

Guidelines for Preparation of an Environmental Impact Statement

Roper Bar Iron Ore Project

- Western Desert Resources Ltd -

May 2012

1	INTRODUCTION	3
2	GENERAL ADVICE ON EIS	5
2.1	General content	5
2.2	Format and style	5
2.3	Administration	6
2.4	Environmental impact assessment approach	7
2.4.1	Risk assessment methodology	7
3	DESCRIPTION OF THE PROPOSED DEVELOPMENT	8
3.1	General information	8
3.2	Project alternatives	10
3.3	Project Planning	10
3.4	Construction	11
3.5	Project components – design and operations	11
3.5.1	Mine	11
3.5.2	Crushing Circuit	12
3.5.3	Ancillary infrastructure	12
3.5.4	Haul Road	13
3.5.5	Bing Bong Load Out Facility	13
3.6	Transport	14
3.7	Water demand and management	15
3.8	Energy	16
3.9	Waste management	16
3.10	Workforce and accommodation	16
3.11	Decommissioning	17
3.11.1	Progressive rehabilitation	17
3.11.2	Mine closure planning	17
4	EXISTING ENVIRONMENT	18
4.1	Climate	18
4.2	Topography and geomorphology	18
4.3	Geology	18
4.4	Soils	19
4.5	Land use and tenure	19
4.6	Landscape character and visual amenity	19
4.7	Biodiversity	19
4.7.1	Listed species	20
4.7.2	Marine environment	21
4.8	Surface water	22
4.9	Hydrogeology and Groundwater	23
4.10	Air, Noise and vibration	23
5	SOCIAL ASPECTS	23
5.1	Public consultation	23
5.2	Cultural and historic values	24
5.3	Socioeconomics	24
6	ENVIRONMENTAL IMPACTS AND RISK ASSESSMENT	25
6.1	Risk assessment process	25
6.2	Risks to water resources	26
6.2.1	Surface water	26
6.2.2	Groundwater	29
6.3	Risks to biodiversity	30
6.3.1	Terrestrial and aquatic biodiversity	30
6.3.2	Marine biodiversity	33
6.4	Rehabilitation and mine closure	33
6.5	Social and cultural impacts	35
6.6	Cumulative impacts	37

6.7	Other Issues	38
7	MANAGEMENT OF IMPACTS.....	39
8	NT POLICY AND GUIDANCE NOTES.....	39
8.1	Greenhouse gas emissions and climate change guidelines	39
8.2	Environmental offsets	40
8.3	Biodiversity and natural resource guidelines.....	40
8.4	Erosion and sediment control guidelines	40
8.5	Mine closure guidelines	40
8.6	Public health premises and food premises	41
8.7	Water supply	41
8.8	Wastewater	41
8.9	Solid waste storage and disposal	41
8.10	Mosquito breeding.....	41

1 INTRODUCTION

Western Desert Resources Limited (WDRL) proposes to construct and operate an iron ore mine within the Gulf region of the Northern Territory. The mine site is approximately 50km west from the coast and 60 km south east of Ngukurr and approximately 140km from Roper Bar, along Nathan River Rd.

WDRL's exploration tenements in the region total almost 1850km², and approximately 5000ha is under Mineral Lease Application (MLA). The tenements contain an estimated resource of 311 million tonnes (Mt). Mining is proposed of high grade deposits located at Areas E and F (MLA28264), with 25Mt minable resource and an expected mine life of approximately eight years.

Western Desert Resources Limited proposes to construct and operate:

- Open pit mining of iron ore reserves with a return to pit of most wastes;
- 2.3 km river diversion channel to redirect a tributary of the Towns River away from pit F;
- Some waste and/or overburden rock stockpiles;
- Haul roads and light vehicle access roads;
- Run of Mine pad;
- Crushing;
- Power generation;
- Ancillary infrastructure;
- Camp facility;
- Airstrip;
- A 160km haul road traversing some eight rivers or streams;
- Ore stockpile area 2-3km from Bing Bong;
- Covered conveyor to barge load out facility at Bing Bong port; and
- Transshipment by barge to ocean going vessels.

Mining will be conducted using conventional truck and shovel equipment with an option to use surface mining machines where required. Drilling and blasting will also be required, as well as pit dewatering. The iron ore will be transported approximately 160kms along a proposed haul road to Bing Bong Load Out Facility (owned by Xstrata for its McArthur River Mine), from where it will be transhipped to Ocean Going Vessels (OGVs) according to operational practices of the existing facility. The construction and operations crews will be housed in camp facilities on site on a fly-in fly-out (FIFO) work arrangement.

The Project proposal was referred on 2 August 2011 to the Department of Natural Resources, Environment, the Arts and Sport (NRETAS) for environmental assessment. On 5 October 2011, the NT Minister for Natural Resources, Environment and Heritage (NT Minister) determined that the Project required formal assessment under the NT *Environmental Assessment Act* (EA Act) at the level of an Environmental Impact Statement (EIS). The Project was also referred to the Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) and determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act* (EPBC Act).

On 30 November 2011 WDRL advised its intent to amend the ore processing and transport components of the Roper Bar Iron Ore Project, in accordance with Clause 14A of the NT Environmental Assessment Administrative Procedures (EAAP). On 8 December 2012 the NT Minister determined that the revised Project would require formal assessment at the EIS level. Issues of concern contributing to the decision include:

- Waterways in the area are in near pristine condition. WDRL need to demonstrate that the water quality will not be adversely impacted by runoff or dewatering of pits;
- Mining activities and associated infrastructure may impact Limmen National Park. Biodiversity and conservation values of the sites may be compromised if the proposed activities are not properly managed;
- The transport corridor may create a pathway for weed infestation along its length, further compromising biodiversity values, unless well managed;
- Sufficiently detailed information is not yet available regarding rehabilitation plans for the site, final landform design and the likelihood of success of revegetation;
- Social and cultural impacts are yet to be adequately addressed; and
- It is likely that expansion of the mining industry in this region will have cumulative effects on the environment that will need to be assessed and managed.

The amended proposal was referred to SEWPaC and determined to be a controlled action. The proposed action has the potential to have a significant impact on the following matters of National Environmental Significance (NES) that are protected under Part 3 of the EPBC Act:

- Listed threatened species and communities (section 18 and 18A); and
- Listed migratory species (sections 20 and 20A).

The proposal is being assessed under the bilateral agreement between the Australian and NT Governments.

On 4 May 2012, the proponent notified the Minister under clause 14A of the EAAP of alterations to the project. The alterations involve:

- A diversion of a tributary of the Towns River;
- Mining of a pit in Area F which is on a flood plain; and
- The presence of potentially acid forming (PAF) ore.

The environmental risk setting of the proposed action is increased by these changes, particularly when considering the interaction of these changes in combination, and their potential impact to downstream waterways which flow into the Limmen Bight, an area of high biodiversity values and designated area of conservation significance.

Under clause 14A(3) of the EAAP, in consultation with the Minister for Resources, the Minister determined that the environmental significance of the project remained such that an EIS is necessary in respect of the proposed action and it was necessary to issue new Guidelines to address the additional matters relating to the environment arising from the alterations to the proposed activity.

Draft EIS Guidelines were advertised for public comment for a period of 14 days from 9 May 2012.

2 GENERAL ADVICE ON EIS

2.1 General content

The EIS should be a stand-alone document containing sufficient information to avoid the need to search out previous or supplementary reports.

The EIS should enable interested stakeholders and the Minister to understand the environmental consequences of the proposed development. Information provided in the EIS should be objective, clear and succinct and be supported by maps, plans, diagrams or other descriptive detail. The body of the EIS is to be written in a concise style that is easily understood by the general reader and technical jargon should be avoided. Cross-referencing should be used to avoid unnecessary duplication of text. Detailed technical information, studies or investigations necessary to support the main text should be included as appendices to the EIS.

The EIS should demonstrate a Project commitment to the principles of ecologically sustainable development, which is defined as development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

In general, the EIS should:

- Describe the existing environment and key ecosystem processes;
- Describe the proposed action and evaluated alternatives;
- Determine the nature and magnitude of environmental impacts of the proposed action on the existing environment at a local and regional scale including both human and ecological concerns;
- Identify key environmental issues and the safeguards in place to avoid, minimise or ameliorate adverse impacts; and
- Establish mechanisms to determine the long term impact of environmental impacts associated with key environmental issues (monitoring and reporting).

The level of analysis and detail in the EIS should reflect the level of significance of the expected and potential impacts on the environment, as determined through adequate technical studies. Any and all unknown variables or assumptions made in the assessment must be clearly stated and discussed. The extent to which the limitation, if any, of available information may influence the conclusions of the environmental assessment should also be discussed.

The Proponent should demonstrate its commitment in the EIS to best practice environmental management. Best practice requires careful planning and commitment from all levels and groups within a mining company and through all phases of a resource Project from the initial exploration to construction, operation and closure. It is based on a comprehensive and integrated approach to recognising, and avoiding or minimising, environmental impacts and maximising benefits of the Project.

2.2 Format and style

The EIS should comprise three elements, namely:

- The executive summary;
- The main text of the document, and
- Appendices containing detailed technical information and other information that can be made publicly available.

The Guidelines have been set out in a manner that may be adopted as the format for the EIS. This format need not be followed where the required information can be more effectively presented in an alternative way. However, each of the elements must be addressed to meet NT Government regulatory requirements and requirements under the EPBC Act where appropriate.

The EIS should be written so that any conclusions reached can be independently assessed. To this end all sources must be appropriately referenced using the Harvard standard. The reference list should include the address of any Internet “web” pages used as data sources.

The main text of the EIS should include a list of abbreviations, a glossary of terms and appendices containing:

- A copy of these guidelines;
- A list of persons and agencies consulted during the EIS;
- Contact details for the Proponent;
- The names of the persons involved in preparing the EIS and work done by each of these persons, demonstrating that studies have been undertaken by suitably qualified professionals;
- The environmental record of the Proponent, including details of their environmental policy and planning framework and details of any proceedings (if applicable) under a Commonwealth, or state law for the protection of the environment against them.
- A table listing commitments made by the Proponent;
- A table listing how these Guidelines have been met in the EIS (using cross-referencing); and
- Detailed technical information, studies or investigations necessary to support the main text.

Maps, diagrams and other illustrative material should be included in the EIS. The EIS should be produced on A4 size paper capable of being photocopied, with maps and diagrams on A4 or A3 size and in colour where possible.

The Proponent should consider the format and style of the document appropriate for publication on the Internet. The capacity of the website to store data and display the material may have some bearing on how the document is constructed.

2.3 Administration

Approximately ten (number to be finalised close to time of publication) bound copies of the EIS should be lodged with the NT Minister, care of the Environment and Heritage Division of NRETAS for distribution to NT Government advisory agencies.

The EIS should be provided on CD/DVD in searchable .pdf format for placement on the NRETAS internet site. Both a single .pdf file of the entire document and separate files of Chapters and Appendices should be provided. These should be provided at least five business days before newspaper publication of the notification. Additionally, a MS Word (.doc) copy should be provided to facilitate production of the Assessment Report and Recommendations.

Hard copies of the EIS document should be offered to all neighbours of the Project, and other significant stakeholders.

At a minimum, WDRL is to advertise the EIS for review and comment in the *NT News*, *The Australian*, and *The Katherine Times*.

The EIS should be made available for public review at:

- Environment and Heritage Division (EHD), NRETAS, 2nd Floor, Darwin Plaza, 41 Smith Street Mall, Darwin;
- Minerals and Energy Information Centre, Department of Resources, 3rd Floor, Paspalis Centrepont, 48 Smith Street Mall, Darwin;
- Borroloola Community Government Council Building;
- Roper Gulf Shire office at Katherine (29 Crawford St);
- Northern Territory Library (NTL), Parliament House, Darwin;
- The Environment Centre NT, Unit 3, 98 Woods St, Darwin;
- Northern Land Council, 45 Mitchell St, Darwin; and
- An appropriate location at Ngukurr (e.g. NLC office).

To ensure optimal opportunity for public and Government scrutiny of the submitted EIS document, EIS exhibition should not occur in late December or January in any year. If EIS public exhibition overlaps any Christmas – January period, additional time will be added to the EIS exhibition period. The EIS public exhibition period is to be determined by the Minister.

The Project Officer is Renee Muller from the Environment and Heritage Division of NRETAS. Contacts are: Ph (08) 8924 4218; Fax (08) 8924 4053; e-mail: eia.nretas@nt.gov.au.

2.4 Environmental impact assessment approach

Project planning should aim to ensure **best practice environmental management**, with particular regard to the principles of ecologically sustainable development. The environmental impact assessment should be undertaken by applying a whole-of-Project risk assessment approach.

2.4.1 Risk assessment methodology

The risk assessment should be based on international best practice and undertaken using standardised methodologies including:

- AS/NZS ISO 31000:2009: Risk management - Principles and Guidelines (Standard)
- HB 203:2006: Environmental risk management - Principles and process (Guide)
- HB 158:2010: Delivering assurance based on ISO 31000:2009 - Risk management - Principles and Guidelines (Guide)

Risk is defined as the chance of something happening that will have an impact on objectives, or the effect of uncertainty on objectives. Environmental risks include risks to both humans and ecosystems. An iterative process of continual improvement should be developed and applied, such that controls implemented may include alteration of Project components or design (as shown in Figure 1).

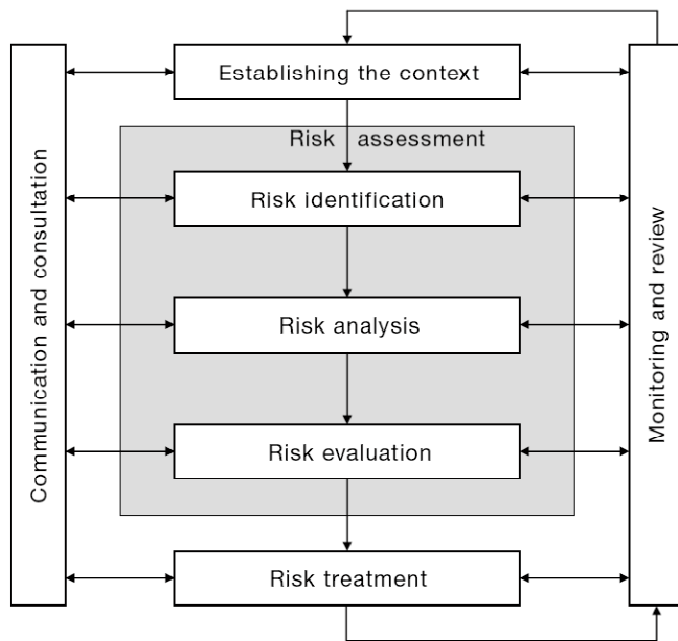


Figure 1. Risk Assessment Process.

Specifically, WDRL is required to:

- Demonstrate that risks to the environment, people and nearby facilities associated with the Project will be managed effectively during the construction, commissioning, operation, and decommissioning of the development.
- Acknowledge and discuss the full range of risks presented by the proposed action, including those of special concern to the public.
- Quantify (where possible) and rank risks so that the reasons for proposed management responses are clear.
- Acknowledge levels of uncertainty about estimates of risk and the effectiveness of risk controls.
- With the intent of creating realistic community expectations, evaluate risks of the Project not realizing its projected economic / social benefits.
- Identify and discuss residual risks (risks remaining once risk management strategies have been implemented) and potential environmental impacts expected to affect the community over the life of the Project.

Information provided should permit the reader to understand the likelihood of the risk, its potential severity, and any uncertainty about the effectiveness of controls. If levels of uncertainty do not permit robust quantification of risk, then this should be clearly acknowledged.

3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1 General information

Provide the background and context of the proposal including:

- The title of the proposal;

- The full name and postal address of the designated Proponent;
- Legislative background for the Project including the relevant NT legislation that applies to the Project;
- Relevant National and Northern Territory standards, codes of practice and guidelines;
- Tenure/s under which the proposal would be held and any Native Title issues;
- How the action relates to any other proposals or actions (of which the Proponent should reasonably be aware) that have been or are being taken, or that have been approved in the region affected by the action, including the Proponent's long-term plan for exploration and mining in the area;
- Identification of areas under exploration which may be mined in future, or any other potential future activities being planned;
- The proposal's location in the region and its proximity to landmark features, regional community centres, and sensitive environments such as major waterways, significant groundwater resources and conservation reserves;
- Proximity of sites of sacred, cultural, historical or social interest;
- Delineation of the Project footprint, including:
 - Location of the resource/s to be explored, developed or mined;
 - Boundaries of land tenures and mining tenures, in place or proposed, to which the Project areas are or will be subject;
 - All areas to be cleared (including mine, haul road, loadout facility and other infrastructure), both for the life of the Project and temporarily, prior to progressive rehabilitation (provide detailed mapping of areas to be cleared);
 - The location of any works to be undertaken, structures to be built or elements of the proposed Project, including illustrations and maps. Where relevant this must include, but is not limited to, the location of mine pits, waterway/s to be diverted or obstructed and proposed realignment/s, water storage facilities, roads, camp/s, hard stands, stockpiles (soil/ore), power station and infrastructure, crushing facility, haul road, new onshore and offshore development at Bing Bong (in relation to existing); and
 - Any other infrastructure associated with the proposed Project.
- All components of the Project should be described in detail, including construction through to rehabilitation, and care and maintenance;
- The sources (including land clearing) and projected quantities of greenhouse gases emitted by the Project and any offsets or actions to mitigate these emissions;
- Methods for storage, handling, containment and emergency management of chemicals and other hazardous substances (including fuel);
- Employment and business opportunities (direct and indirect), including sources of workforce, skill levels required and opportunities for local people, Indigenous employment and businesses;
- An explanation of the objectives, benefits and justification for the proposal, including:
 - A summary of environmental, economic (market requirements) and social factors to support the Project;
 - Employment and business opportunities (direct and indirect), including sources of workforce, skill levels required and opportunities for local people, Indigenous employment and businesses; and

- Commercial objectives (e.g. predicted volume of product and proportion of market demand to be met by output from the Project);
- The consequences of not proceeding with the action.

3.2 Project alternatives

The EIS should describe any feasible alternatives to carrying out the proposed activity. These alternatives, including the 'no Project' option, should be discussed in sufficient detail to make clear the reasons for preferring certain options and rejecting others.

The choice of the preferred option(s) should be explained, including a comparison of the adverse and beneficial effects (direct and indirect) used as the basis for selection, and compliance with the principles and objectives of ecologically sustainable development.

Alternatives should include:

- Not proceeding with the proposal;
- Avoidance of realignment of the tributary of the Towns River;
- Site selection (pits, mine operations centre (MOC), Run of Mine (ROM), loadout facility etc.);
- Mining methods and management of wastes;
- Haul road options including upgrading or building alongside existing road;
- Rehabilitation methods;
- Transportation options, including location of port;
- Alternative sources of water, or water storage options;
- Energy sources for power generation (diesel/gas); and
- Consideration of alternative environmental management measures for key risks/impacts.

Discussion should include:

- Sufficient detail to make clear why a particular alternative is preferred to another;
- Adverse and beneficial effects of alternatives at national, territory, regional and local level;
- Identification of water-resources, habitats, areas and/or stakeholder groups that are adversely or beneficially affected;
- The comparison of short (whilst operational), medium (post closure) and long term (> 1000 years) advantages and disadvantages of the options; and
- A comparative description of the impacts of each alternative on the NES matters protected by controlling provisions of Part 3 of the EPBC Act for the action.

3.3 Project Planning

Describe Project planning and how the works are to be undertaken, including but not limited to:

- An explanation of the anticipated timetable for construction, commissioning, operation and decommissioning;
- Details of construction, commissioning, operation and decommissioning equipment to be used;
- Waste management measures including reduction, treatment, reuse and disposal;

- Information on potentially hazardous materials to be used throughout the proposal life, including methods of transport, storage and disposal;
- The number and sources of staff, and training for staff involved for all phases of the proposed Project;
- Identify buildings required at the mine site and provision of worker facilities including cooking facilities, ablution facilities, sewerage, and sewage treatment, drinking water sources and treatment;
- Infrastructure requirements for ore to be transported to ROM, including alignment of haul roads, identification and management of creek crossings, locations of required borrow pits, etc. (if relevant).

3.4 Construction

The extent and nature of the Project's construction phase should be described, including offsite works required to enable construction to commence. Include construction methods, equipment, and transport of equipment. Provide project staging including site boundaries, development sequencing and timeframes and include all aspects of the mine and transport facilities.

For construction of all project components provide the following information:

- Timetable for construction, noting seasonal rainfall;
- Site access:
 - Vegetation clearing and disposal of plant matter following clearing;
 - Provision of access, power, telecommunications, water supply and other infrastructure.
- Construction requirements, including:
 - Type, sources, quantity and method of transport of construction materials, including water;
 - Methods of mine construction, volumes of materials required;
 - Any staging of construction activities; and
 - Plant and machinery required.
- Hours of operation;
- Solid and liquid waste handling;
- Erosion and sediment control practices;
- Proximity to sensitive habitats;
- Details of potential disruption to flows of waterways during construction and any diversion works required;
- Containment/disposal of construction spoil;
- Dust control requirements and water sources; and
- Provisions for management of weeds and prevention of weed spread.

3.5 Project components – design and operations

3.5.1 Mine

Provide specific details on the following;

- Mining types and methods, including the major equipment to be used in the various components of the operation;
- Number of pits proposed and their location, design and depth;
- Design basis for flood protection bunding and stream diversion infrastructure;
- Handling/stockpiling of topsoil, overburden and waste materials;
- Different techniques to be used for different sites/ore bodies (differing geotechnical character or topography);
- Quantity of material to be mined annually, including any proposed ramping up of production or staging of development;
- Identify the pit footprint in relation to existing waterways, with consideration of appropriate buffers (with reference to surface water information requirements described in section 5.8, below). Include details of the Towns River tributary realignment and any other planned waterway diversions;
- Projected dewatering requirements of the pit/s;
- Determine potential for generation of acid and metalliferous mine drainage based on ore characteristics, as described in Section 4.3, below;
- If proposed, include details of design, construction and operations of Waste Rock Dump and Tailings Storage Facility; and
- Information on pit backfill methods/designs.

3.5.2 Crushing Circuit

Provide specific details on the crushing circuit, including:

- Indicative process flow-sheets;
- Materials handling requirements;
- Water requirements – sources, volumes, treatment and wastes (if relevant);
- Chemicals to be used – inputs and waste handling (if relevant);
- Handling (storage, transport) of waste solids and tailings (if relevant); and
- Handling (storage, transport) of product.

3.5.3 Ancillary infrastructure

Provide relevant operational information regarding ancillary infrastructure, including, but not limited to:

- Water supply facilities, storages, bores and pipelines (drinking, process, raw, waste, etc. as required);
- Power station and associated infrastructure (powerlines, fuel storage);
- Buildings;
- Roads (internal haul roads, light vehicle access) and bridges;
- Identification of site access points;
- Fuel and chemical storages;
- Telecommunications;

- Management of wastes, including recycling, landfill, waste oils;
- Methods for storage, handling, containment and emergency management of chemicals and other hazardous substances (including fuel) and compliance with relevant legislation;
- Permanent and temporary accommodation facilities; and
- Airfields to be used/upgraded.

3.5.4 Haul Road

Details of haul road construction should be provided, including:

- Provide the preferred corridor alignment and justification for its selection, including identification of sensitive habitats;
- Provide length, width, location, land requirements, tenure and acquisition requirements;
- Describe consultation undertaken landowners, leaseholders and with relevant regulatory agencies and necessary approvals required;
- Vegetation clearing methods and disposal of plant matter following clearing;
- Provision of access, power, telecommunications, water supply and other infrastructure, if required;
- Location of campsites for construction crews, sources of water and treatment of solid and liquid wastes;
- Source and extraction of construction inputs and materials, including water.
- Identify and discuss impacts on availability of materials for competing uses (e.g. maintenance of Nathan River Road);
- Methods and timeframes for road construction, including river crossing techniques and identification of creeks and landforms that require specific construction methods (provide cross section diagram/s);
- Details of potential disruption to flows of waterways during construction and any diversion works required, including changes in creek morphology and hydrology of surface water systems due to haul road construction;
- Stormwater management;
- Plant and machinery required;
- Provisions for control of weeds and weed spread prevention;
- Ongoing provisions for road maintenance, including source and extraction of maintenance inputs and materials; and
- Provide a decommissioning plan if the haul road is no longer required by the mine after the proposed eight year mine life.

3.5.5 Bing Bong Load Out Facility

New infrastructure to be located at the Bing Bong Load Out Facility should be described, in context with the existing facility. Identify processes to be used for unloading and loading of product, stockpiling requirements, transport and handling to barges and ocean going vessels, including:

- Description of key plant and equipment, processes, inputs/outputs, capacities and raw materials required for construction; identify source of materials for hardstand construction;
- New buildings required and provision of worker facilities including, ablution facilities, sewerage, and sewage treatment, drinking water sources and treatment (where additional to existing facilities);
- Indicative process flow-sheets and materials handling requirements and balances – anticipated rates of inputs, wastes, and recycle streams (where relevant);
- Determine stockpiling requirements prior to loading;
- Identify any water storage requirements (ponds or tanks) and/or groundwater extraction requirements, where in significant excess of existing operations;
- Operational hours/days, if different from existing operations;
- Lighting requirements, with consideration of impacts on wildlife, particularly marine turtles (where additional to existing facilities);
- Provide the frequency of barge trips required and increase in boat traffic compared with existing operations and proposed expansion by Xstrata.
- Identify any increase in frequency or extent of dredging requirements;
- Identify any additional mooring points required for ships, including cyclone mooring facilities;
- Consider in design of additional infrastructure the original extreme event design criteria for Bing Bong Load Out Facility and whether these values remain appropriate (i.e. provide storm surge and wave height that the facility will be designed to withstand, with reference to those used for existing infrastructure and contemporary data);
 - Specify the design of the facility in relation to extreme events and storm surge and discuss provisions for containment of hazardous material and fuels during extreme events.
- Assess potential impacts of dust from roadtrains, stockpiles, conveyer, loading facilities and barges and identify management requirements.

3.6 Transport

Where additional to those aspects described above, the project description should consider, as a minimum, the following:

- Description of transport systems and methods to convey all site traffic (including materials, workers and product) to and from the site (both during construction and operation) including:
 - Type, size and number of vehicles required during all phases of the proposal;
 - The estimated volumes, tonnage, composition, origin and destination of traffic generated by the proposal;
 - Estimated times of travel;
 - Additional road infrastructure works required including site access and signage.
- Provide details of the existing transport infrastructure at locations likely to be impacted by the proposal;
- Describe how the project will, or has the potential to, impact on transport infrastructure during construction and operational phases. In addition, describe possible transport impacts as a result of the proposal including issues such as dust and road traffic noise;

- Describe the method of truck loading and load constraint so as to prevent the dropping or tracking of materials onto roads (includes ensuring that all wheels, tracks and body surfaces are free of mud and other contaminants before entering onto the sealed road network);
- Describe dust control of all vehicles;
- Provide details of safety measures to be used to reduce transport risks (e.g. safety awareness measures);
- Identify routes for transport, including vehicles carrying construction materials - including any Public Roads (e.g. the Stuart Highway, Roper Highway and the Nathan River Road);
- Describe intersection treatments (e.g. with the Nathan River Road);
- Identify peak periods for traffic;
- Hours of Operation;
- Staff Transport Method(s), including FIFO component (use of existing airstrip at Ngukurr and/or the existing (or proposed) airstrip at Roper Bar);
- Describe proposed safeguards, management and monitoring strategies that will be implemented to minimise potential transport impacts during construction and operation including, but not limited to:
 - Methods for complying with any relevant road vehicle axle limits;
 - Methods for securing loads;
 - Measures to reduce any road traffic noise impacts;
 - Consultation with local communities affected by transport impacts;
 - Traffic management; and
 - Management of driver fatigue.
- Future of the Haul Road (to be handed to the NTG or rehabilitated).

3.7 Water demand and management

Provide information on the quantity, quality, source (groundwater, surface water, bores), storage, infrastructure requirements of water to be used by the project, and treatment and/or recycling of wastewaters produced. Include process and drinking water requirements for all activities and consider:

- Detail water requirements and sources (surface and groundwater), including:
 - Dust suppression;
 - Drinking water;
 - Ablutions and sewage treatment;
 - Processing/ crushing plant;
 - Any wetting of ore materials prior to hauling;
 - Any other uses.
- Provide a proposed schedule for extraction or retention of water to demonstrate the system can support proposed extraction volumes.
- Describe water management, including:
 - Management of clean, dirty and contaminated water;
 - Any required diversion of surface waters; and
 - Management of high/extreme rainfall events.

- Mine pits:
 - Predict any dewatering requirements for mine pit/s, due to groundwater ingress and/or Wet season rainfall and surface flows, including water quality and quantity and proposed strategy for release to environment.
- Where treatment or recycling of water is required, provide details of waste water treatment systems and effluent disposal;
- Describe stormwater drainage systems proposed at each operational and construction site and proposed disposal or re-use arrangements;
- Identify any requirements for additional clean water in the Dry season and Wet season discharge options for excess contaminated water;
- Water balance model should be provided indicating the relationship between surface and groundwater, the interaction of pits with both surface and groundwater supplies, and the likely 'flow on' resulting from extraction, draw down, dewatering, irrigation (if used for dust suppression).

Please refer to the Northern Territory Department of Resources Water Management Plan Guidance note:

www.nt.gov.au/d/Minerals_Energy/Content/File/Forms_Guidelines/AA7-023_Water_Management_Plan_Guide.pdf

3.8 Energy

- Determine Project energy requirements, including mining fleet fuels and electricity demand;
- Provide details of proposed power plant (type of equipment, fuel use, expected emissions to air);
- Provide details of energy infrastructure requirements, both on and off the site; and
- Discuss energy conservation measures and greenhouse gas mitigation strategies.

3.9 Waste management

- Describe proposed management of solids wastes at the mine site, camp site, and other relevant locations, including industrial and domestic wastes and provisions for recycling.

3.10 Workforce and accommodation

- Describe the number of people to be employed, skills base required, and likely sources (local, regional, overseas) for the workforce during construction, and operational phases.
- Discuss arrangements for transport of workers to and from project areas, including air services required.
- Describe 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.

For the proposed mine camp, provide the following information:

- Proximity to works sites and travel arrangements;
- Food preparation and storage;
- Licensed premises or alcohol storage facilities;

- Ablution facilities, sewerage, and sewage treatment;
- Drinking water sources and treatment; and
- Dust and noise control (where campsite is located close to construction sites).

3.11 Decommissioning

3.11.1 Progressive rehabilitation

Mining and rehabilitation should aim to create a landform with land use capability and/or suitability similar to that prior to disturbance unless other beneficial land uses are pre-determined and agreed. The amount of land disturbed at any one time should be minimised. Describe methods for progressive and final rehabilitation of disturbed areas, including:

- Proposed staging / timing;
- Soil profile reconstruction;
- Final landform design and any voids or landscape depressions to be left at cessation of mining;
- The rehabilitation techniques to be used and the final topographic and drainage morphology;
- The proposed revegetation program, with selection and collection of local native species e.g. native grasses and other vegetation;
- Other preparations required for successful rehabilitation (seed harvesting, seedling generation, etc.);
- Water supply;
- Describe provisions for ensuring protection of groundwater and surface water on and off site, along with monitoring program to ensure actions are successful, including:
 - Runoff and erosion control measures;
 - Describe expected surface and groundwater quality of waters leaving the lease in the long term. Current and future water quality should be maintained at levels acceptable to downstream users and for maintenance of environmental values;
- Protection from fauna, including cattle and feral animals;
- Provide details of how rehabilitated condition will be self-sustaining and weed-free;
- Fire management; and
- Contingency management against rehabilitation failure.

3.11.2 Mine closure planning

Describe mine closure plans including:

- Removal of plant, equipment, structures, hardstand and concrete footings, buildings, water storages, and methods proposed for stabilisation of affected areas;
- Where diversion of creeks and the Towns River is proposed during operations, describe reinstatement or stabilisation of creeks after operations have ceased; and
- Discuss future land tenure arrangements.

4 EXISTING ENVIRONMENT

Studies used to describe the existing environment of the Project area and its surrounds should be of a scope and standard sufficient to serve as a benchmark (or baseline) against which the impacts of the Project may be assessed, over an extended period. The level of detail should reflect the scale and nature of the likely studies required to clearly define potential for impact from the Project.

The environmental impact statement must identify all threatened species, ecological communities, and migratory species listed under the EPBC Act that are likely to be impacted by the proposed action, including those likely to be impacted in the event of an emergency such as an iron ore spill, or vessels caught in cyclone events.

4.1 Climate

Describe climate factors which may affect management of the Project, for example:

- Rainfall patterns (magnitude and seasonality);
- Temperature;
- Humidity;
- Wind;
- Cyclones;
- Any special factors (e.g. temperature inversions); and
- Climate extremes (drought, floods).

4.2 Topography and geomorphology

- Provide topographic maps at an appropriate scale;
- Identify significant topographical features of the cultural landscape in the affected area, in terms of the physical and cultural integrity of the area; and
- Describe landform processes in the vicinity of the development and predict changes to landform (both onsite and offsite) resulting from the proposal, including impacts relating to changes to surface water hydrology and morphology.

4.3 Geology

- Provide a summary of the results of studies and surveys undertaken to identify the extent of the iron ore resource within the Project area, including areas underlying related infrastructure;
- Identify mineral resources which may be sterilised by any proposed infrastructure corridors or easements (electricity, roads, etc.);
- Identify geological properties of the Project sites which may influence stability, occupation health and safety, rehabilitation programs, or the quality of wastewater or stormwater leaving any disturbed area;
- Undertake ore and waste rock characterisation to determine potential for generation of acid and metalliferous mine drainage. Please refer to:
 - International Network for Acid Prevention (INAP) Gard Guide for guidance on best practices and technology to address issues relating to waste rock dump design and

acid mine drainage (AMD) management:
www.gardguide.com/index.php/Main_Page; and

- Australian Government Department of Resources, Energy and Tourism Leading Practice Sustainable Development Program Handbooks – *Managing Acid and Metalliferous Drainage*, available at <http://www.ret.gov.au/resources/Documents/LPSDP/LPSDP-AcidHandbook.pdf>
- Investigate the physical, geo-mechanical and chemical properties of waste rock in both fresh and weathered forms. This information will inform site rehabilitation plans in terms of slope stability and possible acid generation.
- Survey and mapping of land capability is required to be conducted at a scale that will allow for the identification of risks and help address any planning and operational concerns associated with the proposed development.

4.4 Soils

- Provide a soil survey of the Project area with reference to the physical and chemical properties of the material which will influence erosion potential, storm water run-off quality, revegetation of any waterway realignments and rehabilitation.

4.5 Land use and tenure

- Provide details of current land tenures, conservation zones and Limmen National Park, location and owner/custodians of Native Title in the area, designated sacred sites.
- Identify areas of conservation value, or sensitive environmental areas. Include riparian vegetation, monsoonal vine forest, gorges, gullies, escarpments, etc. as required.

4.6 Landscape character and visual amenity

- Describe characteristics of the landscape that may be affected by the Project, in particular escarpments adjacent to the mining area. This includes scenic characteristics, panoramas, lookouts, etc.
- Discuss Project impacts on the community (local and wider community) amenity and recreation values of the region as a remote area.

4.7 Biodiversity

With reference to the NRETAS biodiversity and natural resource guidelines (see section 8.3) the following information should be provided for sites impacted by the mine, haul road and port:

- Identify sensitive environmental areas, i.e. ecosystems that provide important ecological function e.g. riparian vegetation, protected area buffer zones, refugia, important habitat corridors, or geological features which may support unique ecosystems (escarpments, gorges, gullies etc.);
- Present flora and fauna surveys of the Project area, including the haul road route. Identify flora and fauna species of conservation significance present, or potentially present within the Project area, and which may be affected by the Project. Targeted fauna and flora surveys for listed species should primarily be in areas of uncleared vegetation that will be directly affected by the proposed development. Include seasonal and diurnal variation;
- Present terrestrial flora and fauna surveys on the section of stream that is proposed to be diverted. Identify threatened species that occur in the area as well as species that are dependent on riparian vegetation, provide an assessment on how these species are likely to be affected, and any negative affects ameliorated.

- Present aquatic fauna surveys (including fish, turtles and macroinvertebrates) for sections of the Towns River potentially impacted by mining activities (including stream diversion, dewatering and any wastewater discharge). Include sites above and below the proposed diversion area and MLA, tidal and non-tidally affected waters and permanent water holes. Provide a map of the vegetation communities within the Project areas, including the haul road, and surrounding areas at an appropriate scale such as 1:25 000 or 1:50 000. The map must also identify areas containing sensitive and significant vegetation communities, including creek lines with associated riparian vegetation or rainforest;
- Identify groundwater dependant ecosystems in the vicinity of project area;
- Identify and discuss species of traditional Aboriginal cultural significance (particularly aquatic and terrestrial fauna species), based upon consultation with traditional owners and surveys of the Project area; and
- Identify areas requiring clearing of native vegetation for the Project, including potential for edge (degradation) effects. Present alternative configurations where available to minimise clearing requirements. Detail habitat types within areas to be cleared, with focus on significant habitats and habitats supporting species of conservation significance.

4.7.1 Listed species

The discussion on listed species should include both Territory and Commonwealth listed species. Listed threatened species to be considered in the EIS should include, but not be limited to:

- Bare-rumped Sheath-tail Bat (*Saccolaimus saccolaimus nudiclunatus*);
- Gouldian Finch (*Erythrura gouldiae*);
- Northern Quoll (*Dasyurus hallucatus*);
- Gulf Snapping Turtle (*Elseya lavarackorum*);
- Northern Hopping-mouse (*Notomys aquilo*);
- Green Sawfish (*Pristis zijsron*);
- Freshwater Sawfish (*Pristis microdon*);
- Dwarf Sawfish (*Pristis clavata*);
- Green Turtle (*Chelonia mydas*);
- Flatback Turtle (*Natator depressus*);
- Water Mouse (*Xeromys myoides*);
- Olive Ridley Turtle (*Lepidochelys olivacea*);
- Crested Shrike tit (*Falcunculus frontatus whitei*);
- Red Goshawk (*Erythrotriorchis radiatus*);
- Masked Owl (*Tyto novaehollandiae kimberli*);
- Australian Painted Snipe (*Rostratula australis*); and
- Brush-tailed Rabbit-rat (*Conilurus penicillatus*).

Listed migratory species to be considered in the EIS should include, but not be limited to:

- Dugongs (*Dugong dugon*);

- Australian Snubfin Dolphin (*Orcaella heinsohni*); and
- Indo-pacific Humpback Dolphin (*Sousa chinesis*).

For each of the species identified, the following information must be provided as a minimum:

- Information on the abundance, distribution, ecology, and habitat preferences of listed species and communities;
- Information on the conservation value of each habitat type from a local and regional perspective, including the percentage representation of each habitat type on site in relation to its local and regional extent;
- If a population of a listed species is present on the site, its size and the importance of that population from a local and regional perspective;
 - Details of the scope, timing (survey season/s) and methodology for studies or surveys used to provide information on the listed species/community/habitat at the site (and in areas that may be impacted by the Project); and
 - Other details required for site-specific species should be included here.
- Discussion of known existing threats to the species, whether or not attributable to the proposed action, with reference to relevant impacts from the proposed action (including taking into consideration any relevant guidelines, policies, plans and statutory provisions);
- Details of the geology and geomorphology of the area;
- Baseline information and maps identifying at both the site and regional levels:
 - Known occurrences of the species;
 - Potential habitat for species or communities (differentiating where relevant on the basis of use e.g. breeding habitat, migration pathways, feeding habitat); and
 - Regional migration pathways for species or communities.

For all listed threatened, migratory or marine species that are believed not likely to be impacted by the proposed action, but for which suitable habitat is present and could be impacted by the proposed action, detailed information must be included to demonstrate that a relevant impact on the species will not occur.

4.7.2 Marine environment

A description of the marine environment relevant to the proposal should be provided, including the estuarine and marine areas influenced by the Towns River. Note that the level of detail provided should reflect the level of significance of the expected and potential impacts on the environment. Include:

- Climate and atmospheric characteristics (e.g. air quality, seasonal temperatures, humidity, wind, evaporation and rainfall);
- Oceanographic conditions, especially those which may have a bearing on the proposed action. Provide information on seasonal variation, waves, tides, currents, water salinity, clarity, temperature and depths. Discuss frequency and severity of extreme weather conditions, such as storms and cyclones, for the 2, 10 and 100 year conditions;
- Known flora and fauna, including baseline information and maps on communities and individual species types, and where known, population genetics and stock structure, in the immediate and surrounding areas that may be subject to relevant impacts, as determined by literature search and survey and sampling programs if required.

- The environmental impact statement must provide an evaluation of the flora and fauna communities identified with reference to:
 - Habitat values in a local, regional and national context;
 - Presence of endemic species;
 - Local and regional representation;
 - Conservation and biodiversity values;
 - Economic and cultural values of species;
 - Migratory species; and
 - Unique habitats.
- The likely presence of any unique, rare, threatened, endangered or vulnerable flora and fauna species and communities or listed migratory species, as well as cetaceans in the marine environment relevant to the proposed action, including the marine environment that may be impacted in the event of a hydrocarbon spill or a failure of the realigned river channel, should be discussed. This should include an evaluation of the significance of their occurrence (including conservation status, distribution, population viability and habitat requirements).
- A broader description of the biodiversity and biogeography of the potentially impacted environment must be included. Sensitive environments must be identified along with key ecological relationships and interdependencies (e.g. coral spawning, fish spawning aggregations, flora and fauna relationships etc.).
- The extent of existing disturbance to flora and fauna, and the incidence of introduced pest species must be discussed.

4.8 Surface water

For surface waters potentially impacted by the Project:

- Provide a detailed map of the current drainage, including both major and minor drainage lines, in relation to the proposed diversion channel, and the planned mining activities.
- Provide baseline surface water quality data including location of monitoring sites to inform ongoing monitoring and assessment of the Project impacts on water resources using existing relevant site monitoring data;
- Provide a surface water monitoring program and explain how it will be implemented in order to include monitoring of impacts from the Project on the local and regional hydrological conditions;
- Present and interpret water quality monitoring data for surface water in the area of the Project;

And describe:

- Catchments, their significance (Ramsar etc.), boundaries, area and topography, including location of mine infrastructure and the mining lease boundary;
- Areas of inundation, drainage lines, surface-water flow directions, creeks and receiving waterways. Existing surface drainage patterns, flows (including flood level contours) and discharge rates;
- Strahler Order of any creeks or rivers to be diverted;
- Size and seasonal flow rates of drainage lines, creeks and waterways;
- Beneficial uses; and

- Identify sensitive receptors to impacts upon surface water systems, including consideration of riparian, aquatic, estuarine and marine ecosystems, flora and fauna;

4.9 Hydrogeology and Groundwater

To determine the impacts to the environment and public health, provide a conceptual hydrogeological model, including detailed maps or diagrams where appropriate, describing:

- Volume of water to be extracted;
- Seasonal groundwater depth(s), surface connections via springs or recharge zones, extent and degree of connectivity or confinement, proximity and connectivity to local and regional aquifers, and flow velocities and directions;
- Locations of groundwater monitoring bores;
- The extent and hydrogeological properties of local and regional aquifers.
- Information pertaining to any recent hydrogeological assessments;
- Sensitive receptors to impacts upon groundwater systems, including consideration of groundwater dependant ecosystems;
- The groundwater monitoring program and how it will be implemented in order to monitor impacts from the mine site on the local and regional hydrogeological conditions; and
- Provide a comprehensive Groundwater Report summarising baseline groundwater levels, quality and trends over time. Identify any issues (e.g. degrading water quality, significant drawdown) and potential causes or issues and details of actions taken to address those issues.

4.10 Air, Noise and vibration

- Identify sensitive receptors adjacent to the Project area and discuss their potential level of sensitivity to dust and noise (including underwater noise).
- Record applicable ambient air quality parameters such as dust (in particular the PM10 fraction) and background noise.
- Include meteorological information applicable to air quality and noise parameters.

5 SOCIAL ASPECTS

5.1 Public consultation

WDRL should plan and undertake a public consultation process as a component of the EIS. Details of the consultation should be provided in the EIS including:

- Stakeholders that were identified and details of methods used for engagement (types of activities, timing, feedback process, etc.);
- Identification of affected parties, including a statement outlining any communities that may be affected and describing their views;
- Consultation undertaken to date and any documented response to, or result of, the consultation;
- Future consultation/communication strategies about relevant impacts of the action to be continued throughout the life of the Project;

- An outline of negotiations and discussions with local government and the Northern Territory Government should be provided; and
- Indicate how feedback from consultations has been integrated into the EIS process and any alterations made in mine planning.

The EIS has an important role in informing the public about this proposal. It is essential that the Proponent demonstrate how any public concerns were identified, and will influence the design and delivery of the proposal. Public involvement and the role of government organisations should be clearly identified. The outcomes of any surveys, public meetings and liaison with interested groups should be discussed including any changes made to the proposal as a result of consultation. Details of any ongoing liaison should also be discussed.

5.2 Cultural and historic values

- Identify cultural-spiritual environment and values.
- Identify areas of historic or archaeological significance likely to have or require consideration under the *Heritage Conservation Act*;
- Describe potential impacts to any heritage or archaeological places identified in baseline studies;
- Identify areas with special values to Indigenous and non-Indigenous people (e.g. traditional land use, landscape, visual environment, recreational, commercial, tourism, fisheries, scientific, educational, archaeological sites).
- Describe the proposal in relation to Limmen National Park and how the Park's announcement influences project planning, site operations and proposed rehabilitation.

5.3 Socioeconomics

- Describe the population, demographic, social, cultural and economic profiles at the local, regional and territory levels, based on available published data as well as additional field based research where required.
- Identify social factors (lifestyle characteristics, existing trends, social problems and underlying reasons) including reference to results and recommendations of relevant studies.
- Describe the social amenity and use of the Project area and adjacent areas for fishing, recreation, tourism, industrial, residential and/or educational purposes.
- Identify community infrastructure and services potentially impacted or benefitted by the Project, including transport, communication, housing, health, education.
- Identify employment and business opportunities (direct and indirect), including sources of workforce, skill levels required and opportunities for local people and businesses.
- Provide employment numbers, indigenous employment numbers and targets, training and upskill opportunities, investment, local business opportunity to service and supply the project and any other relevant economic and social benefits.
- Include project financial viability and consequences of reduced commodity prices on project. Also address associated risks if the project is forced to cease operations earlier than predicted, including the social-economic consequence of this for the surrounding community and potential legacy issues.
- Describe the existing economic environment that may be affected by the Project at a local and regional level. Where relevant, provide information regarding:

- The current economic position of the local community and any social issues faced by the local community, including employment levels and characteristics;
- Any industries potentially impacted (positively or negatively) by the Project;
- Sectoral activity;
- Existing local and regional housing market;
- Existing property and land values; and
- Availability of goods and services.

6 ENVIRONMENTAL IMPACTS AND RISK ASSESSMENT

6.1 Risk assessment process

The proposal to construct and operate an iron ore mine and associated infrastructure in the Roper region poses risks to the surrounding environment that may be cumulative to those posed by other projects in the region. WDRL is required to undertake a whole-of-Project risk assessment, using standard methods as described in Section 2.4.

Risks to people, the environment and nearby facilities associated with the construction, operation and maintenance of the various components of the proposal, and the storage and transport of materials to and from the complex, should be included in the assessment. The aim of this assessment is to demonstrate that:

- The Proponent is fully aware of the risks associated with all aspects of the development;
- The prevention and mitigation of risks are properly addressed in the design specifications for the facility; and
- The risks can and will be managed effectively during the construction, commissioning, operation, and decommissioning of the development.

Sufficient quantitative analysis should be provided to indicate whether risks are likely to be acceptable compared with similar ventures in Australia and internationally. Assumptions used in the analyses should be explained. Relevant standards, codes and best practice methodologies that minimise risks should be discussed.

The risk assessment should, as a minimum, address:

- Perceptions of risk to the surrounding community;
- Risks associated with facilities and daily operations;
- Extreme events such as cyclones and storm surge, seismic activity and climate change related sea level rise;
- Catastrophic failure of components;
- Consequences of possible incidents and accidents associated with construction, operation, maintenance and decommissioning of the various components of the proposal, including storage and transport of materials.

The hazard and risk analysis will identify the critical areas that need to be addressed in management plans, monitoring programs, contingency and emergency plans. Responsibilities and liabilities in such an event should be included.

A number of key Project risks have been identified through a preliminary assessment of the Project. Each of the identified risks should be addressed by WDRL in the risk assessment and management process.

Additionally, it is expected that further risks will be identified through the comprehensive risk assessment process required for the EIS. These should also be addressed and appropriate management initiatives be developed.

Environmental objectives, or overarching goals identifying environmental values to be protected, have been identified for each risk. These are supported by **environmental outcomes**, which define specific performance requirements to be met by the Proponent in order to achieve identified environmental objectives.

The key Project risks currently identified include:

- Potential negative impacts on surface/ground water quality, and on groundwater dependant ecosystems due to pit dewatering and inadequate characterisation and management of potentially acid forming material;
- Potential significant upstream and downstream impacts, including negative impacts to estuarine and marine ecosystems, from realignment of a tributary of the Towns River;
- Habitat disturbance resulting in impacts on terrestrial, aquatic and marine biodiversity;
- Potential for poor minesite rehabilitation and mine closure outcomes;
- Potential negative impacts on local communities (social and cultural impacts); and
- Potential cumulative impacts of large scale development/s in a remote area.

6.2 Risks to water resources

6.2.1 Surface water

Key Risks

- Waterways in the region are in near pristine condition. Water quality may be impacted by discharge of waste waters to surface water, runoff containing elevated sediment concentrations, or acid and metalliferous mine drainage (AMD).
- A tributary of the Towns River is proposed to be realigned to allow mining of the existing river channel. There is the potential for the diversion channel to fail and impact on mine components and the downstream environment including estuarine and coastal areas during flood events.
- Any change in flow regime may impact on the downstream environment including estuarine and coastal areas.

Environmental Objective

- To ensure that surface water quality is protected both now and in the future, such that ecological health and the health, welfare and amenity of people and land uses are maintained.

Outcomes

- Pre-mining (baseline) water quality conditions of potentially impacted waterways should be established and maintained.
- The quality of surface water onsite and moving offsite should be managed so that it complies with relevant standards and guidelines such as the National Water Quality Management Strategy (www.environment.gov.au/water/policy-programs/nwqms/) and beneficial use declarations. The surface water monitoring program will be sufficient to ensure surface water runoff from the mine site is not impacting downstream water quality.

- The Towns River tributary diversion should not impact on other mine components during flood events;
- River morphology upstream and downstream of the Towns River realignment should be maintained during mine life and after mine closure with no afflux upstream of the diversion;
- Geomorphic conditions within the realigned channel should be similar to the existing Towns River channel so that natural flow regime upstream and downstream can be maintained especially at the intersections of the diversions;
- There should be no change to flow velocities of flood regimes downstream of the diversion;
- The aquatic habitat integrity can be maintained both downstream (including estuarine, wetland and coastal areas) and upstream of the Towns River realignment through the life of the mine and after mine closure; and
- A functioning aquatic, riparian and riverine system in the diverted Towns River channel is able to be established and sustained within a timeframe that would not cause fragmentation of fauna populations in the medium- to long-terms.

Information Requirements

- Refer to Section 4.8 for information requirements on existing surface water;
- Develop a site water balance within the water management system and its management across the mine site. The water balance must take into account inputs (rainfall, surface flows), outputs (e.g. evaporation, evapotranspiration, controlled/uncontrolled discharges, production use etc.), interactions with surface and groundwater, surface area of stores, total catchment surface area per store etc.;
- Identify broader impacts to surface waters, for example: channel degradation and erosion (due to changes in hydrological processes), loss of habitat value associated with water quality degradation and modified stream flows, weed ingress, etc.;
- With respect to proposed creek and river realignments, in particular the Towns River tributary diversion:
 - Describe and illustrate with maps, plans and cross-sections any proposal/s to divert creeks or undertake other instream works;
 - Assess the potential impacts of in-stream works on hydrology and water quality;
 - Determine the change of flood extent in the floodplain and the impact of that change on the ecosystem. More precisely, determine post diversion flood extent and impacts on areas within the catchment which flood regularly (pre-diversion), and impacts on areas which will receive post-diversion flood waters (e.g. Melaleuca woodlands, wetlands, riparian woodlands, etc);
 - Where flooding levels will be affected by diversion and flood mitigation infrastructure, model the afflux and illustrate the extent and height variations with maps.
 - Determine post diversion flow regimes upstream and downstream of the diversion;
 - Identify post-diversion changes to catchment size or characteristics, including future resource exploitation in catchments above the diversion and likely impacts; and
 - Provide end of mine life strategies for the diversion;
- Provide details of the history and likelihood of flooding, including the extent, levels and frequency of floods in and around the project site (utilising anecdotal evidence where necessary, e.g. photos from previous flood events). Include depth contours, and potential interaction with mine infrastructure both pre- and post-diversion of the Towns River;

- Describe and illustrate how an operating pit and mine site would be protected from flooding (including design criteria for flood protection), and address the flood protection level of any final void without the need to maintain levees;
- Provide the likelihood/frequency of rain events which would result in breaching of flood protection bunds and describe impacts associated with breach event;
- Describe proposed domestic wastewater (sewage) treatment processes;
- Provide details on the impacts of road construction, including the haul road, on creeks and river crossings:
 - Construction and management of any proposed creek diversions;
 - Any temporary or long term impacts associated with construction and operation of roads (altered hydrology, erosion and sediment impacts, water quality impacts associated with road runoff, potential weed incursion downstream due to occurrence of weeds on road corridors, etc.);
- Mine de-watering requirements must be provided with details on water quality, predicted volumes, discharge points and likely impacts on regional drainage;
- Discuss the potential for formation of AMD during mining activities and following mine closure, and how surface water systems may be impacted; and
- If proposed as a project component, discuss Waste Rock Dump and Tailings Storage Facility as potential sources of contamination.

Monitoring and management

- Describe water management systems and design criteria of infrastructure in terms of average recurrence intervals (ARI), durations and intensities; consider local meteorology in the context of Project environmental management including the frequency and severity of extreme weather conditions such as storms and cyclones for the 2, 10 and 100 year average return interval events.
- Determine potential impacts of, and describe emergency response plans for fuel spills, solid waste spills (e.g. from conveyor belts) and other related incidents which may impact on surface water.
- Provide strategies for ongoing geocharacterisation of waste rock and management of any Potential Acid Forming (PAF) material to prevent/minimise and manage AMD.
- Provide ongoing plan for water quality monitoring, indicating baseline conditions determined in Section 6 (existing environment), and criteria for determining the extent of impact of mining activities on water quality.
- Provide management strategies for control of erosion and sediment runoff from disturbed areas, processing areas and any stockpiles (Erosion and Sediment Control Plan). Include maps and information detailing contours, areas of seasonal inundation, and location of settling ponds and sediment control measures. Include Wet season operational management strategies.
- Details of the safeguards and management strategies used to minimise the impacts of construction, operation and closure on hydrogeological features should be provided:
 - Outline management of clean and contaminated water within the proposed mineral lease;

- Detail management strategies for high/extreme rainfall events and probable maximum precipitation events;
 - Outline any water recycling; and
 - Proposed surface water monitoring program.
- Identify contingency measures in the event that monitoring demonstrates that management measures have not been effective.
- Propose measures for avoiding or mitigating impacts to hydrology and water quality as a result of creek/river realignment, and discuss measures for stabilising and rehabilitating any diversion works. Monitoring requirements are included in Section 6.3.
- Provide detailed information on the management of potentially acid forming (PAF) material and material with elevated metal levels to prevent contamination of surface water through AMD.

6.2.2 Groundwater

Key Risks

- Impacts to groundwater quality from mining activities causing contamination of groundwater or release of contaminated groundwater expressing to surface water.
- Groundwater drawdown associated with dewatering impacting flows in the Towns River and any other groundwater dependant ecosystems.
- Isolation of a reach of the Towns River due to a proposed realignment may alter groundwater regimes and lead to mortality of existing riparian vegetation, particularly groundwater dependent vegetation.

Environmental Objective

- To ensure that groundwater quality and quantity is protected both now and in the future, such that ecological health and the health, welfare and amenity of people and land uses are maintained.

Outcomes

- The quality of groundwater is maintained so that it complies with relevant standards and Guidelines such as document four of the National Water Quality Management Strategy (www.environment.gov.au/water/policy-programs/nwqms/) and beneficial use declarations; and
- Groundwater monitoring, based on the known availability and extent of the groundwater resource, is sufficient to ensure over extraction of groundwater does not occur and regional groundwater quality is not impacted.
- No offence is to be committed under the Northern Territory of Australia *Water Act* (March 2011), particularly in reference to Division 2, Section 16, by contaminated water migrating off-site.

Information Requirements

- Refer to Section 4.9 for information requirements on existing groundwater and hydrogeology;
- Provide a conceptual model showing an understanding of subsurface migration processes and behaviour of the groundwater system and interactions with all activities potentially

impacting groundwater (dewatering, extraction, storage of water in disused pits, storage of PAF waste rock, etc.);

- Undertake groundwater modelling to determine the potential for and scale of drawdown and whether there are impacts to groundwater dependent ecosystems;
- Describe any proposed extraction bores – the number of bores, location, extraction rates;
- Identify the natural hydro-geochemistry of the groundwater system (heavy metals, toxic metalloids, pH, redox, total dissolved solids);
- Discuss the potential for formation of AMD during mining activities and its potential impacts on groundwater;
- Identify and determine impacts on groundwater dependant ecosystems – billabongs, Dry season creek/river flows. Present multiple lines of evidence assessment of groundwater dependant ecosystem condition, including water quality data, sediment, rapid biological assessment data and existing land use data; and
- Supply monitoring data from water quality sampling of groundwater monitoring bores receiving discharges and drainage from the mine.

Monitoring and management

- Describe the groundwater monitoring program and how it will be implemented in order to include monitoring of impacts from the mine site on the local and regional hydrogeological conditions;
- Identify existing seasonal depth ranges of aquifers being accessed by the proposed bores, to identify appropriate water table depths which can serve as triggers for management action to provide alternative water supplies;
- Identify water treatment options to manage risk of AMD contaminating groundwater (if relevant);
- Describe how the periodic assessment of groundwater quality will be undertaken and discuss how any impacts from operations, along with mitigation measures and remediation (if required) to prevent contaminated groundwater migrating off-site, will be managed; and
- Determine a list of chemical parameters likely to be influenced by operations (may include fuel storage, metals, herbicides etc.) and general hydrogeological parameters (major ions) that can be used in the assessment of operations on the environment. Establish a monitoring, reporting and response program that includes periodic analysis of groundwater samples for the parameters identified.
- Identify contingency measures in the event that monitoring demonstrates that management measures have not been effective.

6.3 Risks to biodiversity

6.3.1 Terrestrial and aquatic biodiversity

Key risks

- The Project proposes a large area of land clearing, some of which will be progressively rehabilitated, which could result in a loss of biodiversity if not properly managed.
- Several weeds that are declared under the Northern Territory *Weed Management Act*, some of which are Weeds of National Significance, occur in isolated infestations within the project area and are a threat to regional biodiversity.

- Isolation of a reach of the Towns River due to a proposed realignment may alter localised surface and groundwater regimes and may lead to mortality of existing riparian vegetation, particularly groundwater dependent vegetation. Connectivity of the riparian corridor is likely to be lost between the upstream and downstream sections of the river before the realigned channel is fully established, with consequential ecological impacts.

Environmental Objectives

- To maintain the abundance, diversity, geographic distribution and productivity of flora and fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge; and
- As an action of the Territory 2030 Strategic Plan, intensive developments are to operate under a 'no net biodiversity loss principle'. The Proponent will need to demonstrate that the Project can proceed without net loss of biodiversity.

Outcomes

- Native flora and fauna species, and significant habitat types, particularly those of conservation and traditional Aboriginal cultural significance, will be identified, and ultimately protected from impacts from the Project.
- Surveys of flora and fauna species, and proposed clearing of native vegetation will be in accordance with relevant NT Guidelines.
- The Proponent will ensure that buffer zones, wildlife corridors and protection zones are adequate to prevent significant damage to adjacent sensitive ecosystems.
- The Proponent is to prevent the introduction of weeds or spread of weeds whilst constructing and operating the mine.
- Connectivity of riparian vegetation should be maintained as far as reasonably practicable between the reaches above and below the proposed Towns River realignment during and after establishment of the proposed channel.

Information Requirements

Sufficient information is required regarding the current biodiversity of the Project area to assess and monitor Project impacts. The following information should be provided:

- Refer to Section 4.7 for information requirements on describing existing flora and fauna;
- Detail the extent of clearing required during construction and operation of all facilities, and indicate on a map;
- Identify and discuss environmental risks associated with the proposed vegetation clearing. Discuss proposed clearing with regard to issues raised and recommendations contained within the *NT Land Clearing Guidelines*: www.nretas.nt.gov.au/national-resource-management/natveg/guidelines.
- Discuss impacts on species, communities and habitats of local, regional or national significance including sensitivity of species to disturbance;
- Describe impacts such as loss of vegetation, reduction in species abundance, introduction and increase in abundance of pest plants and animals, edge effects, reduced conditions for favourable plant growth, impacts on habitat corridors, habitat loss and fragmentation impacts associated with the vegetation clearing required during the life of the Project;
- Identify occurrence of weed species, including weed species declared under the NT *Weed Management Act*, which occur on or near the project area, or have potential to be

introduced via contaminated machinery, and identify weeds with potential to infect the Project sites;

- Discuss potential impacts on water quality of creeks, streams and ephemeral lakes (habitat for aquatic fauna and drinking water for terrestrial species); and
- Identify potential risks to conservation values of Limmen National Park and identify management measures required.
- With respect to the proposed realignment of the Towns River tributary:
 - Discuss any consequential impacts of changes to water flow or groundwater recharge on ecosystems and wildlife;
 - Demonstrate that water quality and the health of aquatic ecosystems can be maintained, and habitat for wildlife and corridors for their movement (fish passage/riffles/woody debris /shade / eddies) will be provided;
 - Demonstrate that the new channel would:
 - withstand bank erosion, undercutting, loss of significant riparian vegetation in flood events;
 - maintain water quality and the health of aquatic ecosystems; and
 - not cause sedimentation and burial of the in-stream aquatic fauna.

Monitoring and Management

- Provide a rehabilitation plan for the Towns River tributary diversion channel, including criteria for success, demonstrating that equivalent riparian vegetation could be successfully established along the length of the diversion channel. Include measures for managing invasive weed species and feral/grazing animals and monitoring of rehabilitation success. Clearly demonstrate how rehabilitation success criteria will be achieved and measured;
- Identify the likely impediments and risks to achieving rehabilitation success criteria and how those impediments and risks will be ameliorated. Provide anticipated time frames for successful rehabilitation;
- Discuss ways in which impacts on species, communities and habitats will be minimised (e.g. timing of works, minimising disturbance area);
- Identify the need for provision of wildlife passages along the haul road, associated with fragmentation of habitats;
- Include a weeds and feral animal management plan as part of the Environmental Management Plan, with particular consideration of weed management along the haul road;
 - Specifically address management of Bellyache Bush in relation to the proposed haul road.
- Demonstrate that appropriate flora and fauna survey methodology has been employed, to define species present on the Project site.
- Identify potential offset measures to compensate for residual effects of the Project that cannot be avoided, mitigated or repaired.

Guidance on identifying appropriate biodiversity offsets under the EPBC Act is available at: www.environment.gov.au/epbc/publications/draft-environmental-offsets.html. The draft NT Environmental Offsets Policy is available at: www.greeningnt.nt.gov.au/climate/environmental_offsets.html.

6.3.2 Marine biodiversity

Key risks

- Marine fauna may be impacted by increased barge traffic through vessel collision, hydrocarbon spills, underwater noise, lighting, etc.
- Failure of the realigned Towns River channel during flooding could lead to significant sedimentation and turbidity in the estuarine and marine environment downstream from the mine.

Environmental Objectives

- To maintain the abundance, diversity, geographic distribution and productivity of flora and fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

Outcomes

- Negative impacts on marine biodiversity will be assessed and appropriately managed.

Information Requirements

Assessment of impacts on marine biodiversity is required where those impacts are new impacts or greater in extent than impacts associated with the existing load out facility. The assessment should be considered in the context of existing operations and impacts, and the planned expansion works proposed by Xstrata.

- Determine and discuss potential impacts to marine fauna, including transient species, and habitat during construction and operation, including:
 - Vessel collision due to increased boat traffic;
 - Hydrocarbon spills;
 - Additional underwater noise levels and duration;
 - Illumination and lighting, including disorientation of fauna such as marine turtles and seabirds/shorebirds from illumination of offshore infrastructure, support vessels and ongoing operations (where additional to existing facility); and
 - Other impacts identified through a risk assessment process.
- Consider the findings of the Independent Monitor for the McArthur River Mine as they relate to Bing Bong Load Out Facility and ensure that the Proposal does not contribute to any identified impacts or risks of concern associated with the Bing Bong Load Out Facility.
- Assess the impacts of flow regimes from a realigned Towns River on estuarine and marine environments.

Management

- Identify ways in which impacts on species, communities and habitats will be minimised.
- Identify contingency measures in the event that monitoring demonstrates that management measures have not been effective.

6.4 Rehabilitation and mine closure

Mine closure is an important step of the mining process and planning for closure should be done as early as possible in the preliminary stages of mine planning, even before a mine opens. This allows for the most options to be considered and can result in lower costs at the time of closure. Closure planning is a progressive process that requires review and improvement

throughout the mine life. In many instances a closure strategy is not required for decades; however it is important to demonstrate that ecologically sustainable closure can be achieved.

Key Risk

- Progressive rehabilitation is proposed and the Proponent will need to demonstrate that topsoil replacement and regeneration of native vegetation will be effective.

Environmental Objective

- 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.

Outcomes

- To ensure that rehabilitation achieves a stable and functioning landform which is consistent with the surrounding landscape and other environmental and stakeholder values;
- 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.

Information Requirements

Provide a Mine Closure Plan (MCP) referring to the information requirements in the West Australian Environment Protection Authority and Department of Mines and Petroleum mine closure guidelines <http://edit.epa.wa.gov.au/EPADocLib/Guidelines-for-preparing-mine-closure-plans-210611.pdf>. The MCP must provide an understanding of the issues that require management at closure and that all relevant issues have been identified and appropriately managed. See Section 3.11 Include:

- Provide details on the proposed state the mining pit voids will be left and managed following closure (i.e. whether it will remain dry or partially or totally filled with water, or backfilled), and discuss the benefits or detriments of each option and support these with studies or data;
- Provide post-mine closure strategies for the realigned Towns River tributary channel including details of the permanency of the diversion 'structure' and modelling to determine long-term impacts;
- If relevant, identify and discuss environmental risks associated with potentially acid forming materials (PAF);
- Determine availability and volumes of key materials required for rehabilitation such as competent waste rock, subsoil, topsoil and low permeability clays (i.e. encapsulation material, if required);
- Relevant scheduling information with respect to material stockpiling and deployment to ensure that rehabilitation materials mined early in the process are appropriately segregated and preserved for later use;
- Demonstrate potential success of proposed rehabilitation plans through either a pilot scale demonstration or by reference to other Project sites which have similar geographical characteristics and support similar vegetation types;
- If fines rejects are to be placed back into the pits, provide details on amount of fines to be backfilled and subsequent impacts on the final rehabilitation;

- Develop a protocol for measuring site rehabilitation success through appropriate ecological indices;
- Identify seed mixes to be used in rehabilitation and any information gathered from trials;
- Indicate that appropriate materials are available on site and contingencies provided to make landforms secure and non-polluting in the event of unexpected or temporary closure;
- Describe proposed post-mining land uses which have been identified and agreed upon through consultation with stakeholders; and
- Identify contingency measures in the event that monitoring demonstrates that management measures have not been effective.

Proponents are expected to follow the principles and objectives identified in the *Strategic Framework for Mine Closure* (ANZMEC/MCA 2000), and to refer to the methodology and approaches described in relevant guidance including the national *Leading Practice Sustainable Development in Mining* handbooks and the *Planning for Integrated Mine Closure: Toolkit* (ICMM 2008). The DOR Mine Close Out Objectives (2008) should also be considered (http://www.nt.gov.au/d/Minerals_Energy/Content/File/Forms_Guidelines/CA7-011_Mine_Close_Out_Criteria_V3.pdf).

6.5 Social and cultural impacts

Key Risks

- Mining operation and increased human activities in the Roper region have the potential to alter the social demographic of this remote region. Assessment and monitoring is required to ensure the local community benefits from the Project.

Objectives

- To analyse, monitor and manage the intended and unintended social consequences, both positive and negative, of the Project and any social change processes.

Outcomes

- A Social Impact Assessment will identify potential social risks resulting from the mine and associated infrastructure, and develop appropriate mitigation strategies. The design and focus of the assessment will reflect social and community risks specific to the Project.

Information Requirements

Provide information regarding regional socioeconomics and the impact of the proposed activity as per Section 5, and include:

- Identify any impacts on tourism or touristic experience in the region, including potentially impacted tourist operators, relating to the physical presence of the mine and haul road, including noise, dust and visual impacts;
- Estimate the quantity and value of production/exports as it relates to the mine, including expected reduction in revenue should the proposal not proceed;
- Estimate the value of expenditure during the construction phase;
- Estimate the value of annual expenditure on regional goods and services as it relates to the mine and associated infrastructure;
- Describe potential opportunities related to the mine for the development of new skills and facilities that may be of benefit to the local community, past the lifetime of the mine;

- Define risk of the mine or associated workforce impacting on identified social issues in the region of the Project Area;
- Describe benefits to the local community, during and beyond the life of the mine, such as development of new skills and facilities, economic development and opportunities for local and regional business and employment opportunities; and
- Describe how potential local and regional business and employment opportunities related to the mine will be identified and involved.

Baseline information should be provided regarding cultural heritage sites in the region, as per section 5, and including:

- A description of Indigenous and non-Indigenous sites, places or objects of historic or contemporary cultural heritage significance, including:
 - Areas nominated for listing or listed on Commonwealth and Northern Territory Heritage registers and Commonwealth and Northern Territory registers of Indigenous cultural heritage;
 - Sacred sites - provision of evidence of an Aboriginal Areas Protection Authority (AAPA) Authority Certificate under the *Northern Territory Aboriginal Sacred Sites Act*; and
 - European historic sites.
- A description of areas with special values to Indigenous and non-Indigenous people (e.g., traditional land use).

The EIS should describe the arrangements that have been negotiated with relevant Indigenous groups in relation to archaeological surveys. The identification of Indigenous cultural heritage impact is to take place in consultation with relevant Indigenous groups. Provide:

- An assessment of the Project's (mine, haul road and shipping operations) effects on lifestyles, traditional practices, heritage places, the impact of increased visitation and the effects on Indigenous culture generally, including impacts on Traditional Ecological Knowledge and Land Management Practices. Discussion of the traditional subsistence economy, Indigenous natural resource use and any Native Title interests in the area;
- A discussion of the impacts on the relationships between groups identified with traditional and/or contemporary interest in the Project area;
- Details of any requirements to apply to, or applications already made to, the NT Minister for Natural Resources, Environment and Heritage to disturb or destroy a prescribed archaeological place and/or object (as defined in Heritage Conservation Regulation 3) under sections 29 and 34 of the *Heritage Conservation Act*.

Management

- Describe how WDRL proposes to manage any identified social, cultural or spiritual risks from the Mine and infrastructure, or its associated workforce, in the region of the Roper region.
- Establish a mechanism for monitoring any identified potential socio-economic impacts.
- Provide a community liaison and consultation plan including identification of, and ongoing consultation and negotiations with, all relevant stakeholders, ensuring the full range of community viewpoints are sought.

- The EIS should identify the monitoring program to be implemented for each potential cultural heritage impact and should provide outcome and assessment criteria that will give early warning that management and mitigation measures are failing.
- A management plan should be developed to include:
 - Procedures to avoid significant areas;
 - Protection of key sites during construction, operation and decommissioning work;
 - Ongoing protection measures; and
 - Procedures for the discovery of surface or sub-surface materials during the course of the Project.
- As per section 5.1, provide details of any consultation about the proposal, including:
 - Any consultation that has already taken place;
 - Proposed consultation about relevant impacts of the Project;
 - If there has been consultation about the proposed Project, any documented response to, or result of, the consultation; and
 - Identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.

6.6 Cumulative impacts

Cumulative impacts can arise from compounding activities of a single operation or multiple mining and processing operations, as well as the aggregation and interaction of mining impacts with other past, current and future activities that may not be related to mining.

An assessment of cumulative environmental impacts considers the potential impact of a proposal in the context of existing developments and future developments to ensure that any potential environmental impacts are not considered in isolation. The extent of cumulative impacts to be considered depends upon the nature of the environmental issue. Cumulative Impact Assessment accounts for impacts on a regional scale, such as:

- Landscape-scale change originates not only from single projects and management actions, but also from complex and dynamic interactions of multiple past, present and future management actions;
- Biophysical, social and economic change accumulates through additive or interactive (or synergistic) processes. The aggregate impact of multiple actions on the environment can be complex and may result in impacts that are more significant because of interactive processes; and
- Any given action does not operate in isolation. The most significant changes are often not the result of the direct effects of an individual action, but from the combination of multiple minor effects over the accumulation of time.

The cumulative impacts of the Project on biodiversity and ecological function should be assessed within the EIS. Specific issues that should be covered include:

- Impacts on regional ecosystems within the Roper region;
- Social impacts, including perception of the region as remote or wilderness;
- Key habitats (e.g. riparian, wetland, threatened species habitat) which retain connections with adjacent vegetation and habitat;
- Hydrologically connected surface water and groundwater systems that support wetlands and base flows in rivers and creeks; and

- Cumulative impacts on the marine environment in association with existing and proposed future activities at the Bing Bong Load Out Facility.

6.7 Other Issues

Other environmental impacts should be identified and management strategies proposed, including, but not limited to:

Bushfires

- The Proponent should be aware of sections of the *Bushfires Act 2009* and Regulations that may apply to the Project and address risk and management of fires occurring both within the mine site (e.g. during site clearing operations) and outside the mine site.

Biting insects

- A 12 month baseline mosquito assessment should be conducted at both the proposed accommodation village site and the Hodgson Downs mine site, to determine the risk of transmission to workers of mosquito borne diseases such as Ross River virus, Barmah Forest virus and the potentially fatal Murray Valley encephalitis virus.

Noise and vibration

- Describe the 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.
- Describe the management of noise and vibration impacts.

Air quality and dust

- Discuss dust suppression strategies and monitoring of dust impacts.

Greenhouse gas emissions and climate change

The Project is considered likely to lead to very significant greenhouse gas emissions due to both extensive land clearing and burning of fossil fuels for power generation and motor vehicle operation.

- Undertake greenhouse gas emissions modelling, and demonstrate consideration of measures to minimise and/or offset emissions;
- The implication of climate change on the Project's environmental and commercial feasibility should be assessed;
- Analyse risks to the Project from climate change impacts (e.g. increased risk and severity of flood; increased vulnerability to more intense bushfires, sea level rise, etc.);
- Identify adaptation measures to minimise risk to the Project from climate change impacts, particularly where there may be a significant impacts to human safety or property.

Visual amenity

- Describe the extent and significance of the changed visual landscape as a result of the proposed mining of outcrops, mesas, and escarpments (where relevant) on visual amenity from key vantage points day and night and during all stages of the Project, as it relates to the surrounding landscape. Provide aspects visible from any sensitive locations (publicly accessible areas).

7 MANAGEMENT OF IMPACTS

The EIS must provide an Environmental Management Plan (EMP) that is strategic, describing a framework for environmental management of the proposal and the property; however, as much detail as is practicable should be provided to enable adequate assessment of the proposed activity during the public exhibition phase. Where possible, specific management practices and procedures should be included in the EMP. Include:

- The proposed management structure of the operation and its relationship to the environmental management of the site;
- Management targets and objectives for relevant environmental factors;
- The proposed measures to minimise adverse impacts and maximise opportunities, including environmental protection outcomes;
- Performance indicators by which all anticipated and potential impacts can be measured;
- Proposed monitoring programs to allow early detection of adverse impacts;
- Describe contingencies for events such as failure of sewerage systems, heavy or prolonged rainfall, or saltwater intrusion into ground water;
- The EMP needs to address the Project phases (construction, operation, decommission) separately. It must state the environmental objectives, performance criteria, monitoring, reporting, corrective action, responsibility and timing for each environmental issue;
- The name of the agency responsible for endorsing or approving each mitigation measure or monitoring program;
- A summary table listing the undertakings and commitments made in the EIS, including clear timelines for key commitments and performance indicators, with cross-references to the text of the EIS; and
- Provision for the periodic review of the EMP.

Reference should be made to relevant legislation, guidelines and standards, and proposed arrangements for necessary approvals and permits should be noted. Proposed reporting procedures on the implementation of the plan, independent auditing or self-auditing and reporting of accidents and incidents should also be included. The agencies responsible for overseeing implementation of the EMP should be identified.

The EMP would continue to be developed and refined following the conclusion of the assessment process, taking into consideration the proposed timing of development activities, comments on the EIS and incorporating the Assessment Report recommendations and conclusions.

8 NT POLICY AND GUIDANCE NOTES

8.1 Greenhouse gas emissions and climate change guidelines

The Northern Territory Government's objective for managing greenhouse gas emissions from new and expanding operations is to minimise emissions to a level that is as low as practicable. This will help fulfil the objective of minimising greenhouse gas emissions from the NT into the future.

The Northern Territory Government's objective for considering future climate change in the assessment process is to ensure projects and developments are planned taking climate change

science and projections into account, to minimise future environmental, social and economic costs and take advantage of any opportunities.

The Environmental Impact Assessment Guide

(http://www.nretas.nt.gov.au/__data/assets/pdf_file/0012/6600/Environmental-Assessment-Guidelines-Greenhouse.pdf) aims to assist proponents in providing the information needed by the Department of Natural Resources, Environment, the Arts and Sport (NRETAS) to assess the impact of greenhouse gas emissions from proposed projects and assess other potential impacts from proposed projects under projected future climatic conditions under the Northern Territory *Environmental Assessment Act*.

8.2 Environmental offsets

The Draft NT Environmental Offsets Policy provides guidance on when and how offsets should be incorporated into development proposals so that there is no net loss of environmental quality. Offsets are designed to compensate for significant residual damage that cannot be avoided, reduced or mitigated at reasonable cost at the development site. The draft NT Environmental Offsets Policy is available at www.greeningnt.nt.gov.au/climate/environmental_offsets.html.

Provisions of the Draft Environmental Offsets Policy are taken into account when considering permits, licences or other authority to undertake and operate a development affecting Territory environments. Consideration of proposed activities or projects that could be implemented to offset the residual detriment should be discussed with the NRETAS Offsets Group.

The EIS should provide information on:

- Any identified impacts or detriments that cannot be avoided, reduced or mitigated at reasonable costs; and
- Risks of failure of management actions (such as rehabilitation, weed control, etc.) and uncertainties of management efficacy should be identified.

8.3 Biodiversity guidelines

NRETAS has developed guidelines for surveying terrestrial vertebrate fauna in the Northern Territory (available upon request). For any vegetation surveys reference should be made to the Northern Territory Guidelines and Field Methodology for Vegetation Survey and Mapping (Brocklehurst et al. 2007), Guidelines for Surveying Soil and Land Resources (McKenzie et al. 2008 (eds.)) and The Australian Soil and Land Survey Handbook (NCST, 2009) for further discussion of the techniques and requirements associated with particular scales of mapping. Proponents should use these guidelines when conducting flora and fauna studies.

For matters of National Environmental Significance under the EPBC Act, proponents should use the survey methods provided by the Australian Government, available at: www.environment.gov.au/epbc/guidelines-policies.html.

8.4 Erosion and sediment control guidelines

It is important that the Proponent comprehensively addresses the need for erosion and sediment controls, sediment capture, runoff collection and storm water drainage, dust control, etc. as described in the NT Erosion and Sediment Control Guidelines to ensure best practice: www.nretas.nt.gov.au/national-resource-management/soil

8.5 Mine closure guidelines

Mine closure is an important step of the mining process and should be done as early as possible in the preliminary stages of planning, even before a mine opens. This allows for the

EIS Guidelines

Roper Bar Iron Ore Project - Western Desert Resources Limited
May 2012

most options to be considered and can result in lower costs at the time of closure. Closure planning is a progressive process that requires review and improvement throughout the mine life. In many instances closure will not occur for decades, however it is important to demonstrate that ecologically sustainable closure can be achieved prior to commencement.

8.6 Public health premises and food premises

If shops or accommodation facilities are to be provided on the Project site, Northern Territory Department of Health (DOH) will require detailed plans submitted via a building certifier, prior to construction, for any future public health or food premises built on the proposed lots. This would include food businesses, public accommodation, swimming pools etc.

8.7 Water supply

The provision of an adequate potable water supply needs to be provided for mine sites and work places. All water supplies collected from groundwater must be at least 100 metres from any effluent drainage system or other water bodies as described in the *NT Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent (The Code)*.

8.8 Wastewater

If the existing effluent treatment system at the mine site is to be used to treat effluent, written certification will be required from a suitably qualified hydraulic consultant, stating that the existing effluent disposal system has the capacity to handle the extra load in accordance with the Code.

If a new effluent treatment system is to be installed to treat effluent, DOH requires a notification to install a waste water treatment system outside of a building control area. Any waste water treatment system(s) installed on-site shall be capable of collecting, treating and disposing of waste water on-site in accordance with the Code.

It should be noted that if the daily waste water flow exceeds 22kL/day or a capacity of 150EP an application for recycled water systems will be required. All waste water from ablution facilities shall be directed to the waste water treatment system.

Further information can be found at:

www.health.nt.gov.au/Environmental_Health/Wastewater_Management. Any discharge of wastewater from the mining lease will require a Waste Discharge Licence under the *Water Act 1992*. Guidance and application forms can be found at the following site: www.nretas.nt.gov.au/environment-protection/licences/guides.

8.9 Solid waste storage and disposal

Disposal of waste should be conducted in such a way as to avoid potential public health nuisances and environmental pollution.

8.10 Mosquito breeding

A biting insect assessment including an examination of the old mine site for actual and potential mosquito breeding sites and ensure new facilities are designed to have minimal mosquito breeding potential. The biting insect assessment should include trapping to determine the current seasonal population and abundance of adult mosquitoes. Refer to the Medical Entomology guideline Department of Health (2005) *Guidelines for preventing mosquito breeding sites associated with mining sites in the Northern Territory*.

http://health.nt.gov.au/Medical_Entomology/Publications/Development_Guidelines/index.aspx