Application for Authorisation

Northern Territory of Australia - *Mining Management Act*

Section 1 – Project Details

Please mark the relevant boxes below.

X	**New Authorisation** Section 36(1) *Mining Management Act* *		**Variation of Authorisation** Section 38(1) *Mining Management Act* **		
X	**Exploration**		**Extractive**		**Mining**

Project name
Please provide a new or existing project name in the space provided below.

Yarram Iron

Authorisation number
Insert existing authorisation number in the space below, where applicable.

TBD

Section 2 – Operator Details

Operator Name Use ASIC-ABR registered name (if a company), or name of the applicant	Yarram Iron Pty Ltd		
ACN Leave ACN/ABN blank if not relevant		**ABN**	18 125 984 401
Postal Address	PO Box 268 West Perth		
State	WA	**Postcode**	6872
Street Address	50 Kings Park Road West Perth WA 6005		
State	WA	**Postcode**	6500
Contact Person Include name, title and position	Bruce Marriott		
Phone (business) Include area code		**Phone (mobile)**	0447 387 823
Email Address Note: all correspondence will be sent via email	bruce@goldvalley.com.au		

Section 3 - Declaration

I hereby declare that:

The information provided in this application, and including the attached associated Mining Management Plan, is correct and accept that failure to supply the information required may delay processing of this application;

Signed by Operator in accordance with section 126 or 127 of the *Corporations Act* (Cth) where applicable.

Director	**Name (please print)**	**Date**
	yuzheng xie	19/04/2019
Director or Company Secretary	**Name (please print)**	**Date**

***New Authorisations** (Section 36(1) of the *Mining Management Act*) - Application must be accompanied by a mining management plan (section 36(2)(a)) and, if necessary, operator appointment notice (section 36(2)(b).

****Variation of Authorisation** – (Section 38(1) of the *Mining Management Act*) - Application must be accompanied by the current mining management plan or the proposed amendment thereof (section 38(3)) and an explanation of the reasons for the application (for example changes in operator name, mining interests (i.e. titles) and mining activities).

Nomination of an Operator of a Mining Site

This form is to be completed by a Title Holder appointing an Operator in accordance with section 10 of the *Mining Management Act*. Each Title Holder having an interest in the site should complete a separate nomination form.

Section 10 of the *Mining Management Act*

TITLE HOLDER'S NAME	Northern Territories Resources PTY LTD	
ACN/ABN:	78124647829	
POSTAL ADDRESS	PO BOX 37446 WINNELLIE , NT	
	Postcode:0821	
CONTACT PERSON	ANDREW TONG	
PHONE	Business:	Mobile:0438675333
E-MAIL	Andrew.tong@ntresources.com.au	

MINING INTEREST/S (i.e.: Title numbers)	MLN 1163, ELR125, ELR146

NAME OF OPERATOR (as per ASIC-ABR registered name)	Yarram Iron Pty Ltd
ACN/ABN:	18 125 984 401

CONFIRMATION OF TITLE HOLDER'S NOMINATION OF OPERATOR

We, the authorised officers of the Title Holder confirm the Title Holder has, by written agreement(s) with the Operator:

- appointed the Operator in accordance with section 10 of the Mining Management Act; and
- conferred on the Operator the right of the Title Holder to take and use water in accordance with section 81 of the *Mineral Titles Act*.

Signed (Title Holder)	Name (Please Print)	Date
Director	Dr Andrew Tong	23/9/19
Director/Company Secretary		

Signed in accordance with section 126/127* of the *Corporations Act 2001 Cth* (*delete inapplicable section)

CONFIRMATION OF OPERATOR'S ACCEPTANCE OF APPOINTMENT

We, the authorised officers of the Operator, confirm the Operator has:

- accepted the appointment and complied with section 10 of the *Mining Management Act;* and
- accepted the Title Holder's rights to take and use water pursuant to section 81 of the *Mineral Titles Act* and in accordance with the *Mining Management Act* accepts responsibility for meeting the environmental obligations.

Signed (Operator)	Name (Please Print)	Date
Director	Zhizheng Xie	19/09/2019
Director/Company Secretary		

Signed in accordance with section 126/127* of the *Corporations Act 2001 Cth* (*delete inapplicable section)

TERRITORY RESOURCES PTY LTD
(ACN 100 552 118)

Level 3, 46-50 Kings Park Road
West Perth, WA 6005

PO Box 268
West Perth, WA 6872

Mobile: 0412919945
Email:
mining@goldvalley.com.au

18 October 2019

Department of Primary Industry and Resources
Mines Division

Floor 5, Centrepoint Building, 48-50 Smith Street, Darwin, Australia
GPO Box 4550, Darwin, NT 0801 Australia
ABN: 84 085 734 992

Dear DPIR,

This correspondence is provided in order to a request the complete transfer of security held against authorisation number 0263 held in the name of Territory Resources Pty Ltd (ACN 100 552 118), to authorisation number 1034, which is to be to be issued to Yarram Iron Pty Ltd (ACN 125 984 401).

Yours sincerely

Yuzheng Xie | Director for,
Territory Resources Pty Ltd
Gold Valley Iron and Manganese Pty Ltd
Yarram Iron Pty Ltd

Steven Parnell | Director for,
Territory Resources Pty Ltd
Gold Valley Iron and Manganese Pty Ltd
Yarram Iron Pty Ltd

Mining Management Plan Exploration Activities

Northern Territory of Australia – *Mining Management Act*

It is recommended that the Mining Management Plan is completed in conjunction with the user guide, available on the Northern Territory Government website.

Section 1 – Project Details

Project Name Provide new or existing project name	Yarram Iron Ore

Authorisation Number Insert existing authorisation number, where applicable	N/A

Operator Name Use ASIC-ABR registered name (if a company), or name of the applicant	Yarram Iron Pty Ltd. Please refer to letter provided above

Location and Access Details Include brief description of the location, access details, and distance to nearest town or community	2030 White Road, Rum Jungle NT 0822 Australia, 10km North East of Batchelor, on Whites Road. Access is via Lithgow Rd, Rum Jungle.

Target Commodity Details Include target commodities (i.e. gold, copper etc)	Iron

Mining Activities Summarise the mining activities (exploration) to be the subject of the proposed Authorisation or Variation	Installation of 7 groundwater monitoring bores and 5 exploration drill holes for collecting samples for geochemical and geotechnical assessment. Please see files included in submission. All groundwater bores will be installed as per the attached KML file while ensuring that impacts to flora and fauna are minimised as much as practicable.

Proposed Schedule Include start and finish dates of ground disturbing work	October 2019 – November 2019

Mining Interest and Land Ownership

List the mining interests (titles), the title holder name/s, the title expiry date and the Property name/Land holder (e.g. pastoralist or Aboriginal land trust) for each title.

During this exploration period activities will be restricted to MLN1163 while other stakeholders are engaged.

Title Number	Title Holder	Expiry Date	Property Name or Land Holder
ELR125	Northern Territories Resources	22/08/2023	Multiple land owners
ELR146	Northern Territories Resources	18/09/2021	Finnis River Land Trust
MLN1163	Northern Territories Resources	23/03/2030	Freehold – See below

Delete or add rows as required

Potentially impacted sections

- Sections02943 and 02949 Hundred of Goyder

Organisational Structure

Position Title	Name
Managing Director	**Yuzheng Xie**
General Manager	**Bruce Marriott**
Exploration Manager	**TBD – (Bruce Marriott interim)**
Senior Geologist	**TBD – (Bruce Marriott interim)**
Environmental Manager	**SLR**
Radiation Safety Officer	**Not Required***

Delete or add rows for various position titles as required

*Naturally occurring radioactive material has not been encountered during previous exploration activities and is not expected to be encountered during the proposed activities, this data has been provided to DPIR previously. All uranium concentrations are well below 80ppm, and Thorium are below 246ppm, or the equivalent of 1Bq/g which is the IAEA proposed investigation value for NORM[1].

[1]INTERNATIONAL ATOMIC ENERGY AGENCY VIENNA ISBN 978–92–0–113910–8

Section 2 – Operator Self-Assessment of the Environmental Risk

The purpose of this self-assessment is to ensure Operators complete a project risk assessment of potential environmental impacts and are aware of other legislative obligations from various Agencies. As a result of this self-assessment, further information may be required in the form of a management plan to enable full assessment of the MMP. If you have any queries please contact a Mining Officer prior to submitting the MMP. Useful resources to assist with this self-assessment are provided in the User Guide.

Environmental considerations

ASSESSMENT ASPECT	**YES or NO**	**ACTIONS REQUIRED (if answered YES)**	**APPENDED INFORMATION (Evidence of consultation with DENR and/or management plan)**
Step 1: Are there any threatened flora and fauna species or habitats of significance that may occur in the proposed work area?	Yes	It is likely a threatened species will show up in most reports. Therefore, the Operator must undertake a likelihood analysis, which looks at the likelihood of the species or its habitat occurring at or near the site. If the analysis results in a high likelihood, then a "Significant Impact Assessment" should be undertaken, which may require consultation with the DENR – Flora and Fauna Division. The DENR may recommend a Biodiversity Management Plan – this must be developed and attached to the MMP.	A number of Flora and Fauna studies have been completed for the project area. The project has been designed to minimise the impact on flora and fauna. See **Appendix A** for more detail.
Step 2: Are there any known declared weeds within the proposed work area?	Yes	Under the *Weeds Management Act* declared weeds are required to be eliminated or controlled by the owner and occupier of land. Seek advice from DENR – Weeds Management to ensure management measures are appropriate for the level of activity proposed and attach a Weed Management Plan (if required).	Weed management information is included in **Appendix B**
Step 3: Will you be using water from bores or other sources for the operation?	Yes (Monitoring Only)	*Note the Government is proposing to amend the exemption of water licencing under the Water Act for mining activities, including exploration.* *This section will be updated in light of any changes in the future.*	Exploration activities are not expected to impact significantly on water resources.

Environmental assessment and cultural considerations

ASSESSMENT ASPECT	YES or NO	MANAGEMENT REQUIREMENTS
Step 4: Is your project likely to have a significant impact on the environment?	No	Refer to the NTEPA Environmental Factors and Objectives Guideline.
Step 5: Are there Aboriginal sacred sites in the Project area?	Yes	Sacred Sites are protected under the NT *Aboriginal Sacred Sites Act* and administered by the Aboriginal Areas Protection Authority (AAPA). It is recommended that advice be sought from AAPA in relation to sacred site protection. Please refer to attached AAPA Abstract of Records
Step 6: Are there archaeological and heritage sites in the Project area?	Yes	Heritage and archaeology sites are protected in the NT. NT Heritage Branch of the Department of Natural Resources and Environment (DENR) administers the *Heritage Act*. Seek advice in relation to protection of heritage and archaeological sites. Heritage assessment has been undertaken, see Impacted Sacred and Heritage Sites map. No Heritage sites will be impacted during drilling,

Section 3 – Amendments

As per Section 41(3) of the *Mining Management Act*, an MMP reviewed and amended under Section 41(1)(a) is to clearly identify amendments made.

Section 4 – Activities Proposed

Mining Interests (i.e. titles)	**MLN1163**
Number and type of proposed drill holes	12 Holes – 7 Water bores for monitoring, 5 exploration drill holes for geochemical assessment.
Maximum depth of proposed holes (m)	70m
Number and size of drill pads to be cleared (Length: m x Width: m)	15m x 15m x 12 holes
Total area of drill pads to be cleared (ha)	0.27ha
Is drilling likely to encounter groundwater? (Y, N, unsure)	Yes
Number of costeans (Length: m x Width: m x Depth: m)	[redacted]
Number of bulk sample pits	
Total bulk sample (tonnes) (Length: m x Width: m x Depth: m)	
Bulk sample pits approved under *Mineral Titles Act*? (Y or N)	
Length of line/track clearing (km: x Width: m)	0.2 km x 5 m (1,000 m^2)
Camp area to be cleared (ha)	[redacted]
Camp Infrastructure (i.e. demountable, tents)	
Previous disturbance yet to be remediated on title (ha) if known	

Mining Interests (i.e. titles)	**MLN1163**
Other	[redacted]
Total area disturbed proposed (ha)	0.37ha

Section 5 – Previous Disturbance (for existing Authorisations only)

Refer to attached rehabilitation register and **Appendix D** for previous disturbance report.

Section 6 – Environmental Management

By checking these boxes, you are agreeing to implement the following minimum environmental management standards on the project area. Where boxes have been left unchecked, justification is required.

6.1	X	Blade-up approach for clearing will be used (i.e. no windrows, leave root stock and topsoil)
6.2	X	Significant vegetation will be avoided during clearing (i.e. large trees, specimens providing habitat or food sources, riparian vegetation, and threatened species)
6.3	X	Vegetation clearing during, and immediately after rainfall events, will be avoided
6.4	X	Vegetation clearing will be kept to the minimum required to safely traverse vehicles and drill rigs along tracks and drill pads
6.5	X	Where blade-up techniques cannot be employed, topsoil and vegetation will be stockpiled appropriately for remediation purposes
6.6	X	All employees and contractors will be trained and inducted in relation to the management of environmental risks in the work area, including weeds, waterways, threatened species, soil erosion, sacred sites and heritage areas
6.7	X	Sumps will be lined or tanks of appropriate size to contain water, sediment and drilling fluids encountered during drilling, will be used
6.8	X	Sumps, drill holes, and fuel stores will be located away from environmentally significant areas and water courses
6.9	X	Excavations (sumps, costeans and pits) will be appropriately ramped to allow fauna egress
6.10	X	Drill holes will be securely capped immediately after drilling
6.11	X	Vehicle hygiene measures will be employed to prevent the introduction and spread of invasive species and pathogens when mobilising vehicles and equipment from one location to another
6.12	X	Hydrocarbon spills will be minimised using liners and drip trays under machinery, and appropriately sized spill-kits available in the event of a spill
6.13	X	Hazardous substances (including hydrocarbons) will be stored and handled in accordance with relevant Australian Standards
6.14	X	Hydrocarbons will be stored in lined and bunded areas

6.15	X	Waste will be stored securely while on-site to minimise windblown rubbish and access by feral animals
6.16	X	Waste will be removed off-site and disposed of at an appropriate waste management facility
6.17	X	All environmental incidents will be reported to the Department in accordance with Section 29 of the *Mining Management Act*.

Justification and alternative management measures:

Nil.

Please note that some bore locations are off lease within a road reserve area. Approval to construct a water bore within the Whites Road has been provided and a traffic management plan is not required. Please refer to accompanying information.

Section 7 – Remediation and Closure

By checking these boxes, you are agreeing to implement the following minimum remediation standards on the project area. Where boxes have been left unchecked, justification is required.

7.1		Drill holes plugged below ground level at a minimum depth of 0.4 metres and soil mounded to prevent subsidence, within 6 months of completion of drilling
7.2	X	Drill samples/spoil returned down drill holes, buried in sumps, or removed from site
7.3	X	All drill hole and access markers including flagging tape, wooden markers and star pickets will be removed from site
7.4	X	Re-contouring of cut and fill drill pads will be consistent with the surrounding terrain
7.5	X	Ripping/scarifying of drill pads, and compacted areas along the contour (on sloping ground) and cross-ripping (zig-zag) along tracks
7.6	X	Tracks will be remediated, including pushing in all windrows
7.7	X	Appropriate erosion and sediment controls will be installed where erosion is evident or likely to occur
7.8	X	All tracks will be remediated unless otherwise agreed in writing by the land holder or appropriate third party
7.9	X	Access through watercourses will be removed and banks restored
7.10	X	No erosion is occurring in disturbed areas, on tracks and in remediated areas
7.11	X	All excavations backfilled within 6 months of completion of drilling
7.12	X	All water bores decommissioned unless otherwise agreed in writing by the land holder or appropriate third party. The bore must comply with the Minimum Construction Requirements for Water Bores in Australia and may require permits or licenses under the *Water Act*
7.13	X	All rubbish and infrastructure will be removed from site
7.14	X	Replacement of topsoil and vegetation
7.15	X	Contaminated soils (e.g. hydrocarbon or hazardous chemicals) will be remediated or removed from site

7.16	**X**	Monitoring will be undertaken following the wet season or a significant rainfall event

Justification and alternative management measures:

7.1 - 7 of the proposed drill holes will be used to monitor groundwater and therefore not backfilled within 6 months.

Section 8 – Required Attachments

8.1	**X**	Security Calculation Spreadsheet
8.2	**X**	Nomination of Operator Form
8.3	**X**	Spreadsheet with coordinates of proposed drill holes or polygons of target areas
8.4	**X**	Google Earth KML/shape files/track logs of proposed tracks and camp sites
8.5	**X**	A map of the work area(s) showing: 1. title boundaries and title numbers - Map attached 2. current and proposed drill holes, or polygons of target areas - Map attached 3. current and proposed tracks - Map attached 4. remediated areas – Not required 5. camp sites – Not required 6. sacred/heritage sites – Map attached 7. environmental constraints –See Appendix A and spatial data
8.6	**N/A**	Remediation Register (for existing Authorisations)
8.7	**N/A**	Photographs of remediation work
8.8	**N/A**	Radiation Management Plan (if applicable) No NORM is likely to be intersected based on previous exploration data (U below 80ppm and other elements not significantly elevated).

Section 9 – Declaration

The Mining Management Plan must be endorsed by a senior representative of the company who has the appropriate level of authority to do so.

	Author	Reviewed by	Approved by
Date	26/09/2019		
Name	Jesse Pottage		
Signature			

I Yuzheng xie **……..*(name of approving person)* ……..……*(position title)* declare that I have the authority to make the commitments contained in this mining management plan on behalf of the company. To the best of my knowledge the information contained in this plan is true and correct and commit to undertake the works in accordance with the agreed minimum standards and all relevant Northern Territory and Commonwealth Government legislation.**

SIGNATURE: ……..……..

2/10/2019

DATE: ……

Aboriginal Areas Protection Authority
protecting sacred sites across the territory

Our File: RI2019/477
In Reply Please Quote: 201908079

26 September 2019

YARRAM IRON PTY LTD
21 Parap Road
PARAP 0820

Attention: **Jesse Pottage**

RE: **Abstract of Records - NT Portion 2949 and 2943 and Part of NT Portions 2954, 2944, 962, 982, 997, 996, 2940, 2895 and 2955**

Referring to your request received on 26 September 2019 seeking information of AAPA records within the above area, I advise as follows:

The area contained by your proposal lies on Aboriginal land held by the Finniss River Aboriginal Land Trust and is administered by the Northern Land Council. Under section 23 of the Land Rights Act this Land Council has the Statutory responsibility for consulting with the traditional owners with respect to any proposal relating to the use of the land.

The Authority has no records of Sacred Sites within the above area. This does not necessarily mean that there are no sacred sites located in the area, but rather reflects the situation that Aboriginal custodians have not sought protection for sacred sites under Northern Territory law and that no other information on the location of sites is available to the Authority.

The *Northern Territory Aboriginal Sacred Sites Act 1989* enables a person, wishing to make use of or carry out works on land in the Northern Territory, to request that the Aboriginal Areas Protection Authority consult with custodians and provide written advice specifying the constraints (if any) to a particular activity imposed by the existence of sacred sites. Section 19G of the Act also provides the opportunity for an Applicant to discuss the project with Aboriginal custodians at a meeting convened by the Authority.

Please note that the cost of this Abstract of Records will be 23 Revenue Units per Lot Searched ($297) and an invoice will be issued to you by the Department of Corporate and Information Services. The terms and conditions of the invoice will require you to make payment within 30 days of receipt.
If you have any queries, please do not hesitate to contact the Registrar via email through enquiries.aapa@nt.gov.au or by phone on 8999 4332.

Yours sincerely

Kim Flitcroft
ASSISTANT REGISTRAR
On Behalf of Ambre Philpott
REGISTRAR

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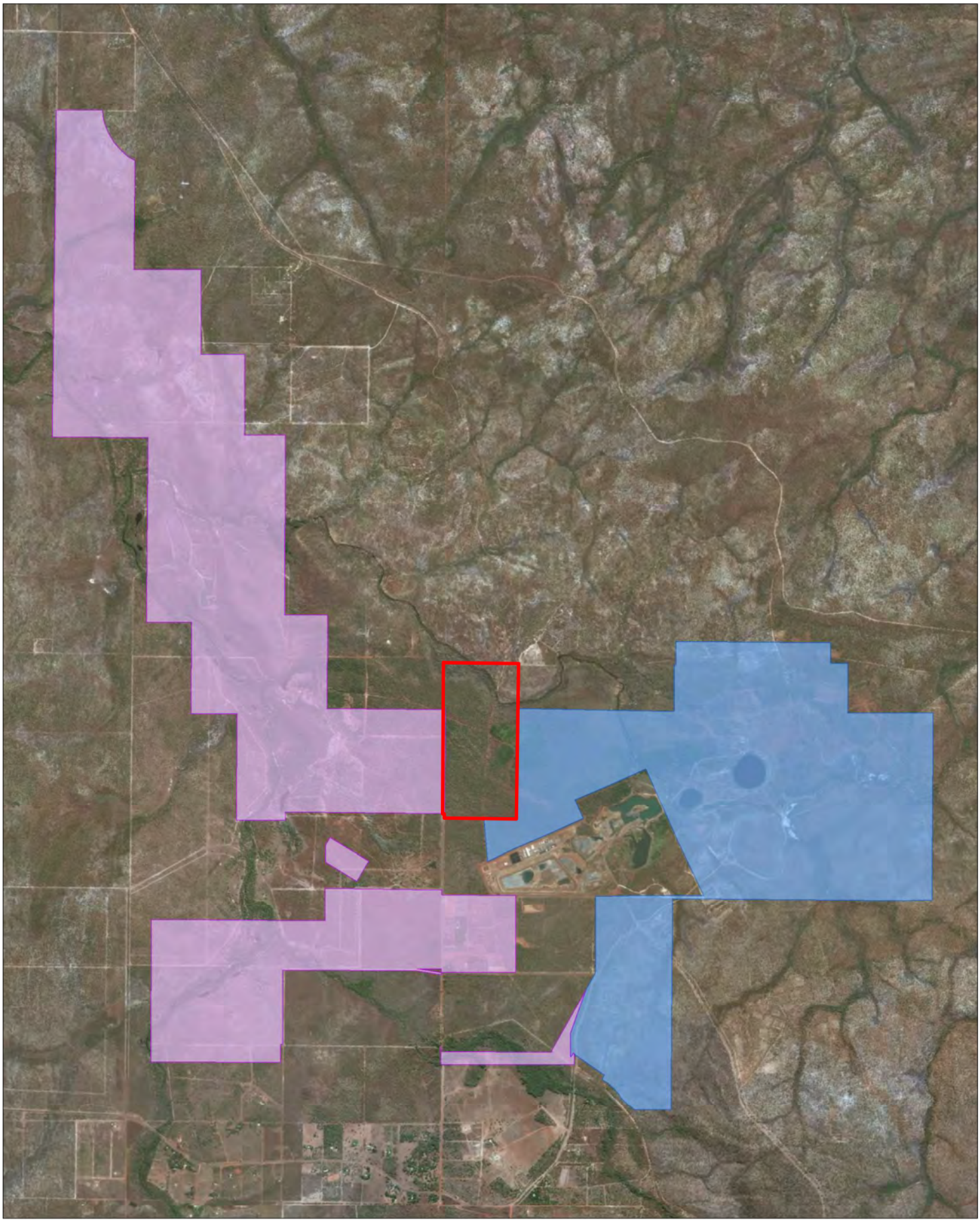


C:\Users\jgodfeau\Desktop\Working\680.10606\680106606_Title boundaries and title numbers .mxd

0 1 Kilometers

Projection: GDA 1994 MGA Zone 52
Scale: 1:53,207

Project No.:	680.10606
Date:	Thu 26-Sep-2019
Drawn by:	JG
Sheet Size:	A4

MLN1163 Area

Yarram ELR125

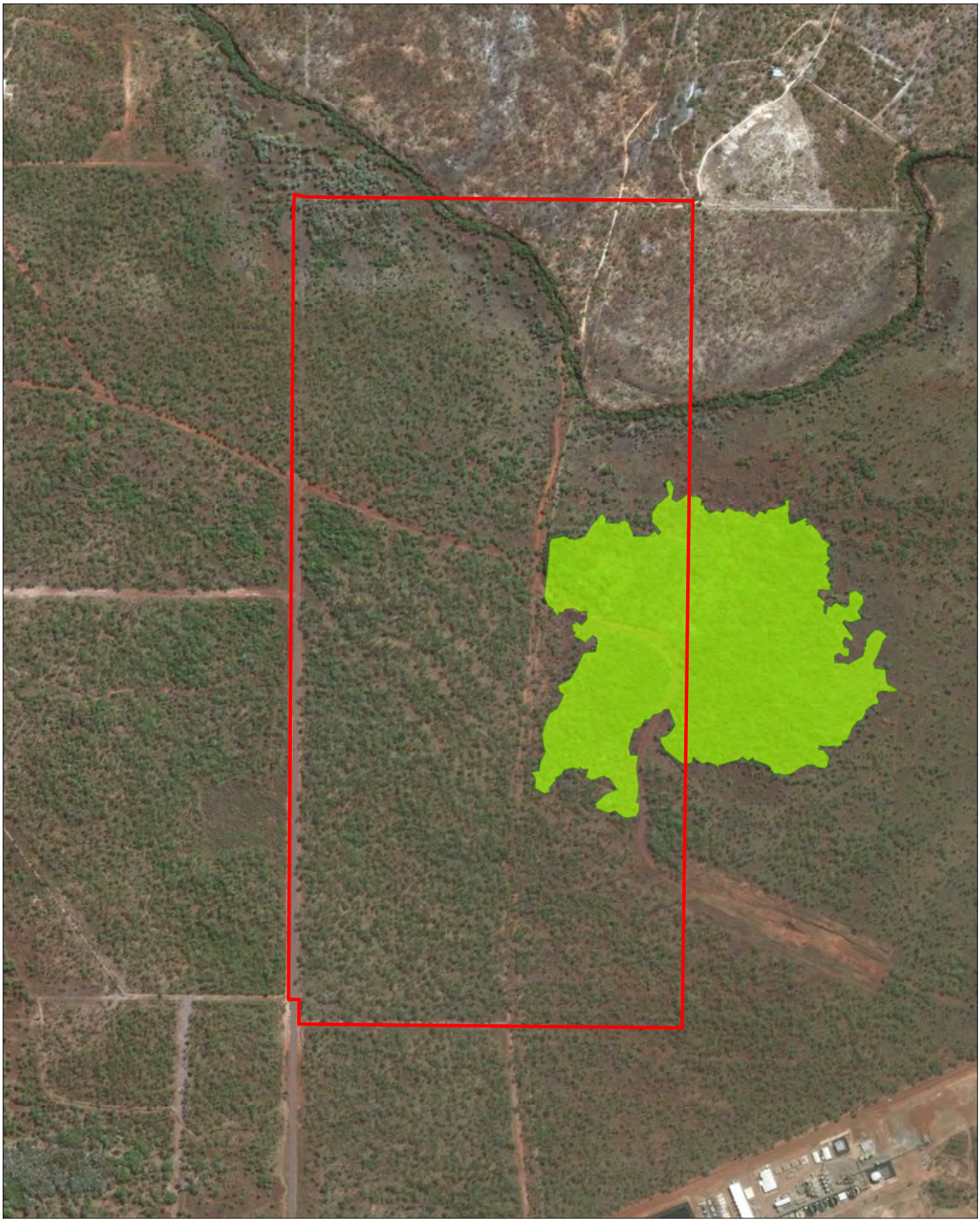
ELR146

YARRAM IRON APPROVALS

Title boundaries and title numbers

SLR
www.slrconsulting.com

FIGURE 1



C:\Users\jgofleau\Desktop\Working\680.10606\680106010606_Environmental constraints_mxd

0 100 m

Projection: GDA 1994 MGA Zone 52
Scale: 1:10,000

Project No.:	680.10606
Date:	Thu 26-Sep-2019
Drawn by:	JG
Sheet Size:	A4

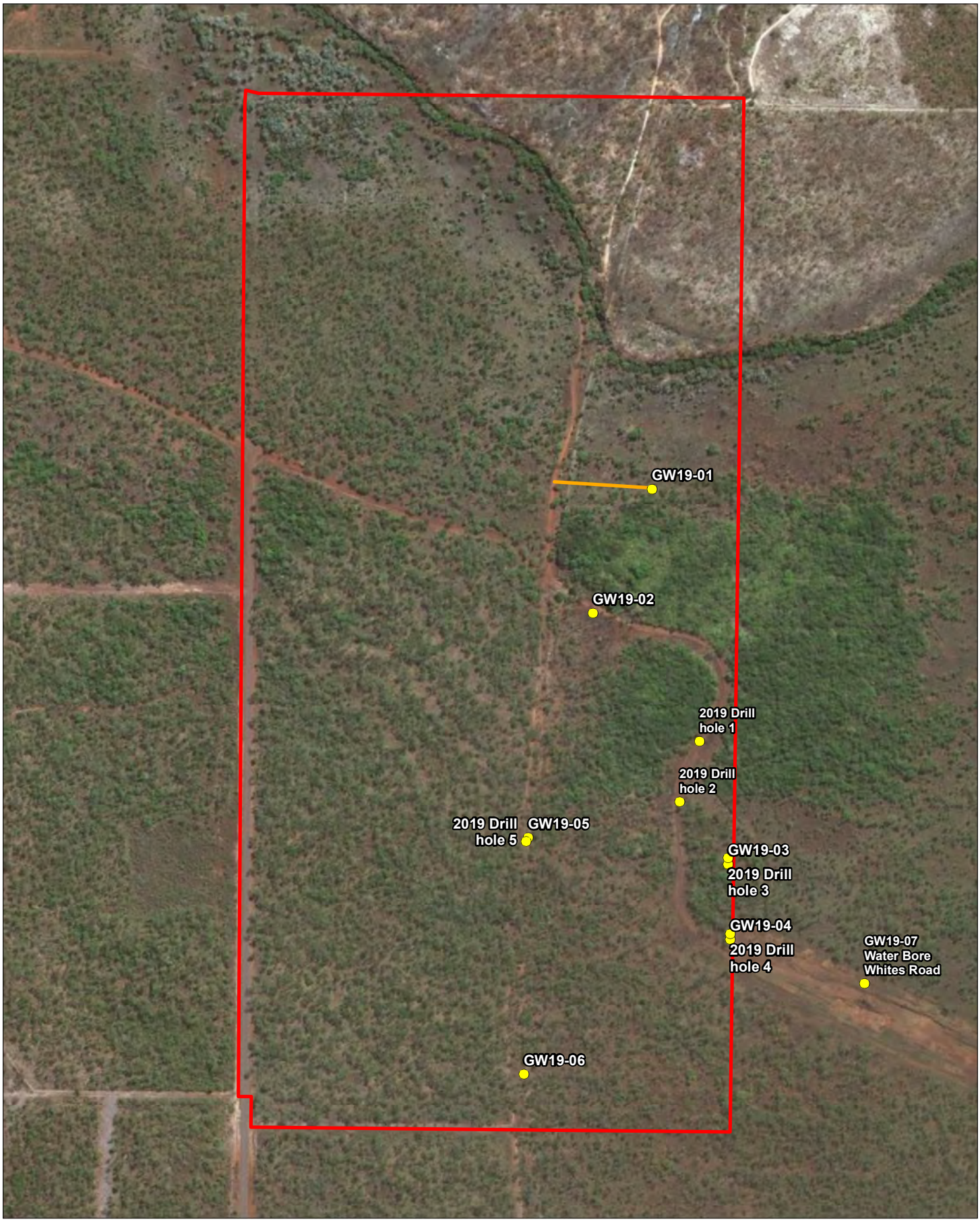
SLR
www.slrconsulting.com

MLN1163 Area
Monsoon Forest

YARRAM IRON APPROVALS

Environmental Constraints

FIGURE 4



X:\gis\fleau\680.10606\680106006_Current and Proposed Drill Holes and Tracks.mxd

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Projection: GDA 1994 MGA Zone 52
Scale: 1:8,000

Project No.:	680.10606
Date:	Thu 03-Oct-2019
Drawn by:	JG
Sheet Size:	A4

Groundwater Bores

Track to GW bore 1

MLN1163 Area

SLR
www.slrconsulting.com

YARRAM IRON APPROVALS

Current and Proposed Drill Holes and Tracks

FIGURE 2

C:\Users\jgodfeau\Desktop\Working\680.10606\680.10606_Impacted Sacred and Heritage Sites.mxd

0 100 m

Projection: GDA 1994 MGA Zone 52
Scale: 1:8,000

Project No.:	680.10606
Date:	Thu 26-Sep-2019
Drawn by:	JG
Sheet Size:	A4

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- Historical Site
- Isolated Artefacts
- Yarram Heritage Site
- MLN1163 Area
- Historical Site
- Yarram Heritage Site

YARRAM IRON APPROVALS

Impacted Sacred and Heritage Sites

FIGURE 3

APPENDIX A

Threatened and significant flora and fauna

Several assessments of the flora and fauna values of the Yarram project area have been conducted for previously proposed mining ventures. These assessments have identified the Monsoon Vine Forest (MVF) vegetation community as being regionally significant, although not formally protected, and have assessed the likelihood of occurrence for threatened species. The outcome of threatened species likelihood assessments conducted by EcOz (2018) and Northern Resource Consultants (2018) are presented in **Table 1** (for species rated as low or higher in either report). Since these reports were produced, an individual Northern Quoll (listed as endangered under the federal *Environment and Biodiversity Conservation Act* (EPBC Act) and Critically Endangered under the NT *Territory Parks and Wildlife Conservation Act* (TPWC Act)) was observed at the site. A Managed plan specific to the Northern Quoll has been developed and is included as Appendix C.

The report produced by EcOz (2018) provides an assessment of the potential impacts of an exploration drilling program largely equivalent to the current proposed (with the exception of their 'Pit Bore 5' located within the MVF which is no longer required). The impact avoidance, mitigation and management strategies identified will be applied to the current project.

Table 1 Outcome of previous likelihood assessments for threatened species

Species	EcOz (2018)	NRC (2018)
Plants		
Acacia praetermissa A shrub	None	Low
Cycas armstrongii	High	Known
Helicteres macrothrix	None	Low-moderate
Stylidium ensatum A triggerplant	None	Low
Birds		
Gouldian Finch *Erythrura gouldiae*	Medium	Low
Northern Masked Owl *Tyto novaehollandiae kimberli*	High	Moderate-high
Partridge Pigeon *Geophaps smithii smithii*	High	Moderate
Red goshawk *Erythrotriorchis radiatus*	High	Moderate
Mammals		
Bare-rumped Sheath-tailed Bat *Saccolaimus saccolaimus*	Medium	Moderate-high

Species	EcOz (2018)	NRC (2018)
Black-footed Tree-rat *Mesembriomys gouldii*	Medium	Low-moderate
Fawn Antechinus *Antechinus bellus*	Medium	Moderate-high
Ghost bat *Macroderma gigas*	Low	Low
Nabarlek *Petrogale concinna*	None	Low
Northern Brush-tailed Phascogale *Phascogale pirata*	Medium	Moderate
Northern Quoll *Dasyurus hallucatus*	Medium	Low
Pale Field-rat *Rattus tunneyi*	Known	Not assessed
Reptiles		
Plains Death Adder *Acanthophis hawkei*	None	Low-moderate
Merten's Water Monitor *Varanus mertensi*	High	Not assessed
Mitchell's Water Monitor *Varanus mitchelli*	Medium	Not assessed

References

EcOz. (2018). Rum Jungle Project Mining Management Plan amendment: Assessment of land clearing impacts and risks. Report prepared for Territory Iron.

Northern Resource Consultants. (2018). Yarram: targeted ecological assessment - dry season. Report prepared for Gold Valley Iron and Manganese Pty Ltd.

RUM JUNGLE PROJECT

MINING MANAGEMENT PLAN AMENDMENT

Assessment of land clearing impacts and risks

www.ecoz.com.au

DOCUMENT CONTROL RECORD

Job	EZ17134
Document ID	161826-19
Author(s)	Kylie Welch
Reviewer	Jeff Richardson
Approver	Jeff Richardson
Date approved	8 January 2018

DOCUMENT HISTORY

Rev	Issued to	Date
1	Territory Iron	8/1/18

Recipients are responsible for eliminating all superseded documents in their possession.

EcOz Pty Ltd.
ABN: 81 143 989 039
Winlow House, 3rd Floor
75 Woods Street
DARWIN NT 0800
GPO Box 381, Darwin NT 0800

Telephone: +61 8 8981 1100
Facsimile: +61 8 8981 1102
Email: ecoz@ecoz.com.au
Internet: www.ecoz.com.au

TABLE OF CONTENTS

Tables

Figures

Appendices

Acknowledgements: Cover page photo sourced from Low Ecological Services (2012)

1 BACKGROUND

Territory Resources Ltd is seeking approval for amendment to the Rum Jungle Exploration Project (Yarram Project) Mining Management Plan (MMP) (*Authorisation 0263-01*) to allow for installation of nine groundwater monitoring bores on Exploration Lease Retention (ELR) 146 Mineral Lease (ML) 1163. The purpose of the bores is to provide information in relation to the groundwater conditions at the site, which will be used to inform mine planning and environmental impact assessment. This document has been prepared by EcOz Environmental Consultants, to provide information in relation to the potential impacts and risks associated with the native vegetation clearing that is required to install the bores. The information is based on the project details provided by the proponent and previous ecological survey reports prepared for the leases and surrounding areas.

2 PROPOSED ACTIVITIES

The proposed activities are described in Section 3.2 of the amendment request submitted to Department of Primary Industry and Resources (DPIR) on 23 November 2017. In summary, the proposed activities involve the construction of five 'Pit Bores' to monitor groundwater conditions in the future pit footprint, and four 'Regional Bores' in surrounding areas to provide information on groundwater flows. To construct each bore will require clearing of vegetation within a 20 m by 15 m area (for a drill pad) and establishment of a 5 m wide access track from the closest existing road/track. The total area of disturbance for the nine pads and 1,234 m of access tracks will be 0.89 ha. The locations are shown in Figure 1.

3 EXISTING ENVIRONMENT

The flora and fauna in the Yarram Project area is described in a survey report prepared by Low Ecological Services (2012). Also, there have been numerous ecological surveys undertaken in the surrounding areas associated with the former Browns Oxide mine (Ecological Management Services 2005; Egan 2005) and Rum Jungle, the most recent being those prepared by Eco Logical (2015, 2014).

Vegetation mapping at a scale of 1: 20,000 by Metcalfe (2002) provides an overview of the types of vegetation that occur; however, more recent vegetation mapping of some areas (Eco Logical 2014; Low Ecological Services 2012) indicates significant change in vegetation has taken place over the past 15 years due to the combined effects of mining activities, weeds and fire. The terrestrial[1] flora and fauna that are known or likely to occur at each of the proposed groundwater bore sites and access tracks are described below with reference to previous reports and a more current desktop-based threatened species likelihood of occurrence assessment prepared by EcOz (Appendix A).

3.1 Vegetation

The vegetation communities that occur at each of the proposed bore pads and access tracks are documented in Table 1. The vegetation descriptions are derived from the more recent vegetation surveys/maps from Eco Logical 2015 and Low Ecological Services 2012, where survey sites are in close

[1] Aquatic fauna in the downstream receiving environments of the Finniss East Branch are not described as the scale of the proposed disturbance is relatively small and would not be expected to cause impacts to downstream environments.

proximity to the proposed groundwater bores. The Metcalfe (2002) vegetation map has been used, where no recent data are available. The vegetation survey sites and maps referred to are provided in Appendix B.

Table 1. Vegetation community disturbance at proposed bore and access track locations

Bore PB=Pit Bore RB=Regional Bore	**Vegetation communities**	**Approx. area cleared (ha)**	**Source of veg community data**
PB1	*Eucalyptus tetrodonta* and *E. miniata* woodland.	0.09	Metcalfe 2002
PB2	Monsoon vine thicket with emergent tree layer of *Mimusops elengi, Diospyros sp., Pouteria sericea, Celtis philippensis*, *Ficus virens* and *F. scobina* combined with a *Bambusa arnhemica* forest.	0.04	Low Ecological Services 2012 (Site Y1)
PB3	Grassland of *Mnesithea rottboellioides* with patches of Gamba grass *(Andropogon gayanus)* and Annual Sorghum, with an emergent/remnant tree layer of sparse *Erythrophleum chlorostachys, Eucalyptus tectifica* and *Acacia spp.* up to 20 metres present. *Cycas armstrongii* in understory.	0.11	Low Ecological Services 2012 (Site Y3)
PB4	*Eucalyptus tetrodonta*, *E. miniata* and *Erythrophleum chlorostachys* tall open forest to woodland.	0.03	Metcalfe 2002
PB5	Monsoon vine thicket with emergent tree layer of *Mimusops elengi, Diospyros sp., Pouteria sericea, Celtis philippensis*, *Ficus virens* and *F. scobina*. *Cycas armstrongii* were also recorded at this site.	0.06	Low Ecological Services 2012 (Site Y2)
RB1	*Eucalyptus tetrodonta* and *E. miniata* woodland	0.04	Low Ecological 2012 (Site Y4)
RB2	Gamba Grass (*Andropogon gayanus*) closed grassland with remnant shrubs/trees at pad site. Surveys of the area in 2015 note that the vegetation is heavily degraded woodlands, transformed by Gamba Grass and Calopo (*Calopogonium mucunoides*) to grasslands. The access track passes through mainly *Eucalyptus tetrodonta* and *E. miniata* woodland.	0.38	Eco Logical Services (2015)
RB3	*Eucalyptus tetrodonta*, *E. miniata* and *Erythrophleum chlorostachys* tall open forest to woodland.	0.09	Metcalfe 2002
RB4	Transition between *Acacia auriculiformis* vine forest and *Eucalyptus tetrodonta* and *E. miniata* woodland.	0.05	Metcalfe 2002
TOTAL CLEARING		**0.89**	

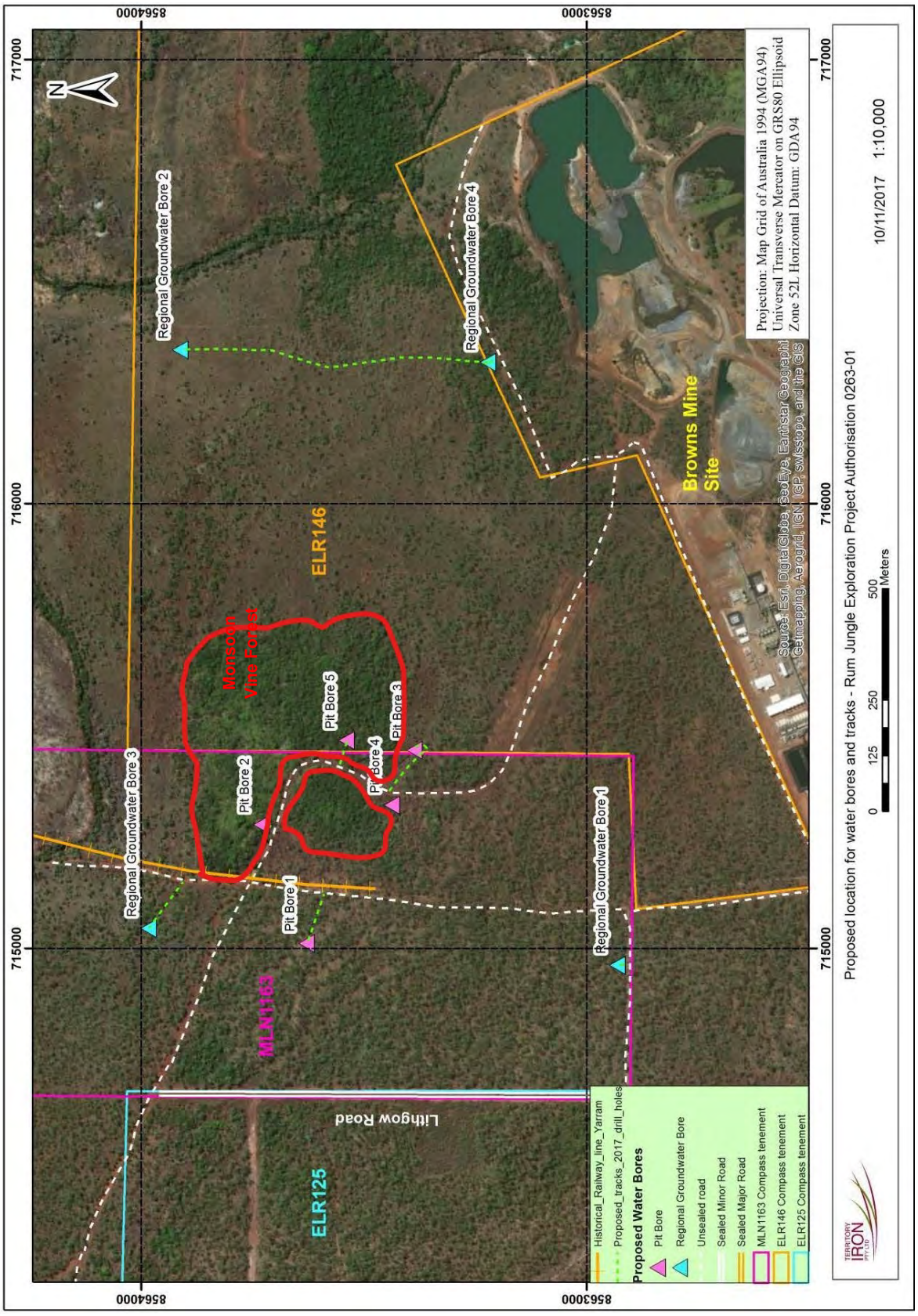

Figure 1. Approximate proposed locations for bores and access tracks

3.2 Flora

Cycas armstrongii is the only threatened flora species that has been recorded in previous surveys. It is listed as Vulnerable under the *Territory Parks and Wildlife Conservation Act* (*TPWCA*). The species is widespread through the Eucalyptus woodland habitats across the site and was also recorded in the monsoon vine forest. Eco Logical (2015) states that cycad density was 130 plants per ha.

A number of other threatened plant species were identified in the NT Fauna Atlas database and EPBC Protected Matters Search Tool searches undertaken by EcOz; however, these species were assessed as very unlikely to occur, due to the absence of suitable habitat (refer Appendix A).

3.3 Fauna

Fauna studies have been undertaken across the Yarram Project area. Eco Logical (2015) surveyed sites in close proximity to the proposed regional bores, RGB2 and RGB4. Low Ecological Services (2012) surveyed four sites in the Eucalyptus woodland and monsoon vine communities, representative of the areas impacted by the proposed pit bores (PB1-4) and regional bores, RB1 and RB3.

The previous surveys recorded a range of mammals, birds and reptiles that are typical of the Eucalyptus woodland habitats that dominate the region. The threatened species likelihood of occurrence assessment (Appendix A) identified a number of threatened fauna which although not previously recorded, have a high or medium likelihood of occurring in the area (Table 2). The sections below provide comment on the potential occurrence and utilisation of the Yarram site by these species.

Table 2. Threatened species 'likelihood of occurrence' results (excluding low likelihood species)

Likelihood	Scientific name	Common name	Class	Status*	
				NT	Cth
Known	*Rattus tunneyi*	Pale Field-rat	Mammal	VU	-
High	*Geophaps smithii smithii*	Partridge Pigeon	Bird	VU	VU
	Tyto novaehollandiae kimberli	Masked Owl (mainland Top End)		VU	VU
	Erythrotriorchis radiatus	Red Goshawk		VU	VU
	Varanus mertensi	Mertens' Water Monitor	Reptile	VU	-
Medium	*Erythrura gouldiae*	Gouldian Finch	Bird	VU	EN
	Antechinus bellus	Fawn Antechinus	Mammal	EN	-
	Mesembriomys gouldii	Black-footed Tree-rat		VU	EN
	Varanus mitchelli	Mitchell's Water Monitor	Reptile	VU	-

*VU = Vulnerable; EN = Endangered; - not listed in that jurisdiction

3.3.1 Species known to occur

The threatened species *Rattus tunneyi,* listed as Vulnerable under the *TPWCA,* was recorded on MLN1163 and ELR146 by Low Ecological Services (2012). The species occurred in numbers in the tall *Mnesithea rottboellioides* grasslands and to a lesser extent, in the monsoon-vine thickets, most likely due to its close proximity to the grasslands. The more recent surveys undertaken by Eco Logical (2015) in the eastern part of ELR146, did not record *R. tunneyi*.

3.3.2 High likelihood species

The following species were recorded on the adjacent Browns Oxide mine site prior to its development, and therefore could be expected to occur in similar habitats within the Yarram Project area:

- The **Red Goshawk** prefers tall open *Eucalyptus* forest and riparian areas, and the project area contains such habitat and is within the range of the species. There were two records of this species (2002 and 2005) from within the Browns Oxide site prior to its development. There is also a 1999 record approximately 2.7 km north-west of the project area, near the Finniss River. Although the Red Goshawk may not roost or breed within the project area due to the low numbers of mature trees in which to nest, they may use the area for hunting.
- There are many records of the **Partridge Pigeon** proximate to the project area; the most recent is 2 km to the north-east (2014). There were also records of this species (2002 and 2005) from within the Browns Oxide site prior to its development; and to the south in 2008. The species could occur within any woodland habitat within MLN1163 and ELR146; however, given the fire history and extent of Gamba Grass, it is expected that the area would be used more for feeding than nesting.
- The **Masked Owl (northern subspecies)** responded to call playback to the south of the project area in 2008, as well as at two other sites in the region. Vegetation types seen in MLN1163 and ELR146 are thought to be suitable for the Masked Owl. Woinarski & Ward (2012) state that the species occurs "mainly in eucalypt tall open forests, but also roosts in monsoon rainforests, and forages in more open vegetation types, including grasslands". Numbers of Pale Field Rats captured during the surveys by Low Ecological Services (2012) suggests that there would be sufficient prey to sustain the Masked Owl; however, it was noted in the survey report that the observed small numbers of mature hollow-bearing trees may limit the species use of the area.
- **Mertens' Water Monitors** is likely to occur in the riparian habitats downstream, but there is no habitat within the Yarram Project area.

3.3.3 Medium likelihood species

The following species have been recorded in the region previously; however, there are some indicators that that they may no longer persist, or if present, are likely to occur in low densities:

- The **Black-footed Tree-rat** and **Fawn Antechinus** were most recently recorded in the region of Rum Jungle in 2002 and 2008 respectively, and were not recorded in the surveys by Eco Logical (2015, 2014) or Low Ecological Services (2012). These species have potentially declined or been lost from the region as part of wider declines of critical weight range mammals (generally those below 5 kg) across northern Australia (Woinarski et al. 2010, Murphy & Davies 2014).
- The **Northern Quoll** was recorded within the Browns Oxide site in 2002 and 2005 prior to its development – the most recent record being approximately when Cane Toads first arrived in the region. This species has a low likelihood of persisting within area; however, GHD (2009) note that suitable rocky den sites do occur on the eastern side of the Litchfield National Park Road. The species has some potential to occur in the region and may periodically forage through woodland savanna habitats.
- Ecological Management Services (2002) recorded a siting of the **Northern Brush-tailed Phascogale** during spotlight surveys on the Browns Oxide mine site to the south. Although this species probably occurs naturally in low densities, throughout the last 10 years it has only been recorded in Kakadu, Coburg Peninsula and the Tiwi Islands. Low Ecological Services (2012) state that its reliance on tree hollows and invasion of feral cats make it unlikely that the species resides in the Yarram project area.
- There are nine records of the **Gouldian Finch** assigned to a waypoint in the south-east corner of the Browns Oxide site. These range from 1897 to 1995, and each of them has within its metadata the note: "*Gay Crowley / Riikka Hokkanen clean-up of Gouldian Records 2009*." It is suspected that these records were, at some stage, clumped together and given the localised

geo-reference of -13°, 130°. None of the site surveys have recorded Gouldian Finch and there is no breeding habitat for this species present within the project area. It is possible that this species occurs, from time to time, within the project area, but there is a low likelihood it is resident.

- **Mitchell's Water Monitor** has been recorded in the Finniss River downstream of the Yarram Project area.

3.4 Significant vegetation communities

Monsoon rainforests are significant vegetation communities in the NT and are important for conservation (NRETAS 2010). The Metcalfe (2002) vegetation mapping shows large patches of *Acacia auriculiformis* dominated monsoon vine forest on both MLN1163 and ELR146. These communities were described as typically occurring in areas with slightly lower soil moisture (than evergreen vine forests) and in many areas were observed to be recovering from the impacts of previous disturbance (e.g. clearing, fire, mining etc). Visual assessment of Google Earth imagery indicates that the extent of monsoon vine forest across the area has contracted over time; however, a remnant patch approximately 24 ha in size is present on MLN1163 and ELR146; the indicative current patch boundary is shown on Figure 1.

Low Ecological Services (2012) noted that the monsoon vine forest is located on a rocky outcrop with shallow lateritic soils and has an open canopy. *Ficus virens* was noted as a particularly important tree in this vegetation type as it provides the most fruit of any tree. The edges of the monsoon vine forest community are invaded with weeds and an existing access road dissects the patch.

3.5 Species of cultural value

There has been no formal assessment of flora and fauna species that are of cultural value on the Yarram Project area; however, Hydrobiology (2013) worked with traditional owners to identify species of cultural value in the riparian zone of the nearby reaches of the Finniss River. The work by Hydrobiology (2013) provides lists of native plant species used as bush food and sources of timber for tools and weapons, dye, soap, medicines, fish poison, bark for construction, fibre for string and other domestic uses. The focus was on riparian zone species; however, **Error! Reference source not found.** lists non-riparian species. These species do occur throughout the woodland and monsoon vine forest habitats on the Yarram Project area.

Table 3. Nominated Indigenous plant use outside the riparian zone (from Hydrobiology 2013)

Species	Common Name	Use
Nauclea orientalis	Leichhardt Tree	'bum fodder' (toilet paper), bush medicine (fruit)
Ampelocissus acetosa	Native Grape	'bum fodder' (toilet paper), dye
Barringtonia acutangula	Freshwater Mangrove, Itchy Tree	fish poison
Acacia auriculiformis	Black Wattle	fish poison, timber for tools, weapons, soap
Alphitonia excelsa	Soap Tree, Red Ash	Soap, crushed leaves, bark etc. are medicinal
Calophyllum sil	Beauty Leaf	timber for spear shafts
Melaleuca leucadendra	White Paperbark	sheet bark for roofing, wrapping food
Melaleuca viridiflora	Broad-leaved Paperbark	sheet bark for wrapping food
Canarium australianum	Cedar	timber for dugout canoes

Species	Common Name	Use
Flueggea virosa	White Currant	fibre for bush string
Smilax australis	Native Grape	dye for basket weaving, fabrics, medicinal
Corymbia spp.	Bloodwood	ash for bush medicines
Morinda citrifolia	Rotten Cheese Fruit	fruit is medicinal for sore throat, coughs etc

Hydrobiology (2013) also notes that vertebrate species mentioned as food sources were Antilopine Wallaroo (*Macropus antilopinus*), Agile wallaby (*Macropus agilis agilis*) and emu (*Dromaius novaehollandiae*), as well as feral pigs (*Sus scrofa*) in the riparian environment. Flying fox (*Pteropus alecto* and *P. scapulatus*), are also collected as a food items.

3.6 Weeds

NT government weed records for the region show 66 records of declared weeds within the Yarram Project area, all of which are Gamba Grass *(Andropogon gayanus),* a declared Class B weed in the NT (growth and spread to be controlled) weed and a Weed of National Significance (WoNS). Eco Logical (2015) recorded Gamba Grass, Calopo, Gambia Pea and *Mollugo pentaphylla* in their survey that covered part of the eastern side of the project area. Low Ecological Services (2012) recorded Gamba Grass, Hyptis, Couch Grass and Rhodes Grass.

Weed surveys undertaken on the nearby Browns and Rum Jungle mine sites have consistently recorded a range of weed species. More detailed weed surveys of the Yarram Project area are planned for 2018 and these will inevitably identify weed infestations associated with access roads/tracks and previous disturbance. Weeds (along with fire) are key threats to biodiversity values at the site.

3.7 Pest animals

The following introduced fauna species have been previously recorded within 5 km of MLN1163 and ELR146:

- Asian House Gecko (*Hemidactylus frenatus*)
- Cane Toad (*Rhinella marina*)
- Cat (*Felis catus*)
- Pig (*Sus scrofa*)
- Swamp Buffalo (*Bubalus bubalis*).

Low Ecological Services (2012) observed Pigs and Cane Toads.

4 ASSESSMENT OF IMPACTS AND RISKS

Clearing of native vegetation to establish drill pads and access tracks has the potential to cause the following impacts:

- Loss of native flora and fauna.
- Loss/fragmentation of significant monsoon vine forest habitat.
- Impacts to threatened species populations.
- Localised changes to hydrology.
- Erosion and sedimentation.
- Introduction and spread of weeds.
- Bushfire.

Table 4 describes the significance of potential impacts in the context of the environmental values present in the Project area, assesses the inherent risk, documents mitigation measures to reduce the risks and provides an assessment of the residual risk (subject to effective implementation of the controls). The risk assessment matrix and likelihood and consequence descriptors used in the risk assessment are taken from the DPIR *MMP Structure Guide for Mining Operations* and are shown in Figure 2 and Figure 3.

Figure 2. Risk assessment matrix

LIKELIHOOD	CONSEQUENCES				
	Catastrophic 5	Major 4	Moderate 3	Minor 2	Insignificant 1
Almost certain 5	10	9	8	7	6
Likely 4	9	8	7	6	5
Possible 3	8	7	6	5	4
Unlikely 2	7	6	5	4	3
Rare 1	6	5	4	3	2

Risk Score	Risk Rating	Action Required
9 - 10	Extreme	Immediate
7 - 8	High	Action plan required. Senior management attention
5 - 6	Moderate	Specific monitoring or procedures required
2 - 4	Low	Management through routine procedures

Figure 3. Likelihood and consequence descriptors

LIKELIHOOD		CONSEQUENCES	
Almost certain	Expected to occur in most circumstances	**Catastrophic**	Environmental disaster
Likely	Will probably occur in most circumstances	**Major**	Severe environmental damage
Possible	Might possibly occur at some time	**Moderate**	Contained environmental impact
Unlikely	Could occur at some time	**Minor**	Some environmental impact
Rare	May occur only in exceptional circumstances	**Insignificant**	Low environmental impact

Table 4. Assessment of impacts and risks associated with clearing of native vegetation for drill pads and access tracks

Potential Impacts	Inherent Risk	Avoidance, mitigation and management	Residual Risk
Loss of native flora and fauna Approximately 0.89 ha of vegetation will be removed, 90% of which is Eucalyptus woodlands, which are widespread and common, or open degraded grassland. The other 10% comprises small areas of open degraded grassland and monsoon vine forest. Vegetation and fauna habitat values are already degraded by previous clearing, weeds and fire.	Moderate L=Almost Certain C=Insignificant	• Boundaries of clearing to be clearly delineated prior to commencement of works. • Extent of clearing to be monitored to ensure only the minimum area required is cleared. • Should the Yarram Project not proceed, the bores and tracks will be rehabilitated to the satisfaction of DPIR.	Moderate L=Almost Certain C=Insignificant
Loss/fragmentation of monsoon vine forest habitat A 24 ha patch of remnant monsoon vine forest is present in the Yarram Project area. The patch is likely to be a locally significant habitat for fauna. Dispersal of seeds between patches by fauna is important to maintaining patch diversity at a regional level. Large seed producing trees are important habitat features. Approximately 0.1 ha of monsoon vine forest will be removed for installation of the Pit bores 2 and 5. The patch is fragmented by an access track and impacted by weeds. The proposed clearing will not cause any further fragmentation and, subject to the retention of large tall fruit bearing trees, the amount of clearing proposed is unlikely to result in degradation of the patches habitat value and contribution to regional patch diversity.	High L=Almost Certain C=Minor	• Bores located within the monsoon vine forest have been sited to minimise the amount of clearing required. Pit bore 2 is sited immediately alongside the existing access road and Pit Bore 5 is located in an area previously disturbed by a costean. • The drill pad and track locations will avoid removal of large tall trees. • Should the Yarram Project not proceed, the bores and tracks will be rehabilitated to the satisfaction of DPIR. • Implement weed and fire management (see below).	Moderate L=Almost Certain C=Insignificant
Impacts to threatened species populations *Cycas armstrongii* plants occur in densities up to 130 plants/ha in the Eucalyptus woodland habitats (Low Ecological Services 2012). Using this density estimate, up to 115 plants could be cleared; however, numbers are expected to much less because where possible, the bores and tracks are located in previously disturbed areas. The small area of clearing means the impact of the activities is unlikely to be significant. The Pale Field Rat (Vulnerable) occurs in the project area. Clearing will occur in areas where the species has been recorded in surveys. If burrows are impacted, direct mortality of individuals may	Moderate L=Possible C=Moderate	• Boundaries of clearing to be clearly delineated prior to commencement of works. • The works will take place during the wet season, which is outside of Pale Field Rat breeding period. • The drill pad and track locations will avoid removal of large tall trees. • Should the Yarram Project not proceed, the bores and tracks will be rehabilitated to the satisfaction of DPIR. • Implement weed and fire management (see below).	Moderate L=Unlikely C=Moderate

Potential Impacts	Inherent Risk	Avoidance, mitigation and management	Residual Risk
occur; however, due to the small area of land that will be cleared the likelihood of this occurring is low. The activities are unlikely to impact on breeding, which for this species takes place during the dry season. The Red Goshawk and Masked Owl may forage in the area but are less likely to nest, due to the low numbers of hollow-bearing trees. Clearing of tall trees could impact this species; however, the removal of a very small area of foraging habitat is unlikely to cause a significant impact. The habitats may be utilised by the Partridge Pigeon, but the fire history indicates that area is unlikely to be important breeding habitat. It is expected this mobile species will move into surrounding habitats and is unlikely to be significantly impacted by the activities. Weeds and fire are key threatening processes in the area. The proposed activities could spread weeds; however, given the extent of existing infestations and habitat degradation, further disturbance to 0.89 ha, is unlikely to change the habitat value for threatened species (which is already low).			
Localised changes to hydrology and erosion No drainage lines will be impacted by the activities. Land clearing could cause localised alteration of overland flows. Any concentration of overland flows could cause erosion.	Low L=Unlikely C=Insignificant	• Cleared vegetation and windrows will be respread to prevent concentration of overland flows and subsequent erosion.	Low L=Rare C=Insignificant
Introduction and spread of weeds The Yarram Project area and surrounding areas have a long history of land clearing and disturbance, and as a result weeds are prevalent. Gamba Grass in particular is noted in previous surveys as being widespread. The proposed activities could spread weeds and create conditions for infestations to establish in newly cleared areas. Under the NT *Weed Management Act* land managers are required to control growth and prevent the spread of declared weeds, and follow statutory weed management plans for weeds on their land. Of relevance to the site is that there is the statutory weed management plan in place for Gamba Grass.	High L=Almost Certain C=Moderate	• Machinery will be free of soil and vegetative material prior to mobilising to the site. • Upon completion of works, all soil and vegetative material is to be cleaned off machinery prior to mobilising to other sites. • Tracks and pads will be inspected and weed control implemented as required.	Moderate L=Likely C=Minor
Bushfire Land clearing activities create a risk of starting bushfire, especially	Moderate L=Possible	• Activities are planned to occur during the wet season, when there is a low bushfire risk.	Low L=Unlikely

Potential Impacts	Inherent Risk	Avoidance, mitigation and management	Residual Risk
where clearing occurs on rocky ground. The ground conditions in the monsoon rainforest patch in the Yarram Project area are rocky and the habitat is fire sensitive. The woodland habitats are already degraded to some extent by high fire frequencies and are unlikely to be further impacted by the proposed activities.	C=Moderate		C=Minor

5 CONCLUSIONS

This document provides information in relation to the environmental impacts and risks to the environment associated with clearing approximately 0.89 ha of native vegetation for the installation of groundwater monitoring bores in the Yarram Project area. The risk of significant impact to native flora and fauna associated with the proposed activities is in general inherently low, due to the small area of land clearing involved and the previously disturbed nature of the site. The key aspects requiring some targeted risk management relate to clearing in monsoon vine forest (a significant vegetation community) and weed management. The risk assessment indicates that all risks can be reduced to moderate or low, subject to the effective implementation of the nominated impact avoidance, mitigation and management measures.

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APPENDIX A THREATENED SPECIES LIKELIHOOD OF OCCURRENCE ANALYSIS

To determine which threatened species have potential to occur within the potential impact area, analysis of regional flora and fauna records – informed by the results of the Commonwealth and NT threatened species search tools (described below) – was undertaken. For each of these species, the likelihood that the species occurs within the potential impact area was then assessed based on habitat requirements, distribution, and the number and dates of proximate records. The purpose of such an assessment was to identify those species that required further consideration (including, possibly, field surveys), and those that can be reasonably excluded from further assessment because they are unlikely to occur within the potential impact area.

For this project, the *potential impact area* is considered to comprise the area of land that will be developed, the drainage lines connecting that land to the Finniss River, and the Finniss River itself (to the extent that flows from those drainage lines significantly influence the water quality of the river).

The following procedure was used to undertake the likelihood of occurrence assessment for each relevant threatened species:

1. Identify which bioregions are intersected by the potential impact area.
2. Correlate threatened flora and fauna records with the bioregions using the latest NT Flora and Fauna Atlas database (last updated in September 2017).
3. Use the Protected Matters Search Tool to determine species listed as threatened under the *EPBC Act 1999* (undertaken October 2017). A buffer of 100 km around the potential impact area was used.
4. Combine the results of steps 2 and 3 to generate a list of threatened species that may occur within the bioregion intersected by the potential impact area.
5. Collate the following details for each of those species – conservation status (NT and Commonwealth), habitat requirements, distribution, and number of records within the search area (from the NT Fauna and Flora Atlas dataset).
6. Analyse the likelihood that each species will occur in the potential impact area by applying the following likelihood classifications:
    a) HIGH – it is expected that this species lives within the potential impact area because there is suitable habitat and recent proximate records.
    b) MEDIUM – this species may live within the potential impact area because there is suitable habitat; however, there is evidence that lowers its likelihood of occurrence (i.e. known range contraction of the species in the region, no recent records with the search area, species is naturally rare or occurs at a low density etc.).
    c) LOW – this species may occur, as a vagrant, within the potential impact area; however, there is only marginally-suitable habitat.
    d) NONE – there is strong evidence that this species will not occur within the potential impact area (no suitable habitat and/or the species is considered likely to be regionally-extinct).

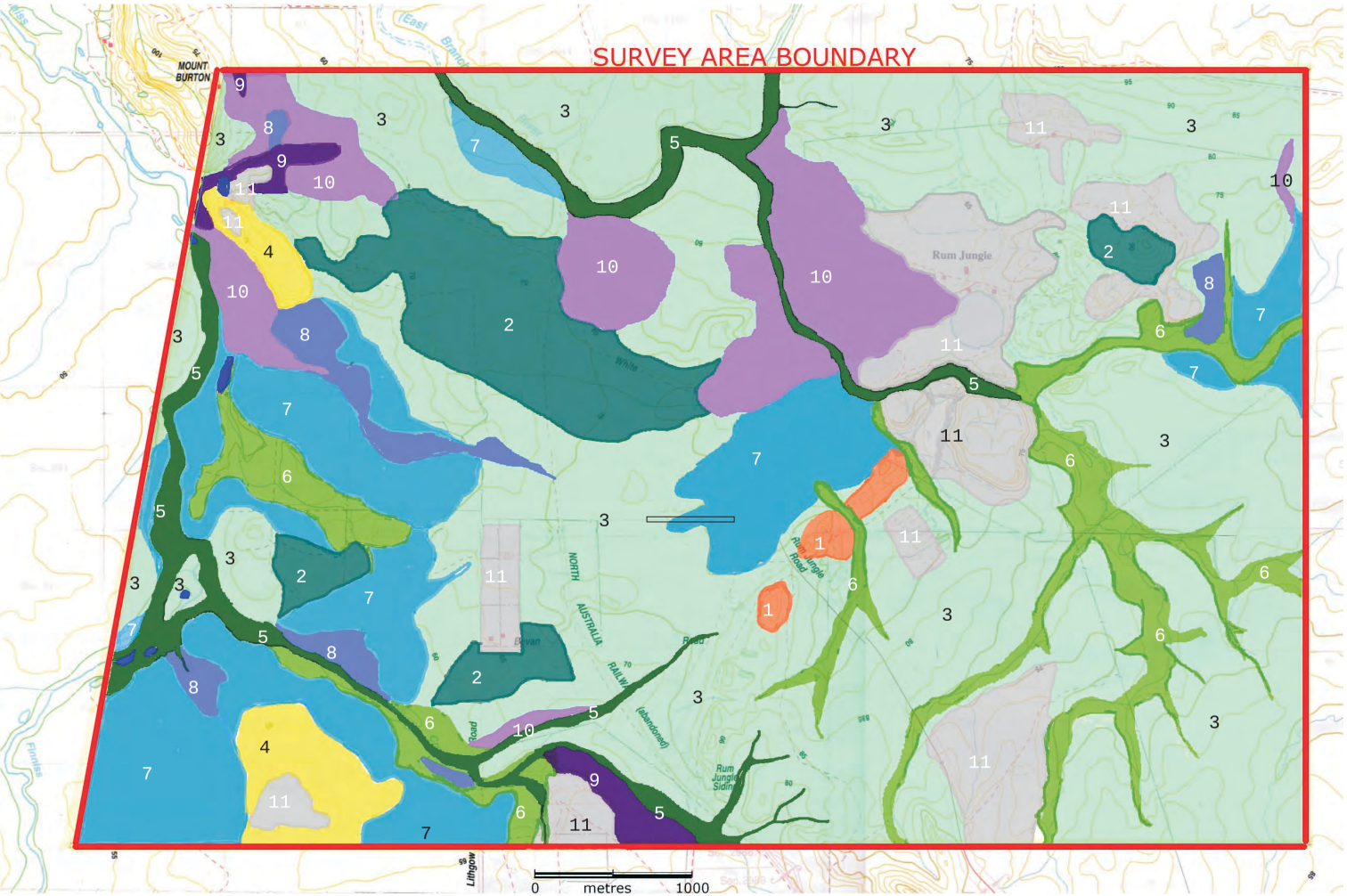
The results are documented below.

Likelihood	Scientific name	Common name	Status NT	Status Cth	Justification
High	*Cycas armstrongii*	A cycad	VU	-	Suitable habitat, core range, onsite records – resident onsite
High	*Rattus tunneyi*	Pale Field-rat	VU	-	Suitable habitat, proximate records, but range contraction
High	*Erythrotriorchis radiatus*	Red Goshawk	VU	VU	Suitable habitat, core range, proximate record – likely resident in the area
High	*Erythrura gouldiae*	Gouldian Finch	VU	EN	Suitable habitat, core range, proximate records – likely visitor to site
High	*Geophaps smithii smithii*	Partridge Pigeon	VU	VU	Suitable habitat, core range, proximate records – likely resident onsite
High	*Tyto novaehollandiae kimberli*	Masked Owl (mainland Top End)	VU	VU	Suitable habitat, proximate records – likely resident in the area
High	*Varanus mertensi*	Mertens' Water Monitor	VU	-	Suitable habitat, proximate record – likely resident in the area
High	*Varanus mitchelli*	Mitchell's Water Monitor	VU	-	Suitable habitat, proximate record – likely resident in the area
Medium	*Antechinus bellus*	Fawn Antechinus	EN	-	Suitable habitat, proximate records, but range contraction
Medium	*Falcunculus frontatus whitei*	Crested Shrike-tit	NT	VU	Suitable habitat, naturally rare / dispersed
Medium	*Mesembriomys gouldii gouldii*	Black-footed Tree-rat	VU	EN	Suitable habitat, records in the area (but not proximate), range contraction
Medium	*Pristis pristis*	Largetooth Sawfish	VU	VU	Suitable habitat in Finniss River, no proximate records to project area
Medium	*Saccolaimus saccolaimus nudicluniatus*	Bare-rumped Sheath-tailed Bat	-	VU	Suitable habitat, no proximate records
Low	*Conilurus penicillatus*	Brush-tailed Rabbit-rat	EN	VU	Suitable habitat, but severe range contraction / population decline
Low	*Dasyurus hallucatus*	Northern Quoll	CR	EN	Suitable habitat, but severe range contraction / population decline
Low	*Falco hypoleucos*	Grey Falcon	VU	-	Non-core habitat, naturally rare / dispersed – possible as a vagrant
Low	*Glyphis garricki*	Northern River Shark	-	EN	Possible habitat – not usually occurring this far upstream, no proximate records
Low	*Glyphis glyphis*	Speartooth Shark	VU	CE	Possible habitat – not usually occurring this far upstream, no proximate records
Low	*Macroderma gigas*	Ghost Bat	-	VU	Suitable habitat but edge of distribution, no proximate records
Low	*Phascogale pirata*	Northern Brush-tailed Phascogale	EN	VU	Suitable habitat, but severe range contraction / population decline
Low	*Pristis clavata*	Dwarf Sawfish	VU	VU	Possible habitat – not usually occurring this far upstream, no proximate records
Low	*Pristis zijsron*	Green Sawfish	VU	VU	Possible habitat – not usually occurring this far upstream, no proximate records

Likelihood	Scientific name	Common name	Status NT	Status Cth	Justification
None	*Acacia praetermissa*	a plant	VU	VU	No suitable habitat
None	*Acanthophis hawkei*	Plains Death Adder	VU	VU	
None	*Amytornis woodwardi*	White-throated Grasswren	VU	-	
None	*Atalaya brevialata*	a plant	-	CE	
None	*Balaenoptera musculus*	Blue Whale	-	EN	
None	*Bellatorias obiri*	Arnhemland Egernia	EN	EN	
None	*Calidris canutus*	Red Knot	VU	EN	
None	*Calidris ferruginea*	Curlew Sandpiper	VU	CR	
None	*Calidris tenuirostris*	Great Knot	VU	CR	
None	*Carcharodon carcharias*	Great White Shark	-	VU	
None	*Caretta caretta*	Loggerhead Turtle	VU	EN	
None	*Charadrius leschenaultii*	Greater Sand Plover	VU	VU	
None	*Charadrius mongolus*	Lesser Sand Plover	VU	EN	
None	*Chelonia mydas*	Green Turtle	-	VU	
None	*Dermochelys coriacea*	Leatherback Turtle	CE	EN	
None	*Dienia montana*	A plant	VU	-	
None	*Eleocharis retroflexa*	a plant	-	VU	
None	*Epthianura crocea tunneyi*	Yellow Chat (Alligator Rivers)	EN	EN	
None	*Eretmochelys imbricata*	Hawksbill Turtle	VU	VU	
None	*Goodenia quadrifida*	a plant	-	VU	
None	*Helicteres macrothrix*	a plant	EN	EN	
None	*Hibbertia tricornis*	a plant	VU	-	
None	*Hibiscus brennanii*	a plant	VU	-	
None	*Hipposideros inornata*	Arnhem Leaf-nosed Bat	VU	EN	
None	*Hipposideros stenotis*	Northern Leaf-nosed bat	VU	-	
None	*Isoodon auratus*	Golden Bandicoot	EN	VU	
None	*Jacksonia divisa*	a plant	VU	-	
None	*Lepidochelys olivacea*	Olive Ridley Turtle	VU	EN	
None	*Limosa lapponica*	Bar-tailed Godwit	VU	-	
None	*Lithomyrtus linariifolia*	a plant	VU	-	
None	*Lucasium occultum*	Yellow-snouted Gecko	VU	EN	
None	*Megaptera novaeangliae*	Humpback Whale	-	VU	
None	*Mesembriomys macrurus*	Golden-backed Tree-rat	CR	VU	
None	*Morelia oenpelliensis*	Oenpelli Python	VU	-	
None	*Natator depressus*	Flatback Turtle	-	VU	
None	*Numenius madagascariensis*	Eastern Curlew	VU	CR	
None	*Petrogale concinna canescens*	Rock-wallaby (Nabarlek)	VU	EN	
None	*Rhincodon typus*	Whale Shark	-	VU	
None	*Rostratula australis*	Australian Painted Snipe	VU	EN	
None	*Schoutenia ovata*	a plant	EN	-	
None	*Stylidium ensatum*	a plant	EN	EN	
None	*Typhonium praetermissum*	a plant	VU	-	
None	*Typhonium taylori*	a plant	EN	EN	
None	*Uperoleia daviesae*	Howard Springs Toadlet	VU	-	
None	*Utricularia dunstaniae*	a plant	VU	-	

Likelihood	Scientific name	Common name	Status NT	Status Cth	Justification
None	*Utricularia singeriana*	a plant	VU		
None	*Varanus panoptes*	Floodplain Monitor	VU	-	
None	*Xeromys myoides*	False Water Rat	-	VU	
None	*Xylopia monosperma*	a plant	EN	EN	
None	*Zeuxine oblonga*	a plant	VU	-	
None	*Zyzomys maini*	Arnhem Rock-rat	VU	VU	

APPENDIX B VEGETATION SURVEY SITES AND MAPS FROM METCALFE (2002), LOW ECOLOGICAL SERVICES (2012) AND ECO LOGICAL (2015)



KEY - VEGETATION MAP

BROWNS POLYMETALLIC PROJECT

MAP UNIT	VEGETATION COMMUNITY
	UPLAND EUCALYPT COMMUNITIES
1	*Eucalyptus phoenicea/E. bleeseri* open woodland
2	*Eucalyptus tetrodonta/ E. miniata/ Erythrophleum chlorostachys* woodland
3	*Eucalyptus tetrodonta/ E. miniata* open woodland to woodland
4	Mixed Eucalypt woodland
	DRAINAGE AREAS
5	Riparian corridor
6	*Lophostemon* open woodland communities
7	*Eucalyptus papuana /E. foelscheana/ Melaleuca* spp. open woodland
8	Paperbark woodland to open woodland communities
	MONSOON FOREST COMMUNITIES
9	Monsoon vine-forest
10	*Acacia auriculiformis* woodland communities
	OTHER
11	Previous mining areas, disturbed sites & rehabilitation areas

From Metcalfe (2012)

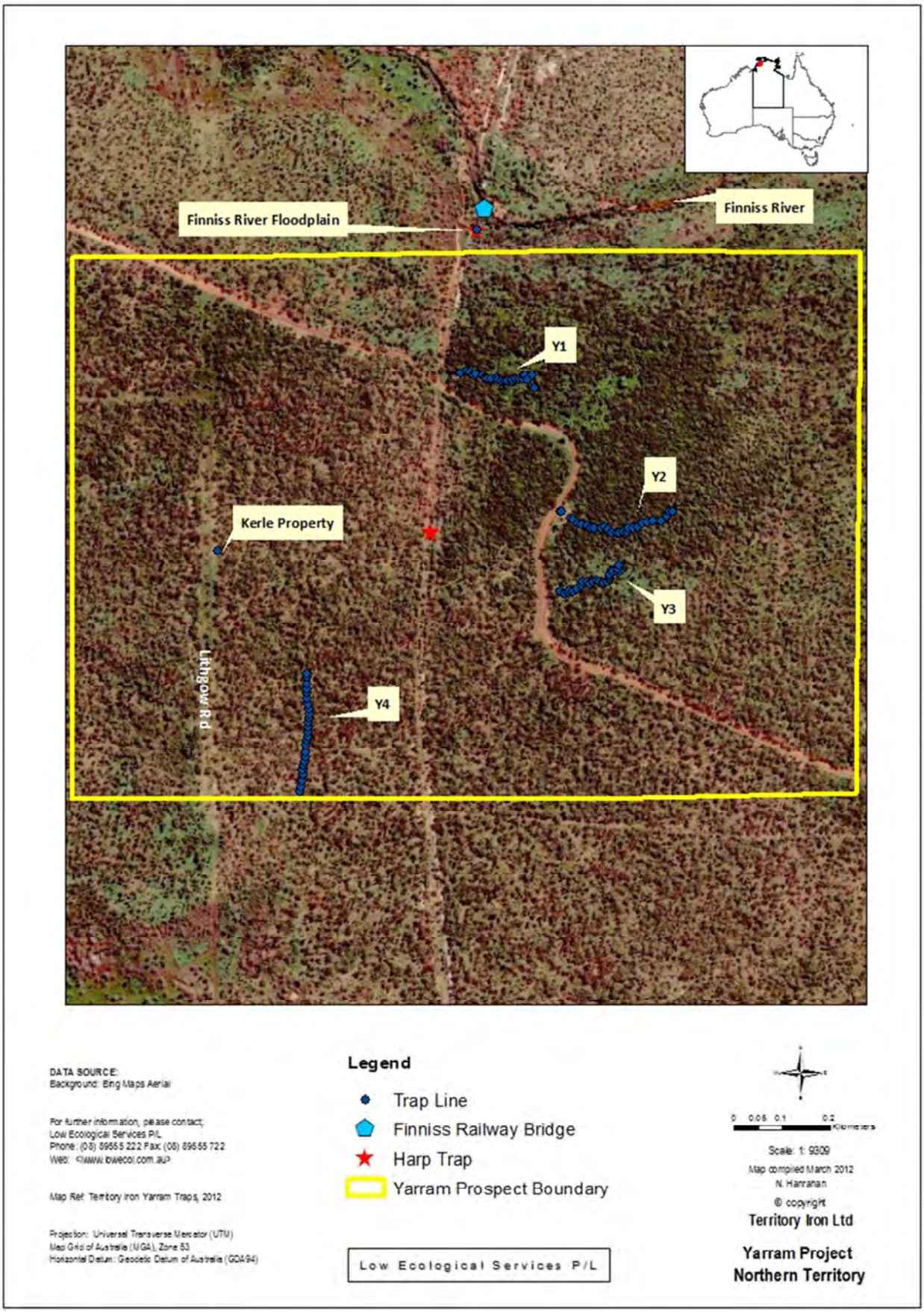


Figure 4. Location of trap lines placed during February 2012 survey of Yarram Prospect area

Source: Eco Logical 2015

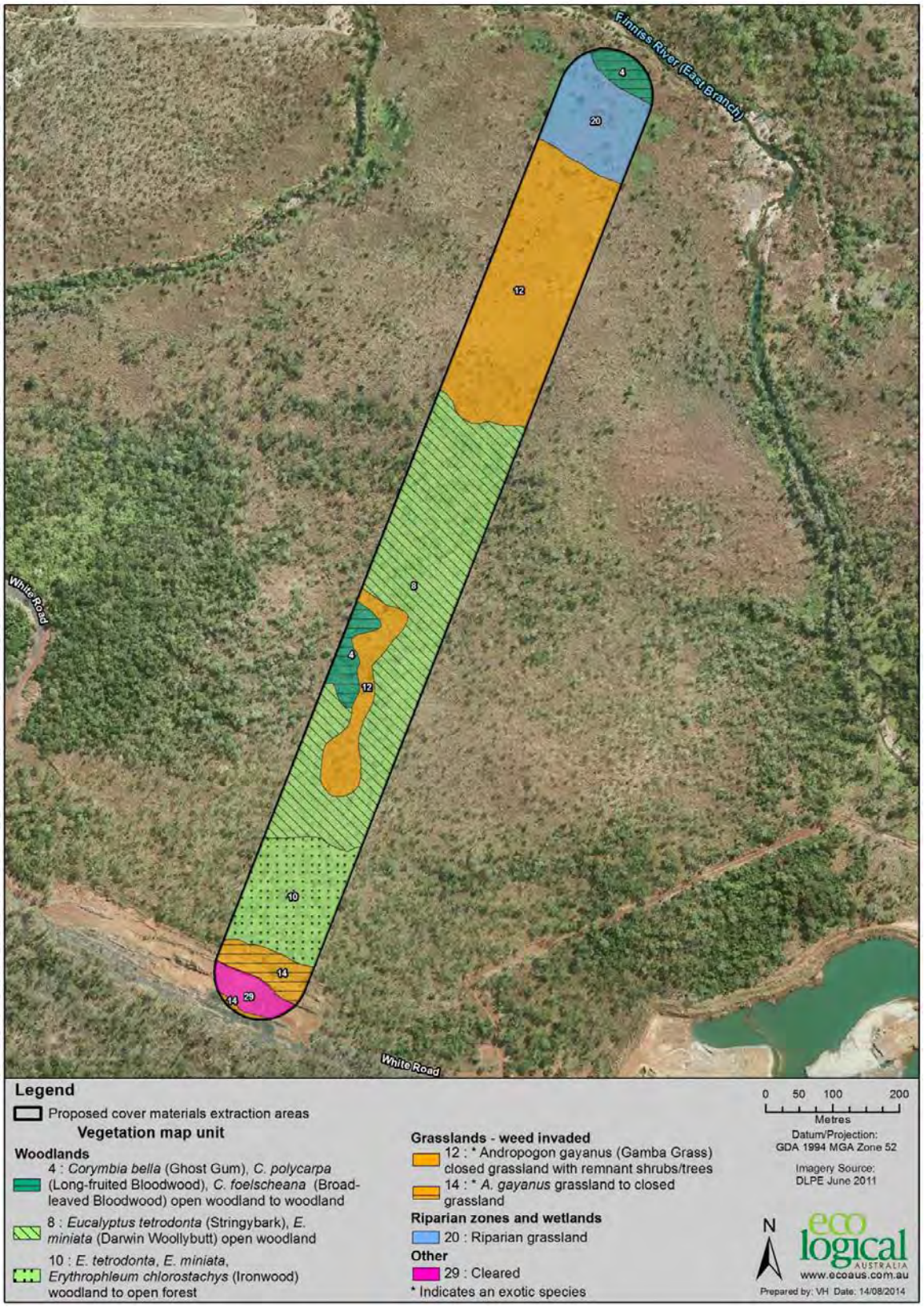


Figure 23: Vegetation map units of the western CMEA

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APPENDIX B

Weed management

The following weed management information has been reproduced (with corrections) from the May 2017 to May 2018 Progressive remediation report/mining management plan for the Rum Jungle Exploration Project, Authorisation 0263-01 (Territory Resources Ltd 2018).

Introduced weeds have a deleterious impact on the natural environment by directly competing with native species for light, water and nutrients. Their rapid growth rate means that they can out-compete endemic species and hinder their growth.

Legislation was introduced in the Northern Territory to provide advice for weed management and mitigation strategies for weed control and eradication. The *Northern Territory Weed Management Act* (2001) outlines community and landholder responsibilities for developing weed management strategies. Under this Act, the owner or occupier of the land must take all reasonable measures to prevent the land being infested with a declared weed (Part 3, Management of Weeds, Division 1, 9 General Duties 1 (a)). The classification of weeds under the act includes:

- Class A - To be eradicated (reasonable effort must be made to eradicate the plant within the NT)
- Class B -Growth and spread to be controlled (reasonable attempts must be made to contain the growth and prevent the movement of the plant)
- Class C - Not to be introduced into the NT (all Class A and B are also classified as Class C)

1.1 Gamba Grass Management Plan

Gamba Grass (*Andropogon gayanus*) is a tall, perennial grass and a declared weed which has proven to be highly invasive in the Northern Territory. It was introduced from Africa to Australia in the 1930s primarily for use as cattle fodder. For this reason, it was widely planted in agricultural and pastoral areas.

The Department of Environment and Natural Resources (DENR) describes Gamba Grass as typically growing to about 4 m tall and 70 cm in diameter, with leaves to 1 m long and up to 3 cm wide. The leaves stay green after native annual grass species have died off. Gamba Grass creates high fuel loads, which increases the fire risk.

The Northern Territory Government have designated two zones for its control: Class A Eradication Zone and Class B Management Zone, **Figure 1**. The Rum Jungle Exploration Project lies within the Class B, Management Zone.

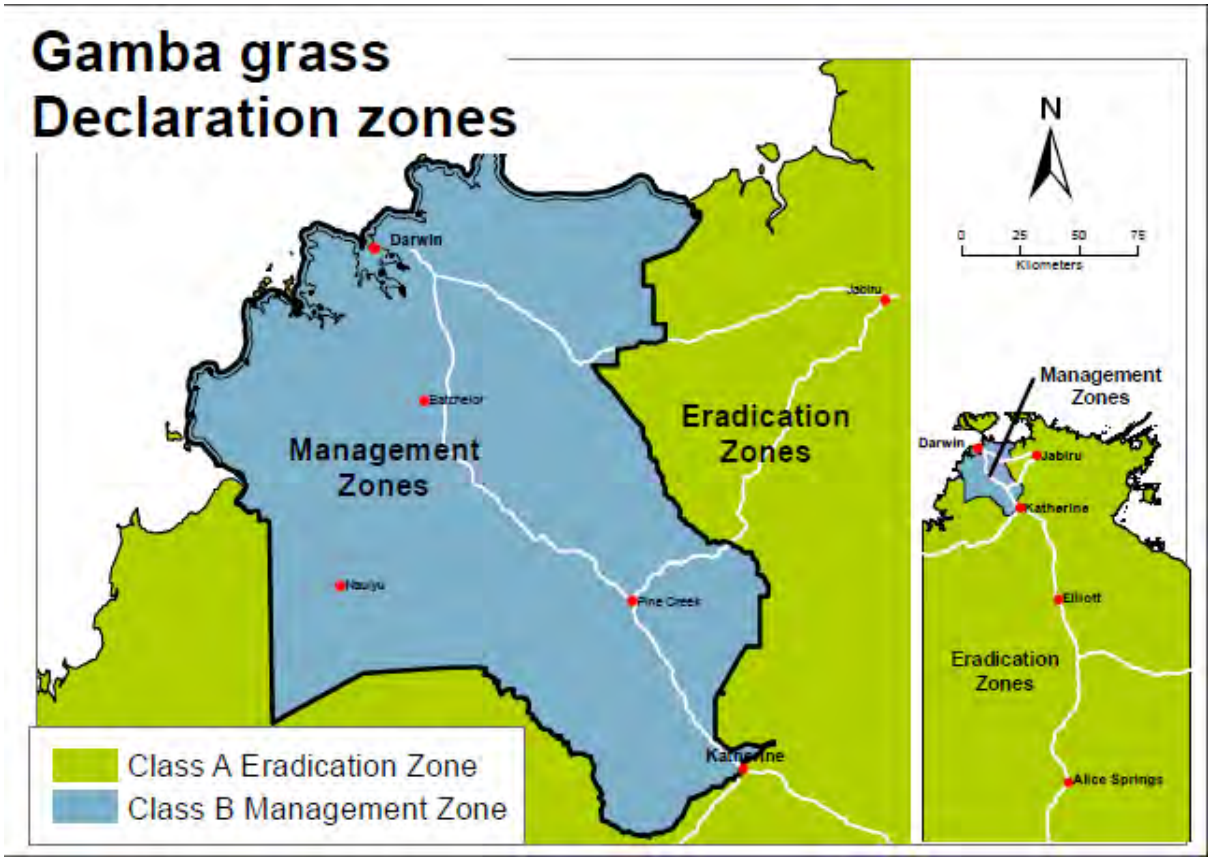

Figure 1 Northern Territory Gamba Grass Declaration Zone Map. Source: NT Government.

Landowners within the Class B Management Zone are legally required to contain existing infestations and eradicate new infestations (Laurencont *et al*., 2013). In addition, results from a 2008 weed survey of the Coomalie Shire revealed Gamba Grass was present in more than 90% of properties within the shire.

Based on the Former Rum Jungle Mine Site 5 Year Weed Management Plan report by Wildman Land Management (2011), for the Rum Jungle Mine Site Weed Management Area (**Figure 2**), Gamba Grass is classified as a Class B and C weed in accordance with the NT Weeds Management Act.

The Rum Jungle Mine Weed Management Area (**Figure 2**) is less than 600 metres from the Territory Resources Rum Jungle Project Area and Gamba Grass is documented as being the dominant species accounting for almost 50% of all recorded weeds in this area (Wildman Land Management, 2011). In this area, Gamba Grass represents 46% to 56% of the total of the Rum Jungle Mine weed infestations.

An integrated management strategy has been developed by the Northern Territory Department of Environment and Natural Resources (https://nt.gov.au/environment/weeds/list-of-declared-weeds-in-the-nt/gamba-grass)

Table 1 shows the DENR Gamba Grass Management Guide.

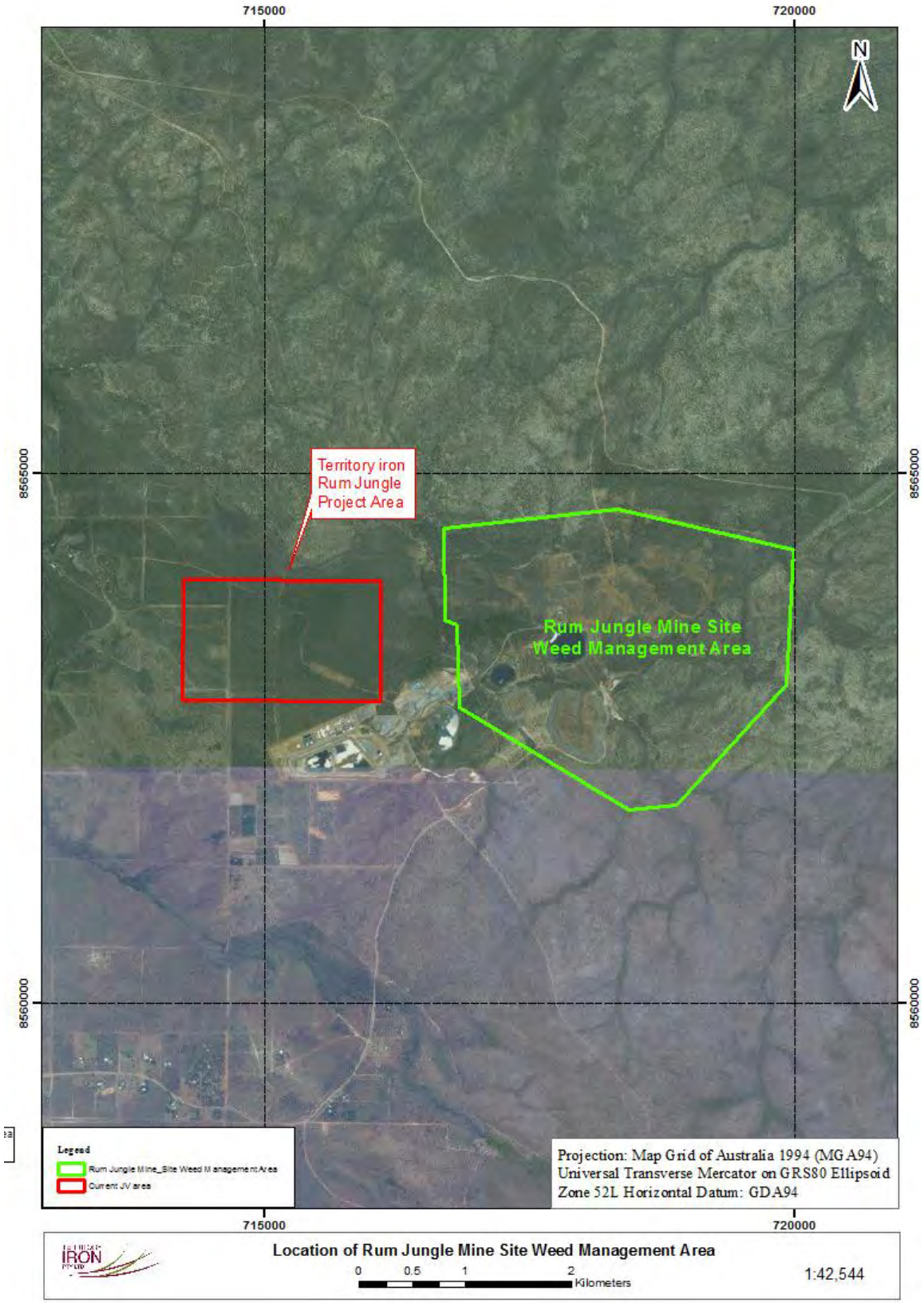

Figure 2 **Rum Jungle Mine Weed Management Area (Wildman Land Management, 2011) and Rum Jungle Project Area**

Table 1 DENR Gamba Grass Management Guide (2018)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Approximate timing of reproduction												
Flowering												
Seed fall												
Germination												
Suitability of control options Orange: most suitable, Yellow: less suitable, Grey: not suitable.												
Slashing												
Fire												
Spraying												

A critical component for the control of Gamba Grass is spread prevention. Gamba Grass seed can be distributed by wind dispersion, animals, vehicles and water. To prevent Gamba Grass spread during an active exploration programme, vehicles should have a designated wash-down area to prevent the contamination of clean areas. A description of the wash-down procedures used by Territory Resources during the 2014 drill programme is documented in Glass (2015) and is reproduced (verbatim) here:

'To prevent the spread of weed species e.g. Gamba Grass (Andropogon gayanus), Territory Resources vehicles were washed down daily at the back of the local BP Service Station in Batchelor (27 Rum Jungle Road, Batchelor NT 0845) using a high pressure cleaner (owned by Territory Resources). All water for the drill rig was locally sourced from a bore at a farm at Bevan Road, NT 0822 which is less than 2 km from the drill area. The drill rig was washed at this site prior to commencement of drilling and thoroughly upon cessation of drilling. Although a wash down site was proposed in the 2013 Amendment to the MMP, (refer to Appendix 3, 2013-2014 Rum Jungle MMP), it was decided to utilise the rear section of the BP Service Station in Batchelor. It is important to note that the Rum Jungle/Batchelor region in general already has an infestation with Gamba Grass (Andropogon gayanus) and the grass is also manifest on landowner properties within the Rum Jungle Project Area prior to the drilling. The last drill programme in the area was conducted in 2005, ten years earlier.'

Methods of control to mitigate Gamba Grass infestations (*source*: DENR) include:

- **Spread prevention** by spraying from the edges of isolated infestations and gradually working inwards until the weeds are eradicated.
- **Physical control** methods include whole plant removal by hand or mattock (only feasible for small infestations and not really effective) or for larger areas, slashing can be effective. If the grass is slashed prior to seed set, then this will prevent germination of new plants. Slashing also has the benefit of reducing biomass preventing seed development and fuel load thus reducing the risk of fire.
- **Grazing.** For areas within Class B Management Zone where cattle are present, grazing may be an effective control method as the grass is kept to low levels thus preventing seed set. Ideally the grass should be kept to less than 1 metre to prevent the grass becoming woody and unpalatable.
- **Fire** can be effective if there is a sufficient fuel load, however, it will not completely eradicate gamba grass. Fire control should not be used when plants have produced seed as hot air currents may disperse seeds to a wider area.

- **Chemical control** includes spraying with a herbicide – Glyphosate (360g/L) mixed with 1% water plus wetting agent (surfactant). The optimal time to spray Gamba Grass is from December to March. Gamba Grass should be sprayed once the weeds have new green leaves (at least 40 cm long) following the first onset of rain. The plants should be sprayed before they reach about 0.5 metre in height. Follow-up spraying should occur at the end of the wet season to target new growth from existing plants and seedlings which have germinated.

Gamba Grass has been identified within the project area especially along the main tracks. To control the infestation, Territory Resources has developed a management strategy (Table 19) to control Gamba Grass as follows:

- **January to February** - site visit to evaluate spread and growth of Gamba Grass
- **February to March** - spray program to target end of wet season growth
- **July to August** - site visit to evaluate spread and growth of Gamba Grass
- **November to December** - spray program to catch new growth with the onset of the wet season

Table 2 DENR Gamba Grass Management Guide

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Site inspection												
Spraying												
Slashing/fire												

References

Glass, L. 2015. Territory Resources Ltd, Mining Management Plan for Rum Jungle Exploration Project, Authorisation 0263-01

Laurencont, T and other contributing authors, 2013. Former Rum Jungle Mine Site, Conceptual Rehabilitation Plan, May 2013. Department of Mines and Energy, Northern Territory Government.

Wildman Land Management, 2011. Former Rum Jungle Mine Site 5 Year Weed Management Plan, July 2017

APPENDIX C

Northern Quoll Management Plan

1 Introduction

The Northern Quoll (*Dasyurus hallucatus*) is listed as critically endangered in the Northern Territory under the Territory Parks and Wildlife Conservation Act (TPWC Act) and as Endangered under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). The sighting of a Northern Quoll at Yarram on 5 February 2019 (reference) indicates the potential for mining and exploration activities to encounter and impact on the species or their habitat. This management plan was developed in accordance with the EPBC Act referral guideline for the Northern Quoll (Commonwealth of Australia, 2016), which also contains management measures, and aims to ensure that all risks to Northern Quoll habitat and the direct risks to individual animals are minimised to acceptable levels.

The EPBC Act referral guideline for the endangered Northern Quoll stipulate it is unlikely that an action will require a referral if the proponents:

- Undertakes surveys consistent with the guidelines (Commonwealth of Australia, 2016) to inform decision making (To be conducted during the next available monitoring season)
- Identify and avoid clearing habitat critical to the survival of the Northern Quoll and any impacts to populations important for the long-term survival of the species
- Maintain dispersal opportunities between populations important for the long-term recovery of the species
- Design the proposed action and infrastructure to avoid and or minimise both direct and indirect mortality to Northern Quoll
- Put in place stringent, monitored and adaptive management measures to control impacts from fire, pastoralism, and invasive species particularly Cane Toads, weeds and feral cats.

The measures listed above will be implemented at Yarram iron where applicable, **Table 4** detailed the proposed management measure. The Yarram project area contains potential habitat for Northern Quolls, including woodland (although woodland in the area is highly degraded) and monsoon vine thicket. To ensure these areas are not impacted, all drilling areas will be demarcated by a suitably qualified person prior to commencement of activities to ensure that the known vine thicket is not impacted during the exploration drill program. The locations selected have been chosen such that they are outside the known monsoon vine thicket boundary, identified through ecological surveys, detailed in 'Mapping of Monsoon Vine Forest Boundary' Information for MMP Amendment for Yarram Exploration Prospect (reference), provided with this report.

1.1 Risk assessment

A risk assessment of potential impacts was undertaken based on *AS ISO 31000:2018 Risk Management – Guidelines*. The likelihood and consequence categories adopted in the risk assessment are provided in **Table 1** and **Table 2**. The likelihood and consequence ratings were combined to derive an overall risk rating using the matrix in **Table 3**. The risk assessment is included in **Table 4**

Table 1 Likelihood Categories

Score	Category	Description	Likelihood of occurrence
A	Rare	Highly unlikely; will only occur in exception circumstances; has never occurred in association with a development in the region	0-1%
B	Unlikely	Could occur at some time, but unlikely; has only occasionally occurred in association with a development in the region	1-10%
C	Moderate	Might occur at some stage; has previously occurred in similar developments	11-50%
D	Likely	Known to occur or will probably occur; has occurred several times in association with recent developments	51-90%
E	Almost certain	Common or repeating occurrence; is expected to occur several times over the duration of the project	91-100%

Table 2 Consequence Categories

Score	Consequence	Flora and Fauna	Environmental Quality	Social, Economic and Cultural	Legal
1	**Insignificant** No measurable impact outside of the immediate disturbance footprint	No measurable impact to terrestrial flora and fauna outside of the immediate disturbance footprint.	No measurable soil disturbance, erosion or contamination outside of the immediate disturbance footprint.	No noticeable impact to stakeholder and/or community values	Damage, non-compliances and breaches of regulations, resulting in investigation and reparation.
2	**Minor** Short term Localised Reversible	Short-term impact to flora and fauna with no measurable impact to biodiversity and/or ecological integrity outside of the project footprint.	Short-term and/or localised soil disturbance, erosion or contamination that is reversible without significant remedial works	Short-term detrimental impact to stakeholder and/or community values. Short-term disruption/ nuisance that is felt by a small number of people.	Serious damage; minor legal issues, non-compliances and breaches of regulations, potentially resulting in fines.

Score	Consequence	Flora and Fauna	Environmental Quality	Social, Economic and Cultural	Legal
3	**Moderate** Medium to long-term Localised Reversible	Medium-long term impacts to flora and fauna that are confined to the disturbance footprint and immediate surrounds with no measurable impact to biodiversity and/or ecological integrity	Localised soil disturbance, erosion or contamination that continues for months to years'. Damage is reversible with a moderate level of remedial works.	Medium-long term disruption that is felt by a small number of people	Serious damage, breach of regulation with investigation or report to authority including potential suspension of operating licenses and permits and fines.
4	**Major** Long-term Regional Reversible	Impacts to terrestrial flora and fauna that lead to long-term alteration of biodiversity and/or ecological integrity and/or extend over a large area beyond the project footprint	Soil disturbance, erosion or contamination that occurs over a long period of time and/or extends over a larger area than the project area. Significant remedial works required to reverse damage.	Long-term impact felt by some of the regional population.	Major damage, breach of regulation, litigation, up to and including potential revocation of operating licenses and permits and fines.
5	**Severe** Permanent Regional Irreversible	Widespread impacts to terrestrial flora and fauna that permanently alter biodiversity and/or ecological integrity over a large area beyond the project footprint	Soil disturbance, erosion or contamination that is irreversible and extends over a larger area beyond the project footprint.	Permanent impact that is felt by the majority of regional population.	Highest level damage prosecution and fines. Major litigation including class action up to and including potential revocation of operating licenses and permits and fines.

Table 3 Risk Matrix

Likelihood	Consequence					
		1	2	3	4	5
	A	1	3	6	10	15
	B	2	5	9	14	19
	C	4	8	13	18	22
	D	7	12	17	21	24
	E	11	16	20	23	25

Matrix result	Ranking	Ranking definition
21-25	Extreme risk	Intolerable level of risk. Imperative to eliminate or reduce to a lower level by the introduction of control measures.
13-20	High risk	Intolerable or tolerable level of risk. Corrective action required.
8-11	Moderate risk	Tolerable or acceptable level of risk. Corrective action to be determined.
1-6	Low risk	Acceptable level of risk. Corrective actions where practical.

Table 4 Northern quoll Risk Assessment and Mitigation Measures

Potential impact	Likelihood	Consequence	Risk without mitigation	Mitigation measure	Likelihood	Consequence	Residual risk
Vehicle impact	B	3	Moderate	As quolls are nocturnal, vehicle access will be restricted to daylight hours, and the number of vehicles will be kept to a minimum. Speed limits will be enforced (maximum 40km per hour on site and 20km per hours on Whites Road adjacent to the monsoon vine thicket) to ensure reasonable stopping times if a sighting occurs.	A	3	Low
Hazardous material and waste	A	3	Low	Hazardous products will be removed from site or locked within containment facilities when not being used.	A	3	Low
Habitat clearing	C	3	High	Northern Quoll habitat primarily consists of rocky outcrops and hollow logs. This type of habitat will not be cleared during the proposed drilling program. Drill locations have been primarily selected in previously cleared/disturbed areas. In any areas where clearing is required and potential habitat exists, a pre-clearance survey will be conducted to ensure that no individuals, habitat, significant food sources (i.e. food sources that would impact on species numbers if they were removed) or water sources are impacted. All pre-clearance surveys will be conducted by a suitably experienced ecologist.	A	3	Low
Impact on food sources from clearing	A	2	Low	Northern Quolls are carnivores and eat a variety of food, it is not foreseeable that the exploration activities proposed would significantly impact on any Northern Quoll food sources.	A	2	Low

Potential impact	Likelihood	Consequence	Risk without mitigation	Mitigation measure	Likelihood	Consequence	Residual risk
Impacts on water sources from contaminated runoff	A	2	Low	Water is plentiful in the surrounding area; however, many sources are contaminated from existing disturbance. The proposed exploration activities do not include any disturbance to water resources in the surrounding area and potential contaminating material will be contained on site.	A	2	Low
Fire	C	4	High	Manage fires to reduce incidence, extent and severity to levels appropriate to retain or restore optimal Northern Quoll habitat, primarily through the control of Gamba Grass. Ensure Gamba Grass is controlled within the project area, in line with the proposed weed management plan. Educate and train staff about equipment and procedures to act on unexpected fire events.	A	4	Moderate
Introduced species	D	3	High	In accordance with the federal referral guidelines for the Northern Quoll the site will implement a strict policy of no dogs or cats on site. Weed management protocols will be implemented as per the weed management plan. Vehicles will be inspected for Cane Toads prior to travelling to site. Sumps, or other potential Cane Toad breeding grounds will be backfilled as soon as practicable post exploration. The creation water sources that might benefit Cane Toads will be avoided and any additional breeding grounds created will be remediated during the exploration work undertaken.	A	3	Low

If a Northern Quoll, or evidence of Quoll activities is observed, work within the area will not proceed until the area is inspected by an ecologist and signed off prior to clearing activities occurring. All mitigation measures will be implemented and during the entire proposed exploration program.

References

Commonwealth of Australia, 2016. *EPBC Act referral guideline for the endangered Northern Quoll*.

Appendix D

YARRAM IRON REHABILITATION REPORT

Prepared for:

Yarram Iron Pty Ltd
Level 3, 50 Kings Park Road
West Perth WA 6005

SLR Ref: 680.10606-R02
Version No: -v1.0
October 2019

PREPARED BY

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Yarram Iron Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
680.10606-R02-v1.0	23 October 2019	Jesse Pottage	Sarah Smith	Sarah Smith

CONTENTS

DOCUMENT REFERENCES

TABLES

PHOTOS

APPENDICES

1 Introduction

Yarram Iron Pty Ltd recently purchased Territory Iron Pty Ltd and all the associated mining rights. This includes the ability to conduct mining activities at the Yarram site and responsibility for the rehabilitation of previous exploration work undertaken at the Yarram site.

A joint site inspection between SLR consultants and DPIR representatives took place on Friday the 04/10/2019. During the inspections DPIR officers took aerial imagery, which, along with photographs obtained by SLR has been used as evidence of rehabilitation within this report.

2 Project details

Project Name	Yarram Iron Ore
Authorisation Number	1034
Operator Name	Yarram Iron Pty Ltd.
Location and Access Details	2030 White Road, Rum Jungle NT 0822 Australia, 10km North East of Batchelor, on Whites Road. Access is via Lithgow Rd, Rum Jungle.
Contact Details	Bruce Marriott – Site Manager Mobile: 0447 387 823 Email: Bruce@goldvalley.com.au Address: 50 Kings Park Road West Perth WA, 6005 Postal Address: PO Box 268 West Perth WA, 6872

2.1 Mining interest and land ownership

Title Number	Title Holder	Expiry Date
ELR125	Northern Territories Resources	22/08/2023
ELR146	Northern Territories Resources	18/09/2021
MLN1163	Northern Territories Resources	23/03/2030

2.2 Organisational structure

Position Title	Name
Managing Director	Yuzheng Xie
General Manager	Bruce Marriott
Exploration Manager	TBD – (Bruce Marriott interim)

Position Title	Name
Senior Geologist	TBD – (Bruce Marriott interim)
Environmental Manager	SLR Consulting Australia Pty Ltd

3 Scope

On the 14/10/2019 Yarram Iron Pty Ltd engaged SLR Consulting Australia Pty Ltd (SLR) to conduct an assessment of the existing disturbance at the proposed Yarram mine site (the Yarram site, including title ELR125, ELR146 and MLN1163), and submit a Mining Management Plan amendment to the Department of Primary Industries and Resources (DPIR) on their behalf. This assessment aims to identify any rehabilitation work required on site and determine the adequacy of rehabilitation works previously undertaken. Additionally, this report also aims to provide evidence of rehabilitation in accordance with Division 4, Part 4, Section 46 of the Northern *Territory Mining Management Act* 2018 in order to receive a partial refund of security for historic exploration activities. To achieve the outcomes above this report includes a summary of historical exploration activity, rehabilitation work and information regarding the current status of the site.

4 Historical activities

Three drilling programs have been conducted within the Yarram project area, with the first occurring in the 1960s, another in 2005 and the most recent in 2014. Geospatial and excel files containing coordinates and points identifying the drilling activities undertaken to date has been provided with this report.

The impacted area includes mining leases ELR146, ELR 125 and MLN1163, and the Finnis River Land Trust land.

5 Rehabilitation undertaken

Refer to the Yarram Rehabilitation Register, **Appendix A**, for a detailed description of the rehabilitation of each drill hole. .

6 Current status

During the recent joint SLR and DPIR site visit the site appeared in good condition with the only identified remnant exploration activities being a discarded wooden stake, a single pile of drill spoil used to cover a drill hole, one drill pad (approximately 25m x 25m) and a small volume of topsoil that has not been recontoured to match the existing landscape (**Table 1**). No further evidence of previous disturbance was noted. The proposed exploration activities proposed for October 2019, are situated within previous disturbed areas, including the 25m x 25m remnant drill pad, the security provided for these exploration activities will adequately cover the existing rehabilitation work required.

Department representatives obtained aerial imagery via an unmanned aerial vehicle, this imagery covers the entire extent of exploration activities undertaken during the 2005 and 2014 campaigns. No areas of significant residual impact have been identified, supporting the data contained within **Attachment A,** that notes all exploration activities, with the exception of that mention above, was completely rehabilitated.

Table 1 Summary of findings

Action required	Evidence of completion or evidence that action is not required	Outcome
Drill holes plugged below ground level at a minimum depth of 0.4 metres and soil mounded to prevent subsidence.	No evidence of subsidence observed 5 years post rehabilitation. See **Appendix B Photo 1 - Photo 9**	Action not required
Drill samples/spoil returned down drill holes, buried in sumps, or removed from site.	A small area was observed where drill spoil remains. The drill spoil will be removed using hand tools and the area covered with topsoil during the next site visit. **Appendix B Photo 6** shows the remnant drill spoil.	Not completed, security to be retained
All drill hole and access markers including flagging tape, wooden markers and star pickets will be removed from site.	A single wooden stake was observed on site, this will be removed along with the drill spoil discussed above.	Not completed, security to be retained
Re-contouring of cut and fill drill pads will be consistent with the surrounding terrain.	All drill pad areas have been recontoured to match the surrounding terrain. See **Appendix B Photo 1 - Photo 9.**	Completed
Ripping/scarifying of drill pads, and compacted areas along the contour (on sloping ground) and cross-ripping (zig-zag) along tracks.	No evidence of ripping was observed for tracks or drill pads. However, the areas inspected contained vegetation which has naturally regenerated. To undertake ripping of drill pads and tracks this would require the existing naturally regenerating vegetation to be removed, and an overall net environmental detriment. Based on these observations, SLR recommend leaving the existing vegetation and allowing the land to continue to naturally regenerate. See **Appendix B Photo 1 - Photo 9.**	Action not required
Tracks will be remediated, including pushing in all windrows.	During the site inspection all previously cleared tracks contained established vegetation. Where windrows were not pushed in access is limited and would require established vegetation to be removed. This would result in net environmental harm and is not recommended.	Action not required
Appropriate erosion and sediment controls will be installed where erosion is evident or likely to occur.	No evidence of erosion, including sheet, gully or rill, was observed while on site. See **Appendix B Photo 1 - Photo 9.**	Action not required

Action required	Evidence of completion or evidence that action is not required	Outcome
All tracks will be remediated unless otherwise agreed in writing by the land holder or appropriate third party.	During the site inspection all access tracks contained established vegetation, dead vegetation debris and some evidence of fauna activity. This indicates that access tracks have been returned to a functioning part of the surrounding ecosystem.	Action not required
Access through watercourses will be removed and banks restored.	No access through watercourses was required and therefore no disturbance occurred.	Action not required
No erosion is occurring in disturbed areas, on tracks and in remediated areas.	No erosion was observed on site, despite the significant rainfall received post rehabilitation works.	Completed
All excavations backfilled.	Costeans from historic activities were found throughout the site. These contained established vegetation, including protected and culturally significant species (Cycas armstrongii), see **Appendix B Photo 5** and **Photo 7**. All available information indicates the costeans were excavated prior to 2005. The existing security is not believed to be associated with the observed costeans.	Action not required
All water bores decommissioned unless otherwise agreed in writing by the land holder or appropriate third party. The bore must comply with the Minimum Construction Requirements for Water Bores in Australia and may require permits or licenses under the *Water Act.*	No water bores currently exist for the site.	Action not required
All rubbish and infrastructure will be removed from site.	The only rubbish observed during the site inspection was a wooden stake, which will be removed from site.	Not completed

Action required	Evidence of completion or evidence that action is not required	Outcome
Replacement of topsoil and vegetation.	Approximately 25m x 25m of previously disturbed land was observed to contain minimal topsoil and no vegetation. This includes the area where topsoil appears to have been stockpiled adjacent the previously disturbed area. The associated security for this area is expected to be approximately $200 (0.125 ha @ $800 per ha using the DPIR security calculator). This area will be rehabilitated, if required, upon closure of the proposed mine and the security provided for the proposed 2019 site activities also covers this area.	Security to be retained
Contaminated soils (e.g. hydrocarbon or hazardous chemicals) will be remediated or removed from site.	No soil stains, die back or any other evidence of hydrocarbon contamination was observed.	No action required
Monitoring will be undertaken following the wet season or a significant rainfall event.	Since rehabilitation of the most recent exploration program there has been 5 wet seasons of rainfall across the site. The most recent site inspection, while not having occurred immediately after significant rainfall, is expected to provide evidence of erosion or inadequate rehabilitation	No action required

7 Summary

Based on the information contained within the Yarram Rehabilitation Register (**Appendix A**), the observations made during the recent site inspection and the images contained in **Appendix B,** all previous exploration activities at the Yarram mine site have been successfully rehabilitated with no observable long lasting impacts.

APPENDIX A

Yarram Rehabilitation Register

APPENDIX B

Rehabilitation Photos

Photo 1 Access track 2014, minimal signs of ripping

Photo 2 Access Track 2014, vegetation debris returned over track

Photo 3 Access track 2014 showing signs of recovery

Photo 4 Drill pad 2014, no drill spoil

Photo 5 Historic costean with established vegetation

Photo 6 Remnant drill spoil observed

Photo 7 Historic costean with established protected vegetation

Photo 8 Previous drill holes within MVT overlayed on drone imagery captured by DPIR

Photo 9 Previous drill holes outside MVT overlayed on drone imagery captured by DPIR

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