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Roper Bar Iron Ore Project

Notice of Intent



WESTERN DESERT RESOURCES Ltd

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1 Proponent Details

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NT Portion 819 (St Vidgeon Pastoral Lease)

Roper Gulf Shire

Northern Territory

2 Proposal Location

Western Desert Resources Limited (WDRL) propose to mine within Mining Lease Application (MLA) 28264 and 28963 in the Roper Bar Region of the Northern Territory. The project includes Roper Bar and Mountain Creek project areas consisting of seven granted Exploration Licences (EL) EL25672, EL26759, EL24307, EL24944, EL24665, EL27143 and EL26992. The location of the project is shown in **Figure 2.1**, and the Exploration leases can be seen in **Figure 2.2**.

WDRL have submitted five MLA's as required under the Northern Territory *Mining Act*:

- MLA 28264 – Mining
- MLA 28267 – Infrastructure (airstrip)
- MLA 28266 – Infrastructure (facilities)
- MLA 28962 – Camp
- MLA 28963 – Mining

The location of the MLAs are shown in **Figure 2.3**, and the coordinates are presented in **Table 2.1**

Table 2.1 MLA Coordinates

| Location | Latitude | | | Longitude | | |
|-----------|----------|---------|---------|-----------|---------|---------|
| | Degrees | Minutes | Seconds | Degrees | Minutes | Seconds |
| MLA 28266 | -15 | 7 | 15.3 | 135 | 0 | 13.5 |
| | -15 | 8 | 14 | 135 | 0 | 13.5 |
| | -15 | 8 | 14 | 135 | 1 | 20.5 |
| | -15 | 7 | 15.3 | 135 | 1 | 20.5 |
| MLA 28267 | -15 | 7 | 57.6 | 135 | 1 | 20.5 |
| | -15 | 8 | 14 | 135 | 1 | 20.5 |
| | -15 | 8 | 14 | 135 | 3 | 21.1 |
| | -15 | 7 | 57.6 | 135 | 3 | 21.1 |
| MLA 28264 | -15 | 8 | 30.2 | 135 | 3 | 21.1 |
| | -15 | 10 | 8 | 135 | 3 | 21.1 |
| | -15 | 10 | 8 | 135 | 5 | 35.5 |
| | -15 | 10 | 33.8 | 135 | 5 | 35.5 |
| | -15 | 10 | 33.8 | 135 | 8 | 50 |
| | -15 | 8 | 30.4 | 135 | 8 | 50 |
| MLA 28962 | -15 | 7 | 57.6 | 135 | 3 | 21.1 |
| | -15 | 8 | 30.2 | 135 | 3 | 21.1 |
| | -15 | 8 | 30.2 | 135 | 3 | 37.8 |
| | -15 | 7 | 57.6 | 135 | 3 | 37.8 |
| MLA 28963 | -15 | 8 | 14.7 | 135 | 3 | 21 |
| | -15 | 8 | 14.7 | 135 | 0 | 0 |
| | -15 | 9 | 0 | 135 | 0 | 0 |
| | -15 | 9 | 0 | 135 | 1 | 0 |
| | -15 | 9 | 19.8 | 135 | 1 | 0 |
| | -15 | 9 | 19.8 | 135 | 3 | 21.1 |

The WDRL proposal is located within the proposed Limmen National Park (**Figure 2.4**). The majority of the project area is within the former St Vidgeon Pastoral Lease. St Vidgeon Station was abandoned due to its inability to support a sustainable pastoral enterprise and as a result, the Limmen Park proposal was gazetted by the Northern Territory government in 1991 for consideration to allocate the area as "Park or Reserve" status. The Park has never been declared. A section of the project extends south from the former St Vidgeon

Pastoral Lease into Nathan River Station. Tenure information for St Vidgeon Pastoral Lease and Nathan River Station are shown in **Table 2.2**, and **Figure 2.5**.

The proposal includes a 160km Haul Road between the mine site, and an existing port facility at Bing Bong. The 160 km proposed Haul Road traverses the tenures in **Table 2.2** and **Figure 2.5**.

Table 2.2 Properties intersected by the proposed haul road

| Name | Tenure Type | NT Portion | Approximate distance |
|--------------------------------------|-----------------------|------------|----------------------|
| St Vidgeon Pastoral Lease* | Crown Lease Perpetual | 819 | 30km |
| Nathan River* | Pastoral Lease | 1334 | 30km |
| Lorella | Pastoral Lease | 1333 | 75km |
| Wurrunburru Association Incorporated | Crown Lease Perpetual | 2432 | 20km |
| Macarthur River Station | Pastoral Lease | 4319 | 10km |

* Part of the proposed Limmen National Park

The proposed haul road also passes through a number of exploration leases, held by both WDRL and others, which are listed in **Table 2.3**

Table 2.3 Mining Tenements intersected by proposed haul road

| Granted Tenements | Licence Holder |
|-------------------|--|
| MLA 28264 | WDR Iron Ore Pty Ltd |
| EL24307 | WDR Iron Ore Pty Ltd |
| EL24665 | WDR Iron Ore Pty Ltd |
| EL 28587 | Australian Manganese Resources Pty Ltd |
| EL28605 | Australian Manganese Resources Pty Ltd |
| EL26939 | Sandfire Resources NL |
| EL26837 | Sandfire Resources NL |
| EL26835 | Sandfire Resources NL |
| EL29021 | Brumby Resources Limited |
| EL29022 | Sandfire Resources NL |
| EL24401 | Sandfire Resources NL |
| EL28319 | Natural Resources Exploration PTY Ltd |

Current road access to the mine and ancillary infrastructure site is via the Savannah Way/Roper Highway, which departs the Stuart Highway 10km South of Mataranka (**Figure 2.1**). This road is largely a single lane sealed road to Roper Bar. Approximately 5km west of the Roper Bar Store, the Savannah Way/Nathan River Road heads south and ultimately intersects the Carpentaria Highway near Cape Crawford 340km away. This section of road is unsealed and is where the project area is located, approximately 140km from Roper Bar. There are currently no roads or tracks linking the mine site and the port facilities.

An Indigenous Land Use Agreement (ILUA) is proposed to cover the entire area of interest.

The WDRL exploration tenements total approximately 1,850 km². WDRL have Mineral Lease Applications for approximately 5000 Hectares within this area. The area of prospective ground, or likely footprint, is approximately 10 000 hectares. A further 200 hectares will be cleared for the haul road.

Coordinates for major direction changes along the proposed haul road are presented in **Table 2.4**.

Table 2.4 Haul Road Coordinates

| Location | Latitude | | | Longitude | | |
|-------------------|----------|---------|---------|-----------|---------|---------|
| | Degrees | Minutes | Seconds | Degrees | Minutes | Seconds |
| Minesite | -15 | 8 | 54.6 | 135 | 7 | 27 |
| 2 | -15 | 8 | 27.3 | 135 | 7 | 45 |
| 3 | -15 | 8 | 23.1 | 135 | 8 | 28.5 |
| 4 | -15 | 8 | 40.3 | 135 | 9 | 31.8 |
| 5 | -15 | 9 | 13.9 | 135 | 10 | 18.1 |
| 6 | -15 | 10 | 57.9 | 135 | 11 | 32.7 |
| 7 | -15 | 12 | 29.1 | 135 | 13 | 18.7 |
| 8 | -15 | 14 | 5.3 | 135 | 14 | 43.3 |
| 9 | -15 | 15 | 59.2 | 135 | 16 | 1.8 |
| 10 | -15 | 17 | 46.6 | 135 | 16 | 42.6 |
| 11 | -15 | 18 | 42.3 | 135 | 16 | 45.5 |
| 12 | -15 | 19 | 22.8 | 135 | 16 | 30.9 |
| 13 | -15 | 19 | 42.8 | 135 | 16 | 35.2 |
| 14 | -15 | 20 | 9.1 | 135 | 16 | 48.7 |
| 15 | -15 | 23 | 35.9 | 135 | 19 | 47.7 |
| 16 | -15 | 25 | 9 | 135 | 21 | 18.2 |
| 17 | -15 | 27 | 18.1 | 135 | 23 | 40.4 |
| 18 | -15 | 27 | 33.6 | 135 | 24 | 26.7 |
| 19 | -15 | 27 | 32.5 | 135 | 25 | 20.5 |
| 20 | -15 | 27 | 1.1 | 135 | 27 | 53.6 |
| 21 | -15 | 27 | 2.6 | 135 | 30 | 43 |
| 22 | -15 | 27 | 25 | 135 | 33 | 17.3 |
| 23 | -15 | 27 | 44.4 | 135 | 33 | 46.8 |
| 24 | -15 | 29 | 49.8 | 135 | 35 | 29.7 |
| 25 | -15 | 32 | 13.9 | 135 | 38 | 7.5 |
| 26 | -15 | 34 | 27.5 | 135 | 46 | 6.3 |
| 27 | -15 | 34 | 32.9 | 135 | 47 | 0.3 |
| 28 | -15 | 34 | 4.8 | 135 | 49 | 6.3 |
| 29 | -15 | 34 | 4.7 | 135 | 50 | 4.2 |
| 30 | -15 | 35 | 39.1 | 135 | 55 | 37.3 |
| 31 | -15 | 35 | 47.6 | 135 | 59 | 8 |
| 32 | -15 | 36 | 59.4 | 136 | 2 | 46.3 |
| 33 | -15 | 38 | 10.7 | 136 | 9 | 30.4 |
| 34 | -15 | 39 | 46.8 | 136 | 11 | 25.5 |
| 35 | -15 | 41 | 8.1 | 136 | 13 | 57 |
| 36 | -15 | 41 | 57.2 | 136 | 16 | 47.8 |
| 37 | -15 | 42 | 3.8 | 136 | 19 | 5 |
| 38 | -15 | 40 | 52.2 | 136 | 20 | 33.3 |
| Near Bing Bong | -15 | 37 | 57.9 | 136 | 21 | 56 |

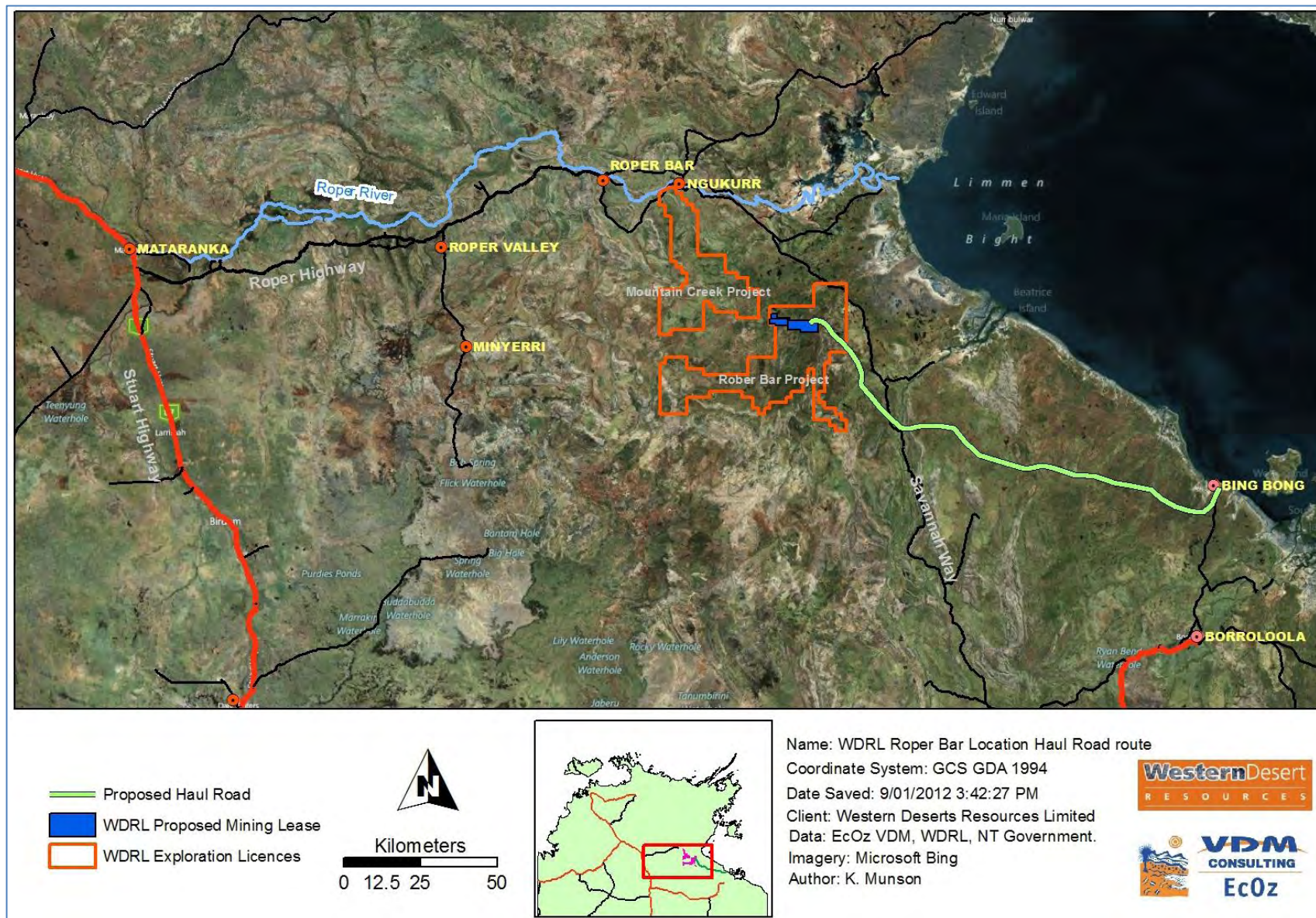


Figure 2.1 Project Location

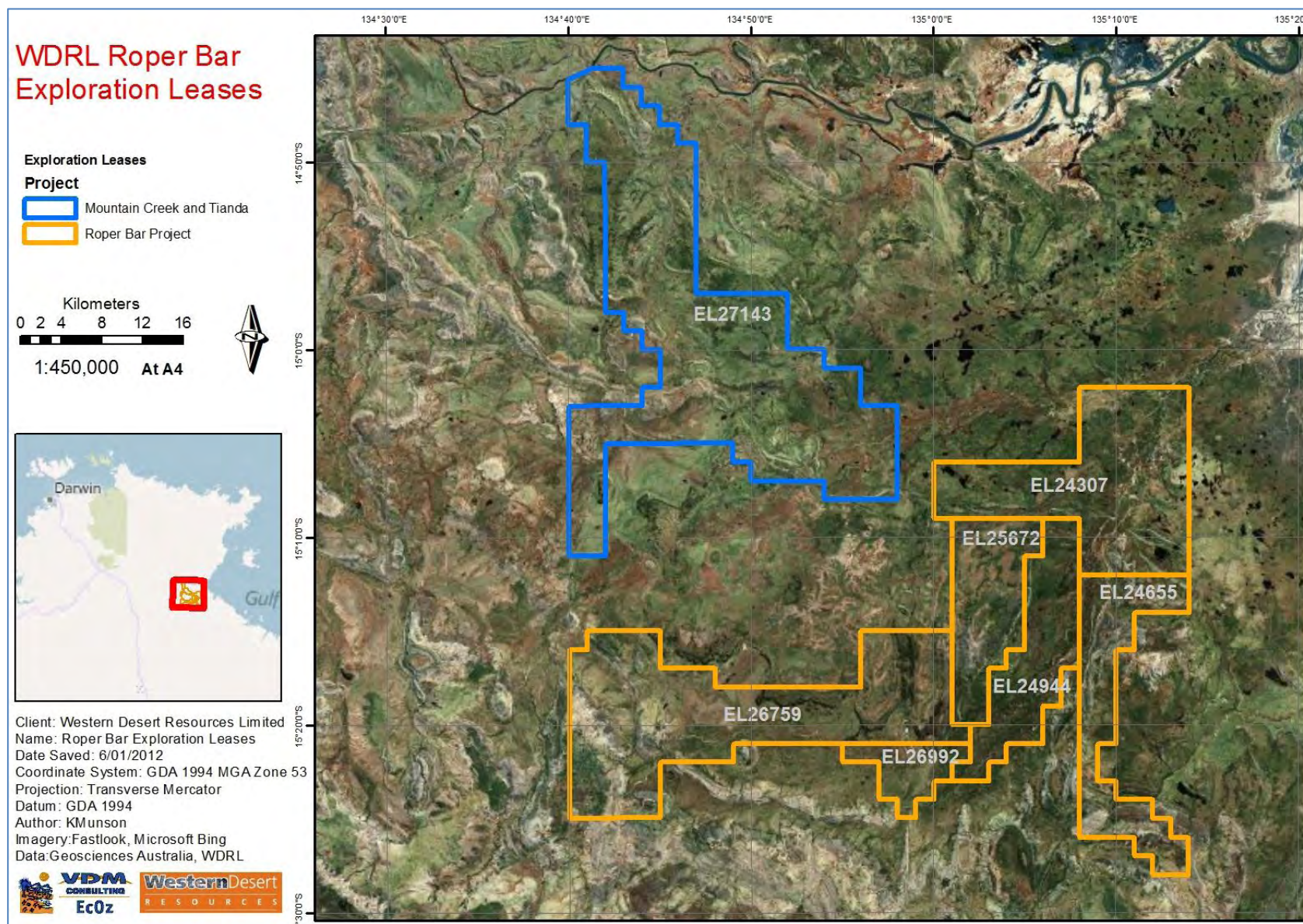


Figure 2.2 Western Desert Resources Exploration Leases Held in the Roper Bar Region

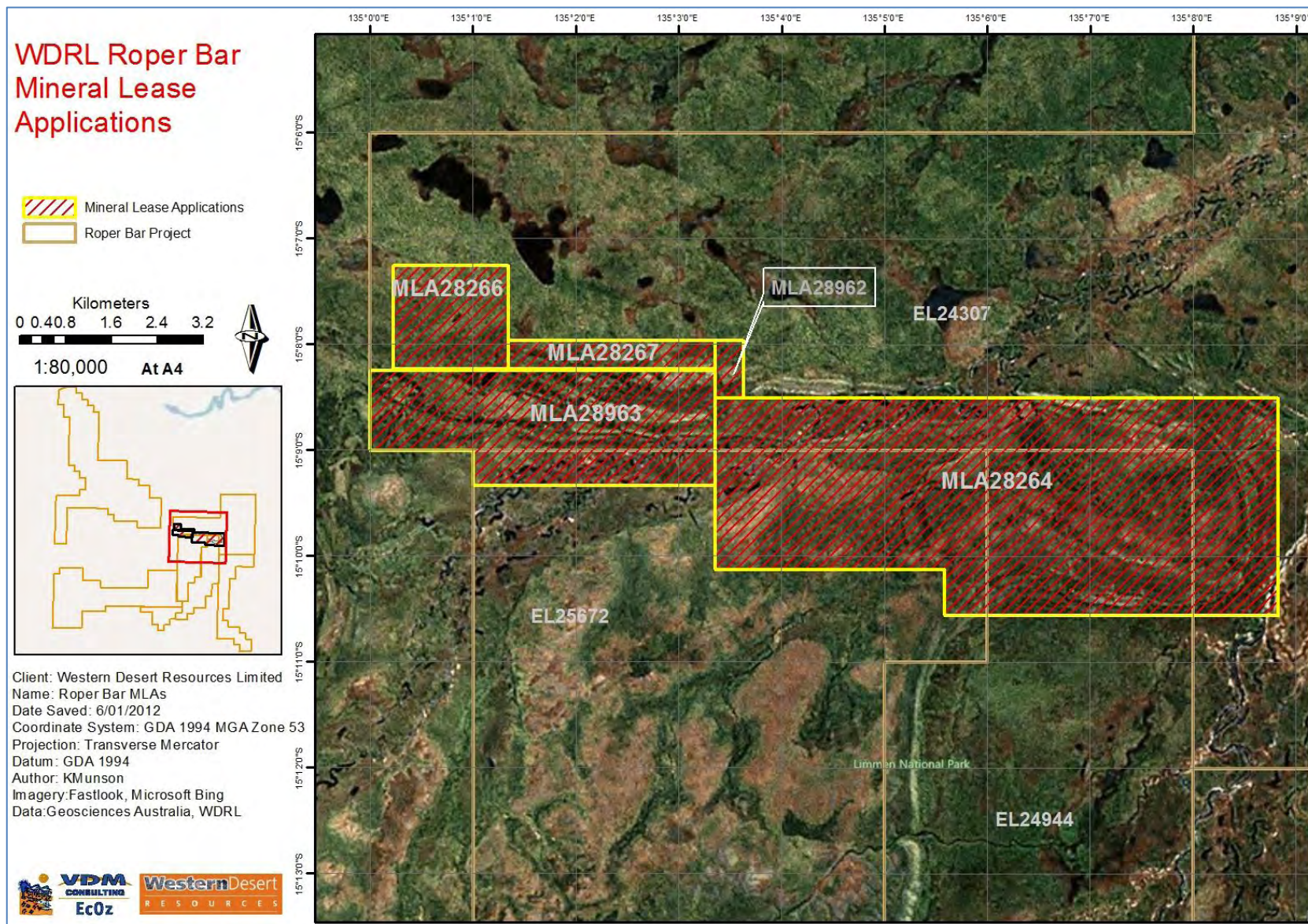


Figure 2.3 WDRL Mineral Lease Application in the Roper Bar Region

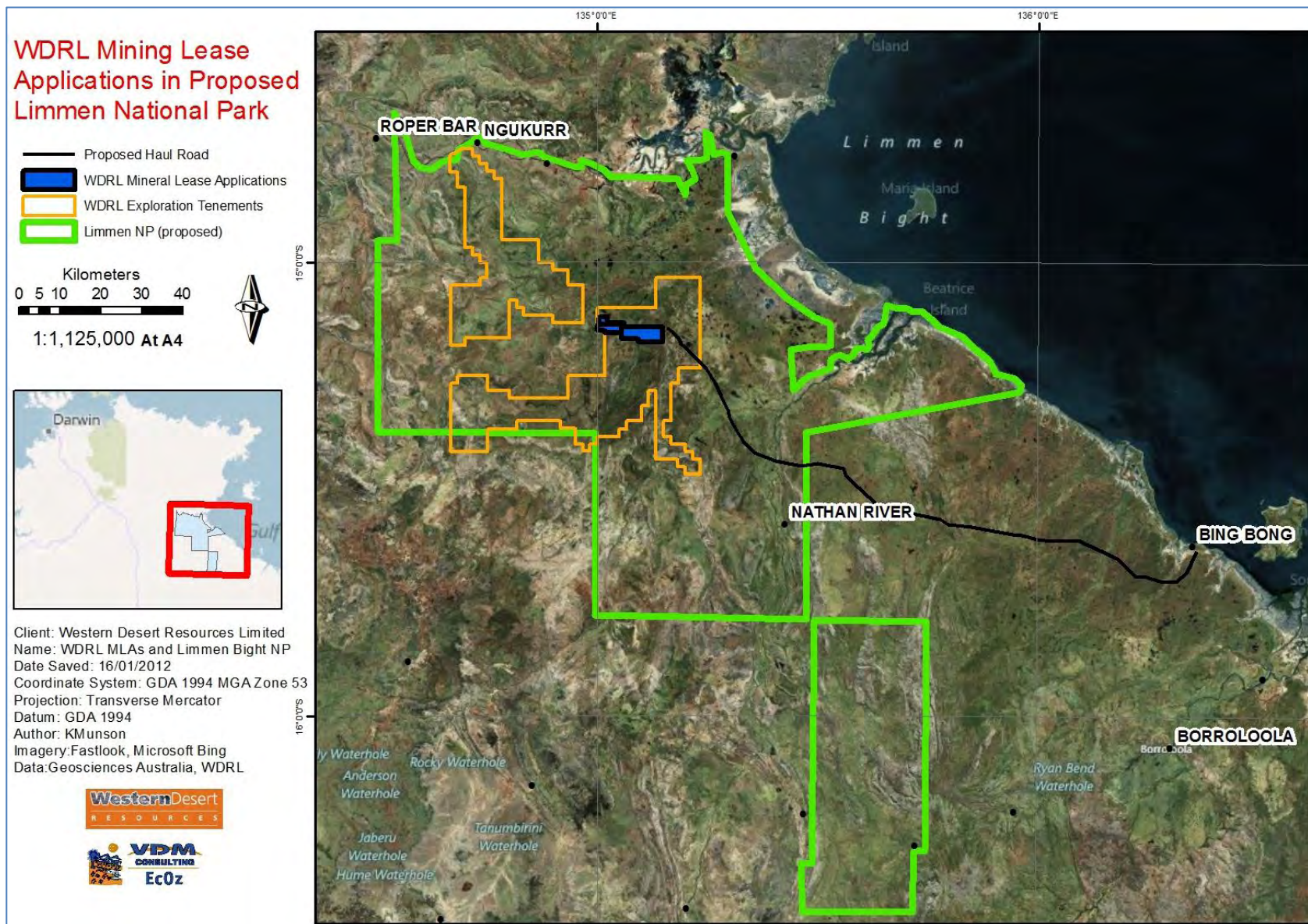


Figure 2.4 WDRL Tenements within the Proposed Limmen National Park

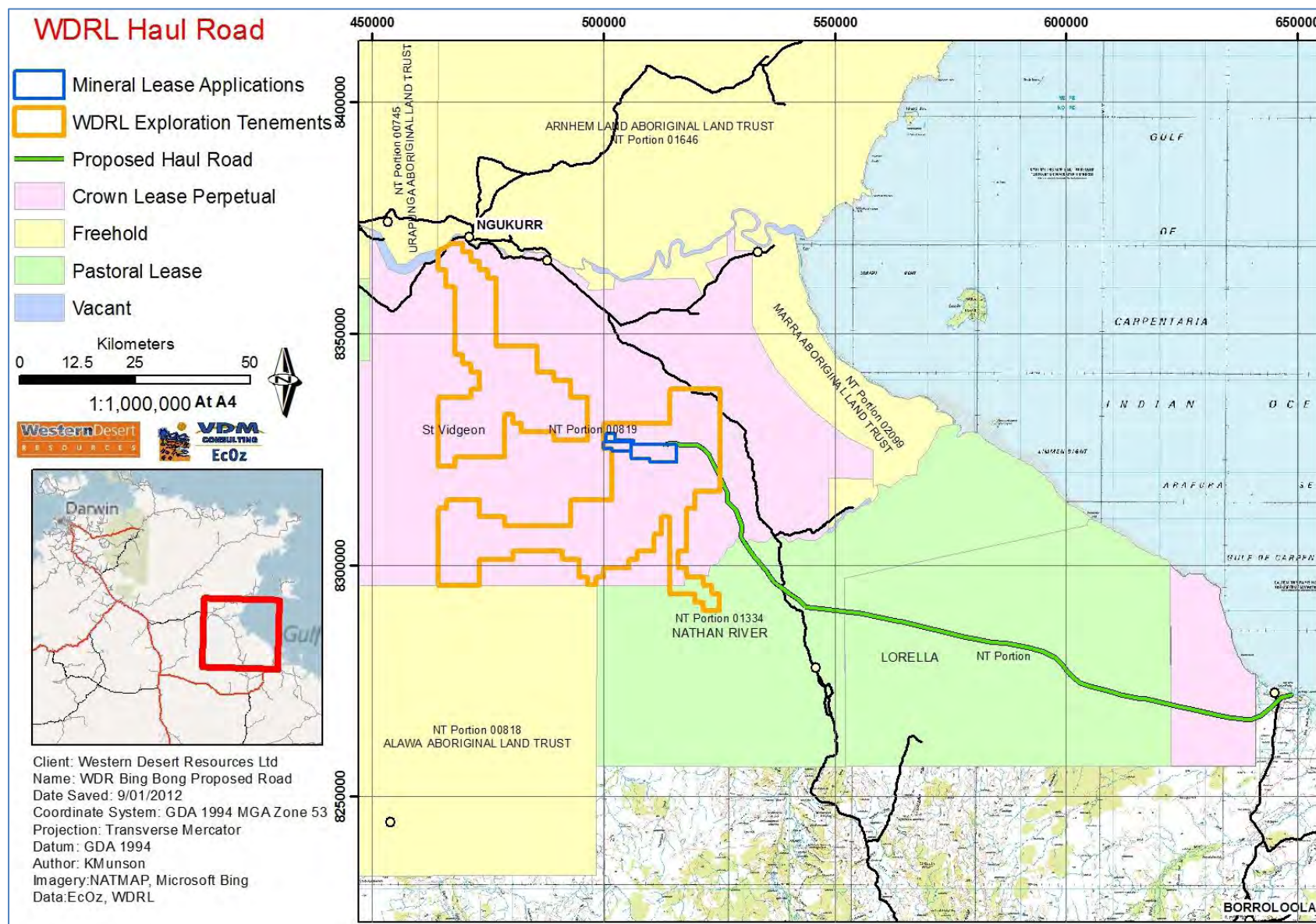


Figure 2.5 Western Desert Roper Bar Project Tenures.

3 Project Description

3.1 Project Overview

WDRL hold a number of Exploration Leases (ELs) and currently have (Five) Mineral Lease Applications (MLAs) lodged with the Northern Territory Government. WDRL has identified a number of deposits within the MLAs and hope to commence mining these resources once approvals are granted (

Figure 2.3). Conventional truck and shovel open cut mining methods and surface mining machines will be used where appropriate.

Other facilities within the MLAs include an airstrip for FIFO staff, camp facilities including dry and wet mess, sleeping quarters, laundry facilities, ablution blocks and showers, and mine offices. FIFO staff will be flown to site from Darwin and Ngukurr.

The Project infrastructure and development comprises:

- Open pit mining of Iron Ore reserves with a return to pit of most wastes;
- Some Waste and/or Overburden rock stockpiles;
- Haul roads and Light Vehicle (LV) access roads;
- Run Of Mine (ROM) pad;
- Crushing;
- Ancillary Infrastructure (workshop , administration office);
- Camp Facility;
- Airstrip; and
- Infrastructure and transport for the shipping of iron ore to and from the Gulf of Carpentaria.

The entire project area currently contains a large estimated resource 311 Mt of which it is expected that approximately 200Mt will be mined. This is expected to increase with further exploration and drilling.

The ore is contained in various orebodies. Initial mining is proposed to be from MLA 28264 which contains a number of deposits including the high grade areas F and E East. Area E South features an estimated 25 Mt of mineable resource, resulting in an expected mine life for this ML of approximately 8 years.

The ore body is shallow, mostly surface outcropping and often linear, resulting in a mining pit design that will evolve as the mining activities progress along the deposit. The deposit is expected to be mined in sections so that the waste can be returned to the pits.

WDRL, via the community consultation process, are currently working towards a plan for local employment opportunities for Indigenous and other residents.

Product Transport

Iron ore will transported to the existing Bing Bong facility via the proposed Haul Road, where it will be deposited and stockpiled inland from the facility. The ore will then be transported to the port facility via conveyor where it will be loaded onto barges to be conveyed to Ocean Going Vessels (OGV).

Blasting activities

A large portion of the orebody is classified as low strength to soft and will be removed by hydraulic excavators. Blasting will be used where required for the removal of hard rock intervals or for rock conditioning if required by surface mining machines. Any blasting that is carried out will be conducted in accordance with Northern Territory legislative requirements.

3.2 The Company

The company proposing to mine the Roper Bar iron ore bodies is Western Desert Resources Ltd (WDRL). WDRL is an ASX-listed exploration company. The company's primary asset is iron ore deposits at the Roper Bar Iron Ore Province in the Northern Territory. WDRL has 2,500 km² of exploration tenements covering most of the outcropping areas of the Sherwin Ironstone in this part of the Gulf Region (refer to Figure 2.2

Primary contact details are identified in section 1 of this document.

3.3 Purpose of this Notice of Intent

This Notice of Intent (NOI) provides formal notification to the Northern Territory Government and other interested parties of WDRL's intent to develop the Roper Bar Iron Ore Project on MLAs 28264, 28962, 28963, 28267 and 28266. This NOI also outlines the options of transporting the ore off site. It provides the required information to Department of Natural Resources, Environment, the Arts and Sport (NRETAS) to determine the appropriate level of environmental assessment for the Project.

This NOI has been prepared in accordance with the NRETAS *Information Guidelines for a Notice of Intent* (NRETAS, 2007), and the DoR Environmental Assessment of Mining Proposals Advisory Note (DoR 2008).

4 Mining and Processing Project Description

4.1 Project History

In 1957, BHP (now BHP-Billiton) commenced exploration on hematite sandstones immediately west of Roper Bar, or about 100 kilometres northwest of the WDRL Roper Bar Project Area. BHP defined many individual prospects. Drilling, costeaning and considerable metallurgical test work was completed, but the project was abandoned in the early sixties in favour of investigation of the massive deposits in the Pilbara region of Western Australia.

In 1996 Geoff Fanning pegged EL9041, which generally coincided with the current EL25672. Geoff Orridge, a consulting Geologist, completed reconnaissance exploration of the area and took 16 samples. Only three samples assayed above 50% Fe; maximum 56.6%. These results were not of commercial interest at the time, and the EL was relinquished. As the demand and price for Iron Ore has increased, the viability of this project can now be realised.

WDRL were initially granted exploration licences within the area in July 2005. In September 2010 applications were lodged for three Mineral Leases, and a further two Mineral Lease Applications were lodged in August 2011. It is WDRL's intention to both manage and operate the proposed mineral leases.

4.2 Project Components

Table 4.1 Project Components and timeframe

| Component | Details and timeframe |
|---------------------------------------|---|
| Proposed Construction Commencement | late 2012 |
| Proposed Operation Commencement | 1 quarter 2014 |
| Life of Mine | 8 years |
| Estimated Year of Decommissioning | 2022 |
| Size of Orebody | 25 Mt |
| Ore Type | Oolitic Hematite |
| Ore Mining Rate (pa) | Up to 3 Mtpy |
| Overburden Mining Rate (pa) | Up to 5 Mtpy |
| Estimated Total Ore Production | 25 Mt |
| Strip Ratio | 1.21:1 after initial prestrip |
| Number of Pits | At least 2 |
| Depth of Pits | Up to 50m |
| Estimated Recoverable Topsoil | 15M cubic metres |
| Crushing Rate | Up to 3 Mtpy |
| Ore Grade | 50-60% Fe average |
| Estimated Total Disturbance Footprint | 1.5 sq km per year rehabilitated annually |
| Workforce | 125 – 150 for construction and operation |

4.3 Supporting Studies

WDRL expect that this project will require assessment at the EIS level and therefore have begun performing or commissioning a series of studies to help inform the assessment process. **Table 4.2** lists all the completed supporting studies and programs that have been completed or scheduled.

Table 4.2 – Supporting Studies

| Study | Status / timeline |
|---|--|
| Preliminary Scoping Study | Complete (November, 2010) |
| Concept Study - Interim Draft | Complete (2010) |
| Flora and Fauna Desktop Survey | Complete (September, 2010) |
| Phase 1 – Flora and Fauna Survey | Complete (October, 2010) |
| Phase 2 – Flora Survey | Complete (April/ May, 2011) |
| Phase 2 – Fauna Survey | Complete June 2011 |
| AAPA Certificate Application | Underway |
| Surface Water monitoring | Ongoing (at least quarterly) |
| Water Monitoring Strategy | Complete (January, 2011) |
| Surface Hydrology Study | Underway |
| Groundwater Assessment | Underway |
| Hydro-geological Study | Underway |
| Groundwater Monitoring | Ongoing |
| Transshipment facilities and location studies | 2010 - ongoing |
| Social Impact Study | Underway |
| AMD potential and Waste characterisation | Underway |
| Mining Planning and Design | Underway |
| Consultation with TO's | Ongoing |
| Consultation with government | Ongoing |
| Greenhouse Gas and Environmental Offsets | Preliminary Planning stage |
| Mine Closure rehab planning | Conceptual plans being developed. |
| Metallurgical survey | Ongoing |
| Geotechnical survey | 3 rd quarter 2011 (Ongoing) |

4.4 Mining

4.4.1 Mining Operations

The Project Area will be mined using standard open cut mine operations that will involve;

- Topsoil removal
- Overburden removal
- Removal of ore
- Pit Dewatering
- A small TSF until there is space for backfilling of pits

4.4.2 Pit Design

The ore body is shallow, mostly surface outcropping and often linear, resulting in a mining pit design that will evolve as the mining activities progress along the deposit. The deposit is expected to be mined in sections so that the waste can be pumped back into the pits. Mining method and pit design are indicated by the starter pit in Area E south with progression from sections 1 through 5 in Figure 4.1. Please note that Figure 4.1 has an indicated tailings storage facility (outlined red) which is no longer part of the project plan as there will be no tailings produced.

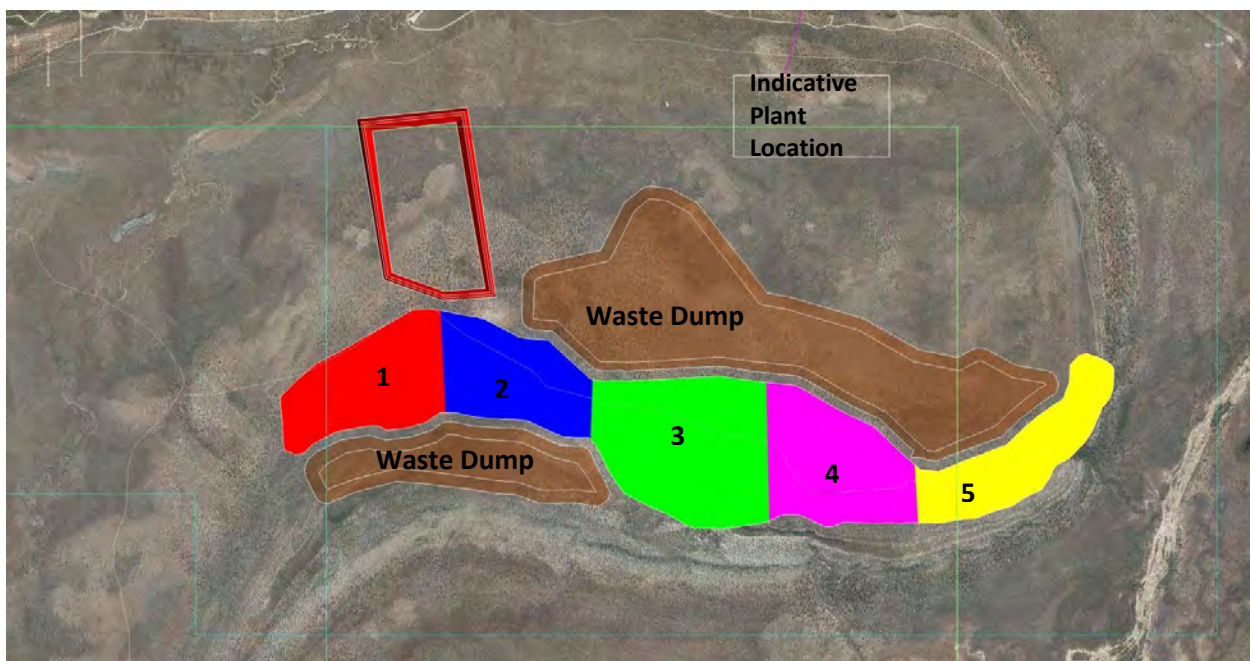


Figure 4.1 Indicative mining advance for easterly advancing terrace mining system

Mining is proposed to start on the western side of zone 1 at the outcrop line which is shown along the southern boundary. The mine depth at the outcrop line will be excavated to a depth slightly exceeding the maximum mining depth. This will provide a drainage path leading away from the working face.

4.4.3 Mining Schedule

Table 4.3 presents a five year schedule for the mine, in which a pre-stripping period has been assumed for the year before ore extraction commences.

Table 4.3 Five Year Mine Schedule

| <i>Year</i> | <i>-1</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> |
|---|-----------|----------|----------|----------|----------|----------|
| Target Ore (Mt) | 0.0 | 1.5 | 2.0 | 3.0 | 3.0 | 3.0 |
| Annual Waste (Mt) | 0.0 | 1.8 | 2.2 | 3.7 | 3.4 | 3.0 |
| Avg % Iron (Fe) | | 56-62% | 56-62% | 56-62% | 56-62% | 56-62% |
| Avg % Phosphorus (P) | | 0.008 | 0.007 | 0.008 | 0.007 | 0.007 |
| Avg % Aluminium Oxide (Al ₂ O ₃) | | 3.1 | 2.6 | 4.5 | 3.7 | 2.1 |
| Total Volume Bank m ³ (BCM) | 2.1 | 8.4 | 14.7 | 16.8 | 16.8 | 11.6 |
| Operated Excavators | 0.5 | 2.0 | 3.5 | 4.0 | 4.0 | 2.8 |

4.4.4 Pit Dewatering

SKM (2010) conducted a Groundwater Assessment for the Project Area. One of the objectives of this report was to estimate the initial mine dewatering requirements. WDRL has collected water level data from mineral exploration drillholes across the Project Area, however the spatial distribution of these data is almost completely confined to the Project orebodies. Nevertheless, conclusions regarding the hydrogeology can still be drawn from the limited data and information available (SKM, 2010).

Based on this data the mine pits will first intersect water at approximately 5 to 10 m, the depth associated with the overlying seasonal water table. More extensive water tables, expected at greater depths, will be the subject of ongoing hydrogeology studies. However, it is clear that management of inflows will be required. Dewatering will be carried out by active groundwater pumping if aquifer permeability is high or via in-pit sumps if permeability is low, or both.

Ten environmental monitoring bores have been installed around the site and detailed logging and water and pump testing has occurred. These results are pending.

4.4.5 Blasting Activities

A large portion of the orebody is classified as low strength to soft and will be removed by hydraulic excavators. Blasting will be used where required for the removal of hard rock intervals or for rock conditioning if required by surface mining machines. Any blasting that is carried out will be conducted in accordance with NT legislative requirements.

4.4.6 Mining Equipment

It is anticipated that the mining equipment used will range from 180t hydraulic excavators to large surface mining machines. These will be used where they offer economic advantage and improved accuracy in selective mining.

4.5 Ore Processing

4.5.1 Crushing Circuit

The crushing circuit will be a wet circuit and will consist of a primary crusher (e.g. JAW, MMD or Abon sizer) and secondary / tertiary crushers and integrated screening circuit. Roper Bar ore has a geological classification of soft rock, therefore utilisation of a sizer for primary crushing duty is considered appropriate.

Run of Mine (ROM) will be fed to plant by loader or mining trucks discharging into a ROM bin through a static grizzly. An apron feeder will empty the ROM bin and discharge onto a scalping screen. The scalping screen oversize will be fed directly to the sizer, whereas screen undersize bypasses the sizer.

Crushed ore is to be reclaimed from the stockpile by Front End Loaders (FEL) and loaded for delivery to export facility.

4.6 Water Management

4.6.1 Water Source

There is currently very little verified information on either ground or surface water within the Towns River catchment. As part of the groundwater assessment SKM (2010) investigated options for sourcing a water supply for the Project Area. Four water supply options were investigated and three are presented in Table 4.4. (sea water was identified and dismissed) Dewatering activities will be conducted as part of the mining operations, however, dewatering volumes may not be large enough to support all mine and process water supply requirements and a supplementary water supply may still be required.

Table 4.4 Water Supply Options

| Water Supply Option | Pipeline Requirement | Advantages | Disadvantages |
|---|----------------------|--|--|
| Near-mine aquifers | <20km | Low salinity Un-regulated | Unknown resource Requires bore field |
| Regional aquifers | >100km | Low salinity Abundant resource | Regulated Requires bore field |
| Surface Water (Roper or Limmen Bight Rivers) | 30 – 40km | Low salinity Comparatively lower cost of extraction | Seasonal Ecological impacts Cultural issues |

It is considered that near-mine aquifers, including those undergoing dewatering for mining, form the most suitable water supply option at this stage of the project.

4.6.2 Water Demand

Water demand will be minimised by transporting ore via haul road to Bing Bong, and then by OGVs to market.

Multiple dust suppression requirements for the project exist. A dust suppression water supply is needed for the ore stockpiles, as well as for in and around the active mining zones and haul roads. Preliminary estimates indicate a dust suppression water requirement of approximately 0.7 ML/d for the ore stockpiles and 1.4 ML/d for the active mining zones and mine haul roads.

Preliminary estimates of potable water requirements are approximately 0.05 ML/d, which equates to around 500 L/person/day assuming 100 persons on site. (0.2 ML/d has been used for calculations). It may be necessary to treat water to potable standards, although salinity concentrations of groundwater are likely to be at potable levels. Table 4.5 presents a preliminary water demand for the project. Total Project water demand amounts to approximately 5,840 ML/yr (16 ML/d) as shown in Table 4.5. This estimate will need to be revisited once the process design and mine footprint details (such as haul road length) have been defined.

Table 4.5 Estimated Water Demand

| Mining Operation | Water Demand | |
|--------------------------------------|--------------|-------------|
| | ML/yr | ML/day |
| Dust Suppression | 803 | 2.1 |
| Potable (assuming non saline supply) | 73 | 0.2 |
| TOTAL | 5,840 | 15.9 |

4.6.3 Waste Water

Site waste water will be treated according to applicable regulations and standards. Sewage and waste water from laundries, kitchens, bathrooms and safety showers will be treated in a package treatment plant meeting the necessary health and safety requirements. The treated grey water will be reticulated for landscape irrigation.

4.7 Transport Infrastructure

Staff transport to and from the site will primarily be via aircraft. There is an airstrip that has the capacity to land aircraft suitable to service this proposal and will transport FIFO employees to and from Darwin. The Access road to the site connects to Nathan River Road/ Savannah Way which can be accessed via Borroloola or Roper Bar. This will allow access from either Mataranka or from across the Queensland border. For much of the wet season the only access will be via aircraft. Existing internal roads will be maintained to link the mining operations, camp and airstrip facilities. When required, these roads will be extended.

4.8 Proposed Haul Road

The iron ore haul road is proposed to be constructed from the Roper Bar Mine Site to Bing Bong, a distance of approximately 160 km across predominantly Gulf Savannah country. The road alignment will traverse some 8 rivers or streams and some 17 smaller creek/drainage paths. The alignment is currently being optimized to ensure that the river crossings are kept to a minimum and at the most favourable locations. The route plan can be seen in **Figure 2.1 to Figure 2.4**

The haul road is to be designed to allow safe travel of 140 to 380 Tonne road trains with up to 4000 tonnes of product transported per shift in peak periods. The road will be a private road for WDRL heavy vehicles and mine traffic. The design requirements will generally comply with the National Road Safety Guidelines.

The road cross section will be 10m in width to permit safe passing of vehicles. The surface will initially be a crushed rock gravel pavement with a 20/14 seal. It is expected that material for the road construction will be sourced along the route.

The flood immunity of the road alignment is under analysis and will be dependent upon a number of factors including cost and time for construction. It is expected that flood immunity will be at least 1 in 3 months, that is the road may be flooded at key river crossing locations up to 4 times per year for short periods.

4.8.1 Storage and Stockpiles

At the end of the haul road WDRL propose to stockpile ore at a Load Out facility inland and potentially 2-3km from the coast at Bing Bong. The Load out Facility will include unloading of trucks and automated loading into open stockpiles. From there it will be transfer by covered conveyor overland to the barge load out facility, from where it will be transshipped on barges to Ocean Going Vessels (OGV's) according to the existing operational practices of Bing Bong. All load out facility activities are expected to be in accordance and compliance with existing operational procedures.

The proposed location of the Load out Facility is shown in Figure 4.2. The nature of the required stockpiles, along with other relevant aspects of the coastline suggest that the most appropriate location would be approximately 2-3km inland of the coast..

To use the Panamax OGVs effectively, a stockpile of ore is required near the Bing Bong Facility. The number of stockpiles required has been determined based on two scenarios as follows: one week breakdown in the delivery of the product to the stockyard area and one week delay in shipping. Based on this assumption, the volume of stockpiled material required to maintain circuit capacity on the operating circuit is approximately 300,000 tonnes, about 4.3% of the annual throughput. Therefore, to approximately match a Panamax cargo vessel, four stockpiles each of 75,000 tonnes of iron ore product or 37,500 cu.m are proposed.

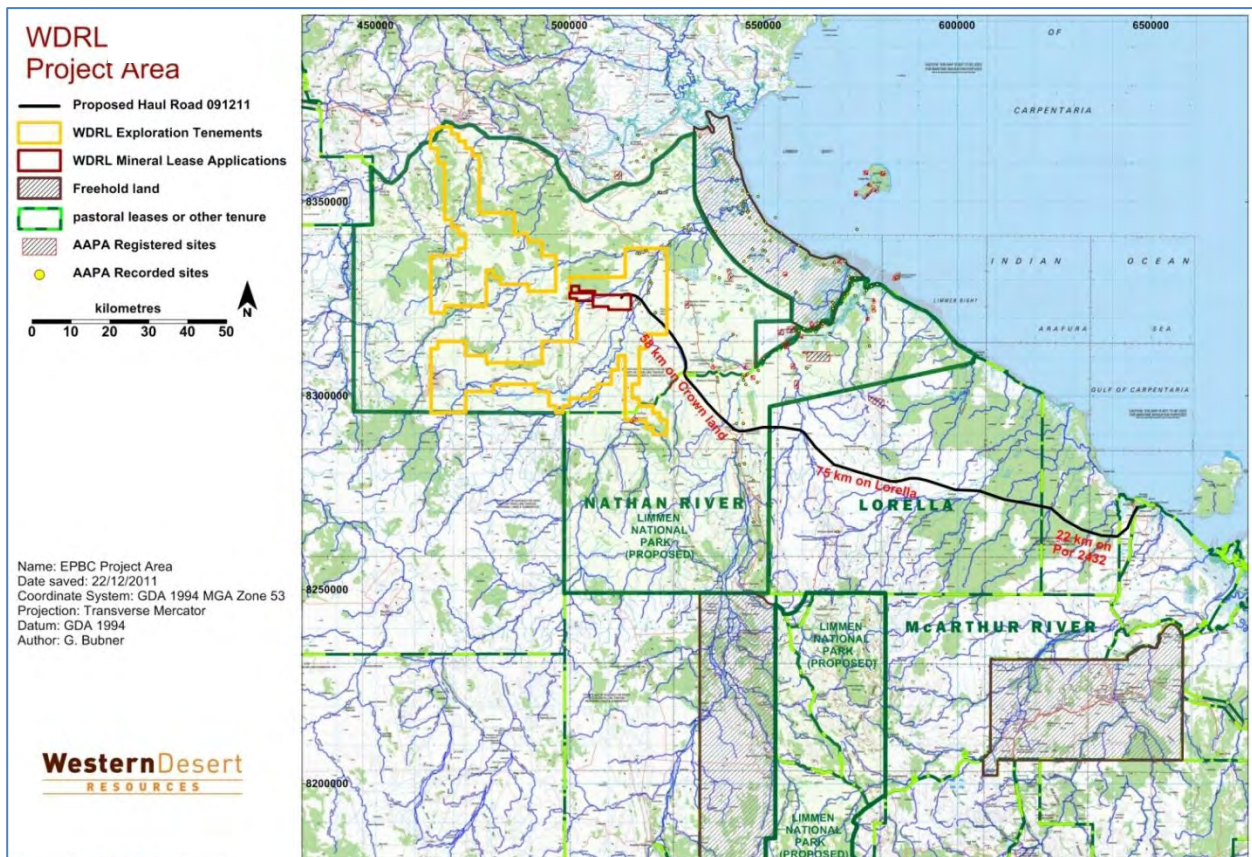


Figure 4.2 Project Area and AAPA sites

4.8.2 Shore to Barge Loading Facility

The product will be delivered via covered conveyer to a barge loader for transshipping to an ocean going vessel (OGV). The barge loader will be mounted at the end of the jetty and / or causeway arrangement and the covered export conveyor will travel from the stockpiles directly feed the barge loader.

4.8.3 Dangerous Goods

Dangerous goods and other substances, as classified by Dangerous Goods and other legislation, associated with the construction phase include:

- Diesel fuel;
- Engine oil
- Tarmac

4.8.4 Operation and Maintenance

The proposed haul road will be private, and for the sole use of the transportation of iron ore to the Bing Bong Port facility

4.9 Marine and Offshore Facilities

If this project is realised it will use the current port facility owned and operated by McArthur River Mines. Product will be transferred to barges at the port via a conveyer or similar, which will then transport them to OGVs moored 20-30 km offshore.

No expansion of the footprint of the port facility is envisaged and current dredging frequency and methods should not require changing. There would, however, be increased boat traffic between the port, and the OGVs and within the Gulf of Carpentaria.

4.10 Waste Management

Due to the remote location of the site, a landfill facility will be required to manage the domestic and inert, non-mining waste generated as part of the operations. The land fill will be constructed according to best practice and advice to reduce windblown rubbish and avoid attracting pest animals.

4.10.1 Mining Overburden Waste

Mining overburden waste is to be disposed in dedicated areas and these areas will be progressively rehabilitated. The rock waste shall be used for suitable construction purposes on site. Waste rock will be backfilled into the mining pit when it becomes practical.

4.10.2 Waste Water Management

Site waste water will be treated according to applicable regulations. Decant water from the tailings and filtrate from concentrate dewatering is recycled back to the beneficiation plant. Sewage and waste water from laundries, kitchens, bathrooms and safety showers is treated in a package treatment plant meeting the necessary health and safety requirements. The treated grey water is reticulated for landscape irrigation.

4.10.3 General Industrial Waste Management

Industrial waste generated on site will be disposed of in a manner to minimise the impact on the environment. Recycling of materials such as metals, used oils/lubricants, batteries, and tyres will be conducted where feasible. Non-process solid and putrescible waste will be buried in a designated landfill.

4.11 Hazardous Materials and reagents

Diesel is envisaged as an option for power generation during the initial stage of the project. Diesel is also required for the mining fleet. Bulk diesel storage will meet all the requirements of the Australian Standard for storage and handling of flammable and combustible liquids.

Explosives will be stored in a dedicated explosives magazine, away from infrastructure. The magazines will be registered and licensed in accordance to applicable NT standards.

4.12 Power Generation

A number of options are being considered for the generation of power required on site. These include:

- A natural gas power station located adjacent to an existing natural gas pipeline in the region, with a transmission line used to deliver power to site.
- A natural gas pipeline extension closer to site, gas fired power station and a short run of transmission lines.
- On site diesel storage infrastructure and dual diesel and gas powered generators.

4.13 Workforce

4.13.1 Construction

It is expected that approximately 125 staff will be required to be on site during the construction phase of the project.

4.13.2 Operations

A total of approximately 70 staff members will work on site per shift and the total overall number of employees is expected to be 200. Additional, and not yet determined staff requirements will include;

- Catering and camp support staff
- OH&S and medical staff
- Airport and other potential support staff
- Various Contractors and WDR contract personnel.

4.14 Communications

Satellite communications will be established so as to provide standard telephone and internet connections to the site. A radio system will be used internally for operational communications.

4.15 Accommodation

Accommodation will be built on site in the form of an accommodation village.

The construction camp will be located approximately 4 km north west of the proposed Process Plant. The camp will have 100 beds during the initial construction and mine establishment period. Management and administration of the camp facility is to be provided by a reputable camp catering contractor.

The camp shall be provided with:

- Mess with associated kitchen;
- Administration office;
- Nursing station;
- Office building;
- Ablution block (shower/toilet);
- Laundry facilities;
- Bar & entertainment area;
- Fitness & recreation centre;

The camp is laid out in such a way that it is expandable for future plant expansion stages.

4.16 Airport

The airport will consist of an airstrip, a parking area, and an aircraft refuelling station.

The airstrip will be 2,000 m long and 30 m wide. These dimensions permit 19-seat M23 and 30-seat Brasilia EMB 120 type aircraft. The airstrip may be sealed to allow maximum aircraft payload during the wet season. The airstrip is uncertified. Brasilia EMB 120 and M23 aircraft are permitted to land on uncertified airstrips. Security checks on Brasilia aircraft are not required at the time of writing, however legislation may change. If the airstrip is sealed and certified in the future, 70-seat ERJ 170 jet-powered aircraft would be permitted to land.

The check-in terminal will be comprised of passenger check-in and check-out facilities, a crew rest room, and will serve as a gate-house for entrance and exit of personnel and vehicles onto the airport grounds.

A re-fuelling station will be provided at the airport. This will ensure maximum payloads are available ex-Darwin.

A one-way flight between Darwin and Roper Bar would take approximately 1.1 hours, with a 3 hour layover to accommodate shift change meetings prior to return flight to Darwin.

4.16.1 Ancillary Infrastructure

Other onsite infrastructure associated with the Project may include the following, in isolation or in combination:

- Administration and worker facilities;
- A diesel power station; and
- Buildings, including offices, workshops, substations and security
- Site roads, comprising a combination of sealed and unsealed roads
- Light and heavy vehicle parking
- Fuel storage
- Fencing
- Landscaping
- Lighting
- Stormwater drainage
- Culverts/bridges over creeks and rivers
- Water and sewage networks and treatment plants as required
- Power distribution
- Provision of fire fighting facilities

4.17 Rehabilitation and Decommissioning

WDRL intend to prepare draft rehabilitation and decommissioning plans for submission in the EIS.

5 Existing Environment and its Management

5.1 Regional Description

The Interim Biogeographic Regionalisation for Australia (IBRA) divides Australia into units of broadly similar landform, geology and biodiversity (Baker et al., 2005). There are 12 bioregions wholly within the Territory, and another 13 that are shared with neighbouring states. The project area is situated across the Gulf Fall and Upland and Gulf Coastal bioregions.

Gulf Fall and Upland Bioregion

The Gulf Fall and Uplands bioregion is recorded to feature 13 significant animal species and 26 significant plant species. Threatened species present within the bioregion includes the highly localised and endangered Carpentarian Rock-rat (*Zyomys Palatalis*) which occurs only in the far southern part of the region (over 150km from the proposed haul road and further still from the mining lease) and the endangered Gouldian Finch (*Erythrura gouldiae*) which is associated with particular vegetation types and drainage through this region.

The Gulf Fall and Uplands bioregion includes some regionally significant perennial rivers and gorge systems. Riparian areas are generally in reasonably good condition, but are suffering some degradation from uncontrolled livestock and feral animals. Other threats to the bioregion, which is currently in good condition, include increasing weed infestation, impacts associated with mining, and broad-scale changes in fire regime. Existing data suggests that Gulf Fall and Uplands bioregion contains 10 weed species and 7 feral animal species of concern (Woinarski, 2007a).

Gulf Coastal Bioregion

The Gulf Coastal bioregion is recognised for its significant refugial values, nationally significant sites including two wetlands, 36 marine turtle nesting sites, 22 seabird nesting sites, 33 shorebird feeding/nesting sites and 7 waterbird feeding/nesting sites. Nine significant plant species and 16 significant vertebrate species occur within the Gulf Coastal Bioregion. The environment of the region is considered generally to be in good condition, but threatened by changed fire regimes, feral animals, weeds and also potentially by commercial fishing and/or impacts associated with mining. Five weed species and seven feral animals of concern are present.

5.2 National Parks

The Mining Project Area is situated wholly within the proposed Limmen National Park (see Figure 2.4) which has been gazetted since 1991. The proposed area has conservation values because it represents a transition zone between the tropical north and the more arid areas inland, with many unique species found in the region. The proposed Limmen National Park has been subject to very little biological research, therefore leaving an uncertain picture of the biological richness of the Southern Gulf of Carpentaria (Griffiths *et al.*, 1997). NRETAS presently manages the Park (12 300 km²) for weed, fire and feral animals. The Park is regarded as being rich in Aboriginal culture with numerous art and other significant cultural sites located in the area. The park is very isolated and access can be difficult.

5.3 Sites of Conservation Significance

The proposed haul road will intersect the McArthur River Coastal Floodplain Site of Conservation Significance) near the existing port facilities of Bing Bong (Figure 5.1). This site covers 1831 km², and is joined to the north by the Sir Edward Pellew Island group SOCS. It includes tidal flats which extend from the north-western most point of the site near Bing Bong Creek.

The McArthur River Coastal Floodplain is recognised as having outstanding conservation values which attract very large aggregations of migratory shorebirds. Waterbirds breed in mangroves at the site, and seabirds use coastal sand spits for nesting.

The site is both regionally and internationally significant for its environmental attributes which include:

- Six threatened species are reported from this area
- Eight plant species recorded in this site are endemic to the NT;
- Marine turtles frequent the waters adjacent to this site and around the Sir Edward Pellew Islands but they are not known to breed on the mainland coast in this area
- The site is considered of National Significance to seabirds due to the numbers of nesting Little Terns
- Significant numbers of shorebirds present with highest count of shorebirds 27 000+ in 1996;
- A large part of this site is listed as a wetland of national significance in the Directory of Important Wetlands in Australia (NRETAS 2009a)

Nature and extent of likely impact

The haul road route has been selected to avoid the most valuable components of this area of significance, and where possible will follow existing road or track layouts. Movement of construction vehicles along the route and introduction of plant and vehicles to the Project from elsewhere across Australia has the potential to introduce and / or spread pest plant and animal species. Pest plant species can displace native species and thus also impact on fauna habitat, fire regimes and food sources.



Figure 5.1 Sites of Conservation Significance

5.4 Climate

The project area experiences a tropical savannah climate with a distinct a Wet and Dry season. The seasonal contrast between the Wet and the Dry has significant implications for water resources. The monsoon brings Wet season rain and during times of cyclones (including the lows before and after cyclones), the project area experiences significant rainfall events. These rainfall events can cause flooding which is determined by the volume, duration and spatial distribution of the rainfall. It is these flooding events that provide the recharge to the aquifers. In contrast, the Dry season experiences negligible rain which results in many of the rivers ceasing to flow.

The Project Area falls within the Humid Zone which can experience an average rainfall between 600 – 800mm per year (Figure 5.2). There are no weather stations within the project area, however there are nearby weather stations; Ngukurr (Station 14609) and Limmen River (Station 14645). These stations are located approximately 60 kilometres to the north and to the south of the project area.

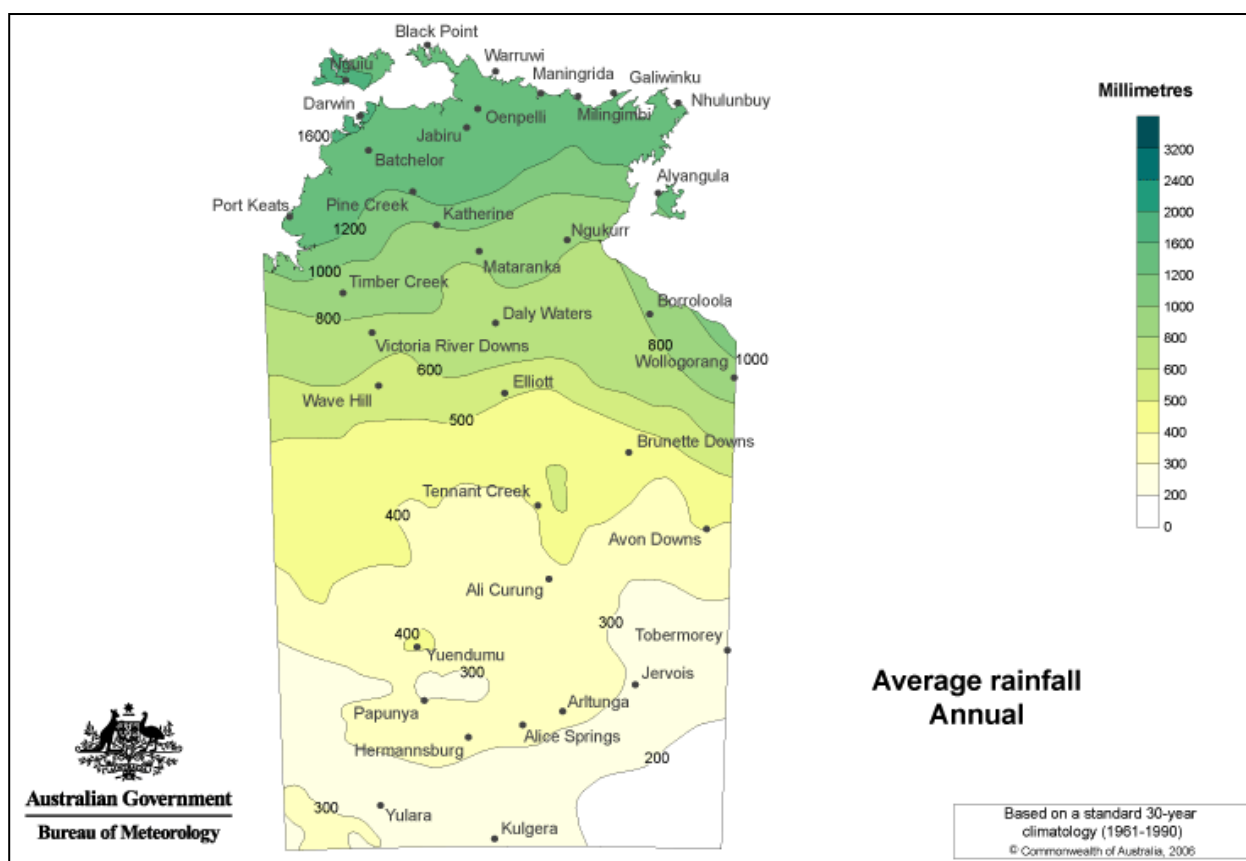


Figure 5.2 Average Annual Rainfall for the Northern Territory

(From BOM website: http://www.bom.gov.au/jsp/ncc/climate_averages/rainfall/index.jsp)

Most of the rain falls during the Wet season between November and April, while the Dry season from May to October brings negligible rainfall. **Figure 5.3** shows a mean maximum monthly rainfall ranging between 182 -252mm (January) and a mean minimum monthly rainfall ranging between 0.1 – 0.7mm (August) for Ngukurr and Limmen River.

The mean daily minimum temperatures at Ngukurr range from 15.1 to 25.5°C and a maximum mean daily temperature range from 29.6 – 38.9 °C (**Figure 5.4**). Average annual evaporation is approximately 2,400mm for the region which, even in the wettest of years, exceeds the annual rainfall (NT Govt, 2009).

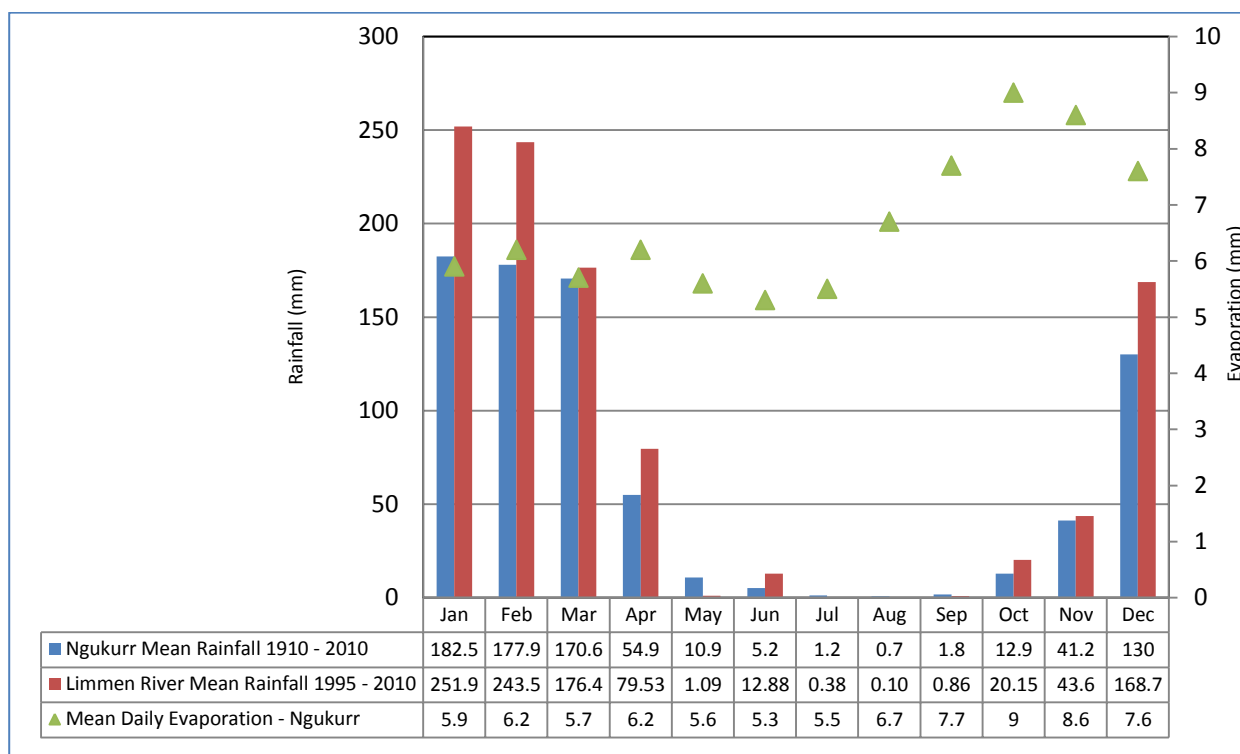


Figure 5.3 Mean rainfall data for Ngukurr and Limmen River Weather Stations (BOM, 2011)

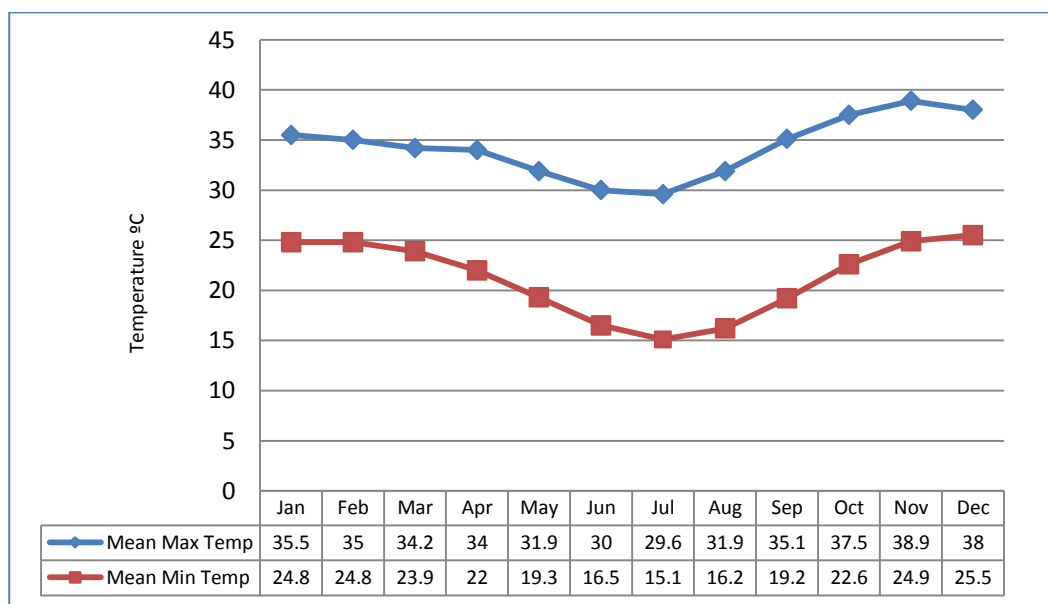


Figure 5.4 Mean Daily Temperature - Ngukurr 1962 to 2010 (BOM, 2011)

5.5 Air Quality

5.5.1 Existing Environment

The project area is remote and far from pollution sources often associated with larger population centres or industry. The only air pollutant likely present at significant concentrations is particulate matter from wind-blown dust and bushfire smoke during the dry season.

5.5.2 Potential Impacts

The main air quality issues that may arise during the construction and operation of the project include an increase in dust levels with potential to have adverse effects on human health, vegetation and visual amenity. The main sources of dust include;

- Excavations and clearing activities
- Loading and unloading of ore and waste rock
- Truck and vehicle movements over unsealed roads
- Wind erosion from exposed surfaces (e.g. stockpiles)

Vehicle and processing plant emissions of fuel combustion products such as carbon monoxide (CO), sulphur dioxide (SO₂), nitrogen dioxide (NO₂) and particulate matter will occur and also have the potential for minor adverse impacts to local air quality.

5.5.3 Management and Mitigation

The Mining and GIS Project Areas are situated in a remote location with the nearest town centre being Ngukurr to the northwest or Borroloola to the southeast. Several family outstations are located through the region, the closest two being at Roper River and another at Limmen Bight River. Management of air quality issues will be managed through comprehensive community and stakeholder engagement. A Consultation Plan will facilitate opportunities for residents to have any issues heard and dealt with in relation to any concern or potential impacts from mining operations including particularly, dust and noise.

The following mitigation strategies will be adopted, and also refined and strengthened in response to any community or other stakeholder concerns:

- Access to and from the mine will be via an existing private access road the runs off Nathan River Road near Towns River
- Dust suppression measures will be used such as water trucks, spray bars and cannons
- Designated and signposted speed limits
- Signage and markings will be installed to ensure traffic is kept to designated roadways
- Concentrate to be transported via pipeline
- The extent of exposed areas susceptible to wind erosion will be minimised
- Progressive rehabilitation of disturbed areas once they are no longer required for mining
- Where practical, high dust-generating activities will be limited during adverse wind conditions
- A dust monitoring program will be established a part of WDRL's environmental management system. Silica dust presents potential human health issues so a dust monitoring program will serve several goals.

5.6 Greenhouse Gas

5.6.1 Existing Environment

According to information presented in the State and Territories Greenhouse Gas Inventories 2008 (DCC, 2010) greenhouse gas emissions for the Northern Territory (excluding emissions and removals from land use, land use change and forestry) were 16.2 Mt. When emissions and removals from land use, land use change and forestry are included the total becomes 16.3 Mt. The Northern Territory accounts for 2.8% of Australia's total greenhouse gas emissions (DCC, 2010). The principal source of emissions in the Northern Territory is the burning of savannah woodlands.

Greenhouse gas emissions, other than those associated with bushfires within close vicinity of the Project Area are limited.

The proposal is remotely located, with the only other nearby, significant and likely greenhouse gas emissions coming from other proposed mining ventures.

5.6.2 Potential Impacts

The construction and operation of the project will increase the greenhouse gas emissions for the region. Of the main greenhouse gases, carbon dioxide (CO₂) and nitrous oxide (NO₂) are the most significant in relation to the Project since they are the main products that result from the combustion of diesel when powering earthmoving equipment and operating the processing plant. These sources will be present both during and after construction.

5.6.3 Management and Mitigation

Best practice environmental measures for reducing greenhouse gas emissions will be employed during the construction and operations phases and include:

- Allow for the installation of energy efficient devices in all plant, machinery and other infrastructure from conception
- Developing and applying policies and procedures for energy efficient mine operation
- Minimising haul distances to minimise diesel consumption
- Monitoring energy consumption (e.g. diesel and electricity) and calculating greenhouse gas emissions
- Where practicable, establishing measurable improvement targets for greenhouse gas emissions
- Reporting greenhouse gas emissions in accordance with the Territory Greenhouse Gas Inventory
- Investigate the suitability of environmental offsets

5.7 Land Resources and Use

5.7.1 Existing Environment

Topography and Land Systems

The main topographic features of the Mining Project Area are low escarpments formed by sandstones. Away from the escarpments outcrop is scarce, covered by boulders, rubble and sands of the underlying sub-outcrop. The maximum elevation at the project area is only 126 metres above mean sea level.

Aldrick and Wilson (1992) nominate most of the Mining Project Area as the Bukalara and Frog land systems (Figure 5.5 and Table 5.1). The Bukalara area is where most of the mining will be concentrated and is described as rugged rocky plateau and steep linear ridges on massive sandstones with Lithosols and shallow siliceous soils. This description suggests far more variable topography than actually exists on site. The Frog system is described as broad sandy floodplains, terraces and colluvial slopes with deep siliceous, earthy sands and solodic soils

Indicated coordinates of the proposed haul road have been provided, however the exact route is contingent on physical geography, AAPA approval, engineering requirements, and further flora and fauna studies. Due to this, a 5km buffer has been created around the indicated route to take any future route changes into consideration. The land systems throughout this area can be seen in

Figure 5.6 and detail can be found in **Table 5.1**

Proposed Limmen National Park

The Mining Project Area is situated wholly within the proposed Limmen National Park which was in 1991, but has never been “declared”. The proposed park has conservation values as it represents a transition zone between the tropical north and the more arid areas inland, with many unique species found in the region. It has been subject to very little biological research and therefore leaving an uncertain picture of the biological richness of the Southern Gulf of Carpentaria (Griffiths, *et al*, 1997). The Parks and Wildlife Service presently manages the Park (12,300 km²) for weed, fire and feral animals. The Park is regarded as being rich in Aboriginal culture with numerous art and other significant cultural sites located in the area. The park is very isolated and access can be difficult.

Table 5.1 Land Systems Represented within the Mining Project Area and within 5km of the proposed Haul Road

| Land System | | Landform and soils | Vegetation |
|-------------|-------------|--|---|
| Alh | Horse Creek | Gently undulating plains and rises on mainly fine-grained sandstones. Sandy yellow earths and siliceous sands. | Mid-high woodland of <i>Melaleuca viridiflora</i> with <i>Pandanus spiralis</i> and <i>Eucalyptus polycarpa</i> . |
| Als | Seigal | Gently undulating to undulating rises with abundant, often linear rocky outcrops and shallow sandy soils. Lithosols, minor siliceous and earthy soils. | Mid-high open woodland of <i>Eucalyptus miniata</i> , <i>Eucalyptus tetradonta</i> and <i>Eucalyptus ferruginea</i> with <i>Corymbia dichromophloia</i> and <i>Eucalyptus leucophloia</i> . |
| Asb | Bukalara | Rugged rocky plateaux and steep, linear ridges on massive sandstones such as the Bukalara and Kombolgje sandstones. Lithosols and shallow siliceous sands. | Mid-high open woodland of <i>Corymbia dichromophloia</i> with <i>Eucalyptus miniata</i> , <i>Eucalyptus tetradonta</i> and <i>Eucalyptus leucophloia</i> . |
| Lwf | Fletcher | Level to very gently undulating plains on ferruginous material (laterite) that has been re-exposed from a sub-marine position, with swales in a sub-coastal orientation; Orthic Tenosols, some Chromosolic Redoxic Hydrosols | Tall open woodland of <i>E. tetradonta</i> with <i>Melaleuca viridiflora</i> , <i>Melaleuca nervosa</i> and <i>Callitris intratropica</i> |
| Taf | Frog | Broad sandy floodplains, terraces and colluvial slopes. Deep siliceous and earthy sands, sandy yellow earths and sandy solodic soils. | Mid-high open woodland <i>Eucalyptus tectifica</i> , <i>E. terminalis</i> , <i>Erythrophleum chlorostachys</i> with some <i>E. papuana</i> on sandy floodplain. |
| Tam | McArthur | Broad or narrow fluvial corridors conducting regional drainage across various land systems towards the coast. Grey and brown clays, red and yellow earths and siliceous sands. | Mid-high open woodland of <i>Eucalyptus microtheca</i> with some <i>Eucalyptus papuana</i> and <i>Eucalyptus polycarpa</i> . Tall fringing riparian vegetation often includes <i>Melaleuca</i> spp. |
| Tas | Spillen | Level to gently undulating plains on mainly unconsolidated, transported materials. Yellow and brown earths and cracking clays. | Mid-high open woodland of <i>Eucalyptus tectifica</i> , <i>Eucalyptus latifolia</i> and <i>Erythrophleum chlorostachys</i> . |
| Ald | Downs | Gently undulating plains and rises on mainly fine-grained sandstones; Yellow Kandosols and Orthic Tenosols | mid high woodland of <i>Melaleuca viridiflora</i> with <i>Pandanus spiralis</i> and <i>E. polycarpa</i> |
| All | Lansen | Long, low, often terraced rises with linear outcrop on prominently bedded sandstones; Leptic Rudosols | mid high open woodland of <i>E. ferruginea</i> with some <i>Lysiphyllum cunninghamii</i> |
| Lwb | Bingbong | Incised, undulating rises flanking streams which are eroding into the laterite carapace of Lwf (Fletcher). Ferruginous lithosols and earthy sands. | Mid high open woodland of <i>E. tetradonta</i> with <i>Callitris intratropica</i> . |
| Tac | Coolibah | Level to gently undulating plains on unconsolidated, transported materials, rarely sedentary; Aquic Vertosols | mid high open woodland of <i>E. microtheca</i> with some <i>Excoecaria parvifolia</i> and <i>E. papuana</i> |
| Rle | Emmerugga | Undulating to rolling low hills on mainly argillaceous sediments; Leptic Rudosols and shallow Yellow Kandosols; | mid high open woodland of <i>E. latifolia</i> with some <i>E. tectifica</i> , <i>E. terminalis</i> and <i>Erythrophleum chlorostachys</i> |
| Rsf | Favenc | Steep hills on mainly argillaceous sediments; Leptic Rudosols and Brown Kandosols; | mid high open woodland of <i>E. dichromophloia</i> , <i>E. miniata</i> and <i>E. tetradonta</i> |
| Rlk | Kangaroo | Gently undulating to undulating rises on mainly argillaceous sediments; Yellow Kandosols and Chromosolic Redoxic Hydrosols | mid high open woodland of <i>E. tectifica</i> , <i>E. terminalis</i> and <i>Erythrophleum chlorostachys</i> with <i>Melaleuca viridiflora</i> , <i>Pandanus spiralis</i> and <i>E. polycarpa</i> on low lying areas |
| Lck | Kulampirri | Gently undulating plains on the Kulampirri Travertine Beds. Solodic soils | Tall open woodland of <i>E. papuana</i> with mixed grassland. |
| Lwl | Lancewood | Crenulate escarpments, rugged low hills and gently undulating lower slopes on actively eroding, ferruginised Lower Cretaceous sediments (claystone and laterite); Grey and Brown Vertosols and Leptic Rudosols | mid high open woodland of <i>E. pruinosa</i> with areas of mixed grasslands, <i>Acacia shirleyi</i> on cliffs and slopes |

| Land System | | Landform and soils | Vegetation |
|-------------|-------------|---|---|
| Rll | Leila | Gently undulating to rolling low hills on dolomite, dolomitic siltstones, quartzite and sandstones, frequently with linear structural terraces. Lithosols and shallow sandy yellow earths. | Mid high open woodland of <i>E. tectifera</i> , <i>E. Terminalis</i> and <i>Erythrophleum chlorostachys</i> |
| Tol | Littoral | Floodplains and terraces, some lower slopes and small swamps, drainage floors and flats, with fine sandy materials. Yellow and Brown Kandosols and Chromosols; | low open woodland of <i>Melaleuca viridiflora</i> with some <i>E. polycarpa</i> |
| Tcn | Nathan | Pediments and side slopes of broad valleys on detritus and argillaceous sediments. Yellow earths, siliceous sands and brown clays. | Mid high open woodland of <i>E.tectifera</i> , <i>E. terminalis</i> and <i>Erythrophleum chlorostachys</i> with some <i>Lysuphyllum cunninghamii</i> and <i>Melaleuca citrolens</i> . |
| Alo | October | Very rocky gently undulating rises on massive sandstones; Leptic Rudosols | mid high open woodland of <i>E. dichromophloia</i> and <i>E. phoenicea</i> |
| Aso | Okeefe | Broad, breached anticlines and dissected structural plateaux on sub-horizontally bedded sandstones of the Roper Group (Abner Sandstone; Munyi and Hodgson Sandstone Members) with sandstone columns; Leptic Tenosols and Leptic Rudosols | mid high open woodland of <i>E. miniata</i> , <i>E. tetradonta</i> and <i>E. ferruginea</i> |
| Alp | Patterson | Low hills, rises and undulating areas on reddish platy sandstones and siltstones, often micaceous, of the Crawford and Burrell Creek Formations and the Kyalla Member (Maiwok Subgroup) of Roper sediments; Leptic Rudosols and Leptic Tenosols, shallow Red and Brown Kandosols; | mid high open woodland of <i>E. leucophloia</i> and <i>E. tectifera</i> with some <i>Melaleuca citrolens</i> and <i>E. pruinosa</i> |
| Tor | Rosie | Almost level plains on old sea-floor deposits with regular dune-swale systems, or isolated sand dunes, in a sub-coastal orientation. Earthy sand and yellow podzolic soils. | Tall open woodland of <i>E. tetradonta</i> with <i>Melaleuca viridiflora</i> , <i>Melaleuca symphyocarpa</i> on low lying area |
| Lwr | Running | Gently undulating plains and rises on ferruginised, mainly arenaceous sediments; Grey and Brown Kandosols, Orthic Tenosols and Leptic Rudosols | tall open woodland of <i>E. tetradonta</i> with <i>E. dichromophloia</i> , <i>E. ferruginea</i> , <i>E. miniata</i> and <i>E. phoenicea</i> |
| Alt | Tawarrila | Undulating rises to low hills with some rocky outcrops on sandstone; Leptic Rudosols and Leptic Tenosols | mid high open woodland of <i>E. phoenicea</i> with <i>E. polycarpa</i> on lower slopes |
| Alw | Warranmanna | Almost level plains on the Warranmana Sandstone, often overlain by thin alluvial sand sheets: Siliceous sands | Mid high open woodland of <i>E. tetradonta</i> and <i>Callitris intratropica</i> with <i>Melaleuca viridiflora</i> on lower areas |
| Tcw | Wearyan | Gently undulating plains and pediplains on transported material or argillaceous sediments: yellow podzolics and solodic soils | Mid high woodland of <i>Melaleuca citrolens</i> |
| Tpw | Wulkulyi | Seasonal and perennial swamps and poorly drained, low-lying areas; Chromosolic Redoxic Hydrosols | mid high open woodland of <i>Melaleuca nervosa</i> |

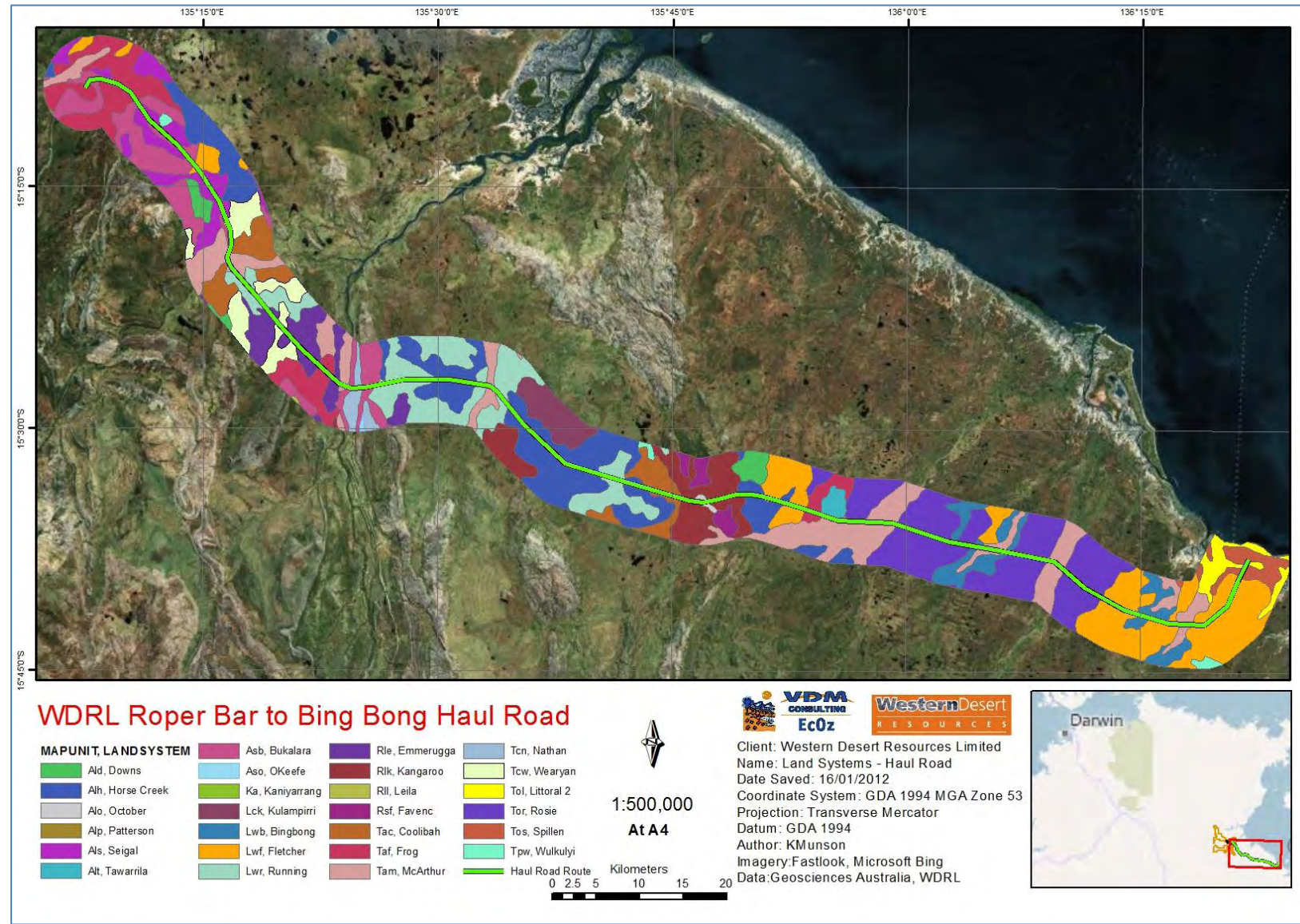


Figure 5.6 Land Systems within 5km of the Proposed Haul Road

Geology

The Roper Bar Iron Ore Province is located in the McArthur Basin. This is a large intracratonic sedimentary basin with an exposed area of about 180,000 km². It occurs mostly in the Gulf of north-eastern Northern Territory, but extends into Queensland. The basin contains thick marine and non-marine sedimentary rocks which were deposited from the late Paleoproterozoic to the early Mesoproterozoic (1800-1430 Ma). Within the locale of the Iron Ore Province the dominant stratigraphy comprises relatively undeformed and unmetamorphosed sediments of the Mesoproterozoic Roper Group (Figure 5.7 and Figure 5.8). Near the top of this sequence an oolitic ironstone called the Sherwin Formation occurs in outcrop and under shallow cover. The Sherwin Formation hosts all the known iron mineralisation and deposits. North-south striking faults are common, although a major east-west structure called the Hells Gate Hinge Line transects the area. Other than rare dolerite sills there are no volcanics in the area.

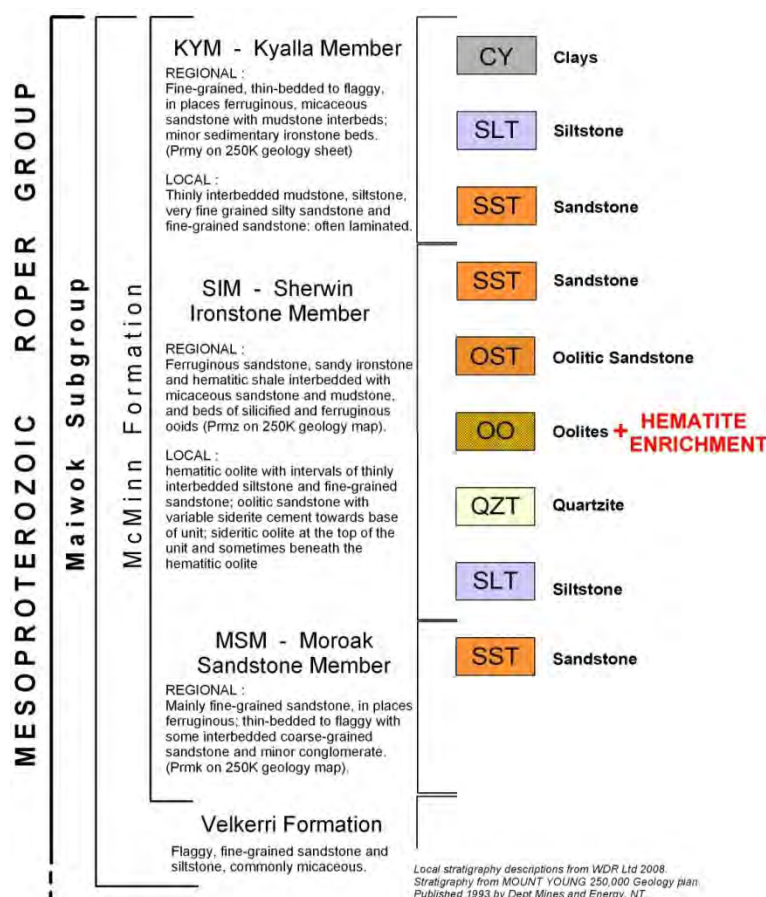


Figure 5.7 Stratigraphy and Lithologies for the Roper Project Area

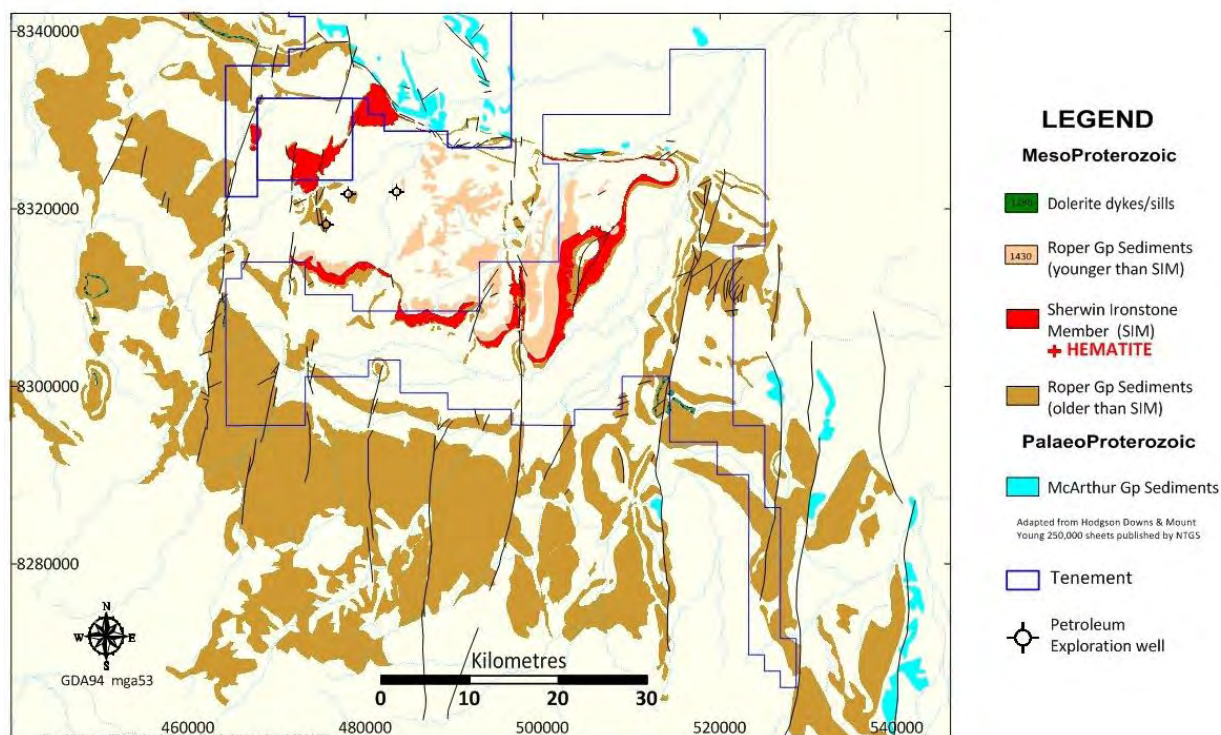


Figure 5.8 Regional Geology of the Roper Bar Iron Ore Province

5.7.2 Potential Impacts

There is unlikely to be any significant impact to the current land resource and use, such as indigenous uses, recreation and tourism activities should the mining proposal proceed. The proposed Project Area does not contain any significant heritage sites or any other areas of interest that are advertised through the NRETAS website. The closest fishing and camping amenities are located at the Towns River confluence approximately 15km downstream from the proposed mine site, with the majority of other attractions much further to the south of the proposed park.

Open cut mining and related infrastructure has potential to expose soils and increase risk of wind and soil erosion. Should the pits not be backfilled, there may be impacts to the hydrology and the natural topography of the area.

Soil contamination may occur during project activities from chemical, fuel or product spills. Soil contamination may inhibit plant growth, contaminate surface or groundwater's and limit suitable land uses for the future.

5.7.3 Management and Mitigation

Management measures to reduce or avoid impacts associated with land resources and use include;

- Clearing to be kept to minimum, utilisation of pre-disturbance to reduce disturbance footprint and clearing to be kept to an 'as needed' basis to reduce area of exposed soils
- Collect and stockpiling of all available topsoil to be utilised in progressive rehabilitation
- Using appropriate transport, storage and handling of methods for fuels, lubricants and other chemicals
- Appropriate spill response training provided to employees
- Ensuring site have a high level of operator training and diligence

- Assessing soils prior to mine closure for contamination and undertaking appropriate remediation where required
- Backfilling of pit void for minimal impact to the natural topography of the area
- Monitoring and reporting regimes
- Rehabilitation of disturbed areas will be undertaken after the completion of backfilling. This will be carried out on a per cell basis. This will be a progressive operation, dealing with each backfilling enclosure within the pit as it is completed.

5.8 Flora

5.8.1 Existing Environment

The vegetation of the region is mapped at 1:2,000,000 scale by Fox et al. 2001. The mining project area is wholly within mapping unit D11 which is generally woodland or low woodland. This vegetation types is dominated by *Eucalyptus tectifica*, often with *Corymbia terminalis*. Other canopy species that may be present in this vegetation unit include *Erythrophleum chlorostachys*, *E. leucophloia*, *E. pruinosa*, *C. Grandifolia*, *C. Confertiflora*, and *Terminalia arostrata*. There may be a sparse shrub layer of mixed species including *Terminalia canescens*, *Flueggea virosa*, *subsp. Melanthesoides*, *Melaleuca sp.* *Carissa lanceolata* and *Lysiphyllum cunninghamii* is generally present. The ground layer includes forbs such as *Vigna spp.* and *Tephrosia spp.*, but is dominated by tall grasses including *Heteropogon contortus*, *Chrysopogon fallax*, *Sehima nervosum*, *Sorghum plumosum*, *Eriachne obtuse* and *Eulalia aurea* (Fox et al, 2001).

The haul road runs for approximately 160km from the mine site to Bing Bong, and crosses four mapping units. These are described in Table 5.2

5.8.2 Flora Database Search

Surveys

An Environmental Desktop Survey was completed by EcOz Environmental Services (EcOz) in September 2010 and was followed up with a flora survey within the proposed mining area in October 2010 and again in April/May 2011. The Desktop survey only identified no flora species that are listed in the TPWC Act within the Northern Territory as Extinct, Extinct in the Wild, Critically Endangered, Endangered or Vulnerable. No significant species were found during the 2010 Flora survey. Several weeds species have been recorded within the vicinity of the project area however; no weed species were identified during the flora survey.

5.8.3 Potential Impacts

The project has potential to impact on individual species and the vegetation communities within the Project Area. Approximately **4000 ha** of land will be progressively cleared for the purpose of mining and infrastructure. Clearing will remove individual species from the broader regional population, which has the potential to impact on the distribution, dispersion and genetic diversity of the species. Clearing also reduces available food and habitat resources available to fauna species of the area. However, vegetation and land system mapping results indicate that the broad habitat types and species within the region are relatively common and widespread, and that it is unlikely that the area provides important refuge for populations of conservation significance. There is also risk to the stability and functionality of riparian vegetation due to the close proximity of development to the Towns River.

There is an increased risk of weed introduction through project related vehicles in particular earthmoving equipment.

Table 5.2 Mapping units traversed along the proposed haul road

| Mapping Unit | General Description | Dominant Canopy Species | Other Canopy Species | Mid to low level | Ground level |
|--------------|---|---|---|--|---|
| D11 | Generally woodland or low woodland | <i>Eucalyptus tectifica</i> +/- <i>Corymbia terminalis</i> | <i>Erythrophleum chlorostachys</i> , <i>E. leucophloia</i> , <i>E. pruinosa</i> , <i>C. Grandifolia</i> , <i>C. Confertiflora</i> , and <i>Terminalia arostrata</i> | Sparse mixed <i>Terminalia canescens</i> , <i>Flueggea virosa</i> , subsp. <i>Melanthesoides</i> , <i>Melaleuca</i> sp. <i>Carissa lanceolata</i> and <i>Lysiphyllum cunninghamii</i> | Includes forbs, such as <i>Vigna</i> spp. and <i>Tephrosia</i> spp., but is dominated by tall grasses including <i>Heteropogon contortus</i> , <i>Chrysopogon fallax</i> , <i>Sehima nervosum</i> , <i>Sorghum plumosum</i> , <i>Eriachne obtuse</i> and <i>Eulalia aurea</i> |
| D19 | Teatree low woodlands | <i>Melaleuca citrolens</i> +/- <i>M. nervosa</i> , <i>M. viridiflora</i> , <i>M. alsophila</i> & <i>M. acacioides</i> | <i>Asteromyrtus symphyocarpa</i> , <i>Terminalia platyptera</i> , <i>Lysiphyllum cunninghamii</i> , <i>Grevillea</i> spp., <i>Petalostigma</i> spp., <i>Terminalia canescens</i> , <i>E. pruinosa</i> | - | Tall grasses such as <i>Chrysopogon fallax</i> , <i>Eulalia aurea</i> , <i>Sorghum plumosum</i> and <i>Sehima nervosum</i> dominate. Also includes <i>Aristida</i> spp, <i>Schizachryium fragile</i> , <i>Heteropogon contortus</i> , <i>Cymbopogon bombycinus</i> , <i>Evolvulus alsinoides</i> , <i>Phyllanthus</i> spp. & <i>Rhynchosia minima</i> . |
| H9 | Open woodland, can also be low woodland, low open-woodland, or woodland | <i>Corymbia dichromophloia</i> , <i>E. miniata</i> , +/- <i>E. tetradonta</i> | <i>E. tintinnans</i> , <i>Corymbia rubens</i> , <i>E. tectifica</i> , <i>C. aspera</i> , <i>C. ferruginea</i> . | Mixed <i>Terminalia canescens</i> , <i>Erythrophleum chlorostachys</i> , <i>Gardenia</i> spp., <i>Calytrix</i> spp., <i>Acacia</i> spp., <i>Livistonia humilis</i> , & <i>Grevillea</i> spp. | <i>Triodia bitextura</i> dominant with tussock grasses such as <i>Sorghum</i> spp., & <i>Sehima nervosum</i> . |
| D13 | Woodland or low woodland | <i>Eucalyptus tetradonta</i> , +/- <i>Melaleuca viridiflora</i> +/- <i>Callitris intratropica</i> | <i>Corymbia ferruginea</i> , <i>C. jacobsoniana</i> , <i>C. polycarpa</i> , <i>Erythrophleum chlorostachys</i> , <i>Eucalyptus miniata</i> , and <i>E. pruinosa</i> | In the north: <i>E. tectifica</i> , <i>Livistonia humilis</i> , <i>Zanthostemon paradoxus</i> , <i>Petalostigma pubescens</i> , <i>Melaleuca viridiflora</i> , & <i>Calytrix exstipulata</i> | North: <i>Eriachne</i> spp., <i>Schizachryium fragile</i> , <i>Heteropogon triticeus</i> . South: <i>Triodia bitextura</i> |

5.8.4 Management and Mitigation

Disturbance to vegetation outside the mining area and processing plant footprint will be minimal. The use of existing cleared areas and transport corridors will be used as a preference to clearing additional land. Where clearing is required, clearing will be kept to a minimum and in alignment with the NT Clearing Guidelines.

Rehabilitation will be progressive throughout the life of the mine and will involve the re-establishment of local provenance species through promotion of natural regeneration, direct seeding and establishment of fire exclusion zones until vegetation has stabilised. Appropriate re-contouring and erosion control methods will be used to ensure stabilisation of rehabilitated areas. Annual inspection of rehabilitated sites will identify any areas that may require remediation and if required, will be included in the mine plan to ensure adequate

access to resources. Vehicle hygiene procedures (eg vehicle wash down area) will be implemented to all vehicles that have potential to translocate weed species.

5.9 Fauna

5.9.1 Existing Environment

The fauna species in this remote region are not well studied (sparsely distributed records that are biased to accessible areas). An Environmental Desktop Survey was completed by EcOz in December 2011 and was followed up with fauna surveys within the proposed mining area in October 2010 and June 2011. The Desktop survey (EcOz, 2010) identified 21 species that have potential to inhabit the project area. These species are listed in Table 5.3. A total of four Vulnerable species were recorded during the 2010 fauna survey. These include;

- Arnhem Leaf-nosed Bat (*Hipposidero inornata*) (V)
- Australian Bustard (*Ardeotis australis*) (V)
- Emu (*Dromaius novaehollandiae*) (V)
- Merten's Water Monitor (*Varanus mertensi*) (V)

The preliminary survey results also show that there was high species abundance in the Project Area, in particular reptile species.

The Desktop survey identified 13 potential pest species that have the potential to occur in the area. Of these the cane toad, pig and buffalo were recorded during the October 2010 survey.

5.9.2 Potential Impacts

The project has potential to impact fauna species through the construction and the operation of a mining operation. Further fauna surveys are scheduled and they will further assist in refining potential impacts. Initial impacts will be from clearing of native vegetation which may result in the loss of individual animals when clearing, loss and fragmentation of habitat, and increased competition for resources. Disturbance to fauna may also occur due to the increase of noise and vibration generated from blasting, processing and vehicular movement. There is potential for disruption to aquatic species and their habitat through the construction of roads over river and creek crossings. Off-site impacts are expected to be limited to those associated with transport corridors.

5.9.3 Management and Mitigation

WDRL will continue baseline fauna surveys in 2011 and beyond, and if required, avoidance measures will be established into the mine plan. Disturbance to vegetation outside the mining area and processing plant footprint will be minimal. The use of existing cleared areas and transport corridors will be used as a preference to clearing additional land. Where clearing is required, clearing will be kept to a minimum and in alignment with the NT Clearing Guidelines. Large trees will be avoided where practicable and cleared vegetation will be stockpiled for the purpose of rehabilitation and re-establishment of habitat. Rehabilitation will be progressive throughout the life of the mine and will involve the re-establishment of local provenance species through promotion of natural regeneration and establishment of fire exclusion zones until vegetation has stabilised.

There will be a requirement for road infrastructure to cross over rivers and creeks. Engineering controls will be required to construct appropriate crossings so as not to disrupt the natural flows of these systems or reduce the habitat or water quality of these waterways.

Reducing the presence of rubbish and artificial water sources will reduce the potential for an increase in the abundance of pest species.

Table 5.3 Threatened Species that May Potentially Occur in the Project Area (EcOz, 2010)

| Name | TPWC Status | Habitat | Possible Impacts |
|---|-----------------------|---|--|
| Mammals | | | |
| Northern Quoll <i>Dasyurus hallucatus</i> | Critically Endangered | wide range of habitats, the most suitable habitats being rocky areas and eucalypt open forests. | Proposed development is in contiguous woodland; the limited clearing will not affect the range of this species and is unlikely to influence any occurrences of this species. |
| Brush-tailed Rabbit-rat <i>Conilurus penicillatus</i> | Vulnerable | Moist areas with dense grassy understorey within coastal she-oak woodlands, sclerophyll forest and pandanus thickets. | This development will not be affecting this species habitat. |
| Northern Hopping-mouse <i>Notomys aquilo</i> | Vulnerable | A range of vegetation types including acacia scrub, heath, grassland | Proposed development is in contiguous woodland; the limited clearing will not affect the range of this species and is unlikely to influence any occurrences of this species. |
| Golden Bandicoot <i>Isododon auratus</i> | Endangered | Formerly occurred across most of northern, central and western Australia, has only been seen in the NT in northern islands | There is one record in the region for this species, collected pre-1975. It is unlikely that the species continues to inhabit the area |
| Northern Brush-tailed Phascogale <i>Phascogale pirata</i> | Vulnerable | Tall open forests dominated by <i>Eucalyptus miniata</i> & <i>E.tetradonta</i> | Within the search area, this species is only known in the Sir Edward Pellew group. This development should not impact the species |
| Carpentarian Antechinus <i>Pseudantechinus mimulus</i> | Endangered | occurs in a range of vegetation types, but always with a high cover of rocks, boulders and crevices. | Proposed development is unlikely to impact this species, as it is only known from the Sir Edward Pellew Island group |
| Canefield Rat <i>Rattus sordidus</i> | Vulnerable | Sandy low-lying open woodland with a grassy understorey | In the Northern Territory, the canefield rat is known only from South-West Island in the Sir Edward Pellew group. This development will not impact the species |
| Gouldian Finch <i>Erythrura gouldiae</i> | Endangered | wooded hills that contain a group of <i>Eucalyptus</i> species commonly referred to as snappy or salmon gums. | Proposed development is in contiguous woodland; the limited clearing will not affect the range of this species and is unlikely to influence any occurrences of this species. |
| Australian Painted Snipe <i>Rostratula australis</i> | Vulnerable | shallow, vegetated, freshwater swamps, claypans or inundated grassland (including temporary wetlands). | While considered likely regionally, the proposed development will not affect this species habitat, so it is unlikely that this species will be affected. |
| Crested Shrike-tit (northern), <i>Falcunculus frontatus whitei</i> | Vulnerable | once occurred across a range of eucalypt forests and woodlands. | Proposed development is in contiguous woodland; the limited clearing will not affect the range of this species and is unlikely to influence any occurrences of this species. |
| Emu <i>Dromaius novaehollandiae</i> | Vulnerable | Occurs across most of the Northern Territory but is scarce in the driest desert regions and densities are low in most of the Top End woodlands. | Proposed development is in contiguous woodland; the limited clearing will not affect the range of this species and is unlikely to influence any occurrences of this species. |

| Name | TPWC Status | Habitat | Possible Impacts |
|---|-------------|--|--|
| Partridge Pigeon <i>Geophaps smithii</i> | Vulnerable | occur principally in tall eucalypt open forest | Proposed development is in contiguous woodland; the limited clearing will not affect the range of this species and is unlikely to influence any occurrences of this species. |
| Purple-crowned Fairy-wren <i>Malurus coronatus</i> | Vulnerable | Restricted to a narrow band around well vegetated river channels | Proposed development, while crossing rivers and creeks will not be affecting this habitat |
| Red Goshawk <i>Erythrorhynchus radiatus</i> | Vulnerable | forest and woodland with a mosaic of vegetation types | Proposed development is in contiguous woodland; the limited clearing will not affect the range of this species and is unlikely to influence any occurrences of this species. |
| Australian Bustard <i>Ardeotis australis</i> | Vulnerable | Widespread though generally scarce in the Northern Territory. Typically occurs in open country preferring grasslands, low shrublands, grassy woodlands and other structurally similar but artificial habitats such as croplands and airfields | Proposed development is in contiguous woodland; the limited clearing will not affect the range of this species and is unlikely to influence any occurrences of this species. |
| Masked Owl (mainland Top End) <i>Tyto novaehollandiae kimberli</i> | Vulnerable | Eucalypt tall open forests (especially those dominated by Darwin woollybutt <i>Eucalyptus miniata</i> and Darwin stringybark <i>E. tetrodonta</i>), but also roosts in monsoon rainforests, and forages in more open vegetation types, including grasslands. | Proposed development is in contiguous woodland; the limited clearing will not affect the range of this species and is unlikely to influence any occurrences of this species. |
| Little Stint <i>Calidris minuta</i> | Vulnerable | Coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores | The species may be present near the existing Bing Bong port facility, however minor upgrades to this should have little influence on the occurrences of this species |
| Reptiles | | | |
| Gulf Snapping Turtle <i>Elseya lavarackorum</i> | Not Listed | The species inhabits large rivers and their associated overflow lagoons and oxbow lakes. The Gulf Snapping turtle is found in deeper permanent pools most often with muddy, sandy or rocky bottoms. The species is also found in the middle reaches of rivers, upstream of saline regions and downstream of escarpments, including plunge pools. Steep rocky gorges, and river reaches with intact river banks seem to be preferred habitats for Gulf Snapping Turtles | This species may be present in some of the larger rivers that are crossed by the haul road; the haul road construction techniques will not affect the water quality of these rivers nor the ability of the species to move along the river; consequently this development is not likely to affect the species. |
| Loggerhead Turtle <i>Caretta caretta</i> | Endangered | open ocean, coastal waters, coral reefs, muddy bays, sandflats, estuaries and seagrass meadows. Nest on open, sandy beaches, | Marine turtles frequent the waters adjacent to this site and around the Sir Edward Pellew Islands but they are not known to breed on the mainland coast in this area. Possible impacts include: <ul style="list-style-type: none"> • Boat Strike • Light pollution from existing jetty • Ingestion of marine pollution / rubbish • Noise and vibration pollution |
| Mertens' Water Monitor <i>Varanus mertensi</i> | Vulnerable | found in coastal and inland waters across much of northern Australia | Species is seldom seen far from water. This species may be present in some of the rivers that are crossed by the haul road; the haul road construction techniques will not affect the water |

| Name | TPWC Status | Habitat | Possible Impacts |
|---|-------------|---|--|
| | | | quality of these rivers nor the ability of the species to move along the river; consequently this development is not likely to affect the species. |
| Floodplain Monitor <i>Varanus panoptes</i> | Vulnerable | occupies a variety of habitats, including coastal beaches, floodplains, grasslands and woodlands. | Proposed development is in contiguous woodland; the limited clearing will not affect the range of this species and is unlikely to influence any occurrences of this species. |

A further twenty seven (27) species are identified as Data Deficient. Further surveys to be conducted will target these species.

This project has also been submitted as an EPBC referral, which can be found at

http://www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6242

5.10 Groundwater

5.10.1 Existing Environment

Regional groundwater data for the broader Project Area is sparse, with little information available in online databases or previous mapping and reports. However, the hydrogeology of the Roper River catchment (i.e. north and west of the Project Area), has been the subject of recent meaningful studies (e.g. NRETAS, 2009), where the focus of those studies was to quantify the relationship between groundwater from the extensive carbonate (limestone and dolostone) aquifers and surface water bodies of the catchment. These carbonate aquifers do not extend into the Towns River catchment where the Project Area is located (NRETAS, 2009).

Due to the age and apparent extensive deformation of the geological units of the Project Area, the hydrogeology of the site is likely to be dominated by secondary porosity. Although, advice from WDRL indicates that some primary porosity is present in the oolitic sandstones comprising the Roper Bar Project orebodies, with the host units forming an extensive aquifer. Where the oolitic sandstones of the Sherwin Ironstone Formation outcrop, any aquifers hosted by the Formation are expected to be unconfined. However, where the Formation is flat lying and overlain by the Kyalla Siltstone, any aquifer is expected to be semi-confined or confined.

Groundwater elevation data collected by WDRL from mineral exploration drillholes across the north of Area D as well as Area E and the southern margin of Area F indicate that the water table generally lies between 5 and 15 m depth below surface, with an average depth of around 8 m. At some locations, the water table is recorded as lying at less than 2.5 m below ground surface.

EcOz collected groundwater quality samples in December 2010 from seven exploration drill holes. As these bores are not Environmental Monitoring Bores (EMB's) as is set out in the Minimum Construction Requirements for Water Bores in Australia (Land and Water Biodiversity Committee, 2003) any water quality data can only be used as a guide. The pH of all groundwater samples were acidic with values ranging from 4.8 to 6.78 and the EC ranged from 71 – 434 $\mu\text{S}/\text{cm}$. Metal concentrations were within the Australian Drinking Water Guidelines (ADWG) (health) except for Manganese which triggered the ADWG (health) at four of the seven sites. The remaining three sites triggered the ADWG (aesthetic) guidelines for Manganese.

Ten EMB's have been installed and sampled for water quality. Results are pending.

5.10.2 Potential Impacts

The comparatively low level of third party (non-environmental) development in the Project Area means that groundwater and surface water usage by non-environmental third parties is also relatively low. Additionally, the long distances between communities and stations means that it is unlikely there will be significant issues relating to human groundwater use (domestic or stock related). Any local surface and/or groundwater issues for local users will be dealt with during the planning and EIS studies that will be undertaken during the Project Area's mine development phase.

Regardless of the water source used for mine and process operations, the project mine pits themselves will likely require dewatering in the long term. Shallow groundwater in the project area very likely supports surface water flows through discharge to creeks and rivers, particularly in the dry season. These creeks and rivers in turn support potentially significant ecological systems. Future studies will address potential impacts to Groundwater Dependent Ecosystem's (GDE).

Groundwater contamination may be possible through spillage or seepage from waste rock storage and final voids. Geochemical characterisations of the waste rock is currently being completed however initial assays suggest that the potential for Potential Acid Forming (PAF) material is not present in the waste rock or orebody. Groundwater contamination can also occur from buried waste products such as those found in landfills.

5.10.3 Management and Mitigation

WDRL will develop a comprehensive Water Management Plan (WMP) that will include commitments to water extraction limits, water recovery and recycling, and water use minimisation. It will also outline how environmental issues associated with surface and groundwater at the mine site will be managed along with monitoring, setting performance measures, and reporting. WDRL has is currently planning the drilling of EMB's to be schedule in for the 2011 drilling season. This will be done in consultation with a qualified hydrogeologist.

During the planning stage of the development, water saving strategies will be investigated and implemented where practicable. Current investigation is looking into a water return system to recycle water extracted from the concentrate so it can be reused through the process plant to be. Similar investigations will continue across all facets of the operation to enable the most appropriate systems and infrastructure to be implemented and installed.

Additional strategies to mitigate and manage impacts associated with a reduction in groundwater quality and quantity include;

- Use of sustainable extraction rates
- Establish a baseline groundwater monitoring program
- Appropriate bunding and management of wastes and chemicals
- Appropriate design and construction of waste rock storage areas
- All listed wastes to be disposed of site by licensed contractor and only inert waste to be buried within the landfill

5.11 Surface Water

5.11.1 Existing Environment

The Northern Territory is broken into four drainage basins (Figure 5.9) which are categorised by the particular sea (or inland area) to which the rivers flow. Each drainage division contains numerous river basins, otherwise known as surface water catchment areas. There are thirty five surface water catchment areas in the NT (Figure 5.9).

The project area lies in the Gulf of Carpentaria Drainage Basin which comprises 12 surface water catchment areas. The project area lies within the Towns River Catchment which covers an area of 5,432km², the third smallest in the Gulf of Carpentaria (Faulks, 2001). There are three main rivers within the Towns River Catchment which include; the Yumanji (Little Towns River), Towns River, Magaranyi River and all their tributaries. These rivers meander across the landscape in a north easterly direction before draining into the Gulf of Carpentaria.

The rivers in the Towns River Catchment dry up in the Dry season however the rivers do retain permanent waterholes and billabongs along sections of the rivers. Figure 5.10 shows the project area as it exists in the Towns River catchment and the rivers that flow through it.

WDRL began a surface water monitoring program in December 2010. Nine monitoring locations were sampled with two sites upstream and seven within the zone of influence. One additional site downstream of the disturbance zone has been identified and will be included future monitoring programs. The pH ranged from 6.65 to 8.01 with electrical conductivity (EC) ranging from 31- 128 µS/cm. All sites recorded metals within the ANZECC guidelines for 80% protection level while only three sites triggered the ANZECC guidelines for copper (95%.protection level).

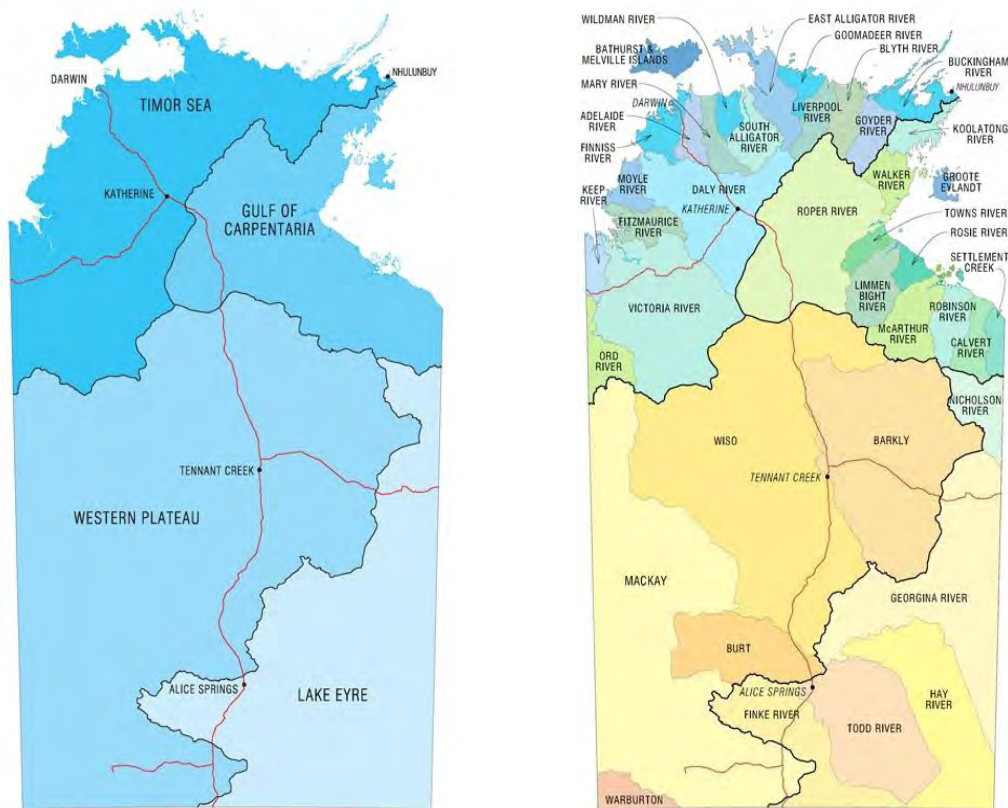


Figure 5.9 Northern Territory Drainage Basins and Surface Water Catchment Areas
(NRETAS, 2011)



Figure 5.10 Mining Project Area and the Towns River Catchment

5.11.2 Potential Impacts

Due to the vicinity of the proposed development to the river, erosion and sedimentation will be the highest risk issue related to surface water. Changes to surface water hydrology and drawdown from aquifers also have potential to negatively impact the existing environment.

There is potential for contaminants in surface water runoff from poorly managed hydrocarbons and chemicals materials.

5.11.3 Management and Mitigation

The following migration techniques will be employed to protect surface water quality.

- Drainage structures will be designed and built to minimise disturbance to existing surface water drainage
- Obtain a Permit to Construct or Alter Works for all activities that will interfere with waterways
- Riparian vegetation buffers to be retained along water courses.
- Progressive rehabilitation to be implemented to minimise exposed areas and to minimise erosion
- Store all potential contaminants in bunded areas
- Continue surface water sampling to monitor the health of waterways

5.12 Noise and Vibration

5.12.1 Existing Environment

The existing noise levels of the project area are considered typical of a remote rural area with low ambient noise levels. The main population centre is the aboriginal community of Ngukurr, with a population of about 900, however there are two Aboriginal Family Outstations within approximately 40km of the project area. In addition there is a designated camping facility at the Towns River on Nathan River Road located approximately 15km from the project area.

5.12.2 Potential Impacts

Sources of potential noise and vibration with potential to impact ambient levels include blasting activities, excavations, plant operations, power generation, heavy vehicle operation and movement. This increase in ambient levels has potential to impact fauna species that frequent or inhabit the area (such as bats and birds).

5.12.3 Management and Mitigation

To reduce the impact of increases in noise and vibration the following measurements will be put in place.

- Installing standard noise abatement devices (e.g. mufflers) on machinery and vehicles and servicing machinery and vehicles regularly
- Restrict blasting activities to day light hours

5.13 Aboriginal Sacred Site and Heritage Site Clearance

5.13.1 Existing Environment

The area encompassing the iron ore deposits is subject to the *Native Title Act 1993*. The National Native Title Tribunal found in favour of the Wandaring, Alawa, Marra and Ngalakan peoples in 2000 in Determination NTD6001/97. This simplifies development process as the Determination process has already identified people who have an interest in the land. There is no right of veto over works on this land.

A search of the Aboriginal Areas Protection Authority (AAPA) Database identified a variety of sites and listing levels in and around the proposed mining area. (**Figure 4.2**). Liaisons with Traditional Custodians will ensure that no sites of importance are impacted and a full AAPA authority certificate will be sought.

Three Aboriginal communities, Nugkurr, the Roper River & Minyerri communities are located within proximity to the exploration leases and project area. The project area tenements that are on Native Title Land have been granted by the Northern Territory Government in accordance with the Native Title procedures and requirements.

The Project site also contains archaeologically sensitive features such as creek flats, exposed ridgelines and rocky overhang areas. All of these features increase the potential for previously unrecorded aboriginal sites or artifacts to exist in the Project area.

Aboriginal Heritage and archaeological surveys are currently underway within the Project area. Within a predefined process with the Northern Land Council (NLC) regular consultation with traditional land owners regarding heritage surveys and Project development is ongoing.

5.13.2 Potential Impacts

Sites of indigenous or cultural heritage significance may exist in the area. Disturbance or destruction to these sites during construction and operations exist without the appropriate control measures.

5.13.3 Management and Mitigation

WDRL is seeking Aboriginal Areas Protection Authority (AAPA) sacred sites or other sensitive areas clearance within the province. The maps show there are no significant sites that will impact on exploration or development of the deposits.

5.14 Socio-economic Environment

In this region the prevalent industry is pastoralism, with Flying Fox, Big River, Mount McMinn & Namul Namul station to the north east, and Lorella, McArthur River and the old Nathan River Station to the South of the proposal. The proposed haul road will traverse the Nathan River, Lorella, and McArthur River Leases.

There are several Aboriginal Land Trusts around the project site including:

1. Arnhem Land Aboriginal Land Trust
2. Urapunga Aboriginal Land Trust
3. Yutpundji-Djindiwirritj Aboriginal Land Trust
4. Marra Aboriginal Land Trust
5. Alawa 1 Aboriginal Land Trust
6. Alawa Aboriginal Land Trust

A significant proportion of the population in this region is indigenous with many small communities, family outstations and aboriginal lands including Garawa, Alawa, Hodgson Downs, Yutpundji Djindiwirritj, Narwinbi, Beswick and Arnhem Land. Settlements in the bioregion include Ngukurr, an Aboriginal settlement, and Borroloola. The McArthur River Mine is also located in this region and provides employment opportunities and economic interest.

Tourism is a growing industry in the region, based on the area's spectacular scenery. The region is also popular for fishing in the rivers that flow into the Gulf of Carpentaria.

5.15 Stakeholder Consultation

Western Desert Resources have and continue to actively consult regarding the project with all affected Native Title Holders since June 2009. During that time we have held a significant number of meetings at all communities in the region.

They have also maintained a continuous dialogue with the Northern Land Council as the representatives of native Title Holders.

During 2011 Western Desert Resources employed 2 indigenous personal to work in the areas of Indigenous Liaison and Cultural and Heritage Advisor.

They also maintain a significant percentage of indigenous personal as part of their exploration work force, people sourced from local communities.

To date all consultation has gone very well and they expect to finalise documentation regarding a mining and compensation agreement with the Northern land Council in the near future.

6 Legislative Requirements

6.1 Commonwealth Legislation

6.1.1 *Environmental Protection and Biodiversity Conservation Act*

Assessment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is required for actions that are likely to have a significant impact on a matter of national environmental significance, or on the environment in general by Commonwealth agencies, or on Commonwealth land.

The matters of national environmental significance are:

- World Heritage properties;
- National Heritage places;
- Wetlands of international importance (Ramsar wetlands);
- Threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas;
- The Great Barrier Reef Marine Park; and
- Nuclear actions (including uranium mines).

The Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) administer the Act and have established a formal referral and assessment process. If SEWPaC determines a project will likely significantly impact a matter of national significance it is declared a “controlled action” and is required to undergo assessment and approval under the *EPBC Act*. In the Northern Territory this will be through the bilateral agreement between the Northern Territory and Australian governments. If the project is not a controlled action, assessment will proceed under the Northern Territory legislative approvals process.

Some threatened species potentially occur within the mining lease and haul road areas; however it is unlikely that the project mining would have significant negative impacts. This project has been referred to the EPBC act.

6.1.2 *Native Title Act*

The *Native Title Act 1993* provides legal recognition of the rights and interests of the Aboriginal people over land and water possessed under their traditional laws and customs. The Act sets out basic principles regarding native title in Australia and establishes a regulating and governing body, the National Native Title Tribunal.

The Act also sets out processes by which native title rights are established, protected and compensation determined. Another important function of the Act is through facilitating Indigenous Land Use Agreements (ILUA's) between native title parties and other interest holders.

The area encompassing the iron ore deposits is subject to the *Native Title Act 1993*. The National Native Title Tribunal found in favour of the Wandaring, Alawa, Marra and Ngalakan peoples in 2000 in Determination NTD6001/97. This simplifies development process as the Determination process has already identified people who have an interest in the land. There is no right of veto over works on this land.

Three Aboriginal communities, Nugkurr, the Roper River & Minyerri communities are located within proximity to the exploration leases and project area. The project area tenements that are on Native Title Land have been granted by the Northern Territory Government in accordance with the Native Title procedures and requirements.

6.1.3 *Aboriginal Land Rights (Northern Territory) Act 1976*

The *Aboriginal Land Rights (Northern Territory) Act 1976* provides for the granting of inalienable freehold title to traditional Aboriginal owners of land in the Northern Territory, the establishment of Land Councils, and the establishment and management of Land Trusts to hold the Aboriginal land for the benefit of traditional owners of the land. The Act also regulates exploration and mining on Aboriginal land and sets out the processes to be followed when negotiating with Traditional Owners (TO's) for access to and leases over Aboriginal land. An exploration license cannot be granted in relation to Aboriginal land without the consent of the relevant Land Council (for the traditional owners) and the Minister. A mineral lease cannot be granted unless an agreement has been entered into under the Act.

6.2 Northern Territory Legislation

Environmental permitting of mining activities is regulated in the NT by both the *Mining Management Act 2001* and the *Environmental Assessment Act 1994*.

A decision on the appropriate permitting route for new mining proposals in the NT is initiated by the proponent's submission of an NOI (i.e. this document) to the NT Government through the Minerals and Energy Referral Assessment branch of the Department of Resources (DoR). If assessment under the *Environmental Assessment Act* is thought to be required, the NOI is referred to the Minister for Natural Resources, Environment and Heritage through NRETAS for determination of the appropriate level of assessment.

Following completion of the assessment and approval process under the *Environmental Assessment Act* the Environment Minister provides a recommendation to the Resources Minister who then uses that information to approve or not approve the project.

6.2.1 *Environmental Assessment Act 1994*

The Environmental Assessment Act and the Environmental Assessment Administrative Procedures establish the framework for the assessment of potential or anticipated environmental impacts of development, and provide for protection of the environment. The NT Minister for Natural Resources, Environment and Heritage is responsible for administering the Act. The Minister also determines the appropriate level of assessment for new developments or material changes to existing operations, based on the sensitivity of the local environment, the scale of the proposal and its potential impact upon the environment.

This NOI is informing the administrators of the *Environmental Assessment Act* of the proposed activity so that a determination as to the level of assessment required to properly assess the potential impacts of the project can be addressed and therefore the project can be appropriately assessed.

6.2.2 *Northern Territory Aboriginal Sacred Sites Act*

The *Northern Territory Aboriginal Sacred Sites Act 1989* recognises the need to preserve and enhance Aboriginal cultural tradition in relation to certain land in the NT and Aboriginal self-determination. The Act provides for the protection and registration of sacred sites by the traditional owners of the sacred sites or the custodians who have the responsibility for protecting a sacred site in accordance with Aboriginal tradition.

The Aboriginal Areas Protection Authority (AAPA) is responsible for administering the Act and records and maintains a sacred sites register. Custodians may apply to the AAPA to have a sacred site included in the Register and may also include, amongst other things, restrictions on activities that may be carried out on or in the vicinity of the sacred site.

Unauthorised entry on to a sacred site is an offence under the Act and penalties are prescribed accordingly. A person or entity may apply to the Authority to issue an Authority Certificate to allow a person or entity to undertake work on or in the vicinity of a sacred site. Again, unauthorised entry to undertake work on or in the vicinity of a sacred site is an offence under the Act and penalties are prescribed.

The Minister may issue a Minister's Certificate for work to be undertaken on or near a sacred site when an Authority Certificate has not been issued. Whilst a Minister's Certificate has the same effect as an Authority Certificate, in the event of variance the Authority Certificate will have no force or effect.

The Act provides for the preservation of proprietary rights of owners of land comprised in a sacred site. Proprietary owners may enter and remain on that land and do anything on that land for the normal enjoyment of that owner's proprietary interest in the land.

6.3 The Mining Act and Mining Management Act

The *Mining Act 1980* and the *Mining Management Act 2001* are the principal legislation for the regulation of mining proposals in the Northern Territory, both of which are administered by DoR.

The *Mining Act* establishes the framework within which activities to explore for and mine mineral resources can occur. The Act sets out the administrative processes for authorising these activities through the granting of a title.

Prior to any activities taking place on a granted Mineral Lease, an authorisation to carry out mining activities under the *Mining Management Act* must be obtained. The objectives of the *Mining Management Act* are to ensure that the development of mineral resources is in accordance with the best practice health, safety and environmental standards and to protect the environment and health and safety of all persons on mining sites.

Under the *Mining Management Act*, an application for an authorisation to carry out mining activities must be accompanied by a Mine Management Plan (MMP). A MMP includes information relating to the description of mining activities, the management system to be implemented for the management of health, safety and environmental aspects, costing of closure activities and particulars of organisational structure. Plans of any existing or proposed mine workings and infrastructure must also be included. The MMP is required to be reviewed at intervals specified in the authorisation to carry out mining activities.

The Company will operate under an approved Mine Management Plan.

6.4 Territory Parks and Wildlife Act

The Act is administered by the Parks and Wildlife Services division of NRETAS and makes provision for and in relation to the establishment of Territory Parks and other Parks and Reserves and the study, protection, conservation and sustainable utilisation of wildlife.

Reserved Area status does not generally preclude mining and exploration activity, however mining proposals within various parks or reserves is only permitted under strict conditions and where the proposed activity does not significantly impact on the purpose for which the park or reserve was created. A permit system is in place to assist the Northern Territory Parks and Wildlife Service to monitor and manage our native flora and fauna and to protect them against potential damage. Permits are required for conducting, camping, filming, driving off road, scuba-diving, fishing and much more. All commercial activities and disturbance to natural features and use of certain substances are some of the activities that required to be permitted if they are being conducted within a Protected Area. These permits are known as By-Laws and are governed under the *Territory Parks and Wildlife Conservation Act 2006* and the *Territory Parks and Wildlife Conservation By-Laws*.

The Company will not be conducting any mining within a Reserve Area. The proposed Limmen National Park is located approximately 70km northwest of the proposal area.

6.4.1 Water Act

The *Water Act 1992* is administered by the Water Resources Branch of NRETAS and provides for the investigation, allocation, use, control, protection and management of surface water and groundwater resources, as well as the administrative process for licensing these activities. The Act allows the enforceable allocation of water to various declared beneficial uses including; agriculture, aquaculture, public water supply, riparian and industry, while ensuring that adequate provisions are made to maintain cultural and environmental requirements.

Water Control Districts are declared in areas where it is recognised that increasing development and demand for water have the potential to cause degradation to water quality and reduce flows required to maintain water dependent ecosystems in the region. The Mining Project Area is located within the Daly Roper Water Control District (DRWCD).

Beneficial Uses (water values) is a legislated process to assist in the protection and management of water resources. The community decides how a particular water body can be used by identifying what values they place on that water body such as public water supply, industry or agriculture. Once a Beneficial Use has been legislated water allocation plans may be implemented.

6.4.2 Other Relevant Legislation

Other Northern Territory legislation relevant to the project includes the following acts and their associated amendments and regulations:

- *Aboriginal Land Act 2004;*
- *Bushfires Act 1980;*
- *Control of Roads Act 2011;*
- *Crown Lands Act NT 2009;*
- *Dangerous Goods Act 1998;*
- *Dangerous Goods (Road and Rail Transport) Act 2011;*
- *Environmental Offences and Penalties Act 1996;*
- *Heritage Conservation Act 2008;*
- *Miscellaneous Acts Amendment (Aboriginal Community Living Areas) Act 2000;*
- *Planning Act 1989;*
- *Public Health Act 1952;*
- *Soil Conservation and Land Utilisation Act 2009;*
- *Traffic Act 2011;*
- *Waste Management and Pollution Control Act 1998;*
- *Water Supply and Sewage Act 1983;*
- *Weeds Management Act 2001;* and
- *Workplace Health and Safety Act 2001.*

7 Environmental Management

7.1 Environmental Management Plans

Management commitments will be developed and finalised throughout Project planning and through the development of the Project EMP and Mine Management Plan (MMP).

A central component of the Project EMP is to identify those activities that may have a significant risk to the natural environment and develop management strategies to:

- Completely avoid the impact if possible;
- Substitute with a lesser impact;
- Design rehabilitation and engineering solutions to reduce the degree and risk of impact; and
- Design operational controls and emergency response around reduction of impact.

In assessing the significance of environmental impacts potentially resulting from this proposal, the Company will consider relevant legislation, standards and guidelines; biological assessments of the Project area and input from government and stakeholders.

A risk-based Project EMP will be developed for the project to:

- Document project commitments;
- Document potential impacts, management measures, and key performance indicators, monitoring and reporting requirements;
- Document conditions of approval resulting from the environmental approval process; and
- Provide the basis for the development of environmental guidelines and work procedures to be prepared by the construction contractor.

The Project EMP will include objectives and management strategies that address:

- Surface Water Management;
- Groundwater Management;
- Vegetation and Flora Management;
- Fauna Management;
- Dust Management;
- Greenhouse Gas Emissions Management;
- Weed Management;
- Fire Management;
- Hydrocarbon and Chemical Management;
- Aboriginal Heritage Management;
- Rehabilitation Planning and Management;
- Topsoil Management; and
- Closure Planning

Component Environmental Management Plans that may be developed are:

- Cultural Heritage;
- Air Quality and Noise ;
- Life of Mine Tailings;
- Terrestrial Ecology;
- Aquatic Ecology;
- Social Impact;

- Life of Mine Waste Management;
- Greenhouse Gas Management;
- Water management – surface, storm and ground; and
- Rehabilitation and decommissioning.

7.2 EMP Implementation

Information contained within the EMP will be dispersed to personnel to ensure that each employee understands their role in ensuring that the Company conducts operations in an environmentally sound manner.

The objectives of communicating environmental issues include:

- Provides access to information for all Company employees;
- Ensures that employees are aware of, and understand, their accountabilities for environmental management;
- Facilitates internal auditing and reporting;
- Enables regulatory reporting;
- Encouraging employee involvement in continuously improving environmental systems and procedures;
- Providing information on the Company's environmental performance to the broader community; and
- Addressing environmental concerns of local communities.

Communication on environmental issues can take on many forms with a variety of audiences. Various methods of communication will be pursued both internally and externally. In addition to this, new employees will undergo an induction which will include detail on the Company's environmental systems and procedures. Management plans will be made available to the public.

Elements of the EMP will be continuously updated to incorporate further information, new techniques and relevant legislative requirements and adaptations resulting from monitoring results. Implementation strategies will be directed to achieving the performance criteria set out in the EMP and any statutory requirements.

7.3 Environmental Monitoring

Monitoring of environmental changes is a crucial part of an environmental management system. Monitoring should focus on threats, pressures and opportunities. The Company will develop an environmental monitoring program, as part of the EMP, and will include:

- Identification and monitoring of trends and threats;
- Identification and monitoring of potential long term impacts/patterns;
- Identification and exploration of emerging opportunities;
- Monitoring of both direct and indirect impacts;
- Strategies for assessing and measuring effectiveness of policies and/or projects; and
- Provision for updating policies, plans, strategies and projects.

If monitoring indicates that the desired level of protection is not being met, improved techniques or management methods will be initiated to guarantee the standard of protection expected by stakeholders and the general public.

8 Stakeholder Consultation

8.1 Stakeholders

Stakeholders are parties with an interest in the project who can potentially influence, or are influenced by its development. The Company will undertake continuous community consultation based on open sharing of information with all stakeholders and communities, this may include discussions around the following potential issues:

- Flora and fauna;
- Employment opportunities;
- Cultural impacts;
- Greenhouse gas emissions;
- Waste dumps and tailings dams; and
- Groundwater impacts.

Community consultation and outcomes will focus on raising awareness of the project, future employment and contracting opportunities that might exist, and developing an engagement and participation strategy.

The following (Table 8.1) is an indicative list of potential stakeholders for the proposal.

Table 8.1 Potential Stakeholders

| Interest Group | Stakeholder Name |
|-------------------------------|--|
| Northern Territory Government | Minister for Natural Resources, Environment The Arts and Sport |
| | Minister for Resources |
| | Roper Gulf Shire Council |
| | Department of Lands and Planning |
| | Department of Construction and Infrastructure |
| | Power and Water Corporation |
| | Aboriginal Areas and Protection Authority |
| | Environmental Protection Authority |
| Australian Government | Dept of Sustainability, Environment, Water, Population and Community |
| | Federal Environment Minister |
| | Dept of Families, Housing, Community Services and Indigenous Affairs |
| Indigenous Groups | Northern Land Council |
| | Traditional Owners |
| Local Community | Pastoral Property Owners or operators |
| | Other Landholders |
| | Residents |
| | Recreational fishermen |
| Non-government Organisations | Environment Centre NT |
| | Amateur Fisherman's Association of the Northern Territory |
| Media | Local, regional, NT and national |
| Industry | Minerals Council of Australia |
| | The Australian Institute of Mining and Metallurgy |
| | Northern Territory Industry Capability Network |
| | NT Chamber of Commerce |

8.2 Timing

The Company has commenced consultation with interested parties and will continue this through the life of the project. Initially consultation will take place at regular intervals (quarterly) and once production commences this will take place on an annual basis. This will enable the Company to make informed decisions that will enhance community consent and support for continued exploration, development, construction and the ongoing operation of the Project. Continual consultation will also facilitate ongoing business and employment opportunities within the community.

9 Acronyms

| | |
|--------|--|
| AAPA | Aboriginal Areas Protection Authority |
| AFANT | Amateur Fishermen's Association of the Northern Territory |
| AMC | Australian Mining Consultants |
| ARD | Acid Rock Drainage |
| BOM | Bureau of Meteorology |
| BUD | Beneficial Use Declaration |
| DFS | Definitive Feasibility Study |
| DMA | decision-making authorities |
| DoR | Department of Resources |
| DRWCD | Daly Roper Water Control District |
| EMP | Environmental Management Plan |
| FIFO | Fly In Fly Out |
| HPGR | high pressure grinding roll |
| ILUA | Indigenous Land Use Agreements |
| JORC | Joint Ore Reserves Committee Code - Australasian Code for Reporting of Identified Mineral Resources and Ore Reserves |
| ML | Mining Lease |
| MMP | Mine Management Plan |
| NADL | North Australian Diamonds Ltd |
| NGO | non-government agencies |
| NRETAS | Department of Natural Resources, Environment, The Arts and Sport |
| NT | Northern Territory |
| ROM | Run of Mine |
| SEWPAC | Department of the Sustainability, Environment, Water, Population and Communities |
| SOCS | Site of Conservation Significance |
| TDS | Total Dissolved Salts |
| TSF | Tailings Storage Facility |
| WONS | Weed of National Significance |

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