ntepa Northern Territory Environment Protection Authority

# FINAL TERMS OF REFERENCE FOR PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT

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|---|---|
| **PROPOSAL NAME:** | **Hayes Creek Project** |
| **LOCATION:** | **Pine Creek / Adelaide River** |
| **PROPONENT:** | **PNX Metals Ltd** |
| **ISSUED:** | **2 August 2019** |

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# Initialisms and Glossary

| | |
|---|---|
| AMD | acid and/or metalliferous drainage |
| DPIR | Department of Primary Industry and Resources (NT) |
| Draft EIS | Draft Environmental Impact Statement |
| EIS | Environmental Impact Statement |
| ICMM | International Council on Mining and Metals |
| MCA | Minerals Council of Australia |
| NT EPA | Northern Territory Environment Protection Authority |
| the Proposal | the Hayes Creek Project; the proposed action undergoing environmental impact assessment |
| the Proponent | PNX Metals Limited; the company intending to undertake the proposed action |
| TOR | Terms of Reference (for an EIS) |

# PART 1 INTRODUCTION

## 1.1 Overview

The Hayes Creek Project (the Proposal) is being assessed by the Northern Territory Environment Protection Authority (NT EPA) under the Environmental Assessment Act 1982 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, in accordance with clause 8(3) of the Environmental Assessment Administrative Procedures 1984. The Draft EIS must also address all requirements in the NT EPA General Guidance for Proponents Preparing an EIS.

## 1.2 Background

PNX Metals Limited (the Proponent) referred a notice of intent for the Proposal to the NT EPA for consideration under the Environmental Assessment Act 1982 on 27 August 2018. This outlined the proposal to mine and process polymetallic ore over eight years near Hayes Creek, 170 km south of Darwin. Activities would occur over three sites:

- expansion and mining of an existing open pit at Mount Bonnie
- development and mining of a new underground mine at Iron Blow
- construction and operation of a processing facility at Fountain Head

All three sites have been previously mined for various metals in the last 135 years. Legacy components that remain in the landscape include unrehabilitated open pits, pit lakes, waste rock dumps, tailings storage facilities, ore stockpiles, dams and other disturbances.

The NT EPA decided on 14 December 2018 that the Proposal requires assessment at the level of an EIS. Further details on the Proposal and the reasons contributing to the NT EPA's decision are outlined in the Statement of Reasons (NT EPA, 2018d) available at: https://ntepa.nt.gov.au/environmental-assessments/current-projects.

In February 2019 the Proponent submitted a referral under the Australian Government Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). On 22 May 2019 a delegate of the Australian Government Minister for Environment and Energy determined that the Proposal was not considered a controlled action and did not require further assessment and approval under the EPBC Act.

## 1.3 Structure of these Terms of Reference

- Part 1 – Introduction: an overview of the Proposal and decisions relating to its environmental assessment.
- Part 2 – Matters to be addressed in the Draft EIS: a description of the information requirements specific to this Proposal. The Proponent is required to address all these matters, relating to the Proposal and the surrounding environment, in its Draft EIS. This part must be read in conjunction with the NT EPA General Guidance for Proponents Preparing an EIS, which outlines the general information that is also required in the Draft EIS.
- Part 3 – Other requirements for the Draft EIS: a list of applicable guidelines and policies, and description of the public exhibition requirements.

# PART 2 MATTERS TO BE ADDRESSED IN THE DRAFT EIS

## 1.4 Proposal description

### 1.4.1 Historical environmental disturbance

Historical mining has contributed to pre-existing environmental issues at the Proposal sites and a range of ongoing management measures are currently required to limit impacts on the surrounding environment. It is important for the Proponent, the NT EPA and stakeholders to understand who is responsible for managing these pre-existing environmental issues if the Proposal goes ahead. Provide a summary[1] of previous land use/s and the current state of the environment at the Proposal sites and the haul route.

To clarify the scope of responsibilities for site management (including legacy issues) and future rehabilitation, provide an overview of arrangements made with the Department of Primary Industry and Resources (DPIR) on who (the Proponent, another company, or the Northern Territory Government) is legally responsible for managing any environmental issues derived from previous land use at the Proposal sites. This must address both the current situation and the future scenario if the Proposal is implemented, considering all phases of the Proposal.

Describe measures that will be implemented as part of the Proposal to manage any significant pre-existing environmental issues at the Proposal sites. Describe how the Proposal may interact with the pre-existing site conditions.

### 1.4.2 Construction and operation

Provide a detailed description of all construction and operational aspects of the Proposal as outlined in Table 1.

**Table 1: Minimum information required in the Proposal description**

| Topic | Required information |
|---|---|
| Site layout maps | • the location and dimensions of existing disturbance, infrastructure and roads/tracks and landforms resulting from historic mining activities<br>• the location and approximate dimensions of areas to be disturbed, structures to be built or repurposed, including (as relevant):<br>○ mine pits<br>○ underground mine<br>○ stockpiles<br>○ waste rock dumps<br>○ processing plant and associated infrastructure<br>○ in-pit waste storages (tailings or waste rock)<br>○ hardstands<br>○ mine access and haul roads<br>○ water storage facilities (including for dewatering and stormwater)<br>○ explosives and detonator magazines |

[1] Detailed analysis is required as part of the characterisation of environmental values of each key environmental factor

| Topic | Required information |
|---|---|
| | ○ pipelines and access easements<br>○ other significant mine infrastructure |
| Construction | • extent of clearing of native or regrowth vegetation, and a description of how vegetation and topsoil will be managed<br>• construction materials required – major types, quantities, qualities, sources, storage requirements and potential hazards<br>• if water is required to be discharged from existing or any proposed storages/pits, provide an overview of treatment methodology, discharge water quality (including targets in accordance with ANZG (2018) or otherwise), location of the discharge point/s, and schedule for the discharge[2]<br>• if any large dams are to be constructed, provide commitment and a description of how the design and construction will be in accordance with ANCOLD (2012)<br>• type of crossing to be used for the haul road crossing of waterways and any other sensitive areas<br>• timeframes |
| Mining operation | • methods for open pit expansion at Mount Bonnie and methods for underground mine development and mining at Iron Blow<br>• any requirement for dewatering and water treatment as a result of mining, including an overview of methods and expected volumes<br>• quantity of material to be mined annually (ore and waste rock) from each site<br>• material characterisation (waste rock and ore) and classification (including cut-off grades) and expected volumes of each material type (e.g. non acid-forming, potentially acid-forming) at each site<br>• timetable for mining operations, including staging of progressive rehabilitation activities |
| Ore processing | • processing methods, including the major equipment and chemicals to be used in the various ore processing operations<br>• chemicals, reagents and fuel to be used in the processing circuit (volumes and storage)<br>• water requirements (volume and quality), sources and storage<br>• characterisation of tailings (volumes and chemical composition) and methods for their subaqueous placement in the existing pit at Fountain Head |
| Non-mineral waste and hazardous materials | • list and description of potentially hazardous materials to be used or produced and methods for storage, transport, handling, containment, disposal and emergency management of these materials (including fuel)<br>• descriptions of predicted solid and liquid waste streams, both industrial and domestic, including information on the streams to be disposed in landfill at |

[2] Wastewater discharge off the mine lease will trigger requirements for an application for a Waste Discharge Licence (WDL). The proponent should be aware that a WDL should not form part of the water management strategy and should be considered as a last resort water management tool.

| Topic | Required information |
|---|---|
| | the Proposal sites and/or transported offsite for recycling, reuse or disposal in a licenced landfill facility<br>• how the Proposal design conforms with legislation, guidelines, and standards applicable to the Proposal's landfill, sewage treatment and any other waste disposal facilities |
| Energy | • the Proposal's energy requirements and proposed source<br>• a comparison of the proposed energy source against more renewable sources of energy<br>• estimate of the greenhouse gases emissions from the Proposal (scope 1 and scope 2)<br>• any obligations for reporting greenhouse gas emissions under the National Greenhouse and Energy Reporting Act 2007<br>• measures proposed to maximise energy efficiency and avoid and or reduce greenhouse gas emissions |
| Transport | • identify which sections of public road would be used by the Proposal and whether any sections of public road may require upgrading (and summary of engagement with NT Government road authority stakeholder)<br>• volumes of existing vehicles using the proposed transport routes<br>• estimated vehicle types and frequency (over seasons and hours/days) of Proposal-related vehicle use on public roads<br>○ among the three sites<br>○ to and from the Proposal area<br>• consideration of low-carbon emission transport options |
| Water Use | • a water balance (including schematic) and account for the Proposal[3], based on the Minerals Council of Australia Water Accounting Framework (MCA 2014), incorporating:<br>○ predicted water demand requirements for each aspect and all phases of the Proposal (including dust suppression, drinking water, ablutions and sewage treatment, mine water, processing of ore and any other uses)<br>○ proposed water supply sources, volumes and yields (including details of any peak periods and seasonal variations)<br>○ pit and underground dewatering requirements<br>○ management of process waters<br>• a map identifying the location of water sources/storages (bores, dams), water drainage and wastewater management features<br>• measures for using water sustainably, with reference to International Council on Mining and Metals guidance (ICMM 2017)<br>• predictions associated with water to be used for sterilising potentially acid-forming mining waste: |

[3] noting the Water Act 1992 requires proponents to prepare a plan that demonstrates how and when water will be used over the life of the Proposal. An assessment against Section 90 factors in the Act will be required and any gazetted exemptions should be discussed.

| Topic | Required information |
|---|---|
| | ○ a projected timeline until backfilled potentially acid forming waste rock would be covered with water in the Mount Bonnie pit<br>○ water quality of the final pit lakes (Mount Bonnie and Fountain Head), based on hydrogeological modelling, material characterisation, and other modelling (e.g. contaminant transport modelling) as required, for the short-term (e.g. at closure) and long-term (post-closure) up to at least the time of predicted equilibrium/stability, or 1000 years (whichever occurs first) |
| Workforce | • summary of the estimated number of people to be employed during construction, operation and decommissioning and closure phases, including breakdown of:<br>○ expected local employment versus fly-in fly-out<br>○ Aboriginal employment targets |

### 1.4.3 Rehabilitation and closure

Include a conceptual Mine Closure Plan developed according to leading practice guidance (e.g. DIIS 2016; DMP & EMP 2015; ICMM 2019), the principles of the International Council of Mining and Minerals Mine Closure Guidelines (ICMM 2015), and as outlined in Table 2. As recommended by the ICMM (2015 and 2019), planning for mine rehabilitation and closure should be an integral part of early mine planning.

**Table 2: Minimum information required in the conceptual Mine Closure Plan**

| Topic | Required information |
|---|---|
| Closure objectives | • proposal-specific closure objectives and an explanation of how they are consistent with closure objectives in leading practice guidelines<br>• intended future/next land-use and land tenure arrangements<br>• stakeholder expectations and an outline of methods (including milestones) for reaching agreement with stakeholders on closure objectives |
| General plans | • a site plan identifying the intended final landforms of the sites<br>• intended closure timeframes<br>• expected post closure monitoring and management arrangements, including identification of how these arrangements would be funded and who would be responsible for them<br>• indicative volumes, sources and characterisation of materials required for rehabilitation and closure (e.g. fill, cover materials)<br>• methods and processes that will be implemented to address any knowledge gaps associated with specific rehabilitation and closure activities |
| Key components:<br>• Open pits / pit lakes<br>• Tailings | For each of the key components, provide the following:<br>• closure options<br>○ outline all rehabilitation and closure options that have been or are being considered, and where uncertainties remain, outline a process that will be used to decide which closure options will be adopted |

| Topic | Required information |
|---|---|
| • Waste rock dumps<br>• Site drainage<br>• Revegetation | ○ evaluate and compare the potential environmental outcomes and the costs, benefits and residual environmental and social risks of the rehabilitation and closure alternatives considered[4]<br>○ demonstrate that the selected closure option delivers superior post-closure environmental outcomes over other feasible options. Where backfilling pits is not the selected closure option, demonstrate that the selected option presents an environmental improvement over the pre-existing conditions at the Proposal sites. Demonstrate that there will be no ongoing costs borne by the community and government in future in relation to post-mining land use. This should be demonstrated with respect to the principles of ecologically sustainable development<br>• plans for progressive rehabilitation, including details of any audits and reporting on its progress that would be undertaken<br>• explanation of how it contributes to meeting the overall closure objectives<br>Also provide, as relevant to the component:<br>• the intended dimensions and shape of final landforms (e.g. pits and waste rock dumps) and detail on whether they will shed or retain surface water and act as a source or sink to groundwater<br>• an assessment of the intended pit lakes in accordance with Appendix H of the Western Australian Guidelines for Preparing Mine Closure Plans (DMP & EPA 2015), including density driven exchange between pit lake water and surrounding groundwater<br>• methods for topsoil management and soil profile reconstruction, with demonstration of their effectiveness for rehabilitating disturbed areas and ensuring long term stability<br>• a schedule and strategies to be used for revegetation, including species to be used and their source, and identification of any research that may be required to determine appropriate revegetation methods<br>• a conceptual site model including landforms and final structures that are designed to divert, capture, retain and/or treat surface runoff from the site |
| Risks to successful rehabilitation and closure | • description of matters that could influence unanticipated or early closure or care and maintenance of the mine, how this may affect rehabilitation objectives, and the contingency and mitigation measures to be implemented<br>• discussion of the potential risk that the Proposal may create an ongoing environmental, social and/or economic legacy if operations are required to cease ahead of schedule due to unforeseen circumstances, prior to the planned closure and rehabilitation of the site<br>• discussion of the potential risks associated with earthquakes, rainfall events, weeds, fire, flood and climate change |

## 1.5 Key environmental factors

The NT EPA has identified the preliminary key environmental factors that must be addressed in the Draft EIS as they may be significantly impacted by the Proposal

[4] Include information on the methods, assumptions and limitations used in any calculations of cost, time and materials required for rehabilitation options.

(Table 3). These have been selected from the NT EPA's environmental factors and objectives (NT EPA 2018a).

**Table 3: Preliminary key environmental factors that must be addressed in the Draft EIS**

| Theme | Key environmental factor | Objective |
|---|---|---|
| **Water** | Hydrological processes | Maintain the hydrological regimes of groundwater and surface water so that environmental values are protected. |
| **Land** | Terrestrial environmental quality | Maintain the quality of land and soils so that environmental values are protected. |
| **Water** | Inland water environmental quality | Maintain the quality of groundwater and surface water so that environmental values including ecological health, land uses, and the welfare and amenity of people are protected. |
| **Water** | Aquatic ecosystems | Protect aquatic ecosystems to maintain environmental water requirements and the biological diversity of flora and fauna and the ecological functions they perform. |
| **Land** | Terrestrial flora and fauna | Protect the NT's flora and fauna so that biological diversity and ecological integrity are maintained. |
| **People and communities** | Social, economic and cultural surroundings | Protect the rich social, economic, cultural and heritage values of the Northern Territory. |

For each of the preliminary 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 General Guidance for Proponents Preparing an EIS and detailed below.

If additional potential environmental impacts are identified through the environmental impact assessment process, they must also be included in the Draft EIS, even if this requires addressing additional environmental factors not specified in Table 3.

### 1.5.1 Hydrological processes

Provide sufficient information to enable assessment of whether the Proposal is likely to meet the NT EPA's objective to maintain the hydrological regimes of groundwater and surface water so that environmental values are protected. Information requirements outlined in Table 4 below should be read in consideration of the general advice provided in sections 2.6 and 3.2 of the NT EPA General Guidance for Proponents Preparing an EIS.

**Table 4: Minimum information required for assessment of Hydrological processes**

| Aspect | Specific information required |
|---|---|
| Environmental values | Characterise the current hydrological regime of the Proposal area and receiving waterways that may be impacted by the Proposal, using maps and/or schematic diagrams of flow directions where applicable, including:<br>• the surface water hydrology, including: |

| Aspect | Specific information required |
|---|---|
| | ○ major and minor rivers, drainage lines and wetlands (permanent and ephemeral)<br>○ surface water flow directions and rates, based on field data and modelled data<br>○ water reservoirs (natural and artificial)<br>○ beneficial uses<br>• groundwater aquifers and hydrogeological properties, including:<br>○ groundwater flows, volumes, yields[5], and connectivity (considering seasonal variation) of the three sites and surrounding area of influence<br>○ connectivity between existing pits and the surrounding groundwater environment<br>○ groundwater behaviour in the vicinity of the proposed waste storage facilities and stockpiles<br>○ surface connections via springs or recharge zones<br>○ local and regional aquifers<br>○ depth to water tables, including temporal variation<br>Include a discussion and analysis of how hydrological processes may have been impacted by previous mining. |
| Potential impacts and risks | Quantify and/or discuss the potential impacts for all phases of the Proposal, related to:<br>• altered surface water flow pathways, volumes and timing (seasonality) for each phase of the Proposal including post-closure – at all three sites and along the haul road<br>• impacts to the site and consequences of the 1% annual exceedance probability Riverine flooding from nearby creeks<br>• groundwater drawdown for each of the three sites during operations and post-mining/closure, indicating the peak drawdown and predictions of post-closure recovery of groundwater levels – predict the time required for full recovery, and give predicted groundwater level contours at four regular intervals from the time of peak drawdown until the time of full recovery<br>• any discharge to the environment (ground or surface) from the pit lakes, post-closure, based on a predicted water balance of the final pit lakes<br>• availability of surface water and groundwater resources to other persons and the environment |
| Mitigation and management | Address all potential impacts identified above in accordance with the mitigation hierarchy i.e. avoid, minimise, mitigate, restore, offset. |
| Monitoring and reporting | Address, at a minimum:<br>• groundwater levels and flows (rate and direction)<br>• surface water volumes and flow rates |

### 1.5.2 Terrestrial environmental quality

Provide sufficient information to enable assessment of whether the Proposal is likely to meet the NT EPA's objective to maintain the quality of land and soils so that

[5] It is noted that yields in areas of mineralisation can be greater than the typical low yields of the Mount Bonnie formation, so field data is essential to quantify this value

environmental values are protected. Information requirements outlined in Table 5 below should be read in consideration of the general advice provided in sections 2.6 and 3.2 of the NT EPA General Guidance for Proponents Preparing an EIS.

**Table 5: Minimum information required for assessment of terrestrial environmental quality**

| Aspect | Specific information required |
|---|---|
| Environmental values | Describe the terrestrial environmental values within the Proposal area that could be potentially impacted by the Proposal, including<br>• regional and significant topography, geomorphology and geology<br>• soil types and land units, including a summary of expected natural elevations of minerals that could become contaminants if released<br>To provide a baseline, describe the current status of land contamination due to historic land use at the Proposal sites, based on a geochemical assessment conducted in accordance with the NT EPA's Environmental Assessment Guidelines for Acid and Metalliferous Drainage (2013a). |
| Potential impacts and risks | Quantify and/or discuss the potential impacts for all phases of the Proposal, related to:<br>• erosion of land/soils and the movement of sediment, including the identification of vulnerable areas<br>• possible release of hazardous substances and subsequent contamination, with reference to the volumes of each hazardous material (including hydrocarbons) to be used/stored on site during operation<br>• generation and release of contaminants from mined materials in all phases of the Proposal, including for the long term following closure<br>• long term stability of landforms considering erosion by water or wind and as a result of seismic instability<br>The discussion of the latter two points must refer to a material characterisation and the conceptual Mine Closure Plan. The material characterisation[6] should identify the potential for acid, metalliferous and any other non-benign drainage (AMD) from mined materials, including a comprehensive classification of waste rock, tailings and other materials in accordance with the NT EPA's Environmental Assessment Guidelines for Acid and Metalliferous Drainage (2013a). It should include results of investigations to identify the presence of sulfides, other potential contaminants, and naturally occurring radioactive material. The investigation should characterise individual lithologies and the level of homogeneity for each. Spatial distribution and density should be designed to define waste and not limited to sampling from locations intended for ore definition. |
| Mitigation and management | Address[7] all potential impacts identified above in accordance with the mitigation hierarchy. |
| Monitoring and reporting | Address, at a minimum:<br>• waste rock and tailings characterisation updates |

[6] The NT EPA recommends the Proponent communicate with the Department of Primary Industry and Resources (DPIR) regarding the requirements for material characterisation

[7] Potentially as part of management plans (e.g. an AMD Management Plan)

### 1.5.3 Inland water environmental quality

Provide sufficient information to enable assessment of whether the Proposal is likely to meet the NT EPA's objective to maintain the quality of groundwater and surface water so that environmental values including ecological health, land uses, and the welfare and amenity of people are protected. Information requirements outlined in Table 6 below should be read in consideration of the general advice provided in sections 2.6 and 3.2 of the NT EPA General Guidance for Proponents Preparing an EIS.

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

| Aspect | Specific information required |
|---|---|
| Environmental values | Describe the values associated with the quality of surface water and groundwater within and downstream of the Proposal area that could be potentially impacted by the Proposal, including:<br>• declared beneficial uses areas of receiving waters (including a map)<br>• an assessment of baseline water quality, including a comparison with relevant water quality guidelines (e.g. ANZG 2018), and incorporating any additional parameters of relevance to the Proposal sites, of:<br>  ○ receiving waters (surface and groundwater), including the Margaret River and control sites<br>  ○ pit water at Fountain Head (to be used for processing)<br>  ○ water currently in the pits at Mount Bonnie and Iron Blow<br>  ○ groundwater at Mount Bonnie and Iron Blow (to be dewatered and used for dust suppression and other purposes) water in each dam or other reservoir at all Proposal sites<br>Analyse and quantify any historic impacts to water quality. |
| Potential impacts and risks | Quantify and/or discuss the potential impacts for all phases of the Proposal, related to:<br>• any passive discharge or seepage of non-benign contaminants (including from AMD and saline drainage) from historical or Proposal-related mine waste storages[8], including:<br>  ○ seepage from pit lakes at Mount Bonnie and Fountain head, taking into account pit filling rates and predicted water quality<br>• the release of water from the Proposal sites through unintended loss of control/containment or intended discharge<br>• potential unintended release of any hazardous substances (including hydrocarbons)<br>This should be supported by conceptual site models describing sources of potential contaminants, mechanisms for their release, transport pathways, receptors, and fate of any potentially contaminated waters from the Proposal, with reference to the NT EPA Guidelines on Conceptual Site Models (NT EPA 2013e). A conceptual site model should be provided for each phase of the Proposal at each of the three sites, including:<br>• preparation, including any dewatering of existing pits/storages<br>• during mining/processing, including any dewatering<br>• post-mining at Mount Bonnie, while pit lake is filling |

[8] This may refer to an AMD management plan

| Aspect | Specific information required |
|---|---|
| | • at closure<br>• beyond the expected time of stabilisation |
| Mitigation and management | Provide a draft Water Management Plan to demonstrate that all potential impacts identified above will be sufficiently addressed, including:<br>• describe the methodology for treating any poor-quality water requiring discharge, and a predicted schedule for the discharge<br>• sufficient detail[9] to demonstrate that mine closure strategies will be implemented to avoid impacts to values dependent on good water quality, both during operation and into the long-term following closure<br>• details of the internal review processes undertaken, including the names and qualifications of third party reviewers engaged by the proponent and details of the scope of the review. |
| Monitoring and reporting | Address and include a monitoring plan for all phases of the Proposal (including post-closure) for:<br>• pit lakes<br>• groundwater in the vicinity of the Proposal<br>• surface water in the vicinity of the Proposal and downstream |

### 1.5.4 Aquatic ecosystems

Provide sufficient information to enable assessment of whether the Proposal is likely to meet the NT EPA's objective to protect aquatic ecosystems to maintain the biological diversity of flora and fauna and the ecological functions they perform. Information requirements outlined in Table 7 below should be read in consideration of the general advice provided in sections 2.6 and 3.2 of the NT EPA General Guidance for Proponents Preparing an EIS.

**Table 7: Minimum information required for assessment of aquatic ecosystems**

| Aspect | Specific information required |
|---|---|
| Environmental values | Describe the values of all aquatic ecosystems in the area where hydrological processes and inland water environmental quality may be impacted by the Proposal and at nearby control sites. This is to include:<br>• a map/s delineating the area of potential impact<br>• distribution and abundance or extent of aquatic ecosystems within this area and comparable control areas<br>• baseline data of aquatic ecosystems downstream of the Proposal that is sufficiently statistically robust to enable detection of any impacts to these ecosystems in the event of an unplanned pollution event e.g. uncontrolled discharge of contaminated water or hazardous substances from the Proposal |

[9] Including reference to the conceptual Mine Closure Plan required in section 2.1.3

| Aspect | Specific information required |
|---|---|
| Potential impacts and risks | Quantify and/or discuss the potential impacts for all phases of the Proposal, related to:<br>• changes, in comparison to baseline data, in the distribution, abundance or health of aquatic ecosystems and their constituent taxa due to (at a minimum):<br>  ○ changes to hydrological processes (including reduction or increase in surface water flows or ephemeral pools)<br>  ○ changes in water quality |
| Mitigation and management | Address all potential impacts identified above in accordance with the mitigation hierarchy. |
| Monitoring and reporting | Address and include a monitoring plan for, at a minimum:<br>• water availability (quantity and quality) for any aquatic ecosystems<br>• distribution, abundance and/or health of aquatic ecosystems and constituent taxa, as applicable |

### 1.5.5 Terrestrial flora and fauna

Provide sufficient information to enable assessment of whether the Proposal is likely to meet the NT EPA's objective to protect the NT's flora and fauna so that biological diversity and ecological integrity are maintained. Information requirements outlined in Table 8 below should be read in consideration of the general advice provided in sections 2.6 and 3.2 of the NT EPA General Guidance for Proponents Preparing an EIS. As the NT EPA previously concluded that there is a low likelihood of significant impacts on terrestrial flora and fauna from the Proposal (NT EPA, 2018d), this factor does not require detailed additional assessment for the Draft EIS.

**Table 8: Minimum information required for assessment of terrestrial flora and fauna**

| Aspect | Specific information required |
|---|---|
| Environmental values | Provide updated results of targeted surveys for threatened species in areas where vegetation is to be cleared as part of the Proposal.<br>Quantify and map values associated with sensitive or significant water dependent ecosystems where hydrological processes and inland water environmental quality may be impacted by the Proposal, and at nearby control sites, in accordance with the requirements for aquatic ecosystems (Table 7) |
| Potential impacts and risks | Quantify and/or discuss any potential for a decline in distribution, abundance or health of identified values (for all phases of the Proposal, including post-closure) due to<br>• clearing of vegetation or other habitat disturbance<br>• road strike, dust, noise, vibration and light<br>• decline in water quality or quantity (as discussed in 2.2.1 and 1.5.3)<br>• decline in terrestrial habitat quality (as discussed in 1.5.2)<br>• the introduction and/or spread of weeds[10]<br>• increased fire risk |

[10] Obligations under the Weeds Management Act 2001 and relevant Statutory Weed Management Plans must be met.

| Aspect | Specific information required |
|---|---|
| | Assess the significance of any residual impact or risk of the Proposal to identified values. |
| Mitigation and management | Address any potential impacts identified above in accordance with the mitigation hierarchy, including commitments for pre-clearance surveys. |
| Monitoring and reporting | Address, at a minimum:<br>• a plan for monitoring indicators of impacts from the Proposal to identified values, and reporting on exceedances of criteria for those indicators. |

### 1.5.6 Social, economic and cultural surroundings

Provide sufficient information to enable assessment of whether the Proposal is likely to meet the NT EPA's objective to protect the rich social, economic, cultural and heritage values of the Northern Territory. Information requirements outlined in Table 9 below should be read in consideration of the general advice provided in section 2.6 of the NT EPA General Guidance for Proponents Preparing an EIS.

The description of values and assessment of potential impacts in this factor should take into account the community's views on these matters, as understood by the Proponent from stakeholder and community engagement undertaken in accordance with section 2.3 of the NT EPA General Guidance for Proponents Preparing an EIS.

**Table 9: Minimum information required for assessment of social, economic and cultural surroundings**

| Aspect | Specific information required |
|---|---|
| Environmental values | Describe, using maps where appropriate, the existing social, economic and cultural values of the region, including:<br>• population and demographics of the Proposal area and nearby towns, using the most recent statistics<br>• economy in the region such as tourism and recreation pastoral and mineral industries<br>• water users in the area, including the location of groundwater bores in the immediate vicinity and offtake points for surface water users in the vicinity and downstream[11]<br>• areas listed on Australian Government and Northern Territory Government registers of historic and/or cultural heritage<br>• a description and location of Aboriginal and non-Aboriginal sites[12], places or objects of historic or cultural heritage value, based on archaeological and/or anthropological survey and any other research<br>• the spiritual or cultural significance of places to Aboriginal people, including those associated with water, and details of any current utilisation of these areas |
| Potential impacts and risks | Quantify and/or discuss the following potential impacts for all phases of the Proposal, including post-closure: |

[11] including the planned future Adelaide River Off-stream Water Storage (AROWS), its catchment area and offtake point

[12] including the Port Darwin Camp Cemetery

| Aspect | Specific information required |
|---|---|
| | • social and economic benefits and impacts in the region, addressed in an Economic and Social Impact Assessment (ESIA) in accordance with NT EPA (2013c) that provides an independent analysis of the social and economic value and potential impacts of the Proposal on a local/regional, NT and national scale, including:<br>○ overall economic benefit, as expressed by the estimated capital and annual operational expenditure and estimated total revenue<br>○ training and employment, including for Aboriginal people<br>○ changes to economic and social activity in regional centres, which may have positive and/or negative impacts on local people during operations and transitioning to mine closure<br>○ social impacts associated with not achieving the proposed economic benefits[13]<br>○ reduction in the availability of water of appropriate quality for other water users (current or future) in the vicinity or downstream<br>○ changes to social, cultural and recreational values through potential water contamination, if applicable, pending assessment of inland water environmental quality<br>○ impacts on existing and future transport infrastructure and road users from project transport requirements[14]<br>• biophysical and intangible (e.g. amenity or access) changes to sacred sites, heritage places[15] or other places with identified cultural or social values, including downstream water and land |
| Mitigation and management | Address[16] all potential impacts identified above through the ESIA, and include:<br>• strategies for engaging with local Aboriginal communities to facilitate employment including identification of suitable roles, how training may be delivered, and how cultural values would be accommodated<br>• assessment criteria that will give early warning in the event that management measures are not achieving the expected benefits or are not avoiding negative impacts<br>• procedures that would be implemented in the event that any items or sites of heritage and/or cultural significance (additional to those identified in the EIS) are identified during implementation of the Proposal<br>• measures to avoid or minimise a reduction in water of suitable quality available to any other water users<br>• measures to avoid impacts to sacred sites[17]<br>• an outline of a plan for ongoing communication with stakeholders |

[13] Accompanied by a summary of the economic feasibility of the Proposal

[14] A Traffic Impact Assessment and Traffic Management Plan should be developed in accordance with the Austroads Guide to Traffic Management

[15] Outline the status of any approvals, permits or clearances in relation to the protection of heritage items or places

[16] Potentially as part of management plans (e.g. a draft Economic and Social Impact Management Plan)

[17] Provide evidence that an Authority Certificate has been obtained or is under application in accordance with the Northern Territory Aboriginal Sacred Sites Act (NTASS Act)

| Aspect | Specific information required |
|---|---|
| Monitoring and reporting | Address, at a minimum:<br>• social and economic benefits and impacts<br>• water availability (quantity and quality) for other users and downstream aquatic and riparian ecosystems that may have social values<br>• condition of cultural sites |

# PART 3 OTHER REQUIREMENTS FOR THE DRAFT EIS

## 1.6 Relevant guidance material / References

As outlined in the NT EPA General Guidance for Proponents Preparing an EIS (section 3.2.1), the Proponent is expected to refer to guidance material considered relevant to the Proposal. A list of such material is provided below, but is not exhaustive. The NT EPA expects the Proponent to refer to the most up-to-date and relevant evidence-based information.

- ANCOLD 2012. *Australian National Committee on Large Dams – Guidelines*. Australian National Committee on Large Dams Incorporated
- ANZG 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines
- APEC, 2018. *Mine Closure Checklist for Governments*. Asia-Pacific Economic Cooperation.
- Austroads, 2016. *Guide to Traffic Management Part 12: Traffic Impacts of Development.*
- Barnett B., Townley L.R., Post V., Evans R. E., Hunt R. J., Peeters L., Richardson S., Werner A. D., Knapton A. and Boronkay A., 2012. *Australian Groundwater Modelling Guidelines,* Waterlines Report. National Water Commission, Canberra.
- Commonwealth of Australia, 2016. *Preventing Acid and Metalliferous Drainage – Leading Practice Sustainable Development Program for the Mining Industry*.
- Commonwealth of Australia, 2013. *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance.*
- Commonwealth of Australia, 2012. *Aquatic ecosystems toolkit*. Department of Sustainability, Environment, Water, Population and Communities.
- Commonwealth of Australia, 2010 – 2014. *Survey Guidelines for Nationally Threatened Species*, available at http://www.environment.gov.au/epbc/policy-statements
- Department of Environment and Natural Resources' NT Flora and Fauna Atlases at http://www.lrm.nt.gov.au/nrmapsnt
- DoH, 2018. *Health requirements for mining and construction*. Department of Health, Environmental Health Branch. Available at: https://www.nt.gov.au/property/building-and-development/health-and-safety/health-requirements-mining-construction-projects. Last updated 1 March 2018.

- DoH, 2014. *Code of practice for on-site wastewater management*. Department of Health, Northern Territory Government.
- DoH, 2005. *Guidelines for preventing mosquito breeding sites associated with mining sites*. Medical Entomology, Department of Health. Northern Territory Government.
- DIIS, 2016. *Mine Closure - Leading Practice Sustainable Development Program for the Mining Industry.* Department of Industry and Innovation, Australian Government, Canberra.
- DMP & EPA, 2015. *Guidelines for Preparing Mine Closure Plans.* Department of Mines and Petroleum & Environmental Protection Authority, Government of Western Australia, Perth, Western Australia.
- DPIR, 2017. *Water Management Plan* – Chapter 6 of the Mining Management Plan Structure Guide for Mining Operations. Department of Primary Industry and Resources, Northern Territory Government.
- IECA 2008. *Best Practice Erosion and Sediment Control Guidelines*. Picton NSW: International Erosion Control Association.
- ICMM, 2015. *ICMM 10 Principles*. International Council of Mining & Metals. available at: https://www.icmm.com/en-gb/about-us/member-commitments/icmm-10-principles/the-principles
- ICMM, 2017. *Position statement on water stewardship*. International Council on Mining and Metals, London, UK.
- ICMM, 2019. *Integrated Mine Closure, Good Practice Guide, 2nd Edition.* International Council on Mining and Metals. London, United Kingdom. Available at: https://www.icmm.com/en-gb/environment/mine-closure/integrated-mining-closure
- INAP, 2009. *The Global Acid Rock Drainage Guide* (incorporating best practices and technology to address acid and metalliferous drainage issues). International Network for Acid Prevention.
- MCA, 2014. *Water accounting framework for the minerals industry – User guide*. Minerals Council of Australia.
- NT EPA, 2019a (draft). *General guidance for proponents preparing an environmental impact statement.* Northern Territory Environment Protection Authority, Darwin.
- NT EPA, 2019b. *Guidance for proponents – stakeholder engagement*. Northern Territory Environment Protection Authority, Darwin.
- NT EPA, 2018a. *Environmental Factors and Objectives*. Northern Territory Environmental Protection Authority.
- NT EPA, 2018b. *Guidance on adaptive management*. Northern Territory Environment Protection Authority.
- NT EPA, 2018c. *Opportunities and timeframes for community engagement in the environmental impact assessment process: Information for proponents and the public.* Northern Territory Environment Protection Authority.
- NT EPA, 2018d. *Statement of Reasons: PNX Metals Limited – Hayes Creek Project.* Northern Territory Environment Protection Authority.
- NT EPA, 2013a. *Environmental Assessment Guidelines on Acid and Metalliferous Drainage (AMD).* Northern Territory Environment Protection Authority.

- NT EPA, 2013b. *Guidelines for Assessment of Impacts on Terrestrial Biodiversity*. Northern Territory Environment Protection Authority.
- NT EPA, 2013c. *Guidelines for the Preparation of an Economic and Social Impact Assessment.* Northern Territory Environment Protection Authority.
- NT EPA, 2013d. *Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the NT.* Northern Territory Environment Protection Authority.
- NT EPA, 2013e. *Guideline on Conceptual Site Models.* Northern Territory Environment Protection Authority.
- McCullough, C. D., Marchand, G. & Unseld, J., 2013. *Mine closure of pit lakes as terminal sinks: Best available practice when options are limited?* Mine Water and the Environment, Volume 32, pp. 302-313.
- Moffat, K. & Zhang, A. 2014. The paths to social licence to operate: An integrative model explaining community acceptance of mining. *Resources Policy, Volume 39, pp 61-70.* https://doi.org/10.1016/j.resourpol.2013.11.003


## 1.7 Public exhibition requirements

The public exhibition requirements are outlined in section 3.6.3 of the NT EPA General Guidance for Proponents Preparing an EIS. Additional specific details are provided below.

### 1.7.1 Exhibition period

Recognising the TOR are released at an early stage of the assessment of this Proposal, the NT EPA proposes an eight week public exhibition period for the Draft EIS. This will be confirmed or adjusted during the Draft EIS pre-lodgement phase.

### 1.7.2 Exhibition locations

The Draft EIS should be provided to and be made available for public exhibition at:

- NT EPA, Level 1, Arnhemica House, 16 Parap Road, Parap
- Department of Primary Industry and Resources, 3rd Floor, Paspalis Centrepoint, 48 Smith Street Mall, Darwin
- Northern Territory Library, Parliament House, Darwin
- Environment Centre Northern Territory, Unit 3, 98 Woods St, Darwin.
- Northern Land Council, 45 Mitchell St, Darwin
- Adelaide River Post Office Store, 1 Stuart Highway, Adelaide River
- Victoria Daly Regional Council – Pine Creek Office, 55 Moule St, Pine Creek