Australian Ilmenite Resources
Public Environmental Report (PER)
Volume One: Main Report

SILL80 Project, Mining Lease Application 27422
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Executive Summary

Australian Ilmenite Resources Pty Ltd (AIR) proposes to develop its SILL80 Ilmenite Project, within Mining Lease Application MLA27422, located on Numul Numul Station in the Roper River Region of the Northern Territory, approximately 105 km east of Mataranka Township and 3km south of the Roper Highway.

A Notice of Intent (NOI) was submitted to the Northern Territory Minister for Natural Resources, Environment and Heritage (the Minister); who has determined that this proposal requires formal assessment under the NT Environmental Assessment Act 1982 (EA Act) at the level of a Public Environmental Report (PER). The Minister has provided Guidelines for the Preparation of a Public Environmental Report, SILL80 Project, Roper River area, NT (hereafter called Guidelines) (see Appendix A).

Three major key risks were identified in relation to this project:

1. Extraction of water from the Roper River used for processing ore;
2. Effectiveness of the proposed rehabilitation over large areas
3. Potential impacts to threatened species

This PER is the information provided so as to allow a formal assessment under the NT Environmental Assessment Act 1982 (EA Act) at the request of the Northern Territory Minister for Natural Resources, Environment and Heritage (the Minister). The PER will provide the Minister with the required information to make informed recommendations to the Responsible Minister/relevant consent authority in accordance with the EA Act.

Specifically, this PER has been developed to examine the environmental impact the proposed development will have on the environment.

LEGISLATIVE BACKGROUND

This development must operate within a range of legislation including that related to environmental, cultural and mining legislation at the Federal and Northern Territory legislation. A summary of the relevant legislation is given in Section 3. Most relevant, for this document, are the Commonwealth’s Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and the Native Titles Act 1993 and the Northern Territory’s Environmental Assessment Act, Water Act, Territory Parks and Wildlife Conservation Act, and Pastoral Land Act.

PROJECT ALTERNATIVES

Alternatives to the proposed development were considered. The SILL80 site was selected due to the resource richness, transportation access and water resources. Alternative water resources were explored and are discussed within this report. A no development option would result in the land continuing to be used as a pastoral enterprise but with a lost opportunity for employment and economic development for the traditional owners of the land.

PROJECT DESCRIPTION

The development plans to extract 100,000 tonnes of ilmenite concentrate per annum and increase to 200,000 tonnes per annum within 3 years.

Operations will utilise strip mining, excavating to a maximum depth of 4m (300m long and 200m wide). Strips will be developed in a campaign mining style. Ore will be processed through a series of wash trommels to create concentrated ilmenite which will be transported to Port Darwin via truck. Regolith material will be returned to the mining pit. Once regolith material has been returned, the pit will be fenced and revegetated with improved pasture grasses and be progressively grazed under the management of Numul Numul Station.
Water for processing will be sourced from the Roper River. A pump will move water to Numul Numul Station where it will be held in existing dams. Water will then be transferred from the holding dams to MLA27422 as required.

Vehicles will access the mine from a road to be constructed from the Roper Highway to MLA27422 through Numul Numul station.

It is envisaged that this project will employ up to ten staff. Of these, three positions will be made available to local indigenous persons.

PROJECT OUTLINE

Testing of the processing plant using a representative bulk sample excavated from the site is scheduled for March/April 2012 and production is scheduled to commence in mid-2012 pending environmental, legislative, and traditional owner approvals.

RISK ASSESSMENT

A preliminary risk assessment, focussing on environmental risks, was completed in accordance with the existing Australian Standard AS/NZS ISO 31000:2009 Risk Management.

A combination of physical and procedural measures will be applied to the project and its activities to either eliminate threats or to reduce and manage them in order to ensure that appropriate safety standards are maintained.

ENVIRONMENTAL MANAGEMENT

A Draft Environmental Management Plan (EMP) incorporating the findings of this PER (Appendix L) has been prepared specifically for the SILL80 project. A Mining Management Plan (MMP) will be developed incorporating detail from the EMP. The Mining Management Plan (MMP) will be the principal guiding document in relation to environmental management for the Project. Informing the EMP, and attached as Appendices to the PER are:

(i) A Flora and Fauna Report that reports on a terrestrial biological desktop and field survey of the ML and identifies the threatened species that may be found on the lease. This appendix concludes that there are no significant impacts to any threatened species.

(ii) An Aquatic Fauna Report which reports on an aquatic vertebrate desktop and field survey of the Roper River (focused on the extraction pool); it is considered unlikely that the water extraction operation will significantly affect the aquatic fauna or flora of the area, or the environmental values of the Roper River.

(iii) A Social and Cultural Aspects Report that considers cumulative impacts and identified likely social impacts on stakeholders and the wider community caused by the establishment of the SILL80 Ilmenite Project and outlines mitigation and management of these impacts.

(iv) An Archaeology Report that outlines a cultural heritage survey performed with the traditional owners of the area.

(v) A Radiation Assessment Report that looks at the radioactive components of the resource and outlines some future survey obligations.

(vi) A Water Management Plan that, in concert with the PER main report, describes the procedures and processes for ensuring sustainable extraction from the Roper River.

(vii) An Erosion and Sediment Control Plan which outlines the strategies for ensuring mining activity does not cause erosion or sedimentation within the mining lease and associated infrastructure areas.

(viii) A Weed Management Plan describing the current weed situation, mitigation strategies and ongoing commitments for management and reporting with particular emphasis on weeds of national significance.
(ix) A Biting Insect Management Plan that describes the likely habitat opportunities presented at mining sites, recognition of outbreak of disease and management and reporting commitments.

(x) A Rehabilitation Management Plan describing the strategy to progressively rehabilitate the mining areas to instate land with increased productivity and health by creating a perennial grass rangeland for cattle grazing by using intensive stock management practices in close partnership with pastoral lease managers.

(xi) An Environmental Management Plan outlining all risks identified as being associated with this proposal and their mitigation, management and related commitments.

MANAGEMENT OF KEY RISKS

Water

Water for the SILL80 Project will be sourced from the Roper River, pumped via a pipeline 12 km south to the processing site. Under the Water Act of the Northern Territory, 1992, mining operations are exempt from licensing for consumptive use. The NT Water Allocation Planning Framework nominates that at least 80% of flow at any one time in any part of a river is allocated as water for environmental and other public beneficial water provision. It also nominates that extraction for consumptive uses will not exceed the threshold level of 20% of instantaneous flow at any time in any part of the river. For this development it is assumed that extracting less than 20% of instantaneous flow will achieve this plan’s objectives. In lieu of a surface water license a Water Management Plan for the AIR’s SILL80 Project provides the necessary information and framework to ensure AIR’s operations cause minimal disruption to the environment and other users (Appendix G). This WMP has been developed to minimise impacts on the environment and downstream water users by ensuring extraction from the Roper River for AIR’s SILL80 project does not exceed the threshold level of 20% of instantaneous flow. AIR will perform daily monitoring of water flow within the Roper River to ensure that operations do not exceed this threshold.

Rehabilitation

Current land managers, in consultation with traditional owners, suggested the rehabilitation program focus on instating pasture species in disturbed areas post mining works.

Mined areas will be rehabilitated in a co-ordinated program between AIR staff and station managers in order to develop the area as a perennial grass rangeland for cattle grazing. As a perennial grass rangeland develops, the area will by grazed systematically. Native grasses, small shrubs and trees will also be encouraged. Success and failure will be determined through the use of photo monitoring, the presence/absence of weeds, and presence/absence of erosion and sedimentation. In general terms, it is expected that more than 80% perennial groundcover will be achievable and will indicate success.

Threatened Species

Flora and Fauna surveys were conducted within and adjacent to MLA27422. With the fauna trapping program a total of 526 trap nights resulted in 52 captures of 13 species. An additional 27 species were recorded as incidental records. Two recorded species are considered threatened under the TPWC Act: the Australian Bustard (Ardeotis australis) and Mertens’ Water Monitor (Varanus mertensi).

The flora survey recorded 92 species which represented 37% of the recorded plant diversity of the local area, implying low regional plant diversity. There was a large number of introduced plants identified but no conservation significant species were recorded.

It is not considered likely that threatened or migratory species will be affected by this development.
MANAGEMENT OF OTHER RISKS

Transportation
AIR intends to transport concentrated ilmenite to a Darwin warehouse using road trains, prior to shipping to China. The proposed route for the road transport will utilise the Stuart and Roper Highways, and then join a new road, constructed by AIR through Numul Numul Station.

Erosion and Sedimentation
Stormwater will be diverted around the site to prevent mixing with mobilised sediments. All other water will be directed to sedimentation ponds.

Sediment fences or similar structure will be used in areas where high concentrations of sediments are expected, where there is increased erosion potential, and areas that are to be rehabilitated. Suitable drainage structures will be put in place to minimise surface flow and help prevent erosion. AIR will monitor the effectiveness of all erosion control measures and where necessary will implement remediation measures.

The Erosion Sediment Control Plan (Appendix H) will be reviewed periodically to determine success of mitigation and management.

Social and Cultural
Mitigation and management of social and cultural impacts will focus on protection of known archaeological, historical or cultural features and ongoing community consultation.

AIRs principle aim is to ensure that they develop and implement a process for estimating, before development, any social consequences potentially resulting from this proposal and to identify methods for management and mitigation.

Waste and Hazardous Substance Management
Wastes which are likely to be produced from this proposal include processing waste, hazardous substances, and fuel. Other wastes associated with mining operations, such as standard wastes associated with the operation of machinery (e.g. oils and replacement parts), will be minimised and all waste materials collected, contained and removed from the site and disposed of at an approved waste disposal facility.

Management of wastes will be in accordance with the relevant Australian Standards.

Emissions

Radiation
A Radiation Survey and Assessment has been performed and found that the radionuclide activity concentrations in the soils associated with the ilmenite deposit are low. The gamma dose rate over the deposit is also low and is equal to or less then background levels in the area.

Greenhouse Gas Emissions
Greenhouse gas emissions will be emitted over the duration of the SILL80 project. During construction, the main emission source will be the burning of diesel fuel by the mobile equipment required to carry out construction work. Additional emission sources will include diesel generators at the mine site and the pump at the water extraction site.

The nature of this project offers few if any alternatives to the use of diesel for activities such as transportation and power generation. Care has been taken to ensure that the most efficient diesel engines have been selected for use to minimise greenhouse gas emissions.

Biting Insects
A Biting Insect Management Plan has been prepared (Appendix J). Management actions will be incorporated into the development and management of the mine site to prevent mosquito breeding opportunities, reduce the potential for contact between personnel and mosquitoes and detail monitoring and response strategies to severe outbreaks or incidence of disease.
OFFSETS

AIR will consult with Government regulators throughout the design and selection process for offsets. Wherever possible, statements of detriment and of offset benefits will be based on agreed metrics.

AIR will seek to counter-balance damage to environmental assets by at least equivalent improvement in the same type of assets in another location, this will chiefly be achieved through rehabilitation work, designed to improve the overall stocking rate and economic value of the pastoral lease, post mining. Rehabilitating the land in this manner will secure the land in a condition that is maintained in an equivalent or better condition over the long term.

Other indirect offsets will be developed, through consultation with stakeholders, to complement works carried out within the mining lease and/or infrastructure areas, such as supporting research that will contribute to delivery of an offset.

ENVIRONMENTAL MANAGEMENT

A draft EMP has been developed for AIR’s SILL80 project within the Roper River Region of the NT. This EMP is continually referred to as a Draft to allow for this progressive document to be updated as necessary with the aim of achieving best practice environmental management. The EMP will be utilised in the development of a Mining Management Plan (MMP) for the SILL80 project. All management plans detail the monitoring programs and control measures employed to mitigate identified environmental issues. These plans have been developed to be implemented across the entire life of the project from construction to mining and rehabilitation.
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1 Document Map

The Guidelines for the Preparation of Public Environmental Report (see Appendix A) for this development outline numerous requirements. This document map aims to assist readers in locating where each of these requirements have been addressed within the PER. The table’s structure is the same as the Guidelines.

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<td>Provide a list of soil types within MLA27422</td>
<td>Appendix B</td>
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<tr>
<td></td>
<td>Discuss rehabilitation methodologies</td>
<td>Appendix K</td>
</tr>
<tr>
<td></td>
<td>Detail water and fertiliser requirements for rehabilitation</td>
<td>Appendix K</td>
</tr>
<tr>
<td></td>
<td>Indicate whether rehabilitation activities can provide local employment opportunities</td>
<td>Section 6.3.2</td>
</tr>
<tr>
<td>PER Guideline Section</td>
<td>Detail Requested in PER</td>
<td>PER Section / Appendix</td>
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<td></td>
<td>Provide an Erosion and Sediment Control Plan</td>
<td>Appendix H</td>
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<td></td>
<td>Provide a Weed Management Plan</td>
<td>Appendix I</td>
</tr>
<tr>
<td></td>
<td>Discuss review and monitoring to gauge rehabilitation success</td>
<td>Appendix K</td>
</tr>
<tr>
<td></td>
<td>Detail how flora surveys will inform rehabilitation in the case of threatened species</td>
<td>Appendix K</td>
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<tr>
<td></td>
<td>Identify sources of top soil for rehabilitation</td>
<td>Appendix K</td>
</tr>
<tr>
<td>Key Risks: Potential Impacts to Threatened Species pg. 12</td>
<td>Provide results of formal flora and fauna surveys</td>
<td>Section 6.3.3 and Appendix B</td>
</tr>
<tr>
<td></td>
<td>Provide details of threatened species identified through surveys</td>
<td>Section 6.3.3 and Appendix B</td>
</tr>
<tr>
<td></td>
<td>Identify significant vegetation communities, fauna aggregations or colonies</td>
<td>Section 6.3.3 and Appendix B</td>
</tr>
<tr>
<td></td>
<td>Provide assessment of impacts on aquatic vertebrate communities</td>
<td>Section 6.3.3 and Appendix C</td>
</tr>
<tr>
<td>Environmental Management pg.13</td>
<td>Provide management structure and roles in environmental management</td>
<td>Appendix L</td>
</tr>
<tr>
<td></td>
<td>Management targets and objectives for environmental factors</td>
<td>Appendix L</td>
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<td></td>
<td>Proposed measures to minimise adverse impacts</td>
<td>Appendix L</td>
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<td></td>
<td>Performance indicators</td>
<td>Appendix L</td>
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<td></td>
<td>Proposed monitoring programs</td>
<td>Appendix L</td>
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<td></td>
<td>Information on land management if taken out of production</td>
<td>Appendix K</td>
</tr>
<tr>
<td></td>
<td>Summary table detailing commitments made in PER – including timelines</td>
<td>Appendix L</td>
</tr>
<tr>
<td></td>
<td>Provision for periodic review of EMP</td>
<td>Section 8</td>
</tr>
<tr>
<td>Environmental Offsets pg. 14</td>
<td>Identified impacts or detriments that cannot be avoided, reduced or mitigated at reasonable cost.</td>
<td>Section 7.1</td>
</tr>
<tr>
<td></td>
<td>Risks of failure of management actions</td>
<td>Section 7.2</td>
</tr>
</tbody>
</table>
## AIR’s PROJECT COMMITMENTS

<table>
<thead>
<tr>
<th>Subject</th>
<th>Description</th>
<th>Commitment/Safeguard</th>
<th>Section in PER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety and Risk Management</td>
<td>Continual Improvement</td>
<td>A continual improvement approach will be taken for risk management and annual updates to the Mining Management Plan (MMP) that will reflect the latest developments in research and monitoring as well as on-site lessons learned.</td>
<td>Section 6</td>
</tr>
<tr>
<td>Economic Contribution</td>
<td>Employment Opportunities</td>
<td>Appropriate skills-transfer and employment opportunities will be provided throughout the region through the encouragement of local business enterprises, giving preference to a local supply chain, and requiring contractors to provide the same.</td>
<td>Section 5.7</td>
</tr>
<tr>
<td></td>
<td>Local sourcing of goods and services</td>
<td>Goods and services will be sourced from the Northern Territory where possible.</td>
<td>Section 4.4</td>
</tr>
<tr>
<td>Protection of Flora and Fauna</td>
<td>Management</td>
<td>AIR will undertake active weed control.</td>
<td>Section 6.3.3</td>
</tr>
<tr>
<td></td>
<td>Vegetation clearing</td>
<td>Vegetation clearing will be kept to the minimum necessary to accommodate proposed operations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exclusion of fauna species</td>
<td>AIR will erect fences or similar structures to control stock, along with other vertebrate fauna species, from hazardous areas such as the processing area, mine pit and internal roads.</td>
<td>Section 6.4.2</td>
</tr>
<tr>
<td></td>
<td>Invasive species</td>
<td>AIR will build a wash down area so that all vehicles and equipment arriving and leaving the site can be inspected and if necessary washed to reduce the risk of weed spread.</td>
<td>Weed Management Plan (Appendix I)</td>
</tr>
</tbody>
</table>
| Protection of Water Resources | Surface water monitoring                         | AIR will enter a Service Level Agreement with NRETAS to receive flow rate alarm from the Red Rock gauging station as per the Water Management Plan.  
AIR will install a surface water gauge at Judy Crossing.  
AIR will develop tables capable of converting river depth at Judy Crossing into water volume.  
AIR will install and maintain a water flow meter on their pump.  
AIR will to monitor water volume at Judy Crossing and pumping volume and follow procedures detailed in Water Management Plan.  
AIR will cease pumping operations when critical thresholds are crossed as detailed in Water Management Plan.  
AIR will engage an independent auditor to audit water extraction processes and procedures as per the Water Management Plan.  
AIR will complete daily data sheets detailing water consumption and extraction.  
AIR will supply data to independent auditor monthly. | Section 6.3.1 and the Water Management Plan (Appendix G) |
<table>
<thead>
<tr>
<th>Subject</th>
<th>Description</th>
<th>Commitment/Safeguard</th>
<th>Section in PER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erosion and Sediment Control</td>
<td>AIR will follow the existing ECSP AIR will ensure a site specific erosion and sediment control plan prior to mining development in accordance with Northern Territory Governments requirements. AIR will implement recommendations relevant to erosion and sediment control as identified in the annual MMP update.</td>
<td></td>
<td>Section 6.4.2 and the Erosion Sediment Control Plan (Appendix H)</td>
</tr>
<tr>
<td>Social Impact Management</td>
<td>Stakeholder engagement</td>
<td>Regular (as required) consultation with TO and affected land holders. Relevant stakeholder input or concerns will be addressed within the annually updated Mining Management Plan (MMP).</td>
<td>6.4.3 Section 6.4.3 and the Social Cultural Aspects Report (Appendix D)</td>
</tr>
<tr>
<td></td>
<td>Employment and training</td>
<td>AIR will employ three residents of nearby communities and will train appropriately All staff will undergo an induction which includes details on social and cultural impacts and management, ‘cease work’ protocols and access limitations.</td>
<td>Section 5.7</td>
</tr>
<tr>
<td>Erosion and Sediment Control</td>
<td>Sediment dams</td>
<td>Impacted drainage lines will be diverted into a sediment dam to trap any transported sediments. Sediment dams will be designed to accommodate the large rainfall events that are common in the region and monitored and maintained to ensure they remain effective.</td>
<td>Section 6.4.2 and Erosion Sediment Control Plan (Appendix H)</td>
</tr>
<tr>
<td></td>
<td>Road development</td>
<td>All road design will follow the principles and procedures outlined in the ESCP. Erosion and sediment monitoring will be conducted over established roads in the project area in line with the Erosion and Sediment Control Plan.</td>
<td></td>
</tr>
<tr>
<td>Waste and Hazardous Materials</td>
<td>Waste management</td>
<td>AIR will engage a licenced contractor to dispose of all waste material.</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Hazardous materials</td>
<td>All hazardous materials and dangerous goods will be purchased, transported, stored and used in accordance with the relevant Australian Standards, NOHSC guidelines, Work Health (Occupational Health and Safety) Regulations, Dangerous Goods Regulations and Northern Territory guidelines. Specific training for hazardous goods handling will be provided where necessary.</td>
<td>Section 6.4.4</td>
</tr>
<tr>
<td></td>
<td>Fuel storage</td>
<td>Hydrocarbons will be stored in appropriately bunded areas according to Australian standards AS/NZS 1940:1993 and AS/NZS 4452:1997. Bunding will be regularly inspected for damage and repaired as soon as is practicable if any damage is detected. Appropriate licences for storage will be obtained.</td>
<td></td>
</tr>
<tr>
<td>Subject</td>
<td>Description</td>
<td>Commitment/Safeguard</td>
<td>Section in PER</td>
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<tr>
<td><strong>MSDS and Spill Kits</strong></td>
<td></td>
<td>Appropriate management will be initiated if a spill occurs and the contaminated area will be managed appropriately, consistent with Australia standards. Spill clean-up kits and Material Safety Data Sheets will be provided on site and accessible to all staff.</td>
<td></td>
</tr>
<tr>
<td><strong>Radioactive Materials</strong></td>
<td></td>
<td>Once the mining and processing begins AIR will conduct a radiological survey over the stockpile and processing area (see Radiation Assessment Report Appendix F).</td>
<td></td>
</tr>
<tr>
<td><strong>Protection of Historic and Cultural Environment</strong></td>
<td>Restricted areas</td>
<td>Restricted access areas will be developed to protect historical and cultural sites, and to ensure staff and contractor safety.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Whilst on site, workers and visitors will be restricted from accessing culturally sensitive areas. Any inappropriate behaviour will be responded to promptly, and the induction revised if necessary.</td>
<td></td>
</tr>
<tr>
<td><strong>Archaeological sites</strong></td>
<td></td>
<td>Should archaeological material be uncovered during mining activities, work will cease, and the relevant authorities will be informed and consulted in accordance with the Northern Territory Heritage and Conservation Act and the Sacred Sites Act.</td>
<td>Section 6.4.3</td>
</tr>
<tr>
<td><strong>Road and Transport Management</strong></td>
<td>Road maintenance</td>
<td>The access road will be maintained through regular grading and all windrows will be removed. Use of heavy vehicles will be minimised during the wet season, and the condition of road surfaces, tracks and associated drainage will be monitored at least three times a year: leading up to, during, and coming out of the wet season. Further road formation will be undertaken if the roads begin to degrade.</td>
<td>Sections 5.6 &amp; 6.4.3</td>
</tr>
<tr>
<td><strong>Signage</strong></td>
<td></td>
<td>Signage will be placed on the access road regarding appropriate speed and use of the road.</td>
<td></td>
</tr>
<tr>
<td><strong>Road use</strong></td>
<td></td>
<td>Vehicular traffic will be restricted to the proposed vehicle access road.</td>
<td>Section 5.6</td>
</tr>
<tr>
<td><strong>Dust suppression</strong></td>
<td></td>
<td>Dust suppression will be delivered via water trucks.</td>
<td>Section 5.6.1 &amp; 6.4.5.4</td>
</tr>
<tr>
<td><strong>Air Quality and Noise Management</strong></td>
<td>Noise and air pollution</td>
<td>Due to the remote location of the project area, noise mitigation activities will focus on the occupational health and safety of employees. Industry best practice techniques and adherence to the relevant Australian Standards will be used when performing activities likely to create excessive noise or dust.</td>
<td>Section 6.4.5.4</td>
</tr>
<tr>
<td><strong>Greenhouse Gas Emissions</strong></td>
<td>Vehicle emissions</td>
<td>Vehicles will be regularly maintained to minimise the quantity of greenhouse gases being produced by vehicular movement around the mine.</td>
<td>Section 6.4.5.2</td>
</tr>
<tr>
<td>Subject</td>
<td>Description</td>
<td>Commitment/Safeguard</td>
<td>Section in PER</td>
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</tr>
<tr>
<td><strong>Biting Insects Management</strong></td>
<td>Water storage</td>
<td>AIR will minimise mosquito breeding areas in line with Biting Insect Management Plan (BIMP) AIR will manage mosquito breeding sites as per BIMP AIR will minimise contact between personnel and mosquitoes as per BIMP</td>
<td>Section 6.4.6 and the Biting Insect Management Plan (Appendix J)</td>
</tr>
<tr>
<td></td>
<td>Mine site buildings</td>
<td>Will be appropriately screened, and the screens will be inspected annually to ensure they are not damaged. Yellow lights will be used.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitoring</td>
<td>AIR will monitor mosquitoes and potential mosquito habitat as per BIMP</td>
<td></td>
</tr>
<tr>
<td><strong>Decommissioning and Rehabilitation Requirements</strong></td>
<td>Revegetation</td>
<td>AIR will revegetate mined areas with the aim of the land going back to pastoral production as detailed in the Rehabilitation Management Plan and in close consultation with pastoral managers.</td>
<td>Section 6.3.2 and the Rehabilitation Management Plan (Appendix K)</td>
</tr>
<tr>
<td></td>
<td>Weed management</td>
<td>During rehabilitation AIR will identify and control weeds as per Weed Management Plan.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infrastructure</td>
<td>Ongoing consultations with traditional owners and land managers will occur regarding retention, removal, or relocation of infrastructure. Infrastructure that is not to be retained by traditional owners and land managers will be removed and the site subject to rehabilitation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ongoing mosquito control</td>
<td>Upon mine closure, all disturbed areas will be rehabilitated to be free draining where practical, and septic tanks and other artificial receptacles will be removed.</td>
<td>Section 6.4.6</td>
</tr>
<tr>
<td><strong>Environmental Management</strong></td>
<td>Management Plans</td>
<td>All management plans will be updated annually.</td>
<td>Section 8 and the Environmental Management Plan (Appendix L)</td>
</tr>
<tr>
<td></td>
<td>Audits</td>
<td>Annual audits of AIR's performance against the current EMP, commitments stated in this PER, and all relevant and current legislative requirements will be conducted.</td>
<td></td>
</tr>
<tr>
<td><strong>Legislation and Permits</strong></td>
<td>Timing</td>
<td>All applicable legislation will be followed and all applicable licences and permits will be obtained before the relevant aspects of the project commence.</td>
<td>Section 3</td>
</tr>
</tbody>
</table>
2 General Information

2.1 Purpose of this Public Environmental Report

This Public Environmental Report (PER) is the information provided so as to allow a formal assessment under the NT Environmental Assessment Act 1982 (EA Act) at the request of the Northern Territory Minister for Natural Resources, Environment and Heritage (the Minister). The PER will provide the Minister with the required information to make informed recommendations to the Responsible Minister/relevant consent authority in accordance with the EA Act. This PER has been prepared in accordance with the NRETAS Guidelines for the Preparation of a Public Environmental Report, SILL80 Project, Roper River area, NT (NRETAS April 2011, Appendix A).

The key risks identified by the Northern Territory Government in these guidelines, through analysis of the Notice of Intent (NOI) for the SILL80 Project, are:

1. Extraction of water from the Roper River used for processing ore:
   - Average cease to flow occurrences in the Roper River may increase with significant amounts of extraction; and
   - Impacts may be caused downstream from the extraction point to water quality and supply for other users and wildlife.

2. Effectiveness of the proposed rehabilitation over large areas:
   - Identification of suitable revegetation species;
   - Supply and sources of an adequate seed bank or seedlings;
   - Soil erosion and weed management over large areas; and
   - Timing of establishment and water requirements.

3. Potential impacts to threatened species:
   - Annual clearing and strip mining of 13 to 33 ha of native vegetation could impact on local threatened species; and
   - Identifying any listed threatened species, particularly flora, will provide better information for management and rehabilitation.

2.2 Proposal Title

SILL80 Ilmenite Project.

2.3 Name and Address of Proponent

| Proponent: | Australian Ilmenite Resources Pty Ltd |
| Contact:   | Geoff Fanning, Director |
| Main Office: | 8/4 Shepherd Street, Darwin NT 0800 |
| Postal Address: | PO Box 947, Darwin NT 0801 |
| Phone: | 08 8941 3213; Fax: 08 8941 3498 |
| Email: | geofffanning@ilmenite.com.au |
2.4 Land Tenure and Location

2.4.1 Land Tenure

Australian Ilmenite Resources Pty Ltd (AIR) proposes to develop its SILL80 Ilmenite Project, within Mining Lease Application (MLA) 27422, located within the Roper Gulf Shire, Perpetual Pastoral Lease 1161, Land Parcel NT Portion 4970 Chatterhoochee (Namul Namul) (Figure 2-1). The Indigenous Land Corporation (ILC) acquired Numul Numul station in 2000, on behalf of the Traditional Owners (Namul Namul Aboriginal Corporation). The area was sub-leased in 2001 to the O’Brien family who continue to manage the property as a cattle station. The area is under Native Title Claim Chatterhoochee lodged with the Federal Court in 2001 by the Traditional Owners represented by the Northern Land Council (NLC).

![Diagram of AIR SILL80 Project Location](image)

Figure 2-1. Location of Proposal.

2.4.2 Project Location

The property is located in the Roper River Region of the Northern Territory, 8 km south of the Roper Highway. The major townships in the area are Mataranka Township (Population ~ 600) 105km to the West and Ngukurr (Population ~ 1,600) 80km to the East. The proposed mine site is approximately 12km south of the Roper River, 4km south-east of the Kewulyi Aboriginal Community Outstation (old Roper Valley Homestead) and 1km south-west of Numul Numul homestead.

2.5 Resource

The SILL80 Project forms part of AIR’s larger Roper Heavy Minerals Project and arises from exploration results within AIR’s Exploration Leases (EL23048, EL24655, and EL24986), which have now been
amalgamated into Substitute Exploration Licence (SEL28291) indicating a resource of approximately 120 million tonnes at 10% - 25% ilmenite (FeTiO₃). This PER specifically relates to development of the SILL80 Project within MLA27422 and only seeks approval to mine that area.

MLA27422 contains an estimated ilmenite (FeTiO₃) resource of approximately 4.5 million tonnes (non-JORC compliant, as AIR is a Private Company and not required to report to ASIC). Based on this, the mine could have a life well in excess of 20 years dependent on further ore body definition. Details of any mining planned for ore that extends beyond MLA27422 will be submitted separately for assessment if considered desirable.

The ilmenite mineralisation results from the weathering of dolerite sills within the top 3 m of regolith. As such, ilmenite recovery will require strip mining using excavators to remove the regolith to an average depth of 1.2m (maximum 4m). Excavations will progress along 300m x 200m wide strips, allowing for successive rehabilitation of mined strips, which are backfilled with the residual material following extraction of the ilmenite. Only water is used in separating the ilmenite, leaving between 75 – 90% of the original regolith material for infilling mined pits once excavations move to the next strip. Initially, AIR proposes to produce 100,000 tonnes of ilmenite concentrate per annum, requiring the excavation and processing of between 400,000 and 1 million tonnes of regolith per year. Each pit will cover an area of approximately 6ha.

The Roper Heavy Minerals Project, incorporating the SILL80 Project, covers a large area of heavy minerals prospective ground in the Roper River Region of the Northern Territory. Ilmenite mineralisation in the project region results from weathering of dolerite sills close to the surface (within the top 3m of regolith), where ilmenite grains have been liberated from the host rock and lay in-situ. The ilmenite-bearing dolerite sills and their associated deep red-purple-brown, clay-rich soils have been mapped throughout the SILL80 Project area. To date, exploration has focussed on locating and characterising these sills using remotely sensed data (geophysics, satellite imagery, aerial photography), helicopter-supported sampling, GPS-assisted gridding, soil and lag sampling, and hand/mechanical auger drilling. Over 6,000 auger and RC holes have been drilled and in excess of 20,000 samples taken, analysed, and reported to the Department of Resources. MLA27422 within the SILL80 Project area was identified for mine development based on exploration results, ease of access, proximity to existing highways, and the relatively flat topography and sparse vegetation, simplifying mining operations and lowering the risk of environmental impacts. The land is also currently used for cattle grazing, and therefore has been and will continue to be subjected to disturbance.

2.5.1 Project Period

Exploration results within MLA27422 indicate an ilmenite (FeTiO₃) resource of 4.5 million tonnes, which would sustain a mine life in excess of 20 years. Representative samples are being used to further refine ilmenite grade estimates and plan open pit mining operations. They will also be used to test the processing plant to determine specifications and practically test the planned water usage requirements.

Further ore body definition and characterisation will continue within MLA27422 and SEL28291 and future mining will follow the most economic mineralisation. Any mining that extends beyond MLA27422 however, is beyond the scope of this PER and would be submitted as a separate application.

2.5.2 Ilmenite Uses

Ilmenite is a metallic to submetallic mineral that is generally iron black. It is now the most important ore from which titanium is sourced. Titanium is light weight, non-corrosive, able to withstand temperature extremes (melting point, 1800°C) and it has good strength (as strong as steel and twice as strong as aluminium). Titanium alloys have found many applications in high tech airplanes, missiles, space vehicles and even in surgical implants.

Additionally, titanium dioxide TiO₂, is a white pigment that is used more and more in paints as lead paint is discontinued due to health considerations. In fact, the largest percentage (up to 95%) of worldwide use for titanium is for the production of this white pigment. The pigment has great lustre, good endurance, high
opacity and a pure white colour. The pigment is also used to provide colour for rubber, plastics, textiles, ink, cosmetics, leather, ceramics and paper (Mineral Zone 2005).

Extracted ilmenite (FeTiO$_3$) from MLA27422 is to be shipped to China where it will be used to produce titanium dioxide (TiO$_2$), an important base pigment in paint, paper, and plastics. Market demand for titanium dioxide is growing rapidly in China and further processing will occur to produce Synthetic Rutile or Titanium Sponge.

2.6 Related Proposals

Western Desert Resources Limited and Sherwin Iron Limited are both currently in the process of developing Iron Ore projects in the Roper River Region. The Western Desert Iron Ore project is situated approximately 80km south east of the Roper Bar. An Environmental Impact Statement concerning the development is currently underway with Iron Ore exports predicted for 2014.

Sherwin Iron Limited has targeted production for their Hodgson Downs Iron Ore Project, 40kms to the south west of SILL80, for 2013. The potential development of additional transport options, although possibly beneficial to this project, is beyond the scope of this report and therefore will not be explored in detail.

2.7 Current Status of Proposal

AIR’s SILL80 Ilmenite project is currently awaiting relevant environmental approvals before mine development can progress. A brief outline of the process to date is listed below:

- Ilmenite resource has been explored and defined within AIR’s exploration Licenses EL23048, EL24655 and EL24986;
- Mineral Lease Application (MLA) 27422 & ancillary MLA29042 submitted;
- Northern Land Council consulted on potential issues with proposed development;
- Notice of Intent (NOI) to develop the SILL80 Ilmenite mine project within MLA27422 submitted to the Northern Territory Government and other interested parties;
- AIR amalgamated exploration Licenses EL23048, EL24655 and EL24986 into Substitute Exploration License (SEL) 28291;
- Public Environmental Report (PER) requested to provide information to the Minister of the Environment for this proposal under the Environment Assessment Act 1982; and
- Aboriginal Areas Protection Authority (AAPA) consulted concerning presence of any significant sites within MLA27422 – with results included in this PER.

Simultaneous to the development of the PER the proponent is:

- Purchasing and assembling processing equipment for the mine development;
- Purchasing pumping equipment necessary to deliver water for processing;
- Surveying areas for road construction through Numul Numul Station;
- Preparing for construction of processing shed; and
- Preparing to perform a bulk sample, test excavation pit to analyse ore characteristics and provide grade estimates (to be performed in March/April 2012).

2.8 Consequence of Not Proceeding with Proposal

The primary consequence of not proceeding with this proposal would be lost economic opportunity from the ilmenite resource contained within land currently used for pastoral purposes.
This lost opportunity will impact the Traditional Owners, the pastoral lease holders, the owners of the pastoral lease containing the camp infrastructure, local people and contractors, Mataranka, Katherine and Darwin businesses and councils as well as the proponent.

Impacts might include:

- Loss of royalties for land owners and traditional owners;
- Loss of employment opportunities, particularly for people from the local communities, such as Kewulyi (Roper Valley Homestead), Minyerri, Jilkminggan, Mataranka and Ngukurr;
- Loss of revenue for businesses that might otherwise have the opportunity to supply goods and services to the mine; and
- Loss of a potentially positive legacy for future generations through the provision of the above.
3 Legislative Background

This section identifies the legislation relevant to this development and introduces the aims and intent of the legislation and how these intents have been addressed in this development.

3.1 Commonwealth Legislation

3.1.1 Environment Protection and Biodiversity Conservation Act 1999

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) administers the Act and has 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.

Environments affected by the SILL80 Project include those within the mining and processing plant area, the immediate areas surrounding these operations, and along the road used by mine vehicles and trucks to access the mine. The Roper River section located 12 km north of the mine used for water extraction (Figure 3-1) will also be affected. An EPBC Act Protected Matters Report generated on these locations and the 10 km wide area surrounding them indicates neither the mine site nor the section of Roper River used for water extraction is within or near a site mentioned in the matters of national environmental significance mentioned above.

In regards to nuclear actions, the project does not involve uranium mining. Additionally, the EPBC Act excludes the mining of potentially radioactive mineral sands or rare earths as a nuclear action. Therefore, the project is not considered a nuclear action.

The project is in the vicinity of recorded habitats for nationally listed threatened species and nationally listed migratory and marine species (discussed in 6.3.3). Potential impacts on the overall status of these species are considered minimal, and the terrestrial and aquatic ecology investigations have supported this (Appendices B and C). Therefore this project has not been referred to the EPBC Act.
3.1.2 Native Title Act 1993

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 between native title parties and other interest holders.

Exploration Licence and Mineral Lease applications on Pastoral Lease land in the NT are subject to the Native Title Act. MLA27422 is wholly within Perpetual Pastoral Lease 1161. The Indigenous Land Corporation (ILC) acquired this land in 2000, granting it to the Traditional Owners (Namul Namul Aboriginal Corporation) who currently sub-lease it to the O’Brien family who manage it as a cattle station. The Traditional Owners, represented by the Northern Land Council (NLC), have also lodged a Native Title Claim *Chatterhoochee* with the Federal Court in 2001. All activities associated with the proposal are proceeding under the assumption that Native Title exists.

Australian Ilmenite Resources Pty Limited has instigated a community consultation strategy based on open sharing of information with all stakeholders and communities including the NLC and Northern Territory Government. AIR has developed a stakeholder matrix and consultations with key stakeholders such as Australian and Northern Territory Government departments, land councils, land managers, land owners and traditional owners has been open and ongoing since exploration began in the area.

AIR collaborates with Indigenous communities by identifying and protecting areas of cultural significance while it consults with traditional owners and land councils about the company’s current and planned activities. This ensures that respect and trust occurs both ways with AIR respecting the connections of

Figure 3-1. The Roper River Extraction Point in Relation to MLA27422.
Aboriginal people with their land and sites of significance and the Aboriginal people and their Councils respecting the staff and the work carried out by AIR.

3.1.3 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 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.

MLA27422 is wholly within pastoral lease land, which is owned by the local Aboriginal Traditional Owners but it is not Aboriginal freehold title.

3.2 Northern Territory Legislation

Environmental permitting of mining activities is regulated in the Northern Territory by both the Mining Management Act and the Environmental Assessment Act.

A decision on the appropriate permitting route for new mining proposals in the Northern Territory is initiated by the proponent's submission of a NOI to the Northern Territory 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. This project has been determined as requiring a PER. The Environment and Heritage Division (E&H) prepares Draft Guidelines for a project which is required to be assessed under the Environmental Assessment Act in consultation with relevant advisory bodies. The Draft Guidelines provide advice to the proponent regarding the issues that will need to be addressed in the PER.

Draft guidelines are made available to the public for comment and review for a period of 14 days. At the close of this period, E&H takes into consideration any public comments and advice from relevant advisory bodies and finalises the Guidelines for approval by the Minister for Natural Resources, Environment and Heritage. Once approved, the Minister forwards the final Guidelines to the proponent to prepare the PER. Reports are available to the public as a hard copy at the E&H Division.

Once the proponent receives a copy of the final Guidelines and a direction from the Minister for Natural Resources, Environment and Heritage to prepare a Public Environmental Report (PER), the proponent prepares the PER. There is no statutory timeframe in which the proponent is to prepare the PER unless specified by the Minister.

Once the PER has been prepared it undergoes a maximum public review period of 28 days. During this time, the PER is also circulated to various government advisory bodies for comment in their area of expertise. Invitation for public comment is advertised by the proponent in various media, and copies of the PER are placed on display at NT libraries and other suitable locations as well as the Northern Territory Government website. The proponent also makes copies available for sale.

At the close of the public review period, the Minister has 14 days in which to make a determination about the proposal. This decision is based upon the contents of the PER, issues raised in any comments received and advice from the various advisory bodies. The Minister's determination is included in the Assessment Report which also includes any suggestions or recommendations concerning conditions which should apply to the proposal in order to minimise potential environmental impacts and to protect the environment. The
Assessment Report is forwarded to the approving Minister for consideration (that is, the Minister responsible for approving the proposal).

The Assessment Report is publicly available through the web site. All Assessment Reports are available to the public as a hard copy at the Environment & Heritage Division.

Following completion of the assessment and approval process under the Environmental Assessment Act the DoR proceeds with the approval process under the Mineral Titles Act 2010 and Mining Management Act.

3.2.1 Mineral Titles Act 2010 and Mining Management Act 2011

The Mineral Titles Act 2010 and the Mining Management Act are the principal legislation for the regulation of mining proposals in the Northern Territory, both of which are administered by the DoR.

The Mineral Titles Act 2010 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.

AIR currently holds the Exploration Licences encompassing the proposed mine area (SEL28291, an amalgamation of EL23048, EL24655, and EL24986) and is currently applying for MLA27422.

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 Mining Management Plan (MMP). An 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.

3.2.2 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 Northern Territory 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 PER reports to the administrators of the Environmental Assessment Act and members of the public the potential impacts of the project and demonstrates that the risks have been appropriately addressed.

3.2.3 Water Act 2011

The Water Act is administered by the Water Resources Branch of the 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. Water extraction licences are required for extraction greater than 5 ML/year within a Water Control District however mining activities are exempt from this requirement as well as water extraction for domestic or stock watering purposes. A water control district has been declared for the Daly Roper Region, which includes MLA27422. The project will be exempt from requiring a water extraction licence, however in order to ensure sustainable use of the water resource, and to fulfil Guideline obligations, a Water Management Plan has been developed detailing metering, monitoring and reporting requirements to minimise negative impacts on the environment and other users from the Roper River (Appendix G).

Water allocation plans are developed for specific areas within water control districts, ensuring water is equitably managed. Water allocation planning has commenced for the area around Mataranka, which does not include MLA27422 but however, is relevant to the project since it involves the allocation of groundwater from aquifers that supply important baseflows to the Roper River and the subsequent water users downstream.

In regards to waste disposal licensing, this project is not planning to discharge any waste off the Mineral Lease, if off-lease discharge is required a waste discharge licence will be sought. Waste is defined in the Water Act as any solids, liquids or gas, which, if added to the water, may pollute the water.

3.2.4 Territory Parks and Wildlife Conservation Act 2011
This Act applies statutory obligations in relation to the protection of flora and fauna. This Act allows the listing of threatened species with special conservation status, and requires a permit to be obtained prior to interference with these species.

3.2.5 Pastoral Land Act (NT) 1992
The Pastoral Land Act 1992 (NT) makes provision for the conversion and granting of title to pastoral land as well as the administration, management and conservation of pastoral lands. The objects of the Act are, amongst other things, to provide a form of tenure of Crown land that facilitates the sustainable use of land for pastoral purposes, recognise the right of Aboriginal people to follow traditional pursuits on pastoral land, and provide a procedure to establish Aboriginal Community Living areas on pastoral land.

Pursuant to the terms of the Act a pastoral lease is subject to a reservation in favour of the Aboriginal inhabitants of the NT and of the leased land. It allows for the Aboriginal inhabitants to take and use the water, flora and fauna on the leased land subject to certain restrictions and conditions.

The Act allows for a pastoral lessee, with the consent of the Minister, to sublet part of the leased land for Aboriginal community living purposes to an incorporated body set up for the management of the Aboriginal community. The Act also provides for Aboriginal people to apply to the Minister for an area of land comprised in a pastoral lease to be removed from the pastoral lease and granted to the applicant as freehold land for the purpose of a community living area (this provision is similar to provision repealed in the Crown Lands Act).

AIR has been consulting with both the lease owners and the lease holders. Both stakeholder groups have been kept informed of the proposals progress and plans and have provided valuable feedback as to their rehabilitation desires.

3.2.6 Northern Territory Aboriginal Sacred Sites Act 1989
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.

AIR have made application to AAPA for an authority certificate to perform works in relation to the SILL80 project. Since application, aspects of the project have developed including the location of the proposed access road. An application to amend the certificate to include new developments has been lodged. The initial map of restricted works areas is shown below in (Figure 3-2). Note – pipeline has since been relocated to prevent passage through restricted works areas.
Figure 3-2. Initial AAPA identified restricted works areas in relation to SILL80 Project
3.2.7 Other Relevant Legislation

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

- *Bushfires Act 2009.*
- *Control of Roads Act 2011.*
- *Dangerous Goods (Road and Rail Transport) Act 2010.*
- *Environmental Offences and Penalties Act 2011.*
- *Planning Act 2009.*
- *Soil Conservation and Land Utilisation Act 2009.*
- *Waste Management and Pollution Control Act 2011.*
4 Alternatives

4.1 Site Alternatives

AIR’s SILL80 Project has been selected for development due to the relatively rich Ilmenite deposit, minimal excavation requirements, viable transportation option and necessary water for processing requirements. AIR investigated other potential deposits such as their BUKA and BMC deposits.

MLA27422 occurs wholly within Numul Numul Station, therefore meaning the area is already subject to environmental degradation due to impacts from cattle. Sections of the MLA are within the laneway and cattle mustering area of the property resulting in significant numbers of stock channelling through the area as a result of mustering practices.

4.2 No Development Option

Should the SILL80 project not proceed to development, the land would continue to be utilised for cattle production. Economically, this would mean a lost business opportunity for the traditional owners of the land. Upgrades to existing infrastructure on Numul Numul Station, such as tracks and the airstrip – would not occur. If the SILL80 project was not developed, additional employment opportunities would not be created, which may be particularly significant for local communities in a region that offers few other options/opportunities for employment, and local businesses would lose an opportunity to supply directly or indirectly to the mine (including transportation companies).

4.3 Alternative Locations for Supporting Infrastructure

4.3.1 Processing Plant

The areas immediately adjacent to MLA27422 have been identified for the processing plant and stock pile areas. An application for ancillary MLA29042 has been lodged to include these areas (Figure 5-1). This area will house all relevant supporting infrastructure associated with the mineral processing plant. Some minor disturbances of uncleared land will be required. This location has been nominated as there is no ilmenite within this area and therefore the plant will not require relocation. This allows permanent structures to be developed and potentially utilised by land owners and managers post completion of the SILL80 Project.

4.4 Alternative Sources of Raw Materials for the Project

Raw materials can be separated into those supplied on site – i.e. ore, water and earthen materials for construction and processing, and those purchased and brought to site. Earthen and gravel material will be utilised to construct and maintain the site, roads and airstrip. They will be accessed from benign waste material from the mining activities where suitable, or otherwise from approved gravel pits on site if specific material is required. Environmental and cultural clearances will be sought before any new ground disturbing activities take place.

Water requirements for the site are detailed in chapter 4.6 (alternative water sources) and chapter 5.5 (water infrastructure).

Fuel will be the major product required during mining and processing and fuel purchase and supply arrangements have been made with a Darwin Company. Fresh goods and supplies for the camp will be offered on a competitive basis to the supplier who can provide the most efficient and effective service.
4.5 Alternative Transport Corridors

Transport corridors, alternative options and issues are thoroughly detailed in Chapter 5.6, and the Social and Cultural Aspects report (Appendix D) and will not be repeated here.

4.6 Alternative Water Sources

4.6.1 Groundwater

The Tindall Limestone, Dook Creek dolomitic and other smaller carbonate aquifers maintain dry season river flows in the Roper River, and as such, their water dependant ecosystems. Except for these aquifers, which are located at the far edge of the catchment, and scattered pockets within, the region is generally poor in groundwater. Groundwater resources near MLA27422 are typical for the catchment, comprising fractured and weathered rocks with bores yielding less than 1 L/s. Groundwater is utilised in the area for some stock and domestic supply – however yields are inadequate to meet the water use requirements for AIR’s SILL80 project.

4.6.2 Catchment Dam

The Roper River Region has a significantly high evaporation rate (mean annual rate about 2400 mm), which exceeds annual rainfall, even in particularly wet years.

Roper Bar store, 60km downstream of AIR’s proposed water extraction point, provides the nearest point for which there are rainfall records. Average rainfall is 787.7mm/year with observations ranging from 502.6 – 1133mm/year. This, measured against the average evaporation rate of 2400mm, poses significant losses to water stored in an open dam.

MLA27422 is surrounded by areas of generally flat topography with small intermittent water courses which flow only during periods of significant rainfall. The black and red soils present throughout Numul Numul station are porous and display poor water retention abilities. The topography of the area and surface water resources available are not conducive for construction of a catchment dam – particularly due to the low level of ground fall and high evaporation rates. For a catchment dam to meet the needs of AIR’s proposed operations, significantly greater volumes of water would need to be stored, than required for processing, to compensate for evaporation and transpiration losses. The high levels of evaporation coupled with the variation in seasonal rainfall observed in the Roper River catchment renders open earthen catchment dams to be an un-reliable water source for AIR’s ilmenite processing requirements.

4.7 Alternative Environmental Management Techniques

The evolving mine decommissioning and closure plan will research and possibly trial several different surface stabilisation and erosion prevention strategies, revegetation methods and other strategies that will benefit final closure and relinquishment.

Environmental management is addressed in detail in Chapter 8 and their implementation is documented in the EMP provided in Appendix L.

4.8 Alternative Decommissioning Options

Conceptual plans for the decommissioning of the site are detailed in Chapter 5.8. Rehabilitation and Mine Closure. MLA27422 is located in a highly prospective region and there may be opportunities to utilise the facilities for Numul Numul Station. All such alternatives will be explored throughout the life of the project.
5 Proposal Description

5.1 Objectives, Benefits and Justification for the Action

5.1.1 Objectives

Objectives for the SILL80 project can be summarised to:

1. Develop a profitable business venture;
2. Support and meet future demand for raw ilmenite and ilmenite products;
3. Operate in an environmentally sustainable manner; and
4. Create and support socio-economic opportunities for the local communities.

5.1.2 Benefits

Benefits for proceeding with this project include:

1. Economic and employment opportunities;
2. Opportunities for local businesses;
3. Training opportunities;
4. Positive legacy for future generations; and
5. Create a profit for shareholders.

5.1.3 Justification

This project is important to support a rapidly growing demand for ilmenite and ilmenite containing products (ilmenite is a base pigment in paint, paper and plastics) particularly from Asian countries. In addition, the location of this proposed mine is considered ideal as there is good resource to support a 20+ year project, on land which is already impacted from grazing, resulting in minimal environmental impact.

5.1.4 Project Infrastructure

The project will be owner operated and comprise (refer to Figure 5-1 for location of infrastructure):

- **On-site processing shed** (1260 m²) shed to house wash trommels and gravity separation spirals that use water to separate the ilmenite from the regolith.
- **On-site drying pad** (1750 m²) concrete pad for cyclones for the removal of water from processed ilmenite and spoil.
- **Storage and packing shed** (2040m²) to pack and store dried ilmenite concentrate in 2 tonne ‘bulka’ bags awaiting transport to Darwin.
- **Small on-site office** small and basic office incorporated in the processing shed for daily operation purposes.
- **Workers camp – off mining lease** (2000 m²) camp to use existing camp – located at Flying Fox station (approximately 10km from MLA27422). Camp comprises communal kitchen and dining area and individual units with bedroom and en suite. Camp facilities will be capable of housing ten employees of AIR. A site office also exists on site.
- **Power generation shed** (70 m²) to supply power to processing plant, water pumps, and office.
- **Self bunded fuel storage station** (100 m²) to safely store approximately 61,000 litres diesel fuel for machinery, power generation, and for water pumps.
- **Vehicle wash down bay** (100 m²)
- **WC facilities** (10m²) on-site amenities with an incorporated septic unit.
- **Water pump and pipeline** (approx. 12 km long) to pump water from the Roper River to MLA27422. The pipe will be parallel to existing Numul Numul station pipes and track and then through Flying Fox Station to the river. Water will be pumped into Numul Numul Station dams before being relayed to the processing plant.
- **Water storage** AIR will also utilise existing Numul Numul Station dams to store water from the Roper River.
- **Private access road** from the Roper Highway (approx. 8 km) through Numul Numul Station. 15m wide corridor, 6m wide road capped with gravel. This will provide good dry season access for road trains and moderate wet season access for mine maintenance.

![Figure 5-1. Location of MLA29042 and Infrastructure.](image)

### 5.2 Project Schedule

Testing of the processing plant using a representative bulk sample excavated from the site is scheduled for March/April 2012 and production is scheduled to commence in mid-2012 pending environmental, legislative, and traditional owner approvals.

Mining will aim to initially produce 100,000 tonnes of ilmenite concentrate per annum, increasing to 200,000 tonnes in the subsequent years.
5.3 Mining Activities

Operations will utilise strip mining to excavate ilmenite rich soils for refinement. Excavations will be performed to a maximum depth of 4m (300m long and 200m wide). Strips will be developed in a campaign mining style; an area of equal size will be left between each pit to provide stability between pits and minimise exposed ground. Areas between pits will eventually be mined; however rehabilitation measures will provide stability to previously mined sections (Figure 5-2). The mining campaign within MLA27422 will be governed by resource richness and fluctuations within the market. Excavated material will be transported to ancillary MLA29042 and stockpiled.

![Figure 5-2. Progressive Mining.](image)

5.4 Processing Activities

Stockpiled material will be loaded into a hopper and then processed through a wash trommel with water. This will produce concentrated ilmenite sludge which will be pumped into a holding sump and waste regolith will be returned to the mining pit. The concentrated ilmenite sludge will then be run through a second wash trommel and further refined. Again, concentrated ilmenite sludge will be stored in a second sludge sump before being pumped into the final wash trommel (Figure 5-3). Through this process all waste material generated through each wash process will be stockpiled prior to being returned to mining pit. Once regolith material has been returned, the pit will be fenced and revegetated with improved pasture grasses.
Concentrated ilmenite will then be transferred to the concrete pad to dry prior to being bagged into 2 tonne “bulka” bags. Bags will be stored in the packing and storage shed prior to transport to Port Darwin via truck.

5.5 Water Infrastructure

5.5.1 Pump
AIR will utilise an AGM 820 mono pump powered by a Kubota v2203 Diesel engine. This pump will be capable of pumping up to 18.0 l/s. The pump used to extract water will incorporate “best practice” engineering design by having a caged foot valve to minimise potential for aquatic vertebrates to be drawn into the pump and impeller (location of the pump is shown in Figure 5-4).

5.5.1.1 Site Flooding
AIR will construct a 3m rock armoured island, 40m from the Roper River. This island will have a concrete pad on which the pump, drive engine and a 3,000 litre self bunded diesel storage will be mounted. The suction line to the pump will be housed inside a 9” steel bore casing that will be staked down to prevent movement during flood periods.

5.5.2 Pipeline
Approximately 12 kilometres of 125mm polyethylene pipe (PN10) will be laid above ground to deliver water to MLA27422 (Figure 5-4).
5.5.3 Water Storage

AIR will store water from the Roper River on-site in tanks and water dams present on Numul Numul Station. Given the high evaporation and transpiration rates observed at MLA27422 a storage dam constructed to hold water extracted from the Roper River, faces the same constraints as a catchment dam. To alleviate this, a dam constructed with synthetic liner and cover would be a potential water storage option. Essentially, this dam would function similarly to a water tank on a much larger scale. A synthetic lined and covered dam could potentially be explored post mine development. Until then, AIR will utilise tanks and water storages within Numul Numul station with an approximate storage capacity of 55ML.

5.5.4 Water Re-Use

AIR will pump excess water from holding sumps between wash trommel cycles back into water storages to reclaim as much of the processing water as possible.

5.5.5 Rainfall Collection

AIR will construct sheds to house the processing plant with a roof area of 3690m². This shed will be capable of capturing run-off during the wet season which will supplement processing water in the onsite storages. Mean rainfall is 787.7mm/year at Roper Bar store (60km East). Therefore, approximately 2.9ML will be added to the processing water from rainfall each year.
5.6 Transportation

AIR will purchase a fleet of trucks to transport the ilmenite concentrate from the mine site to the storage warehouse in Darwin. Truck numbers will increase as the mine production increases. As transportation is not AIR’s primary expertise, AIR is open to the development of an additional party performing the transportation under contract. Improved transport options may be developed at a later stage after undergoing feasibility assessment. This includes linking to the existing railway line near Mataranka to transport the ilmenite concentrate to Darwin.

5.6.1 Mine Construction and Continued Access

Vehicles and trucks will access the mine from the Roper Highway through an access road to be constructed through Numul Numul Station (Figure 5-4). This road will be an 8m wide gravel based and capped construction providing good dry season access for road trains and access for maintenance purposes during the wet season. This road will be maintained through continued grading and water spraying for dust suppression as required. Workers will access the site using personal vehicles and will rotate shifts as per a roster system.

5.6.2 Construction

During the construction phase of the project, materials required for construction and operation will be transported to the site from Darwin by truck. Mine access from the Roper Highway during the construction period will use the existing unsealed Hodgson River Road.

5.6.3 Ilmenite Concentrate to Darwin

AIR will transport dried ilmenite concentrate in 2 ton 'bulka' bags by truck to Darwin to be stored in a warehouse and await shipment to China through Port Darwin.

Trucks to be used will either be road trains (up to 107 tonne) or 60 tonne B-double trucks – dependent on availability and cost effectiveness. When AIR’s production reaches 200,000 tonne of ilmenite concentrate per year, approximately 1,000 tonne of ilmenite concentrate would be transported to Darwin along the Roper and Stuart Highways each day for 200 days of the year. This would be achieved through;

- 10 x 100 tonne road trains per day; or
- 16 x 60 tonne B-double trucks per day.

The distance from ML27422 to Darwin is approximately 550km and travel time for return passage is estimated to be 11 hours excluding loading and unloading. Return trips would be largely empty unless freight to Katherine, Mataranka or surrounds could be arranged.

5.7 Project Employment

5.7.1 Employment for Mining Operations

It is envisaged that this project will employ up to ten staff. Of these, three positions will be made available to local indigenous persons.

5.7.2 Employment for Product Transportation

AIR will initially purchase a series of trucks to transport concentrated ilmenite to Darwin. Additional employees will be required to operate these vehicles. AIR envisages contracting the transportation requirements to a private company once processing rates have stabilised.
5.8 Rehabilitation and Mine Closure

AIR will progressively rehabilitate throughout the life of mining to stabilise the land to protect it from problems associated with erosion and sedimentation.

The rehabilitation program will focus on instating pasture species; sabi grass and stylo legumes (seca, verano) in disturbed areas post mining works. Mined areas will be rehabilitated in conjunction with station managers in order to develop the area as a perennial grass rangeland for cattle grazing.

Annual reporting on rehabilitation methods will be presented in the Mining Management Plan and reported to the Department of Mines. Further information is available within Appendix K Rehabilitation Management Plan.

Mine closure planning will be conducted in consultation with land owners and other stakeholders to ensure that the final rehabilitation and mine closure objectives incorporate their requirements (e.g. retention of certain infrastructure or a specific alternate land use).

The mine closure plan will be developed according to objectives developed from the NT Department of Resources Mine Close Out Objectives (DoR 2008). See section 6.3.2 for more information.
6 Risk

6.1 Risk Assessment

This risk assessment chapter aims to identify the potential risks associated with the proposed AIR development on MLA27422, the proposed pipeline and water extraction point. Any future variations of a substantive nature may influence the findings of this risk assessment, and thus may require revision of this document. The terms of reference are as defined in the guidelines to the PER (Appendix A).

6.2 Risk Assessment Objectives

Solid environmental risk assessment provides a project management team with an analysis of issues, prioritisation of issues, and the ability to make informed decisions (Australian Standard AS/NZS ISO 31000:2009 Risk Management). Continual awareness of risk management “enhances and encourages the identification of greater opportunities for continuous improvement through innovation” (Australian Standard AS/NZS ISO 31000:2009 Risk Management). Specific benefits of risk assessment to this project include:

1. Comprehensive understanding of potential impacts upon the environment;
2. Fewer surprises;
3. The ability to take advantage of opportunities based on project confidence;
4. Improved decision making, planning, performance and effectiveness, via improved information;
5. Improved efficiency;
6. Improved stakeholder relationships and general reputation;
7. Improved due diligence, accountability and governance; and
8. The potential improved wellbeing of employees and the public.

The success of risk management and/or treatment of risks will be measured and identified through the Mining Management Plan (MMP) process so as to ensure that risk management remains a solid and valuable tool for the project managers and regulators.

6.2.1 Risk Assessment Methods

The methods used for this Environmental Risk Assessment follow those described in the Australian Standard AS/NZS ISO 31000:2009 Risk Management. Evaluation of potential impacts has been guided by the US Environmental Protection Agency guidelines for ecological risk assessment (e.g. US EPA 1998) and background information detailed in this PER.

Environmental risk assessment and management provides a formal set of processes that help when making decisions affecting the environment, project design, and project development. Risk assessment also assists decision-makers to deal with uncertainty. The risk assessment process is designed to minimise uncertainty associated with potential and actual risks and hazards.

This Risk Assessment aims to assess the risks and identify management practices to mitigate potential impacts resulting from the project. The objectives for the risk assessment were specifically:

- To identify the hazards and resultant risks to the environment from the project as a whole, and threats from environmental aspects to the project;
- To rank and prioritise risks through a risk assessment process; and
- To evaluate the risks and identify management measures to mitigate the risks.

This involves the value judgment determination of key assumptions based on existing knowledge as well as determining a level of tolerable risk. The tolerable risk approach utilises the As Low As Reasonably
Practicable (ALARP) concept and helps identify and rank risks and potential risks according to the ability of the project to manage the risk. This method identifies risks that are either –

**Intolerable** - Risk cannot be justified or managed;

**Tolerable** - Risk can be managed; or

**Acceptable** - Risk is minimal and requires little if any intervention or management.

Aspects and activities are evaluated against AS/NZS ISO 31000:2009 by allocating a qualitative measure of likely consequence (Table 6-1) and likelihood (Table 6-2). From these a risk ranking has been developed for each aspect. Risks with rankings in the extreme and high categories are considered to be significant and will be addressed in particular, and those in the low and moderate categories addressed by accepted practices for each of the activities.

**Table 6-1: Criteria and Consequence of the Activity Occurring.**

<table>
<thead>
<tr>
<th>Consequence</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Insignificant</td>
<td>No measurable impact on the environment. No injuries. Low-nil financial loss.</td>
</tr>
<tr>
<td>3 Moderate</td>
<td>Substantial temporary or permanent minor, localised environmental damage. Stakeholder enquires (this may include government, unions or public). Medical attention required. High-medium financial loss.</td>
</tr>
<tr>
<td>4 Major</td>
<td>Substantial or permanent environmental damage. Prosecution possible. Loss of company credibility and high stakeholder interest. Permanent injuries. High financial loss.</td>
</tr>
<tr>
<td>5 Catastrophic</td>
<td>Widespread severe and permanent environmental damage. Major stakeholder and media interest. Prosecution likely. Permanent injury or death. Extreme financial loss.</td>
</tr>
</tbody>
</table>
Table 6-2: Qualitative Measures of Likelihood.

<table>
<thead>
<tr>
<th>Probability/Likelihood</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Rare</td>
<td>Practically impossible, will only occur in exceptional circumstances. Has never occurred in the industry.</td>
</tr>
<tr>
<td>B Unlikely</td>
<td>Could occur at some time but highly unlikely. Has occurred in the industry previously.</td>
</tr>
<tr>
<td>C Moderate</td>
<td>Might occur at some time. Has occurred in associated companies previously.</td>
</tr>
<tr>
<td>D Likely</td>
<td>Known to occur or will probably occur in most circumstances. Has occurred several times/year in associated companies.</td>
</tr>
<tr>
<td>E Almost Certain</td>
<td>Common or repeating occurrence. Is expected to occur several times/year in any associated business.</td>
</tr>
</tbody>
</table>

The likelihood of an event occurring provides a measure of the known or anticipated frequency of occurrences. Combining likelihood with consequence provides guidance on risk levels of each aspect and enables ranking of priorities. The risk levels used in this risk assessment are given below in Table 6-3.

Table 6-3: Risk Rankings Combining Consequence with Likelihood.

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Consequence</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Rare</td>
<td></td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
</tr>
<tr>
<td>B Unlikely</td>
<td></td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
</tr>
<tr>
<td>C Moderate</td>
<td></td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
</tr>
<tr>
<td>D Likely</td>
<td></td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
</tr>
<tr>
<td>E Almost Certain</td>
<td></td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
<td>💚</td>
</tr>
</tbody>
</table>

Where:
- 💚 = extreme risk - intolerable
- 💚 = high risk - intolerable or tolerable
- 💚 = medium risk - tolerable or acceptable
- 💚 = low risk – acceptable
6.2.2 Assessment of Risks

This section applies the risk assessment methods described above to AIR’s development proposal. The likelihood of each risk was determined with consideration of AIR’s proposed mitigation strategies, management actions, controls and procedures. The majority of risks identified through this assessment process closely align with the three primary environmental issues identified in the Guidelines, namely:

1. Extraction of water from the Roper River used for processing ore:
   a. Average cease to flow occurrences in the Roper River may increase with significant amounts of extraction; and
   b. Impacts may be caused downstream from the extraction point to water quality and supply for other users and wildlife.

2. Effectiveness of the proposed rehabilitation over large areas:
   a. Identification of suitable revegetation species;
   b. Supply and sources of an adequate seed bank or seedlings;
   c. Soil erosion and weed management over large areas; and
   d. Timing of establishment and water requirements.

3. Potential impacts to threatened species:
   a. Annual clearing and strip mining of 13 to 33 ha of native vegetation could impact on local threatened species; and
   b. Identifying any listed threatened species, particularly flora, will provide better information for management and rehabilitation.

This section will examine these and other risks, the following section (Section 6.3) will look at the management of the key risks. Table 6-4 shows the outcomes of this analysis. Further information on environmental management strategies is available in the EMP (Appendix L).

This risk assessment has prioritised the areas of risk and their level of importance and has guided the development of this PER and the ongoing EMP’s.
Table 6-4: Risk Assessment of the Proposed Development.

<table>
<thead>
<tr>
<th>Issues</th>
<th>Aspect</th>
<th>Impact</th>
<th>Risk (C=Consequence; L=Likelihood; RS=Risk Score)</th>
<th>Severity of Impact</th>
<th>Mitigation Measures (MM) and Controls (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Extraction</td>
<td>Detrimental impacts on the downstream water quality and ecology</td>
<td>3  B  9 (low)</td>
<td>Substantial changes in water regime leading to increase in cease-to-flow events.</td>
<td>MM: Water Management Plan and associated monitoring and auditing; aquatic fauna survey informing WMP objectives and outcomes. C: Stop pumping when thresholds crossed.</td>
</tr>
<tr>
<td>Water</td>
<td>Extraction-others</td>
<td>Groundwater entitlements taken up leading to increase in cease-to-flow events</td>
<td>3  C  13 (med)</td>
<td>Substantial changes in water regime leading to increase in cease-to-flow events.</td>
<td>MM: Future iterations/ review of water management plans needs to be aware of changing water allocations. C: Future water management planning</td>
</tr>
<tr>
<td>Water</td>
<td>Extraction-threatened species</td>
<td>Detrimental impacts to threatened species as consequence of water extraction</td>
<td>3  C  13 (med)</td>
<td>Change or loss of threatened species populations</td>
<td>MM: Water Management Plan, though none known to occur. C: Cease pumping when monitoring threshold reached.</td>
</tr>
<tr>
<td>Issues</td>
<td>Aspect</td>
<td>Impact</td>
<td>Risk (C=Consequence; L=Likelihood; RS=Risk Score)</td>
<td>Severity of Impact</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Clearing and Rehabilitation</td>
<td>Weeds and offsite impacts</td>
<td>Weed establishment/spread Erosion and sedimentation Reduced quality of surrounding water resources</td>
<td>3 (\text{C}) 13 (med)</td>
<td><strong>Infestation of weeds in disturbed areas and mobilised sediments</strong>&lt;br&gt;MM: Rehabilitation, weed and erosion and sediment control management plans&lt;br&gt;C: Progressive rehabilitation of mined areas (Rehabilitation Management Plan) and erosion and sediment control measures (Erosion Sediment Control Plan). Weed monitoring and management (Weed Management Plan).</td>
<td></td>
</tr>
<tr>
<td>Clearing and Rehabilitation</td>
<td>Expansion works requiring clearing near habitat</td>
<td>Removal of vegetation/potential animal habitat leading to displacement or death. Safety risks to humans.</td>
<td>3 (\text{B}) 9 (low)</td>
<td><strong>Preferred habitat avoidance measures in place</strong>&lt;br&gt;MM: minimisation of areas cleared at any one time.&lt;br&gt;C: staff awareness via inductions and toolbox meetings, rehabilitation management plan, SOP for clearing.</td>
<td></td>
</tr>
<tr>
<td>Terrestrial Threatened Species</td>
<td>Impacts due to mining operations</td>
<td>Strip mining deleteriously affects threatened species</td>
<td>3 (\text{B}) 9 (low)</td>
<td><strong>Change or loss of threatened species populations</strong>&lt;br&gt;MM: After desktop and field studies no threatened species are known to occur within the planning envelope; threatened species that occur within the region have been reviewed and it is unlikely that, even if present that this development would affect them.&lt;br&gt;C: N/A</td>
<td></td>
</tr>
<tr>
<td>Waste and Hazardous Substance Management</td>
<td>Failure of tanks or associated infrastructure.</td>
<td>Potential contamination to local environment. Potential health and safety hazards associated with spillage.</td>
<td>3 (\text{B}) 9 (low)</td>
<td><strong>Tanks will be constructed according to current best practice and standards.</strong>&lt;br&gt;MM: Tanks will be bunded according to AS1940: 1993, storage facilities inspected regularly, training in appropriate handling and disposal of hazardous substances&lt;br&gt;C: Spill kits located on site, MSDS data sheets available for all hazardous substances on site</td>
<td></td>
</tr>
<tr>
<td>Issues</td>
<td>Aspect</td>
<td>Impact</td>
<td>Risk (C=Consequence; L=Likelihood; RS=Risk Score)</td>
<td>Severity of Impact</td>
<td>Mitigation Measures (MM) and Controls (C)</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Waste and Hazardous Substance Management   | Leaks from vehicles and plant.                                          | Potential contamination to local environment. Potential health and safety hazards associated with spillage. | 2 B 5 (low)                                      | *Minor temporary localised environmental damage.*                                 | MM: Plant will be constructed according to current best practice and standards, Regular plant and vehicle inspections and maintenance  
C: Spill kits located on site, MSDS data sheets available for all hazardous substances on site |
| Protection and management of Heritage sites| Mining activity in the vicinity of important Heritage sites            | Impact on or loss of valuable heritage material.                       | 3 B 9 (low)                                      | *Staff awareness of heritage values raised through inductions and toolbox meetings* | AAHA Authority Certificate  
MM: Archaeological Survey conducted and sites mapped and documented, staff awareness via inductions and toolbox meetings  
C: Cease works if sites of significance found or suspected, clearly mark areas which are “Restricted Work Areas” |
| Soil Erosion and Sedimentation             | Mining activity and rehabilitation                                      | Increased erosion and sedimentation from poor stormwater design and/or failed rehabilitation within the mining areas | 2 B 5 (low)                                      | *Minor to moderate environmental damage and changes to post mining landform*      | MM: Progressive site rehabilitation  
C: Continued monitoring as defined in ESCP (appendix H). Maintenance of catch drains, sediment basins, mulch bunds and silt fences. |
| Transportation                             | Traffic between mine site and Port of Darwin                           | Increased road traffic resulting in potential accidents and road degradation | 5 B 19 (high)                                    | *Accidents could result in serious injury or death, or minor to moderate environmental harm/impact* | MM: Driver training  
C: SOP’s developed regarding product transportation, drivers to abide by NT road rules. |
<table>
<thead>
<tr>
<th>Issues</th>
<th>Aspect</th>
<th>Impact</th>
<th>Risk (C=Consequence; L=Likelihood; RS=Risk Score)</th>
<th>Severity of Impact</th>
<th>Mitigation Measures (MM) and Controls (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social and Cultural</td>
<td>Potential impact to unknown heritage site.</td>
<td>Damage to heritage site</td>
<td>4  B  14 (med)</td>
<td><em>Damage could occur to cultural and heritage areas if staff are not aware of their localities.</em>&lt;br&gt;MM: Heritage value awareness, AAPA authority certificate, Staff induction&lt;br&gt;C: Fence restricted access areas</td>
<td></td>
</tr>
<tr>
<td>Emissions</td>
<td>Vehicle, Plant and Exhaust missions</td>
<td>Increased dust, noise and greenhouse gas emissions (health and environmental implications)</td>
<td>2  B  5 (low)</td>
<td><em>Vehicles, plant and processing operations result in noise, dust and greenhouse gas emissions</em>&lt;br&gt;MM: Continued track maintenance, continued vehicle and plant maintenance&lt;br&gt;C: Mufflers installed and maintained</td>
<td></td>
</tr>
<tr>
<td>Biting Insects</td>
<td>Health and safety of personnel</td>
<td>Mosquito borne diseases are identified in workforce</td>
<td>4  B  14 (med)</td>
<td><em>Workers potentially exposed to mosquito borne diseases</em>&lt;br&gt;MM: Minimise potential breeding areas, Biting Insect Management Plan, personnel induction&lt;br&gt;C: Medical treatment, isolation</td>
<td></td>
</tr>
</tbody>
</table>
6.3 Key Risks and Their Management

6.3.1 Water

AIR will access water for processing ilmenite from the Roper River at the waterhole currently used for extraction by Flying Fox station. Water extraction from the Roper River has the potential to impact on environmental, social, cultural and tourist values if over extraction were to occur. Aboriginal people believe that Spirit Ancestors associated with plants, animals, rocks and watercourses are active and can be contacted through ceremony, songs and ritual actions. Water extraction from the Roper River must be conducted with respect to environmental and cultural requirements. Fishing within the Roper River is a common activity and pastime. Much of the region’s tourism draw is based on aesthetics concerning the Roper River – it is therefore important that AIR’s activities do not negatively impact on the Roper River.

Water flowing in the Roper River at the proposed point of extraction is fed by groundwater flows from the Tindal Limestone aquifer at Mataranka during the dry season and from combined rainfall, surface water flows and groundwater flows during the wet season. Groundwater in the source Tindal Limestone aquifer will be allocated under the Mataranka Water Allocation Plan to approximately 19,365 ML/year. Extraction from the Roper River for consumptive uses should not exceed the threshold level of 20% of flow at any time in any part of the river (Northern Territory Water Allocation Planning Framework 2006).

Water for the SILL80 Project will be sourced from the Roper River, pumped via a pipeline 12 km south to the processing site (see Figure 3-1). Current data indicates that the Roper River, on average, ceases to flow at Red Rock gauging station (60 km downstream of the proposed extraction point) approximately 18 days of the year, and with full allocation of groundwater entitlements from the Tindal Limestone Aquifer this would increase to 73 days per year at Red Rock (Knapton 2002). There is a subsequent future risk to environmental values and also the AIR project if ground water entitlements are fully allocated.

6.3.1.1 Risks to Other Water Users

6.3.1.1.1 Daly Roper Water Control District

The Daly Roper Water Control District (WCD) was declared by the Minister for Natural Resources, Environment and Heritage on 8 December 2008. WCD’s are a statutory instrument under the NT Water Act 1992 that allow a greater level of water management to be implemented. Within a WCD:

- All groundwater and surface water extraction, excluding for stock and domestic purposes must be licensed;
- Bore construction permits with minimum construction standards designed to prevent contamination are required; and
- Water Allocation Plans can be declared.

Currently, a Water Allocation Plan (WAP) is being developed for the Tindall Limestone Aquifer in the area immediately surrounding Mataranka. The Mataranka Water Allocation Plan seeks to plan and manage the groundwater resource for sustainable future demand. The Mataranka WAP will relate only to groundwater extraction – however, consideration of the connection between the Tindall aquifer and the Roper River surface flows will be taken into account. Prior to a Water Control District (WCD) being declared, groundwater extraction licenses were only required if extraction exceeded 0.015m$^3$/s (15 l/s). Since declaration of the Water Control District, all new groundwater applications have been classified as pending so that full availability of the resource can be made prior to additional licenses being issued.

The Mataranka WAP will only cover the Tindall Limestone Groundwater Aquifer in the Mataranka area, however, it is anticipated that the plan will affect the level of surface water extraction permitted also.
6.3.1.1.2 Roper River Users

The community of Ngukurr rely on water from the Roper River to supplement the town’s groundwater supplies. Communities and cattle stations adjacent to the Roper River utilise the stream for reliable water supply. Cattle stations nearby to MLA27422 have reported dams drying up late in the dry season due to extended periods of minimal to no rain and high evaporation rates. Historically, Numul Numul and Flying Fox stations have drawn water from permanent water holes in the Roper River to supplement dam and groundwater infrastructure during dry periods.

Current information pertaining to surface water license entitlements from the Roper River was sourced through the NRETAS Water Licensing Register. As of 3rd June 2011, three surface water licenses currently exist on the Roper River (Table 6-5).

Table 6-5: Current Roper River license entitlements.

<table>
<thead>
<tr>
<th>USER</th>
<th>LOCATION</th>
<th>ENTITLEMENT (ML)</th>
<th>EXPIRY DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Water Corporation (ROPER)</td>
<td>Ngukurr Community</td>
<td>60</td>
<td>2/5/2012</td>
</tr>
<tr>
<td>VJ Janyschka &amp; GT Cornes</td>
<td>Lot 227</td>
<td>2.2</td>
<td>19/06/2017</td>
</tr>
<tr>
<td>VJ Janyschka &amp; GT Cornes</td>
<td>NTP 1185</td>
<td>26</td>
<td>19/06/2017</td>
</tr>
</tbody>
</table>

6.3.1.1.3 Groundwater Resources

Groundwater incursion into the Roper River occurs at sites where the water table has been incised by the river bed. The dominant aquifer discharging to the Roper River is the Tindall Limestone aquifer with smaller contributions also from the Dook Creek dolomitic and other minor carbonate aquifers. The contribution of groundwater to the Roper River is significant, particularly during the dry season when rainfall runoff is minimal to non-existent. Groundwater inputs prevent the development of isolated pools or complete drying of the river in places, except in very dry years.

Groundwater is currently sourced for domestic supply where possible within the Roper catchment, and the major population centres of Minyerri, Urapunga, and Ngukurr all use groundwater. However, Ngukurr, the largest community in the region, supplements its supply with Roper River water. Groundwater yields near Numul Numul are generally poor for commercial supply with yields typically <0.001 m³/s.

The Kewulyi (Roper Valley Homestead) Community, located 4 km north-west of MLA27422 at the old Roper Valley Homestead, source water from a nearby spring. Nearby cattle stations also utilise groundwater resources for stock watering purposes dependent on availability and reliability. Outstations utilise bores, springs, river water and lagoons for domestic water supply dependent on resource reliability and proximity.

Current information pertaining to ground water licenses for entitlement from the Tindall Limestone (Mataranka) aquifer was sourced through the NRETAS Water Licensing Register. As of 3rd January 2012, fifteen licenses currently exist within this aquifer (Table 6-6).
<table>
<thead>
<tr>
<th>USER</th>
<th>LOCATION</th>
<th>ENTITLEMENT (ML)</th>
<th>EXPIRY DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitter Sweet Investments</td>
<td>NT Portion 7030</td>
<td>13</td>
<td>27/07/2012</td>
</tr>
<tr>
<td>Lindsay and Bettina MacFarlane</td>
<td>NT Portion 6403</td>
<td>500</td>
<td>10/08/2012</td>
</tr>
<tr>
<td>Kane and Maree Younghusband</td>
<td>NT Portion 6266</td>
<td>1814</td>
<td>27/07/2012</td>
</tr>
<tr>
<td>Japala Services</td>
<td>NT Portion 6233</td>
<td>10</td>
<td>27/07/2012</td>
</tr>
<tr>
<td>Stewart Younghusband</td>
<td>NT Portion 6280</td>
<td>676</td>
<td>27/07/2012</td>
</tr>
<tr>
<td>Debrah Moore and Steve Garner</td>
<td>NT Portion 638</td>
<td>10</td>
<td>27/07/2012</td>
</tr>
<tr>
<td>Northern Cement</td>
<td>NT Portion 3337</td>
<td>6</td>
<td>27/07/2012</td>
</tr>
<tr>
<td>Alan and Merran Williams</td>
<td>Lot 146 Carew Road, Mataranka</td>
<td>9</td>
<td>27/07/2012</td>
</tr>
<tr>
<td>Power Water Corporation</td>
<td>NT Portion 5417</td>
<td>70</td>
<td>27/07/2012</td>
</tr>
<tr>
<td>Power Water Corporation</td>
<td>Various</td>
<td>95</td>
<td>27/07/2012</td>
</tr>
<tr>
<td>Roper Gulf Shire Council</td>
<td>NTP 922, 1508, 2631</td>
<td>50</td>
<td>27/07/2012</td>
</tr>
<tr>
<td>Bruce Ross</td>
<td>NT Portion 7029</td>
<td>13</td>
<td>27/07/2012</td>
</tr>
<tr>
<td>Territory Manor</td>
<td>NT Portion 1371</td>
<td>19</td>
<td>27/07/2012</td>
</tr>
<tr>
<td>Jera Investments Pty Ltd</td>
<td>NT Portion 6402</td>
<td>1682</td>
<td>27/07/2012</td>
</tr>
</tbody>
</table>

### 6.3.1.1.4 Potential Salinity Impacts

The Ngukurr community downstream of the Roper Bar divert water from the Roper River to supplement the community's groundwater supply. The diversion point for the community is located below Roper Bar, in the tidal section of the Roper River (Figure 2-1), therefore in an area susceptible to migration of the salt water interface during low flow conditions. Continued freshwater inflow across Roper Bar can assist in slowing salt water incursion upstream. Predicting the impact of increased water diversion on salinity within the...
Roper River is complicated as the geology, groundwater interaction, rainfall and water residence times all affect salinity within the system. Monitoring surface flows to prevent any increase in CTF events within the Roper River is the most effective way of mitigating salinity impacts downstream of AIR’s water extraction site (for additional detail on AIR’s flow monitoring program see the Water Management Plan, Appendix G).

6.3.1.2 Strategies to Minimise Impacts

Water Management Plan

A Water Management Plan (WMP) for the proposed extraction of surface water from the Roper River has been developed specifically for the AIR mine and is attached in Appendix G. A WMP was requested by the Northern Territory Government as listed in the Guidelines for the Preparation of a Public Environmental Report for the sustainable management of water extracted from the Roper River. Under the Northern Territory Water Act 1992, mining operations are exempt from licensing for consumptive use, however, the developed WMP will outline measures implemented to minimise negative impacts to the Roper River. This WMP has been developed to minimise impacts on the environment and downstream water users by ensuring extraction from the Roper River for AIR’s SILL80 project does not exceed the threshold level of 20% of instantaneous flow, through pumping conditions and monitoring and reporting requirements.

Flow Monitoring

AIR will perform daily monitoring of water flow within the Roper River to ensure that operations do not exceed the diversion threshold of 20% of instantaneous flow. This will be achieved through performing a daily assessment of flow using NRETAS operated automated flow monitoring instrumentation. Currently 7 monitoring stations operate within the Roper River catchment, with only 2 monitoring stations presently operating on the Roper River. AIR will access information from the Red Rock Gauging Station downstream of AIR’s extraction point. Red Rock will be utilised due to it being located downstream of the extraction point in a section of the Roper River that does not receive significant groundwater input. It is assumed that water flow information for Red Rock will in fact be less than the flow present at AIR’s extraction point. However, the Red Rock Gauging station becomes unreliable in low flows (Cruickshank S, 2011 pers. comm., 2 September), therefore AIR will monitor flow here until flow reaches 3m³/s. Once flow falls below this threshold, AIR will perform daily manual gaugings at Judy Crossing. Judy Crossing is located approximately 1km downstream of AIR’s proposed extraction point and is a confined section of the river that suitable for flow gauging. AIR will be responsible for developing rating tables to measure flow in this section of the river. AIR will monitor flow at Judy Crossing to ensure that operations do not exceed the diversion threshold of 20% of instantaneous flow. Once flow at Judy Crossing reaches 0.1m³/s, AIR will be required to cease pumping until flow returns to above threshold. Details of the flow monitoring methods employed by AIR can be found in the WMP (Appendix G).

Water Infrastructure

AIR will utilise best practice water infrastructure when available to minimise pressure placed on aquatic resources. See chapter 5.5 of this report for detail on water infrastructure utilised.

6.3.1.3 Flocculent Use

At this stage the SILL80 project does not require flocculants for processing operations. Should flocculants be required at a later stage, AIR will amend their MMP to use such products. As flocculants are not required for processing they are not explored further within this PER.

6.3.2 Rehabilitation Practices

Australian Ilmenite Resources Pty Ltd (AIR) SILL80 Project is a proposed open cut mine and processing facility to be constructed in the Roper River region of the Northern Territory. AIR intends to produce 200,000 tonnes of refined ilmenite at the mine per annum, with an expected mine life exceeding 20 years. Negative impacts that may occur on MLA27422 due to the operation of the mine include:

- Large areas of exposed earth available for weed colonisation and/or erosion and sedimentation;
• Spread of existing weed infestations due to disturbance and vehicle traffic;
• Unstable landscape post mining;
• Reduced quality of surrounding water resources;
• Gradual decline in landscape function;
• Untidy and bare infrastructure areas; and
• Altered drainage and hydrology.

To stabilise mined land to mitigate erosion and sedimentation problems progressive rehabilitation to pastoral production will occur. Specifically, the land should be rehabilitated to a healthy perennial grass rangeland with a diverse mix of plants both native and introduced.

The objectives of the rehabilitation work are to:

• Achieve stable landforms;
• Reduce incidence of weed infestation and spread;
• Reduce risk of erosion and sedimentation;
• Progressively rehabilitate over the life of mining;
• Prevent non-essential access to rehabilitation areas;
• Maintain natural drainage and hydrology of land as much as is practicable;
• Rehabilitate the access tracks and roads that are not required post construction and mining;
• Comply with all regulatory requirements, approvals and any other legislation; and
• Outline monitoring and performance evaluation measures that are practical and measurable.

Mined areas will be rehabilitated in a co-ordinated program between AIR staff and station managers in order to develop the area as a perennial grass rangeland for cattle grazing. Processed spoil will be returned to mined pits, which will then be broadcast with perennial grass seeds and covered with weed free pasture hay. Cattle will be introduced to the area for a short and controlled period to initiate sowing of seeds and stimulate ground preparation. As a perennial grass rangeland develops, the area will be grazed systematically, for a short duration (6-12 hours) every six or more months, as determined by a Grazing Plan, to promote growth. Native grasses, forbs, small shrubs and trees will also be encouraged.

Photo monitoring will also be conducted within the rehabilitation areas, with flagged reference points set up. Success and failure will be determined through the use of photo monitoring, the presence/absence of weeds, and presence/absence of erosion and sedimentation. In general terms, it is expected that 80% total groundcover will be achievable and will indicate success. In addition, retention of moisture in the soil, displayed by ‘healthy’ pasture, particularly towards the end of the dry season, will also be an indicator of success.

Annual reporting on rehabilitation methods will be presented in the Annual Environmental Review required as part of the Environmental Management Plan and reported to the Department of Mines.

A mine closure plan will be developed prior to completion of mining according to objectives developed from the NT Department of Resources Mine Close Out Objectives (DoR 2008).

6.3.3 Terrestrial and Aquatic Flora and Fauna

This section identifies the potential impacts that the proposed development will have on the biological values of the region, namely the fauna, flora and vegetation communities.
This section reports on a desktop and field biological survey which was specifically aimed at identifying potential impacts on terrestrial and aquatic flora and fauna with an emphasis on conservation significant species.

Conservation significant species are those species that are considered threatened under Northern Territory (Territory Parks and Wildlife Conservation Act 2011, [TWPC Act]) or Commonwealth legislation (Environment Protection and Biodiversity Conservation Act, 1999 [EPBC Act]); species listed as migratory under the EPBC Act or vegetation communities listed as rare or of high conservation value under the NT Planning Scheme and NT Land Clearing Guidelines.

The desktop surveyed collated data from existing Commonwealth and Territory databases and by literature review.

The field survey methods were consistent with those described by the NT government and outlined in the Guidelines for the Terrestrial Biodiversity Component of Environmental Impact Assessment. The field survey occurred in May 2011.

Six survey sites were selected to sample the diversity of vegetation communities across and nearby to the lease. No survey sites were permitted in sacred site exclusion areas. While this may limit the comprehensiveness of the biological survey to some degree, any potential threatened species would be found via database search. In addition, these species are less likely to be influenced by the development as these areas are not permitted to be developed.

With the fauna trapping program a total of 526 trap nights resulted in 52 captures of 13 species. An additional 27 species were recorded as incidental records (i.e. species that were recorded within the survey area but not as part of the systematic trapping and sampling program). Forty-seven records from the fauna sampling program are new records for the area. Four introduced species were recorded: Cane Toad (Rhinella marinus), Cattle (Bos indicus), Feral Pig (Sus scrofa) and the House Mouse (Mus musculus). Two recorded species are considered threatened under the TPWC Act: the Australian Bustard (Ardeotis australis) and Mertens' Water Monitor (Varanus mertensi).

The flora survey recorded 92 species which represented 37% of the recorded plant diversity of the local area, implying low regional plant diversity. There was a large number of introduced plants identified but no conservation significant species were recorded. Three main vegetation communities were identified: Low Eucalyptus pruinosa open woodland over tall closed tussock grass; Medium height Corymbia terminalis, Eucalyptus tectifica open woodland, over tall mid-dense tussock grass; and Low Corymbia terminalis, Eucalyptus tectifica Woodland over medium height / mid-dense closed tussock grass.

To get an understanding of the species that are required to be considered, results for conservation significant species found from the desktop survey and field survey were combined. A total of 14 threatened species (listed under NT or Commonwealth legislation) possibly occur in the development envelope. This consists of 10 birds, one reptile, and three mammals. A further 12 species are listed as migratory (11 birds and one reptile) under EPBC legislation and also need to be considered.

It is concluded that no threatened or migratory species will be affected by this development for several reasons. Firstly, there is no critical habitat affected by this development. The flora and vegetation mapping showed that none of the vegetation communities (habitats) are special or of restricted distribution. Secondly, all these species are wide ranging to the extent that the range of each of these species is much wider than the development impact. Thirdly, many of the species have other threats affecting them; for instance Mertens's Water Monitor is now a threatened species due to the cane toad.

The following safeguards are to be employed to ensure AIR does not negatively impact on the terrestrial and aquatic flora and fauna within or near the mining and infrastructure areas:

- Confine clearing of vegetation to the minimum required for construction and operation of the mine and associated infrastructure such as roads;
Further and continuous monitoring to be completed to determine the presence/absence of weeds, with particular focus on Weeds of National Significance;

Clearly mark the areas to be cleared prior to land clearing;

Parking areas and turning points for plant and equipment is to be within site boundaries to minimise vegetation disturbance;

Implement a weed and pest management program to prevent weeds and pests leaving or entering the site;

Machines are to arrive on site ‘clean’ of weed seeds (including mud) and are to be inspected and recorded;

Ensure machinery hygiene by establishing a wash down area;

Inspect vehicles for weeds, seeds and soil prior to leaving and entering the site;

Monitoring of weeds will be conducted during construction and treatment will take place if they become visible, and weed information to be reported within the Mining Management Plan;

Maintain clean and tidy work areas to ensure native fauna are not attracted to the site, including provision of covered bins, e.g., dispose of leftover food from construction workers appropriately;

Large trees with hollows and hollow logs on the ground should be left in situ where possible, to provide nesting opportunities for native species;

As part of inductions instruct personnel to only use existing tracks and avoid off-road driving;

In inductions educate personnel on the importance of protecting stands of native vegetation, and on measures to prevent the spread of weeds, and weed identification and reporting; and

Develop reporting and action framework for any weed invasions.

In addition the following monitoring and reporting will be carried out, at minimum:

Monitor construction activities to ensure that land disturbance does not extend beyond the construction area;

Inspect construction site and adjacent areas for fauna kills/deaths and for plant stress and detail information in the environmental review required as part of the Mining Management Plan;

Monitor conformance to the EMP in relation to flora and fauna;

Monitor contractors’ compliance with all actions;

Conduct ongoing weed monitoring during the construction and operation of the mine, especially in areas disturbed by ongoing construction activities;

Use photo monitoring points to help determine success/failure of rehabilitation;

Monitor rehabilitation areas to determine appropriate stocking rate for cattle and timing and duration of stocking, in close consultation with station managers;

Report any fauna kills (including fish and birds at extraction point);

Report any evidence of plant stress or plant dieback as a result of construction activities;

Report any occurrence of additional, excessive or unapproved vegetation clearing;

Report any occurrence of listed weed species in the Mining Management Plan; and
- Revise/review environmental safeguards as necessary to ensure they remain effective and applicable.

6.4 Other Risks

6.4.1 Transportation

AIR intends to transport concentrated ilmenite to a Darwin warehouse using road trains, prior to shipping to China. The proposed route for the road transport will utilise the Stuart and Roper Highways, and then join a new road, constructed by AIR through Numul Numul Station. At full scale production this will result in up to 20 road trains per day travelling on the Stuart and Roper Highways.

Large scale transport can impact on social amenities in a number of ways. These include but are not limited to:

- Increased noise associated with trucking activity (e.g. air brakes, vibration, engine noise);
- Increased air emissions i.e. dust (particularly on sections of dirt road);
- Mine traffic resulting in increased road congestion;
- Increase in animal fatality through vehicle strike;
- Increased degradation of road infrastructure; and
- Increased risk of accidents.

AIR had intended to use the existing Hodgson River Road to access Numul Numul Station. During the consultation process it was highlighted that the existing Numul Numul Station tracks are in a cultural exclusion area and any road work beyond maintenance was not permitted. AIR discussed the possibility of constructing an access road to Numul Numul Station further south along the Hodgson River Road that would bypass all exclusion zones. This proposal was viewed positively by stakeholders on the condition that the final path is confirmed by traditional owners of Numul Numul station prior to any excavation works. This road, however, still required access using Hodgson River Road potentially resulting in increased noise, dust and road degradation. After consideration of minimising negative impacts on the local community, improving station access and developing worthwhile infrastructure to exceed the life of the mine AIR committed to constructing a road from the Roper Highway through Numul Numul Station, to join existing station tracks at the cattle yards (Figure 5-4). This road will be 8m wide, lime based and capped construction that will allow good dry season access for road trains and access for maintenance vehicles during the wet season.

6.4.2 Erosion and Sedimentation

The SILL80 Ilmenite Project is situated on a relatively flat to low lying area currently utilised as pastoral grazing paddocks and subject to stock trampling, grazing, weed incursion, and occasional controlled burning. There is also some evidence of erosion on the land and increased sedimentation and turbidity in nearby watercourses and drainage areas.

This terrain is characterised by broad alluvial valleys between low rubbly hills and prominent strike ridges of resistant Roper Group strata. These areas are considered highly erodible, especially the sloping red soils.

Excavations will be dug along 300 x 200 m wide strips to a maximum depth of 4 m where ilmenite-bearing soils occur and successively backfilled with the residual material and rehabilitated following extraction of the ilmenite. The returned regolith will be processed and washed soil. The residual material will be returned to bunded sections of the mining pit in a moist state. This will help it settle to be flat, resulting in lower wind and water erosion potential. The moist state also facilitates rapid regrowth of cover material, also benefitting the reduction in potential impacts.
Stormwater will be diverted around the site to prevent mixing with potentially high sediment containing process water. All other water will be directed to a sedimentation pond to allow settling of particles before either discharge to the environment or re-use back on site. The size of the sediment pond will be designed to retain expected quantities of contaminated water plus stormwater for a 1 in 10 year storm event, at any one time. The sediment pond will be fenced to limit access by native animals, domestic stock or feral animals.

Sediment fences or similar structure will be used in areas where high concentrations of sediments are expected, where there is increased erosion potential, and areas that are to be rehabilitated. Regular maintenance of sediment fences will be undertaken to ensure the correct function and repair of any damage.

Suitable drainage structures will be put in place to minimise surface flow and help prevent erosion. AIR will monitor the effectiveness of all erosion control measures and where necessary will implement remediation measures.

Earthworks will be conducted to stabilise and reshape the site to as near original condition as possible, particularly in rehabilitated sites. Contour ripping will be used to loosen soils, minimise erosion and aid revegetation where necessary. Where available, topsoil and vegetation will be retained and spread back over the re-contoured areas progressively upon completion of mining.

The initial site to be rehabilitated will be relatively small and increased progressively to reduce the likelihood of erosion or disturbance. Where possible, large trees and other significant vegetation will be avoided to aid in future rehabilitation. During mining, surrounding vegetation will be retained as far as practicable to provide a buffer to rehabilitated vegetation once mining is complete.

Management will be achieved through:

- Areas of disturbed or exposed soil will be minimised;
- Quality of water from the backfilled pits will be monitored to ensure it does not impact on the overall quality of water discharged or recycled from the sediment pond;
- AIR will monitor any impact of surface facilities on surface water flows and quality;
- All potentially contaminated water will be captured within the sediment pond;
- Viability of soil returned to pits will be assessed to determine if it requires supplementation to assist in stability and erosion management;
- Management of Cattle/livestock access;
- the root cause of any erosion will be identified and corrective actions will be carried out as soon as practicable; and

No new clearing work will be undertaken during period when risks of heavy rainfall are likely to result in erosion and sediment problems.

The Erosion Sediment Control Plan (Appendix H) will be reviewed periodically to determine success of mitigation and management. If any sedimentation or erosion is occurring on site a full review will be made to assess the effectiveness of current control measures and/or the requirement for more intensive control measures.

### 6.4.3 Social and Cultural

Cumulative impacts of water abstraction from the Roper River and increases in traffic are considered the most significant potential social and cultural impacts for this region.

Ongoing stakeholder engagement will be guided by a series of key principles. This will include, but not be limited to:

- Building long term relationships which can develop and adapt over the life of the project;
Determination of realistic timeframes while ensuring that all stakeholder enquiries and views are responded to in a timely manner;

- Developing an understanding of who is involved and how each group may be affected by decisions;
- Working closely with all interested parties to seek mutually beneficial outcomes;
- Ensuring transparency internally and externally regarding plans, decisions and changes;
- Incorporating, where possible, the knowledge, skills and experience of stakeholders; and
- Being flexible in how information is sourced and provided and being adaptable to change.

Some cumulative impacts that may occur within the Roper River Region include:

- Transportation increases;
- Abstraction of water from the Roper River; and
- Concentration of proposals within the Roper River Region.

Other impacts likely to result either directly or indirectly from the SILL80 Project include, but are not limited to:

- Increased sedimentation and erosion;
- Changes to access, including reduction in accessibility to traditional or farming lands;
- Clearing of native vegetation impacting visual amenity of the area;
- Fragmentation of fauna habitat;
- Increase in feral animals which may come into the area foraging for food found in landfills (?) and near residence (mining camp?)
- Water extraction from Roper River leading to changes in flow regime and timing as well as impacting on tourism, recreation and indigenous cultural activity/beliefs;
- Increases in noise, air pollution (dust) and vibration;
- Increased vehicular movement on site and nearby roads can lead to an increase risk of accidents, increased issues with erosion and general road condition, and visual amenity and road kill; and
- Impacts on indigenous sites of significance within and in close proximity of the mining lease – There is the risk of increased awareness leading to increased visitation and potentially vandalism, and impacts from mining such as dust and direct impacts (destruction).

6.4.3.1 Management

Inductions

AIR will follow a strict protocol of contractor induction covering the following topics as a minimum:

- General health and safety;
- Environmental management and awareness;
- Management and awareness of cultural assets within the lease and surrounding area; and
- Waste management.

General

Mitigation and management of impacts will be facilitated through:
• Ensuring there is no disturbance to known archaeological, historical or cultural features, this may be through limiting access (fencing) and / or educational programs and campaigns to raise awareness, including but not limited to signage;

• Regular inspections will be conducted to assess effectiveness of archaeological/historical site management;

• Immediate assessment of any new archaeological, historic or cultural discoveries during works;

• Immediate cessation of works if historical or cultural material found or suspected;

• Regular internal and external audits;

• Non-compliance and incident reporting;

• Site Induction including ‘cease work’ protocols and access limitations;

• Regular inspection of work areas conducted to assess effectiveness of protection measures;

• Maintenance of landowner property access at all times, where fences are breached temporary stock proof gates will be provided;

• Minimise disruption to landowners and third parties where possible;

• Immediate assessment of any new archaeological, historic or cultural discoveries during works;

• Regular internal and external audits;

• Non-compliance and incident reporting;

• Site Induction including ‘cease work’ protocols and access limitations;

• Regular inspection of work areas conducted to assess effectiveness of protection measures;

• Maintenance of landowner property access at all times, where fences are breached temporary stock proof gates will be provided;

• Minimise disruption to landowners and third parties where possible;

• Regular communication with TO's to ensure access is not an issue;

• Consultation meetings held as required;

• Grading and maintenance work carried out regularly to access tracks particularly following the wet season;

• Speed limit of <40 km per hour on all access roads;

• Development of a Biting Insect Management Plan;

• Ensure all equipment (e.g. Tyres) are disposed of from site to reduce incidence to standing water in / on infrastructure;

• Promoting training to allow stakeholders/community members to undertake specific management tasks such as surveying or rehabilitation; and

• Engaging stakeholders/community members as contractors to undertake specific tasks.

6.4.3.2 Management Plans
Management of potential social and / or cultural impact will be firmly entrenched into management plans developed for the SILL80 Project to ensure that strategies are in place to address impacts before they occur, but also capable of recognising new potential impacts so that the AIR is able to respond in an adaptive way to changes in operational circumstances. Social impacts may become more apparent at different stages of the operation and as such processes to address impacts must be in place prior to, and following, the project approval process and operations phase (Franks et al. 2009).

6.4.3.3 Training and Employment
Increased opportunities for training and employment will help to offset, to some degree, the disturbance to country caused by mining and therefore AIR has commenced negotiations to employ two local community members at the mine site.

6.4.3.4 Monitoring
Regular monitoring and review of potential and realised issues is essential in determining success and the need for adaptive management. Monitoring will be carried out through continued consultation with stakeholders and members of the local community including pastoralists and TO's.
Key aspects of monitoring will be:

- Consultation feedback;
- Internal and external auditing;
- Feedback received ad hoc, both positive and negative; and
- Assessment of level and type of support and services provided to local communities.

Moves will also be made to work collaboratively with other mine operators in the region to determine whether social impacts are being felt at a regional level and whether a strategy should be developed collectively over a wider area.

Results and findings from monitoring will be fed back into management plans and strategies to allow for continual improvements and adaptive management.

6.4.3.5 Proposed Monitoring

- Monitoring river levels over time to gauge the impact and compare to historic data;
- Metering of overall abstraction from the river;
- Regular monitoring of cultural/historical sites to determine any impacts;
- Routine dust monitoring; and
- Monitoring of rehabilitated land to ensure end function is reached.

Increased opportunities for training and employment will help to offset, to some degree, the disturbance to country caused by mining and therefore AIR has commenced negotiations to employ three local community members at the mine site.

Key aspects of monitoring will be:

- Consultation feedback;
- Feedback received ad hoc, both positive and negative; and
- Assessment of level and type of support and services provided to local communities.

Moves will also be made to work collaboratively with other mine operators in the region to determine whether social impacts are being felt at a regional level and whether a strategy should be developed collectively over a wider area.

Results and findings from monitoring will be fed back into management plans and strategies to allow for continual improvements and adaptive management.

Other monitoring proposed by AIR includes:

- Monitoring river levels over time to gauge the impact and compare to historic data;
- Metering of overall abstraction from the river;
- Regular monitoring of cultural/historical sites to determine any impacts;
- Routine dust monitoring; and
- Monitoring of rehabilitated land to ensure end function is being achieved.

AIRs principle aim is to ensure that they develop and implement a process for estimating, before development, any social consequences potentially resulting from this proposal and to identify methods for management and mitigation.

Further information is available in Appendix D Social Cultural Aspects Report.
6.4.4 Waste and Hazardous Substance Management

6.4.4.1 Processing Waste

The only waste generated from ore processing is washed regolith, which will undergo active separation to remove water prior to being returned to the mining pit for site rehabilitation. No chemicals or reagents are planned to be used during the water and gravity separation process. Other wastes associated with mining operations, such as standard wastes associated with the operation of machinery (e.g. oils and replacement parts), will be minimised and all waste materials collected, contained and removed from the site and disposed of at an approved waste disposal facility. Washed regolith will be the only substance replaced into mined pits.

6.4.4.2 Camp Waste

AIR will share the existing and well established Sherwin Iron Exploration camp, located on Flying Fox Station. This camp is currently run by MS Stock, the property owners. All waste disposal responsibilities are contracted to MS Stock and additional licensed contractors. This relationship will continue during AIR’s residence.

6.4.4.3 Hazardous Substances

Any hazardous substances will be stored appropriately in accordance to their specific MSDS. MSDS documents will be available within the onsite office. Currently no hazardous substances other than diesel fuel storage have been identified as required for the processing of ilmenite.

6.4.4.4 Fuel

Diesel fuel will be stored adjacent to the processing shed in a relocatable self bunded 61,000 litre fuel storage tank in an area selectively cleared to prevent fire risk and allow for heavy vehicle access. An appropriately built refuelling station will be established so as to reduce the potential impacts of refuelling spillages. Refuelling stands and equipment will be in accordance with Australian Standard AS1940.

6.4.4.5 Recycling

Wherever practically and economically viable all waste materials will be recycled. Used metal machinery, copper wire, etc. will be collected in designated areas prior to removal from site for recycling. Plastic pipe including HDPE, PVC, ABS, will be reused wherever possible. Used tyres will be collected and periodically dispatched to off-site disposal facilities. Waste produced as a result of mining activities will be disposed of through contractors processing the camp waste at Flying Fox Station.

6.4.5 Emissions

6.4.5.1 Radiation Survey and Assessment

A baseline gamma dose survey was performed at MLA27422 prior to the commencement of mining (Appendix F Radiation Assessment Report). As the mine area is reasonably large, 1225 hectares, a gridded ground gamma survey over a portion of the area was conducted. This area has been identified by AIR as the first area of the mining lease to be developed and mined (Figure 6-1). Multi-purpose radiological survey meters were used with measurements taken 1 metre above the ground, with over 400 measurements taken to establish the baseline gamma radiation levels over this portion of the mineral lease.

Once mining and processing begins it will be necessary to conduct a radiological survey over the stockpile and processing area. This survey will establish the activity and the activity concentrations of the possible radionuclides of interest in the ore concentrates to determine if radiation levels fall below exemption levels.

The low gamma dose rates are assumed to be caused by two main factors. Firstly, the area does not have high concentrations of naturally occurring radionuclides in the surface materials. Secondly, the ilmenite is low in monazite sands, the source of radiation in most mineral sands. MLA27422 is not a placer deposit, it is an in-situ deposit that has not been transported away from its parent rock and therefore has not had the concentration mechanisms of nature most mineral sand deposits have experienced and, consequently, the
introduction and concentration of monazites. This has led to very low levels of radionuclides which are reflected in the results of the radionuclide analysis.

The radionuclide activity concentrations in the soils associated with the ilmenite deposit surveyed are low. The gamma dose rate over the deposit is also low and is equal to or less than background levels in the area.

Figure 6-1. Radiation Survey Location.

6.4.5.2 Greenhouse Gas Emissions

Due to the nature of the mining process, greenhouse gas emissions will be emitted over the duration of the SILL80 project. The emissions will vary according to the stage of the operation. During construction, the main emission source will be the burning of diesel fuel by the mobile equipment required to carry out construction work. Additional emission sources will include diesel generators at the mine site, the pump at the water extraction site and aviation fuel required when utilising the nearby Numul Numul Station Airstrip for site access.

During operations, primary emission sources will result from;

- Mining and transport to processing plant;
- Ilmenite refinement practices at the processing plant;
- Transport of Ilmenite to Port Darwin;
- Operation of power generators, pumps, and the small vehicle fleet required for daily operation of processing facilities; and
- Ongoing land clearing to access the mineral resources.

The nature of this project offers few if any alternatives to the use of diesel for activities such as transportation and power generation. Care has been taken to ensure that the most efficient diesel engines have been selected for use to minimise greenhouse gas emissions. The SILL80 project and its associated greenhouse gas emissions will be in an area not subject to other concentrated sources of greenhouse gases.

<table>
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<th>Item</th>
<th>Annual Fuel Consumption kL / Year</th>
<th>Hours per Day &amp; Days per Year</th>
<th>Usage</th>
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<tbody>
<tr>
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<td>36</td>
<td>12 &amp; 200</td>
<td>15 litres / hour</td>
</tr>
<tr>
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<td>1440</td>
<td>12 &amp; 200</td>
<td>30 litres / hour each</td>
</tr>
<tr>
<td>Excavator</td>
<td>91.2</td>
<td>12 &amp; 200</td>
<td>38 litres / hour</td>
</tr>
<tr>
<td>Grader</td>
<td>18.4</td>
<td>4 &amp; 200</td>
<td>23 litres / hour</td>
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<tr>
<td>Loader</td>
<td>91.2</td>
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<td>Haul Truck</td>
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<td><strong>Total</strong></td>
<td><strong>1770.4</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 6.4.5.3 Greenhouse Sinks

The clearing of vegetation for project related activities will result in the removal of approximately 800 ha of existing woodland. This comprises the processing and general work area, open cut pits and access roads. Land clearing contributes to Greenhouse Emissions via the use of machinery to remove vegetation but importantly it is recognised that removal of vegetation generally contributes to a loss of a carbon sink. The rehabilitation proposed should improve the overall ability of the land to sequester carbon. Recent studies (i.e. Chan et al. 2009 & Tychniiewicz Consulting 2006) indicate that improved pasture and grazing management can lead to increased Soil Organic Carbon (SOC) sequestration potential and reduction in greenhouse gas emissions (when compared to traditional grazing practices and unmanaged grazing).

Methods for measuring sequestration are being developed (M Lanzarin 2012, pers. comm., 10 Jan.) and will enable estimates to be made of the effectiveness of this type of rehabilitation in creating an offset for mining. It will also enable comparisons to be made between the different rehabilitation strategies to determine the most effective. A “control” area will be established to provide baseline data on the current land practice and its ability to sequester carbon for later comparison to various rehabilitated sites.

### 6.4.5.4 Noise and Dust

Industry best practice techniques and adherence to the relevant Australian Standards will be used when performing activities likely to create excessive noise or dust.

### 6.4.6 Biting Insects

A Biting Insect Management Plan has been prepared (Appendix J), developed with reference to the *Guidelines for Preventing Mosquito Breeding Sites Associated with Mining Sites 2005* by the Northern Territory Government – Department of Health and Families.
Mine site infrastructure has the potential to create new mosquito breeding sites or increase the yield at existing sites. Potential breeding areas can be created in or around construction works, water storage facilities, sediment traps, pit dewatering, waste water disposal, mine waste dumps, site clearing burrow pits and storage of artificial receptacles. Any equipment sourced from North Queensland that is capable of holding even a small amount of water can potentially harbour the eggs of the dengue mosquito *Aedes aegypti*.

Management actions will be incorporated into the development and management of the mine site to prevent mosquito breeding opportunities, reduce the potential for contact between personnel and mosquitoes and detail monitoring and response strategies to severe outbreaks or incidence of disease.

A decommissioning and rehabilitation plan will be in place to ensure no actual or potential mosquito breeding sites remain after cessation of mining operations. All disturbed areas will be rehabilitated to be free draining where practical.
7 Environmental Offsets

7.1 Unavoidable Impacts

Identified impacts or detriments that cannot be avoided, reduced or mitigated at reasonable cost:

Abstraction of water from the Roper River – options have been explored to either reduce volume of water required or manner in which it is obtained. Pumping water from the River was identified as the most appropriate with safeguards in place, to ensure the ongoing operation of the mine.

Clearing of vegetation to make way for the mine and associated infrastructure – Clearing is essential to allow AIR access to the mined resource.

7.2 Management Failure

Risks of failure of management actions:

Failure to manage abstraction of water from the Roper River will potentially result in increases in ‘cease to flow’ events, reduction in availability of water for local communities, death of riparian vegetation, impacts on aquatic fauna, impacts on threatened fauna (Merten's Water Monitor), and loss of production time due to reduction in availability of water for processing.

Failure to manage clearing may result in excessive clearing, changes to hydrology and landform, direct impact on vegetation through removal of flora over a wide area, indirect impacts to fauna through removal of habitat.

7.3 Identification of Appropriate Offsets

The following section has been developed using the NT Governments Draft NT Environmental Offsets Policy (2010).

As the development is occurring on a pastoral lease, and in a heavily utilised and therefore highly disturbed part of the lease, the offsets plan needs to be appropriate to that situation. The land owners and lesasers of that land are eager to investigate the potential benefits of studying the increase in soil carbon via the rehabilitation planned, and therefore the environmental benefit of increases in soil carbon.

This will be the focus of the offsets plan proposed by AIR; however consultation will take place moving forward to determine if this is the most appropriate offsets for the proposed mining operation. Consultation will be done with land owners and land managers, government, and the general public.

Methods for measuring carbon sequestration are being developed (M Lanzarin 2012, pers. comm., 10 Jan.) and will enable estimates to be made of the effectiveness of the planned rehabilitation in creating an offset for mining. It is proposed that a “control” area will be established to provide baseline data on the current land practice and its ability to sequester carbon for later comparison to various rehabilitated sites. Interest in this work is high and it is envisaged that results from planned rehabilitation by AIR will feed into what is already known about carbon sequestration in other parts of Australia, leading to improvements in the future management of land in the NT.

AIR will consider options for contributing to better management of other pressing environmental issues, ensuring that measurable benefits are developed to determine that the offset is of equivalent value to residual impacts. While the focus will be on carbon offsets, AIR will look for other opportunities that may exist.

Offsets will be designed to avoid risks of obligation, or cost-shifting. Costs of long-term maintenance, for all parties involved, will be taken into account in building and assessing quality of offset arrangements.
Wherever possible, delivery of offsets will utilise skills and physical infrastructure available in the region or show how local capability will be accessed in a reasonable time. In particular, AIR will seek the advice of Holistic Land Managers with experience in carbon sequestration and local land managers with experience in managing land in the NT.

AIR will give particular regard to offsets that have benefits for:

- Local land managers;
- Local communities; and
- The management of pastoral land in the NT.

The period over which offsets will be maintained will be specified in any agreements. Any agreed offsets will be subject to monitoring to verify delivery of benefits. An agreed monitoring, reporting and review framework will be developed and upheld. Specifically, a section on offsets reporting will be included within the Mining Management Plan.

AIR will also consult with Government regulators throughout the design and selection process for offsets. Wherever possible, statements of detriment and of offset benefits will be based on agreed metrics.
8 Environmental Management

8.1 Introduction to the AIR Draft EMP

This PER and the draft Environmental Management Plan (draft EMP, Appendix L) aim to address the issues of concern highlighted in the Guidelines for the Preparation of a Public Environmental Report, SILL80 Project, Roper River area, NT (see Appendix A).

Specifically, the three major key risks identified in relation to this project:

- Extraction of water from the Roper River used for processing ore;
- Effectiveness of the proposed rehabilitation over large areas; and
- Potential impacts to threatened species.

8.1.1 Environmental Management

An essential part of AIR’s commitment to environmental management will be their compliance with environmental performance obligations, which will be demonstrated throughout the Project by monitoring; auditing and inspection, conducted internally by AIR and an appointed independent auditor, and externally via relevant authorities (refer to Draft EMP in Appendix L).

Additional to the EMP, AIR has a number of management plans to maintain environmental standards at the SILL80 project site. These include:

- Water Management Plan (refer to Appendix G);
- Erosion and Sediment Control Plan (refer to Appendix H);
- Weed Management Plan (refer to Appendix I);
- Biting Insect Management Plan (refer to Appendix J); and
- Rehabilitation Management Plan (refer to Appendix K).

These management plans have been developed specifically for the AIR's SILL80 project and will be utilised in the development of a Mining Management Plan (MMP) for the project. All management plans detail the monitoring programs and control measures employed to mitigate identified environmental issues. These plans have been developed to be implemented across the entire life of the project from construction to mining and rehabilitation.

8.1.2 Introduction to the AIR Draft EMP

A draft EMP has been developed for AIR's SILL80 project within the Roper River Region of the NT. This EMP is continually referred to as a Draft to allow for this progressive document to be updated as necessary with the aim of achieving best practice environmental management.

The draft EMP has been prepared and designed to:

- Be in accordance with industry best practice;
- Summarise each commitment detailed in this PER:
- Be strategic, ensuring appropriate environmental protection and impact minimisation techniques are implemented throughout and following construction and operational activities at the SILL80 site; and
- Describe the safeguards and controls to be employed to prevent, manage and monitor identified and potential impacts of AIR’s SILL80 Project.
8.1.3 Current and Future Locations of the EMP

The draft EMP is included in Appendix L of this document. It is anticipated that changes will be made to the draft EMP to address comments that may be received through the public review phase for this PER. The draft EMP will be finalised at the conclusion of the assessment, taking into consideration comments on the PER, and incorporating recommendations and conclusions.

It is also anticipated that ongoing changes to the EMP will be necessary throughout the life of the mine:

- To reflect newly available research or information;
- To keep up with best practice environmental management; and
- To respond to monitoring results with an adaptive management approach.

Thus, although the draft EMP may be finalised at the conclusion of the assessment, it will be updated each year, and submitted to N.T. Government authorities as part of AIR's annual MMP. The annually updated EMP will be provided in a form suitable for inclusion in the MMP, as required under the *Mining Management Act*. 
9 Public Involvement and Consultation

9.1 Persons Involved in Preparation of this PER

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Tasks</th>
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<tbody>
<tr>
<td>James Adcock</td>
<td>Civil Engineering Manager</td>
<td>Water MP</td>
</tr>
<tr>
<td>Kate Bauer</td>
<td>Senior Environmental Scientist</td>
<td>Fieldwork, Flora and Fauna Report</td>
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<tr>
<td>Ian Brown</td>
<td>Environmental Scientist</td>
<td>Aquatic Vertebrate Report</td>
</tr>
<tr>
<td>Jyoti Choudhary</td>
<td>Environmental Scientist</td>
<td>Digital Data Requests, GIS Mapping</td>
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<tr>
<td>Huon Clarke</td>
<td>Environmental Scientist</td>
<td>Document Review</td>
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<tr>
<td>Christine Crassweller</td>
<td>Archaeologist – Begnaze Pty Ltd</td>
<td>Archaeology survey and report</td>
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<tr>
<td>Pablo Elizondo</td>
<td>Civil Engineer</td>
<td>ESCP</td>
</tr>
<tr>
<td>Ann Grattidge</td>
<td>Senior Environmental Scientist</td>
<td>Community Consultation</td>
</tr>
<tr>
<td>Ray Hall</td>
<td>Manager and Principal</td>
<td>Project Development, Document Review</td>
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<tr>
<td>Casey Hawkey</td>
<td>Environmental Scientist</td>
<td>ESCP, Flora and Fauna Report, Fieldwork, Community Consultation, Water MP, Weed MP, Aquatic Vertebrate Report, Project Storybook, Biting Insect MP, Environmental MP</td>
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<tr>
<td>Alice Parawa</td>
<td>Administration Manager</td>
<td>Project Administration</td>
</tr>
<tr>
<td>Thomas Reilly</td>
<td>Senior Environmental Scientist</td>
<td>Document Review</td>
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<tr>
<td>Jeff Richardson</td>
<td>Principal Environmental Scientist</td>
<td>Flora and Fauna Report, Environmental MP, Document Review</td>
</tr>
<tr>
<td>Justine Shailes</td>
<td>Senior Environmental Scientist</td>
<td>Social and Cultural Aspects Report, ESCP, Rehabilitation MP, Document Review</td>
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<tr>
<td>Keith Munson</td>
<td>Environmental Scientist</td>
<td>GIS Mapping</td>
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<tr>
<td>Emma Murray</td>
<td>Environmental Scientist</td>
<td>Flora and Fauna Report, Fieldwork</td>
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<tr>
<td>Bruce Ryan</td>
<td>Radiation Principal – Paulka Radiation Services Pty Ltd</td>
<td>Radiation Surveys and Report</td>
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<tr>
<td>Dave Wilson</td>
<td>Aquatic Flora and Fauna Specialist – Aquagreen Pty Ltd</td>
<td>Aquatic Vertebrate Surveys Roper River</td>
</tr>
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</table>
EcOz Environmental Services (EcOz) is a fully Australian-owned and well-respected environmental consulting business providing services to industry, communities and government in northern, western and central Australia. The company was established in the Northern Territory in 1990 and merged with the VDM Group in July 2006. EcOz provides a broad range of environmental services to a diverse range of local, national and international clients. EcOz have bioregional expertise in the wet/dry tropics and the arid zones of Australia, and can provide a wide range of additional services and expertise from national resources. EcOz work closely with their clients to provide rigorous and practical solutions to environmental problems whilst maintaining integrity in environmental practice.

### 9.2 Persons, Department and Organisations Consulted During PER Development

<table>
<thead>
<tr>
<th>Consultation</th>
<th>Mark Sullivan</th>
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<tbody>
<tr>
<td><strong>Flying Fox Station</strong></td>
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</tr>
<tr>
<td>Northern Land Council</td>
<td>Charlotte Deans: Senior Project Officer, Mining and Major Projects</td>
</tr>
<tr>
<td></td>
<td>Daniel Maher: Katherine Regional Officer</td>
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<tr>
<td></td>
<td>Howard Smith: Manager, Mining and Major Projects</td>
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<tr>
<td></td>
<td>Tamara Cole: Legal Advisor</td>
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<td></td>
<td>Gaye English: Regional Anthropologist</td>
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<td></td>
<td>Emma King: Regional Anthropologist</td>
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<td></td>
<td>Therese Cramb: Special Planning Officer, Mining and Major Projects</td>
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<tr>
<td>NRETAS</td>
<td>Natural Resources Division</td>
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<tr>
<td></td>
<td>Ralf Koberstein: Resource Information Officer</td>
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<td>Water Resources Branch</td>
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<tr>
<td></td>
<td>Chris Wicks: Manager, Planning and Regulation</td>
</tr>
<tr>
<td></td>
<td>Simon Cruickshank: Senior Manager, Water Monitoring</td>
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<td></td>
<td>Ian Lancaster: Director, Water Resources</td>
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<td></td>
<td>Brendan Dimech: Water Resource Planner</td>
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<td>Numul Numul Station</td>
<td>Moira Lanzarin</td>
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<td></td>
<td>Rory O'Brien</td>
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<td>Patrick O'Brien</td>
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<td>Mike O'Brien</td>
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<td>Claire O'Brien</td>
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<td>Traditional Owners and Native Title Claimants</td>
<td>Moses Silver</td>
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<td>Steven Sandy</td>
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<td>Mildred Ponto</td>
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<td>Estelle Farrar</td>
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<td></td>
<td>Jojo Huddleson</td>
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## 10 Glossary

### 10.1 Glossary

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<tr>
<td>AAPA</td>
<td>Aboriginal Areas Protection Authority</td>
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<td>AIR</td>
<td>Australian Ilmenite Resources</td>
</tr>
<tr>
<td>DoR</td>
<td>Northern Territory Department of Resources</td>
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<tr>
<td>E&amp;H</td>
<td>Northern Territory Department of Natural Resources, Environment, The Arts and Sport, Environment and Heritage Division</td>
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<tr>
<td>EA Act</td>
<td><em>Northern Territory Environmental Assessment Act 1982</em></td>
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<tr>
<td>EL</td>
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<td>EMP</td>
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<td>EPBC Act</td>
<td><em>Environment Protection and Biodiversity Conservation Act, 1999 (Commonwealth)</em></td>
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<td>ESCP</td>
<td>Erosion and Sediment Control Plan</td>
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<tr>
<td>ILC</td>
<td>Indigenous Land Corporation</td>
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<tr>
<td>ML</td>
<td>Mega litres</td>
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<td>MLA</td>
<td>Mining Lease Application</td>
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<td>MMP</td>
<td>Mining Management Plan</td>
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<td>MSDS</td>
<td>Material Safety Data Sheet</td>
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<td>NLC</td>
<td>Northern Land Council</td>
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<td>NOHSC</td>
<td>National Occupational Health and Safety Commission</td>
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<td>NOI</td>
<td>Notice of Intent</td>
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<td>NRETAS</td>
<td>Natural Resources, Environment, The Arts and Sport</td>
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<td>NT</td>
<td>Northern Territory</td>
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<td>PER</td>
<td>Public Environmental Report</td>
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<td>SEL</td>
<td>Substitute Exploration License</td>
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<td>SEWPaC</td>
<td>Australian Government Department of Sustainability, Environment, Water, Population and Communities</td>
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<td>SOP</td>
<td>Standard Operating Procedure</td>
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<td>WCD</td>
<td>Water Control District</td>
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<td>WDL</td>
<td>Waste Discharge Licence</td>
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<td>Water Management Plan</td>
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</tbody>
</table>
11 References


Australian Ilmenite Resources
Public Environmental Report
Appendices

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Appendix B: Flora and Fauna Report
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Appendix E: Archaeology Report
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Appendix H: Erosion and Sediment Control Plan
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Appendix J: Biting Insect Management Plan
Appendix K: Rehabilitation Management Plan
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ARCHAEOLOGY REPORT
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APPENDIX G
WATER MANAGEMENT PLAN
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REHABILITATION MANAGEMENT PLAN