

**GUIDELINES FOR THE PREPARATION OF AN ENVIRONMENTAL IMPACT
STATEMENT**

**SHERWIN CREEK AND HODGSON DOWNS
IRON ORE PROJECT**

SHERWIN IRON LIMITED

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1 INTRODUCTION

Sherwin Iron Limited proposes to construct and operate an iron ore mine within the Roper River region, located 120 km east-south-east of Mataranka and 475 km southeast of Darwin, NT.

The Project involves the development of open pits at Sherwin Creek and Hodgson Downs deposits, haul roads from each mining area to a proposed siding on the Adelaide-Darwin rail line, ancillary infrastructure (workshops etc), internal access roads and an accommodation village.

Direct Shipping Ore would be transported via haul road, each approximately 130km long, to the Darwin Railway near Mataranka and transported by train to the Darwin Port Facility for export.

The Project proposal was referred by the Northern Territory (NT) Department of Mines and Energy (DME) on 30 November 2012 to the NT EPA, for environmental assessment.

On 18 December 2012, the then Deputy Chief Executive of the NT EPA under delegated authority determined that the Project required formal assessment under the NT *Environmental Assessment Act* (EA Act), at the level of an Environmental Impact Statement (EIS). Issues of concern contributing to the decision included:

- the size and scale of the proposal;
- the potential impacts on biodiversity, including listed flora and fauna, from land clearing activities and weed incursion as a result of the development;
- uncertainties regarding in-pit rejects disposal and rehabilitation of the mine areas;
- the unknown potential for acid and metalliferous drainage;
- uncertainties associated with water resources and the potential impacts from the water supply dam;
- the potential adverse changes and disturbance to riparian corridor habitats, aquatic habitats and other currently unknown habitats from construction of the haul roads; and
- the potential social, cultural and economic impacts.

The Project was referred to the Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) and, on 8 April 2013, was determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The proposed action has the potential to have a significant impact on the following matters of National Environmental Significance (NES) that are protected under Part 3 of the EPBC Act:

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

The proposal is being assessed by accredited assessment under the NT *Environmental Assessment Act*.

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

2 GENERAL ADVICE ON EIS

2.1 General content

The EIS should be a stand-alone document. It should contain sufficient information to avoid the need to search out previous or additional, unattached reports.

The EIS should enable interested stakeholders and the NT EPA to understand the environmental consequences of the proposed development. Information provided in the EIS should be objective, clear, succinct, and easily understood by the general reader. Maps (using an appropriate scale, resolution and clarity), plans, diagrams and other descriptive detail should be included. Technical jargon should be avoided wherever possible. Cross-referencing should be used to avoid unnecessary duplication of text.

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

Information materials summarising and highlighting risks of the project should be provided in a culturally appropriate format and language, where relevant.

2.2 Format and style

The EIS should be produced on A4 size paper capable of being photocopied, with any maps, diagrams or plans on A4 or A3 size paper, and in colour, if possible.

The EIS should comprise of three elements:

1. Executive summary

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

2. Main text of the document

The main text of the EIS should include a list of abbreviations, a glossary to define technical terms, acronyms and abbreviations, and colloquialisms. The document should consist of a series of chapters detailing the level of significance of the expected and potential impacts on the environment from the project.

3. Appendices

The appendices must include detailed technical information, studies or investigations necessary to support the main text that can be made publicly available, including:

- A table listing how these Guidelines have been addressed in the EIS, cross-referenced to chapters, page numbers and/or appendices;
- An outline of the relevant legislation, codes, standards and guidelines applicable to the project;
- A list of persons and agencies consulted during the EIS;
- The names of, and work done by, the persons involved in preparing the EIS;
- The qualifications and experience of the people involved in work contributing to the EIS;
- A table listing commitments made by the Proponent; and

- Detailed technical information, studies or investigations necessary to support the main text.

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

2.3 Administration

The Proponent should lodge ten, bound, hard copies and an electronic (Adobe PDF format) copy of the EIS with the NT EPA and two bound hardcopies with the Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPaC). The electronic copies should be provided both as a single file of the entire document and separate files of the document components. Additionally, a Microsoft Word copy of the EIS should be provided to facilitate the production of the Environmental Assessment Report.

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

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

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

Please note that the NT EPA requires the EIS document and a draft of the advertisement at least one week prior to advertising the draft EIS, to arrange web upload of the document and review and comment on advertising text.

2.4 Public Exhibition

The EIS should be made available for public review at:

- NT Environment Protection Authority, 2nd Floor, Darwin Plaza, 41 Smith Street Mall, Darwin;
- Mines and Energy Information Centre, Department of Mines and Energy, 3rd Floor, Paspalis Centrepoint, 48 Smith Street Mall, Darwin;
- Borroloola Community Government Council Building;
- Roper Gulf Shire office at Katherine (29 Crawford St);
- Northern Land Council, 45 Mitchell St, Darwin;
- The Australian Government Department of Sustainability, Environment, Water, Population and Communities Library, John Gorton Building, Parkes, Canberra;
- Northern Territory Library (NTL), Parliament House, Darwin.

The EIS exhibition period should not occur in late December or January in any year to ensure optimal opportunity for public and Government viewing of the EIS document. Additional time will be added to the EIS exhibition period if the EIS exhibition overlaps any Christmas and January periods.

3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1 General information

Provide the background and context of the proposal including:

- The title of the Project;
- The full name and postal address of the Proponent;
- An explanation of the objectives, benefits and justification for the proposal;
- The proposal's location in the region and its proximity to landmark features, sites of cultural/social significance, regional community centres, and sensitive environments such as major waterways, significant groundwater resources, significant natural features and conservation reserves;
- Climate and atmospheric characteristics relevant to the Project (e.g. air quality, seasonal temperatures, humidity, wind, evaporation, extreme events and rainfall).
- Terms of current agreement between the Northern Territory Government, Northern Land Council and the Proponent;
- Details of the Proponent's environmental record, including details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against the Proponent;
- The background to the development of the Project including discussion of previous environmental impact assessment and overview of any historic mining activities;
- Identification of areas under exploration which may be mined in future, or any other potential future activities being planned;
- How the project relates to any other proposals or actions (of which the Proponent should reasonably be aware) that have been or are being taken, or that have been approved in the region;
- National and Northern Territory standards, codes of practice and guidelines relevant to the Project;
- An overview of the schedule for the whole Project; and
- The current status of the project.

3.2 Description of the proposal

The EIS should identify all the processes and activities intended for the Sherwin Creek and Hodgson Downs Iron Ore Project and associated ancillary activities, during the life of the Project. As background to discussion of specific components, the following should be included:

An outline of the geology of the area including:

- A summary of the results of studies and surveys undertaken to identify the extent of the resource within the Project area;
- Geological properties of the Project site; and
- Characterisation of the ore to be mined and waste material associated with the ore body.
- Delineation of the Project footprint using detailed maps and diagrams, including:
 - Location of the resource/s to be explored, developed or mined;
 - All areas to be cleared or disturbed (including mine, haul roads, rail siding, product stockpiles and other infrastructure), both for the life of the Project and temporarily, prior to rehabilitation;
 - The location of any works to be undertaken, structures to be built or elements of the proposed Project. Where relevant this must include, but is not limited to, the location of the mine, water extraction points and storage facilities, roads, airfield,

- accommodation village, camp/s, hard stands, stockpiles (soil/ore/waste rock), haul roads, product export facilities; and
- Additionally, data should be provided to the NT EPA as importable GIS shape files (compatible with ArcMap) with relevant features and areas marked as polygons, lines and points, and any relevant geospatially referenced underlays also included.

3.2.1 Project components

Mine

Provide specific details on the following aspects of construction:

- Timetable for construction including staging of construction activities;
- Vegetation clearing and disposal of consequent plant matter;
- Methods of mine construction, volumes of materials required; and
- Plant and machinery required.

Provide specific details on the following;

- Mining types and methods, including the major equipment to be used in the various components of the operation;
- Handling/stockpiling of topsoil;
- Storage/disposal and use of mine waste material;
- Quantity of material to be mined annually, including any proposed ramping up of production or staging of development; and
- Timetable for operation of the mine including the targeting of individual mining areas and deposits.

Crushing circuit

Provide relevant operational information with respect to the crushing plant, including but not limited to:

- Indicative process flow-sheet;
- Quantities and characteristics of the product and reject streams on an annual basis;
- Chemicals to be used – inputs and waste handling (if relevant);
- Methods for handling and disposal of fines rejects;
- Handling and storage of product;
- Blending of product if required.

Road transport

- Provide a description of transport systems and methods to convey all site traffic (including materials, workers and product) to and from the site (both during construction and operation) including:
 - Type, size and number of vehicles required during all phases of the proposal;
 - The estimated volumes, tonnage, composition, origin and destination of traffic generated by the proposal;
 - Estimated times of travel;
 - Additional road infrastructure works required including site access and signage;
- Describe transport systems and methods to convey any product to proposed markets;

- Describe proposed haul roads, including length, width during construction, final width for operation, location, land requirements, tenure and acquisition requirements;
- Describe construction methods and timeframes for any proposed private and public haul roads;
- Consultation undertaken with relevant regulatory agencies; and
- Necessary approvals required.

Details of haul road construction should be provided, including:

- The preferred corridor alignments;
- Length, width, location, land requirements, tenure and acquisition requirements;
- Describe consultation undertaken with landowners, leaseholders and with relevant regulatory agencies and necessary approvals required;
- Vegetation clearing methods and disposal of plant matter following clearing;
- Provision of access, power, telecommunications, water supply and other infrastructure, if required;
- Location of campsites for construction crews;
- Source and extraction of construction inputs and materials, including water;
- Methods and timeframes for road construction, including river crossing techniques and identification of creeks and landforms that require specific construction methods (provide cross section diagram/s);
- Details of potential disruption to flows of waterways during construction and any diversion works required, including changes in creek morphology and hydrology of surface water systems due to haul road construction;
- Plant and machinery required;
- Ongoing provisions for road maintenance, including source and extraction of maintenance inputs and materials.

Identify proposed routes for transport of construction materials, personnel and product for the Project, including use of the existing road network.

Details of road construction / upgrade should be provided, including:

- Maximum width of road corridors required for construction;
- Plant and machinery required;
- Vegetation clearing methods and disposal of plant matter following clearing;
- Location of campsites for construction crews, if required;
- Sources of water;
- Sources of construction inputs and materials;
- Methods including creek crossing techniques where relevant (provide cross section diagram/s);
- Timeframes for road construction/upgrade; and
- Ongoing provisions for road maintenance, including source and extraction of maintenance inputs and materials.

Details of road use should be provided 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 frequency of Project vehicle use on public roads; and
- Hours of Operation.

Rail facility

Describe the proposed rail loading facility, including:

- Description of key plant and equipment, processes, inputs/outputs, capacities and raw materials used;
- Stockpiling requirements prior to loading;
- Requirements for construction of passing lanes (rail infrastructure); and
- Buildings required and provision of worker facilities including ablutions, sewerage and sewage treatment, drinking water sources and water treatment.

Facilities at Port of Darwin

Provide an overview of the facilities required at Port of Darwin, including:

- New infrastructure to be established;
- Access and upgrade requirements to existing infrastructure;
- Buildings required and provision of worker facilities including ablutions, sewerage and sewage treatment, drinking water sources and water treatment.
- Indicative process flow-sheets and materials handling requirements and balances – anticipated rates of inputs, wastes, and recycle streams (where relevant);
- Determine stockpiling requirements prior to loading.

Water

- Provide information on the quantity, quality, source (dam, surface water, groundwater), storage and infrastructure requirements for water use, including a water balance, for both construction and operational aspects of the Project. Include:
 - Dust suppression;
 - Drinking water;
 - Ablutions and sewage treatment;
 - Processing/ crushing plant;
 - Any wetting of ore materials prior to hauling;
 - Any other uses.
- Discuss any mine pit dewatering requirements including expected water quality, predicted volumes and discharge points;
- Provide information on the proportion of water that will be recycled and if treatment is required, provide details of waste water treatment systems and effluent disposal;
- Describe stormwater drainage systems proposed at the Project site and disposal or re-use arrangements;
- Identify any requirements for additional clean water in the Dry season and Wet season discharge options for excess contaminated water if applicable;

- Describe the proposed water storage dam including:
 - Location, size and area to be inundated;
 - Proposed design of dam wall, including identification of relevant safety standards and a description of how these will be achieved;
 - Creek flow volumes and seasonality, provision for flooding;
 - Expected fill time, extraction volumes, allowance for environmental flows; and
 - Provisions for fish passage.

Energy

- Determine Project energy requirements, including mining fleet fuels and electricity demand;
- Provide details of proposed power plant (type of equipment, fuel use);
- Provide details of energy infrastructure requirements, both on and off the site, including fuel storage.

Waste management

- Describe predicted waste streams, both industrial and domestic, including solid wastes at the mine site, camp site and other relevant locations;
- Provide an inventory of any hazardous wastes requiring management during the Project.

Workforce and accommodation

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

For the proposed mine camp, provide brief information on aspects of the facility such as:

- Proximity of the camp to work sites;
- Requirements for food preparation and storage;
- Whether the premises will be licensed and include alcohol storage facilities.

Ancillary infrastructure

- Provide construction and operational information regarding ancillary infrastructure, including, but not limited to:
 - Telecommunications;
 - Information on potentially hazardous materials to be used or produced and methods for storage, transport, handling, containment, disposal and emergency management of these materials (including fuel); and
 - Airfields to be used or upgraded.
- Detail any existing ancillary infrastructure that could be used by the Project.

Closure and rehabilitation

Discuss the various aspects of proposed progressive and final rehabilitation of disturbed areas, including:

- Proposed staging / timing;
- Infrastructure requirements for fines to be transported from the crushing circuit back to the pits;

- Conceptual pit design, stockpiling, and design of the mining pits to take fines rejects during the mining operation (e.g. bunding requirements);
- Soil profile reconstruction;
- Final landform design and any voids or landscape depressions to be left at cessation of mining;
- The rehabilitation techniques to be used and the final topographic and drainage morphology;
- The proposed revegetation program, with selection and collection of local native species e.g. native grasses and other vegetation;
- Other preparations required for successful rehabilitation (seed harvesting, seedling generation, etc.); and
- Water supply.

Describe mine closure plans including:

- Removal of plant, equipment, structures, hardstand and concrete footings, buildings, water storages, and methods proposed for stabilisation of affected areas;
- Reinstatement of creeks where diversion of creeks is proposed during operations; and
- Future land tenure arrangements.

3.3 Alternatives

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

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

Alternatives should include:

- Not proceeding with the proposal;
- Options for ore transport and export;
- Haul road options including the use of a single haul road for both areas or upgrade of the Roper Highway corridor;
- Site selection for mine components;
- Mining methods and management of wastes;
- Rehabilitation methods;
- Alternative sources of water;
- Alternatives to discharge of waste to waterways, if relevant;
- Energy sources for power generation;
- Alternative processes, methods and lifecycle; and
- Consideration of alternative environmental management measures for key risks/impacts.

Discussion should include:

- Sufficient detail to make clear why a particular alternative is preferred to another;

- Adverse and beneficial effects of alternatives at national, territory, regional and local levels;
- The comparison of short (whilst operational), medium (post closure) and long term (> 1000 years) advantages and disadvantages of the options; and
- A comparative description of the impacts of each alternative on the NES matters protected by controlling provisions of Part 3 of the EPBC Act for the action.

4 RISK ASSESSMENT

4.1 Risk assessment approach

The EIS should be undertaken with specific emphasis on the identification, analysis and treatment of risks through a whole-of-project risk assessment. Through this process, the EIS will:

- Acknowledge and discuss the full range of risks presented by the project, including those of special concern to the public;
- Quantify 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; and
- Explicitly identify those members of the community expected to accept residual risks and their consequences, 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 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. Levels of uncertainty preclude robust quantification of risk should be clearly acknowledged.

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

The risk assessment should be based on international best practice. Processes for risk management are formalised in Standards Australia / Standards New Zealand (e.g. AS/NZS ISO 31000:2009; HB 436:2004; HB 158:2010; HB 203:2012).

A number of key Project risks have been identified through a preliminary assessment of the Project. Each of the identified risks should be addressed by the Proponent 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 developed.

Environmental objectives, or overarching goals identifying environmental values to be protected, have been identified for each key risk.

4.2 Risks to human health and safety

Key risks

The EIS should include an assessment of the risks to human health and safety associated with the construction, operation, maintenance and decommissioning of the various components of the Project, and the storage and transport of materials to and from the work sites.

The aim of this assessment is to demonstrate that:

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

Information Requirements

Aspects to be discussed include:

- Safety risks for the workforce and the general public for the duration of the Project;
- Safety risks associated with the Project including:
 - Fire;
 - Infections disease (including from biting insects);
 - Extreme weather and climatic conditions;
 - Hazardous materials exposure; and
 - Safety risks to road users associated with increased traffic and use of the existing road networks.

Mitigation

Detailed human health, safety, emergency plans and response procedures need to be developed and provided in the final Environmental Management Plan as a contingency in the event of an emergency or accident. Responsibilities and liabilities in such an event should be described.

The hazard and risk analysis will identify critical areas that need to be addressed in management plans, monitoring programs, and contingency and emergency plans.

4.3 Risks to hydrology and water quality

Key Risks

Water quality may be impacted by spills to surface water and runoff containing acidic leachate, hazardous substances or elevated sediment concentrations;

Surface and groundwater volumes and flow patterns may be altered with potential impacts to riparian vegetation and groundwater dependent ecosystems.

The EIS should include a detailed assessment of the risks to demonstrate that:

- The Proponent is fully aware of the risks to existing surface and groundwater resources and quality associated with all aspects of the Project; and
- The prevention and mitigation of risks to surface and groundwater quality and the groundwater resource are adequately addressed.

Environmental Objective

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

Information requirements

- Provide a detailed description of site and regional surface water catchments and waterways including size and seasonal flow rates of drainage lines and creeks, in the vicinity of the proposed Project area and along haul roads;
- Provide detailed soil and landscape information pertaining to erosion and sedimentation risks across the Project areas, including mining areas, proposed haul road alignments and rail siding location;
- Discuss the sensitivity and significance of site and regional surface water resources from an ecological, public/social and economic perspective, including a description of water quality and flows, beneficial uses and any existing surface water users in the Project area.
- Provide a description of site and regional groundwater resources, quality and significance in the vicinity of the deposits to be mined and their connectivity with surface waters;
- Describe site and regional hydrogeology to enable the prediction of potential impacts of the proposal on vegetation adjacent to mining areas, including drawdown cones and pollution pathways;
- Indicate the location of groundwater bores for the project with respect to any groundwater dependent natural features or users.

Assessment of Risks

Provide an estimate of the risk to surface and groundwater resources in the vicinity of the site and regionally as a result of Project activities. In particular, discuss:

- Potential impacts to adjacent areas and vegetation from groundwater drawdown as a result of pit dewatering and extraction;
- Impacts on environmental flows and fish passage within surface water systems as a consequence of the dam and any diversions to waterways;
- Potential impacts to groundwater and surface water systems from spills, leachate from potential acid forming waste material and sediment loads in stormwater runoff; and
- Any other potential impacts from the Project on surface and groundwater quality and hydrological features described in Section 3.2.1.

Mitigation

- Detail preventative, management and treatment strategies used to minimise the impacts of the project on hydrological features. In particular, provide details on the following:
 - measures to safeguard surface and groundwater resources and their dependant ecological communities including options for minimising water use, management and treatment of clean and contaminated water including site stormwater, erosion and sediment control measures, and maintaining environmental flows;
 - measures to minimise disturbance to, and erosion of, surface water bodies, particularly where haul roads cross wetlands and water courses. Provide details of typical waterway crossings that would be constructed if required;

- strategies for ongoing geocharacterisation of waste rock and management of any potential acid forming material to prevent/minimise and manage acid and metalliferous mine drainage; and
 - emergency response to fuel spills, solid waste spills, product spills and other related incidents.
- Describe proposed domestic wastewater (sewage) treatment processes.

Monitoring

- Provide details on proposed surface water and groundwater monitoring programmes.

4.4 Risks to biodiversity

Key risks

The Project requires the clearing of native vegetation, some of which will be progressively rehabilitated, which could result in a loss of biodiversity and ecological function if not properly managed.

Threatened flora, fauna and ecological communities could be at risk from the Project.

Degradation of habitat could occur through the introduction of weed and pest fauna species, and increased weed spread in the Project area.

The EIS should include an assessment of the risks to biodiversity to demonstrate that:

- The Proponent is fully aware of the risks to biodiversity associated with all aspects of the Project; and
- The prevention and mitigation of risks to biodiversity are adequately addressed.

Risk assessment to biodiversity should focus on threats to the conservation significance of vegetation types, identified threatened species and areas of potential significance to listed migratory species.

Environmental Objectives

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

Information Requirements

- Vegetation communities within and adjacent to the Project area including:
 - A broad overview of the dominant vegetation communities and their conservation status (rare, endangered, vulnerable, threatened species according to specified listing); and
 - Introduced and weed species, including those declared under the NT *Weed Management Act*.
- Sensitive ecosystems, i.e. ecosystems that provide important ecological function e.g. riparian vegetation, protected area buffer zones, important habitat corridors, monsoon forests, wetlands, areas of conservation significance or geological features which may support unique ecosystems;
- Identify groundwater dependant ecosystems in the vicinity of the Project area; and
- Identify and discuss species of traditional Aboriginal cultural significance (particularly aquatic and terrestrial fauna species), based upon consultation with traditional owners and surveys of the Project area.

The discussion on listed species should include species listed under both the *Territory Parks and Wildlife Conservation Act* (TPWC Act) and EPBC Act. Listed threatened fauna species to be considered in the EIS should include, but not be limited to:

- Northern Brush-tailed Phascogale (*Phascogale pirata*);
- Brush-tailed Rabbit-rat (*Conilurus penicillatus*);
- Northern Spotted Quoll (*Dasyurus hallucatus*);
- Greater Bilby (*Macrotis lagotis*);
- Bare-rumped Sheath-tailed Bat (*Saccolaimus saccolaimus*);
- Australasian Bittern (*Botaurus poiciloptilus*);
- Red Goshawk (*Erythrotriorchis radiatus*);
- Gouldian Finch (*Erythrura gouldiae*);
- Crested Shrike-tit (northern) (*Falcunculus frontatus whitei*);
- Australian Painted Snipe (*Rostratula australis*);
- Gulf Snapping Turtle (*Elseya lavarackorum*); and
- Freshwater Sawfish (*Pristis microdon*).

Additionally, listed migratory species potentially occurring in the area should be considered in the EIS, specifically including:

- White-bellied Sea-Eagle (*Haliaeetus leucogaster*);
- Fork-tailed Swift (*Apus pacificus*);
- Great Egret (*Ardea alba*);
- Cattle Egret (*Ardea ibis*);
- Derby White-browed Robin (*Poecilodryas superciliosa cerviniventris*);
- Barn Swallow (*Hirundo rustica*);
- Rainbow Bee-eater (*Merops ornatus*);
- Rufous Fantail (*Rhipidura rufifrons*);
- Oriental Plover (*Charadrius veredus*); and
- Oriental Pratincole (*Glareola maldivarum*).

The listed Threatened Ecological Community known as the Arnhem Plateau Sandstone Shrubland Complex, which could occur in the Project area, and all listed flora species potentially occurring in the area should be considered in the EIS.

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

- Information on the abundance, distribution, ecology, and habitat preferences of listed species and communities;
- Information on the conservation value of each habitat type from a local and regional perspective, including the percentage representation of each habitat type on site in relation to its local and regional extent;
- If a population of a listed species is present on the site, its size and the importance of that population from a local and regional perspective;

- Details of the scope, timing (survey season/s) and methodology for studies or surveys used to provide information on the listed species/community/habitat at the site (and in areas that may be impacted by the Project). Where surveys are proposed for the above species and where survey methods are provided by the Australian Government, these should be used or an explanation as to why alternate methodology has been used. The survey methods are available at www.environment.gov.au/epbc/guidelines-policies.html; and
- Other details required for site-specific species should be included here.
- Discussion of known existing threats to the species, whether or not attributable to the proposed action, with reference to relevant impacts from the proposed action (including taking into consideration any relevant guidelines, policies, plans and statutory provisions);
- Baseline information and maps identifying at both the site and regional levels:
 - Known occurrences of the species;
 - Potential habitat for species or communities (differentiating where relevant on the basis of use e.g. breeding habitat, migration pathways, feeding habitat); and

Assessment of Risks

- Identify and discuss the risks of impacts associated with the proposed vegetation clearing with particular focus on significant habitats and habitats supporting species of conservation significance;
- Discuss the risks of impacts to species, communities and habitats of local, regional or national significance from indirect Project effects, including impacts to downstream environments and habitat connectivity;
- Assess the potential for the Project to introduce or increase the spread of weed species, including weed species declared under the NT *Weed Management Act*;
- Discuss potential impacts on aquatic habitat.
- For all listed threatened or migratory species for which suitable habitat is present but to which impacts from the proposed action are considered unlikely, include detailed information to demonstrate that a relevant impact on the species is unlikely to occur.

Mitigation

- Discuss ways in which impacts on sensitive ecosystems, and listed species, communities and habitats will be minimised (e.g. timing of works, minimising disturbance area) and managed, including an assessment of the expected effectiveness of the mitigation measures, any statutory or policy basis for the mitigation measures and the cost of the mitigation measures;
- Detailed biodiversity management plans, with clear and concise methods, need to be developed in the final Environmental Management Plan. Mitigation should be in accordance with best practice advice from relevant NT and Australian Government Advisory agencies and focus on:
 - Potentially significant impacts to biodiversity as a whole; and
 - Potentially significantly impacted vegetation types, threatened species, migratory species and the biology of these entities.

Monitoring

- Provide a monitoring plan which outlines clear and concise methods, based on best practice advice, to assess the effectiveness of each mitigation method.

4.5 Rehabilitation and mine closure

Key Risks

- The mine may be forced to close earlier than expected leaving the site exposed if closure planning is inadequate at any stage of the development;
- Rehabilitation of the mine site may not be successful leading to erosion, significant contaminant seepage and degradation of ecosystems important for listed threatened and migratory species;
- Ongoing management of the site could be required well after mining is completed.

Environmental Objective

Rehabilitation of the site is undertaken in a manner that requires minimal maintenance inputs post closure, but maximum protection of the environment from seepage of contaminants, weed incursion, erosion or other impacts.

Information Requirements

- Investigate the physical, geo-mechanical and chemical properties of the ore body with respect to rehabilitation characteristics such as slope stability, presence of potential acid forming material and vegetation establishment;
- Provide an assessment of soil and landscape properties at appropriate scales to inform any risks and constraints to rehabilitation success of landform and cover design;
- Determine availability and volumes of key materials required for rehabilitation;
- Provide relevant scheduling information with respect to material stockpiling and deployment;
- Describe proposed post-mining land uses which have been identified and agreed upon through consultation with stakeholders.

Assessment of risks

- Provide an assessment of the risks to the environment associated with closure of the mine and ancillary infrastructure prior to scheduled closure;
- Identify and discuss environmental risks associated with potentially acid forming materials;
- Identify any other risks that may interfere with successful closure and rehabilitation of the Project.

Mitigation

- Describe contingencies to make landforms secure and non-polluting in the event of unexpected or temporary closure;
- Demonstrate potential success of proposed rehabilitation plans through either a pilot scale demonstration or by reference to other Project sites which have similar geographical and geological characteristics and support similar vegetation types;
- Include measures for protection from fauna, including feral animals; and
- Discuss fire management.

Monitoring

- Develop a protocol for measuring site rehabilitation success through appropriate ecological indices; and
- Identify contingency measures in the event that monitoring demonstrates that management measures have not been effective.

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

4.6 Historic and cultural heritage impacts

Key Risk

Operations associated with the life of the Project and increased human activities in the Project area have the potential to disturb or damage areas of historic and/or cultural heritage.

The EIS should include a detailed assessment of the risks to demonstrate that the Proponent is fully aware of the risks and mitigation measures to existing areas of historic and cultural heritage value.

Information Requirements

Baseline information should be provided regarding cultural heritage sites in the region, in the form of an archaeological / heritage survey report which includes:

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

Assessment of Risks

- The identification of Indigenous cultural heritage impact is to take place in consultation with relevant Indigenous groups. Provide:
- An assessment of the Project's (mine, transport and export operations) potential effects on sacred sites, heritage places, and any potential impacts on Indigenous culture generally, including impacts on Traditional Ecological Knowledge and Land Management Practices;
- Details of any requirements to apply to, or applications already made to, the NT Minister for Lands, Planning and the Environment to disturb or destroy a prescribed archaeological place and/or object under the *Heritage Act*.

Mitigation

The Proponent should describe the prevention and mitigation of risks to existing areas of historic and cultural heritage. A management plan should be developed to address matters including:

- Procedures to avoid significant areas;
- Protection of key sites during construction, operation and decommissioning work;
- Ongoing protection measures; and
- Procedures for the discovery of surface or sub-surface materials during the course of the Project.

Monitoring

- The EIS should identify the monitoring program to be implemented for each potential cultural heritage impact and should provide outcome and assessment criteria that will give early warning that management and mitigation measures are failing.

4.7 Socio-economic risks

Key Risk

Mining operations and increased human activities in the region have the potential to alter the regional economy and social demographic.

Assessment and monitoring is required to ensure local communities receive a net benefit from the Project.

Objectives

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

Information Requirements

The EIS should include a balanced summary of the project's economic value (positive and negative) to the regional, state and national economies, in terms of direct and indirect effects on employment, income and production. The following are suggestions that may assist with highlighting the economic value of the project and are not intended to result in the inappropriate disclosure of confidential information. It should be noted in the EIS if data are not available or unsuitable.

Aspects to be covered include:

- The project's contribution to the NT and Australian economy;
- A summary of project feasibility;
- Estimated total project revenue for the duration of the project (to provide the economic scale of the project);
- Total contribution to Gross State Product (GSP) and Gross Domestic Product (GDP) over the economic life of the project;
- Opportunities available to regional centres, including Katherine, based on the activity generated by the project (construction, rehabilitation and operation);
- Estimated overall tax;
- Estimated capital expenditure for the whole project;

- Expected annual operational expenditure;
- Estimated workforce and contractor numbers by occupational classification;
- Overall employment training proposed during commencement, construction and operations;
- Planned Indigenous employment, training and other project participation;
- Expected level of overseas recruitment (if appropriate);
- Availability of goods and services;
- Community and economic value of any residual infrastructure, such as roads, following the life of the project; and
- Other contributions to local communities, including traditional owners.

The EIS should include a balanced summary of the project's social value (positive and negative) on a regional, state and national scale. A brief description of the current population, demography and social aspects of the region affected by the Project should be provided in the EIS. This should be done through community consultation, historic research and field survey. No information of a confidential nature, particularly related to anthropological matters relevant to Indigenous people or groups is to be disclosed in the EIS.

Existing social aspects, and their components, to be discussed must include:

- Key stakeholders;
- Regional community structures and vitality (e.g. demography, health, education and social well being, access to services, housing);
- The number and capacity of existing human services to support the construction work force:
 - Skills audit of affected communities;
 - Workforce characteristics; and
 - Accommodation type and quantity.
- Social amenity.

Assessment of Risks

An Economic and Social Impact Assessment (ESIA) should be conducted. The ESIA should include consideration of the following:

- Estimates of the quantity and value of production/exports relating to the mine, including expected reduction in revenue should the proposal not proceed;
- An estimate of the value to the local economy associated with expenditure during the construction phase and the annual expenditure on regional goods and services as it relates to the mine and associated infrastructure;
- Benefits to the local community, including the town of Katherine, during and beyond the life of the mine, such as development of new skills and facilities, economic development and opportunities for local and regional business and employment opportunities;
- The risks of the mine, related infrastructure and associated workforce negatively impacting on identified social issues in the region, including in the town of Katherine;
- The risks to services and infrastructure in regional centres, including Katherine, from the mining activity and workforce. In particular, consideration should be given to potential impacts on the demand for industrial support services, office space, accommodation, retail services such as food suppliers, entertainment, and health services;
- The risks of mining related activities to:

- Stuart Highway traffic flows, particularly at intersections with mine haul roads;
- the Ghan rail services, particularly as a result of construction and operation of a new rail siding; and
- road access to local communities in the region and the Limmen National Park.

Management and mitigation

A Social Impact Management Plan (SIMP) should be prepared to address any identified risks and benefits associated with the ESIA. The SIMP should:

- Describe how Sherwin Iron proposes to respond to and maximise benefits and manage any identified economic, social, cultural or spiritual risks from the Project, or its associated workforce, in the region;
- Describe how potential local and regional business and employment opportunities related to the mine will be identified and managed; and
- Provide a stakeholder communications strategy including identification of, and ongoing consultation and negotiations with, all relevant stakeholders, ensuring the full range of community viewpoints are sought.

Monitoring

The SIMP should:

- Establish a mechanism for monitoring any identified potential socio-economic and cultural impacts and benefits; and
- Provide outcome and assessment criteria that will give early warning that management and mitigation measures are not achieving the outcomes and benefits expected and identified by the Proponent.

4.8 Other Issues

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

Cumulative impacts

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

An assessment of cumulative environmental impacts should be undertaken that considers the potential impact of a proposal in the context of existing developments and future developments to ensure that any potential environmental impacts are not considered in isolation. The extent of cumulative impacts to be considered depends upon the nature of the environmental issue.

Cumulative Impact Assessment accounts for impacts on a regional scale, such as:

- Landscape-scale change originates not only from single projects and management actions, but also from complex and dynamic interactions of multiple past, present and future management actions;
- Biophysical, social and economic change accumulates through additive or interactive (or synergistic) processes. The aggregate impact of multiple actions on the environment can be complex and may result in impacts that are more significant because of interactive processes; and

- Any given action does not operate in isolation. The most significant changes are often not the result of the direct effects of an individual action, but from the combination of multiple minor effects over the accumulation of time.

The cumulative impacts of the project, in combination with the other proposed mining projects, on the biodiversity and ecological function should be assessed within the EIS. Specific issues that should be covered include impacts on:

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

Bushfires

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

Transport

Describe how the project will, or has the potential to, impact on transport infrastructure during construction and operational phases. In addition, describe possible transport impacts as a result of the proposal including issues such as dust and road traffic noise.

Describe proposed safeguards, management and monitoring strategies that will be implemented to minimise potential transport impacts during construction and operation including, but not limited to:

- Methods for complying with any relevant road vehicle axle limits;
- Methods for securing loads;
- Measures to reduce any road traffic noise impacts;
- Consultation with local communities affected by transport impacts;
- Traffic management; and
- Management of driver fatigue.

Biting insects

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

Noise and vibration

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

Describe the management of noise and vibration impacts.

Air

- Describe the sources (including land clearing) and projected quantities of greenhouse gases emitted by the Project.
- Discuss dust suppression strategies and monitoring of dust impacts.

Waste

- Identify the Project's on-site waste disposal facility and describe the associated leachate management systems;
- Discuss the opportunities for waste minimisation and recycling in the Project.

5 ENVIRONMENTAL MANAGEMENT

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

The EMP should be strategic, describing a framework for environmental management of the project. However, as much detail as is practicable should be provided to enable adequate assessment of the proposal during the public exhibition phase. Specific management practices and procedures should be included in the EMP, where possible.

The EMP should include:

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

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

The EMP would continue to be developed and refined following the conclusion of the assessment process, taking into consideration the proposed timing of development activities,

comments on the EIS and incorporating the Assessment Report recommendations and conclusions.

6 NT POLICY AND GUIDANCE NOTES

6.1 Environmental offsets

The Australian Government Environmental Offsets Policy, October 2012, requires residual significant impacts (after avoidance and mitigation measures have been implemented) to be offset, with a focus on direct offsets. The Offsets assessment guide, which accompanies this policy, has been developed to give effect to the policy's requirements, utilising a balance sheet approach to quantify impacts and offsets. It applies where the impacted protected matter is a threatened species or ecological community. These documents are available at:

<http://www.environment.gov.au/epbc/publications/environmental-offsets-policy.html>.

The EIS should provide information on:

- Any identified impacts or detriments that cannot be avoided, reduced or mitigated at reasonable costs and whether these impacts could be considered as 'significant' under the EPBC Act;
- Risks of failure of management actions (such as rehabilitation, weed control, etc.) and uncertainties of management efficacy should be identified; and
- Proposed offsets for residual significant impacts to listed threatened species or ecological communities and listed migratory species and an explanation as to how these proposed offsets meet the requirements of the Environmental Offsets Policy and Offsets assessment guide, where relevant.

6.2 Public health premises and food premises

- NT Department of Health will require detailed plans submitted via a building certifier, prior to construction, for accommodation facilities, and food preparation and serving areas on the project site. The *Food Act* and *Public and Environmental Health Act* are both applicable to this Project.
- Further information from the NT Department of Health is provided in fact sheet 700 *Requirements for Mining and Construction Projects*.

6.3 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)*.

6.4 Wastewater

NT Department of Health will require a notification to install a waste water treatment system outside of a building control area if a new effluent treatment system is to be installed to treat effluent. 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.

Further information can be found at:

[www.health.nt.gov.au/Environmental Health/Wastewater Management](http://www.health.nt.gov.au/Environmental_Health/Wastewater_Management).

6.5 Waste discharge

Any discharge of waste, including wastewater, from the project area into tidal waters, groundwaters or waterways may require licensing under the NT *Water Act*. Guidance and application forms can be found at:

www.ntepa.nt.gov.au.

6.6 Solid waste storage and disposal

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

6.7 Mosquito breeding

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

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