



Australian Government

Department of the Environment and Heritage

Ms Kate George
Martinick Bosch Sell Pty Ltd
Cook street
WEST PERTH WA 6005

RECEIVED
22 SEP 2005
BY: *Lut Bosch*
23/9/05

Dear Ms George

Murchison Metals Limited/Mining/Murchison region/WA/Jack Hills Iron Ore Mine and crushing and screening plant and transport to Geraldton Port – EPBC 2005/2278

Thank you for the above referral, received on 22 August 2005, for decision whether or not approval is needed under Chapter 4 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The referral has now been considered under the EPBC Act and I have decided that the action is not a controlled action. Approval is therefore not needed under Part 9 of the Act before the action can proceed.

Please note that this decision only relates to the potential for significant impact on the specific matters of national environmental significance protected by the Australian Government under the EPBC Act. There may be a need for separate State or Local Government environmental assessment and approval to address potential impacts on State, regional or local environmental values.

A copy of the document recording my decision is attached for your information. I have written separately to Mr Frank Sibbel of Murchison Metals Limited to advise of my decision (copy attached).

Yours sincerely

Ms Alex Rankin
Assistant Secretary
Environment Assessment Branch

15 September 2005

COMMONWEALTH OF AUSTRALIA

ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

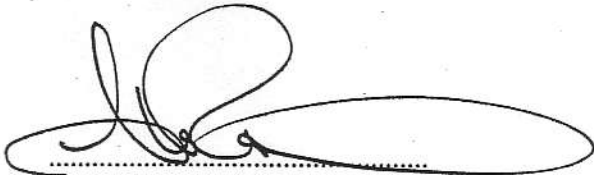
DECISION THAT ACTION IS NOT A CONTROLLED ACTION

I, ALEX RANKIN, Assistant Secretary, Environment Assessment Branch, Department of the Environment and Heritage, a delegate of the Minister for the Environment and Heritage for the purposes of section 75 of the *Environment Protection and Biodiversity Conservation Act 1999*, decide that the proposed action, set out in the Schedule, is not a controlled action.

SCHEDULE

The proposed action to construct and operate an open cut iron ore mine and associated infrastructure known as "the Jack Hills Project", including transportation of ore to the Geraldton Port, located in the Murchison Region, about 100 kilometres east of the town of Meekatharra, in Central Western Australia, and as described in the referral and associated documentation received under the Act on 22 August 2005 (EPBC 2005/2278).

Dated this 15TH day of SEPTEMBER 2005



ASSISTANT SECRETARY
ENVIRONMENT ASSESSMENT BRANCH
DEPARTMENT OF THE ENVIRONMENT AND HERITAGE



Environmental Protection Authority

Westralia Square,
141 St Georges Terrace, Perth, Western Australia 6000.
Telephone: (08) 9222 7000. Facsimile: (08) 9222 7155.

Postal Address: PO Box K822,
Perth, Western Australia 6842.
Website: www.epa.wa.gov.au

RECEIVED
24 JAN 2006

BY:

Mr Paul Rokich
Environmental Consultant
Martinick Bosch Sell Pty Ltd
4 Cook Street
WEST PERTH WA 6005

Our Ref CRN215358
Enquiries Tim Gentle

Dear Mr Rokich

PROPOSAL: Jack Hills Iron Ore Project (Stage 1), Mining Lease 20/506
LOCATION: 100 km east of Meekatharra
LOCALITY: Shire of Murchison
PROponent: Murchison Metals Limited

Thank you for referring the above proposal to the Environmental Protection Authority (EPA). The EPA has looked at the information provided by you and considers that the proposal has the potential to be assessed under the expedited assessment process as an Environmental Protection Statement (EPS). The gazetted Administrative Procedures provide information on this level of assessment and are available on the EPA Website, www.epa.wa.gov.au.

To participate in this expedited process the proponent is required to consult with the staff of the EPA Service Unit and other identified stakeholders (including the public), undertake any studies requested by the EPA, and prepare an EPS document, in accordance with the Administrative Procedures.

The EPA will advertise its intentions with regard to this proposal in Monday's *West Australian* newspaper on 23 January 2006. There are no appeal rights at this time, however the proponent's contact details will be advertised so that you and any interested members of the public can discuss with the proponent any environmental concerns.

When the above consultation and documentation process has been completed the EPS document should be formally referred for environmental assessment. The EPA will consider the information provided by the proponent and then either:

1. Confirm that an EPS is the appropriate level of assessment for the proposal, advertise it at that level and publicly release the proponent's documentation and the EPA's Report and Recommendations at the same time. Appeal rights exist at this stage for anyone to request to the Minister for the Environment that the proposal be assessed more fully and/or more publicly (ie Public Environmental Review (PER) or Environmental Review and Management Program (ERMP) or appeal against the EPA's advice contained in its report; or
2. Decide to assess the proposal more fully and/or more publicly, if this is considered necessary, on the basis of additional information related to the proposal, to enable the EPA's environmental objectives to be met. In this case, the level of assessment will be set at either PER or ERMP.

The project officer for this proposal is Tim Gentle and can be contacted on telephone number 9222 7085.

Yours sincerely


K J Taylor
Director
Environmental Impact Assessment

23 January 2006



Mr Lance Bosch
MBS Environmental
4 Cook Street
WEST PERTH WA 6005

RECEIVED
15 NOV 2005
BY:.....

Dear Lance

JACK HILLS IRON ORE PROJECT: SHORT RANGE ENDEMIC INVERTEBRATE FAUNA DISCUSSIONS

Thank you very much for your letter of 7 November 2005 regarding our discussions on the short-range endemic invertebrate fauna on the Jack Hills Range.

As previously indicated, I am of the view that SRE invertebrate fauna are likely to occur on the Jack Hills Range but individual species are unlikely to be restricted to the Jack Hills project area. Examples of SRE's that may be found in the area and of most importance include native millipedes, snails and trapdoor spiders. Habitats preferred by SRE invertebrate include slopes and gullies that retain some moisture and are at least partially protected from northerly and north-westerly sunshine. Thus, the southern and south-eastern facing aspects of the range are likely to harbour populations of SRE's.

My inspection of the maps shown to me highlighting the extent of the proposed development indicate that there are no southern and south-eastern facing slopes are currently included in the proposal, thus minimizing the impact on SRE's of the region.

Surveys for SRE invertebrate fauna should include a variety of techniques including hand collecting and pitfall trapping during the cooler months of the year, autumn and winter being the optimal periods. Given the location of the proposed development in relation to suspected SRE habitat, it is probably not necessary to conduct surveys for SRE's at this time. However, any future plans to extend the mine footprint or impact area should incorporate extensive surveys to establish the impact that the mine may have on these highly specialized and relictual fauna.

Yours sincerely

DR MARK S. HARVEY
Senior Curator
Head, Department of Terrestrial Invertebrates

14 November 2005

WESTERN AUSTRALIAN MUSEUM

Locked Bag 49, Welshpool DC, Western Australia 6986

49 Kew Street, Welshpool, Western Australia 6106 • ABN: 9524 951 7733

Telephone: +61 8 9427 2700 • Facsimile: +61 8 9472 1151 • Web: www.museum.wa.gov.au

9321-0140

**Department of
Environment**

Your ref: GWL 159131
Our ref: MG61
Enquiries: Craig Tuesley
Direct tel: 98645078

Mr K Walzok
Managing Director
PO Box 541
Mount Hawthorn
Perth 6915
WA

ISSUE OF A LICENCE TO CONSTRUCT OR ALTER WELL
PROPERTY: Murchison Metals LTD Mining Tenement Number E20/535

Please find enclosed your Licence, authorising you to Construct or Alter a Well, subject to certain terms, conditions or restrictions.

It is important that you read the conditions of your licence carefully. If you do not understand your licence, please contact the Commission as soon as possible, as there are penalties for failing to comply with all of your licence conditions. Under Section 26G1 of the *Rights in Water and Irrigation Act 1974*, you have a right to apply to the State Administrative Tribunal for a review of the decision to issue a *Licence to Construct or Alter a Well*. You have 28 days from the date you received this letter to request that the decision be reviewed.

For further information please contact the State Administrative Tribunal:

State Administrative Tribunal
12 St Georges Terrace
PERTH WA 6000

GPO Box U1991
PERTH WA 6845

Telephone: (08) 9219 3111
Toll-free: 1300 306 017
Facsimile: (08) 9202 1180
www.sat.justice.wa.gov.au



Midwest Gas/Coynne Region
81 Forrest Street
Geraldton Western Australia 6530
PO Box 73 Geraldton Western Australia 6531
Telephone (08) 9964 5978 Facsimile (08) 9964 5983
www.environment.wa.gov.au

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Under section 21 of the *State Administrative Tribunal Act 2004*, you have a right to request a written statement of reasons for the decision to issue a *Licence to Construct or Alter a Well*. This request must be made, in writing, to the Water and Rivers Commission within 28 days after the day on which you received this letter.

Within one month of completing the well, you are required to submit **Form L - Particulars of Completed Borehole** to the Water and Rivers Commission Office in Geraldton. A penalty of \$150 applies for failure to submit this Form.

If the water from this well is being improperly used, is being wasted or is having a harmful effect, the Commission may direct the closing of this well. For further information, please read the enclosed pamphlet *What are my obligations as a licence holder*.

Compliance with the terms, conditions or restrictions of this licence does not absolve the licensee from responsibility for compliance with the requirements of all Commonwealth and State legislation.

If you have any questions, please contact the Midwest/Gascoyne Office on 99645978.

Yours sincerely


Paul Anderson
Acting Program Manager
15 April 2005

9321 0140

File No: MG61



Water and Rivers Commission
Government of Western Australia

Page 1 of 1

Instrument No. CAW158131(1)

LICENCE TO CONSTRUCT OR ALTER WELL

Granted by the Commission under section 26D of the Rights in Water and Irrigation Act 1914

Licensee(s)	Murchison Metals Ltd	
Description of Water Resource	East Murchison Combined - Fractured Rock West - Fractured Rock	
Location of Well(s)	E20/535, E20/538	
Authorised Activities	Activity	Location of Activity
	Construct 10 non-artesian well(s).	E20/535, E20/538
Duration of Licence	From 15 April 2005 to 14 April 2006	

This Licence is subject to the following terms, conditions and restrictions:

- 1 The well must be constructed by a driller having a current class 2 water well drillers certificate issued by the Western Australian branch of the Australian Drilling Industry Association or other certification approved by the Water and Rivers Commission as equivalent.
- 2 The licensee is required to provide to the Water and Rivers Commission a completed 'Particulars of Completed Bore Hole Form' on completion of the approved drilling programme.
- 3 That on completion of the exploratory drilling programme the licensee shall submit a hydrogeological assessment of the groundwater resource, prepared by a groundwater professional.
- 4 That the licensee shall design a programme to monitor the underground waters to determine the effects of the licensee's proposed draw. The programme shall be submitted to the Water and Rivers Commission by 31st July 2006 for assessment and subject to any amendments required by the Commission, the programme shall be implemented at the licensee's cost.
- 5 The Water and Rivers Commission, at its discretion, may direct changes to be made to the monitoring programme at any time.
- 6 That the licensee shall allow access, in an agreed manner, by Water And Rivers Commission personnel for the purposes of inspection at any time.
- 7 That a plan is provided showing the exact location of the bore/s.
- 8 That should there be a detrimental impact on water quality as a result of the licensed activity, the Water and Rivers Commission may cause the well to be closed.
- 9 This licence is not renewable.

End of terms, conditions and restrictions

This Licence is granted subject to the Rights in Water and Irrigation Regulations 2000.

9321-0140



OFFICE USE ONLY



Rights in Water and Irrigation Act 1914 - Section 26E
Rights in Water and Irrigation Regulations 2000 - Regulation 38

PARTICULARS OF COMPLETED BOREHOLE (Completion of this form is compulsory)
DRILLER TO COMPLETE SECTIONS 6 - 8, 10; LICENSEE TO COMPLETE SECTIONS 1 - 5, 9, 10.

1. DETAILS OF INDIVIDUAL OR COMPANY/ASSOCIATION

Licence number (for construction or alteration of well) - If applicable

(a) Name of licensee MR MRS MS MISS OTHER

SURNAME OR FAMILY NAME

GIVEN OR FIRST NAMES

COMPANY NAME

Company/Association contact details MR MRS MS MISS OTHER

SURNAME OR FAMILY NAME

GIVEN OR FIRST NAMES

POSITION IN COMPANY/ASSOCIATION

(b) Postal address of licensee

NUMBER OR PROPERTY NAME

STREET

SUBURB OR TOWN

POSTCODE

TELEPHONE/MOBILE NUMBER

FAX NUMBER

EMAIL ADDRESS

2. LOCATION OF WELL/BORE

LOT/LOCATION NUMBER

STREET

SUBURB OR TOWN

GPS READING/COORDINATE

ZONE EASTING/LATITUDE NORTHING/LONGITUDE DATUM (e.g. GDA84/AGD84/AGD68)

(IF UNABLE TO PROVIDE GPS READING/COORDINATE, PLEASE COMPLETE SECTION 8)

Please retain a copy of this form for your records.

9321-0140

COMPANY

DRILLER

DRILLER LICENCE NUMBER (if applicable)

POSTAL ADDRESS

TELEPHONE NUMBER

DRILLING METHOD USED (Tick applicable) ROTARY AIR CABLE TOOL AUGER ROTARY MUD SLUDGE OTHER (PLEASE SPECIFY)

4. PARTICULARS OF BORE

BORE NAME (if applicable)

BORE NUMBER

DRILLING COMMENCEMENT DATE

DRILLING COMPLETION DATE

FINAL STATUS OF BORE (Tick applicable) CAPPED OBSERVATION ONLY CASING REMOVED EQUIPPED FOR USE ABANDONED OTHER (PLEASE SPECIFY)

5. PURPOSE (USE) OF BORE (Tick applicable)

DOMESTIC/DRINKING STOCK IRRIGATION INDUSTRIAL INVESTIGATION GARDEN OBSERVATION OTHER (PLEASE SPECIFY)

6. DETAILS OF CONSTRUCTION

	Depth Below Natural Surface from (m)	to (m)	Diameter (mm)	Gauge or Slot Size Aperture	Type of Material
Casing (inc well liners)					
Slotted Casing					
Gravel Packing					
Back Fill					
Open Hole					
Cementing					

ATTACH GEOPHYSICAL LOG ATTACHED IF ATTACHED, STATE TYPE, CONTRACTOR DETAILS AND CONTACT

[Empty box for contractor details]

ARTESIAN FLOW YES NO

IF YES, STATE FLOW RATES Full Flow Rate [] L/s Recession Test [] L/s

BORE DEVELOPMENT YES NO

IF YES, STATE TYPE [] DURATION [] HOURS

FINAL DRILL DEPTH (m) (including all) []

9321-0140

7. DETAILS OF PUMPING TEST

TYPE OF PUMP TEST STEP AND/OR CONSTANT

HEIGHT OR DATUM (m) (if known)

(specify level reference point for which depth readings were taken, e.g. top of casing/ground level/AHD)

Empty table for height or datum information.

Table with 4 columns: Parameter (e.g., Height above surface, Final drawdown), Unit, Test/Supply Type, and Value.

PUMPING TEST TYPE (Tick applicable) TURBINE CENTRIFUGAL AIRLIFT BAILER SUBMERSIBLE

8. DESCRIPTION OF STRATA AND WATER-BEARING BEDS

Large table for describing strata and water-bearing beds with columns for From/To depth, Strata description, and Water bearing bed classification.

IF INSUFFICIENT ROOM, PLEASE CONTINUE ON SEPARATE SHEET OF PAPER

9321-0140

ADDITIONAL INFORMATION OR OBSERVATIONS

SALINITY OR CONDUCTIVITY TEST

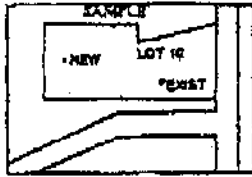
EQUIPMENT USED

TDS RESULT (mg/L) or CONDUCTIVITY READING (μm)

Four horizontal lines for data entry.

9. LOCATION PLAN (not required if GPS reading/coordinate supplied in section 2)

In the box below, please sketch a plan showing position of bore/well in relation to buildings and boundaries and road.



A large empty rectangular box for drawing a location plan.

10. SIGNATURE

By signing this form you are declaring that the statements on this form are true and correct

DRILLER

..... (NAME OF DRILLER) HAVE COMPLETED SECTIONS 6 TO 8

..... SIGNATURE OF DRILLER OR A PERSON DULY AUTHORISED TO SIGN ON BEHALF OF DRILLER

..... DATE

LICENSEE

..... (NAME OF LICENSEE) FORWARD THIS INFORMATION UNDER SECTION 25E OF THE RIGHTS IN WATER AND IRRIGATION ACT 1914 (FOR NON-ARTESIAN WELLS) OR * REGULATION 38 OF THE RIGHTS IN WATER AND IRRIGATION REGULATIONS 2000 (FOR ARTESIAN WELLS). * DELETE AS APPLICABLE

..... SIGNATURE OF LICENSEE OR A PERSON DULY AUTHORISED TO SIGN ON BEHALF OF LICENSEE

..... DATE

This form should be forwarded to: Water and Rivers Commission
Region
Address

FOR FURTHER INFORMATION PLEASE CALL (08)

Data gathered will be added to the State Water Information System to improve Western Australia's water resource management.

9321.0140



Additional notes

- ◆ Application forms are available from the Commission

Related pamphlets in this series:

- ◆ *What is a water licence and how can I apply for one?*
- ◆ *I want to change or extend my water licence*
- ◆ *How can I use the register to find out who can take water?*
- ◆ *I am buying a property – how can I get a water licence?*
- ◆ *I am selling my property – what can I do with my water licence?*
- ◆ *Transferring water licences*
- ◆ *Building a dam*
- ◆ *Civil remedy*
- ◆ *Directions*
- ◆ *How can I appeal.*
- ◆ *Rights to take water in licensed areas*
- ◆ *Rights to take water in unlicensed areas*
- ◆ *Community participation*
- ◆ *Changes to the Rights in Water and Irrigation Act 1914*

*For further information contact
the Commission on (08) 9278 0300 or
your solicitor for your own circumstances*

Website: www.wrc.wa.gov.au

5. Amending, suspending, cancelling licences

The licence holder may apply to amend or transfer a licence at any time

The Commission may amend, suspend or cancel a licence...

- ◆ due to detrimental effects of authorised actions on others
- ◆ to protect the water resource from unacceptable damage
- ◆ to protect the associated environment from unacceptable damage
- ◆ to prevent serious damage to life or property
- ◆ if the water entitlement on the licence has consistently not been taken
- ◆ in the public interest
- ◆ if there is insufficient water to meet demand or expected demand
- ◆ to more effectively regulate the use of water
- ◆ to prevent inconsistency with a management plan or by-laws
- ◆ if a licence holder is convicted of an offence against the Act
- ◆ to comply with State or Commonwealth law
- ◆ if the Commission has authority to do so under the licence

What are my obligations as a licence holder?

This pamphlet is one of a series designed to help water users and property owners understand their rights and responsibilities in accessing and managing water

This pamphlet provides brief information on the following:

1. All licences
2. Licences to take water
3. Licences to construct or alter a well
4. Penalties
5. Amending, suspending, cancelling licences

Licences are issued under the *Rights in Water and Irrigation Act 1914*. The obligations on licence holders also apply to people who have an agreement with a licence holder to operate under a licence.



**WATER AND RIVERS
COMMISSION**

9321 0140

2. Licences to take water

What you must do...

- ◆ write to the Commission within 30 days of ceasing to be eligible to hold a licence
- ◆ return a suspended or cancelled licence to the Commission within seven days
- ◆ pay all licence, transfer or agreement fees where appropriate
- ◆ if you sell your property, make an application to transfer the licence within 30 days of the property being sold
- ◆ make an application to renew your licence before the licence expires

3. Licences to construct or alter a well

What you must do...

- ◆ make an application to the Commission if you wish to alter a well
- ◆ inform the Commission in writing within seven days of carrying out maintenance or emergency work on a well
- ◆ provide monthly reports to the Commission while work is being done
- ◆ provide a final report to the Commission within one month of the work being completed
- ◆ install a meter where required, maintain it in good condition and ensure it operates accurately

1. All Licences

What you must do...

- ◆ comply with the terms, conditions and restrictions on the licence
- ◆ write to the Commission with any significant change in circumstance since you first made an application for a new or amended licence
- ◆ keep your licence in a safe place—it is a valuable legal document
- ◆ comply with licence directions
- ◆ keep the licensed works, facilities and equipment in good order
- ◆ minimise degradation of the water resource

- ◆ have the meter read as required
- ◆ continue to comply with all necessary terms, conditions or restrictions, even once the licence has expired
- ◆ return the licence to the Commission within seven days of it being cancelled

4. Penalties

Penalties relating to licences apply...

- ◆ for contravention of a licence condition
 - ◆ for failing to maintain a meter
 - ◆ for damaging a meter or preventing its accurate operation
 - ◆ for failing to return a cancelled licence
 - ◆ if a suspended or cancelled licence is not returned to the Commission
 - ◆ if fees are not paid
 - ◆ for the failure to maintain works
 - ◆ for the failure to inform the Commission of a change in material circumstances that affect the licence
- Penalties can include...*
- ◆ cancellation of a licence
 - ◆ the issue of a direction stopping or limiting you from taking water
 - ◆ a fine

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT

Environmental Protection Act 1986

WORKS APPROVAL NUMBER: 4141

FILE NUMBER: W33/82/1

CONDITIONS OF WORKS APPROVAL

DEFINITIONS

In these conditions of works approval, unless inconsistent with the text or subject matter:

‘approved’ and ‘approval’ means approved and approval in writing by the Director;

Director” means Director, Environmental Management Division of the Department of Environment for and on behalf of the Chief Executive Officer as delegated under Section 20 of the *Environmental Protection Act 1986*;

“Director” or "Department of Environment" for the purpose of correspondence means-

Manager, Mid West – Gascoyne Region

Department of Environment

PO Box 73

GEALDTON WA 6531

Telephone: (08) 9964 5978

Facsimile: (08) 9964 5983;

“Premises” means Lot No: 2353, Reserve No: 20606, 298 Marine Terrace, Geraldton, WA 6530;

“storage shed” means the Murchison Metals Limited iron ore storage shed; and

“Works approval holder” means the Geraldton Port Authority;

GENERAL CONDITIONS

GENERAL CONSTRUCTION AND OPERATIONAL DESCRIPTION

- 1 The works approval holder shall construct, manage and operate the works in accordance with the works approval application form dated 12 May 2005 and the document: “Environmental Management System – New Cargo, Iron Ore Storage and Handling Submission – Port of Geraldton”, prepared by Michael Mulligan on behalf of the Geraldton Port Authority, dated 12 May 2005. Where the details and commitments of the above documents are inconsistent with conditions of this works approval, the works approval shall prevail.

SUBMISSION OF COMPLIANCE DOCUMENT

- 2 The works approval holder shall, following the construction of the works outlined in the Works Approval application and supporting documentation and prior to commissioning, submit to the Director a compliance document. The Compliance Document shall be signed by an authorised officer of the Geraldton Port Authority, with the printed name and position of that person within the company.

AIR POLLUTION CONTROL CONDITIONS

DUST - GENERAL REQUIREMENT

- 3 The works approval holder shall employ routine maintenance and housekeeping practices along with measures outlined in the document *Iron Ore Storage and Handling Submission – Port of Geraldton* prepared by the Geraldton Port Authority, dated 12 May 2005 to prevent visible dust from crossing the boundary of the premises from all construction activities and associated transport activities.

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT

Environmental Protection Act 1986

WORKS APPROVAL NUMBER: 4141

FILE NUMBER: W33/82/1

DUST - IRON ORE STORAGE SHED

- 4(a) The works approval holder shall construct the storage shed walls such that when operational, iron ore is unable to overtop the concrete wall and exit the shed between the concrete and cladding walls.
- 4(b) The works approval holder shall install a dust extraction and ventilation system in the storage shed so that, at all times during stockpiling or load out operations, negative air pressure is maintained within the storage shed.

DUST SUPPRESSION - CONVEYORS AND TRANSFER POINTS

- 5(a) The works approval holder shall ensure that the iron ore conveyor belt system from the truck unloader facility to the storage shed and from the storage shed to the ship loader is constructed such that when operational, iron ore is not subject to wind whipping and all conveyor spillage can be collected within the conveyor system.
- 5(b) The works approval holder shall install tension scrapers on all shiploader conveyors, and a similar belt cleaning system on conveyors exiting the truck unloader facility and exiting the storage shed, in order to minimise carryover of iron ore.
- 5(c) The works approval holder shall ensure that all belt to belt transfer points are fully enclosed and serviced by dust extraction/collection equipment.
- 5(d) The works approval holder shall construct all conveyor systems which handle iron ore such that they are fitted with water sprays should they be required during loading.

WATER POLLUTION CONTROL CONDITIONS

- 6 The works approval holder shall install a drainage system on the storage shed to ensure that stormwater is kept away from areas of potential contamination and directed to the on-site stormwater drainage system.

SEVERANCE

It is the intent of these works approval conditions that they shall operate so that, if a condition or a part of a condition is beyond my power to impose, or is otherwise *ultra vires* or invalid, that condition or part of a condition shall be severed and the remainder of these conditions shall nevertheless be valid to the extent that they are within my power to impose and are not otherwise *ultra vires* or invalid.

.....

Officer delegated under Section 20
of the *Environmental Protection Act 1986*

Date of Issue: Monday, 18 July 2005



MURCHISON METALS LTD

CORPORATE ENVIRONMENTAL POLICY STANDARDS & GOALS

The prime objective of Murchison Metals Ltd is to protect the safety and health of people living in areas where the company is involved in mining, processing and or exploration activities and to establish a reputation of being environmentally responsible.

To achieve this objective all group companies and contractors have a commitment to operate in an environmentally responsible manner and are required to:

- Comply with all the applicable Commonwealth and State government regulations for the protection of the environment
- Establish and maintain proper standards of environmental care through audit and self regulation
- Provide adequate training to ensure employees and contractors do recognize the potential impact of their activities
- To monitor the state of the environment throughout the operation and take the relevant corrective action
- Design, operate and decommission all facilities and associated infrastructure to avoid or mitigate adverse environmental impact
- Respect all human and property rights

In respect to mining activity it is recognized that as temporary land users the company's rehabilitation objectives must be consistent with projected future land use of the area. Accordingly, the overall objective is to re-establish the site to a safe stable and non-erodible condition with all environmental, heritage and conservation values intact.

A handwritten signature in black ink, appearing to read 'R. Vagnoni', is positioned above the printed name and title.

Robert Vagnoni
Executive Director



MURCHISON METALS LIMITED

SITE ENVIRONMENTAL COMMITMENT

Murchison Metals Limited recognises that responsible environmental management is a key part of its operations. Murchison Metals recognises that it must ensure superior environmental performance in its daily operations.

To meet these objectives Murchison Metals will carry out the following:

- Continue to operate in a manner that ensures minimum long term environmental impact.
- Communicate any closure plans with all the operations people and the local community.
- Seek input from the immediate landowners and regulators on any closure plans.
- Implement, and where possible improve, waste management programs to maximise reduction and recycling options.
- Manage the stockpile storage facilities to ensure safe and efficient operation.
- Train and keep all employees environmentally aware.
- Maximise efficient use of water and energy resources.
- Meet, and where appropriate, exceed legal and regulatory requirements.
- Report incidents openly and honestly.

What everyone must do:

- Report any environmental incident immediately.
- Undertake training provided and ensure that you operate in a way not to adversely effect or damage the environment.
- Follow procedures so as to minimise impact on the environment.
- Act on any potential environmental hazards and put in place improvements where possible.
- Encourage others to be of similar mind.

Environmental management is not the responsibility of any one person, it is the responsibility of everyone on site.

Robert Vagnoni
Executive Director



MURCHISON METALS LIMITED

SITE SAFETY COMMITMENT

We will conduct our operations in a manner that includes commitment to the highest standards of safety, and establishing a totally integrated safe production culture that ensures the well being of our people and the longevity of our business.

This will be achieved by:

- Recognising that all injuries are preventable and the only acceptable target is for no workplace injuries.
- Implementing, maintaining and communicating a comprehensive Site Safety System.
- Integrating safety and health considerations into design, planning, purchasing, production and maintenance.
- Using Risk Management, as the basis for ensuring the workplace is free of potentially hazardous agents and conditions, which could result in personal injury or illness, property damage, business interruption or security loss.
- Providing training and a working environment which enables people to reach their full potential.
- Complying with legal and regulatory requirements as a minimum standard, and where practical adopting or establishing industry Best Practise.
- Adopting a *Behavioural* approach to safety, which recognizes that policies and environment alone are not sufficient to ensure a safe work site.
- Commitment at all levels demonstrated by active involvement in daily PASS meetings.
- Encouraging the reporting of all incidents and using the investigations to improve site safety.
- Facilitation of an early return to work of injured employees in conjunction with the employee, Supervisor and the medical profession through the Company's rehabilitation program.

What everyone must do:

- Undertake training provided and ensure that you act in the manner instructed.
- Follow procedures.
- Act on any potential safety hazards and act immediately where possible.
- Report any incident immediately.
- Encourage others to be of similar mind.

Safety management is not the responsibility of any one person, it is the responsibility of every person on site.

A handwritten signature in black ink, appearing to read 'R. Vagnoni'.

Robert Vagnoni
Executive Director



MURCHISON METALS LIMITED

HEALTH & SAFETY POLICY

Murchison Metals Limited is an Australian mining company, with a principal focus on iron ore.

Murchison Metals believes that responsible health & safety management and superior health & safety performance is integral to an efficient and successful company. This will be achieved through leadership and the use of reliable systems, which support effective decision making.

To enable health & safety objectives to be achieved, each Murchison Metals operation will:

- **Implement** and maintain a health & safety management system that identifies, assesses and effectively controls health & safety risks to employees, contractors and the broader community. Such a system must be characterized by rigor, simplicity and action.
- **Identify** opportunities for improvement and set challenging standards that are consistent with the values and expectations of employees and the broader community.
- **Integrate** health & safety into all aspects of the company's activities including exploration, project development, mine operation, mine expansion, acquisitions and divestments.
- **Design**, construct, commission and operate all facilities and associated infrastructure to create and maintain a safe workplace and promote employee well being.
- **Select** appropriately qualified and capable people who can demonstrate a high level of awareness and commitment towards proactive safety management.
- **Provide** training to enable employees, contractors and suppliers to work in a safe and responsible manner and to ensure they are able to manage their activities in accordance with this policy.
- **Initiate** regular audit and assessment programs and embrace recommendations for improvement with prompt follow-up action.
- **Consult** employees and the community on concerns, aspirations and values for health & safety related to the development, operation and closure aspects of projects.
- **Communicate** openly about workplace hazards, risks or incidents and ideas for improvement, to enable effective decision making and action.
- **Demonstrate** commitment to reporting of health & safety performance.
- **Comply** with all applicable legal and regulatory requirements as a minimum standard.

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Robert Vagnoni
Executive Director

Environmental Management Plan, Jack Hills Iron Ore Project:

Dust Management Plan

Prepared for:
Murchison Metals Limited

March 2006

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MBS
ENVIRONMENTAL

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

Murchison Metals Limited (MML) proposes to open pit mine 1.0 to 1.8 million tonnes of iron ore per annum, which will be crushed and screened on-site before being transported by road to the Geraldton Port. It will then be conveyed into a storage facility before being shipped on a Free On Board (FOB) basis to overseas markets.

MML is currently in the process of preparing the necessary documentation to achieve project environmental approval from the Minister for the Environment. This documentation includes:

- Environmental Protection Statement (EPS).
- Construction Environmental Management Plan (CEMP).
- Vegetation Management Plan (VMP).
- Dust Management Plan (this document).

1.2 PURPOSE

This Dust Management Plan has been prepared in fulfilment of commitments made by MML in the Jack Hills EPS (MBS Environmental, 2006), and to address anticipated conditions set by the Minister for the Environment in approving the proposal.

This plan has been prepared to monitor and manage the impacts of dust for the following areas:

- Jack Hills mine area.
- Transport corridor.
- Accommodation village.
- Waste dumps.

The plan applies prior to construction and during the construction, operation and decommissioning phases of the project. The plan will be subject to ongoing review and therefore will be subject to change to ensure that it remains relevant and effective in light of technological advances throughout the life of the operation.

All commitments and procedures contained within this plan and the performance of MML against the Minister's Conditions will be audited internally by MML and externally by the relevant authorities, including the Department of Industry and Resources and the Department of Environment.

1.2.1 Proponent Commitments

MML makes the following commitments to dust management in the EPS:

Dust Management	
3.8.2	Dust will be suppressed by a high pressure water system in the crushing plant.
3.8.3	Dust suppression measures will include: <ul style="list-style-type: none"> • Water trucks will be used on a needs basis to spray water on operational surfaces to suppress dust. • The ROM stockpile area will be watered with either a water cart or sprinklers to suppress dust generation. • The unsealed haul road will be watered by water trucks to suppress dust.
3.10.4	Haulage trucks will have dust covers covering the ore in the trailers.
8.10.5a	Site personnel will visually monitor dust levels during construction and operation of the project. Dust suppression measures will be instituted using water trucks, spray bars and other means as necessary, in the event that high levels of dust are observed, and/or strong winds and dry conditions make dust generation likely.
8.10.5b	Site personnel will monitor dust deposition on the <i>Triodia</i> plant communities, and other vegetation communities visually and also using dust deposition gauges, to ensure there is no detrimental effect from dust.
8.10.5c	Prevailing wind information will be utilised to, where possible, undertake blasting when wind directions are blowing away from the remaining T3 plant community, which is located in close proximity east and north-east of the pit.
8.10.5d	Dust minimisation, management and monitoring measures will be implemented in accordance with the Dust Management Plan.

1.2.2 Ministerial Conditions

Not yet determined.

1.3 OBJECTIVES

The objectives of the Dust Management Plan are to:

- Minimise dust emissions within the project area.
- Ensure that dust emissions meet appropriate criteria and do not cause environmental problems.
- Prevent any adverse impacts on environmentally significant flora and vegetation communities.

1.4 PROJECT AREA

The Jack Hills Iron Ore Project is located about 350 kilometres north-east of the port of Geraldton and 100 kilometres west of the town of Meekatharra in the Murchison region of central Western Australia (Figure 1). The project area comprises the Jack Hills prospect and the mine and processing plant will be located on Mining Lease 20/506. The main access to the project area from Cue will be via the Beringarra-Cue public road. This route is covered by Miscellaneous Licence 20/47. The accommodation village will be located approximately three kilometres to the north-east of the mine. The waste rock dump will be situated approximately 250 metres north and east of the mine.

A more detailed description of the project and the prevailing environmental conditions is provided in the EPS (MBS Environmental, 2006).

1.5 DEFINITIONS

Dust is considered to be any particle suspended within the atmosphere. Particles can range in size from as small as a few nanometres to 100 microns (μm) and can become airborne through the action of wind turbulence, by mechanical disturbance of fine materials or through the release of particulate rich gaseous emissions. Most mine originated dust is chemically inert, however there is the potential for more harmful and persistent particulate contamination to occur from mining ore containing or associated with certain products, such as asbestos, radioactive materials or heavy metals. Emissions from operating machinery not included as greenhouse gasses can also be classed as dust particulates.

Dust is measured using a variety of methods, the most common being Total Suspended Particulates (TSP), which nominally measures up to $50\mu\text{m}$, and PM_{10} or $\text{PM}_{2.5}$ (particulate matter less than $10\mu\text{m}$ or $2.5\mu\text{m}$ in size, respectively). Deposited matter measures the mass of any particulate falling out of suspension expressed in mass per area per time, and is the least commonly used in determining dust concentrations (Environment Australia, 1998). The NEPM for Ambient Air Quality sets criteria for fugitive dust emissions are listed in Table 1.

Table 1: NEPM Ambient Air Quality Criteria

Pollutant	Averaging Period	Maximum Concentration	Goal Within 10 years Maximum Allowable Exceedance
Particles as PM_{10}	1 day	$50\mu\text{g}/\text{m}^3$	5 days
Particles as $\text{PM}_{2.5}$	1 day	$25\mu\text{g}/\text{m}^3$	Goal is to gather sufficient data nationally to facilitate a review of the standard as part of the review of this Measure scheduled to commence in 2005
	1 year	$8\mu\text{g}/\text{m}^3$	

1.6 RELEVANT LEGISLATION AND GUIDELINES

MML, its employees and contractors will comply with all Commonwealth and State legislation that applies to the development and operation of the Jack Hills project. Legislation, policy and guidelines relevant to the Dust Management Plan are presented in Table 2.

Table 2: Relevant Legislation and Guidelines

State Government Legislation	Application
<i>Environmental Protection Act 1986</i>	EPS Assessment and Ministerial Approval Process
<i>Mines Safety and Inspection Act 1994</i>	Assigns responsibility for worker health and safety on mining operations
<i>National Environment Protection Council (Western Australia) Act 1996</i>	Establishes National Environmental Protection Measures (NEPM)
Commonwealth Legislation	
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Maintenance of biodiversity values surrounding the operation
State Government Guidelines	
Land Development Sites and Impacts on Air Quality	Management of on-site air quality issues during construction
Ambient Air Quality NEPM	Prescription of acceptable air pollutant concentrations
National Pollutant Inventory NEPM	
Commonwealth Government Guidelines	
Dust Control	Best Practice Environmental Management in Mining

There are no single standards or limits applied universally throughout Western Australia. A review of a range of standards is listed below:

1. The *Environmental Protection (Kwinana Atmospheric Wastes) Policy 1992* (“Kwinana EPP”) has specified levels of pollutants (including particulates) in defined zones around the Kwinana industrial area as shown below.

Area	Description	Standard (TSP ug/m ³)	Limit (TSP ug/m ³)	Averaging period
A	Central industrial area.	150	260	1 day
B	‘Transition area’. Some residential	90	260	1 day
C	Residential areas	90	150	1 day

2. The National Environment Protection Council (NEPC), in 1998, set health-based ambient air quality standards for six pollutants, including particles as PM₁₀. The standards and goal are shown below:

Pollutant	Averaging Period	Maximum Concentration	Goal Within 10 years – Maximum Allowable Exceedences
Particles as PM ₁₀	1 day	50ug/m ³	5 days per year

3. NPI emission estimation techniques provide a relationship between Total Suspended Particulates (TSP) and PM₁₀ for fugitive dust emissions.

Factor	Reference	
Blasting	A1.1.1.9	PM ₁₀ = 52% of TSP
Drilling	A1.1.1.8	PM ₁₀ = 0.31/0.59 (52.5%) of tsp
Wind erosion	A1.1.15	PM ₁₀ = 50% of TSP

Using the NPI factor of PM₁₀ = 52% \times TSP, the Kwinana EPP standards and limit can be converted as shown below.

	TSP	PM ₁₀
Area B & C standard	90	47
Area A standard & Area C limit	150	78
Area A & B limit	260	135

	PM ₁₀	* Approx TSP
DOE Pilbara Air Quality study. Port Hedland, interim target	150	290

* Using NPI conversion factor in 3 above.

The review of various guidelines, targets and standards above demonstrates:

- There is no single standard currently being applied specifying “acceptable” residential/sensitive area dust levels.
- There is currently a 300% range in standards currently being applied (50 to 150 ug/m³ PM₁₀).
- Both TSP and PM₁₀ are being measured, with an acceptable conversion factor in use at both Federal and State government agencies.

The standards and guidelines above are generally applicable to human health and amenity issues. Their relevance to potential impacts on flora species has not been determined.

Specifically, the above values are a measure of airborne particles. In the case of potential impacts to flora species, impacts are most likely to be caused as a result of dust deposition on leaves, blocking stomata and inhibiting photosynthesis. The more relevant factor is therefore dust deposition rather than airborne concentration. There are no dust deposition guidelines relating to health or condition rating of plant species.

1.7 CLIMATE

The severity and extent of dust emissions is largely influenced by climate. Hot, dry conditions result in more favourable conditions for dust lift, while dust deposition is strongly influenced by wind strength and direction.

The Jack Hills project falls within the semi-arid region of Western Australia, with hot summers and mild winters. The average annual rainfall is 237 millimetres, distributed fairly evenly throughout the year, and with considerable annual variation.

The nearest climate recording station to the project area is located at Meekatharra, 100 kilometres to the east. Wind roses available from the Bureau of Meteorology indicate that the prevailing summer winds are from the east and northeast in the morning and east and south-east in the afternoon. Prevailing winter winds are from the east and north-east in the morning, and more predominantly from the northwest and west in the afternoon, although easterly winds are also prevalent.

2. RESPONSIBILITY AND REPORTING

Overall responsibility for ensuring that the site environmental management requirements are met during the life of the operation will rest with MML's Project Manager. In respect of the Dust Management Plan, this responsibility will include:

- Ensuring that all construction and operational personnel, both the proponent's workforce and contract personnel, conform with requirements pursuant to the Management Plan.
- Ensuring that contractor staff are fully inducted and aware of their environmental responsibilities and obligations.
- Ensuring that monitoring requirements are being met.

Contracting companies undertaking construction or operational roles will be required to appoint an environmental representative. The key responsibilities of this representative will be to:

- Maintain routine contact with the proponent's Project Manager to ensure that environmental objectives of this plan are being met.
- Provide monthly reports to the proponent's Project Manager on environmental issues and conduct regular audits.
- Ensure that all management aims and monitoring requirements of the Dust Management Plan are being met.

3. PREDICTED IMPACTS

Dust associated with mining activity is usually generated as a result of the disturbance of fine particles derived from soil and rock, and the handling of bulk construction materials such as crushed hard rock aggregate. Removal of the layer of vegetation and stable soil which would normally form a seal against wind dispersion also contributes to this process. Consequent environmental effects are usually localised and depend on the size of the dust particles and the strength of distributing factors and usually decrease rapidly with separation from the source. Under adverse weather conditions, however, dust can travel considerable distances, potentially resulting in its deposition in otherwise remote locations.

In the immediate vicinity of the source, dust can stress vegetation through blocking stomata (adversely affecting gas exchange) and reducing light availability (reducing photosynthetic ability and limiting plant growth). Depending on the type and size of dust particles, can also pose a human health risk through inhalation.

Mining activities are likely to generate dust as a result of activities such as:

- Removal of vegetation and topsoil.
- Light and heavy vehicle movements over unpaved surfaces.
- Construction of haul roads and tracks.
- Drilling and blasting.
- Mining operations such as pit excavation and overburden and waste removal.
- Ore handling.
- Ore transport.
- Stockpiling.
- Crushing.

The project is located in a semi-arid environment, experiencing dry summer months, during which time dust generation is expected to be at a peak. The distance between the project site and the nearest residential community, other than the project camp, is such that the risk of dust impacts from the operation on residences is negligible. The greatest potential for impact will be within the immediate environs of mining activities, including the on-site construction camp, and on the surrounding vegetation. Accordingly, dust suppression measures will be necessary to mitigate any consequent adverse effects of construction related dust.

Potential impacts include:

- Reduced visual amenity.
- Smothering of surrounding vegetation.
- Adverse impact and disturbance to fauna.
- Risk to human health.
- Nuisance.

4. MANAGEMENT ACTIONS

For the purposes of achieving the stated objectives of this Dust Management Plan, measures to manage dust in this management plan are categorised according to the potential sources from:

- General mining activities, including construction, extraction, crushing, stockpiling and haulage.
- Traffic on roads, including access and haul roads.
- Blasting.

4.1 GENERAL MINING ACTIVITIES

The following measures will be employed to minimise dust emissions:

1. A 'minimum clearing' policy will be adopted to ensure that vegetation is cleared only when and where necessary. In instances where the clearing of extensive areas is unavoidable, additional dust suppression techniques will be employed to ensure stabilisation of the cleared surfaces. When clearing:
 - Where practicable vegetation will be salvaged from the site to be cleared (taking care to limit the amount of soil disturbance) and retained;
 - Topsoil will be removed to the maximum depth practicable and consistent with best operational practice;
 - Where practicable, topsoil will be directly transferred to exposed surfaces requiring rehabilitation and covered with salvaged vegetative material;
 - Where direct transfer of topsoil is not possible, it will be stockpiled and stabilised with previously salvaged vegetation; and
 - Topsoil stockpiles will be further stabilised by encouraging native vegetation to establish and, if necessary, appropriate stabilising emulsion will be applied to supplement these measures.
2. As practicable and consistent with operational requirements, disturbed areas will be progressively rehabilitated, to reduce the potential for windborne dust generation.
3. Truck mounted sprays will water unsealed, regularly trafficked areas such as access tracks, work areas and haul roads as conditions require.
4. Water sprays will be fitted to dump hoppers, crushing and screening plants and stackers.
5. A monitoring programme will be implemented to quantify dust levels, identify dust generating sources and to determine ambient dust levels.
6. Any blasting required to facilitate construction will be conducted only under favourable wind and weather conditions.
7. Routine housekeeping practices will be employed to contain and collect any spillages that could contribute to dust generation around conveyors, loading / unloading areas and sediment traps.

8. In the event that dust levels exceed acceptable limits, dust suppression measures will be immediately reviewed and more stringent measures implemented as appropriate.
9. If additional dust control measures are required and dust suppressant products are deemed necessary, only environmentally benign products will be used.
10. All personnel (including contractors) will be informed of their responsibilities and the importance of minimising ambient dust levels during site inductions.
11. Other methods of minimising site disturbance will be undertaken, including limiting vehicle speeds and restricting access to some areas.
12. Any complaints received will be registered and will trigger a review of the relevant dust management procedure/s by the Project Manager as a basis for development and implementation of appropriate modified practice/s.

4.2 HAUL ROADS

The impacts of the haul road on the immediate surrounds come not only from the dust generated through vehicle movement, but also from the potential for spillage of crushed material being transported between the mine and port.

For the purposes of minimising dust generation from the haul road, the following measures will be employed:

1. Vehicle speeds will be restricted on unsealed surfaces. It is proposed to restrict vehicle speeds on haul roads within the ridge area to 40 kilometres per hour.
2. Water will be regularly applied to haul roads via controlled spray or dribble bars.
3. All loads bound for Geraldton will be covered.

4.3 BLASTING

Blasting is the greatest single source of dust generated by the mining operation. Due to the close proximity of the mine to environmentally sensitive vegetation communities, attention shall be given to minimising the impact of fugitive dust arising from blasting at this site.

The following measures will be employed to minimise dust from blasting activities:

1. Methods for minimising the amount of dust produced by drilling and blasting operations will be investigated and applied where applicable.
2. Climatic conditions will be monitored and the data used to assist with planning blast events. Prevailing wind information will be utilised to, where possible, undertake blasting when wind directions are blowing away from the remaining T3 plant community, which is located in close proximity east and north east of the pit.
3. The surrounding vegetation will be the subject of a monitoring programme designed to enable early detection of adverse impacts as a result of dust deposition. In particular site personnel will monitor dust deposition on the surrounding *Triodia* plant communities.

5. PERFORMANCE INDICATORS

MML will ensure that all realistic, best practice measures to prevent or minimise the generation of dust from mining activities will be implemented for the duration of the project, and the effectiveness of the Dust Management Programme will be reviewed against the following indicators:

- The level of complaints received and registered.
- The level of complainant satisfaction achieved.
- The absence of fugitive dust originating from cleared areas, product stockpiles and other nodes of mining activities.
- The level of impact on vegetation adjacent to cleared areas, haul roads, access tracks and the mine.

Using these performance indicators, the proponent will undergo continuous review of its dust management procedures and will adjust target levels as improved resources, capability or technical understanding is achieved.

6. MONITORING

Dust monitoring will be undertaken by MML throughout the duration of the project. Monitoring will include:

1. Baseline deposition dust monitoring prior to the commencement of ground disturbing activities to determine background levels of dust.
2. Deposition dust monitoring to ensure the effectiveness of dust management. Monitoring will provide for assessment of both short-term events (such as blasting) and long-term impacts from the mining operation.

Dust deposition gauges will be used to measure the levels of deposition of dust.

3. Monitoring will conform to the relevant methods outlined in Table 3.
4. Dust deposition gauges will be located within environmentally sensitive areas (e.g. *Triodia* plant communities - see Figure 1).
5. Inspection of the health of native vegetation, in particular environmentally sensitive vegetation communities (eg. *Triodia* plant communities) and around the dust deposition monitoring sites.
6. Control monitoring locations (i.e. located away from the operational areas) will also be monitored for dust deposition levels and health of native vegetation.
7. Visual dust monitoring by relevant operational personnel will occur constantly and be incorporated into the general operational procedures. Monitoring will focus on dust generating activities such as vehicle traffic and blasting.
8. A complaints register will be maintained, any complaints received will be investigated, and the dust suppression methods employed reviewed. Suitable remedial actions will be undertaken as necessary and practicable.

Table 3: Australian Standards for Particulate Monitoring

Pollutant	Method Title	Method Number
All	Ambient Air – Guide for the Siting of Sampler Units	AS 2922
All	Workplace Atmospheres – Methods for Sampling Respirable Dust	AS 2985
All	Workplace Atmospheres – Methods for Sampling Inspirable Dust	AS 3640
Total Suspended Particles (TSP)	Determination of Total Suspended Particles	AS 2724.3

It is proposed to utilise the data from both the dust deposition and native vegetation health monitoring, as a basis to develop appropriate operational dust deposition targets.

Specific dust trigger targets have to be linked to the potential impacts on surrounding sensitive native vegetation. It is considered that the only viable way to achieve this is to gather site-

specific ambient dust deposition data over a period of time and correlate this with corresponding native vegetative health assessments. Table 4 shows the process proposed for the first 12 months of operations to establish an interim trigger target. The review of the first year's operation will establish an interim trigger target and a review process for further monitoring.

Table 4: Process to Establish Dust Deposition Trigger Levels

No.	Action	Time	Outcome	Contingency measures
1	Dust depositional monitoring.	Ongoing. Commencing from construction.	Establishing baseline data.	
2	Flora health assessment.	Monthly for the first 12 months.	Establishing baseline data in sensitive vegetation communities.	If monthly vegetation health assessment identifies significant adverse impact to vegetation, MML is to consult with DOE and CALM immediately to prepare an action plan to resolve the cause of the impact and prevent further adverse impact occurring.
3	Annual review of data, in consultation with DoE and CALM.	12 months from commencement of construction.	Review baseline data to establish any correlation of dust deposition with impact on vegetation and identify an interim dust deposition trigger level. Establish a contingency action plan, to be implemented by MML in the event the interim trigger level is exceeded.	
4	Develop a review process.	3 months from the commencement of the first annual review (item 3).	Any amendments required to the frequency and format of monitoring. A schedule for further reviews of the results. Possible review of interim trigger level.	
5	Ongoing monitoring of dust deposition and vegetation health.	Frequency as determined from the first annual review.	Further development of baseline data.	

7. TIMING

7.1 GENERAL MINING ACTIVITIES

Dust control procedures pertaining to general mining activities are to be employed at all times during the construction and operational phases of the project. Particular attention is to be given to dust control procedures during dry periods, where dry soils and lengthy periods of dry winds enhance the potential for dust lift.

7.2 HAUL ROADS

Spraying of haul roads is to be undertaken as required, based on measured dust levels and visual observations. Given that the project area is within a semi-arid environment, prevailing climatic conditions will be conducive to dust generation. As such, it is envisaged that the frequency of the use of water trucks will be high and can be considered as a component of daily/shift operations (i.e. utilised on a fairly constant basis). The watering of haul roads will be a component of the mining contract and be one of the stated required activities to be undertaken during each operational shift.

The effectiveness of the spraying regime is to be periodically reviewed. Particular attention is to be given to dust control procedures during dry periods, where dry soils and lengthy periods of dry winds enhance the potential for dust lift.

7.3 BLASTING

The procedures for dust management during blasting are to be observed whenever blasting is undertaken.

7.4 MONITORING

Dust monitoring will be undertaken using deposition dust gauges prior to the commencement of construction. Following 12 months of mine operation, the frequency of monitoring will be reviewed. Figure 1 shows the proposed dust monitoring locations.

8. DECOMMISSIONING

During decommissioning, all rehabilitation and decommissioning activities will be undertaken in accordance with the procedures outlined in this Dust Management Plan, consistent with the requirements of the final Decommissioning and Closure Plan.

9. AUDITING

MML will conduct periodic internal audits of dust control and monitoring measures.

10. REPORTING

10.1 INTERNAL REPORTING

All MML employees and contractors will be required to report generation of significant dust plumes and any observations made of significant levels of dust deposited on vegetation or excessive build-up of silt in sediment traps to the Project Manager via their supervisor.

10.2 ENVIRONMENTAL REPORTING

All records of dust monitoring kept in accordance with this plan will be summarised in the Annual Environmental Review, which will be submitted to the Department of Industry and Resources and Department of Environment.

10.3 PERFORMANCE REVIEW

Performance reviews will be undertaken following feedback from regulatory authorities of the Annual Environmental Report.

11. TRAINING

All employees and subcontractors will be required to undergo a site-specific induction, outlining environmental controls to be implemented during construction and operation. The induction will provide necessary awareness of dust management and the procedures and work practices to minimise and report dust generation.

Regular toolbox meetings will also be held to reinforce a positive attitude towards dust management and to highlight any issues that arise during the course of construction. A record of all training will be maintained.

12. MANAGEMENT PROGRAMME SUMMARY

Table 5 provides a summary of management actions.

Table 5: Summary of Management Actions

Objective	Item	Relevant Phase	Task / Requirement	Timing	Performance Indicators	Responsibility	Related Plans/ Procedures	Section Reference
Minimise the impact of dust from general mining activities	12.1	Construction and Operation	Implement a minimum clearing policy to ensure that vegetation is cleared only when and where necessary. In instances where the clearing of extensive areas is unavoidable, additional dust suppression techniques will be employed to ensure stabilisation of the cleared surfaces.	Ongoing	No unnecessarily cleared areas evident	Project Manager	Construction EMP Vegetation Management Plan Staff induction/training	4.1
	12.2	Construction and Operation	Progressively rehabilitate disturbed areas, where practicable and consistent with operational requirements	Ongoing	Successful establishment of vegetation on rehabilitated surfaces	Project Manager	Construction EMP Rehabilitation Plan Decommissioning and Closure Plan Staff induction/training	4.1

Objective	Item	Relevant Phase	Task / Requirement	Timing	Performance Indicators	Responsibility	Related Plans/ Procedures	Section Reference
	12.3	Construction and Operation	Watering by truck mounted sprays or dribble bars of regularly trafficked areas such as access tracks, haul roads and work areas as conditions require	Ongoing	Minimal dust lift during traffic movements	Project Manager	Construction EMP Staff induction/ training	4.1
	12.4	Operation	Water Sprays fitted to dump hoppers, crushing and screening plant and stackers	Pre-construction	Minimal dust generation from mine plant	Project Manager	Construction EMP Staff induction/ training	4.1
	12.5	Construction and Operation	Monitoring of ambient dust levels	Ongoing	Dust levels remain within the relevant criteria	Environmental Manager	Staff induction/ training	4.1
Minimise the impact of dust from general mining activities	12.6	Construction	Where practicable, undertake construction related blasting during favourable wind and weather conditions.	Construction	Dust plumes resulting from construction related blasts are negligible and drift away from environmentally sensitive areas	Construction Manager	Staff induction/ training Run of Mine Plan	4.1
	12.7	Construction and Operation	Employ routine housekeeping practices to contain and collect any spillages that could contribute to dust generation around conveyors, loading / unloading areas and sediment traps	Ongoing	No evidence of accumulation of dust generating material	Project Manager	Staff induction/ training	4.1
	12.8	Construction and Operation	In the event of acceptable dust levels being exceeded, undertake immediate review of dust suppression methods and employ more stringent methods or cease operations	Ongoing	Dust levels return to acceptable limits	Environmental Manager Project Manager	Emergency Response Procedures	4.1

Objective	Item	Relevant Phase	Task / Requirement	Timing	Performance Indicators	Responsibility	Related Plans/ Procedures	Section Reference
	12.9	Construction and Operation	Use only environmentally benign dust suppression products when required	Ongoing	Dust suppressants do not have a negative impact on the environment	Project Manager	Staff induction/ training	4.1
	12.10	Construction and Operation	Identify and, where practicable, control previously unidentified dust sources	Ongoing	Additional sources of dust are controlled	Environmental Manager	Staff induction/ training Dust Monitoring Programme	4.1
	12.11	Construction and Operation	Inform all MML employees and contractors of their responsibilities regarding reporting and minimising dust generation	Ongoing	Employees and contractors are proactive in reporting dust generation	Training Manager	Staff induction/ training	4.1
	12.12	Construction and Operation	Undertake other methods of minimising site disturbance, including limiting vehicle speeds and restricting access to some areas	Ongoing	Methods for minimising disturbance are implemented as and when required	Project Manager	Dust Monitoring Programme Environmental Review	4.1
Minimise the impact of dust from general mining activities	12.13	Construction and Operation	Review and, where practicable, implement alternative dust management procedures in response to complaints received	Ongoing	Complaints acted on promptly	Project Manager	Complaints Procedure	4.1
Manage dust emissions from Haul roads	12.14	Construction and Operation	Restrict vehicle speeds on unsealed surfaces	Ongoing	Dust lift from unsealed surfaces is minimal	Project Manager	Traffic Management Plan	4.2
	12.15	Construction and Operation	Apply water to haul roads via controlled sprays or dribble bars	Ongoing	Dust lift from unsealed surfaces is minimal	Project Manager		4.2
	12.16	Operation	Cover loads bound for Geraldton	Ongoing	Spillage from loads bound for Geraldton is negligible	Project Manager		4.2

Objective	Item	Relevant Phase	Task / Requirement	Timing	Performance Indicators	Responsibility	Related Plans/ Procedures	Section Reference
Minimise dust deposition on environmentally sensitive areas	12.17	Operation	Investigate and, where practicable, implement procedures to minimise dust lift from blasting activities	Pre-operation	Dust lift from blasting activities is kept to a minimum	Project Manager		4.3
	12.18	Operation	Monitor climatic conditions and utilise data to assist with planning blasting events	Ongoing	Prevailing winds do not direct dust plumes towards environmentally sensitive areas or accommodation village	Environmental Manager		4.3
	12.19	Operation	Undertake blasting activities during favourable wind and weather conditions	Ongoing	Prevailing winds do not direct dust plumes towards environmentally sensitive areas or accommodation village	Environmental Manager Project Manager		4.3
	12.20	Operation	Monitor surrounding vegetation, in particular environmentally sensitive vegetation communities, to enable early detection of adverse impacts from dust	Ongoing	Dust deposition on environmentally sensitive areas is such that it does not have a detrimental impact on environmental values	Project Manager Environmental Manager		4.3

13. SUMMARY OF DUST MONITORING PROGRAMME

Table 6 provides a summary of the Dust Monitoring Programme.

Table 6: Summary of Dust Monitoring Programme

Objective	Item	Monitoring Action	Criteria	Frequency	Responsibility
Determine background dust levels	13.21	Install dust monitoring equipment as soon as practicable.	AS 2922 AS 2985 AS 3640	Ongoing	Environmental Manager
Measure effectiveness of dust management strategies	13.22	Employ the use of dust deposition gauges	AS 2724.3	Ongoing	Environmental Manager
Ensure management methods are protecting environmentally sensitive vegetation communities	13.23	Visual assessment of vegetation health and degree of dust deposition.	Vegetation health is maintained	Ongoing	Environmental Manager
Review and respond to complaints as applicable	13.24	Maintain a register of complaints. Review and act on complaints as and when required.	Complaints are kept to a minimum	Ongoing	Environmental Manager

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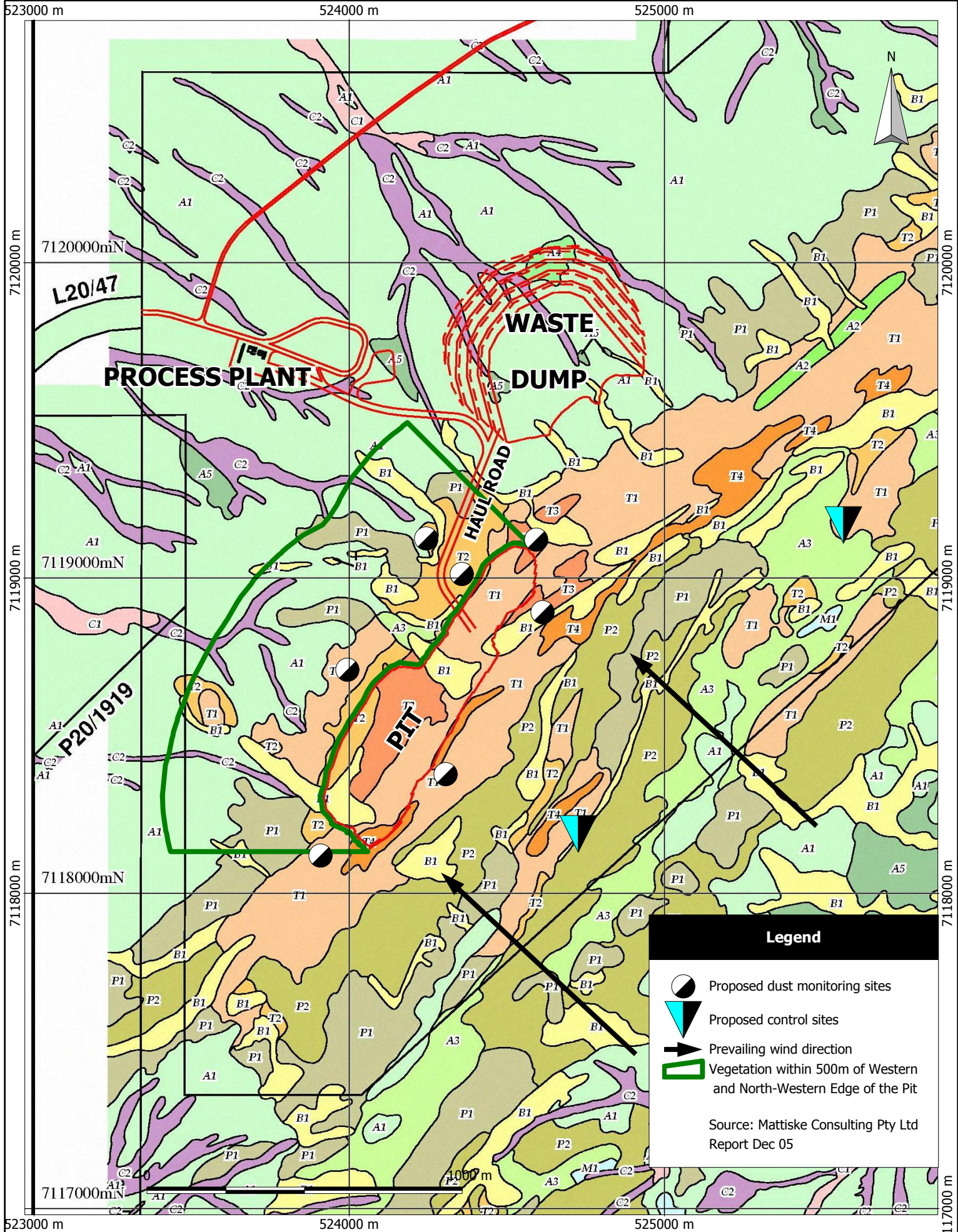
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FIGURES



VEGETATION MANAGEMENT PLAN:

**JACK HILLS IRON ORE PROJECT,
MURCHISON REGION, WESTERN AUSTRALIA**

MAY 2006

PREPARED FOR

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BY

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APPENDICES

- Appendix A: Murchison Metals Procedures and Forms

1. INTRODUCTION

This Vegetation Management Plan has been prepared in fulfilment of commitments made by Murchison Metals Limited (MML) in the Jack Hills Environmental Protection Statement (EPS) (MBS Environmental, 2006), and to address anticipated conditions set by the Minister for the Environment in approving the proposal.

This plan has been prepared to monitor and manage the impacts on vegetation for the following areas:

- Jack Hills mine area.
- Transport corridor.
- Accommodation village.
- Waste dumps.
- Explosives Magazine

The plan applies prior to construction and during the construction, operation and decommissioning phases of the project. The plan will be subject to ongoing review and therefore will be subject to change to ensure that it remains relevant and effective in light of technological advances throughout the life of the operation.

All commitments and procedures contained within this plan and the performance of MML against the Minister's Conditions will be audited by MML and externally by the relevant authorities, including the Department of Industry and Resources (DoIR), Department of Environment (DoE) and the Department of Conservation and Land Management (CALM). MML will report all land clearing in the Annual Environmental Report (AER). DoIR holds bonds calculated and secured for hectares of land disturbed.

2. OBJECTIVE

MML will minimise the impact on vegetation during all phases of the Jack Hills Iron Ore Project through implementing the following procedure. This procedure applies to any undisturbed vegetation area on the site where land disturbance is planned to be undertaken.

MML's Jack Hills project objectives for vegetation, flora and fauna management are outlined in Table 1.

Table 1: Vegetation Management Commitments for the Jack Hills Iron Ore Project

Objective	Target
All land clearing to be approved by relevant government permit or approval and the project permitting system.	0 incidents of unapproved land clearing each year.
Minimise clearing of native vegetation within approved area, with vegetation retained where possible.	Minimise land clearing.
Disturbed areas will be progressively rehabilitated.	100% of land available for rehabilitation is rehabilitated each year.
To prevent the introduction of invasive weed species into the project area, and to control any existing populations of weeds to prevent them from spreading.	100% of all earthwork equipment entering the site is inspected and washed down.
Conduct activities to minimise impacts on species of conservation significance.	No disturbance of Declared Rare flora and to avoid, minimise and mitigate any impacts to Priority Flora.
Prevent contamination of land, minimise and remediate spills.	100% of key personnel trained to contain and clean up spills.
Prevent erosion (wind and water) on disturbed surfaces.	Zero significant erosion on disturbed sites.

The EPA has the following objectives for the Jack Hills project:

- To maintain the abundance, diversity, geographic distribution and productivity of flora and fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.
- Protect flora and fauna and their habitats, consistent with the provisions of the *Wildlife Conservation Act 1950* and the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999)*.

3. RELEVANT LEGISLATION

Related Acts, Regulations and Standards relevant to the management of adverse impacts on vegetation, flora and fauna from all phase of MML's Jack Hills project are documented below.

- *Environmental Protection Act 1986.*
- *Environmental Protection (Clearing of Native Vegetation) Regulations 2004.*
- *Mining Act 1978.*
- *Wildlife Conservation Act 1950.*
- *EPBC Act 1999.*
- *Soil Conservation Act 1945.*
- EPA Guidance Statements No. 51 and 56 (Terrestrial Flora and Fauna).

4. POTENTIAL ENVIRONMENTAL IMPACTS

4.1 VEGETATION AND FLORA

Clearing of 103.2 hectares within the mine site and haul road will involve the temporary or permanent loss of native vegetation, which may result in the loss of protected flora species, plant communities with limited knowledge of their distribution or threatened ecological communities.

The *Triodia* communities, restricted to the BIF component of the range, will be impacted by the pit and ramp. Several Priority or significant flora species recorded in the Jack Hills project area will be impacted by the pit, mining infrastructure and haul road.

The waste dump, relocated to avoid the *Triodia* communities, will impact a small granite outcrop plant community.

4.2 WEEDS

Activities associated with the project have the potential to cause:

- The introduction of weed species not already present in the project area.
- The spread of weed species that may already be present in the project area.

The first priority is to prevent weeds being brought into the area on vehicles and equipment. Once established, weeds can be extremely difficult to eradicate, as seeds of some species (eg Ruby Dock) may persist in soil for fifty years or more.

4.3 SOIL EROSION

Once disturbed, soil binding by vegetation roots will be lost, and the potential for erosion by wind and water increases. Erosion can lead to the transport of nutrients, organic matter and plant seeds away from the affected area, making revegetation more difficult.

Areas most susceptible to soil erosion are those on higher landforms with steep slopes (exposed to wind and water) such as on waste rock stockpiles and embankments.

Driving on tracks in wet conditions can cause deep wheel ruts that restrict overland flow of surface water during rainfall events and can channel water causing severe gully erosion.

4.4 SOIL COMPACTION

The use of heavy machinery and constant vehicle traffic on access roads and tracks, and building of stable pads for construction of infrastructure cause soil compaction. Compaction of soil reduces the size and number of air spaces between the soil particles. This results in a reduced water holding capacity of the soil, inhibition of plant root penetration and reduction

of rainfall infiltration into the soil. This in turn affects the health and vigour of plants growing in the compacted soil.

4.5 FIRE

Many of Australian flora species are adapted to fire, and depend on fire for regeneration and survival. However, the situation changes when human activities modify the natural fire regime and fire-vulnerable floral communities instead become fire-prone.

Increasing the fire regime has the potential to impact on the environment through destruction of significant flora, destruction of fauna habitats, and exposure of burnt areas to wind and water erosion. Changes to the natural fire regime of an area can result in changes to vegetation seed setting, germination and health of plants as well as destroying fauna habitats.

The potential for fire may be increased as a result of mining activities such as hot work (welding etc) in uncleared areas.

4.6 CONTAMINATION

Soil and water contaminants have the potential to impact on the health and vigour of plant growth.

5. MANAGEMENT AND MITIGATION MEASURES

MML will implement the following measures during the project to minimise the impact on vegetation and maximise the conservation of the botanical and fauna values in the project area, namely:

5.1 LAND CLEARING

5.1.1 Environmental Surveys

Flora and fauna surveys of the area have been completed as documented in Mattiske Consulting Pty Ltd (December 2005) and MBS Environmental (August 2005 and November 2005).

Follow up flora and fauna surveys will be conducted in the project areas in February/March 2006 to supplement these flora surveys and to focus on Priority flora species in the low lands and specifically along the haul road route.

Further fauna surveys will be conducted to target specific fauna groups.

5.1.2 Approvals and Permits

Permits and Approval to Clear Native Vegetation

The relevant approval from the DoE or DoIR shall be obtained prior to clearing of any native vegetation that is not excluded from the DoE Permit system. Information on the area of land proposed for clearing shall be provided to the Environmental Manager by the relevant Project Manager or their delegate through the Murchison Metals Internal Land Clearing Approval Form. Every attempt shall be made to plan land clearing well in advance, as DoE approvals may take up to 12 to 14 weeks.

Should the area of land not have the relevant government approval for clearing and not be exempt from the permit process, the Environmental Manager shall submit the relevant application form and supporting documentation for approval to the DoE (refer to Murchison Metals Land Clearing Procedures in Appendix A). A copy of the application and supporting documentation shall be kept in the Land Clearing and Rehabilitation Register.

Where the clearing of land involves a significant change to the mining operations, the Environmental Officer shall also submit a plan of the new operations and land clearing, and a programme outlining how the environmental impact of the clearing and operation will be safeguarded, to the State Mining Engineer (DoIR) for assessment.

The Environmental Manager shall ensure any conditions outlined in the DoE Permit or by the DoIR are forwarded to the Project Manager. The Project Manager shall inform all earthworks personnel of the conditions prior to commencing earth works.

Approvals to Take Significant Flora

Should any Declared Rare flora (DRF) be identified, every attempt shall be made to not disturb the species. Should disturbance of DRF be necessary for mining activities, the Environmental Manager shall apply to CALM for an approval to take DRF in management operation. The application shall be submitted on the CALM form 'DRF2'.

Should disturbance of a Priority 1, 2, 3 or 4 species of flora be required, the Environmental Manager shall liaise with the Regional Office of CALM to determine the approvals required.

All correspondence with CALM with respect to Priority flora or DRF shall be kept in the Murchison Metals Environmental Correspondence Register.

Internal Permits to Clear or Disturb Land

All land clearing on site shall be approved with an internal permit using 'Murchison Metals Internal Land Clearing Approval' Form prior to the commencement of earthworks (refer to Murchison Metals Land Clearing Procedures). Each land clearing approval permit shall be authorised by the site Environmental Manager and the Operations Manager.

The person requesting the Permit shall provide appropriate details on the permit of the location (including a map), purpose of clearing, date clearing is to be completed, area of clearing required, marked on a map with GPS coordinates of the boundary, (ensuring area required to stockpile vegetation and topsoil adjacent to the cleared area, if required, is included) (as per Murchison Metals Internal Land Clearing Approval Form - Appendix A).

Conditions shall be documented on the Permit by the Environmental Manager. These can include requirements for the removal, stockpiling or re-use of topsoil and vegetation and clearing methodology for large areas (such as the open pit) using a 'from the inside –out' technique, to maximise the opportunity of fauna to move away from the clearing activity. A copy of the permit and conditions shall be provided to the person requesting the clearing (the Project Manager). The Project Manager shall then be responsible for ensuring earthworks operators are informed of the conditions and comply with all requirements of the permit.

The original Internal Land Clearing Approval Form shall be filed in the hardcopy Land Clearing and Rehabilitation Register. The location, purpose and area of land cleared shall be entered into the electronic database Land Clearing and Rehabilitation Register by the Environmental Manager. The total area of land cleared shall be reported in the AER.

Should an excavation of land be required in a vegetated area, the Project Manager shall be responsible for submitting a Permit to Excavate along with the Permit to Clear or Disturb Land.

5.1.3 Minimisation of Land Cleared

All Project Managers or persons requiring land to be cleared shall be responsible for ensuring that only the minimum area required to safely perform the activity is cleared. They shall appropriately plan the work to ensure previously cleared areas such as access tracks, fence lines, and service corridors are used wherever possible.

The Project Manager shall be responsible for ensuring the area to be cleared is clearly marked in the field and defined on plans using GPS coordinates. Earthworks operators are informed that only the demarcated area proposed for clearing is disturbed.

Project Managers shall also plan land clearing such that only the area of land required for immediate use is cleared. Areas requiring land clearing in the future shall be left vegetated until such time as they will be used.

Based on these principals the following measures have been taken:

- The project layout has been designed to minimise the clearing of vegetation and clearing will be limited to that which is necessary for the completion of the first stage of the project. Any expansion will require further detailed investigations and approval.
- Existing access tracks and transport routes have been used where possible.
- New transport routes have been located away from areas of environmental sensitivity such as the range, granite outcrops and drainages as much as possible.
- Pockets or strips of vegetation will be left undisturbed within areas cleared for infrastructure where the risk of fire, impacts on road safety or interference with mining operations is low.
- As an alternative to clearing vegetation, areas of low shrub will be clearly marked out for lay down areas where this use is temporary only, and does not increase the risk of fire.
- Areas to be cleared will be clearly defined on maps and in the field, and clearing activities will be supervised.

5.2 MISCELLANEOUS LAND DISTURBANCE

- Vehicles and machinery are to be parked in designated areas.
- Access to the range, other than the pit area, will be restricted as follows:
 - Only for MML personnel conducting environmental monitoring.
 - Exploration activities that have the appropriate permits.
 - MML induction will prohibit personnel from access to the range other than for monitoring, mining and exploration purposes.
 - Signage prohibiting access on the entry points will be erected and maintained.
- An environmental induction and awareness programme will be developed to raise the workforce awareness of conservation issues.
- Review other options for conserving the communities in the Jack Hills lease areas.

Additional Management Plans are in place to manage other potential impacts including:

- Jack Hills Project Dust Management Plan.
- Jack Hills Project Decommissioning and Closure Plan.
- Jack Hills Project Construction Management Plan.

5.3 REHABILITATION

The objective of the rehabilitation program is to minimise erosion potential and ensure local native plant species are re-established. It is anticipated that the rehabilitation program will result in establishment of a self-sustaining vegetation complex into which local fauna will be able to return.

Rehabilitation undertaken over the project area will be guided by the following principles:

- Minimise soil erosion; particularly on the batters of the waste stockpiles.
- Stockpile vegetative material and topsoil for later use.
- Rehabilitate completed areas as soon as practicable and where possible topsoil will be placed directly on nearby disturbed areas. If the latter is not practical then the length of topsoil stockpiling should be minimised wherever possible. Seeding with local native plant species.
- Fence waste stockpiles to minimise grazing impact.

Rehabilitation will be conducted according to details also outlined in the EPS document.

An annual plan of proposed rehabilitation areas will be prepared and submitted as part of the annual environmental reporting process. This plan will include areas, location details, site treatment needs and seed mixtures and a summary of proposed works.

Borrow pits will be battered and contoured to a safe and stable angle of less than 20 degrees, allowing the egress of fauna. When available, topsoil and subsoil will be spread over the base of the pits to a depth of 10 centimetres and ripped along the contours to a depth of 20 centimetres. The rehabilitation areas will be seeded with locally occurring native species. Diverted drainage will be maintained around the pits to prevent down stream reduction in flow or erosion of the pit embankments.

On completion of mining the open pit will have an abandonment bund constructed to specifications required by DoIR.

Design and rehabilitation of the Waste Rock Stockpile is based on waste characterisation and geotechnical conditions and will comply with existing DoIR guidelines. The final surface of the Waste Rock Stockpile will be shaped by a bulldozer. The need for reshaping will be kept to a minimum by adopting an appropriate dumping schedule.

The Waste Rock Stockpile will be designed to reduce the need to construct and maintain a comprehensive drainage system. This will include the following measures:

- To prevent water from the top of the stockpile eroding the batters, the upper surface of the Waste Rock Stockpile will be concave to provide an inward draining surface and also be sloped inwards to the face of the range.
- The upper surface of the Waste Rock Stockpile will be compartmentalised with windrows to 0.5 metres to prevent water from collecting in a single area on the top of the stockpile.

- The perimeter crest of the top of the stockpile and the leading edge of each berm will have a one metre bund pushed up to prevent water cascading down the face of the stockpile.

If available, rocky material and topsoil will be stripped from the advancing stockpile footprint and directly returned to a depth of about 150 millimetres over the shaped Waste Rock Stockpile.

The waste characterisation assessment (Appendix 2.5, Volume 2) has identified that dark green mafic schists and the browner BIF waste will blend well with the general landscape while also armouring the slopes and batters.

All topsoiled surfaces will be scarified on the contour to a depth of about 300 millimetres. The first rip line between berms will be surveyed to ensure that it is horizontal.

The Waste Rock Stockpile will be seeded with local native species. Local provenance seed from adjacent to the project area will be preferentially sourced. If insufficient seed is available from the adjacent area, seed will then be sourced from up to a 10 kilometres radius, to maintain the local provenance seed selection. If due to poor seasons, loss through bushfire, or poor viability of seed collected, insufficient seed of local provenance (within a 10 kilometre radius) is available, alternative sources will be selected in consultation with CALM. Direct seeding will be undertaken immediately prior to the expected onset of seasonal rains.

On completion of mining, all infrastructure, including the crushing plant, offices and workshops, power cables and bore equipment, will be removed. All concrete foundations will be broken up and buried. Approval is to be obtained by the Pastoral Lands Board and the Company for any infrastructure to be left on site at the end of operations that is required by the pastoralist. All items that cannot be sold, recycled or used off-site will be removed and buried in the on-site industrial landfill (located within the waste rock stockpile).

On completion of mining, the original ground level of all roads and disturbed areas will be restored as far as is practicable. Culverts will be removed and natural drainage reinstated. Barriers may be installed at various points to prevent unauthorised access.

All disturbed areas will be graded, covered with topsoil, ripped and seeded. Highly compacted areas will be deep-ripped to approximately 500 millimetres in depth.

Small scale hydrocarbon spills will be remediated in-situ using bioremediation absorbents. Larger scale contaminated soil will receive an application of bioremediation absorbents and then be excavated and disposed of at the project's industrial waste landfill (located within the waste rock stockpile) or as otherwise directed by regulatory authorities.

Filling of the landfill site will occur progressively over the life of the project. As part of the decommissioning and closure phase of the project, the waste at the landfill site will be capped with a clay layer (or other suitably low permeability material) to approximately 300 millimetres in depth and contoured to encourage runoff away from the waste. Material excavated in the construction of the landfill will be placed over the clay capping and contoured to blend in with the natural contours of the local area. The surface will be spread with topsoil, ripped and seeded. Seeding with deep-rooted species will be avoided on the landfill site, as deep roots may provide pathways for surface water to infiltrate the waste.

To assist with ongoing review of the rehabilitation and environmental management at the site, the proponent will submit an AER to DoIR and DOE as required by lease and approval conditions respectively.

5.4 WEED MANAGEMENT

Only one introduced species was found in the project area (*Cuscuta planiflora*) during vegetation and flora assessment surveys (Mattiske Consulting Pty Ltd 2005). The area has been subject to some grazing pressures (largely goats). The lack of introduced species in the Jack Hills project area appears to relate to the location of the project area on the upper ridges and slopes.

Weeds will be controlled through prevention, monitoring and early eradication as follows:

- Avoiding or minimising disturbance to areas with, or vulnerable to, weed infestation where practicable.
- Inspecting vehicles and machinery for soil and seeds when entering the site and washing them in designated areas if required.
- Inspecting disturbed and rehabilitated areas for weeds (particularly after rainfall events) and consulting with CALM and the Department of Agriculture as to the treating of infested areas.
- Raising awareness of the workforce in weed control.
- Rehabilitating disturbed areas progressively to discourage weed establishment.

5.4.1 Mobile Equipment Washdown

All mobile equipment shall be washed down and clean of mud, earth and seeds prior to entry to site. It is the responsibility of the Contract Manager or Department Manager to inform all earthworks contractors of the requirement to thoroughly wash their equipment prior to it arriving on site.

The Contract Manager or the Department Manager is also responsible for ensuring all earthworks equipment is inspected prior to commencement of work to ensure they have been adequately washed down. The inspection shall be documented by the Contract Manager or Department Manager on the Weed Inspection Certificate (Appendix A) and a copy of the certificate shall be forwarded to the Environmental Manager for filing in the Weed and Feral Animal Control Register.

A wash down area, with drainage water directed to a dedicated sump, will be located near the office area. All vehicles requiring entry to the site will be required to wash down before proceeding into the site.

The haul truck fleet are dedicated vehicles that are not used on other sites. They remain on established roads and highways and are considered to pose minimal risk to the introduction of weeds. These vehicles are not required to wash down at each return trip to the mine site.

5.4.2 Invasive Species Register

The project area, powerlines and roads shall be regularly inspected for invasive species by the Environmental Manager or their delegate. Locations of any populations shall be recorded in the Weed and Feral Animal Control Register by the Environmental Manager. The register shall also record the weed species, common name, surface area of coverage and the date and type of any control treatment applied (refer to Section 5.4.3).

Photographs of weed species known to be problematic in the area shall be posted on noticeboards such that all employees may be able to identify any populations around their work areas and report them to the Environmental Manager. The site induction will include information and photographs of a range of common weeds. This ensures all personnel on site are aware of weed species and their management.

Examples of weed species to be included in the induction and awareness programmes include:

Feather Grass



Tree Tobacco



Source: <http://www.naturebase.net/florabase/index.html>

Ruby Dock



5.4.3 Manual and Chemical Control

The Environmental Manager shall implement a manual or chemical control program wherever new weed species are identified on the Jack Hills Project and project access tracks, roads, and service corridors. Advice on the most effective control means for each weed species shall be sought from the Department of Agriculture and CALM.

The most likely locations of weed introduction on site include the wash down bay and sediment sump, visitor parking area and stores/laydown yards. Routine spraying of these areas will be undertaken to eradicate all germinating plants, prior to seed set, to ensure any weeds are eradicated from site.

All weed control activities shall be recorded in the Weed and Feral Animal Control Register, including the weed species, location, date and the type of control methods used.

5.5 FIRE MANAGEMENT

Firebreaks around the Jack Hills Project shall be regularly inspected and maintained to minimise the potential for ignition of native vegetation from mining activities. Fire management activities undertaken (e.g. fire break clearing) shall be recorded in the Land Clearing and Rehabilitation Register.

6. MONITORING

6.1 REHABILITATION

Rehabilitated areas will be monitored to ensure the success of the rehabilitation programme. Monitoring of rehabilitated sites will be undertaken to establish if targets set out in the completion criteria, developed in consultation with CALM, are being achieved. Monitoring will be carried out on a regular basis to assess:

- The physical stability of the landform of rehabilitated areas.
- The characteristics of the vegetation in rehabilitated areas.
- The establishment of self-sustaining ecosystems.
- Water drainage from the site.
- Any public safety aspects.

Ecosystem Function Analysis (EFA) shall be used to monitor rehabilitated sites. Persons undertaking the rehabilitation monitoring shall have attended an EFA workshop or course.

Monitoring the rehabilitated areas will ensure that any areas requiring remedial work are identified. Maintenance procedures will be carried out where necessary and may include:

- Replanting areas that may not have regenerated.
- Repairing any erosion problems.
- Weed control.

The frequency of monitoring will decrease as rehabilitation progresses and will cease when the rehabilitation objectives and completion criteria have been achieved. The results of these management and monitoring activities will be described in the AER to be submitted to the DoIR.

6.2 VEGETATION CONDITION MONITORING

Permanent vegetation plots will be established and monitored before, during, and after mining activities. The monitoring program will be developed prior to initial disturbance of the project.

7. PROCEDURE

7.1 SITE CLEARANCE PERMITS

Prior to any land clearing being undertaken, a 'Permit To Clear' form must be completed by the person initiating the clearing (the Project Manager), provided to the Environmental Superintendent for comment and the Operations Manger for approval. A copy of the Permit to Clear form is kept (refer to Appendix A for the Permit to Clear form and procedures).

The construction map shows the project area and defines the envelope in which clearing and construction activities can occur. Clearing will be restricted to the minimum area required for construction works. No clearing beyond the boundary of the project area will be approved.

MML has committed to avoiding certain areas in the EPS for the Jack Hills Iron Ore Project. Access to these areas during the construction stage is not permitted. The *Triodia* (Spinifex) plant community, and T3 especially, are of particular conservation significance and will not be disturbed. Should any disturbance of these areas be required, specific approval from Government regulatory authorities will need to be obtained. Access to the range will be restricted.

7.2 WEED INSPECTION CERTIFICATE

Prior to any equipment or machinery entering the Jack Hills Project area a Weed Inspection Certificate (Appendix A) will be completed and lodged with the Environmental Manager.

Any records of weeds found and their subsequent treatment will be recorded in the Weeds and Feral Animals Control Register (Appendix A). Any weeds found will be managed using the Weed Management Procedures (Appendix A).

8. RECORDS AND REPORTING

8.1 RECORD KEEPING

The Environmental Manager shall ensure all records are maintained in accordance with the site Document Control Procedure. Records relevant to this Vegetation Management Plan and other related Management Plans that shall be maintained include items listed in Table 2.

Table 2: Land, Flora and Fauna Records to be Kept for the Jack Hills Project

Record	Location	Responsibility
Murchison Metals Internal Land Clearing Approval	Land Clearing and Rehabilitation Register	Environmental Manager
DoE Area/Purpose Permits to Clear Native Vegetation		
Rehabilitation Monitoring Record Sheets	Rehabilitation Monitoring Database	Environmental Manager
Weed control activities	Weeds and Feral Animal Control Register	Environmental Manager
Non-compliance reports	Environmental Correspondence Register	Environmental Manager
Flora and fauna survey reports	Environmental Manager's office	Environmental Manager
Equipment Weed Certificates	Weeds and Feral Animal Control Register	Environmental Manager

8.2 NON-COMPLIANCE REPORTING

Any unapproved land clearing, or disturbance of environmentally significant sites shall be immediately reported on the project's Incident/Near Miss Investigation Report form by the Project Manager. The Project Manager shall be responsible for notifying the Environmental Manager and the Operation's Manager immediately upon noticing the non-compliance.

The Environmental Manager shall inform the relevant government regulatory authority, verbally, as soon as practicable after notice of the non-compliance. Written correspondence detailing the date, time and location of the non-compliance, any known environmental impacts, investigations planned or undertaken and corrective actions planned or taken is to be forwarded to the Director of the DoE within 24 hours.

Copies of all documentation relating to non-compliances are to be maintained in the Environmental Correspondence Register.

8.3 ANNUAL ENVIRONMENT REPORT

The following land management information shall be reported in the AER:

- Total land cleared against the DoE Permit approved total.
- Total disturbed areas rehabilitated.
- Rehabilitation and vegetation monitoring results.
- Weed control activities.
- Any non-compliance with respect to land management (i.e. unapproved land clearing).

9. VEGETATION MANAGEMENT PLAN DOCUMENTATION

The following documents form part of the Vegetation Management Plan:

Document Type	Document Title	Link
Procedure	Murchison Metals Land Clearing Procedures	..\Permits and Procedures\Land clearing procedure.pdf
Procedure	Land Clearing and Topsoil Stockpiling	..\Permits and Procedures\Land clearing and topsoil stockpiling.pdf
Procedure	Rehabilitation Monitoring	..\Permits and Procedures\Rehabilitation monitoring.pdf
Form	Internal Land Clearing Permit	..\Permits and Procedures\Internal land clearing approval.pdf
Form	Rehabilitation Monitoring Record Sheet	..\Permits and Procedures\Rehabilitation monitoring record sheet.pdf
Form	Weed Inspection Certificate	..\Permits and Procedures\Weed inspection certificate.pdf
Register	Weed Register	..\Permits and Procedures\Weed and feral animal control register.xls
Register	Land Clearing and Rehabilitation Register	..\Permits and Procedures\Land clearing and rehabilitation register.xls
Register	Rehabilitation Monitoring Database	Pending
Register	Weed and Feral Animal Control Register	..\Permits and Procedures\Weed and feral animal control register.xls

10. TRAINING AND AWARENESS

10.1 GENERAL SITE INDUCTION

The following information shall be provided to all employees and contractors in the environmental component of the General Site Induction:

- The project's objectives and targets with respect to land, flora and fauna management.
- The DoE and project permitting forms and procedures for approval to clear or disturb land.
- Requirements for all personnel to use existing tracks and roads and not to drive off road unless absolutely necessary.
- Description and location of any environmentally significant sites to be avoided by personnel (including information on Aboriginal heritage sites).
- Requirements for all earthworks equipment to be washed before arrival to site, and to be inspected and approved by the relevant Project Manager or Department Manager through the Weed Inspection Certificate process.
- Photographs of new weed species to be reported to the Environmental Manger for control.
- Species of conservation significance.
- Information on the impact of feral cats and other feral species on the environment, and the requirement for personnel not to interfere with any feral animal control program.

10.2 EARTHWORKS OPERATOR TRAINING

The Project Manager or Department Manager shall be responsible for ensuring all operators of earthworks machinery are appropriately trained and certified/competent to use the particular piece of machinery. The Project Manager or Department Manager shall also ensure the earthworks operators are made aware of the conditions for clearing as outlined by the relevant Permit to Clear or Disturb Land, and are informed of the location and protection requirements for any environmentally significant sites located in the vicinity of their work area.

10.3 ENVIRONMENTAL MONITORING TRAINING

Personnel required to undertake monitoring of rehabilitation or vegetation shall be provided with appropriate training from a person experienced in identifying flora of the Murchison region and rehabilitation/vegetation monitoring methodologies.

11. ROLES AND RESPONSIBILITIES

11.1 REGISTERED MANAGER

- Ensure appropriate resources are provided to implement the management and mitigation measures outlined in this document and associated procedures.
- Ensure all land clearing within the MML project area is conducted in compliance with this Management Plan and other regulatory requirements.

11.2 ENVIRONMENTAL MANAGER

- Ensure measures contained in this Plan are implemented.
- Ensure this Vegetation Management Plan is reviewed on an annual basis (including all procedures and registers referred to).
- Ensure all employees are provided with the training and awareness required to fulfil their obligations under this Management Plan (e.g. inductions, noticeboards and procedure reviews).
- Provide advice and assistance to all employees to ensure compliance with this Management Plan.
- Schedule flora and fauna monitoring surveys, weed control spraying and progressive rehabilitation as per this and other Management Plans.
- Compile disturbance data received from the Project Manager for the AER.

11.3 PROJECT MANAGER

- Ensure appropriate information and forms are supplied to the Environmental Manager when clearing is requested.
- Allow sufficient time for formal/additional assessment of land clearing to be undertaken by DoIR and DoE.
- Provide supervision of all contractors undertaking clearing on behalf of MML.
- Liaise with the Environmental Manager to arrange audits.
- Record all clearing and rehabilitation undertaken and communicate this to the Environmental Manager, and provide data for the AER.

11.4 ALL EMPLOYEES

- Follow correct land clearance procedures (as outlined in this Management Plan).
- Keep to existing tracks unless following advice from the Registered Manager or Environmental Manager.
- Keep off rehabilitation areas.
- Report any non-compliance with the Vegetation Management Plan to the Environmental Manager.
- Provide assistance in implementing and maintaining impact minimisation programs when requested by the Environmental Manager or Project Manager.

12. REFERENCES

Mattiske Consulting Pty Ltd (2005). *Flora and Vegetation on the Jack Hills Project Area*. Report prepared for Murchison Metals Limited.

MBS Environmental (2005). *Jack Hills Iron Ore Project, Murchison Region, Western Australia: Vegetation and Fauna Assessment*. Report prepared for Murchison Metals Limited.

MBS Environmental (2005b) *Notice of Intent for the Jack Hills Iron Ore Project, Murchison Region, Western Australia*. Report prepared for Murchison Metals Limited.

MBS Environmental (2006). *Jack Hills Iron Ore Project, Murchison Region, Western Australia: Environmental Protection Statement*. Report prepared for Murchison Metals Limited.

APPENDICES

APPENDIX A

Murchison Metals Procedures and Forms

Murchison Metals Internal Land Clearing Approval

Submit to the Environmental Department, 14 DAYS PRIOR to any new ground disturbing work

Project Manager:

Department:

Commencement date:

Completion date:

Size of area to clear:

hectare(s)

Date of application:

Cost centre for fees:

No. trees to be removed

Map *(must be attached)*

Photo *(not essential)*

PURPOSE OF CLEARING

Equipment to be used:

Depth of topsoil to be recovered:

Location of topsoil and vegetation stockpiles:

Environmental Department to complete

OTHER PERMITS REQUIRED

- Area Permit Application required Purpose Permit Application Heritage
 Licence to Take Rare Flora Other *(state which)*

AREA APPROVED TO CLEAR

- Works Approval No. EIA Approval No. Previous NOI approval
 Exemption from permit *(state reason)* _____

ENVIRONMENTAL CONDITIONS OF CLEARING

Project Manager to complete

I understand the environmental conditions applicable to this land clearance, and will ensure all persons associated with the clearing will comply.

Name:

Sign:

Date:

POST CLEARING INSPECTION

Issue	Yes	No	Comment
Correct area cleared (size and location)	<input type="checkbox"/>	<input type="checkbox"/>	
Minimal damage to vegetation outside of area	<input type="checkbox"/>	<input type="checkbox"/>	
Topsoil and cleared vegetation stockpiled in correct location	<input type="checkbox"/>	<input type="checkbox"/>	
Topsoil stockpiled < 2m high	<input type="checkbox"/>	<input type="checkbox"/>	

Other Actions Required	Accountability	Complete By	Completed

RECORDS

- Clearance entered in database
- Copy of approval/conditions forwarded to Project Manager
- Approval documents filed
- Actions forwarded to Project Manager

Murchison Metals Land Clearing Procedures

1. BACKGROUND

Objective

This procedure outlines how proposed land clearance is to be approved by the Environmental Department prior to the commencement of earthworks. The procedure ensures that all government permit requirements are met and clearing data is captured for reporting and rehabilitation purposes.

2. EQUIPMENT

- Nil

3. RESPONSIBILITIES

Department Managers

- Responsible for ensuring that approval is granted for all proposed land clearance prior to the commencement of earthworks
- Ensure land clearance is carried out in compliance with all environmental conditions imposed by either the Environmental Manager or the Department of Environment.

Environmental Manager

- Ensure the appropriate land clearance approval is obtained from Department of Industry and Resources
- Maintain land clearance information in the Land Clearance and Rehabilitation Register
- Ensure regular compliance inspections of land clearing activities

4. PROCEDURE

Step	Description	Responsibility
1.	Identify area of land requiring clearing. Produce a map that clearly shows the location and size of the area to be cleared.	Project Manager
2.	Complete the <i>Land Clearance Approval</i> form, attach the map, and forward to the Environmental Department <u>at least 14 days prior</u> to the proposed start date of earthworks.	Project Manager
3.	<u>DO NOT COMMENCE CLEARING UNTIL APPROVAL HAS BEEN GRANTED BY THE ENVIRONMENTAL DEPARTMENT.</u>	Project Manager
4.	Check in the compliance register if the proposed area of land to be cleared has been approved previously through a Works Approval, Environmental Impact Assessment Approval or other approval system.	Environmental Manager
5.	Check to see if the proposed area to be cleared is exempt from the DoE native vegetation permit process.	Environmental Manager
6.	If the area of land has not been previously approved and is not exempt, contact the Project Manager to discuss whether an Area Permit or a Purpose permit is most practicable for the clearing.	Environmental Manager
7.	Complete a DoIR Application for a Clearing Permit (Purpose Permit) or a Application for a Clearing Permit (Area Permit).	Environmental Manager

Step	Description	Responsibility
8.	Complete a Cheque Request form (with the cost centre allocated on the Land Clearing Approval form) and obtain a cheque for the permit fees (fees and cheque payable information can be found on the DoIR Application forms).	Environmental Manager
9.	Photocopy the cheque and DoIR application form and file in the Land Clearance folder in the Environmental Manager's office.	Environmental Manager
10.	Send original DoIR application form and cheque to the DoIR and inform the Project Manager the application has been sent.	Environmental Manager
11.	Once approval in writing has been received from the DoIR forward a copy of the approval and any environmental conditions on the clearing to the Project Manager.	Environmental Manager
12.	Discuss any environmental conditions on the clearing, area to be cleared, method to be used, and location of topsoil and vegetation stockpiles with all persons involved in the earthworks (at the pre-start meeting).	Project Manager
13.	Undertake regular inspections during the land clearing earthworks to ensure environmental conditions etc are being complied with. Immediately rectify any non-compliances (report to the Environmental Manager).	Project Manager
14.	File the original DoIR approval for the land clearing in the Land Clearance folder attached to the documents previously filed in step 9.	Environmental Manager
15.	After completion of the clearing (and preferably during the earthworks) undertake an inspection to ensure environmental conditions were complied with.	Environmental Manager
16.	Note any actions or non-compliance issues on the <i>Land Clearance Approval</i> form and forward a copy to the Project Manager to complete the actions.	Environmental Manager
17.	Record the information on the clearing in the <i>Land Clearance and Rehabilitation Register</i> .	Environmental Manager

5. SIGN OFF

I have read and understand the contents of this procedure. I have been shown how to complete this procedure in a safe and environmentally responsible manner.

Full Name	Position	Signature	Date

MURCHISON METALS LIMITED

LAND CLEARING AND TOPSOIL STOCKPILING

1. Background

Objective

This procedure outlines how land is to be cleared such that disturbance to native vegetation is minimised and environmentally significant sites are protected. The procedure also describes how vegetation and topsoil is to be removed from cleared areas for placement on rehabilitation sites or stockpiled for use on future rehabilitation. This procedure is aimed at ensuring compliance with all mining lease and environmental licence conditions, and the requirements of the Department of Environment (DoE) and Department of Industry and Resources (DoIR).

Legislation

Mining Lease conditions

Jack Hills Project Notice of Intent to Mine (2005)

Environmental Protection Act 1986

Environmental Protection (Clearing of Native Vegetation) Regulations 2004

Aboriginal Heritage Act 1972

EMS Links

- *Weed Inspection Certificate*
- *Permit to Clear or Disturb Land*
- *Land Clearing and Rehabilitation Register*

2. Equipment

- Earthworks equipment

3. Responsibilities

Project Manager (Or Department Manager)

- Ensure all clearing is approved prior to commencing earthworks.
- Ensure all earthworks operators are appropriately trained and competent to operate the machinery.
- Notify earthworks operators of clearing conditions on the Permit to Clear or Disturb Land, and the location of any significant sites (environmental or heritage) within the vicinity of the works and their protection requirements.
- Regularly inspect the earthworks and ensure the conditions of the Permit to Clear or Disturb Land and this procedure are complied with.

Earthworks Operators

- Ensure a Permit to Clear or Disturb Land has been approved prior to commencing earthworks.
- Follow all instructions and conditions outlined in the permit or this procedure.

Environmental Manager

- Inspect the earthworks to ensure all permit conditions and this procedure are followed.

LAND CLEARING AND TOPSOIL STOCKPILING

4. Procedure

Pre-Start Requirements

Step	Description	Responsibility
1.	Obtain an approved Permit to Clear or Disturb Land from the Environmental Manager.	Project Manager
2.	Peg the area to be cleared with survey pegs and flagging tape such that the area to be cleared is clearly marked.	Project Manager
3.	<p>Inspect any earthworks equipment that has newly arrived at site or may have been used in an area where weed species are recorded. Ensure the underside of the machinery and implements are free of weed seeds, pieces of vegetation and caked mud or earth.</p> <p>Any machinery that is not free of weed seeds, vegetation or caked earth must not be allowed to operate until it is thoroughly cleaned. Equipment should only be cleaned at a designated vehicle washbay.</p>	Project Manager
4.	Complete a Weed Inspection Certificate and provide a copy to the earthworks contractor supervisor. Forward the original certificate to the Environmental Manager.	Project Manager
5.	View the training and competency records of the earthworks operators (unless previously sited under the Contractor Management Plan and procedures). Do not allow operators to work if proof of competency has not been sighted.	Project Manager
6.	<p>Hold a pre-start meeting with the earthworks operators and supervisor to ensure they are advised of the following:</p> <ul style="list-style-type: none"> • The exact requirements of the earthworks (eg where the clearing pegs are located). • Any clearing conditions specified in the permit (including depth of topsoil to be removed). • The location where vegetation and topsoil are to be stockpiled or re-spread. • The location of any environmental or heritage significant sites to avoid. 	Project Manager

Earthworks

Step	Description	Responsibility
1.	Familiarise yourself with the area to be cleared, the requirements of the Permit to Clear or Disturb Land, and the location of any significant environmental or heritage sites. Do not clear any land until you have sighted an approved Permit to Clear or Disturb Land.	Earthworks Operator
2.	With the dozer or machinery blade resting on the surface of the ground remove the vegetation layer and push it to the area where the vegetation stockpile is to be located. If the vegetation is to be stockpiled elsewhere push the vegetation into an area where it can be easily loaded and removed.	Earthworks Operator

LAND CLEARING AND TOPSOIL STOCKPILING

Step	Description	Responsibility
3.	Once vegetation has been removed, commence the removal of topsoil to the depth specified in the Permit to Clear or Disturb Land. Push the topsoil to the area where it is to be stored. If the topsoil is to be stockpiled elsewhere, push the topsoil into an area where it can be easily loaded and removed.	Earthworks Operator
4.	Ensure the topsoil stockpile is less than two (2) metres high, and is not located in an area where it can be inundated by water, driven over or disturbed.	Earthworks Operator
5.	During earthworks, regularly inspect the activities and ensure the conditions of the Permit to Clear or Disturb Land, and this procedure are complied with.	Project Manager
6.	Should any non-compliance with the permit conditions or this procedure, or the potential disturbance of an environmental or heritage significant site be noticed or suspected, immediately stop the earthworks until the issues are solved.	Project Manager
7.	Undertake a post-clearing inspection and completed the relevant section in the Permit to Clear or Disturb Land form. Note any further actions required in the space provided on the form and assign responsibility for the actions to be completed by.	Environmental Manager
8.	Provide a copy of the Permit to Clear or Disturb Land to all persons given responsibility for the actions and enter the actions into the Environmental Action Register.	Environmental Manager
9.	File the completed Permit to Clear or Disturb Land in the hardcopy Land Clearing and Rehabilitation Register	Environmental Manager
10.	Record the location of the vegetation and topsoil stockpiles, volume and date in the Topsoil Stockpile worksheet of the Land Clearing and Rehabilitation Register.	Environmental Manager

5. Sign Off

I have read and understand the contents of this procedure. I have been shown how to complete this procedure in a safe and environmentally responsible manner.

Full Name	Position	Signature	Date

**MURCHISON METALS LIMITED
WEED INSPECTION CERTIFICATE**

Submit completed certificate to the Environmental Manager

Project or Department Manager to complete

Project Manager: _____ Department: _____
 Inspection Date: _____ Equipment Owner: _____
 Equipment Inspected: _____ Previous Location: _____
 Type: _____ Registration: _____

Inspection Results:

Area	Yes	No	Results
Exterior	<input type="checkbox"/>	<input type="checkbox"/>	Free of soil
	<input type="checkbox"/>	<input type="checkbox"/>	Free of vegetative matter (sticks, seeds, leaves, runners)
	<input type="checkbox"/>	<input type="checkbox"/>	Disinfected prior to arrival
	<input type="checkbox"/>	<input type="checkbox"/>	Free of animals and insects
Interior	<input type="checkbox"/>	<input type="checkbox"/>	Free of soil, dust and dirt
	<input type="checkbox"/>	<input type="checkbox"/>	Free of vegetative matter

Further Action Required:

Action	Completion Due By	Responsibility	Action Completed

Comments:

On inspection the aforementioned equipment has been found to be in a clean and weed seed free state, and has been approved for use at Jack Hills.

Name: _____ Sign: _____ Date: _____

Murchison Metals Weed Management Procedures

Murchison Metals Jack Hills Project Weed Management Procedures

Step	Description	Responsibility
	Before Entering Site	
1.	All Vehicles complete a Weed Inspection Certificate	Project Manager
	Ongoing	
1.	Identify target plant as a weed using the weed reference books in the Environmental office or botanical knowledge of the species selected.	Operator
2.	Contact site Environmental Officer to confirm selection of appropriate herbicide for treatment of the weed. Use weed reference books in the Environmental Office.	Operator
3.	Obtain MSDS sheets from the red files in the central filing system and product label information and read instructions. Obtain correct herbicide and PPE from the stores.	Operator
4.	Fill the backpack with the correct dose of herbicide, as given in the product label information.	Operator
5.	Add a small amount of dye to the mix to ensure the weeds are marked when they've been sprayed.	Operator
6.	Go to designated area for spraying and put on PPE and backpack.	Operator
7.	Ensure the correct spray setting is on the nozzle depending on what the target weed is and pump spray pack, spraying the weeds where it is specified in the weed book.	Operator
8.	If contact is made on skin, have a shower immediately afterwards. Wash overall/clothes used during spraying.	Operator
9.	Once spraying of area is complete, record the action in the Weed Register, ensuring details such as area sprayed, chemical and concentration are included in the file note. Inform the site Environmental Officer of completed action.	Operator
10.	Take photos of the area once the weeds are dying. This is for reporting in the annual environmental report.	Environmental Officer
11.	Undertake weekly inspections during the project works to ensure all weeds in the area are dying. If some weeds are not dying, undertake a respray program following the above steps from step 3.	Environmental Officer

Form: ECP	Weed Register	
Revision: 0		
Date:		

Project No: _____ **Site Location:** _____ **Date:** _____

Unit (Asset) No.	Plant Description	Location of last works undertaken	Date Cleaned & Inspected	Inspected by	Date due on site

Approved for access to site
 by _____
 Signature _____
 Position _____
 Date _____

MURCHISON METALS LIMITED

FERAL ANIMAL CONTROL

1. Background

Objective

This procedure outlines how feral cats are to be controlled on site (including trapping and humane euthanasia of trapped animals). For the control of other feral animals including foxes and goats a professional animal control contractor shall be contracted to complete the works.

Legislation

Jack Hills Notice of Intent to Mine (2005)

EMS Links

- *Weed and Feral Animal Register*

2. Equipment

- Cat cage traps
- Hessian bags
- Meat (steak or similar) and fish oil (or cat food)
- Euthanasia box and chloroform
- Riggers gloves
- Shovel

3. Responsibilities

Field Technician

- Set and check the traps and dispose of trapped animals humanely.
- Ensure the chloroform bottle is returned to the locked poisons cabinet immediately after use.

Environmental Manager

- Schedule feral cat trapping and record the success of each trapping session
- Organise for professional contractor to control feral animals other than cats.

4. Procedure

Step	Description	Responsibility
1.	For the control of feral foxes, dingoes, goats or animals other than feral cats, contact Animal Pest Management (or a similar reputable feral animal control company) on (08) 9725 3377. For feral cat control follow steps 2 to 14 below.	Environmental Manager
2.	Schedule trap setting for the late afternoon/early evening. Identify locations to place the traps, where feral cats have been reported or are known to frequent (eg waste landfill facilities, around the village kitchen or cribsrooms).	Environmental Manager
3.	Place a cage trap on flat ground, in a position that is hidden from general view (where possible).	Field Technician

FERAL ANIMAL CONTROL

Step	Description	Responsibility
4.	Rub a piece of meat with fish oil or cat food and thread it onto the hook inside the cage. Set the door flap of the cage open.	Field Technician
5	Place the cage inside the Hessian bag with only the door showing (or drape the Hessian bag over the top of the cage).	Field Technician
6.	Return to each cage location as soon as possible the next morning (preferably before 7am). If the cage is empty remove and dispose of the bait. Do not re-set the cage until later in the evening.	Field Technician
7.	If a cat has been trapped, wear riggers gloves and carefully pick up the cage and place it securely in the tray of the vehicle. Be wary of the cats sharp claws, and hold the cage securely as the cat may shift its body weight causing the cage to drop if not held securely. Check remaining traps.	Field Technician
8.	Place the euthanasia box in a well ventilated area. Place the entire cat trap cage (remove the Hessian bag) into the large compartment of the euthanasia box.	Field Technician
9.	Obtain chloroform from the locked poisons cabinet. Wearing rubber disposable gloves and in a well ventilated area, pour some chloroform (approximately 10 millilitres) into a bowl. Place a clean rag in the bowl to absorb and disperse the chloroform.	Field Technician
10.	Place the chloroform bowl and rag into the smaller section of the euthanasia box. Securely close the lid of the euthanasia box and leave undisturbed for at least 4 hours.	Field Technician
11.	Remove the cage from the euthanasia box (wear riggers gloves). If the cat awakens place it back in the euthanasia box and add a larger amount of chloroform to the chloroform bowl. Leave in the closed euthanasia box for another 4 hours.	Field Technician
12.	Dig a hole in a location away from buildings (or at the landfill facility), remove the cat from the cage and bury it ensuring the carcass is completely covered.	Field Technician
13.	Wash hands thoroughly with disinfectant or soap after handling the cage traps or dead cats. If scratched report to the site Paramedic as soon as possible to have the wound cleaned and treated.	Field Technician
14.	Enter the number of animals trapped and disposed of into the Weed and Feral Animal Control Register (if no animals were trapped record this in the register also).	Environmental Manager

FERAL ANIMAL CONTROL

5. Sign Off

I have read and understand the contents of this procedure. I have been shown how to complete this procedure in a safe and environmentally responsible manner.

Full Name	Position	Signature	Date

Murchison Metals Limited

Weed and Feral Animal Register

Species	Location	Easting (GDA94)	Northing (GDA94)	Treatment Date	Treatment Method	Comments

MURCHISON METALS LIMITED

REHABILITATION MONITORING

1. Background

Objective

This procedure outlines how rehabilitated areas are to be monitored to determine progress and assess the success of rehabilitation programs for mining affected lands including waste dumps and tailings storage facilities. This procedure is aimed at ensuring compliance with all mining lease and environmental license conditions, and the requirements of the Department of Environment (DoE) and Department of Industry and Resources (DoIR) with regard to environmental monitoring of rehabilitated areas. The procedure incorporates Land Function Analysis (LFA) concepts.

Legislation

Mining Lease conditions

Jack Hills Project Notice of Intent to Mine (2005)

EMS Links

- *Rehabilitation Monitoring Record Sheet*
- *Rehabilitation Monitoring Database*

2. Equipment

- Rehabilitation Monitoring Record Sheets
- Pens/marker pens/pencils, 100m tape measure, 3m retractable tape measure, flagging tape
- Star pickets and mallet/hammer (for setting up new monitoring sites)
- Water and open container for slake testing
- Handheld GPS
- Digital camera (and spare batteries if required)
- Field herbarium or flora identification books/notes
- 4 wheel drive vehicle with 2-way radio, first aid kit, drinking water, sunscreen and hat

3. Responsibilities

Sampler

- Undertake monitoring of rehabilitation as per this procedure and forward all record sheets, photographs and specimens to the Environmental Manager.

Safety and Environmental Manager

- Schedule and organise rehabilitation monitoring to take place annually (or as determined necessary according to individual site progress towards completion criteria) at close to the same time each year.
- Reviewing and reporting of monitoring results.

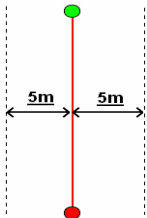
REHABILITATION MONITORING

4. Procedure

Setting up a New Monitoring Site

Step	Description	Responsibility
1.	Wearing leather 'riggers' gloves, hammer a star picket into the ground at the start of the new transect and record its GPS coordinate. Write the site Name/Number in white marker on the southern face of the picket.	Sampler
2.	Secure a 10m tape measure to the first star picket and walk it out the full 10m (directly down slope of the first star picket).	Sampler
3.	Place a second star picket into the ground and record its GSP coordinates. Write the site Name/Number in white marker on the southern face of the picket.	Sampler
4.	Take a photograph of the transect.	Sampler
5.	Forward all photographs and transect coordinates to the Safety and Environmental Manager.	Sampler
6.	Add the coordinates for both points of the transect onto the Rehabilitation Monitoring Site Locations map and into the Rehabilitation Monitoring Database.	Environmental Manager

Monitoring a Rehabilitation Site

Step	Description	Responsibility
1.	Secure the 10m tape measure to one star picket (to the higher star picket if monitoring a site on a slope, eg a waste rock dump). Walk the length of the tape measure to the second star picket, keeping the tape relatively tight and kink free to form the transect.	Sampler
2.	Enter all site information into the Site Description Data Sheet of the Rehabilitation Monitoring Record Sheet.	Sampler
3.	<p>Walk back along the tape measure and record the species diversity by listing all species occurring within 5m of either side of the transect. Record species on the Species Survey Data Sheet.</p> <p>Add any new species to the bottom of the Species Survey Data Sheet. Take a photograph and collect a sample of the new species for further identification.</p>	Sampler
		
4.	<p>Walk back along the transect recording the following information on 'run-on' areas (where there are obstructions likely to halt the flow of materials down slope, eg rip lines or fallen branches) and 'run-off' area (where loose materials can flow unhindered down slope):</p> <ul style="list-style-type: none"> • Distance to the start of the 'run-on' or 'run-off' area (as measured from the higher star picket when the transect is on a slope); • Width of the obstruction or 'run-on' catchment area; • 'Run-on' or 'run-off' identity (eg rocky slope, plant trough) • Soil surface condition. <p>Record this information on the Landform Organisation Data Sheet of the Rehabilitation Monitoring Record Sheet.</p>	Sampler

REHABILITATION MONITORING

Step	Description	Responsibility
4.	<p>Using the 3m tape measure 3m from the start of the transect and then lay the 3m tape measure at right angles from the transect line so that 1.5m of tape lies either side of the transect, and the area is sectioned into four quadrats.</p> <p>When facing the top of the transect, the quadrats are divided into A (top left), B (top right), C (bottom left) and D (bottom right).</p>	Sampler
5.	<p>In each quadrat measure the distance to the nearest plant (of height greater than 10cm) from the end of the transect line. Record the distance, plant height, breadth, and species name in the Point Centre Quadrat Data Sheet of the Rehabilitation Monitoring Record Sheet.</p>	Sampler
6.	<p>Walk down to the halfway point of the transect and run the tape measure 25m out on the right hand side at right angles from the transect.</p> <p>Starting at the transect, record the distance from the transect that any erosion feature starts, the depth and width of the feature, and whether the erosion feature is a rill (<30cm deep) or a gully (>30cm deep) on the Erosion Transect Data Sheet of the Rehabilitation Monitoring Record Sheet.</p>	Sampler
7.	Walk to the finish (down slope end) of the transect and repeat steps 4 and 5.	Sampler
8.	Repeat steps 1 to 7 for all other rehabilitation transects.	Sampler
9.	Forward all data sheets, photographs, and specimens to the Safety and Environmental Manager	Sampler
10.	Enter all monitoring data into Rehabilitation Monitoring Database and generate LFA index values for each site.	Environmental Manager
11.	Add any specimens of new species to the site herbarium.	Environmental Manager

REHABILITATION MONITORING

5. Sign Off

I have read and understand the contents of this procedure. I have been shown how to complete this procedure in a safe and environmentally responsible manner.

Full Name	Position	Signature	Date

MURCHISON METALS LIMITED
REHABILITATION MONITORING RECORD SHEET

Rehabilitation Monitoring Site Description Data Sheet

Site Number:.....

Date:.....

Site Name:.....

Transect Position:

Start:

E.....N.....RL.....

Finish:

E.....N.....RL.....

Position in

Landscape:.....

Soils:.....

Slope:..... **Aspect:**.....

Vegetation Type:

.....

Landuse:.....

State of Soil Surface:

.....

Comments:.....

.....

.....

Stability:..... **SE:**.....

Infiltration:..... **SE:**.....

Nutrients:..... **SE:**.....

REHABILITATION MONITORING RECORD SHEET

Point Centre Quadrat Data Sheet

Transect ID	Position	Quarter	Distance (cm)	Breath (cm)	Height (cm)	Species (cm)	Flowering (cm)	Comments
	Start	A						
	Start	B						
	Start	C						
	Start	D						
	Finish	A						
	Finish	B						
	Finish	C						
	Finish	D						
	Start	A						
	Start	B						
	Start	C						
	Start	D						
	Finish	A						
	Finish	B						
	Finish	C						
	Finish	D						
	Start	A						
	Start	B						
	Start	C						
	Start	D						
	Finish	A						
	Finish	B						
	Finish	C						
	Finish	D						
	Start	A						
	Start	B						
	Start	C						
	Start	D						
	Finish	A						
	Finish	B						
	Finish	C						
	Finish	D						

REHABILITATION MONITORING RECORD SHEET

Erosion Transect Data Sheet

Transect ID		Date:	
Observer:			

Distance from Transect	Width of Erosion (cm)	Depth of Erosion (cm)	Gully or Rill

Total No. Rills per 50m	
Average Width of Rills (m)	
Average Depth of Rills (m)	

Total No. Gullies per 50m	
Average Width of Gullies (m)	
Average Depth of Gullies (m)	

Average cross sectional area (m ²)	
Proportion of bank eroded (%)	

JACK HILLS IRON ORE PROJECT:

CONSTRUCTION ENVIRONMENTAL
MANAGEMENT PLAN

MAY 2006

PREPARED FOR

MURCHISON METALS LIMITED

BY

MBS ENVIRONMENTAL

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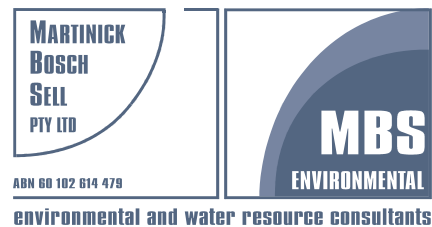


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1. INTRODUCTION

1.1 BACKGROUND

The Jack Hills Iron Ore Project (“the Project”) is located about 350 kilometres north-east of the port of Geraldton and 100 kilometres west of the town of Meekatharra in the Murchison region of central Western Australia (Figure 1). The project area comprises the Jack Hills prospect (of which Exploration Licence E20/535 of 20.5 square kilometres covers a portion). The Project is owned and operated by Murchison Metals Limited (the Proponent, MML) through its 100 percent acquisition of Iron Jack Pty Ltd.

MML proposes to open pit mine 1.0 to 1.8 million tonnes of iron ore per annum, which will be crushed and screened on-site before being transported by road to the Geraldton port where it will be stockpiled before being shipped on a Free On Board (FOB) basis to overseas markets.

The Department of Industry and Resources (DoIR) currently holds a security bond of \$10,000 for tenement E20/535 for exploration activities undertaken by MML.

Based on the anticipated land disturbance that would result from development of the Jack Hills Iron Ore project, the unconditional performance bonds have been calculated at \$636,000 and \$182,000 for Mining Lease 20/506 and Miscellaneous License 20/47 respectively. The project mine life is anticipated to be five years. The largest contributing element of the total bond is the Waste Rock Stockpile; however, not all of this footprint will be disturbed at the beginning of the project.

MML requests the provision of the bond be made in two stages. At project commencement, a footprint of only 50 percent of the ultimate Waste Rock Stockpile area is required. This will be sufficient to cater for the mining operations for the first one to two years. The Annual Environmental Report (AER) system provides an appropriate mechanism to review the project as it progresses and to initiate the second stage of bond allocation, at the required time. Figure 2 shows the conceptual outline of the mining area.

1.2 PURPOSE OF THE REPORT

The purpose of this document is to establish environmental guidelines for the construction phase of the project.

1.3 TERMINOLOGY

In the EPS for the Jack Hills Iron Ore Project, MML committed to undertake a range of measures to protect the environment. Commitments in the EPS require the preparation of a Construction Environmental Management Plan (CEMP) for the construction phase of the Jack Hills project.

2. PROJECT OVERVIEW

2.1 SCOPE OF PROJECT

The layout of the proposed Jack Hills project is shown in Figure 2 and will comprise the following major components:

- Mining to depths of up to 140 metres.
- Construction and operation of a crushing and screening processing plant (1.8 million tonnes per annum).
- Construction of a waste rock dump.
- Construction of water supply borefield, water containment pond, associated support facilities and access roads.

The Jack Hills project will occupy an estimated area of 127.7 hectares. The extent of the proposed disturbances is given in Table 1.

Table 1: Proposed Areas of Disturbance

Disturbance	Area to be Cleared (ha)
Waste rock stockpile	52.6
Pit	25.4
Crusher and ROM	0.8
Workshop	0.2
Ore stockpile area	0.1
Fuel storage	0.04
Power house	Included in workshop/ administration area
Laydown	0.6
Administration area	0.2
Camp	2.8
Haul road (M20/506)	4.4
Site roads	3.9
Domestic landfill	0.2
Haul road (L20/47)	36.4
Airstrip	Upgrade existing Mt Hale airstrip – no new disturbance required
Explosives magazine	0.04
Sewage treatment	0.03
Total	127.7

2.2 SITE LAYOUT

The overall site layout (Figure 2) shows the position of the pit and proposed location of the processing plant, Run of Mine (ROM) pad, waste dump, water collection pond and supporting infrastructure.

Borrow pits will be excavated within the footprint of the planned waste dump wherever possible.

Gravel areas for hardstand, roads and parking areas will be located to suit road train delivery, office parking and security requirements.

An area for the mine contractor to construct offices, hardstand and workshops will be cleared.

3. MANAGEMENT AND MITIGATION MEASURES

3.1 EXISTING MML SYSTEMS

Existing MML management plans and forms will address a number of EPS actions. These plans and forms include the:

- Vegetation Management Plan.
- Dust Management Plan.
- Equipment/Machinery Inspection Form.
- Incident Report Form.

Operations at Jack Hills are managed and regulated through many systems that control day-to-day operations, the activities of contractors coming to site, supply of materials (including dangerous goods) and incident reporting. The construction phase at Jack Hills can utilise many of the systems currently in place to comply with EPS actions for Jack Hills. Existing MML systems that address EPS actions are shown in Table 2.

Table 2: Existing MML Systems that Address EPS Actions

MML Existing Systems	Description
Site induction	The MML site induction is undertaken by all personnel coming to site. The induction covers a range of environmental requirements and issues including access to sensitive areas such as Aboriginal heritage sites and flora / fauna management.
Incident reporting	All incidents on site are to be reported. This includes environmental incidents such as chemical and hydrocarbon spills and other non-conformances.
Emergency Response Plan	Major incidence response plan for the site. Emergency Response Team (ERT) members are trained for fire fighting, chemical spills and other emergency situations.
Equipment inspection checksheet	Inspection report for all equipment coming to site for compliance to safety and environmental requirements.
Hazardous materials register	Register of all chemicals on site, MSDS sheets etc.

3.2 PROJECT SPECIFIC MANAGEMENT AND MITIGATION MEASURES

Environmental management actions proposed by MML in the EPS are listed in Appendix 1.

For each action reference is made to the relevant section in the EPS document. Some or all of these actions will form part of the conditions of other approvals from the Department of Industry and Resources (DoIR) and the EPA.

Environmental commitments made by MML in regards to the Jack Hills project are outlined in Appendix 2.

Not all actions in Appendix 1 are relevant to the construction phase of the project. The construction phase of the project is relatively small in scope when compared to many other mining operations. There are no large processing plants and tailings dams to construct. Much of the plant and infrastructure coming to site is mobile or modular in nature, requiring minimal establishment and commissioning time.

As a result, a number of environmental criteria identified in the EPS are not required to have specific management plans implemented during the construction phase. These are:

- Groundwater (quantity and quality)

Groundwater extraction will be managed in accordance with the Department of Environment bore licensing system. Water needs during the construction phase are minimal and will be restricted to dust suppression.
- Surface water

Site drainage will be managed through adherence to the 'Drainage Plan' (Figure 3). The plan will identify the location of all culverts, sumps, water course diversions and armouring required to ensure that surface water impacts such as sedimentation and contamination are not transported off site. The design of any diversions will ensure that surface water flows are maintained at levels that protect downstream ecosystems.
- Fauna

The implementation of the Vegetation Management Plan will ensure that disturbance of fauna habitat is minimised. The site induction will include information regarding appropriate behaviour around wildlife, including the need to minimise vehicle speeds, ensure excavations are not left open over night and provide exit ramps from permanent excavations. Company policy will prohibit the introduction of domestic animals to the site and feeding wildlife. The Constraints Plan restricts access by construction personnel beyond the immediate project area/work area.
- Air emissions

The major contributor to air emissions during construction will be dust, which will be managed through implementation of the Dust Management Plan. Construction contracts will specify requirements for the regular maintenance of construction machinery to ensure that other sources of emissions (exhaust) will be controlled during construction.

The use of Equipment/Machinery Inspection Form will ensure adherence to these requirements.
- Noise

The nearest local pastoral station residence is over 30 kilometres from the project area. This distance is sufficient to ensure noise from the construction phase would have no impact.

- **Waste Products**
Minimal waste will be generated during construction. Construction waste will be disposed in locations identified in the Construction Plan. On site landfill will be designed to conform to the requirements of the Code of Practice for Rural Landfill Management (2000).
Sewage will be disposed of in septic tanks designed and operated under license provided by the Health Department of Western Australia and will comply with the health requirements of the Shire of Meekatharra.
- **Fire Management**
Fire management will be included in the induction for all construction personnel.
- **Heritage**
The site induction will ensure that personnel are fully aware of their responsibilities with regard to heritage issues. The site Constraints Plan will identify any access restricted areas, which will include any areas of heritage significance.
- **Surrounding land use.**
The site induction will cover neighbour relations with regard to appropriate behaviour when travelling within pastoral properties.

Other approvals for the project include:

1. Department of Environment (DoE) Works Approval process: Regulating the construction phase. An application for a Works Approval was submitted to the DoE on 13 April 2005.
2. DoE licensing process: Regulating the operational phase.

Project specific maps, identified in Table 3 below, also address a number of EPS action items for the construction phase of the project, that remove the necessity for construction phase specific procedures for these issues.

Table 3: Project Specific Maps to Address EPS Actions

Document Type	CEMP Reference	Description
Drainage map	Figures 3	The drainage map identifies natural drainage lines in and around the project site, location of constructed sediment control sumps, diversion drains and discharge points.
Construction map	Figure 4	The site map identifies the boundary of the project construction site, designated locations such as equipment laydown areas, washdown bays, fuel storage locations, service corridors and access roads.
Constraints map	Figures 5	The constraints map identifies locations in and adjacent to the construction site that are environmentally significant and measures that are to be taken to protect them.

3.3 IMPLEMENTATION

The CEMP will be implemented throughout the construction project. The Project Manager is the primary person responsible for implementing the CEMP through the supervision of contractors on site and the administration of the construction contract(s) (Table 4).

The MML Environmental Supervisor will oversee environmental management of the project.

Construction has been outsourced to a contractor. The contractor will be responsible for employment of the construction workforce.

Table 4: Responsibilities During the Project

Personnel	Responsibilities
Project Manager	<ul style="list-style-type: none"> • Ensure all employees and contractors participate in the site induction prior to commencing work on the project. • Ensure the construction contractor is aware of the commitments made in the CEMP and any other relevant regulatory requirements and construction will be undertaken in compliance with these. • Conduct project meetings regularly during the construction period to review actions arising from previous inspections, current status of tasks and schedule of upcoming tasks.
Environmental Supervisor	<ul style="list-style-type: none"> • Prepare a CEMP for the project. • Ensure construction activities are undertaken in compliance with the requirements of the CEMP and relevant regulatory conditions. • Notify relevant regulatory authorities if serious environmental incidents occur as soon as practicable. • Conduct monitoring of the project area in accordance with the requirements of the CEMP. • Liaise with regulatory authorities during construction.
Construction Contractor	<ul style="list-style-type: none"> • Ensure management and mitigation measures outlined in the CEMP and other regulatory requirements are implemented. • Report all environmental hazards and incidents to the Project Manager. • Ensure appropriate corrective or remedial action is taken to address all environmental hazards and incidents reported by employees or subcontractors. • Participate in compliance inspections undertaken by MML.

Table 5: CEMP Implementation Schedule

Period	Personnel	Details
Pre contract	Environmental Supervisor; Project Manager	Prepare tender documentation, contract plans and CEMP.
Award of Contract	Project Manager	Supply required MML documentation to contractor.
Pre start at project site	Contractor	All personnel do site induction. All completed documentation to be returned to MML.
	Project Manager	Pre start meeting with Contractor. Discuss CEMP requirements and procedures.
Fortnightly project meetings	Project Manager	Implementation of CEMP.

4. MONITORING AND REPORTING

Monitoring and reporting during the construction phase of the project will occur through the following methods.

4.1 PROJECT MONITORING AND AUDIT

Regular site inspections will be undertaken and an audit form completed. Results of the audits will be submitted to the Project Manager for action on any items required.

4.2 PROJECT MEETINGS

Regular project meetings will be held on site, involving MML personnel, the Project Manager and Contractors. Minutes from these meetings will form part of the reporting system that identifies:

- Actions required to be implemented as a result of past internal audits.
- Proposed activities for the next project period.
- Maintenance of any records required in the CEMP.

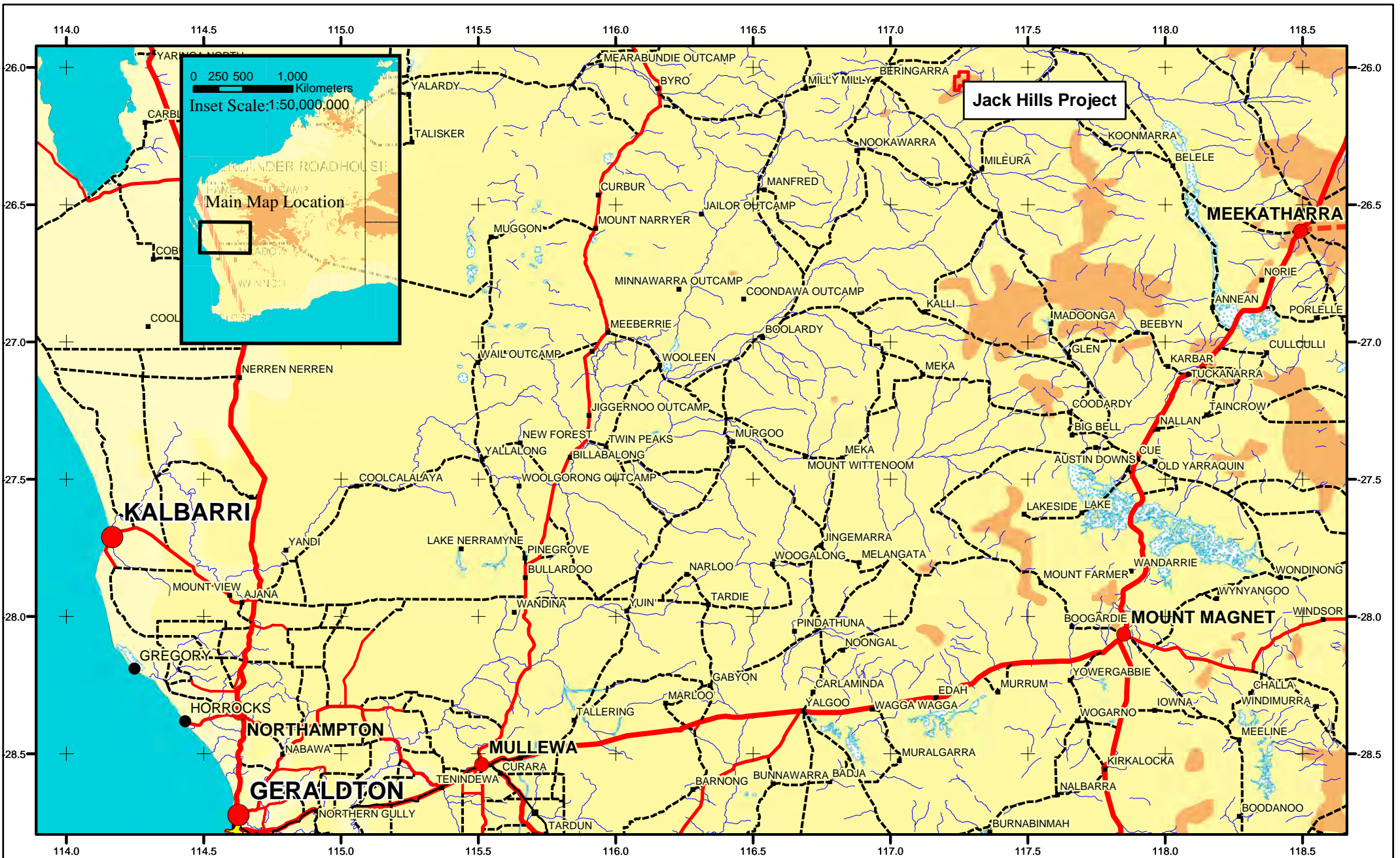
4.3 OTHER APPROVALS

The DoE Works Approval will have its own reporting conditions to be fulfilled.

5. REFERENCES

MBS Environmental (2006). *Environmental Protection Statement: Jack Hills Iron Ore Project, East Pilbara, Western Australia*. Report prepared for Murchison Metals Limited.

FIGURES

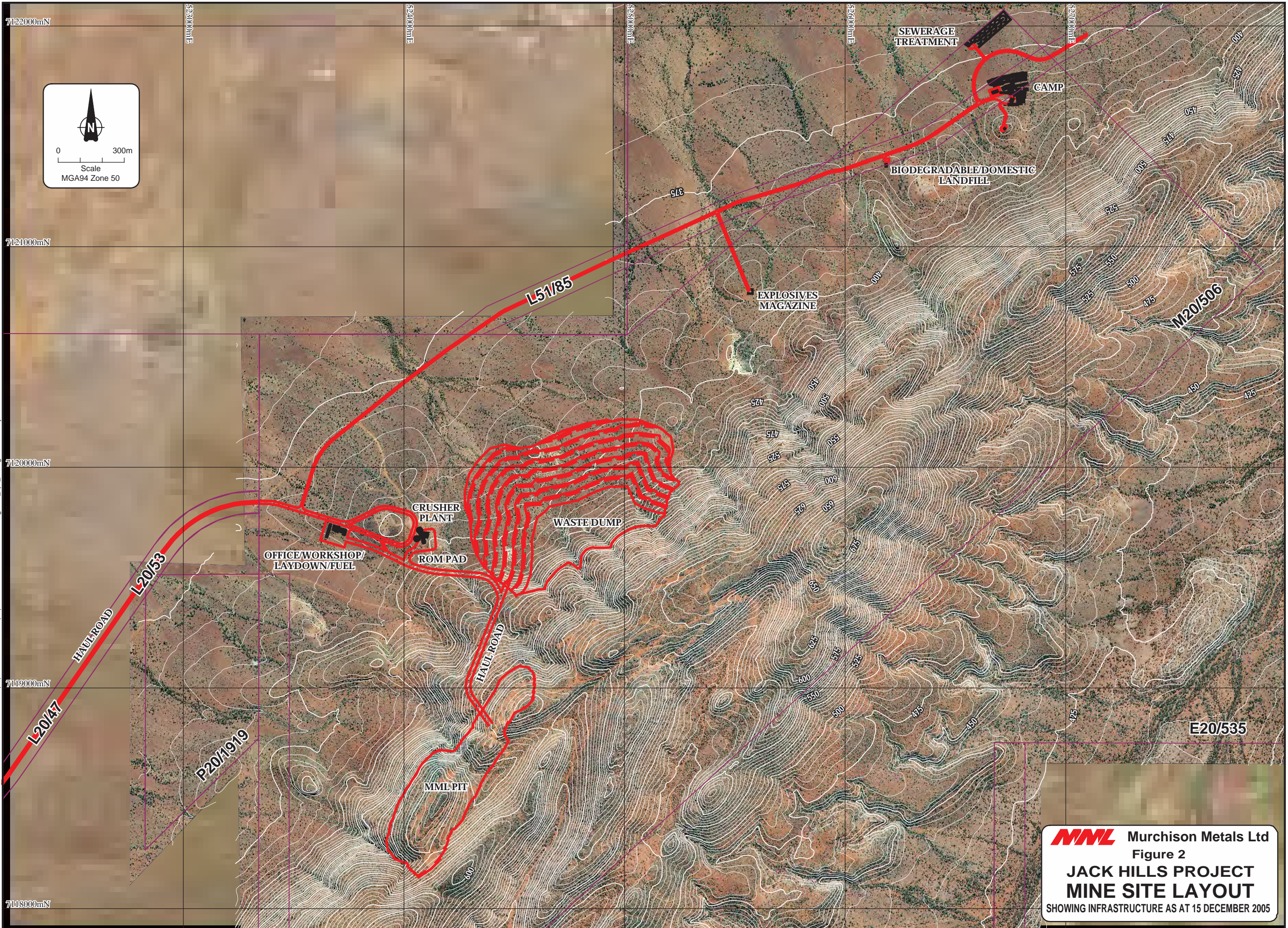



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Scale: 1:2,000,000
 0 510 20 30 40 50 60 70 80 90 100
 Kilometers
 Orig Size: A4 Date:25/11/04 Drawn by M. Dufty

Murchison Metals
Jack Hills Project

Location Plan
Figure 1



Author: F. Sibble - Drawn: CAD Resources - www.cadresources.com.au - Tel: (08) 9246 3242 - Fax: (08) 9246 3202 - CAD Reference: g1288_eps_103.dgn - A3 - May 2006 - Rev. A

MML Murchison Metals Ltd
 Figure 2
JACK HILLS PROJECT
MINE SITE LAYOUT
 SHOWING INFRASTRUCTURE AS AT 15 DECEMBER 2005

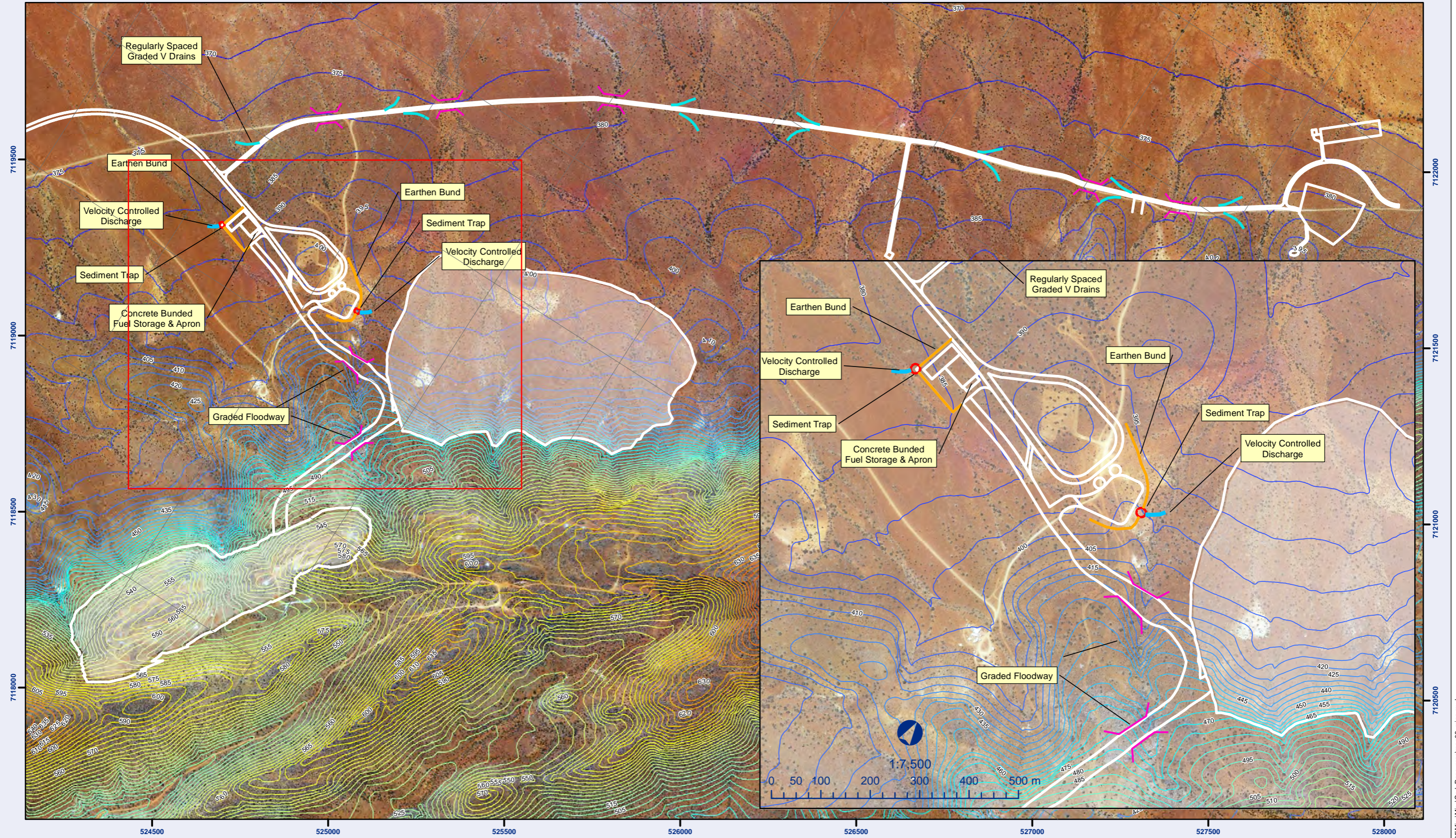


Figure 3

- Drain
- Earthen Bund
- Graded Floodway
- Sediment Trap
- Velocity Controlled Discharge



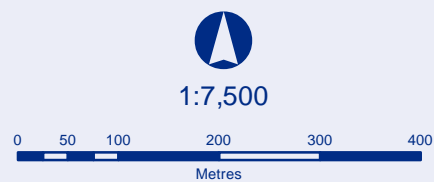
Drainage Plan



Figure 4

Construction Map

- | | | |
|--|--|--|
| DRF | ● Calytrix verruculosa | ■ T3 |
| ● Acacia cockertoniana (ms) | ● Gunniopsis divisa | Limited Access |
| ● Amaranthus interruptus | ● Lobelia sp. nov. | Access Prohibited |
| ● Calandrinia pleiopetala | ● Verticordia jamiesonii | |



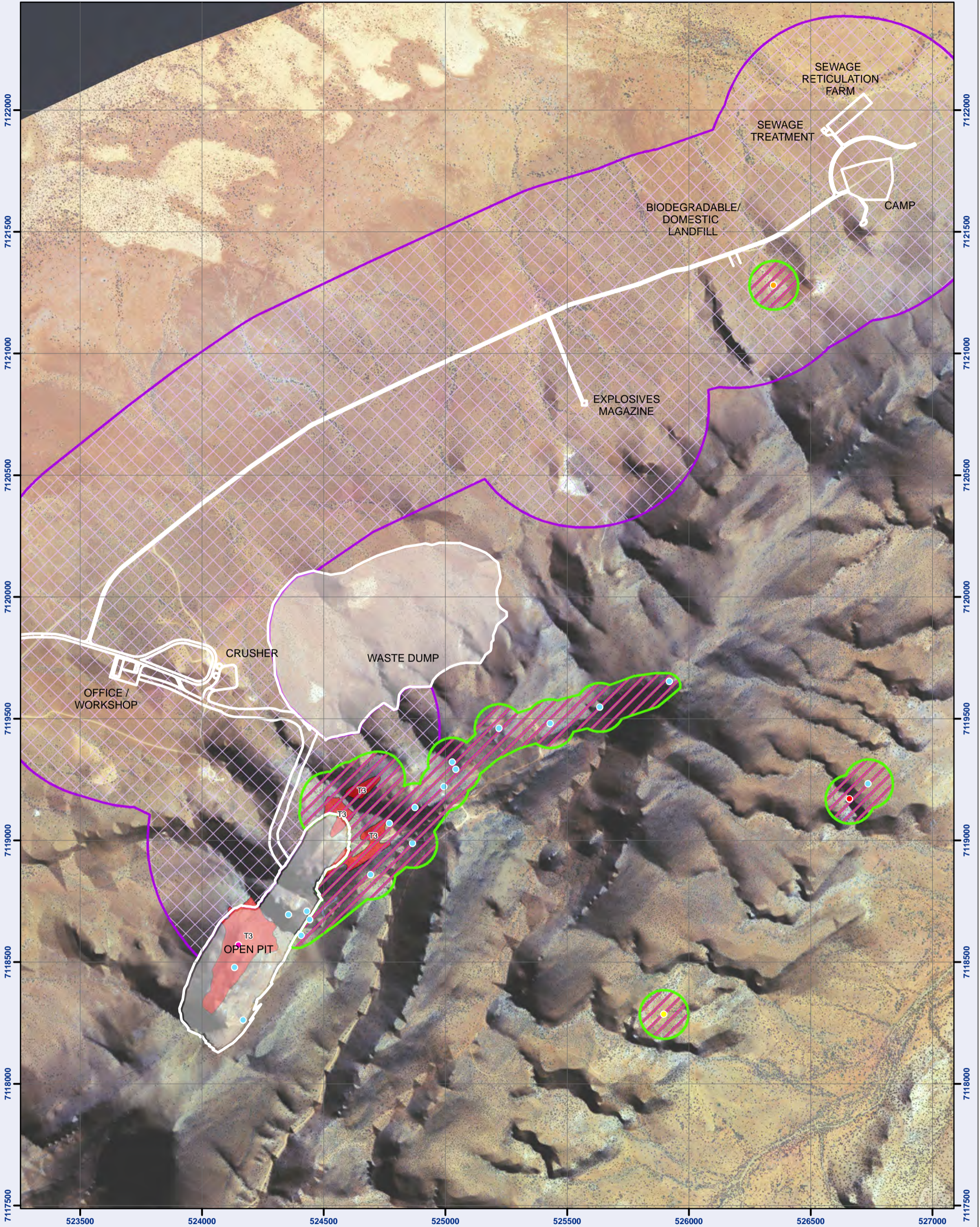


Figure 5

Constraints Map

- | | | |
|-----------------------------|--------------------------|---------------------|
| DRF | ● Calytrix verruculosa | ■ T3 |
| ● Acacia cockertoniana (ms) | ● Gunniopsis divisa | ■ Limited Access |
| ● Amaranthus interruptus | ● Lobelia sp. nov. | ■ Access Prohibited |
| ● Calandrinia pleiopetala | ● Verticordia jamiesonii | |



APPENDICES

APPENDIX 1

Management Actions

Table A1: Management Actions

No.	Management Action
Pit	
3.4.1	Wherever practically feasible, topsoil from the surfaces affected by the pit will be stripped and stockpiled for rehabilitation of the waste rock stockpile.
Waste Rock Stockpile	
3.6a	The waste rock stockpile will consist of a series of vertical lifts, up to 10 metres high, with a five-degree in sloping berm between lifts of 10 metres width. Final slopes of the lifts will be battered to no steeper than 18°.
3.6b	Topsoil will be directly striped and respread on an area available for rehabilitation. In the initial mine phase, completed areas on the waste rock stockpile will not be available. In this case, topsoil will be stockpiled. When areas on the top of the waste rock stockpile become available, direct return topsoil will be preferentially used before stockpiled topsoil.
6.3.3	<p>The Waste Rock Stockpile will be designed to reduce the need to construct and maintain a comprehensive drainage system for the entire stockpile. This will include the following measures:</p> <ul style="list-style-type: none"> • To prevent water from the top of the stockpiles eroding the batters, the upper surface of the Waste Rock Stockpile will be concave to provide an inward draining surface. • The upper surface of the Waste Rock Stockpile will also be compartmentalised with windrows to 0.5 metre to prevent water from collecting in a single area on the top of the stockpile. • The perimeter crest of the top of the stockpile and the leading edge of each berm will have a one-metre bund pushed up to contain water. • If available, rocky material and topsoil will be placed to a depth of about 150 millimetres over the shaped Waste Rock Stockpile. • The waste characterisation assessment (Appendix 2.5, Volume 2) has identified that dark green mafic schists and the browner BIF waste will blend well with the general landscape while also armouring the slopes and batters. • All topsoiled surfaces will be scarified on the contour to a depth of 300 millimetres. The first rip line between berms will be surveyed to ensure that it is horizontal. • The Waste Rock Stockpile will be seeded with local species, with a preference for local provenances, when available.
Roads and Transport	
3.10.2a	The 181 kilometre Beringarra-Cue public road will be upgraded to make it suitable for use by road trains. MML will continue to maintain this section of the road during the life of the project.
3.10.2b	The Beringarra-Cue public road will be upgraded with a bitumen-sand seal.
Preliminary Decommissioning and Closure Plan	
6.6	The Decommissioning and Closure Plan will be reviewed regularly through the operation to ensure it remains current and it will be implemented at the end of the mine life, which at present is estimated to be approximately five years. A timeframe for completion criteria will be developed in the subsequent version, within two years of project commencement.

Groundwater	
8.5.5a	<p>A groundwater monitoring programme will be implemented by MML in accordance with a Groundwater Licence Operating Strategy and will include:</p> <ul style="list-style-type: none"> • Fitting of flow meters to groundwater extraction bores to enable monitoring of extraction volumes. • Monthly monitoring of groundwater levels. • Collection of groundwater samples on a quarterly basis and analysis for the following: <ul style="list-style-type: none"> • Samples to be filtered before analysis. • pH. • Electrical conductivity. • Total dissolved solids (gravimetric and calculation). • Ions – sodium, calcium, magnesium, chloride, potassium, bicarbonate, carbonate, sulphate, nitrate. • Metals – aluminium, arsenic, barium, boron, chromium, copper, iron, manganese, lead, nickel and zinc.
8.5.5b	Data from the water monitoring programme will be collected and reviewed. Water quality results will be compared with existing baseline data and concentrations and trends analysed. Should the rate of drawdown be higher than expected or if the groundwater levels in bores used by pastoralists are found to decline to below regional groundwater level values, MML will seek to reduce drawdown by using alternative water sources.
8.5.5c	Water level and quality information will be reported to the DoE annually.
8.5.5d	The monitoring and management of groundwater abstraction and dewatering will be addressed in the Groundwater Licence Operating Strategy and will be reviewed and updated annually.
Surface Water	
8.6.5a	Impacts on surface water quality will be minimised by constructing bunds around mine infrastructure areas which have the potential to contaminate surface water flows with fuels, oils, sediment or other contaminants.
8.6.5b	Containment bunding, silt and oil traps will be established where necessary to remove sediments or pollutants from runoff before water enters local drainage.
8.6.5c	Any spills of contaminants, such as oil or fuel, which occur outside of bunded areas will be cleaned up immediately where a risk of surface water contamination occurs.
8.6.5d	Surface water management structures will be designed and constructed to minimise erosion.
8.6.5e	Diversion drains will be constructed to ensure water re-enters natural drainage lines at a velocity and depth that can be accommodated by the natural stream line without increased scouring. Regular visual monitoring will be undertaken of the diversion channels and downstream drainage lines, and the condition of vegetation in the diversion channels.
8.6.5f	Should substantial erosion occur, the cause of the erosion will be identified, erosion/ deposition areas rehabilitated as appropriate, and measures implemented to prevent further erosion.
8.6.5g	At closure, disturbed areas will be stabilised and revegetated to minimise erosion potential.

Vegetation and Flora

8.7.5a

MML will implement the following measures during the project to minimise the impact on vegetation and maximise the conservation of the botanical values in the project area, namely:

- The project layout has been designed to minimise the clearing of vegetation and clearing will be limited to that which is necessary for the completion of the first stage of the project. Any expansion will require further detailed investigations and approval.
- Existing access tracks and transport routes have been used where possible.
- New transport routes have been located away from areas of environmental sensitivity such as the range, granite outcrops and drainages as much as possible.
- Pockets or strips of vegetation will be left undisturbed within areas cleared for infrastructure where the risk of fire, impacts on road safety or interference with mining operations is low.
- As an alternative to clearing vegetation, areas of low shrub will be clearly marked out for laydown areas where this use is temporary only, and does not increase the risk of fire.
- Areas to be cleared will be clearly defined on maps and the ground, and clearing activities will be supervised.
- Vehicles and machinery are to be parked in designated areas.
- Dust control measures will be implemented.
- Access to the range, other than the pit area, will be restricted as follows:
 - Only for MML personnel conducting environmental monitoring and exploration.
 - MML induction will prohibit personnel from access to the range other than for monitoring, mining and exploration purposes.
 - Signage prohibiting access on the entry points will be erected and maintained.
- Conduct additional follow-up botanical surveys to include:
 - Searches for Rare and Priority Flora will continue during the operational phase of the project.
 - Searches for flora that are restricted or occur as range extensions will be investigated further in the field during the operational phase of the project, including additional targeted searching should be undertaken for species that occur as outliers and the three Priority species
 - Additional detailed on-ground studies to clearly define the extent of the various Spinifex communities on Jack Hills, the Robinson Ranges and Mt Gould during the operational phase the project. The definition of the outer extent of Triodia communities was undertaken on the Jack Hills in October 2005.
 - Undertake further integrated regional studies, in conjunction with CALM, to investigate and define the extent of the communities on the Jack Hills Ranges during the operational phase of the project.
 - Establish permanent vegetation plots and monitor before, during, and after mining activities.

	<ul style="list-style-type: none"> • Management actions specific to the occurrence of rare, Priority and range extension flora are: <ul style="list-style-type: none"> • <i>Acacia cockertoniana</i> (ms) – Undertake additional investigations into relative numbers in the different plant communities (as mapped) in order to clarify the potential impact of the proposed operations on this taxon at Jack Hills. • <i>Verticordia jamiesonii</i> (Priority 3) – This taxon will be investigated as the opportunity arises in more detailed native vegetation studies during the operational phase of the project. • <i>Lobelia heterophylla</i> subsp. <i>pilbarensis</i> – In view of the recent rains it is intended to undertake additional investigations into relative numbers both within the proposed impact area and outside the proposed impact area in coming weeks and also this taxon will be investigated as the opportunity arises in more detailed native vegetation studies during the operational phase of the project. • <i>Amaranthus interruptus</i> – This taxon will be investigated as the opportunity arises in more detailed native vegetation studies during the operational phase of the project. • <i>Calandrinia pleiopetala</i> – This taxon will be investigated as the opportunity arises in more detailed native vegetation studies during the operational phase of the project. • <i>Eremophila pendulina</i> – This taxon will be investigated as the opportunity arises in more detailed native vegetation studies during the operational phase of the project. • Implement rehabilitation procedures using data from mining activities in similar environments. Investigate the likely success for revegetation, addressing the issues of water relations, weed invasion, changes in topography and soil structure. • Topsoil, rootstock and cleared vegetation will be retained in designated areas for use in rehabilitation. • Disturbed areas will be progressively rehabilitated with native species and monitored. • Respread topsoil over disturbed areas as soon as possible after clearing and stockpiling for short periods if direct return of topsoil is not feasible. • Further collections of flora will be undertaken after higher seasonal rainfall events • An environmental induction and awareness programme will be developed to raise the workforce awareness of conservation issues. • Review other options for conserving the communities in the Jack Hills lease areas.
8.7.5b	<p>Weeds will be controlled through prevention, monitoring and early eradication as follows:</p> <ul style="list-style-type: none"> • Avoiding or minimising disturbance to areas with, or vulnerable to, weed infestation where practicable. • Inspecting vehicles and machinery for soil and seeds when entering the site and washing them in designated areas if required. • Inspecting disturbed and rehabilitated areas for weeds (particularly after rainfall events) and consulting with CALM and the Department of Agriculture as to the treating of infested areas. • Raising awareness of the workforce in weed control. • Rehabilitating disturbed areas progressively to discourage weed establishment.
8.7.5c	<p>Weed prevention, management and monitoring measures will be implemented in accordance with a Vegetation Management Plan.</p>

Fire Management	
8.7.5(d)	Fire management will be implemented in accordance with a Fire Management Plan.
Fauna	
8.8.5	<p>The following measures will be implemented during the project to minimise the impact on fauna:</p> <ul style="list-style-type: none"> • Clearing of vegetation will be restricted to the minimum necessary to implement the project. This will be achieved using the Murchison Metals Limited internal “Permit to clear” procedures. • An egress will be provided at one end of pits and trenches to enable trapped wildlife to escape. • Drill hole capping will be regularly checked to ensure the integrity of the capping is maintained. • Open holes and trenches without egress will be inspected prior to 10:00am daily for trapped fauna. Trapped individuals will be released. • The environmental induction programme and ongoing provision of information will raise the awareness of the workforce about the conservation of fauna (particularly rare, threatened or vulnerable fauna) and their habitats. • Direct contact with fauna will be avoided whenever possible. • Vehicles and machinery will be parked in designated locations only to minimise habitat damage. • Refuse and the landfill site will be managed to prevent an increase in feral animal populations. • Feral animal deterrent measures and/or eradication programmes will be implemented in consultation with CALM, the Department of Agriculture and pastoralists. • Restricting traffic to established roads and parking areas.
Dust Management	
3.8.2	Dust will be suppressed by a high pressure water system in the crushing plant.
3.8.3	<p>Dust suppression measures will include:</p> <ul style="list-style-type: none"> • Water trucks will be used on a needs basis to spray water on operational surfaces to suppress dust. • The ROM stockpile area will be watered with either a water cart or sprinklers to suppress dust generation. • The unsealed haul road will be watered by water trucks to suppress dust.
3.10.4	Haulage trucks will have dust covers covering the ore in the trailers.
8.10.5a	Site personnel will visually monitor dust levels during construction and operation of the project. Dust suppression measures will be instituted using water trucks, spray bars and other means as necessary, in the event that high levels of dust are observed, and/or strong winds and dry conditions make dust generation likely.
8.10.5b	Site personnel will monitor dust deposition on the <i>Triodia</i> plant communities, and other vegetation communities visually and also using dust deposition gauges, to ensure there is no detrimental effect from dust.
8.10.5c	Prevailing wind information will be utilised to, where possible, undertake blasting when wind directions are blowing away from the remaining T3 plant community, which is located in close proximity east and north-east of the pit.
8.10.5d	Dust minimisation, management and monitoring measures will be implemented in accordance with a Dust Management Plan.

Air Emission	
8.9.5	<p>The following management and mitigation measures will be implemented to minimise and control air emissions:</p> <ul style="list-style-type: none"> • Vehicles and power generating equipment will be regularly maintained and serviced to manufacturer's specifications to ensure efficient running of equipment and optimum fuel consumption, thereby minimising exhaust emissions. • Rehabilitation will, where possible, be progressive and involve careful topsoil management and re-introduction of endemic species such that a self sustaining vegetation complex is established. • Emissions will be reported as part of the National Pollutant Inventory.
Noise	
8.11.5	<p>MML will implement the following noise management measures to ensure that:</p> <ul style="list-style-type: none"> • Noise control equipment on stationary and mobile equipment is operating correctly. • The noise emissions comply with the requirements of the <i>Environmental Protection (Noise) Regulations 1997</i> and the <i>Mining Act 1978</i>.
Waste Products	
8.13.5	<p>MML will implement management measures to minimise the potential for contamination of the surrounding environment due to general waste disposal as follows:</p> <ul style="list-style-type: none"> • General domestic and office waste will be disposed of to an on-site landfill, located above the water table. Currently there are no viable opportunities for the broad recycling of office and domestic wastes, due to the remote nature of the site. However, MML will, throughout the life of project, actively identify and look to apply, any viable opportunities for the recycling of office and domestic wastes. • Industrial waste will be disposed of to an on-site landfill, located in the waste rock stockpile. • Landfill cells will be located away from areas that may be subject to localised inundation and away from drainage lines. Surface water will be managed in the vicinity of the landfill cell to minimise runoff entering the cell. • The industrial landfill site will be regularly covered with soil to prevent access by animals and the occurrence of wind-blown litter. • The camp landfill site will be fenced and regularly covered with soil to prevent access by animals and the occurrence of wind-blown litter. • Waste oils, solvents and other hazardous material will be collected in drums and stored in a bunded area. These will be removed from site for recycling or disposal to an approved waste disposal facility. • Sewage generated during operations will be treated in approved systems and discharged to irrigation areas or leach drains. • During closure of the project, the landfill will be capped with a clayey soil layer and rehabilitated.

Dangerous and Hazardous Substances	
8.14.5	<p>MML will implement management measures to minimise the risk of contamination of soil, surface water and groundwater and harm to employees at the site:</p> <ul style="list-style-type: none"> • A register of all hazardous materials on site will be developed and maintained. This will document the hazardous material name, location, approximate volume, storage method and where applicable, disposal method for the substance and containers. • Fuel storage areas and workshops will be bunded in accordance with the DoIR and DoE requirements. • Runoff contaminated with hydrocarbons will be treated prior to discharge. • Absorbents will be kept on site for minor spills. Staff will be trained on the use of the absorbents. • Oil spills in the workshop area will be directed to an oil-water separator. • Hydrocarbon spills will be cleaned up and contaminated soil will be remediated on-site. • Hazardous wastes generated by the operation will be transported offsite to licensed waste disposal facilities. This is likely to include waste oil, grease and heavy equipment fuel and oil filters. • Hazardous materials will be brought to the site in bulk packaging wherever possible. This practice will minimise the number of containers and reduce the risk of spillage. • All mobile equipment and light vehicle servicing activities including wash down will be conducted on impermeable surfaces. • The heavy vehicle workshop facility shall contain a purpose built wash down facility incorporating a triple interceptor style sediment and oil/grease removal system. • An explosives magazine will be constructed and operated in accordance with regulatory requirements. • Crushing activities will be conducted in areas where surface drainage can be captured to ensure overflows, spillages or leaks can be contained. • A Licence to Store Dangerous Goods will be obtained for the storage of all hazardous materials on site. • Spillages of hazardous materials will require incident reporting according to company policy and procedures. • All explosives will be transported by road from Perth or Geraldton and will be transported and stored in accordance with the <i>Mines Safety and Inspection Act 1994</i>, <i>Mines Safety and Inspection Regulations 1995</i> and <i>Explosives and Dangerous Goods Act 1961</i>.
Fuels and Oils	
3.14	<p>A fuel storage log will be maintained and will include the following:</p> <ul style="list-style-type: none"> • Types and volumes of fuel on site. • Location of storage facilities, storage methods, bunding and secondary containment. • Pumping, piping, transfer and separation procedures. • Maintenance, testing and audit procedures. • Waste fuel/oil collection and disposal procedures.

Surrounding Land Use	
9.1.3	<p>Any disturbance to stock and pastoral activities arising from the project's implementation will be minimised through the following measures:</p> <ul style="list-style-type: none"> • MML will liaise with the pastoralists throughout the life of the project. • The mining operations will be fenced and unused test pits and drill holes will be backfilled. • The site induction will instruct all personnel on pastoral lease activities around the project site and compliance with Company Policy requirements. • Night driving outside the Jack Hills operational area will be minimised. • The waste landfill site will be fenced and waste will be regularly covered to prevent stock entering and litter escaping. • Water levels will be measured regularly in regional bores to monitor the impact of water abstraction from the water supply bores and whether pastoral water supplies will be affected.
Aboriginal Heritage	
9.2.5	<p>MML will avoid any unnecessary disturbance to any identified Aboriginal heritage sites. Management and mitigation measures that will be implemented to achieve this will include:</p> <ul style="list-style-type: none"> • The general site induction will include information regarding the importance of cultural sensitivity, respect for land and protection of items of heritage significance. All employees and contractors will be required to participate in this induction. • Raising workforce awareness on Aboriginal heritage issues, including measures for protecting Aboriginal sites identified during Aboriginal surveys or discovered during operations. • All employees and contractors will be advised of the correct procedure to be followed in the case of any items of potential heritage significance being discovered during mining. • Comply with the requirements of the <i>Aboriginal Heritage Act 1972</i> and will seek advice from the Department of Indigenous Affairs in the event that any Aboriginal heritage sites are identified during the life of the project.

APPENDIX 2

Summary of Commitments

Table A2: Summary of Commitments

No.	Topic	Objective	Action	Timing	Advice
1	Environmental Management	To avoid, minimise or mitigate impact to the environment	Implement environmental procedures and management plans that address the management or avoidance of impacts to the environment such as impacts to: <ul style="list-style-type: none"> • Weeds. • Groundwater quantity and quality. • Surface water. • Vegetation and flora. • Fauna. • Air, including dust impact. • Heritage. • Surrounding land use. And the management of: <ul style="list-style-type: none"> • Fire. • Noise. • Waste. • Dangerous and hazardous substances. 	During Construction	Received during preparation and assessment of EPS
2	Environmental Management	To avoid, minimise or mitigate impact to the environment	Environmental performance achieved as a result of the environmental procedures and management plans will be audited, and procedures reviewed as necessary	During Construction	

No.	Topic	Objective	Action	Timing	Advice
3	Environmental Management	To avoid, minimise or mitigate impact to the environment	<p>Implement environmental procedures and management plans that address the management or avoidance of impacts to the environment such as impacts to:</p> <ul style="list-style-type: none"> • Weeds. • Groundwater quantity and quality. • Surface water. • Vegetation and flora. • Fauna. • Air, including dust impact. • Heritage. • Surrounding land use. <p>And the management of:</p> <ul style="list-style-type: none"> • Fire. • Noise. • Waste. • Dangerous and hazardous substances. 	Operation	
4	Environmental Management	To avoid, minimise or mitigate impact to the environment	Environmental performance achieved as a result of the environmental procedures and management plans will be audited, and procedures reviewed as necessary	Operation	
5	Environmental Management	To avoid, minimise or mitigate impact to the environment	MML will employ the services of suitably qualified personnel who will maintain a presence on site which is appropriate to the scale of the mining operation and different phases of implementation.	Operation	

No.	Topic	Objective	Action	Timing	Advice
6	Vegetation and Flora Surveys	To establish the further extent of conservation, significant flora species and plant communities.	MML will conduct follow-up botanical surveys to include: <ul style="list-style-type: none"> • Searches for rare and priority flora and flora that are restricted or occur as range extensions • Definition of extent of Spinifex communities on Jack Hills, the Robinson Ranges and Mt Gould • Integrated regional studies in conjunction with CALM, to define extent of plant communities on Jack Hills. 	Operation	
7	Vegetation Monitoring	To monitor impact of mining activities on vegetation	MML will establish permanent vegetation plots and monitor before, during and after mining activities	During Construction and Operation	

APPENDIX 3
Works Approval

The Works Approval has not yet been issued.

It will be inserted into this document
when it has been issued.

Preliminary Decommissioning and Closure Plan

Jack Hills Iron Ore Project,
Murchison Region, Western Australia

Prepared for:
Murchison Metals Limited

May 2006

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MBS
ENVIRONMENTAL

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1. INTRODUCTION

1.1 JACK HILLS PROJECT

The Jack Hills Project occupies a portion of Mining Lease M20/506 in the Murchison region of Western Australia. Mining Lease M20/506 covers an area of 1,000 hectares and was granted on 21 October 2005. The lease is subject to the exploration and mining regulations under the Western Australian *Mining Act 1978*. The term of the Mining Lease is 21 years with the right to take successive renewals for further periods of 21 years.

MML proposes to open pit mine 1.0 to 1.8 million tonnes of iron ore per annum, which will be crushed and screened on-site before being transported by road to the Geraldton Port where it will be stockpiled before being shipped on a Free On Board (FOB) basis to overseas markets.

The Jack Hills iron ore project is located about 350 kilometres north-east of the port of Geraldton and 100 kilometres west of the town of Meekatharra in the Murchison region of central Western Australia (Figure 1). The main access to the project area from Cue will be via the sealed Beringarra-Cue public road. A mine access road from the Beringarra-Cue public road to the mine will be constructed. This route will be covered by Miscellaneous Licence L20/47 and Miscellaneous Licence application 20/53.

1.2 PURPOSE AND SCOPE OF THE PRELIMINARY DECOMMISSIONING AND CLOSURE PLAN

1.2.1 Overview

The purpose of the Preliminary Decommissioning and Closure Plan (DCP) is to describe the rehabilitation and closure strategies necessary to adequately address environmental issues to the satisfaction of regulatory authorities and MML at the completion of operations. The strategies are designed to ensure maintenance free or “walk away” closure over the long term.

The overall objective of this document is to ensure that planning for mine closure commences in the early stages of project planning and is integrated with mine development planning, consistent with the Australian and New Zealand Minerals and Energy Council / Minerals Council of Australia (ANZMEC/MCA) *Strategic Framework for Mine Closure*. To that end, this document sets out a conceptual closure strategy for the project. In particular it provides information on the location and construction of the waste rock stockpile and progressive placement of topsoil on the stockpile to facilitate rehabilitation.

At the end of mine life, the five basic steps involved in closure planning are:

- The removal and disposal of all infrastructure not required for other uses.
- The remediation of any soil or water contamination.
- Rehabilitation of remaining disturbances.

- Post-closure maintenance and monitoring.
- Tenement relinquishment and bond retirement.

1.2.2 Relevance to Other Plans

The DCP is included in the Environmental Protection Statement (EPS) as a component of the proponent's environmental management activities associated with the Jack Hills project approval process.

The DCP will be revised every two years during site operations to ensure it remains accurate and relevant. It is anticipated that subsequent revisions of this document will contain more detailed information concerning actual infrastructure, rehabilitation, closure strategies and potential environmental issues as the project moves from the current planning stage through to operation.

2. BACKGROUND

2.1 PROJECT DESCRIPTION

Figure 2 shows the overall site layout. The main components of the Jack Hills project are:

- Open cut mining operations to depths of up to 140 metres.
- Run-of-Mine (ROM) pad.
- Topsoil stockpiles.
- Waste rock stockpile.
- A Crushing Plant with screening circuits.
- Bulk fuel storage.
- Production borefield for dust suppression and potable uses.
- Haul roads and other access roads.
- Laydown areas.
- Mine administration offices and contractor's workshops.
- Accommodation camp and supporting infrastructure.

Detailed descriptions of infrastructure and operating processes are contained within the Jack Hills Environmental Protection Statement (MBS Environmental, 2006).

Figure 3 shows the development of the mine pit through the project life.

2.2 RATIONALE FOR SITE INFRASTRUCTURE

The plant has been sited to be close to the orebody for minimal haul distance. The design follows process requirements and also consolidates ancillary infrastructure and support services in close proximity to the plant.

The plant siting and design has also addressed environmental requirements using the principles of:

1. Avoidance of significant features.
2. Integrating natural contours and drainage lines where possible.
3. Maximum utilisation of resources in the one area.

Borrow pits will be located in the footprint of the planned waste rock stockpile to both minimise areas of disturbance and maximise the available resources in the locality.

Conceptual plans for the removal or possible retention of plant and infrastructure are addressed in Sections 5.1 and 6.1.

3. STATUTORY AND POLICY REQUIREMENTS, AND INDUSTRY GUIDELINES

3.1 MML POLICY

The DCP is consistent with the Company environmental policy (Appendix A).

3.2 ENVIRONMENTAL PROTECTION ACT 1986

The DCP is consistent with the following documentation relevant to the Jack Hills project and assessed under the *Environmental Protection Act 1986*:

- Jack Hills EPS (MBS Environmental, 2006).

Closure related commitments in this document principally relate to:

- Effective and timely closure consultation with stakeholders.
- Undertaking progressive rehabilitation.
- Developing a DCP concurrently with mining operations.

3.3 MINING ACT 1978

The following requirements related to mine closure are included within MML's mining tenement conditions issued under the *Mining Act 1978*:

- All surface holes drilled for the purpose of exploration are to be capped, filled or otherwise made safe immediately after completion.
- All costeans and other disturbances to the surface of the land made as a result of exploration, including drill pads, grid lines and access tracks, being backfilled and rehabilitated to the satisfaction of the Environmental Officer, Department of Industry and Resources (DoIR). Backfilling and rehabilitation being required no later than six months after excavation unless otherwise approved in writing by the Environmental Officer, DoIR.
- All waste materials, rubbish, plastic sample bags, abandoned equipment and temporary buildings being removed from the mining tenement prior to or at the termination of exploration program.
- No interference with Geodetic Survey Stations Hale and NMF 408 and mining within 15 metres thereof being confined to below a depth of 15 metres from the natural surface.
- All topsoil being removed ahead of all mining operations from sites such as pit areas, waste disposal areas, ore stockpile areas, pipeline, haul roads and new access roads and being stockpiled for later respreading or immediately respread as rehabilitation progresses.

- At the completion of operations, all buildings and structures being removed from site or demolished and buried to the satisfaction of the Director, Environment Division, DoIR.
- All rubbish and scrap is to be progressively disposed of in a suitable manner.
- At the completion of operations, or progressively where possible, all access roads and other disturbed areas being covered with topsoil, deep ripped and revegetated with local native grasses, shrubs and trees to the satisfaction of the Director, Environment Division, DoIR.

3.4 LANDOWNER AGREEMENTS

The Jack Hills project area is located in an area that involves two registered Native Title claims and one new claim that is subject to the registration test. The proposed mine is within the Ngoonooru Wadjari Native Title Claim (WC 00/012) while the haul road and bore field involve both the Ngoonooru Wadjari and Wajarri Elders (WC 01/003) Native Title Claims. The two claim groups have lodged a new combined claim known as the Wajarri Yamatji Native Title Claim. This Claim is currently being assessed by the National Native Title Tribunal for registration.

Murchison Metals Limited has negotiated with both claim groups. These negotiations have resulted in a comprehensive mining agreement under which the Native Title parties have agreed to the grant of project tenures in return for a package of benefits involving monetary benefits as well as initiatives relating to training, employment, contracting, heritage protection, cultural awareness training and an ongoing consultation mechanism.

Following the signing of this Project Agreement in September 2005, the Native Title parties have signed State Deeds and withdrawn objections to facilitate the grant of the project titles.

3.5 OTHER RELEVANT ENVIRONMENTAL LEGISLATION

Beyond specific approval documentation, key environmental legislation relevant to mine closure in Western Australia includes general provisions under the following:

- *Environmental Protection Act 1986.*
- *Mining Act 1978.*
- *Mines Safety and Inspection Act 1994.*

Other relevant legislation relevant to mine closure includes:

- *Aboriginal Heritage Act 1972.*
- *Agriculture and Related Resources Protection Act 1976.*
- *Bushfires Act 1954.*
- *Conservation and Land Management Act 1984.*
- *Contaminated Sites Act 2003.*

- *Dangerous Goods (Transport) Act 1998.*
- *Explosives and Dangerous Goods Act 1961.*
- *Land Administration Act 1997.*
- *Occupational Safety and Health Act 1984.*
- *Rights in Water and Irrigation Act 1914.*
- *Soil and Land Conservation Act 1945.*
- *Town Planning & Development Act 1928.*
- *Waterways Conservation Act 1976.*
- *Wildlife Conservation Act 1950.*

Both DoIR and DoE will be responsible for overseeing the closure of the Jack Hills project area. Other authorities involved in providing advice on closure issues include CALM and DoA.

3.6 GOVERNMENT AND INDUSTRY GUIDELINES

Key government and industry guidelines relevant to mine closure in Western Australia are listed in Table 1.

Table 1: Key Government and Industry Guidelines for Mine Closure

Guideline	Purpose
Australian Minerals Industry (AMI) Code for Environmental Management (MCA, 2000).	Framework including consultation, progressive rehabilitation and reporting.
Strategic Framework for Mine Closure (ANZMEC/MCA, 2000) (a joint government and industry guideline).	Framework including upfront planning for closure, consultation, progressive rehabilitation and reporting.
Guideline Safety Bund Walls Around Abandoned Open Pit Mines. Department of Minerals and Energy of Western Australia (1997).	Design of abandonment bunds around open pits to prevent vehicular access.
Mine Closure Guideline for Mineral Operations in Western Australia (Chamber of Minerals and Energy WA Inc. 2000).	Framework including consultation, progressive rehabilitation and reporting.
Mine Closure Policy (MCA, 1999).	Policy on mine closure.
Mine Rehabilitation Handbook (MCA, 1998).	Stakeholder consultation and financial provisioning.
Assessment Levels for Soil, Sediment and Water (DoE, V3 Nov 2003).	Threshold levels for contaminated soils.
ANZECC/ARMCANZ: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.	Establishing water quality criteria using previous monitoring data and site specific factors, to establish standards to be achieved at closure.
The Commonwealth Environmental Protection Agency series 'Best Practice Environmental Management in Mining'.	Industry examples of mining practices.
Guidance for the Assessment of Environmental Factors: Rehabilitation of Terrestrial Ecosystems. Draft No. 6 (EPA 2006)	Closure strategy and description of objectives, targets and review during mine operation.

This document, The Preliminary DCP conforms to the Conceptual Closure Plan as defined in Section 2.3 of the ANZMEC/MCA's Strategic Framework for Mine Closure (ANZMEC/MCA, 2000). The final DCP will be further developed to conform to this document, as well as Government and Industry Guidelines.

MML will review its DCP in the light of results of rehabilitation research programs at Jack Hills during the project life (eg; Acacia re-establishment trials) and ongoing industry best practice as they are presented through such forums as:

- Chamber of Minerals and Energy (CME).
- Other mining operations in the Murchison region.
- DoIR Golden Gecko Awards.

4. STAKEHOLDER CONSULTATION

4.1 STAKEHOLDER IDENTIFICATION

Stakeholders are defined as individuals, government agencies, community groups or others who have the potential to be affected by mine closure. Stakeholder consultation is a critical component of the closure planning process as the interests held by stakeholders in an area often precede an operation and remain long after its closure.

The Jack Hills stakeholders identified to date are listed in Table 2 below.

Table 2: Jack Hills Stakeholders

Stakeholder Sector	Organisation
State Government	<ul style="list-style-type: none"> • Department of Conservation and Land Management • Department of Environment • Department of Industry and Resources • Department of Indigenous Affairs • Department of Water • Main Roads Western Australia • Department of Agriculture • Western Australian Museum
Local Government	<ul style="list-style-type: none"> • Shire of Meekatharra • Shire of Murchison • Shire of Cue
Indigenous groups	<ul style="list-style-type: none"> • Ngoonooru Wadjari • Wajarri Elders • Yamatji Land and Sea Council
Non-Government Organisations and Special Interest Groups	<p><i>Pastoralists</i></p> <ul style="list-style-type: none"> • Beringarra Station • Mount Hale Station • Mileura Station <p><i>Conservation Groups</i></p> <ul style="list-style-type: none"> • Conservation Council • Wildflower Society • Naturalists Club

4.2 RECORD OF PUBLIC CONSULTATION TO DATE

No specific consultation concerning Jack Hills closure planning has been undertaken to date. Consultation with the identified stakeholders has been undertaken concerning the

implementation of the Jack Hills project in general. The details of this consultation are included in the EPS.

4.3 CONSULTATION PROCESS FOR CLOSURE PLANNING

Consultation with the identified stakeholders concerning closure of the Jack Hills project will be undertaken according to the ANZMEC/MCA, principles outlined in Strategic Framework for Mine Closure. This includes:

- All stakeholders will be included in consultation, which will occur throughout the life of the mine to ensure effective consultation.
- A targeted communication strategy will be implemented to reflect the needs of the stakeholder groups and interested parties.
- Adequate resources will be allocated to ensure that the consultation process can be undertaken effectively.
- Communities will be included in the consultation process.

The public consultation programme will be designed to:

- Inform the public about the proposed development of the mine.
- Record potential concerns, issues and recommendations.
- Aid in preparing the design and management of the proposed mine, ensuring that public concerns are addressed.
- Provide feedback.
- Establish meaningful and ongoing dialogue.

5. CLOSURE OBJECTIVES AND COMMITMENTS

5.1 KEY OBJECTIVES

The overall objective of the DCP is to establish a safe, stable landform with a self-sustaining and resilient vegetative cover similar in species richness and density to that in the surrounding landscape, so that pastoral activity can resume. Specific objectives of the DCP also include:

- Demolish surplus infrastructure and rehabilitate the site.
- Landfill all rubbish and contaminated material.
- Re-establish a self-sustaining ecosystem.

The area in the vicinity of Jack Hills is sparsely populated and prior to the start of formal mining, the land was used for pastoral activities. For purposes of this plan, the assumption has been made that all site facilities and infrastructure will be dismantled and the area returned to its pre-mining use.

However, it should be emphasised that during the mine's operating life, MML will ensure appropriate consultation and approval processes are undertaken to ensure facilities and infrastructure that could be productively used after the completion of operations are not dismantled. The process by which consultation will occur is outlined in Sections 1.2.2 and 4.3.

Sequential land use planning is an issue gaining increasing importance for the mining industry in general, often with conflicting principles that make final decisions difficult. The development of mines in remote locations in Western Australia necessitates the construction of significant infrastructure, with many possibilities for sequential use. Infrastructure can include:

1. An independent power supply, often with many kilometres of transmission line.
2. Potable water supply and treatment plant.
3. Communications links.
4. Airstrip.
5. Accommodation and messing facilities.
6. Borefield and pipeline networks.
7. Potential assets such as open pit lakes that provide possible future uses for aquaculture, recreation, or agriculture uses.

In tandem, desire from pastoralists to diversify into new activities and local governments to capitalise on the increasing tourism and eco-tourism industry mean that requests from external stakeholders for mining companies to retain infrastructure for other sequential uses continues to gain momentum.

Often, safety and public liability considerations conflict with stakeholder desires of having the public in close proximity to disused mines. Other issues include ongoing ownership and

maintenance of the infrastructure, as well as continued government regulation. Continued consultation by all parties is required to resolve such issues.

5.2 CLOSURE CRITERIA

Closure criteria are an agreed standard or level of performance that enables progressive assessment of the site in meeting the objectives, and ultimately demonstrate successful closure (ANZMEC/MCA, 2000). The overall objective of the DCP is to establish a safe, stable landform with a self-sustaining and resilient vegetative cover similar in species richness and density to that in the surrounding landscape so that pastoral activity can resume.

Further to the overall objective for the project, specific completion criteria will be developed to address the following components of the rehabilitation and closure of the site:

- Public safety.
- Geotechnical stability.
- Physical stability.
- Chemical stability.
- Revegetation.
- End land use.

The broad objectives for completion criteria should produce:

- Safe, stable, non polluting landforms, designed to emulate and blend in with surrounding natural landforms as far as practicable, and to be compatible with previous land uses
- Resilient and self supporting vegetation that mirrors the attributes and functions of pre-existing vegetation as closely as practicable.

Closure criteria will be developed in consultation with stakeholders to define the measurable goals for rehabilitation and closure (see Section 5.1). The agreed criteria will enable quantitative assessment during the life of the project to provide an indication of whether rehabilitation and closure objectives have been or are likely to be achieved. The criteria will be developed and periodically reviewed in liaison with regulatory authorities including the DoIR, DoE, CALM and the Department of Agriculture (DoA). The agreed criteria and the detailed actions necessary to satisfy the criteria will be detailed in subsequent versions of this document.

The mechanism for determining rehabilitation completion criteria will be the application of an Ecosystem Function Analysis (EFA). The EFA will be implemented throughout the life of the project and the outcomes will be incorporated into subsequent reviews of the DCP. The EFA is a multi factorial assessment method, conducted on both vegetation and soil criteria. The assessment is conducted on both undisturbed locations (analogue sites) and rehabilitated areas. For soil, various indices are derived from a list of assessment criteria and can be compared against the analogue sites. The indices include soil stability, infiltration/runoff and nutrient cycling status (Chart 1). Other criteria assessed as part of the EFA process include habitat complexity (Chart 2) and erosion (Chart 3).

Repeated assessments over time plot the development of the rehabilitated areas against the analogue sites and also progression towards defined scores that can be set as completion targets. This process will be further developed in subsequent versions of the DCP.

Chart 1: Soil Indices

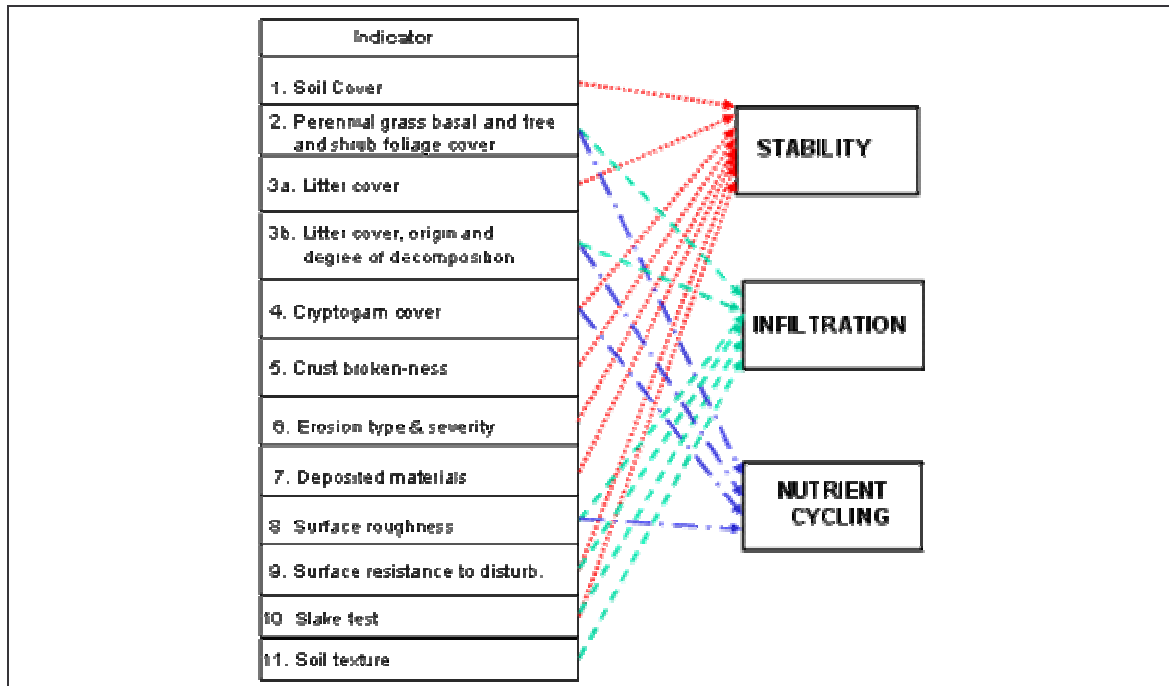


Chart 2: Habitat Complexity Data Sheet

Site: _____ Date: _____
 Transect: _____ Observer: _____

Structure	Score				Assigned Score:
	0	1	2	3	
Tree Canopy Cover (%)	0	<30	30-70	>70	
Shrub Canopy Cover (%)	0	<30	30-70	>70	
Ground Herbage	Sparse <0.5m	Sparse >0.5m	Dense <0.5m	Dense >0.5m	
Logs, Rocks, Debris, etc (%)	0	<30	30-70	>70	
Soil Moisture	Dry	Moist	Permanent Water Adjacent	Water Logged	
TOTAL					

Chart 3: Rill Transect Data Sheet

Site: _____				Date: _____		
Observer: _____				Year of Rehabilitation: _____		

Location on Slope	Type (R or G)	Distance from transect	Left or Right of Transect	Width (m)	Depth (m)	Comments

Number of rills/50m:	_____ m
Number of rills recorded:	_____
Number of gullies/50m:	_____ m
Number of gullies recorded:	_____
Average width:	_____ m
Average depth:	_____ m
Average cross sectional area:	_____ m ²
Proportion of bank eroded:	_____ %

DoE (2006) requires that completion criteria must be sufficiently stringent to ensure that the overall objectives of rehabilitation have been met. These criteria must also be designed to allow effective reporting and auditing to define an endpoint for rehabilitation activities where sites can be handed over to a third party. Guidelines published by ANZMEC (2000) for completion criteria state they should be:

1. Specific enough to reflect unique set of environmental, social and economic circumstances.
2. Flexible enough to adapt to changing circumstances without compromising objectives.
3. Include environmental indicators suitable for demonstrating that rehabilitation trends are heading in the right direction.
4. Undergo periodic review resulting in modification if required due to changed circumstances or improved knowledge.
5. Based on targeted research which results in more informed decisions.

Closure criteria, objectives and interim targets are shown in Table 3. Initial EFA assessments will further establish interim targets for inclusion into subsequent reviews of the DCP. The interim targets will in turn be reviewed against the success of progressive rehabilitation in the setting of final closure targets in the final DCP.



Table 3: Closure criteria, objectives and interim targets

Criteria	Objective	Interim Targets
Safety, stability, sustainability and suitability	The overall health and safety of humans, stability of soils, landforms and hydrology, long-term sustainability without additional management inputs and suitability for agreed land uses. Suitability for agreed land uses is required to ensure the economic value of sites for agriculture, grazing, forestry, tourism, recreation, etc. is retained.	Safety and abandonment structures all in place.
Visual amenity and heritage	Recovering visual amenity is normally a key objective. Visual amenity is defined by community expectations.	Permanent photographic monitoring points installed. Historical photographic record showing increased vegetation establishment and blending of mining landforms into natural landscape
Pollution	Pollutants due to chemical spillage, excavation of substrates or changes to hydrology (e.g. acid drainage) must also be avoided or managed within rehabilitated areas as required.	Monitoring showing that pollution levels are within parameters set by Regulatory agencies.
Off-site impacts	Significant adverse off-site impacts must be avoided.	No off site impacts for 3 years
Hydrology	Criteria that measure flows and availability of surface and groundwater are provided to receiving environments if there are major changes to hydrology as a result of mining operations. Hydrological management is required for effective establishment of vegetation and to ensure site stability.	Photographic record showing flow in all creek systems. All temporary creek diversions rehabilitated and original pathway restored.
Soils	Soil profiles and structures must ensure vegetation establishment and landform stability.	Rehabilitated waste rock stockpile achieving an EFA/LFA score for defined indices. Interim targets to be defined in subsequent reviews of the DCP.
Resilient and self-sustaining vegetation	This is a frequently used completion criteria that is linked to the other criteria listed below.	
Plant species diversity	Specified targets are based on reference plot data. Setting appropriate targets requires past experience in similar habitats and knowledge of the proportion of plant species that are unlikely to recruit or can be propagated from seeds in the short term.	Rehabilitated waste rock stockpile achieving an EFA/LFA score for defined indices. Interim targets to be defined in subsequent reviews of the DCP.

Criteria	Objective	Interim Targets
Plant abundance and cover	<p>Sustainable rehabilitation requires the cover of vegetation to be sufficient to stabilise landforms and soils and exclude weeds.</p> <p>In most cases, completion criteria based on relative cover (% of area) will be most effective and efficient. This is the relative area occupied by native plants, weeds and bare ground measured in permanent plots or transects.</p> <p>Permanent photographic-monitoring points should also be established.</p>	<p>Rehabilitated waste rock stockpile achieving an EFA/LFA score for defined indices. Interim targets to be defined in subsequent reviews of the DCP.</p> <p>Permanent photographic monitoring points installed.</p>
Weed management	<p>Effective weed management requires demonstration that:</p> <p>(a) the relative cover of minor weeds is low</p> <p>(b) major environmental weeds capable of becoming dominant at the expense of native plants are absent.</p>	<p>Monitoring and photographic records showing weed species on site limited to minor infestations.</p>
Pests and diseases	<p>Effective management of alien or native species of animals, fungi or microbes that can have a major impact on plant survival and productivity.</p> <p>Animal grazing also requires effective management in rehabilitated areas.</p>	<p>Declared weed species controlled over rehabilitated areas.</p> <p>Installation of fencing around waste rock stockpile.</p>

Source: DoE (2006)

5.3 POST-CLOSURE MONITORING AND MAINTENANCE

Once the rehabilitation and closure work has been completed, a post-closure monitoring programme will be initiated, with the aim of confirming that the rehabilitation and closure has been effective and the closure criteria satisfied (Table 4). In some cases this monitoring programme will be a continuation or slight variation of those conducted during operations.

In general terms, post-closure monitoring will include:

- **Public safety:** visual inspection to confirm that access to the pit void and other excavations has been effectively prevented and will not allow access to vehicles without heavy equipment.
- **Geotechnical stability:** visual inspection to confirm that the reshaping and cover (where appropriate) have been completed as per design, and there are no signs of subsidence, slumping or slippage in the structure.
- **Physical stability:** visual confirmation by the inspecting personnel that there are no unplanned drainage lines developing, no undue erosion taking place, and no undermining of material by wind or water.
- **Chemical stability:** a continuation of the water quality monitoring programmes employed during the operational phase of the mine, including sampling of surface runoff, ground water and soils for levels of contaminants that exceed the guidelines adopted for closure.
- **Revegetation:** monitoring to confirm that the vegetation cover density is likely to become comparable with that on similar areas in the region that have not been disturbed by mining.

It is expected that on ground mine closure works are likely to span a period of less than 12 to 18 months. This will be followed by a period of post-closure monitoring and maintenance, which is envisaged as nominally another two years, but may extend longer depending on monitoring results against closure criteria.

During this period it is likely that only a skeleton staff presence will be maintained on site. At specified intervals a monitoring team will visit the site to take scheduled samples and make assessments regarding the progress of revegetation and the effectiveness of closure measures put in place. That team will assess if remedial work is required, and at the end of the first year post-closure an appropriate maintenance team will carry out essential repairs and maintenance.

Monitoring the rehabilitated areas will ensure that any areas requiring remedial work are identified. Maintenance procedures will be carried out where necessary and may include:

- Replanting areas that may not have regenerated.
- Repairing any erosion problems.
- Weed control.

The frequency of monitoring will decrease as closure progresses and will cease when the closure objectives and closure criteria have been achieved.

Table 4: Summary of Closure Monitoring

Time	Issue	Monitoring	Standard
At closure	Rehabilitation works	Confirm that specifications of works have been completed, e.g. abandonment bund in place, stability of slopes, drainage system in place.	<ul style="list-style-type: none"> Final DCP. Guideline Safety Bund Walls Around Abandoned Open Pit Mines. Department of Minerals and Energy of Western Australia (1997). Strategic Framework for Mine Closure (ANZMEC/MCA, 2000) Mine Closure Guideline for Mineral Operations in Western Australia. Chamber of Minerals and Energy WA (2000).
6 months	Rehabilitation works	Confirm stability of implemented works.	
	Water	Groundwater and surface water.	Groundwater: Parameters (e.g. SWL, TDS) meet required criteria. Surface: Parameters (e.g. TSS, pH) meet required criteria prior to discharge to the environment.
12 months	Rehabilitation works	Confirm that specifications of works have been completed, e.g. abandonment bund in place, stability of slopes, drainage system in place. Implement remedial works on year 1 program (if required), e.g. replanting, reseeding, erosion remediation. Ecosystem Functional Analysis on rehabilitated areas.	Final DCP. Final DCP.
	Water	Groundwater and surface water.	Groundwater: Parameters (e.g. SWL, TDS) meet required criteria. Surface: Parameters (e.g. TSS, pH) meet required criteria prior to discharge to the environment.
	Flora	Initial plant establishment; density and diversity.	Final DCP.
18 months	Water	Groundwater and surface water.	Groundwater: Parameters (e.g. SWL, TDS) meet required criteria. Surface: Parameters (e.g. TSS, pH) meet required criteria prior to discharge to the environment.

Time	Issue	Monitoring	Standard
24 months	Flora	Implement remedial works on year 1 program (if required): e.g. replanting, reseeded. Ecosystem Function Analysis on rehabilitated areas.	Final DCP.
	Water	Groundwater and surface water.	Groundwater: Parameters (e.g. SWL, TDS) meet required criteria. Surface: Parameters (e.g. TSS, pH) meet required criteria prior to discharge to the environment.
36 months	Flora and Fauna	Ecosystem Function Analysis on rehabilitated areas.	Meets closure criteria against natural analogue sites.
	Water	Groundwater and surface water.	Groundwater: Parameters (e.g. SWL, TDS) meet required criteria. Surface: Parameters (e.g. TSS, pH) meet required criteria prior to discharge to the environment.

5.4 REPORTING

Comprehensive records of the planning and implementation of all rehabilitation and closure works will be maintained for each rehabilitated area and will include:

- Data on analogue sites of the pre-disturbance condition of each area (to provide a baseline against which the rehabilitation can be assessed).
- Information on the vegetation, topsoil and subsoil removal and storage techniques utilised.
- The extent and timing of each disturbance.
- Details on the rehabilitation treatment(s), including:
 - The rehabilitation earthworks.
 - Seed bed preparation.
 - The species used in the seeding programme.
 - Seed pre-treatment and seeding methods.
- The results of the rehabilitation monitoring programme.
- The scope of any remedial work (such as re-ripping, re-seeding and weed control).

5.5 RESOURCE ALLOCATION AND FINANCIAL PROVISIONING

Table 5 identifies the staff employed by MML to manage environmental issues, undertake rehabilitation and closure planning and supervise rehabilitation and closure activities.

This version of the DCP does not include cost estimates of the closure strategies presented. MML has established landform rehabilitation provisions for closure. However, total closure costs also include other costs such as plant relocation and demolition; possible incomes from sale or salvage of plant, and workforce retrenchment. Subsequent versions will:

- Confirm that a financial provision is in place and that it reflects the real cost of closure.
- Confirm that accepted accounting standards were used for the basis of the financial provisioning.
- Confirm that adequate securities will protect the community from closure liabilities.

Post closure, full time workforce on site is likely to reduce, ultimately to periods when site supervision of closure works occurs. An ongoing 'caretaker' presence may be maintained. At required intervals a monitoring team will visit the site to take scheduled samples and make assessments regarding the progress of revegetation and the effectiveness of closure measures put in place.

Table 5: Management Responsibility Framework

Time	Responsibility	Description
Pre Closure	Operations Manager	Ensure DCP is prepared
	Company Accountant	Ensure provision for DCP is in place
	Environmental Officer	Preparation of progressive DCP's and Final DCP
Post Closure	Environmental Officer	Implementing Final DCP

5.6 SUSPENSION OF OPERATIONS

Circumstances may eventuate that require a temporary suspension of mine operations, and enter into a “Care and Maintenance” period. Provisions in the *Mines Safety and Inspection Regulations 1995* govern care and maintenance periods. The provisions in the regulations (in part below) would form the basis of a suspension plan to be implemented in such a situation.

Mines Safety and Inspection Regulations 1995

Part 3 - Management of mines

Division 2 - Notification of commencement or suspension of mining operations

3.14. Details to be included in notification of suspension

Notification of the suspension of mining operations at a mine must, in addition to the details set out in regulation 3.12, include the following details —

- (a) the reason for the suspension and the planned duration of the suspension;
- (b) whether the closure is total or whether access to underground and/or open pit workings is to be maintained;
- (c) if underground and/or open pit access is to be maintained, details of the arrangements that have been made for the provision of regular services and emergency services to ensure the safety of employees engaged in maintaining the mine;
- (d) the measures that have been taken to prevent unauthorised access or entry to the mine;
- (e) the precautions that have been taken to protect underground equipment and service installations; and
- (f) any plans required to be prepared under section 88 of the Act.

The nature of a temporary suspension in operations is such that all rehabilitation and closure works would generally not be in a final state. In addition to the safety and access provisions, required in the regulations, the suspension plan would also need to address a range of environmental factors as listed in Table 6. The suspension plan would also need to cater for ongoing caretaker/maintenance functions that necessitate some continued provision of services such as power, water, communication and waste disposal at the site.

Table 6: Suspension Plan Criteria

Criteria	Description
Surface water	All disturbed areas will not be stabilised, so potential for erosion will remain. Suspension plan will address ongoing drain and sump maintenance to ensure continued sediment control.
Hazardous substances	Storage of large volumes of chemicals and fuel will not be required with closure of the mine, processing plant and power generation. The suspension plan will address removal of surplus quantities of hazardous materials.
Waste management	<ul style="list-style-type: none"> • Empty all rubbish bins on site. Remove bulk bins. • Empty out all oil/water separators, washdown bay sumps etc. • Close the active faces at the industrial and domestic landfill sites and remove all quantities of recyclable materials.
Reporting	With no activities on site, continued requirements for environmental reporting need to be reviewed (eg: DoE Licence and National Pollutant Inventory trigger thresholds). The suspension plan will address the issue of renewal or cancellation of licences and what reporting functions may still be required during the suspension period.

6. REHABILITATION AND CLOSURE MEASURES

The actions necessary to achieve the end land use objective and ensure the closure and rehabilitation criteria are met are grouped into general and specific measures. General measures are the default measures applied as required across the site to satisfactorily address the issues. Where required, area specific measures are detailed for areas of the operation that have unique issues that may not be adequately managed using the default rehabilitation and closure measures.

6.1 GENERAL REHABILITATION AND CLOSURE MEASURES

In the absence of closure or rehabilitation issues requiring closure or rehabilitation actions, the following default measures will be applied and used to calculate the rehabilitation and closure costs.

6.1.1 Demolition

All plant and permanent structures will be dismantled or demolished and removed. Recoverable materials may be sold if a suitable market can be found at the time of decommissioning. A reasonable estimate of salvage values that could be offset against the closure cost has not yet been calculated. This will be calculated from an asset register and incorporated within subsequent versions of this document.

It is envisaged that, prior to closure the final lift of the waste rock disposal area would be developed in such a manner as to leave a suitable hollow to serve as a disposal site for inert material only.

All inert rubble and materials resulting from the demolition exercise will be disposed within the designated closure landfill facility located within the waste rock stockpile. Liquid or hazardous wastes will be disposed within appropriately licensed facilities off site.

All surface pipelines, power cables/lines and security fences will be removed and materials will be sold or otherwise disposed within waste rock stockpile.

Sub surface pipelines will remain if they cannot be economically salvaged, but will be appropriately drained, flushed and sealed (crimped or capped).

Plastic, pond liners will be cut, folded and buried in situ for belowground ponds or removed to the disposal site for aboveground ponds.

6.1.2 Clean Up and Remediation

The largest hazardous material (by volume) required on the site will be diesel, used for power generation and the mining equipment.

A register will be maintained for all hazardous materials on site.

At closure, remaining chemicals and hydrocarbons will be returned to the supplier or sold to a third party. Waste chemicals, hydrocarbons and contaminated materials will be removed offsite for disposal at a licensed facility or remediated onsite prior to disposal on site.

It is recognised that some minor spillage of hydrocarbons (fuels and oils) will occur during operations and these shall be dealt with as part of the mine's ongoing environmental management plan. Small scale hydrocarbon-contaminated soils remaining at closure will be remediated in-situ using bioremediation absorbents. Larger scale contaminated soil will receive an application of bioremediation absorbents and then be excavated and disposed of at the project's industrial waste landfill (located within the waste rock stockpile) or as otherwise directed by regulatory authorities.

Remaining rubbish will be removed and disposed within the inert landfill.

6.1.3 Revegetation

Following demolition of infrastructure and site clean up, the remaining disturbed sites will be regraded to re-establish existing drainage lines.

Topsoil up to 200 millimetres thick will be stripped from available sites and stockpiled. Stockpiles will be a maximum of two metres high and be located in water shedding sites, to prevent localised flooding/inundation. The stockpiles will be signposted by MML environmental personnel to prevent inadvertent use for purposes other than rehabilitation. Other than the stockpiling of topsoil from the initial footprint of the waste rock stockpile topsoil will be directly returned onto progressively rehabilitated landforms during waste rock stockpile construction.

During rehabilitation, previously stockpiled topsoil will be respread and deep ripped to a depth of one metre along the contour to reduce compaction and ensure cohesion between the topsoil, the subsoil and the disturbed land surface. Ripping will also provide niches where water, organic matter and seed can collect.

Stockpiled vegetation, where available, will be spread over the ripped surface. Seeding with native grasses, shrubs and trees will be conducted to supplement the seed source within the topsoil, the respread vegetation and adjacent native vegetation. The species selected for the revegetation programme will depend on the site-specific conditions (e.g. slope, drainage, soil conditions). If local seed is unavailable, alternative sources of seed of local provenance will be selected in consultation with the DoIR and CALM. Direct seeding will be undertaken immediately prior to the expected onset of seasonal rains.

Stock exclusion fencing around the project area will be retained for several years to allow the vegetation within the rehabilitated area to become established and the landform stabilised. When monitoring against closure criteria indicates the rehabilitation no longer has management requirements above that of undisturbed areas and has received DoIR signoff and bond return, the removal of fences will be carried out by MML if so requested by the pastoralist.

6.2 AREA SPECIFIC REHABILITATION AND CLOSURE MEASURES

For the purpose of this DCP, the mine has been divided into ten management areas. The general rehabilitation and closure activities applicable to all areas are described in Section 6.1 above and the specific closure measures applicable to the ten management areas are listed below:

- Open cut mine and associated facilities.
- Crushing plant and associated facilities.
- Waste rock stockpile area.
- Workshops and stores.
- Offices and administrative facilities.
- Contractor yards.
- Water management facilities.
- Solid waste facilities.
- Roads, powerlines, fences and drains.

At this stage of the Jack Hills project development it is not currently possible to fully detail the infrastructure components for each management area. Once a final design has been agreed and constructed, this information can be included in the final DCP. The final DCP will include a more detailed description of the facilities and management measures necessary to achieve the closure objectives.

6.2.1 Open Cut Mine and Associated Facilities

The area defined as the “Open Cut Mine and Associated Facilities” is comprised of the following:

- Open cut pit.
- Access ramp.
- Survey stations.
- Explosives storage yard.

In addition to the general provisions, the following specific provisions apply.

- All access to the mine workings will be suitably blocked using a pit abandonment bund constructed around the void in accordance with DoIR Guidelines on Safety Bund Walls Around Abandoned Open Pit Mines.
- Explosive magazine will be removed and all fencing dismantled.

6.2.2 Crushing Plant and Associated Facilities

The area defined as the “Crushing Plant and Associated Facilities” is comprised of the following:

- Crushing plant with screening circuits.

No area specific closure measures were identified. General rehabilitation and closure measures (Section 6.1) will be implemented.

6.2.3 Waste Rock Stockpile Area

The area defined as the “Waste Rock Stockpile Area” is comprised of the following:

- Waste rock stockpile
- Topsoil stockpiles.
- ROM stockpile.

The overall site layout of the crushing plant, ROM pad, waste rock stockpile, and supporting mining infrastructure has taken into account environmental and engineering constraints that include:

- Drainage and breakaways associated with the Jack Hills Range.
- Vegetation communities associated with BIF.
- Priority flora known to occur on the range and haul road route.
- Natural drainage features on the foothills and plain.

The waste rock stockpile will be constructed primarily using a ‘top-down’ construction method by dumping waste rock from the uppermost levels of the stockpile layout adjacent to the scree slope to form the top lift and advancing outwards (downslope) in steps to form lower lifts. The bottom lift may also be constructed using a ‘bottom-up’ method, the method commonly used in construction of the gold mine waste rock stockpiles in the region, by dumping waste rock along the lower slopes that form the outer perimeter of the bottom lift.

Topsoil will be progressively stripped from the lower (more gentle) slopes of the waste rock stockpile footprint in advance of the tipping face. Topsoil is proposed to be stripped from approximately 415-420 metres AHD, depending on the steepness of the slope, to the lower edge of the waste rock stockpile.

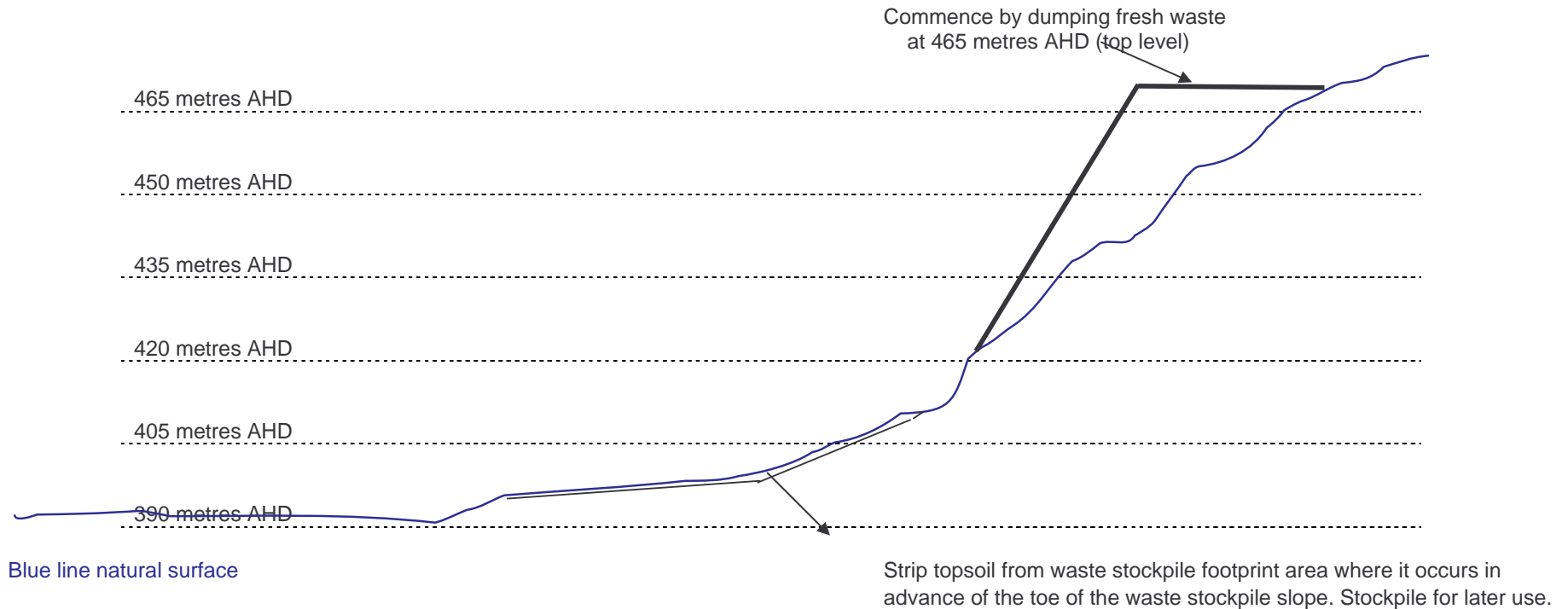
The objective is to directly strip topsoil and respread it on an area available for rehabilitation. In the initial mine phase, completed areas on the waste rock stockpile will not be available. In this case, topsoil will be stockpiled. When areas on the top of the waste rock stockpile become available, direct return topsoil will be preferentially used before stockpiled topsoil.

The final waste rock stockpile will be constructed in lifts approximately 15 metres high with a final slope angle not exceeding 18 degrees. The lifts will be separated by 10 metre wide benches.

The waste rock stockpile will be designed as an internally draining system. To prevent water from the top of the stockpile draining down the batters and causing erosion, the upper surface will be concave to store all runoff and also slope backwards, into the range. It is expected water will infiltrate rapidly through the rock matrix once past the topsoil and subsoil layers. Water will flow through the original drainage lines in an 'underdrain' system and exit through the natural drainage line at the toe of the waste rock stockpile.

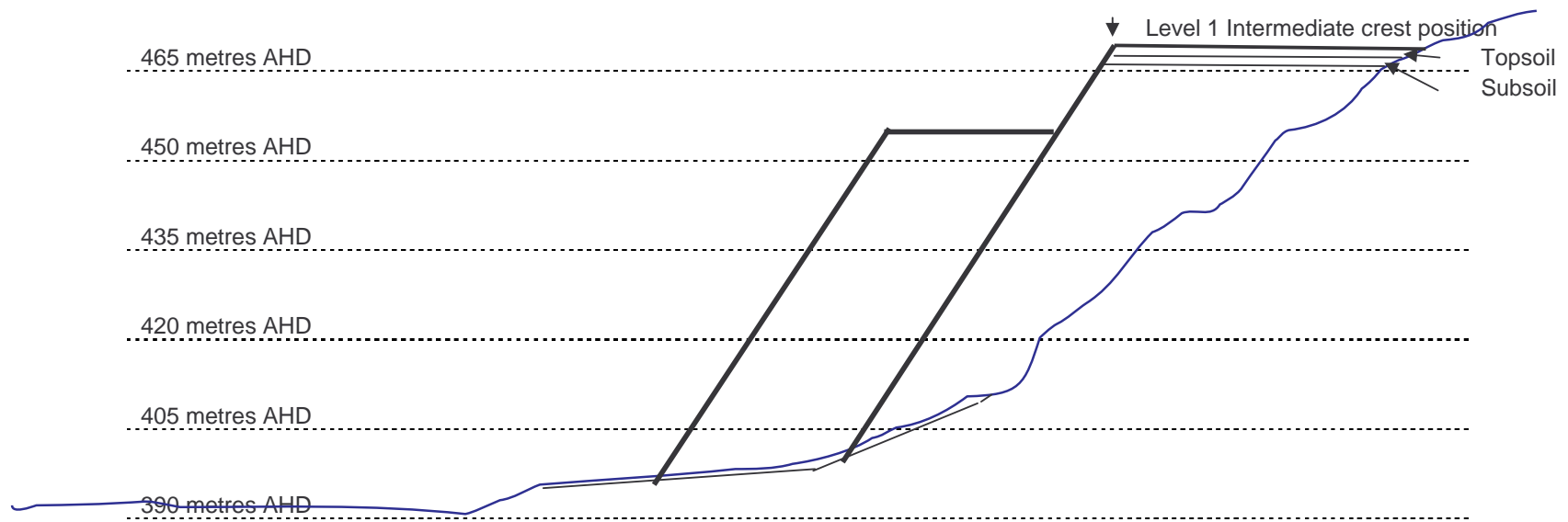
The following diagrams (Phases 1, 2, 3 and 4) show a schematic view from the initial phase of construction, which depicts the development of the top levels of the waste rock stockpile. Construction of the waste rock stockpile using the top down method will enable the completion of portions of the stockpile early in the mine schedule, to allow progressive rehabilitation and the establishment of rehabilitation trials on the top of the waste rock stockpile and the slope of the top lift.

As the waste rock stockpile nears completion, space constraints may necessitate the final (lowest) lift being constructed using a combination of top-down and bottom-up methods.

PHASE 1. Initial dumping on Waste Stockpile.

- Note
- *Waste materials will be selectively mined and placed so that those requiring encapsulation will be dumped in the centre of the stockpile.
 - *Water run off will be to the rear (up-hill end) of the stockpile surface where a suitable drain will collect such and control the run-off, either through to the base of the stockpile/natural surface contact or to the edges of the stockpile and thence into the existing waterways as much as possible.
 - *Stripping of suitable topsoil materials from the plain will be below a selected contour that represents the cut-off between predominantly outcrop zones and vegetated zones, anticipated to be between 415 – 420 metres AHD.

PHASE 2. Waste Stockpile Level 1 (465 metres AHD to 450 metres AHD) taken to the Intermediate position with placement of subsoil/topsoil.
Commence tipping on Waste Stockpile Level 2 (450 metres AHD to 435 metres AHD) below and around the perimeter of Level 1.

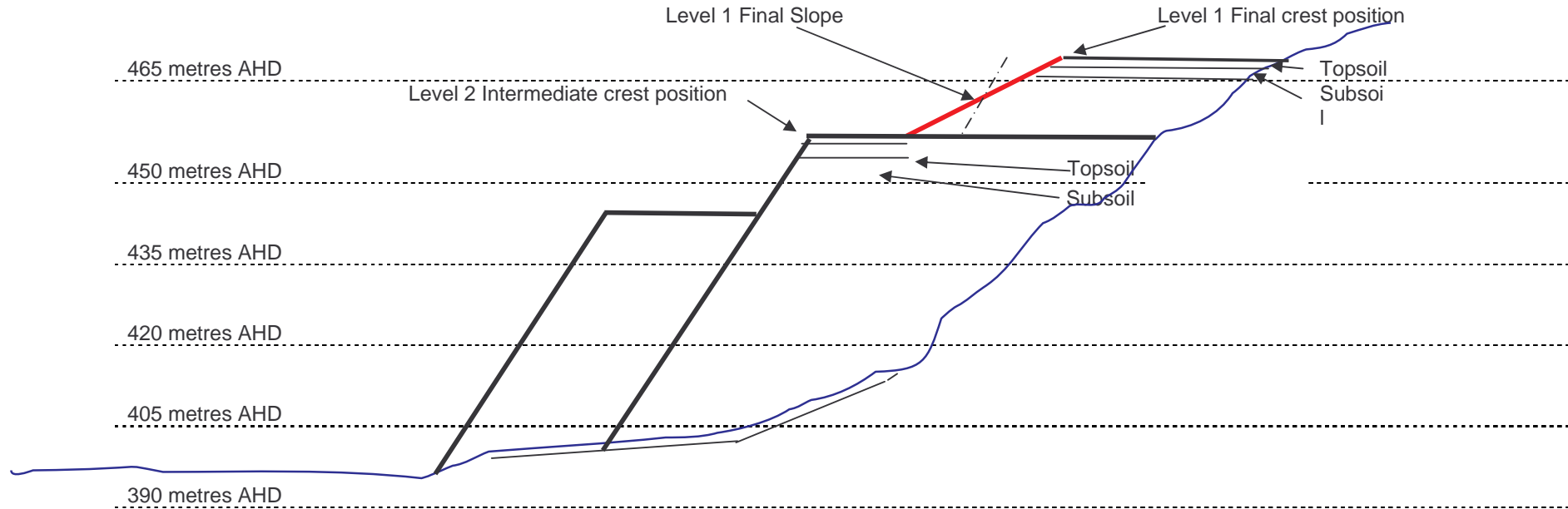


Blue line natural surface

- Note
- *Topsoil and Subsoil will be placed in thicknesses that equate to the mass balance of such materials (volume vs. area).
 - *Initial treated flat surfaces on the waste stockpile will be established for the first growing season to enable early trial plots to be set up.
 - *The tipping of waste materials will be further controlled with two available stockpile levels to ensure proper encapsulation.
 - *Topsoil and Subsoil will be placed right to the edge of the Level 1 surface Intermediate crest position. This will enable such materials to end up on the final contour slope after "cut and fill" of the 30 degree natural rill angle to the 18 degree final slope angle.
 - *Tipping on Level 2 will commence on the south-west corner of the waste stockpile and the "tiphead" will follow the outward intermediate crest position of the upper Level 1

PHASE 3.

Waste Stockpile Level 1 (465 metres AHD to 450 metres AHD) contoured/pushed off to final slope (max 18 degrees) after Level 2 has been taken through to its Intermediate position. Commence dumping on Level 3 (435 metres AHD to 420 metres AHD)

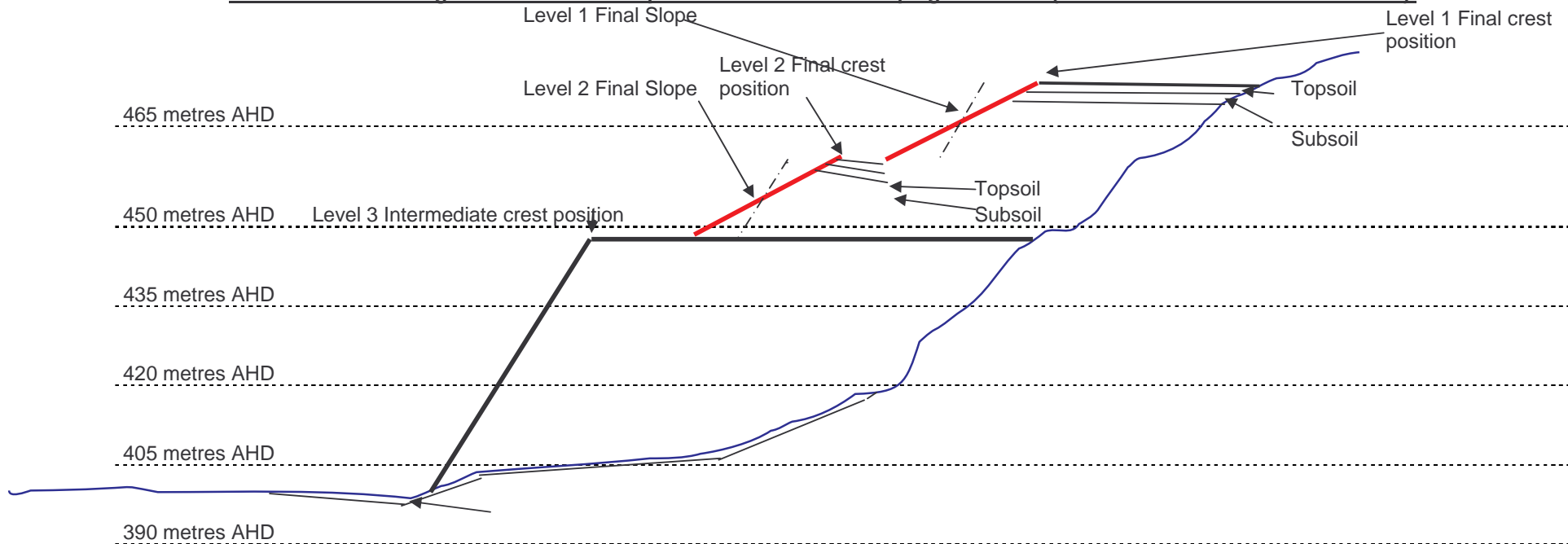


Blue line natural surface

- Note
- *The final slope of Level 1 can now be seeded/planted as well in trial plots for future rehab/re-veg evaluation.
 - *Tipping for Level 3 also commences down-hill and from the natural ground surface at 435 metres AHD.
 - *Subsoil and Topsoil are placed at the outer edge of Level 2 to facilitate placement on the resulting 10 metre berm and final slope.

PHASE 4.

Waste Stockpile Level 2 (465 metres AHD to 450 metres AHD) contoured/pushed off to final slope (max 18 degrees) after Level 3 has been taken through to its Intermediate position. Commence dumping on Level 4 (420 metres AHD to 405 metres AHD).



Blue line natural surface Further topsoil stripping

- Note
- *The final slope of Level 2 can now be seeded/planted plus the inward sloping 10 metre berm between the final slopes.
 - *Tipping for Level 3 also commences down-hill and from the natural ground surface at 435 Metres AHD.
 - *Further topsoil stripping is required as the waste stockpile lowest toe position moves out from the previously stripped area. This topsoil is ideally directly placed on the upper waste stockpile levels as required prior to the winter rainy season (before June). The area of disturbance is kept to a minimum width out from the generally north-westerly growing waste stockpile.

The most highly weathered material within the open pit profile is located at approximately RL 560 metres and above. This material represents the most oxidised waste material and is to be the source of the subsoil layer over the unweathered, rocky matrix of the waste rock stockpile. As sufficient area becomes available on the top of the waste rock stockpile, this material will be stockpiled, for later respreading as a subsoil layer. The estimated quantity of material available is 160,000 loose cubic metres. Table 7 shows the priority of use and quantities available for waste rock stockpile rehabilitation.

Table 7: Subsoil material use on the waste rock stockpile.

Priority		area (m ²)	subsoil depth (m)	quantity (m ³)
1	Top level	100,000	1	100,000
2	benches	40,000	0.5	20,000
3	slopes	80,000	0.5	40,000
	Total			160,000

Rehabilitation of the waste rock stockpile will consist of spreading available topsoil over the subsoil layer to a depth of approximately 15 centimetres and scarifying on the contour to a depth of about 300 millimetres to create favourable conditions for seed to embed.

The dominant species present over the footprint of the waste rock stockpile are *Acacia* species. Rehabilitation will focus on re-establishment of species identified in community types A1, A4, A5 and C2 in Figure 6 of the EPS.

A shallow perimeter bund at the toe of the stockpile will be constructed to capture runoff and sediment from the stockpile's lower batters.

6.2.4 Workshops and Stores

The area defined as the "Workshops and Stores" is comprised of the following:

- Fuel and oil storage facilities.
- Light vehicle workshops.
- Truck workshops.
- Wash bays.
- Stores yard.

No area specific closure measures were identified. General rehabilitation and closure measures (Section 6.1) will be implemented.

6.2.5 Offices and Administrative Facilities

The area defined as the “Offices and Administrative Facilities” is comprised of the following:

- Offices.

No area specific closure measures were identified. General rehabilitation and closure measures (Section 6.1) will be implemented.

6.2.6 Contractor Yards

The area defined as the “Contractor Yards” is comprised of the following:

- Drilling contractor yard.
- Mining contractor yard.
- Laydown areas.

No area specific closure measures were identified. General rehabilitation and closure measures (Section 6.1) will be implemented.

6.2.7 Water Management Facilities

The area defined as the “Water Management Facilities” is comprised of the following:

- Water collection sumps and drains.
- Borefield.
- Sewage plant.

In addition to the general provisions, the following specific provisions apply.

- Plastic liners will be removed from water ponds and will be disposed of at the landfill site or for below-ground ponds; the liner may be cut, folded and buried in place.
- All earth drains will be backfilled by dozing loose earth from the immediately adjacent area into the drains and providing for an approximately 30% overfill to allow for settlement. Crossberms, consisting of 0.5 metre high lightly compacted earth walls will be provided at appropriate intervals (50 metre intervals allowed for) in order to divert any rainfall runoff water that may be channelled by the backfilled drains.
- All access to borefields will remain. Pumps, gensets and fuel tanks will be removed and bores will be decommissioned according to the Agriculture and Resource Management Council of Australia and New Zealand (1997) Minimum Construction Requirements for Water Bores in Australia.

6.2.8 Solid Waste Facilities

The area defined as the “Solid Waste Facilities” is comprised of the following:

- Existing landfill.

- Proposed closure landfill within waste rock stockpile.

In addition to the general provisions a one metre layer of waste rock shall be placed on top of the covered landfill sites to discourage any scavenging. A further 150 to 200 millimetres of soil/growth medium will then be placed on top of the cover.

6.2.9 Roads, Powerlines, Pipelines and Fences

The area defined as the “Roads, Powerlines, Pipelines and Fences is comprised of the following:

- On-site access roads.
- On-site power and lighting network.
- Substation.
- On-site pipeline network.
- Fences.

No area specific closure measures were identified. General rehabilitation and closure measures (Section 6.1) will be implemented.

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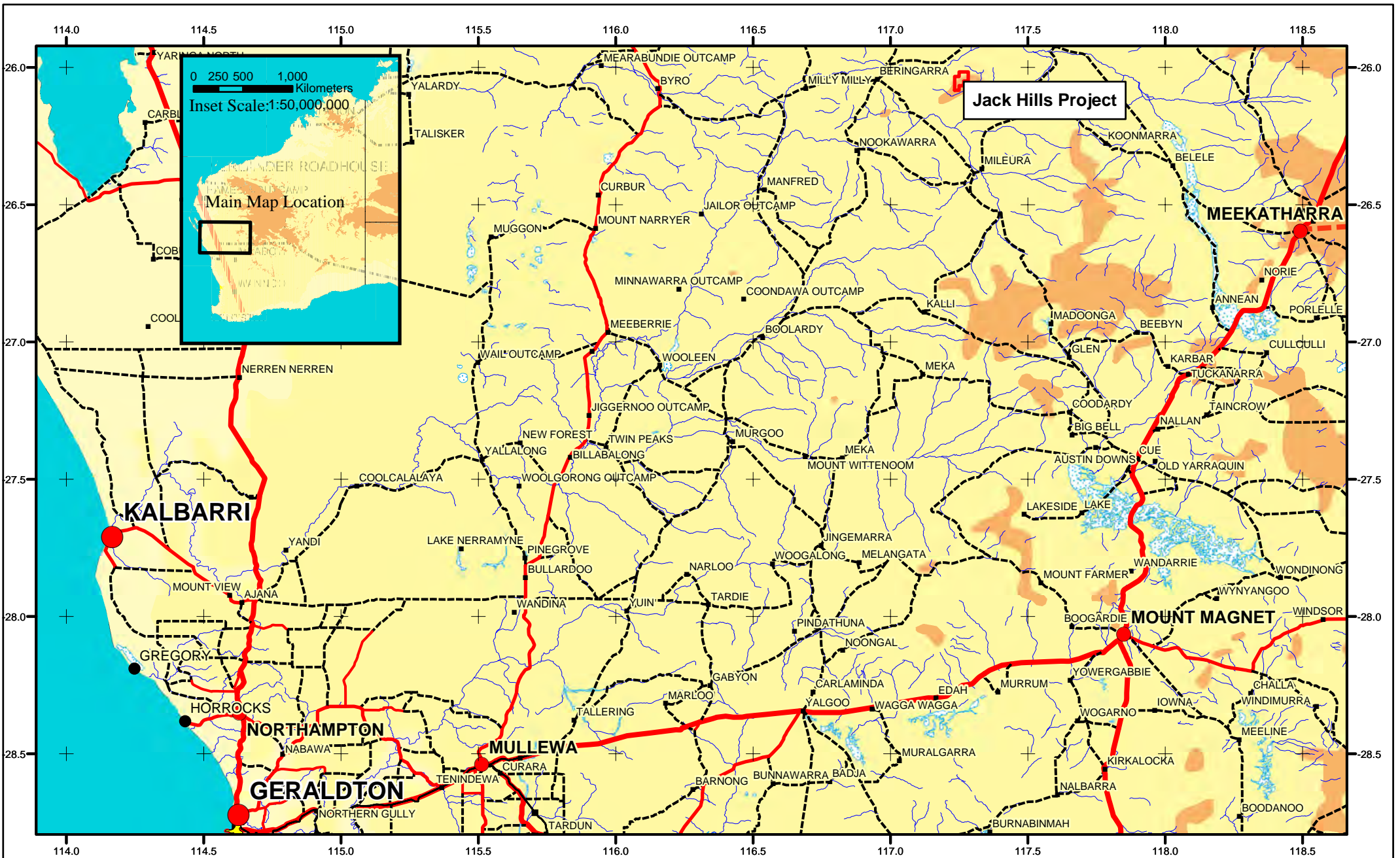
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FIGURES



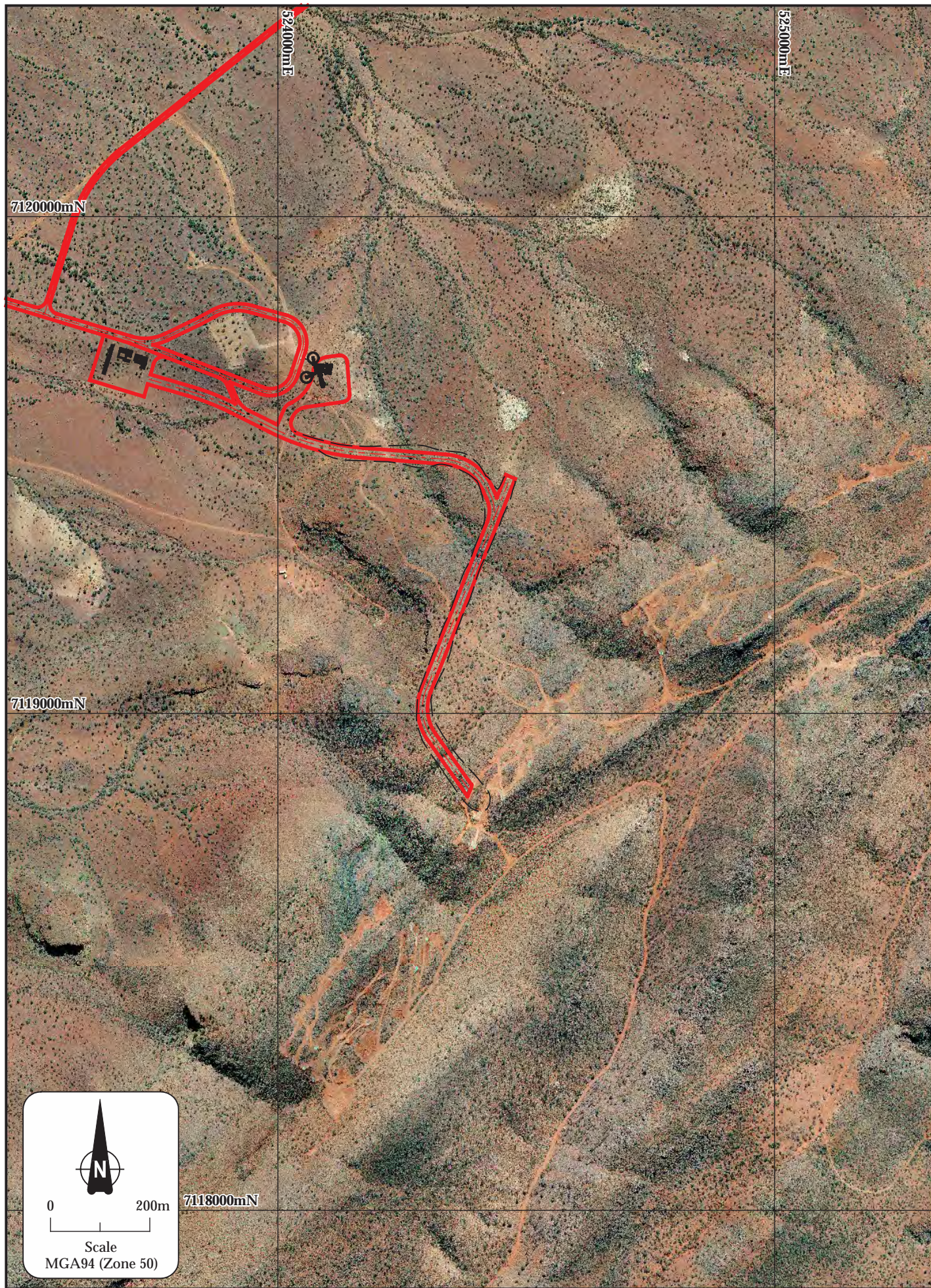

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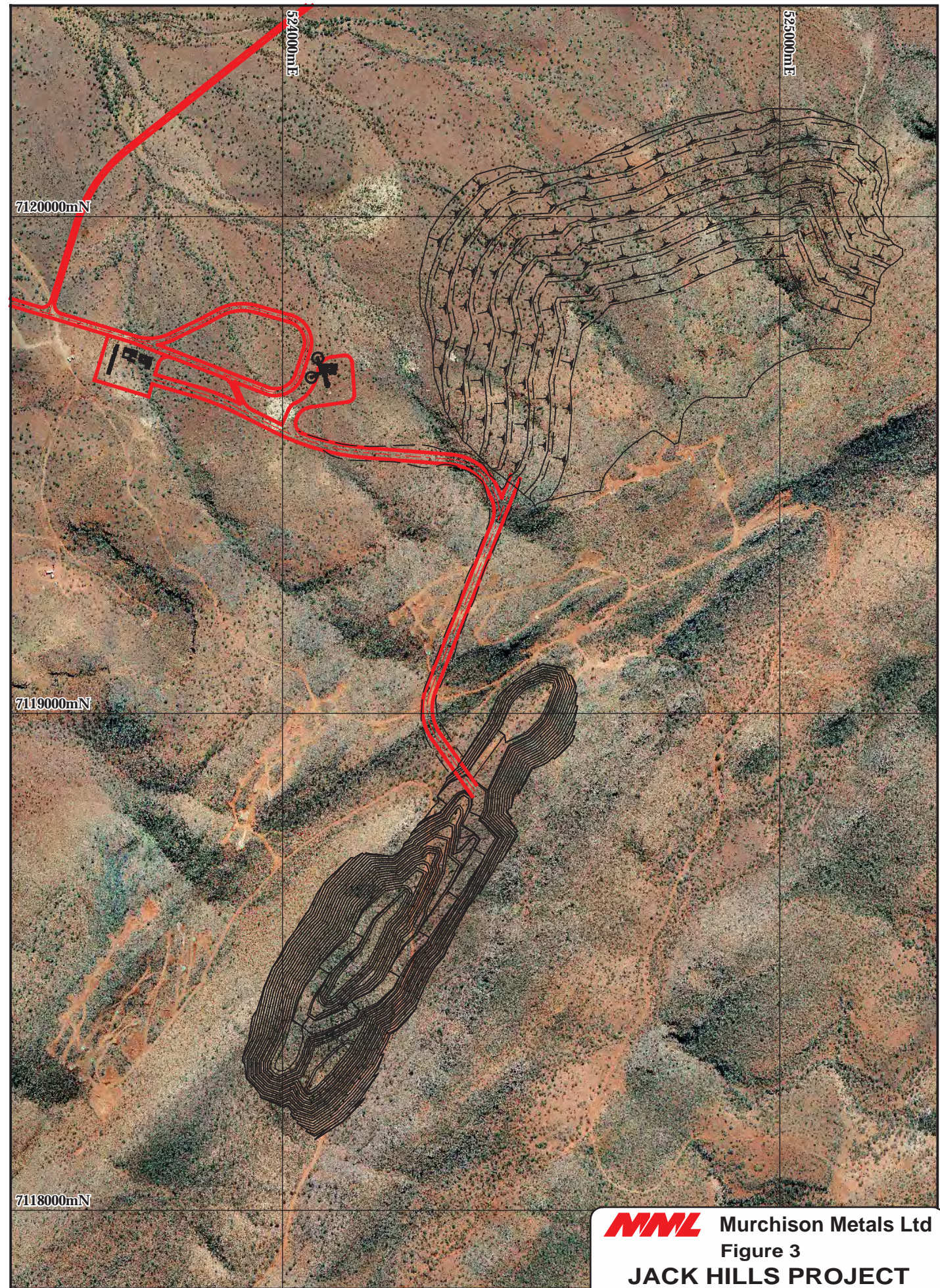
Murchison Metals
Jack Hills Project

Location Plan
Figure 1

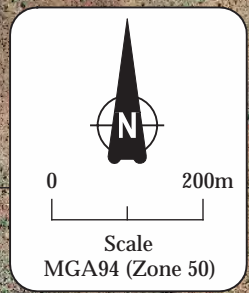
Author: F Sibble - Drawn: CAD Resources - www.cadresources.com.au - Tel: (08) 9246 3242 - Fax: (08) 9246 3202 - CAD Reference: g1288 - eps_f14.dgn - A3 - May 2006 - Rev. A



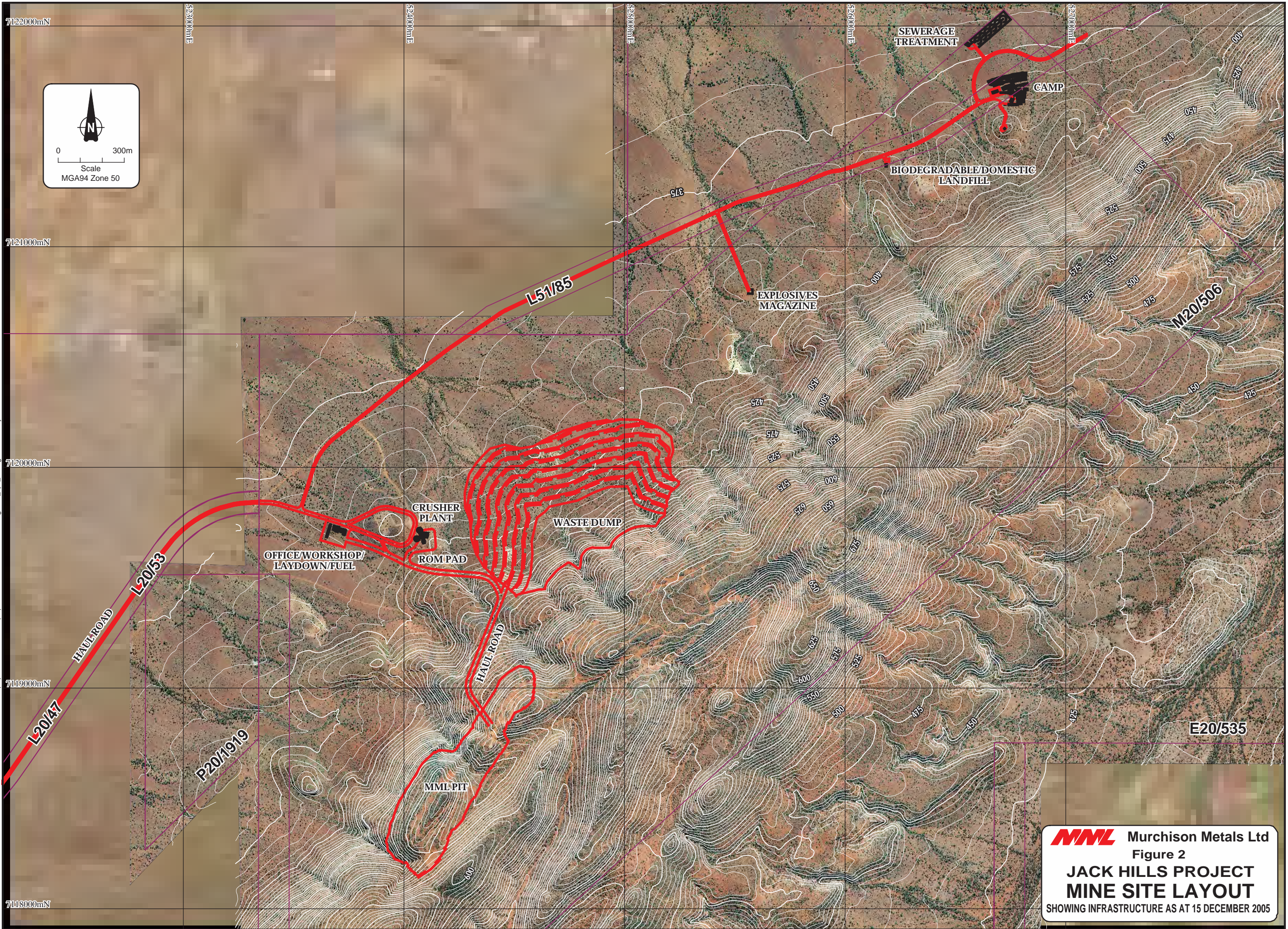
INITIAL DEVELOPMENT



FINAL DEVELOPMENT



MNL Murchison Metals Ltd
Figure 3
JACK HILLS PROJECT
PROJECT AREA AND HAUL ROAD
DEVELOPMENT STAGES



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MML Murchison Metals Ltd
 Figure 2
JACK HILLS PROJECT
MINE SITE LAYOUT
 SHOWING INFRASTRUCTURE AS AT 15 DECEMBER 2005

APPENDICES

APPENDIX A
MML Environmental Policy



MURCHISON METALS LTD

CORPORATE ENVIRONMENTAL POLICY STANDARDS & GOALS

The prime objective of Murchison Metals Ltd is to protect the safety and health of people living in areas where the company is involved in mining, processing and or exploration activities and to establish a reputation of being environmentally responsible.

To achieve this objective all group companies and contractors have a commitment to operate in an environmentally responsible manner and are required to:

- Comply with all the applicable Commonwealth and State government regulations for the protection of the environment
- Establish and maintain proper standards of environmental care through audit and self regulation
- Provide adequate training to ensure employees and contractors do recognize the potential impact of their activities
- To monitor the state of the environment throughout the operation and take the relevant corrective action
- Design, operate and decommission all facilities and associated infrastructure to avoid or mitigate adverse environmental impact
- Respect all human and property rights

In respect to mining activity it is recognized that as temporary land users the company's rehabilitation objectives must be consistent with projected future land use of the area. Accordingly, the overall objective is to re-establish the site to a safe stable and non-erodible condition with all environmental, heritage and conservation values intact.

A handwritten signature in black ink, appearing to read 'R. Vagnoni', is positioned above the printed name and title.

Robert Vagnoni
Executive Director

Environmental Management Plan, Jack Hills Iron Ore Project:

Fire Management Plan

Prepared for:
Murchison Metals Limited

March 2006

Prepared by:

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MBS
ENVIRONMENTAL

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4.	EXISTING ENVIRONMENTAL FACTORS	4
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APPENDICES

Appendix A: Hot Work Permit

Appendix B: Vehicle Inspection Checksheet

1. INTRODUCTION

The Jack Hills iron ore project is in a region of generally sparse vegetation that does not pose an inherently high fire risk.

There will be no burning of vegetation or other materials required as a normal part of mine operations. The site will operate under the general principle of fire avoidance.

Fires will only be lit during fire control and emergency response team training exercises. Such training will be conducted in an open cleared area. Only small fires will be lit for the purposes of training on equipment to use and techniques to extinguish fires.

There will be no central reticulated fire system at Jack Hills. Fire protection will be by use of hand held extinguishers within buildings and equipment. A fire protection trailer will be located at Jack Hills that will have fire hoses, a 900-litre water container and a fire pump.

All mining equipment and generating sets will be equipped with fire extinguishers.

The objective of this Management Plan is to ensure that fire control practices are implemented on site to minimise the risk of fire from site operations.

2. RELEVANCE TO OTHER PLANS

This Fire Management Plan forms part of the Jack Hills Environmental Protection Statement's associated documentation.

Some aspects of other management plans, such as the Vegetation Management Plan, also relate to fire management.

3. BUSH FIRES ACT 1954

The *Bush Fires Act 1954* requires owners of premises to maintain firebreaks or low fuel areas around buildings and infrastructure. Murchison Metals Limited will undertake seasonal maintenance of firebreaks around accommodation camp buildings and plant infrastructure in line with legislative requirements.

4. EXISTING ENVIRONMENTAL FACTORS

The project is located about 350 kilometres north-east of Geraldton and 100 kilometres west of Meekatharra in the Murchison region of central Western Australia. The closest dwelling is the Mt Hale station 30 kilometres east of the project area.

The annual average rainfall is 236 millimetres. Half the annual evaporation of 3,576 millimetres occurs from November to February.

The project area is located on the Jack Hills Range in the vicinity of Mt Hale and Mt Matthew and on the adjoining plains immediately north of the range. Jack Hills extend almost 300 metres above the flat plains of the Murchison, itself approximately 400 to 450 metres AHD at the project site.

The Jack Hills project will occupy an estimated area of 114.5 hectares, with the open pit (25.4 hectares) on the range and the remaining mine site infrastructure, plant, roads and camp on the adjoining plain.

Vegetation comprises *Acacia* shrublands and restricted *Triodia* upland plant communities on the rugged ranges and ridges and sparse *Mulga* systems on the undulating stony plains. Eighteen plant communities were mapped in the Jack Hills project area. The *Triodia* plant community is restricted to the Banded Ironstone Formation (BIF) on the range.

5. FIRE MANAGEMENT

A range of existing systems and practices are in use at Jack Hills that serve to manage the issue of fire control at the site. These are outlined below.

5.1 HOT WORK PERMIT

All welding, cutting and grinding activities that are undertaken on site require the issue of an internal Hot Work Permit (Appendix A). The permit will specify fire control practices to ensure no fires are started from conducting these activities.

5.2 SITE INDUCTION

The site induction informs all personnel on site about fire awareness, the requirement to obtain a Hot Work Permit before undertaking welding, cutting or grinding activities, emergency contact numbers, procedures in case of a fire and fire control training that is periodically undertaken.

5.3 COMMUNICATIONS

There is a single Emergency Response Number on site for any emergency, including fire that occurs on site.

All vehicles are fitted with two-way radios that can also be used in an emergency situation.

5.4 TRAINING

Periodic fire control training is undertaken for all personnel on site on the proper use of fire extinguishers, evacuation of buildings in case of fire and emergency muster points.

5.5 VEHICLE INSPECTION CHECKSHEET

A vehicle inspection checksheet (Appendix B) is completed for all vehicles coming to site to ensure they are fitted with appropriate safety equipment that includes a fire extinguisher.

5.6 EMERGENCY RESPONSE TEAM

The site will establish an Emergency Response Team (ERT) that will be trained to respond to serious accidents, incidents and fires.

APPENDICES

APPENDIX A
Hot Work Permit

Murchison Metals Limited

HOT WORK PERMIT

DATE ISSUED _____ VALID UNTIL _____

LOCATION OF WORK _____

MML SUPERVISOR PHONE # _____

CONTRACTOR PHONE # _____

The location where this work will take place will be examined before the start of cutting/welding/grinding operations and all the appropriate precautions (**including any that exceed those outlined below**) will be taken.

Signed (at issue of permit) _____ Date _____

Print name _____

FIRE SAFETY PRECAUTIONS

BEFORE THE WORK - *All* of the following precautions must be taken:

- Cutting/grinding/welding equipment must be thoroughly inspected and found to be in good repair, free of damage or defects.
- A multi-purpose dry chemical, portable fire extinguisher must be located such that it is immediately available to the work and is fully charged and ready for use.
- At least one fire alarm or means of contacting the Emergency Response Team (ERT) (i.e. site telephone/2 way radio) must be available and accessible to person(s) conducting the hot work operation.
- Floor areas under and at least 3 metres around the cutting/welding operation must be clean of combustible and flammable materials.
- All construction equipment fueling activities and fuel storage must be relocated at least 10 metres away from the cutting/welding operation.

Where applicable, the following precautions will also be taken before the work begins:

- Fire resistant shields must cover combustible floors.
- Spark/slag catchers must be suspended below any elevated cutting/welding operation.

- ❑ All floor and wall openings must be covered to prevent sparks/slag from traveling to other, unprotected areas.
- ❑ Containers in or on which cutting/welding will take place must be purged of flammable vapors.

DURING / AFTER THE WORK - The following precautions will be taken:

- ❑ Person(s) must be assigned to a fire watch during all cutting/welding/grinding activities.
- ❑ Fire watch person(s) are to be supplied with multi purpose dry chemical, portable fire extinguisher and trained in its use.
- ❑ A fire alarm station or means of contacting the ERT available and accessible to fire watch person(s).

The location where this work will take place has been **examined before the start** of cutting/welding/grinding operations and all the appropriate precautions have been taken. *Responsible party to sign under Signature 1 for each date.*

The work area and all adjacent areas to which sparks and heat might have spread were **inspected 30 minutes after** the hot work operations ceased for the day and were found to be fire safe. *Responsible party to sign under Signature 2 for each date.*

	Signature 1	Signature 2
Date _____	Before _____	After _____
Date _____	Before _____	After _____
Date _____	Before _____	After _____
Date _____	Before _____	After _____
Date _____	Before _____	After _____
Date _____	Before _____	After _____
Date _____	Before _____	After _____

APPENDIX B

Vehicle Inspection Checksheet



MACHINERY INSPECTION CHECKLIST

In accordance with MML’s operational practices it is important that earthmoving machinery is in an acceptable condition before it enters site working areas in relation to safety, weeds, hydrocarbons, emissions and noise.

This inspection must be completed by the Site Supervisor in the presence of the machinery Supervisor.

Date of arrival/inspection:

Name of machinery Supervisor:

Name of person conducting inspection:

What kind of machine is it?
Please list any problem weeds at the last site.

Was the machine cleaned before it left the last site? Yes No

Are buckets, tracks, blades etc free of soil and vegetation? Yes No

Are the tyres free of seeds? Yes No

Is machine free of fuel and oil leaks? Yes No

Is the exhaust/muffler in good working order? Yes No

Work required/comments:
.....
.....
.....

If you have answered NO to any of these questions, please carry put the required cleaning and/or maintenance before the machine enters the site. This form must be signed by the machine Supervisor and provided to the Project Manager when all cleaning and/or maintenance is completed.

Signed

Machine Supervisor Date

Vehicle Decontamination Procedure

- Park machine on hardstand area at least 10m from vegetation.
- Use fire trailer or reticulated water to wash down machine.
- Remove all soil and vegetation including seeds.
- Ensure runoff, soil and any seeds are contained on the hardstand or directed to a sediment basin.
- Carry out final inspection with MML personnel before moving into site.



INSPECTION EQUIPMENT AND VEHICLE COMPLIANCE

CHECK	YES	NO	N/A	ACTION REQUIRED	BY WHO/DATE
Are project vehicles fitted with relevant safety stickers prior to use?					
Do relevant cabins have an Australian Standard approved rollover structure?					
Are earthmoving equipment and vehicles equipped and maintained with suitable brakes?					
Are earthmoving equipment and vehicles fitted with adequate headlights?					
Do vehicles have suitable audible warning devices?					
Are vehicles equipped with an adequate automatic flashing light?					
Are vehicles equipped with an 'In Service' fire extinguisher?					
Are earthmoving equipment and vehicles fault/defect inspected and maintained as per manufacturers specifications?					
Are there up to date records of inspections and maintenance?					
Do contractors earthmoving equipment and vehicles comply with these requirements?					

DATE: _____

AREA: _____

INSPECTOR: _____

SIGNATURE: _____