



Northern
Territory
Government

DEPARTMENT OF
NATURAL RESOURCES, ENVIRONMENT, THE ARTS AND SPORT

Guidelines for the Preparation of an Environmental Impact Statement

**Mount Todd Gold Project
Katherine Region, NT**

Vista Gold Australia Pty Ltd

September 2011

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1 INTRODUCTION

Vista Gold Australia Pty Ltd (the Proponent) proposes to re-establish and operate the Mount Todd Gold Mine (“the Project”), located 55km north of Katherine and 250km south of Darwin. A limestone quarry would also be established approximately 20km west of the mine site to use lime/limestone as a neutralising agent in mining operations and rehabilitation.

The proposed Project comprises:

- Extension of the existing Batman pit from its current depth of 114m to approximately 471m and surface area of 40 hectares (ha) to approximately 100ha;
- Extension of the existing Waste Rock Dump (WRD) from height 24m to approximately 140 – 170m and surface area 70ha to approximately 200ha. The existing WRD comprising of 16 Million tonnes (Mt) would expand to contain approx.214Mt of waste rock;
- Existing Tailings Storage Facility (TSF1) raised from 16m to approx.34m;
- Proposed new Tailings Storage Facility (TSF2) (approximately 420ha, 80m high);
- Rehabilitation of the existing heap leach pad no longer required for gold production (40ha);
- Construction and processing of low grade ore stockpiles (approx.40ha);
- New Water Treatment Plant;
- Clay borrow area (approx.12ha, 15m depth);
- Administration and Plant Site Buildings (32ha)
- Anaerobic Treatment Wetlands (10ha); and
- Limestone quarry (approx.150m x 150m at approx.25m depth) and access road approximately 20km west of the Mount Todd mine site.

The proposed operations involve open cut mining and processing up to 10.65 Million tonnes of ore per annum (Mtpa) to produce gold dore (unrefined gold). Over the life of the Project approximately 214 Mt of waste material would be disposed in the WRD.

Gold dore would be trucked weekly to Darwin in an armoured car for onward secure shipment to a refinery. The proposed limestone quarry consists of a 300 – 500 tonnes per day (tpd) open pit mine to process in a 150 tpd vertical lime kiln. The kiln would produce the lime for ore processing and waste water treatment. An access road would be required from the limestone quarry to the mine site. The proposed disturbance footprint for mine facilities and infrastructure is approximately 1000ha. An exploration lease has just been granted for the limestone quarry and a specific location and dimensions of the quarry has yet to be determined depending on the outcomes of exploration and environmental impact assessment.

The Project is anticipated to run for approximately 15 years with the construction workforce of approximately 400 and a mine workforce of up to 300 personnel. It is expected that all employees would live in the local area.

A detailed description of the Mount Todd Gold Project can be found within the Notice of Intent on the NRETAS website at:

http://www.nt.gov.au/nreta/environment/assessment/register/vista_gold/index.html

The Proponent submitted a referral under the *Environment Protection and Biodiversity Conservation Act* to the Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPAC) and the Project was determined to be a controlled action. The proposed action has the potential to have a significant impact on listed threatened species and communities (sections 18 and 18A) and listed migratory species (sections 20 and 20A).

The Project was referred by the Northern Territory (NT) Department of Resources (DoR) on 21 April 2011 to the Department of Natural Resources, Environment the Arts and Sport (NRETAS), for environmental assessment. On 8 August 2011, the NT Minister for Natural Resources, Environment and Heritage determined that the Project requires formal assessment under the NT *Environmental Assessment Act 1982* (EA Act), at the level of an Environmental Impact Statement (EIS) and will be assessed under the bilateral agreement between the NT and Australian Government. Issues of concern contributing to the decision included:

- Acid and Metalliferous Drainage (AMD) seepage and runoff from the waste rock dump, ore stockpiles and tailings storage facilities potentially contaminating surface and ground waters continuing long after the mine has ceased operation;
- Potential contamination of surface water from AMD causing adverse impacts on downstream water quality, aquatic environment and downstream users;
- Potential contamination of groundwater from AMD causing groundwater quality impacts outside of the mineral lease or release of contaminated groundwater expressing to surface water;
- Potential groundwater drawdown impacts to groundwater flows in the Edith River and the potential to impact production bores in the region;
- Management and treatment of a large quantity of acidic and metal laden water currently existing on the site;
- The proposed WRD covers an approximate area of 200ha with an estimated height of 140 – 170m. Final design of the WRD must ensure the structure is safe, stable, not prone to significant erosion, minimises AMD seepage and runoff and meets stakeholder expectations as a final land use structure;
- Biodiversity impacts, including matters of environmental significance, associated with disturbance footprint of mining activities and infrastructure requirements;
- The challenges of successful mine closure and rehabilitation; and
- Potential social, economic, transport and heritage impacts.

These Guidelines have been developed to assist The Proponent in preparing an EIS for the Project, in accordance with Clause 8 of the NT *Environmental Assessment Administrative Procedures 1984* of the EA Act.

2 GENERAL ADVICE ON THE EIS

2.1 General content

The EIS should be a stand-alone document. It should contain sufficient information to avoid the need to search out previous or additional, unattached 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 structure of these Guidelines may be adopted as the format for the EIS. This format need not be followed if the required information can be presented alternatively for better effect. However, each of the elements in these Guidelines must be addressed to meet NT Government regulatory requirements.

The Executive Summary must include a brief outline of the Project and each chapter of the EIS, allowing the reader to obtain a clear understanding of the proposed Project, its environmental implications and management objectives. It must be written as a stand-alone document, able to be reproduced on request by interested parties who may not wish to read the EIS as a whole.

The main text of the EIS should include a glossary to define abbreviations, technical terms, acronyms and colloquialisms.

The appendices must include:

- A copy of these Guidelines;
- A list of persons and agencies consulted during the EIS;
- Contact details for the proponent;
- A table listing commitments made by the proponent;
- A table cross referencing key risks to address in these Guidelines to relevant sections in the EIS;
- The names of, and work done by, the persons involved in preparing the EIS;
- The qualifications and experience of the people involved in work contributing to the EIS; and
- 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.

The EIS must be written so that any conclusions reached can be independently assessed. All sources must be appropriately referenced using the Harvard Standard. The reference list should include the address of any internet pages used as data sources. All referenced supporting documentation must be available upon request.

The EIS should be produced on A4 size paper capable of being photocopied, with any maps and diagrams on A4 or A3 size and in colour if 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 influence how the document is constructed.

2.3 Administration

Fifteen bound copies of the EIS should be lodged with the Minister, care of the Environment and Heritage Division (EHD) of the Department of Natural Resources, Environment, the Arts and Sport (NRETAS) for distribution to NT Government advisory bodies.

The EIS should be provided in Adobe PDF format for placement on the NRETAS internet site. Additionally, copies in Microsoft Word or unsecured PDF of the EIS should be provided to facilitate production of the Assessment Report and Recommendations.

The EIS is to be advertised for review and comment in the *NT News*, *Weekend Australian* and the *Katherine Times*. The EIS should be made available for public review at:

- Northern Territory Library, Parliament House, Darwin;
- Minerals and Energy Information Centre, Department of Resources, 3rd Floor, Paspalis Centrepoint, 48 Smith Street Mall, Darwin;
- Darwin City Council Library (Casuarina) (casuarinalibrary@darwin.nt.gov.au; Ph: 8930 0200);
- Palmerston City Library, Goyder Square, Palmerston (Ph 8935 9991);
- Pine Creek Community Library, National Trust Museum, Railway Terrace (Ph 8976 1287);
- Katherine Town Council Public Library (ph: 8972 5500);
- Environment and Heritage Division (Department of Natural Resources, Environment, the Arts and Sport), 2nd Floor, Darwin Plaza, 41 Smith Street Mall, Darwin;
- Australian Department of Sustainability, Environment, Water, Population and Communities, John Gorton Building, King Edward Terrace, Parkes, ACT 2600, or GPO Box 787, Canberra ACT 2601;
- Northern Land Council offices (Darwin and Katherine);
- The Environment Centre, Unit 3, 98 Woods St Darwin; and
- Jawoyn Association Aboriginal Corporation, Pandanus Plaza, 1st Street, Katherine, NT, 0851 (ph: 8972 5400, 8971 1100).

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 this period, additional time will be added to the EIS exhibition period. The EIS public exhibition period will span a minimum period of six weeks.

The Project Officer is Sally-anne Strohmayer from the Environmental Assessment Unit of NRETAS. Contacts are: Ph (08) 8924 4020; Fax (08) 8924 4053; e-mail: sally.strohmayer@nt.gov.au with cc. to: eia.nretas@nt.gov.au.

3 BACKGROUND INFORMATION

The EIS should have a chapter that provides general information on the background and context of the action including:

- The title of the action;
- 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;
- Terms of current agreement between the Northern Territory Government and the Proponent;
- The background to the development of the action, including discussion of previous environmental impact assessment and overview of historic mining activities;
- 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;
- All components of the Project should be described in detail, including construction through to rehabilitation, and care and maintenance;
- Tenure/s under which the proposal would be held and any Native Title issues;
- Relevant National and Northern Territory standards, codes of practice and guidelines (see section 10);
- Proximity of sites of sacred, cultural, historical or social interest;
- The sources of greenhouse gas emissions caused by the Project and any offsets or actions to mitigate emissions (see section 10.1);
- Employment and business opportunities (direct and indirect), including sources of workforce, skill levels required and opportunities for local people, Indigenous employment and businesses;
- Methods for storage, handling, containment and emergency management of chemicals and other hazardous substances (including fuel);

- Rehabilitation objectives for the site; and
- The consequences of not proceeding with the action.

3.1 Project Objectives

The EIS should provide:

- A brief summary of the type of operation including size, scale, Project life, areas impacted and tonnages mined and processed;
- A summary of environmental, economic and social impacts in the region; and
- Schedule or timeline for all relevant aspects of the proposal.

3.2 Location and Site Layout

Provide detailed location maps and site plans at appropriate scale that clearly show:

- Location of Project and associated ancillary activity sites in the Northern Territory in relation to nearest major centres, towns, other mines and regional infrastructure;
- Conceptual site plan for the mining Project including all infrastructure, haulage routes (from limestone quarry to mine), other proposed disturbances and tenement boundaries;
- Surrounding land tenure including reserves and pastoral lease boundaries;
- Biogeographical zones and relevant natural features including significant groundwater resources, conservation reserves and sensitive environments;
- Vegetation communities and other environmental constraints such as rare flora and fauna populations;
- Aboriginal/cultural heritage sites;
- Geological plans; and
- Surface contours at appropriate interval showing major topographic features including landform types, surface hydrology (rivers, creeks, drainage lines).

An aerial photograph should be provided to underlay the layout plan to provide an indication of Project component's footprint and scale relative to existing surrounding landscape.

3.3 History

As the Project is a brown field site, description, photographs and maps to document the extent of this disturbance should be included to provide context of the legacy issues and rehabilitation liability. An outline of information gaps and assumptions made in the 1992 Assessment of the Zapopan NL, Mount Todd Gold Project (NSR Environmental Consultants Pty Ltd, 1992) would provide background to the reader of information that may provide context for this current assessment.

The existing environmental issues and extent of current remediation liability should be clearly defined to show that the Proponent has an understanding of remediation costs that will be taken on if granted mining approval. The Proponent should describe the existing condition of the Mount Todd site, how it is currently being managed and the extent of remediation works required if the Proponent assumes responsibility of the site. While it is recognised that the Proponent does not take on any rehabilitation liability for the site until the assessment process is complete and a Mining Management Plan approved, any evidence to date of company performance resulting in positive environmental benefits, would provide the public with assurance the company has capacity and understanding to manage the existing environmental issues and rehabilitation liability.

It is essential that adequate identification and characterisation of existing environmental conditions occurs to ensure proposed future activities do not cause further degradation to existing environmental conditions. Additionally, discuss any benefits of the re-opening of the Project in the long term management of pre-existing liabilities on site.

The EIS should discuss the background to the proposal:

- Describe the extent of pre-existing environmental conditions, including sources of contamination and condition of receiving waters downstream from the proposed Project site. Existing environmental monitoring data, modelling and reporting should be summarised (include the most recently authorised Water Management Plan and Waste Discharge Licence report as appendices). Important aspects such as an understanding of current environmental liability and legacy issues and a clear understanding of the estimated costs to remediate those issues should be demonstrated;
- Outline the management of environmental legacy issues since the Proponent signed the current agreement with the Government (2007) – including both successful treatment/rehabilitation programs and incidents where uncontrolled releases of contaminated water have occurred, complaints received etc. and subsequent action the Proponent has taken to prevent re-occurrence;
- Provide an indication of the existing volumes and quality of water treated and released from the Project site and any modifications to current Waste Discharge Licence;
- Detail the capacity of the current water treatment facility compared to the proposed water treatment infrastructure to inform future water management techniques;
- Outline how the proposed expansion of activities would influence the existing condition of the Project site and downstream receiving waters;
- State how the Project will potentially affect the management of surface water and groundwater volumes and quality both within the Project site and surrounding environment; and
- Describe how the Project would contribute to the future management of the Project site in a rehabilitation and closure context.

4 DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 Project Components and Supporting Infrastructure

The existing and proposed facilities/infrastructure, including ancillary activities, quarry and borrow areas should be described in detail and disturbance footprint (hectares) for each facility listed. The infrastructure design and engineering for all phases of construction, operation and management of the Project should be detailed and relevant plans, photos and maps included. More detail is required for key components with the most potential for significant short and long term environmental impacts. Details of the proposed road connecting the mine and limestone quarry (covering 20km) must also be provided. Detailed technical information can be included in the appendices.

4.2 Mining Operations

Describe the construction and operation including:

- Overview of mining operations including mining techniques, plant and equipment;
- Timing and duration of construction, operation and decommissioning phases;
- Tonnages of material mined, ore produced and waste rock generated;
- Provide a conceptual pit design and waste rock dump design that provides an indication of their scale in relation to existing surrounding landscape; and
- De-watering and raw water use requirements.

4.3 Ore Processing

- Describe the ore processing method, including flow diagrams;
- Describe the high pressure grinding roll technology proposed and its efficiency success or otherwise in similar operations;
- Describe the anticipated recovery rate of cyanide and details of its storage; and
- Describe the waste streams, tailings and emissions produced from the processing activities.

4.4 Tailings Storage Facilities (TSF1 and TSF2)

Seepage from tailings storage facilities is often difficult to predict prior to construction due to the complexity of factors in their siting (e.g. if over a water course or within a flood zone), construction material, design, location of ground and surface waters and climatic influence. Modelling potential impacts to the environment requires a thorough investigation of variables affecting the stability of these facilities. Clearly outline methods to construct, manage and rehabilitate tailings storage facilities.

Provide a description of:

- Surface configurations, capacity and location of the tailings storage facilities including conceptual designs that provides an indication of the scale in relation to surrounding landscape;
- Tailings disposal and impoundment principles, wall designs and construction, estimated flood heights, erosion protection, spillway design and location, sub drainage and seepage collection systems;
- Sediment capture structures;
- Construction methods including lining systems for walls and floor;
- Source of construction material including consideration of AMD potential in selection of materials;
- Geochemical and geophysical characterisation of the tailings material and expected seepage chemistry;
- Projected groundwater interactions with TSFs;
- Location of TSFs in relation to surface water drainage (catchment details);
- Implications of any geotechnical and hydrogeological studies on the design, construction and management of the TSFs;
- Details of mitigation measures proposed to manage seepage, with focus on the post-mine-closure period; and
- Indicate contingency arrangements including reporting protocols for dealing with both minor leakage and catastrophic failure of the tailings dam.

References

The following guidance on planning tailings storage facility siting, design and operation should be used:

Government of Western Australian Department of Mines and Petroleum Environment, Mining Environmental Management Guidelines – *Safe Design and Operating Standards for Tailings Storage*:

<http://www.dmp.wa.gov.au/documents/000139.gemma.dunthorne.pdf>

Current geotechnical engineering principles/practices and Australian National Committee on Large Dams (ANCOLD) guidelines

(<http://www.ancold.org.au/publications.asp>)

Australian Government Department of Resources, Energy and Tourism Leading Practice Sustainable Development Program Handbooks – *Tailings Management*

<http://www.ret.gov.au/resources/Documents/LPSDP/LPSDP-TailingsHandbook.pdf>

4.5 Waste Rock Dump (WRD)

The mining proposal should clearly outline methods to manage and rehabilitate the WRD. Management strategies should be based on material characterisation, encapsulation of Potentially Acid Forming (PAF) material, designing long term stability,

visual amenity, stakeholder expectations and the integration of final outcomes (closure planning) into mining operations.

General details of waste rock management in the EIS should include:

- A cross section diagram showing final design concept;
- Identification of the total amount of waste rock produced;
- Characterisation of waste rock in terms of AMD potential and neutralising capacity from static acid-base accounting;
- Identification of classes and amounts of waste rock;
- A description of proposed waste rock storage location, dimensions, water catchments, surface treatment and final landform. Any alternative locations, surface configurations, wall/pad designs and construction and provisions for extreme rainfall and flood events, erosion protection, sub-drainage and collection sumps should also be discussed;
- Detection and remediation plans for potential AMD waste rock seepage;
- How construction quality control will be achieved;
- A description of final rehabilitation and revegetation plans;
- Ongoing monitoring and management plans for WRD, including proposed cover systems to manage PAF material;
- Describe extent and significance of the changed skyline as a result of the proposed waste rock dump 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 visual Projects from visually sensitive locations.

References

Please refer to the 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 AMD management:

http://www.gardguide.com/index.php/Main_Page

Australian Government Department of Resources, Energy and Tourism Leading Practice Sustainable Development Program Handbooks – *Managing Acid and Metalliferous Drainage*:

<http://www.ret.gov.au/resources/Documents/LPSDP/LPSDP-AcidHandbook.pdf>

4.6 Power Supply

Describe energy supplies, including:

- Quantity for the pit, transport processing circuit and workforce purposes;
- An estimate of the greenhouse gases that will be produced over the life of the mine from power production;

- Types of energy which can be utilised, including alternative (renewable) sources of energy;
- Sulphur content of fuel oils to be used; and
- Proposed sources of energy supplies, increased power generating capacity and transmission nodes (including placement of power lines).

4.7 Operational Water Management

Describe water management, including:

- Management of clean, dirty and contaminated water (definitions can be provided in the draft EIS);
- Management of effluent;
- Diversion of surface waters;
- Dewatering of the pit;
- Management of high/extreme rainfall events including Probable Maximum Precipitation;
- Management of process waters;
- Water recycling;
- Treatment of domestic sewage; and
- Identify any requirements for additional clean water in the dry season and wet season discharge options for excess contaminated water.

References

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

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

4.8 Social Impact Assessment

Conduct a Social Impact Assessment (SIA) to gauge community values and opinions on the potential impacts of the Mount Todd Gold Project in the region. The SIA should:

- Identify key stakeholders, regional community structure and community vitality (including demography, health, education and social well-being, access to services and housing etc);
- Include ongoing consultation with stakeholder groups to ensure the full range of community viewpoints are sought. The proponent is to outline its proposed methods for community consultation, including how it will respond to community feedback, questions and concerns in a formal, publicly accessible communication plan for the Project;

- Estimate local employment including a breakdown of skills/trades required and specific opportunities for skills development;
- Indicate where the workforce will be sourced and commute arrangements for non-local workforce personnel;
- Direct and indirect employment, training and business opportunities associated with the Project particularly in relation to Indigenous employment and training programs and how this would be managed and implemented;
- Outline accommodation requirements and arrangements for construction and operation activities and associated infrastructure and services required;
- Discuss the potential negative social impacts that could arise from the Project including the impacts of the Project on affected landowners and communities, recreational users, local health services, etc.
- Discuss the potential positive social benefits that could be realised from the Project;
- Provide information on impacts from additional road transport that may affect the community;
- Identify and discuss expected regional, Territory or national benefits and costs (including those that cannot be adequately described in monetary or physical terms e.g. effects on cultural and aesthetic amenity), in the short and long term; and
- Develop management controls to minimise the negative social impacts and optimise the positive opportunities.

5 PROJECT ALTERNATIVES

Alternatives to the proposal must be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and rejecting others. These alternatives should include locations for various components of the Project, mining methodologies, waste and water management. The final proposed configuration of the mine should be based on best practice environmental management and adhere to the EPA NT principles of ecologically sustainable development:

<http://www.epa.nt.gov.au/wp-content/uploads/2010/02/Final-Advice-ESD-in-the-Northern-Territory1.pdf>.

Alternative management techniques need to be considered for moderate to high level impacts with the following hierarchy of impact strategies followed:

1. Impact avoidance
2. Impact assessment
3. Impact minimisation
4. Identification of mitigation measures
5. Assessing mitigation measure effectiveness
6. Mitigation plan selection
7. Monitoring, reporting and adaptive management

Discussion should include:

- Not proceeding with the Project;
- Alternative locations for Project infrastructure;
- Alternative WRD and TSF location, configurations and cover systems considered, and why a particular option was chosen;
- Alternative sources of raw materials for the Project, including limestone, water supply and alternative energy sources;
- Alternative transport options;
- Alternative extraction and processing technologies;
- Alternative environmental management techniques for moderate to high risk impacts;
- Alternative mine closure and rehabilitations options– refer to industry leading practice sustainable development guidelines (http://www.ret.gov.au/resources/resources_programs/lpsdpmine/handbooks/Pages/default.aspx#closure) and discuss option of:
 - Scenarios for immediate remediation costs and outcomes of existing site compared to rehabilitation after further mining;
 - Backfilling the final void with waste rock; and
 - Alternative final pit void closure scenarios with final selection based on lowest potential impact to the environment, stakeholder expectations and minimum post closure maintenance requirements.

6 EXISTING ENVIRONMENT

6.1 Hydrogeology and groundwater

Provide a description, including detailed maps or diagrams where appropriate, of underlying aquifer. Incorporate:

- Local and underlying geology and depths of underlying geological strata at the mine site, limestone quarry and clay borrow areas;
- Relevant groundwater resources in any areas likely to be affected by the construction and operation of the mine (including quarry and borrow areas);
- A map with groundwater levels for dry and wet season with groundwater contours, 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; and
- An estimate of the effects of current and future pits, water stores and operational processes on groundwater distribution and quality, including effect on base flows.

Use the above information to develop a conceptual hydrogeological model to understand and assess the groundwater regime, groundwater/surface water

interactions and risk posed by the off-site migration of contamination from the site with consideration of:

- Geology and structures (with maps presenting geology in planar view and section view included);
- site boundary borehole logs showing stratigraphy;
- details of different water bearing zones (perched, confined and unconfined aquifers) and their characteristics in terms of permeability and yield and identify any connectivity between the water bearing zones;
- detailed description of the location, design and construction of boundary wells:
- background water quality;
- directions and rate of groundwater flow;
- environmental monitoring bore data (water quality, depth, screen depth, lithology);

Estimate the demand for potable and raw water for the operational period (in ML per annum) and discuss this in relation to the resource capacity and current use with particular reference to the cumulative impacts on water resources.

Describe the current groundwater monitoring program and any proposed modifications to the program to monitor impacts (Incurred both during operation and following closure of the mine) on the local and regional hydrogeological conditions. Provide a map illustrating the location of groundwater monitoring sites.

6.2 Surface water

For surface water systems within the Project area, identify and discuss, using detailed maps or diagrams where appropriate. Incorporate:

- Catchments, their significance (Ramsar etc), boundaries, area and topography. Indicate location of infrastructure footprints;
- An estimate of effects of current and future pits, water stores and operational processes on surface water distribution and quality;
- 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;
- Size and seasonal flow rates of drainage lines, creeks and waterways, and frequency of extreme rainfall events;
- Declared beneficial uses (<http://www.nt.gov.au/nreta/water/beneficial/>); and
- Sensitive receptors to impacts upon surface water systems, including consideration of riparian and aquatic ecosystems, flora and fauna.

Describe the current surface water monitoring program, any proposed modifications to the program, and how it will be implemented in order to include monitoring of impacts from the Project (incurred both during operation and following closure of the mine) on

the local and regionally hydrogeological conditions. Provide a map illustrating the location of surface water monitoring sites.

Present and interpret water quality monitoring data for surface water in the area of the Project.

6.3 Biodiversity

The Project falls within a NT Site of Conservation Significance – the Yinberrie Hills. Sufficient information is required regarding the current biodiversity of the Project area to assess and monitor expansion impacts. With reference to the NRETAS biodiversity and natural resource guidelines and Australian Government Survey Guidelines for threatened species (<http://www.environment.gov.au/epbc/guidelines-policies.html#threatened>):

- Present baseline flora and fauna surveys of areas both within and surrounding the Project area. Identify EPBC and NT listed flora and fauna species that are present, or are potentially present within the Project area, including the Gouldian Finch, and which may be affected by the Project either directly or indirectly;
- Conduct a systematic fauna survey targeting EPBC and NT listed species in areas of native vegetation that the Proponent proposes to clear in the proposal; and areas that lie adjacent to cleared areas. This also includes all areas of vegetation or potential habitat that are proposed for clearing in order to accommodate the new road connecting the mine to the limestone quarry;
- Provide a map of the vegetation communities within the Project and quarry leases and surrounding areas at an appropriate scale such as 1:25 000 or 1:50 000. Surrounding areas must include the area of land where the 20km road connecting the mine to the limestone quarry is proposed to occur. The map must also identify areas containing significant¹ vegetation communities, including creek lines with associated riparian vegetation or rainforest;
- Conduct targeted surveys for the limestone quarry on the NT listed threatened fauna species including the Victoria's land snail (*Setobaudinia victoriana*) known to be restricted to limestone areas;
- Conduct a targeted survey of the cycad species *Cycas calcicola* and, if present, mapping the distribution of the species within the quarry and adjacent area;
- Describe in detail aquatic fauna (e.g. macro-invertebrates, crustaceans, fish) present in local creeks and rivers in and downstream of the 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;
- Identify areas requiring clearing of native vegetation for the Project, including potential for edge (degradation) effects and any disturbance to drainage lines.

¹ Rare, threatened, endangered and regionally restricted species, vegetation types or habitats such as mangroves, rainforest, vine thicket, monsoon vine forest, riparian or closed forest and vegetation containing large trees with hollows suitable for fauna.

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;

- Describe whether the limestone quarry has potential to significantly impact stygofauna. Refer to the Western Australian Guidance notes: (http://www.epa.wa.gov.au/docs/1720_GS54.pdf) if the quarry does present a significant impact on groundwater levels and quality of subterranean cave and void systems in an environment where stygofauna may be restricted;
- Identify presence and potential presence within the Project area of declared and environmental weeds and feral animals; and
- Identify all listed threatened and/or migratory species that could be affected either directly or indirectly as a consequence of the proposal;
- Provide a description of the distribution, ecology and habitat preferences of listed threatened and/or migratory species;
- The listed threatened and/or migratory species that need to be addressed includes but is not limited to:
 - *Gouldian Finch (Erythrura gouldiae)*
 - *Northern Quoll (Dasyurus hallucatus)*
 - *Crested Shrike-tit (northern)/Northern Shrike-tit (Falcunculus frontatus whitei)*
 - *Partridge Pigeon (Geophaps smithii smithii)*
 - *Bare-rumped Sheath-tail Bat (Saccolaimus saccolaimus nudicluniatus)*
 - *Red Goshawk (Erythrotriorchis radiates)*
 - *Massey Owl (Tyto novaehollandiae kimberli)*
 - *Northern Brush-tailed Phascogale (Phascogale pirata)*
 - *Freshwater Sawfish (Pristis microdon)*
 - *Brush-tailed Rabbit-rat (Conilurus penicillatus)*
- Provide appropriate scale maps for listed threatened and/or migratory species showing:
 - The location of known records (from databases and all surveys including those described in bullet points 1-2 of Section 6.3);
 - All potential habitat for each species within the Project and surrounding area; and
 - Habitat components important for each species such as breeding habitat.
- Provide calculations of the area (in hectares) of all potential and known habitat of EPBC listed species that will be directly or indirectly impacted.

6.4 Climate

- Describe the existing climate of the region, including extremes in climate (such as highest rainfall records, evaporation, longest period of wet and dry spells, cyclonic activity, etc.);
- Provide sufficient information that would allow an understanding of the potential impacts climate will have on infrastructure longevity and maintenance – particular emphasis should be given to appropriate water storage and cover system designs; and

- Describe what variations to the known climate (eg. future rainfall) may occur under various climate change scenarios and how that may impact surface water management.

7 RISK ASSESSMENT

7.1 Risk assessment approach

Understanding environmental risk and uncertainty is a major element of the National Strategy for Ecologically Sustainable Development. This EIS should be undertaken with specific emphasis on identification, analysis and treatment of risks through a whole-of-Project risk assessment. Through this process, the EIS should:

- Acknowledge and discuss the full range of risks presented by the Project including those of special concern to the public;
- Demonstrate risks to people, the environment and nearby facilities associated with the Project can and will be managed effectively during the construction, commissioning, operation, and decommissioning of the Project;
- 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;
- Include the potential scenario where benefits of the Project for the wider community may not eventuate; and
- Identify residual risks (risks remaining once risk management strategies have been implemented) and their consequences expected to be borne by the community, providing better understanding of equity issues.

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.

The risk assessment should be based on international best practice. Processes for risk management are formalised in Standards Australia / Standards New Zealand (e.g. AS/NZS ISO 31000:2009; HB 436:2004; HB 203:2006; HB 158:2010).

7.2 Key risks of the Mount Todd Gold Project

The major risks below have been identified through analysis by the Northern Territory Government of the Notice of Intent for the Mount Todd Gold Project. It is possible that

further risks will be identified in the environmental impact assessment process. The major risks currently identified are:

- Acid and Metalliferous Drainage (AMD) seepage and runoff from the waste rock dump (WRD), ore stockpiles and tailings storage facilities (TSFs) polluting surface and ground waters;
- Contamination of groundwater from mining activities causing groundwater quality impacts outside of the mineral lease or release of contaminated groundwater expressing to surface water;
- Groundwater drawdown impacts on groundwater flows in the Edith River and the potential to impact production bores in the region;
- Contamination of on-site surface water from AMD and mining activities, potentially exacerbated by poor segregation of clean and polluted water generated on-site, causing adverse impacts to downstream environmental values;
- Biodiversity impacts associated with the disturbance footprint of mining activities and infrastructure requirements;
- Mine closure and rehabilitation – failure of final design of the WRD and TSFs to adequately ensure the structures are safe, stable, not prone to significant erosion, minimises AMD seepage and runoff and meet stakeholder expectations as final land use structures; and
- Social, economic, transport and heritage impacts have not yet been fully identified.

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.

Each of the identified risks should be addressed by the Proponent in the risk assessment and management process. Additionally, any further risks identified through the comprehensive risk assessment process required for the EIS should be addressed and appropriate management initiatives instigated.

The Environmental Impact Statement must demonstrate the following environmental outcomes:

7.3 Acid and Metalliferous Drainage (AMD)

The Mount Todd Mine site has a history of mining operations with a legacy of contamination from waste rock and tailings storages. This history highlights the importance of mine planning for all new Projects to minimise the potential for AMD development during operations and as a legacy of the proposed mine. Assessment of likelihood and consequence for the AMD risk assessment should take into account other incidences of AMD that have occurred in the region, as well as associated management and rehabilitation costs.

Key Risk

- Potential for AMD from Project infrastructure and operations causing environmental impact.

Environmental Objective

- Prevent, mitigate or manage AMD so that it does not create off-site environmental impact during mine operations and legacy issues both on and off site after mine closure.

Outcomes

- The footprint, intensity and duration of AMD impacts associated with waste rock and tailings disposal is minimised; and
- Potential for AMD development is minimised and managed to a degree which can be assimilated by the receiving environment without causing environmental harm, both now and in the future, for all mine components and construction, operation and post closure stages.

Information Requirements

- Summary of the proposed ongoing treatment of existing AMD at the Mount Todd site;
- Summary of the AMD characterisation of final pit wall, ore and waste rock and tailings including chemical and physical characteristics such as sodicity, salinity and dispersive potential and detail appropriate AMD management strategies;
- Provide a conceptual site model describing potential release, transport, and fate of any AMD waters from the mine site identifying possible sources, pathways, and receptors (see example figure 4.4 GARD Guide);
- Provide total sulphur and total metals for a representative suite of samples from all rock types and process materials and ensure information is an integral component of ore body and waste block modelling phase of mine development;
- Provide details on selection of samples (drill core, drill cuttings) and sampling methodology for subsequent testing for potential AMD;
- An assessment of potential for AMD using specific AMD chemical analyses (pH, Total Sulphur, Net Acid Producing Potential (NAPP), Net Acid Generation (NAG), Acid Neutralising Capacity (ANC), multi-element composition and mineralogy of mine waste and tailings samples;
- Full waste characterisation report (as an appendix) with details on methodologies used for above determinations and main results summarised in the EIS;
- Describe classes and quantities of waste rock and selective handling purposes to minimise AMD for life of mine plan;
- A geological waste block model based on comprehensive static and kinetic test data to facilitate AMD management;

- Proposed strategies to prevent, mitigate and manage AMD including avoidance of disturbance, dry covers, underwater storage, neutralisation and collection and treatment;
- Develop detailed operational guidelines integrating AMD management practices into the daily operating activities;
- Detail a monitoring program to ensure design specifications to manage AMD are implemented (e.g. proposed instrumentation used to evaluate whether oxidation of sulphides is occurring and evaluate the performance of encapsulation layers, cover systems);
- Detail proposed performance monitoring of geochemical and geotechnical characteristics of placed waste, oxygen and temperature monitoring and water quality data to evaluate performance of AMD management; and
- Detail long term closure options for AMD storage and management.

References:

Western Australia Department of Mines and Petroleum – Acid Mine Drainage:
http://www.dmp.wa.gov.au/documents/acid_mine_drainage.docx.pdf

INAP 2009, *Global Acid Rock Drainage Guide (GARD Guide)*, International Network for Acid Prevention (<http://www.gardguide.com/>)

DITR 2007, *Managing Acid and Metalliferous Drainage*, Leading Practice Sustainable Development Program for the Mining Industry produced by the Department of Industry, Tourism and Resources, Canberra (available on DMP website http://www.dmp.wa.gov.au/documents/file_MAMD20070227104556.pdf)

7.4 Groundwater Impacts

Key Risks

- Impacts to groundwater quality from mining activities causing contamination of groundwater or release of contaminated groundwater expressing to surface water.
- Groundwater drawdown impacting groundwater flows in the Edith River and the potential to impact production bores in the region.

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 and extraction of groundwater so that it complies with relevant standards and Guidelines such as document four of the National Water Quality Management

Strategy (<http://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.

Information Requirements

- Refer to section 6.1 for information requirements of existing groundwater and hydrogeology;
- Conceptual model showing understanding of subsurface migration processes and behaviour of the groundwater system and interactions with all waste storage facilities;
- Groundwater modelling to determine the potential and scale of drawdown and whether there are impacts to groundwater dependent ecosystems;
- Describe the proposed bore field – the number of bores, location, extraction rates and pit dewatering requirements;
- Identify the natural hydro-geochemistry of the groundwater system (heavy metals, toxic metalloids, pH, redox, total dissolved solids);
- 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 depths of bore holes on neighbouring properties, and seasonal depth ranges of potable aquifers being accessed by the 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;
 - Supply monitoring data from water quality sampling of groundwater monitoring bores receiving discharges and drainage from the Mount Todd; and
 - Present multiple lines of evidence assessment of groundwater ecosystem condition, including water quality data, sediment, rapid biological assessment data and existing land use data.

7.5 Surface Water Impacts

Key Risks

- Impacts to surface water quality from mining activities causing contamination of surface water.
- Physically altered surface flow regime impacting downstream aquatic habitats.

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

- The quality of surface water onsite and moving offsite is managed so that it complies with relevant standards and guidelines such as document four of the National Water Quality Management Strategy (<http://www.environment.gov.au/water/policy-programs/nwqms/>) and beneficial use declarations; and
- Surface water runoff from the mine site does not impact downstream water quality.

Information Requirements

- Refer to section 6.2 for information requirements of existing surface water;
- Outline a plan to develop site-specific Water Quality Objectives (WQO), such that identified environmental values and beneficial uses are maintained;
- Provide baseline surface water quality data including location of monitoring sites to inform ongoing monitoring and assessment of the legacy and future Project impacts on water resources using existing relevant site monitoring data (include details of the sources of monitoring data);
- Provide 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.;
- Provide details on the construction and management of any proposed creek diversions and their potential environmental impacts;
- Provide management strategies for control of erosion and sediment runoff from disturbed areas, processing areas and waste rock stockpiles. Describe the size and design of sediment control structures proposed to intercept and divert surface water;
- Describe water management systems and design criteria of infrastructure in terms of average recurrence intervals (ARI), durations and intensities;
- Provide mine de-watering requirements must be provided with details on water quality, predicted volumes, discharge points and likely impacts on regional drainage;
- Provide details on the current and proposed Water Treatment Plant with a cost/benefit analysis of purchasing and maintenance costs;
- Summarise existing surface water knowledge and how multiple lines of evidence will be used to assess the condition of surface water ecosystems, including water quality data, rapid biological assessment data and existing land use data;

- 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, dirty 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 proposed to validate any models.

7.6 Biodiversity

Key Risks

- The proposed clearing of approximately 700ha of native vegetation impacting flora and fauna species of conservation significance; and
- Potential impacts on matters of national environmental significance under the EPBC Act, including listed threatened species and communities (Gouldian Finch) and listed migratory species.

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 within the Project and surrounding area; and
- No net loss of biodiversity consistent with the *Territory 2030 Strategic Plan* requirement that intensive developments operate under a 'no net biodiversity loss principle'.

Outcomes

- Native flora and fauna species, and significant habitat types, particularly those of conservation and traditional Aboriginal cultural significance, are identified, and protected from impacts from the Project; and
- Surveys of flora and fauna species, and proposed clearing of native vegetation are in accordance with relevant NT Guidelines (section 10.3).

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 6.3 for information requirements of describing existing flora and fauna;
- Detail the extent of clearing required during construction and operation and indicate on a map;
- 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 and visual impacts associated with the vegetation clearing required during the life of the Project;
- Discuss potential impacts on water quality of creeks, streams and ephemeral lakes (habitat for aquatic fauna and drinking water for terrestrial species);
- The ability of identified stands of vegetation and fauna to withstand any increased pressure resulting from the Project (e.g., increase in dust, light, noise, vibration, traffic and fire) and measures proposed to mitigate impacts;
- Identify and discuss environmental risks associated with the proposed land clearing. Discuss proposed clearing with regard to issues raised and recommendations contained within the *NT Land Clearing Guidelines* (NRETAS 2009):

http://www.nt.gov.au/nreta/natres/natveg/pdf/clearing_guidelines_2009.pdf

- Discuss ways in which impacts on species, communities and habitats can be minimised (e.g. timing of works, minimising disturbance catchment);
- Discuss how visual impacts of land clearing will be minimised;
- A fire, weeds and feral animal management plan as part of the Environmental Management Plan; and
- Demonstrate that appropriate flora and fauna survey methodology has been employed, to define species present on the Project site.

7.7 Rehabilitation, Decommissioning and Closure

Mine rehabilitation and closure is an important step of the mining process and should be considered as early as possible in the preliminary stages of planning. 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. It is important to demonstrate that ecologically sustainable closure can be achieved.

Key Risk

- Legacy mine structures become unstable or produce AMD post-closure.

Environmental Objective

- Rehabilitation of the site achieves maximum protection of the environment from seepage of contaminants, erosion or other impacts with minimal maintenance inputs post-closure.

Outcomes

- Rehabilitation achieves a stable and functioning landform which is consistent with the surrounding landscape and other environmental and stakeholder values; and
- The decommissioning, rehabilitation and closure 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 details on the rehabilitation of the existing Heap Leach Pad (40 hectares) with decommissioning timeframes;
- Describe the future management of the Project site in a rehabilitation and closure context;
- Provide a Mine Rehabilitation and Decommissioning Plan that provides an understanding of the issues that require management at closure and that all relevant issues have been identified. It is recognised that closure planning is a progressive process and that mine closure plans are living documents which should undergo periodic review, development and continuous improvement throughout the life of a mine. Mine closure planning needs to be appropriately integrated into the different stages of the life of a mine (including planning and design stage which is part of this assessment) and be flexible enough to allow for adaptive management;
- Describe:
 - Design and construction of landforms and voids;
 - Availability and volumes of key materials required for rehabilitation such as competent waste rock, subsoil, topsoil and low permeability clays (i.e. encapsulation material);
 - 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;
 - Existing and proposed mathematical models to predict long term performance or environmental impacts;
 - Learnings from closure experience generated from the previous operation and other mines in the region; and
 - Seed mixes used in rehabilitation and any information gathered from trials.

- Indicate that appropriate materials are available on site and contingencies provided to make landforms such as tailings storage facilities and waste dumps secure and non-polluting in the event of unexpected or temporary closure;
- Provide details on the proposed state the mining pit void 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;
- Estimate the quantity and quality of any water sources left on site after temporary or permanent closure;
- Identify and discuss environmental risks associated with characteristics of material to be exposed in the final (legacy) pit walls;
- Provide details on rehabilitation of the WRD and TSF1 and TSF2 and how they will be managed to prevent contamination of surface or ground waters; and
- Describe proposed post-mining land uses which have been identified and agreed upon through consultation with stakeholders.

References

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).

DOR Mine Close Out Objectives (2008)

(http://www.nt.gov.au/d/Minerals_Energy/Content/File/Forms_Guidelines/CA7-011_Mine_Close_Out_Criteria_V3.pdf)

Western Australian Environment Protection Authority and Department of Mines and Petroleum Mine Closure Guidelines:

[http://www.dmp.wa.gov.au/documents/Mine_Closure\(2\).pdf](http://www.dmp.wa.gov.au/documents/Mine_Closure(2).pdf)

7.8 Other Impacts

7.8.1 Cultural Heritage

Baseline information should include:

- 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.

The EIS should provide:

- A description of the potential impacts on the features described in the baseline assessment;
- An assessment of the Project's effects on lifestyles, traditional practices, heritage places, the impact of increased visitation and the effects on Indigenous culture generally. 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 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*.
- 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.

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.

7.8.2 Socio-Economics

The EIS should describe the socio-economic characteristics of the local, regional and Northern Territory communities (including a prediction of trends over the expected operational life of the Project). The section should present a balanced broad summary of the Project's impact on the local, regional and Northern Territory economies in terms of direct effects on employment, income and production.

It should outline the overall economic benefits of the Project, the likely contribution of the Project to the development of mining industry, regional economic development and Indigenous economic development in the Northern Territory, employment and skills development outcomes and linkages with other Northern Territory business and sectors, including suppliers and other service providers.

The EIS should specify:

- Estimated value of expenditure during the construction and operation, highlighting the proportion to be spent in the Northern Territory;
- Estimated value of annual expenditure on goods and services from the Northern Territory;
- Estimated quantity and value of production/exports;
- Anticipated markets for products;
- Estimated royalties and taxes to be paid to the Northern Territory Government;
- Opportunities for local industry and Indigenous workforce participation in the construction and operation of the mine. Identify how potential local business and employment opportunities will be identified and involved;
- Relevant opportunities to contribute to Indigenous economic development and wider regional development in the surrounding area, specifically Katherine;
- A breakdown of skills/trades required, including specific opportunities for skills development that may be of benefit to the local community, past the lifetime of the mine;
- Identification of opportunities for facilities and infrastructure development that may be of benefit to the local community, past the lifetime of the mine;
- Identification of negative impacts or potential synergies with existing land uses;
- A description of anticipated socio-economic impacts upon local residents, communities and towns;
- Any proposals to contribute to community benefit including improved services and infrastructure for relevant communities involved;
- Potential local business and employment opportunities and opportunities for synergistic facilities and infrastructure development;
- Specify the mechanisms that would be utilised to inform the local business community and workers of business and employment opportunities; and
- Detail the socio-economic parameters that would be monitored on an ongoing basis.

7.8.3 Fire

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 (eg. during site clearing operations) and outside the mine site.

8 ENVIRONMENTAL MANAGEMENT

Specific safeguards and controls, which are proposed to be employed to minimise or remedy environmental impacts identified in previous sections, are to be included in an Environmental Management Plan (EMP) for inclusion in the Mining Management Plan.

The EMP should be strategic, describing a framework for environmental management of the Project; however, as much detail as is practicable should be provided to enable adequate assessment of the Project during the public exhibition phase. Where possible, specific management practices and procedures should be included in the EMP.

Where practicable, the EMP should include:

- The proposed management structure of the Project 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;
- Information on how the land will be managed if it is taken out of production;
- 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 itself.

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.

9 PUBLIC INVOLVEMENT AND CONSULTATION

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 Project. 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 Project as a result of consultation. Details of any ongoing liaison should also be discussed.

An outline of negotiations and discussions with local government and the Northern Territory Government should be provided.

10 POLICY AND GUIDANCE NOTES

10.1 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.nt.gov.au/nreta/environment/assessment/eiaguide/pdf/EA_Guide_Greenhouse_Clim.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*.

10.2 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 http://www.greeningnt.nt.gov.au/climate/environmental_offsets.html. 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 a consolidated list of mitigation measures and offsets proposed to be undertaken or provided to minimise or compensate for the relevant impacts of the action, including mitigation measures proposed to be taken by the proponent; and
- Provide a detailed description of proposed offsets. Guidance on identifying appropriate biodiversity offsets under the EPBC Act is available at: <http://www.environment.gov.au/epbc/publications/consultation-draft-environmental-offsets-policy.html>
- Identify impacts or detriments that cannot be avoided, reduced or mitigated at reasonable costs; and
- Identify risks of failure of management actions (such as rehabilitation, weed control, etc.) and uncertainties of management efficacy.

10.3 Biodiversity and Land Clearing Guidelines

NRETAS has developed standardised methodologies for surveying terrestrial vertebrate fauna in the Northern Territory (Environmental Assessment Guidelines for the Northern Territory: Terrestrial Fauna Survey (available upon request)). Proponents should use these methodologies when conducting fauna surveys and the Australian Government Survey Guidelines for nationally threatened species:

<http://www.environment.gov.au/epbc/guidelines-policies.html#threatened>

Proponents proposing land clearing as part of a Project should consider the NRETAS (2010) *Land Clearing Guidelines 2010 Updated Version*. Technical Report No. 20 / 2009D. Land Clearing Guidelines. First published 2002. Updated 2006, 2010. Department of Natural Resources, Environment, The Arts and Sport, Darwin. Northern Territory. Natural Resource Management Division. ISBN 978-1-921519-47-5. Also available at:

http://nt.gov.au/nreta/natres/natveg/Guidelines/pdf/landclearingguidelines_2010.pdf

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.

10.4 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.nt.gov.au/nreta/natres/soil/management/index.html.

10.5 Mine closure guidelines

Closure planning is a progressive process that requires review and improvement throughout the Project 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. The Western Australian Environment Protection Authority and Department of Mines and Petroleum have mine closure guidelines that could be used in the formulation of a plan at [http://www.dmp.wa.gov.au/documents/Mine_Closure\(2\).pdf](http://www.dmp.wa.gov.au/documents/Mine_Closure(2).pdf)

10.6 Transport guidelines

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; and
 - Additional road infrastructure works required including site access and signage.
- Description of transport systems and methods to convey any product to proposed markets;
- Description of any proposed haul roads, including length, location, land requirements, tenure and acquisition requirements (for mine proposals only);
- Description of construction methods and timeframes for any proposed private and public haul roads (for mine proposals only);
- Consultation undertaken with relevant regulatory agencies; and
- Necessary approvals required.

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 Project including issues such as dust and road traffic noise.

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.

11 REGULATORY NOTES

In addition to the requirements outlined in the Guidelines above, the following advice must be considered.

11.1 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.

11.2 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)*.

11.3 Waste water

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.

Any discharge of waste water 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.nt.gov.au/nreta/environment/licences/guides.html#water.

11.4 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.

11.5 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 (including minimising seepage from water impoundments that have potential to create ongoing mosquito breeding sites throughout the dry season). The biting insect assessment should include trapping to determine the current seasonal population and abundance of adult mosquitoes. The following should be considered as part of a biting insect assessment:

- Existing raw water supply dams – shallow areas of ponding, where semi-aquatic vegetation is present may be breeding sites for pest and disease carrying mosquitoes;
- Clay borrow areas – should be rendered free draining or appropriately filled when no longer required;
- Administration and plant site buildings – discharge of effluent to be used as irrigation water should be in accordance with the Department of Health (2009) Medical Entomology guideline “*Mosquito breeding and sewage pond treatment in the Northern Territory*”;
- Waste disposal – waste rock dumps sited away from natural drainage lines or suitable diversion drains with a longitudinal slope to prevent ponding within drain;
- Tailings Storage Facility – diversion channels require appropriate design to ensure erosion and silt deposition of downstream areas does not occur;
- Active water treatment – to prevent favouring mosquito breeding - should be no continual dry season water discharge into any drainage lines;
- Passive water treatment – refer to information on design and maintenance of anaerobic and aerobic wetlands in the below Medical Entomology guideline; and
- Rehabilitation and closure

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://www.health.nt.gov.au/library/scripts/objectifyMedia.aspx?file=pdf/32/40.pdf&siteID=1&str_title=Guidelines for preventing mosquito breeding sites association with Mining Sites.pdf](http://www.health.nt.gov.au/library/scripts/objectifyMedia.aspx?file=pdf/32/40.pdf&siteID=1&str_title=Guidelines%20for%20preventing%20mosquito%20breeding%20sites%20association%20with%20Mining%20Sites.pdf)

11.6 Work Health and Safety Act

The primary Northern Territory legislation for regulation of Occupational Health and Safety matters will be through the model *Work Health and Safety Act 2011* regulations and codes of practice, to commence on 1 January 2012. This legal framework will replace the current *Workplace Health and Safety Act 1995* and associated regulations. It is expected that the proposed Regulations and Codes of Practice will be finalised by the end of 2011.

12 REFERENCES

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Current geotechnical engineering principles/practices and Australian National Committee on Large Dams (ANCOLD) guidelines

(<http://www.ancold.org.au/publications.asp>)

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http://www.epa.wa.gov.au/docs/1720_GS54.pdf

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http://nt.gov.au/nreta/natres/natveg/Guidelines/pdf/landclearingguidelines_2010.pdf

Whelan, P., Warchot, A. (2005) *Guidelines for Preventing Mosquito Breeding Sites Associated with Mining Sites*. Medical Entomology, Centre for Disease Control, Department of Health and Families, Northern Territory Government, Darwin NT.

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