YANGIBANA EXPANSION 1

ENVIRONMENTAL SCOPING DOCUMENT

DOCUMENT NO. YB-1-0000-HE-EN-APP-00018

REVISION HISTORY

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A	18/03/21	Issued for internal review	Lara Jefferson	Anle Tieu Andrew Reid	
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CHANGE HISTORY

REVISION	DATE	CHANGE DESCRIPTION	UPDATED BY
A	18/3/2021	Document prepared for internal review	LJ
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0	22/07/21	Minor edits	LJ
1	02/09/21	Revisions based on correspondence from EPA Chair dated 27/08/21	LJ

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ENVIRONMENTAL SCOPING DOCUMENT

Proposal name:	**Yangibana Expansion 1**
Proponent:	**Hastings Technology Metals Ltd**
Assessment number:	**2280**
Location:	**270 kilometres east-northeast of Carnarvon**
Local Government Area:	**Shire of Upper Gascoyne**
Public Review Period:	**4 weeks**
EPBC Ref #:	**2021/8892**

1. INTRODUCTION

The Environmental Protection Authority (EPA) has determined that the above proposal is to be assessed under Part IV of the *Environmental Protection Act 1986* (EP Act). The purpose of the Environmental Scoping Document (ESD) is to define the form, content, timing and procedure of the environmental review, required by s. 40(3) of the EP Act. Hastings Technology Metals Ltd (the proponent) has prepared this ESD according to the procedures in the EPA's Procedures Manual.

1.1 FORM

The EPA requires that the form of the report on the environmental review required under s. 40 (Environmental Review Document, ERD) is according to the Environmental Review Document template.

1.2 CONTENT

The EPA requires that the environmental review includes the content outlined in sections 2 to 6.

1.3 TIMING

Table 1 sets out the timeline for the assessment of the proposal agreed between the EPA and the proponent.

Table 1: Assessment Timeline

KEY ASSESSMENT MILESTONES	COMPLETION DATE
EPA approves Environmental Scoping Document	19 Aug 2021
Proponent submits first draft Environmental Review Document (ERD)	1 Feb 2022
EPA provides comment on first draft ERD (*6 weeks from receipt of ERD*)	15 Mar 2022
Proponent submits revised draft ERD	12 Apr 2022
EPA authorises release of ERD for public review (*2 weeks from EPA approval of ERD*)	17 May 2022
Proponent releases ERD for public review for 4 weeks	24 May 2022
Close of public review period	21 Jun 2022
EPA provides Summary of Submissions (*3 weeks from close of public review*)	13 Jul 2022
Proponent provides Response to Submissions	27 Jul 2022
EPA reviews the Response to Submissions (*4 weeks from receipt of Response to Submissions*)	24 Aug 2022
EPA prepares draft assessment report and completes assessment (*6 weeks from EPA accepting Response to Submissions*)	5 Oct 2022
EPA finalises assessment report (including 2 weeks consultation on draft conditions) and gives report to Minister (*6 weeks from completion of assessment*)	16 Nov 2022

1.4 PROCEDURE

The EPA requires the proponent to undertake the environmental review according to the procedures in the Administrative Procedures and the Procedures Manual.

Assessment

The proposal has been referred and determined to be a controlled action under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) under an accredited assessment by the Western Australian EPA. The relevant matters of national environmental significance (MNES) for this proposal are:

- Nuclear actions (s21 and s22A)
- Listed threatened species and communities (s18 and 18A)

This ESD includes work required to be carried out and reported on in the Environmental Review Document in relation to MNES. The Environmental Review Document will also address the matters in Schedule 4 of the Environmental Protection and Biodiversity Conservation Regulations 2000. MNES that may be impacted by the proposal will be identified and the potential impacts on these matters addressed within each relevant preliminary environmental factor identified in Table 2. In addition, the proposed action will require an assessment of the 'environment' as defined under section 528 of the EPBC Act. Proposed offsets to address significant residual impacts on MNES will also be discussed in the Environmental Review Document.

2. PROPOSAL DESCRIPTION

The subject of this ESD is the proposal by Hastings Technology Metals Ltd to develop the Yangibana Expansion 1 located in the Upper Gascoyne region of Western Australia (WA).

The regional location of the proposal is shown in Figure 1 and the development envelope and indicative footprint of the proposal is delineated in Figure 2.

The key characteristics of the proposal are set out in Table 2.1 and Table 2.2. The key proposal characteristics may change as a result of the findings of studies and investigations conducted and the application of the mitigation hierarchy by the proponent. The ERD will review existing conditions of Ministerial Statement (MS) 1110 for the original proposal, including but not limited to consideration of whether existing conditions for flora surveys and modelling of indirect impacts have been completed so conditions can be updated for the revised proposal.

Table 2.1: Summary of the Proposal

Proposal Title	**Yangibana Expansion 1**
Proponent Name	Hastings Technology Metals Ltd
Short Description	Hastings Technology Metals Ltd (Hastings) proposes to extend the mining areas at the Yangibana Rare Earths Project, located approximately 270 km east-northeast of Carnarvon, in the Upper Gascoyne region of Western Australia (WA). The Proposal will involve additional mining of areas (Bald Hill-Simon's Find-Fraser's pit, Auer pit and Yangibana pit) above and below the ground water table and increase the capacity of the Tailings Storage Facility (TSF).

Table 2.2: Location and Proposed Extent of Physical and Operational Elements

ELEMENT	LOCATION	EXISTING APPROVAL (MS 1110)	PROPOSED CHANGE (THIS PROPOSAL)	PROPOSED EXTENT (REVISED PROPOSAL)
	Physical Elements			
Mine and associated infrastructure	**Figure 2**	Clearing of no more than 1,000 ha within a development envelope of 13,373 ha	Clearing of no more than 1,500 ha within a development envelope of 14,611 ha	Clearing of no more than 2,500 ha within a development envelope of 14,611 ha
	Operational Elements			
Mining	**Figure 2**	Mining from five pits: Yangibana North Yangibana West	Mining from three pits: Bald Hill-Simon's Find–Fraser's[1]	Mining from five pits: Bald Hill-Simon's Find–Fraser's[1]

ELEMENT	LOCATION	EXISTING APPROVAL (MS 1110)	PROPOSED CHANGE (THIS PROPOSAL)	PROPOSED EXTENT (REVISED PROPOSAL)
		Bald Hill and Bald Hill SE Fraser's	Auer Yangibana	Auer pit Yangibana pit Yangibana North Yangibana West
Groundwater abstraction from fractured rock aquifer of the Yangibana North and West, Bald Hill and Bald Hill SE and Fraser's mine pits and the palaeochannel of the SipHon Borefield	**Figure 2-1**	No more than 2.5 GL/a of groundwater	No additional water required. However, pit dewatering will be extended to include the combined Bald Hill-Simon's Find–Fraser's pit, Auer pit and Yangibana pit	No more than 2.5 GL/a of groundwater
Tailings disposal	**Figure 2-1**	No more than: 10 Mt into Beneficiation TSF 770,000 t into Hydromet TSF	No more than: 10 Mt into the Beneficiation TSF 770,000 t into Hydromet TSF	No more than: 20 Mt into the Beneficiation TSF 1.54 Mt into the Hydromet TSF

[1] Note that the one pit will replace the Fraser's pit, Bald Hill pit and Bald Hill SE pit (as approved in MS 1110).

113°30'E 114°0'E 114°30'E 115°0'E 115°30'E 116°0'E 116°30'E 117°0'E 117°30'E 118°0'E

7,700,000 7,600,000 7,500,000 7,400,000 7,300,000 7,200,000 7,100,000

21°0'S 21°30'S 22°0'S 22°30'S 23°0'S 23°30'S 24°0'S 24°30'S 25°0'S 25°30'S 26°0'S

Dampier

Onslow

Exmouth

Tom Price

Yangibana Expansion 1

MOUNT AUGUSTUS NATIONAL PARK

KENNEDY RANGE NATIONAL PARK

Carnarvon

Gascoyne Junction

Broome
Onslow
Carnarvon
Meekatharra
Geraldton
Kalgoorlie
Perth

Legend

Proposed Development Envelope

Proposal indicative footprint

0 20 40 60 80 100

Kilometres

GDA 1994 MGA Zone 50

200,000 300,000 400,000 500,000 600,000

HASTINGS Technology Metals Limited

YANGIBANA RARE EARTHS EXPANSION 1 PROJECT

Regional Location

Fig1-1_Exp1_Regional_Location_A3.mxd
17 December 2020

Figure 1-1

116°5'E
116°10'E
116°15'E
116°20'E
23°50'S
23°55'S
24°0'S
24°5'S
7,365,000
7,360,000
7,355,000
7,350,000
7,345,000
7,340,000
7,335,000
410,000
415,000
420,000
425,000
430,000

Yangibana West
Yangibana North
Yangibana
Bald Hill
Bald Hill SE
Simon's Find
Fraser's
Auer
Cobra Gifford Creek Road
GIFFORD CREEK
RFDS Airstrip

0 1 2 3 4 5
Kilometres
GDA 1994 MGA Zone 50

Legend

- Approved Development Envelope (MS1110)
- Proposed Development Envelope
- Approved footprint (MS1110)
- Proposal indicative footprint

HASTINGS Technology Metals Limited

YANGIBANA RARE EARTHS EXPANSION 1 PROJECT

Development envelope and indicative footprint

Fig2-1_Exp1_Envelope_Footprint_A3.mxd
17 December 2020

Figure 2-1

3. PRELIMINARY KEY ENVIRONMENTAL FACTORS AND REQUIRED WORK

The preliminary key environmental factors for the environmental review are:

- Flora and vegetation
- Terrestrial fauna
- Subterranean fauna
- Inland waters
- Terrestrial environmental quality
- Human health
- Social surroundings

Table 3.1 outlines the work required for each preliminary key environmental factor and contains the following elements for each factor:

- EPA factor and EPA objective for that factor
- Relevant activities – the proposal activities that may have a significant impact on that factor
- Potential impacts and risks to that factor
- Required work for that factor
- Relevant policy and guidance – EPA (and other) guidance and policy relevant to the assessment.

Where appropriate, the Environmental Review Document (ERD) must be supported by:

a) Evidence based conclusion based on the best available scientific peer reviewed literature with supporting references cited or expert opinion cited.

b) Relevant approved conservation advice, recovery plans, and/or threat abatement plans for all listed species and/or communities and a discussion of how the proposed action is not inconsistent with these documents.

Table 3.1: Preliminary Key Environmental Factors and required Work: Preliminary Key Environmental Factors and required Work

FLORA AND VEGETATION	
EPA Objective	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.
Relevant Activities	• Pre-strip activities of mining areas • Mining activities • Construction of waste rock landforms (WRLs) • Placement of infrastructure • Dewatering of pits

Potential Impacts and Risks	• Clearing of up to 1,500 ha of native vegetation • Removal and disturbance to conservation significant flora and vegetation • Fugitive dust deposition associated with mining activities and transport of ore to the Run of Mine (ROM) pad, and waste rock to the respective WRL • Groundwater drawdown • Interruption of surface water flows • Weed species introduction and establishment.
Required Work	1. For areas not previously surveyed, identify and characterise the flora and vegetation that may be directly or indirectly impacted by the proposal in accordance with Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment. The survey should be designed to inform local and regional context. 2. Demonstrate how surveys are relevant, representative and demonstrate consistency with current EPA policy and guidance. Undertake additional surveys if previous surveys do not adequately meet the EPA's Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment. Ensure database searches and taxonomic identifications are up-to-date. As multiple surveys have been undertaken to support the assessment, a consolidated report will be provided including the integrated results of the surveys. All surveys should be appended to the environmental review documentation. 3. Provide a figure depicting survey effort applied in relation to the study area and development envelope, identifying the direct and indirect impact areas. 4. Determine whether any flora species recorded are significant, and provide an analysis of local and regional context, (refer to Environmental Factor Guideline – Flora and Vegetation for definition of significant flora) including but not limited to Eucalyptus camaldulensis and Eucalyptus vitrix. 5. Determine whether any vegetation identified is significant, and provide an analysis of local and regional context, (refer to Environmental Factor Guideline – Flora and Vegetation for definition of significant vegetation including but not limited to Eucalyptus camaldulensis and Eucalyptus vitrix. 6. Provide figures depicting the recorded locations of flora and vegetation in relation to the development envelope in accordance with Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment including but not limited to Eucalyptus camaldulensis and Eucalyptus vitrix.

7. Assess the extent of potential direct, indirect and cumulative impacts of the construction and operational elements of the proposal on identified environmental values at a local and regional level.
8. Provide a quantitative assessment of impact:

   For significant flora, this includes:

   - number of individuals and populations in a local and regional context
   - numbers and proportions of individuals and populations directly or potentially indirectly impacted, and
   - numbers/proportions/populations currently protected within the conservation estate (where known).

   For all vegetation units (noting threatened and priority ecological communities and significant vegetation) this includes:

   - area (in hectares) and proportions directly or potentially indirectly impacted, and
   - proportions/hectares of the vegetation unit currently protected within conservation estate (where known).

   An assessment of impact from the original proposal (MS 1110), this proposal (Yangibana Expansion 1), the revised proposal (MS 1110 plus Yangibana Expansion 1) and cumulative impacts will be provided in the ERD.
9. Describe how licenses and approvals, not issued under Part IV of the Environmental Protection Act 1986 and Environment Protection and Biodiversity Conservation Act 2000, assess and mitigate impacts to the environment.
10. Describe the application of the mitigation hierarchy in the proposal design, construction, operation and closure. Detail actions undertaken to avoid, minimise and mitigate proposal impacts. Include management and/or monitoring plans to be implemented pre- and post-construction to demonstrate that residual impacts are not greater than predicted. Management and/or monitoring plans are to be presented in accordance with EPA instructions.
11. Provide project specific rehabilitation information that demonstrates that rehabilitation of flora and vegetation will be achievable.
12. Demonstrate how the EPA's objective for this factor has been addressed.
13. Determine and quantify any significant residual impacts by applying the Residual Impact Significance Model (page 11) and WA Offset Template (Appendix 1) in the WA Environmental Offsets Guidelines (2014) and include reference to the Commonwealth Assessment Guide for any MNES.

	14. Where significant residual impacts remain, propose an appropriate offsets package that is consistent with the WA Environmental Offsets Policy and Guidelines. Spatial data defining the area of significant residual impacts for each environmental value should also be provided (e.g., vegetation type, vegetation condition).
Relevant Policy and Guidance	***EPA Policy and Guidance*** *Statement of Environmental Principles, Factors and Objectives (EPA, 2020)* *Instructions on how to prepare an Environmental Review Document (EPA, 2020)* *Environmental Factor Guideline – Flora and Vegetation (EPA, 2016)* *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016)* *Instructions and Form: IBSA Data Packages* *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA, 2020).* ***Other policy and guidance*** *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (Commonwealth of Australia, 2012)* *WA Environmental Offsets Policy (Government of Western Australia, 2011)* *WA Environmental Offsets Guidelines (Government of Western Australia, 2014)* *Western Australian Environmental Offsets Template (Government of Western Australia, 2014).* *Relevant recovery plans, conservation advices and/or threat abatement plans for conservation significant species that are known to occur, or are likely to occur in the vicinity of the proposal area.*

TERRESTRIAL FAUNA	
EPA Objective	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.
Relevant Activities	• Pre-strip activities of mining areas • Mining activities • Construction of WRLs.
Potential Impacts and Risks	• Habitat loss and fragmentation from vegetation clearing. • Displacement of fauna species.
Required Work	15. Any new or revised impact areas that have not been previously surveyed, should be surveyed in accordance with EPA guidance (EPA 2016; EPA 2020). The choice of survey type and the survey effort required should be informed by the desktop study and the scale and nature of the proposed impacts. Targeted surveys should be used

	where any significant fauna species are predicted to occur in the proposal area using the methodology suitable to detect that species. 16. In accordance with the requirements of EPA Guidance conduct a desktop study to identify and characterise the fauna and fauna habitats to inform local and regional context; and based on the results of the desktop study: a. conduct a Basic (Level 1) survey and fauna habitat assessment; and/or b. conduct a Detailed (Level 2) survey; and/or c. conduct targeted surveys for significant fauna that may be directly or indirectly impacted. 17. Demonstrate how surveys are relevant, representative and demonstrate consistency with current EPA policy and guidance. Ensure database searches and taxonomic identifications are up-to-date. As multiple surveys have been undertaken to support the assessment, a consolidated report will be provided including the integrated results of the surveys. All surveys should be appended to the environmental review documentation. 18. Provide a map of the survey effort applied in relation to the fauna habitats, the study area, Development Envelope, identifying the direct and indirect impact areas. 19. Identify and describe the fauna assemblages present and likely to be present within the development envelope that may be impacted by the proposal. 20. Identify and describe the characteristics of the fauna habitats identified by the desktop study and surveys, including a map of their extents in relation to the study area, the Development Envelope and direct and indirect impact areas. Describe significant habitats, including but not limited to: refugia, breeding areas, key foraging habitat, movement corridors and linkages. 21. Identify significant fauna and describe in detail their known ecology, likelihood of occurrence, habitats and known threats. Map the locations of significant fauna records in relation to the fauna habitats, the study area, the Development Envelope, and direct and indirect impact areas. 22. Identify, describe and quantify the potential residual impacts (direct, indirect and cumulative) to fauna assemblages, habitats, significant species, that may occur following implementation of the proposal after considering and applying avoidance and minimisation measures, in a local and regional context. Provide a table of the proportional extents of each habitat within the study area and Development Envelope, and the predicted amount to be directly and indirectly impacted. An assessment of impact from the original proposal (MS 1110), this proposal (Yangibana Expansion 1), the revised proposal (MS1110 plus

	Yangibana Expansion 1) and cumulative impacts will be provided in the ERD). 23. Specific to the EPBC listed grey falcon (*Falco hypoleucos*, Vulnerable) provide survey reports to confirm the presence/absence of the grey falcon and their potential breeding habitat (i.e. the Groundwater Dependent Ecosystem (GDE) characterised by *Eucalyptus camaldulensis* and *Eucalyptus vitrix*). 24. Describe how licenses and approvals, not issued under Part IV of the *Environmental Protection Act 1986* and *Environment Protection and Biodiversity Conservation Act 2000,* assess and mitigate impacts to the environment. 25. Outline and justify the proposed avoidance and mitigation measures to reduce the potential impacts of the proposal. Include proposed management and/or monitoring plans that will be implemented pre- and post-construction to demonstrate and ensure residual impacts are not greater than predicted. Management and/or monitoring plans are to be presented in accordance with the EPAs Instructions. 26. Specific to the EPBC listed grey falcon (*Falco hypoleucos*, Vulnerable), discuss how the proposed action has had regard to approved conservation advice. 27. Provide project specific rehabilitation information that demonstrates that rehabilitation of fauna habitat will be achievable. 28. Demonstrate how the EPA's objective for this factor has been addressed. 29. Determine and quantify any significant residual impacts by applying the Residual Impact Significance Model (page 11) and WA Offset Template (Appendix 1) in the *WA Environmental Offsets Guidelines* (2014) and include reference to the Commonwealth Assessment Guide for any MNES. 30. Where significant residual impacts remain, propose an appropriate offsets package that is consistent with the WA Environmental Offsets Policy and Guidelines and, where impacts relate to EPBC Act-listed taxa the Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (2012). Spatial data defining the area of significant residual impacts for each environmental value should also be provided (e.g., specific fauna species habitat).
Relevant Policy and Guidance	***EPA Policy and Guidance*** *Statement of Environmental Principles, Factors and Objectives (EPA, 2020)* *Instructions on how to prepare an Environmental Review Document (EPA, 2020)* *Environmental Factor Guideline – Terrestrial Fauna (EPA, 2016)* *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA, 2020)*

	Technical Guidance: Sampling of short range endemic invertebrate fauna (EPA, 2009) *Instructions and Form: IBSA Data Packages* *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA, 2020).* ***Other policy and guidance*** *WA Environmental Offsets Policy (Government of Western Australia, 2011)* *WA Environmental Offsets Guidelines (Government of Western Australia, 2014)* *WA Environmental Offsets Template (Government of Western Australia, 2014)* *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (Commonwealth of Australia, 2012)* *Outcomes-based Conditions Policy Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia, 2016)* *Relevant recovery plans, conservation advices and/or threat abatement plans for conservation significant species that are known to occur, or are likely to occur in the vicinity of the proposal area.*

SUBTERRANEAN FAUNA	
EPA Objective	To protect subterranean fauna so that biological diversity and ecological integrity are maintained.
Relevant Activities	• Pit excavation • Pit dewatering • Placement of infrastructure.
Potential Impacts and Risks	• Loss or alteration of habitat, assemblage, and loss of individuals from stockpiling, mine pit excavation, and other ground disturbance. • Loss or alteration of habitat, assemblage, and loss of individuals from groundwater drawdown due to pit dewatering activities.
Required Work	31. In accordance with EPA guidance, conduct a Level 1 (basic) subterranean fauna survey, including a desktop study that incorporates existing regional subterranean fauna surveys and databases. Subject to the outcomes of the Level 1 survey, undertake Level 2 (detailed) surveys in all areas of impact not previously surveyed, to identify and characterise subterranean fauna and subterranean fauna habitat, at a local and regional scale, that may be impacted directly and indirectly by the implementation of the proposal. This should include sampling inside and outside the impact areas and consider cumulative impacts. 32. Identify and describe the subterranean fauna assemblages present and likely to be present within the development envelope that may be impacted by the proposal. Identify significant or restricted subterranean fauna and describe in detail their known ecology, likelihood of occurrence, habitats and known threats.

33. Describe the characteristics of subterranean fauna habitat that may be impacted directly and indirectly by implementation of the proposal during both construction and operations, including the operations of SipHon Well borefield and describe the significance of these values in a local and regional context. Include relevant geological and hydrological information to determine habitat suitability and connectivity, including inside and outside the impact areas.
34. Provide figure(s) and maps showing the extent of subterranean fauna habitat in relation to the proposal and species distributions.
35. Map the locations of significant/restricted fauna records in relation to the subterranean fauna habitats, the study area, the development envelope, and direct and indirect impact areas.
36. Describe and assess the extent of direct, indirect and cumulative impacts as a result of implementation of the proposal during both construction and operations, including the operations of SipHon Well borefield to subterranean fauna, taking into consideration the significance of fauna and fauna habitat.
37. Quantify the extent of direct, indirect and cumulative impacts, including percentages, of habitat types to be disturbed or otherwise impacted. An assessment of impact from the original proposal (MS 1110), this proposal (Yangibana Expansion 1), the revised proposal (MS 1110 plus Yangibana Expansion 1) and cumulative impacts will be provided in the ERD.
38. Describe how licenses and approvals, not issued under Part IV of the *Environmental Protection Act 1986* and *Environment Protection and Biodiversity Conservation Act 2000,* assess and mitigate impacts to the environment.
39. Outline the proposed management, monitoring and mitigation methods to be implemented to ensure residual impacts (direct and indirect) are not greater than predicted.
40. Demonstrate how the EPA's objective for this factor has been addressed.
41. Predict the residual impacts from the proposal (including the operations of SipHon Well borefield) on subterranean fauna and their habitat after considering and applying the mitigation hierarchy.
42. Determine and quantify any significant residual impacts from Proposal activities (including the operations of SipHon Well borefield) on stygofauna in the Gifford Creek Calcrete Priority Ecological Community by applying the:
    - Residual Impact Significance Model (page 11 of the WA Environmental Offsets Guideline) for all direct and indirect impacts, including an explanation of how the information and values within the model have been determined

	• WA Offset Template (Appendix 1) in the WA Environmental Offsets Guidelines (2014), including the provision of supporting information, such as evidence of rehabilitation success • the Commonwealth Assessment Guide including rationale for the values entered into the guide. 43. Where significant residual impacts remain, propose an appropriate offsets package with supporting information to demonstrate consistency with the WA Environmental Offsets Policy and Guidelines and where residual impacts relate to EPBC Act-listed threatened and/or migratory species the Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy. Spatial data defining the area of significant residual impacts for each environmental value should also be provided (e.g. vegetation type, vegetation condition, specific fauna species habitat).
Relevant Policy and Guidance	**EPA Policy and Guidance** *Statement of Environmental Principles, Factors and Objectives (EPA, 2020)* *Environmental Factor Guideline – Subterranean Fauna (EPA, 2016)* *Technical Guidance – Sampling methods for subterranean fauna (EPA, 2016)* *Technical Guidance – Subterranean fauna survey (EPA, 2013)* *Instructions on how to prepare an Environmental Review Document (EPA, 2020)* *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA, 2020)* *Instructions and Form: IBSA Data Packages.* **Other policy and guidance** *Statutory Guidelines for Mine Closure Plans (DMIRS, 2020)* *Mine Closure Plan Guidance – how to prepare in accordance with the Statutory Guidelines (DMIRS, 2020)* *WA Environmental Offsets Policy (Government of Western Australia, 2011)* *WA Environmental Offsets Guidelines (Government of Western Australia, 2014)* *WA Environmental Offsets Template (Government of Western Australia, 2014)* *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (Commonwealth of Australia, 2012)* *Outcomes-based Conditions Policy Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia, 2016)* *Relevant recovery plans, conservation advices and/or threat abatement plans for conservation significant species that are known to occur, or are likely to occur in the vicinity of the proposal area.*

INLAND WATERS	
EPA Objective	To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected

Relevant Activities	• Drawdown from water abstraction and dewatering pits • Saline pit lakes at closure • Construction of Waste Rock Landforms and increase in additional capacity of the Tailings Storage Facility
Potential Impacts and Risks	• Drawdown from water abstraction and dewatering pits resulting in deaths of stygofauna and vegetation supporting Groundwater Dependent Ecosystems (GDEs) • Saline pit lakes contaminating surrounding groundwater • Erosion and sedimentation of WRLs and linear infrastructure • Contamination of surface water and groundwater from seepage of heavy metals, salts and radionuclides from the TSF.
Required Work	44. Conduct hydrogeological assessment of pit areas to determine presence of fractured rock aquifers, volume of groundwater recharge, height of the water table and expected amount of water available from pit dewatering versus the proposal's operational requirements. 45. Conduct pit dewatering drawdown model to determine the potential impacts of drawdown including, but not limited to, the rate of drawdown over time and links to GDEs. Illustrate drawdown contours to assess impacts to GDEs and potential GDEs. Assess the potential for GDE's to be impacted by drawdown. 46. Assess the potential for salinity, acidity and metals in final void pit lakes to contaminate surrounding ground water. 47. Conduct hydrological assessment to determine potential impacts of linear infrastructure on conservation significant flora and vegetation, and habitat. 48. Conduct water abstraction modelling, including SipHon Well borefield and fractured rock aquifers, over the extended mine life to assess potential impacts to GDEs and potential GDEs and update the water management plan/s and will include clear environmental outcomes. 49. Revise the mine water balance over the life of the proposal including actual amounts available from SipHon Well borefield and fractured rock aquifers as a water source, actual amounts required for the proposal and discuss the capacity to reuse surplus mine dewater." 50. Discuss potential impacts on GDEs from pit dewatering and water abstraction from SipHon Well Borefield over the extended mine life. 51. Characterise waste rock (physical and chemical; radiological) to assess risks to the integrity of the WRLs. 52. Characterise ore (physical and chemical; radiological) within the Proposal resource areas with the Yangibana Rare Earths Project (MS1110) resource areas to inform consistency of tailings

	characteristics being deposited in the expanded TSF (increase in capacity). 53. Review TSF seepage assessment and TSF design against any variation in tailings chemical characteristics including radionuclides. 54. Assess the potential for any diversion of drainage networks, if required, to impact the environment. 55. Describe and assess the extent of direct, indirect and cumulative impacts as a result of implementation of the proposal during both construction and operations, including water abstraction of SipHon Well borefield, to inland waters including: • Changes in groundwater levels • Changes to surface water flows • Water quality of pit lakes at closure • Seepage of contaminants. An assessment of impact from the original proposal (MS 1110), this proposal (Yangibana Expansion 1), the revised proposal (MS 1110 plus Yangibana Expansion 1) and cumulative impacts will be provided in the ERD. 56. Describe how licenses and approvals, not issued under Part IV of the *Environmental Protection Act 1986* and *Environment Protection and Biodiversity Conservation Act 2000,* assess and mitigate impacts to the environment. 57. Demonstrate application of the mitigation hierarchy to avoid and minimise impacts to Inland Waters. 58. Address the development of completion criteria to maintain the hydrological regimes and the quality of groundwater and surface water so that environmental values are maintained post closure to be incorporated in a revised Mine Closure Plan consistent with the Guidelines for the Preparation of a Mine Closure Plan (DMIRS 2020) and submitted in the format under the Statutory Guidelines for Mine Closure Plans in Western Australia (DMIRS 2020). 59. Establish appropriate trigger levels for gross alpha emissions and gross beta emissions, or specific radionuclide analysis, heavy metals and other possible contaminants. Provide monitoring methods and actions if triggers are exceeded. 60. Outline the proposed management, monitoring and mitigation methods to be implemented to ensure residual impacts (direct and indirect) are not greater than predicted.Predict the residual impacts from the proposal on inland waters after considering and applying the mitigation hierarchy.

	61. Demonstrate and document how the EPA's objectives for these factors can be met.
Relevant Policy and Guidance	***EPA Policy and Guidance*** *Environmental Factor Guideline – Inland Waters (EPA, 2018)* *Statement of Environmental Principles, Factors and Objectives, (EPA, 2020)* *Instructions on how to prepare an Environmental Review Document (EPA, 2020)* *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA, 2020).* ***Other Policy and Guidance*** *Statutory Guidelines for Mine Closure Plans (DMIRS, 2020)* *Mine Closure Plan Guidance – how to prepare in accordance with the Statutory Guidelines (DMIRS, 2020)* *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (Commonwealth of Australia, 2012)* *Outcomes-based Conditions Policy Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia, 2016)* *WA Environmental Offsets Policy (Government of Western Australia, 2011)* *WA Environmental Offsets Guidelines (Government of Western Australia, 2014).*

TERRESTRIAL ENVIRONMENTAL QUALITY	
EPA Objective	To maintain the quality of land and soils so that environmental values are protected.
Relevant Activities	• Development of WRLs • Increased capacity of Tailings Storage Facility (TSF) over an extended life of mine resulting from an increase in the volume of ore proposed to be processed • Mining activities • Land clearing activities • Construction, operation and closure of the mining operation and associated infrastructure.

Potential Impacts and Risks	• Dispersion of saline, sodic and alkaline soils, which will reduce the soil quality and local provenance native species seedbanks.
	• Potential contamination of surrounding soil and land due to:
	  • dust (including dust with elevated radiation levels) from vehicle movements, TSF surfaces and loading and unloading of ore and waste rock, ROM pad, crusher and ore sorter
	  • failure of TSF integrity

	• drainage and associated erosion of WRL surfaces.
Required Work	62. Include rationale for site selection of WRLs (i.e., favourable meteorological, geological and geographical characteristics). 63. Present a baseline soil quality assessment of the development envelope. 64. Include in the ERD, figures of the mapped soil units. 65. Conduct chemical and physical characterisation of the waste rock material and chemical characterisation of ore material from each resource area. 66. Conduct studies to determine the *in situ* levels of uranium (and to lesser extent molybdenum, vanadium, and fluoride), which may have the potential to leach from the Waste Rock Landforms. 67. Determine any variation in ore characterisation of each deposit compared to that previously completed for the Yangibana Rare Earths Project deposits (MS 1110). 68. Determination of waste rock volumes above 1 Bq/g, associated lithologies and strategies to manage these materials. 69. Conduct long term (1000 years) Landform Evolution Modelling of behaviour and performance of landforms associated with containment systems including expanded TSFs, modelled under a range of climatic events. Include the modelling of the appropriate Probable Maximum Precipitation (PMP) and associated Probable Maximum Flood (PMF) scenarios. 70. For each tailings stream, identify: • geochemical properties (e.g., NAF, strongly gypsiferous etc.) • radionuclide levels at each stage • if radionuclides will be water soluble • any issues with drainage and tailings consolidation. for the original proposal approved under MS1110 and any changes as a result of the proposal. 71. Conduct chemical and physical characterisation of the waste materials, including characterisation of tailings pore water. 72. Assess impacts on surrounding environment if there was failure of TSF integrity. 73. Assess potential radiation impacts on surrounding soils/land including flora and fauna values using the Environmental Risk from Ionising Contaminants: Assessment and Management (ERICA) tool. Australian specific data should be used where available. An assessment of impact from the original proposal (MS 1110), this proposal (Yangibana

	Expansion 1), the revised proposal (MS 1110 plus Yangibana Expansion 1) and cumulative impacts will be provided in the ERD. 74. Demonstrate conformance with internationally recognised design criteria for TSF design and describe measures to minimise the risk of environmental exposure to as low as reasonably achievable/possible (ALARP). Include a conceptual design of the enlarged TSF should ensure long-term encapsulation of tailings/wastes that reduces any risks to the environment and environmental values to an acceptable level. Noting that more detailed reports will be provided to the DMIRS as part of the Mining Proposal. 75. Provide a graphical conceptual representation of the final enlarged TSFs. 76. Provide details of stability of the site from a geotechnical and geochemical perspective. 77. Describe how licenses and approvals, not issued under Part IV of the *Environmental Protection Act 1986* and *Environment Protection and Biodiversity Conservation Act 2000,* assess and mitigate impacts to the environment. 78. Described proposed management, monitoring and mitigation methods to be implemented demonstrating that the revised TSF design of the proposal has addressed the mitigation hierarchy in relation to impacts (direct and indirect) on soils/lands/receiving environment. This description should contain recommendations for soil handling to minimise erosion of stockpiled soils. 79. Provide rehabilitation and closure management and mitigation measures to be included in the updated Mine Closure Plan. A Mine Closure Plan should be provided as an appendix to and discussed in the ERD. The Mine Closure Plan should be prepared in accordance with the Guidelines for the Preparation of a Mine Closure Plan (DMIRS 2020) and submitted in the format under the Statutory Guidelines for Mine Closure Plans in Western Australia (DMIRS 2020). 80. Provide a reviewed and updated Radioactive Waste Management Plan (RWMP) with clear environmental outcomes as an appendix to the ERD and describe high-level management to be implemented to mitigate the risk associated with radioactive waste. Identify amendments that have been made to the RWMP. 81. Outline the outcomes, trigger and contingency actions to ensure impacts (direct and indirect) are not greater than predicted. 82. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.
Relevant Policy and Guidance	***EPA Policy and Guidance*** *Statement of Environmental Principles, Factors and Objectives (EPA, 2020)*

	Environmental Factor Guideline: Terrestrial Environmental Quality (EPA, 2016) *Instructions on how to prepare an Environmental Review Document (EPA, 2020)* *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA, 2020).* ***Other Policy and Guidance*** *Statutory Guidelines for Mine Closure Plans (DMIRS, 2020)* *Mine Closure Plan Guidance – how to prepare in accordance with the Statutory Guidelines (DMIRS, 2020)* *National Waste Policy: Less Waste More Resources (Commonwealth of Australia, 2018)* *Outcomes-based Conditions Policy Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia, 2016)* *Guidelines on Tailings Dams - Planning, Design, Construction, Operation and Closure (ANCOLD, 2012a)* *Guidelines on the Consequence Categories for Dams (ANCOLD 2012b)* *Code of Practice for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (the Mining Code; ARPANSA, 2005)* *Guideline (under review) Managing naturally occurring radioactive material (NORM) in mining and mineral processing (also known as the NORM Guidelines) (DMIRS, 2021)* *Code of Practice - Tailings storage facilities in Western Australia. Resources Safety and Environment Divisions (DMP, 2013a)* *Guidelines on the Safe Design and Operating Standards for Tailings Storage (DMP, 2013b)* *Guide to the Preparation of a Design Report for Tailings Storage Facilities (TSFs) (DMP, 2015)* *Mine sites, exploration camps and construction villages Scoping Tool: Public Health Considerations (Department of Health, 2011).*

HUMAN HEALTH	
EPA Objective	To protect human health from significant harm
Relevant Activities	• Blasting and mining of naturally occurring radioactive material in the ore from three proposed pits • Increased capacity of radioactive tailings in the Hydromet Tailings Storage Facility (TSF) • Transporting and processing of ore • Increased capacity of radioactive tailings in the Hydromet and Beneficiation TSFs.

Potential Impacts and Risks	• Gamma irradiation and absorption, from a person being in close proximity to material with elevated radioactive levels • Inhalation of radon decay products (RnDP) and thoron decay products (TnDP) • Inhalation of radionuclides in dust • Ingestion of animals or plants that have come in contact with emissions • Ingestion of water
Required Work	83. Define the radiation and exposure pathways. Conduct and summarise a radiological exposure assessment and modelling of radiation exposure risk to the public and workers, both during operation and post closure, including a radiological dose assessment. Include characterisation of expected levels of radioactivity associated with each stage of the process, including transportation of the final product. 84. Modelling of dust emission sources, particularly in relation to near surface mineralisation and dispersion modelling to predict radionuclide activities in airborne and deposited dust and to ensure compliance with National Environment Protection Measure (NEPM) standards. 85. Consider and discuss appropriate conversion factors and modelling of absorbed doses. 86. Include management measures that would be implemented to minimise emission of radionuclide-containing dust and radon decay products. 87. Include monitoring, management and contingency procedures to reduce exposure. 88. Review the approved Mine Closure Plan to address completion criteria and mitigation actions for risks at closure in addition to those considered for the Yangibana Rare Earths Project (MS 1110). 89. Include a revised Mine Closure Plan (MCP) with the ERD. Ensure the MCP continues to include completion criteria to protect human health from significant harm so that environmental values are maintained post closure. 90. Outline the outcomes, trigger and contingency actions to ensure impacts (direct and indirect) are not greater than predicted. 91. Conduct a health risk assessment for hazards associated with radiation, using evidence based information for health impacts. The results of the health risk assessment will be provided and discussed in the ERD. 92. Establish an appropriate baseline for model input, including natural variation. Include details of methodology used for the collection and analysis of radiological baseline data.

	93. Describe the residual impacts for the proposal and analyse these impacts to identify and detail any that are significant. 94. Describe how licenses and approvals, not issued under Part IV of the *Environmental Protection Act 1986* and *Environment Protection and Biodiversity Conservation Act 2000,* assess and mitigate impacts to the environment. 95. Discuss the predicted impacts transport workers and the general public in particular at sensitive receptors in the original proposal and any changes to those previously assessed impacts that may result from this proposal. 96. Provide information and an assessment of cumulative impacts including baseline levels and the impacts of the original proposal to environmental values. Include any impacts that may occur due to an increased project life and volume. An assessment of impact from the original proposal (MS 1110), this proposal (Yangibana Expansion 1), the revised proposal (MS 1110 plus Yangibana Expansion 1) and cumulative impacts will be provided in the ERD 97. Demonstrate and document in the ERD how the EPA's objectives for these factors can be met.
Relevant Policy and Guidance	***EPA Policy and Guidance*** *Environmental Factor Guideline – Human Health (EPA, 2016)* *Statement of Environmental Principles, Factors and Objectives (EPA, 2020)* *Instructions on how to prepare an Environmental Review Document (EPA, 2020)* *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA, 2020).* ***Other Policy and Guidance*** *Statutory Guidelines for Mine Closure Plans (DMIRS, 2020)* *Mine Closure Plan Guidance – how to prepare in accordance with the Statutory Guidelines (DMIRS, 2020)* *Outcomes-based Conditions Policy Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia, 2016)* *Guideline (under review) Managing naturally occurring radioactive material (NORM) in mining and mineral processing (also known as the NORM Guidelines) (DMIRS, 2021)* *National Code of Practice & Safety Guide: Radiation protection and radioactive waste management in mining and mineral processing; known as "the Mining Code" (ARPANSA, 2005)* *National Safety guide: Management of naturally occurring radioactive material (ARPANSA, 2008)* *National Fundamentals: Protection against ionising radiation (ARPANSA, 2014)*

	National Code of Practice: Safe transport of radioactive material (ARPANSA, 2019).

SOCIAL SURROUNDINGS	
EPA Objective	*To protect social surroundings from significant harm.*
Relevant Activities	• Land clearing • Construction of landforms • Vehicle and equipment movement • Mining activities.
Potential Impacts and Risks	• Direct and indirect impacts to the Fraser Creek heritage exclusion zone • Direct impacts to significant cultural heritage sites within the development envelope • Dust and noise impacts to sensitive receptors • Air-blast overpressure noise emissions • Mining noise emissions.
Required Work	98. Conduct consultation and investigations, including ethnographic and archaeological surveys in consultation with the relevant Traditional Owners and Native Title holders, the Combined Thiin-Mah, Warriyangka, Tharrkari and Jiwarli People, to determine the significance of potential impacts to social surroundings as a result of the proposal. The studies will be to a standard that will accurately characterise the Aboriginal heritage values for the area likely to be impacted by the proposal. 99. Provide information on ongoing engagement with relevant Traditional Owners. 100. Identify cultural heritage sites that may be directly or indirectly impacted by the proposal. 101. Provide a figure depicting cultural heritage survey effort applied in relation to the study area and development envelope, identifying the direct and indirect impact areas. *102.* Provide figures depicting the recorded locations of cultural heritage sites in relation to the development envelope. 103. Assess the impacts of noise and air quality on sensitive receptors. 104. Assess the potential direct and indirect impacts of the construction and operational elements of the proposal on identified cultural heritage values. An assessment of impact from the original proposal (MS 1110), this proposal (Yangibana Expansion 1), the revised proposal (MS 1110 plus Yangibana Expansion 1) and cumulative impacts will be provided in the ERD.

	105. Describe how licenses and approvals, not issued under Part IV of the *Environmental Protection Act 1986* and *Environment Protection and Biodiversity Conservation Act 2000,* assess and mitigate impacts to the environment. 106. Describe the application of the mitigation hierarchy in the proposal design, construction, operation and closure. Detail actions undertaken to avoid, minimise and mitigate proposal impacts. 107. Describe any additional management actions including clear environmental outcomes to be included in the Cultural Heritage Management Plan and Air Quality Management Plan. 108. Demonstrate how the EPA's objective for this factor has been addressed.
Relevant Policy and Guidance	***EPA Policy and Guidance*** *Environmental Factor Guideline: Social surroundings (EPA, 2016)* *Statement of Environmental Principles, Factors and Objectives (EPA, 2020)* *Instructions on how to prepare an Environmental Review Document (EPA, 2020)* *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA, 2020).* ***Other Policy and Guidance*** *Statutory Guidelines for Mine Closure Plans (DMIRS, 2020)* *Mine Closure Plan Guidance – how to prepare in accordance with the Statutory Guidelines (DMIRS, 2020)* *Aboriginal Heritage Due Diligence Guidelines (DPLH, 2013).*

4. OTHER ENVIRONMENTAL FACTORS OR MATTERS

The EPA has identified the following other environment factors or matters relevant to the proposal that must be addressed during the environmental review and discussed in the environmental Review Document:

- Greenhouse Gas Emissions: A greenhouse gas emissions estimate and consideration of mitigation measures shall be undertaken in the context of the EPA's Environmental Factor Guideline: Greenhouse Gas Emissions

5. STAKEHOLDER CONSULTATION

The proponent must consult with stakeholders who are affected by, or are interested in the proposal. This includes the decision-making authorities (see section 6), other relevant state (and Commonwealth) government agencies and local government authorities, the local community and environmental non-government organisations.

The proponent must document the following in the ERD:

- identified stakeholders

- the stakeholder consultation undertaken and the outcomes, including decision-making authorities' specific regulatory approvals and any adjustments to the proposal as a result of consultation
- any future plans for consultation.

6. DECISION-MAKING AUTHORITIES

At this stage, the EPA has identified the following decision-making authorities for the proposal. Additional decision-making authorities may be identified during the assessment.

Table 6.1 Decision-making Authorities

DECISION-MAKING AUTHORITY	RELEVANT LEGISLATION
Minister for Environment	*Biodiversity Conservation Act 2016*
Minister for Water	*Rights in Water and Irrigation Act 1914*
Minister for Mines and Petroleum	*Mining Act 1978*
Minister for Aboriginal Affairs	*Aboriginal Heritage Act 1972*

DECISION-MAKING AUTHORITY	RELEVANT LEGISLATION
Director General, Department of Water and Environmental Regulation	*Environmental Protection Act 1986*
Executive Director, Resource and Environmental Compliance Division, Department of Mines, Industry Regulation and Safety	*Mining Act 1978*
Chief Dangerous Goods Officer, Department of Mines, Industry Regulation and Safety	*Dangerous Goods Safety Act 2004*
State Mining Engineer, Department of Mines, Industry Regulation and Safety	*Mines Safety and Inspection Act 1994*
Secretary, Radiological Council	*Radiation Safety Act 1975*
Chief Health Officer, Department of Health	*Health (Miscellaneous Provisions) Act 1911* *Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974* *Public Health Act 2016*