

# Terms of Reference for an EIS

**Winchelsea Island Manganese Mine Project**

**Winchelsea Mining Pty Ltd**

**East Arnhem Local Government Area**

**October 2023**

<b>Proposal :</b>	Winchelsea Island Manganese Mine Project
<b>Proponent:</b>	Winchelsea Mining Pty Ltd
<b>NT EPA Reference:</b>	EP2021/004
<b>Location:</b>	Winchelsea Island, approximately 12 km northeast of Alyangula in the Gulf of Carpentaria, in the northeast of the Northern Territory
<b>Local Government Area:</b>	East Arnhem Region
<b>Public consultation period:</b>	Draft Terms of Reference – 15 business days Environmental Impact Statement – 30 to 60 business days
<b>EPBC Act Reference No.:</b>	EPBC 2021/8877

Further information and guidance on the environmental impact assessment process is available on the NT EPA website at: [www.ntepa.nt.gov.au](http://www.ntepa.nt.gov.au)

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# 1. Introduction

## 1.1. Overview

The Winchelsea Island Manganese Mine Project (the proposal) proposed by Winchelsea Mining Pty Ltd (the proponent) is being assessed by the Northern Territory Environment Protection Authority (NT EPA) under the *Environment Protection Act 2019* (EP Act) at the level of an environmental impact statement (EIS).

These terms of reference (TOR) set out the matters relating to the environment that are to be addressed in the draft EIS for this proposal. The draft EIS must also address all requirements in the [NT EPA guidance: Preparing an environmental impact statement](#), and Schedule 4 to the Environment Protection and Biodiversity Conservation (EPBC) Regulations 2000.

The proposal is to construct and operate an open cut manganese mine on Winchelsea Island, about 600 km southeast of Darwin and 6 km northeast of Groote Eylandt in the Gulf of Carpentaria. Production of approximately 0.7 million tonnes per annum run-of-mine (ROM) would be targeted utilising hydraulic excavators to extract ore and overburden in strips over a 12 year mine life.

Mine infrastructure would include ROM and ore stockpiling areas, crushing and screening equipment, workshops, haul and access roads, a product conveyor from the processing area to the wharf facility (construction of the wharf facility will require dredging, with dredge spoil disposal in Bartalumba Bay). Product would be loaded onto barges then transferred to ships at a designated transshipment location.

The proposed mineral lease would cover an area of 1,460 hectares, approximately 35%, of Winchelsea Island, and the mine disturbance footprint is predicted to be 378 hectares, or 10% of the island. Winchelsea Island possesses significant environmental value, and this environmental impact assessment will need to demonstrate that the potential impacts to, and loss of environment values are acceptable, in order for an environmental approval to be granted.

## 1.2. Assessment under accredited assessment process

The proposal was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and the delegate of the Australian Government Minister for the Environment decided under section 75 of the EPBC Act that the proposed action is a controlled action with the controlling provisions being:

- listed threatened species and communities (sections 18 & 18A), and
- listed migratory species (sections 20 & 20A).

As such, the action will require assessment and an approval decision due to the potential for a significant impact on matters of national environmental significance (MNES) protected under Part 3 of the EPBC Act.

The proposal is being assessed under an accredited assessment process (in accordance with section 87(4) of the EPBC Act as referenced in section 45 of the EP Act). These TOR have been prepared to meet the requirements of both government jurisdictions.

### 1.3. Assessment timeline

The proponent EIS must address matters outlined in Schedule 4 of the EPBC Regulations, and the draft EIS must be submitted within two years of the finalisation of this TOR. Table 1 sets out the indicative timeline for the assessment of the proposal.

**Table 1: Indicative assessment timeline for the proposal**

Key assessment milestones	Proposed / completion date
Referral accepted	6 January 2021
Public and government authority consultation on referral	8 January 2021 – 8 February 2021
Decision on accepted referral	10 March 2021
Assessment process suspended at proponent's request	25 March 2021
Notice of significant variation 1 (NOSV#1) accepted by NT EPA	24 May 2021
Public and government authority consultation on NOSV	1 June 2021 – 29 June 2021
Decision on significant variation	10 August 2021
Draft Terms of Reference (TOR) consultation period	29 September 2021 – 19 October 2021
TOR approved	4 November 2021
TOR published	15 November 2021
NOSV#2 accepted by NT EPA	10 July 2023
Public and government authority consultation on NOSV#2 (includes proponent amended TOR and Statement of Reasons why the amendments to the terms of reference adequately capture the potentially significant impacts that require assessment)	10 July 2023 – 22 August 2023
NT EPA approves the draft amending TOR	14 September 2023
Approved TOR is published	10 October 2023
Draft EIS submitted to the NT EPA	Within 2 years from the date the approved TOR is published
Public and government authority consultation on draft EIS	TBC
Proponent prepares Supplement, including any additional information the NT EPA has directed it to provide	TBC
Supplement submitted to the NT EPA	TBC
Public and government authority consultation on Supplement	TBC
Assessment Report provided to the Minister	TBC
NT Minister's decision	TBC
Australian Government Minister's decision	TBC

## 2. Matters to be addressed in the draft EIS

### 2.1. Summary

A summary of the draft EIS is required as part of the EIS documentation. The summary should be written as a stand-alone document and file, able to be provided on request to interested parties who may not wish to read the full EIS.

The summary should provide the following at a minimum:

- a clear and concise overview of the proposal, including key components and activities, lifespan, closure outcomes and intended future use of the site
- an explanation of the approvals process and function of the EIS
- a summary of the site selection process and alternatives considered
- an overview of the existing environment including location of the nearest sensitive receptors
- a summary of the environmental impacts of the proposal
- a summary of measures to avoid, mitigate and, if applicable, offset potential impacts of the proposal

For information given in a draft EIS, the draft must state:

- the source of the information
- how recent the information is
- how the reliability of the information was tested, and
- what uncertainties (if any) are in the information.

### 2.2. Proposal description

#### 2.2.1. Overview

Provide a clear description of the proposal and the full scope of works for which approval is sought. The proposal description should include:

- a summary table listing the key physical components of the proposal
- a description of the proposal footprint (direct and indirect disturbance) and the proposal activities
- maps, figures, images, diagrams and flow charts
- any variations or modifications to the proposal since the referral information was submitted
- where there is uncertainty in the detailed design, footprint, capacity or life of the proposal, the approach to resolving this uncertainty should be clearly explained and the maximum extent for each parameter provided.

### 2.2.2. Proponent

Provide background to the proponent including but not limited to:

- information on the environmental history of the proponent
- partnerships with other organisations or industries as part of the proposal
- notification/disclosure of offences with regard to fit and proper person, or any non-compliances
- compliance with state/territory and Commonwealth environmental approval conditions.

### 2.2.3. Objectives of the proposal

State the rationale and justification for the proposal, considering social, economic and other environmental benefits and costs to the NT, in particular to local and regional communities, during the life of the proposal and post closure.

List the key objectives of the proposal and include a description of how the proposal meets these objectives.

The proponent should demonstrate in the draft EIS how the objectives of the proposal address the specific requirements of sections 42 and 43 of the EP Act.

### 2.2.4. Statutory framework

The EIS must provide information on the statutory framework including a description of any permits, consents, or other approvals, that will be required and or gained from NT and Australian government authorities e.g. the *Water Act 1992* and the *Waste Management and Pollution Control Act 1998* (for wastewater discharge approval and/or licence); the *Mining Management Act 2001* for mining activity; for the protection of Aboriginal sacred sites, the *Northern Territory Aboriginal Sacred Sites Act 1989* for an Aboriginal Areas Protection Authority (AAPA) authority certificate, and the *Aboriginal Land Rights (Northern Territory) Act 1976* (ALRA).

### 2.2.5. Mineral resources and ore reserves

Summarise the results of studies and surveys undertaken – supported by references and with supporting reports included as appendices - to identify and delineate the mineral resources, and ore reserves within the proposal footprint (including any areas underlying related infrastructure).

Describe in detail the location, tonnage and quality of the mineral resources and ore reserves within the project area. Illustrate, with appropriately-scaled maps and diagrams, the location, areal extent and depth of the mineral resources to be developed or mined, and show those resources in relation to the following features:

- boundaries of mining tenures, granted or proposed, to which the project area is, or would be subject
- proposed mine excavation(s)
- features that would result from the proposed mining, including waste/spoil dumps, water storage facilities and other infrastructure
- proposed buffers surrounding the working areas



- boundaries of any other project sites
- any part of the resource not intended to be mined and any part of the resource that might be sterilised by the proposed mining operations or infrastructure.

Similarly report, to the extent practicable, on other resources related to the geology of the locality, including petroleum and energy resources. Include information from publicly available or searchable studies and surveys undertaken by entities other than the proponent.

### 2.2.6. Dredging

This section should outline:

- feasible dredging and spoil disposal alternatives, including alternative dredging methods. Where multiple alternatives exist, the choice of the preferred option(s) should be clearly explained, and a comparison provided against other options in terms of environmental outcomes (i.e. severity of positive and/or negative outcomes), and
- wharf alternatives, including alternative wharf designs and locations. Where multiple alternatives exist, the choice of the preferred option(s) should be clearly explained, and a comparison provided against other options in terms of environmental outcomes.

The environmental impact assessment of proposed dredging activities should also review relevant websites that provide contemporary dredging related information (e.g. WAMSI<sup>1</sup>, GBRMPA<sup>2</sup>, Qld Ports and International Dredging nodes), and be in accordance with the procedures, the [National Assessment Guidelines for Dredging](#), and the [Western Australian Environmental Protection Authority Technical Guidance – Environmental impact assessment of marine dredging proposals](#).

The quality of sediment to be dredged must be evaluated using nationally accepted guidelines for application to coastal waters, e.g. [Simpson et al, 2005, Handbook for Sediment Quality Assessment](#), the [CSIRO Guidelines for the Dredging of Acid Sulfate Soil Sediment and Associated Dredge Spoil Management](#), and the [Australian and New Zealand Guidelines for Fresh and Marine Water Quality](#).

To protect marine environmental quality and ecosystems, provide information that includes but is not limited to:

- capital and maintenance dredging requirements, areas and volumes
- dredge material characteristics including analysis of grain size and chemistry to identify contaminants of concern
- location where dredge spoil will be disposed and its environmental characteristics
- dredging methods, timing, plant and equipment, inclusive of dredge spoil loading and disposal
- location, outline and method of any land reclamation
- surveys of the marine environment to identify and protect ecological values, and collection of relevant baseline and environmental data

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<sup>1</sup> The Western Australian Marine Science Institution (WAMSI)

<sup>2</sup> The Great Barrier Reef Marine Park Authority (GBRMPA)

- modelling that describes impact zones and impact prediction using contemporary approaches developed by the Western Australian Marine Science Institution (WAMSI) Dredging Science Node (DSN)<sup>3</sup>
- a dredge management strategy and plan prepared by an appropriately qualified person for capital and maintenance dredging that considers the *critical windows of marine environmental sensitivity*<sup>4</sup> i.e. spawning and larval settlement periods for corals, spawning aggregations and juveniles of fish and invertebrates, habitat that supports primary food resources for threatened marine fauna (e.g. seagrass meadows), and critical habitat for breeding of marine wildlife (e.g. turtles, dugong).
- a dredge management plan prepared by an appropriately qualified person for capital and maintenance dredging that allows monitoring:
  - for compliance purposes
  - for adaptive management, and
  - to meet the NT EPA’s environmental objectives.

### 2.2.7. Construction and operation

Provide a detailed description of all construction and operational aspects of the proposal as outlined in Table 2.

**Table 2: Minimum information requirements for the proposal description**

Topic	Required information
Site layout maps	The description of the proposal must include, but not be limited to, detailed maps, drawings and graphics/illustrations of: <ul style="list-style-type: none"> <li>• the location and dimensions of existing disturbance, infrastructure, roads/tracks and natural and modified landforms (including a depiction of these overlaid on aerial photos or high-resolution satellite imagery) within the proposal area</li> <li>• the location and approximate dimensions of areas to be disturbed, structures to be built or repurposed, including (where applicable):                             <ul style="list-style-type: none"> <li>○ all areas to be cleared<sup>5</sup> and/or disturbed (including dredge spoil disposal and transshipment areas)</li> <li>○ mineral processing, tailings and waste storage facilities</li> <li>○ access and haul roads, mining and service infrastructure</li> <li>○ all drainage areas where run-off from disturbed/mined areas can enter sensitive terrestrial habitats and/or the marine environment</li> <li>○ water storage, stormwater and drainage infrastructure and surrounds</li> <li>○ land reclamation areas</li> <li>○ marine infrastructure (e.g. wharf, offshore transshipment, and dredge spoil disposal areas)</li> </ul> </li> </ul>

<sup>3</sup> Chaojiao Sun, Paul Branson, Des Mills (2020) Guideline on dredge plume modelling for environmental impact assessment. WAMSI Dredging Science Node Themes 2/3. Western Australian Marine Science Institution (WAMSI).

<sup>4</sup> Critical windows of environmental sensitivity include times of the year or particular sites where key species or ecological communities or critical processes may be particularly vulnerable to pressures from dredging.

<sup>5</sup> In accordance with the NT Land Clearing Guidelines and/or requirements under the NT Planning Scheme.

Topic	Required information
	<ul style="list-style-type: none"> <li>○ buildings, structures and laydown areas</li> <li>○ borrow areas</li> <li>○ hazardous mine waste and other waste storage areas</li> <li>○ borefield locations</li> <li>○ other significant infrastructure.</li> <li>● the proposal layout in relation to existing infrastructure (e.g. roads, cables, pipelines, exploration disturbance, shipping channels and other developments or proposals)</li> <li>● the boundaries of the proposal area in relation to any overlapping or adjacent licences and permits (mineral, petroleum or other); and any other interests in land including native title (claims or determined), and Aboriginal freehold land.</li> </ul>
Design	<p>Describe mine planning and design options considered, reasons for selection of preferred mine plan, and how the proposed mine plan avoids and/or mitigates environmental constraints and potential impacts and risks to the surrounding environment.</p> <p>Provide details of geochemical characterisation investigations undertaken to determine the physical and chemical characteristics of materials to be mined and processed (e.g. ore, tailings and waste rock), and to be used for construction purposes (e.g. basal clay liner or capping material).</p> <p>Provide details of ore processing including description of flocculents, thickening agents and chemical additives.</p> <p>Provide details of the physical and chemical qualities of both the solid and liquid fractions of the tailings, tailings handling, management and disposal of waste streams.</p> <p>Provide details of alternatives and options for handling, treatment, storage and management of tailings and potentially problematic mine waste materials, including procedures for progressively backfilling into pits, rehabilitation and mine closure<sup>6</sup>.</p> <p>Describe the design measures for the management and control of seepage at the Tailings Storage Facility (TSF), and provide the relevant technical specifications for:</p> <ul style="list-style-type: none"> <li>● the High Density Polyethylene (HDPE) liner, and</li> <li>● the compacted soil liner (CSL) including thickness and saturated hydraulic conductivity.</li> </ul> <p>Demonstrate that the design of the TSF has been prepared by suitably qualified engineers and references accepted engineering and design standards and leading practice guidelines e.g. the Australian National Committee on Large Dams (ANCOLD) Guidelines on Tailings Dams - Planning, Design, Construction, Operation and Closure (ANCOLD 2012a).</p> <p>Describe the barge/ship loading facility and offshore transshipment infrastructure, and related requirements.</p> <p>Describe alternatives and options for barge/ship loading and general handling of ore, and how the proposed method avoids and/or mitigates potential impacts and risks to</p>

<sup>6</sup> To achieve the NT EPA's rehabilitation and mine closure objectives and outcomes, open pit voids must be backfilled and rehabilitated before surrender or relinquishment, unless it can be demonstrated that retaining a final pit void would ensure closure objectives are met

Topic	Required information
	<p>the surrounding environment.</p> <p>Describe alternatives and options for transshipping and general handling of ore, and how the proposed method avoids and/or mitigates potential impacts and risks to the surrounding environment.</p> <p>Describe alternatives and options to any capital dredging, maintenance dredging, dredge spoil disposal, and any land reclamation. Describe how the proposed method avoids and/or mitigates potential impacts and risks to the surrounding environment.</p> <p>Describe alternatives and options for power generation, meeting the project energy and water demand, and how the proposed method avoids and/or mitigates potential impacts and risks to the surrounding environment.</p> <p>Discuss how the design mitigates changes in run-off and the groundwater table, as well as potential saltwater intrusion from exaction of ore and resulting mine pits.</p> <p>Describe options for meeting the project water demand, including consideration of the quantity and quality of water available through alternative sources.</p> <p>Where water is intended to be extracted from a waterway (including through the use of a dam), include a water balance for the waterway which demonstrates the total amount of water extracted or withheld from the relevant sub-catchment.</p> <p>Discuss any feasible operation alternatives including alternatives for land management. Where multiple alternatives exist, the choice of the preferred option(s) should be clearly explained, and a comparison provided against other options in terms of potential environmental impacts.</p> <p>Describe how the proposal has been designed to consider, or allow for, impacts of a changing climate e.g. sea-level rise, capacity and efficiency of water facilities to allow for potential increase in evaporation and/or large rainfall events, and changes in the frequency or intensity of extreme weather events.</p> <p>Demonstrate engagement with existing operators and/or other infrastructure owners in the region, for opportunities, alternatives and options to share existing infrastructure and facilities on Groote Eylandt, to reduce impacts on the environment.</p>
Construction	<p>Describe all elements of the construction phase including:</p> <ul style="list-style-type: none"> <li>• construction methods and any limitations of these in the area of the proposal. Where multiple alternatives exist, the choice of the preferred option(s) should be clearly explained and a comparison provided against other options in terms of potential environmental impacts</li> <li>• equipment and machinery required</li> <li>• construction materials required – major types, quantities, qualities, sources, storage requirements and potential hazards</li> <li>• location, shape, size and nature of temporary stockpiles</li> <li>• timeframes</li> <li>• any new ancillary infrastructure and upgrades required to service the proposal, including supply of electricity, road access and wharf.</li> <li>• detailed design for the proposed TSF and associated infrastructure</li> <li>• development of the wharf facility, any dredging, and dredge spoil disposal including:</li> </ul>

Topic	Required information
	<ul style="list-style-type: none"> <li>○ dredging frequency</li> <li>○ method, plant and equipment used</li> <li>○ dredge material and volume</li> <li>○ dredge spoil disposal location</li> <li>○ land reclamation</li> <li>○ a monitoring and reporting program</li> <li>● available and potential sources of fill / borrow material</li> <li>● vegetation clearing and site preparation</li> <li>● erosion, sediment and drainage control</li> <li>● water requirements including sources, supply, storage, treatment and methods and criteria for discharge</li> <li>● waste management including classification of waste streams</li> <li>● air quality and emissions management</li> <li>● maintenance of components and servicing of infrastructure</li> <li>● controls to avoid spills/discharges to the terrestrial and marine environment</li> <li>● traffic and transport activities during construction including but not limited to:               <ul style="list-style-type: none"> <li>○ proposed transport methods onshore, nearshore and offshore, including land and marine based vessels</li> <li>○ forecast vehicle/vessel movements including type, size, volume and frequency of movements</li> <li>○ details on access, routes, vehicle / vessel types, volumes of traffic</li> </ul> </li> <li>● barge/ship loading and transport activities during construction including but not limited to:               <ul style="list-style-type: none"> <li>○ infrastructure (equipment, machinery, instruments, supplies and materials)</li> <li>○ vessels, vessel movements including type, size, volume and frequency of movements</li> </ul> </li> <li>● storage, containment and loading method</li> <li>● biosecurity management and control in relation to import of construction materials e.g. clay, sand, gravel, or rock</li> <li>● biosecurity management and control in relation to weeds, feral animal (particularly cane toads) and introduced plants (particularly introduced pasture grasses)</li> <li>● noise disturbance and artificial light spillage management and control</li> <li>● barge/ship loading facility infrastructure</li> <li>● offshore shipping infrastructure/components</li> <li>● fire management and control</li> <li>● staff commute</li> <li>● applicable legislation, guidelines and standards.</li> </ul>
Operation	<p>Describe all elements of the proposed operation including:</p> <ul style="list-style-type: none"> <li>● all aspects of the proposed operation with detailed maps, diagrams and facility</li> </ul>

Topic	Required information
	<p>design specifications and standards where relevant, including:</p> <ul style="list-style-type: none"> <li>○ mine plan, pit layout and pre-stripping of vegetation and overburden</li> <li>○ mining, handling and processing of ore</li> <li>○ tailings management that includes characterisation, handling and disposal</li> <li>○ location, shape, size and nature of temporary and permanent stockpiles</li> <li>○ erosion and sediment control</li> <li>○ water management including water requirements, storage, supply and demand (provide a water balance)</li> <li>○ waste management including disposal and recycling</li> <li>○ air quality management, including dust control</li> <li>○ weed management</li> </ul> <ul style="list-style-type: none"> <li>● details on the operation and management of the proposed TSF including details for closure and rehabilitation</li> <li>● transport and traffic activities during operation, including but not limited to: <ul style="list-style-type: none"> <li>○ proposed transport methods onshore, nearshore and offshore, including land and marine based vessels</li> <li>○ forecast vehicle/vessel movements including type, size, volume and frequency of movements</li> <li>○ details on access, routes, vehicle/vessel types, volumes of traffic</li> </ul> </li> <li>● barge/ship loading and transport activities at wharf facility during operation, including but not limited to: <ul style="list-style-type: none"> <li>○ infrastructure (equipment, machinery, instruments, supplies and materials)</li> <li>○ vessels, vessel movements including type, size, volume and frequency of movements</li> <li>○ storage, containment and loading method</li> </ul> </li> <li>● nearshore and offshore ship loading activities and transport operations, including: <ul style="list-style-type: none"> <li>○ the type, size and number of vessels utilised for ship loading</li> <li>○ planned navigation and shipping routes</li> <li>○ anchorage or mooring location and method, and where the ship would be loaded</li> <li>○ the product loading and transfer location, mode, method and mitigation measures to avoid or minimise spillage to the marine environment</li> </ul> </li> <li>● any dredging and dredge spoil disposal including: <ul style="list-style-type: none"> <li>○ method, plant and equipment used</li> <li>○ dredge material and volume</li> <li>○ dredge spoil disposal location</li> <li>○ land reclamation</li> <li>○ frequency and method of required maintenance dredging</li> <li>○ a monitoring and reporting program</li> </ul> </li> <li>● frequency of vessel movements</li> <li>● biosecurity management and control</li> </ul>

Topic	Required information
	<ul style="list-style-type: none"> <li>• ongoing maintenance of onshore and offshore components, and servicing of infrastructure (e.g. expected frequency, volume and number of days of required dredging for the wharf maintenance)</li> <li>• noise disturbance and artificial light spillage management and control</li> <li>• pest management</li> <li>• fire management and control</li> <li>• controls to avoid spills/discharges to the terrestrial and marine environment</li> <li>• information on contaminated materials that will propose a risk to the environment</li> <li>• prevention and potential ingress of contaminated materials from flood and storms on the island</li> <li>• staff commute</li> <li>• applicable legislation, guidelines, and standards.</li> </ul>
Energy	<p>Provide relevant information with respect to energy during construction and operation, including but not limited to:</p> <ul style="list-style-type: none"> <li>• energy requirements</li> <li>• a detailed comparison of options for renewable and non-renewable sources of energy. Provide selection criteria and justification of selected options.</li> </ul>
Groundwater	<p>Provide relevant information with respect to groundwater, including but not limited to a description of:</p> <ul style="list-style-type: none"> <li>• aquifer system</li> <li>• the groundwater flow system</li> <li>• recharge and discharge</li> <li>• surface water groundwater interaction</li> <li>• groundwater dependent ecosystems.</li> </ul>
Workforce	<p>Provide a summary for each phase of the proposal, of the:</p> <ul style="list-style-type: none"> <li>• estimated number of people to be employed</li> <li>• skills base required</li> <li>• likely sources (local, regional, overseas)</li> <li>• onsite facilities provided.</li> </ul>
Impacts of a changing climate	<p>Describe the extent of impacts relating to a changing climate across all project components including the built, operated (such as energy security), and workforce (including increasing number of extreme heat days).</p> <p>Include an assessment of the resultant viability of the proposal and discuss how the proposal can adapt, including design features.</p>

### 2.2.8. Rehabilitation and mine closure

This section should outline the strategy and plan for rehabilitation and mine closure. It should detail:

- the proposal lifespan
- biological, cultural, economic and social considerations of options for progressive rehabilitation, decommissioning of infrastructure, removal and disposal of infrastructure and components at the end of the proposal's life, and final closure
- proposed land use after closure (including alternatives).

Provide a detailed description of rehabilitation and closure as outlined in Table 3.

**Table 3: Minimum information requirements for rehabilitation and closure.**

Aspect	Specific information required
Mine rehabilitation and closure planning requirements for the EIS	<ul style="list-style-type: none"> <li>• Provide a proposed Mine Rehabilitation and Closure Plan (MRCP) that describes best practice approaches about the strategies and methods for progressive and final rehabilitation</li> <li>• The plan must:                             <ul style="list-style-type: none"> <li>○ Include consideration of what the long-term, post-mining land use(s) will be</li> <li>○ Show how and where activities will be carried out on land in a way that maximises the progressive rehabilitation of the land to a stable condition and provide the condition to which the land must be rehabilitated</li> <li>○ Describe how the rehabilitation costs have been considered in the proposed rehabilitation outcomes</li> <li>○ Demonstrate that the rehabilitation of the environment disturbed by construction, operation, and decommissioning of the proposal can meet the NT EPA's environmental objectives and outcomes listed below</li> <li>○ Describe how rehabilitation and closure requirements would be considered during the construction phase, including how a baseline for rehabilitation success would be established; and whether a seedbank and woody material would be collected and stored for use in rehabilitation</li> <li>○ Address remediation of roads and tracks, bore sites, infrastructure associated with land-to-ship transport of ore, and potential accumulation of ore dust and contamination in marine and terrestrial environments, as well as in waste water discharge sites</li> <li>○ Describe how land disturbed as a result of the proposal that is outside of the mining lease will be rehabilitated where there is no ongoing use</li> <li>○ Ensure revegetation will be with indigenous plant species selected based on site-specific analysis by appropriately qualified specialists</li> </ul> </li> <li>• The proposed MRCP must be consistent with the information requirements in the:                             <ul style="list-style-type: none"> <li>○ International Council on Mining and Metals (ICMM) Integrated Mine Closure: Good Practice Guide</li> <li>○ Australian Government Leading Practice Handbooks for Sustainable Mining: Mine Closure</li> </ul> </li> </ul>



Aspect	Specific information required
	<ul style="list-style-type: none"> <li>○ Australian Government Leading Practice Handbooks for Sustainable Mining: <a href="#">Mine Rehabilitation</a></li> <li>• The proposed MRCP must include the following components:               <ul style="list-style-type: none"> <li>○ a rehabilitation planning component</li> <li>○ a progressive mine rehabilitation and closure plan schedule component, and</li> <li>○ the Cooperative Research Centre for Transformations in Mining Economies (CRC TiME)<sup>7</sup> Project 1.2 Post-mining land uses report ((Beer, A et al. 2022).</li> </ul> </li> </ul>
Rehabilitation planning	<p>The rehabilitation planning part of the proposed MRCP must address the following:</p> <ul style="list-style-type: none"> <li>• Describe each resource tenure, including the area of each tenure</li> <li>• Describe the relevant activities and the likely duration of the relevant activities</li> <li>• Include a detailed description, including maps, of how and where the relevant activities are to be carried out</li> <li>• Include details of the consultation undertaken by the proponent in developing the proposed MRCP and details of how the proponent will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan</li> <li>• Provide the extent to which each proposed post-mining land use or non-use area is consistent with the outcome of consultation with the community in developing the plan, and any strategies or plans for the land of the Anindilyakwa people, or the government of the region, the Territory or the Commonwealth</li> <li>• For each proposed post-mining land use, state the proposed methods or techniques for rehabilitating the land to a stable condition in a way that supports the rehabilitation milestones under the proposed MRCP schedule</li> <li>• For land identified for a proposed post-mining land use, identify the risks and potential impacts of a stable condition not being achieved. Also identify how the proponent intends to mitigate or manage those risks and impacts</li> <li>• For any area that is not proposed for a future beneficial post-mining land use, state the reasons the proponent considers the area cannot be rehabilitated to a stable condition, and the proposed methodology for achieving best practice management of the area to support the proposed MRCP.</li> </ul>
Rehabilitation scheduling requirements	<p>Provide a proposed MRCP schedule which describes time-based milestones for achieving each post-mining land use for the proposal. The schedule must identify:</p> <ul style="list-style-type: none"> <li>• all land within the resource tenure as either post-mining land use, or (if</li> </ul>

<sup>7</sup> Beer A, Haslam-McKenzie F, Weller S, Davies A, Cote C, Ziemski M, Holmes K, Keenan J (2022) Post-mining land uses. CRC TiME Limited.

Aspect	Specific information required
	<p>applicable) non-use area</p> <ul style="list-style-type: none"> <li>• when land becomes available for rehabilitation or further development and human use</li> <li>• rehabilitation milestones to achieve a post-mining land use, and management milestones for any area where a post mining land use is not proposed</li> <li>• milestone criteria that are consistent with the SMART principles<sup>8</sup> and demonstrate when each milestone has been completed</li> <li>• completion dates for each milestone to be achieved</li> <li>• a final site design supported by suitably scaled maps which show the area of each relevant resource tenure, proposed area of disturbance and locations of the proposed post-mining land uses and (if applicable) any areas where a post-mining land use is not proposed.</li> </ul>
<p><b>The following rehabilitation and mine closure objectives and outcomes are to be met:</b></p> <ul style="list-style-type: none"> <li>• Land disturbed by mining activities must be rehabilitated progressively as it becomes available, to minimise environmental impacts and reduce cumulative areas of disturbed land for mining.</li> <li>• The proposal must be implemented in a way that meets the NT EPA’s environmental objectives.</li> <li>• The proposal must be implemented in a manner that disturbed land will be rehabilitated or restored to a safe and stable condition, does not cause environmental harm, and can sustain a post-mining land use.</li> <li>• Open pit voids are backfilled and rehabilitated before surrender or relinquishment, unless it can be demonstrated that retaining a final pit void would ensure closure objectives are met.</li> <li>• Pit lakes formed after the end of mining operations must be designed and engineered to ensure closure objectives are met.</li> <li>• The final landform is physically safe to humans and animals, geo-technically stable and geo-chemically non-polluting/non-contaminating.</li> </ul>	

### 2.2.9. Minor changes or amendments to proposal

Describe any minor changes, amendments or refinements to the proposal since submission of the referral, noting that the NT EPA must be formally notified of any significant variations under section 51 of the EP Act.

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<sup>8</sup> SMART milestones are:

Specific – it is clear what must be done

Measurable – it must be possible to know when it has been achieved

Achievable – it is capable of being achieved

Reasonable/relevant – there is a reasonable and clear connection between the milestone and the desired outcomes

Time-specific – it is clear when the milestone will be completed.

### 3. Information requirements for environmental factors

The preliminary environmental factors for the EIS are listed in Table 4.

**Table 4: Environmental factors that must be considered in the draft EIS**

THEME	FACTOR	ENVIRONMENTAL OBJECTIVE
LAND	Landform	Conserve the variety and integrity of distinctive physical landforms.
	Terrestrial environmental quality	Protect the quality and integrity of land and soils so that environmental values are supported and maintained.
	Terrestrial ecosystems	Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.
WATER	Hydrological processes	Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.
	Inland water environmental quality	Protect the quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.
	Aquatic ecosystems	Protect aquatic habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.
SEA	Coastal processes	Protect the geophysical and hydrological processes that shape coastal morphology so that the environmental values of the coast are maintained.
	Marine environmental quality	Protect the quality and productivity of water, sediment and biota so that environmental values are maintained.
	Marine ecosystems	Protect marine habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.
AIR	Air quality	Protect air quality and minimise emissions and their impact so that environmental values are maintained.
	Atmospheric processes	Minimise greenhouse gas emissions so as to contribute to the NT Government's target of achieving net zero greenhouse gas emissions by 2050.
PEOPLE	Community and economy	Enhance communities and the economy for the welfare, amenity and benefit of current and future generations of Territorians.
	Culture and heritage	Protect culture and heritage.
	Human health	Protect the health of the Northern Territory population.

The draft EIS should address how each of the above factors may be impacted by the relevant components of the proposal. While it is for the NT EPA to decide whether potential impacts are significant, the EIS should consider the significance of the identified potential impacts with reference to section 11 of the EP Act and [significant impact guidelines](#) for MNES. In addition, the EIS will consider and address indirect and cumulative impacts.

A proposal footprint (direct disturbance) and area of influence (indirect disturbance) are to be established to identify the aspects of the environment (under each environmental factor) and the specific environmental values that could be impacted by implementation of the proposal. Consideration should be given to potential impacts associated with normal operations, abnormal operations, unplanned shutdowns of part or all of the proposal, and emergency shutdowns of part or all of the proposal.

For each of the key environmental factors listed in Table 3, the draft EIS is to provide an assessment of how the NT EPA’s environmental objective would be met, as outlined in the NT EPA’s [Preparing an environmental impact statement – Environmental impact assessment guidance for proponents](#), and detailed below.

The following sections and tables outline the information to be addressed for each environmental factor. The below information requirements should be addressed in an appropriate format within the draft EIS, with technical assessment reports appended to the EIS as applicable.

Detailed maps and figures must be included to support the descriptions and findings for each of the relevant environmental factors.

### 3.1. Landforms

**Table 5: Minimum information required for assessment of Landforms**

Aspect	Specific work and information required
<b>NT EPA objective:</b> Conserve the variety and integrity of distinctive physical landforms.	
Relevant activities	<ul style="list-style-type: none"> <li>• Ground disturbance within the proposal footprint to accommodate the mining areas and proposal infrastructure, and</li> <li>• Construction and mining operations, rehabilitation and closure of the proposal.</li> </ul>
Environmental values	<ul style="list-style-type: none"> <li>• Characterise the distinctive, recognisable physical features that are the landforms and landscapes of the existing environment.</li> <li>• Describe the links that landforms may have to other environmental values e.g. a threatened species, benthic community, cultural, heritage or amenity.</li> </ul>
Potential significant impacts and risks	<p>Identify potential significant impacts and risks to the landforms and:</p> <ul style="list-style-type: none"> <li>• Describe the proposed activities and pathways by which landforms could potentially be affected by the proposal (from construction and operation, to mine closure and rehabilitation), and undertake a risk assessment addressing soil erosion, dispersive soils, potential acid sulfate soils, surface hydrology and sediment transport.</li> <li>• Describe the variety, integrity, ecological and scientific importance, rarity, and social importance of the landform and the broader landscape and identify the environmental values supported by the landform.</li> <li>• Discuss the interrelationships between the values including how the proposal will affect the role of the landform in maintaining these values (e.g. through changes in surface water or groundwater flows, wind movement, precipitation, temperature, stability, landscape connectivity, and soil composition / chemistry).</li> </ul>

Aspect	Specific work and information required
	<ul style="list-style-type: none"> <li>Using appropriate studies, investigations and relevant information, quantify the direct, indirect and cumulative impacts of the proposal on landforms, and assess the significance of those impacts.</li> <li>Include an analysis of whether the landform is robust and therefore less sensitive to damage or degradation from development activities, or whether it is easily disturbed or degraded, and discuss whether there is likely to be a significant residual impact.</li> </ul>
Avoidance, mitigation and management	<p>Outline the measures for avoiding or mitigating potential significant impacts identified above, with consideration of section 26 (Environmental decision-making hierarchy) and section 27 (Waste management hierarchy) of the EP Act. Also consider measures to restore environmental quality.</p> <ul style="list-style-type: none"> <li>Describe the proposed avoidance, mitigation and management measures to be implemented, applying the management hierarchies (sections 26 and 27 of EP Act), including an assessment of their effectiveness and considerations for mine closure and rehabilitation.</li> <li>Demonstrate that all reasonable and practicable avoidance and mitigation measures would be taken to ensure residual impacts and risks are acceptable.</li> <li>Provide a summary of the mine planning and (mine) site selection process that demonstrates potentially less environmentally damaging alternative approaches, methodologies or technologies has been considered.</li> <li>Discuss adaptation to a changing climate including design and resultant viability of the proposal, with reference to the NT policy <a href="#">Northern Territory Climate Change Response: Towards 2050</a> and <a href="#">Climate Change in the Northern Territory: State of the science and climate change impacts</a>.</li> <li>Substantiate proposed mitigation measures with consideration of best practice standards including benchmarking of mitigation measures at similar facilities, and with advice from relevant Australian and NT government authorities.</li> <li>Describe how the NT EPA's objective for this factor and the predicted environmental outcomes can be met.</li> </ul>
Monitoring and reporting	<ul style="list-style-type: none"> <li>Outline proposed monitoring and reporting activities related to potential impacts and risks, and mitigation and management measures. The proposed monitoring and reporting should address potential impacts and risks from each project phase.</li> <li>Substantiate proposed monitoring activities with consideration of best practice standards and advice from relevant government authorities.</li> </ul>
Residual impact	<ul style="list-style-type: none"> <li>Identify and, where possible, quantify any potential residual impact of the proposal on environmental values.</li> </ul>
Offsets	<ul style="list-style-type: none"> <li>Where significant residual impacts remain (after applying the environmental decision making hierarchy), determine and quantify any significant residual impacts by applying the <a href="#">NT Offsets framework</a> and <a href="#">Target-based outcomes offsets model</a>, and the Commonwealth <a href="#">EPBC Act Environmental Offsets Policy</a> where the impact is for MNES.</li> </ul>

Aspect	Specific work and information required
	<ul style="list-style-type: none"> <li>• Include an assessment of any proposed offsets against the six offsets principles in the <a href="#">NT Offsets Framework Principles</a>.</li> <li>• The area and extent of any significant residual impacts must also be quantified.</li> </ul>

## 3.2. Terrestrial environmental quality

**Table 6: Minimum information required for assessment of Terrestrial environmental quality**

Aspect	Specific work and information required
<b>NT EPA objective:</b> Protect the quality and integrity of land and soils so that environmental values are supported and maintained.	
Relevant activities	<ul style="list-style-type: none"> <li>• Ground disturbance within the proposal footprint to accommodate the mining areas and proposal infrastructure, and</li> <li>• Mining operations.</li> </ul>
Environmental values	<ul style="list-style-type: none"> <li>• Characterise the existing environment, considering topography, geology, landforms and landscape, land suitability and soils.</li> <li>• Characterise the chemical and physical nature of the ore, mine waste (overburden, rejects/tailings) materials and product.</li> </ul>
Potential significant impacts and risks	<p>Identify potential significant impacts and risks to the terrestrial environment and:</p> <ul style="list-style-type: none"> <li>• Describe the proposed activities and pathways by which terrestrial environmental quality could potentially be affected by the proposal, and undertake a risk assessment addressing soil erosion, dispersive soils, potential acid sulfate soils, surface hydrology and sediment transport.</li> <li>• Using appropriate studies, investigations and relevant information, quantify the direct, indirect and cumulative impacts of the proposal on terrestrial environmental quality, and assess the significance of those impacts.</li> </ul>
Avoidance, mitigation and management	<p>Outline the measures for avoiding or mitigating potential significant impacts identified above, with consideration of section 26 (Environmental decision-making hierarchy) and section 27 (Waste management hierarchy) of the EP Act. Also consider measures to restore environmental quality.</p> <ul style="list-style-type: none"> <li>• Describe the proposed avoidance, mitigation and management measures to be implemented, applying the management hierarchies (sections 26 and 27 of EP Act), including an assessment of their effectiveness and considerations for mine closure and rehabilitation.</li> <li>• Demonstrate that all reasonable and practicable avoidance and mitigation measures would be taken to ensure residual impacts and risks are acceptable.</li> <li>• Discuss adaptation to a changing climate including design and resultant viability of the proposal, with reference to the NT policy <a href="#">Northern Territory Climate Change Response: Towards 2050</a> and <a href="#">Climate Change in the</a></li> </ul>

Aspect	Specific work and information required
	<p><a href="#">Northern Territory: State of the science and climate change impacts</a>.</p> <ul style="list-style-type: none"> <li>Substantiate proposed mitigation measures with consideration of best practice standards including benchmarking of mitigation measures at similar facilities and with advice from relevant Australian and NT government authorities.</li> <li>Describe how the NT EPA's objective for this factor and the predicted environmental outcomes can be met.</li> </ul>
Monitoring and reporting	<ul style="list-style-type: none"> <li>Outline proposed monitoring and reporting activities related to potential significant impacts and risks, and mitigation and management measures. The proposed monitoring and reporting should address potential impacts and risks from each project phase.</li> <li>Substantiate proposed monitoring activities with consideration of best practice standards and advice from relevant government authorities.</li> </ul>
Residual impact	<ul style="list-style-type: none"> <li>Identify and, where possible, quantify any potential residual impact of the proposal on environmental values.</li> </ul>
Offsets	<ul style="list-style-type: none"> <li>Where significant residual impacts remain (after applying the environmental decision making hierarchy), determine and quantify any significant residual impacts by applying the <a href="#">NT Offsets framework</a> and <a href="#">Target-based outcomes offsets model</a>, and the Commonwealth <a href="#">EPBC Act Environmental Offsets Policy</a> where the impact is for MNES.</li> <li>Include an assessment of any proposed offsets against the six offsets principles in the <a href="#">NT Offsets Framework Principles</a>.</li> <li>The area and extent of any significant residual impacts must also be quantified.</li> </ul>

### 3.3. Terrestrial ecosystems

Table 7: Minimum information required for assessment of Terrestrial ecosystems

Aspect	Specific information required
<p><b>NT EPA objective:</b> Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.</p>	
Relevant activities	<ul style="list-style-type: none"> <li>Disturbance of habitat in the construction footprint to accommodate the mining areas and proposal infrastructure.</li> <li>Clearing of habitat in the construction footprint to accommodate the mining areas and proposal infrastructure Use of plant and equipment during all stages of the proposal.</li> <li>Management of pest species and biosecurity measures particularly the potential threat of cane toads on native fauna and ecosystem processes (as mentioned in Table 5 as well).</li> </ul>
Environmental values	<ul style="list-style-type: none"> <li>Identify all terrestrial ecological values present or likely to be present within</li> </ul>

Aspect	Specific information required
	<p>the areas potentially impacted by the proposal.</p> <ul style="list-style-type: none"> <li>• Carpentarian antechinus (<i>Pseudantechinus mimulus</i>) has been recently detected on Groote Eylandt and suitable habitat for it occurs on Winchelsea Island. Conduct appropriate surveys to determine presence and habitat on Winchelsea Island and assess potential impacts on this species.</li> <li>• The presence of Ghost Bats on Winchelsea Island is currently uncertain. Conduct appropriate surveys to determine habitat and/or roosts used or potentially used by ghost bats on Winchelsea Island.</li> <li>• Appropriate targeted surveys for the Ghost bat should be undertaken approximately six months apart (i.e. one in the dry season and one in the wet season, six months apart), as the species has the potential to be present in some or all seasons. This recommendation becomes more relevant in habitats in the NT, where seasonal climate variability is strong, significantly influencing the distribution of bat species.</li> <li>• Appropriate targeted survey for the Ghost bat should be undertaken on the whole Island, including sandstone habitats (vegetation class 15) to determine the presence of critical roosting habitat.</li> <li>• Thorough and appropriate targeted survey for the Masked Owl (northern) should be undertaken within the whole proposal site and on Winchelsea Island to determine habitat use and importance of the population.</li> <li>• Survey efforts for the Masked Owl (northern) must align with the requirements in the <a href="#">Survey guidelines for Australia's threatened birds</a>.</li> <li>• Surveys suggests that the Brush-tailed Rabbit-rat occurs at low abundance and is patchily distributed on Groote Eylandt. The species was not detected during camera trapping surveys within the proposal area on Winchelsea Island however, the likelihood of occurrence of this species is considered high. Conduct further appropriate targeted surveys to resolve the uncertainty.</li> <li>• Undertake appropriate and robust targeted flora and fauna surveys, taking into account seasonal, spatial and temporal differences, to describe the terrestrial ecosystem values that could be impacted by the proposal, with detail on vegetation communities, flora species and fauna species. Provide a description of communities and species of regional and national significance, and pest and introduced species. The vegetation mapping must be to at least NVIS level 4 or higher.</li> <li>• Thorough, appropriate and robust targeted surveys, identify the known, likely and potential presence of threatened ecological communities and species (identified in preliminary terrestrial ecology studies for the proposal, NR Maps and the Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) as target species) under the EPBC Act.</li> </ul> <p>The known and potential threatened, migratory and/or marine species listed under the EPBC Act or the <i>Territory Parks and Wildlife Conservation Act 1976</i> (TPWC Act) are identified as target species in preliminary terrestrial ecology studies for the proposal and includes but is not limited to:</p> <ul style="list-style-type: none"> <li>• Northern Hopping-mouse (<i>Notomys aquilo</i>)</li> <li>• Northern Masked owl (<i>Tyto novaehollandiae kimberli</i>)</li> </ul>



Aspect	Specific information required
	<ul style="list-style-type: none"> <li>• Northern Quoll (<i>Dasyurus hallucatus</i>)</li> <li>• Brush-tailed Rabbit-rat (<i>Conilurus penicillatus</i>)</li> <li>• Ghost bat (<i>Macroderma gigas</i>)</li> <li>• Bare-rumped Sheathtail bat (<i>Saccolaimus saccolaimus</i>) and</li> <li>• Northern Leaf-nosed bat (<i>Hipposideros stenotis</i>).</li> </ul> <p>Describe the existing condition of habitat and vegetation communities using the appropriate protocol.</p> <p>Describe any existing threatening processes, including extent, severity and frequency of such processes.</p> <p>Species protected under the EPBC Act and TPWC Act must be described subject to appropriate targeted surveys in consultation with Flora and Fauna Division of the Department of Environment, Parks and Water Security (DEPWS) and in consideration of the EPBC Act’s survey guidelines. The survey methodology, including timing and frequency should be discussed with the Flora and Fauna Division of DEPWS.</p>
<p>Potential significant impacts and risks</p>	<p>Describe potential significant impacts and risks to terrestrial ecosystems and address:</p> <ul style="list-style-type: none"> <li>• known and potential threatened, migratory and/or marine species listed under the EPBC Act or the TPWC Act that includes but is not limited to: <ul style="list-style-type: none"> <li>○ Northern Hopping-mouse (<i>Notomys aquilo</i>)</li> <li>○ Northern Masked owl (<i>Tyto novaehollandiae kimberli</i>)</li> <li>○ Northern Quoll (<i>Dasyurus hallucatus</i>)</li> <li>○ Brush-tailed Rabbit-rat (<i>Conilurus penicillatus</i>)</li> <li>○ Ghost bat (<i>Macroderma gigas</i>)</li> <li>○ Bare-rumped Sheathtail bat (<i>Saccolaimus saccolaimus</i>) and</li> <li>○ Northern Leaf-nosed bat (<i>Hipposideros stenotis</i>).</li> </ul> </li> <li>• direct loss of flora/ecological communities from vegetation clearing and ongoing maintenance (e.g. fire and vegetation management) including significant and sensitive vegetation<sup>9</sup> and potential habitats for threatened species listed under TPWC Act and EPBC Act or fauna species that are locally sensitive to impacts. Provide an overview of the extent (ha) of the loss in table and map format</li> <li>• the potential threat of cane toads on native fauna and ecosystem processes</li> <li>• indirect disturbance or degradation of vegetation communities, possibly resulting in a long-term decline or loss over time, for example from erosion, dust, weeds/pathogens, disturbance of acid sulfate soils, etc.</li> <li>• introduction or increase of weed and pest species due to proposal activities</li> </ul>

<sup>9</sup> NT Planning Scheme Land Clearing Guidelines (DEPWS 2021)

Aspect	Specific information required
	<ul style="list-style-type: none"> <li>• changes in fire frequency, intensity and timing due to anthropogenic factors</li> <li>• direct impacts on threatened or sensitive fauna and fauna habitat (including behaviours) from clearing, operating plant, vehicles and equipment, noise and/or light</li> <li>• indirect impacts on threatened or sensitive fauna and fauna habitat due to changes to water quality or hydrological processes, reduced habitat availability, or fragmentation and edge effects</li> </ul> <p>Determine the areas that could feasibly experience those impacts. Classify the areas as:</p> <ul style="list-style-type: none"> <li>• proposal footprint – or direct disturbance footprint. These are the areas of proposed infrastructure, vegetation clearing and direct use</li> <li>• area of influence – or indirect disturbance footprint. These are surrounding areas that may be indirectly affected by proposed activities, for example via noise disturbances, artificial light spillage, the release of contaminants (air, water, land), changes to land, water, and also cumulative impacts with other natural processes (e.g. cyclones), industries or proposals.</li> </ul> <p>Quantify extent of impacts on terrestrial ecosystems relating to a changing climate, and how these have been considered cumulatively to proposal impacts.</p>
<p>Avoidance, mitigation and management</p>	<p>Outline the measures for avoiding or mitigating potential significant impacts identified above, with consideration of sections 26 (Environmental decision-making hierarchy) and section 27 (Waste management hierarchy) of the EP Act, and EPBC Act statutory documents.</p> <p>Also consider measures to enhance or restore environmental quality through restoration or rehabilitation in line with section 42 of the EP Act.</p> <p>These should address at a minimum:</p> <ul style="list-style-type: none"> <li>• mine design and layout</li> <li>• noise disturbance and artificial light spillage management and control</li> <li>• fire management</li> <li>• rehabilitation management</li> <li>• clearing of native vegetation</li> <li>• pest/weed/pathogen control and management</li> <li>• compliance with any statutory or policy basis for the proposed measures.</li> </ul> <p>Describe how declared weeds under the <i>NT Weeds Management Act 2001</i> would be managed.</p> <p>Bellyache bush, gamba grass, grader grass and neem are subject to Statutory Weed Management Plans. Describe how management obligations outlined in these statutory plans would be adhered to.</p> <p>Gamba grass, para grass, perennial mission grass and annual mission grass, as well as olive hymenachne are listed as a Key Threatening Process (KTP) and are subject to Threat Abatement Plans (TAPs) under the EPBC Act. Describe how TAPs would be complied with.</p>

Aspect	Specific information required
	<p>Provide a weed management plan for preventing the introduction and/or spread of declared weeds and KTP grasses to the site, within the site and from the site, and the island generally.</p> <p>A comprehensive and effective quarantine plan is required to ensure that the proposed action does not provide a vector for introduction of the Cane Toad to Winchelsea Island.</p> <p>Provide a toad management plan that includes details of robust measures to prevent the introduction of the cane toad to Winchelsea Island. The plan must:</p> <ul style="list-style-type: none"> <li>• include details of monitoring and assurance measures to evaluate the success of the measures, and contingency measures in case of failure or breach</li> <li>• be consistent and complement other cane toad management plans being prepared or currently being implemented within the Groote Archipelago.</li> <li>• include regular audits and performance reviews to ensure it remains effective and up to date.</li> </ul> <p>Discuss adaptation to a changing climate including design and resultant viability of the proposal.</p> <p>All mitigation measures should be substantiated and in accordance with best practice, including advice from relevant government advisory agencies.</p>
Monitoring and reporting	<p>Outline proposed monitoring and reporting activities related to potential significant impacts and risks and mitigation and management measures to terrestrial ecosystems. The proposed monitoring and reporting should address the potential impacts and risks of each project phase, i.e. construction or operations.</p> <p>Provide a detailed cane toad monitoring and reporting protocol that has sufficient sensitivity to detect plan failure.</p> <p>All monitoring activities should be substantiated and in accordance with best practice advice from relevant government advisory agencies.</p>
Residual impact	<p>Identify and, where possible, quantify any potential residual impact of the proposal on environmental values.</p>
Offsets	<p>Where a significant residual impact may remain after applying the environmental decision-making hierarchy, identify offsets and describe how any proposed offset is consistent with the NT Offsets Framework (as published) and EPBC Act environmental offsets policy.</p>

### 3.4. Hydrological processes

**Table 8: Minimum information required for assessment of Hydrological processes**

Aspect	Specific information required
<p><b>NT EPA objective:</b> Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.</p>	
<p>Relevant activities</p>	<ul style="list-style-type: none"> <li>• Clearing of vegetation and disturbing the natural surface and flowpaths in the construction footprint to accommodate the mining areas and proposal infrastructure</li> <li>• Lowering the watertable and dewatering during mining operations</li> <li>• Taking of water flowing or contained in a waterway</li> <li>• Taking water from a bore, reinjecting water to recharge an aquifer, or disposing of water directly or indirectly into groundwater</li> <li>• Interfering with a waterway by causing:               <ul style="list-style-type: none"> <li>○ a material change to the shape of a waterway, or</li> <li>○ volume, speed or direction of flow, or likely flow of a waterway, or</li> <li>○ an alteration to the stability of bed or banks of a waterway, including the removal of vegetation.</li> </ul> </li> </ul>
<p>Environmental values</p>	<p>Describe the following:</p> <ul style="list-style-type: none"> <li>• climate and meteorological conditions of the proposal's area of influence with reference to hydrological regimes, the frequency and severity of extreme weather conditions, such as storms and cyclones</li> <li>• surface water, surface water catchment systems of the proposal's area of influence including detail on any waterways of significance, drainage patterns, flow variations and flooding</li> <li>• groundwater, groundwater systems and hydrogeology of relevant proposal areas</li> <li>• any relevant water control districts and water allocation plans</li> <li>• the estimated sustainable yield of any water resources from which water is proposed to be sought for the proposal, taking into account any water allocation plan applying to the area in question</li> <li>• declared beneficial uses, existing users, water quality objectives and environmental values of water resources in proposal's area of influence.</li> </ul> <p>Provide detailed maps to support the above descriptions.</p> <p>Provide results and interpretation of any hydrological and hydrogeological surveys of the area of influence.</p>
<p>Potential significant impacts and risks</p>	<p>Describe potential significant impacts and risks to hydrological processes and characterise:</p> <ul style="list-style-type: none"> <li>• the natural catchment and surface and groundwater hydrology, for example from the creation of pits, roads, hardstand surfaces, dams and other</li> </ul>

Aspect	Specific information required
	<p>infrastructure through construction and operation of the proposal</p> <ul style="list-style-type: none"> <li>• surface water flows (including impacts on other current and likely future groundwater users and the environment)</li> <li>• groundwater use (including impacts on other current and likely future groundwater users and the environment)</li> <li>• groundwater quality including the risk of saltwater intrusion.</li> </ul> <p>Determine the proposal footprint and influence that could feasibly experience those impacts.</p> <p>Provide an assessment of potential significant impacts on hydrological processes utilising outcomes of investigations and other relevant information. As a minimum, the assessment should take into consideration:</p> <ul style="list-style-type: none"> <li>• methods, equipment, timing and frequency</li> <li>• any cumulative impacts with other industries or proposals</li> <li>• environmental management requirements associated with seasonal weather, extreme weather conditions such as storms and cyclones for the 10%, 5%, 2%, 1% and 0.1% annual exceedance probability (AEP) design events</li> <li>• reversibility of potential impacts (including timeframe).</li> </ul> <p>The assessment must take into account all construction and operation activities of the proposal.</p> <p>The assessment must identify potential impacts and risks to hydrological processes and quantify their significance:</p> <ul style="list-style-type: none"> <li>• against relevant guideline thresholds</li> <li>• on the beneficial uses, water quality objectives and identified environmental values including groundwater dependent ecosystems and existing ground and surface water users.</li> </ul> <p>Quantify extent of impacts on hydrological processes relating to a changing climate, and how these have been considered cumulatively to proposal impacts.</p>
<p>Avoidance, mitigation and management</p>	<p>Outline the measures for avoiding or mitigating potential significant impacts and risks identified above, with consideration of sections 26 (Environmental decision making hierarchy) and section 27 (Waste management hierarchy) of the EP Act. Also consider measures to enhance or restore environmental quality. These should address at a minimum:</p> <ul style="list-style-type: none"> <li>• mine design and layout</li> <li>• water management and efficiency, including stormwater and wastewater management</li> <li>• water efficiency</li> <li>• waste management including a detailed description of management methods for all types of wastes</li> <li>• geomorphic stability</li> <li>• compliance with any statutory or policy basis for the proposed measures</li> </ul>

Aspect	Specific information required
	<p>Discuss the design features of the proposal that will allow it to adapt to a changing hydrological environment.</p> <p>All mitigation measures should be substantiated and in accordance with best practice, including advice from relevant government advisory agencies.</p>
Monitoring and reporting	<p>Outline proposed monitoring and reporting activities related to potential significant impacts and risks and mitigation and management measures to hydrological processes.</p> <p>The proposed monitoring and reporting should specify which project phase it relates to, i.e. construction or operations.</p> <p>The proposed water monitoring measures must identify the purpose of each measure e.g. groundwater/surface water model verification or identification of impacts.</p> <p>All monitoring activities should be substantiated and in accordance with best practice advice from relevant government advisory agencies.</p>
Residual impact	Identify any potential residual impact of the proposal on environmental values.
Offsets	Where a significant residual impact may remain after applying the environmental decision-making hierarchy, identify offsets and describe how any proposed offset is consistent with the NT Offsets Framework (as published) and EPBC Act environmental offsets policy.

### 3.5. Inland water environmental quality

**Table 9: Minimum information required for assessment of Inland water environmental quality**

Aspect	Specific information required
<b>NT EPA objective:</b> Protect the quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.	
Relevant Activities	<ul style="list-style-type: none"> <li>Mining operations and ground disturbance activities within the proposal footprint generating sediments, dust, reject material and waste</li> <li>Operation of mining infrastructure, plant and equipment generating dust, reject material and waste.</li> </ul>
Environmental values	<p>Describe the water quality (chemical, physical and biological) of surface water and groundwater in the proposal's area of influence.</p> <p>Provide detailed maps to support the above descriptions.</p> <p>Provide results and interpretation of any hydrological and hydrogeological surveys of the area of influence.</p>
Potential significant impacts and risks	<p>Describe potential significant impacts and risks to water quality and describe:</p> <ul style="list-style-type: none"> <li>changes to surface water quality from sediment, mine waste management,</li> </ul>

Aspect	Specific information required
	<p>mineral processing and product storage and transfer</p> <ul style="list-style-type: none"> <li>• changes to groundwater quality from seepage</li> <li>• contamination from hazardous materials.</li> </ul> <p>Determine the proposal footprint and area of influence that could feasibly experience those impacts.</p> <p>Provide an assessment of potential impacts, benefits and risks to inland water environmental quality utilising outcomes of investigations and/or other relevant information. As a minimum, the assessment should take into consideration:</p> <ul style="list-style-type: none"> <li>• methods, equipment, timing and frequency</li> <li>• potential contaminants/pollutants</li> <li>• cumulative impacts with other industries or proposals.</li> <li>• environmental management requirements associated with seasonal weather, extreme weather conditions such as storms and cyclones for the 10%, 5%, 2%, 1% and 0.1% annual exceedance probability (AEP) design events</li> <li>• the physical and chemical characteristics, volume, timing and location of any discharges</li> <li>• the reversibility of potential impacts (including timeframe).</li> </ul> <p>The assessment must take into account all construction and operation activities of the proposal.</p> <p>The assessment must identify potential impacts and risks to inland water environmental quality and quantify their significance:</p> <ul style="list-style-type: none"> <li>• against site specific water quality data and any relevant guideline thresholds including ANZG (2018)</li> <li>• on the beneficial uses, water quality objectives and identified environmental values.</li> </ul> <p>Quantify extent of impacts on inland water environmental quality relating to a changing climate, and how these have been considered cumulatively to proposal impacts.</p>
<p>Avoidance, mitigation and management</p>	<p>Outline the measures for avoiding or mitigating potential significant impacts identified above, with consideration of sections 26 (Environmental decision making hierarchy) and section 27 (Waste management hierarchy) of the EP Act. Also consider measures to enhance or restore environmental quality.</p> <p>These should address at a minimum:</p> <ul style="list-style-type: none"> <li>• mine design and layout</li> <li>• water management and efficiency, including stormwater, wastewater and mine-affected water management</li> <li>• waste management including a detailed description of management methods for all types of wastes</li> <li>• erosion, sediment and drainage controls</li> </ul>

Aspect	Specific information required
	<ul style="list-style-type: none"> <li>compliance with any statutory or policy requirements for the proposed measures.</li> </ul> <p>Provide an overview of water quality of any controlled discharge (including targets in accordance with ANZG (2018), best practice erosion and sediment control guidance and other relevant guidance), location of the discharge point/s, and schedule for discharges.</p> <p>Discuss adaptation to a changing climate including design and resultant viability of the proposal.</p> <p>All mitigation measures should be substantiated and in accordance with best practice, including advice from relevant government advisory agencies.</p>
Monitoring and reporting	<p>Outline proposed monitoring and reporting activities related to potential impacts, risks, mitigation and management measures.</p> <p>The proposed monitoring and reporting should specify which proposal phase it relates to, i.e. construction or operations.</p> <p>All monitoring activities should be substantiated and in accordance with best practice advice from relevant government advisory agencies.</p>
Residual impact	Identify any potential residual impact of the proposal on environmental values.
Offsets	Where a significant residual impact may remain after applying the environmental decision-making hierarchy, identify offsets and describe how any proposed offset is consistent with the NT Offsets Framework (as published) and EPBC Act environmental offsets policy.

### 3.6. Aquatic ecosystems

Table 10: Minimum information required for assessment of Aquatic ecosystems.

Aspect	Specific information required
<p><b>NT EPA objective:</b> Protect aquatic habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.</p>	
Relevant activities	<ul style="list-style-type: none"> <li>Clearing of vegetation and disturbing the natural surface and surface hydrology in the construction footprint to accommodate the mining areas and proposal infrastructure</li> <li>Lowering the watertable and dewatering during mining operations, and changing groundwater seepage /discharge points</li> </ul>
Environmental values	<p>Describe the aquatic ecosystems and groundwater dependent ecosystems in the proposal's area of influence.</p> <p>Provide detailed maps to support the above descriptions.</p> <p>Provide results and interpretation of any aquatic ecology surveys of the area of influence.</p>



Aspect	Specific information required
<p>Potential significant impacts and risks</p>	<p>Describe potential significant impacts and risks to aquatic ecosystems from:</p> <ul style="list-style-type: none"> <li>• direct and indirect disturbance to waterways and/or wetlands and associated ecological and hydrological values during proposal construction and operation, including but not limited to:               <ul style="list-style-type: none"> <li>○ pit development and mine waste storage</li> <li>○ mining and construction infrastructure, where in proximity to waterways/wetlands, e.g. sedimentation, erosion, uncontrolled runoff</li> <li>○ processing infrastructure, where in proximity to waterways/wetlands.</li> </ul> </li> </ul> <p>Determine the proposal footprint and area of influence that could feasibly experience those impacts.</p> <p>Provide an assessment of potential impacts, benefits and risks to aquatic ecosystems utilising outcomes of investigations and/or other relevant information. As a minimum, the assessment should take into consideration:</p> <ul style="list-style-type: none"> <li>• methods, equipment, timing and frequency</li> <li>• cumulative impacts with other industries or proposals</li> <li>• the reversibility of potential impacts (including timeframe).</li> </ul> <p>The assessment must take into account all construction and operation activities of the proposal.</p> <p>The assessment must identify potential impacts and risks to aquatic ecosystems and quantify their significance:</p> <ul style="list-style-type: none"> <li>• against relevant guideline thresholds</li> <li>• on the beneficial uses, water quality objectives and identified environmental values including groundwater dependent ecosystems and existing ground and surface water users.</li> </ul> <p>Quantify extent of impacts on aquatic ecosystems relating to a changing climate, and how these have been considered cumulatively with proposal impacts.</p>
<p>Avoidance, mitigation and management</p>	<p>Outline the measures for avoiding or mitigating potential significant impacts identified above, with consideration of sections 26 (Environmental decision-making hierarchy) and section 27 (Waste management hierarchy) of the EP Act. Also consider measures to enhance or restore environmental quality.</p> <p>These should address at a minimum:</p> <ul style="list-style-type: none"> <li>• mine design and layout</li> <li>• compliance with any statutory or policy basis for the proposed measures.</li> </ul> <p>Describe the measures for mitigating the introduction and spread of aquatic weeds including the KTPs para grass and olive hymenachne</p> <p>Discuss adaptation to a changing climate including design and resultant viability of the proposal.</p> <p>All mitigation measures should be substantiated and in accordance with best practice, including advice from relevant government advisory agencies.</p>

Aspect	Specific information required
Monitoring and reporting	<p>Outline proposed monitoring and reporting activities related to potential significant impacts and risks and mitigation and management measures to aquatic ecology.</p> <p>The proposed monitoring and reporting should specify which project phase it relates to, i.e. construction or operations.</p> <p>All monitoring activities should be substantiated and in accordance with best practice advice from relevant government advisory agencies.</p>
Residual impact	Identify any potential residual impact of the proposal on environmental values.
Offsets	Where a significant residual impact may remain after applying the environmental decision-making hierarchy, identify offsets and describe how any proposed offset is consistent with the NT Offsets Framework (as published) and EPBC Act environmental offsets policy.

### 3.7. Coastal processes

**Table 11: Minimum information required for assessment of Coastal processes.**

Aspect	Specific information required
<b>NT EPA objective:</b> Protect the geophysical and hydrological processes that shape coastal morphology so that the environmental values of the coast are maintained.	
Relevant activities	<ul style="list-style-type: none"> <li>• Construction of infrastructure and operations within the proposal footprint onshore, nearshore and offshore to accommodate transport and transshipping ore.</li> <li>• Operation of infrastructure and plant, dredging and dredge spoil disposal within the proposal footprint onshore, nearshore and offshore.</li> <li>• Operation of marine infrastructure and vessels, and use of plant and equipment.</li> </ul>
Environmental values	<p>Describe and synthesise the significance of the physical characteristics and coastal processes from a regional perspective, as well as from within the proposal's area of influence (direct and indirect) perspective. This should focus on pre-existing conditions and natural fluctuations, including seasonality, duration, and frequency aspects at local and regional scales.</p> <p>This includes, but is not restricted to, consideration of:</p> <ul style="list-style-type: none"> <li>• bathymetry at a sufficient spatial resolution to inform hydrodynamic, sediment transport, plume, wave and benthic habitat modelling. Maps should include contours for the tide levels Lowest Astronomical Tide, Mean Low Water Springs, Mean Low Water Neaps, Mean Sea Level, Mean High Water Springs and Highest Astronomical Tide</li> <li>• tidal currents (broad regional characteristics and fine-scale local characteristics, direction and maximum current strength for neap and spring) and tidal energy at the seafloor (bottom shear stress)</li> <li>• wave characteristics (natural variability, season (wet, dry, build-up),</li> </ul>

Aspect	Specific information required
	<p>frequency, height, duration and extreme weather events, and wave energy at the seafloor)</p> <ul style="list-style-type: none"> <li>• combined current and wave energy at the seafloor</li> <li>• basic environmental parameters such as seawater temperature and salinity (minimum, maximum, medium, seasonal variability, temporal and spatial variability (local and regional)) at the sea surface and seafloor</li> <li>• seafloor characteristics (continuous interpolated data layers) showing grainsize characteristics percentage muds, fine, medium and coarse sands, gravel and hard substrates</li> <li>• sediment mobility characteristics (seasonal, spatial variability at local and regional scales)</li> <li>• coastal geomorphology (seafloor and terrestrial environments).</li> </ul> <p>Identify the construction and operational activities that can impact on coastal processes and the geomorphological values they shape.</p> <p>Provide cross-references to other sections in the EIS where coastal processes can result in changes to other NT EPA listed factors.</p> <p>Provide supporting evidence (data, reports) of any investigations undertaken in the area of influence (direct or indirect) that inform the EIS.</p>
<p>Potential significant impacts and risks</p>	<p>Describe potential pathways for how infrastructure and activities during construction and operation can impact on coastal processes and geomorphological values.</p> <p>Undertake assessments using modelling and/or analyses to determine the area of influence (direct and indirect); to predict changes to coastal processes and geomorphology; and assess the significance of these impacts.</p> <p>This may require:</p> <ul style="list-style-type: none"> <li>• hydrodynamic modelling to ascertain changes in currents within the water column and at the seafloor. Model resolution should have broad regional aspect and fine-scale local aspect and modelling outputs need to take into account short and long-term impacts</li> <li>• sediment transport modelling to ascertain changes to sediment transport due to planned coastal infrastructure and fate of spilt ore at the loading bay and transshipment area</li> <li>• sediment plume modelling to ascertain changes in suspended sediments at the loading and transshipment areas with the ability to model the extent, duration, size and depth characteristics of suspended sediment plumes from mine ore spill and consequences thereof to the benthic and pelagic environment</li> <li>• wave model to ascertain the potential of re-suspending sediments, including deposited suspended sediments/mining ore.</li> </ul>
<p>Avoidance, mitigation and management</p>	<p>Outline the measures for avoiding or mitigating potential significant impacts identified above, with consideration of sections 26 (Environmental decision making hierarchy) and section 27 (Waste management hierarchy) of the EP Act. Also consider measures to enhance or restore environmental quality.</p>

Aspect	Specific information required
	<p>These should address at a minimum:</p> <ul style="list-style-type: none"> <li>• facility design and layout</li> <li>• construction/installation methods</li> <li>• noise disturbance and artificial light spillage management and control</li> <li>• erosion and sediment control</li> <li>• marine water quality management</li> <li>• marine pest control</li> <li>• potential acid sulfate soil management</li> <li>• spill response</li> <li>• compliance with any statutory or policy basis for the proposed measures.</li> </ul> <p>Assess the metocean conditions (e.g. currents and waves) ensuring that:</p> <ul style="list-style-type: none"> <li>• 3D Hydrodynamic modelling is undertaken (to facilitate sediment transport modelling)</li> <li>• the wave model is calibrated with seasonal wind data characteristics</li> <li>• the performance of current and wave models are qualitatively and quantitatively validated</li> <li>• modelling is undertaken to establish existing and changes in current - wave energy characteristics at the seafloor from project activities, and</li> <li>• before, after, and residual change spatial maps are included.</li> </ul> <p>Develop a Sediment Transport Model ensuring that:</p> <ul style="list-style-type: none"> <li>• 3D Hydrodynamic modelling is undertaken</li> <li>• long-shore sediment drift, suspended sediments, and bed load sediment transport (as sediment transport pathways) are modelled</li> <li>• the modelled sediment parameters reflect sediment and suspended sediment characteristics, and if appropriate should include multiple grain sizes classes</li> <li>• all models required to be calibrated and validated, and performance of all models is qualitatively and quantitatively validated</li> <li>• the cumulative effect of these three sediment transport pathways is assessed</li> <li>• the seasonal aspects of sediment transport pathways are assessed, and</li> <li>• before, after, and residual change spatial maps are included.</li> </ul> <p>Include (as an appendix to the Draft EIS) an independent qualified person(s) review of the completed hydrodynamic, sediment transport and plume modelling.</p> <p>Discuss adaptation to a changing climate including design and resultant viability of the proposal.</p> <p>All mitigation measures should be substantiated and in accordance with best</p>

Aspect	Specific information required
	practice, including advice from relevant government advisory agencies.
Monitoring and reporting	<p>Outline proposed monitoring and reporting activities related to potential significant impacts and risks, and mitigation and management measures.</p> <p>The proposed monitoring and reporting should specify which project phase it relates to, i.e. construction or operations.</p> <p>All monitoring activities should be substantiated and in accordance with best practice advice from relevant government advisory agencies.</p>
Residual impact	Identify any potential residual impact of the proposal on environmental values.
Offsets	Where a significant residual impact may remain after applying the environmental decision-making hierarchy, identify offsets and describe how any proposed offset is consistent with the NT Offsets Framework (as published) and EPBC Act environmental offsets policy.

### 3.8. Marine environmental quality

**Table 12: Minimum information required for assessment of Marine environmental quality.**

Aspect	Specific information required
<b>NT EPA objective:</b> Protect the quality and productivity of water, sediment and biota so that environmental values are maintained.	
Relevant activities	<ul style="list-style-type: none"> <li>Construction of infrastructure and operations within the proposal footprint onshore, nearshore and offshore to accommodate transport and transshipping ore (includes dredging and offshore dredge spoil disposal).</li> <li>Operation of marine infrastructure and vessels, and use of plant and equipment.</li> </ul>
Environmental values	<p>Describe the water quality (chemical, physical and biological) and sediment characteristics of the marine environment in the proposal's area of influence.</p> <p>This includes, but is not restricted to:</p> <ul style="list-style-type: none"> <li>turbidity, with information required for natural variability (means and peaks), mean, variability measure, time duration, intensity, and model light – turbidity relationships</li> <li>light availability for primary producers in water column and primary-producing habitats at the seafloor. Minimum data requirements being the natural variability of light conditions in the water column and at the seafloor, seasonal variability, time duration estimates of low-light conditions, and model light – turbidity relationships</li> <li>nutrients, with minimum data requirements being: modelled speciation of nutrients within fine-scale and seasonal context, organic matter, and nutrient pathways between water column and sediments</li> <li>underwater noise, with minimum data requirements being to establish</li> </ul>

Aspect	Specific information required
	<p>background underwater noise characteristics within a local context and environmental conditions (depth, substrate types, water temperature and salinity); review tolerance levels for sensitive receptors</p> <ul style="list-style-type: none"> <li>the physical and chemical characteristics of the sediment within the dredge and dredge spoil footprint, the proposal footprint and zone of influence (the surveyed baseline) including acid sulfate soil potential, toxicities and nutrients</li> <li>the location, and physical and biological characteristics of the spoil disposal site, reclamation site, and transshipping area.</li> </ul> <p>The following is required information for suspended sediments:</p> <ul style="list-style-type: none"> <li>establish seasonal variability for Total Suspended Solids (TSS), turbidity (NTU) and light as Photosynthetic Active Radiation (PAR), to be expressed as a percentage of the sea surface intensity and daily light integrals</li> <li>establish TSS, NTU and PAR relationships (surface, mid-water column and seafloor) for existing sensitive receptors</li> <li>establish baseline conditions that take into account temporal and spatial variability</li> <li>temporal variability taken into account by undertaking monitoring over at least three consecutive neap-spring tides for the Wet, Dry and transitional seasons (under natural environmental conditions). If cyclonic activities occurs during monitoring of baseline conditions, then additional three neap-spring tidal cycles after the cyclone is required</li> <li>assessment of baseline conditions should include frequency and time duration of TSS, Suspended Sediment Concentration (SSC), NTU and sediment deposition and light.</li> </ul> <p>The plume modelling undertaken to assess the characteristics and behaviour of sediment plumes:</p> <ul style="list-style-type: none"> <li>requires 3D modelling</li> <li>should be modelled to reflect seasonal conditions in which dredging and dredge spoil disposal is planned. If unsure of timing, then both Wet and Dry season conditions should be modelled</li> <li>takes into account resuspension of deposited TSS from dredging and dredge spoil disposal</li> <li>includes plume modelling outputs that at a minimum includes: Cumulative Probability TSS/SSC graphs for sites within sensitive receptors, time series SSC graphs and plume dispersion maps, and</li> <li>includes a discussion on how the Construction Environmental Management Plan (CEMP) will implement monitoring to validate plume behaviour and sediment deposition of TSS from dredging and dredge spoil disposal.</li> </ul> <p>Include (as an appendix to the Draft EIS) an independent qualified person(s) review of the completed hydrodynamic, sediment transport and plume modelling (see Coastal processes).</p>
Potential significant	Describe potential significant impacts and risks to marine environmental quality

Aspect	Specific information required
impacts and risks	<p>including but not limited to:</p> <ul style="list-style-type: none"> <li>• impacts on fishing (commercial, recreational, charter)</li> <li>• proposed installation of marine infrastructure causing increased sedimentation in water column, negatively impacting on water quality and aquatic environments</li> <li>• potential to produce site run- off, with impacts on water quality</li> <li>• spills of hazardous materials</li> <li>• acid sulfate soils</li> <li>• all direct and indirect impacts on the seabed from wharf construction, rock armour, anchoring, and any other marine infrastructure or equipment</li> <li>• impact on water quality as a result of dredging, transshipping and spoil disposal (e.g. seabed disturbance, spoil accumulation, sediment plume, increased turbidity etc.).</li> </ul> <p>Determine the proposal footprint, area and zone of influence that could feasibly experience those impacts.</p> <p>Describe and assess how the ore can impact on water and sediment chemistry, chemical pathways between water and sediment column, and sediment health.</p> <p>Describe and assess how suspended sediments and sedimentation from spilt ore and dredging can impact on water quality, light availability at the seafloor and sediment health.</p> <p>Undertake sediment hydrodynamic and transport modelling to predict the extent of potential impacts on benthic habitats within the zone of influence where the zone of influence is to be established using:</p> <ul style="list-style-type: none"> <li>• the 80th percentile from natural background TSS / SSC / NTU concentrations (for dredging related activities), and</li> <li>• zones where suspended sediments from dredging activities is predicted to be deposited.</li> </ul> <p>Assess how underwater noise from construction and operation activities can impact fauna at various life stages (benthos, fishes, turtles and mammals).</p> <p>Provide an assessment of potential impacts, benefits and risks to marine environmental quality utilising outcomes of investigations and/or other relevant information. As a minimum, the assessment should take into consideration:</p> <ul style="list-style-type: none"> <li>• methods, equipment, timing and frequency</li> <li>• the likely scale of disturbance</li> <li>• water management, including stormwater and wastewater management</li> <li>• erosion and sedimentation</li> <li>• cumulative impacts with other industries or proposals</li> <li>• reversibility of impacts.</li> </ul> <p>The assessment must take into account all construction and operation activities of the proposal including dredging and dredge spoil disposal.</p>

Aspect	Specific information required
	<p>The assessment must identify potential impacts and risks to marine environmental quality and quantify their significance:</p> <ul style="list-style-type: none"> <li>• against relevant guideline thresholds</li> <li>• on the beneficial uses, water quality objectives and identified environmental values</li> <li>• direct disturbance to the intertidal zone and potential for disturbance to marine values during project construction and operation.</li> </ul> <p>Quantify extent of impacts on marine environmental quality relating to a changing climate, and how these have been considered cumulatively to proposal impacts.</p>
<p>Avoidance, mitigation and management</p>	<p>Outline the measures for avoiding or mitigating potential significant impacts identified above, with consideration of sections 26 (Environmental decision making hierarchy) and section 27 (Waste management hierarchy) of the EP Act. Also consider measures to enhance or restore environmental quality.</p> <p>These should address at a minimum:</p> <ul style="list-style-type: none"> <li>• facility design and layout</li> <li>• construction/installation methods</li> <li>• erosion and sediment control</li> <li>• sediment health</li> <li>• dredging and dredge spoil management</li> <li>• management transshipping of ore</li> <li>• marine water quality management</li> <li>• marine pest control</li> <li>• potential acid sulfate soil management</li> <li>• spill response</li> <li>• compliance with any statutory or policy basis for the proposed measures.</li> </ul> <p>Discuss adaptation to a changing climate including design and resultant viability of the proposal.</p> <p>All mitigation measures should be substantiated and in accordance with best practice, including advice from relevant government advisory agencies.</p>
<p>Monitoring and reporting</p>	<p>Outline proposed monitoring and reporting activities related to potential significant impacts and risks, and mitigation and management measures.</p> <p>The proposed monitoring and reporting should specify which project phase it relates to, i.e. construction or operations.</p> <p>All monitoring activities should be substantiated and in accordance with best practice advice from relevant government advisory agencies.</p>
<p>Residual impact</p>	<p>Identify any potential residual impact of the proposal on environmental values.</p>



Aspect	Specific information required
Offsets	Where a significant residual impact may remain after applying the environmental decision-making hierarchy, identify offsets and describe how any proposed offset is consistent with the NT Offsets Framework (as published) and EPBC Act environmental offsets policy.

### 3.9. Marine ecosystems

**Table 13: Minimum information required for assessment of Marine ecosystems.**

Aspect	Specific information required
<b>NT EPA objective:</b> Protect marine habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.	
Relevant activities	<ul style="list-style-type: none"> <li>Construction and operation of infrastructure and vessels within the proposal footprint onshore, nearshore and offshore to accommodate transport and transshipping ore impacting the marine environment.</li> </ul>
Environmental values	<p>Describe the environmental values for marine ecosystems that may be significantly impacted (direct or indirectly) within the proposal's area of influence.</p> <p>Describe, characterise and map existing physical, environmental and biological habitats within the area of influence, and assess their representativeness at local and regional scales.</p> <p>Within the area of influence (direct or indirect impacts):</p> <ul style="list-style-type: none"> <li>characterise primary producer habitats (mangroves, seagrass, macro algae, coral dominated communities and mixed benthic communities of seagrass, corals and macro algae), filter feeder habitats and fauna within sediments at a sufficient scale and detail for designing surveys and monitoring programs with sufficient statistical power to detect changes before and after impacts within a local and regional ecological context. This includes, but is not restricted to, presenting presence/absence/abundance data, species composition, extent, temporal and spatial variability, and their reproductive periods</li> <li>describe how ecosystem processes support these habitats and establish ecological windows to determine trigger values of declining health (including light, currents, wave regimes, suspended sediments, turbidity, sedimentation, nutrients) for primary producer habitats</li> <li>describe the role(s) these communities play in maintaining ecosystem processes and values in terms of water quality, food webs, nutrient cycling, primary production, biostructure, and supporting EPBC Act and TPWC Act listed species, subsistence use of wildlife and iconic species</li> <li>for threatened, migratory and/or marine species that have the potential to be significantly impacted, the following aspects of their ecology may be relevant to determining risks:             <ul style="list-style-type: none"> <li>abundance (time duration and frequency), distribution, seasonality, habitat use for feeding, reproduction, nursery, roosting and dispersal /</li> </ul> </li> </ul>

Aspect	Specific information required
	<p>migration characteristics</p> <ul style="list-style-type: none"> <li>○ trigger points for behavioural changes, noise levels for listed species, habitat use, decline in abundance/presence, and health</li> <li>○ habitat requirements (physical and biological) in context of e.g. foraging, breeding, nesting, roosting, migration / dispersal (adults and juveniles)</li> <li>○ proposed survey and monitoring programs need to be designed with sufficient statistical power to detect changes before and after impacts within local and regional ecological context.</li> </ul> <p>The known and potential threatened, migratory and/or marine species listed under the EPBC Act or the <i>Territory Parks and Wildlife Conservation Act 1976</i> (TPWC Act) are identified as target species in preliminary terrestrial ecology studies for the proposal.</p> <p>Describe any listed or threatened marine species within the proposal's area of influence and the Commonwealth Marine Area, and the habitats they rely on, including (but not limited to) the following list derived from the results of the PMST search:</p> <ul style="list-style-type: none"> <li>• All relevant cetaceans</li> <li>• All relevant threatened/migratory marine shorebirds.</li> <li>• Dugong (<i>Dugong dugon</i>)</li> <li>• Flatback turtle (<i>Natator depressus</i>)</li> <li>• Giant Manta Ray (<i>Mobula birostris</i>)</li> <li>• Green turtle (<i>Chelonia mydas</i>)</li> <li>• Hawksbill turtle (<i>Eretmochelys imbricata</i>)</li> <li>• Leatherback turtle (<i>Dermochelys coriacea</i>)</li> <li>• Loggerhead turtle (<i>Caretta caretta</i>)</li> <li>• Narrow Sawfish (<i>Anoxypristis cuspidata</i>)</li> <li>• Olive Ridley Turtle (<i>Lepidochelys olivacea</i>)</li> <li>• Reef Manta Ray (<i>Mobula alfredi</i>)</li> <li>• Saltwater crocodile (<i>Crocodylus porosus</i>)</li> <li>• Whale shark (<i>Rincodon typus</i>)</li> <li>• <i>Pristis pristis</i></li> <li>• <i>Pristis zijsron</i></li> <li>• <i>Pristis clavata</i>.</li> </ul> <p>Undertake targeted marine turtle surveys particularly for the Flatback turtle (<i>Natator depressus</i>), Green turtle (<i>Chelonia mydas</i>) and Hawksbill turtle (<i>Eretmochelys imbricata</i>) to clarify their presence on Winchelsea Island and impacts of the project on these species (including potential impact to any subpopulations).</p> <p>Describe the existing health/condition/amenity of marine ecosystems in the</p>

Aspect	Specific information required
	<p>proposal's area of influence, with reference to threatening processes (e.g. pest species, habitat degradation), underwater noise and vibration, and sedimentation.</p> <p>Mapping requirements for baseline benthic habitats:</p> <ul style="list-style-type: none"> <li>• if underwater video or drop down cameras are used to characterise benthic communities, then the National benthic habitat classification scheme (CATAMI<sup>10</sup>) should be used to classify communities</li> <li>• benthic habitat map is developed using predictive modelling (e.g. Udyawer et al, 2021<sup>11</sup>) rather than drawing polygons around sites with similar community types</li> <li>• a qualitative and quantitative assessment of how well the collected data matches the predictive habitat maps should be undertaken</li> <li>• map extent sensitive receptors are provided and their condition is assessed – at the very least for mangrove, coral, macro algal, seagrass and autotroph/mixotroph sponge dominated communities and filter feeders within the zone of influence, and</li> <li>• established spatial and temporal variability (in particular seagrass and macro algal communities).</li> </ul> <p>For listed threatened and migratory species:</p> <ul style="list-style-type: none"> <li>• provide baseline data to establish the abundance (time duration and frequency), distribution, seasonality, habitat use for feeding, reproduction, nursery, roosting and dispersal / migration characteristics for listed and migratory species, and</li> <li>• establish habitat requirements (physical and biological) in context of e.g. foraging, breeding, nesting, roosting, migration / dispersal (adults, juveniles and larvae).</li> </ul>
<p>Potential significant impacts and risks</p>	<p>Determine the proposal footprint, area and zone of influence that could feasibly experience potential significant impacts (direct and indirect) and risks to habitats and EPBC Act and TPWC Act listed species, in particular to the wharf extension, dredging, dredge spoil disposal and transshipping activities.</p> <p>Key aspects to consider are:</p> <ul style="list-style-type: none"> <li>• understanding of size of the impact, including cumulative impacts of the proposal (from construction and operation activities, dredging and dredge spoil disposal, and transshipping) and competing marine resource users (e.g. indigenous, recreational, commercial users</li> <li>• assessing to what degree physical disturbance will have on densities of ecosystem engineers and subsequent changes in benthic ecosystem processes</li> </ul>

<sup>10</sup> Althaus et al. 2015. A standardised vocabulary for identifying benthic Biota and substrata from underwater imagery, CATAMI, <https://catami.org/>

<sup>11</sup> Udyawer, V., Thums, M., Ferreira, L.C., Tulloch, V. & Kyne, P.M. (2021). Distribution and habitat suitability of Threatened and Migratory marine species in northern Australia. Report to the National Environmental Science Program, Marine Biodiversity Hub

Aspect	Specific information required
	<ul style="list-style-type: none"> <li>• identify and assess for listed species how and to what degree construction and operation activities will impact on habitats for feeding, spawning, nesting, nursery, refuge and movement</li> <li>• assessment of changes in habitat characteristics and species composition, abundance and distribution due to changes in coastal hydrodynamics and potential changes in sedimentation regimes</li> <li>• assessment of potential habitat fragmentation, connectivity and implications on integrity of sensitive habitat and the flora and fauna they support</li> <li>• assessment of potential change/shift the state of the ecosystem; within the short, medium and long-term</li> <li>• assessment of ecological recovery and recolonisation potential</li> <li>• assessment of impacts from hydrological alteration, habitat loss and burial / smoothing on benthos and trophic pathways</li> <li>• assessment of impacts of lighting on marine species</li> <li>• consideration of critical windows of environmental sensitivity that includes times of the year or particular sites where key species or ecological communities or critical processes may be particularly vulnerable to pressures from dredging (e.g. coral spawning, timing and routes for migration, breeding cycles).</li> </ul> <p>Describe potential impacts and risks to marine ecosystems including:</p> <ul style="list-style-type: none"> <li>• impacts on fauna habitat (feeding, nursery, epibenthic, infauna, pelagic, water column etc.) due to changes to marine environment, introduction or spread of contaminants or pest species</li> <li>• impacts on fauna as a result of collision with vessels or survey and/or marine construction equipment or vessels</li> <li>• changes to marine fauna behaviours as a result of noise, vibration or lighting offshore and underwater</li> <li>• disturbance/loss to benthic habitats from dredging and dredge spoil disposal, wharf construction, vessel movement, product loading and unloading, and offshore transshipping operations</li> <li>• impacts on the marine environment from buildings and infrastructure, including wharf construction on the shore, or on land close to the shore</li> <li>• potential impacts on marine turtles and dugongs, including to their foraging habitat, resulting from construction of the wharf. Undertake sediment transport and hydrodynamic modelling to predict the extent of potential impacts on benthic habitats within the vicinity of the project area.</li> <li>• impacts on the seabed and benthic habitats from wharf construction, rock armour, groynes, jetties anchoring, moorings, channel markers, navigation aids, or other infrastructure to be built in waters.</li> </ul> <p>Provide an assessment of potential impacts, benefits and risks to marine ecosystems utilising outcomes of investigations and/or other relevant information.</p>

Aspect	Specific information required
	<p>The assessment should take into consideration:</p> <ul style="list-style-type: none"> <li>• marine and nearshore infrastructure design and layout</li> <li>• methods, equipment, timing and frequency</li> <li>• the likely scale, extent of disturbance</li> <li>• cumulative impacts with other industries or proposals</li> <li>• environmental management requirements associated with seasonal weather, extreme weather conditions such as storms and cyclones for the 10%, 5%, 2%, 1% and 0.1% annual exceedance probability (AEP) design events</li> <li>• reversibility of impacts (including timeframe)</li> <li>• applicable legislation, guidelines and standards.</li> </ul> <p>Quantify extent of impacts on marine ecosystems relating to a changing climate, and how these have been considered cumulatively to proposal impacts.</p>
<p>Avoidance, mitigation and management</p>	<p>Outline the measures for avoiding or mitigating potential significant impacts identified above, with consideration of sections 26 (Environmental decision-making hierarchy) and section 27 (Waste management hierarchy) of the EP Act. Also consider measures to enhance or restore environmental quality.</p> <p>These should address at a minimum:</p> <ul style="list-style-type: none"> <li>• facility design and layout</li> <li>• construction/installation methods, such as: <ul style="list-style-type: none"> <li>○ erosion and sediment control</li> <li>○ potential acid sulfate soil management</li> <li>○ marine water and sediment management, and</li> <li>○ marine pest control</li> <li>○ dredging and dredge spoil management</li> <li>○ management transshipping of ore.</li> </ul> </li> <li>• noise disturbance and artificial light spillage management</li> <li>• underwater noise and vibration management</li> <li>• compliance with any statutory or policy basis for the proposed measures.</li> </ul> <p>The following information is required to establish thresholds (TSS/SSC and PAR) for sensitive receptors:</p> <ul style="list-style-type: none"> <li>• a review of relevant literature in terms of methods for establishing thresholds for sensitive receptors, and apply best practices to establish</li> </ul>

Aspect	Specific information required
	<p>thresholds (e.g. Jones et al. 2019<sup>12</sup>, Lavery et al. 2018<sup>13</sup>, Collier et al. 2016<sup>14</sup>, Abdul Wahab et al. 2019<sup>15</sup>, Pineda et al. 2017<sup>16</sup>)</p> <ul style="list-style-type: none"> <li>• developing trigger values that are absolute and set against natural background values (i.e. no Water Quality reference sites used to determine if a trigger is reached)</li> <li>• an independent review by relevant expert of the proponents derived thresholds and zones of influence/impacts is undertaken and submitted in full as an appendix to the draft EIS.</li> </ul> <p>For listed threatened and migratory species:</p> <ul style="list-style-type: none"> <li>• establish trigger points for behavioural changes, noise levels for listed species, habitat use, decline in abundance/presence, and health, and</li> <li>• survey and monitoring design needs to be designed with sufficient statistical power to detect changes before and after impacts within local and regional ecological context.</li> </ul> <p>Discuss adaptation to a changing climate including design and resultant viability of the proposal.</p> <p>All mitigation measures should be substantiated and in accordance with best practice, including advice from relevant government advisory agencies.</p>
Monitoring and reporting	<p>Outline proposed monitoring and reporting activities related to potential significant impacts and risks, and mitigation and management measures.</p> <p>The proposed monitoring and reporting should specify which project phase it relates to, i.e. construction or operations.</p> <p>All monitoring activities should be substantiated and in accordance with best practice advice from relevant government advisory agencies.</p>
Residual impact	<p>Identify any potential residual impact of the proposal on environmental values.</p>
Offsets	<p>Where a significant residual impact may remain after applying the environmental decision-making hierarchy, identify offsets and describe how any proposed offset is consistent with the NT Offsets Framework (as published) and/or EPBC Act environmental offsets policy.</p>

<sup>12</sup> Jones et al. 2019. Theme 4 Synthesis Report: Defining thresholds and indicators of coral response to dredging-related pressures. Western Australian Marine Science Institution (WAMSI). Perth, Western Australia pp. 36.

<sup>13</sup> Lavery et al. 2018. Synthesis Report: Defining thresholds and indicators of primary producer response to dredging-related pressures. Report of Theme 5 prepared for the Dredging Science Node, Western Australian Marine Science Institution, Perth, Western Australia, 32 pp.

<sup>14</sup> Collier et al. 2016). Light thresholds for seagrasses of the GBR: a synthesis and guiding document. Including knowledge gaps and future priorities. Report to the National Environmental Science Programme. Reef and Rainforest Research Centre Limited, Cairns (41pp.).

<sup>15</sup> Abdul Wahab et al. 2019. Defining thresholds and indicators of filter feeder responses to dredging-related pressures - final synthesis report. Report of Theme 6 – prepared for the Dredging Science Node, Western Australian Marine Science Institution, Perth, Western Australia 26 pp.

<sup>16</sup> Pineda et al. 2017. Effects of combined dredging-related stressors on sponges. Scientific Reports. 7: 5155. DOI:10.1038/s41598-017-05251-x

### 3.10. Air quality

**Table 14: Minimum information required for assessment of Air quality.**

Aspect	Specific information required
<p><b>NT EPA objective:</b> Protect air quality and minimise emissions and their impact so that environmental values are maintained.</p>	
Relevant activities	<ul style="list-style-type: none"> <li>• Construction and mining operations, rehabilitation and closure, handling and processing manganese ore</li> <li>• Power generation using diesel generators.</li> </ul>
Environmental values	<ul style="list-style-type: none"> <li>• Describe the sensitive receptors within and in proximity to the proposal area</li> <li>• Describe the existing air environment</li> <li>• Provide maps and figures to support descriptions as appropriate.</li> </ul>
Potential significant impacts and risks	<p>Describe potential significant impacts on air quality and identify:</p> <ul style="list-style-type: none"> <li>• any sources of emissions which could impact air quality</li> <li>• the impacts on local air quality due to the emission of dust, particulates, and products of fuel combustion during all phases of the proposal</li> <li>• the proposal footprint and area of influence that could feasibly experience those impacts.</li> </ul> <p>Provide an assessment of potential impacts on air quality utilising outcomes of investigations and/or other relevant information. As a minimum, the assessment should take into consideration:</p> <ul style="list-style-type: none"> <li>• methods, equipment, timing and frequency</li> <li>• the likely source, scale and extent of emissions</li> <li>• nature and location of sensitive receptors</li> <li>• cumulative impacts with other activities or proposals</li> <li>• the duration, magnitude and extent of potential impacts.</li> </ul> <p>The assessment must identify and quantify potential impacts on air quality against relevant guidelines and standards.</p> <p>Describe the extent of impacts on air quality relating to climate change, and how these have been considered cumulatively with proposal impacts.</p>
Avoidance, mitigation and management	<p>Outline the measures for avoiding or mitigating potential significant impacts identified above, with consideration of sections 26 (Environmental decision making hierarchy) and section 27 (Waste management hierarchy) of the EP Act. Also consider measures to enhance or restore environmental quality.</p> <p>These should address at a minimum:</p> <ul style="list-style-type: none"> <li>• facility design and layout</li> <li>• construction methods</li> </ul>

Aspect	Specific information required
	<ul style="list-style-type: none"> <li>emission avoidance, mitigation or management measures</li> <li>compliance with any statutory or policy basis for the proposed measures.</li> </ul> <p>All mitigation measures should be substantiated and in accordance with best practice, including advice from relevant government advisory agencies.</p>
Monitoring and reporting	<p>Outline any proposed monitoring and reporting activities related to potential significant impacts and risks, and mitigation and management measures.</p> <p>The proposed monitoring and reporting should specify which project phase it relates to, i.e. construction or operations.</p> <p>All monitoring activities should be substantiated and in accordance with best practice advice from relevant government advisory agencies.</p>
Residual impact	Identify any potential residual impact of the proposal on environmental values.
Offsets	Where a significant residual impact may remain after applying the environmental decision-making hierarchy, identify offsets and describe how any proposed offset is consistent with the NT Offsets Framework (as published) and EPBC Act environmental offsets policy.

### 3.11. Atmospheric processes

Table 15: Minimum information required for assessment of atmospheric processes.

Aspect	Specific information required
<b>NT EPA objective:</b> Minimise greenhouse gas emissions so as to contribute to the NT Government’s target of achieving net zero greenhouse gas emissions by 2050.	
Relevant activities	<ul style="list-style-type: none"> <li>Land clearing</li> <li>Operation of vehicles, plant and equipment</li> <li>Power generation.</li> </ul>
Environmental values	The causal link between GHG emissions and climate change is well established. The NT EPA acknowledges that climate change impacts are being experienced globally and across the Territory.
Potential significant impacts and risks	<p>Describe the measures taken to make a material and meaningful contribution towards achieving the Territory’s target of net zero emissions by 2050.</p> <p>Estimate the proposal’s direct GHG emissions due to Scope 1 (e.g. land clearing, diesel combustion during construction and operation), and Scope 2 emissions (e.g. during construction and operation), and include:</p> <ul style="list-style-type: none"> <li>comparison with NT and national emissions</li> <li>contribution to the NT target of net zero greenhouse gas emissions by 2050 and broader efforts to reduce global greenhouse gas emissions</li> <li>improvements in the supply of renewable energy and meeting NT renewable</li> </ul>



Aspect	Specific information required
	<p>energy targets.</p> <p>Provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO<sub>2</sub> equivalent' terms.</p> <p>Identify the sources for generation of GHG emissions, and quantify GHG emissions from each source for each financial year, including total GHG emissions for the life of the project.</p> <p>Estimate emissions from upstream activities associated with the proposal, including the fossil fuel based electricity to be used during construction, operation and decommissioning and briefly describe the methods used to make the estimates.</p> <p>Assess the potential impacts of the proposal on the Territory and national greenhouse gas inventories and propose measures to avoid and/or minimise greenhouse gas emissions resulting from the proposal, including such activities as transportation of products and consumables, and energy use.</p> <p>Describe how the proposal would contribute to the NT target of net zero greenhouse gas emissions by 2050 and broader efforts to reduce global greenhouse gas emissions.</p>
Avoidance, mitigation and management	<p>Describe any energy efficiency and mitigation and management measures to reduce or minimise GHG emissions, and demonstrate best practice.</p> <p>Describe how proposed measures to maximise energy efficiency and avoid and/or reduce GHG emissions are consistent with the NT Government's target of achieving net zero greenhouse gas emissions by 2050.</p>
Monitoring and reporting	<p>Outline any proposed monitoring and reporting activities related to potential impacts and risks to atmospheric processes, and mitigation and management measures.</p> <p>The proposed monitoring and reporting should specify which proposal phase it relates to, i.e. construction or operations.</p> <p>All monitoring activities should be substantiated and in accordance with best practice advice from relevant government advisory agencies.</p>
Residual impact	<p>Identify any potential residual impact of the proposal on identified values.</p>
Offsets	<p>Where a significant residual impact may remain after applying the environmental decision-making hierarchy, identify offsets and describe how any proposed offset is consistent with the NT Offsets Framework (as published) and EPBC Act environmental offsets policy.</p>

### 3.12. Community and economy

**Table 16: Minimum information required for assessment of Community and economy.**

Aspect	Specific information required
<p><b>NT EPA objective:</b> Enhance communities and the economy for the welfare, amenity and benefit of</p>	

Aspect	Specific information required
current and future generations of Territorians.	
Relevant activities	<ul style="list-style-type: none"> <li>• Construction and mining operations, rehabilitation and closure, handling and processing manganese ore.</li> <li>• Generating employment and social and economic opportunity for local communities.</li> </ul>
Environmental values	<p>Describe the existing socio-economic profile of the proposal's areas of influence, including reference to:</p> <ul style="list-style-type: none"> <li>• key landowners/custodians/stakeholders/communities, and other persons with overlapping or intersecting interests</li> <li>• social values as identified by stakeholders</li> <li>• demographics, including skills audit of affected communities and workforce characteristics</li> <li>• relevant accommodation type and quantity</li> <li>• existing and required local businesses relevant to supply chain, construction and operations</li> <li>• primary economic characteristics within the proposal area</li> <li>• primary employment source/s of townships/communities within or in proximity to the proposal area</li> <li>• proximity to existing infrastructure and associated operators (e.g. roads, boat ramps, accommodation facilities etc.)</li> <li>• social amenity and use of the proposal area and adjacent areas for other purposes, including, residential, commercial, industrial, recreational/leisure, tourism, and traditional land use.</li> </ul>
Potential significant impacts and risks	<p>Describe potential benefits to, and significant impacts on, the community and the economy including:</p> <ul style="list-style-type: none"> <li>• net positive benefits, particularly to local communities associated with the proposed construction and operational activities</li> <li>• changes to population (local and NT), employment market and businesses and indirect impacts on the housing market, community and social services, infrastructure and economy</li> <li>• social integration of non-local personnel during construction and operation</li> <li>• direct and indirect impacts on recreation and commercial areas and industries including fishing and tourism activities within the Groote Eylandt archipelago and the existing GEMCO mine</li> <li>• impacts on existing waste management facilities on Groote Eylandt</li> <li>• changes or restrictions on boat ramp access by local traffic during construction and operation</li> <li>• changes or restrictions to local traffic due to development of new roads and construction vehicles resulting in delays or inconvenience to local communities and other road users</li> <li>• visual impact of infrastructure</li> <li>• impacts on amenity (e.g. noise and dust)</li> </ul>

Aspect	Specific information required
	<ul style="list-style-type: none"> <li>• interference with shipping and freight-barge logistics and controls (current and planned)</li> <li>• economic assessment of the proposal's impact on the NT economy including the total contribution to Gross Territory Product and Gross Domestic Product over the economic life of the proposal</li> <li>• details of the financial capacity to implement the proposal and the potential risks to project implementation</li> <li>• expected employment and availability of appropriately skilled labour during construction and operation phases of the proposal</li> <li>• potential adverse impacts on local and regional industries due to competition for limited skilled labour resources</li> <li>• use of non-local workforce</li> <li>• estimated capital and annual operational expenditure</li> <li>• value of residual infrastructure at end-of-life of the proposal.</li> </ul> <p>Provide an assessment of potential impacts, benefits and risks to the local and NT community and the economy utilising modelling, outcomes of investigations, and/or other relevant information.</p> <p>The assessment must quantify the significance of potential impacts and risks to local and NT communities and the economy.</p> <p>The assessment of each aspect should consider cumulative impacts and the reversibility of potential impacts.</p> <p>The assessment of each aspect must consider the significance of potential impacts and risks to communities when the proposed activities have been completed.</p> <p>Quantify extent of impacts on the community and economy relating to a changing climate, and how these have been considered cumulatively to proposal impacts.</p>
<p>Avoidance, mitigation and management</p>	<p>Outline the measures for systematically avoiding and mitigating adverse social impacts, and maximising benefits.</p> <p>Conduct an assessment of the impacts and benefits of the proposal on the community. The assessment must be informed by an inclusive and collaborative community and stakeholder engagement and consultation process that is iterative throughout preparation of the EIS.</p> <p>Prepare a report to detail the existing social environment of potentially affected communities, the potential impacts and benefits to communities and how these would be managed and monitored, and how the proposal would contribute to enhancing the sustainability of these communities.</p> <p>Discuss strategies that would be implemented to address:</p> <ul style="list-style-type: none"> <li>• community and stakeholder engagement</li> <li>• workforce management (including how Aboriginal employment target will be met)</li> <li>• housing and accommodation</li> <li>• local business and industry procurement</li> </ul>

Aspect	Specific information required
	<ul style="list-style-type: none"> <li>community wellbeing.</li> </ul> <p>Describe timeframes for implementation of management measures, key performance indicators, roles and responsibilities, stakeholders and potential partnerships.</p> <p>All mitigation measures should be substantiated and in accordance with best practice, including advice from relevant government advisory agencies.</p> <p>Discuss the design features of the proposal that will assist the community to adapt to a changing climate.</p>
Monitoring and reporting	<p>Provide proposed monitoring and reporting activities related to potential significant impacts and risks to community and economy, and mitigation and management measures.</p> <p>The proposed monitoring and reporting should specify which project phases it relates to</p> <p>All monitoring activities should be substantiated and in accordance with best practice advice from relevant government advisory agencies.</p>
Residual impact	Identify any potential residual impact of the proposal on identified values.
Offsets	Where a significant residual impact may remain after applying the environmental decision-making hierarchy, identify offsets and describe how any proposed offset is consistent with the NT Offsets Framework (as published) and EPBC Act environmental offsets policy.

### 3.13. Culture and heritage

**Table 17: Minimum information required for assessment of Culture and heritage.**

Aspect	Specific information required
<b>NT EPA objective:</b> Protect sacred sites, culture and heritage.	
Relevant activities	<ul style="list-style-type: none"> <li>All construction and operation activities.</li> </ul>
Environmental values	<p>Sites of cultural significance, including but not limited to:</p> <ul style="list-style-type: none"> <li>Aboriginal sacred sites protected under the ALRA and the <i>Northern Territory Aboriginal Sacred Sites Act 1989</i> (Sacred Sites Act)</li> <li>Heritage places or objects protected under the <i>Heritage Act 2011</i> (Heritage Act) includes both the automatic protection of Aboriginal and Macassan archaeological sites and the protection of other declared places.</li> <li>Underwater Cultural Heritage protected under the Commonwealth's <i>Underwater Cultural Heritage Act 2018</i> and administrated by the Northern Territory Government's Heritage Branch.</li> <li>Traditional owner cultural values linked to marine species, and maintaining cultural traditions.</li> </ul>
Potential significant	Describe potential significant impacts on cultural and heritage values, including:

Aspect	Specific information required
impacts and risks	<ul style="list-style-type: none"> <li>• direct and indirect disturbance to sites of cultural significance during construction, operation, and maintenance activities including vegetation clearing, topsoil stripping, subsoil excavation, marine dredging and construction</li> <li>• direct and indirect disturbance to traditional and/or contemporary Aboriginal values (including sacred sites) or uses of land (e.g. hunting and ceremonial use) due to construction and operation activities</li> <li>• change or permanent land access or use restrictions in areas of project infrastructure</li> <li>• changes to the physical and biological attributes of the environment that could impact on sites of cultural significance.</li> </ul> <p>Determine the proposal footprint and area of influence that could feasibly experience those impacts.</p> <p>Determine the construction and operational footprint of the project and describe potential impacts on Underwater Cultural Heritage, including marine, coastal and intertidal environments. This includes, but not limited to, vessel operation, wharf construction, rock armour, groynes, moorings, or other infrastructure to be built in water or the intertidal zone. This also includes any dredging or similar disturbance of the seafloor or intertidal zone.</p> <p>Provide an assessment of potential impacts, benefits and risks to culture and heritage using outcomes of investigations and/or other relevant information.</p> <p>The assessment must identify potential impacts and risks to sacred sites and cultural heritage and quantify their significance.</p> <p>The assessment must identify any effect on intergenerational transmission of cultural traditions.</p> <p>The assessment of each aspect should consider cumulative impacts and the reversibility of potential impacts.</p> <p>Quantify extent of impacts on culture and heritage relating to a changing climate, and how these have been considered cumulatively with proposal impacts.</p>
Avoidance, mitigation and management	<p>Characterise the natural and cultural values of Winchelsea Island (Akwamburkba) including sacred sites and heritage places listed under NT legislation and heritage and cultural values of that occur within the proposed disturbance areas, and any other areas that may be indirectly impacted, to identify sites of significance and their relevance within a wider regional context.</p> <p>Describe the measures for avoiding and mitigating impacts on cultural heritage values and transmission of cultural traditions</p> <p>Conduct appropriate surveys and consultation to identify and characterise any sites, places or objects of cultural significance</p> <p>Obtain sacred sites and heritage clearance for all areas of the proposal. The information required for demonstrating avoidance/minimisation of impacts on sacred sites is:</p> <ul style="list-style-type: none"> <li>• evidence of obtaining an Authority Certificate that covers all areas of the proposal, in accordance with the Sacred Sites Act, and</li> <li>• a commitment to comply with the conditions of the Authority Certificate.</li> </ul>

Aspect	Specific information required
	<p>Develop a Cultural Heritage Management Plan that includes:</p> <ul style="list-style-type: none"> <li>• the footprint of impact of the proposal in relation to sites of cultural heritage significance</li> <li>• identification of all sites to be affected by the proposal and outlines a mitigation response for each site</li> <li>• the restrictions that are to be placed on access to sites of cultural heritage significance</li> <li>• avoidance measures such as a 'cultural heritage buffer zone'<sup>17</sup> that are justified and demonstrates culture and heritage values are protected</li> <li>• a program of awareness training, including employee inductions, to ensure all mine employees and contractors are informed of their obligations in relation to cultural heritage values</li> <li>• obligations for all personnel to comply with the access restrictions as well as the procedures to be adopted in relation to any unexpected finds</li> <li>• measures for monitoring and assessment of any long term impacts of the proposal on coastal cultural heritage sites</li> <li>• a protocol must be developed for the discovery of human remains, cultural artefacts and other archaeological features during the construction phase</li> <li>• outline the measurements for avoiding, mitigating and managing the risks. A check against existing historical and archaeological databases</li> <li>• consultation with traditional owners and custodians regarding historical maritime sites within the project footprint</li> <li>• coastal archaeological surveys including intertidal surveys for historical deposits</li> <li>• geophysical marine surveys, with data analysis by experts with specific experience in identifying underwater archaeological targets</li> <li>• investigation of marine survey targets as required.</li> </ul> <p>Demonstrate the application of the mitigation hierarchy to avoid and minimise impacts on cultural heritage values, including any considerations for mine rehabilitation and closure.</p> <p>Identify and address the potential impacts on potentially affected Aboriginal people and communities, landholders, tourism and operators as stakeholders.</p> <p>All mitigation measures should be substantiated and in accordance with best practice, including advice from relevant government advisory agencies and traditional owners.</p> <p>Demonstrate and document in the EIS how the NT EPA's objective for this factor can be met and the predicted environmental outcomes.</p>

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<sup>17</sup> From the SHIM Consulting Report on the Cultural Heritage of Akwamburkba (Winchelsea Island). Prepared for Anindilyakwa Land Council (February 2018). The buffer on any mining activity has been established following consultation between Winchelsea Mining Pty Ltd and the Traditional Owners.

Aspect	Specific information required
Monitoring and reporting	<p>Outline proposed monitoring and reporting activities related to potential impacts and risks and mitigation and management measures to culture and heritage and transmission of cultural traditions.</p> <p>The proposed monitoring and reporting should specify which project phases it relates to.</p> <p>All monitoring activities should be substantiated and in accordance with best practice advice from relevant government advisory agencies.</p> <p>The Heritage Branch of the Northern Territory Government is the primary agency to consult regarding maritime heritage matters.</p>
Residual impact	Identify any potential residual impact of the proposal on identified values.

### 3.14. Human health

**Table 18: Minimum information required for assessment of Human health.**

Aspect	Specific information required
<b>NT EPA objective:</b> Protect the health of the Northern Territory population.	
Relevant activities	<ul style="list-style-type: none"> <li>Construction and mining operations, rehabilitation, closure and post-closure activities.</li> </ul>
Environmental values	<ul style="list-style-type: none"> <li>Health and wellbeing of the workforce, community and general population.</li> </ul>
Potential significant impacts and risks	<ul style="list-style-type: none"> <li>Conduct baseline studies on biting insects and other arthropods which may be a nuisance to humans, and that can cause irritation and illness, and has an impact on the health and wellbeing of the workforce, community and general population.</li> </ul>
Avoidance, mitigation and management	<p>Outline the measures for avoiding, mitigating and managing the risks of mosquito borne disease.</p> <p>Develop and implement a biting insect management plan for the project in accordance with the <a href="#">Guidelines for Preventing Mosquito Breeding Sites Associated with Mining Sites</a>.</p> <p>Outline the measures for avoiding, mitigating and managing legacy mosquito breeding sites that may affect the future amenity of the land, the health and wellbeing of the workforce, community and general population after cessation of operations.</p>
Monitoring and reporting	Provide proposed monitoring and reporting activities related to potential impacts and risks to workforce, community and the general population, and mitigation and management measures.
Residual impact	Identify any potential residual impact of the proposal on identified values.

## 4. Other requirements

### 4.1. Other environmental factors or matters

#### 4.1.1. Matters of national environmental significance (MNES)

The proposal is a controlled action under the EPBC Act where the relevant controlling provisions are:

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

The proposal is being assessed as an accredited assessment in accordance with the EPBC Act and agreement between the NT EPA and the Commonwealth. The EIS must address matters outlined in Schedule 4 of the EPBC Regulations.

In addressing all relevant MNES, include the following details:

- a list of any matter protected by the controlling provisions that are known or likely to occur within the proposal site according to PMST (using a buffer of 5km)
- a list of the relevant policy and guidance for the MNES
- impacts discussion of the protected matters listed above addressing whether or not the impacts are significant
- impacts discussion on protected matters should address uncertainty (where applicable) and in the absence of information about impacts a precautionary approach should be applied and the maximum potential impact assumed
- a significant impact assessment for the relevant protected matters using the DCCEEW [Significant Impact Guidelines 1.1](#) to determine the level of significance of the impact on the MNES
- a summary of the impacts (direct, indirect and cumulative) on the MNES and provide relevant tables and maps
- description of proposed avoidance and mitigation measures
- how the mitigation hierarchy has been applied
- ensure that avoidance, mitigation and management measures are aligned with the requirements of all EPBC Act relevant policy and guidance
- a summary of whether offsets are required in relation to the MNES and if so, provide details of the proposed offset and how the offset addressed the Australian Government Environmental Offset Policy.

The draft EIS must address all relevant MNES, and explain how they have adequately regarded the Conservation Advices of each EPBC Act listed species that are known or likely to be impacted, and Australia's obligations under international conventions and agreements. Moreover, the draft EIS must explain how the proposal is not inconsistent with any Threat Abatement Plans, Bioregional Plans or Recovery Plans.

These include but are not limited to:

- The biodiversity Convention: <http://www.austlii.edu.au/au/other/dfat/treaties/ATS/1993/32.html>



- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): <http://www.austlii.edu.au/au/other/dfat/treaties/ATS/1976/29.html>
- The Bonn Convention: <https://www.cms.int/en/convention-text>
- Marine Bioregional Plans for the North Marine Areas: <http://environment.gov.au/coasts/marineplans/north/index.html>
- EPBC Act Policy Statement 3.21 - Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species: <https://www.environment.gov.au/epbc/publications/shorebirds-guidelines>
- Conservation Advices for:
  - Ghost Bat: <http://www.environment.gov.au/biodiversity/threatened/species/pubs/174-conservation-advice-05052016.pdf>
  - Largetooth sawfish: <http://www.environment.gov.au/biodiversity/threatened/species/pubs/60756-conservation-advice.pdf>
  - Masked owl (northern): <http://www.environment.gov.au/biodiversity/threatened/species/pubs/26048-conservation-advice-01102015.pdf>
- Recovery Plans for:
  - Northern Quoll: <http://www.environment.gov.au/resource/national-recovery-plan-northern-quoll-dasyurus-hallucatus>
  - Brush-tailed Rabbit-rat: <http://www.environment.gov.au/biodiversity/threatened/publications/recovery/brush-tailed-rabbit-rat>
  - Marine turtles in Australia: <http://www.environment.gov.au/marine/publications/recovery-plan-marine-turtles-australia-2017>
- Threat Abatement Plans for:
  - Predation by feral cats: <http://www.environment.gov.au/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats>
  - The biological effects, including lethal toxic ingestion, caused by cane toads: <http://www.environment.gov.au/biodiversity/threatened/publications/tap/threat-abatement-plan-biological-effects-including-lethal-toxic-ingestion-caused-cane-toads>
  - Reducing the impacts on northern Australia's biodiversity by the five listed grasses: <https://www.environment.gov.au/biodiversity/threatened/publications/threat-abatement-plan-reduce-impacts-northern-australias-biodiversity-five-listed-grasses>

The draft EIS must include a discussion of how the proposal meets the principles of ecologically sustainable development, as defined under section 3A of the EPBC Act.

## 4.2. Offsets

Provide details of an overall offset strategy for the significant residual impacts on the terrestrial and marine environments. If a requirement for offsets is identified in the draft EIS, details of a draft implementation plan for the offset/s may be required as part of the Supplement to the EIS. Offsets may be required as a condition of any approval under the EPBC Act. Offsets must be consistent with the NT Offsets Framework (as published), and the EPBC Act environmental offsets policy.

## 4.3. Whole of environment considerations (NT)

Provide a holistic assessment of the impacts of the proposal on the whole of the environment, including a description of the connections and interactions between the environmental factors, and indirect and cumulative impacts. Succinctly discuss predicted outcomes in relation to the principles of environment protection and management (as set out in Part 2 of the EP Act), and the NT EPA's environmental objectives.

## 4.4. Stakeholder engagement and consultation

Proponents have a general duty under section 43 of the EP Act to provide communities that may be affected by a proposal with an opportunity for consultation to assist community understanding of the proposed action and its potential impacts and benefits.

The Proponent must engage and consult with stakeholders<sup>18</sup> who are affected by and interested in the Proposal. The Proponent must document the following in the EIS:

- identified stakeholders
- the stakeholder consultation undertaken and the outcomes, including decision-making and any adjustments to the proposal as a result of consultation
- future engagement activities intended during the assessment process and post-approval, including during construction and operation of the proposal.

## 4.5. Indigenous peoples

The Proponent must recognise the role and interests of Indigenous peoples, promote the conservation and ecologically sustainable use of natural resources, and seek to:

- obtain the views of any group of Indigenous people directly affected
- promote the cooperative use of Indigenous peoples' knowledge of biodiversity and Indigenous heritage, and
- where it is appropriate, treat the views of Indigenous peoples as the primary source of information on the value of Indigenous cultural heritage.

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<sup>18</sup> As defined in the NT EPA's Stakeholder Engagement and Consultation – Environmental impact assessment guidance for proponents (NT EPA 2020)

## 4.6. Public consultation requirements

The public consultation requirements for the EIS are outlined in Part 5 Division 6 of the Environment Protection Regulations 2020.

Consultation material must summarise and highlight the main risks and potential impacts of the proposal in a culturally appropriate format and language, accompanied by graphics and illustrations or other media to assist with interpretation.

### 4.6.1. Submission period

The NT EPA proposes a period (usually between 30 and 60 business days) for consultation on the draft EIS. The duration of the period will be confirmed during the draft EIS pre-lodgement phase.

### 4.6.2. Public consultation locations

The draft EIS should be provided to and be made available for public consultation at:

1. Anindilyakwa Land Council, 30 Bougainvillea Drive, Alyangula
2. Department of Industry, Tourism and Trade, Paspalis Centrepoint, 48 Smith Street Mall, Darwin
3. East Arnhem Regional Council, Angurugu
4. Environment Centre Northern Territory, Unit 3, 98 Woods Street, Darwin
5. Northern Territory Library, Parliament House, Darwin
6. NT EPA, Level 1, Arnhemica House, 16 Parap Road, Parap

## Appendix A – List of relevant guidance material

Guidance material that is considered relevant to the TOR, includes but is not limited to, the documents listed below. This list is not exhaustive, but captures key guidance used in the preparation of these TOR and to inform the preparation of the EIS. The Proponent must draw on further relevant industry and best practice guidance as part of developing the EIS.

- Australian Government Department of Industry, Science, Energy and Resources, 2016. Leading Practice Handbook: Mine Closure. Australian Government Department of Industry, Science, Energy and Resources: <https://www.industry.gov.au/sites/default/files/2019-05/lpsdp-mine-closure-handbook-english.pdf>
- Australian Government Department of Industry, Science, Energy and Resources, 2016. Leading Practice Handbook: Mine Rehabilitation. Australian Government Department of Industry, Science, Energy and Resources: <https://www.industry.gov.au/sites/default/files/2019-04/lpsdp-mine-rehabilitation-handbook-english.pdf>
- Australian Government Department of Agriculture, Water and the Environment, 2015. Arrive Clean, Leave Clean: <https://www.environment.gov.au/cgi-bin/sprat/public/publicshowkeythreat.pl?id=18>
- Australian Government Department of Agriculture, Water and the Environment, 2009. Commonwealth Listing Advice on Invasion of northern Australia by Gamba Grass and other introduced grasses, Threatened Species Scientific Committee: <https://www.environment.gov.au/cgi-bin/sprat/public/publicshowkeythreat.pl?id=18>
- Chaojiao Sun, Paul Branson, Des Mills, 2020. Guideline on dredge plume modelling for environmental impact assessment. WAMSI Dredging Science Node Themes 2/3. Western Australian Marine Science Institution (WAMSI)
- Commonwealth of Australia, 2016. Conservation Advice *Macroderma gigas* Ghost Bat. Department of Agriculture, Water and the Environment: <http://www.environment.gov.au/biodiversity/threatened/species/pubs/174-conservation-advice-05052016.pdf>
- Commonwealth of Australia, 2014. Conservation Advice for *Pristis pristis* (largetooth sawfish). Department of Agriculture, Water and the Environment: <http://www.environment.gov.au/biodiversity/threatened/species/pubs/60756-conservation-advice.pdf>
- Commonwealth of Australia, 2015. Conservation Advice *Tyto novaehollandiae kimberli*, masked owl (northern). Threatened Species Scientific Committee: [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=26048](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=26048)
- Commonwealth of Australia, 2017. EPBC Act Policy Statement 3.21 - Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species. Department of Agriculture, Water and the Environment: <http://www.environment.gov.au/epbc/publications/shorebirds-guidelines>
- Commonwealth of Australia, 2012. Marine bioregional plan for the North Marine Region. Department. Department of Agriculture, Water and the Environment: <http://environment.gov.au/coasts/marineplans/north/index.html>
- Commonwealth of Australia 2020. National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds:

<https://www.environment.gov.au/system/files/resources/2eb379de-931b-4547-8bcc-f96c73065f54/files/national-light-pollution-guidelines-wildlife.pdf>

- Commonwealth of Australia, 2010. National Recovery Plan for the Northern Quoll (*Dasyurus hallucatus*). Department of Natural Resources, Environment, The Arts and Sport: <https://www.environment.gov.au/resource/national-recovery-plan-northern-quoll-dasyurus-hallucatus>
- Commonwealth of Australia, 2017. Recovery, Management and Monitoring Plan for the Brush-tailed Rabbit-rat (*Conilurus penicillatus*). Department of Agriculture, Water and the Environment: <http://www.environment.gov.au/biodiversity/threatened/publications/recovery/brush-tailed-rabbit-rat>
- Commonwealth of Australia, 2017. Recovery Plan for Marine Turtles in Australia. Department of Agriculture, Water and the Environment: <http://www.environment.gov.au/marine/publications/recovery-plan-marine-turtles-australia-2017>
- Commonwealth of Australia, 2015. Sawfish and River Sharks Multispecies Recovery Plan. Department of Agriculture, Water and the Environment: <http://www.environment.gov.au/biodiversity/threatened/publications/recovery/sawfish-river-sharks-multispecies-recovery-plan>
- Commonwealth of Australia, 2013a. Significant Impact Guidelines 1.1: Matters of National Environmental Significance. Department of Agriculture, Water and the Environment: <https://www.environment.gov.au/epbc/publications/significant-impact-guidelines-11-matters-national-environmental-significance>
- Commonwealth of Australia, 2013b. Significant Impact Guidelines 1.2: Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies Department of Agriculture, Water and the Environment: [http://www.environment.gov.au/system/files/resources/a0af2153-29dc-453c-8f04-3de35bca5264/files/commonwealth-guidelines\\_1.pdf](http://www.environment.gov.au/system/files/resources/a0af2153-29dc-453c-8f04-3de35bca5264/files/commonwealth-guidelines_1.pdf)
- Commonwealth of Australia, 2011. Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads. Department of Sustainability, Environment, Water, Populations and Communities: <http://www.environment.gov.au/system/files/resources/2dab3eb9-8b44-45e5-b249-651096ce31f4/files/tap-cane-toads.pdf>
- Commonwealth of Australia, 2012. Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses. Department of Sustainability, Environment, Water, Populations and Communities: <https://www.environment.gov.au/system/files/resources/ff24e078-fbb9-4ebd-855d-db09cb4db1f8/files/five-listed-grasses-tap.pdf>
- Department of the Environment Water Heritage and the Arts, 2009. National Assessment Guidelines for Dredging.
- DEPWS, 2021. NT Planning Scheme Land Clearing Guidelines. Department of Environment, Parks and Water Security: [https://nt.gov.au/\\_data/assets/pdf\\_file/0007/236815/land-clearing-guidelines.pdf](https://nt.gov.au/_data/assets/pdf_file/0007/236815/land-clearing-guidelines.pdf)
- DEPWS, 2020. Northern Territory Climate Change Response: Towards 2050. Department of Environment, Parks and Water Security: [https://denr.nt.gov.au/\\_data/assets/pdf\\_file/0005/904775/northern-territory-climate-change-response-towards-2050.pdf](https://denr.nt.gov.au/_data/assets/pdf_file/0005/904775/northern-territory-climate-change-response-towards-2050.pdf)

- DoH, 2005. Guidelines for preventing mosquito breeding sites associated with mining sites. Medical Entomology, Department of Health: <https://digitallibrary.health.nt.gov.au/prodjspui/handle/10137/1029>
- DoH, 2018. Health requirements for mining and construction camps. Department of Health: <https://www.nt.gov.au/property/building-and-development/health-and-safety/health-requirements-mining-construction-projects>
- Environment Protection and Biodiversity Conservation Regulations 2000 (Cth) Schedule 4: <https://www.legislation.gov.au/Series/F2000B00190>
- ICCM, 2019. Integrated Mine Closure: Good practice guide. International Council on Mining and Metals: [https://www.icmm.com/website/publications/pdfs/environmental-stewardship/2019/guidance\\_integrated-mine-closure.pdf](https://www.icmm.com/website/publications/pdfs/environmental-stewardship/2019/guidance_integrated-mine-closure.pdf)
- NESP Earth Systems and Climate Change Hub, 2020. Climate change in the Northern Territory: state of the science and climate change impacts. National Environment Science Programme, Earth Systems and Climate Change Hub: <http://nеспclimate.com.au/building-understanding-of-climate-change-in-the-northern-territory/>
- Northern Territory Government, 2017. Preventing weed spread guide, Weed Management Branch: <https://nt.gov.au/environment/weeds/how-to-manage-weeds/prevent-weed-spread-industry-and-recreation>
- Northern Territory Government, 2018. Weed Management Plan for Bellyache Bush (*Jatropha gossypifolia*): [https://nt.gov.au/\\_data/assets/pdf\\_file/0016/231415/bellyache-bush-weed-management-plan.pdf](https://nt.gov.au/_data/assets/pdf_file/0016/231415/bellyache-bush-weed-management-plan.pdf)
- Northern Territory Government, 2020. Weed Management Plan Gamba Grass 2020-2030: [https://nt.gov.au/\\_data/assets/pdf\\_file/0006/954789/weed-management-plan-for-gamba-grass-2020-2030.PDF](https://nt.gov.au/_data/assets/pdf_file/0006/954789/weed-management-plan-for-gamba-grass-2020-2030.PDF)
- Northern Territory Government, 2016. Weed Management Plan for Grader Grass (*Themeda quadrivalvis*): [https://nt.gov.au/\\_data/assets/pdf\\_file/0014/330035/grader-grass-weed-management-plan.pdf](https://nt.gov.au/_data/assets/pdf_file/0014/330035/grader-grass-weed-management-plan.pdf)
- Northern Territory Government, 2015. Weed Management Plan for Neem (*Azadirachta indica*), - [https://nt.gov.au/\\_data/assets/pdf\\_file/0020/231428/neem-management-plan.pdf](https://nt.gov.au/_data/assets/pdf_file/0020/231428/neem-management-plan.pdf)
- NSW DPIE, 2021. Cumulative Impact Assessment Guideline for State Significant Projects. NSW Department of Planning, Industry and Environment: <https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/Policy-and-legislation/GD1259-RAF-Assessing-Cumulative-Impacts-Guide-final.pdf>
- NSW DPIE, 2021. Social Impact Assessment Guideline for State Significant Projects. NSW Department of Planning, Industry and Environment: [https://shared-drupal-s3fs.s3.ap-southeast-2.amazonaws.com/master-test/fapub\\_pdf/SIA+Guideline+20210622v6\\_FINAL.pdf](https://shared-drupal-s3fs.s3.ap-southeast-2.amazonaws.com/master-test/fapub_pdf/SIA+Guideline+20210622v6_FINAL.pdf)
- NT EPA, 2020a. Environmental impact assessment guidance: NT EPA Environmental Factors and Objectives. Northern Territory Environment Protection Authority: <https://ntepa.nt.gov.au/publications-and-advice/environmental-management>
- NT EPA, 2021. Environmental impact assessment guidance for proponents: Preparing an environmental impact statement. Northern Territory Environment Protection Authority: [https://ntepa.nt.gov.au/\\_data/assets/pdf\\_file/0009/818217/preparing-an-environmental-impact-statements.pdf](https://ntepa.nt.gov.au/_data/assets/pdf_file/0009/818217/preparing-an-environmental-impact-statements.pdf)

- NT EPA, 2020c. Environmental impact assessment guidance for proponents: Stakeholder Engagement and Consultation. Northern Territory Environment Protection Authority: <https://ntepa.nt.gov.au/publications-and-advice/environmental-management>
- NT EPA, 2013a. Guidelines for Assessment of Impacts on Terrestrial Biodiversity. Northern Territory Environment Protection Authority: <https://ntepa.nt.gov.au/publications-and-advice/environmental-management>
- NT EPA, 2013b. Guidelines for the Preparation of an Economic and Social Impact Assessment. Northern Territory Environment Protection Authority: <https://ntepa.nt.gov.au/publications-and-advice/environmental-management>
- NT EPA, 2015. Waste Management Strategy for the Northern Territory 2015-2022. Northern Territory Environment Protection Authority: <https://ntepa.nt.gov.au/publications-and-advice/environmental-management>
- Queensland Department of Environment and Science (2018) Biological assessment - Guidance on using Photosynthetically Active Radiation (PAR) as a method to measure light availability for aquatic photosynthetic organisms facing acute impacts.
- Simpson SL, Mosley L, Batley G, Shand P., 2018. National Acid Sulfate Soils Guidance - Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management. Australian Government Department of Agriculture and Water Resources.
- WA Environment Protection Authority, 2021. Technical Guidance - Environmental impact assessment of marine dredging proposals.