

DRAFT ENVIRONMENTAL SCOPING DOCUMENT

Proposal name:	Mesa A Hub Revised Proposal
Proponent:	Robe River Mining Co. Pty. Ltd.
Assessment number:	2107
Location:	43 kilometres west of Pannawonica in the Pilbara region of Western Australia
Local Government Area:	Shire of Ashburton
Public review period:	Environmental Review Document 2 weeks public review
EPBC Reference No:	2016/7843

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. This draft ESD has been prepared by the EPA in consultation with the proponent, decision-making authorities and interested agencies consistent with the EPA's *Procedures Manual*.

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.

Content

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

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	16 March 2017
Proponent submits first draft Environmental Review Document	30 August 2017
EPA provides comment on first draft Environmental Review Document <i>(6 weeks from receipt of ERD)</i>	11 October 2017
Proponent submits revised draft Environmental Review Document	15 November 2017
EPA authorises release of Environmental Review Document for public review <i>(2 weeks from EPA approval of ERD)</i>	27 December 2017
Proponent releases Environmental Review Document for public review for 2 weeks	15 January 2018
Close of public review period	30 January 2018
EPA provides Summary of Submissions <i>(3 weeks from close of public review period)</i>	20 February 2018
Proponent provides Response to Submissions	20 March 2018
EPA reviews the Response to Submissions <i>(4 weeks from receipt of Response to Submissions)</i>	17 April 2018
EPA prepares draft assessment report and completes assessment <i>(7 weeks from EPA accepting Response to Submissions)</i>	31 May 2018
EPA finalises assessment report (including two weeks consultation on draft conditions) and gives report to Minister <i>(6 weeks from completion of assessment)</i>	12 July 2018

Procedure

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

This ESD has not been released for public review. The ESD will be available on the EPA website (www.epa.wa.gov.au) upon endorsement and must be appended to the ERD.

Assessment as an accredited assessment

The proposal has been referred and determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* and is being assessed as an accredited assessment. The relevant matters of national environmental significance (MNES) for this proposal are:

- Listed threatened species and communities (Sections 18 and 18A).

This draft ESD includes work required to be carried out and reported on in the ERD document in relation to MNES. The ERD 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 as identified in Table 4. The ERD will include a separate section which summarises the potential impacts on MNES and describes, to the extent practicable, any feasible alternatives to the proposed action and possible mitigation measures. Proposed offsets to address significant residual impacts on MNES are also to be discussed.

2. The proposal

The subject of this ESD is Robe River Mining Co. Pty. Ltd's Mesa A Hub Revised Proposal which is to expand their existing operations at the Mesa A/Warramboe Iron Ore Project. Joint Venture entities include: Robe River Mining Co. Pty. Ltd., North Mining Limited, Mitsui Iron Ore Development Pty. Ltd., Cape Lambert Iron Associates, a partnership carried on by Nippon Steel & Sumitomo Metal Australia Pty Ltd, Nippon Steel & Sumikin Resources Australia Pty Ltd and Mitsui Iron Ore Development Pty Ltd and Pannawonica Iron Associates, a partnership carried on by Nippon Steel & Sumitomo Metal Australia Pty Ltd, Nippon Steel & Sumikin Resources Australia Pty Ltd. The Proposal includes development of additional mine pits and associated infrastructure, water treatment facilities, processing facilities and water management infrastructure as well as expansion of existing mine pits, waste dumps and associated infrastructure. The expansion of the existing pits is to include a reduction of the mining exclusion zone (MEZ) at Mesa A by 33 hectares (ha) and mining below water table at Warramboe. The regional location of the Proposal is shown in Figure 1 and the Development Envelope encompassing the physical elements of the proposal is delineated in Figure 2.

The key characteristics of the Proposal are set out in Tables 2 and 3. 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 current Proposal is mainly located on Mineral Lease ML248SA granted pursuant to the *Iron Ore (Robe River) Agreement Act 1964*. The deposits included in the Proposal are within ML248SA except for portions of the Mesa B and Mesa C deposits that extend into Exploration Licence E08/01148. Conversion of these areas into ML248SA will be required prior to development for mining.

The main co-existing *Land Administration Act 1997* (LAA) tenure in the Proposal Area is the Yarraloola Pastoral Station (Lease N49500). This pastoral lease is held by the Yarraloola Station Partnership which comprises members of the Robe River Iron Associates (RRIA). The main ancillary tenure is the RRIA LAA lease for the Mesa A railway (Lease K876559). This lease runs between Mesas B and C and forms a tenure connection to the Mesa A mining

operation. Grants of additional tenure and/or conversion of tenure will be required for bore field development, waste dumps, pipelines, haul roads, and other infrastructure.

The original 'Mesa A / Warrambo Iron Ore Project' proposal was referred to the EPA in May 2005. The proposal, located approximately 43 km west of Pannawonica in the Shire of Ashburton, involved the development of new above water table mine pits at Mesa A and Warrambo. In total (Mesa A and Warrambo) would see clearing of up to 2,900 ha of native vegetation.

The EPA assessed the proposal and determined it to be environmentally unacceptable on the grounds it would not meet objectives for two environmental factors: 'subterranean fauna' and 'landforms, closure planning and rehabilitation' (EPA Bulletin 1251). In particular, the EPA noted the following in its report:

Subterranean Fauna

The 11 species presently recorded from Mesa A have not been recorded elsewhere, and currently five of these species have only been recorded in the area proposed for mining, and not in the area to be set aside as a 'mining exclusion zone' (MEZ). The EPA is therefore of the view that the proposal has the potential to result in the extinction of at least five species of troglobitic fauna, and considers this to be a high and unacceptable risk. (Page 24, EPA, 2007a)

Landforms, Closure Planning and Rehabilitation

Mesa A is considered to be a landform of significance as it is a partial mesa with three distinct gullies, which is not common in the Robe River/Deepdale formations. Rockshelters, terraces and water holes around and within the Mesa A escarpment were identified [...] as having a high level of ethnographic significance.

...the EPA considers the 50 m width (up to 200 m in some areas) of the rim to be retained to be inadequate for the protection of troglobitic fauna, and landscape and Aboriginal heritage values associated with Mesa A. The EPA is concerned that the narrow width of the 'rim' to be retained may mean that it is not geotechnically stable post-mining. (Pages 15-16, EPA, 2007a)

The proponent subsequently appealed the recommendations of the EPA (Appeal Number 032 of 2007). It amended the proposal and provided further information as described below:

1. Increased the size of the Mining Exclusion Zone (MEZ) – thereby retaining habitat for troglofauna and increasing its width to conserve landscape and Aboriginal heritage values.
2. Provided a geotechnical report showing the landform would be stable after mine closure (Snowden, 2007).

The Minister for Environment considered the new information could have significant implications for the acceptability of the project and as such requested the EPA to re-assess

the proposal under section 43(1). The EPA reassessed the proposal with regard to 'subterranean fauna' and 'landforms, closure planning and rehabilitation' and recommended the changed proposal be allowed to proceed subject to conditions (EPA Bulletin 1264). The proposal was approved on 21 November 2007 with the issuing of Ministerial Statement 756.

The proposal has since been changed on three occasions under section 45C as follows:

1. On 27 July 2008 the orientation of the escarpment breakthrough portal was changed and was added as a key characteristic of the proposal.
2. On 17 December 2010 the mining pit shell and the MEZ were changed, with the MEZ increasing in size. Groundwater abstraction was increased from 1.5 GL per annum to 3 GL per annum.
3. On 27 March 2013 clearing of native vegetation was increased from 2,900 ha to 3,680 ha. The key characteristics table was also amended to remove project life, ore location, transport of product, and the escarpment breakthrough portal as they were not considered relevant to the environment. Dewatering was removed to be managed under the *Rights in Water and Irrigation Act 1914*.

The expansion of mining at Mesa A that is part of the current referral was originally submitted as a section 45C change to proposal in August 2015. In January 2016 the proponent was advised that the increased impact on subterranean fauna does not meet the requirements for a section 45C change due to significance of the change. The proponent was advised that the expansion should be referred to the EPA under section 38. The proponent has done this by combining the proposed expansion at Mesa A with the proposal to mine below the water table at Warramboe and develop additional mine pits at Mesas B and C, Highway and Tod Bore as detailed below.

Table 2 Summary of the Proposal

Proposal title	Mesa A Hub Proposal (Revised Proposal).
Proponent name	Robe River Mining Co. Pty. Ltd.
Short description	<p>The Proposal is to revise the existing Mesa A/Warramboe Iron Ore Project.</p> <p>The Proposal includes development of additional mine pits and associated infrastructure, water treatment facilities, processing facilities and water management infrastructure as well as expansion of existing mine pits, waste dumps, and associated infrastructure.</p>

Table 3 Location and proposed extent of physical and operational elements

Element	Location	Existing approval (Ministerial Statement 756)	Proposed change (This Proposal)	Proposed extent (Revised Proposal)
<i>Physical elements</i>				
Mine and associated infrastructure	Figure 2	No more than 3680 ha (with the exception of clearing in Mining Exclusion Zone, MEZ, other than the approved portal breakthrough and other approved infrastructure as per Figure 2 and Figure 4).	Additional clearing of up to 2,500 ha (within Development Envelope of 20,184 ha). Includes 42 ha in current Mesa A MEZ in addition to already considered clearing. (e.g. access roads and abandonment bunds). 33 ha of clearing is for mining in the MEZ.	Clearing of up to 6,180 ha (within Development Envelope of 20,184 ha). Includes 6 ha in <i>proposed revised</i> Mesa A MEZ in addition to already considered clearing.
<i>Operational elements</i>				
Dewatering		Was 3 GL per annum but was removed in s45C Change 27 March 2013 – managed under RIWI Act. <i>See 'Background Information' above.</i>	Up to 5 GL/annum at Warrambo. Up to 5 GL/annum at Mesa C.	Up to 5 GL/annum at Warrambo. Up to 5GL/annum at Mesa C.

Surface Water Management		<i>New characteristics</i>	<p>Surplus water management options include use on site, in processing and discharge to the environment or alternative means of disposal.</p> <p>Controlled surface discharge to extend along Warrambo Creek no further than 8 km downstream of the discharge point under natural no-flow conditions.</p>	<p>Surplus water management options include use on site, in processing and discharge to the environment or alternative means of disposal.</p> <p>Controlled surface discharge to extend along Warrambo Creek no further than 8 km downstream of the discharge point under natural no-flow conditions.</p>
Water supply		<i>New characteristics</i>	Up to 11 GL/annum from a bore field to be developed at Warrambo and/or Jimmawurrada.	Up to 11 GL/annum from a bore field to be developed at Warrambo and/or Jimmawurrada.

3. Preliminary key environmental factors and required work

The preliminary key environmental factors for the environmental review are:

1. Flora and Vegetation;
2. Subterranean Fauna;
3. Terrestrial Fauna;
4. Hydrological Processes and Inland Waters Environmental Quality;
5. Landforms; and
6. Social Surrounds.

Table 4 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.

Table 4 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	Clearing of native vegetation, groundwater abstraction, potential alteration of surface water flows, and potential discharge of excess mine dewater.
Potential impacts and risks	<ul style="list-style-type: none"> • The revised proposal would include a further 2,500 ha to be cleared. Of this up to 42 ha of the clearing will be within the currently Mesa A MEZ. • Vegetation units considered to have high local significance were recorded in the survey area. These vegetation units include the following riparian vegetation species and therefore are considered to have elevated environmental value in the riparian habitat they support: <ul style="list-style-type: none"> ○ ChAbAtrTw – Corymbia hamersleyana low isolated trees over Acacia ivenosa and Acacia trachycarpa mid sparse to open shrubland over Triodia wiseana hummock grassland to open hummock grassland; and ○ EcEvMgAtrCv – Eucalyptus camaldulensis subsp. refulgens and Eucalyptus victrix low open woodland over Melaleuca glomerata and Acacia trachycarpa tall to open shrubland over Cyperus vaginatus sparse sedgeland. • Impacts to the Priority 3 Sand sheet vegetation (Robe Valley) Priority ecological community (PEC). • Disturbance to three Priority Flora taxa recorded in the Development Envelope : <ul style="list-style-type: none"> ○ Triodia sp. Robe River (M.E. Trudgen et al. MET 12367) (Priority 3); ○ Rhynchosia bungarensis (Priority 4); and ○ Goodenia nuda (Priority 4).

<p>Required work</p>	<ol style="list-style-type: none"> 1. Identify and characterise flora and vegetation in accordance with the requirements of Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment, December 2016. The survey should take into account areas that are likely to be directly or indirectly impacted as a result of the Proposal. For surveys previously undertaken of the proposal and adjacent areas, demonstrate how these surveys are relevant and representative of the development envelope and if they are consistent with EPA policy, and summarise their findings. 2. Undertake baseline mapping of weed affected areas in any area likely to be directly or indirectly impacted by the proposal. 3. Provide an analysis of the vegetation and significant flora species present and likely to be present within the Development Envelope and indirect disturbance areas outside of the Development Envelope. Include an assessment of the relevance of any vegetation and significant flora species in a local and regional context. Include a quantitative assessment of levels of impact on conservation significant species, communities or vegetation units. For species, this includes numbers and proportions of individuals for the species in a local and regional context, and numbers and proportions of populations directly or potentially indirectly impacted. For communities and vegetation units this includes the area (in hectares) and proportions directly or potentially indirectly impacted. 4. Provide a clear set of data that shows the impact (direct, indirect and secondary) from the existing approved project to date against the currently approved footprint and proposed additional impact (direct, indirect and secondary) for the expanded Proposal. 5. Provide information on the current status and outcomes of current activities to ensure that no significant adverse effects through direct or indirect impacts to the Sand Sheet Vegetation PEC have occurred from the implementation of the proposal as required by condition 7-1 in Ministerial Statement 756. 6. Review and revise the current Flora and Vegetation management plan in relation to the requirements of condition 7 in Ministerial Statement 756, to apply to the entire proposal. The following should be addressed in the plan: <ul style="list-style-type: none"> • Invasive species control – control of weeds, in particular through the infrastructure corridor, other transport and/or entry and exit points, and in areas of native vegetation including the Sand Sheet Vegetation PEC and vegetation units considered to have high local significance (e.g. rare units, habitat for conservation significant species). • Monitoring program – to monitor the health of significant flora species and vegetation identified, including (but not limited to): <ul style="list-style-type: none"> - The Sand Sheet Vegetation PEC; - <i>Triodia</i> sp. Robe River (M.E. Trudgen et al. MET 12367) (Priority 3); - <i>Rhynchosia bungarensis</i> (Priority 4); and
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	<p>- <i>Goodenia nuda</i> (Priority 4).</p> <ol style="list-style-type: none"> 7. Provide an analysis of any additional potential impacts from the proposal in relation to dewatering and discharge activities. 8. Provide a detailed description of the cumulative impacts associated with the proposal, including direct impacts from clearing, and indirect impacts such as groundwater drawdown, altered drainage, changes in water quality, spread of weeds, fragmentation of vegetation, altered fire regime, and dust. 9. Provide tables and maps of the proposed clearing and predicted indirect impact to vegetation and significant flora species, including but not limited to threatened and/or priority ecological communities, threatened flora, Priority flora, unnamed or new flora species. 10. Discuss, and determine significance of, potential direct, indirect (such as dust downstream impacts, weed invasion, etc) and cumulative impacts (including in relation to the existing project) to flora and vegetation as a result of the Proposal at a local and regional level. 11. Demonstrate that all practicable measures have been taken to reduce both the area of the proposed disturbance footprint and the Development Envelope based on progress in the proposal design and understanding of the environmental impacts. 12. Demonstrate application of the mitigation hierarchy to avoid and minimise impacts to flora and vegetation. 13. Discuss management measures, outcomes/objectives sought to ensure residual impacts (direct and indirect) are not greater than predicted. 14. Prepare a Mine Closure Plan consistent with DMP and EPA <i>Guidelines for Preparing Mine Closure Plans</i> (2015), which includes methodologies and criteria to ensure progressive rehabilitation of disturbed areas with vegetation composed of native species of local provenance. 15. Describe the residual impacts for the proposal and analyse these impacts to identify and detail any that are significant. 16. Create an offsets position following application of the 'mitigation hierarchy'. 17. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.
<p>Relevant policy and guidance</p>	<p><u>EPA Policy and Guidance</u></p> <p>Advice of the Environmental Protection Authority to the Minister for Environment under Section 16 of the <i>Environmental Protection Act 1986</i>, <i>Cumulative environmental impacts of development in the Pilbara region</i>.</p> <p>DMP and EPA <i>Guidelines for Preparing Mine Closure Plans</i> (2015).</p> <p>EPA 2016, <i>Statement of Environmental Principles, Factors and Objectives</i>.</p> <p>EPA 2016, <i>Environmental Factor Guideline – Flora and Vegetation</i>.</p>

	<p>EPA 2016, <i>Environmental Factor Guideline – Inland Waters Environmental Quality</i>.</p> <p>Environmental Protection Authority 2016, <i>Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment</i>.</p> <p><i>Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans</i> (EPA, 2016).</p> <p><u>Other policy and guidance</u></p> <p>The Government of Western Australia 2011, <i>WA Environmental Offsets Policy</i>.</p> <p>The Government of Western Australia 2014, <i>WA Environmental Offsets Guidelines</i>.</p>
Subterranean Fauna	
EPA objective	To protect subterranean fauna so that biological diversity and ecological integrity are maintained.
Relevant activities	<p>Loss of habitat due to mining and disposal of waste fines and water abstraction.</p> <p>Loss of individual subterranean fauna through mining.</p> <p>Change to subterranean fauna assemblage due to mining.</p>
Potential impacts and risks	<p>Impacts on subterranean fauna habitat, assemblage and individuals from mine pit development and groundwater drawdown due to groundwater abstraction.</p> <p>Seepage from placement of waste fines in-pit at Warramboos will result in the loss of subterranean fauna habitat.</p> <p>Change to subterranean fauna assemblage through mining.</p>
Required work	<p>18. Provide a desktop study of all surveys of the proposal area undertaken in accordance with EPA Policy The study should include:</p> <ul style="list-style-type: none"> • a justification of how those surveys are relevant and representative of the development envelope and if they were carried out using methods consistent with the EPA policy; and • a comprehensive listing of subterranean fauna known or likely to occur in the habitats present, and identification of conservation significant fauna species likely to occur in the area. <p>19. Conduct Level 2 subterranean fauna surveys in areas not previously surveyed that are likely to be directly or indirectly impacted as a result of the proposal. Surveys are to be undertaken in accordance EPA policy. The surveys should also consider other areas outside the proposed impact footprint as reference areas.</p> <p>20. Present a review of previous survey information and operational monitoring, and the results of the subterranean fauna surveys and discuss the potential for direct, indirect and cumulative impacts to subterranean fauna (species,</p>

	<p>populations and assemblages) and habitat including consideration of altered water regimes and water quality (e.g. nutrient flows) as a result of the Proposal.</p> <ol style="list-style-type: none">21. Assess the impacts to subterranean fauna with reference to relevant impacts from the proposed action (including taking into consideration any relevant guidelines, policies, plans and statutory provisions). For species which are likely to be impacted, provide information, including maps of habitat extent and an appropriate explanation of the likely distribution of species within those habitats including evidence to demonstrate whether there is habitat connectivity.22. Provide a detailed description of the potential direct, indirect and cumulative impacts to conservation significant and other species within the proposal area and on a regional scale.23. Demonstrate application of the mitigation hierarchy to avoid and minimise impacts to subterranean fauna.24. Discuss management measures, outcomes/objectives sought to ensure residual impacts (direct and indirect) are not greater than predicted.25. Review the current Mesa A Subterranean Fauna management plan(s) in relation to the requirements of conditions 5 (Troglobitic fauna monitoring) and 6 (Troglofauna habitat retention) in Ministerial Statement 756, to apply to the entire proposal including but not limited to areas depicted in of Ministerial Statement 756, and how these areas are proposed to change. The Plan(s) should link to the outcomes of the Subterranean Fauna Peer Review. The following should be addressed in the review, consistent with conditions but not limited to:<ul style="list-style-type: none">• subterranean fauna species and populations and assemblages;• key habitat parameters for subterranean fauna, including humidity within the underground spaces which form the habitat of the troglobitic fauna and water quantity and quality for stygofauna;• studies on the impacts of blasting and mining on the integrity of the troglobitic fauna habitat;• the effectiveness of re-creating troglobitic fauna habitat through such measures as replacement of waste rock, supported by evidence, including reference to previous trials;26. Revise the current Subterranean Fauna management plan(s) to apply to the entire proposal.27. Prepare a Mine Closure Plan consistent with DMP and EPA Guidelines for Preparing Mine Closure Plans (2015), which considers:<ul style="list-style-type: none">○ The use of Mining Exclusion Zones (MEZ) to protect troglofauna habitat;
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	<ul style="list-style-type: none"> ○ The use of waste rock to maximise survival of, and possible re-colonisation by, troglobitic fauna; and ○ The need to retain intact material suitable for troglobitic fauna habitat under the pit floor after mining to facilitate movement of troglobitic fauna between the material below the pit floor and the MEZ. <p>28. Describe the residual impacts for the proposal and analyse these impacts to identify and detail any that are significant.</p> <p>29. Create an offsets position following application of the ‘mitigation hierarchy’</p> <p>30. Demonstrate and document in the ERD how the EPA’s objective for this factor can be met.</p>
Relevant policy and guidance	<p><u>EPA Policy and Guidance</u></p> <p>DMP and EPA <i>Guidelines for Preparing Mine Closure Plans</i> (2015).</p> <p>EPA 2016, <i>Statement of Environmental Principles, Factors and Objectives</i>.</p> <p>EPA 2016, <i>Environmental Factor Guideline – Inland Waters Environmental Quality</i>.</p> <p>EPA 2016, <i>Technical Guidance – Sampling methods for subterranean fauna</i>.</p> <p>EPA 2016, <i>Technical Guidance – Subterranean fauna survey</i>.</p> <p><i>Instructions on how to prepare an Environmental Review Document</i> (EPA, 2016).</p> <p><i>Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans</i> (EPA, 2016).</p> <p><u>Other policy and guidance</u></p> <p>The Government of Western Australia 2011, <i>WA Environmental Offsets Policy</i>.</p> <p>The Government of Western Australia 2014, <i>WA Environmental Offsets Guidelines</i>.</p>
Peer Review	<p>A peer review is required to be commissioned by the proponent, in consultation with the OEPA, and included in the ERD. A peer review of the impacts to subterranean fauna and management, focussing on the impacts on troglofauna and the troglofauna habitat that would remain if the proposal was implemented and its stability and suitability to sustain viable troglofauna populations and assemblages.</p>
Terrestrial Fauna	
EPA objective	<p>To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.</p>
Relevant activities	<p>Clearing of habitat, dewatering, discharge of surplus dewater into Warrambo Creek, connectivity between Mesa C deposit and Robe River alluviums may impact fauna habitats and may result in the loss of individuals, noise, vibration, and dust from mining operations and ore transportation may damage the</p>

	integrity of or disturb threatened fauna habitat at Mesa B and Mesa C and loss from vehicle strike.
Potential impacts and risks	<p>Direct impacts to fauna from increased vehicle strikes, and as a result of construction and operation of the mine.</p> <ul style="list-style-type: none"> • Direct and indirect loss of fauna and fauna habitat (e.g. caves) from an increase in the currently approved disturbance. • Direct and indirect disturbance resulting in the fragmentation of habitat. • Indirect impacts to fauna may occur as a result of: <ul style="list-style-type: none"> ○ altered fire regimes due to clearing of native vegetation; ○ groundwater drawdown; ○ altered surface and groundwater regimes; ○ mounding and increase in surface water from excess mine dewater discharge; ○ changes to feral animal populations; ○ introduction or spread of weed species; and ○ restriction or removal of access to breeding habitat, foraging/dispersal habitat or water sources; ○ collisions with fencing; ○ attraction to light sources; ○ changes to water seasonality or quality in surface waterways as a result of discharge of; ○ excess mine dewater; and ○ removal of foraging/hunting habitat.
Required work	<p>31. Provide a desktop review and analysis of all surveys of the proposal area undertaken in accordance with EPA Policy and Assessment, Survey guidelines for Australia's threatened mammals. EPBC Act survey guidelines 6.5 (Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), 2011), Survey Guidelines for Australia's Threatened Bats. EPBC Act survey guidelines 6.1 (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2010); and Survey guidelines for Australia's threatened reptiles. EPBC Act survey guidelines 6.6 (Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), 2011).</p> <p>32. The study should include:</p> <ul style="list-style-type: none"> • a justification of how those surveys are relevant and representative of the development envelope and if they were carried out using methods consistent with the EPA policy; and

	<ul style="list-style-type: none">• a comprehensive listing of vertebrate fauna and short range endemic (SRE) invertebrate fauna known or likely to occur in the habitats present, and identification of conservation significant fauna species likely to occur in the area. <p>33. Conduct Level 2 terrestrial fauna and SRE invertebrate surveys in areas that are likely to be directly or indirectly impacted as a result of the proposal. Surveys are to be undertaken in accordance with EPA policy and, where available, species-specific survey guidelines for relevant species listed under the <i>Wildlife Conservation Act 1950</i> and the <i>Environmental Protection Biodiversity Conservation Act 1999</i>.</p> <p>34. Conduct additional targeted surveys for conservation significant fauna that are known to or likely to occupy habitats in the project area if demonstrated to be required based on the results of the desktop study and Level 2 surveys.</p> <p>35. Specify any MNES being assessed as part of the accredited assessment.</p> <p>36. Provide a review of bat populations and habitat in the local and regional area including the existing Mesa A Hub Proposal.</p> <p>37. Investigate and provide a description of any potential bat populations and habitat in the revised proposal area, and potential impacts from the revised proposal.</p> <p>38. For each relevant conservation significant species, including bat species and SREs, identified as likely to occur within the proposal area, provide:</p> <ul style="list-style-type: none">• baseline information on distribution (including known occurrences), ecology, and habitat preferences at both the site and regional levels;• information on the conservation value of each habitat type from a local and regional perspective, including the percentage representation of each habitat type on site in relation to its local and regional extent;• size and the importance of the population from a local and regional perspective and potential percentage loss of the conservation significant species locally due to loss of habitat;• maps illustrating the known recorded locations of conservation significant species and SRE invertebrates in relation to fauna habitat and the proposed disturbance and areas to be impacted.• For bats:<ul style="list-style-type: none">○ Provide evidence for the assertion made in the referral that bats can be expected to safely move from one cave to another if a cave is disturbed by construction or operational activities;○ Detail the extent to which clearing will remove foraging/hunting habitat for these species and the likely impacts of this on the local population; and○ The extent to which attraction to light sources will be impact these species and what might be done to mitigate this.
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	<ul style="list-style-type: none"> • For the Northern Quoll: <ul style="list-style-type: none"> ○ The extent to which clearing will remove hunting habitat and impact the species; and ○ Explanation of how the construction of cuttings will avoid harm to the species. • For the Olive Python: <ul style="list-style-type: none"> ○ The extent to which changes in surface water availability and quality can be expected to impact this species. <p>39. Identify the fauna habitat types within and outside the areas of impact. Consider habitat types that provide important ecological function within the proposal area (e.g. geological features which may support unique ecosystems).</p> <p>40. Discuss known existing threats to the species, with reference to relevant impacts from the proposed action (including taking into consideration any relevant guidelines, policies, plans and statutory provisions).</p> <p>41. Provide a detailed description of the potential direct, indirect (including downstream) and cumulative impacts to conservation significant and other species within the proposal area and on a regional scale.</p> <p>42. Develop a fauna management plan to apply to the entire revised proposal. The following should be addressed in the plan:</p> <ul style="list-style-type: none"> • Monitoring of the health and population sizes of threatened species, in particular, the following species (all of which are MNES): <ul style="list-style-type: none"> - Ghost Bat (<i>Macroderma gigas</i>) – Vulnerable; - Pilbara Olive Python (<i>Liasis olivaceus barroni</i>) – Vulnerable; - Pilbara Leaf-nosed Bat (<i>Rhynonictoris aurantia</i>) – Vulnerable; and - Northern Quoll (<i>Dasyurus hallucatus</i>) – Endangered. • Management options to be triggered should monitoring show a decline in health or population sizes of threatened species as a result of implementing the proposal. • Retention of critical habitat where possible, and where not possible justification/explanation is required. <p>43. Demonstrate application of the mitigation hierarchy to avoid and minimise impacts to terrestrial fauna.</p> <p>44. The proponent should demonstrate that the proposed action is not inconsistent with any relevant policy and guidance the proposed action is not inconsistent with any relevant Recovery Plan and Threat Abatement Plan.</p> <p>45. Prepare a Mine Closure Plan consistent with DMP and EPA Guidelines for Preparing Mine Closure Plans (2015), which addresses the need for progressive rehabilitation of habitat for conservation significant species.</p>
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	<p>46. Describe the residual impacts for the proposal and analyse these impacts to identify and detail any that are significant.</p> <p>47. Create an offsets position following application of the 'mitigation hierarchy'.</p> <p>48. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.</p>
Relevant policy and guidance	<p><u>EPA Policy and Guidance</u></p> <p>DMP and EPA <i>Guidelines for Preparing Mine Closure Plans</i> (2015).</p> <p>EPA 2016, <i>Environmental Factors Guidelines – Terrestrial Fauna</i>.</p> <p>EPA 2016, <i>Technical Guidance – Sampling methods for terrestrial fauna</i>.</p> <p>EPA 2016, <i>Technical Guidance – Sampling of short range endemic invertebrate fauna</i>.</p> <p>EPA 2016, <i>Environmental Factor Guideline – Inland Waters Environmental Quality</i>.</p> <p><i>Instructions on how to prepare an Environmental Review Document</i> (EPA, 2016).</p> <p><i>Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans</i> (EPA, 2016).</p> <p><u>Other policy and guidance</u></p> <p>The Government of Western Australia 2011, <i>WA Environmental Offsets Policy</i>.</p> <p>The Government of Western Australia 2014, <i>WA Environmental Offsets Guidelines</i>.</p>
Hydrological Processes and Inland Waters Environmental Quality	
EPA objective	<p>To maintain the hydrological regimes of groundwater and surface water so that environmental values are protected.</p> <p>To maintain the quality of groundwater and surface water so that environmental values are protected.</p>
Relevant activities	<p>Abstraction of groundwater.</p> <p>The discharge of surplus dewater into Warrambo Creek.</p> <p>Alteration of surface water flows through the Development Envelope.</p>
Potential impacts and risks	<p>Dewatering at Mesa C will result in groundwater drawdown. If there is hydraulic connectivity between the Mesa C deposit and the Robe River alluviums, drawdown in this area may result in temporary, seasonal reduction to water levels in semi-permanent pools in the Robe River.</p> <p>The discharge of surplus dewater into Warrambo Creek will result in surface flow approximately 8 km downstream of the discharge point under natural no-flow conditions and could lead to erosion of the creek bank.</p>

	<p>The discharge of surplus dewater into Warrambo Creek may reduce water quality.</p> <p>Discharge of surplus dewater into Warrambo Creek has the potential to impact water <i>seasonality</i> and in turn impact species including the Olive Phthon.</p> <p>Surface water flows through the Development Envelope may become contaminated by sediment or hydrocarbon spills.</p>
Required work	<p>49. Characterise the baseline hydrology and hydrogeological regimes and water quality, both in a local and regional context, including but not limited to, water levels, water chemistry, stream flows, flood patterns, and water quantity and quality.</p> <p>50. Provide a detailed description of the design and location of the revised proposal with the potential to impact surface water or groundwater. A Figure should be provided in the PER document with depicts the predicted location of the wetting front.</p> <p>51. Provide an update of the conceptual model of the surface and groundwater systems incorporating the results of monitoring conducted subsequent to the initial approval, including the extent of connectivity between surface and groundwater systems.</p> <p>52. Provide a conceptual mine water balance over the life of the proposal to discuss the capacity to reuse surplus mine dewater.</p> <p>53. Discuss the potential environmental impacts and benefits of identified surplus water management options (i.e. discharge of excess mine dewater, reuse on site, local water supply, aquifer recharge etc.) and discuss the most appropriate water management strategy for the proposal.</p> <p>54. Analyse, discuss and assess surface water and groundwater impacts. The analysis should include but not be limited to:</p> <ul style="list-style-type: none"> • changes in groundwater levels and changes to surface water flows associated with the proposal; • the nature, extent, and duration of impacts; • cumulative impacts with other projects and referred proposals, for which relevant information is publicly available; and • impacts on the environmental values of significant receptors but not limited to Warrambo Creek catchment. <p>55. Demonstrate application of the mitigation hierarchy to avoid and minimise impacts to Hydrological Processes and Inland Waters Environmental Quality.</p> <p>56. Prepare a Mine Closure Plan consistent with DMP and EPA <i>Guidelines for Preparing Mine Closure Plans</i> (2015) which addresses the development of completion criteria to maintain of the hydrological regimes and the quality of groundwater and surface water so that environmental values are maintained post closure.</p>

	57. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.
Relevant policy and guidance	<p><u>EPA Policy and Guidance</u></p> <p>DMP and EPA <i>Guidelines for Preparing Mine Closure Plans</i> (2015).</p> <p>EPA 2016, <i>Environmental Factors Guideline – Hydrological Processes</i>.</p> <p>EPA 2016, <i>Environmental Factors Guidelines – Inland Waters Environmental Quality</i>.</p> <p>EPA <i>Inland Waters of the Pilbara Western Australian (Part 1)</i>.</p> <p><i>Inland Waters of the Pilbara Western Australian (Part 2)</i>.</p> <p><i>Statement of Environmental Principles, Factors and Objectives, December 2016</i>.</p> <p><i>Instructions on how to prepare an Environmental Review Document</i> (EPA, 2016).</p> <p><i>Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans</i> (EPA, 2016).</p> <p><u>Other policy and guidance</u></p> <p>The Government of Western Australia 2011, <i>WA Environmental Offsets Policy</i>.</p> <p>The Government of Western Australia 2014, <i>WA Environmental Offsets Guidelines</i>.</p>
Landforms	
EPA objective	To maintain the variety and integrity of distinctive physical landforms so that environmental values are protected.
Relevant activities	Mining activities on Mesas A, B, and C.
Potential impacts and risks	<ul style="list-style-type: none"> • Variety – Mesa A was noted as being of landscape and visual significance. Mesa B and C may also be significant but no information has been provided. • Integrity – Mesa B and C have not been disturbed. • Ecological importance – as noted under terrestrial fauna the mesas contain caves in use by threatened fauna which may be impacted by operations. The Pilbara Leaf-nosed Bat, Ghost Bats and the Northern Quoll are dependent on the mesa landscapes. There is also habitat for troglodfauna species that appear restricted to Mesas A, B and C. • Social importance – there may be significant indigenous heritage values. The mesas are also of significant amenity value.
Required work	58. Provide a description of the geology and morphology of the landform.

	<p>59. Provide an analysis of whether the landform is robust and therefore less sensitive to damage from development activities, or whether it is easily disturbed or degraded.</p> <p>60. Provide an analysis of whether the landform is distinct at a local, regional or national level, or is well represented</p> <p>61. Provide a comparison of the character and condition of the landform with others of the same type at a local, regional or national scale.</p> <p>62. Analyse of the spatial extent of the landform likely to be impacted</p> <p>63. Assess the current integrity of the landform, the degree to which the landform has been disturbed, and the degree to which any previous disturbance has fragmented the landform</p> <p>64. Analyse the environmental values supported by the landform, including how the proposal will affect the role of the landform in maintaining these values (e.g. surface water or groundwater flows, wind movement, precipitation, temperature, landscape connectivity, and soil composition/chemistry)</p> <p>65. Demonstrate consideration of the cumulative impacts on the landform from historic and reasonably foreseeable future development.</p> <p>66. Demonstrate application of the mitigation hierarchy to avoid and minimise impacts to landforms.</p> <p>67. Prepare a Mine Closure Plan consistent with DMP and EPA <i>Guidelines for Preparing Mine Closure Plans</i> (2015), which addresses maintaining the integrity of physical landforms post closure (including geotechnical stability).</p> <p>68. Describe the residual impacts for the proposal and analyse these impacts to identify and detail any that are significant.</p> <p>69. Create an offsets position following application of the ‘mitigation hierarchy’.</p> <p>70. Demonstrate and document in the ERD how the EPA’s objective for this factor can be met.</p>
<p>Relevant policy and guidance</p>	<p><u>EPA Policy and Guidance</u></p> <p>EPA 2016, <i>Environmental Factors Guidelines – Inland Waters Environmental Quality</i>.</p> <p>EPA 2016 - <i>Environmental Factor Guideline – Landforms</i>.</p> <p>EPA 2016 – <i>Statement of Environmental Principles, Factors and Objectives</i>.</p> <p>DMP and EPA <i>Guidelines for Preparing Mine Closure Plans</i> (2015).</p> <p><i>Instructions on how to prepare an Environmental Review Document</i> (EPA, 2016).</p> <p><i>Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans</i> (EPA, 2016).</p> <p><u>Other policy and guidance</u></p> <p>The Government of Western Australia 2011, <i>WA Environmental Offsets Policy</i>.</p>

	The Government of Western Australia 2014, <i>WA Environmental Offsets Guidelines</i> .
Social Surroundings	
EPA objective	To protect social surroundings from significant harm.
Relevant activities	Clearing and excavation for mining activities. Abstraction of groundwater for mining and related activities. Discharge of excess dewater. Alteration to hydrological processes.
Potential impacts and risks	Disturbance of sites of cultural significance. Prevention or change to access to a site. Changes to the physical and biological attributes of the environment (e.g. pools, creeks, breakaways, bush tucker and bush medicine) which would impact on sites of heritage significance. The proposed intersection of the North West Highway by a mine pit.
Required work	71. Characterise the heritage and cultural values of proposed disturbance areas and any other areas that may be indirectly impacted to identify sites of significance and their relevance within a wider regional context. 72. Conduct Aboriginal heritage surveys in conjunction with the native title claim (WC99/012) holders Kuruma Marthudunera and other local people to identify Aboriginal sites of significance and identify concerns in regard to impacts from proposed mining operations. 73. Provide a description of the heritage values within the Development Envelope and provide a figure(s) of the heritage locations and proposed disturbance. 74. Assess the impacts of the Proposal on heritage sites and/or cultural associations as a result of implementation of the Proposal, including those arising from changes to the environment which may impact on ethnographic and archaeological heritage significance. . 75. Demonstrate application of the mitigation hierarchy to avoid and minimise impacts to social surroundings. 76. Provide detail on consultation that will be undertaken with Traditional Owners in preparing the mine closure plan, particularly in relation to cessation of discharge of water into Warrambo Creek. 77. Prepare a Mine Closure Plan consistent with DMP and EPA <i>Guidelines for Preparing Mine Closure Plans</i> (2015), which addresses the need to to protect the social surrounds from significant harm post closure. 78. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.

Relevant policy and guidance	<p><u>EPA Policy and Guidance</u></p> <p>DMP and EPA <i>Guidelines for Preparing Mine Closure Plans</i> (2015).</p> <p>Environmental Protection Authority 2016 – <i>Environmental Factor Guideline – Social Surrounds</i>.</p> <p><i>Instructions on how to prepare an Environmental Review Document</i> (EPA, 2016).</p> <p><i>Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans</i> (EPA, 2016).</p> <p><u>Other policy and guidance</u></p> <p>Department of Aboriginal Affairs and Department of Premier and Cabinet, 2013, <i>Due Diligence Guidelines, Version 3.0</i>. Perth, Western Australia.</p>
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4. Other environmental factors or matters

It is also important that the proponent be aware that other factors or matters may be identified during the course of the environmental review that were not apparent at the time that this ESD was prepared. If this situation arises, the proponent must consult with the EPA to determine whether these factors and/or matters are to be addressed in the ERD, and if so, to what extent.

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; and
- any future plans for consultation.

6. Decision-making authorities

At this stage, the EPA has identified the authorities listed in Table 4 as decision-making authorities (DMAs) for the proposal. Additional DMAs may be identified during the course of the assessment.

Table 5 Decision-making authorities

Decision-making authority	Relevant legislation
1. Minister for State Development.	<i>Iron Ore (Robe River) Agreement Act 1964.</i>
2. Minister for Mines and Petroleum.	<i>Mining Act 1978.</i>
3. Minister for Lands.	<i>Land Administration Act 1997.</i>
4. Minister for Environment.	<i>Wildlife Conservation Act 1950.</i>
5. Chief Executive Officer, Department of Environment Regulation.	<i>Environmental Protection Act 1986.</i>
6. Executive Director: Environment, Department of Mines and Petroleum.	<i>Mining Act 1978.</i>
7. State Mining Engineer, Department of Mines and Petroleum.	<i>Mines Safety and Inspection Act 1994.</i>
8. Department of Water.	<i>Rights in Water and Irrigation Act 1914.</i>
9. Minister for Aboriginal Affairs.	<i>Aboriginal Heritage Act 1972.</i>
10. Main Roads WA.	<i>Main Roads Act 1930.</i>

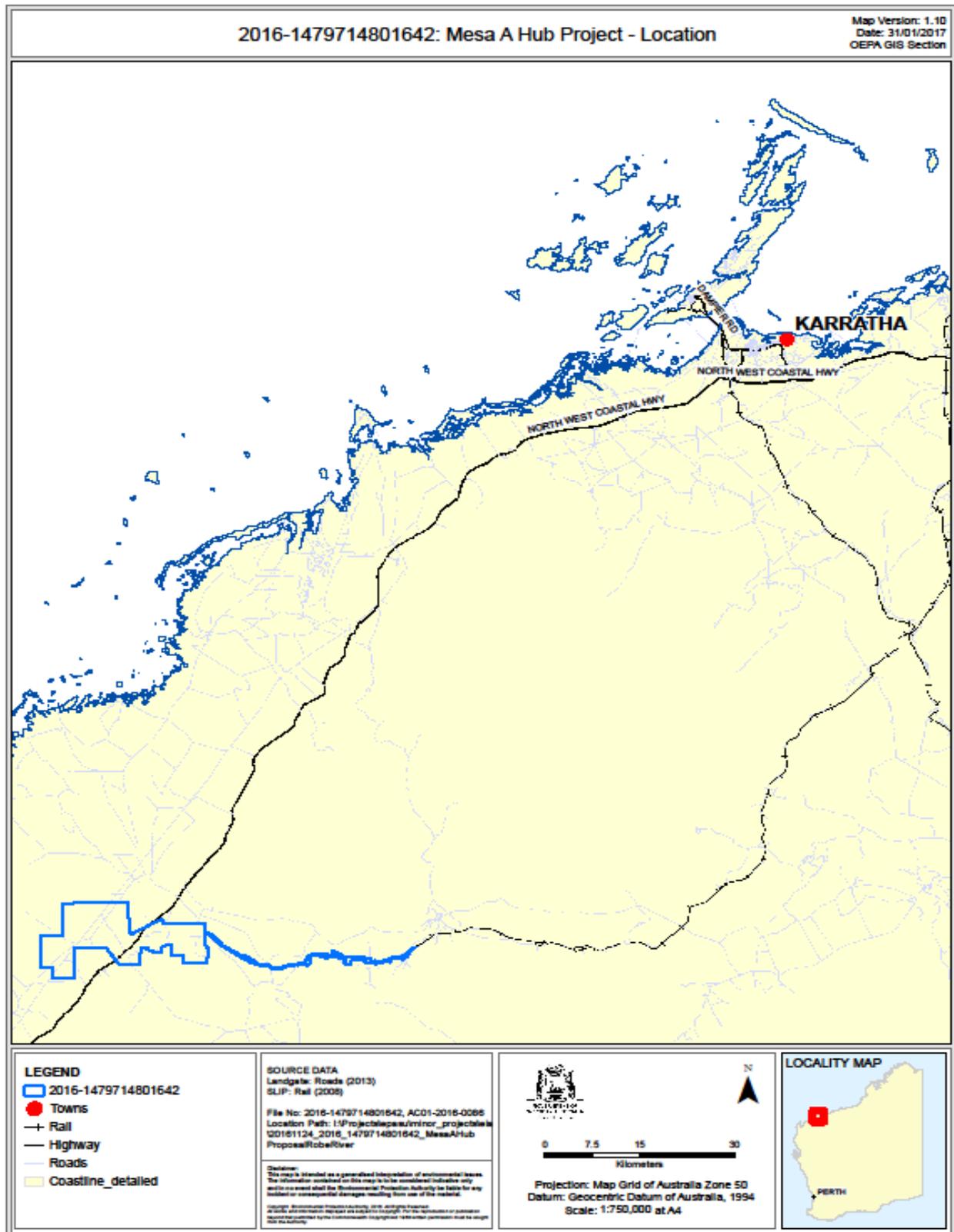


Figure 1 – Regional location

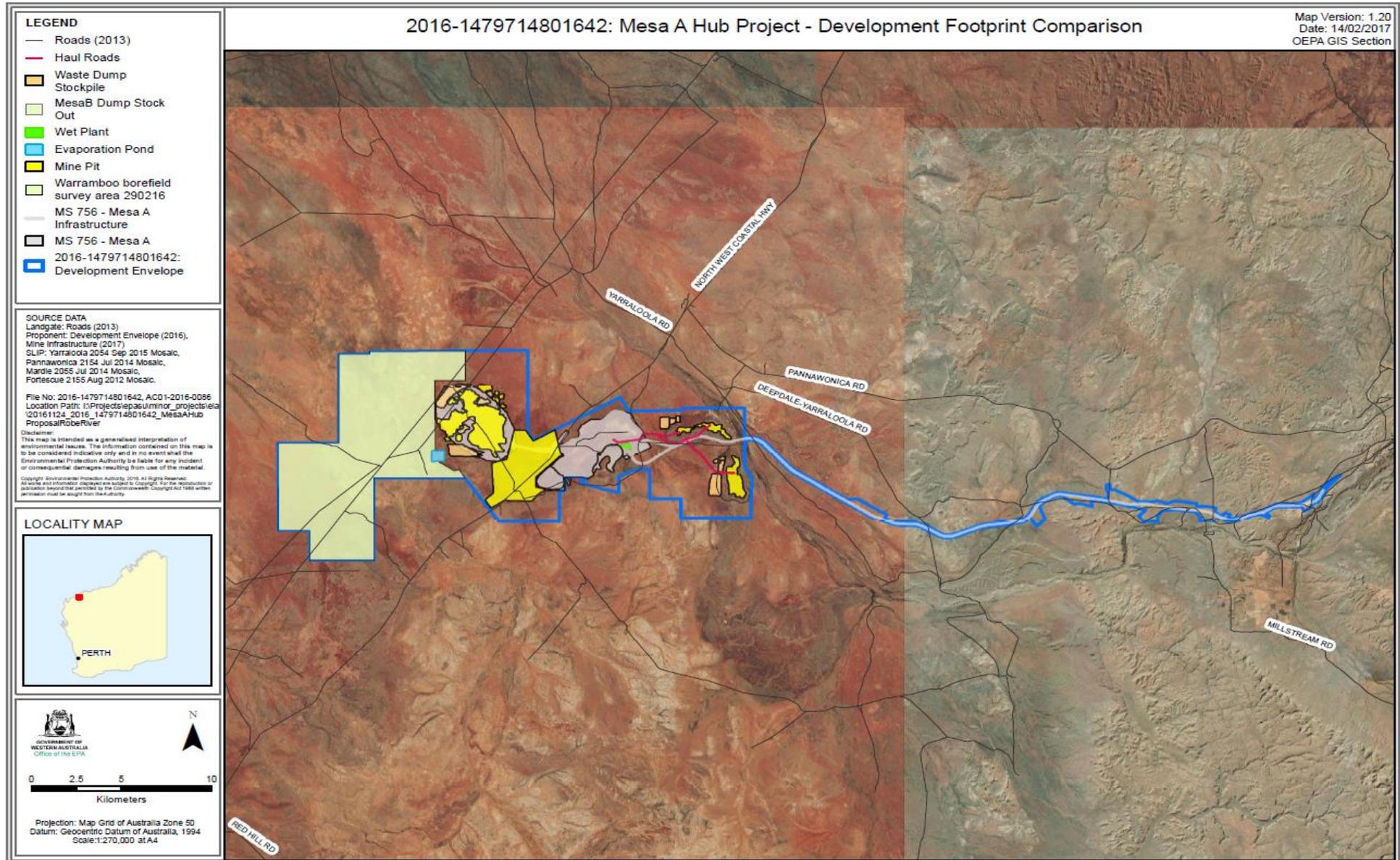


Figure 2 – Development envelope