

Expansion of the Redbank Copper Oxide Operations

Redbank Copper Limited

Assessment Report 63A

Environmental Assessment Report and Recommendations

prepared by
Environment, Heritage and the Arts Division

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Glossary of Acronyms

AMD	Acid and Metalliferous Drainage
ARD	Acid Rock Drainage
ANZECC	Australian and New Zealand Environment and Conservation Council
DoR	Department of Resources (formerly Department of Regional Development, Primary Industries, Fisheries and Resources)
EIS	Environmental Impact Statement
EHA	Environment, Heritage and the Arts Division, NRETAS
EMS	Environmental Management System
EMB	Environmental Monitoring Bores
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERL	Exploration Retention Licence
MLN	Mining Lease Northern
MMP	Mining Management Plan
NAPP	Net acid producing potential
NOI	Notice of Intent
NRETAS	Department of Natural Resources, Environment, the Arts and Sport
PAF	Potentially acid forming
PSP	Pregnant solution pond
Redbank	Redbank Copper Limited
SFP	Sandy Flat Pit
SW/EW	Solvent Extraction/Electrowinning
TSF	Tailings Storage Facility
WDL	Waste Discharge Licence
WMP	Water Management Plan
WRD	Waste Rock Dump
XRF	X-ray fluorescence

Units/Symbols

Ha	Hectare
kL	kilolitre
km	kilometre
m	metre
Mt	Million tonne
ML	Megalitre
Tpa	tonne per annum

Executive Summary

This report assesses the environmental impact of the proposal by Redbank Copper Limited (Redbank) to expand existing operations at the Redbank Copper Mine located 30 km from the Queensland border and 70 km inland from the Gulf of Carpentaria (Figure 1). The project would involve open cut mining methods to extract approximately 765,000 tonnes of copper oxide over a project life of three years. The oxide ore (near surface; maximum expected depth 30 – 50 m) would be processed using a Solvent Extraction/ Electrowinning (SW/EW) plant to produce 99.99% copper cathode. The product will be transported 1300 km from site by road to the Port of Darwin via Wollogorang Road, the Carpentaria Highway and Stuart Highway from Daly Waters.

Although the project was proposed to include sulphide ore, Redbank have withdrawn the sulphide mining and processing component from the project until income is generated from the processing of oxide ores. Redbank anticipates that the mining and processing of sulphide ores (below the oxide ore zone, 150 – 175 m depth, including the transition zone) would commence in year three of the operation and would be processed in a sulphide flotation plant to produce copper concentrate. Mining of sulphides is considered a higher risk to the environment, and would include a new tailings storage facility, expanding the existing Sandy Flat pit, and waste rock characterisation and management. Substantial investment and time required to investigate these components means it will be subject to subsequent environmental assessment at the level of Environmental Impact Statement (EIS).

The assessment of oxide operations include:

- The mining of oxides only in three new pits (Redbank, Azurite and Bluff);
- Waste rock dumps (WRDs) associated with each of these pits;
- Upgrades of the processing plant and associated facilities at the Sandy Flat pit site;
- A haul road of approximately 4 km in length to transport ore to the processing plant;
- Use of the existing tailings storage facility for oxide vat leach tailings;
- Retention ponds to assist in management and treatment of water on site; and
- Commencement of remediation of contamination due to legacy issues.

The split assessment should enable Redbank to address all the information requirements listed in the EIS Guidelines (September 2009) and undergo assessment as normal under the *Environmental Assessment Act*. Conducting the assessment as a two-part assessment process ensures an open and transparent process on the sulphidic component of the operation. Subject to project approval from the Minister for Primary Industry, Fisheries and Resources, it also ensures that the project remains economically viable by generating an income during the oxide stage to address outstanding legacy issues on site – an outcome desirable for both stakeholders and the proponent. Existing environmental legacy issues have resulted in contaminated groundwater and surface water systems for over a decade. Redbank have committed to remediating the legacy issues in the process of expanding the existing operations.

This Environmental Assessment Report is based on a review of the draft EIS (hereafter referred to as the EIS), the Supplement, further information request, and comments from the public and Northern Territory Government agencies. Environmental assessment is the process of defining those elements of the environment which may be affected by a development proposal and of determining the significance of the potential impacts and residual risks of the proposal.

Major Issues

Recommendations provided in this report address methods to mitigate or further understand potential impacts. The major issues associated with the oxide mining and processing are:

- Characterisation, mitigation and management of existing legacy environmental impacts and contamination sources, which includes:
 - Management of the existing Tailings Storage Facility (TSF) with respect to preventing seepage issues and meeting closure requirements; and
 - Characterisation of legacy groundwater and surface water contamination;
- Management of impacts on groundwater levels and quality;
- Increased risks and management issues for site surface water management;
- Prevention or minimisation of acid and metalliferous drainage (AMD) into the environment, including management of waste rock and tailings; and
- Protection of flora and fauna in an area listed as a Site of Conservation Significance with *Environment Protection and Biodiversity Conservation (EPBC) Act* listed species.

Conclusions

Following review of the EIS, Supplement and further information requested, significant uncertainties associated with the proposal remain. The level of information provided in the EIS and quality of responses to the request for further information has not been sufficient to enable a comprehensive assessment of the proposal. While the documentation provided commits Redbank to minimising environmental harm and remediate where necessary, the capacity to fulfill these commitments has not been demonstrated. This has significantly increased the risk setting of the project.

In response to deficiencies in the information provided, the Assessment Report recommends that in order for the project to proceed in an environmentally acceptable manner, the proponent needs to address all information gaps identified in this Assessment Report prior to commencement of works.

Redbank have stated that their investment into addressing legacy issues and future management of the site can only continue and increase when the site is providing an economic return. A split assessment was facilitated by the Environment Heritage and the Arts (EHA) Division to allow the oxide operations to commence so that Redbank could continue its investigations and management into legacy issues. This is separate to the environmental management of the newly proposed oxide operations that are considered a standard cost of production and not reliant on funds becoming available. As part of the approvals process for mining of transition and

sulphide ore, Redbank will need to demonstrate that the oxide operations have been managed in an environmentally appropriate manner and have not contributed to the existing legacy issues.

All environmental commitments and recommendations detailed in the EIS, the Supplement, a further information request, and this Assessment Report are to be implemented and managed under the Environmental Management System (EMS) for the project and subject to regular reporting and compliance auditing. The final management plans for the proposal will be subject to review to the satisfaction of the relevant Northern Territory Government agencies prior to their incorporation into the Mining Management Plan (MMP). The management plans will be working documents for the life of the project and will require continual review in light of operational experience and monitoring results.

The outcome of the environmental impact assessment for this proposal is that the environmental issues associated with the oxide component of the proposed expansion of Redbank Copper have been identified, and if proper consideration is given to the recommendations and commitments in this Assessment Report in developing the Mining Management Plan and associated documents, Redbank should be able to demonstrate that the proposed mining operations can be managed in an environmentally appropriate manner.

List of Recommendations

Recommendation 1

The proponent shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards identified in the Expansion of Redbank Copper Operations draft Environmental Impact Statement (EIS), Supplement, Additional Information and in this Assessment Report (No. 63A).

All safeguards, mitigation measures, and commitments outlined in the EIS and Supplement are considered as commitments by Redbank and are to be incorporated into the Mining Management Plan (MMP) for approval by the Department of Resources (DoR) as per Appendix 1 of this Assessment Report.

Recommendation 2

The proponent shall advise the Minister of any changes to the proposal in accordance with clause 14A of the Administrative Procedures of the *Environmental Assessment Act*, for determination of whether or not further assessment is required.

Recommendation 3

The proponent shall ensure that no transition or sulphide ore is extracted before the environmental assessment of sulphide operations has been completed and that the mining of transition zone ore not be incorporated in the MMP approval process for the oxide operation that are the subject of this Assessment Report.

Recommendation 4

The proponent shall provide monitoring results showing a reduction in contaminant levels of water downstream of the mine as a result of the physical reduction of water at the Sandy Flat pit. The results should be provided to DoR in the Water Management Plan for the MMP and to the Environment, Heritage and the Arts Division (EHA) of NRETAS in the EIS for the assessment of sulphide operations.

Recommendation 5

The proponent must continue annual macroinvertebrate and sediment sampling throughout the life of mining activities in waterways downstream from both the Sandy Flat site and in Redbank Creek (downstream from the Azurite, Bluff and Redbank deposits). The data should be provided to DoR as part of the current Water Management Plan for the MMP.

Recommendation 6

The proponent is to demonstrate to EHA in the EIS for the assessment of sulphide operations that more complete knowledge of baseline conditions of the Sandy Flat pit water reduction and treatment program has been obtained. The proponent must demonstrate the effectiveness of the above program using, among other information, quantitative data obtained from annual macroinvertebrate monitoring.

Recommendation 7

The proponent should develop sediment monitoring parameters and schedules specifically for off-site assessment in consultation with EHA, with a particular focus on assessing the bioavailability of metals in sediment, factors that mobilise existing contamination and the relationship between sediment, water chemistry and biological components. The proponent should report results to DoR in the MMP.

Recommendation 8

The proponent is to provide the investigation results into the integrity of the existing ROM, vat leach, PSP and process plant and design/construction details of proposed new facilities as part of the MMP, with timeframes of when these facilities are to be replaced.

Recommendation 9

The proponent should develop specific strategies and commitments to investigate and remediate the existing waste rock dump, to be provided to DoR in the MMP.

Recommendation 10

The proponent is to process material from the heap and dump leach pads, identified as contamination sources, through the oxide plant within the two year oxide project. The status of this action should be reported to DoR in the MMP.

Recommendation 11

The proponent must investigate leakage from the tailings storage facility and report to DoR as part of the current Water Management Plan and to EHA in the EIS for sulphide operations. The proponent must also provide an indication of whether there are other potential points of flow from the existing TSF and how this seepage would be managed in the Water Management Plan. If monitoring results indicate there are points of flow from the existing TSF, the proponent will need to liaise with EHA for a Waste Discharge Licence for the discharge of groundwater off-site.

Recommendation 12

The proponent is to install monitoring wells during 2010 to understand the seepage from the existing TSF and to investigate potential for seepage into the groundwater with seepage trench analysis. Evidence from monitoring of the TSF is required to support preliminary conclusions that seepage from the existing TSF has been reduced and that the TSF is entering a state of neutrality. The effectiveness of the lime sludge as an impermeable layer also needs to be quantitatively assessed. Monitoring results from the existing TSF should be supplied to DoR as part of a current Water Management Plan and also to EHA in the EIS for sulphide operations.

Recommendation 13

The proponent is to provide the Acid and Metalliferous Drainage (AMD) analyses on vat leach tailings to support conclusions that the vat leach tailings will not contribute to contamination in the existing TSF to DoR as part of MMP approval process.

Recommendation 14

The proponent is to provide quantitative evidence to DoR on the suitability of the TSF to store vat leach tailings and process water quality during the MMP approval process for oxide operations. The proponent is to investigate the potential for continual reclamation of process water and resulting water quality for the oxide process and in the TSF.

Recommendation 15

The proponent is to provide a complete set of groundwater quality data including water level and water quality data obtained since the drilling program was undertaken and an outline of proposed actions if deterioration in groundwater quality is detected, to DoR as part of the Water Management Plan in the MMP. A hydrogeological model, including data from the current water treatment and Sandy Flat pit water level

reduction, is to be provided to DoR for the Water Management Plan prior to commencement of works.

Recommendation 16

The proponent is to undertake pump testing of the local aquifer to assess transmissivity as part of the model validation and the results provided in the EIS for sulphide operations. In consultation with EHA, natural tracers are to be used to calculate recharge rates and residence times to assist in validating flow paths. This is to be reported in the Water Management Plan to DoR.

Recommendation 17

The proponent should provide an indication of the lateral extent of the seepage zone in the area and complete the groundwater finite element model so that dewatering and seepage estimations and management can be determined and provided in the Water Management Plan as part of the MMP approval process by DoR.

Recommendation 18

The proponent is to provide quantitative data to support the claim that the springs are not hydraulically connected to the proposed new pits, and that any dewatering that may occur as a result of mining the oxides will not impact on nearby springs that support groundwater dependent ecosystems, as part of the current Water Management Plan to be provided to DoR in the MMP.

Recommendation 19

The proponent is to provide a hydrogeological model and demonstrate progress of the following research projects:

- detailed Groundwater Management Plan;
- an understanding of the extent of groundwater contamination;
- a thorough understanding of the existing sources of contamination;
- plans to remediate these sources of contamination; and
- studies of the impacts and improvements in the downstream surface water quality as required by the Waste Discharge Licence (WDL 175).

These projects are to be provided to DoR in the Water Management Plan as part of the MMP approval process and to EHA in the EIS for the assessment of sulphide operations.

Recommendation 20

The proponent is to apply for a Waste Discharge Licence for the off-site migration of contaminated groundwater and develop a Remediation Action Plan in liaison with EHA.

Recommendation 21

The proponent is to provide results from physical reduction of water level in Sandy Flat pit and provide specific management actions to DoR as part of the MMP approval that will be instigated (including applying for a Waste Discharge Licence and developing a Remediation Action Plan) if the monitoring results indicate contaminated groundwater is flowing off-site.

Recommendation 22

The proponent is required to develop further contingency methods to manage contaminated groundwater migrating off the site as part of the new TSF and WRD design. More detailed understanding of the Sandy Flat aquifer, connections to other aquifers in the region and the proposed oxide pits, is to be provided to EHA in the EIS for the assessment of sulphide operations. The proponent should also provide this information and results to DoR as part of the Water Management Plan in the MMP.

Recommendation 23

The proponent must redevelop the surface water sampling program and interpretation of data to provide greater confidence in the baseline assessment of surface water quality, and provide this to DoR as part of the current Water Management Plan in the MMP.

Recommendation 24

The proponent is to provide trigger levels and remedial actions for surface and groundwater impacts to DoR in the Water Management Plan and these should also be provided to EHA in the EIS for the assessment of sulphide operations.

Recommendation 25

The proponent is to provide details to DoR on how the Return Water Dam and any surface water infrastructure would be designed to minimise risk of contaminants, sediment or potentially acid forming runoff to interact with groundwater as part of the MMP approval process.

Recommendation 26

The proponent is to update water balance modelling to inform surface water management at the site for the maximum average rainfall for Wollgorang Station (1433mm). The proponent is to demonstrate effective water management measures for extreme rainfall events and periods to DoR in the MMP.

Recommendation 27

The proponent is to demonstrate to DoR in the MMP that the non acid forming waste rock, proposed for mining infrastructure, does not produce neutral metalliferous runoff and has appropriate design (e.g. batter slope angle) to minimise erosion.

Recommendation 28

The proponent is to provide to DoR in the MMP detailed information to support the assumption that sediment dams designed for the waste rock dumps would be adequate to contain water seepage and sediment runoff during high rainfall events.

Recommendation 29

The proponent is to submit to DoR as part of the MMP approval process the AMD testing results for both static and kinetic methods with mineral leach and mineralogical tests on oxide waste rock (from each of 3 pits) and oxide tailings.

Recommendation 30

The proponent is to provide details on the ARD testing program proposed for the sulphide materials to ensure adequate characterisation and data is to be provided to EHA in the EIS for the assessment of sulphide operations.

Recommendation 31

The proponent should add water quality of the springs to the regular monthly surface water monitoring and sampling regime, and if impacts are detected, contingency actions should be implemented and be reported in the MMP. In the event that the springs are impacted by groundwater drawdown, the proponent is to develop a re-establishment strategy or vegetation offset areas in liaison with DoR and EHA.

Recommendation 32

The proponent is to develop a fire management plan, aiming to protect threatened species habitats, particularly rainforest patches, to DoR with the MMP.

Recommendation 33

The proponent is to provide details on the management objective, actions and specific response variables that are to be used to assess the impacts of mining works on the threatened species Carpentarian Rock-rat and Gouldian Finch, to DoR as part of the Environmental Management Plan, to be submitted in the MMP.

Recommendation 34

The proponent is to provide details of threatened species offset programs that have been approved by the Australian Government Department of Environment, Water, Heritage and the Arts, to DoR in the MMP.

Recommendation 35

The proponent should implement a feral animal management plan, aimed to remove feral species from ERL94 and to exclude cattle from the proposed riparian and creek bank buffers, as part of the Environmental Management Plan to be submitted to DoR in the MMP.

Recommendation 36

The proponent is to update the Environmental Management Plan each year, and submit this to relevant Northern Territory Government authorities as part of the annual MMP approval.

Recommendation 37

The proponent should monitor energy consumption and identify opportunities to reduce and/or offset greenhouse gas emissions and provide a Greenhouse Gas Emissions Management Plan to DoR as part of the MMP approval process.

Recommendation 38

Further investigations into tailings seepage quantity and quality are necessary prior to the proponent committing to a decommissioning plan of impermeable or otherwise capping layer or discounting the option of re-processing the tailings to extract copper and other potential contaminants.

Recommendation 39

The final rehabilitation and decommissioning plan for the existing TSF is to be developed and submitted to DoR for approval in the early stages of operation. In line with the monitoring programs being reviewed and revised annually, the Mine Closure Plan must be reviewed annually as part of the MMP. The Plan must also include rehabilitation objectives and contingency planning for sudden mine closure. As part of the Mine Closure Plan, the proponent will provide details on the planned management of seepage from the TSF post mine closure.

1 Introduction and Background

This report assesses the environmental impact of the Expansion of Redbank Copper Operations for the extraction and processing of copper oxide ore from the three deposits Redbank, Azurite and Bluff. The proposed oxide operations would run for approximately three years, use the existing Tailings Storage Facility and be scheduled to commence in the 2010 Dry season.

This Environmental Assessment Report is based on a review of the EIS, Supplement, further information request (submitted as Hydrogeological Conditions Redbank Copper, February 2010), and comments from the public and Northern Territory Government agencies on the EIS. The EIS and Supplement can be viewed on the Department of Natural Resources, Environment, the Arts and Sport (NRETAS) website at:

<http://www.nt.gov.au/nreta/environment/assessment/register/redbank>

1.1 Environmental Impact Assessment Process

One of the major objectives of environmental impact assessment is to fully define those elements of the environment that may be affected by a proposed development and to determine the significance, risks and consequences of the potential impacts of the proposal. The potential impacts are considered at both local and regional levels.

This Assessment Report evaluates the adequacy of undertakings and environmental safeguards proposed by the proponent to avoid or mitigate the risks of potential impacts identified in the assessment process. The safeguards may be implemented at various levels within the planning framework of a project and include (among other approaches):

- Design and layout of buildings and other infrastructure on the site/s;
- Management of construction activities; and
- Management of processes used in operations of the facility (e.g. inputs and outputs).

A list of commitments made by the proponent in the EIS and Supplement is provided in Appendix 1. Additional safeguards are recommended in this Assessment Report where appropriate, and are summarised in the Executive Summary and Appendix 2 of this report.

The contents of this Assessment Report form the basis of advice to the NT Minister for Natural Resources, Environment and Heritage on the environmental issues associated with the project.

1.2 Environmental Impact Assessment History

In April 2008, Redbank Copper Limited (Redbank) submitted a Notice of Intent (NOI) to the Department of Resources (DoR) (formally Department of Regional Development, Primary Industries, Fisheries and Resources) for the expansion of Redbank Oxide Copper Leaching Operations. The NOI was referred to the EHA

Division of NRETAS and in June 2008, the NT Minister for Natural Resources, Environment and Heritage determined the proposal would be assessed at the level of an EIS.

The project was referred to the Australian Government in June 2008 and was declared a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The project was determined to have a likely impact on listed threatened species and communities (sections 18 and 18A).

Guidelines for the EIS were issued in October 2008 outlining issues to be addressed for the oxide operation.

In July 2009, Redbank submitted a NOI under clause 14A of the NT *Environmental Assessment Administrative Procedures* to alter the proposal to include the mining and processing of sulphidic ores. The proposed alteration included:

- Extension of mining life from three to eight years;
- Requirement that an additional pit (Sandy Flat pit) be dewatered and re-opened to access the sulphide ores;
- Deepening of the Redbank, Azurite and Bluff pits into the sulphide zones;
- The requirement to characterise and manage a larger amount of potentially problematic sulfidic waste rock;
- Construction of a 500 000 tonne per annum (tpa) capacity sulphide processing plant with associated tailings storage.

In August 2009, the NT Minister for Natural Resources, Environment and Heritage determined that the oxide and sulfidic ore extraction and processing required formal assessment at the level of an EIS. Revised EIS Guidelines for both the oxide and sulphide proposals were issued in September 2009.

The EIS was placed on public review on 31 October 2009 for 28 days and circulated to NT Government advisory bodies for review and comment. Two public submissions were received within the review period as well as comments from NT Government agencies. Redbank was asked to address these comments in the Supplement.

On 29 January 2010, Redbank submitted a second notice under clause 14A of the NT *Environmental Assessment Administrative Procedures* to alter the project by withdrawing the mining and processing of sulphidic ores. This was due to outstanding information requirements necessary for the mining and processing of sulphide ores, including waste rock characterisation, construction of a new Tailings Storage Facility (TSF), and hydrogeological modeling of the area, that would not be available prior to the project needing to generate an income.

Consequently, assessment of the oxide and sulphidic components has been split so that the sulphide operations will be subject to subsequent assessment under the EIS Guidelines issued in September 2009, including public review of an EIS and requirement of a second Supplement and Assessment Report.

The Supplement to the EIS (addressing the mining and processing of oxide ores only) was submitted on 2 February 2010. Further information was requested from the proponent on 18 February 2010, and on 10 March 2010 the proponent supplied an additional report titled *Hydrogeological Conditions Redbank Copper: Sandy Flat, Redbank, Azurite and Bluff* (2010 VDM Consulting, EcOz). This additional report, along with the EIS, Supplement, public and government comments have been taken into account in the preparation of this Assessment Report.

1.3 Regulatory Framework

Environmental assessment was undertaken in accordance with the requirements of both the Northern Territory *Environmental Assessment Act (1982)* and the EPBC Act. This report forms the basis of advice to the NT Minister for Natural Resources, Environment and Heritage on the environmental issues associated with the project and informs the decision as to whether or not the project should proceed. The NT Minister for Natural Resources, Environment and Heritage is required to make comment and/or recommendations with regard to the proposal to the responsible Minister (Minister for Primary Industries, Fisheries and Resources).

The Minister for Primary Industries, Fisheries and Resources will then make a determination as to whether or not an 'Authorisation to Operate' will be issued to Redbank to operate the Redbank project under the *Mining Management Act 1990*. Under this Act, the proponent must submit a MMP, which is the principal administrative document for the management of mine sites and can incorporate environmental conditions created through the environmental assessment process. A number of environmental management plans prepared by the proponent will be included as part of the MMP.

Once the Minister for Natural Resources, Environment and Heritage has considered and agreed to the findings of this Assessment Report, it will be forwarded to the Australian Government Minister for the Environment Protection, Heritage and the Arts in accordance with section 130 of the EPBC Act. The Australian Government has 30 business days in which to issue an approval once it has received this Assessment Report, subject to any further information request.

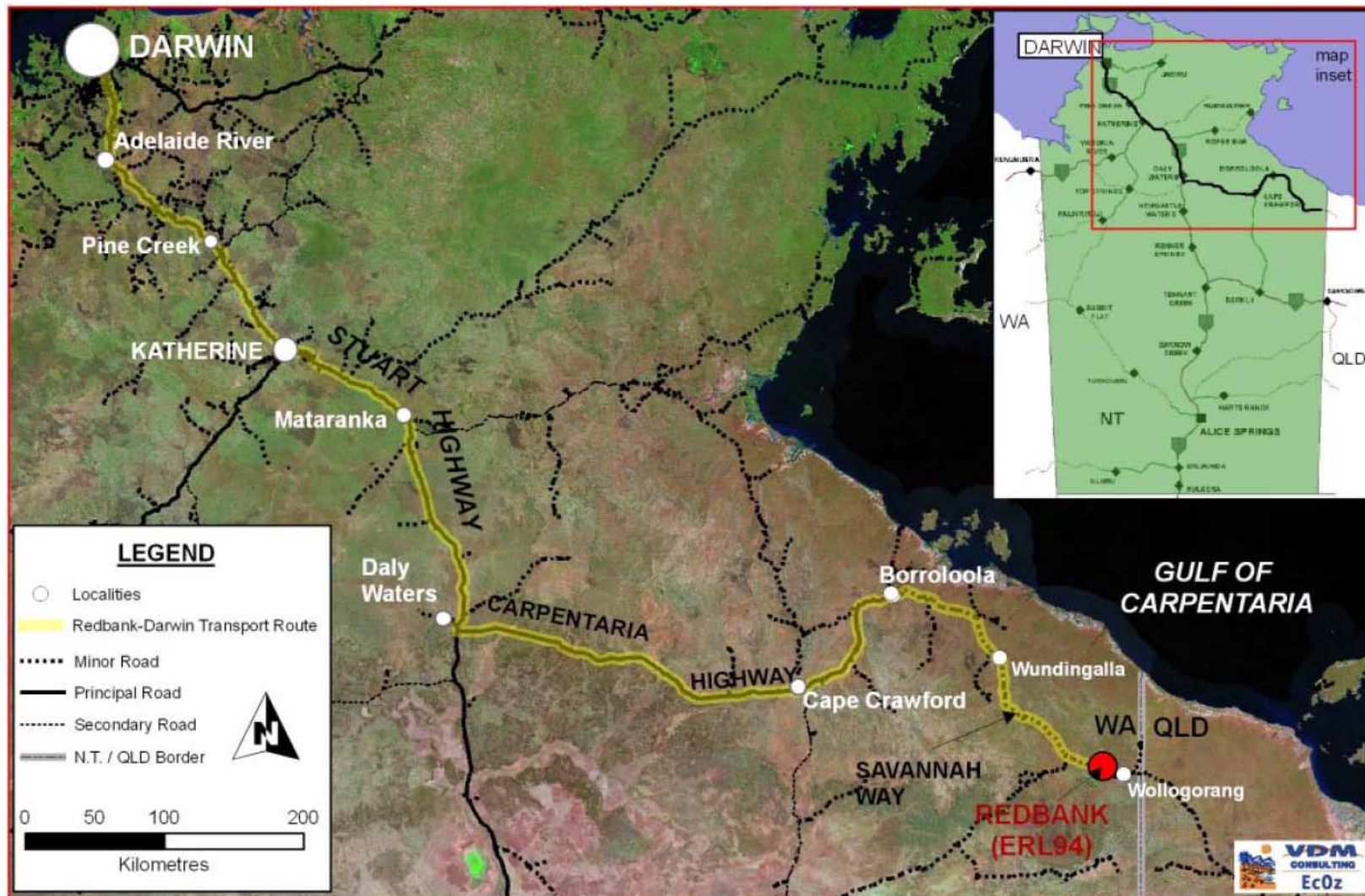


Figure 1: Location of the Redbank Project Area (Source: Redbank EIS)

2 Project Description

2.1 The Proponent

The proponent is Redbank Copper Limited, an Australian Stock Exchange listed public company, who became owner and operator of the Redbank Copper operations in early 2006. The Redbank Copper operation is located in the Northern Territory, 30 km west of the Queensland border and approximately 70 km south of the coast of the Gulf of Carpentaria (Figure 1).

The project area encompasses a group of seven mining leases (Mining Lease Northern; MLN 631, 632, 633, 634, 635, 636 and 1108) within an Exploration Retention Licence (ERL94; Figure 2). Recent mining activity (extraction of surface oxide ore) has been restricted to Sandy Flat pit (within MLN 631, 632, 633, 636 and 1108).

The proposed expansion focuses on oxide ores from the Redbank and Azurite Deposits (MLN 634), previously mined in only small areas between 1916 and 1965 and Bluff Deposit (MLN 635). Deeper sulphidic ores in all deposits will be the focus of future mining proposals and separate approvals.

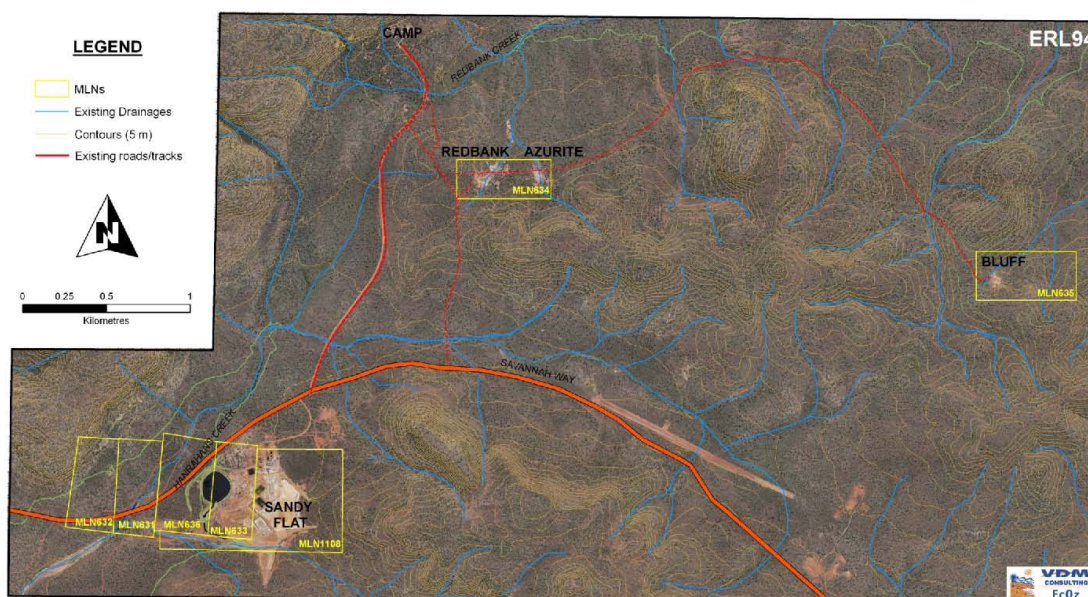


Figure 2. Location of mining leases on Exploration Retention Licence (ERL) 94 (Source: Redbank EIS).

2.2 Historical mining activities

William Masterson discovered the Redbank and Azurite prospects in 1916 and for over 45 years sank shallow shafts at both of these prospects. He mined an estimated 800 tonnes of copper oxide ore grading between 25 – 40% copper until 1961.

Many companies prospected in the area subsequently but it was not until 1994 – 1996 that a 250 000 tonnes per annum capacity processing plant was erected at Redbank to process ore from the Sandy Flat open pit. For most of the two year operation, the plant treated ore from the upper oxide and transition zone (between

oxide and sulphide). When the mine closed due to falling copper prices, an estimated 54 000 tonnes of partially treated and potentially acid forming material remained on site including crusher oversize, vat residues and unbanded waste rock piles. This has contributed significantly to the legacy issues which the current owners must address during the early stages of operation.

In 2006 when the current Redbank owners purchased the lease, they operated under a Mine Management Plan to extract copper from the partially treated 54 000 tonnes of mined ore (which did not trigger environmental assessment). They commenced leach operations that involved placing crushed oxide ore in lined vats and heap leach pads. The ore was then irrigated with a recycled acidic solution of pH 2-3 to leach the copper. Copper cement was extracted and the spent ore was put into the tailings dam that was originally developed to receive tailings from the mid 1990s operation. The site was then placed into care and maintenance at the end of 2008.

2.3 Project description

A detailed description of the proposal components and supporting infrastructure is presented in section 3 of the EIS. Since the submission of the first Notice of Intent in April 2008 which proposed to mine oxide ore only, the proponent changed the terms of the project in July 2009 to include the mining of sulphidic ore, and in January 2010 reverted back to mining oxides only. This Assessment Report will be for oxide ore, and sulphidic and transition ore will be treated separately.

Reasons for the changes are explained in the Introduction of the Supplement. Redbank anticipate commencing mining of oxides in the 2nd Quarter 2010 (Table 3.2.1, EIS). Redbank has stated in the EIS, Supplement and other correspondence that funds need to be generated during the oxide ore mining stage to undertake investigations and manage the legacy issues and to gather information on the potential impacts of mining sulphides. To enable this, the assessment of this project has been split into two parts: oxide and sulphide operations.

An overview of the proposal for mining of oxides includes:

- Total disturbance footprint 25.7 hectares (includes 18.7 ha of new clearing, Table 6.2-2, Supplement);
- The mining of 765 000 tonnes of ore (0.5% cutoff grade) from three new pits (Redbank, Azurite and Bluff) which would be open cut and mined for oxides (depths ranging from 30 to 50 m);
- Construction of two waste rock storages, up to 10 m high, approximately one hectare in footprint (Figures 6.7-3, 6.7-4, Supplement);
- Settling ponds (or sediment dams) for the oxide WRDs;
- Construction of an oxide processing plant located within the existing Sandy Flat site;
- Use of existing TSF associated with the processing plant for storage of vat leach tailings which would be dewatered and utilised for disposal of oxide tailings;
- Water in the Sandy Flat pit would be used in processing of the oxide ores;
- Production bores would be installed for raw water supply;
- Dewatering bores installed around new pits with water discharged to settlement ponds and discharged to Redbank Creek if required;

- Redbank Camp would be expanded but located in current position with no additional clearing;
- Airstrip upgraded;
- Haul and other roads installed or upgraded as required (including approximately 10 ha of proposed new clearing); and
- Rectification of past water contamination and on-going water management.

2.4 Mining method

Mining will be by drill and blast open cut methods. Ore will be taken to the processing facility at Sandy Flat along a haul road.

2.5 Mine life

The mining and processing of oxides from the three oxide pits (Redbank, Azurite and Bluff) would take place over three years (commencing 2010) and processing would occur year round. In years one and two production would be only from oxide ore treatment. Year three would be the first year of sulphide production, and waste material from the Sandy Flat open pit would be available for the new TSF wall construction.

2.6 Mine pits

The oxide material lies above the sulphide resources. For the purpose of this Assessment Report the pits at Redbank, Azurite and Bluff are included. Sandy Flat pit will provide water for processing ore.

2.7 Waste rock

Waste rock would be deposited in two WRDs adjacent to the pits (one at Bluff, one at Redbank and Azurite). The proposed WRDs will be shaped according to surrounding topography and will be approximately 10 m in height and have batter slopes not exceeding 20°. The total amount of waste rock to be placed in dumps is 91 000 m³ (loose volume; Table 1).

Table 1. Expected waste rock volumes for Redbank, Azurite and Bluff Deposits (units: Loose Volume m³, *in situ* density 2.2 t/m³, swell 30%)

Proposed Voids	Total Volume of Oxide Waste Rock	Volume for Mine Site Construction			Volume for Waste Rock Dumps
		Haul Road (SFP to Azurite)	Haul Road (Azurite to Bluff)	Pit Safety Bunding	
Redbank	104,000	70,000	0	1800	32,200
Azurite	70,000	25,000	25,000	1600	18,400
Bluff	117,000	0	75,000	1600	40,400
Total	291,000	95,000	100,000	5000	91,000

Source: Redbank Supplement (Table 6.7-3).

In dumps that contain non acid forming material the surface would be shaped to avoid wind tunneling, erosion and to promote the absorption of water. Deep ripping would also occur in these areas to encourage stability and vegetation establishment.

2.8 Tailings Storage Facility

A TSF established for the 1990s operation is proposed to be used for the oxide tailings. The proponent states that these tailings are suitable to be added to the existing TSF and pose no contamination risk. Seepage trench analysis of sub-surface seepage from the TSF is to be provided in the Water Management Plan as part of the MMP approval. A new TSF to handle sulphide ore tails will be assessed in subsequent approvals.

2.9 Water sources and use

Potable water will be sourced from an existing bore at Redbank Camp and when fully operational will require 50 kL per month. Various sources of water have been identified for processing of ore including ground water, pit water, tailings reclamation water and storm water from sediment and return water dams.

2.10 Transport

Processed ore would be transported to Darwin via Borroloola (1300 km) where it will be stored until export (Figure 1). Goods will be transported to the site from Queensland via Doomadgee. Haulage of ore from pits to the processing facility will be along a haul road that crosses the Savannah Way. A Traffic Management Plan has been developed to ensure the Haul Road/Savannah Way intersection remains safe. Employees would fly-in fly-out from Darwin and Borroloola to an airstrip upgraded to Civil Aviation Safety Authority requirements. Employees would stay at the Redbank Camp, a short (up to 6 km) journey to pits and processing facilities (Figure 2).

2.11 Workforce

The project is expected to be staffed by 40 people at commencement and gradually increase as demand requires to a maximum of 60 people. Employees would be mainly based in Darwin or Borroloola.

3 Regional Setting

3.1 Physical

Climate

The climate at Redbank is subtropical with a well defined Wet and Dry season. Most rain occurs in the months from October to April, with a mean annual rainfall of 977 mm.

Geology

The ore occurs in volcanic breccia pipes which in this region are in clusters and along broadly linear zones, and are probably localised by fault jogs and fault intersections in the Tawallah Group. More broadly, the Tawallah Group deposits occur within the sediments and volcanics of the Mesoproterozoic McArthur Basin. The Tawallah Group comprises four main zones, from lower to upper: Settlement Creek Volcanics, Wollogorang Formation, Gold Creek Volcanics, and Masterton Sandstone. Oxide deposits occur in the upper layers of the Gold Creek Volcanics.

Landform and Soils

The region surrounding Redbank generally consists of three land systems (Bukalara, Seigal, and Cliffdale) generalised as massive sandstone plateaux and linear ridges or undulating terrain and rocky outcrops (Aldrick and Wilson 1990). The soils are formed from parent rock that is on its second cycle of erosion resulting in mainly infertile soils with a low potential for salinity and sodicity.

Hydrology and Hydrogeology

The surface waters at Redbank ERL94 comprise two catchments: Redbank Creek (in the northern part, flowing to the east); and Hanrahan's Creek (along the western area, flowing to the south). Hanrahan's Creek flows into Settlement Creek outside of ERL94 and eventually into Queensland where it forms a floodplain near the coast.

The hydrogeology in this area remains poorly understood, and Redbank are undertaking studies to assess groundwaters at ERL94. Legacy issues with contamination have shown that there is groundwater connection between Sandy Flat pit and Hanrahan's Creek, which has resulted in significant pollution downstream.

There are a number of springs within ERL94 which support important patches of monsoon forest. These in turn provide important refuges for wildlife. None of the mining activities directly affects these springs, however impacts to groundwater levels may affect flow rates of springs.

3.2 Biological

The Redbank lease is situated in the Gulf Coastal Bioregion, close to the boundary of the Gulf Fall and Uplands Bioregion. The landscape of the lease reflects more typically the latter as it is surrounded by many rocky ranges, yet it is within close proximity to wetlands of the Gulf Coastal Bioregion.

Five vegetation types occur within ERL94: Closed Monsoon Forest (0.5 % of ERL94), Woodland with *Eucalyptus tectifica* and *Corymbia terminalis* (12 %); Low Woodland with *Eucalyptus pruinosa* (3 %); Low Open Woodland with *Corymbia dichromophloia* and *Eucalyptus tetrodonta* (58.5 %); and Low Open Woodland with *Eucalyptus leucophloia* Snappy Gum (22 %). The latter is an important breeding habitat for the Gouldian Finch.

The Wollgorang and China Sandstone Ranges area has been identified as one of 66 NT sites of conservation significance (Harrison *et al* 2009). Its sandstone escarpments support a rich sandstone fauna of national significance, and it is also regionally significant due to the presence of springs providing wildlife refuges. Six threatened species occur in the area (Carpentarian Rock-rat, Carpentarian Grasswren, Gouldian Finch, Emu, Australian Bustard, and Merton's Water Monitor). Six plant species and three vertebrate species are endemic to the region.

Flora and Fauna surveys in 2009 detected 149 flora species and 143 species of vertebrates (10 amphibians, 32 reptiles, 80 birds, 21 mammals). Two threatened species were identified in the project area (Carpentarian Rock-rat and Gouldian Finch, both Endangered under national legislation and Critically Endangered and Endangered respectively under NT legislation). The Carpentarian Rock-rat was recorded near the Redbank Camp. Impacts to water sources due to groundwater extraction are of concern for this species as well as pressure from feral animals. Snappy Gum woodland known to support Gouldian Finches will be impacted by clearing activities.

Seven introduced flora species were recorded, including two declared weed species under the *Weeds Management Act 2001*. Five vertebrate pest species were also detected during surveys in 2009: Cane Toad, Cattle, Horse, Pig and Buffalo.

3.3 Cultural and Historical

Redbank is centrally located within a region traditionally occupied by the Waanyi Garawa group (which extends from Doomadgee in the east to Robinson River in the west). The area had interest for early European exploration, with a pastoral industry commencing in the 1880s at Wollgorang and viable copper deposits discovered in Settlement Creek at the turn of the 20th century. William Masterton discovered copper at Redbank Creek and worked the deposit from 1916 until his death in 1961. Masterton made a permanent base near the current Redbank Camp and many artefacts remain at the site. His grave is within an area marked for disturbance at the Redbank Pit.

3.4 Socio-economic

The two closest towns to the project area are Borroloola (population 900), 200 km to the north west, and Doomadgee (population 1150), 140 km to the south east in Queensland. The Aboriginal community of Robinson River has a population of 147 and is located between Borroloola and Redbank. There are a number of homesteads associated with pastoral properties in the area, the closest of which is Wollgorang, about 40 km east of the mine site.

4 Environmental Impact Assessment

4.1 Introduction

The main purpose of this Assessment Report is to identify the potential environmental risks and impacts associated with the proposed project, and evaluate the environmental protection measures proposed to mitigate those risks/impacts, to determine whether the proposal can proceed without unacceptable environmental impacts. Based on this analysis, this Assessment Report provides recommendations to inform decision-making by the proponent and government regulators to ensure that the proposal can proceed in an environmentally acceptable manner.

The environmental acceptability of the project is based on the following considerations:

- Adequacy of information outlining the proposal (particularly which structures or activities are likely to impact the environment);
- Adequacy of information on the existing environment (particularly environmental sensitivities, legacy issues);
- Adequacy of information on the range and extent of potential impacts; and
- Adequacy of the proposed safeguards to avoid or mitigate unacceptable environmental impacts.

4.1.1 Assessment Report 63A

This assessment report addresses the oxide component of the operation and provides recommendations on addressing legacy contamination and investigations required by Redbank for the proposed sulphide ore mining (including transition ore). This report includes the assessment of:

- The mining of three new pits (Redbank, Azurite and Bluff);
- WRDs associated with these pits;
- Haul road of approximately 4 km in length to transport ore to the processing plant;
- Use of the existing tailings storage facility for oxide vat leach tailings;
- Upgrades of the processing plant and associated facilities at the Sandy Flat site;
- Retention ponds and production bores to assist in management and treatment of water on site; and
- Commencement of remediation of contamination due to legacy issues.

The level of information provided in the EIS and quality of responses to the request for further information has not been sufficient to enable a comprehensive assessment of the proposal. While the documentation provided commits Redbank to minimising environmental harm and remediation where necessary, the capacity to fulfil these commitments has not been demonstrated. This has significantly increased the risk setting of the project.

The EIS and the Supplement did not provide information on a number of issues. Shortcomings include:

- Limited data has been provided to indicate the vat leach tailings from oxide processing would be benign and not contribute to existing contamination via seepage;
- There is an outstanding requirement to finalise and validate the conceptual hydrogeological model;
- There is an outstanding requirement for appropriate action to address the ongoing off site migration of contamination via groundwater and sedimentation;
- Only anecdotal evidence has been given that the lime rich sludge from dewatering of acidic Sandy Flat pit is sealing gaps, reducing seepage, and neutralising the tailings in the existing Tailings Storage Facility;
- A decommissioning and rehabilitation plan for the existing TSF has not been provided and it has not been determined whether a low permeability layer is required as capping to reduce future mobilisation of metals;
- Very limited data (2 samples) has been provided on the net acid producing potential from oxides of which one value indicates further analysis is required to determine if the oxides may possibly be generating Acid Rock Drainage. No data was provided on the likelihood of metalliferous drainage under neutral conditions; and
- Further information on Threatened Species offsets has not been provided to the satisfaction of the Australian Government Department of Environment, Water, Heritage and the Arts (DEWHA).

In response to deficiencies in the information provided, in order for the project to proceed in an environmentally acceptable manner, the proponent needs to address the information gaps identified in this Assessment Report relating to the oxide operations prior to commencement of works. Any additional issues identified should be able to be managed or resolved through appropriate mitigation measures or re-engineering and design of the project.

This Assessment Report provides recommendations on information requirements for approval of oxide operations under a MMP, as well as information that will be required in any subsequent assessment of sulphide operations. To assist the reader these information requirements have been separated in Appendix 2 into requirements for an oxide operation MMP and future sulphide operation EIS respectively.

In conclusion it is considered that if proper consideration is given to the recommendations and commitments in this Assessment Report in developing the Mining Management Plan and associated documents, Redbank should be able to demonstrate that the proposed mining operations can be managed in an environmentally appropriate manner.

Subject to the adequate provision of information and decisions that permit the project to proceed, the primary recommendation of this assessment is:

Recommendation 1

The proponent shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards identified in the Expansion of Redbank Copper Operations draft Environmental Impact Statement (EIS), Supplement, Additional Information and in this Assessment Report (No. 63A).

All safeguards, mitigation measures, and commitments outlined in the EIS and Supplement are considered as commitments by Redbank and are to be incorporated into the Mining Management Plan (MMP) for approval by the Department of Resources (DoR) as per Appendix 1 of this Assessment Report.

Recommendation 2

The proponent shall advise the Minister of any changes to the proposal in accordance with clause 14A of the Administrative Procedures of the *Environmental Assessment Act*, for determination of whether or not further assessment is required.

4.1.2 Future mining of sulphide and transition ore

In August 2009 Redbank indicated they would continue the mining operation beyond the oxide ore stage to include mining sulphides, however this proposal was withdrawn from the current assessment in January 2010 because of the lengthy investigations required for that type of operation and the company needing to produce an income for those studies.

During the oxide mining stage, Redbank has further opportunity to demonstrate that mining at the site can be managed in an environmentally appropriate manner with submission of a second EIS and Supplement and preparation of the Mining Management Plan, Groundwater Management Plan, Water Management Plan and associated documents. Information requirements highlighted in this assessment report and the EIS Guidelines issued in September 2009 would need to be addressed with scientific data to support management options.

Due to the similar environmental risks posed in the mining of transition and sulphide ores, transition ores should not be mined before Redbank has completed a second environmental assessment.

If Redbank intends to mine and process sulphide ore (including transition ore), the second assessment phase would require impacts of the sulphides to be addressed, and may include:

- Expansion of the Sandy Flat pit, Redbank, Azurite and Bluff into the deeper transition and sulphidic zones;
- A sulphide processing plant and associated infrastructure;
- Establishment of a new tailings storage facility; and
- Waste rock characterisation and management of WRDs associated with each of the pits.

Recommendation 3

The proponent shall ensure that no transition or sulphide ore is extracted before the environmental assessment of sulphide operations has been completed and that the mining of transition zone ore not be incorporated in the MMP approval process for the oxide operation that are the subject of this Assessment Report.

4.2 Summary of Issues

The primary issues associated with the current proposal to mine oxide ore and rehabilitate the Sandy Flat site include:

- Characterisation, mitigation and management of existing legacy environmental issues and contamination sources, which includes:
 - Management of the existing TSF with respect to preventing seepage issues, and meeting closure requirements; and
 - Characterisation of legacy groundwater and surface water contamination;
- Management of impacts to groundwater levels and quality;
- Increased risks and management issues for site surface water management;
- Prevention or minimisation of acid and metalliferous drainage (AMD) into the environment, including management of waste rock and tailings; and
- Protection of flora and fauna in an area listed as a Site of Conservation Significance and EPBC Act listed species.

The lack of information on important environmental aspects in the assessment documentation has increased the risk setting of the project, as some of the key assumptions of the project have not been demonstrated through thorough studies. These outstanding issues have been discussed further throughout this report.

4.3 Pre-existing environment and legacy issues

Redbank has acknowledged there is a level of residual risk associated with commencing this project due to lack of information and absence of studies that have not been provided for assessment. However, as stated in the EIS, government stakeholders, Wollogorang Station and the Indigenous stakeholders are generally supportive of Redbank developing this project on the basis that the environmental legacy issues are addressed.

The current environmental situation is unacceptable but remediation works to repair the situation would require the support of a profitable and operating mine (section 5.1, EIS). During the mining of oxides it is imperative that the legacy issues are further investigated and addressed in the short-term to ensure a desirable outcome for all stakeholders.

4.3.1 Surface and Groundwater Impacts

Contamination of surface and ground water at the Redbank site and further downstream was caused by previous operations. It is evident that acidic metal-laden waters from Sandy Flat pit, WRD and the TSF have impacted upon Hanrahan's Creek through a combination of direct surface water (discharged from breaches of the Sandy Flat pit in periods of high rainfall), and indirect ground water seepage emanating downstream from the fully charged pit and aquifer.

Contaminated water remains in semi-permanent and permanent waterholes many kilometres downstream in the Settlement Creek system (section 6.1.2, EIS). Acidic waters with elevated levels of copper and aluminium have been recorded in Settlement Creek 35 km downstream from the Sandy Flat pit site with visual

observations recording a lack of aquatic life and stream vegetation (Table 6.3.2, Figure 6.3-7, EIS).

These legacy issues have occurred largely as a result of operations by previous owners that left the Sandy Flat site in 1996. The remediation strategy at the time was based on the prospect of future mining of the site, and an estimated 54 000 tonnes of partially treated and potentially acid forming material remained on site, including crusher oversize, vat residues, and unbanded waste rock piles. Storm water containment devices were installed to contain the potential sources of contamination and directed all contaminated water into the Sandy Flat pit (section 4.1, EIS).

To address the legacy issues resulting from past mining operations, Redbank has developed the following strategies:

1. Divert direct clean surface water runoff away from the existing Sandy Flat pit and TSF to increase the volume of clean water entering Hanrahan's Creek (and thus dilute current contamination in the creek) as well as decrease volume of water requiring treatment prior to release.
2. Highly acidic and metal laden water stored in Sandy Flat pit is pumped through a lime treatment process to increase pH and precipitate copper and other heavy metals. The resulting sludge is placed on the existing TSF. A total of 145 ML has been treated (until February 2010) although no discharge of treated water had occurred at the date of Supplement submission.
3. By removing and treating water in Sandy Flat pit, in combination with evaporation, water is reduced to a level that would contain all inflows and not allow pit water to overflow into surface waters or interact with the shallow aquifer that flows into Hanrahan's Creek during periods of high rainfall.
4. The proposed oxide processing circuit would utilise the remaining volume of legacy acidic water, thus further reducing pit water levels and removing the potential for interaction between pit water and surrounding surface/ground waters from 2010 onwards.

Redbank expect the current water treatment to result in less, if any, connection between the Sandy Flat pit and Hanrahan's Creek, reducing the potential for contaminated water to leave the site either via pit overflows or express into surface waters via the groundwater. The monitoring results of the physical reduction in Sandy Flat pit water levels via this treatment system is expected in a revised Water Management Plan to DoR.

Recommendation 4

The proponent shall provide monitoring results showing a reduction in contaminant levels of water downstream of the mine as a result of the physical reduction of water at the Sandy Flat pit. The results should be provided to DoR in the Water Management Plan for the MMP and to the Environment, Heritage and the Arts Division (EHA) of NRETAS in the EIS for the assessment of sulphide operations.

The macroinvertebrate sampling undertaken since 2008 to provide baseline data against which improvements in water management at the Sandy Flat pit and future expansions can be measured against, was not included in the EIS. The March 2008 sampling period was included in Appendix A of the Supplement, and results from the 2009 macroinvertebrate sampling regime were not ready in time for submission in the

Supplement or further information request. Redbank indicated that an update on the macroinvertebrate sampling results will be supplied to the relevant authorities as soon as it is received. Macroinvertebrate sampling is also expected to be performed during the early Dry season of 2010.

The March 2008 macroinvertebrate assessment showed elevated levels of copper, cobalt, nickel, sulphur, zinc and aluminium in creek bed sediments, with the highest sediment concentration observed 18 km downstream of the mine site. Redbank indicate that there is little potential of mobilisation of residual contamination being transported further downstream due to creek beds consisting of mostly coarse sand and rock. Samples of the existing stream bed soil conditions have been tested to determine the potential of mobilisation of residual contamination although analyses of the results were not provided in the Supplement. Redbank have committed to repeating these surveys in subsequent Wet seasons.

As per Australian Water Quality Guidelines, and recommendations in the 2008 macroinvertebrate report, annual sampling of stream sites, both in Hanrahan's-Settlement Creek system and Redbank Creek (which is downstream from the proposed new pits Bluff, Azurite and Redbank) should continue for a minimum of three years. Redbank have committed to undertake macroinvertebrate sampling annually throughout the life of the proposed mining activities. The aim of these surveys is to obtain baseline data (macroinvertebrate, sediment and water quality) and provide a basis for detecting and assessing ecosystem recovery resulting from the dewatering activities of Sandy Flat pit.

Recommendation 5

The proponent must continue annual macroinvertebrate and sediment sampling throughout the life of mining activities in waterways downstream from both the Sandy Flat site and in Redbank Creek (downstream from the Azurite, Bluff and Redbank deposits). The data should be provided to DoR as part of the current Water Management Plan for the MMP.

Recommendation 6

The proponent is to demonstrate to EHA in the EIS for the assessment of sulphide operations that more complete knowledge of baseline conditions of the Sandy Flat pit water reduction and treatment program has been obtained. The proponent must demonstrate the effectiveness of the above program using, among other information, quantitative data obtained from annual macroinvertebrate monitoring.

Recommendation 7

The proponent should develop sediment monitoring parameters and schedules specifically for off-site assessment in consultation with EHA, with a particular focus on assessing the bioavailability of metals in sediment, factors that mobilise existing contamination and the relationship between sediment, water chemistry and biological components. The proponent should report results to DoR in the MMP.

4.3.2 Existing Sources of Contamination

4.3.2.1 Existing run of mine pad, vat leach pads, pregnant solution pond and process plant

Throughout the EIS and Supplement, the proponent states the major sources of contamination that led to existing legacy issues include runoff and seepage from the previous mine infrastructure, including the Run of Mine pad (ROM), vat leach pads, Pregnant Solution Pond (PSP) and processing facilities. Redbank is aware that the management and treatment of contaminated material in these facilities would result in a reduction in the contamination potential and thus address some of the legacy issues.

In the further information request Redbank provided information that large a concentration of copper in groundwater bores confirm that the existing infrastructure is leaking and/or facilitating seepage of acidic metal laden waters into the underground (section 5.1.3, Hydrogeological Conditions report). Redbank state that these structures are under investigation to ascertain their integrity and are to be replaced by new and appropriately designed and constructed facilities.

Recommendation 8

The proponent is to provide the investigation results into the integrity of the existing ROM, vat leach, PSP and process plant and design/construction details of proposed new facilities as part of the MMP, with timeframes of when these facilities are to be replaced.

4.3.2.2 Existing waste rock dump and heap leach pads

Analysis of samples from the existing WRD reportedly had varying contamination potential although this data was not provided in the Supplement. In particular, spent heap leach material may have been deposited on the WRD in previous operations and one area returned assays indicating that acid generating potential exists. Tests also indicate that copper in the WRD originates from a mostly sulphide/transitional provenance where acid generating potential exists (section 6.3, Supplement). Redbank propose to devise a suitable strategy to further investigate and determine a management strategy within two years.

In the absence of data to confirm otherwise, the existing WRD and heap leach pads should be considered as known sources of contamination and methods to investigate and remediate this material need to be committed to in the short-term (within two years) rather than a vague commitment to research or *scale up activities in 2011* as a long term strategy. The strategies that have been proposed in the assessment for dealing with these potentially contaminated materials (WRD, heap leach pads) include:

- Treatment through the processing plant;
- Relocation to a better managed area;
- Encapsulating material; and
- In-situ treatment and neutralisation.

In the further information request, Redbank commits to re-processing the existing WRD in the future and remaining wastes are to be encapsulated in either the new TSF and/or WRD.

It is recommended that Redbank commit to not just scaling up activities during 2011, but by 2011 the sources of legacy contamination are addressed with a site clean up prior to mining of the sulphides. There is a level of risk associated with the oxide project due to the company's size, limiting *"its ability to invest in significant environmental repair prior to the project returning an income"* (section 1.2.3, EIS). The split assessment, subject to approval from the responsible Minister, allows the oxide operations to commence so that Redbank can further investigate and clean up contamination sources that are currently causing the legacy issues. A firm commitment to cleaning up contamination sources would offset some of the residual risk associated with this project due to outstanding information and studies that are to be funded by the oxide operations.

Remediation of these materials needs firm commitment in the early stages of mine operations to ensure environmental legacy issues on site are addressed early in the operations. This is particularly important in the event that the mine closes prior to the mining of sulphides with the potential outcome that the legacy contamination sources remain unaddressed. Alternatively a larger security bond may be requested to ensure these contamination sources are addressed in the unexpected event the mine reverts back to Government.

Recommendation 9

The proponent should develop specific strategies and commitments to investigate and remediate the existing waste rock dump, to be provided to DoR in the MMP.

The heap and dump leach pads have been identified as a legacy contamination source and Redbank state the material would be processed through the oxide plant. Redbank determined it would be treated as supplementary material and most likely be treated in the second year of operations so that those areas can be utilised for future planned activities.

Recommendation 10

The proponent is to process material from the heap and dump leach pads, identified as contamination sources, through the oxide plant within the two year oxide project. The status of this action should be reported to DoR in the MMP.

4.3.2.3 Existing tailings storage facility

The existing TSF was highlighted to be a potential source of contamination contributing to environmental legacy issues at Redbank mine. During most Wet seasons, contaminated water from Sandy Flat pit was pumped into the TSF in an attempt to reduce pit water levels and prevent pit overflows, and over 10 years contaminated pit water has accumulated and concentrated in the existing TSF.

Redbank is currently treating up to 600 ML of acidic water from Sandy Flat pit with a lime treatment process and the resulting lime sludge is being deposited in the TSF. Visual observations from the current dewatering of Sandy Flat pit indicates the placement of lime treated water into the existing TSF appears to be displacing and neutralising the contaminated water in the TSF as well as sealing some of the leaks, as the flows through the south low flow drain have ceased (section 5, Supplement). Redbank have indicated that surface water monitoring points that target the sub

surface expressions from the TSF are monitored monthly and would continue to do so throughout the project.

To determine whether the existing TSF is being appropriately managed so that it is not a contamination source in the future, Redbank will need to provide more than anecdotal observations that the existing TSF is approaching a state of neutrality and the potential impacts from any seepage have been reduced. In the Supplement, Redbank stated that a significant amount of information regarding the existing TSF is being collected and analysed but it is not yet at a point where it can be reported (section 5, Supplement). In the further information request, Redbank indicated that the treated water is largely contained in the TSF and seepage into the Southern Low Flow Drain has ceased or reduced. This information has not yet been quantified and will need to be provided as part of the current Water Management Plan.

Water losses from the TSF are also being measured and compared to on site evaporation tests to determine if there are other points of flow from the TSF. This information needs to be supplied prior to the start up of oxide operations to determine whether the existing tailings facility can be appropriately used for storage of oxide tailings. Specific management actions need to be outlined if seepage from the existing facility needs to be addressed.

Recommendation 11

The proponent must investigate leakage from the tailings storage facility and report to DoR as part of the current Water Management Plan and to EHA in the EIS for sulphide operations. The proponent must also provide an indication of whether there are other potential points of flow from the existing TSF and how this seepage would be managed in the Water Management Plan. If monitoring results indicate there are points of flow from the existing TSF, the proponent will need to liaise with EHA for a Waste Discharge Licence for the discharge of groundwater off-site.

Recommendation 12

The proponent is to install monitoring wells during 2010 to understand the seepage from the existing TSF and to investigate potential for seepage into the groundwater with seepage trench analysis. Evidence from monitoring of the TSF is required to support preliminary conclusions that seepage from the existing TSF has been reduced and that the TSF is entering a state of neutrality. The effectiveness of the lime sludge as an impermeable layer also needs to be quantitatively assessed. Monitoring results from the existing TSF should to be supplied to DoR as part of a current Water Management Plan and also to EHA in the EIS for sulphide operations.

In the EIS, Redbank proposed that the sources of contamination from the existing TSF would be isolated and not utilised during site expansions. It was stated that the existing TSF needed to be sampled and assayed for the possibility of remaining copper that could be extracted from the leach process, and for other potential contaminants that may be adding to its existing environmental contamination issues. In the Supplement the new plan for the existing TSF is to utilise it for storage of oxide tailings for 2010 and 2011 and there are now no plans to access the copper content in the lime rich sludge that has been deposited on the existing TSF.

Redbank state that the vat leach tailings from the oxide process have most of the major metal components removed and would be “relatively benign”, not contributing to contamination in the existing TSF. In the Supplement, Redbank provides a table of expected metal content in process water that would be deposited in the existing TSF (Table 3.1, Supplement) but does not indicate how this data was obtained and how much of the water would be reclaimed in the process.

In addition, Redbank indicate further samples have been submitted for analysis and Acid and Metalliferous Drainage (AMD) testing but these results have not been made available for assessment. More quantitative evidence is required during the approval process for oxides on the suitability of the TSF to store vat leach tailings, process water quality and the potential issue of the use of reclamation water and its suitability in the oxide process. The storage of oxide tailings in the existing TSF, potential environmental risks and final decommissioning and rehabilitation are further discussed in section 4.8.

Recommendation 13

The proponent is to provide the Acid and Metalliferous Drainage (AMD) analyses on vat leach tailings to support conclusions that the vat leach tailings will not contribute to contamination in the existing TSF to DoR as part of MMP approval process.

Recommendation 14

The proponent is to provide quantitative evidence to DoR on the suitability of the TSF to store vat leach tailings and process water quality during the MMP approval process for oxide operations. The proponent is to investigate the potential for continual reclamation of process water and resulting water quality for the oxide process and in the TSF.

4.4 Protection of Water Resources

4.4.1 Groundwater Quality

A number of concerns were raised on the limited understanding of the hydrogeology of the Sandy Flat pit area. More information was requested to ensure additional contamination problems would not contribute to those already existing and that the design of infrastructure prevents further groundwater contamination.

The proponent has established eight new Environmental Monitoring Bores between Sandy Flat pit and Hanrahan’s Creek in September and October 2009 to sample water quality and levels. Two Environmental Monitoring Bores have been installed in the vicinity of the proposed Bluff pit. While Redbank have committed to monthly sampling for at least the first year to assess groundwater quality, only two months of groundwater quality data (September and November 2009) have been provided for this Assessment (Appendix E, Supplement). This data lists the results that have triggered the Australian and New Zealand Environment and Conservation Council (ANZECC) Guidelines for aquatic freshwater ecosystems for 80% species level. As these are new bores and they have been established to provide an indication of aquifer water quality, at a minimum the five monthly results from September 2009 to January 2010 should have been included for the Sandy Flat pit and Bluff pit bores as part of this assessment.

Redbank state that updated groundwater sampling results will be incorporated in the Water Management Plan in May 2010. Redbank also states that a Groundwater Management Plan is currently under development outlining the proposed actions to be taken if deterioration in groundwater quality is detected and is to be provided in the Water Management Plan.

Recommendation 15

The proponent is to provide a complete set of groundwater quality data including water level and water quality data obtained since the drilling program was undertaken and an outline of proposed actions if deterioration in groundwater quality is detected, to DoR as part of the Water Management Plan in the MMP. A hydrogeological model, including data from the current water treatment and Sandy Flat pit water level reduction, is to be provided to DoR for the Water Management Plan prior to commencement of works.

4.4.2 Groundwater Levels

There is a poor understanding of groundwater and modelling of the aquifer was requested in section 6.3.2 of the EIS Guidelines (September 2009). In response to this, Redbank indicated that the installation of monitoring wells and associated studies were to be conducted in the early Dry season and a bore testing program and laboratory test work was to be completed for April/May 2010. Redbank indicated that an update of progress was to be submitted to relevant authorities early in 2010 with proposed management and monitoring activities to include additional groundwater monitoring bores, continued sampling and more in-depth hydrogeological modelling.

The drilling program that was undertaken in September 2009 indicated that the previously postulated permeable paleo-channel is absent in the seepage zone between the Sandy Flat pit and Hanrahan's Creek. The drilling indicated that the seepage zone is devoid of significant structures which may have a bearing on the occurrence and movement of ground water.

Assessment of the monitoring data to date indicated that the drilling program largely defined the lateral extent of the seepage zone. This complicates the mechanisms of seepage as it is currently interpreted that seepage is taking place through fractured rock. Further drilling in April/May 2010 to coincide with geotechnical investigations for the new TSF and WRD, together with water level and quality data obtained since last year and during current water treatment and pit water level reduction, is to be utilised to calibrate a finite element model which will be used for dewatering and seepage estimations and management.

A conceptual hydrogeological model was requested to be developed as part of a further information request to Redbank. Conceptual diagrams were provided as illustrations (Figures 15-17, Hydrogeological Conditions report), however no strong supporting data was provided. EHA considers there are data gaps in the assessment that have not identified the full extent of contaminant migration from all the pits. As a priority, Redbank need to finalise and validate the conceptual hydrogeological model and have committed to commencing a detailed bore testing program to further refine the model (section 4.3.1, Hydrogeological Conditions report).

Recommendation 16

The proponent is to undertake pump testing of the local aquifer to assess transmissivity as part of the model validation and the results provided in the EIS for sulphide operations. In consultation with EHA, natural tracers are to be used to calculate recharge rates and residence times to assist in validating flow paths. This is to be reported in the Water Management Plan to DoR.

Recommendation 17

The proponent should provide an indication of the lateral extent of the seepage zone in the area and complete the groundwater finite element model so that dewatering and seepage estimations and management can be determined and provided in the Water Management Plan as part of the MMP approval process by DoR.

The Redbank, Bluff and Azurite pits are proposed to require dewatering during the oxide operations. Concern was raised regarding the impact of pit dewatering on nearby Muinyin Springs (Masterton's Gully) that provides habitat for the threatened Carpentarian Rock-rat. The response to this concern was that the *"springs appear not to be hydraulically connected with the proposed new pits"* and that *"should the springs (negligible probability) be impacted upon by dewatering activities"*, the management options proposed were:

- Placing a recharge bore between the dewatering bores and spring;
- Supplement the flow in the springs by a similar quality of water from bores located closer to the springs;
- Pipe water of a similar quality from the dewatering system to the springs; and/or
- Sourcing alternative camp water supplies other than the bore at the camp in order to avoid risk of overdraft.

To address this concern, Redbank committed to locating monitoring bores between the dewatering system and the springs to demonstrate that dewatering would not impact on the springs. The Supplement states that water quality monitoring of the springs also identified a difference in water quality parameters between the Redbank groundwater and that of the springs although no data was provided to substantiate this claim. The springs have also been added to the regular monthly surface water monitoring and sampling regime.

Concern was raised on the lack of information on expected inflow of groundwater into the proposed pits and Redbank proposed that the installation of new bores would provide sufficient baseline information on groundwater movement to enable groundwater flow modeling, a task which is also planned for 2010. Groundwater flow models will provide valuable information to enhance design of proposed developments and facilitate water quality management. Baseline standing water level data from Environmental Monitoring Bores will also enable calculations of groundwater recharge and potential groundwater drawdown.

Redbank also indicated that a revised version of the Water Management Plan is to be submitted to DoR and that the draw down issues associated with increased camp capacity and commencement of processing ore, would be covered at that time.

Recommendation 18

The proponent is to provide quantitative data to support the claim that the springs are not hydraulically connected to the proposed new pits, and that any dewatering that may occur as a result of mining the oxides will not impact on nearby springs that support groundwater dependent ecosystems, as part of the current Water Management Plan to be provided to DoR in the MMP.

4.4.3 Legacy Groundwater Issues

During the EIS assessment, EHA requested that Redbank show how they would manage groundwater legacy issues on site. The proponent indicated that once the project enters operations phase, research into the Sandy Flat aquifer and its potential connections to other aquifers would continue during the operations and be underway prior to their application to mine Sandy Flat pit for its sulphide reserves. The proponent has committed to further research into the development of a Groundwater Management Plan that involves drilling more Environmental Monitoring Bores and pump tests (section 4.4.1, Supplement).

An extensive hydrogeological modeling program is planned for 2010 and the following research projects are currently underway:

1. detailed Groundwater Management Plan;
2. an understanding of the extent of groundwater contamination;
3. a thorough understanding of the existing sources of contamination;
4. plans to remediate these sources of contamination; and
5. studies of the impacts and improvements in the downstream surface water quality as required by the Waste Discharge Licence (WDL 175).

Recommendation 19

The proponent is to provide a hydrogeological model and demonstrate progress of the following research projects:

- detailed Groundwater Management Plan;
- an understanding of the extent of groundwater contamination;
- a thorough understanding of the existing sources of contamination;
- plans to remediate these sources of contamination; and
- studies of the impacts and improvements in the downstream surface water quality as required by the Waste Discharge Licence (WDL 175).

These projects are to be provided to DoR in the Water Management Plan as part of the MMP approval process and to EHA in the EIS for the assessment of sulphide operations.

In the further information request, Redbank state that results from ground and surface water qualities indicate that the Sandy Flat pit is impacting on Hanrahan's Creek (section 4.3.4, Hydrogeological Conditions report). Therefore, Redbank will require a WDL for the off-site migration of contaminated groundwater. In addition,

priority is to be given to the development of a remedial action plan with the key objectives:

- Prevent continuing off-site migration of contaminants;
- Assess the fate and transport of the contamination in sediment off the site; and
- Develop appropriate long term action plans with key milestones identified for the staged remediation of contaminated groundwater leaving the site with a Remediation Action Plan.

Recommendation 20

The proponent is to apply for a Waste Discharge Licence for the off-site migration of contaminated groundwater and develop a Remediation Action Plan in liaison with EHA.

The current water treatment program and reduction of Sandy Flat pit water is the main project underway dealing with legacy issues at Redbank. Redbank state that the information from this program obtained from existing and planned installation of 10 monitoring bores, will determine the extent of any plume of contaminated groundwater that may exist. In the Supplement, Redbank states the most valuable and practical results would come from the information gained by monitoring the impacts of the physical reduction in Sandy Flat pit waters from the current treatment and release program authorised by WDL 175 or subsequent licences. If contamination groundwater is showing off site flow, the installation of production bores into such plume would be investigated. Further contingency measures will be devised when each site specific facility (i.e. WRD or TSF) is designed.

Recommendation 21

The proponent is to provide results from physical reduction of water level in Sandy Flat pit and provide specific management actions to DoR as part of the MMP approval that will be instigated (including applying for a Waste Discharge Licence and developing a Remediation Action Plan) if the monitoring results indicate contaminated groundwater is flowing off-site.

A number of queries were raised as to the unknown extent and flow of groundwater contamination at the Sandy Flat pit site and whether the decision to base a processing plant and TSF at this site be deferred until more information is provided regarding the groundwater beneath the site and its interaction with Hanrahan's Creek in the Wet and Dry seasons.

In Appendix I of the Supplement, Redbank commits to developing groundwater flow models within the project area in 2010. Short term targets to minimise the risk of further contributing to legacy groundwater contamination include:

- All new infrastructure would be designed to minimise risk of contaminants, sediment or Potential Acid Forming (PAF) material to interact with the groundwater system;
- Prevent interaction between groundwater and potentially contaminated materials;

- Preventative measures such as sediment traps would be installed; and
- Maintain quality of groundwater (taking season into account) in the short term.

Recommendation 22

The proponent is required to develop further contingency methods to manage contaminated groundwater migrating off the site as part of the new TSF and WRD design. More detailed understanding of the Sandy Flat aquifer, connections to other aquifers in the region and the proposed oxide pits, is to be provided to EHA in the EIS for the assessment of sulphide operations. The proponent should also provide this information and results to DoR as part of the Water Management Plan in the MMP.

4.4.4 Surface Water

The EIS Guidelines of September 2009, requested that surface water quality baseline data be used to describe the existing environment to:

- allow the separation of existing mineralogical influences; and
- provide a realistic target for environmental management and closure criteria.

Table 6.3-2 and figures 6.3-7 and 6.3.8 of the EIS were provided to illustrate the average stream water quality in Settlement Creek, the impacted water body downstream from Sandy Flat pit. Explanation of this data was requested in terms of whether the figures were total or filterable, laboratory or field tested and raw data provided to show number of samples and concentrations at different times of the year. A revised table 6.3-2 was provided in the Supplement with the note that averages were gathered from samples where a breach in the ANZECC 80% protection level guidelines was experienced, potentially exaggerating the contamination levels.

The surface monitoring data provided in Table 6.3-2 in the Supplement reflects substantial fluctuation (high standard deviations) which strongly suggests that insufficient data has been collected to indicate actual site conditions and the degree and extent of existing contamination. Raw data should be examined to avoid exaggerating existing contamination levels.

Recommendation 23

The proponent must redevelop the surface water sampling program and interpretation of data to provide greater confidence in the baseline assessment of surface water quality, and provide this to DoR as part of the current Water Management Plan in the MMP.

Concerns were raised regarding surface water quality and triggers for action if monitoring detected surface water quality impacts. In response, Redbank defined trigger levels in the Supplement in Appendix I and committed to including remedial actions within the revised Water Management Plan. Actions proposed include:

- Cessation of all or part of the mining/processing activities until sources of contamination are located and remediated;

- Speeding up processing of remnant sources of PAF (contamination source) material over new oxide material; or
- Relocating remnant PAF sources where contamination can be restricted (Appendix C, Supplement).

Recommendation 24

The proponent is to provide trigger levels and remedial actions for surface and groundwater impacts to DoR in the Water Management Plan and these should also be provided to EHA in the EIS for the assessment of sulphide operations.

Appropriate water quality triggers for Hanrahan's Creek are to be determined in consultation with DoR as part of developing the Water Management Plan

Further detail was requested on proposed water management infrastructure and management of surface water runoff to determine that design was suitable for site conditions. The Return Water Dam is due for design in 2011 following dewatering of the Sandy Flat pit. Its capacity would be 250 – 300 ML of potentially contaminated water from the processing facility area. Design details of how this structure would be designed to prevent contaminated water from interacting with the groundwater will need to be provided in the EIS for sulphides.

Recommendation 25

The proponent is to provide details to DoR on how the Return Water Dam and any surface water infrastructure would be designed to minimise risk of contaminants, sediment or potentially acid forming runoff to interact with groundwater as part of the MMP approval process.

4.4.5 Water Balance

As part of the Supplement Redbank provided an updated Water Balance Model to address concerns that the Redbank site had experienced higher than average rainfall for seven out of the last 13 years. Redbank indicated that excess water was not expected to be a problem after 2010 and that future mining and processing at Sandy Flat pit would require water in excess of existing sources (use of groundwater from production bores south of the Redbank and Azurite deposits or import surface water from Redbank, Azurite and Bluff open pits or sediment dams). An updated Water Balance Model was included in Appendix H of the Supplement.

Without information on the groundwater it is difficult to assess the water balance model that has been provided in the Supplement. Results from the groundwater investigations planned in April/May 2010 need to be carefully analysed before a comprehensive site water management plan can be developed. At present, with lack of information, it remains uncertain that water can be supplied and adequately managed from groundwater of suitable quality for the oxide operations.

Recommendation 26

The proponent is to update water balance modelling to inform surface water management at the site for the maximum average rainfall for Wollongorang

Station (1433mm). The proponent is to demonstrate effective water management measures for extreme rainfall events and periods to DoR in the MMP.

4.5 Waste rock management and Acid and Metalliferous Drainage

The EIS and Supplement contained little information on waste rock and tailings characterisation and management of potentially acid and metalliferous producing material. These pose a high risk in contributing to existing contamination on and off the site. In light of the assessment process being split into the oxides and sulphides, the majority of the issues are relevant to the sulphide component of the operations, and hence the following focuses on the oxide mining.

The total volume of waste rock generated from the proposed oxide mining at Redbank, Azurite and Bluff is 291 000 m³ of which approximately 200 000 m³ is proposed for construction of mining infrastructure, including haul roads, pit safety bunding and sediment dam embankments (Table 6.7-3, Supplement). The use of this material has reduced the footprint required for waste rock storage to less than one hectare (assuming batter slopes not exceeding 20 degrees and a height of 10 m). Redbank provided a conceptual design for the WRDs associated with oxide mining at each of the pits that would be shaped according to the surrounding topography and landscape (Figure 6.7-2, Supplement). The base of the WRD would be prepared and compacted at a gradient that directs surface water flow and water seepage to the toe of the facility where a sediment dam would be constructed.

Recommendation 27

The proponent is to demonstrate to DoR in the MMP that the non acid forming waste rock, proposed for mining infrastructure, does not produce neutral metalliferous runoff and has appropriate design (e.g. batter slope angle) to minimise erosion.

Recommendation 28

The proponent is to provide to DoR in the MMP detailed information to support the assumption that sediment dams designed for the waste rock dumps would be adequate to contain water seepage and sediment runoff during high rainfall events.

In the EIS, Redbank stated that the host rock is most likely to consist of dolomitic rock, which is acid consuming (section 3.12.1, EIS). In response to the request to support this statement with evidence, Redbank indicated that recent laboratory tests indicated that there is little acid consuming potential in the host rock (no data provided in the Supplement). Redbank concedes that further work into investigating dolomitic areas and testing is required to determine its potential value as an acid consuming material in the future.

The oxide waste rock has been deemed to be non acid forming after results identified the material had no recorded sulphur content. This was based on 1600 samples tested on site using a hand held XRF (X-ray fluorescence). Redbank indicated that laboratory results from a small number of oxide samples from Bluff did not identify acid producing material (Figure 1, Supplement). Redbank indicated that samples for

AMD testing, employing a full suite of both static and kinetic methods complimented by minerals leach and mineralogical tests were submitted during December 2009 and January 2010 but only a limited number of tests were returned in time for the preparation of the Supplement. The data that has been provided on net acid production potential versus the final pH of samples is provided in Figure 1 in section 6.7 of the Supplement. This included:

- Two samples from the oxide zone (Bluff pit only);
- Two samples from the transition zone;
- Five samples from the sulphide zone;
- Four samples from existing tailings waste from the oxide process.

The existing tailings indicated that two out of the four samples (EPO907550002 and EPO907550001) had a possible NAPP (net acid producing potential) scale with a resultant pH of 3. Redbank concedes that limited test data has been provided and the following investigations are planned in 2010 to deal with ARD issues:

- A drilling program that will identify the potential to sterilise a pit; and
- Testing the ARD potential of the sulphide materials and their relevant volumes.

Recommendation 29

The proponent is to submit to DoR as part of the MMP approval process the AMD testing results for both static and kinetic methods with mineral leach and mineralogical tests on oxide waste rock (from each of 3 pits) and oxide tailings.

Recommendation 30

The proponent is to provide details on the ARD testing program proposed for the sulphide materials to ensure adequate characterisation and data is to be provided to EHA in the EIS for the assessment of sulphide operations.

In section 5.2 of the Hydrogeological Conditions report, Redbank indicated that mining would include the transition zone and low grade ores, and that mineralized wastes will be placed in a separate stockpile for processing at a later stage. This assessment report only covers the assessment of the oxide component of the operation. The limited testing results that have been provided to date indicate a high probability of AMD from the transition zones (Table 17, Hydrogeological Conditions report).

4.6 Protection of Flora and Fauna

Potential impacts to springs near the mining operations that provide important refuges to threatened wildlife were raised during the assessment of Redbank. Mitigation of this potential impact could be provided by groundwater monitoring to determine if impacts would occur by opening new mining pits. In response to this issue, Redbank indicated the springs “*appear not to be hydraulically connected to the proposed new pits*” and that there was “*negligible probability*” that the springs would be impacted by dewatering activities. The new pits are proposed to be dewatered

and Redbank would install monitoring bores between the dewatering system and springs to demonstrate that dewatering would not impact the springs.

Redbank indicate that if dewatering activities from the pits impact on the springs the following management options include:

- Placing a recharge bore between the dewatering bores and the springs;
- Supplementing flow in the springs with a similar quality of water from bores located somewhat closer to the springs;
- Piping water of a similar quality from the dewatering system to the springs; and/or
- Sourcing alternative camp water supplies other than the bore at the camp in order to avoid risk of overdraw.

Similar issues with impacts to groundwater have been raised in section 4.4.2 and Recommendation 18 of this Assessment Report.

Recommendation 31

The proponent should add water quality of the springs to the regular monthly surface water monitoring and sampling regime, and if impacts are detected, contingency actions should be implemented and be reported in the MMP. In the event that the springs are impacted by groundwater drawdown, the proponent is to develop a re-establishment strategy or vegetation offset areas in liaison with DoR and EHA.

Redbank acknowledge in the EIS that poor fire management within ERL94 could contribute to degradation of habitats of threatened species and provide management actions to mitigate this with bushfire management (Table 6.2-6, EIS). Inappropriate management of fire could lead to localised extinctions of threatened species. The draft Environmental Management Plan (Appendix I, EIS) does not explicitly detail fire management for threatened species.

Recommendation 32

The proponent is to develop a fire management plan, aiming to protect threatened species habitats, particularly rainforest patches, to DoR with the MMP.

Redbank has committed to annual monitoring of Carpentarian Rock-rat and Gouldian Finch populations and general biodiversity surveys every second or third year of the operation, however risks were identified in the assessment process by the absence of monitoring management actions. Redbank will need to identify the management objective, management actions and specific response variables that are to be used to assess the success of management prior to development.

Recommendation 33

The proponent is to provide details on the management objective, actions and specific response variables that are to be used to assess the impacts of mining works on the threatened species Carpentarian Rock-rat and Gouldian Finch, to

DoR as part of the Environmental Management Plan, to be submitted in the MMP.

Redbank has identified areas of habitat that will be directly impacted by the opening of new pits and other facilities such as the planned haul road. Impacted species include Commonwealth listed threatened species, and as such require biodiversity offsets under the EPBC Act.

Recommendation 34

The proponent is to provide details of threatened species offset programs that have been approved by the Australian Government Department of Environment, Water, Heritage and the Arts, to DoR in the MMP.

One of the threats posed to the Carpentarian Rock-rat is increased risk of predation from introduced predators, in particular, feral cats (section 6.2, Supplement). In response, Redbank have committed to maintaining a feral cat trap at the base of the gully (checked and re-baited daily) and any cats trapped would be euthanised in accordance with animal ethics requirements.

The management recommendations Redbank propose for managing species in an area of conservation significance include:

- Continuing to implement the management program for the Carpentarian Rock-rat in conjunction with the landowner surrounding ERL94;
- Investigate options for inclusion of significant areas of Wollongorang Station in the reserve system by agreement with landholder;
- Managing grazing and fire to help maintain the conservation values of the area; and
- Survey weeds in the area and develop a management plan that identifies weed management priorities and potential resources.

The above management actions are supported but do not include feral animal control when one of the identified management issues is the presence of feral cats and pigs. It is acknowledged that the mining leases and ERL94 are within a working cattle station (Wollongorang); however cattle movements near to important habitats may also impact on threatened species.

Recommendation 35

The proponent should implement a feral animal management plan, aimed to remove feral species from ERL94 and to exclude cattle from the proposed riparian and creek bank buffers, as part of the Environmental Management Plan to be submitted to DoR in the MMP.

Redbank state that the biological monitoring program will be expanded over time to ensure that an adequate baseline of information exists and that future developments are not detrimentally impacting the regional environment. Fire will be excluded from revegetation areas for a period of 10 years to enable seed bank generation in the topsoil. Redbank is committed to weeds management, fire management, erosion management, and biological monitoring and management.

Recommendation 36

The proponent is to update the Environmental Management Plan each year, and submit this to relevant Northern Territory Government authorities as part of the annual MMP approval.

4.7 Greenhouse gas emissions

The estimated annual greenhouse gas emissions from the mining of oxides is 13 792.3 tonnes (Table 6.10-2, EIS). The majority of emissions are derived from the use of diesel fuel for oxide refining, mine operations and equipment, and transport.

Although subject to a separate EIS, sulphide refining would see an increase in greenhouse gas emissions to approximately 28 012 tonnes per annum.

The *National Greenhouse and Energy Reporting Act 2007* requires mandatory reporting of greenhouse gas emissions and energy production and consumption data by facilities that meet specified thresholds. Redbank should be familiar with this legislation, as there may be a requirement that it report under the National Greenhouse and Energy Reporting Scheme. This appears particularly likely for the proposed sulphide operations.

Rehabilitation of cleared land will involve the reestablishment of cleared areas to return the sites back to as close to their original vegetation as is practicable. Over time this should return carbon sinks to close to their original size negating the initial effects of cleared land.

Redbank state the major greenhouse gas offset would involve returning the pH of waters from Hanrahan's Creek downstream to Settlement Creek to near neutral. This is not an appropriate offset for greenhouse gas emissions and the assessment and management of greenhouse gas emissions must be guided by the *NT Environmental Assessment Guide: Greenhouse Gas Emissions and Climate Change*.

At a minimum, energy consumption must be monitored and greenhouse gas emissions calculated to identify and address any key opportunities to reduce greenhouse gas emissions. Opportunities could involve the use of renewable energy sources at the camp, more efficient fuel technology and the use of energy efficient appliances and lighting. These opportunities should be considered in the context of the Australian Government's intention to introduce a Carbon Pollution Reduction Scheme, which will place a price on carbon emissions in the Australian economy.

Recommendation 37

The proponent should monitor energy consumption and identify opportunities to reduce and/or offset greenhouse gas emissions and provide a Greenhouse Gas Emissions Management Plan to DoR as part of the MMP approval process.

4.8 Decommissioning and Rehabilitation

In the Supplement, Redbank indicate that mitigation measures to reduce both the seepage and long term potential impact of the existing TSF are well underway (section 5, Supplement). Redbank state that the current water treatment of Sandy Flat pit and ongoing management of the existing TSF should result in the TSF not

being a source of contamination and therefore not requiring an impermeable layer. This is to be determined during the next two years so that the decommissioning and rehabilitation strategy can be in place during 2012.

Recommendation 38

Further investigations into tailings seepage quantity and quality are necessary prior to the proponent committing to a decommissioning plan of impermeable or otherwise capping layer or discounting the option of re-processing the tailings to extract copper and other potential contaminants.

Recommendation 39

The final rehabilitation and decommissioning plan for the existing TSF is to be developed and submitted to DoR for approval in the early stages of operation. In line with the monitoring programs being reviewed and revised annually, the Mine Closure Plan must be reviewed annually as part of the MMP. The Plan must also include rehabilitation objectives and contingency planning for sudden mine closure. As part of the Mine Closure Plan, the proponent will provide details on the planned management of seepage from the TSF post mine closure.

5 References

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- Redbank (2008) Notice of Intent. Expansion of Redbank oxide copper leaching operations. Redbank Mines, Perth.
- Redbank (2009a) Redbank Mine Study. <http://www.redbankcopper.com.au/>, Accessed February 2009.
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Appendix 1 – Voluntary Commitments

Table of voluntary commitments by Redbank Copper Limited for the Expansion of the Redbank Copper Operations, as stated in the EIS or Supplement (for acronyms and abbreviations refer to relevant documents).

Subject	No.	Description	Commitment/Safeguard	Document	Section in doc
Air Quality and Noise Management	1	Dust suppression Noise pollution	Dust suppression will be delivered via water trucks that will also provide emergency fire fighting capacity. In areas where high levels of dust are identified, dust suppression devices such as water cannons and fans may be utilised on a more permanent basis, allowing water trucks to be utilised in a more effective and mobile manner.	EIS	6.10.3
	2	Dust suppression Noise pollution	All formed roads will be watered twice daily during dry weather conditions to minimise dust issues and maximise visibility. Water trucks will use either water that has been treated to a standard suitable for release or water extracted from process or dewatering bores.	EIS	6.9.3
	3	Dust suppression Noise pollution	Heavily utilised roads will be maintained such that dust does not become an issue.	EIS	6.10.3
	4	Dust suppression Noise pollution	Due to the remote location of the project area, noise mitigation activities will focus on the occupational health and safety of employees. Industry best practice techniques and adherence to the relevant Australian Standards will be used when performing activities likely to create excessive noise (e.g. blasting).	EIS	6.10.3
	5	Noise pollution	The transport vehicles utilised on public roads will comply with standard registration requirements, such as noise standards.	EIS	6.10.3
	6	Speed limits	Reduced speed limits near communities that may be impacted by increased traffic noise and air pollution will be investigated should public complaints arise.	EIS	6.10.3
	7	Vehicle emissions	Appropriate vehicles will be used in order to minimise the quantity of greenhouse gases being produced by vehicular movement around the mine.	EIS	6.10.4

Air, Noise and Greenhouse Gas	8	Carbon	Redbank Mine will rehabilitate this pit area once available copper ores have been extracted, resulting in an anticipated net gain in carbon stocks at this location	Supp	6.1
	9	Carbon	Redbank will engage an ecologist to gather ancillary data necessary to calculate carbon stocks to a greater accuracy, including from a representative 50m x 50m plot in each identified vegetation type: average trunk diameters at breast height and range; average tree height and range; tree densities within plot; general woody growth descriptions; and collected cross-sections of tree trunks of dominant upper-storey species (allow wood density and age estimates from which growth rates may be estimated for each species).	Supp	6.1
	10	Carbon	Total area cleared of each vegetation type will also be recorded.	Supp	6.1
	11	Draft Erosion and Sediment Control Plan	The draft Erosion and Sediment Control Plan will be finalised soon after the submission of this Supplement and submitted to NRETAS for approval prior to implementation	Supp	9
	12	Greenhouse Gas Emissions	Greenhouse gas emissions from the proposed expanded mine will be reported annually for the life of the mine in a transparent manner in accordance with the Territory Greenhouse Gas Inventory	Supp	6.1
Alternatives	13	Environmental Monitoring Bores	All new EMB additions will be added to the sampling program and will aid in developing an understanding of contamination both spatially and temporally	Supp	4
	14	Water Management	Current water treatment practices will be studied to assist in understanding water contamination issues.	Supp	4
	15	Water Management	The results of the following areas of investigation planned for 2010 will help direct a decision as to whether a pit can be sterilised and utilised for storage of potential contaminants: 1. A drilling program that will identify the potential to sterilise a pit; and 2. Testing the ARD potential of the sulphide materials and their relevant volumes	Supp	4
	16	Water Management	The ongoing and post closure monitoring of surface and groundwater will continue for at least 5 years or until DRDPIFR are satisfied that the site is meeting its closure criteria.	Supp	4

Biting Insects Management	17	Camp lighting	All sleeping quarters and mess areas in the camp will be appropriately screened, and the screens will be inspected annually to ensure they are not damaged. Yellow lights will be used outside of the construction camp, and light proof curtains will be used to minimise insects being attracted to camp.	EIS	6.12, 5.2.7
	18	Inspections	Periodic inspections of artificial receptacles will be conducted during the wet season at the mine sites and mine camp. Any receptacle found ponding water will be either be disposed of, stored under cover, have drainage holes drilled or treated with an appropriate insecticide on an appropriate schedule.	EIS	6.12, 5.2.4
	19	Inspections	Annual inspections will be conducted of water impoundments for mosquito habitat indicators, septic systems to ensure they are sealed and functioning correctly, and camp insect screens.	EIS	6.12, 5.3.2
	20	Predatory fish stocks	Where water quality permits, all areas of artificial water ponding will be stocked with predatory native fish species from Hanrahans Creek or Redbank Creek.	EIS	6.12, 5.3.2
	21	Revegetation trials	Revegetation trials will commence immediately that an area of Waste Rock Dump (WRD) has reached its designated height and capacity.	EIS	6.6.3
	22	Road design	The Haul and access roads will have culverts or floodways installed at a level that prevents the upstream impoundment of water for periods greater than 5 consecutive days.	EIS	6.12, 5.2.6
	23	Waste rock dump design	Waste rock stockpile design, especially those at Bluff, will involve diversion drains to divert surface flows around the stockpile to prevent the upstream impoundment of water.	EIS	6.12, 5.2.5
	24	Water storage Dry season water discharge	Should uncontaminated water require storage (such as the process area retention dam), the pond will be designed to be deep (2m), with steep sides (1:2 slope) and / or a concrete or HDPE liner, such that it provides minimal potential for mosquito breeding.	EIS	6.12, 5.2.2
	25	Water storage Dry season water discharge	Artificial items that have been sourced from North Queensland and are capable of ponding rainwater have the potential to introduce the dengue mosquito. This species has drought resistant eggs, thus these items will be treated with a 10% chlorine solution or an appropriate residual insecticide (lambdacyhalothrin or alpha-cypermethrin).	EIS	6.12, 5.2.4

	26	Water storage Dry season water discharge	Water storage features such as the process area retention dam will be inspected annually for indicators of potential mosquito breeding, which would be semi-aquatic vegetation and shallow isolated pools as water levels recede. Any potential problems will be mitigated by removing semi-aquatic vegetation and removing silt.	EIS	6.12, 5.2.2
	27	Water storage Dry season water discharge	Treated pit water will be discharged to Hanrahan's Creek only for the first year of operation. Following the first year, prolonged dry season discharge will be avoided (dry season discharge can create mosquito breeding grounds) by dispersal by sprinkler irrigation, or by sending treated water to deep, steep-sided ponds from which water will only be discharged during the wet season.	EIS	6.12, 5.2.3
Consultations	28	Biological Monitoring	The biological monitoring program will be expanded over time to ensure that an adequate baseline of information exists and that future developments are not detrimentally impacting the regional environment.	EIS	7.1.2
	29	Indigenous Consultations	Redbank will work with the NLC to ensure: • A focused approach to compensation and benefits which actively seeks to maximise long term benefits to Traditional Owners (including consideration of employment initiatives and training opportunities); • Inclusion of social and environmental considerations; • Provision of funding to NLC to enable on the ground consultations; and • A transparent approach whereby senior Traditional Owners and NLC representatives will be permitted to inspect the project footprint.	EIS	8.3

Decommissioning and Rehabilitation	30	Management Plan	Decommissioning Plan will be developed over the following years in preparation for the end of operations	Supp	6.4
	31	Pit Rehabilitation	Redbank have committed to investigating and attempting to determine if any of these deposits can be defined as ceasing at depth so that the possibility of infilling, or sterilizing a pit can be progressed. This work will begin during 2010.	Supp	6.4
	32	Pit Rehabilitation	The proposed Redbank Pit will be designed to have nil catchment other than direct input to its own surface area	Supp	6.4
	33	Pit Rehabilitation	Pit closure strategies will be developed to ensure zero discharge of pit void water into the environment and therefore there will not be any requirement for ongoing management	Supp	6.4
	34	Dewatering	Redbank will develop dewatering scenarios to contain contaminant flows and future mining options.	EIS	6.3
	35	Fire	Fire will be excluded from revegetation areas for a period of 10 years to enable seed bank generation in the topsoil.	EIS	6.5.6
	36	Ongoing mosquito control	Upon mine closure, all disturbed areas will be rehabilitated to be free draining where practical, and septic tanks and other artificial receptacles will be either removed or buried. Facilities such as open pit voids and water dams will be left as water holding pits only if they are constructed with steep sides (at least 1:2 slope) and are deep (2m or greater), and are stocked with fish during the rehabilitation process.	EIS	6.12, 5.4
	37	PAF material	Assessment of Potentially Acid Forming (PAF) material, along with the development of a capping and encapsulation design to minimise acid rock drainage will be informed through trialing a range of potential designs that could meet the long-term closure objectives.	EIS	3.6, 6.7.1
	38	PAF material	Approaching closure, if the costs of encapsulating the PAF material are high, PAF material may be processed through the plant such that it does not remain on site as a AMD risk.	EIS	6.7.1

	39	Progressive rehabilitation	Constructed landforms will be revegetated progressively throughout the life of the mining operation and through to completion of the project. The topsoil required to revegetate the site will be removed from disturbed areas at a depth of around 300mm using a double stripping method which stores the top 50mm separately. This method of topsoil management is utilised to concentrate the soil seed bank layer for later use in rehabilitation of the mine site. Topsoil will preferably be stripped when the ground is still slightly moist so soil structure is maintained.	EIS	6.6.3, 6.5.6
	40	Revegetation trials	Revegetation procedures will endeavour to re-establish a vegetation community of similar composition to that originally removed from the site.	EIS	6.5.6
	41	Ripping	Respread topsoil and subsoil material will be ripped to a depth of 1m in a cross contour direction providing a less compacted soil environment for vegetation establishment.	EIS	6.6.3
	42	Topsoil stockpiles	Topsoil stockpiles will be constructed no more than 2m in height to maintain seed viability and soil health. Locally common native grass seed will be scattered in the stockpiles to provide cover vegetation, maintain soil organisms and greatly reduce the erosion potential of the site.	EIS	6.6.3, 6.5.6
	43	Topsoil stockpiles	Topsoil stockpiles will be respread on areas for rehabilitation as soon as possible, with a maximum storage time of one year. Topsoil will be spread around October, just prior to the wet season so vegetation cover can be established in early rains before the onset of the monsoon later in the season.	EIS	6.6.3, 6.5.6
	44	Training	A formal training needs analysis will be conducted annually for all employees and contractors to ensure training opportunities are targeted to specific needs and expansion is made into new areas of expertise.	EIS	6.5.3
	45	TSF Rehabilitation	Rehabilitation of the tailings dam will involve encapsulating tailings with a dry cover constructed with a layer of neutralising dolomitic rock mixed with available clay soils and compacted to create an impermeable layer above the tailings material. A layer of suitable overburden and top soil will then be placed above the capping to enable the establishment of cover vegetation to assist in the rehabilitation of the site.	EIS	6.6.3

	46	Weed Management	If weeds are identified in an area to be cleared, topsoil from these areas will be buried immediately in subsoil layers of the developing landform to prevent germination of the seeds.	EIS	6.6.3, 6.5.6
	47	Revegetation	Seed for revegetation species will be collected from vegetated areas of similar landform that are as close as possible to the revegetation site, in the year preceding revegetation.	EIS	6.5.6
Economic Contribution	48	Employment Opportunities	Appropriate skills-transfer and employment opportunities will be provided throughout the region through the encouragement of local business enterprises, giving preference to a local supply chain, and requiring contractors to provide the same.	EIS	3.1.1, 6.5.3
	49	Local sourcing of goods and services	Goods and services will be sourced from the Northern Territory where possible.	EIS	3.1.1, 6.5.3
Environmental Management	50	EMP	The draft EMP will be updated each year, and submitted to Northern Territory Government authorities as part of Redbank's annual MMP, as required under the <i>Mining Management Act</i> .	EIS	
	51	General Management	The environmental legacy will be improved and it will be ensured that there are minimal further environmental impacts resulting from expansion activities.	EIS	7.1.3
	52	General Management Audits	Redbank is committed to; weeds management, fire management, erosion management, and biological monitoring and management.	EIS	7.1.2
	53	General Management Audits	Annual environmental audits of Redbank's environmental performance against the current WMP and WDL, commitments stated in this EIS, and all relevant and current legislative requirements will be conducted. A final external audit will be conducted post closure to ensure that closure criteria have been met.	EIS	6.5.9

	54	WDL, WMP and MMP	Redbank's Waste Discharge Licence (WDL) and Water Management Plan (WMP) will guide all relevant activities in the project area, and will be updated annually with the Mining Management Plan (MMP) to reflect the latest requirements and monitoring results.	EIS	Section 2.4.2.3, WDL: Appendix C, WMP: Appendix B
Exploration Drilling	55	Minimal impact	Any diamond drilling will use portable aboveground tanks for water circulation, alleviating the requirement for sumps to be excavated in ground.	EIS	3.15
	56	RC Bags	RC bags will be removed from the drill site by the end of the current field season.	EIS	3.15
General Information	57	Oxide Mining	Redbank will be processing oxides only.	Supp	2
Greenhouse Gas Emissions	58	Carbon sinks	Rehabilitation of cleared land will involve the re establishment of cleared areas to return the sites back to as close to their original vegetation as is practicable. Over time this should return carbon sinks to close to their original size negating the initial effects of cleared land.	EIS	6.10.3
	59	Vehicle emissions FIFO efficiency	Greenhouse gas emissions will be minimised by utilising all available space and or weight capacity on trucks driving to, from and around the mine site as is practicable, thus minimising the overall number of vehicles required.	EIS	6.10.4
	60	Vehicle emissions FIFO efficiency	Fly in/fly out (FIFO) rosters will be planned so as to maximise the use of each plane taking personnel to and from the site.	EIS	6.10.4
	61	Water storage	On site effluent will be appropriately stored and disposed such that mosquito breeding sites are not created. Septic systems will be well sealed and tanks and infiltration trenches will be maintained.	EIS	6.12, 5.2.2
Historical and Cultural Environment	62	Consultation with Traditional Owners	Redbank will build upon its commitment to engaging and communicating with traditional owners by identifying priorities for discerning and documenting a cultural baseline and how this may be achieved	Supp	6.8

	63	Consultation with Traditional Owners	Redbank will make the commitment to consult further with traditional owners to ascertain some of the key values of these tributaries, with a particular focus on species and qualities (or uses) which may be useful indicators for detecting negative impacts or restoration of the degraded systems against the undisturbed Redbank Creek.	Supp	6.8
Landform and Erosion Control	64	Benches and batters	In cases where area is restricted, benches will be positioned in the landform to control erosion. Minor sections of steeper slope will be protected from erosion with rock batters constructed of inert rock.	EIS	6.6.3
	65	Creek crossings	Haul roads are to intersect with creek and drainage lines at a 90 degree angle to minimise erosion potential at the crossing.	EIS	6.6.3
	66	Haul road construction	Haul roads within ERL94 will be constructed across slope so as to reduce the erosion potential along the alignment. Roadside windrows will be removed to maintain natural rainfall runoff direction across the road surface, minimising the concentration of flows. Topsoil removed from the alignment will be stockpiled for future placement at onsite WRD's.	EIS	6.6.3
	67	Haul road construction	Design of the Haul Road will accommodate frequent and controlled collection and discharge of runoff from the road in order to prevent soil erosion and trap sediment before it is dissipated into natural drainage areas.	EIS	6.6.3
	68	Haul road construction	The haul road has been located so as to avoid steep topography, watercourses, historical sites and areas of cultural, environmental or biodiversity significance.	EIS	3.7
	69	Landform Evolution Models	A landform evolution model will be developed for each of the waste rock dumps to minimise the erosion potential of these landforms. Parameters will include; sub-surface acid forming material, landform, surface characteristics, wind, rainfall, rate of sediment transportation, distance and location of sediment deposition, surface and underground drainage patterns, revegetation success, and percent vegetation cover.	EIS	6.6.3
	70	Roadside erosion	Erosion and sediment monitoring will be conducted over established roads in the project area in line with the Erosion and Sediment Control Plan.	EIS	6.9.3
	71	Roadside erosion Sediment dams	The minimum grade for drains along roadsides will be 0.5% to reduce velocity and potential for erosion. Native vegetation will be encouraged in drainage lines to promote stability and entrapment of sediment.	EIS	6.6.3

	72	Roadside erosion Sediment dams	Impacted drainage lines will be diverted into a sediment dam to trap any transported sediments before releasing water from the landform into an existing suitable watercourse. Sediment dams will be designed to accommodate the large rainfall events that are common in the region and monitored and maintained to ensure they remain effective.	EIS	6.6.3, 6.5.4
	73	Sediment dams Design of open pits	Rock dissipaters will be constructed to reduce the flow velocity at sediment dam discharge points.	EIS	6.6.3
	74	Sediment dams Design of open pits	Proposed new open pits will be surveyed and shaped by a mining engineer to ensure a safe stable profile suited to local rock characteristics. Earth diversion banks, and safety bund walls will be constructed to divert water away from the pit and into existing drainage lines.	EIS	6.6.3
	75	Tailings Storage Facility (TSF)	The new TSF will utilise a disturbed area. Any new disturbance will avoid primary fauna habitat and major drainage lines, and within the same surface and groundwater catchment as the existing facilities. The new TSF will be designed to avoid overflow.	EIS	3.1
	76	Waste Rock Dumps (WRDs)	The height of each WRD will be determined by local topography, to a maximum height of 20 metres.	EIS	6.7.1
	77	Waste Rock Dumps (WRDs)	Areas of waste rock that may require topsoil will be constructed with profiles less than 20 degrees with a convex crown sloping into a concave lower slope to reduce the velocity of runoff as the catchment size increases	EIS	6.5.4
Legislation and Permits	78	Timing	All applicable legislation will be followed and all applicable licences and permits will be obtained before the relevant aspects of the project commence.	EIS	2.4.2
Pre-existing Environment	79	Environmental Legacy Issues	Redbank are committed to addressing the onsite environmental legacy issues which will result in a reduction of contamination exiting the site	Supp	6.1
	80	Environmental Legacy Issues	Samples of the existing stream bed soil conditions have been analysed and will be repeated after this and subsequent wet seasons	Supp	6.1
	81	Environmental Management	Lessons learnt from investigating the legacy issues at the Sandy Flat Area will be applied to ensure that the environmental risk to Redbank Creek system is minimised	Supp	6.1

	82	Remedial Actions	Remedial actions for issues identified by monitoring will be determined in consultation with DRDPIFR and other relevant Government Departments according to the relevant activity.	Supp	6.1
	83	Remedial Actions	Proposed remediation methods include re-processing legacy wastes until they no longer pose a contamination risk, surface water management through bunding and diversion banks, and neutralising PAF materials and waters with lime	Supp	6.1
	84	Remedial Actions	Should low pH water seep from the SF Pit or any other source, the current monitoring regime will identify it early so that its source can be identified and remediation actions put in place	Supp	6.1
	85	Risk Assessment	Future planned activities will include greater details on the risk assessment process for a variety of options	Supp	5
	86	Water Management	The annually updated WMP will identify the water monitoring regime	Supp	6.1
	87	Water Management	A more detailed ground water monitoring and research program is also underway and both will be expanded during 2010	Supp	6.1
	88	Water Management	Site specific surface water sampling locations will be established with each new facility	Supp	6.1
	89	Water Management	EMB's will be established to obtain baseline ground water quality information and allow for ongoing monitoring around new facilities	Supp	6.1
	90	Water Management	New surface and groundwater sampling locations will be required to be approved through the WMP process	Supp	6.1
	91	Water Management	It is expected that the water levels in the SFP will be reduced to a point that it will be impossible for those waters to express into the surface waters via the ground water.	Supp	6.1
	92	Water Management	Improved management of the site associated with new operations will result in a reduced area of catchment that directs contaminated water into a storage structure (currently the SFP pit).	Supp	6.1
	93	Water Management	Testing and studies will take place prior to the potential for mining Sulphidic Ores to assist in determining the extent of groundwater contamination.	Supp	6.1

	94	Water Management	A comprehensive monitoring regime has been designed to enable early detection of contaminating issues, should they occur, and monitoring points will be located to provide a reasonable estimate of contaminant origin	Supp	6.1
	95	Water Management	Redbank will invest all available resources into remediating any water contamination issues until monitoring indicates that the problem has been resolved.	Supp	6.1
	96	Water Management	2010 will also see the installation of new monitoring points so as to ensure awareness of any potential new impacts so that they may be acted upon immediately	Supp	6.1
	97	Water Management	A solid baseline of conditions in Hanrahans Creek and downstream environments exists so that environmental improvements can be tracked and a thorough baseline of the un-impacted Redbank Creek exists and will be built on this year prior to any mining activities.	Supp	6.1
	98	Water Management	New EMB's will be installed in early 2010	Supp	6.1
	99	Water Management	The reduction of the Sandy Flat Pit water to topographically below the level at which it can express into the surface water systems will result in an immediate substantially positive impact on the surrounding environment by way of not allowing another year of extremely acidic and metal laden water to enter the environment.	Supp	6.1
Preliminary Risk Assessment	100	Closure Plan	Development of the closure plan will begin in 2010 and be ongoing throughout the project as research continues and rehabilitation trials are monitored.	Supp	5
	101	Environmental Auditing	Environmental performance will be independently monitored through DRDPFR's audit process	Supp	5
	102	Environmental management	EcOz staff will be contracted for the management and monitoring tasks for which they have appropriate expertise.	Supp	5
	103	Future Development	All new activities will be aligned with current best practice and environmental management will be rigorous, monitored and ongoing.	Supp	5
	104	Future Development	The management of newly proposed activities will be separate from legacy issues	Supp	5

	105	Legacy Environmental Issues	Redbank will continue to invest into remediating the legacy issues over which they have responsibility, and management to ensure they minimise risk of further environmental impact.	Supp	5
	106	Legacy Issues	Redbank will continue to invest into remediating the legacy issues over which they have responsibility, and management to ensure they minimise risk of further environmental impact.	Supp	5
	107	Operational Design	All parties involved in the previous venture learnt valuable lessons and will thus ensure that, should the current venture experience severe commodity price down turn, greater security bonds and improved infrastructure design will affect a far more acceptable and sustainable situation than what currently exists.	Supp	5
	108	Potential Water Contamination	Waste and ore storage areas will be monitored for potential contaminants that may emanate from the area and enter the surface or ground waters.	Supp	5
	109	Rehabilitation	Decommissioning and rehabilitation strategy will be in place within the first year of operation.	Supp	5
	110	Risk Assessment	The risk assessment was also identified as 'preliminary', and will thus be reviewed throughout the life of the project	Supp	5
	111	Risk Assessment	The first review of the Risk Assessment will focus on stakeholder comments received on the draft EIS.	Supp	5
	112	Threatened Species	Camp design and ongoing management will continue to be aware of the need to minimise potential impacts on the Carpentarian Rock-rat	Supp	5
Prevention of Contaminated Discharge	113	Contaminated water	All potentially contaminated waters will be contained in ponds on site so that they can be tested prior to release.	EIS	6.1.5
	114	Reassessment of release requirements	As improvements in stream health are made, the quality of release waters be reassessed, such that released water is of equal or superior quality to that within the discharge waterway.	EIS	6.1.5
	115	ROM pad	The ROM pad, that will hold mined ore close to the crusher, will be a bunded zone which is engineered to contain stormwater run-off.	EIS	6.7.1

	116	Stakeholder engagement	Stakeholders will continue to be engaged such that project related information can be shared in a transparent manner both ways, Redbank can receive feedback on a range of concerns, employment outcomes can be achieved, contributions can be made to the regional knowledge base, and natural resource management initiatives can be contributed to where practicable.	EIS	6.5.3
	117	Surface water runoff	Diversion banks, contour banks, and drains will be designed and located around all impacted areas to ensure that clean surface water runoff is directed away from potentially contaminating substances, and potentially contaminated water is retained and pumped to holding ponds for testing and treatment prior to discharge.	EIS	6.7.1
Proposed Development	118	Legacy Issues	Redbank are committed to ensuring that the mistakes of the past are not repeated.	Supp	3
	119	Rehabilitation	Redbank are committed to a progressive rehabilitation plan	Supp	3
	120	Rehabilitation	remaining rehabilitation requirements will be completed soon after processing operations begin	Supp	3
	121	Rehabilitation	rehabilitation monitoring will continue past closure of operations and identified remediation requirements will also be addressed past this point	Supp	3
	122	Rehabilitation	The rehabilitation plan will be fully developed utilising a current best practice adaptive management strategy to ensure that the best options are chosen when available	Supp	3
Protection of Flora and Fauna	123	Artificial lighting	Camp lighting will be maintained at low levels, and installed in directional arrangements designed to minimise light spill on surrounding areas.	EIS	6.2.3
	124	Ecological Research	Redbank will engage in (either actively or by providing support for) further ecological research in the region	Supp	6.2
	125	Exclusion of fauna species	Redbank will erect fences or similar structures to exclude cattle and horses, along with other vertebrate fauna species, from hazardous areas such as the tailings storage facility.	EIS	6.2.3
	126	Fire Management	Fire management procedures will be employed to decrease the risk of high intensity, late dry season wildfires.	EIS	6.2.4
	127	Fire Management	Redbank will maintain sufficient resources on hand to extinguish a wildfire should it start through activities on ERL94	Supp	6.2

	128	Fire Management	Redbank's proposed fire management strategy will stand as outlined in the draft EMP	Supp	6.2
	129	Fire Management	Redbank will encourage liaison with Bushfires NT for fire management advice, and engagement of local traditional owners to conduct the burns. In addition, Redbank will minimise the risk of wildfires originating through their own mining activities, and will maintain resources on site to extinguish a fire should it start.	Supp	6.2
	130	Ground and surface water monitoring	Redbank are committed to continuing their comprehensive groundwater and surface water monitoring regime at quarterly intervals for the first year post mine closure, and bi-annually for the following two years. Any issues that may be identified during this monitoring period will be addressed immediately.	EIS	6.5.8, 6.3.3
	131	Habitat Protection	Redbank will not be clearing or directly impacting the riparian systems, comprehensive monitoring of ground and surface water quality as proposed in the draft EIS will allow early detection and thus mitigation of potential deteriorating water quality within the downstream river systems.	Supp	6.2
	132	Habitat Protection	Redbank will not clear any monsoon forest habitat, and will not clear within 300 metres of monsoon forest habitat.	Supp	6.2
	133	Habitat Protection	Management strategies to protect threatened species through protection of significant habitats such as monsoon forests from fires will be developed.	Supp	6.2
	134	Habitat Protection	Fencing for the exclusion of cattle will be considered for Masterton's Gully should further research and monitoring highlight the need, however the cattle are the property of Wollogorang Station and any cattle management strategies would need to be approved by the owners.	Supp	6.2
	135	Impacts on Flora and Fauna	Ongoing monitoring will be undertaken to assess the impacts of mining works and expansions on local flora and fauna	Supp	6.2
	136	Introduced Species	Redbank have committed to pest animal management actions as detailed in the following paragraphs, and the Draft EMP will be updated accordingly.	Supp	6.2
	137	Introduced Species	A feral cat trapping program will be initiated in 2010.	Supp	6.2

	138	Introduced Species	Through preventative measures, Redbank will minimise introduction of new weed and pest animal species. If new species are detected, management plans will be put in place to eradicate. Existing weeds and pest animals will be monitored and managed in conjunction with the land owner and government authorities to minimise population increase and spread. The draft project EMP reflects this change and will be submitted for approvals in the near future.	Supp	6.2
	139	Introduced Species	Any signs of feral pigs and notes on the extensiveness of habitat damage will be recorded	Supp	6.2
	140	Introduced Species	Redbank will continue to work with Wollogorang Station to provide feral animal control on the mining lease.	Supp	6.2
	141	Introduced Species	The use of firearms will necessarily comply with the conditions of the mining lease.	Supp	6.2
	142	Introduced Species	Redbank will ban cats and dogs from entering the lease for the life of the mine, and staff and contractor inductions will emphasise this ban.	Supp	6.2
	143	Introduced Species	Redbank will maintain a feral cat trap at the base of the gully.	Supp	6.2
	144	Introduced Species	Any cats trapped will be euthanased in accordance with Animal Ethics requirements	Supp	6.2
	145	Invasive species	Redbank will avoid creating artificial habitats that may provide potential Cane Toad breeding grounds, and are committed to support any invasive species programs operating in the area.	EIS	6.2.3
	146	Invasive species	Redbank will actively manage weeds in areas of monsoon vine-forest habitat within the project area.	EIS	6.2.3
	147	Invasive species	Redbank will build a wash down area so that all vehicles and equipment arriving and leaving the site can be inspected and if necessary washed to reduce the risk of weed spread.	EIS	6.2.3
	148	Protection of valuable habitat areas.	Redbank will avoid impacting sandstone monsoon habitat areas and will actively manage weeds and fire that may degrade the quality of the habitat.	EIS	6.2.3

	149	Protection of valuable habitat areas.	Proposed expansion areas will be selected to avoid <i>Eucalyptus leucophloia</i> (Snappy Gum) woodland habitat where practicable.	EIS	6.2.3
	150	Reduced Risk to Fauna	Redbank will consider the following options to reduce the number of native animals drinking from contaminated mine water sources (such as sulphide pits and TSF): Screening or netting liquid tailings or avoiding supernatant; Use of live and 'bird frite' ammunition if flocks of 'susceptible species' are present, or significant mortalities are being experienced; Keeping surrounding ground bare of vegetation and debris; Checking for, and removing, carrion daily to avoid attracting raptors and native scavengers	Supp	6.2
	151	Research and management	Redbank are committed to supporting Government surveys in the Redbank region targeting species of conservation significance, especially in regards to the Carpentarian Rock-rat.	EIS	6.2.3
	152	Threatened Species	Carpentarian Rock-rat and Gouldian Finch monitoring will be conducted on an annual basis.	Supp	6.2
	153	Threatened Species	Redbank and EcOz will seek advice from the NT Biodiversity Division on Rock-rat and Gouldian Finch survey methodologies and align with their preferred monitoring outcomes.	Supp	6.2
	154	Threatened Species	Redbank will support any external studies that are to be conducted within the project area, and, under the guidance of the NT Biodiversity Division, will conduct annual monitoring of Rock-rats within Masterton's Gully.	Supp	6.2
	155	Threatened Species	Redbank will support any external studies that are to be conducted within the project area, and may implement surveys to gather requested data from authorities	Supp	6.2
	156	Threatened Species	Redbank will support local Carpentarian Rock-rat research that will provide biological information for input into the PVA models.	Supp	6.2
	157	Threatened Species	A suitably qualified ecologist will check for hollows in trees designated prior to clearing	Supp	6.2
	158	Threatened Species	Ongoing monitoring will identify any populations in residence for an extended period in order to ensure that breeding Gouldian Finches are not disturbed.	Supp	6.2

	159	Vegetation clearing	Vegetation clearing will be kept to the minimum necessary to accommodate proposed expansions	EIS	6.2.8
	160	Vegetation corridors	Redbank commits to retaining native vegetation corridors between Monsoon Forest patches along the escarpment.	EIS	6.2.4
	161	Weed Management	Redbank will undertake weed mapping at a finer scale	Supp	6.2
	162	Weed Management	All weed mapping and weed management data will be sent to NRETAS Weed Management Branch for amalgamation into the Territory data set.	Supp	6.2
	163	Weed Management	Redbank will build a wash down area so that all vehicles and equipment arriving and leaving the site can be inspected <i>prior to entering and leaving</i> and, if necessary, washed to reduce the risk of weed spread.	Supp	6.2
	164	Weed Management	Redbank plan to spray the Hyptis around the base of the gully at the end of this wet season, and will monitor the extent of the existing Hyptis infestation annually	Supp	6.2
	165	Weed Management	Should the Hyptis infestation prove to be spreading throughout the Gully, management actions will be implemented, and will involve foliar spraying the plants with herbicide, with annual follow-up spraying as required. Redbank will monitor the site quarterly following the spraying to ensure that the Hyptis is not replaced with new invasive species or native grass species that may increase risk of wildfire.	Supp	6.2
Protection of Historic and Cultural Environment	166	Heritage sites Archaeological sites	Access to William Masterton's cave and Masterton Charlie's grave, both in close proximity to the mining camp, will be restricted, and these sites will be fenced.	EIS	6.8.3
	167	Heritage sites Archaeological sites	A permit to disturb will be sought to move an identified archaeological scatter, this site will be appropriately recorded by an archaeologist prior to any disturbance.	EIS	6.8.3
	168	Heritage sites Archaeological sites Road design and maintenance	Should archaeological material be uncovered during mining activities, work will cease, and the relevant authorities will be informed and consulted in accordance with the Northern Territory <i>Heritage and Conservation Act</i> and the <i>Sacred Sites Act</i> .	EIS	6.8.3

	169	Heritage sites Archaeological sites Road design and maintenance	Road alignment will ensure perpendicular intersection with creek lines, and will incorporate open floodways using minimal disturbance techniques, which will retain as much of the native vegetation and natural stabilising properties as possible.	EIS	6.9.3
	170	Restricted areas	Restricted access areas will be developed to protect historical and cultural sites, and to ensure staff and contractor safety.	EIS	6.8.3
	171	Restricted areas Heritage sites	Whilst on site, workers and visitors will be restricted from accessing culturally sensitive areas. Any inappropriate behaviour will be responded to promptly, and the induction revised if necessary.	EIS	6.5.3
	172	Restricted areas Heritage sites	Extensive consultations with stakeholders have commenced, and will continue to be undertaken with respect to possible relocation of Masterton's Grave.	EIS	6.8.3
Protection of Water Resources	173	Influence of the mine on receiving waterways	Creek crossings will be designed and constructed to minimise impacts to banks and creek beds.	EIS	6.3.3
	174	Influence of the mine on receiving waterways	The undertaking of site specific Erosion and Sediment Control Plans (ESCPs) will occur prior to mining development on the ERL. An ESCP will be provided prior to the construction of haul roads, topsoil stockpiles and WRD's, and each ESCP will be in accordance with Northern Territory Government requirements.	EIS	6.6.3, 6.5.4
	175	Influence of the mine on receiving waterways	Monitoring of downstream areas will be conducted on an ongoing basis such that any erosion issues can be quickly diagnosed and rectified in accordance with the Northern Territory Erosion and Sediment Control Guidelines.	EIS	6.6.3
	176	Influence of the mine on receiving waterways	Redbank commit to a net positive effect on the water quality and stream health in Hanrahan's Creek and downstream tributaries of Settlement Creek.	EIS	6.3.2
	177	Contaminated water treatment	Redbank will undertake water treatment processes with contaminated water currently occurring in Sandy Flat Pit. Treatment will involve raising pH and reducing copper and aluminium concentrations	EIS	6.2.6
	178	Design	The RWD will be designed during 2011.	Supp	6.3

	179	Ground and surface water monitoring	Standing water levels will be closely monitored at the camp water bore and stream flow of Muinyin Spring (within Masterton's Gully) and measured as part of monthly monitoring.	EIS	6.2.3
	180	Ground and surface water monitoring	Redbank commit to bore and aquifer testing by means of pumping tests to obtain the hydraulic parameters of the aquifer required for aquifer and contaminant assessments by means of modelling.	EIS	6.3
	181	Ground and surface water monitoring	Geochemical characterization of the ground water regime will be investigated with regard to heavy metals.	EIS	6.3
	182	Ground and surface water monitoring	Redbank will continue with current sampling at all sites in accordance with the WMP and WDL.	EIS	6.3
	183	Ground and surface water monitoring	Erosion and sediment control measures will be put in place to control surface water runoff and minimise erosion and deposition of sediment and silt in water courses.	EIS	6.3.3
	184	Monitoring	Fish monitoring will take place annually to detect improvements. The involvement of Traditional Owners will be sought for this survey.	Supp	6.3
	185	Monitoring	Groundwater sampling will be performed on a monthly basis for the first 12 months of EMB installation and updated results will be incorporated in forthcoming annual WMP updates.	Supp	6.3
	186	Monitoring	Once ground and surface water monitoring indicates trigger levels have been exceeded over consecutive days, further monitoring and remedial actions will be put into place	Supp	6.3
	187	Monitoring	An update on the macroinvertebrate sampling results will be supplied to the relevant authorities as soon as this information is received.	Supp	6.3

	188	New Environmental Monitoring Bores	Redbank Mines will locate monitoring bores between the dewatering system and the springs to demonstrate that dewatering will not impact on the springs. Should the springs (negligible probability) be impacted upon by the dewatering activities, management options include; Placing a recharge bore between the dewatering bores and the springs; Supplementing flow in the springs with a similar quality of water from bores located somewhat closer to the springs; Piping water of a similar quality from the dewatering system to the springs; and/or Sourcing alternative camp water supplies other than the bore at the camp in order to avoid risk of overdraft.	Supp	6.3
	189	New Environmental Monitoring Bores	The installation of monitoring wells and associated studies will be conducted in the early dry season.	Supp	6.3
	190	Sedimentation	The sediment dam for the oxide WRD will be designed to hold 500m ³ of sediment for every hectare of catchment	Supp	6.3
	191	Water Management	Redbank will maintain the (lowered) water level of the SFP in order to remove the potential for contaminated water to enter the natural system during the wet season, resulting in improved off site and downstream water quality	Supp	6.3
	192	Water Management	WRD's will be designed to eliminate or at worst minimise release of acidic water to the environment.	Supp	6.3
	193	Water Management	A detailed monitoring program will be established to monitor potential water quality impacts.	Supp	6.3
	194	Water Management	The small drainage necessarily crossed by the proposed WRD will be diverted and managed as its upper catchment will be impacted by the proposed pit.	Supp	6.3
	195	Water Management	New surface water management infrastructure will be established at the SFP processing plant area to ensure that all potentially contaminated storm water is captured and stored on site	Supp	6.3
	196	Water Management	The addition of infrastructure to prevent clean waters entering contaminated areas will be planned on site as developments occur.	Supp	6.3
	197	Water Management	Surface water management structures will be installed around new pits and WRD's to direct any surface flows of clean water away from the area of impact and into the natural drainages.	Supp	6.3

	198	Water Management	Settlement ponds will be monitored and if required, treatment measures will be designed in accordance with anticipated water flows and qualities.	Supp	6.3
	199	Water Management	The observation re the insignificance of seepage from the SF Pit will be continuously reviewed and particularly during further drilling, testing and sampling programs and subsequent modelling	Supp	6.3
	200	Water Management	Dewatering effluent will be treated in the plant to a pH of at least 7.0 in accordance with the Waste Discharge Licence prior to release, if required	Supp	6.3
	201	Water Management	Redbank Mines will locate monitoring bores between the dewatering system and the springs to demonstrate that dewatering will not impact on the springs.	Supp	6.3
	202	Water Management	Ongoing monitoring of the springs will include water quality and flow rate.	Supp	6.3
	203	Water Sources	Camp water will be supplied from the nearby bore	Supp	6.3
	204	Water Treatment	Any site expansions will take into account the location of water sources and actions will be taken where necessary in order to conform with the NT Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent (The Code).	Supp	6.3
	205	Wind and earthquakes	All infrastructure, and where possible, all pits, WRDs, and TSFs will be designed to withstand seismic activity and according to wind loading requirements.	EIS	6.7.1, 6.6.3
	206		Monitoring will continue until water quality targets are met.	Supp	6.3
Remediation of Pre-existing Environment	207	Adaptive management	Lessons learnt from studying the existing environmental legacy issues will be fully utilised in all stages of design and planning of future activities so as to establish thresholds of impact and prevent repeating the environmental mistakes that have been inherited.	EIS	6.1.5
	208	Ground water study	A detailed study into the ground water systems and resources, including ground water monitoring of existing and new bores, will be conducted to determine the nature and extent of local aquifers.	EIS	6.1.5

	209	Ground water study	Redbank will undertake further drilling including shallow (less than 10m) and deep (up to 50m and cutting off the shallow weathered/fractured strata) bores in the area between SFP and Hanrahan's Creek.	EIS	6.3
	210	Investigation	Investigations will continue at least through the first 2 years of operation to enable understanding and effective management of the contamination associated with environmental legacy issues.	EIS	6.1.5, 6.5.2
	211	Investigation	Shallow electromagnetic geophysical exploration will be used to 'trace' contaminant migration zones and provide suitable drilling targets for a detailed aquifer assessment.	EIS	6.3
	212	Investigation	The contaminated water, ore piles and waste rock at the Sandy Flat site will be investigated so as to determine whether they should be treated, processed, moved to contained areas, moved to the TSF, or remediated.	EIS	6.1.5
	213	Investigation	Flow and mass transport modelling of the SFP and Hanrahan's Creek impacted zone will be conducted.	EIS	6.3
	214	Pit water treatment	The water from Sandy Flat Pit will be treated with limestone and lime so as to increase its pH close to neutral and precipitate the dissolved metals (especially copper and aluminium) so that water can be released according to the water quality standards agreed to in the current Waste Discharge Licence conditions.	EIS	6.1.5, 6.7.1
	215	Research and management	Redbank will foster improved fire management and active weed control as well as support research endeavours in the region, especially into endangered species.	EIS	6.8.3
	216	Surface water management	New surface water management infrastructure in the form of surface water flow management devices and retention ponds will be installed.	EIS	6.1.5
	217	Surface water management	All potentially contaminated surface water will be collected and directed to a suitable storage facility or the pit or TSF where it can be stored for treatment or utilisation.	EIS	6.1.5
	218	Surface water monitoring	A comprehensive surface water monitoring program as identified in the WMP will be conducted at frequent intervals to allow the current extent of contamination to be determined, and allow early detection of improvements to quality within the downstream watercourses.	EIS	6.1.5

Safety and Risk Management	219	Continual Improvement	A continual improvement approach will be taken for risk management, and annual updates to the Mining Management Plan (MMP), Water Management Plan (WMP) and the Waste Discharge Licence (WDL) will reflect the latest developments in research and monitoring.	EIS	5.1.2
	220	Potential Acid Forming material	Research and monitoring into the potential impacts of Potential Acid Forming (PAF) material at Redbank has begun and will be ongoing throughout the life of the project.	EIS	5.1.4
Social Environment	221	Complaints Management	Redbank will advertise (phone book and website) an enquiries phone number and email address such that community members who wish to complain or enquire about dust and noise may do so.	Supp	6.5
	222	Complaints Management	Administration personnel will be allocated time to record and appropriately respond to any complaints received.	Supp	6.5
	223	Health Management	All expansions and operations will also be performed in accordance with the Environmental Health Information Bulletin No 6 - Requirements for Mining, Construction & Bush camps.	Supp	6.5
	224	Kitchen and Food Handling	All mine site kitchens will hold <i>Food Act</i> registration, and will be consistent with standards contained in Australian and New Zealand Food Standards Code.	Supp	6.5
Social Impact Management	225	Airstrip upgrade	Redbank's airstrip will be upgraded in line with CASA standards for daytime charter operation, thus providing access by light aircraft including emergency aero-medical services during daylight hours.	EIS	6.5.3
	226	Communications	VOIP telephony and wireless internet communications will be provided for staff for general and emergency use.	EIS	6.5.3
	227	Counter Disaster Plan	A Counter Disaster Plan, including available evacuation facilities, will be developed to guide preparation for and response to emergencies during the life of the mine. Redbank will also seek to be included in the Borroloola Counter Disaster Plan to ensure any evacuation needs from Redbank can be accommodated.	EIS	6.5.3
	228	Cyclones	Plant and associated infrastructure constructed according to AS1170.2 for wind loads.	EIS	5

	229	Employment and training	A partnership will be forged with the Northern Land Council's Employment and Training branch to tap into a register of trained locals as well as host onsite training in relevant activities such as mining vehicle operation.	EIS	6.5.3
	230	Health management	Potential substance abuse by staff will be minimised through not allowing alcohol to be brought on site, allowing only moderate alcohol consumption on site within a wet mess only, and establishing a rigorous drug and alcohol screening procedure.	EIS	6.5.3
	231	Health management	All employees will comply with a health surveillance program to ensure adequate fitness and medical condition as well as to monitor effects of any potential hazards from the operation of the mine.	EIS	6.5.3
	232	Indigenous rangers	If there is sufficient interest to develop a skills base, Redbank will engage the services of local Indigenous rangers to assist with environmental management and rehabilitation activities.	EIS	6.5.3
	233	Payment of royalties	Relevant stakeholder input or concerns will be addressed within the annually updated Environmental Management Plan (EMP).	EIS	6.8.3
	234	Payment of royalties	For any negotiated benefits or royalties associated with the proposed expansions, Redbank will engage with a representative organisation with the capacity to manage this role with sound governance procedures.	EIS	6.5.3
	235	Safeguards for road closure	Staff will be rostered so that there will always be two staff trained in remote first aid delivery on site at all times, and appropriate medical, first aid supplies, and food will be maintained on site for the times of wet season road cuts.	EIS	6.5.3
	236	Stakeholder engagement	Ongoing consultations with land owners and native title holders will occur regarding retention, removal, or relocation of infrastructure. Infrastructure that is not to be retained by land owners and native title holders will be removed and the site subject to rehabilitation.	EIS	6.5.8

	237	Waste Rock Dumps (WRDs)	WRDs will be positioned based on ground and surface water movements and waste rock characteristics and volumes. The initial slope requirements will be determined by a number of factors including the safe working angles of machinery and the erosion properties of topsoil used in rehabilitation of the landform. Areas of waste rock that require topsoil will be constructed with surfaces less than 20 degrees with a convex crown sloping into a concave lower slope to reduce the velocity of runoff as the catchment of the slope increases.	EIS	6.6.3
Staff and Contractor Skills Base	238	Training Continuing Consultations	Relevant personnel will be trained in the storage, transport and handling requirements of all chemicals and hazardous materials on-site.	EIS	6.7.1
	239	Training Continuing Consultations	A variety of consultation practices has been and will continue to be implemented as appropriate during Project development and these include: • One-on-one meetings with major government departments, Members of Parliament and key representative bodies. • Individual consultations and negotiations with the surrounding land owner; • Site visit and meetings with DRDPIFR and Department of Natural Resources, Environment and the Arts (NRETAS), (Division Environment, Heritage and the Arts (EHA) staff; • Meetings and telephone consultations with other relevant Government Departments, Local Government Bodies and Community Organisations. • Letters of information to surrounding landowners and regional Council; and • Group consultations with the Northern Land Council (NLC) and identified Traditional Owners and Native Title Claimants.	EIS	8.2
Traffic and Transport Management	240	Blasting activities near roads	Should any blasting activity be required in the vicinity of Wollogorang Road, Redbank will implement temporary road closure, seek appropriate approvals, and provide appropriate warnings, in addition to implementing a tight safety protocol to minimise disturbance to Wollogorang Road traffic.	EIS	6.9.3
	241	Dust suppression	A dust collector will reduce airborne dust generation around the primary crusher and the belt feeder. Dust suppression sprays will be mounted at appropriate transfer points.	EIS	3.9.1

	242	Rehabilitation of most project roads	Access roads to historical and cultural sites within the project area (e.g the road to the ceremonial site, and the road to Masterton's Cave) will be maintained for public access, however all formed roads (aside from the access road) will be rehabilitated.	EIS	6.9.3
	243	Road design and maintenance Traffic Management Plan	The Haul Road and access road will be unsealed, thus to minimise the impact on cross flow of surface drainage, these roads will be formed with cross fall with a slope of 4-6% from the road centre. The roads will be maintained through regular grading and all windrows will be removed.	EIS	6.9.3
	244	Road design and maintenance Traffic Management Plan	Use of heavy vehicles will be minimised during the wet season, and the condition of road surfaces, tracks and associated drainage will be monitored at least three times a year; leading up to, during, and coming out of the wet season. Further road formation will be undertaken if the roads begin to degrade.	EIS	6.9.3
	245	Road design and maintenance Traffic Management Plan	The safety of the Redbank Wologorang intersection and all roads and traffic within the mine site will be managed through a Traffic Management Plan which will include; separation of light and heavy haul vehicles, traffic speed limited to 60km/hr and 20km/hr in camp, haul vehicle right of way, and other restrictions.	EIS	6.9.3
	246	Road use	Constructed roads and vehicular traffic will be restricted to the proposed Haul Road and the nearby general vehicle access road. Speed signs and other appropriate warnings will be erected in prominent locations.	EIS	6.2.8
	247	Signage	Signage will be placed on the access road regarding appropriate access and use of the road to access Masterton's cave, at the Haul Road intersection forbidding public access (approvals will be sought from the NT Road Network Division), and 'slow oversize trucks crossing ahead' signs will be placed east and west of the intersections.	EIS	6.9.3
Waste and Hazardous Materials	248	Blast explosives	Only qualified shotfirers shall be used for blasting and all blasting activities will fully comply with the <i>Dangerous Goods Act</i> , Dangerous Goods Regulations and Australian Standard AS2187.2 - 2006.	EIS	6.7.1

Management	249	Emergency minimisation	A fire suppression system will be installed throughout the site, the site will be manned 24 hours, 7 days a week, regular site inspections will occur, there will be a no smoking and no alcohol policy across the entire work site, and emergency response procedures will be developed to deal with spills of all hydrocarbons, chemicals and other hazardous substances at various volumes. Smoking will be restricted to the camp and designated smoking areas.	EIS	6.7.1
	250	Fuel storage	Hydrocarbons will be stored in appropriately bunded areas according to Australian standards AS/NZS 1940:1993 and AS/NZS 4452:1997. Bunding will be regularly inspected for damage and repaired as soon as is practicable if any damage is detected. Appropriate licences for storage will be obtained. New storage facilities for aviation fuels in line with the airstrip upgrades will be installed to comply with all relevant regulations and legislation.	EIS	6.7.1
	251	Fuel storage	Fuel storage areas will be monitored to ensure hydrocarbons are appropriately contained. Appropriate management will be initiated immediately if contamination is identified, and the contaminated area will be rehabilitated concurrent with operations.	EIS	6.5.8
	252	Hazardous materials	All hazardous materials and dangerous goods will be purchased, transported, stored and used in accordance with the relevant Australian Standards, NOHSC guidelines, Work Health (Occupational Health and Safety) Regulations, Dangerous Goods Regulations and Northern Territory guidelines. Specific training for hazardous goods handling will be provided where necessary.	EIS	6.7.1
	253	MSDS and Spill Kits	Spill clean-up kits and Material Safety Data Sheets will be provided on site and accessible to all staff.	EIS	6.7.1
	254	Ore stockpile management	Impermeable storage areas will be created to store sulphide ore stock piles for processing, such that acid runoff can be contained and subsequently utilised in processing or treated for release.	EIS	6.6.3
	255	Process wastes	Process wastes will be sent to the TSF or recycled through the process circuit. Flocculants will be added to tailings where necessary so as to bind the tailings.	EIS	6.7.1

	256	Rehabilitation of waste rock dumps	Capped waste rock dumps will involve a layer of neutralising dolomitic rock on the PAF waste rock, overtopped by a layer of suitable onsite material compacted to create an impermeable layer. A layer of suitable overburden and top soil will then be placed above the capping to enable the establishment of cover vegetation to assist in the rehabilitation of the site.	EIS	6.5, 6.6.3
	257	Sewage	Redbank's waste management strategy of "Avoid, Reduce, Reuse, Recycle", will include appropriate storage and disposal, segregation and recycling of wastes (depending upon the availability and capacity of local facilities), and maintaining all work areas in a neat and orderly manner.	EIS	6.7.1
	258	Sewage	The putrescibles tip associated with the camp will be progressively managed to ensure it meets all legislative requirements and guidelines, and will be fully rehabilitated at the completion of mining and processing operations.	EIS	6.5.8
	259	Sewage	All site and camp sewage will be managed on site via septic systems in accordance with relevant health requirements, and will be regularly monitored.	EIS	6.7.1
	260	Storage Facilities	The hazardous substance and dangerous goods storage facilities will be incorporated into the design of the plant and processing facility located at the Sandy Flat processing site	Supp	6.7
	261	Tailings storage Acid consuming rock	The finer sandy tailings will be pumped as slurry and will be stored with their surface at a very low angle that will be effectively horizontal. All tailings storages will be surrounded by low bunded walls that will collect runoff to be returned to the process water stream.	EIS	3.1
	262	Tailings storage Acid consuming rock	Acid consuming dolomitic rock material and imported lime will be used to manage PAF subgrade material extracted from the sulphidic zone.	EIS	3.1
	263	Tailings Storage Facility (TSF)	The new TSF will be built from non acid forming waste materials sourced from local borrow materials within the tailings dam area and supplemented by waste rock from open pit overburden removal.	EIS	3.11

	264	Tailings Storage Facility (TSF) Tailings storage	The new TSF will be designed according to advice from the sites specialist TFS engineer and metallurgist, who will investigate optimal structural integrity of the wall and the requirement for lining prior to construction and development. Oxide tails materials from the first 2 years of processing may form a gypsum rich lower layer that seals the dam and provides neutralising capacity.	EIS	6.6.3
	265	Tailings Storage Facility (TSF) Tailings storage	TSF designs will be undertaken to best practice and will be based on the "Guidelines on Tailings Dam Design, Construction and Operation" of October 1999, by the Australian Committee on Large Dams.	EIS	3.1
	266	Tailings Storage Facility (TSF) Tailings storage	The coarse tailings will be relatively dry and will be stored in stable stacks with slopes of 1:3, they will be progressively reclaimed by placing waste and topsoil to seal and cover.	EIS	3.1
	267	Transport of dangerous goods	Transportation of dangerous goods to and from the mine site will be performed by a licensed contractor and will be conducted under the relevant legislative requirements.	EIS	6.7.1
	268	Waste Disposal Site and Landfill	The landfill site will be constructed in accordance with the <i>Building Act</i> (NT), <i>Waste Management and Pollution Control Act</i> (NT), Waste Management and Pollution Regulations (NT) and Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory (EPA 2003).	Supp	6.7
	269	Waste Disposal Site and Landfill	DHF will be notified of plans to upgrade the existing waste disposal site prior to construction.	Supp	6.7
	270	Waste management	A tip will be constructed on site in accordance with the NT Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites for disposal and burning of most putrescible wastes.	EIS	6.7.1
	271	Waste management	Any material deemed unsuitable for the local land fill will be stored and managed on site and disposed of by licensed contractors when appropriate.	EIS	6.7.1
	272	Waste management	The rubbish tip associated with the camp will be progressively managed to ensure it meets all legislative requirements and guidelines, and will be fully rehabilitated at the completion of mining and processing operations.	EIS	6.7.1

	273	Waste rock monitoring and storage	The ongoing monitoring of waste rock prior to removal will detect any material with the potential to form acid leachates. This material will be stored in either capped waste rock dumps, processed or potentially backfilled into sterilised extraction pits partially filled with water. The primary aim is to reduce PAF material from interacting with air or moisture.	EIS	6.6.3
	274	Waste Water Treatment	When camp expansion is required in the future, a consultant will be engaged to assess the adequacy of the existing waste water treatment facilities and make recommendations on further facilities required to accommodate additional personnel.	Supp	6.7

Appendix 2 – Further Information Requirements

Table 1. Recommendations requiring further information to be addressed by Redbank Copper Limited in the Mining Management Plan

Document	No.	Description	Information Requirement	Reference
Mining Management Plan	1	Water Management Plan	The proponent shall provide monitoring results showing a reduction in contaminant levels of water downstream of the mine as a result of the physical reduction of water at the Sandy Flat pit. The results should be provided to DoR in the Water Management Plan for the MMP and to the Environment, Heritage and the Arts Division (EHA) of NRETAS in the EIS for the assessment of sulphide operations.	Recommendation 4
	2	Water Management Plan	The proponent must continue annual macroinvertebrate and sediment sampling throughout the life of mining activities in waterways downstream from both the Sandy Flat site and in Redbank Creek (downstream from the Azurite, Bluff and Redbank deposits). The data should be provided to DoR as part of the current Water Management Plan for the MMP.	Recommendation 5
	3		The proponent should develop sediment monitoring parameters and schedules specifically for off-site assessment in consultation with EHA, with a particular focus on assessing the bioavailability of metals in sediment, factors that mobilise existing contamination and the relationship between sediment, water chemistry and biological components. The proponent should report results to DoR in the MMP.	Recommendation 7
	4		The proponent is to provide the investigation results into the integrity of the existing ROM, vat leach, PSP and process plant and design/construction details of proposed new facilities as part of the MMP, with timeframes of when these facilities are to be replaced.	Recommendation 8

Document	No.	Description	Information Requirement	Reference
	5		The proponent should develop specific strategies and commitments to investigate and remediate the existing waste rock dump, to be provided to DoR in the MMP.	Recommendation 9
	6		The proponent is to process material from the heap and dump leach pads, identified as contamination sources, through the oxide plant within the two year oxide project. The status of this action should be reported to DoR in the MMP.	Recommendation 10
	7	Water Management Plan	The proponent must investigate leakage from the tailings storage facility and report to DoR as part of the current Water Management Plan and to EHA in the EIS for sulphide operations. The proponent must also provide an indication of whether there are other potential points of flow from the existing TSF and how this seepage would be managed in the Water Management Plan. If monitoring results indicate there are points of flow from the existing TSF, the proponent will need to liaise with EHA for a Waste Discharge Licence for the discharge of groundwater off-site.	Recommendation 11
	8	Water Management Plan	The proponent is to install monitoring wells during 2010 to understand the seepage from the existing TSF and to investigate potential for seepage into the groundwater with seepage trench analysis. Evidence from monitoring of the TSF is required to support preliminary conclusions that seepage from the existing TSF has been reduced and that the TSF is entering a state of neutrality. The effectiveness of the lime sludge as an impermeable layer also needs to be quantitatively assessed. Monitoring results from the existing TSF should be supplied to DoR as part of a current Water Management Plan and also to EHA in the EIS for sulphide operations.	Recommendation 12
	9	Water Management Plan	The proponent is to provide a complete set of groundwater quality data including water level and water quality data obtained since the drilling program was undertaken and an outline of proposed actions if deterioration in groundwater quality is detected, to DoR as part of the Water Management Plan in the MMP. A hydrogeological model, including data from the current water treatment and Sandy Flat pit water level reduction, is to be provided to DoR for the Water Management Plan prior to commencement of works.	Recommendation 15

Document	No.	Description	Information Requirement	Reference
	10	Water Management Plan	The proponent is to undertake pump testing of the local aquifer to assess transmissivity as part of the model validation and the results provided in the EIS for sulphide operations. In consultation with EHA, natural tracers are to be used to calculate recharge rates and residence times to assist in validating flow paths. This is to be reported in the Water Management Plan to DoR.	Recommendation 16
	11	Water Management Plan	The proponent should provide an indication of the lateral extent of the seepage zone in the area and complete the groundwater finite element model so that dewatering and seepage estimations and management can be determined and provided in the Water Management Plan as part of the MMP approval process by DoR.	Recommendation 17
	12	Water Management Plan	The proponent is to provide quantitative data to support the claim that the springs are not hydraulically connected to the proposed new pits, and that any dewatering that may occur as a result of mining the oxides will not impact on nearby springs that support groundwater dependent ecosystems, as part of the current Water Management Plan to be provided to DoR in the MMP.	Recommendation 18
	13	Water Management Plan	The proponent is to provide a hydrogeological model and demonstrate progress of the following research projects: • detailed Groundwater Management Plan; • an understanding of the extent of groundwater contamination; • a thorough understanding of the existing sources of contamination; • plans to remediate these sources of contamination; and • studies of the impacts and improvements in the downstream surface water quality as required by the Waste Discharge Licence (WDL 175). These projects are to be provided to DoR in the Water Management Plan as part of the MMP approval process and to EHA in the EIS for the assessment of sulphide operations.	Recommendation 19

Document	No.	Description	Information Requirement	Reference
	14		The proponent is to provide results from physical reduction of water level in Sandy Flat pit and provide specific management actions to DoR as part of the MMP approval that will be instigated (including applying for a Waste Discharge Licence and developing a Remediation Action Plan) if the monitoring results indicate contaminated groundwater is flowing off-site.	Recommendation 21
	15	Water Management Plan	The proponent is required to develop further contingency methods to manage contaminated groundwater migrating off the site as part of the new TSF and WRD design. More detailed understanding of the Sandy Flat aquifer, connections to other aquifers in the region and the proposed oxide pits, is to be provided to EHA in the EIS for the assessment of sulphide operations. The proponent should also provide this information and results to DoR as part of the Water Management Plan in the MMP.	Recommendation 22
	16	Water Management Plan	The proponent must redevelop the surface water sampling program and interpretation of data to provide greater confidence in the baseline assessment of surface water quality, and provide this to DoR as part of the current Water Management Plan in the MMP.	Recommendation 23
	17	Water Management Plan	The proponent is to provide trigger levels and remedial actions for surface and groundwater impacts to DoR in the Water Management Plan and these should also be provided to EHA in the EIS for the assessment of sulphide operations.	Recommendation 24
	18		The proponent is to provide details to DoR on how the Return Water Dam and any surface water infrastructure would be designed to minimise risk of contaminants, sediment or potentially acid forming runoff to interact with groundwater as part of the MMP approval process.	Recommendation 25
	19		The proponent is to update water balance modelling to inform surface water management at the site for the maximum average rainfall for Wollogorang Station (1433mm). The proponent is to demonstrate effective water management measures for extreme rainfall events and periods to DoR in the MMP.	Recommendation 26

Document	No.	Description	Information Requirement	Reference
	20		The proponent is to demonstrate to DoR in the MMP that the non acid forming waste rock, proposed for mining infrastructure, does not produce neutral metalliferous runoff and has appropriate design (e.g. batter slope angle) to minimise erosion.	Recommendation 27
	21		The proponent is to provide to DoR in the MMP detailed information to support the assumption that sediment dams designed for the waste rock dumps would be adequate to contain water seepage and sediment runoff during high rainfall events.	Recommendation 28
	22		The proponent is to submit to DoR as part of the MMP approval process the AMD testing results for both static and kinetic methods with mineral leach and mineralogical tests on oxide waste rock (from each of 3 pits) and oxide tailings.	Recommendation 29
	23	Water Management Plan	The proponent should add water quality of the springs to the regular monthly surface water monitoring and sampling regime, and if impacts are detected, contingency actions should be implemented and be reported in the MMP. In the event that the springs are impacted by groundwater drawdown, the proponent is to develop a re-establishment strategy or vegetation offset areas in liaison with DoR and NRETAS.	Recommendation 31
	24	Fire Management Plan	The proponent is to develop a fire management plan, aiming to protect threatened species habitats, particularly rainforest patches, to DoR with the MMP.	Recommendation 32
	25	Environmental Management Plan	The proponent is to provide details on the management objective, actions and specific response variables that are to be used to assess the impacts of mining works on the threatened species Carpentarian Rock-rat and Gouldian Finch, to DoR as part of the Environmental Management Plan, to be submitted in the MMP.	Recommendation 33
	26		The proponent is to provide details of threatened species offset programs that have been approved by the Australian Government Department of Environment, Water, Heritage and the Arts, to DoR in the MMP.	Recommendation 34

Document	No.	Description	Information Requirement	Reference
	27	Feral Animal Management Plan	The proponent should implement a feral animal management plan, aimed to remove feral species from ERL94 and to exclude cattle from the proposed riparian and creek bank buffers, as part of the Environmental Management Plan to be submitted to DoR in the MMP.	Recommendation 35
	28	Environmental Management Plan	The proponent is to update the Environmental Management Plan each year, and submit this to relevant Northern Territory Government authorities as part of the annual MMP approval.	Recommendation 36
	29	Greenhouse Gas Emissions Management Plan	The proponent should monitor energy consumption and identify opportunities to reduce and/or offset greenhouse gas emissions and provide a Greenhouse Gas Emissions Management Plan to DoR as part of the MMP approval process.	Recommendation 37
	30	Rehabilitation and Decommissioning Plan	The final rehabilitation and decommissioning plan for the existing TSF is to be developed and submitted to DoR for approval in the early stages of operation. In line with the monitoring programs being reviewed and revised annually, the Mine Closure Plan must be reviewed annually as part of the MMP. The Plan must also include rehabilitation objectives and contingency planning for sudden mine closure. As part of the Mine Closure Plan, the proponent will provide details on the planned management of seepage from the TSF post mine closure.	Recommendation 39

Table 2: Recommendations requiring further information to be addressed by Redbank Copper Limited in future environmental assessments/EIS.

Document	No.	Description	Information Requirement	Reference
Draft Environmental Impact Statement for Redbank Sulphide Operations	1	Outstanding information requirement	Assessment of the oxide and sulphidic components has been split so that the sulphide operations will be subject to subsequent assessment under Guidelines issued in September 2009, including public review of an EIS and requirement of a second Supplement and Assessment Report.	Section 1.2 Assessment Report
	2		The proponent shall provide monitoring results showing a reduction in contaminant levels of water downstream of the mine as a result of the physical reduction of water at the Sandy Flat pit. The results should be provided to DoR in the Water Management Plan for the MMP and to the Environment, Heritage and the Arts Division (EHA) of NRETAS in the EIS for the assessment of sulphide operations.	Recommendation 4
	3		The proponent is to demonstrate to EHA in the EIS for the assessment of sulphide operations that more complete knowledge of baseline conditions of the Sandy Flat pit water reduction and treatment program has been obtained. The proponent must demonstrate the effectiveness of the above program using, among other information, quantitative data obtained from annual macroinvertebrate monitoring.	Recommendation 6
	4		The proponent must investigate leakage from the tailings storage facility and report to DoR as part of the current Water Management Plan and to EHA in the EIS for sulphide operations. The proponent must also provide an indication of whether there are other potential points of flow from the existing TSF and how this seepage would be managed in the Water Management Plan. If monitoring results indicate there are points of flow from the existing TSF, the proponent will need to liaise with EHA for a Waste Discharge Licence for the discharge of groundwater off-site.	Recommendation 11

Document	No.	Description	Information Requirement	Reference
	5		The proponent is to install monitoring wells during 2010 to understand the seepage from the existing TSF and to investigate potential for seepage into the groundwater with seepage trench analysis. Evidence from monitoring of the TSF is required to support preliminary conclusions that seepage from the existing TSF has been reduced and that the TSF is entering a state of neutrality. The effectiveness of the lime sludge as an impermeable layer also needs to be quantitatively assessed. Monitoring results from the existing TSF should to be supplied to DoR as part of a current Water Management Plan and also to EHA in the EIS for sulphide operations.	Recommendation 12
	6		The proponent is to provide quantitative evidence to DoR on the suitability of the TSF to store vat leach tailings and process water quality during the MMP approval process for oxide operations. The proponent is to investigate the potential for continual reclamation of process water and resulting water quality for the oxide process and in the TSF.	Recommendation 14
	7		The proponent is to undertake pump testing of the local aquifer to assess transmissivity as part of the model validation and the results provided in the EIS for sulphide operations. In consultation with EHA, natural tracers are to be used to calculate recharge rates and residence times to assist in validating flow paths. This is to be reported in the Water Management Plan to DoR.	Recommendation 16

Document	No.	Description	Information Requirement	Reference
	8		The proponent is to provide a hydrogeological model and demonstrate progress of the following research projects: • detailed Groundwater Management Plan; • an understanding of the extent of groundwater contamination; • a thorough understanding of the existing sources of contamination; • plans to remediate these sources of contamination; and • studies of the impacts and improvements in the downstream surface water quality as required by the Waste Discharge Licence (WDL 175). These projects are to be provided to DoR in the Water Management Plan as part of the MMP approval process and to EHA in the EIS for the assessment of sulphide operations.	Recommendation 19
	9		The proponent is required to develop further contingency methods to manage contaminated groundwater migrating off the site as part of the new TSF and WRD design. More detailed understanding of the Sandy Flat aquifer, connections to other aquifers in the region and the proposed oxide pits, is to be provided to EHA in the EIS for the assessment of sulphide operations. The proponent should also provide this information and results to DoR as part of the Water Management Plan in the MMP.	Recommendation 22
	10		The proponent is to provide trigger levels and remedial actions for surface and groundwater impacts to DoR in the Water Management Plan and these should also be provided to EHA in the EIS for the assessment of sulphide operations.	Recommendation 24
	11		The proponent is to provide details on the ARD testing program proposed for the sulphide materials to ensure adequate characterisation and data is to be provided to EHA in the EIS for the assessment of sulphide operations.	Recommendation 30