EcOz Environmental Services

WesternDesert RESOURCES

Draft EIS - Appendix C Environmental Management Plan

Western Desert Resources Limited
Roper Bar Iron Ore Project



2012

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Document Control Record

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Date:	14/04/2012

REVISION STATUS

Revision No.	Description of Revision	Date	Approved
0	First Issue	21 Feb 2012	RH
1	Review	8 April 2012	JR

Recipients are responsible for eliminating all superseded documents in their possession.

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Document Reference Number: DW120004-C0301-EIA-R-0051

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1 Introduction

1.1 Proposal

Western Desert Resources Limited (WDRL) is proposing to develop an iron ore mine in the Gulf region of the Northern Territory. The project is titled the Roper Bar Iron Ore Project (the Project). Broadly, the project intends to mine iron ore and transport it 165km from the mine site via a purpose built haul road with the ore to be loaded onto barges at the existing Bing Bong Loading Facility (see Figure 1-1).

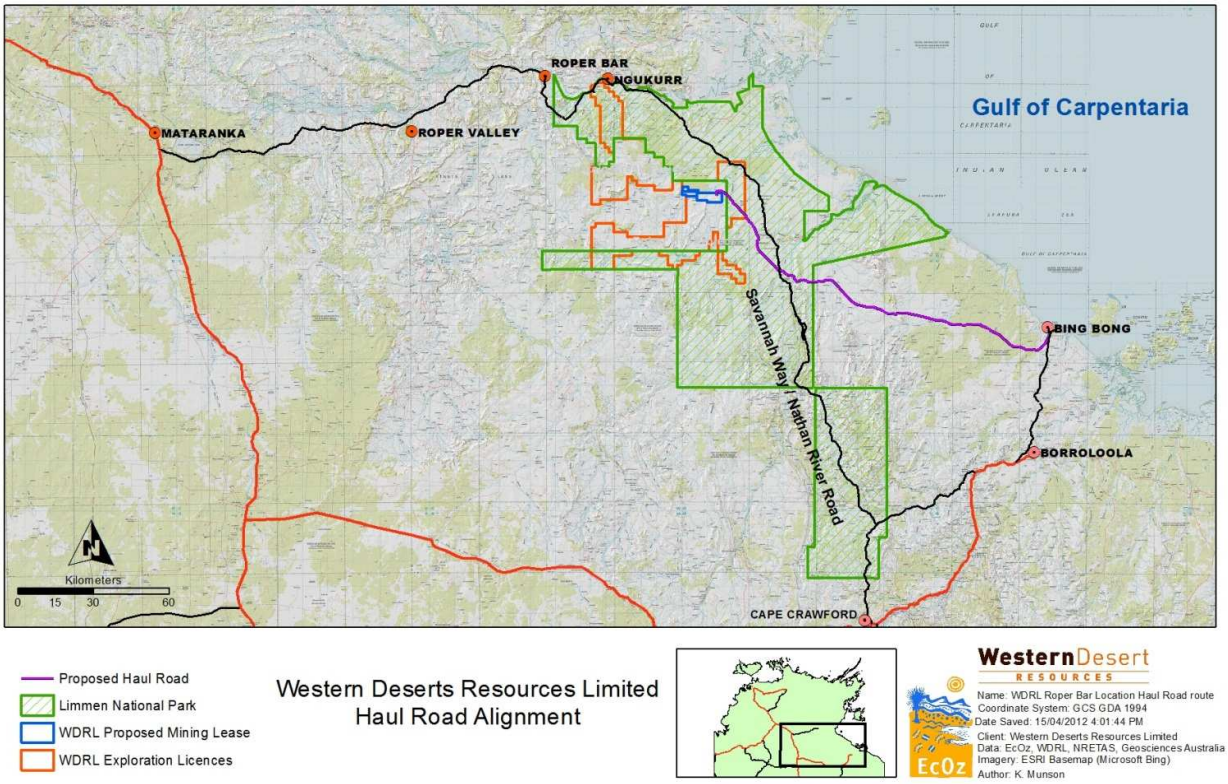

Figure 1-1. Location of the Proposal

This document describes the framework employed by WDRL for environmental management including safeguards and controls developed to ensure environmental impacts are minimised and promptly remedied, and outlines effective monitoring and environmental management throughout the construction phase of the project.

1.2 EMP Purpose and Scope

This Environmental Management Plan (EMP) has been prepared to cover all activities associated with the WDRL Roper Bar Iron Ore Project. Methods developed within this plan can be modified where necessary to assist with continuous improvement of management at WDRL mine sites through the Mining Management Plan (MMP) process.

The objectives of this EMP are as follows:

- To define the statutory obligations that must be fulfilled;
- To present a range of specific environmental management actions necessary to meet the requirements of the environmental assessment process;
- To provide a clear framework for effective environmental management during all phases of the project;
- To assign clear and appropriate responsibilities for the implementation of specific environmental undertakings;
- To specify monitoring regimes to enable assessment of environmental performance; and
- To facilitate self-assessment to ensure that mitigation measures are implemented.

The EMP will be reviewed and amended to incorporate any recommendations resulting from the EIS assessment process. The EMP will be reviewed annually to maintain relevance to all aspects of the project. Any updates to the EMP will also be included in the MMP annual review.

1.3 Legislative Requirements

The main Commonwealth and Northern Territory legislation associated with this proposal are listed in Table 1-1 below.

Table 1-1. Relevant Commonwealth and Northern Territory Legislation

RELEVANT LEGISLATION
COMMONWEALTH LEGISLATION
Aboriginal and Torres Strait Islander Heritage Protection Act 1984
Environment Protection and Biodiversity Conservation Act 1999
Native Title Act 1993
Quarantine Act 1908
Australian Quarantine Regulations 2000
Environment & Heritage Amendment Act No. 1 2003, No 88 2003 (repealed the Australian Heritage Commission Act)
Aboriginal Land Rights (Northern Territory) Act 1976
National Greenhouse and Energy Reporting Act 2007
NORTHERN TERRITORY LEGISLATION
Environmental Assessment Act 1994
Mining Management Act 2001
Northern Territory Aboriginal Sacred Sites Act 1989

RELEVANT LEGISLATION
Mining Act 1980
Territory Parks and Wildlife Conservation Act 2006
Water Act 1992
Aboriginal Land Act 2004
Bushfires Act 1980
Control of Roads Act 2011
Crown Lands Act NT 2009
Dangerous Goods Act 1998
Dangerous Goods (Road and Rail Transport) Act 2011
Environmental Offences and Penalties Act 1996
Heritage Conservation Act 2008
Miscellaneous Acts Amendment (Aboriginal Community Living Areas) Act 2000
Planning Act 1989
Public Health Act 1952
Soil Conservation and Land Utilisation Act 2009
Traffic Act 2011
Waste Management and Pollution Control Act 1998
Water Supply and Sewage Act 1983
Weeds Management Act 2001
Workplace Health and Safety Act 2001

2 Management Structure

It is important to align organisational structure, including tasks, workflow, responsibility and authority, with the overall business and environmental objectives. The following section details the responsibilities of different levels of personnel and the tools that are used to support the management structure.

2.1 Responsibilities

WDRL and its personnel are responsible for implementation of, and compliance with, this EMP. WDRL may engage contractors to carry out activities such as process plant and haul road construction, upgrades or pit excavations at the mine.

Key personnel (i.e. Field Logistics and Operations Manager, Project Manager and Field Supervisors) are responsible for communicating environmental matters and ensuring management practices and procedures are being implemented.

Specific environmental roles and responsibilities are detailed in the following sections.

2.1.1 Managing Director – WDRL

The Managing Director is responsible for the standard of all management, including environmental management. To assist in fulfilling this responsibility, the Managing Director is supported by a series of specialist personnel (refer to hierarchy in Figure 2-1).

2.1.2 Field Logistics & Operations Manager – WDRL

The Field Logistics and Operations Manager is responsible for actioning all required surveys, monitoring, consultations, reporting requirements and community support as committed to within this EMP. Local contractors and employees will be sourced through the Field Logistics and Operations Manager. The Field Logistics and Operations Manager will receive feedback from the Field Supervisor regarding on-ground achievements and conditions, and will liaise directly with higher management for financial guidance and company direction (see Figure 2-1).

2.1.3 Field Supervisor – WDRL

The Field Supervisor is responsible for ensuring that onsite environmental safeguards, surveys and monitoring, inspections and remediation are all carried out as committed to within this EMP and as directed by the Field Logistics and Operations Manager. The Field Supervisor will report back directly to the Field Logistics and Operations Manager with outcomes and on-ground suggestions.

2.1.4 Environmental Contractors

Externally contracted environmental consultancy staff will conduct or supervise required audits and surveys. Environmental consultants will provide reports on this work, including recommendations on environmental management backed by extensive environmental training and experience. Communications regarding logistics will be directed to the Field Supervisor, and management recommendations will be directed to the Field Logistics and Operations Manager for consideration. Environmental consultants will also work closely with the Field Logistics and Operations Manager with respect to annual EMP review and annual submission of the MMP.

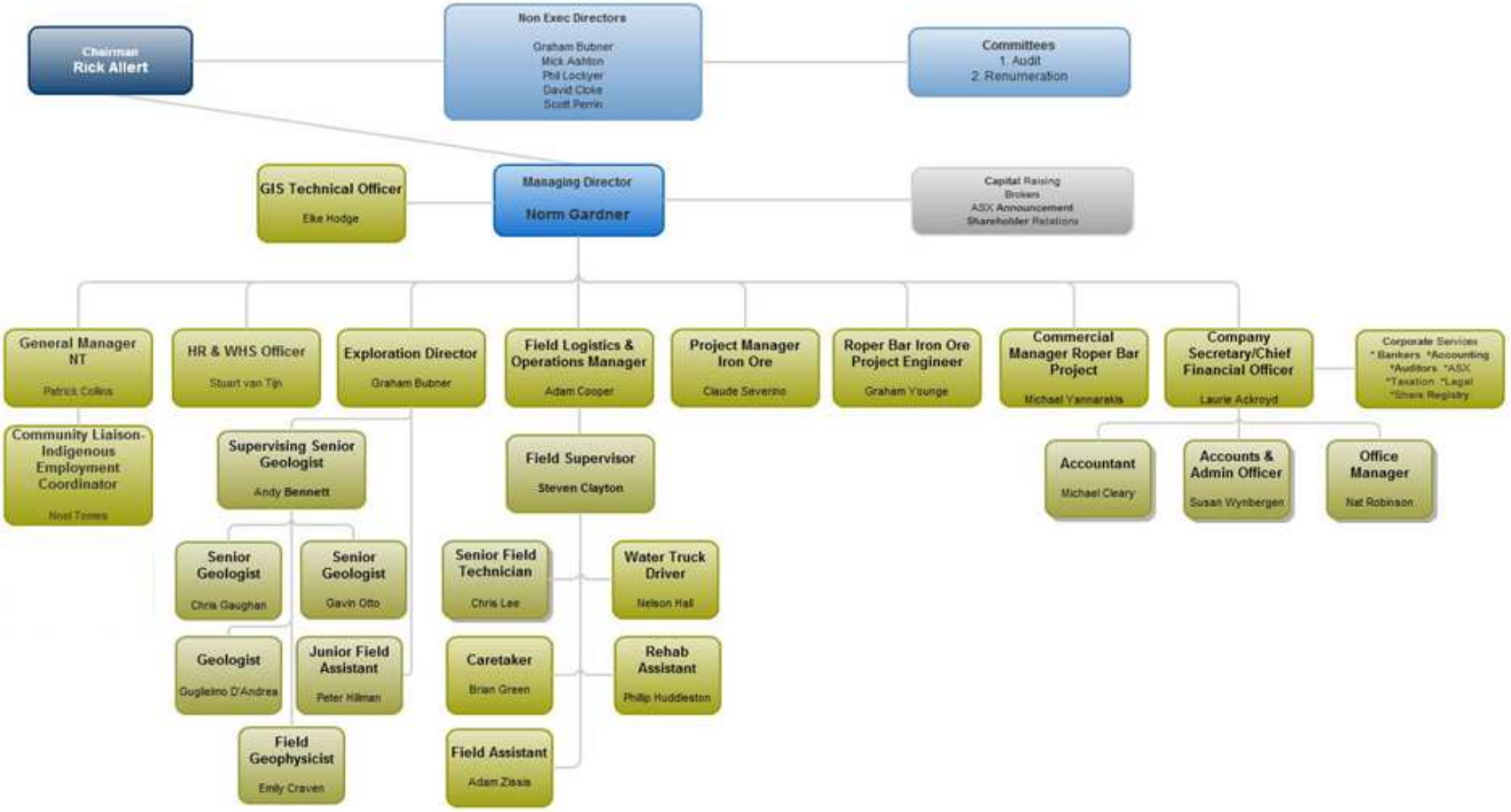

Figure 2-1. WDRL Personnel Management Structure

2.2 Environmental Induction, Training and Awareness

All Managers (including the Field Logistics and Operations Manager, Field Supervisor, and Project Manager – Iron Ore) are responsible for identifying training and competency requirements for personnel under their control, and for ensuring that personnel have the requisite competencies, skills and training to carry out their assigned tasks. Managers are also responsible for ensuring training records are maintained.

2.2.1 Induction

All staff, contractors, and consultants will complete a comprehensive site induction. The induction will include safety requirements, site behaviour rules, access protocols and restrictions, cultural requirements and commitments, and a comprehensive review of environmental risks, responsibilities and standards. All project managers will have an additional training session on the use and implementation of the EMP.

It is the responsibility of the Managers to ensure records of the training of relevant personnel are maintained.

2.2.2 Toolbox Meetings

The Field Supervisor will hold regular toolbox talks with staff and crews to discuss issues associated with the scheduled work. The toolbox meetings will involve highlighting and discussing relevant environmental and safety issues and monitoring results. Toolbox meeting agendas, attendance and outcomes will be recorded and maintained, as they will form the main stream of communication between the upper management and on-site staff.

2.2.3 Construction SOP's

All construction staff, including external contractors, will operate using Standard Operation Procedures (SOP's) developed by WDRL. The SOP's will cover methods and materials used to ensure all works are performed to the same standard as well as ensuring that any potential environmental impacts are effectively managed.

2.2.4 In-House Training

Regular training will be offered for personnel; this will include, but not be limited to, training in pollution/spill management and response, incident reporting, fire-fighting and weed identification.

2.3 Reporting Requirements

It is important that records and reports are maintained to ensure that the objectives of the EMP are being achieved. The Field Supervisor will be required to record daily and weekly activities on pre-prepared checklists addressing relevant EMP requirements.

All reports, reviews, and audits will be maintained by the Field Logistics and Operations Manager, copied to the Managing Director, and made available to appropriate staff (Environmental Officer, Geologists and Field Supervisor) and, when relevant, the Regulatory Authorities. Audit results will be used to review management practices.

2.3.1 Mining Management Plan and Operations Environmental Management Plan

WDRL will submit an annually updated Mining Management Plan (MMP) as required under section 41 (1) of the *Mining Management Act 2011.* The MMP will include an annually revised version of the OEMP.

The EMP is a live document and as such will be updated annually to ensure commitments remain effective and applicable. The Northern Territory Department of Resources (DoR) will be notified of any significant changes to approved mining activities by amending the MMP, this may occur at any time, outside of the above commitment.

2.3.2 Audits

Annual audits of EMP compliance will be conducted and reported as part of the annual MMP review and renewal process. WDRL operations will be annually audited against this EMP and the results provided to the Department of Resources , who may also audit the site as required.

Any reasonable environmental practices, procedures or standards recommended after an environmental audit or assessment will be implemented at the first available opportunity. WDRL understands the importance of high environmental standards and is committed to achieving these.

2.3.3 Incident Reporting and Non-Conformance

Incident reporting will be implemented to record any safety or environmental non-conformances or incidents. These shall be recorded on an incident report form and forwarded to the Field Supervisor and Field Logistics and Operations Manager. Reporting of incidents externally will be undertaken in accordance with relevant legislation (e.g. Section 29 of the *Mining Management Act 2011*). Incidents will be investigated and followed up and, where relevant, corrective actions nominated and implemented. The Field Supervisor is responsible for ensuring all incidents are thoroughly investigated, managed accordingly and that these incidents are made available to auditors.

2.3.4 Complaints Register

The Field Supervisor will be required to report and record any complaints from the public or specific Project stakeholders to the Field Logistics and Operations Manager. The Field Logistics and Operations Manager will record any complaints received from the Field Supervisor and enter these on the WDRL Complaints Register in accordance with a Complaints Management Procedure (to be developed). The Field Logistics and Operations Manager shall review each complaint upon receipt and with the Field Supervisor determine how the complaint will be addressed. Corrective actions and other recommendations including, where applicable, modifications to practices and procedures shall be made and closed out under the direction of the Field Logistics and Operations Manager. A summary of complaints and subsequent investigations, including monitoring results and corrective actions, will be prepared and reported within the MMP.

2.4 Monitoring

Monitoring will be undertaken to verify compliance with environmental conditions and commitments, satisfy regulatory and reporting requirements, track environmental performance and measure the effectiveness of environmental management measures.

WDRL will establish an environment monitoring program specific to its operations at Bing Bong. WDRL will also participate in the relevant environmental monitoring programs currently run by Xstrata and expand these programs if necessary for the WDRL operation.

Results from any monitoring undertaken will be presented within the MMP, with an assessment of compliance against commitments made in the EMP.

Provision will be made for changes in monitoring requirements throughout the proposal including those following the implementation of the Rehabilitation and Closure Plan. Changes will be captured within the MMP.

2.5 Document Management

2.5.1 Review

The draft EMP shall be updated following comments received through the EIS process. Any further improvements identified during implementation of the plan will be incorporated into the EMP. The EMP will

be annually reviewed and updated as required and these changes summarised within the MMP. Both the MMP and EMP shall be provided to NRETAS (Department of Resources) for review and approval.

3 Key Risks

Risks to people, the environment and nearby facilities associated with the proposal, and the storage and transport of materials to and from the complex, have been identified in the Environmental Impact Statement Chapter 9.

The key risks that have been identified include:

- Habitat disturbance impacting terrestrial, aquatic and marine biodiversity;
- Potential negative impacts on local communities (social and cultural impacts);
- Potential cumulative impacts of large scale development/s in a remote area;
- Risks to surface and groundwater water.

Water usage, management and monitoring for both surface and groundwater systems have been identified as key risks within the guidelines. The information and level of detail requested necessitates the development of a separate Water Management Plan (WMP). This document will be developed prior to both the construction and operation phases of the proposal. The WMP will detail the volumes and sources for all requirements during both the construction and operation phases, as well as detailing the monitoring methods developed to prevent over abstraction of resources and the physic chemical parameters to be monitored to ensure the development does not result in any adverse implications to water quality.

Acid Mine Drainage has also been identified as a potential risk associated with this development. Similarly, the information and level of detail required to manage this potential component necessitates the development of a separate Acid Mine Drainage Management Plan (AMDMP). A preliminary plan is provided within Appendix K which will be further developed and implemented after approval from government regulators. The AMD MP will detail the control measures for monitoring and containment.

Other potential environmental impacts that have been identified include:

- Bushfires;
- Biting insects;
- Noise and vibration;
- Air quality and dust;
- Greenhouse gas emission and climate change; and
- Visual amenity.

4 Environmental Management

4.1 Surface Water

4.1.1 Construction Phase

Description

- The project requires a stream realignment
- Mining can expose potentially acid forming materials (PAF)
- Final route selected for haul road will pass over several waterways
- 165km haul road with bridges and culverts will be installed
- Vegetation clearing for the project has the potential to lead to erosion and/or sedimentation issues
- Hazardous material spills may affect water quality
- Permanent mine site camp
- Temporary camps built along haul road

Environmental Aspects to be Managed

- Waterways in the area have been identified as in 'near pristine' condition
- Potential water quality changes due to construction activities, including potential acid/metalliferous drainage (AMD) issues
- The haul road traverses rivers and streams and there is likely to be short term disruption to their flow during construction
- Water extraction for temporary camps and haul road construction
- Sewage disposal and potential for eutrophication of water bodies

4.1.2 Operational Phase

Description

- Dewatering of pits may have deleterious consequences on surface water quality and quantity if not contained on site

- On-going concerns about sedimentation/erosion and water quality
- On-going concerns around AMD

Environmental Aspects to be Managed

- Surface water quality to be monitored
- Stream realignment to ensure no interruption of flow, no pooling etc.
- Integrity of surface water flows needs to be maintained – no impact on downstream environments/communities/amenity

Performance Management

Management Objective	Target	Actions	Performance Indicators
No AMD affects to the environment	A comprehensive understanding of the extent and reactivity of any PAF materials	Create a comprehensive AMDMP	A comprehensive AMDMP completed and implemented
	An AMD Management Plan (AMDMP) using the information derived above		
stream realignment will not affect river function or biota	No changes in stream hydrology including quantity, flow seasonality and velocity	Appropriate channel design and construction that incorporates considerations of quality, quantity and velocity and stream morphology	No evidence of erosion as a consequence of increased velocity
	No change in water quality		No changes in water quality
Maintain baseline water quality	No evidence of erosion	Erosion and Sediment Control Plans (Appendix L) implemented	No evidence of erosion or sedimentation outside or inside the mining footprint

Management Objective	Target	Actions	Performance Indicators
	The haul road will in no way interrupt the flow of waterways or cause concentrated flows leading to erosion	Install appropriately sized culverts/bridges to ensure that there is no pooling of water upstream of culverts etc. and no concentration of flows leading to erosion/sedimentation	Water quality upstream and downstream of bridges the same
	No discharge of hydrocarbons or other environmentally toxic substances	Storage and handling of chemicals and hydrocarbons as per Australian Standards and Industry Best Practice	No spills
		Ensure that all bunds/ESCP measures to Australian Standards and Industry Best Practice	No spills
		Staff trained in spill response	All staff trained in chemical spill response
	No eutrophication of waterways from sewage (temporary or permanent)	Adhere to Northern Territory Code of Practice for the small on-site sewage treatment systems, and the disposal or reuse of sewage effluent	Installations follow code and no reports of incidents
Maintain water quantity	Water quantity will be maintained at a volume and timing that supports waterway function and biota	No action required as mine site water balance shows no excess water from pit dewatering (all water re-used/recycled through process)	

Monitoring Program

Management Objective	Performance Indicators	Monitoring Methods	Reporting
No AMD affects to the environment	A comprehensive AMDMP completed and implemented	To be developed as part of AMDMP but will include water quality	MMP
Stream realignment will not affect river function or biota	No evidence of erosion as a consequence of increased velocity	Part of ESCP	MMP
	No changes in water quality	Part of surface water monitoring program	
Maintain baseline water quality	No evidence of erosion or sedimentation outside the mining footprint	Visual inspection and permanent monitoring points in susceptible areas	MMP
	Water quality upstream and downstream of bridges the same	Chemical and dissolved solids assessment	Monthly initially, six monthly afterwards
	Water quality parameters upstream and downstream of mine in accordance with baseline quality	In situ and laboratory testing according to WQMP	Annually through MMP
	No spills of any environmentally harming products	Incident reporting	Through MMP
	Installation of sewage systems to code and no reports of incidents	Incident reporting	Through MMP audit

Contingencies

Non-compliance	Action
AMD effects on the environment	a) Implement response to limit environmental impact b) Identify source of issue c) Review knowledge base to identify shortcoming d) Update planning and implementation e) Review current strategy
Function or biota affected by stream realignment.	a) Implement response to limit environmental impact b) Identify source of issue c) Review knowledge base to identify shortcoming d) Update planning and implementation e) Review current strategy
Evidence of erosion and sedimentation within the WDRL footprint	a) Document the erosion and/or sedimentation as an environmental incident (take photos) b) Determine what is causing erosion and/or sedimentation c) Review ESCP and mitigation structures – fix any areas which are not working effectively d) Report in the MMP
Uncontrolled discharge incident	a) Record as environmental incident and ensure reported within the MMP b) Determine reasons for uncontrolled discharge and develop strategy to mitigate c) Improve site diversion, ESCP structures as necessary d) Determine if contamination event has occurred and report as necessary
Reduced water quality downstream	a) Record as environmental incident and ensure reported within the MMP b) Determine reasons and develop strategy to mitigate c) Improve site diversion, ESCP structures as necessary

Non-compliance	Action
	d) Report as environmental incident in MMP

4.2 Groundwater

4.2.1 Construction Phase

Description

- During construction haul road constructions teams will have temporary camps utilising groundwater
- Construction water requirements may be obtained from groundwater sources
- There will be an increased demand on groundwater bores at the mine site during construction

Environmental Aspects to be Managed

- Groundwater quality and quantity
- Contamination of groundwater

4.2.2 Operational Phase

Description

- Potential for contamination of groundwater from AMD and other sources
- Changes in groundwater levels that may affect other users including the environment

Environmental Aspects to be Managed

- Groundwater quality and quantity
- Contamination of groundwater
- Impact on groundwater dependent ecosystems

Performance Management

Management Objective	Target	Actions	Performance Indicators
To ensure that groundwater quantity is retained	No evidence of decline in important groundwater dependent ecosystems (GDE) attributable to WDRL construction	Develop a construction bore management plan to ensure sustainable extraction limits	Construction bore management plan written and implemented
			No impact on important GDE
To ensure that groundwater quality is retained	No evidence of AMD impacting groundwater	Adherence to AMDMP	No changes in water quality due to AMD
	No contamination of groundwater resulting spills and leaks of mine site chemicals and hydrocarbons	Adherence to appropriate guidelines for storage and handling	No changes in water quality due to chemicals and hydrocarbons

Monitoring Program

Management Objective	Performance Indicators	Monitoring Methods	Reporting
To ensure that groundwater quantity is retained	Construction bore management plan written and implemented	Monitoring of water levels	MMP
	No impact on important GDE	Condition of important GDE	
To ensure that groundwater quality is retained	No changes in water quality due to AMD	As part of groundwater monitoring plan	MMP
	No changes in water quality due to chemicals and hydrocarbons		

Contingencies

Non-compliance	Action
Groundwater quality has declined	a) Report as environmental incident – report within MMP b) Identify corrective actions and implementation strategies c) If necessary, consult with regulatory authorities to determine appropriate management d) Review ESCP if necessary e) Check all bunding and spill containment structures to ensure no breach is evident f) Check all storage containers/basins to ensure no breaches are evident
Groundwater Dependent Ecosystems are showing signs of deterioration/change	a) Report as environmental incident – report within MMP b) Identify corrective actions and implementation strategies c) If necessary, consult with regulatory authorities to determine appropriate management
Contamination incidents occurring at unacceptable levels	a) Report as environmental incident – report within MMP b) Identify corrective actions and implementation strategies c) If necessary, consult with regulatory authorities to determine appropriate management d) Review ESCP if necessary e) Review spill containment procedures and infrastructure f) Review chemical storage procedures and infrastructure g) Update procedures and equipment as necessary

4.3 Terrestrial and Aquatic Biodiversity

4.3.1 Construction Phase

Description

- Land clearing will be required at the mine, haul road and Bing Bong Loading Facility
- Bridges and culverts will be installed along waterway crossings
- Weeds of National Significance (and other high priority weeds) have been recorded nearby to the development envelope

Environmental Aspects to be Managed

- Sensitive habitats and threatened species are known to occur within and nearby to the development envelope
- Vegetation clearing impacts on water quality
- Introduction and increase in abundance of weeds and pest animals
- Impacts on habitat corridors, habitat loss and fragmentation impacts
- Impacts on water quality of creeks, streams and ephemeral lakes

4.3.2 Operational Phase

Description

- stream realignment complete
- Mine, haul road and loading facility in operation

Environmental Aspects to be Managed

- Potential introduction and increase in abundance of weeds and pest animals

Performance Management

Management Objective	Target	Actions	Performance Indicators
Protect flora and fauna species, and significant habitat types, from negative impact	No clearing outside of approved boundaries	Ensure personnel are aware of clearing guidelines and delineation of approved clearing boundaries	No evidence of unnecessary clearing within approved boundaries
			No evidence of clearing outside of approved boundaries
	No significant or ongoing impact on flora or fauna	Employ and comply with commitments and recommendations made in the WDRL Erosion Sediment Control Plans, Weed and Pest Management Plan and Rehabilitation and Closure Plan	No evidence of impact outside mining footprint e.g. no sedimentation, erosion, weeds and dust
	No impact on mapped sensitive habitats along the haul road	Direct impact - avoid haul road passing on or close to sensitive habitats.	No sensitive habitats directly impacted by haul road
		Offsite impacts for ephemeral wetlands downslope of haul road - ensure culverts installed.	No change in wetland hydrology
Improve knowledge and management of flora and fauna to assist in the maintenance of abundance, diversity, geographic distribution and productivity of species	Improved knowledge of flora, fauna and threats by having these issues as part of site induction and toolbox meetings. Recognition and management techniques should be covered	WDRL Field Supervisor to conduct information sessions for all personnel	Induction log and toolbox meetings content
		Keep record of significant species identified as occurring in the vicinity of the mine and ensure WDRL and contract personnel are aware of content	

Management Objective	Target	Actions	Performance Indicators
Management of clearing and rehabilitation in accordance with NT Guidelines such that there is no significant loss of biodiversity	Clearing only within approved boundaries	Ensure personnel are aware of clearing guidelines and delineation of approved clearing boundaries	No evidence of clearing outside of approved boundaries
	Rehabilitation compliant with NT Government requirements	Comply with commitments in the Rehabilitation and Closure Management Plan	Rehabilitation is completed within specified period of time
			Post rehabilitation condition meets agreed (planned) condition
Prevention of the introduction and spread of weeds, particularly Weeds of National Significance (WONS)	No increase in the extent, population number or number of weeds within the mine area, haul road corridor or loading facility areas	Fulfill obligations as per the Weed and Pest Management Plan including: Pre-construction weed survey along proposed haul road route and subsequent detailed plan for weed control and monitoring. Hygiene controls for mine site	Regular assessment of extent, population number or number of weeds
Effective management of buffer zones, wildlife corridors and protection zones to prevent significant damage to adjacent sensitive ecosystems	No off-site impact from any mining activity	Clearing vegetation to approved boundaries Weed and Pest Management Plan Erosion and Sediment Control Plans Incorporating sensitive habitat mapping into planning and operations	No change in the condition due to mining and associated activities

Monitoring Program

Management Objective	Performance Indicators	Monitoring Method	Reporting
Protect flora and fauna species, and significant habitat types, from negative impact	No evidence of unnecessary clearing within approved boundaries	Visual inspection of cleared areas post clearing	Report any clearing breaches within the Mining Management Plan (MMP)
	No evidence of clearing outside of approved boundaries	Visual inspection of cleared areas post clearing to ensure there has been no clearing outside of approved boundaries	Report any clearing breaches within the MMP
	No evidence of impact outside mining footprint e.g. no sedimentation, erosion, weeds and dust	Regular weed inspection as per Weed and Pest Management Plan	Annual inspection of lease areas to determine extent of any weed infestations and map new occurrences – particularly with regard to WONS
		Seasonal weed control conducted in areas where weeds are found/spreading	Keep a log of weed control undertaken throughout the year, detail weed species, location and extent
		Visual inspection post wet season to determine areas at risk/showing evidence of erosion and/or sedimentation	Keep a record of areas showing signs of erosion and/or sedimentation so that measures of success can be made on mitigation strategies – e.g. photo monitoring

Management Objective	Performance Indicators	Monitoring Method	Reporting
		Condition inspection of sensitive habitats	Any evidence of impact on significant habitats should be documented and reported within the MMP
Improve knowledge and management of flora and fauna to assist in the maintenance of abundance, diversity, geographic distribution and productivity of species	Induction log and toolbox meetings content (regular/thorough)	Monthly audit of log and toolbox meeting content to determine if educational content is appropriate and across all levels of personnel and work areas	Summary of content provided within the MMP
Management of clearing and rehabilitation in accordance with NT Guidelines and such that there is no significant loss of biodiversity	Rehabilitation is complete within specified period of time	Rehabilitation is scheduled within the approved timetable	Summary of rehabilitation works to be included within the MMP
		Rehabilitation log is kept showing areas undergoing rehabilitation, schedule, completion date and approved condition ranking	
	Post rehabilitation condition meets agreed (planned) condition	Monitoring is undertaken to ensure that approved post rehabilitation condition is likely to be met	Final rehabilitation report is to be prepared and made available to relevant stakeholders and departments
Prevention of the introduction and spread of weeds, particularly Weeds of National	Regular assessment of extent, population number or number of weeds in areas as determined from the pre-	Periodic inspection areas to ensure there are no weeds	Periodic inspection of lease areas to determine extent of any weed infestations and map new

Management Objective	Performance Indicators	Monitoring Method	Reporting
Significance	construction weed survey		occurrences – particularly with regard to WONS
		Seasonal weed control conducted in areas where priority weeds are found/spreading	Keep a log of weed control undertaken throughout the year, detail weed species, location and extent
Effective management of buffer zones, wildlife corridors and protection zones to prevent significant damage to adjacent sensitive ecosystems	No change in the condition due to mining and associated activities	Condition indices for sensitive ecosystems determined and measured	Annual audit as part of MMP

Contingencies

Non-compliance	Action
Clearing outside of approved boundaries	a) Report as environmental incident – report within MMP b) Identify corrective actions and implement c) If necessary, consult with regulatory authorities to determine appropriate management
Weed spread/introduction is identified	a) Map location of occurrence b) Investigate and implement methods to control spread c) Report to the appropriate authorities as required d) Communicate to staff through toolbox meeting or other appropriate forum e) Review vehicle wash-down and hygiene procedures/compliance audit

Non-compliance	Action
Evidence of erosion and/or sedimentation	a) Stop work immediately in the area, assess impact and investigate cause b) Determine corrective measures, review ESCP as required c) Implement corrective actions including rehabilitation and/or clean-up of the affected area
Decline in habitat condition within identified significant habitat zone	a) Stop work immediately in the area, assess impact and investigate cause b) Implement corrective actions including rehabilitation of disturbed area c) Determine and implement future preventative measures
Buffer zones are not being maintained (in an effective manner)	a) Determine cause of inappropriate management b) Communicate with appropriate parties and ensure buffer is maintained/re-instated
Rehabilitation is not completed within the specified timeframe	a) Determine why this has occurred and whether corrective actions are required b) Report to the appropriate authorities c) Implement corrective actions and amend rehabilitation plan if required
Post rehabilitation condition is not to agreed or planned state	a) Determine why non-compliance has occurred b) Determine whether planned and agreed state was realistic and make changes to plan as appropriate c) Implement adaptive management strategies, update plan, review and implement

4.4 Marine Biodiversity

4.4.1 Construction Phase

Description

- The loading facility basin will need to be excavated to construct a combi-pile wall
- An area will need to be reclaimed to construct the barge loader

Environmental aspects to be managed

- Sediment from the excavation
- Acoustic disturbance

4.4.2 Operational Phase

Description

- Ocean going vessels entering Gulf to collect ore
- Increased number of barges leading to potential increase in boat strike and acoustic disturbance
- Potential for spills of hydrocarbons or ore

Environmental aspects to be managed

- Potential for Introduction of invasive marine species
- Acoustic and physical disturbance
- Marine water and sediment quality through the prevention of spills of hydrocarbons or DSO
- Increase in shipping and corresponding increased potential for boat strike
- Potential for impacts upon coastal processes

- Interactions with commercial and Indigenous fishers
- Barge collisions and groundings and flow-on impacts
- Waste and rubbish disposal
- Introduction of artificial habitat

Performance Management

The intent of management and monitoring is to maintain the abundance, diversity, geographic distribution and productivity of marine ecological communities at species and ecosystem levels through the avoidance or management of adverse impacts, and improvement in knowledge.

Management Objective	Target	Actions	Performance Indicators
Minimise disturbance of benthic marine habitat	Disturbance of benthic habitat is minimised within the construction period	Suggest use of cutter-suction dredges for maintenance dredging to minimise both the potential for mega-fauna to be injured through contact with the dredge head, and sediment disturbance	Habitat and community composition outside of the construction and operational footprint is comparable to baseline conditions i.e. no net loss of seagrass outside of the swing basin and entrance channel
		Timing of construction works for optimal seasonal and tidal conditions i.e. dry season, low tide conditions	Turbidity returns to acceptable levels once construction ceases
		Use of best practice sediment and erosion control during construction of loading facility	

Management Objective	Target	Actions	Performance Indicators
		Use of silt curtain and floating boom system where practical to minimise generation of turbidity plumes, particularly during construction of the combi-pile wall and where feasible during maintenance dredging	
Prevent colonisation of artificial marine structures	Biofouling of marine structures does not occur	Surface structures are to be treated with antifouling paints that don't contain tributylin (TBT) compounds, in accordance with legislative requirements	Colonisation of marine structures is not observed during monitoring
Ensure no introduction of invasive marine species into the Port	No introductions of invasive marine species occur as a result of WDRL operations	Ships from International ports are already currently required to exchange ballast water outside of Australia's territorial sea under the Quarantine Act 1908	No invasive marine species are detected during monitoring
		Mandatory requirement that all ships comply with AQIS requirements with respect to the management of ballast water i.e. any vessels originating from foreign ports, a hull inspection is required, or vessels that have been outside of Australian waters in the previous 12 months may also necessitate inspection	
		If a marine pest is identified as a result of operations, then immediate measures that both identify and destroy the full extent of the outbreak will be implemented	

Management Objective	Target	Actions	Performance Indicators
		Improved methods that treat ballast water to destroy entrained organisms will be adopted in accordance with best practice and current legislation	
Prevent introduction of rubbish, waste, and debris into marine environment	No introduction of rubbish, waste or debris into the marine environment as a result of WDRL operations	Visual inspection of loading facility	No introduction of rubbish, waste or debris into the marine environment is detected during visual inspections of Barge Landing Area and recreational fishing area
		Correct handling, storage and disposal of industrial wastes	
		Suggest interpretive signage regarding the impacts of debris on the marine environment be installed at an appropriate location, as well as publicly accessible rubbish bins to ensure the appropriate disposal of waste	
		A regular litter collection program (targeting anthropogenic items) within the area of the loading facility and Recreational Fishing Area	
		Cyclone/extreme weather procedures (to be included in Emergency Management Plan) to ensure that waste and other material is secured and cannot enter the marine environment during heavy storms or cyclones	
		Dispose of sewage from vessels to a licensed sewage waste facility located at the loading facility	
Minimise underwater noise emissions to prevent impact on noise sensitive biota	No injury, mortality, or disruption of critical behaviors in marine fauna as a result of noise	During construction, a trained marine fauna observer is to make regular inspections (suggested frequency every half hour) both prior to start up and during construction	Injury or mortality to marine fauna as a result of underwater noise would be impossible to

Management Objective	Target	Actions	Performance Indicators
	emissions	within a 200m observation zone radius. If a cetacean, dugong, or turtle is sighted within the 200m radius observation area, then operations are to cease until the animal has left the observation zone	quantify Performance indicators for underwater noise will be reviewed as part of a strategic assessment of proposed mitigation measures and the current Xstrata marine monitoring program
		Implement strict marine mega-fauna interaction procedures (assuming that these do not presently exist for current loading facility operations) –suggested approach distances are 50 m (dolphins and turtles) and 100 m (whales and dugongs)	
		Implement 'go slow' zone (suggested 6 knots) is suggested for the entrance channel and swing basin	
		Alternatively, soft-start procedures for pile driving are to be utilised (i.e. gradually increasing the power of the leader rig) so that the potential for startle responses and injury or death is minimised	
		If piles are able to be pressed in (subject to engineering considerations and prevailing conditions) then this method should be utilised in preference to a leader rig with vibrator to minimise noise emissions	
		As silt curtains will be utilised, it will be necessary to ensure that no marine mega-fauna is trapped within the curtain bounds prior to start-up specifically cetaceans, dugongs, turtles and crocodiles	

Management Objective	Target	Actions	Performance Indicators
		Potential to use passive/active detection acoustic detection methods will be investigated	
Minimise impacts of coastal construction and operations on coastal-dependent fauna	No injury, mortality, or disruption of critical behaviors in marine fauna as a result of coastal construction or operations	Restrict development to defined footprint. Where field investigations indicate that turtle nesting is occurring adjacent to the loading facility, implement specific lighting controls as specified in Chapter 3.7 of the WDRL EIS	Injury or mortality to coastal-dependent fauna as a result of coastal construction and operations would be impossible to quantify. Performance indicators with respect to the detection and monitoring of impacts on coastal dependent fauna will be reviewed as part of a strategic assessment of proposed mitigation measures and the current Xstrata marine monitoring program
Prevent boat strikes to marine megafauna from shipping operations	No injury or mortality to marine megafauna as a result of vessel strike	Implement go slow zone (suggested 6 knots) is proposed for the entrance channel and swing basin	Number of boat strikes per annum
		All incidents of boat strike and associated injury/mortality are to be maintained in a register and reported to the Parks and Wildlife Commission of the NT to enable identification of number of incidents occurring over time and associated severity	

Management Objective	Target	Actions	Performance Indicators
		Personnel aboard all vessels will be responsible for remaining vigilant and avoiding cetaceans, dugong and turtles	
		Implement strict marine mega-fauna interaction procedures (assuming that these do not presently exist for current loading facility operations) –suggested approach distances are 50 m (dolphins and turtles) and 100 m (whales and dugongs)	
Current water quality levels are maintained through preventing contamination during construction and operation	No departure from baseline water quality conditions as a result of WDRL operations	The following measures will be implemented to minimise the potential of DSO or hydrocarbon spill: – Dust Control will be achieved through pre-conditioning to the Dust Extinction Moisture Level prior to loading, and conveyor transfers, long reclaim and overland conveyors will be fully enclosed, preventing dust migration into tidal waterways and subsequent inputs into the marine environment – Transfer stations and the barge loading and refuelling area will be fully enclosed and sheeted, with floors of transfer stations fully sealed and bunded – Barge loading conveyors will be designed and constructed to relevant Australian Standards and best practice to pull away under a blocked chute and loaded condition	Water quality monitoring does not reveal significant departures from baseline conditions over time

Management Objective	Target	Actions	Performance Indicators
		– Visual inspection of berth decks for cracks or seal damage will be undertaken routinely – Ship loading to be undertaken using high level of control to minimise dust emissions – Slurry will not be released into receiving waters (reclaim conveyors will be covered where practicable to prevent collection of rainwater build up; transport barges will have open decks that are sealed and bunded with runoff and rainwater collected in sumps, when berthed any water and slurry collected will be piped back to the transfer station sump then on to the stockyard for collection, treatment and reuse – During heavy rain/high wind events the loading of the barges will cease until conditions improve – Routine visual inspections to ensure that loads are fully contained and that no material is escaping during loading, at the loading facility and the transhipment anchorages – Fuel will be stored at the Stock Yard facility approximately 2.5 km inland from the loading facility – The fuel pipeline will have an automatic cutoff valve to prevent large spills – No refueling will be undertaken during inclement weather conditions to minimise	

Management Objective	Target	Actions	Performance Indicators
		chance of a spill – Standard operating procedures including appropriate training, visual monitoring of hoses and the sea surface, initial shutdown, and spill response procedures will be implemented – Regular servicing and inspection of vessels and machinery to identify and address any leaks or other problems – An emergency response plan will be developed and equipment supplied to deal with any spill that occurs including fuel handling and storage procedures – Oil spill kits of sufficient capacity including booms and absorption materials will be onboard barges and tugs at all times – The prevention of localised turbidity as described for maintenance dredging	
Current sediment quality levels are maintained contamination during construction and operation	No departure from baseline sediment quality conditions as a result of WDRL operations	As per actions above for water quality	Sediment quality monitoring does not reveal significant departures from baseline conditions over time
Seafood is safe for consumption	No elevated levels of contaminants i.e. metals in seafood	As per above actions for water quality, including spill response procedures	No elevated levels of contaminants i.e. metals in seafood as determined by laboratory analysis as per Xstrata marine monitoring program
Prevent disruption to coastal processes	No disruption to coastal processes including wave climate and sediment transport regimes	Coastal process modelling will be undertaken (if required) at the Detailed Design stage to ensure that the proposed loading facility does	No detectable impact upon coastal processes i.e. changed morphology of coastline and

Management Objective	Target	Actions	Performance Indicators
		not impact upon coastal processes	departure from usual sediment transport regimes
Ensure no risk is posed to coastal/maritime infrastructure and human life by extreme weather events	No significant damage to coastal/maritime infrastructure, or injury or loss of life as a result of extreme weather events	All facilities will be designed to withstand cyclones i.e. cyclone rated	No significant damage to coastal/maritime infrastructure, or injury or loss of life as a result of extreme weather events
		Cyclone bunker will be provided either at the accommodation or stockyard site and constructed to all relevant Australian Standards for cyclone prone areas, with sufficient capacity for WDRL personnel including barge crews and contractors	
		Barge crews would be transferred to shore and to a cyclone shelter or evacuated from site in the event of a cyclone	
		Concentrate storage loading facility will be cyclone rated and flood immune, and all buildings containing hazardous materials and fuels will be fully bunded	
		Cyclone tie-down and maintenance area would be provided at one end of the stacker travel to lock in position during a cyclone	
		Extreme event design criteria (i.e. wave height, storm surge) will be considered at the detailed design stage	
		Cyclone moorings for all barges and floating plant provided	

Management Objective	Target	Actions	Performance Indicators
Ensure no vessel collisions or groundings occur as a result of the project	Zero incidence of vessel collisions or groundings	Shipping Officer may be required to monitor and co-ordinate the movement of vessels in the loading facility and entrance channel, subject to discussions with Xstrata	Number of near misses, actual collisions, and groundings to be recorded and reported every annum
		WDRL proposes that a combined emergency response team and equipment be provided for incidents that occur within the loading facility. WDR will provide equipment, personnel and training required to this end	
		Enforced speed limits within entrance channel and swing basin (6 knots)	
		Good illumination of the loading facility, correct docking procedures, operating only in suitable conditions and standard operating procedures and training for all personnel involved in the loading facility operations	

Management Objective	Target	Actions	Performance Indicators
		Operational and risk assessment workshop will be conducted between WDRL and Xstrata to develop a Loading Facility Operations Manual which would include items such as: – a set of Loading Facility Operating rules – emergency response procedures – safety and security procedures – detailed contact information required to ensure 24 hour coverage during operations	
Cultural and economic values of marine environment are protected i.e. no reduction in populations hunted by indigenous people, no interaction with important recreational or commercial fisheries	No disruption to indigenous fishing and hunting practice. Commercial and recreational fisheries are not prevented from accessing important fishing grounds	As per above actions outlined for water quality	Number of complaints from recreational fishers, traditional owners or commercial fishing industry regarding access to traditional marine resources and/or fishing grounds
		Ongoing consultation with traditional owners and fishing industry regarding potential or future anticipated conflicts	
		The existing viewing platform, access track and informal car parking area will be relocated, with appropriate signage installed as required	

Monitoring Program

WDRL commits to best practice marine environmental management to ensure its impacts upon the marine environment can be minimised.

To this end, WDRL commits to undertaking a strategic assessment of proposed mitigation measures and the current Xstrata marine monitoring program to ensure that the cumulative impacts of both Xstrata's expansion and WDRL's proposal may be appropriately mitigated and monitored. WDRL commits to reviewing the current Xstrata Marine Monitoring program with relevant Xstrata, AIMS, Charles Darwin University, and other relevant technical personnel.

The outcomes of this strategic assessment will be used to verify the proposed mitigation measures within this document (or provide alternative measures), and to determine an appropriate scope of works to be included within the monitoring regime at the loading facility. Proposed monitoring measures (to be subject to review) are included below.

Management Objective	Performance Indicators	Monitoring Methods	Reporting
Minimise disturbance of benthic marine habitat	Habitat and community composition outside of the construction and operational footprint is comparable to baseline conditions i.e. no net loss of seagrass outside of the swing basin and entrance channel	Continuation of Xstrata's seagrass monitoring program	To be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports
	Turbidity returns to acceptable levels once construction ceases	Baseline turbidity measurements to be completed prior to construction commencing, then for three days following completion of construction both within the swing basin and in adjacent seagrass habitats	
Prevent colonisation of artificial marine structures	Colonisation of marine structures is not observed during monitoring	Monitoring for bio-fouling during routine infrastructure and equipment inspections i.e. mooring lines etc	Proposed to be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports
Ensure no introduction of invasive marine species into the Loading facility	No invasive marine species are detected during monitoring	Regular monitoring and identification of marine pest species using settlement plates, hull inspections and other methods as required	Proposed to be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports as well as existing chain of command for such incidents, including NT Fisheries and AQIS

Management Objective	Performance Indicators	Monitoring Methods	Reporting
Prevent introduction of rubbish, waste, and debris into marine environment	No introduction of rubbish, waste or debris into the marine environment is detected during visual inspections of Loading facility and recreational fishing area	Visual inspections of loading facility and recreational fishing location targeting anthropogenic litter. Undertake rubbish item counts including type of item and likely origin	Proposed to be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports
Minimise underwater noise emissions to prevent impact on noise sensitive biota	Injury or mortality to marine fauna as a result of underwater noise would be impossible to quantify Performance indicators for underwater noise will be reviewed as part of a strategic assessment of proposed mitigation measures and the current Xstrata marine monitoring program	To be advised however will include compliance with proposed noise attenuation measures including soft start procedures and speed restrictions	Proposed to be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports

Management Objective	Performance Indicators	Monitoring Methods	Reporting
Minimise impacts of coastal construction and operations on coastal-dependent fauna	Injury or mortality to coastal-dependent fauna as a result of coastal construction and operations would be impossible to quantify Performance indicators with respect to the detection and monitoring of impacts on coastal dependent fauna will be reviewed as part of a strategic assessment of proposed mitigation measures and the current Xstrata marine monitoring program	To be advised subject to the outcomes of the strategic assessment of proposed mitigation measures and the current Xstrata marine monitoring program	Proposed to be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports
Prevent boat strikes to marine mega-fauna from shipping operations	Number of boat strikes per annum	All incidents of boat strike and associated injury/mortality are to be maintained in a register and reported to the Parks and Wildlife Commission of the NT to enable identification of number of incidents occurring over time and associated severity	Proposed to be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports
Current water quality levels are maintained through preventing contamination during construction and operation	Water quality monitoring does not reveal significant departures from baseline conditions over time	Water quality monitoring program as per current Xstrata Marine Monitoring Program, with additional sampling sites and parameters of interest as required	Proposed to be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports

Management Objective	Performance Indicators	Monitoring Methods	Reporting
Current sediment quality levels are maintained contamination during construction and operation	Sediment quality monitoring does not reveal significant departures from baseline conditions over time	Sediment quality monitoring program as per current Xstrata Marine Monitoring Program, with additional sampling sites and parameters of interest as required	Proposed to be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports
Seafood is safe for consumption	No elevated levels of contaminants i.e. metals in seafood as determined by laboratory analysis as per Xstrata marine monitoring program	Continuation of marine gastropod and bivalve heavy metal analysis (i.e. oysters) as per current Xstrata Marine Monitoring Program, with additional sampling sites and parameters of interest as required	Proposed to be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports
Prevent disruption to coastal processes	No detectable impact upon coastal processes i.e. changed morphology of coastline and departure from usual sediment transport regimes	Annual review of aerial imagery to detect any morphological changes to coastline	Proposed to be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports
Ensure no risk is posed to coastal/maritime infrastructure and human life by extreme weather events	No significant damage to coastal/maritime infrastructure, or injury or loss of life as a result of extreme weather events	Review of damage to infrastructure following severe storm or cyclone events, as well as any OHS incidents that occurred	Proposed to be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports

Management Objective	Performance Indicators	Monitoring Methods	Reporting
Ensure no vessel collisions or groundings occur as a result of the project	Number of near misses, actual collisions, and groundings to be recorded and reported on every annum	Number of near misses, actual collisions, and groundings to be recorded and reported every annum	Proposed to be reported by the Shipping Officer using the appropriate communication forums deemed appropriate by WDRL and Xstrata
Cultural and economic values of marine environment are protected i.e. no reduction in populations hunted by indigenous people, no interaction with important recreational or commercial fisheries	Number of complaints from recreational fishers, traditional owners or commercial fishing industry regarding access to traditional marine resources and/or fishing grounds	Ongoing feedback to be collected as part of the Stakeholder Consultation Program	Proposed to be reported within the proposed joint annual Xstrata/WDRL Marine Monitoring Program reports

Contingencies

Non-compliance	Action
Significant turbidity plumes associated with construction or operations occur, due to failure of sediment control devices i.e. silt curtain or other cause	a) Stop work immediately in the area, assess impact and investigate cause b) Determine corrective measures c) Implement corrective actions including install/repair sediment control devices d) Determine future preventative measures
Biofouling of marine structures occurs	a) Identify location and extent of occurrence b) Investigate and implement environmentally acceptable control methods in consultation with NT Department of Fisheries and any other relevant parties

Non-compliance	Action
A marine pest is introduced to the loading facility	a) Identify location and extent of occurrence b) Investigate and implement control methods c) Report to NT Department of Fisheries and AQIS d) Communicate to staff through toolbox meeting or other appropriate forum e) Review current monitoring and control methods so that future introductions are prevented
Significant quantity of waste is introduced into the marine environment	a) Identify location and extent of occurrence b) Identify cause c) Implement clean up using divers as required d) Review current monitoring and control methods so that future introductions are prevented e) Communicate to staff through toolbox meeting or other appropriate forum
Proposed noise attenuation controls i.e. soft start procedures and speed limits are not implemented	a) Stop work order b) Identify cause of non-compliance c) Ensure compliance is achieved through communication with relevant personnel including shipping officer and construction site manager as required d) Communicate importance of compliance to staff through toolbox meeting or other appropriate forum e) Review current monitoring and control methods so that future introductions are prevented
Impacts upon noise or other disturbance sensitive fauna are detected during marine fauna monitoring	a) Determine cause of inappropriate management b) If necessary, consult with regulatory authorities to determine appropriate management c) Identify corrective actions and implement d) Determine future preventative measures e) Communicate importance of compliance measures to staff using appropriate forums
Boat strike occurs	a) Determine cause of boat strike and whether compliance with speed limits and marine megafauna

Non-compliance	Action
	interaction procedures has occurred b) Identify corrective actions and implement c) Record cause and outcome i.e. injury, known mortality, species (if known) and provide to NT Parks and Wildlife Commission annually d) Determine future preventative measures e) Communicate importance of compliance measures to staff using appropriate forums
Water quality monitoring reveals significant departures from baseline conditions either during one off sampling event or over time	a) Determine cause of water quality decline b) If necessary, consult with regulatory authorities to determine appropriate management c) Identify corrective actions and implement d) Determine future preventative measures e) Communicate importance of compliance measures to staff using appropriate forums
Sediment quality monitoring reveals significant departures from baseline conditions either during one off sampling event or over time	a) Determine cause of sediment quality decline b) If necessary, consult with regulatory authorities to determine appropriate management c) Identify corrective actions and implement d) Determine future preventative measures e) Communicate importance of compliance measures to staff using appropriate forums
Elevated levels of contaminants i.e. metals are detected in seafood as determined by laboratory analysis (as per Xstrata Marine Monitoring program)	a) Determine cause of water quality/sediment quality decline b) If necessary, consult with regulatory authorities to determine appropriate management including fishing restrictions c) Identify corrective actions and implement d) Determine future preventative measures e) Communicate importance of compliance measures to staff using appropriate forums
Changed morphology of coastline and departure	a) Determine cause of disruption to coastal processes including modeling if required

Non-compliance	Action
from usual sediment transport regimes i.e. noticeable differences in patterns of erosion and accretion are detected	b) If necessary, consult with regulatory authorities to determine appropriate management c) Identify corrective actions and implement d) Determine future preventative measures and implement
Significant damage to coastal/maritime infrastructure, or injury or loss of life occurs as a result of extreme weather events	a) Determine cause of damage to infrastructure i.e. inappropriate management, structural fault, alternatively determine cause of injury or mortality, procedural matter, timeframes, failure to follow established controls and procedures b) If necessary, consult with regulatory authorities to determine appropriate management c) Identify corrective actions and implement d) Determine future preventative measures and implement e) Communicate outcomes including importance of compliance measures if required to staff using appropriate forums
A near miss, actual collision, or grounding occurs	a) Determine cause of near miss, actual collision or grounding under direction of Shipping Officer and relevant Xstrata and WDRL personnel, and external authorities as required b) Identify corrective actions and implement c) Determine future preventative measures and implement
Complaints are received from recreational fishers, Traditional Owners or commercial fishing industry regarding access to traditional marine resources and/or fishing grounds	a) Investigate complaints on a case by case basis as required b) If necessary, consult with regulatory authorities to determine appropriate management i.e. AFMA, local Traditional Owners c) Identify corrective actions and implement d) Determine future preventative measures and implement

4.5 Rehabilitation and Mine Closure

4.5.1 Construction Phase

Description

- Draft Rehabilitation and Mine Closure Plan developed
- Further work required on:
  - Characterising geology to be rehabilitated
  - Allow for a consultation process to determine success criteria
  - Using the above to perform rehabilitation trials.

Environmental Aspects to be Managed

- Investigations for mined out areas to be progressively rehabilitated
- Some rehabilitation (such as temporary camps and tracks for the haul road) will be assessed for rehabilitation within the year

4.5.2 Operational Phase

Description

- Rehabilitation of temporary camps and tracks underway
- Progressing towards developing the Rehabilitation and Closure Plan

Environmental Aspects to be Managed

- Mined out areas will be progressively rehabilitated
- Some rehabilitation (such as temporary camps and tracks for the haul road) will be assessed for rehabilitation within the year

Performance Management

Management Objective	Target	Actions	Performance Indicators
To develop a comprehensive rehabilitation plan during the planning phase of this development	A comprehensive Rehabilitation Plan by year three of the development	Characterise the geology of the areas to be rehabilitated Work with Traditional Owners and representatives to develop closure criteria Trial rehabilitation methods	A pragmatic Rehabilitation Plan approved through Government processes
Rehabilitation of the site will be done in a manner that requires minimal inputs of maintenance post closure, but maximum protection of the environment from seepage of contaminants, weed incursion, erosion or other impacts	Ensure that areas no longer required after construction are rehabilitated immediately	When practical, commence rehabilitation in areas no longer required after construction activities have ceased	Areas no longer required after construction or operation are rehabilitated
	Rehabilitation is sustainable post mining without need for continual management, developed throughout the mine life through assessment of progressive rehabilitation and adaptive management	An ongoing act and learn strategy improving procedures for rehabilitation during the operational phase of the mine	Rehabilitation methods are showing success/stability within four years (half way mark) of commencement of progressive rehabilitation work
	Rehabilitation is managed to ensure there are no opportunities for incursion of weed species	Implement actions of the Weed and Pest Management Plan	Rehabilitated areas weed free
	Rehabilitation produces a stable landform not subject to erosion or sedimentation attributable to construction or mining activities	Development of a Rehabilitation and Closure Management Plan and Erosion and Sediment Control Plans	Little to no evidence of erosion and sedimentation within rehabilitated areas

Management Objective	Target	Actions	Performance Indicators
To ensure that rehabilitation achieves a stable and functioning landform which is consistent with the surrounding landscape and other environmental and stakeholder values	Rehabilitation produces a stable landform not subject to erosion or sedimentation attributable to construction or mining activities	Development of a Rehabilitation and Closure Management Plan and Erosion and Sediment Control Plan	Little to no evidence of erosion and sedimentation within rehabilitated areas
	Rehabilitation is carried out in consultation with stakeholders to ensure the post mining landscape is consistent with their values and needs	Ongoing stakeholder consultation	Positive feedback from stakeholders
The decommissioning and rehabilitation program is integrated into the mine plan and considered as part of mining operation, rather than as a separate phase at the end of mine life	Development of a comprehensive Rehabilitation and Mine Closure Plan incorporating new information from rehabilitation trials	Development of Rehabilitation and Mine Closure Plan	Rehabilitation and Closure Plan approved within three years of mining commencement

Monitoring Program

Management Objective	Performance Indicators	Monitoring Methods	Reporting
To develop a comprehensive rehabilitation plan during the planning phase of this development	A pragmatic Rehabilitation Plan approved through Government processes	As outlined in the Draft Rehabilitation Plan (Appendix P of EIS) or as modified after rehabilitation trials	Through the MMP process

Management Objective	Performance Indicators	Monitoring Methods	Reporting
Rehabilitation of the site will be done in a manner that requires minimal inputs of maintenance post closure, but maximum protection of the environment from seepage of contaminants, weed incursion, erosion or other impacts	Areas no longer required after construction are rehabilitated immediately	Post construction rehabilitated areas are to be assessed by Field Supervisor to ensure works are completed within a timely manner	Inspection log will be kept with any non-compliance issues reported within the MMP
	Rehabilitation methods are showing success/stability within four years (half way mark) of commencement of progressive rehabilitation work	Rehabilitation to be assessed annually to allow for adaptive management throughout the life of the mine	Progress and assessment of success will be reported within the MMP with details of adaptive management as appropriate
	Rehabilitated areas weed free	Annual inspection of lease areas to determine extent of any weed infestations and map new occurrences – particularly with regard to WONS	Keep a log of weed control undertaken throughout the year, detail weed species, location and extent and report within the MMP
		Seasonal weed control conducted in areas where weeds are found/spreading	
	No evidence of weeds within rehabilitation areas or adjoining land	Keep a log of weed control undertaken throughout the year, detail weed species, location and extent (management details)	
	No evidence of erosion and sedimentation within rehabilitated areas	Visual inspection of areas undergoing rehabilitation	Any evidence of impact on significant habitats will be documented and reported within the Mining Management Plan
To ensure that rehabilitation achieves a stable and functioning landform which is consistent with the surrounding	No evidence of erosion and sedimentation	Visual inspection of areas undergoing rehabilitation	Any evidence of impact on significant habitats will be documented and

Management Objective	Performance Indicators	Monitoring Methods	Reporting
landscape and other environmental and stakeholder values	Stakeholders are satisfied with the proposal final land use and rehabilitation plan	Ongoing stakeholder consultations	reported within the MMP
The decommissioning and rehabilitation program is integrated into the mine plan and considered as part of mining operation, rather than as a separate phase at the end of mine life	Rehabilitation and Closure Plan approved within three years of mining commencement	Approval of the rehabilitation and closure management plan prior to mining and changes (adaptive management) captured within the MMP	MMP updated annually with any changes due to need for adaptive management

Contingencies

Non-compliance	Action
Rehabilitation Plan not approved within 3 years of mining commencement	a) Noncompliance flagged in MMP
Rehabilitation is not sustainable post construction/mining	a) Review Rehabilitation and Closure Management Plan – adaptive management b) Determine reasons for unsustainability/unacceptable timeframe c) Develop strategy and review monitoring schedule d) Report progress within the MMP (noncompliance and actions taken)
Failure to adaptively manage rehabilitation has led to inconsistent results	a) Review Rehabilitation and Closure Management Plan b) Review suitability of species used for rehabilitation c) Review suitability of erosion and sediment control strategies

Non-compliance	Action
	d) Determine cause of rehabilitation failure and possible mitigation strategies e) Report within the MMP (noncompliance and actions taken)
Weeds are present in rehabilitated areas and/or adjacent land	a) Determine appropriate weed management strategy and implement control measures b) Increase monitoring schedule until weeds or spread of weeds is under control c) Review vehicle wash down procedures d) Map areas of weed occurrence/spread and undertake photo monitoring if required e) Report within the MMP (noncompliance and actions taken)
Rehabilitated areas are not stable and showing signs of erosion or sedimentation	a) Review compliance with Erosion and Sediment Control Plans and Rehabilitation and Closure Management Plan b) Determine mitigation strategies in the short and longer term c) Report within the MMP (noncompliance and actions taken)

4.6 Social and Cultural Impacts

Description

- Considerable pre-mining work has included:
  - Mapping of sites of historical and cultural significance
  - A socio-economic study of the four aboriginal communities most likely to be affected by this development
  - A consultative process with the above communities to ensure positive impact from this development
- WDRL has made commitments around developing and implementing:
  - An Indigenous Employment Strategy
  - A social enterprise scheme to maximise benefits to all members of affected communities
- All sites of cultural and heritage value are being mapped and Traditional Owner approval for the specific location of the haul road, minesite and loading facility is currently being sort

Environmental Aspects to be Managed

- Physical disturbance of land and potentially sites of value or importance to the local and regional community
- Implementation of indigenous employment schemes
- That offsets are being appropriately devolved

Performance Management

Management Objective	Target	Actions	Performance Indicators
To ensure that the offsets package addresses key regional issues and concerns	That offsets are managed towards key community concerns	Develop a board of management (BOM) to manage the interface between community expectations and the offsets package	Community representatives support BOM processes and outcomes

Management Objective	Target	Actions	Performance Indicators
To analyse, monitor and manage the intended and unintended social consequences, both positive and negative, of the Project and any social change processes	Understand, articulate and measure these consequences	Ongoing stakeholder consultation	Community support for procedures and processes
To provide employment and training opportunities to people who live within the region	To be determined	Implementing the Indigenous Employment Strategy (Appendix H EIS)	Number of indigenous people employed in the development
To protect sites of cultural, NT and European heritage within close proximity to the WDRL mining activities	No sites of European heritage affected by this development	All such sites to be avoided	No sites impacted
	No sites of archaeological or cultural heritage affected by this development	Traditional Owner signoff and AAPA certification prior to any works	No sites impacted

Monitoring Program

Management Objective	Performance Indicators	Monitoring Methods	Reporting
To ensure that the offsets package addresses key regional issues and concerns	Community representatives support BOM processes and outcomes	Surveying community attitudes	Through appropriate governance procedures
To analyse, monitor and manage the intended and unintended social consequences, both positive and negative, of the Project and any social change processes	Community support for procedures and processes.	Ongoing stakeholder communication	Through appropriate governance procedures

Management Objective	Performance Indicators	Monitoring Methods	Reporting
To provide employment and training opportunities to people who live within the region	Number of indigenous people employed in the development	Monitoring workforce participation and retention rates	Via procedures determined by the Board of Management
To protect sites of cultural, NT and European heritage within close proximity to the WDRL mining activities	No sites affected	Monitor development locations and extent	Via MMP processes

Contingencies

Non-compliance	Action
For issues involving stakeholder consultations, operations of the Board of Management issues and resolution of non-compliance are still to be determined	
Sites of cultural, NT and European heritage affected	a) Stop work immediately b) Report to appropriate authority c) Take corrective actions as directed d) Update MMP and other management plans showing new site

4.7 Other Risks

4.7.1 Bushfires

Management Objective	Target	Actions	Performance Indicators
To manage fire risk effectively both within and external to the mine site (e.g. during site clearing operations) and outside the mine site, including the haul road and Bing Bong loading facility	Ensure that all field exploration personnel are aware of the emergency processes in the event of the outbreak of fire on project sites or the near vicinity	Appropriate firefighting equipment and signage must be made available at all times	Signs are visible and firefighting equipment is available and in good working order at all times
		Firefighting training will be provided to personnel and a fire warden must be selected for each crew/shift/work area	A sufficient number of personnel have received appropriate firefighting training and warden/s present at all times on site
		Ensure that all personnel are aware of locations for firefighting equipment, muster points, emergency evacuation plans, and emergency contact lists as per the EPP (Emergency Procedures Plan)	Emergency Procedures Plan is made available to all staff including contractors and updated as necessary
		Instill a ‘No Fire’ policy	No fires on site

Monitoring Program

Management Objective	Performance Indicators	Monitoring Methods	Reporting
To manage fire risk effectively both within and external to the mine site (e.g. during site clearing operations) and outside the mine site, including the haul road and Bing Bong loading facility	Signs are visible and firefighting equipment is available and in good working order at all times	Field Supervisor is to visually inspect the site quarterly to ensure all signs and firefighting equipment are in place and in good working order	Emergency Log book to be kept which will detail fire extinguisher servicing/ legibility of signs etc.
		'No fire' policy on site at all times	Incidence of WDRL activity generated fire on site to be recorded within the MMP reporting processes
	A sufficient number of personnel have received appropriate firefighting training and warden/s present at all times on site	Field Supervisor is to ensure that training is provided to new personnel	Annual training log provided in MMP
	Emergency Procedures Plan is made available to all staff including contractors and updated as necessary	Field Supervisor is to ensure that Emergency Procedures Plan is made available to all staff and ensure that this is part of staff induction to site	Induction log and procedures should be available on request
	No fires on site	Field Supervisor is to be made aware of any fires on site and keep a log	Fires are to be reported in the MMP and to the relevant authorities (Bushfires NT)

Contingencies

Non-compliance	Action
Fire equipment signs are not in place or not legible	a) Investigate why non-compliance has occurred and report as appropriate b) Install new signs as soon as practicable
Firefighting equipment has not been regularly serviced or is not in good working condition	a) Investigate why non-compliance has occurred and report as appropriate b) Service the equipment as soon as practicable or replace equipment as appropriate c) Put in place procedures to ensure servicing occurs at designated/required time
Burning is occurring on site or there exists some risk of fire on site due to improper use of equipment	a) Investigate why non-compliance has occurred and report as appropriate b) Initiate appropriate training in fire procedures to ensure all personnel are aware of 'no fire' policy c) Ensure all personnel are trained in the safe and proper use of equipment to limit risk of fire
Staff have not been trained in firefighting procedures or wardens are not available on shift	a) Initiate firefighting training as soon as practicable b) Change shift roster to ensure warden/s available on each shift
Fire occurs on site	a) In the event of a vehicle fire, the fire should be extinguished as quickly as practicable using the correct fit-for-purpose portable extinguisher, unless the situation is deemed to be too hazardous b) In the case of a vehicle engine fire, the bonnet should remain closed to prevent acceleration of fire outbreak c) In the event of a fire outbreak within the field camp, the fire alert is to be activated and the fire extinguished if safe to do so by trained personnel using the correct fit-for purpose fire extinguisher or fire hose d) Report fire to authorities as appropriate such as Bushfires NT, NRETAS e) Investigate cause of fire and investigate mitigation to ensure there is no re-occurrence
Emergency Procedures Plan is not available to staff	a) Make sure plan is available to staff

4.7.2 Biting Insects

Description

- WDRL is committed to ensuring the health and safety of its workforce. Biting Insect Management on-site will be performed in accordance with the *Guidelines for Preventing Mosquito Breeding Sites Associated with Mining Sites 2005* by the Northern Territory Government – Department of Health and Families
- Key management objectives will be to prevent mosquito breeding opportunities on-site, reduce the potential for contact between personnel and mosquitoes and detail monitoring and response strategies to severe outbreaks or incidence of disease
- Potential issues identified include: local transmission of mosquito borne diseases; Increase in adult mosquito populations; and Increase in mosquito breeding sites
- Mine site infrastructure will be managed to minimise the potential to create new mosquito breeding sites or increase yields at existing sites
- 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*. Mitigation measures will be put in place to prevent the introduction of this species

Environmental Aspects to be Managed

- A 12 month baseline mosquito monitoring program is currently underway and will be completed in January 2013
- Routine monitoring of potential breeding sites will be undertaken as recommended following completion of the baseline study

Performance Management

Management Objective	Target	Actions	Performance Indicators
Prevent mosquito breeding opportunities on-site	No mosquito breeding sites generated during construction and operations	Material with the potential to pool water will either be stored in a manner to prevent water pooling or discarded after use	No increase in mosquito breeding sites on site during construction or operations
		Runoff sediment ponds should be emptied immediately post storm events to prevent standing water or designed to be deep and steep sided	

Management Objective	Target	Actions	Performance Indicators
Reduce the potential for contact between personnel and mosquitoes	No incidence of mosquito borne disease in WDRL personnel	All personnel will be educated of the risk of mosquito borne disease through onsite inductions. This will include a description of peak abundance periods and personal protective measures including long sleeve shirts and trousers, regular application of insecticide and avoidance of outdoor operations at sundown	No incidence of mosquito borne disease
		Personnel will be educated about the early symptoms associated with exposure to mosquito borne arbovirus and will be instructed of the need to report any observed symptoms	
		All accommodation will be screened and external lighting will utilise yellow bulbs to discourage mosquitoes	

Management Objective	Target	Actions	Performance Indicators
Detail monitoring and response strategies to severe outbreaks or incidence of disease	No incidence of mosquito borne disease in construction or operations personnel	Medical assistance provided to any person displaying symptoms of mosquito borne disease. Ponds, dams and onsite excavations will be periodically inspected for the presence of mosquito larvae at a frequency to be recommended by NT Department of Health. Detected populations will be managed under recommendations from the Medical Entomology Branch NT	No incidence of mosquito borne disease in WDRL personnel

Monitoring Program

Management Objective	Performance Indicators	Monitoring Methods	Reporting
Prevent mosquito breeding opportunities on-site	No evidence of increased mosquito breeding sites during construction or operations	Monitoring should be conducted as per the *Guidelines for Preventing Mosquito Breeding Sites Associated with Mining Sites 2005* by the Northern Territory Government – Department of Health and Families	Significant mosquito activity will be reported to WDRL's General Manager as well as the Medical Entomology Branch NT
Reduce the potential for contact between personnel and mosquitoes	No incidence of mosquito borne disease on site during either construction or operations		
Detail monitoring and response strategies to severe outbreaks or incidence of disease			

Contingencies

Non-compliance	Action
Construction and operation activities have created additional mosquito breeding sites and/or there is evidence of mosquito breeding on site	a) Investigate why non-compliance has occurred b) Activate cleanup of site to remove all potential mosquito breeding sites c) Notify personnel of increased mosquito risk d) Perform Mosquito control under recommendations from Department of Health
Not all accommodation units are screened and yellow lights have not been installed in appropriate areas to deter mosquitoes and/or personnel report mosquito activity within accommodation units/camp areas	a) Notify personnel of increased mosquito risk b) Investigate why non-compliance has occurred and resolve c) Investigate further preventive methods for mosquito activity d) Report to Department of Health if required
Periodic inspections of ponds, dams and onsite excavations has not taken place or is not in accordance with recommendation from the NT Department of Health	a) Investigate why non-compliance has occurred b) Implement recommendations from the NT Department of Health as required c) Ensure personnel are made aware of obligations for monitoring
Incidence or outbreak of mosquito borne disease	a) Notify the NT Department of Health b) Notify all personnel c) Investigate whether procedures on site have led to outbreak of disease and review/modify procedures as necessary

4.7.3 Noise and Vibration

Description

- Possible impact of noise from increased transport in the region or more specifically within the mining areas (impacting personnel)
- Sensitive receptors adjacent to the project area may be impacted by noise (including underwater noise)
- Marine fauna may be impacted by underwater noise and vibration with increased vessel activity at Bing Bong loading facility

Environmental Aspects to be Managed

- expected noise levels and vibration associated with the Project construction and operation, including timing and duration, in comparison to background levels, sensitivity of receptors and nominated performance indicators and standards

Performance Management

Management Objective	Target	Actions	Performance Indicators
Compliance with the requirements for pollution control (including noise & vibration) as per the objectives from Section 5 of the *Waste Management and Pollution Control Act*	No complaints received regarding noise and/or vibration	Keep a 'Complaints Register' of all noise and vibration related community complaints	No noise or vibration complaints
	Comply with the *Waste Management and Pollution Control Act*	During construction, a trained marine fauna observer is to make regular inspections (suggested frequency every half hour) both prior to start up and during construction within an observation zone of 200m from the construction area	Compliance with the objectives of the *Waste Management and Pollution Control Act* based on specific criteria from: – 'Acoustic Quality Objectives' of the Queensland Environmental Protection (Noise) Policy 2008 - EPP (Noise); and – Guidelines specifying the
		Installation of a "go slow zone" (suggested 6 knots) for the entrance channel and swing basin at Bing Bong loading facility	
		Vessel approach distances should be maintained at 50m for dolphins and turtles and 100m for whales	

Management Objective	Target	Actions	Performance Indicators
		and dugongs	recommended human comfort criteria for: i. Airblast overpressure level; ii. Ground vibration peak particle velocity; and iii. Times of blasting.
		If a cetacean, dugong, or turtle is sighted within the 200m radius observation area, then operations are to cease until the animal has left the observation zone	
		Piles can be installed using a leader rig with vibrator where possible but may also be pressed in where silent vibrationless piling is required. If piles are able to be pressed in (subject to engineering considerations and prevailing conditions) then this method should be utilised to minimise noise emissions	
		Soft-start procedures for pile driving are to be utilised (i.e. gradually increasing the power of the leader rig) so that the potential for startle responses and injury or death is minimised	
		Maintaining of maximum practicable distance between the power generator compound and the accommodation units	
		Use of not sensitive (maintenance or storage) buildings as screens between the power generators compound and the accommodation units	
		Use of broadband reversing alarm system to reduce extent of impulsive noise	
		Use of stockpiles as a form of noise attenuation barriers by locating any stationary plant behind the stockpiles	

Management Objective	Target	Actions	Performance Indicators
		Scheduling of operations to prevent concentration of number of mobile and stationary plant at same locations to assist with noise propagation	
		Maintenance of the noise reduction systems (mufflers or attenuators) on any mobile or stationary plant to reduce noise emissions	
		Minimise idle operation of any plant and equipment to reduce duration of noise emissions	
		Minimising the extent of the mining face to reduce physical loss of habitat and noise impact beyond the boundary of the mining face	
		Acoustic design of the building envelopes of the administration building as per the requirements of AS3671-1989 and AS2107-2000	
		Installing of shock-absorbing (vibration dampening) devices or materials around the primary sources of vibration	
		Utilising acoustically attenuated plant and equipment (use of soundproofing and/or noise abatement devices around the significant process noise sources such as crushers)	
		Use of not sensitive (maintenance or storage) buildings as screens between the major noise sources and the administration building	
		Maintaining of maximum practicable distance between the major noise sources (particularly the crushers and power generators) and the administration building	

Management Objective	Target	Actions	Performance Indicators
		Maintaining of maximum practicable distance between the major noise sources (particularly the crushers and power generators) and the administration building	
		Acoustic design of the building envelopes of the accommodation units as per the requirements of AS3671-1989 and AS2107-2000	
		Installing of shock-absorbing (vibration dampening) devices or materials around the primary sources of vibration	
		Utilising acoustically attenuated power-generators (use of soundproofing and/or noise abatement devices around the power generators)	
		Use of natural acoustic barriers (elevated terrain) between noise sources and the accommodation area	

Monitoring Program

Management Objective	Performance Indicators	Monitoring Methods	Reporting
Compliance with the requirements for pollution control (including noise & vibration) as per the objectives from Section 5 of the *Waste Management and Pollution Control Act*	Number of complaints received regarding noise or vibration	Maintain complaints register	All complaints received should be reported within the MMP, including investigation and actions that result from the complaint
	Compliance with the objectives of the *Waste Management and*	Monitor marine fauna every half hour both prior to start up and during construction within an	The Field Supervisor or authorised staff member should maintain the

Management Objective	Performance Indicators	Monitoring Methods	Reporting
	Pollution Control Act based on specific criteria as detailed above	observation zone of 200m from the construction area The Field Supervisor will ensure the following noise amenity protection measures are implemented as necessary: – Carry out regular daily inspections to determine any excessive noise emissions – Monitor the maintenance of any plant and vehicles to reduce noise emissions – Monitor the compliance with scheduling of operations to prevent concentration of number of mobile and stationary plant at same locations to assist with noise propagation – Monitor the compliance with the requirement to use the stockpiles as a form of noise attenuation barriers by locating any stationary plant behind the stockpiles – Monitor the use of broadband reversing alarm system to reduce extent of impulsive noise	following records: • Daily record of the operations carried out (e.g. extent of land disturbance, total material processed and number of vehicle movements on site) • Complaint log and complaint investigation records • Noise monitoring records (if noise monitoring is required) These records will be available for audit by the relevant Administrative Authority on request Should there be any need for noise monitoring to be carried out by a specialist consultant (i.e. due to noise complaint to an Administrative Authority) the Noise Monitoring Report will be made available to the relevant Administrative Authority that is managing the noise complaint issue. The Noise Monitoring Report should contain, as a minimum, the following information: – Noise monitoring methodology and instrumentation

Management Objective	Performance Indicators	Monitoring Methods	Reporting
			– Noise levels recorded at the most exposed part of the sensitive place where the compliant has originated – Analysis of the data and discussion of the results relative to the relevant acoustic quality objectives from *EPP(Noise)* – Recommendations for modified operations to reduce noise emissions or for implementation of additional noise control measures in areas where excessive noise emissions have been generated

Contingencies

Non-compliance	Action
Complaints register has not been maintained	a) Investigate why non-compliance has occurred b) Ensure that all personnel understand the importance of keeping a complaints register up to date and detailed with cause of complaint, timing, duration, location and investigation and mitigation undertaken as a result of complaint c) Monitor reporting procedures
Noise and/or vibration complaint received	a) Investigate the cause of noise or vibration that led to complaint b) Determine mitigation strategies and implement as soon as practicable

Non-compliance	Action
	c) Notify complainant of outcomes d) Monitor source of noise and/or vibration until issue has been adequately resolved e) Report incident/s in the MMP
Non-conformance with the *Waste Management and Pollution Control Act*	a) The Field Supervisor will be responsible for immediate rectification of any identified non-conformance with the objectives of this EMP. b) In the event that a non-conformance occurs as a result of poor practices, personnel on site will be made aware of the problem and informed of acceptable work practices.

4.7.4 Air Quality and Dust

Description

- Dust generating activities include vehicle movement, particularly on unsealed access tracks during construction and during operations there is potential for dust from stockpiles, roadtrains, conveyer, loading facilities, ore transfer points and barges
- The conveyor will be covered to assist in reduction of spillage and dust emissions
- Roadtrains will be covered with tarp during transportation to reduce the risk of dust emissions
- Ore at the mine would be conditioned to the Dust Extinction Moisture Level (DEM) prior to being loaded on trucks. The ore may be treated with a polymer additive that clumps very fine particles and reduces the DEM of the ore
- The barge loader will be fitted with a telescopic loading chute that can be extended to the barge deck and the height between outlet of the chute and the stockpile will be maintained at less than 2 m during the loading of the barge. Chute discharge water sprays would be installed to reduce dust emissions.
- Once the ore is stockpiled at the stockyard the stockpile would be maintained at the DEM for barge and shiploading
- During construction and operations water trucks will be used to reduce the likelihood of dust and within the stockyard dust suppression will be provided by mobile water carts and fixed location water cannons over stockpiles
- Vehicles will have a maximum speed of 20kph within the facility
- Each Receival and Stacking System (RSS) hopper will be fitted with a dust hood and dust suppression water sprays
- Dust suppression water sprays will be provided at each of the conveyor transfer points and the discharge point of the stacker onto the stockpile
- Air emissions from generators and vehicles may impact on health and amenity

Environmental Aspects to be Managed

- Dust emissions from construction works, particularly in areas close to sensitive receptors including the mine camp
- Dust emissions from loading and transfer points both on the mine site and port areas
- Carbon Dioxide emissions from plant, vehicles and generators
- Cumulative impacts from CO_2 emissions at the port

Performance Management

Management Objective	Target	Actions	Performance Indicators
Manage dust and air emissions during construction works to ensure that there is no impact on the health and/or amenity of the project areas and immediate surrounds	No complaints received with reference to dust or air quality impacts	Reduce vehicle movement in high wind conditions	Degree of dust visible on visual inspection of construction site
		Use of water trucks over areas identified as producing dust or in high vehicle movement zones	
		Keep record of any complaints regarding dust in a 'Complaints Register'	Number of complaints received with reference to dust or air quality impacts
Assess potential impacts of dust from roadtrains, stockpiles, conveyer, loading facilities and barges and identify management requirements	Annual air emission assessment demonstrates that there is no reduction in the quality of air over the life of the mine that is attributable to the WDRL operations	Record applicable ambient air quality parameters such as dust (in particular the PM_{10} fraction)	No reduction in air quality evidenced from monitoring.
		Assess potential impacts and success of current mitigation strategies and improve/increase management as required	
Management of transfer of ore and ore stockpiles to reduce impacts from dust	No evidence of spillage between transfer points	Immediately clean ore which has spilt from conveyors or between transfer points	No evidence of ore spillage at transfer points or along conveyor system
		Each Receival and Stacking System (RSS) hopper to be fitted with a dust hood and dust suppression water sprays	No evidence of dust generation at stockpiles or transfer points
		Fixed location water cannons to be used over stockpiles particularly during high wind conditions	

Management Objective	Target	Actions	Performance Indicators
		Dust suppression water sprays to be provided at each of the conveyor transfer points and the discharge point of the stacker onto the stockpile	
Develop provisions for health and safety, including on-site safety and medical facilities and procedures, including measures to prevent exposure to hazardous substances, including fumes and dust, both at the sites and during transportation and handling	No complaints received from either personnel on site or nearby residents with regard to health and safety concerns from dust emissions during operations	Keep record of any complaints regarding dust in a 'Complaints Register'	Number of complaints received regarding dust or air quality
		Develop an on-site health and safety procedure for management of impacts from dust and log of incidents	No incidents of impact on health or safety of site personnel as a result of dust or air quality emissions
		Inform personnel of personal protective equipment available to reduce any health impacts from dust	

Monitoring Program

Management Objective	Performance Indicators	Monitoring Methods	Reporting
Manage dust and air emissions during construction works to ensure that there is no impact on the health and/or amenity of the project areas and immediate surrounds	Degree of dust visible on visual inspection of construction site	Conduct inspections of construction site, particularly during high wind conditions and initiate management as required	Report any incidents within the MMP including what actions were taken in response to incident
	Number of complaints received with reference to dust or air quality impacts	Keep a record of any dust or air quality complaints within the 'Complaints Register'	Maintain complaints register

Management Objective	Performance Indicators	Monitoring Methods	Reporting
Assess potential impacts of dust from roadtrains, stockpiles, conveyer, loading facilities and barges and identify management requirements	No reduction in air quality evidenced from monitoring	Record applicable ambient air quality parameters such as dust (in particular the PM10 fraction), Include applicable meteorological information	Annual summary of air quality monitoring will be provided within the MMP
Management of transfer of ore and ore stockpiles to reduce impacts from dust	No evidence of ore spillage at transfer points or along conveyor system	Conduct regular (minimum weekly) inspections of stockpiles, conveyor and transfer points and initiate management as required	Report any major non-compliance in the MMP
	No evidence of dust generation at stockpiles or transfer points		
Develop provisions for health and safety, including on-site safety and medical facilities and procedures, including measures to prevent exposure to hazardous substances, including fumes and dust, both at the sites and during transportation and handling	Number of complaints received regarding dust or air quality	Keep a record of any dust or air quality complaints within the 'Complaints Register'	Record all complaints or incidents within the 'Complaints Register' and provide a summary including actions taken in response to complaint, within the MMP
	No incidents of impact on health or safety of site personnel as a result of dust or air quality emissions	Keep a record of any health and safety impacts (potential or realised) to personnel within the 'Complaints Register'	

Contingencies

Non-compliance	Action
Dust incidents have occurred on site and complaints have been received	a) Investigate cause of dust incident, noting location, time and duration b) Determine appropriate mitigation strategies, increase existing management as appropriate c) Notify complainant of any outcomes
Air quality has deteriorated	a) Investigate cause of air quality deterioration, noting location, time and duration b) Determine appropriate mitigation strategies, increase existing management as appropriate

Non-compliance	Action
	c) Notify other interested parties (cumulative impact at the port can be investigated) d) Prepare a report and consult with relevant authorities
Monitoring has not been conducted as per commitments/Australian Standards	a) Investigate reasons for non-compliance b) Initiate training for personnel as appropriate c) Ensure that appropriate monitoring is undertaken as soon as practicable
Weekly inspections have not been carried out on transfer points, stockpile and conveyor	a) Investigate why non-compliance has occurred b) Conduct inspection as soon as practicable after non-compliance has been identified
major dust emitting incident has occurred	a) Report to relevant authorities as necessary b) Notify any potentially affected parties as soon as possible c) Investigate cause of incident and determine mitigation strategy

4.7.5 Visual Amenity

Description

- Mining has the potential to impact on visual amenity of the region
- Increased shipping activity at the Bing Bong loading facility has potential to impact on the visual amenity of the coastal areas
- There will be increased activity at night, particularly during the construction phase of the project. This has the potential to impact on visual amenity at night, particular as the project occurs in a remote location not usually impacted by lighting
- There will be increased traffic on the roads which has the potential to impact on the visual amenity of the region from a tourism perspective

Environmental Aspects to be Managed

- Impacts to tourism visiting the Savannah Way for its remoteness
- Increased vessel use at the Port and perceived impact on visual amenity
- Light spill and associated impacts

Performance Management

Management Objective	Target	Actions	Performance Indicators
To have no negative impact on the visual amenity of the region from mining and associated activities	No complaints received regarding impacts on the visual amenity of the region	Ensure that areas subject to substantial change in form/appearance are not visible from key vantage points, where possible	Number of complaints received with regard to visual amenity of the region
		Record any complaints received within the 'Complaints Register'	
		Ensure that lights required for night works are directed down to limit visual impact at night	
		Manage traffic to reduce the need to use roads known as tourism routes	

Monitoring Program

Management Objective	Performance Indicators	Monitoring Methods	Reporting
To have no negative impact on the visual amenity of the region from mining and associated activities	Number of complaints received with regard to visual amenity of the region	Record complaints within the 'Complaints Register' Check positioning of lights bi-annually to ensure they are directed as low as possible/safe	Provide a summary of complaints received in the MMP and include a list of recommendations

Contingencies

Non-compliance	Action
Complaints have been received regarding negative impact on the visual amenity of the region	a) Investigate cause of visual amenity complaint, noting location, time and duration b) Determine appropriate mitigation strategies and implement c) Notify complainant of any outcomes

4.7.6 Transport

Description

- WDRL will utilise existing road infrastructure for access to the mine site and camp as well as the Bing Bong Loading Facility. During the construction phase of the project, goods will be transported utilising public access roads
- During operation of the mine, utilisation of public roads will decrease as personnel will be flown to site, and all ore will be transported via a purpose built private haul road 13m wide and consisting of a 10m sealed pavement and 1.5m wide shoulders
- The proposed alignment of the Haul Road has been determined so as to have the minimum impact on the surrounding environment
- Ore will be transported via the haul road to the Bing Bong storage area 24 hours per day for an estimated 325 days per year. It is estimated that the haul road will not be usable for 40 days per year. Haul trucks will perform four return trips each day from the mine site to the Bing Bong loading facility. During years 1 and 2 of the project 10 trucks will perform this operation daily (one truck every 18 minutes). This will increase to 20 trucks for years 3-8 (one truck every nine minutes)
- The stockyard facility would be located on Bing Bong Station land with none of the infrastructure crossing public roads
- The access road to the Bing Bong Station homestead would be re-routed under the overland conveyor and would provide access for light vehicles
- The existing intersection into the Xstrata Bing Bong loading facility would be modified to allow access to the new WDR barge loader with the addition of a new road but the remainder of the intersection would remain unchanged

Environmental Aspects to be Managed

- Increased traffic and road use will lead to an increased likelihood of motor vehicle accidents and animal strike
- Potential for transport impacts including issues such as dust and road traffic noise
- Deterioration of transport infrastructure
- Driver fatigue
- Securing loads to reduce likelihood of spill

Performance Management

Management Objective	Target	Actions	Performance Indicators
Avoid long term damage to infrastructure, public or private	No complaints received regarding road degradation	Record any complaints received in the 'Complaints Register'	No complaints received regarding road degradation No accidents attributable to deterioration caused by WDRL use of roads
		All employees and contractors inducted to WDRL's Traffic Safety Management System (TSMS)	
		Traffic to be restricted to most appropriate routes	
		Signage will be erected to indicate permitted and denied vehicles for routes	
		All vehicles to operate within legal speed limits on public roads and nominated speed limits defined in TSMS for private roads	
		Tonnage and axle restrictions will comply with Northern Territory roads standards	
To manage transportation to minimise impacts from dust and noise	No complaints received regarding dust and/or noise as a result of transportation	Record any complaints received in the 'Complaints Register'	No complaints received regarding dust or noise as a result of transportation/road usage
		All haul trucks to use tarps to cover loads	
		All vehicles to operate within legal speed limits on public roads and nominated speed limits defined in	

Management Objective	Target	Actions	Performance Indicators
		TSMS for private roads	
		Limit vehicle use of unsealed roads during high wind conditions, where possible	
		Non-essential traffic limited to daylight hours	
		All vehicles to undergo regular maintenance to ensure optimal operation and to limit noise	
To manage driver fatigue to reduce the incidence of accidents	No fatigue attributed motor vehicle accidents	Employees operating haulage vehicles will rotate as per standard shifts. Drivers will have the opportunity to leave the vehicle at both the loading and un-loading areas and will have access to meal, refreshment and bathroom amenities	No fatigue attributed motor vehicle accidents
		Driver fatigue management in line with NT guidelines	

Monitoring Program

Management Objective	Performance Indicators	Monitoring Methods	Reporting
To manage transportation of product in such a way as to minimise impacts from dust and noise	No complaints received regarding dust or noise as a result of transportation/road usage	Keep record of any complaints received	Complaints to be recorded in the 'Complaints Register' and summary provided in the MMP
To manage traffic in a way that limits damage and deterioration to transport infrastructure	No accidents attributable to deterioration caused by WDRL use of roads	Vehicles weighed in line with Australian Standards for operation on public roads	Road inspection and maintenance schedule should be included in the MMP
		Routine road inspections to identify areas displaying degradation	
To manage driver fatigue to reduce the incidence of accidents	No accidents caused by driver fatigue	Driver log books to be maintained in each vehicle	Accidents should be reported to the appropriate authorities as soon as possible following the accident
			An investigation should be conducted to determine cause of accident and summary presented within the MMP
			Summary of results from investigation should be presented in the MMP

Contingencies

Non-compliance	Action
There have been complaints received regarding dust or noise attributable to transport of product	a) Investigate cause of complaint/s, noting location, time and duration b) Determine appropriate mitigation strategies and implement c) Notify complainant of any outcomes d) Review management to determine suitability and modify as required
Road infrastructure is showing signs of deterioration attributable to WDRL use	a) Investigate possible cause of deterioration b) Review vehicle size and weight limits and modify as appropriate c) Notify road users of location of deterioration and initiate management (e.g. hazard warning and speed restriction signage) d) Facilitate road repair as soon as practically possible
Accidents attributable to driver fatigue occur	a) Review driver management strategy and modify as required, possibly including reduced shift hours, reduced work quotas, increased rest periods etc.

4.7.7 Solid and Liquid Wastes

Description

- Management of wastes will be an integral part of WDRL's operations and will follow the principles of reduce, reuse and recycle in recognition of the significant environmental values of the area
- WDRL will generate the following waste streams:
  - Construction waste
  - General operations waste (including waste of a domestic nature)
  - Decommissioning waste
- WDRL will implement a hierarchy of waste management which will:
  - Promote best practice in waste avoidance and/or minimisation
  - Reuse as much material as possible
  - Ensure that all suitable materials are recycled
  - Dispose other wastes in an environmentally responsible manner

Environmental Aspects to be Managed

- Disposal of hazardous goods in an environmentally acceptable manner and according to industry best practice
- Disposal of non-hazardous goods to an approved site
- Potential public health nuisances and environmental pollution

Performance Management

Management Objective	Target	Actions	Performance Indicators
To manage solid and liquid wastes in such a way as to minimise the potential for public health nuisance and/or environmental pollution	No incidence of public health nuisance as a result of inappropriate disposed solid or liquid wastes	All wastes are to be disposed of as soon as practicable and not stored around mining or infrastructure areas for prolonged periods	No evidence of Public health nuisance from improperly disposed of wastes
		Any waste disposal sites located within the lease areas are to be fenced and burnt off as necessary to discourage feral animals	
		Where possible wastes will be separated into different streams to enable identification of materials suitable for re-use and recycling	
		Recyclables are to be transferred to the registered recycling facility in Mataranka	
		Remaining non-hazardous (inert and putrescible) solid wastes are be disposed of at an on-site, approved landfill	
		Septic tanks and sludge from the Sewage Treatment Plant is to be removed from site by a waste disposal contractor and disposed of offsite, as required	
	No incidence of environmental pollution as a result of inappropriately disposed	Non-biodegradable waste (e.g. cans, glass, hazardous or hydrocarbon waste, etc.) is to be separated and	No environmental pollution incidents caused by solid or waste

Management Objective	Target	Actions	Performance Indicators
	solid or liquid waste	disposed of at the nearest approved waste disposal facility	materials
		Hazardous materials and wastes are to be stored in appropriately labelled containers within purpose built dangerous goods and chemical storage containers. These should be self-bunded, ventilated and be compliant with AS1940-2004 Storage and Handling of Flammable and Combustible Liquids	
		Empty fuel drums are to be stored in plastic lined, earth walled and bunded areas	
		Drums should be returned to the supplier where possible. Otherwise they disposed of at the nearest approved waste disposal facility for re-use or recycling	

Monitoring Program

Management Objective	Performance Indicators	Monitoring Methods	Reporting
To manage solid and liquid wastes in such a way as to minimise the potential for public health nuisance and/or	No evidence of Public health nuisance from improperly disposed of wastes	The Field Supervisor is to conduct monthly checks of solid and liquid waste disposal areas to ensure there is no evidence of mosquito breeding or materials likely to encourage feral animals	Any potential public health nuisance issues identified are to be reported to the appropriate authority and

Management Objective	Performance Indicators	Monitoring Methods	Reporting
environmental pollution		Fenced areas are to be inspected monthly to ensure they are intact	the incident summarised in the MMP
		Septic tanks and sludge to be monitored monthly to identify need for removal	Removal of septic waste and sludge is to be documented in the MMP
	No environmental pollution incidents caused by solid or waste materials	A log is to be kept showing removal of hazardous materials from site and by whom	Log of waste removal is to be detailed in the MMP
		All hazardous materials storage is to be inspected weekly by the Field Supervisor to ensure appropriate storage, labelling and disposal	Inspection schedule is to be included in the MMP with any issues and mitigation undertaken
		All bunds are to be inspected by the Field Supervisor weekly to ensure they are structurally sound	Inspection schedule is to be included in the MMP with any issues and mitigation undertaken

Contingencies

Non-compliance	Action
Evidence of public health nuisance	a) Investigate cause of incident b) Report to necessary authorities c) Determine appropriate mitigation d) Notify personnel if risk is ongoing

Non-compliance	Action
Environmental Pollution event	a) Investigate cause of incident b) Clean-up spill as soon as practicable and determine further work required c) Take samples of earth/water as necessary as conduct analysis to determine degree of pollution risk d) Determine ways to reduce future risk of same event e) Notify relevant authorities f) Continue regular monitoring as required (advice from relevant authorities)

Acronyms

AAPA	Aboriginal Areas Protection Authority
AFMA	Australian Fisheries Management Authority
AIMS	Australian Institute of Marine Science
AMDMP	Acid Mine Drainage Management Plan
ANZECC	Australia and New Zealand Environment Conservation Council
AQIS	Australian Quarantine Inspection Service
BOM	Board of Management
DEM	Dust Extinction Moisture level
DoR	Department of Resources
DSO	Direct Shipping Ore
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
ESCP	Erosion Sediment Control Plan
GDE	Groundwater Dependent Ecosystem
MMP	Mining Management Plan
MSDS	Material Safety Data Sheet
NATA	National Association of Testing Authorities
NOHSC	National Occupational Health & Safety Commission
NRETAS	NT Department of Natural Resources, Environment, the Arts and Sport
NT	Northern Territory
OHS	Occupational Health and Safety
PAF	Potentially Acid Forming
RSS	Receival Stacking System
SOP	Standard Operating Procedure
TO	Traditional Owner
TSMS	Traffic Safety Management System
WMP	Water Management Plan
WONS	Weed of National Significance
WQMP	Water Quality Monitoring Plan