Northern Territory Government

DEPARTMENT OF
NATURAL RESOURCES, ENVIRONMENT, THE ARTS AND SPORT

Part B

Draft Guidelines for the Preparation of an Environmental Impact Statement

Area 55 Oxide Project

HNC (Australia) Resources Pty Ltd

July 2011

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Definitions

Best practice environmental management	Best practice can be explained as "the best way of doing things". For it to be successful it 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 (RET, 2011)
Browns Oxide Project	HAR's existing approved Project, originally operated by Compass Mining, located approximately 3.5 km NE of the Area 55 pit.
Browns TSF	The (existing) Tailings Storage Facility for the Browns Oxide Project
Ecologically Sustainable Development (ESD)	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.
Environmental harm	(a) Any harm to or adverse effect on the environment; or (b) Any potential harm (including the risk of harm and future harm) to or potential adverse effect on the environment, of any degree or duration and includes environmental nuisance.
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services
Environmental nuisance	(a) An adverse effect on the amenity of an area that: (i) is caused by noise, smoke, dust, fumes or odour; and (ii) unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area; or (b) An unsightly or offensive condition caused by contaminants or waste.
Environmental Objective	An overall environmental goal, usually identifying environmental values to be protected.
Environmental Outcome	A detailed performance requirement, quantified where practicable, that arises from the environmental objectives and that needs to be set and met in order

	to achieve those objectives.
Long term	Post mine closure and extending to >1000 years. Where long term modelling is required, this should consider a time frame >1000 years, but be conducted for a time period that produces results within a reasonable degree of uncertainty.
Medium term	Mine rehabilitation and closure periods and immediately post-closure.
Monitoring	An action taken to detect or measure qualitatively or quantitatively the presence or amount of any substance, characteristic or effect.
Radon	Radioactive gas produced from uranium decay.
Risk	The chance of something happening that will have an impact on objectives, or the effect of uncertainty on objectives. An event or circumstances and the consequences that may flow from it. Risk = probability x consequence.
Short term	During mine operations.
The Project	The Area 55 Oxide Project
TSF South	The proposed Tailings Storage Facility, receiving tailings from processing of ore from the Area 55 pit.

Acronyms

3D	Three dimensional
AMD	Acidic and/or Metalliferous Drainage
Cth	Commonwealth (Australian Government)
DoH	Northern Territory Government Department of Health
DoR	Northern Territory Government Department of Resources
EA Act	Northern Territory Environmental Assessment Act (1982)
EIS	Environmental Impact Statement
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
HAR	HNC (Australia) Resources Pty Ltd
HNC	Hunan Nonferrous Metals Corporation
NOI	Notice of Intent
NPI	National Pollutant Inventory
NRETAS	Northern Territory Government Department of Natural Resources, Environment, the Arts and Sport
NT	Northern Territory
PAF	Potentially Acid Forming
PER	Public Environmental Report
pH	A measure of the acidity an aqueous solution
ROM	Run-of-mine
TSF	Tailings Storage Facility
WRS	Waste Rock Storage

1 Introduction

HNC (Australia) Resources Pty Ltd (referred hereafter as HAR), proposes to develop the Area 55 Oxide Project ('the Project'), located approximately 105 km south of Darwin by road, 3.5 km southwest of the Browns Oxide Project, and 8 km NW of Batchelor, in the Northern Territory.

The proposed Project comprises:

- Open pit mine.
- Waste rock stockpile(s).
- Tailing storage facility.
- Haul road and light vehicle road.
- Temporary ore stockpile.
- Ancillary infrastructure (workshop, administration office).

The Project would process the ore from the Area 55 open pit at the Browns Oxide Project processing plant, to extract copper, cobalt and nickel metals. A tailings storage facility (known as 'TSF South') would be constructed to store the tails from processing of Area 55 ore. While the Browns Oxide Project processing plant is not under assessment as a component of the Area 55 proposal, information regarding mineral processing is required to enable assessment of the composition of tailings to be stored in the proposed tailings storage facility.

The Project has a nominal resource of 4.7 mega tonnes (Mt) of polymetallic oxide ore and a mine life of approximately 4 years. Ore would be mined at a rate of 1.3 mega tonnes per annum (Mt/a). Over the life of the Project approximately 9.7 Mt of waste material would be produced.

The Project is located in tenements held by Compass Resources Limited. In 2006 Compass Resources Limited formed a joint venture with the Hunan Nonferrous Metals Corporation (HNC), of China. In 2009, the joint venture partners appointed HAR, a wholly owned Australian subsidiary of HNC, to develop and mine its polymetallic oxide ore resources in the Batchelor region, being the existing Browns Oxide Project, and polymetallic oxide resources at Area 55 and Mt Fitch. The Browns Oxide Project is currently under care and maintenance.

The Project proposal was referred from the Northern Territory (NT) Department of Resources (DoR) on 23 December 2009 to the Department of Natural Resources, Environment the Arts and Sport (NRETAS), for environmental assessment. On 2 March 2010, the NT Minister for Natural Resources, Environment and Heritage (NT Minister) 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). Issues of concern contributing to the decision included:

- The potential impact on groundwater quality of leachate/seepage from the Tailings Storage Facility (TSF South) and the Waste Rock Storage (WRS), with particular reference to potential impact on potable water supplies, livestock

watering, and ecosystems, and the potential for cumulative impacts with mining activities at Browns Oxide Project.

- The potential impact on groundwater levels due to pit dewatering, with particular reference to potential impact on potable water supplies, livestock watering, and ecosystems, and the potential for cumulative impacts with mining activities at Browns Oxide Project.
- The proposed Area 55 pit is within a few hundred metres of neighbouring residences, and the proposal may have health, nuisance or amenity impacts.
- Some of the material being mined has the potential to produce acidic and/or metalliferous drainage (AMD).
- Key aspects of the Project with environmental significance are yet to be detailed, including:
    - Design of TSF South to minimise and manage AMD.
    - Designs and final locations of waste rock dump(s) to minimise and manage AMD.
    - Final configuration defining whether one or two run-of-mines will be used.
- A footprint of 173 ha of native vegetation is proposed to be cleared for the Project. Loss habitat for flora and fauna species of conservation significance is expected. The clearing would result in net greenhouse gas emissions conservatively estimated at approximately 83 000 tonnes of CO_2-equivalent.
- There is potential for the Project to spread introduced weed species including mission and gamba grass, leading to impacts on biodiversity and the fire ecology of the area.
- Risks to Matters of National Environmental Significance have been identified by the Australian Government Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), as defined under the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Area 55 Oxide Project was referred to the Australian Government on 19 January 2010 under the EPBC Act. On 30 March 2010, the proposal was determined to be a controlled action, and to therefore require assessment and approval under the EPBC Act. The controlling provisions for the Project are: listed threatened species and communities (sections 18 and 18A). The Project is being assessed under the bilateral agreement by the Northern Territory Government on behalf of the Australian Government. Preparation of an EIS under the EA Act will satisfy assessment requirements under the EPBC Act.

A detailed description of the Area 55 Oxide Project can be found within the Notice of Intent on the NRETAS website at:

www.nt.gov.au/nreta/environment/assessment/register/hnc_resources/index.html

These Guidelines have been developed to assist HAR 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 assessment process aims to provide a mechanism for HAR and Government to gain a clear understanding of potential environmental, social and economic impacts of the Project, and to examine the likely effectiveness of management measures proposed.

The EIS should enable interested members of the public, the NT Minister for Natural Resources, Environment and Heritage (the Minister), the NT Minister for Resources (the Responsible Minister), the Federal Minister for the Environment, and the proponent to understand the environmental consequences of the Project. Information provided in the EIS should be objective, clear and succinct and, where appropriate, be supported by maps, plans, diagrams or other descriptive detail.

The EIS should demonstrate a Project commitment to the principles of Ecologically Sustainable Development, which is defined under the National Strategy for Ecologically Sustainable Development as: '*using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased*' (Commonwealth of Australia, 1992).

In general, the EIS should:

- Describe the proposed action and evaluated alternatives.
- Describe the existing environment and key ecosystem processes.
- Determine the nature and magnitude of environmental effects of the proposed action on the existing environment at a local and regional scale, including cumulative impacts of existing development and including both human and ecological concerns.
- Demonstrate a project commitment to the principles of Ecologically Sustainable Development and Best Practice Environmental Management.
- Detail mine planning that accounts for, and ensures protection against, adverse environmental impacts that have been associated with other mines in the region, and have potential to develop in association with the Area 55 Project, particularly in relation to Acid and/or Metalliferous Mine Drainage (AMD).
- Establish mechanisms to determine the environmental impact of key environmental issues identified in the risk assessment, including potential incidents (management, monitoring and reporting).
- Justify why the Project is environmentally acceptable and provide a synthesis of the environmental costs and benefits of the proposal.

The EIS should demonstrate that HAR has identified all environmental risks associated with the Project, undertaken comprehensive assessment of those risks (including quantification where practicable) and identified effective controls for important risks. Environmental values important to stakeholders must be identified and protected.

HAR is expected to work with close regard to community expectations and concerns, and to respect that the community may perceive the level of risk for this proposal differently to the proponent.

2.2 Format and Style

The EIS should be a stand-alone document. It should contain sufficient information to avoid the need to search out previous or supplementary reports (such as the Browns Oxide Project: Public Environmental Report) and be able to be reproduced in part or whole, on request from interested parties.

The structure of these Guidelines may be adopted as the format for the EIS, at the discretion of the author. The EIS must comprise an Executive Summary, the main text of the document, and the appendices, as described follows, in order to meet NT Government regulatory requirements:

- The **Executive Summary** should 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. The Executive Summary should be written as a stand alone document, able to be reproduced by interested parties who may not wish to read or purchase the EIS as a whole.
- The **main text** of the EIS should address the specific requirements of these Guidelines and include:
    - Contact details for HAR;
    - A Glossary to define technical terms, acronyms, abbreviations and colloquialisms; and,
    - A Reference list.
- The **appendices** should include:
    - A copy of these Guidelines;
    - A list of persons and agencies consulted during the EIS;
    - Names of, and work done by, the persons involved in preparing the EIS and supporting documents, including relevant qualifications and expertise;
    - A table listing commitments made by the proponent;
    - A table listing how these Guidelines have been met; and
    - Detailed technical information, studies or investigations necessary to support the main text.

The EIS should be written so that conclusions can undergo a rigorous third party assessment. All relevant data must also be provided or readily available so that modelling and calculations can be verified by third parties. Any data and papers that are referenced but cannot be made publicly available should not be referred to in the EIS and should not be used in calculations as third parties are unable to verify it. 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, including the date accessed. 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 where possible.

HAR 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 twenty (number to be finalised close to time of publication) bound copies of the EIS should be lodged with the NT Minister, care of the Environmental Assessment Unit 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 (Chapters and Appendices separate. Optimal file size, for example for chapters or images, is less than 1.5 Mb, where possible). 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, HAR is to advertise the EIS for review and comment in the *NT News*, *The Australian*, and papers local to the Project.

The EIS should be made available for public review at:

- Batchelor Institute of Indigenous Tertiary Education (library).
- Northern Territory Library, Parliament House, Darwin.
- Darwin City Council Library (Casuarina)
- Palmerston City Library, Goyder Square, Palmerston
- Minerals and Energy Information Centre, Department of Resources, 3rd Floor, Paspalis Centrepoint, 48 Smith Street Mall, Darwin.
- Environment and Heritage Division (Department of Natural Resources, Environment, the Arts and Sport), 2nd Floor, Darwin Plaza, 41 Smith Street Mall, Darwin.
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), John Gorton Building, King Edward Terrace, Parkes, ACT 2600, or GPO Box 787, Canberra ACT 2601.
- Coomalie Community Government Council; 141 Cameron Road, Batchelor, NT.
- Northern Land Council offices (Darwin and Darwin/Daly/Wagait in Palmerston).
- The Environment Centre, Unit 3, 98 Woods St Darwin.

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 will span a minimum period of eight weeks.

The Project Officer is Renee Muller (or Lisa Bradley) from the Environmental Assessment Unit of NRETAS. Contacts are: Ph (08) 8924 4034; Fax (08) 8924 4053; e-mail: eia.nretas@nt.gov.au .

3 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.

3.1 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 both risks to humans and ecosystems. An iterative process of continual improvement, such that controls implemented may include alteration of Project components or design, should be developed and applied (as shown in Figure 1).

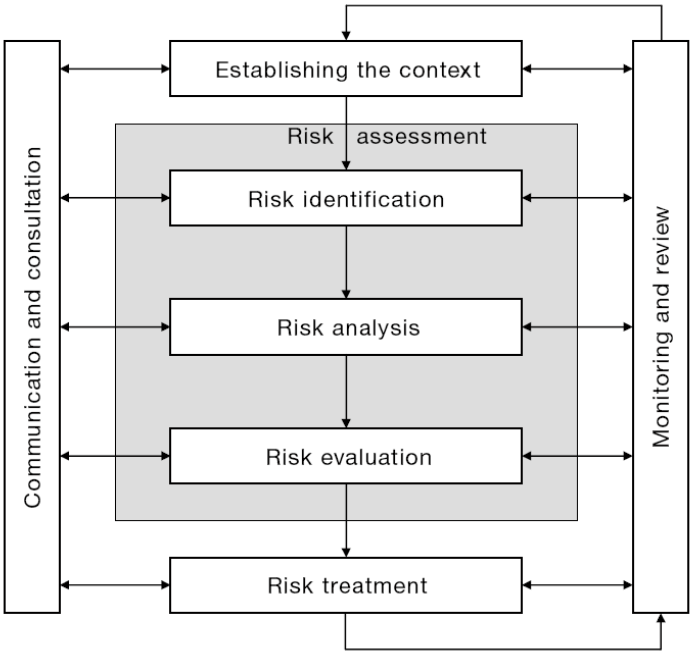

Figure 1. Risk Assessment Process.

Specifically, HAR is required to:

- Demonstrate that 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 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 realising its projected economic / social benefits.
- Discuss the residual risks and their consequences expected to be borne by the community, providing better understanding of equity issues.

Statements about levels of uncertainty should accompany all aspects of the risk assessment. Steps taken to reduce uncertainty or precautions taken to compensate for uncertainty should also be identified and their effect/s demonstrated.

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.

4 Background and context

The EIS should provide detail of the proposed Project location (including associated ancillary activity sites) and its surrounding environment to place the Project in its local and regional context.

4.1 Project objectives

The EIS should contain an explanation of the objectives and benefits of the Project, including:

- The specific objectives the Project is intended to meet.
- A summary of environmental, economic (market requirements) and social factors to support the Project.
- A comparative analysis of expected benefits and costs. This analysis must account for any significant indirect impacts (e.g. negative impacts on local biodiversity), and the long term maintenance costs of the site.
- Commercial objectives (e.g. predicted volume of product and proportion of market demand to be met by output from the Project).

4.2 Existing operations and future plans

To place the Project in context of existing operations and future plans for the site, and to demonstrate HAR's experience and capability to meet required environmental outcomes, the EIS should discuss the background to the proposal, covering, as a minimum, the following points:

- Provide a general history of assessment and development of the Browns Oxide Project, Area 55 Oxide Project and mining in the local area.
- Provide an overview of the impacts of the operation of the Browns Oxide Project to date upon the surrounding environment, including local communities. This information should be used in the environmental impact assessment process to identify where continual improvement and best practice environmental management objectives can be achieved by modifying mine planning based on past experience.
- Outcomes of any relevant additional environmental studies subsequent to the PER process including scientific studies, surveys and consultations conducted in developing the Area 55 Oxide Project. Results of these studies should be included as appendix items.

4.3 Project alternatives

The EIS should describe any prudent and feasible alternatives to carrying out the proposed activity. These alternatives, including the 'no Area 55 Oxide 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.

Discussion should include:

- 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.
- The criteria used and their relative importance in comparing options.

4.4 Legislative framework

Provide a comprehensive list of relevant Northern Territory and Australian Government Legislation (e.g. the EPBC Act), strategies and policies, as well as any international and national standards that apply to the Project and surrounding environment. Relevant Northern Territory Government environmental, work health and construction legislation and Guidelines, standards and codes should be considered during the design phase of the Project.

5 Project Design and Engineering

This section details information requirements that define the proposed development. Information requirements have been identified with consideration of key identified risks (Section 7) and should be used to inform risk assessment and development of mitigation and management strategies.

All components of the Project should be described in detail, including construction through to rehabilitation, care and maintenance, and in the long term. Alternatives to various components of the Project should be outlined. Emphasis should be given to those components with the most potential for significant short and long term environmental impacts. 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 should be included. Technical information should be supported by maps, figures and diagrams where appropriate. Detailed technical information should be included in the appendices. Underlying assumptions and forecast reliability should be discussed.

5.1 Project timeline

Describe each proposed phase of the Project and estimate relevant time frames, including:

- Timing and duration of construction, operation and rehabilitation / revegetation phases, including lead times.
- Estimate the life of mining by HAR under current arrangements.
- To place the Area 55 Oxide Project in a regional context, describe other proposed mining in the area by HAR, in addition to the scope of the Area 55 Oxide Project.

5.2 Site plan

Provide details of:

- Location, site, layout and Project description including ancillary sites.
- Land tenure for the sites of the Project.

5.3 Physical requirements for the Project

Provide details of:

- Hydrogeological setting.
- Access to existing mine components.
- Types, total quantities, sources and availability of major construction materials.
- Infrastructure requirements.

5.4 Works required

Provide details of:

- Extent of earthmoving, vegetation clearance and other site preparatory works including arrangements to minimise unnecessary clearance and disturbance.
- Arrangements for disposal of process wastes.
- Arrangements for erosion control and rehabilitation of construction sites.

5.5 Project components and supporting infrastructure

This section should include a justification of choice of procedures, processes and technologies ('components') to be implemented in each phase of the Project, including consideration of economic, environmental and social objectives. The goal of project planning should be to achieve **best practice environmental management**. Industry best practice should be identified for each component and selection of components should be justified where they do not meet best practice criteria.

- Provide an overview of major plan components associated with various stages of operations and components of the Project (Procedures / processes / technologies to be utilised)

5.5.1 Mine Pit

Provide detail regarding proposed designs of the Area 55 Pit, including:

- 3D view of final pit.
- Final size, depth, length, width, shape.

Predict and discuss future factors controlling water balance and water quality of any proposed future pit lake, as follows:

- Describe the proposed stormwater catchment area of the Area 55 pit.
- Wet season (or groundwater) dewatering requirements whilst the mine is operational, and proposed water treatment methods prior to discharge.
- Using similar existing examples, predict future water quality in the proposed future Area 55 pit lake.
- Present specific water quality targets for any future pit lake, with proposed management and time-lines for achieving and maintaining these.
- Outline a water management plan for any proposed future pit lake.
- Identify which material will become finally (and seasonally) immersed under groundwater, if and when pit flooding occurs. Estimate time frames for partial and permanent immersion, in light of groundwater modelling predictions, and HARs future plans for mining and dewatering in the area.

Describe adjacent and underlying geology, and provide approximate depths of underlying geological strata as follows:

- Establish vertical and horizontal permeability data through the geological strata which will be exposed by mining.
- Describe expected connections to local and regional aquifers, and groundwater connections to local watercourses, standing water, recharge zones, etc.

- Quantitatively estimate the capacity of the exposed geology to produce or neutralise acid and/or metalliferous drainage outputs or inputs.
- Indicate which exposed strata and rock types are likely to host or transmit aquifers.

Characterise rock units projected to be exposed in the final pit walls and floor, in terms of:

- Mineralogy, base metal content; and
- Potential for development of AMD (e.g. acid neutralising capacity, sulfide content and type, net acid production potential, circumneutral drainage potential, likely time frame required for AMD production).

5.5.2 Waste Rock Storage(s)

Provide detail to designs of the proposed Waste Rock Storage(s) (WRS) (where applicable), including:

- Proposed location /configuration;
- Conceptual design principles;
- Capacity;
- Surface configuration, size, height, landform, shape;
- Cross sections;
- Slopes, batters;
- Containment principles for Potentially Acid Forming (PAF) material, and minimisation and management of development of AMD;
- Lining systems (internal cells, base, etc.);
- Subdrainage and collection sumps;
- Armouring;
- Cover design and vegetation;
- Stormwater drains, seepage and runoff collection;
- Erosion protection structures;
- Sediment capture structures;
- Applicable engineering standards and Guidelines; and,
- Describe proposed selective handling / disposal methods of waste rock units containing environmentally relevant constituents.

Describe WRS construction methodology, including:

- Timing;
- Material selection; and
- Selective placement of rock types.

Describe the expected long term interaction of the WRS with the surrounding environment, including:

- Groundwater and geology:

  - Identify and characterise in detail any anomalies or barriers in geological strata underlying the WRS that could create or restrict preferential flow paths for WRS seepage and groundwater flows;
  - Establish vertical and horizontal permeability data and flow directions through any identified anomalies; and
  - Quantitatively estimate the capacity of the geology to neutralise or contribute to any acid and/or metalliferous drainage outputs.
  - Provide detail of, and discuss the extent, value and nature of mineralisation that would potentially be sterilised by the WRS proposed in Option 1 (involves the use of a waste rock storage design that wraps around the south and northwest of the open pit and will provide some screening from surrounding properties)
- Vegetation:
  - Describe how proposed WRS design and construction methods will provide the foundation required to be able to create a self-sustaining, local providence, weed-free vegetation cover, including proposed vegetation cover for the WRS;
- Ecosystems
  - Proximity to sensitive habitats, including riparian and/or vine thicket habitats, wildlife conservation corridors, etc.
  - Sensitive downstream aquatic habitats;
- Cultural heritage
  - Proximity to sites of sacred, cultural, historical or social interest.

5.5.3 Tailings storage facility

HAR should identify and characterise in detail any anomalies or barriers in geological strata underlying the TSF South site that could create or restrict preferential flow paths for TSF seepage and groundwater flows. Vertical and horizontal permeability data should be established, as well as flow directions through any identified anomalies.

Describe and discuss TSF South design and construction, including:

- Conceptual design principles;
- Capacity;
- Surface configuration, size, height, landform, shape;
- Cross sections;
- Slopes, batters;
- Containment principles;
- Spillway design and location;
- Armouring;
- Cover design and vegetation;
- Stormwater drains, seepage and runoff collection;
- Erosion protection structures;
- Sediment capture structures;

- Applicable engineering standards and Guidelines;
- Lining systems, including design depths and expected permeabilities of all liners and containment zones (walls, floors, lids);
- Sub drainage, collection sumps and other seepage collection systems;
- Consideration of AMD potential in selection of material for TSF construction;
- Projected groundwater interactions with TSF South;
- Extent of dewatering of tailings required to maintain dam wall stability; and
- Details of methods of tailings and waste transfer to TSF South.

Outline final rehabilitation and revegetation plans for TSF South, including design details for any proposed final cover.

Ore treatment processes will determine the composition of tailings to be stored in the proposed Tailings Storage Facility (TSF) South. Provide details including:

- Describe the ore processing method (as per section 2.5 of the NOI), and provide details of the new processing circuit (as per section 2.5.5 of the NOI).
- Characterise tailings to be discharged to TSF South from the processing circuit, in terms of:
    - Mineralogy, base metal content;
    - pH;
    - Radioactivity;
    - Potential for development of AMD (e.g. acid neutralising capacity, sulfide content, net acid production potential, circumneutral drainage potential);
    - Residues from the ore-treatment process; and
    - Other constituents and qualities of environmental significance.
- Detail potential air quality impacts associated with the TSF, including chemical or radiological toxicants associated with dust which may be generated from the facility.

Describe and discuss aspects of TSF South operation and management, including:

- Objectives and methods of tailings placement;
- AMD potential of tailings classes, and predicted amounts / proportions of each class; and
- Any specific handling / placement / further processing proposed for any classes of tailings, waste rock, wastes, or acid-neutralising material, etc. to be deposited into the TSF.

5.5.4 Haul road and light vehicle road

Provide detail of proposed roads for the Project, including:

- Functions;
- Alignment;
- Cross section;
- Surface design;

- Clearing required;
- Proximity to sensitive habitats; and
- Stormwater drainage structures.

For the alternatives available for alignment of the haul road route, describe the:

- Proximity to sensitive habitats, including riparian, monsoon forest and/or vine thicket habitats, regional wildlife conservation corridors, etc;
- Sensitive downstream aquatic habitats;
- Proximity to neighbouring properties;
- Proximity to sites of sacred, cultural, historical or social interest; and
- Travel distances from the Area 55 pit to the processing plant.

Identify the final proposed Haul Road route. Describe:

- Designs of roads, bridges, road turnoffs and junctions, water crossings, stormwater drains, erosion and sediment control structures;
- Engineered load bearing capacity of the proposed roads; and
- Describe baseline traffic conditions on roads and transport networks likely to be utilised for the Project.

5.5.5 Temporary ore stockpile (if proposed)

Provide detail of designs of the Area 55 Temporary Ore Stockpile, including:

- Size;
- Capacity;
- Design (bunding, lining, etc.); and
- Location details.

Describe geology underlying the stockpile site:

- Provide depths of underlying geological strata;
- Establish vertical and horizontal permeability data through the geological strata and any identified anomalies;
- Quantitatively estimate the capacity of the geology to neutralise any acid and/or metalliferous drainage outputs;
- Define which PAF rock units would be temporarily stockpiled at Area 55;
- Estimate maximum and average length of time any material would sit on the temporary stockpile; and
- Describe proposed management of classes of PAF material at the Area 55 temporary stockpile site.

5.5.6 Power supply

Describe energy supplies, including:

- Quantity for the mine, transport and workforce purposes;
- Types of energy which can be utilised, including renewable energy;

- Proportions within the proposed energy supply mix;
- 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).

5.5.7 Transport

Describe:

- Transport medium, including loaders, haulage vehicles, transfer equipment (for raw materials and products both within and beyond Project sites);
- Identify existing transport networks to be utilised and proposals for upgraded or additional road links, pipelines, conveyors etc., interim storage sites, transfer and loading of material and decommissioning of transportation and storage sites; and
- The 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;
- The transport systems and methods to convey any product to proposed markets;
- Any proposed haul roads, including length, location, land requirements, tenure and acquisition requirements; and
- The construction methods and timeframes for any proposed private and public haul roads.

5.5.8 Ancillary infrastructure

Identify and discuss Project requirements for other infrastructure or upgrades of existing infrastructure both on and off the Mining Lease, not necessarily supplied by HAR. Consider as a minimum:

- On-site storage facilities (existing and proposed), required for raw materials and products (location, capacity and design); with identification of applicable standards, techniques and site management arrangements.
- Any new requirements for off-loading facilities, storage depots, or distribution infrastructure at the Browns Oxide site, for storage and distribution of inputs or outputs from the Area 55 Project, where these aren't covered in amendments to the Browns Oxide MMP.
- Water and Sewerage;
- Telecommunications;
- Upgrade of public roads;

- Accommodation, including areas for provision of alcohol;
- Offices;
- Secure storage facilities for reagents and any other chemicals;
- Recreation facilities; and
- Shops.

Detail designs of proposed:

- Dams and/or water storage facilities;
- Offices and workers amenities; and
- Other infrastructure required (not including WRS, TSF South, Temporary Ore stockpile or roads, described elsewhere).

5.6 Infrastructure Alternatives

- Describe the final Project configuration in terms of whether a temporary ore stockpile will be created at Area 55, or whether ore will be hauled directly from the Area 55 pit to the Browns Oxide run-of-mine (ROM).
- Discuss alternative WRS configurations considered, and why a particular option was chosen (include consideration of backfilling the Area 55 or Browns Oxide Pit).
- Compare the differences in expected impacts on sensitive receptors, including residents of nearby properties, for the waste rock storage options, particularly relating to noise, vibration and dust impacts.

5.7 Workforce

Describe the required workforce, its establishment and maintenance, including:

- Numbers in various categories of skilled and unskilled workers required at various stages of Project development.
- Requirements for accommodation.
- Provision of other services and facilities to support the Project workforce and the contribution, if any, of HAR.
- Health and safety, including on-site safety and medical facilities and procedures. Measures to prevent exposure to hazardous substances, including fumes and dust, both at the sites and during transportation and handling.

5.8 Water management

Describe water supplies, including:

- Requirements in terms of quantity / quality for construction and operation, dust control and workforce consumption on site;
- Proposals for provision of required supplies; and
- The proposed infrastructure and methods for exploitation and delivery to Project sites and arrangements for maintenance of water quality.

Provide a site water balance (all inputs and outputs) based on long term modelling using rainfall/runoff data for a period equivalent to the expected mine life, including rehabilitation. Include Wet and Dry season conditions and extreme events.

- Identify any requirements for additional clean water in the Dry season, and Wet season discharge options for excess contaminated water.
- Describe water management, including:
    - Management of raw, potable, process, stormwater and wastewater
    - Dewatering of the pit;
    - Management of high/extreme rainfall events; and
    - Water recycling.
- Discuss how water management for the Area 55 Project will affect the existing water management system in place at the Browns site.

5.9 Closure planning and rehabilitation

- Define decommissioning, removal and rehabilitation objectives and goals in the short, medium and long term.
- Identify environmental values for the Area 55 Project site, and objectives with regard to those values in the decommissioning, removal and rehabilitation of the component sites.
- Identify and discuss any constraints against achieving full restoration of the Area 55 Project area in keeping with the features of the original landscape, vegetation communities and faunal community structure.
- Provide details of the design of rehabilitated landforms, including:
    - The rehabilitation techniques to be used and the final topographic and drainage morphology; and
    - Flora species appropriate for use in rehabilitation, including the collection and selection strategy for native flora species.
- Describe rehabilitation methodology, including:
    - Proposed staging / timing;
    - Soil profile reconstruction
    - The proposed revegetation program, with selection and collection of local native species e.g. native grasses and other vegetation;
    - Runoff and erosion control measures;
    - Water supply;
    - Protection from fauna, including cattle and feral animals;
    - Weed control;
    - Fire management;
    - Contingency management against rehabilitation failure.
- Describe the proposed revegetation and post-mining fate of any WRS built between the Area 55 pit and neighbouring residences to act as a noise bund.

6 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.

6.1 Hydrology and water quality

Provide a detailed description of the existing aquatic environments, as detailed below. Water quality impacts may be cumulative with that of the Browns Oxide Project, and hence information regarding the impacts of the Browns Oxide Project is required to facilitate assessment of the current proposal.

6.1.1 Groundwater

Provide description, including detailed maps where appropriate of underlying aquifers, describing:

- Local and underlying geology and depths of underlying geological strata.
- Identify the natural hydro-geochemistry of the groundwater system (heavy metals, toxic metalloids, pH, redox, total dissolved solids).
- Flow velocities and directions. Estimate transit directions and time for groundwater to travel from the site off the mining lease (during mining, versus post mining /dewatering).
- Identify the following groundwater components:
    - Flow domain – including the expected elevation of the water table;
    - Confining layers and expected hydraulic conductivities and porosities of identified aquifers;
    - Lateral and vertical hydraulic gradients;
    - Likely flow directions and flow velocities; and
    - Sources of recharge.
- Map and describe aquifers (in three dimensions) underlying the Project Area including TSF South, and surrounding areas to the outer extent of the underlying aquifers. Identify and overlay:
    - All proposed Project infrastructure, and the Browns TSF (for context);
    - Groundwater contours. Indicate seasonal variations;
    - Extent and degree of aquifer connectivity / confinement.
    - Faults, fractures, discontinuities, barriers, etc expected to influence local groundwater flows and reservoirs; and
    - Surface connections and expressions of groundwater aquifers potentially affected by the Project (eg. bores; springs, soaks, recharge zones, waterways or wetland habitats, natural or artificial, ephemeral or permanent, downstream areas).

Describe the current groundwater monitoring program, any proposed modifications to the program, and how it will be implemented in order to include monitoring of impacts from the Area 55 Oxide Project 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.
- Present and interpret water quality monitoring data for groundwater in the area of the Project:
    - Monitor water quality of groundwater from bores located at sites potentially impacted by seepage from TSF South.
    - Present multiple lines of evidence assessment of groundwater dependant ecosystem condition, including water quality data, rapid biological assessment data and existing land use data; and
- Correlate seasonal groundwater depth data with localised rainfall data.

6.1.2 Surface water

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

- Catchments, their significance (Ramsar etc), boundaries, area and topography. Indicate infrastructure footprints.
- Areas of inundation, drainage lines, surface-water flow directions, creeks and receiving river(s) and discharge rates.
- Size and seasonal flow rates of drainage lines, creeks and waterways.
- Beneficial uses.
- Water quality.
- Current effects on water quality in surface water bodies from inputs of acid and/or metalliferous drainage, uranium or radium from existing mining activities, and from natural sources.
- Quantitatively characterise hydrology and surface water quality in the Finniss River, Rum Jungle Creek and East Finniss River.
- Identify sensitive receptors to impacts upon surface water systems, including consideration of:
    - Local residents and/or communities drawing creek water for on-property use;
    - Riparian and aquatic ecosystems / flora / fauna;
    - Habitats and species of conservation significance and species listed under the EPBC Act;
    - Possible cumulative effects on water quality from inputs of AMD, uranium or radium from existing mining activities, and from natural sources.
- 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 Area 55 Oxide Project on the local and regional hydrogeological conditions.

- Present and interpret water quality monitoring data for surface water in the area of the Project, including the Browns TSF:
    - Present multiple lines of evidence to assess the condition of surface water ecosystems, including water quality data, rapid biological assessment data and existing land use data.

6.2 Biodiversity

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

- Present flora and fauna surveys of the Project Area:
    - Flora and fauna surveys should aim to sample the affected footprint, as well as adjacent areas that will be potentially affected by the proposal.
    - Flora and fauna surveys should proportionally sample each vegetation community.
    - Significant communities should be sampled at a higher site density.
    - Significant species that could potentially occur in the area should be surveyed using targeted survey techniques.
    - Flora and fauna surveys should be conducted at an appropriate time of year. Ideally, surveys should be conducted twice, in the Wet season and the Dry season.
- Identify flora and fauna species of conservation significance present, or potentially present within the Project area, and which may be affected by the Project.
- NRETAS Biodiversity Conservation Guidelines for Terrestrial Biodiversity Assessment recommends that the minimum number of survey sites for a 173 Ha area is 16 sites for fauna and 48 sites for flora.
- Targeted fauna and flora surveys should be conducted at all major sites within the Project area, including for the listed threatened Northern Quoll.
- Map the vegetation communities within the Project and surrounding areas at an appropriate scale.
- Identify areas containing significant vegetation communities, including creek lines with associated riparian vegetation or rainforest.
- Identify and discuss wildlife corridors of local and regional significance within the Project area.
- Survey aquatic fauna present in local creeks / rivers in and downstream of the Project Area, to serve as a baseline biological dataset.
- Identify and discuss species of traditional Aboriginal cultural significance (particularly of water and faunal 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. 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.

- Identify presence and potential presence within the Project area of weeds, and feral animals.

6.3 Noise and vibration

Measure and model the existing ambient and predicted Project noise and vibration conditions of the Project area, including the nearest residences and other sensitive receptors, both including and excluding noise and vibration from the Browns Oxide Project. Parameters must be measured for applicable representative periods, including periods of expected heightened sensitivity of receptors, and seasonal factors (e.g. Dry season tourist traffic).

Identify sensitive receptors (resident and transitory) to impacts potentially arising from the Project from noise and vibration (including blasting).

- Discuss expected levels of sensitivity;
- For the identified sensitive receptors, define noise and vibration sensitivities in terms of expected tolerance thresholds to volume, duration and frequency, relative to time of day, ambient conditions, etc; and
- Include applicable meteorological information.

6.4 Air quality and dust

- Measure the existing ambient dust levels of the Project area, the potentially affected neighbouring properties, and other sensitive receptors.

6.5 Visual amenity and light

- Identify sensitive receptors (resident and transitory) to potential visual amenity and light impacts.
- Describe ambient conditions for artificial light commonly present at night and visible to neighbours of the Project area. Data should be sufficient to serve as a baseline reference and context for predicted Project additions.
- Discuss expected levels of sensitivity.

Describe and discuss the current general amenity of the Project area.

- Describe and discuss the current visual amenity of the Project area.
- Provide figures showing the visibility of mining activities from Litchfield Park Road and from properties in the immediate vicinity of the Project area.

6.6 Radiation exposure

- Determine current levels of radiation exposure to residents in the vicinity of the proposed Project, to provide a baseline for future environmental monitoring. Measure current radiation levels in air, water, soil, dust and any other relevant environmental media.

7 Risk Assessment

The proposal to construct and operate the Area 55 Oxide Project and associated infrastructure poses risks to the surrounding environment that may be cumulative to those posed by the Browns Oxide Project. HAR is required to undertake a whole-of-project risk assessment, using standard methods as described in Section 3.

A number of key Project risks have been identified. Each of the identified risks should be addressed by HAR 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 for Acidic and/or Metalliferous Drainage from Project infrastructure and operations;
- Water quality and supply risks to groundwater and surface water resources;
- Land clearing and loss of biodiversity;
- Impacts on local community including nuisance and health impacts relating to increased noise, vibration, dust, light, radiation and impacts on visual amenity;
- Biodiversity and community nuisance and health impacts relating to the haul road and traffic;
- Potential long term impacts associated with ineffective decommissioning and rehabilitation procedures; and
- Climate change implications of greenhouse gas emissions.

The EIS must demonstrate how the Outcomes defined for each of the issues / risks identified below in these Guidelines will be achieved.

Mine planning and impact modelling requirements in this section require consideration of impacts over a >1000 year time period. Where modelling uncertainty increases beyond a useful extent in predicting impacts over this time period, modelling should be undertaken over the longest practicable time period, with the aim being to consider impacts over the longest possible term.

7.1 Acidic and/or Metalliferous Drainage (AMD)

Key Risk

- Potential for Acidic and/or Metalliferous Drainage from Project infrastructure and operations.

Environmental Objective

- To ensure that groundwater and 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.

Outcome

- Mine planning will ensure that Best Practice Environmental Management is achieved, with respect to mitigation of potential for development of AMD.
- Potential AMD generation will be 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 / rehabilitation stages.
- Potential for AMD development at the site will achieve a residual risk rating of 'Low' according to a risk assessment process which meets Australian standards.

The Batchelor region has a history of mining operations with legacy 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 both during operations and as a legacy of the proposed mine. Assessment of likelihood and consequence for the AMD risk assessment should therefore take into account other incidences of AMD that have occurred in the region, as well as associated management and rehabilitation costs.

The proponent needs to demonstrate that the site is sufficiently well characterised to enable establishment of management initiatives that minimise the development of AMD to a level that can be assimilated by the receiving environment. Mine closure design should be detailed and the need for long term management of the site identified.

This section additionally addresses broader environmental risks where these can best be identified and managed in conjunction with AMD minimisation and management.

7.1.1 Characterisation of material

Outcome

- HAR will fully evaluate risk of AMD prior to mining. Effort will be focussed on minimisation and management, rather than control and treatment.
- Characterisation of AMD risk will commence during exploration and continue through pre-feasibility, feasibility and operations phases.
- Selective handling based upon detailed AMD characterisation and AMD minimisation principals will occur of all mined material not destined for immediate processing.
- Closure planning will be conducted during the feasibility phase demonstrates that AMD can be managed in the long term from both technical and economic perspectives.
- Geological block models based on comprehensive static test data will facilitate AMD management.

7.1.1.1 Ore Characterisation

Information Requirements

- Identify classes of ore for handling purposes. Describe thresholds for selective handling of environmentally relevant constituents, including, but not limited to sulfides and uranium.

Potential Impacts

- Identify and discuss risks stemming from inadequate characterisation or segregation of classes of ore.

Protection, Management and Monitoring

- Describe proposed selective handling methods and management of ore containing environmentally relevant constituents to ensure environmental protection.

7.1.1.2 Waste Rock Characterisation

Information Requirements

- Describe classes of waste rock for handling purposes with respect to any potential to:
    - Produce AMD (including circum-neutral drainage);
    - Contain uranium or other radioactive material;
    - Contain non-target mineralisation; and/or
    - Contain any other environmentally relevant elements.

Potential Impacts

- Identify and discuss risks stemming from inadequate characterisation and/or segregation of classes of waste rock.

Protection, Management and Monitoring

- Demonstrate that HAR's proposed methods of characterisation of waste rock units will accurately describe the units' AMD potential, and will be fully implemented in practice.
- Describe proposed selective handling methods and management of waste rock environmentally relevant constituents to ensure environmental protection.

7.1.1.3 Pit Wall Characterisation

Information Requirements

- Characterise rock units projected to be exposed in the final pit walls and floor, in terms of:
    - Mineralogy, base metal content; and
    - Potential for development of AMD (e.g. acid neutralising capacity, sulfide content and type, net acid production potential, circum-neutral drainage potential, likely time frame required for AMD production).

- Identify which material will become finally (and seasonally) immersed under groundwater, if and when pit flooding occurs. Estimate time frames for partial and permanent immersion, in light of groundwater modelling predictions, and HARs future plans for mining and dewatering in the area.

Potential Impacts

- Identify and discuss environmental risks associated with characteristics of material to be exposed in the final pit walls.

Protection, Management and Monitoring

- Demonstrate that identified environmental risks associated with characteristics of material to be exposed in the final pit walls will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low' for the short to long term, both prior to pit flooding, and upon immersion by permanent groundwater.

7.1.1.4 Tailings Characterisation

Information Requirements

Information requirements are provided in section 5.5.4.

Potential Impacts

- Identify and discuss environmental risks associated with characteristics of tailings.
- Identify and discuss risks potentially stemming from inadequate characterisation of tailings.
- Identify and discuss risks to tailings constitution and AMD potential of tailings, potentially stemming from faults occurring in the processing circuit, incomplete processing of ore, or presence of unforseen mineralogy.

Protection, Management and Monitoring

- Demonstrate that identified environmental risks associated with characteristics of tailings will be avoided, mitigated or otherwise minimised such that a risk rating of 'low' is achieved, for the short to long term.
- Demonstrate that identified environmental risks associated with inadequate characterisation of tailings will be avoided, mitigated or otherwise minimised such that a risk rating of 'low' is achieved, for the short to long term.

7.1.2 Evaluation of alternative mine configurations

Outcomes

- Best practice environmental management and long term ecological sustainability will be achieved by the final proposed configuration of the mine.
- Risk associated with the potential for AMD or contaminants to negatively impact on ground or surface water quality will achieve a residual risk rating of 'Low', according to a risk assessment process which meets Australian standards.

Information Requirements

Identify and evaluate viable mine management alternatives to minimise the AMD generation potential of tailings and waste rock in the short to long term. Provide cost-benefit analyses to compare options, including long term (post-closure) maintenance requirements of identified alternatives.

Specifically provide analysis of potential for:

- Final placement of all Area 55 waste rock and tailings into either the Browns pit or Area 55 pit.
- Placing tailings and waste rock with AMD generation potential permanently under water.

Additionally consider the following options, as well as any others identified through the mine planning process:

- Impermeable geotextile layers (and engineered clay layers) and seepage recovery systems to separate tailings dam contents and seepage from underlying potable groundwater aquifers.
- Addition of Acid Neutralisation Capacity (ANC) in-situ to PAF material.
- Passive drainage systems to recover seepage from tailings dam and waste rock storages before any interface with groundwater or surface water systems is met.
- Passive neutralisation methods including in-situ funnel-and-gate systems with permeable reactive barriers, or metal sequestering layers.

Undertake three dimensional contaminant transport modelling of seepage outputs and compare long term environmental risks of alternative configurations including:

- Long term storage of PAF material permanently under water (i.e. groundwater in the long term), with alternative pit lining options.
- Tailings dam designs incorporating impermeable geotextile layers (and engineered clay layers) and seepage recovery systems to separate tailings dam contents / seepage from underlying potable groundwater aquifers.

Potential Impacts

- Identify risks associated with alternative mine configurations that optimise AMD minimisation and management.
- Identify risks to groundwater and surface water resources in the long term from alternative mine configurations.

Protection, Management and Monitoring

- Describe how AMD would be minimised and contingency management if AMD were to develop.
- Demonstrate that identified risks associated with HAR's final proposed mine configuration to minimise AMD will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low'.
- Demonstrate that the final proposed configuration will achieve best practice environmental management and long term ecological sustainability.

- Describe proposed monitoring; reactive management and contingency actions that will ensure required outcomes will be met.

7.1.3 Design and management of mine components

7.1.3.1 Waste Rock Storage(s) (WRS)

Outcome

- Demonstrate that the Waste Rock Storage will be designed to achieve best practice environmental management and long term ecological sustainability.
- The preferred option for the location and design of the waste rock storage will ensure human health is protected and environment impacts are minimised.
- Risks to local waterways and aquifers will be thoroughly identified, characterised and avoided where possible, or otherwise minimised to the greatest possible extent.

Information Requirements

- Information requirements regarding designs of the proposed WRS are detailed in Section 5.
- Provide details of minimisation and management strategies for AMD development as follows:
    - Describe proposed design and construction of the WRS in terms of how AMD (including circum-neutral drainage) development will be minimised, and captured should it occur.
    - Describe proposed selective handling / disposal methods of waste rock units containing environmentally relevant constituents.
    - Describe any potential impact from AMD emanating from waste rock storages on legacy-pit water quality in the longer term.
    - Describe how proposed WRS design and construction methods will minimise erosion and loss of sediment, topsoil, capping material and vegetation cover during extreme rainfall, heat and drought events.
    - Describe contingency drainage and sediment interception arrangements.
    - Describe how preferential flow paths over and through the WRS will be controlled.
    - Describe how the conceptual cover design of the WRS will minimise AMD development.
    - Describe how proposed WRS design and construction methods will provide the foundation required to be able to create a self-sustaining, local providence, weed-free vegetation cover.
    - Describe proposed vegetation cover for the WRS.

Potential Impacts

- Identify and discuss risks associated with WRS design / configurations.
- Identify and discuss risks associated with WRS site characteristics. Consider as a minimum, risks associated with:

- Underlying geology, including strata anomalies, paleochannels, etc
- Proximity (or downstream connections to) waterways, communal or dolomitic aquifers, sensitive / significant habitats and corridors or sites of cultural or Indigenous heritage.

- Demonstrate that underlying geology and anomalies relevant to modelling of WRS seepage modelling have been appropriately defined for the entire footprint(s) of the WRS.
- Demonstrate that any identified anomalies in geology underlying the WRS have been compensated for in design of the WRS.

Closure and rehabilitation:

- Identify and discuss risks of AMD development with regard to design and construction of the WRS.
- Discuss potential for exacerbation of AMD potential due to seasonal groundwater mounding height differences.
- Identify and discuss risks with regard to design and construction of the rehabilitated WRS cover, including proposed vegetation-cover assemblages.
- Demonstrate that proposed cover designs of the WRS will:
    - Be successful in the local climate, and able to withstand extreme rainfall, heat and drought;
    - Resist erosion and exposure of underlying layers after extreme rainfall events;
    - Present low risk of damage from termite and root growth; and
    - Require minimal or no maintenance in the long term.
- Demonstrate by example (where possible) how the conceptual cover design of the WRS will minimise AMD development, with reference to outcomes from existing, similar WRS cover configurations, in similar climatic settings.

Protection, Management and Monitoring

- Demonstrate that identified risks associated with WRS design or configurations will be avoided, mitigated or otherwise minimised to a low level.
- Demonstrate, with the support of detailed modelling, that the risk of contamination of groundwater or surface water resources, from the WRS, is low.
- Describe monitoring programs and infrastructure proposed to detect manifestation of identified potential impacts, including contamination of water resources and dust, from the WRS.
- Demonstrate that WRS designs would effectively:
    - Eliminate or reduce risk to a low level, by design, the possibility of the WRS contaminating communal groundwater or surface-water resources, particularly post mine-closure; and
    - Exclude or reduce to a low level, the risk of development of AMD (including circum-neutral drainage) from waste rock storage(s) over the long term.

- Demonstrate that identified environmental risks associated with groundwater mounding within the WRS will be avoided, mitigated or otherwise minimised to a low level.
- Demonstrate that identified risks associated with design and construction of the WRS cover will be avoided, mitigated or otherwise minimised to a low level.
- Describe proposed monitoring of WRS cover performance (eg. appropriately sized lysimeters, etc), and reactive management measures aimed at ensuring required outcomes will be met.
- Describe proposed contingency management measures to intercept / treat AMD from the waste rock storage(s) should it develop:
    - While HAR is still actively mining in the area; and/or
    - In the long-term, after mining and processing has ceased (proposed contingency actions should in the long term be passive self-sustaining systems without requirement for ongoing maintenance, to allow for mine closure).

7.1.3.2 Mine Pit

Outcome

- Demonstrate that the Mine Pit will be designed to achieve best practice environmental management and long term ecological sustainability.
- The risk associated with the potential for AMD or contaminants to negatively impact on water quality in the mine pit will achieve a residual risk rating of 'Low', according to a risk assessment process which meets Australian standards.

Information Requirements

- Details of pit design are required as detailed in Section 5.

Potential Impacts

- Identify and discuss environmental risks associated with characteristics of material to be exposed in the final pit walls.
- Identify and discuss risks to local watercourses or aquifers from the Area 55 legacy pit, whether empty, backfilled, or as a pit-lake.
- Identify and discuss potential of development of poor water quality within the legacy Area 55 pit. Identify risks associated with expected long term legacy water quality in Area 55 pit.
- Identify and discuss risks associated with the exposure to the atmosphere of the geology near the surface of the legacy pit walls. Identify potential for the exposed pit walls to cause AMD, and to degrade water quality in the legacy pit.

Protection, Management and Monitoring

- Describe how AMD inputs will be prevented from contaminating the proposed pit lake, both from surrounding areas, and from exposed pit walls.
- Describe any proposed surface treatment or lining of the pit walls prior to closure.

- Describe how any identified risks to local watercourses or aquifers from the Area 55 legacy pit will be avoided, mitigated or minimised.
- Describe how any identified risks of development of poor water quality within the legacy Area 55 pit will be avoided, mitigated or minimised.
- Demonstrate that identified environmental risks associated with characteristics of material to be exposed in the final pit walls will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low' for the short to long term, both prior to pit flooding, and upon immersion by permanent groundwater.

7.1.3.3 Temporary Ore Stockpile

Outcome

- The final proposed ore stockpile configuration will optimise environmental and social benefits and avoid associated risks where possible, or minimise residual risks to achieve a residual risk rating of 'Low', according to a risk assessment process which meets Australian standards.

Information Requirements

Information required to inform this section is detailed in Section 5.

Potential Impacts

- Identify environmental risks associated with having a temporary ore stockpile at Area 55, and a staged hauling of ore to the Browns ROM site (compared to not having a temporary ore stockpile at Area 55.
- Identify environmental risks associated with locating a temporary ore stockpile at the specifically proposed location, in terms of characteristics of the site and surrounding area.
- Compare potential and residual risks, costs and benefits from the two ore-transport configuration options proposed in the NOI, to demonstrate why HAR has selected its final option. Discuss as a minimum:
    - Alternative ore-transport configurations and vehicle considerations;
    - Carbon footprint minimisation; and
    - Erosion, sediment and dust control at the temporary ore stockpile site, and on the haul route.
- Identify and quantify AMD potential and associated environmental risks at the temporary ore stockpile site.

Protection, Management and Monitoring

- Demonstrate and describe that risks from the selected ore stockpile and transport configuration will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low'.
- Describe monitoring programs and infrastructure proposed to detect manifestation of identified potential impacts, including contamination of water resources, and dust, from the temporary ore stockpile and Browns run-of-mine (as a storage repository of Area 55 ore).

- Demonstrate and describe how identified risks associated with AMD development at the temporary ore stockpile at Area 55 will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low'.
- Describe contingency management responses to AMD development at the site.

7.1.3.4 Tailing storage facility (TSF South)

Outcome

- Demonstrate that TSF South will be designed to achieve best practice environmental management and long term ecological sustainability.
- Demonstrate that TSF seepage risks and subsequent contamination of surface and/or groundwater resources will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low', in the planning and design phases, and that monitoring, reactive management and contingency actions will be in place.
- Continual improvement in mine planning and management will be achieved through consideration of the design, management, environmental outcomes of the existing Browns Oxide TSF when designing the proposed TSF South.
- Waste output to the tailings storage facility/s, of the revised ore processing plant / circuit will be characterised and managed such that long term environmental contamination is avoided.

Information Requirements

Information required to inform this section is detailed in Section 5.

Potential Impacts

Selective handling

- Identify risks to environmental or human health from outputs (solids, gasses and liquids) of the ore treatment process. Consider risks associated with their processing, storage, handling, and/or transport.
- Identify outputs from the ore processing circuit that have potential to become sources of environmental contamination in TSF South.
- Identify residual risks to the environment and/or human health associated with wastes from the ore treatment process.

Seepage:

- Predict TSF whole-of-dam seepage rates (progressive, until a long term equilibrium point / pattern is reached).
- Demonstrate that underlying geology and anomalies relevant to a TSF South contaminant transport model have been appropriately defined for the entire footprint and local area of the TSF.
- Quantitatively estimate the capacity of the geology underlying TSF South to neutralise or contribute to any acid and/or metalliferous drainage outputs.

- Demonstrate how vertical and horizontal permeability characteristics of geological strata underlying the TSF South will influence TSF design and construction.
    - Identify and describe expected hydraulic effects of any identified anomalies in geological strata under the footprint of STF South.
    - Demonstrate that any identified anomalies in geology underlying TSF South have been compensated for in design of the TSF.
- Tailings seepage quality is to be comprehensively predicted. Identify relevance to health of humans, aquatic ecosystems and livestock of any elevated metalliferous (or other) concentrations which could potentially occur in seepage, above background groundwater concentrations. Consider cumulative impacts with seepage from the Browns TSF.
- Predict and demonstrate the permeability of all TSF South constructed layers and calculate likely oxygen diffusion and water percolation rates through the layers.
- Describe advances in design of TSF South which ensure seepage issues previously associated with the Browns TSF will be avoided in the TSF South.

Long term stability:

- Outline final rehabilitation and revegetation plans for TSF South.
- Demonstrate that the proposed TSF designs will be stable in the long term, including maintenance of:
    - Structural integrity against weathering elements, such as: extreme rainfall events, floods, long term erosion, desiccation, termite and tree root infestation, climate change and earthquakes; and
    - Design containment specifications to which the TSF was built.
- Describe how proposed TSF South design and construction methods will minimise erosion and loss of sediment, topsoil, capping material and vegetation cover during extreme rainfall, heat and drought events. Describe:
    - Contingency drainage and sediment interception arrangements; and
    - How preferential flow paths over and through the TSF will be controlled.
- Describe how the conceptual cover design of the TSF will minimise AMD development, with reference to outcomes from existing, similar TSF cover configurations, in similar climatic settings.
- Demonstrate that proposed cover designs of TSF South will:
    - Provide the foundation required to be able to create a self-sustaining, local providence, weed-free vegetation cover.
    - Be successful in the local climate, and able to withstand extreme rainfall, heat and drought;
    - Present low risk of damage from termite and root growth; and
    - Require minimal or no maintenance in the long term (post closure).

Protection, Management and Monitoring

- Describe selective handling / placement / further processing proposed for any tailings identified as having potential to generate AMD or contain other potential environmental contaminates.

- Detail mitigation measures available / proposed to manage any poor quality seepage from TSF South, both during operation and in the long term.
- Detail proposed contingency management and monitoring procedures which will reduce risk of impacts on local groundwater quality to a low level, for the short to long term.
    - Include consideration of aquifers accessed by bores from local properties and potentially impacting on health of the environment, aquatic ecosystems, local residents, livestock or local potable groundwater quality.
    - Include consideration of potential cumulative risks with seepage impacts on groundwater from Browns TSF.
- Demonstrate that identified risks associated with seepage, AMD generation or other water contamination will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low', in the planning and design phases, and that monitoring, reactive management and contingency actions will be in place.
- Indicate contingency arrangements including reporting protocols for dealing with both minor leakage and catastrophic failure of either tailings dam.
- Demonstrate that identified risks associated with design and construction of the TSF South cover will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low'.
- Describe monitoring programs and infrastructure proposed to detect manifestation of identified potential impacts, including contamination of water resources, and dust, from TSF South.
- Describe proposed monitoring of the TSF South cover performance (eg. appropriately sized lysimeters, etc), and reactive management measures which will ensure required outcomes will be met.
- Describe ongoing monitoring, and (contingency) management plans for the TSF South after Area 55 and Browns Oxide mining ceases.

7.1.4 Construction materials and quality control

Outcome

- Demonstrate that sufficient clays are available of appropriate quality, quantity and permeabilities to supply Project needs, and to meet all engineering design specifications for proposed mine infrastructure;
- Risks associated with construction of mine infrastructure and availability/supply of suitable construction materials (including clay) will be identified and addressed:
    - A high level of quality control will occur through all phases of selection of construction material and mine construction; and
    - Target (im)permeabilities of clay layers around key mine infrastructure containing PAF material will be comprehensively achieved.

Information Requirements

- Describe clay requirements for individual structures (such as to supply lining material for water holding structures, lining of PAF cells, or other AMD

retention/prevention structures). Indicate target areas requiring cover / lining, and target depths in each case.

- Describe total quantities of clay required relative to available reserves.
- Describe target permeabilities of clays which would in theory achieve sufficient restriction of water and oxygen transmission, to minimise AMD inside PAF cells.
- Demonstrate permeability ranges achievable in practice from available clays, through representative field trials. Provide permeabilities before and after treatment (wetting, compression, etc).

Potential Impacts

- Identify potential environmental risks with regard to being able to source sufficient quantities and qualities of clay.
- Identify and discuss likelihood of risks associated with achievement / non-achievement of target clay permeabilities in practice.
- Describe risks with regard to achieving on-site construction quality (i.e. design quality) of low-permeability layers required around mine infrastructure (TSF South, WRS, ROM, etc) containing PAF material.

Protection, Management and Monitoring

- Describe where sufficient quantity and quality of clay will be sourced from to supply Project needs. Identify contingency management approach if:
    - Insufficient clay is available locally for Project needs; or
    - If target permeability is not available, in sufficient quantities.
- Demonstrate that identified risks associated with achieving target (im)permeabilities of clay layers around key mine infrastructure containing PAF material, will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low'.
- Describe proposed management, monitoring, reactive management and contingency actions that will ensure quality control in construction of impermeable layers around mine infrastructure, so proposed design specifications are met.

7.2 Risks to water resources

Key Risk

- Contamination of groundwater and surface water resources, affecting potable and agricultural water supplies, with potential to impact on downstream riparian and aquatic ecosystems, Northern Quoll habitat, as well as on residents and livestock reliant on water drawn from local creeks

Environmental Objective

- To ensure that groundwater and 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.

Outcome

- Demonstrate that potable and agricultural surface and groundwater quality will not be adversely impacted and ecological health will be protected.
- Demonstrate that potable and agricultural surface and groundwater supply will not be adversely impacted in the short to long term and environmental flows will be maintained.

Contamination of groundwater and surface water resources has been identified as a key risk. Groundwater resources in the area include dolomitic aquifers, which represent the principal potable water supply for local properties. Groundwater risks from TSF South may be cumulative to any risk of legacy groundwater contamination already posed by the existing Browns TSF.

Pit dewatering by the Area 55 and Browns projects has potential to lower groundwater levels in the area in the long term, and impact on bores on nearby properties.

Groundwater drawdown, alteration of surface water flows, sedimentation and AMD contamination of local creeks has potential to impact on downstream riparian and aquatic ecosystems, as well as residents and livestock reliant on water drawn from local creeks.

7.2.1 Groundwater

Outcome

- Best practice environmental management of the mine will be demonstrated by managing the risk of degradation of groundwater quality such that a residual risk rating of 'Low' is achieved.
- HAR will demonstrate the short and long term continuity of potable water supply in acceptable quantities to any local properties and/or ecosystems affected by Project -related lowering of the local water table.

7.2.1.1 Information Requirements

Information requirements to inform this section are detailed in Section 6.

Potential Impacts

- Identify sensitive receptors potentially affected by groundwater impacts from the Project in the short to long term, including current and future bore users, surface water users; riparian and aquatic habitats, groundwater dependent ecosystems and fauna dependent (indirectly or directly) on groundwater.
- Describe risks from the Area 55 Oxide Project and (potentially cumulative) risks from Browns TSF to local shared groundwater resources, and its users. Consider all identified sensitive receptors.
- Estimate impacts of proposed activities on local and regional groundwater depths, flow rates and flow directions, and seasonal flow characteristics in local spring-fed surface waterways and water bodies. Estimate impacts during mining / dewatering, and long-term legacy impacts.

- Identify any groundwater mounding potentially associated with TSF South, the Waste Rock Storages, and Browns TSF. Analyse and discuss the effect of mounding on:
    - Geochemical processes within the facilities;
    - Seepage quality and quantity; and
    - Connectivity and exchange of solutes between storage contents and local aquifers.
- Assess and describe any potential for groundwater linkages and pollution pathways (including AMD, radionuclides or any other chemicals or pollutants) between the Project area and:
    - the catchment of the Darwin River Dam; and
    - the Coomalie dolomite aquifer accessed by bores for the Batchelor town water supply.

Modelling

- Model the drawdown cone predicted to occur over time as a result of groundwater extraction and pit dewatering for the Project. Consider potentially cumulative impacts with existing and future drawdown from the Browns Oxide Project. Include the following scenarios:
    - The natural state (i.e. the absence of any drawdown effects associated with dewatering and mining activities);
    - Currentlcondition (i.e. including any impacts from Browns Oxide Project, if relevant); and
    - Additional impact of proposed project.
- Predict the time required for recovery of water table levels to occur, after mining-related water extraction ceases. Describe expected changes from baseline conditions through to conditions long-term, post-closure
- Predict sustainable extraction rates for Project-related bores, accounting for expected inter-annual rainfall variability for the Project area.
- Predict expected drawdown levels over time for identified sensitive receptors (to groundwater impacts).
- Predict impacts upon flow rates and flow periods of local springs, creeks and rivers downstream of the Area 55 Pit.
- Predict changes expected to occur over time to the flow domain due to the Project's water use– include predicted changes to: elevation of the water table, lateral and vertical hydraulic gradients, groundwater flow directions and flow velocities, discharge points and creek flows.
- Undertake quantitative 3D solute transport modelling to predict groundwater changes (quality and quantities) from TSF South, Browns TSF, waste rock storages and the pit(s):
    - Model for periods such as 1, 5, 10, 20, 100 and 1000 years, where modelling can be achieved with an acceptable degree of uncertainty. If results indicate ongoing impacts, modelling should be applied to their future extent temporally and spatially.

    - An appropriate minimum radius should be identified, modelled, and incorporated to identify any potential connections with potable aquifers accessed by local properties, and the catchment of the Darwin River Dam. Describe and map impacts from TSF / WRS seepage on groundwater quality to depict gradients of impact on water resources.
    - Model for the "return to pit" option.
- Model the effects that the proposed TSF may have on the groundwater when the facility is filled to capacity. Predict:
    - Degree of groundwater mounding; and
    - Nearby groundwater expression at surface due to overlying tailings pressures.
- Validate results where possible with existing data, and discuss confidence limits of the model outputs.

Protection, Management and Monitoring

- Describe and detail proposed designs, management, monitoring and contingency plans to address potential identified risks to water resources and/or sensitive receptors (to groundwater impacts).
- Describe proposed monitoring and management of groundwater levels to protect groundwater dependent ecosystems, and Northern Quoll habitat from impacts from lowering of the water table. Demonstrate that proposed management measures will reduce risks to these habitats from groundwater drawdown, to achieve a risk rating of 'low'.
- Demonstrate that sufficient monitoring bores are in place to provide statistically valid data for groundwater models around key mine infrastructure, and with respect to the site's hydro-geological features, areas of significant or sensitive habitat, and any areas of cultural significance.
    - Groundwater bores are to be installed by a NT licensed bore driller, to ensure separation of aquifers can be accurately determined;
    - The installation and location of Environmental Monitoring Bores are to be advised by a qualified hydrogeologist or in consultation with the Water Resources Branch of the Department of Natural Resources, Environment, the Arts and Sport (NRETAS), to ensure their location will be appropriate to validating the groundwater model.
- Where discharge or seepage to groundwater is expected from the Project, demonstrate that the treatments and discharge regimes will be adequate to ensure water quality will be maintained at the edge of the mining lease prior to mine-closure, and including at the Project site after mine closure and for the long term.
- Describe reactive management measurement proposed if significant contaminant leaks are detected, that will protect sensitive receptors and (ground) water resources.

7.2.2 Surface Water

Outcome

- Surface water resources, and existing uses and benefits of these resources will be identified and risks from mine-related impacts will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low'.
- HAR will demonstrate the short and long term maintenance of surface water quality.

Information Requirements

Information requirements to inform this section are detailed in Section 6.

Potential Impacts

- Identify and discuss aspects of the Project with potential to impact on surface water resources. Include consideration of risks from:
    - Management of stormwater flows, flooding, erosion and sedimentation;
    - Disruption of natural flow paths;
    - Hydrocarbon and chemical pollution;
    - Acidic and/or metalliferous contaminant discharges /seepage; and
    - Drawdown of aquifers reducing supply for groundwater dependant ecosystems;
    - Altered surface water flow patterns due to surface water management on site;
    - Diversion, reduction or loss of flows to sensitive receptors.
- Consider risks to:
    - Catchments, existing surface drainage patterns, flows (including flood contours) and discharge rates.
    - Water quality.
    - Beneficial uses:
        - Describe existing uses and benefits derived from baseline flows in local water ways and wetlands
        - Identify and discuss risks and likelihood of impacts to existing uses and benefits of local waterways and wetlands.
        - Identified sensitive receptors (of impacts to surface water systems); and
        - Downstream areas, users and habitats.
- Estimate how HAR's currently proposed and potential future mining will affect local surface water flows, flow rates and periods of flow. Estimate impacts during mining / dewatering, and long term legacy impacts.

Protection, Management and Monitoring

- Demonstrate that identified risks to surface water resources and existing uses of these resources from the Project will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low'.

- Describe proposed monitoring, reactive management and contingency actions that will provide ongoing protection of surface water resources, and existing uses of these resources.

7.3 Haul Road and Traffic

Key Risk

- Loss of flora and fauna species of conservation significance, in particular destruction of habit of the Northern quoll.
- Nuisance, human health impacts, visual amenity impacts and environmental harm caused by noise, light or dust due to the haul road and traffic.

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.
- To protect the amenity and health of nearby residents from noise, light and dust impacts resulting from activities associated with the proposal.
- To ensure that aesthetic values are considered and measures are adopted to reduce visual impacts on the landscape as low as reasonably practicable.

Outcome

- Risks associated with haul road design, alignment, construction and operation and traffic and transport networks, will be clearly and comprehensively identified, and subsequently avoided, mitigated or otherwise minimised to a low level.
- All roads will be constructed, operated and maintained so as not to create a nuisance from noise, light or dust.
- Control, monitoring and management measures will be implemented to avoid nuisance and environmental harm.

Information Requirements

- Information required to inform this section is detailed in Sections 5 and 6.

Potential Impacts

- 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;
- Identify and discuss risks associated with haul road alignment, construction and operation. Discuss associated risks of each alternative route configuration.
- Characterise sensitivities to identified haul road risks, and identify ranges of sensitivity of receptors associated with particular impact types, durations, timings and intensities. Consider as a minimum:

  - Modelling of haul truck and machinery noise and vibration;
  - Modelling of haul road dust dispersion;
  - Impacts on local residents, neighbours to haul roads, and road users, including early morning and late evening operations.
  - Impacts on sensitive habitats, sensitive species, native species, riparian habitats, threatened species, including loss of connectivity within regional wildlife passage corridors, fauna strikes, and weeds;
  - Sediment runoff, circum-neutral metalliferous drainage, downstream impacts; and
  - Vehicle accidents.
- 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;
  - Management of driver fatigue.
- Detail native vegetation clearing required, including:
  - Corridor width, with justification for clearing width required;
  - Total area to be cleared; and
  - Habitats to be impacted (type, area).
- Assess the impacts of all proposed construction and operational traffic on local and Territory roads and existing road users:
  - Predict changes to local traffic volumes and resulting safety and amenity issues;
  - Detail the change in user/traffic numbers during both construction and operational phases of the Project; and

Protection, Management and Monitoring

- Describe proposed buffers and other measures to protect sensitive habitats and sensitive receptors from haul road impacts.
- Demonstrate that identified risks associated with haul road alignment, construction and operation will be avoided, mitigated or otherwise minimised to a low level.
- Demonstrate that clearing and road widths impacting upon sensitive habitats will be minimised to practical limits.
- Demonstrate that identified risks associated with Project traffic and transport networks requirements will be avoided, mitigated or otherwise minimised to a low level.
- Develop a traffic management plan that describes proposed monitoring, reactive management and contingency actions that will ensure objectives and required outcomes will be met.

7.4 Land Clearing and Biodiversity

Key Risk

- Loss of flora and fauna species of conservation significance, in particular destruction of habit of the Northern quoll.

Environmental Objective

- 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.

Outcome

- Native flora and fauna species, and significant habitat types, particularly those of conservation significance, will be identified, and ultimately protected from impacts from the Project.
- Surveys of flora and fauna species, and proposed clearing of native vegetation are to be undertaken in accordance with relevant NT Guidelines.
- Species of traditional Aboriginal cultural significance will be identified and sacred species protected from impacts from the Project.

Information Requirements

Information required to inform this section is detailed in Section 6.

Potential Impacts

- Identify and discuss risks from the Project to:
    - Sensitive habitats, including riparian areas, vine thickets, monsoon forests, and downstream aquatic ecosystems. Characterise the sensitivity of identified habitats;
    - Native species, communities and habitats of local, regional or national significance and habitats supporting species of conservation significance;
    - Wildlife transit corridors; and
    - Species of traditional Aboriginal cultural significance.
- Discuss the ability of identified species of conservation significance to withstand activities associated with the construction and operation of the proposed Area 55 Oxide Project.
- 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 2010).
- Identify and discuss risks of introducing and/or increasing abundance of weeds, and/or feral animals within the Project area.
- Describe potential residual impacts of the Project following implementation of mitigation measures and rehabilitation.

Protection, Management and Monitoring

- Demonstrate that appropriate flora and fauna survey methodology has been employed, to define species present on the Project site.
- Demonstrate that identified risks will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low', with regard to:
    - Proposed land clearing;
    - Sensitive habitats;
    - Species of conservation significance. Individual Management Plans should be presented for each listed threatened species;
    - Wildlife transit corridors;
    - Species sacred to traditional owners of the area;
    - Weeds; and
    - Feral animals.
- Describe and discuss any proposed transplantation or translocation programs for native fauna species, or flora species of conservation significance likely to be impacted by the Project, such as prior to clearing of native vegetation.
- Describe proposed management to avoid, minimise and mitigate impacts on native fauna from local traffic and haul route impacts, including road strikes.
- Describe proposed monitoring of groundwater levels and vegetation communities to ensure any Northern Quoll habitat is not affected by the potential lowering of the water table.

Guidance on identifying appropriate biodiversity offsets under the EPBC Act is available at: http://www.environment.gov.au/epbc/publications/draft-environmental-offsets.html. The draft NT Environmental Offsets Policy is available at: http://www.greeningnt.nt.gov.au/climate/environmental_offsets.html. Also see section 9, below.

7.5 Impacts on Local Community

Key Risk

- Disturbance and health impacts on neighbouring residents, including noise, vibration, dust, light, visual, radiation exposure and related impacts.

Environmental Objective

- To protect the amenity of nearby residents from noise and vibration impacts resulting from activities associated with the project by ensuring levels meet statutory requirements and acceptable standards.
- To ensure that radiological impacts to the public and the environment are kept as low as reasonably achievable and comply with acceptable standards.
- To avoid or manage potential impacts from light overspill and comply with acceptable standards.
- To ensure that aesthetic values are considered and measures are adopted to reduce visual impacts on the landscape as low as reasonably practicable.

Outcome

- Risks to nearby properties and their residents, including risk of reduction in neighbours' ability to enjoy the natural amenity of their properties, will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low'.
- All infrastructure will be constructed, operated and maintained so as not to create an environmental nuisance from noise, vibration, light, dust or other particulates. Emissions will be controlled, monitored and managed so as not to cause nuisance.

7.5.1 Impacts on neighbouring properties

Information Requirements

Information required to inform this section is detailed in Section 6.

Potential Impacts

- Describe expected noise, vibration, light and dust levels associated with Project construction and operation, including timing and duration:
    - Quantify and characterise expected emissions;
    - Compare predicted levels to ambient levels, sensitivity of receptors and nominated performance indicators and standards;
    - Present modelling studies to predict level and extent of noise, vibration, light and dust levels at sites of sensitive receptors. Compare to ambient conditions, sensitivity thresholds of receptors and nominated performance indicators and standards; and
    - Describe seasonal variations.
- Identify which mine activities or equipment with potential to emit noise, vibration, light or dust are proposed to operate within restricted times of operation (define these), and which are proposed to operate continuously.
- Identify the proximity of neighbours to operation of vehicles and equipment, including lights, dewatering pumps, generators, etc. within periods of heightened sensitivity (eg. night time, weekends, etc).
- Compare noise, dust, light and traffic impacts, and other identified risks to sensitive receptors (including neighbours), from alternative Project:
    - Waste rock storage / noise bund configurations;
    - Haul routes; and
    - Temporary ore storage options.
- Identify and discuss risks to livestock potentially impacted by noise, vibration, light or dust to be produced from the Project.
- Identify and discuss options and HAR's proposals for maximising future community (eg. recreational) and biodiversity benefits from the legacy pits and surrounds, and optimising future pit water quality.

Protection, Management and Monitoring

- Identify and describe proposed mitigation and management measures and alternatives for avoiding / reducing / controlling identified risks from noise,

vibration, light and dust. Demonstrate through noise, light and dust modelling the expected effectiveness of landform (and any other proposed) mitigation measures.

- Identify appropriate day, evening and night-time noise, light and vibration limits for the various components of the Project in the context of relevant standards, Guidelines, and with regard to the local sensitivities identified above.
- Outline an appropriate monitoring and (community) reporting program based on the impact assessment. Identify thresholds of acceptability of noise, vibration and dust levels to sensitive receptors, and proposed reactive management measures to be implemented if thresholds are exceeded.
- Describe (within an Environmental Management Plan), HAR's proposed contingency management plans and commitments for individual neighbouring properties, to address identified risks from the Project specific to each property. Include as a minimum consideration of risks of:
    - Loss of groundwater supply to neighbouring properties' bores, as a result of the Project; and
    - Causing environmental nuisance or other impacts to local residents, livestock and neighbouring properties.

7.5.2 Social, Economic and Cultural impacts

Outcome

- Identified risks to sites of sacred, cultural, historical or social interest from the Project will be avoided, mitigated or otherwise minimised to achieve a residual risk rating of 'Low'.
- Employment opportunities from the Project for traditional owners of the area and the local community are maximised.

Information Requirements

- Outline HAR's stakeholder consultations to date, with regard to the proposed Area 55 Oxide Project. Provide details of topics discussed, and concerns expressed, issues raised and commitments made by HAR.
- Community liaison and consultation is to include identification of, and ongoing consultation with, stakeholder groups to ensure the full range of community viewpoints are sought. HAR is to outline its current and 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.
- Describe sites within or downstream of the Project area of historical, archaeological, cultural or Indigenous significance.
- 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.
- Identify proposed and potential employment opportunities from the Project for traditional owners of the area, and the local community. Present details such as:

- Number of traineeships to be made available;
- Types of small businesses that will be required and promoted; and
- How business capacity-building will be facilitated.

Potential Impacts

- Describe sites of sacred, cultural, historical or social interest which may be impacted during construction or operation by the Project.
- Characterise sensitivities of these sites, and identify risks from infrastructure, construction and operation of the Project.
- Identify and discuss HAR's expected short and long term impacts upon the social and cultural environments.

Protection, Management and Monitoring

- Demonstrate that identified risks to sites of sites of sacred, cultural, historical or social interest from the Project will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low'.
- Identify and discuss HAR's commitments to potential offsets to any (short and long term) impacts upon social and cultural environments.
- Demonstrate that employment opportunities from the Project for traditional owners of the area and the local community are being maximised.

7.5.3 Visual and Community Amenity

Outcome

- Potential impacts to visual amenity and community amenity of the Project area will be avoided, minimised or offset where appropriate.
- HAR's planning and rehabilitation of the legacy pit and surrounds prior to closure will aim to maximise future community (eg. recreational) and biodiversity benefits from any legacy pit / pit lake and surrounds, and optimise future pit water quality.

Information Requirements

- Describe and discuss the current general amenity of the Project area.
- Describe and discuss the current visual amenity of the Project area.

Potential Impacts

- Describe proposed changes to the pre-mining and current levels of community amenity of the Project area. Identify and discuss changes to:
    - Levels of access available to the general public;
    - Levels of access available to traditional owners, including to sites of cultural significance; and
    - Current uses and benefits (other than mining) of the Project area.
- Identify and discuss the risk of proposed restriction of access to mine areas impacting on community amenity of the local area post-closure.

- Identify and discuss risks to the visual amenity of the Project area from the Project. Describe the proposed external appearance of Project infrastructure from common public viewing points:
    - Present virtual images / artists impressions/ computer generated photo montages of the proposed final Project landforms (i.e. WRS, TSF, Pit, roads, etc) from the perspective of agreed viewing points;
    - Describe dimensions, heights, shapes and landforms of the Project Infrastructure, including the WRS(s), TSF, Pit , etc.;
    - Describe / illustrate and discuss residual effects on visual amenity of projected post-closure appearance of residual infrastructure.
    - Describe proposed external covers, colour, vegetation cover, and the potential of post-closure covers to form a substrate for settlement by fauna and flora;
    - Discuss altered visual amenity of the area of the Project during construction and mining phases, and post mining after rehabilitation has occurred. Consider the context of characteristics of the surrounding landscape, and the extent the proposed WRS design will / will not merge with the existing visual landscape.
- Describe any proposed bunds adjacent to neighbouring properties, and any proposed vegetation cover. Describe target time frames and proposed methods to establish an effective vegetation cover.
- Discuss risks to neighbours associated with the bund construction, vegetation and operation.

Protection, Management and Monitoring

- Demonstrate that identified risks to community amenity from proposed restriction of access to mine areas will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low'.
- Demonstrate that long term community benefits in terms of amenity will be maximised in Project rehabilitation and closure planning.
- Describe alternatives and proposed methods to minimise impacts to visual amenity from the Project, in the short to long term, such as measures to screen the Project from public view.
- Demonstrate that future community (eg. recreational) and biodiversity benefits from the legacy pits and surrounds will be maximised, and future pit water quality will be optimised.
- Demonstrate that identified risks, with regard to changes to the visual amenity of the Project area will be avoided, mitigated or otherwise minimised to achieve a risk rating of 'low'.
- Where residual detriment is identified, potential offsets to loss of visual amenity or community amenity of the Project area, in the short and/or long term.
- Describe proposed monitoring, (community) reporting and reactive management that will ensure outcomes will be met.

7.5.4 Radiation exposure

Outcome

- Risks of harmful radiation exposure to workers, the public or surrounding ecosystems as a result of the Project will achieve a residual risk rating of 'Low'.

Information Requirements

- Define the expected radioactive constituents and concentration range / distribution in all types of material to be mined, and how any identified constituents and concentrations will be affected by proposed handling and treatments.
- Describe standard levels which define regulatory thresholds for management of radioactive material, with reference to the full ranges of material to be mined.
- Describe how assay sampling in the pit is to include sampling for radioactive elements. Assay results should be monitored for radioactive anomalies on an ongoing basis.
- Specify clear criteria for identifying anomalies sampling for radioactive elements.
- Describe any findings relevant to the Area 55 Project of radiological surveys carried out at the Browns Oxide site, with particular focus upon the processing plant and TSF, since the mine became operational.
- Refer to Section 8.3 for notes on regulatory requirements.

Potential Impacts

- Describe any pathways and potential doses of radiation for employees, members of the public or the surrounding ecosystems.
- Consider: radon gas, radionuclides and their decay products, radioactive particles in dust, gamma radiation, including exposure from ore transfer and processing, accumulation of scales in the processing plant, the waste rock storage(s), TSF South, transportation and storage associated with the Project.
- It is recommended that HAR consult with the Australian Nuclear Science and Technology Organisation (ANSTO) or an organisation with similar expertise in order to appropriately assess Area 55 radiation sources and pathways.

Protection, Management and Monitoring

- Demonstrate that proposed management and monitoring of any identified radiation risks will effectively remove risk or mitigate to achieve a risk rating of 'low'.
- Describe HAR's proposed radiation management and monitoring in a Radiation Management Plan (Environmental Management Plan) for the Project (including ore processing and transport).
- Demonstrate how compliance with relevant Territory and Federal legislation and codes of practice will be achieved.

7.6 Decommissioning and Rehabilitation

Key Risk

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

Environmental Objectives

- To ensure, as far as practicable, that rehabilitation achieves a stable and functioning landform which is consistent with the surrounding landscape and other environmental values.

Outcome

- Decommissioning and rehabilitation plans will optimise environmental and cultural outcomes from the Project.

Information Requirements

- Outline final rehabilitation, revegetation and closure plans for all aspects of the Project on completion of mining on site.
- Based upon consultation with Traditional Owner groups of the area, rehabilitation and closure plans must incorporate recognition and consideration of traditional Aboriginal knowledge, cultural values, land management systems and significance of particular species.
- Based upon landscape evolution modelling, demonstrate that legacy mine structures will be stable in the long term.

Potential Impacts

- Identify and discuss risks associated with final rehabilitation, revegetation and closure of the Project.

Protection, Management and Monitoring

- Discuss how post-closure amenity, biodiversity and benefits to the local community from the Project area will be maximised by HAR.
- Describe how community interests and Traditional Aboriginal cultural values will be incorporated into final rehabilitation and closure plans for the Project.
- Demonstrate that identified risks associated with rehabilitation, revegetation and closure from the Project will be avoided, mitigated or otherwise minimised to a low level.
- Describe ongoing monitoring, and (contingency) management plans for the TSF South after Area 55 and Browns Oxide mining ceases.

7.7 Greenhouse Gas Emissions

Environmental Objectives

- To minimise emissions to levels as low as practicable on an on-going basis and consider offsets to further reduce cumulative emissions.

Outcome

- Greenhouse gas emissions from the Project will be minimised and/or offset.

Information Requirements

- Define projected increases in the level of greenhouse gas emissions as a result of the Project (including greenhouse gas release from land clearing, plant emissions, fuel use, ore processing), and compare this estimate with that from existing operations.
- Calculate projected greenhouse gas emissions as a result of land clearing for, and construction of the Project.
- Describe measures to be taken to minimise / offset greenhouse gas emissions from the Project.
- Refer to Sections 9 for further information regard NT policy on gas emissions and offsets.

8 Project Environmental Management

Specific safeguards and controls identified through the risk assessment process which will be employed to prevent, manage and monitor environmental impacts are to be detailed in a comprehensive, overarching Mine Operations and Mine Closure Plan (MOMCP) for the Project, containing all component Environment Management Plans (EMPs). The MOMCP should be strategic, describing a framework for environmental management for construction, operational and decommissioning phases of the Project. As much detail as is practicable should be provided to enable adequate assessment during the public exhibition phase. Where possible, specific management policies, practices and procedures should be included in the draft MOMCP Best practice technologies for hazard reduction should be detailed. The MOMCP and individual EMPs would be finalised at the conclusion of the assessment, taking into consideration comments on the EIS and incorporating the Assessment Report recommendations and conclusions.

The draft MOMCP should:

- Define the management structure of both the construction and operational phases and its relationship to the environmental management of the site;
- Describe the proposed measures to minimise adverse impacts (including those mentioned in Section 7) and the effectiveness of these safeguards;
- Provide performance indicators by which all anticipated and potential impacts can be measured;
- Be fully costed;
- Describe best practice technologies for hazard reduction;
- Include identification of responsibilities;
- Describe how employees and visitors will be made aware of environmental responsibilities and safeguards (including an induction process);

- Describe systems and processes to ensure subcontractor environmental conformance – including inductions and incident management - with regard to ensuring environmental compliance;
- Describe monitoring programs to allow early detection of adverse impacts;
- Describe how monitoring will be able to determine the differences between predicted and actual impacts;
- Describe remedial actions for any impacts that were not originally predicted;
- Include 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 report;
- Provide for the periodic review of the management plan itself;
- Include the following EMPs, as a minimum:
    - Soil and Land Management (Erosion and Sediment Control Plan);
    - Water Management;
    - Tailings Management;
    - Waste Rock Management;
    - Mine Treatment Processes Risk Management;
    - Hazardous Material Management;
    - Radiation Management;
    - Fauna Management;
    - Flora Management;
    - Weeds Invasive Species Management;
    - Socio-Economic Management;
    - Management of Impacts to Neighbouring Properties;
    - Archaeology and Cultural Heritage Management;
    - Air Emissions and Dust Management (including greenhouse gas emissions);
    - Traffic and Transport Management;
    - Noise, Vibration and Light Management;
    - Fire Management;
    - Mosquito and Biting Insect Management; and
    - Decommissioning, Rehabilitation and Closure Management.

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

9 Regulatory and Policy Notes

The following legislation may apply to the Project:

9.1 Commonwealth Legislation:

- *Aboriginal Land Rights (Northern Territory) Act*
- *Environment Protection and Biodiversity Conservation Act 1999 (Cth);*
- *Native Title Act 1993*

9.2 Northern Territory Legislation

- *Aboriginal Land Act.*
- *Bushfires Act.*
- *Control of Roads Act.*
- *Dangerous Goods (Road and Rail Transport) Act.*
- *Dangerous Goods Act.*
- *Environmental Assessment Act.*
- *Environmental Assessment Administrative Procedures*
- *Environmental Offences and Penalties Act.*
- *Heritage Conservation Act.*
- *Mining Act*
- *Mining Management Act*
- *Miscellaneous Acts Amendment (Aboriginal Community Living Areas) Act.*
- *Northern Territory Aboriginal Sacred Sites Act.*
- *Planning Act.*
- *Radioactive Ores and Concentrates (Packaging and Transport) Act*
- *Radiation Protection Act*
- *Soil Conservation and Land Utilisation Act.*
- *Territory Parks and Wildlife Conservation Act.*
- *Traffic Act.*
- *Waste Management and Pollution Control Act.*
- *Water Act*
- *Weeds Management Act.*
- *Workplace Health and Safety Act.*

9.3 Radiation

The radiation hazards associated with the handling, transport or storage of significant quantities of radioactive samples off-lease are regulated in the Northern Territory under the *Radioactive Ores and Concentrates (Packaging and Transport) Act*. The health and safety of all workers is regulated under the *Workplace Health and Safety Act*. Both of these Acts are administered by the Department of Justice (NT Worksafe).

The *Radiation Protection Act* applies to the control and use of all radiation sources (radiation apparatus or radioactive material), excluding a mining activity under *the Mining Management Act* in relation to uranium ores or uranium oxide (Radiation Protection Act Division 4, 9(a)).

In addition to the *Code of Practice on Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing* (2005), the following Commonwealth Codes of Practice may apply:

- *Code of Practice for the Transport of Radioactive Material* (2008); and
- *Code of Practice for the Near Surface Disposal of Radioactive Waste in Australia* (1992).

9.4 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 (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 associated with projected future climatic conditions under the Northern Territory *Environmental Assessment Act*.

9.5 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 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.

9.6 Public health premises and food premises

If shops or accommodation facilities are to be provided on the Project site, Northern Territory Department of Health 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.

9.7 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).*

9.8 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, DHF 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 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.nt.gov.au/nreta/environment/licences/ guides.html#water.

9.9 Solid waste storage and disposal

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

9.10 Mosquito breeding

Management should conform to applicable sections of the DHF Guideline: *Guidelines for Preventing Mosquito Breeding Sites Associated with Mining Sites*. Available at: www.health.nt.gov.au/Medical_Entomology/Publications/Development_Guidelines/index.aspx. A desktop investigation should be conducted to determine mosquito breeding sites nearby in consultation with Medical Entomology of the NT Department of Health.

9.11 Biodiversity and natural resource guidelines

NRETAS has developed standardised methodologies for surveying terrestrial vertebrate fauna and flora in the Northern Territory (available upon request). Proponents should use these methodologies when conducting fauna and flora surveys or a suitable alternative such as www.environment.gov.au/ epbc/guidelines-policies.html.

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.

9.12 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: http://www.nt.gov.au/ nreta/natres/soil/ management/index.html.

9.13 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 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 is not planned for decades; however it is important to demonstrate that ecologically sustainable closure can be achieved. The West Australian Environment Protection Authority and Department of Mines and Petroleum have mine closure guidelines that could be used in the formulation of a closure plan at http://edit.epa.wa.gov.au/EPADocLib/Guidelines-for-preparing-mine-closure-plans-210611.pdf.

10 References

Commonwealth of Australia (1992) National Strategy for Ecologically Sustainable Development. Commonwealth of Australia. Available at: http://www.environment.gov.au/about/esd/publications/strategy/index.html

HAR (2009) *Notice of Intent: Area 55 Oxide Project*, by HNC (Australia) Resources Pty Ltd. [HAR] and Coffey Environments Pty Ltd. Document Version: CR 9029_1_NOI_v3; Final for government; 18 December 2009. Parap N.T. Australia. Available at: http://www.nt.gov.au/nreta/environment/assessment/register/hnc_resources/index.html

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

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RET (2011) *Best Practice Environmental Management in the Mining Industry* (Webpage). Australian Government Department of Resources Energy and Tourism (RET). Available at: http://www.ret.gov.au/resources/resources_programs/lpsdp/best_prac/Pages/default.aspxAccessed: 12 July 2011.

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