BEMAX, 2001b) (the MSP EIS) to the Minister for Urban Affairs and Planning. The Minister for Urban Affairs and Planning issued Development Consent on 27 May 2002 and the MSP was commissioned in 2006. The MSP is located on the south-western outskirts of Broken Hill in western NSW (Figure 1-1) and includes the MSP, an ETL and water supply pipeline. The MSP Development Consent was modified in 2006.

1.1.2.3 Snapper Deposit Exploration History

The Snapper mineral deposit was first identified as a mineral sands prospect in August 1999 when five holes were drilled on a regional traverse which intersected a zone of mineralisation.

Additional drilling was undertaken in 2001 and 2002 to enhance the understanding of the deposit and its extent. During this time, approximately 600 drill holes were developed and infill drilling to define areas of geological uncertainty was conducted.

Estimation of the mineral resources and reserves at the Snapper Mine has been undertaken since 2002 through resource modelling and mine planning, incorporating all drilling and sampling undertaken (including two intensive drill programmes completed during 2005 and 2006). At the completion of drilling, BEMAX had a total of approximately 75,000 metres (m) of drilling across 1,219 holes.



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A reserve of approximately 117 million tonnes (Mt) of mineral sands ore (measured and indicated) at a grade of 5.0% heavy minerals has been delineated. Public reporting regarding the reserve (on 5 October 2006) has been undertaken in accordance with the *Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves* (the JORC Code) (JORC, 2004). The Snapper Mine ore reserve has been classified as a "Proved Ore Reserve" under criteria defined in the JORC Code.

The Snapper Mine reserve contains a high value mineral assemblage consisting of approximately 10% zircon, 16% rutile, and 55% ilmenite. A 9% leucoxene proportion is included in the ilmenite total.

Bulk samples of ore from the Snapper Mine path have been collected for assessment of fine particle content, ore and sand residue density and mineral processing requirements. The aim of this testwork was to characterise ore types, ascertain the separation characteristics of the Snapper mineral deposit in comparison to those of the Ginkgo mineral deposit and identify design requirements for MSP equipment. The testwork demonstrated that the MSP could be used to treat mineral concentrate from the Snapper Mine, with some minor equipment adjustment.

1.1.3 Snapper Mine Summary

Construction of the Snapper Mine would commence approximately between Years 3 to 5 of the Ginkgo Mine life. The mining operation would comprise the following:

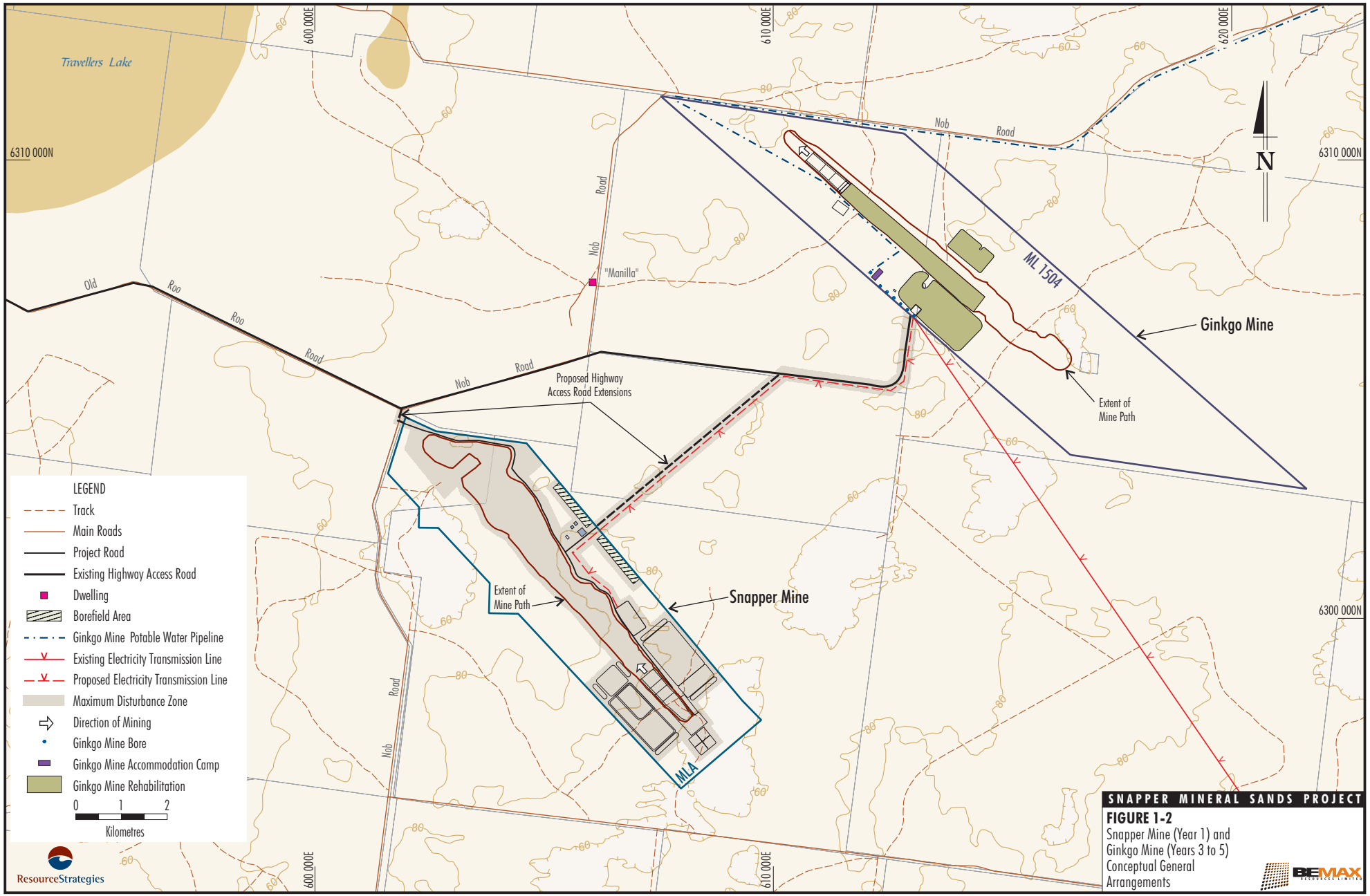
- clearance of vegetation and stripping of soils on a campaign basis ahead of the advancing mine operation;
- overburden stripping, slurrying and direct placement;
- predominantly dredge mining of ore by a conventional floating bucket wheel dredge located in the dredge pond;
- adjustment of dredge pond levels to maintain dredge access to the ore;
- supply of water from the borefields;
- disposal of water to the water disposal dam when lowering dredge pond levels;
- secondary mining of ore by conventional mobile equipment (i.e. dozers and/or scrapers), depositing ore in front of the dredge;
- ore concentration in the primary gravity concentration unit to produce heavy mineral concentrates (HMC);
- stockpiling of HMC;
- supply of desalinated water from the reverse osmosis (RO) plant for HMC salt washing;
- HMC separation via the Wet High Intensity Magnetic Separators (WHIMS) circuit either at the Snapper Mine or at the MSP, to produce three types of mineral concentrates (i.e. ilmenite-rich, leucoxene-rich and non-magnetic [rutile-rich and zircon-rich] concentrates);
- stockpiling of mineral concentrates;
- transport of HMC and/or mineral concentrates to the MSP;
- placement of wastes from the primary gravity concentration unit (i.e. sand residues) at the rear of the dredge pond as mining advances;
- treatment of process water to remove fines material (i.e. particles less than 53 microns in diameter);
- transport and placement of backloaded MSP process waste;
- replacement of overburden on top of sand residues; and
- staged replacement of soils and progressive rehabilitation.

The combined development of the Snapper and Ginkgo Mines would supply up to 650,000 tonnes per annum (tpa) of mineral concentrate to the MSP during the life of the two mines.

Additional components of the Snapper Mine include:

- associated minor infrastructure, plant equipment and activities;
- an ETL from the Ginkgo Mine; and
- road access to the Mine via two extensions of the HAR linking both the Snapper and Ginkgo Mines with the Silver City Highway.

The Snapper Mine area comprises the Snapper Mine Mining Lease Application (MLA) area (Section 1.1.4), the ETL from the Ginkgo Mine and HAR extensions (Figure 1-2).



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A description of the construction and operation of the Snapper Mine, including a provisional production schedule, is provided in Section 2. An assessment of the potential environmental impacts of the Snapper Mine and the proposed environmental mitigation, management and monitoring measures is provided in Section 4. Supporting appendices upon which the assessment is based are attached to this EA.

1.1.4 Land Description and Tenure

BEMAX has applied for two overlapping mining leases (MLA 210 and MLA 272) which cover portions of BEMAX's exploration licences (ELs) (EL 5474 and EL 6024). The Snapper Mine combined MLA area is shown on Figure 1-2.

The Snapper Mine would be situated within the Western Division of NSW, which encompasses approximately 40% of NSW (325,000 square kilometres [km^2]) in the far west of the state. The majority of rural lands within the Western Division are pastoral leases administered under the jurisdiction of the Western Lands Commissioner appointed by the Department of Natural Resources (DNR).

The Snapper Mine area is located on four pastoral leases ("Trelega", "Carstairs", "Manilla" and "Aston"). Land tenure of the Snapper Mine area is summarised in Table 1-1 and shown on Figure 1-3.

Table 1-1
Land Tenure Summary

Lot/DP	Leaseholder	Property Name
1929/763907	J.B. and N.N. Cullinan	Trelega
1927/763905	G.C. and S.L. Cullinan	Carstairs
1925/763903	M.A. Withers	Manilla
1924/763902	K.D. Ingram	Aston

Source: Galloways (2006); Department of Lands (2003).

The Snapper Mine area is located in the Wentworth Shire on lands designated Zone 1(a) (General Rural Zone) under the *Wentworth Local Environmental Plan 1993* (Wentworth LEP) (Wentworth Shire Council [WSC], pers. comm., 26 May 2006).

1.2 SNAPPER MINE SNAPSHOT

Key Snapper Mine information is summarised in Table 1-2.

1.2.1 Proponent

The Snapper Mine is being developed by BEMAX. The Registered principal office of BEMAX is:

BEMAX Resources Limited
Level 14
133 Mary Street
BRISBANE QLD 4000

Telephone: (07) 3210 7900
Internet: www.bemax.com.au

1.2.2 BEMAX Environmental Policy

BEMAX maintains an Environmental Policy which covers all aspects of its operations including exploration, mining, production, transport, shipping and site rehabilitation. BEMAX's Environmental Policy is displayed via the abovementioned internet site.

1.3 DIRECTOR-GENERAL'S REQUIREMENTS

A Planning Focus Meeting (PFM) was held in August 2003. The objective of the PFM was to familiarise government stakeholders with the development proposal and to identify key environmental issues that should be addressed.

Subsequent to the PFM, changes were made to the assessment and approvals regime which applies to major projects in NSW. The Snapper Mine will be assessed in accordance with the framework established by the EP&A Act and the EP&A Regulation. Approval for the Snapper Mine will be sought under Part 3A of the EP&A Act. Accordingly, the Director-General notified BEMAX, on 17 August 2006, of the DGRs (referred to in the EP&A Act as "environmental assessment requirements") for the Snapper Mine under Part 3A of the EP&A Act.

A summary of the DGRs is provided in Table 1-3. Table 1-3 also provides the relevant section of the EA where each issue raised in the DGRs is addressed.

The development approval process is outlined in further detail in Sections 3.1 to 3.6.

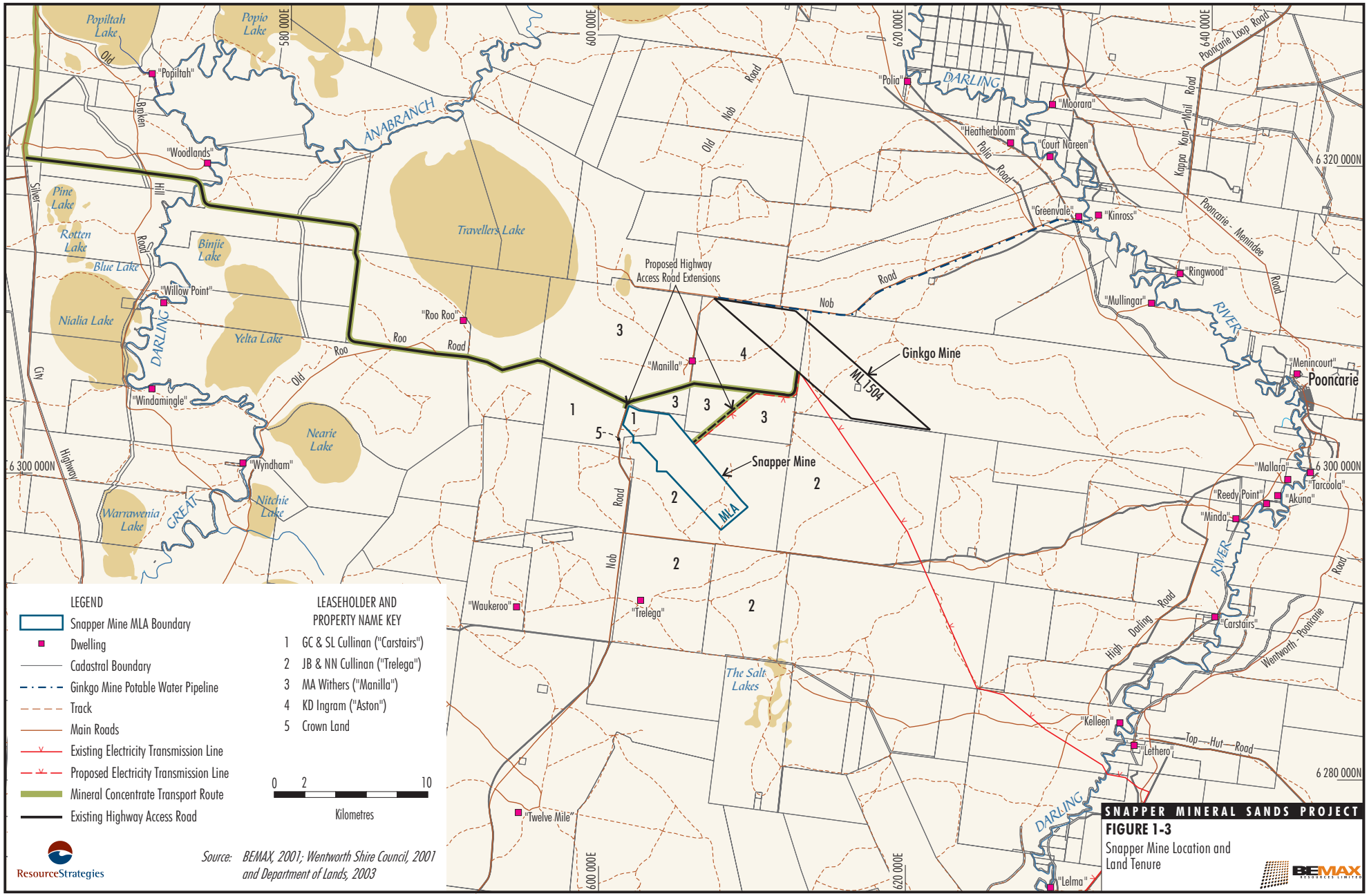

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Table 1-2
Snapper Mine Snapshot

Development Component	Summary Description
Proponent	BEMAX.
Tenement Status	BEMAX has applied for two overlapping mining leases (MLA 210 and MLA 272) which cover portions of BEMAX's ELs (EL 5474 and EL 6024).
Land Tenure	Four pastoral leases, namely, "Trelega", "Carstairs", "Manilla" and "Aston".
Mining	Predominantly dredge mining of approximately 8.2 million tonnes per annum (Mtpa) of ore.
Life of Mine	Approximately 16 years.
Timing*	Mining at the Snapper Mine is planned to commence approximately between the third and fifth years of the Ginkgo Mine operation.
Mineral Concentration	Mineral concentration to be undertaken in a primary gravity concentration unit (comprising a screen, surge bin and wet concentrator). HMC produced would either be separated through the WHIMS circuit on-site or at the MSP. The WHIMS circuit would separate the HMC into an ilmenite-rich concentrate, leucoxene-rich concentrate, a non-magnetic concentrate and waste products. Concentrates would be further separated and treated at the MSP.
Concentrate Transport	Double road trains or other NSW Roads and Traffic Authority (RTA)-approved vehicles (e.g. AB-triple vehicles) would be used to transport mineral concentrate from the Snapper Mine to the MSP via the mineral concentrate transport route.
Overburden Management	Replacement of the majority of deeper overburden would be undertaken by slurrying. Replacement of the majority of shallow overburden would be undertaken by conventional earthmoving equipment. Slurried overburden material would be covered by an appropriate depth of non-slurried material, to provide a suitable revegetation medium.
Sand Residue Management	Sand residues from the primary gravity concentration unit would be placed in an initial sand residue dam for approximately the first six months of operation. For the remainder of the Snapper Mine life, sand residues would be stacked directly into the back of the dredge pond.
Backloaded MSP Process Waste Management	Following transport from the MSP, backloaded MSP process waste would be deposited in a designated stockpile at the mine site. Backloaded MSP process waste would be slurried and deposited or placed directly on the sand residue beach and/or with overburden and covered with overburden.
Water Supply	Water requirements would be supplied primarily by two borefields within the MLA area. The maximum water supply requirement from either borefield would be 370 litres per second (L/s), much of which is returned to the water table after use. Water would be recycled on-site (where practicable) to minimise the quantity of water extracted from the borefields.
Rehabilitation Works	Progressive rehabilitation would be undertaken as mining advances. Rehabilitation trials and investigations would be undertaken to assess the effectiveness of rehabilitation techniques, cover depths and the performance of different plant species over the life of the Snapper Mine.
Access	Snapper Mine traffic would share the existing 64 km HAR from the Ginkgo Mine to the Silver City Highway. The HAR would be extended in two locations to access the Snapper Mine site.
Mine Site Electricity Distribution	A 10 km long 66 kilovolt (kV) ETL would be constructed to extend the existing ETL from the Ginkgo Mine to the Snapper Mine.
Hours of Operation	24 hours per day, seven days per week.
Establishment Cost	Cost of approximately $105 million (M).
Employment	Construction workforce averaging around 200 people with a maximum of approximately 250 employees required during peak construction activity. Operational workforce of approximately 110 employees.

* Subject to Project Approval.

Table 1-3
DGRs – Reference Summary*

General/Key/Consultation Requirements	Document Reference
General Requirements	
The Environmental Assessment must include:	
Executive Summary.	Executive Summary – front of EA document
Description of the proposal including a justification of the need for the Snapper Mine, alternatives considered and the various components and stages of the Snapper Mine.	Sections 1, 2 and 3.9
Consideration of relevant statutory provisions.	Section 3
A general overview of the environmental impacts (General Overview) of the Snapper Mine, identifying the key issues for further assessment and taking into consideration the issues raised during consultation.	Section 3.8 and Appendix L
A detailed assessment of the key issues for the Snapper Mine (and any other significant issues identified in the General Overview for the Snapper Mine), including a description of the existing environment, an assessment of potential impacts of the Snapper Mine and a description of the measures, that would be implemented to avoid, minimise, mitigate, offset, manage, and/or monitor the impacts of the Snapper Mine.	Section 4 and Appendices A to L
Draft Statement of Commitments.	Section 6
A conclusion justifying the Snapper Mine, taking into consideration the environmental impacts of the Snapper Mine, the suitability of the site and the benefits of the Snapper Mine.	Section 3.9
Certification by the author of the Environmental Assessment.	Front of EA document
Key Assessment Requirements	
The Environmental Assessment must include assessment of the following key issues:	
Flora and Fauna – an assessment of impacts on critical habitats, threatened species, populations, ecological communities and native vegetation. A comprehensive offset strategy must be included as part of the mitigation measures.	Sections 4.9 and 4.10 and Appendices D and E
Surface Water and Groundwater – an assessment of surface and groundwater impacts including detailed modelling of potential surface and groundwater impacts and a site water balance.	Sections 2.7, 4.4 and 4.5 and Appendix A
Noise – an assessment of noise impact including construction, operation and road noise impacts.	Section 4.11 and Appendix F
Air Quality – an assessment of air quality including a greenhouse gas assessment.	Section 4.12 and Appendix G
Traffic and Transport – an assessment of traffic and transport impacts.	Section 4.8 and Appendix C
Hazard and Risk – an assessment of the hazards and risks associated with the transport, handling and disposal of waste in accordance with the requirements of its classification.	Section 4.15 and Appendices H, I, K and L
Heritage – an assessment of Aboriginal and non-Aboriginal heritage.	Sections 4.6 and 4.7 and Appendix B
Social and Economic – an assessment of social and economic impacts.	Sections 4.13 and 4.14 and Appendix J
Rehabilitation and Final Landform – a justification of the proposed final landform, a detailed description of how the site would be progressively rehabilitated and management measures that would be put in place for the long-term protection of the site after cessation of mining operations. An assessment of the risks to the success of rehabilitation and revegetation of the site associated with the use of saline slurry in the overburden emplacements.	Sections 2 and 5 and Appendix H
Cumulative Impacts – an assessment of the cumulative impacts which may arise from the combined operation of the Snapper Mine and the Ginkgo Mine, particularly on flora and fauna, surface water, groundwater and transport.	Section 4
Consultation Requirements	
During the preparation of the Environmental Assessment, consultation must be undertaken with the relevant local, state or Commonwealth government authorities, service providers, community groups or affected landowners. In particular consultation must be undertaken with: • NSW Department of Environment and Conservation; • NSW Roads and Traffic Authority; • Wentworth Shire Council; and • Broken Hill City Council.	Section 3.7

* The complete version of the DGRs is presented in Attachment 1.

1.4 DOCUMENT STRUCTURE

The EA comprises a main text component and supporting studies, which include Appendices A to L. An overview of the main text is presented below:

Section 1	Provides background information on the Snapper Mine including an overview of the Snapper Mine and EA document.
Section 2	Describes the various components and stages of Snapper Mine, including those associated with construction and operations.
Section 3	Outlines the statutory provisions relevant to the Snapper Mine, describes the consultation undertaken, summaries the outcomes of the General Overview, considers alternatives, describes the need for the development and provides a conclusion justifying the Snapper Mine (taking into consideration the suitability of the site, potential benefits and potential environmental impacts of the development).
Section 4	Details the environmental assessment for the Snapper Mine including a description of the existing environment, an assessment of potential impacts and a description of measures that would be implemented to avoid, minimise, mitigate, offset, manage and/or monitor the impacts of the Snapper Mine.
Section 5	Justifies the proposed final landform and provides 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 operations.
Section 6	Provides BEMAX's Draft Statement of Commitments outlining environmental management, mitigation and monitoring measures for the Snapper Mine.
Section 7	Lists documents referenced in Sections 1 to 6 of the EA.
Section 8	Defines abbreviations, acronyms and terms used in Sections 1 to 6 of the EA.

Attachments to the EA main text are also provided as follows:

Attachment 1	Director-General's Requirements for the Snapper Mine Environmental Assessment

Appendices A to L contain supporting documentation, including a number of independent specialist reports:

Appendix A	Hydrogeological Assessment
Appendix B	Cultural Heritage Assessment
Appendix C	Road Transport Assessment
Appendix D	Fauna Assessment
Appendix E	Flora Assessment
Appendix F	Noise Assessment
Appendix G	Air Quality Assessment
Appendix H	Rehabilitation Materials Assessment
Appendix I	Process Waste Materials Assessment
Appendix J	Socio-Economic Assessment
Appendix K	Preliminary Hazard Analysis
Appendix L	General Overview of Environmental Impacts

1.5 EA CONSULTANTS

This EA was prepared by Resource Strategies Pty Ltd with specialist input provided by the following organisations/specialists:

- BEMAX project team (Project Description, Mitigation Measures, Environmental Management and Monitoring Programmes, Rehabilitation Materials Assessment, Process Waste Materials Assessment, Preliminary Hazard Analysis and General Overview).
- Golder Associates (Hydrogeological Assessment).
- Landskape (Cultural Heritage Assessment).
- Traffix (Road Transport Assessment).
- Western Research Institute (Fauna Assessment).
- FloraSearch (Flora Assessment).
- Holmes Air Sciences (Air Quality Assessment and Noise Assessment).
- Gillespie Economics (Socio-Economic Assessment).
- Ogyris (*In Situ* Materials Analysis).