RioTinto

Winu Services Pty Ltd

Winu Project
Environmental Review Document

Assessment Number: APP-0025007

Document Number	Revision	Date
C0007-0750-H-PLN-00001	Rev 1	18/08/2026

Status	Name	Position	Signature
Reviewed	Glen Doherty	Manager Regulatory Enagement and Approvals	
Approved	Edmond Meka	Project Director	

Disclaimer and Limitation

This document has been prepared by Winu Services Pty Ltd (the Proponent). Neither the document nor its contents may be eferred to without the express approval of the Proponent unless the document has been released for referral and assessment.

Revision History

Revision	Date	Originator	Reviewed	To whom
A	June 2025	ELA	N/A	RTW
B	October 2025	RTW	RTW	NWAC / JYAC
0	November 2025	RTW	RTW	EPA Services
1	July 2026	WSPL	WSPL	EPA Services
1	Aug 2026	WSPL	WSPL	Public Review

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Invitation to make a submission

The Environmental Protection Authority (EPA) invites people to make a submission on the environmental review for this Proposal.

Winu Services Pty Ltd (the Proponent) plans to develop a new copper-gold mine, referred to as the Winu Project (the Proposal), approximately 300 km south of Broome and 320 km east of Port Hedland in the northern Pilbara region of Western Australia within both the Nyangumarta People's and Martu People's native title determination areas. The Proposal involves developing a single open pit that extends below watertable (BWT) and associated infrastructure, including material waste and waste management infrastructure, mineral processing facilities, mine dewatering infrastructure, water supply infrastructure, linear infrastructure and support facilities. Access to the mine site will be via the Road Access Corridor (RAC), which extends approximately 183 km from the Great Northern Highway to the western edge of the Mine and Infrastructure Area (MIA).

The Proposal has been referred for assessment under the *Environmental Protection Act 1986* (WA) (EP Act) through the Environmental Protection Authority (EPA), and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) through the Department of Climate Change, Energy, the Environment and Water (DCCEEW). This Environmental Review Document (ERD) has been prepared in accordance with EPA guidance for the purposes of reporting on the potential environmental impacts of the Proposal and their proposed mitigations and will be made available for public comment.

The ERD has been prepared in accordance with the EPA's ***Procedures Manual (Part IV Divisions 1 and 2)***. The ERD is the report by the proponent on their environmental review which describes this proposal and its likely effects on the environment.

The ERD is available for a public review period of 8 weeks from 27 August 2026, closing on 22 October 2026.

Information on the Proposal from the public may assist the EPA to prepare its assessment report in which it will make recommendations on the Proposal to the Minister for Environment.

Why write a submission?

The EPA seeks information that will inform its consideration of the likely effects of the Proposal, if implemented, on the environment. This may include relevant new information that is not in the ERD, such as alternative courses of action or approaches.

In preparing its assessment report for the Minister for Environment, the EPA will consider the information in submissions, the Proponent's responses and other relevant information.

Submissions will be treated as public documents unless provided and received in confidence, subject to the requirements of the *Freedom of Information Act 1992*.

Why not join a group?

It may be worthwhile joining a group or other groups interested in making a submission on similar issues. Joint submissions may help to reduce the workload for an individual or group. If you form a small group (up to 10 people), please indicate the names of all participants. If your group is larger, please indicate how many people your submission represents.

Developing a submission

You may agree or disagree with, or comment on, information in the ERD.

When making comments on specific elements of the ERD:

- Clearly state your point of view and give reasons for your conclusions

- Reference the source of your information, where applicable
- Suggest alternatives to improve environmental outcomes.

What to include in your submission

Include the following in your submission to make it easier for the EPA to consider your submission:

- Your name and address
- Date of your submission
- Whether you want your contact details to be confidential
- Summary of your submission, if it is long
- A list of points so that issues raised are clear, preferably by environmental factor
- Refer each point to the page, section and if possible, paragraph of the ERD
- Attach any reference material, if applicable. Make sure your information is accurate.

The closing date for public submissions is: 22 October 2026.

The EPA prefers submissions to be made electronically via the EPA's Consultation Hub at https://consultation.epa.wa.gov.au.

Alternatively, submissions can be:

- Posted to: Chairman, Environmental Protection Authority, Locked Bag 10, Joondalup DC WA 6919; or
- Delivered to: Environmental Protection Authority, Prime House, 8 Davidson Terrace, Joondalup WA 6027.

If you have any questions on how to make a submission, please contact EPA Services at the Department of Water and Environmental Regulation on (08) 6364 7000.

SCOPING CHECKLIST

Task No.	Required Work	Section and Page No.
Flora and Vegetation		
1	In accordance with EPA guidance (including Environmental factor guideline – Flora and vegetation), conduct surveys to identify and characterise the flora and vegetation of areas in a local, regional and where relevant, state context. Provide an explanation, including a spatial boundary, of the local and regional context used in the assessment.	8.3.1
2	All survey reports and data should be submitted via IBSA Submissions with the IBSA number provided for verification.	8.3.1; Table 8-2 Appendix A06: ISA Submissions
3	Provide maps and figures of the survey effort applied in relation to, at a minimum, the local area and development envelope, and identify the direct and indirect impact areas.	8.3.1; Figure 8-1; Figure 8-2
4	Identify and describe the flora species and vegetation identified by the studies and surveys.	8.3.2; Table 8-3; Table 8-4; Table 8-5; Table 8-6; Figure 8-3; Figure 8-4; Figure 8-5; Figure 8-6 8.3.3; Table 8-8; Figure 8-11; Figure 8-12 8.3.2.6; Figure 8-10 8.3.2.7
5	Describe significant flora and vegetation, and provide an analysis of local and regional and state (where relevant) context, (refer to the *Environmental factor guideline – Flora and vegetation* for definition of significant). Provide justification for the flora species and vegetation communities identified in the studies and surveys not considered significant.	8.3.2.4; Figure 8-5 8.3.2.5; Figure 8-6 8.3.3.1; Table 8-7; Table 8-8; Figure 8-11
6	Provide tables with quantitative assessments of impact: a. For significant flora, this includes: i. Known number of individuals and populations in a local, regional and state (where relevant) context ii. Numbers and proportions (% of known) of individuals and populations directly or potentially indirectly impacted and, iii. Numbers/proportions/populations currently protected within the conservation estate (where known). b. For all vegetation units (noting threatened and priority ecological communities and significant vegetation, including facultative or obligate groundwater dependent vegetation) this involves: i. Area (in hectares) and proportions directly or potentially indirectly impacted ii. Proportions/hectare of the vegetation unit currently protected within conservation estate (where known).	8.4.1; Table 8-10; Table 8-11; Table 8-12; Table 8-14; Figure 8-11; Figure 8-14 8.4.1.1; Table 8-16; ; Figure 8-16; Figure 8-17; Figure 8-18 8.4.3; Table 8-17
7	Undertake Traditional Ecological Knowledge assessments to understand culturally significant flora species and vegetation. The information required for significant flora and vegetation	8.3.3.2 Social Surroundings 6.3.3

Task No.	Required Work	Section and Page No.
	should also apply to any identified culturally significant flora species and vegetation.	
8	Provide maps/figures showing the recorded locations of significant flora and vegetation in relation to the proposal's (direct and indirect impact areas,) and species distributions, in local, regional and state context.	8.3.2.3; Figure 8-5; Figure 8-6; Figure 8-10; Figure 8-13 8.3.3.1; Figure 8-11; Figure 8-14
9	Predict the residual impacts from the proposal, both direct and indirect, on flora and vegetation after demonstrating how the mitigation hierarchy has been applied.	8.6.1 8.6.2 8.6.3
10	Alongside the Mine Closure Plan, discuss the direct, indirect, and cumulative impacts on flora species, vegetation units, habitats, and communities from activities, including any proposed management (e.g. surplus water discharge and surface water management, water diversion channels and catchment ponds) that are likely be ongoing post-closure, and how those impacts will be managed during operations and post-closure with regards to the mitigation hierarchy, including but not limited to commitments to progressive rehabilitation rates over the life of the proposal.	8.6.1 8.6.2 8.6.3Table 8-20; Table 8-21 8.7
Terrestrial Fauna		
11	In accordance with EPA (and other relevant state and commonwealth) guidance, conduct studies to identify and characterise the vertebrate, aquatic invertebrate, and short-range endemic (SRE) invertebrate fauna and fauna habitats in a local and regional context, clarify and justify the quantification of the local and regional context used in the assessment. If previous surveys and records are utilised older specimens should be compared with newer collected specimens. Genetic analysis may be required to match and identify specimens (applicable for invertebrates and SREs).	9.3.1; Table 9-2; Table 9-3; Figure 9-1; Figure 9-2; Figure 9-3; Figure 9-4 9.3.4; Table 9-8; Table 9-11; Table 9-13; Table 9-15; Table 9-16; Table 9-22; Figure 9-8; Figure 9-10; Figure 9-14; Figure 9-17; Figure 9-20; Figure 9-23; Figure 9-24; Figure 9-28; 9.3.5; Table 9-29; Figure 9-32 Appendix E07: Winu Project Wind Turbine Avifauna and Bat Risk Assessment
12	Invertebrate species to be identified to the species level or provide a justification if unable to do so. Resolve the invertebrate specimen identifications to species/operational taxonomic units (OTU), using genetic and/or morphological methods.	9.3.5; Table 9-28; Table 9-30; Table 9-31; Figure 9-33
13	All survey reports and data should be submitted via IBSA Submissions with the IBSA number provided for verification.	9.3.1; Table 9-2 Appendix A06: ISA Submissions
14	Undertake Traditional Ecological Knowledge assessments to understand the potential impacts of the proposal on culturally significant fauna species.	9.3.4.2 Social Surroundings 6.3.3
15	Provide maps of the survey efforts applied in relation to, at a minimum, the local area and development envelope, and identifying the direct and indirect impact areas.	9.3.1; Figure 9-1; Figure 9-2; Figure 9-3; Figure 9-4 9.3.4; Figure 9-8; Figure 9-10; Figure 9-14; Figure

Task No.	Required Work	Section and Page No.
		9-17; Figure 9-20; Figure 9-23; Figure 9-24; Figure 9-28 9.3.5; Figure 9-32
16	Identify and describe the fauna assemblages and fauna habitat types present and likely to be present within the development envelope that may be impacted by the proposal.	9.3.2; Table 9-4; Table 9-5; Table 9-6Table 9-7; Figure 9-5; Figure 9-6; Figure 9-7; Figure 9-7 9.3.4 9.4.1.2; Table 9-33; Table 9-34; Table 9-35; Figure 9-34; Figure 9-35
17	Identify significant (including restricted fauna) and describe in detail their known ecology, likelihood of occurrence, habitats and known threats (refer to the Environmental factor guideline – Terrestrial fauna for definition of significant fauna). Provide justification for terrestrial fauna identified in the studies and surveys not considered significant.	9.3.2; Table 9-5 9.3.4.2; Figure 9-7 9.3.4.3; Figure 9-9 9.3.4.4; Figure 9-11 9.3.4.5; Figure 9-15 9.3.4.6; Figure 9-18 9.3.4.7; Figure 9-21 9.3.4.8; Figure 9-26; Figure 9-27 9.3.4.9; Table 9-20; Table 9-23; Figure 9-29 9.3.4.10; Table 9-24; Table 9-25; Figure 9-30 9.3.4.11; Table 9-26 9.3.4.12; Table 9-27; Figure 9-31 9.3.5; Table 9-28; Table 9-30; Table 9-31; Figure 9-33
18	Describe and quantify the extent of potential direct, indirect and cumulative impacts, including percentages, to significant habitats and significant species that may occur following implementation of the proposal during both construction and operations, in a local and regional context.	9.4; Table 9-32; Table 9-33; Table 9-34; Table 9-35; Table 9-36; Table 9-37; Table 9-38; Table 9-39
19	Provide a table of the proportional extents of each habitat within the study area and development envelope, and the predicted amount to be directly impacted and remaining. Consider any local or regional cumulative impacts.	9.4; Table 9-32; Table 9-35; Table 9-36; Table 9-39
20	Predict the residual impacts (direct, indirect and cumulative) from the proposal, both direct and indirect, after outlining any avoidance and mitigation options that will be applied. This should include assessing the risk posed to any listed species as a result of the proposal. Impact predictions should consider both short-and long-term impacts and how the proposal may change terrestrial fauna patterns of use and cumulative impacts.	9.5 9.6
Subterranean Fauna		

Task No.	Required Work	Section and Page No.
21	In accordance with EPA guidance, conduct studies and surveys to identify and characterise the subterranean fauna (identified to a species level where possible), assemblages, and habitats in a local and regional context, and clarify and justify the quantification of the local and regional context used in the assessment. If previous surveys and records are utilised, older specimens should be compared with newer collected specimens. Genetic analysis may be required to match and identify specimens.	10.3.1; Table 10-2; Table 10-5; Figure 10-1; Figure 10-2; Figure 10-3; Figure 10-4
22	All survey reports and data should be submitted via IBSA Submissions with the IBSA number provided for verification.	10.3.1; Table 10-2 Appendix A06: ISA Submissions
23	Identify and describe the subterranean fauna habitats: a. That may be impacted directly and indirectly by the proposal during construction and operations. b. Describe the significance of these values in a local and regional context. c. Include relevant geological and hydrological information to determine habitat suitability and connectivity, including inside and outside the impact areas.	10.3.3; Table 10-4Table 10-4
24	Provide figures and maps showing the extent of subterranean fauna habitats in relation to the proposal and species distributions. Additionally, include a table of the proportional (lateral and vertical) extents of each habitat within the study area and development envelope, and the predicted amount to be directly impacted and remaining. Consider any local or regional cumulative impacts. Any graphics provided must be clearly annotated and of high resolution. If unable to provide any of the above information, clearly provide justification.	10.3.1; Figure 10-1; Figure 10-2; Figure 10-3; Figure 10-4; Table 10-4; Table 10-10
25	Identify and describe the fauna assemblages present and likely to be present within the development envelope that may be impacted by the proposal.	10.3.4; Figure 10-5; Table 10-5
26	Describe and quantify the extent of potential direct, indirect and cumulative impacts, including percentages, to subterranean fauna as a result of implementation of the proposal during both construction and operations, including through resource extraction and mine dewatering, in a local and regional context.	10.4 10.5; Table 10-8 10.6.1; Table 10-9; Table 10-10
27	Alongside the Mine Closure Plan, discuss the direct, indirect and cumulative impacts on subterranean fauna values from activities, including any proposed management (e.g. surplus water management) that are likely to be ongoing post closure. Discuss how those impacts will be managed during operations and post-closure with regards to the mitigation hierarchy, including potential impacts from a pit lake forming post-mining.	10.5 10.6
Terrestrial Environmental Quality		
28	Provide details and rationale for locations of Waste Rock Landforms (WRL), Tailings Storage Facility (TSF), stockpiles, including a detailed flood risk assessment (i.e. meteorological, geological and geographical characteristics). Investigations for WRLs and TSF locations should be informed by the local landforms and natural topography (with minimal impact to	11.3.4; Inland Waters 7.4.1 7.5.2

Task No.	Required Work	Section and Page No.
	visual amenity, ecological function and environmental value, consider placement within the immediate catchment of the pit void and consider the option of in-pit disposal of tailings.	7.6.1
29	Provide details of the stability of the site from a geotechnical and geochemical perspective, including baseline studies and stability assessment, materials characterisation and availability, proposed landform designs, waste schedules and assessment of available growth mediums.	11.3.4
30	Undertake and provide the results of baseline ambient groundwater monitoring in the vicinity of the TSFs with ongoing ambient groundwater monitoring for comparison with the baseline data.	Inland Waters 7.3.4
31	Undertake and provide details of a baseline soil quality assessment of the development envelope. Include figures of the mapped soil units and soil profile in the ERD.	11.3.1 11.3.2; Table 11-3; Table 11-4; Figure 11-3; Figure 11-4
32	Undertake a desktop acid sulfate soils risk assessment to determine the risk of presence of acid sulfate soils. Undertake an acid sulfate soils survey if results from the desktop risk assessment identify this to be necessary. If present, details of proposed management measures to be implemented during construction to minimise impacts to terrestrial environmental quality.	11.3.2.4
33	Provide a graphical conceptual representation of the final TSF, including parameters to prevent/minimise seepage impacts.	11.4.1; Figure 11-6; Figure 11-7; Figure 11-8
34	Conduct seepage modelling (including a groundwater mounding study) to demonstrate that the conceptual TSF design would be environmentally acceptable.	11.3.1; Table 11-2 Inland Waters 7.4.1.3
35	For each mine waste/processing waste and tailings stream identify: a. Geochemical properties, including quantities of problematic materials (e.g. dispersive materials) b. Sampling methodology c. Environmental risk d. Any issues with drainage and tailings consolidation.	11.3.3 11.3.4
36	Assess impacts on surrounding environment from the TSF, including if there was a failure of TSF integrity.	11.4.1.2
37	Assess potential impacts on surrounding environment through erosion and sediment transport as a result of clearing, WRL and stockpiles.	11.4.1.3 11.4.1.4 11.4.1.5
38	Provide details regarding the proposed approach to tailings storage, including an analysis of the approach in arid environments, a proof of concept to verify assumptions regarding the prevention, avoidance, and management of acid and/or metalliferous drainage, and saline drainage generation, and details of any trials or models undertaken or planned. Provide detailed and quantitative information to assess if the risk posed by adverse components can be adequately managed. The approach and analysis of tailings storage should also include:	11.3.3 11.4 11.5; Table 11-8 11.6

Task No.	Required Work	Section and Page No.
	• Analysis of acid and/or metalliferous drainage, so that metalliferous drainage potential in non-acidic conditions is considered, as well as saline drainage • Kinetic tests to assess long term solute release • The spatial extent of neutralisation potential in the primary sulfides and carbonates • Baseline groundwater monitoring to quantify water quality • Design of surface water drainage to align with current design.	
39	Provide details of proposed management actions for the TSF, including early testing to ensure significant impacts will be mitigated over the life of the proposal and an assessment of the suitability of any TSF liner. Discuss the process for developing triggers and thresholds (including appropriate indicators), and contingency measures if the triggers and/or thresholds are reached.	11.5.1.2
40	Provide detailed information on the pit lake closure model, including an assessment of relevant details to inform how potential impacts to terrestrial environmental quality from the pit lake can be mitigated.	11.4 Inland Waters 7.4.2.4 7.6.2.1
Landforms		
41	Describe and assess the significance of potential direct, indirect and cumulative impacts to the system within and directly adjacent to the proposal area.	12.4
42	Consider the impacts resulting from the removal of important dune systems or the disruption of sediment flow, as these actions could lead to the loss of environmental values supported by such systems. Include an analysis of the nature, magnitude and duration of the impacts (including extent, severity and duration).	12.4
43	Synthesise all relevant information (i.e. tables, geospatial information, photos, aerials) to describe, spatially define and visually represent the extent of temporary (define timescales) and permanent impacts to the landform, its ecological function and environmental values.	12.3; Table 12-2; Table 12-3; Table 12-4; Table 12-5; Figure 12-1
44	Provide the relevant additional information set out in the EPA's Environmental Factor Guideline: Landforms.	12.1
Inland Waters		
45	Characterise the baseline hydrological and hydrogeological regimes in the local and regional context. Provide an explanation, including spatial boundary, of the local and regional context used in the assessment.	7.3.3; Figure 7-1 7.3.4; Table 7-4; Figure 7-3 7.3.3; Figure 7-1 7.3.4; Table 7-4; Figure 7-3 Appendix C
46	Provide a hydrogeological conceptualisation and assessment for the proposal (including detailed numerical groundwater modelling) with geological cross-sections to assess potential impacts on local and regional aquifers (and their connectivity) due to groundwater abstraction for dewatering and water supply and surplus water management (e.g. aquifer injection and discharge to infiltration ponds) and subsequent impacts to	7.3.4; Table 7-4; Table 7-5; Figure 7-5; Table 7-6; Table 7-8; Figure 7-6; Figure 7-7; Figure 7-8; Figure 7-9; Figure 7-13; Figure 7-14; Figure 7-15; Figure 7-16;

Task No.	Required Work	Section and Page No.
	culturally significant surface water including soaks, springs and Lake Waukarlicarly. This must address aquifer and pit lake recovery during mine closure. The assessment must demonstrate that predicted drawdown does not extend to the Eighty Mile Beach Ramsar Wetland, including Eighty Mile Beach and Walyarta (Mandora) Marsh and the critically endangered Threatened Ecological Community (TEC) Assemblages of the Organic Springs and Mound Springs of Mandora Marsh Area.	Figure 7-17; Figure 7-18; Figure 7-19 7.4.1.1; Figure 7-20; Figure 7-21; Figure 7-22; Figure 7-23; Figure 7-24; Figure 7-25; Figure 7-26 Table 7-10 7.6.1.1; Figure 7-39; Figure 7-40; Figure 7-41 Appendix C20: Winu Hydrogeological Impact Assessment – Wallal Aquifer
47	Provide a hydrogeological assessment for the proposal (analytical modelling due to temporary nature of the abstraction) to assess potential impacts on regional aquifers due to abstraction for water supply during upgrade/construction of the Road Access Corridor.	7.3.4; Table 7-5; Figure 7-5; Figure 7-6; Figure 7-7; Figure 7-8; Figure 7-9
48	Undertake hydrological investigations to determine: a. The effects any modified drainage will have on the surface and groundwater quality and quantity b. The likely direct and indirect impact areas from the above c. The impacts of climate change, potential weather conditions, cumulative impacts and a range of climatic scenarios including probable maximum precipitation (refer to the Department of Water and Environmental Regulation's [DWER] Guide to future climate projections for water management in WA).	7.3.4 7.3.6
49	Undertake seepage modelling of the conceptual waste rock and tailings storage facilities to characterise geochemical and physical properties of geological structures which may result in greater connectivity between potential sources of seepage (open cut pits, waste rock landforms and tailings storage) and sensitive environmental receptors.	7.3.5 Terrestrial Environmental Quality 11.3.3
50	Provide a detailed description of the design, location, activity, elements and aspects (e.g. pathways) of the proposal with the potential to impact surface and groundwater (including relevant maps and figures). If acid sulfate soils are present, assess the impact of dewatering on acid sulphate soils and present appropriate mitigation strategies.	7.3.5; Figure 7-12 7.3.6; Figure 7-13 Figure 7-14; Figure 7-15; Figure 7-16; Figure 7-17; Figure 7-18; Figure 7-19 7.4; Figure 7-20; Figure 7-21; Figure 7-22; Figure 7-23; Figure 7-24; Figure 7-25; Figure 7-26; Figure 7-27; Figure 7-28; Figure 7-29; Figure 7-30; Figure 7-31; Figure 7-32; Figure 7-33 7.5; Figure 7-34; Figure 7-35; Figure 7-36; Figure 7-38 Terrestrial Environmental Quality 11.3.2.4 11.3.3

Task No.	Required Work	Section and Page No.
51	Conduct a detailed flood risk assessment to justify suitable siting of WRLs and rehabilitation material stockpiles and inform the final proposal design. The flood risk modelling should be undertaken in accordance with the Australian Rainfall and Runoff Guidelines. Note: where flood risk is identified and discussed under other factors, refer to relevant sections of the ERD.	7.4.1.3 7.5.2.2
52	Complete a water balance study to determine if proposal water requirements can be met over the life of the proposal. This must address surplus water management (including but not limited to discharge to infiltration ponds and Managed Aquifer Reinjection (MAR) and consider recovery of TSF decant water) and include locations and sizes. The water balance must quantify the rate of groundwater abstraction and surplus water disposal, including a breakdown of where the water will be disposed (e.g. dust suppression, infiltration, aquifer injection. Assess the potential impacts of the proposed surplus management, including artificial surface water on the Cane toad 'waterless' barrier plan.	7.3.6 7.4.1.2 7.4.2.3
53	Discuss seepage modelling of the waste rock landforms and tailings storage facilities in relation to inland waters.	7.4.2 7.3.3 7.6.2.1 Terrestrial Environmental Quality 11.4.1.2 11.5.1 11.6.1
54	Provide detailed information on the pit lake closure model, including an assessment of the orebody margin and other relevant details in relation to inland waters.	7.4.2.4 7.4.2.4 7.5.2.3 7.6.2.1
55	Predict the residual impacts (direct, indirect and cumulative) from the proposal on inland waters after considering and applying the mitigation hierarchy.	7.4 7.5 7.6
56	Alongside the Mine Closure Plan, discuss the direct, indirect and cumulative impacts on inland water values from activities, including any proposed management (e.g. surplus water management), that are likely be ongoing post closure, and how those impacts will be managed during operations and post-closure with regards to the mitigation hierarchy, including any commitments to progressive rehabilitation.	7.3.4.3; Figure 7-5 7.4 7.5 7.6 Terrestrial Environmental Quality 11.3.3.1 11.4.1 11.6.1
Air Quality		
57	Identify and quantify all air emissions from the proposal that may impact the environment (including where relevant, impacts on human health and well-being, odour, nuisance and	13.3.4; Table 13-7 Appendix I01: Dust Impact Assessment of Proposed

Task No.	Required Work	Section and Page No.
	amenity). Evaluate all potential emission sources, pathways and impacts on receptors.	Mining Operations - Appendix A
58	Describe the scale and nature of power generation/combustion activities associated with the Proposal.	13.3.4; Table 13-7
59	Provide details of the likely dust composition and concentration.	13.3.4.1 13.3.4.2; Table 13-6 13.3.6
60	Undertake dust modelling (consistent with Air quality modelling guidance notes (Department of Environment 2006) and assessment of dust impacts to relevant Traditional Owner groups, nearby landholders and any other sensitive receptors.	Appendix I01: Dust Impact Assessment of Proposed Mining Operations - Appendix A 13.6.1
61	Confirm through water balance modelling that there is sufficient available water for dust suppression activities.	Inland Waters 7.3.6
62	Predict the residual impacts (direct, indirect and cumulative) from the proposal on air quality after considering and applying the mitigation hierarchy.	13.6
Greenhouse Gas Emissions		
63	Estimate scope 1, 2 and 3 greenhouse gas (GHG) emissions in tonnes of carbon dioxide equivalent (CO2-e). Scope 1 estimates must include emissions associated with clearing including estimates of progressive sequestration through progressive rehabilitation. Provide an explanation of the scope boundaries for scope 1, 2 and 3 emissions relevant to the Proposal and justification for any emissions excluded.	14.4.1; Table 14-3
64	Provide a breakdown of estimated scope 1 and 2 emissions by source. Consider all proposed activities in determining the sources of emissions (e.g. electricity generation, transportation and clearing of land). *Please note that the EPA considers greenhouse gas emissions from electricity generation produced for the Proposal (i.e. not by an independent third party) and haulage of concentrate (regardless of third-party contractual arrangements) as scope 1 emissions for the Proposal.*	14.4.1; Table 14-5
65	Identify how scope 1, 2 and 3 GHG emissions are proposed to be avoided or reduced. Provide a clear pathway for reducing scope 1 and 2 GHG emissions (annual and total) over the life of the Proposal.	14.4.2 14.5.3.4
66	Discuss how best practice measures have been adopted to avoid or reduce GHG emissions at commencement and throughout the life of the Proposal through regular reviews.	14.5
67	Describe the intended GHG emissions offsets to offset residual emissions that cannot be avoided or reduced.	14.5.4
68	Discuss how the scope 1, 2 and 3 GHG emissions from the Proposal's operation beyond 2050 is consistent with a global low-carbon transition to a net zero by 2050 scenario.	14.5 14.6
Social Surroundings		
69	Characterise and describe the social, cultural, amenity, and heritage values within and adjacent to the proposal area and	6.3 6.3.5; Table 6-9

Task No.	Required Work	Section and Page No.
	any sensitive receptors that may be directly or indirectly impacted as a result of this Proposal. This includes any receptors that may be affected by land clearing, construction and operation activities, noise and dust emissions, traffic, access, and amenity issues. Include relevant maps to show the locations of the sensitive receptors likely to be affected by the Proposal (refer to the Environmental Factor Guideline – Social Surroundings).	
70	Identify and assess potential impacts to any pastoral leases that may occur as a result of this Proposal being implemented. Consult with pastoral leaseholders and users that may be impacted, either directly or indirectly, regarding operation and closure land uses.	1.1
71	Identify sites of cultural significance within a regional context, in consultation with the Traditional Owners.	6.3.2.6
72	Identify the areas likely to be subject to the Aboriginal Heritage Act 1972 (AH Act), how the AH Act will consider Aboriginal cultural heritage (ACH), likely outcomes of the AH Act and whether application of the AH Act processes to the Proposal are likely to result in consistency with the EPA's objective to protect social surroundings from significant harm (refer to Section 3 of Technical Guidance EIA of Social Surroundings - Aboriginal Cultural Heritage for both work items 72 and 73).	6.3.3.1; Figure 6-5 6.3.2.8 6.3.3.2 Appendix B04: Nyangumarta Survey Sites and Culturally Significant Sites
73	For areas outside the development envelope or within the development envelope but not regulated through the AH Act, and where the Proposal is likely to have a physical or biological impact to ACH values provide the following information: a. A map showing the heritage survey effort for the development envelope. b. Proposal elements or activities that may impact ACH values. c. The physical and biological impacts (both direct and indirect, such as clearing, dust, bush tucker/bush medicine, noise and/or odour), and whether they are, or are not, within the area likely to be subject to the AH Act. d. Identify the ACH values that may be harmed by the physical and biological impacts and the extent and duration of impacts, (including impacts to culturally important dunal landforms) and taking cumulative effects into account. e. The proposed avoidance and mitigation of impacts to ACH. f. Predicted residual impacts to ACH values. g. The proposed environmental outcomes to protect ACH values which may be significantly harmed by physical or biological impact from the Proposal. h. A summary of the consultation process, the information provided to inform the consultation regarding the Proposal and its physical or biological impacts on ACH values and outcomes from the consultation/engagement from all stakeholders, including State Government regulatory authorities.	6.3; Figure 6-3; Figure 6-4; Figure 6-5; Figure 6-6 6.3.5 6.4.3.4
74	Undertake noise modelling and assessment of noise impacts to relevant Traditional Owner groups, nearby landholders and any other sensitive receptors.	6.3.5 6.4.3.6 6.4.4.6 6.4.5.2

Task No.	Required Work	Section and Page No.
75	Undertake a visual impact assessment to inform the Proposal's design and to assess potential impacts to visual amenity as viewed from sites and places of cultural significance as determined through consultation and engagement with Traditional Owner Groups.	6.3.3.1 6.3.3.2 6.4.3.3 6.4.4.3
76	Assess how the changes to hydrological regimes and water quality have the potential to impact culturally significant waters, flora and fauna species considered culturally significant to the Traditional Owners.	6.3.3.1 6.3.3.2 6.4.3.2 6.4.4.2 6.4.3.3 6.4.4.3 6.6.1.1 6.6.1.2 Inland Waters 7.3.3.1 7.4.2.1 7.4.2.2 7.6.1.1 7.6.2.1 Flora and Vegetation 8.3.3.2 8.4.2.2 Terrestrial Fauna 9.3.4.2 9.4.2.1 9.6.2.1
77	Predict the residual impacts from the Proposal on social surroundings after considering and applying the mitigation hierarchy.	6.6 6.4.2.1 6.4.2.2 6.6.3

EXECUTIVE SUMMARY

Winu Services Pty Ltd (the Proponent) plans to develop a new copper-gold mine, referred to as the Winu project (the Proposal), approximately 300 km south of Broome and 320 km east of Port Hedland in the northern Pilbara region of Western Australia within the native title determination areas of the Nyangumarta People and the Martu People (Figure ES-1; Figure ES-2).

The Proposal has been referred for assessment under the *Environmental Protection Act 1986* (WA) (EP Act) through the Environmental Protection Authority (EPA), and, separately, the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) through the Department of Climate Change, Energy, the Environment and Water (DCCEEW). This Environmental Review Document (ERD) has been prepared in accordance with EPA guidance for the purposes of reporting on the potential environmental impacts of the Proposal and their proposed mitigations and will be made available for public comment.

The Proposal involves developing a single open pit that extends below watertable (BWT) and associated infrastructure, including material waste and waste management infrastructure, mineral processing facilities, mine dewatering infrastructure, water supply infrastructure, energy supply infrastructure, linear infrastructure and support facilities. Access to the mine site will be via access road within the Road Access Corridor (RAC), which extends approximately 183 km from the Great Northern Highway to the western edge of the Mine and Infrastructure Area (MIA) (Figure ES-2).

A general Proposal description is provided in Table ES-1, and the key Proposal elements are provided in Table ES-2.

The Proposal is located on the traditional lands of both Nyangumarta People and Martu People, within their respective native title determination areas. Extensive ongoing consultation with the Traditional Owners has resulted in substantial changes to the design of the Proposal and improved social and environmental outcomes.

Rio Tinto recognises the Nyangumarta People and Martu Peoples' intrinsic and continuous connection to Country, culture and community of both the land and waters on which the Proposal is located.

The Proponent respects and honours the rights and obligations Nyangumarta and Martu have to Country by caring for Country and is committed to developing the Proposal in a genuine partnership that is open, honest, culturally appropriate and benefits all.

Through meaningful consultation, co-development and co-management, combining both traditional knowledge and Western science, throughout the development, operation and closure of the Proposal, the Proponent will aim to minimise impact to Country, intangible and tangible culture, and support the economic, social aspirations and opportunities for current and future generations of Nyangumarta People and Martu People.

These commitments have been and will continue to be formalised in separate agreements with the Nyangumarta People and the Martu People.

Table ES-1: General Proposal Description

Items	Details
Proposal Title	Winu Project
Proponent Name	Winu Services Pty Ltd (Proponent)
Short Description	The Winu Project (the Proposal) is a copper-gold mine located approximately 300 km south of Brome and 320 km east of Port Hedland in the northern Pilbara region of Western Australia within both the Nyangumarta People's and Martu People's native title determination areas (Figure ES-3). The Proposal includes, but is not limited to, the following: • An open pit that extends below the watertable • Mineral waste management (waste rock landforms [WRL] and Tailings Storage Facility [TSF]) • Material stockpiles (mine and topsoil) • Groundwater abstraction for water supply and pit dewatering • Mineral processing facilities (crushing, reclaiming, grinding, flotation, concentrate dewatering and handling, gold extraction, tailings thickening, etc.) • Water supply (mine dewatering, regional borefield, on-site dams) • Water management infrastructure (bores, pumps, pipelines, diversion channels, ponds/dams) • Surplus water management (controlled discharge of excess water to designated infiltration areas and managed aquifer recharge bores) • Support facilities (accommodation camps, power supply [including diesel-fired generation, wind turbines, solar panels, and battery storage], aerodrome facilities including an airstrip, warehouse-workshops, explosives storage, laydown areas, hydrocarbon storage, offices, waste-water treatment plant(s), drill-core processing and storage facilities, information and communications technology, laboratories, site roads, waste management, and site fire, emergency, medical facilities) • Linear infrastructure (heavy vehicle and light vehicle access roads, upgrades to existing access roads, pipelines, powerlines, fibre-optic cable, communications distribution networks) Concentrate will be transported by truck via the access road and Great Northern Highway to port by a third party for export. Doré (unrefined gold bar) is expected to be transported via the regular air charter. The Proposal is located within a 23,649 ha Development Envelope and will require the clearing of up to 4,878 ha of new native vegetation.

Table ES-2: Proposal Content Elements

Proposal Element	Location/Description	Maximum Extent, Capacity or Range
Physical Elements		
Mine elements, including: • A below watertable open pit • Material stockpile management including mine and topsoil stockpiles	Mining Lease 45/1288 Figure ES-2	Clearing up to 4,878 ha of new native vegetation for the Conceptual Footprint within the 23,649 ha Development Envelope.
Mineral waste elements, including: • Waste rock landform (WRL) • Topsoil stockpiles • Tailings Storage Facility (TSF)	Mining Lease 45/1288 Figure ES-2	
Processing elements, including: • Run of Mine (ROM) pad • Crushing, stockpiling, and reclaiming • Grinding with oversized recycle pebble crushing • Flotation, concentrate dewatering and handling • Carbon-in-leach (CIL), carbon acid washing and gold elution/desorption • Carbon reactivation, electrowinning, doré production and cyanide detoxification • Tailings thickening • Reagent receival, storage and delivery systems	Mining Lease 45/1288 Figure ES-2	
Water management elements, including: • Dewatering of pit with in-pit and ex-pit bores • Borefield and associated infrastructure • Process water dams/ponds • Water storage dams • Water diversion channels and catchment ponds • Infiltrations areas	Mining Lease 45/1288 Miscellaneous licence 45/755 Figure ES-2	
Infrastructure elements, including: • Accommodation camps • Energy supply infrastructure • Mine workshops and maintenance infrastructure • Bores, pipelines, turkeys nests and supporting facilities • Haul, heavy and light vehicle roads • Pipelines, powerlines, fibre optic cable and communications distributions networks • A possible copper concentrate transfer area • Ancillary buildings • Waste water treatment plants and reverse osmosis plants • Explosives storage and preparation facilities and hydrocarbon storage • Laydown areas • Drill core processing and storage facilities • Information and communications technology	Mining Lease 45/1288 Miscellaneous licences 45/476, 45/491, 45/494, 45/548, 45/549, 45/550, 45/551, 45/552, 45/559, 45/623, 45/722, 45/723, 45/725, 45/755 & L45/857 Figure ES-2	

Proposal Element	Location/Description	Maximum Extent, Capacity or Range
• Aerodrome facilities including airstrip • Site fire emergency and medical facilities • Waste management and landfill facilities		
Operational Elements		
Groundwater abstraction for mine dewatering	Mining Lease 45/1288 Figure ES-2	Lowering the groundwater table to no greater than a standing water level of -250 m RL
Groundwater abstraction from the Rimfire regional borefield (Rimfire)	Miscellaneous licence 45/755 Figure ES-2	Abstraction of no more than 2.8 gigalitres per annum (GL/a)
Waste Rock Landform	Mining Lease 45/1288 Figure ES-2	Up to 490 Mt of waste rock will be mined throughout the life of the Proposal
Groundwater abstraction for RAC road construction	Miscellaneous licences 45/491, 45/548, 45/549, 45/550, 45/551, 45/552, 45/623, and 45/857 Figure ES-2	Temporary water abstraction required for new road construction (approximately 0.7 GL for 12-months) and dust suppression on an existing road until the new road is constructed (0.3 GL for approximately 18-months).
Management of surplus water	Mining Lease 45/1288 Figure ES-2	Surplus water, exceeding the operational requirement (no more than 4 GL/a), is discharged to infiltration areas (up to 4 GL/a) or managed aquifer recharge bores (up to 4 GL/a) within the Development Envelope
Proposal Elements with Greenhouse Gas Emissions*		
Peak Annual		
Scope 1	Plant and equipment, land clearing, haulage and electricity generation: 109,166 t CO2-e	
Scope 2	Electricity generation: 0 t CO2-e	
Annual Average Life of Mine		
Scope 1	Plant and equipment, land clearing, haulage and electricity generation: 89,901 t CO2-e	
Scope 2	Electricity generation: 0 t CO2-e	
Scope 3	Estimated: 162,662 t CO2-e	
Rehabilitation and Closure		
Where practicable, progressive rehabilitation will be undertaken over the life of the mine. Areas disturbed through the implementation of the Proposal will be designed to be safe and non-polluting and will be constructed so the final shape, size and stability meet the closure objectives documented in the Mine Closure Plan (MCP).		

Proposal Element	Location/Description	Maximum Extent, Capacity or Range
Commissioning		
Commissioning of the processing facility will be undertaken subject to the operational limits above.		
Other Elements which Affect Extent of Effects on the Environment		
Proposal timeframe	Maximum project life	Approximately 32 years

**National and international reporting standards define the following set of distinct scopes of GHG emissions, demarcating sources of emissions and associated responsibilities:*

- *Scope 1: emissions generated as a direct result of an activity e.g. diesel combustion by vehicles or gas*
- *Scope 2: emissions generated from the consumption of an energy commodity*
- *Scope 3: indirect emissions, other than Scope 2 emissions, that are generated in the wider community.*

Notwithstanding the above, the EPA has identified through the ESD that it considers for the purpose of this assessment that GHG emissions from:

- *Electricity generation produced for the Proposal as Scope 1 (not Scope 2) - given this, no Scope 2 emissions will occur as a result of the Proposal*
- *Haulage of concentrate (from mine to port), regardless of third-party contractual arrangements as Scope 1 (not Scope 3).*

116°0'0"E
118°0'0"E
120°0'0"E
122°0'0"E
124°0'0"E
18°0'0"S
20°0'0"S
22°0'0"S

N

INDIAN OCEAN

Rowley Shoals Marine Park

BROOME

Yawuru Nagulagun / Roebuck Bay Marine P

Bidyadanga

BROOME, SHIRE OF

Eighty Mile Beach Marine Park

Great Northern Hwy

Sandfire Roadhouse

Walyarta Conservation Park

Pardoo Irrigation Project

Pardoo Roadhouse

PORT HEDLAND

Mt Goldsworthy

Strelley

Warralong

Goldsworthy

Winu

Marble Bar Rd

Ripon Hills Rd

Purungunya National Park

Purungunya Conservation Park

Barrow Island Nature Reserve

Barrow Island Marine Management Area

KARRATHA

KARRATHA, CITY OF

PORT HEDLAND, TOWN OF

Manuwarra Red Dog Hwy

Millstream Chichester National Park

Mungaroona Range Nature Reserve

Roebourne-Wittenoom Rd

North West Coastal Hwy

Cane River Conservation Park

ASHBURTON, SHIRE OF

Munjina Rd

Karijini Dr

Fortescue Marsh Nature Reserve

Karijini National Park

NEWMAN

Jigalong

Woodie Woodie

Nifty

Telfer

EAST PILBARA, SHIRE OF

Punmu

Karlamilyi National Park

Parnngurr

0 100 200 Kilometres

NYANGUMARTA PEOPLE (PART A)

NYAMAL PEOPLE #1

MARTU (AREA A)

Rimfire Bore Field

Winu

Legend

- Homestead
- Roadhouse
- Aboriginal Communities and Town Reserves (DPLH-002)
- Mine
- Highway
- Main Road, Sealed
- Main Road, Unsealed
- Minor Road, Sealed
- Minor Road, Unsealed
- Major River
- Mainstream
- Major Tributary
- Development Envelope
- AREH Project (indicative footprint)

DBCA - Legislated Lands and Waters

- National Park
- Nature Reserve
- Conservation Park
- Section 5(1)(g) Reserve
- Section 5(1)(h) Reserve
- Marine Park
- Marine Management Area
- Gas Pipeline
- Pardoo Station
- Pardoo Irrigation Project
- Native Title Determinations
- Local Government Authorities

RioTinto

Figure ES-1: Winu Project Regional Location and Development Envelope

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Friday, 29 May 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:2,500,000
Rio Tinto © Copyright

Path: \\pe1-shared\Win\TechData\GIS\Jobs\2021\W21_012\02_Processing\20230627_Referral_Figures\W21_012_Referral_Figures.aprx/EPBC Regional Location and Dev Envelope

121°0'0"E
122°0'0"E
123°0'0"E
20°0'0"S
21°0'0"S

Great Northern Hwy

N

Road Access Corridor

Mine Infrastructure Area

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

0 2 4
Kilometres

Road Access Corridor

Road Access Corridor

0 2 4
Kilometres

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

Rimfire Bore Field

0 2 4
Kilometres

MARTU (AREA A)

MARTU #3

YAMAL PEOPLE #1

MARTU #3

NYAM

Legend

- Highway
- Development Envelope
- Native Title Determinations

Conceptual Footprint

- Aerodrome
- ANFO
- Bore Fields and Pipelines
- Camps
- Mine Construction Areas
- Mine Pit
- Ore Stockpiles
- Ponds (Infiltration) and MAR
- Power Generation (Wind and Solar)
- Processing Infrastructure
- Roads and Borrow Pits
- Tailings Storage Facility
- Topsoil Stockpiles
- Waste Rock Landform

0 20 40
Kilometres

RioTinto

Figure ES-2: Development Envelope and Conceptual Footprint

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Friday, 29 May 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:800,000
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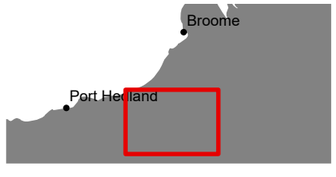

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120°30'0"E
121°0'0"E
121°30'0"E
122°0'0"E
20°0'0"S
20°30'0"S
21°0'0"S

N

Great Northern Hwy

MANDORA

WALLAL DOWNS

L 45/548
L 45/549
L 45/857
L 45/491
L 45/550
L 45/551
L 45/623
L 45/552
L 45/723
L 45/725
L 45/494
L 45/476
L 45/722
L 45/559
L 45/755

Nyangumarta Hwy

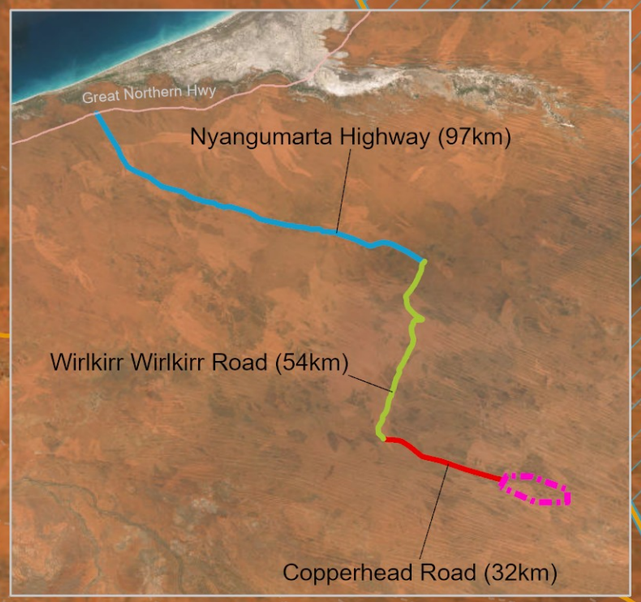
Nyangumarta Warrarn IPA

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

Legend

- Minor Road, Sealed
- Minor Road, Unsealed
- Track
- Highway
- Development Envelope
- Mining Lease
- Native Title Determinations
- Mandora Pastoral Station
- Wallal Downs Pastoral Station
- Rio Tinto Live Tenements
- Rio Tinto Pending Tenements
- Indigenous Protected Areas



RioTinto

Figure ES-3: Land Tenure

Rio Tinto Copper (RTC)

Publisher: Michael.Rouse
Date Published: Friday, 7 August 2026

Coordinate System:
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Datum: GDA 1994
Units: Degree
Scale: 1:500,000
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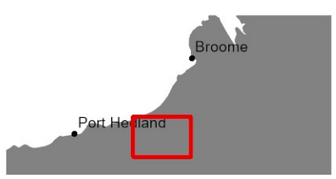


0 10 20 Kilometres

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20230627_Referral_Figures\W21_012_Referral_Figures.aprx/Proposal Tenure and NTD Areas

Key Environmental Factors

The EPA identified the following key environmental factors for this Proposal:

- Social Surroundings (Section 6)
- Inland Waters (Section 7)
- Flora and Vegetation (Section 8)
- Terrestrial Fauna (Section 9)
- Subterranean Fauna (Section 10)
- Terrestrial Environmental Quality (Section 11)
- Landforms (Section 12)
- Air Quality (Section 13
- Greenhouse Gas Emissions (Section 14).

Cumulative Impacts

Eight existing or reasonably foreseeable projects within 150 km of the Proposal and that occur within the Mackay, McLarty and Pindanland subregions of the Great Sandy Desert and Dampierland bioregions, respectively, have been used for the cumulative impact assessment. The cumulative impact assessment for each key environmental factor considered projects relevant to the environmental values being impacted. The Proponent does not consider that the Proposal will result in a significant cumulative impact to any key environmental factor.

Environmental Outcome, Objectives and Management Plans

The mitigation hierarchy has been applied to the Proposal concerning the key environmental values. The full list of anticipated outcomes and objectives is included in Table ES-3 and further detail is provided in the Environmental Outcome sections.

The Proponent has prepared several draft management plans that address the expected environmental outcomes and objectives. The management plans supplement the existing management frameworks that the Proponent already has in place across its diverse operations and have been prepared in accordance with relevant guidelines where they exist. A summary of each of the Proposal's management plans is provided below:

An **Environmental Management Plan** (EMP; Appendix A05) focuses on managing the potential impacts of the Proposal and on ensuring environmental outcomes and objectives are met.

A **Fire Management Plan** will include appropriate work procedures to reduce the risk of fires starting from activities associated with the Proposal.

An **Operational Surface Water Management Plan** (Appendix C01) has been prepared to outline the different stormwater management strategies and infrastructure for handling surface water runoff depending on the level of contamination present and where the runoff originates.

An **Access Road Surface Water Management Plan** (Appendix C02) has been prepared to characterise flooding behaviour adjacent to the proposed access road and develop conceptual risk management design measures to mitigate potential operation flood risks and impacts.

An **Acid and Metalliferous Drainage Strategy and Management Plan** (AMD S&MP; Appendix C07) has been developed to ensure the development and implementation of appropriate measures to reduce the risk for acid and metalliferous drainage (AMD) generation.

A **Cyanide Management Plan** (Appendix C10) has been developed to minimise potential soil contamination.

A **Spill Response Management Plan** to effectively mitigate the risk of contamination.

A **Mine Closure Plan** (MCP; Appendix A03) has been prepared in accordance with current guidance (DEMIRS 2025a) and describes the proposed closure outcomes and how they will be refined over the life of operations and plans for achieving those outcomes.

A **Soil Management Plan** will outline soil management procedures and be incorporated into future updates of the Mine Development and Closure Proposal (MDCP) and MCP.

These management plans may be subject to subsequent approval and reporting requirements under the *Environmental Protection Act 1986* (EP Act) and EPBC Act.

Separate Nyangumarta and Martu Cultural Heritage Management Plans (CHMPs) will also be co-designed with Nyangumarta People and Martu People, respectively to ensure appropriate Aboriginal Cultural Heritage (ACH) management measures are in place.

Environmental Offsets

The Proposal will result in significant residual impacts when assessed against current legislation and government policy, even after thoroughly applying the mitigation hierarchy. These impacts are principally related to the Proposal's contribution to the removal of habitat for several significant fauna species.

In line with government policies, the Proponent will offset these residual impacts through the establishment of the Winu Mine Managed Offset Fund (Offset Fund). The Offset Fund will be governed by a formal agreement developed in consultation with regulatory agencies, the Nyangumarta People and the Martu People, Indigenous Ranger groups and other key stakeholders. The Offset Fund will serve as the long-term financial foundation to support the implementation of conservation measures.

Summary of Potential Impacts, Proposed Mitigation and Proposed Environmental Outcomes

Table ES-3 outlines each key environmental factor's potential impacts, proposed mitigation, and proposed environmental outcomes.

Table ES-3: Summary of Potential Impacts, Proposed Mitigation and Proposed Environmental Outcomes

Key Environmental Factor 1: Social Surroundings	

Impact Theme	**Nyangumarta**
	• ACH and Values
	  ○ Ongoing ground disturbance and human activities impacting sites: RTX_2023_09_SITE_001; RTX_2020_02_Site_001; RTX_2020_02_Site_005; RTX_2020_02_Site_002; Established Tree Stand; RTX_2020_02_Site_004; Winu Soak; Sand Dunes
	• Water
	  ○ Groundwater abstraction and pit dewatering with potential to affect the regional aquifer system
	  ○ Groundwater contamination
	• Visual Amenity
	  ○ Loss of visual amenity due to the development of the landscape, including through the installation of wind turbines, WRL and TSF
	• Ethnobotanical Values
	  ○ Potential impacts to culturally important flora and fauna including Mangarr (*Thinicola incana*), *Crotalaria cunninghamii*, *Corymbia chippendalei*, Parntarl (*Owenia reticulata*), Junyju (*Erythrophleum chlorostachys*), Kumpaly (including *Hakea macrocarpa* and *Hakea lorea*), and a mulga shrub (*Acacia aneura*), bush turkey, native mice, various reptiles and the marsupial mole
	• Access to Country
	  ○ Decreased ability of Nyangumarta People to safely use Nyangumarta Highway given increases in heavy vehicle traffic
	  ○ Decreased ability of Nyangumarta People to safely enjoy the use of Camp 1 given the significant increase of vehicle movements through the area
	  ○ Decreased ability of Nyangumarta People to access the part of their Country covered by the Proposal due to the Proponent's access and health and safety policies
	• Dust and Noise Impacts
	  ○ Potential to interfere with the amenity and ethnobotanical values across the MIA and RAC
	Martu
	• ACH and Values
	  ○ Disruption to the landscape within proximity to the Proposal has the potential to directly affect the relationship between people and place and potentially diminish the cultural integrity of Country
	  ○ Potential for the Proposal to directly impact on tangible values, such as sacred sites, sand dunes and ground water and surface water
	  ○ Potential for sand dunes to be impacted through the construction of the pipeline corridor
	• Water
	  ○ Groundwater abstraction and pit dewatering have potential to affect the regional aquifer system
	  ○ Abstraction from this interconnected system may have impacts that extend beyond the Proposal, potentially impacting water sources further south along the Percival Palaeovalley and extend to sites near Punmu

Key Environmental Factor 1: Social Surroundings	
	○ Abstraction impacts not limited to physical access or water availability but extend to the spiritual and cultural consequences of disrupting ancestral connections ○ Impact to water quality through groundwater contamination related to the TSF, in particular the High Sulfur Tailings (HST) component and degradation of the liner, as well as potentially acid forming materials from the WRL if not properly encapsulated • Visual Amenity ○ Loss of visual amenity within the Martu native title determination boundary due to the industrialisation of the landscape. These changes risk fragmenting the visual and cultural integrity of Country, thereby impacting Martu's ability to maintain ongoing relationships, responsibilities, and practices that are intimately tied to the land. Moreover, these changes risk disrupting Martu's sense of belonging and custodianship, and may diminish the ability to engage with Country in culturally meaningful ways • Ethnobotanical Values ○ Potential for the Proposal to: – Degrade culturally and environmentally significant flora and fauna – Reduce the presence and / or abundance of fauna – Destruct and / or disturb fauna habitats through noise, light, and increased human presence – Disrupt natural behaviours of fauna and thereby affect Martu's ability to track, hunt, and understand animals – Contribute to a decline in native fauna and fauna through changes to surface water flows • Access to Country ○ Physical, cultural, or spiritual harm may arise through altered access arrangements and the resulting prevention of access to important areas, which limits the ability of Martu People to carry out cultural responsibilities ○ Harm to Tjukurrpa (i.e. Dreamtime) can also occur through unintentional breaches of cultural protocol, such as uninitiated individuals entering sacred areas, and consequences of other unauthorised visitation which could include the filming or photographing of sites without consent, or inappropriate behaviour on Martu Country • Dust and Noise ○ The Proposal is expected to result in increased dust emissions within the Martu native title determination, particularly in relation to the road leading to the aerodrome ○ Infrequent noise emissions are anticipated to occur as a result of the aerodrome with the potential to interfere with the amenity values of the Proposal area and beyond, which Martu have identified as culturally significant and sensitive to environmental disturbance ○ Dust emissions may damage vegetation, obscure visibility, and interfere with the ecological and spiritual integrity of Country ○ Dust disturbance to sand dunes, water sources, and vegetation as interconnected elements of the cultural landscape may result in irreversible damage to ancestral places, burial sites, and artefacts ○ Noise emissions from the Proposal have been assessed as a potential impact to both fauna and Martu cultural values **Other Stakeholders** • Increased road traffic has the potential to exacerbate traffic safety for community members and other road users

Key Environmental Factor 1: Social Surroundings	
	• Vegetation clearing and infrastructure installation will result in altered local landforms and a change in the visual landscape and associated amenity, particularly due to the planned construction of wind turbines • Dust and noise generating activities
Mitigation Hierarchy	**Nyangumarta** **Avoid** • Known ACH sites within and adjacent to the Proposal are to be recognised as Exclusion Zones under the Project Agreement (excluding RTX_2020_02_SITE_001) • The Proponent has pursued TSF design option 5H to remove direct impacts to RTX_2020_02_Site_005 • The Proponent has adjusted the spatial footprint of proposed topsoil stockpile to ensure that potential impacts to the integrity of RTX_2020_02_Site 004 are effectively reduced • The Proponent has adjusted the footprint of the WRL adjacent to RTX_2023_09_Site_001 to ensure it does not interact with the site • As far as practicable, the Proponent will construct key infrastructure over dunes to ensure that impacts to dune structures and potential sub-surface archaeological material is effectively limited • While considering the placement of noise generating machinery including generators, the Proponent will locate them in a way that limits noise related impacts to the established tree stand camp area as much as is practicable • No helicopter landings to occur within ACH exclusion zones • The Proponent has assisted Nyangumarta Warran Aboriginal Corporation (NWAC) to develop "*Guidelines for best practice: artefact relocation and excavation guidance for Nyangumarta Country",* which has been used to inform decisions around mitigating potential sub-surface impacts • The Proponent has removed the Wallal Borefield from the Proposal • Water bores to be placed a sufficient distance away from the established tree stand camp area to avoid localised impacts • The RAC will include waterway crossings designed to maintain flow and prevent upstream ponding • Runoff from landforms and stockpiles will be managed as per the Operational Surface Water Management Plan • Potentially acid-forming materials will be encapsulated to prevent contamination of groundwater and surface water systems • The Proponent has revised the TSF designs to enable revegetation of the larger LST cells • Noise-generating infrastructure, including wind turbines and processing facilities, has been strategically placed to reduce acoustic intrusion into culturally significant areas • The Proponent has designated the stand of Kumpaly Trees as an exclusion zone under the Project Agreement and direct impacts to the area will be avoided • The Proponent will construct a diversion road to bypass Camp 1 **Minimise** • The WRL current design was revised to take into account the Nyangumarta People's preference regarding the height versus disturbance footprint trade-off

Key Environmental Factor 1: Social Surroundings	

	• The Proponent and NWAC will salvage and relocate site RTX_2020_02_Site_001
	• ACH sites, as currently mapped, will be physically demarcated and signposted at a co-developed specification
	• Culturally important tree stands identified by the Nyangumarta People have been incorporated into the camp that has been co-designed with the Nyangumarta People
	• Recognition of known ACH sites within and adjacent to the Proposal as Exclusion Zones
	• Proponent staff and contractors to undergo cultural awareness training
	• The Proponent will periodically engage Nyangumarta ACH Monitors when undertaking ground disturbing works within sand dunes as set out in the Project Agreement, CHMP and associated management plans
	• The Proponent will consult with NWAC and continue to apply dune impact minimisation strategies
	• The access roads within the RAC, including Copperhead Road (adjacent to site RTX_2020_02_Site_002) will be sealed, effectively reducing dust emissions from the road. This will also minimise effect on ACH and ethnobotanical values and improve access to Country for Nyangumarta People
	• The Proponent will work with NWAC to develop a 'Chance Finds Procedure'
	• Co-design of a monitoring program and a Winu soak monitoring strategy
	• The Proponent will continue to provide NWAC copies of water study reports as they become available and agree to a co-designed water stewardship program under the Project Agreement
	• The Proponent will support NWAC to undertake cultural mapping activities to locate two additional soaks known to be within the general vicinity of the Proposal
	• The Proponent will co-design management plans with NWAC to ensure the inclusion of Indigenous epistemologies in monitoring regimes
	• The Proponent and NWAC will co-design the Proposal Caring for Country Management Plan
	• To reduce long-term ponding, borrow pit bases may be ripped, where practical, post-construction to improve infiltration
	• The Proponent and NWAC co-designed a visual impact assessment (VIA) which effectively ascertained the impacts to the visual landscape with a particular focus on views from culturally significant locations outside of the Proposal
	• The Proponent has agreed to engage several mitigation measures aimed at minimising visual impacts resulting from the installation of wind turbines. These include:
	  ○ Using muted colours and non-reflective materials
	  ○ Avoiding the use of logos and text on the turbines
	  ○ Minimising the height of ancillary buildings, place behind landforms where possible and use low reflective materials
	• NWAC and the Proponent will establish an appropriate (noise and dust) monitoring and response regime in the co-development of a CHMP
	• Proponent staff and contractors will use the Nyangumarta Weed Glove Box Manual to supplement other weed management controls and actions
	• The Proponent and NWAC will co-design a weed washdown facility for vehicle washdowns upon entering the Nyangumarta IPA
	• The Proponent will continue to investigate alternative low impact installation options for proposed solar infrastructure
	• Water bores will be placed a sufficient distance away from the established tree stand to avoid localised impacts

Key Environmental Factor 1: Social Surroundings	
	• The Proponent will seal the RAC from the Great Northern Highway to the MIA • The Proponent will work with NWAC to ensure the principles of two-way science inform the development of monitoring and management actions undertaken throughout the Proposal • Nyangumarta Traditional Owners visiting the MIA will be classified as visitors for workplace safety purposes. Visitors would not be subject to mandatory medical or induction requirements • The Proponent will work with NWAC to ensure that medicals and inductions for Nyangumarta People and Rangers are as accessible as possible • The Proponent will continue to provide ad hoc support, on a case-by-case basis to the Nyangumarta Rangers to upgrade and maintain facilities at Camp 1 and Camp 2 **Rehabilitate** • The iterative process of closure planning is to ensure that the completion criteria for mine closure will continue to evolve and refine as Proponent knowledge increases • The Proponent will continue to work with NWAC to refine the closure completion criteria • The Proponent will support Nyangumarta People to collect seed stock for progressive revegetation undertaken within the MIA and RAC at an appropriate time • The Proponent will support NWAC and the Nyangumarta Rangers to access the Proposal area to collect nuts from Parntarl trees and Kumpaja trees prior to them being cleared • The Proponent will develop a rehabilitation monitoring methodology in consultation with NWAC to continuously improve implemented approaches to revegetation and produce baseline information to assess revegetation efforts during closure • The Proponent and Nyangumarta People will work together to develop appropriate frameworks required for seed collection and storage to support revegetation activities **Martu** **Avoid** • Removal of the Texas Borefield from the Proposal • Selection of the preferred pipeline corridor for Rimfire that minimises sand dune crossings and follows existing tracks where possible • Development of the pipeline corridor using local low points in sand dunes for potential crossings to reduce physical and visual disturbance • The RAC will include waterway crossings designed to maintain flow and prevent upstream ponding • Runoff from landforms and stockpiles will be managed as per the Operational Surface Water Management Plan • Potentially acid-forming materials will be encapsulated to prevent contamination of groundwater and surface water systems • Noise-generating infrastructure, including wind turbines and processing facilities, has been strategically placed to reduce acoustic intrusion into culturally significant areas • No permanent access restrictions to be imposed on the Nyangumarta Highway throughout the life of the Proposal

Key Environmental Factor 1: Social Surroundings	

	Minimise
	• Martu monitors will be considered during initial earthworks and construction activities in proximity to cultural sites, as identified in co-developed management plans
	• Any newly proposed tracks or changes to the corridor will be referred to JYAC, who will consult with relevant Martu People and arrange further ACH surveys before approval
	• Formation of an Implementation Committee to liaise with the Proponent
	• Ongoing engagement/ communication with Martu / JYAC will be undertaken by the Proponent to develop a Martu stewardship plan for Martu to remain informed in relation to planned water extraction and associated potential impacts to the aquifer, and to document agreed joint monitoring and management measures
	• Pipeline crossings to occur at the lowest local point of sand dunes to reduce surface disturbance and erosion
	• Retention of sand dunes where possible given hidden water sources, burial sites, or ancestral pathways
	• Trialling of evaporation inhibitors on the site will be undertaken to reduce water evaporation
	• Implementation of a monitoring framework to track water levels in the TSF to guide operational adjustments such as water release
	• Groundwater studies (field and desktop) to continue to quantify additional sources to meet supplementary water demands
	• Groundwater drawdown scenarios have been modelled to assess impacts on aquifer systems and will inform adaptive management
	• To reduce long-term ponding, borrow pit bases may be ripped, where practicable, post-construction to improve infiltration
	• Any Proposal adjustments or proposal of new associated infrastructure to be agreed by JYAC to enable appropriate consultation with Martu representatives to assess potential impacts to water systems, and co-design of mitigation measures
	• The Proponent has committed to working with Martu Traditional Owners to ensure transparency and long-term stewardship of water resources
	• Rimfire pipeline corridor has been aligned with existing tracks to minimise new visual disturbances
	• Commitment to implementation of mitigation measures aimed at minimising visual impacts resulting from the installation of wind turbines, including:
	  ○ Use of muted colours and non-reflective materials
	  ○ Avoidance of logos and text on the turbines
	  ○ Minimising the height of ancillary buildings, place behind landforms where possible and use low reflective materials
	• Water cart application across the MIA haul roads to suppress wheel-generated dust
	• The Proponent plans to use selective road construction materials that are less prone to generating dust, particularly in areas approaching the camp and culturally sensitive sites
	• Adjustments to stockpiling practices and haulage routes to minimise dust dispersion
	• Three Management Areas have been delineated to manage any increase in abundance or introduction of pest species
	• The RAC will be dual lane and sealed
	• Co-development of an Access to Country Protocol to ensure that Martu People can safely and respectfully access the Proposal area

Key Environmental Factor 1: Social Surroundings	

	• Support the development and delivery of cultural awareness training for all personnel working on Martu Country
	Other stakeholders
	Minimise
	• Development and implementation of a Traffic Management Plan which includes:
	  ○ Management of workforce and community health and safety risks
	  ○ Regular vehicle inspection and maintenance
	• Inclusion of traffic aspects in ongoing engagement activities, including road safety campaigns where necessary
	• Development of a diversion from Nyangumarta Highway onto Wirlkirr Wirlkirr road
	• The Proponent has agreed to engage several mitigation measures aimed at minimising visual impacts resulting from the installation of wind turbines. These include:
	  ○ Use of muted colours and non-reflective materials
	  ○ Avoidance of logos and text on the turbines
	  ○ Minimisation of the height of ancillary buildings, place behind landforms where possible and use low reflective materials
	  ○ Water cart application across the MIA haul roads to suppress wheel-generated dust
	• The Proponent plans to use selective road construction materials that are less prone to generating dust
	• Adjustments to stockpiling practices and haulage routes to minimise dust dispersion
	• The RAC will be sealed to reduce dust emissions from vehicle movements
	• Three Managements Areas have been delineated to manage any increase in abundance or introduction of pest species
	• The Proponent will undertake progressive rehabilitation wherever practicable
	• Runoff from landforms and stockpiles will be managed as per the Surface Water Management Plan
	• The RAC will include waterway crossings designed to maintain flow and prevent upstream ponding
	• Potentially acid-forming materials will be encapsulated to prevent contamination of groundwater and surface water systems

Residual Impacts, including Assessment of Significance	**Nyangumarta** **Non-significant residual impacts:** • Indirect impacts to the health of and prevalence of culturally significant species of flora and fauna resulting from the depletion of groundwater resources • Indirect impacts to flora throughout and beyond the RAC associated with dust emissions associated with heavy haulage • Impacts to the amenity of Camp 1 resulting from a significant increase in vehicle movements through the area • Direct impacts to Nyangumarta People's ACH, primarily archaeological sites RTX_2020_02_SITE_001, RTX_2020_02_SITE_005, and multiple sand dunes throughout the Proposal area

Key Environmental Factor 1: Social Surroundings	
	• Direct impacts to sub-surface archaeological material • Loss of cultural knowledge resulting from the destruction of tangible elements of Nyangumarta People's ACH • Loss of connection to ancestral spirits resulting from the destruction of tangible elements of Nyangumarta People's ACH • Loss of connection to Country resulting from the destruction of the integrity of the cultural landscape throughout the Proposal • Loss of connection to a rich and complex cultural history resulting from direct impacts to the cultural landscape • Indirect impacts to archaeological sites resulting from dust emissions associated with mining activities and increased road traffic • Indirect impacts to surrounding culturally significant soaks resulting from mine related abstraction activities • Impacts to the amenity of cultural sites resulting from proximity to key infrastructure • Impacts to the integrity of the cultural landscape resulting from the depletion of groundwater resources • Loss of cultural knowledge resulting from impacts to spiritual elements of Nyangumarta People's ACH • Impacts to regionally significant songlines that are connected to 'water places' • Loss of connection to Country resulting from the destruction of the hydrologically reliant elements of the cultural landscape • Reduction in availability of bush tucker resources resulting from the depletion of groundwater resources • Impacts to the physical, social, and psychological health of Nyangumarta People resulting from the degradation of elements of the environment that rely on the healthy function of hydrological systems • Direct impacts to the visual amenity of the Proposal resulting from the installation of wind turbines • Impacts to the integrity of the visual landscape resulting from the unintended introduction of weeds and non-native species of flora • Habitat loss for culturally important species of fauna resulting from the clearing of vegetation • Indirect impacts to the health of and prevalence of culturally significant species of flora and fauna resulting from the depletion or contamination of groundwater resources • Loss of capacity to continue customary practices resulting from impacts to the health of the environment throughout and beyond the Proposal • Loss of cultural knowledge resulting from the reduced prevalence of culturally important species of flora and fauna • Loss of Nyangumarta language resulting from the reduced prevalence of culturally important species of flora and fauna • Loss of the ability for Nyangumarta People to derive or supplement their livelihood with bush tucker sourced from their Country • Sense of loss experienced at a community level resulting from the degradation of the prevalence and health of different types of plants and animals • Impacts to the ability of Nyangumarta People to enact their native title rights and interests resulting from impacts to their ability to safely access their Country via Nyangumarta Highway • Impacts to the ability of Nyangumarta People to enact their native title rights and interests resulting from impacts to their ability to access their Country within the MIA • Loss of physical connection to Country resulting from impacts to Nyangumarta People's ability to safely access their country via Nyangumarta Highway

Key Environmental Factor 1: Social Surroundings	
	• Loss of spiritual connection to Country resulting from impacts to Nyangumarta People's ability to safely access their country via Nyangumarta Highway • Loss of cultural knowledge resulting from impacts to Nyangumarta People's ability to safely access their Country via Nyangumarta Highway • Spiritual retribution resulting from failure to ensure the safe passage of visitors across Nyangumarta Country • Loss of funding for the Nyangumarta Ranger Program resulting from the inability of Nyangumarta Rangers to safely access Country which is critical for the practical implementation of the IPA Management Plan • Loss of income associated with a reduction in tourist visitation to Nyangumarta Country via the Nyangumarta Highway • Exhaustion of significant resources to meet the Proponent's Health and Safety requirements relating to Nyangumarta Rangers/People carrying out fee-for-service work within the Proposal area • Decreased ability of Nyangumarta People to safely enjoy the use of Camp 1 resulting from a significant increase in vehicle movements through the area • Loss of ability for opportunistic visitation of the Proposal area by Nyangumarta People during operations resulting from the Proponent's access policies and requirement **Significant residual impacts:** • Significant impacts to the visual landscape in the vicinity of cultural sites • Direct impacts to the amenity of the visual landscape within the Proposal area resulting from the development of the WRL • Direct impacts to the amenity of the visual landscape within the Proposal area resulting from the construction of the TSF • Direct impacts to the amenity of the visual landscape beyond the Proposal area resulting from the development of the WRL and TSF • Impacts to the integrity of the cultural landscape resulting from significant visual impacts associated with the development of large-scale infrastructure • Direct impacts to culturally significant flora resulting from the clearing of vegetation to facilitate the construction of infrastructure **Martu** **Non-significant residual impacts:** • Potential for loss of connection to a rich and complex cultural history resulting from change to the cultural landscape, including the Tjukurrpa stories which pass through the vicinity of the Proposal. • Indirect impacts to surrounding culturally significant soaks resulting from mine related abstraction activities. • Direct impacts to visual amenity of the landscape resulting from the installation of wind turbines. • Changes to visual integrity of the landscape given its connection with Martu cultural identity and spiritual connection to Country. • Impacts to the integrity of the visual landscape resulting from the unintended introduction of weeds and non-native species of flora. **Significant residual impacts:**

Key Environmental Factor 1: Social Surroundings	
	The following are considered to be of a perceived high residual significance to Martu People. Negotiations are ongoing between the Proponent and JYAC in relation to agreed measures to mitigate and manage residual impacts, including but not limited to through continued consultation with the Martu People throughout the life of the Proposal and through collaboration and information sharing via the proposed Implementation Committee: • Potential for a changed occurrence native flora and fauna through changes to surface water and groundwater flows and emissions (i.e. lighting, dust and noise) • Impacts to the integrity of the cultural landscape resulting from the depletion of groundwater resources • Indirect impacts to surrounding culturally significant soaks resulting from mine related abstraction activities • Impacts to regionally significant songlines that are connected to 'water places' **Other stakeholders** **Non-significant residual impacts:** • Loss of visual amenity due to development of the landscape • Loss of amenity due to nuisance noise • Loss of amenity and degradation of native habitat due to nuisance dust affecting flora and vegetation • Flora impacts and introduced weeds • Fauna impacts, including from workers off-roster • Cattle strike from increased traffic volumes • Changed access to water and reduced water quality • Traffic and increased vehicle movements exacerbating road safety impacts from increased risk of vehicle collision
Proposal Environmental Outcomes	**Nyangumarta** In consideration of the proposed avoidance and management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Nyangumarta Social Surroundings are set out below: • A significant residual impact on Nyangumarta People's social surroundings with respect to its permanent effects on amenity and ACH values, particularly with respect to the visual landscape in the vicinity of cultural sites and landform changes which impact sense of place, connection to Country, enjoyment of and desire to be on Country and undertake cultural practices within and in proximity to the Proposal • A range of measures have been developed with Nyangumarta and management plans will continue to be co-developed. These will ensure the Proponent continues to apply the EPA mitigation hierarchy (avoid, minimise, rehabilitate) to all planning and activities in consultation and in partnership with Nyangumarta and their representatives, while acknowledging that permanent residual impacts to amenity will remain in perpetuity • The Proponent also attests to a process of consultation and engagement with application of mitigation hierarchy in relation to ACH sites and places that will ensure that the Proposal meets the EPA's objective for this factor in this regard. Potential direct impacts to such ACH values will be appropriately managed via Aboriginal heritage legislation and the management plans. Any disturbance will be in accordance with approvals under the relevant heritage legislation if required and as agreed with Traditional Owners through ongoing engagement and consultation, based on the principle of free, prior and informed consent

Key Environmental Factor 1: Social Surroundings	
	Martu In consideration of the proposed avoidance and management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Martu Social Surroundings are set out below: • A residual impact on Martu People's social surroundings in relation to the potential disruption to ACH values associated with water, given its significance in Martu culture and ethnobotanical values • A range of measures have been developed with Martu and management plans will continue to be co-developed. These will ensure the Proponent continues to apply the EPA mitigation hierarchy (avoid, minimise, rehabilitate) to all planning and activities in consultation and in partnership with Martu and their representatives, while acknowledging that permanent residual impacts to amenity will remain in perpetuity • The Proponent also attests to a process of consultation and engagement with application of mitigation hierarchy in relation to ACH sites and places that will ensure that the Proposal meets the EPA's objective for this factor in this regard. Potential direct impacts to such ACH values will be appropriately managed via Aboriginal heritage legislation and the management plans. Any disturbance will be in accordance with approvals under the relevant heritage legislation if required and as agreed with Traditional Owners through ongoing engagement and consultation, based on the principle of free, prior and informed consent **Other stakeholders** In consideration of the proposed avoidance and management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to other stakeholder Social Surroundings are set out below: • A low residual and cumulative impact on Wallal Downs Pastoral Station and the Proponent will continue with dedicated consultation forums with this stakeholder and other key stakeholders regarding designs, impacts and management
Assessment of offsets (if relevant)	Not applicable

Key Environmental Factor 2: Inland Waters	

Potential Impacts	**Direct Impacts**
	• Lowering of groundwater levels through:
	  ○ Mine pit dewatering at the MIA
	  ○ Abstraction of water from Rimfire for operational water supply
	  ○ Abstraction of water for construction of the new access road
	• Mounding of groundwater levels through discharge of surplus water within infiltration ponds and aquifer recharge bores
	• Alteration to surface hydrological regimes from the development and placement of open mine pits and associated infrastructure
	Indirect Impacts
	• Reduction in groundwater and/or surface water quality
	Cumulative Impacts
	• Reduction of the Great Sandy Desert Lake Dora catchment
	• Groundwater drawdown

Mitigation Hierarchy	**Avoid** • The proposed Development Envelope has been reduced from 37,365 ha to 23,649 ha, representing a 36% reduction since the Proposal was referred • The Development Envelope and Conceptual Footprint have been modified during the design phase to minimise the size of the footprint where practicable • Removal of two potential aquifer reinjection (managed aquifer recharge) areas from the Development Envelope to minimise the impacts from groundwater mounding • The Wallal Borefield was removed from the Proposal which has reduced the area in which groundwater abstraction is proposed to occur • The Texas Borefield was removed from the Proposal which has reduced the area in which groundwater abstraction is proposed to occur • Discharge of surplus mine dewatering into the environment has been avoided by the use of clean water dam (CWD) and infiltration/ managed aquifer recharge (MAR) bore areas • The Proposal will use mine water to meet most operational water demand, and the TSF has been designed to ensure maximum water recovery throughout the processing circuit, avoiding the need for additional non-potable water supply borefields • Potentially contaminating substances, such as solid and liquid wastes and bulk hydrocarbons (including aviation fuel) will be stored and handled per the requirements of the Dangerous Good Safety Act 2004, industry guidelines, and relevant standards including within secondary containment • High Sulfur (HS) tailings will be stored sub-aqueously during operations within the TSF to avoid tailings exposure to oxygen and resulting acidification

Key Environmental Factor 2: Inland Waters	

	Minimise
	• Groundwater is abstracted according to programs that have been modelled to ensure dewatering volumes are minimised while ensuring safe and efficient access to the BWT mine pit. Ongoing groundwater level monitoring is used to verify the models and adjust dewatering programs as required
	• Proposed abstraction volumes to be within the sustainable yield of Rimfire Borefield's groundwater resources
	• Operational water demand will be supplied from mine dewatering in the first instance, reducing the requirement for water supply from Rimfire
	• Surplus clean water from operations will be directed into a CWD. Where surplus water cannot be managed in the CWD, MAR (preferentially) and infiltration ponds will be used
	• The infiltration ponds and MAR area will be situated in a part of the MIA that contains a deep sand profile of approximately 10 m, a low permeability silcrete layer and partially-to unsaturated deeper sandstone profile capable of accepting infiltrated/injected water
	• The Proponent will implement an Operational Surface Water Management Plan (Appendix C01) to ensure inputs are managed such that water flows and quality are maintained
	• A network of ponds, drains and flood protection bunds will be installed around the MIA to redirect stormwater from mining operations
	• Waterway crossings will be installed along the RAC to prevent ponding upstream, water shadows downstream and to maintain flows downstream
	• TSF design includes segregation of HS and Low Sulfur (LS) tailings materials
	• HS cells will be lined with a High-density Polyethylene (HDPE) (or equivalent) geomembrane liner and a suitable subgrade layer
	• LS cells will be lined with a HDPE (or equivalent) liner
	• The final liner selection will be based upon liner laboratory testing and further review by industry experts
	• The TSF will be designed and operated in accordance with Global Industry Standard on Tailings Management (ICMM 2020), Rio Tinto standards and general good international practice
	• TSF design includes the WRL abutting and wrapping around the high sulfur storage cell as a further control preventing failure
	• The TSF will have internal drainage with the internal slopes of its embankments directing surface water flows into the TSF cells
	• Two reclaim water ponds will be constructed to receive supernatant from the TSF during operations. HS supernatant will only be directed to ponds during periods of excess water; however, this will be dosed with lime to keep water as close to pH neutral as possible
	• Minimisation of spillage risk will be central to TSF design, construction and operation
	• Emergency response and long-term recovery plans will be implemented in the event of a TSF failure
	• The Proponent will implement a TSF Operating and Maintenance Manual, which will include a:
	  ○ Trigger, Action, Response Plan (TARP) to prevent loss of control to avoid potential TSF failures that could lead to spillage
	  ○ Emergency Preparedness Plan to monitor and address Potential TSF failures
	• All waste rock will be characterised to inform the design of the WRL

Key Environmental Factor 2: Inland Waters	
	• Potentially Acid Forming (PAF) material is to be stored within the core of the WRL, requiring ongoing waste rock identification and segregation of PAF waste • The WRL will be constructed bottom up to ensure effective PAF encapsulation. The movement of Heavy Mobile Equipment on the WRL will form compacted layers that will minimise seepage and restrict oxygen movement • The internal slopes of the berms will be reverse sloped to ensure that the WRL drains internally • During Operations any AMD from mine stockpiles will be collected in perimeter drains and sumps and transported to the concentrator for amelioration during short-term processing • A basal clay layer will be laid before the placement of any PAF material in the WRL or mine stockpiles to reduce significant AMD seepage into the underlying groundwater • Visual inspection of the WRL for degradation of the outer competent material slopes and NAF encapsulation material • Inspection and monitoring of the WRL perimeter drainage sumps, pumps and groundwater and surface water quality • The Proponent will regularly update the AMD S&MP consistent with the Leading Practice Sustainability Development Program for the Mining Industry (Australian Government 2016) • Mine stockpiles will be built in small lifts and have low permeability layers underneath to minimise AMD percolation • Mine stockpile operating procedures will include inspections and monitoring of drainage sumps, pumps, and ground and surface water quality • Each infiltration area may consist of two cells (to allow for maintenance) with perimeter and central embankments • The infiltration areas will be designed to protect against floodwaters in the 1% Annual Exceedance Probability (AEP) event (Advisian 2023b) • Water required for any artificial water sources within the ‘waterless’ barrier area will be appropriately contained to prevent Cane Toad access, e.g. in tanks or bladders • A Winu Spill Response Management Plan will be developed and implemented during construction and operation • Spill kits will be located strategically throughout the MIA, and employees trained in their use • The Proponent has prepared and will implement a Cyanide Management Plan (ELA 2024) (Appendix C10) consistent with the International Cyanide Management Institute Code (the Cyanide Code) (ICMI 2023) • The Development Envelope and Conceptual Footprint have been modified during the design phase to minimise vegetation clearing where practicable • Perimeter bunds will be constructed on the upper surface and benches of the WRL to ensure surface water retained within the bunds infiltrates into the WRL or evaporates • Drains and bunds will be monitored and managed to remove sediments to ensure they meet the designed volume requirements • Topsoil stockpiles will not exceed 2 m in height and will be placed in the direction of the natural sand dunes to minimise wind erosion • Topsoil stockpiles will be vegetated where possible to increase evapotranspiration and minimise soil loss to erosion • WRL and TSF will be constructed with competent non-acid forming (NAF) material on the outside to minimise erosion

Key Environmental Factor 2: Inland Waters	

	• Dispersive waste material will be encapsulated within NAF material to control wind erosion and allow vegetation establishment
	Rehabilitate
	• Groundwater bores will be decommissioned in accordance with relevant Department of Water and Environmental Regulation (DWER) guidelines, once no longer required
	• Groundwater level recovery timeframes will be modelled in future iterations of the MCP (Appendix A03)
	• At closure the infiltration ponds will be rehabilitated to natural surface
	• The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03), consistent with Department of Mines, Petroleum and Energy (DMPE) guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement. This will include:
	  ○ Installation of a store and release cover, constructed of NAF material, on the WRL to limit water ingress
	  ○ Reducing the overall slope angle of the WRL to 11° to reduce the effects of erosion and the potential to expose PAF material
	• All disturbed areas that are no longer required will be stabilised and, if appropriate, rehabilitated
	• All surface diversions remaining after closure are designed and engineered to minimise impacts on local hydrological regimes, ensure long term stability across the realistic range of expected flow events, and do not significantly cause or contribute to water quality impacts
	• At closure, the LS cells will be capped with a 0.5 m layer of NAF metasediment rock and a layer of topsoil. Meanwhile, the HS cells will have a 'tension saturated cover' consisting of 6.0 m LS tailings followed by a 0.5 m NAF metasediment rock capping layer. Further details will be provided in the MCP and will be refined through further study prior to mine closure (Appendix A03)
	• At closure, spillways and retention bunds will be constructed on top of the covered TSF to control water discharge during heavy rainfall events. The spillways will direct water away from the HS cells to the LS cells and will be constructed of durable NAF material and a maximum gradient of 1:10. Further details are provided in the Winu TSF Closure Design report (WWL 2025b) (Appendix G08)
	• The infiltration ponds and MAR bores will be removed and rehabilitated at closure, with the ponds backfilled to ground level
	• Topsoil (from the two main soil units, Deep Sand and Gradational Sand) will be stockpiled separately from subsoils for use in rehabilitation. Subsoils suitable for use in rehabilitation will also be segregated and stockpiled where practicable
	• Recovery and stockpiling of topsoil is intended for future use as a growth medium in rehabilitation works
	• Installation of a TSF LS tailings cover with topsoil and growth media placed over the top using competent material. Erosion resistant material at appropriate slope will be used to minimise erosion. Water on the embankment crests will be directed internally into TSF and prevent from flowing down the outer slopes

Residual impacts, including assessment of significance	**Non-significant Residual Impacts** • Lowering of groundwater levels at the MIA and Rimfire is not expected to result in a significant residual impact to Inland Waters • Given the short duration and limited volumes proposed to be abstracted to support construction of the RAC, the drawdown estimation results obtained from the analytic assessment and forward predictions of groundwater abstraction indicate: ○ 0.4 GL/a from the Broome Aquifer and Lower Callawa Formation above the Jarlemai Siltstone can be sustained with negligible impacts on any receptors

Key Environmental Factor 2: Inland Waters	
	○ 0.6 GL/a from the Lower Callawa and Unconfined Wallal aquifer where the Jarlemai Siltstone is absent can be sustained with negligible impacts on any receptors • Given the limited and localised effect of mounding on groundwater, and in consideration of the mitigation measures, the proposed management of surplus water is not expected to have a significant residual impact on Inland Waters • The Proposal does not intersect any major surface water features and negligible reduction in the Great Sandy Desert Lake Dora Catchment size will not affect any key regional surface water hydrological regimes • No significant residual impacts to surface water hydrology are expected as a result of the construction of the MIA and RAC • Through the implementation of mitigation measures, the EMP and the AMD S&MP, the Proponent expects that the Proposal will not result in a significant residual impact on the environment due to: ○ TSF seepage or spillage ○ Surface water and groundwater AMD contamination • Given management of surplus water through utilisation of the infiltration ponds and MAR will only occur when necessary when the CWD capacity is exceeded, and the prioritisation of clean water from pit dewatering directed to the CWD and then infiltration ponds/ MAR, any impact to groundwater quality is not expected to be significant • The creation of a pit lake is not expected to result in a significant impact to surface water and groundwater quality. Closure studies will be progressively developed throughout the mine life to build confidence in predictions and reduce residual risk from final landforms • With mitigation measures, the Proponent expects the Proposal will not have a significant residual impact on the environment due to surface water and/ or groundwater chemical contamination • With the application of mitigation measures, the Proponent expects that the Proposal will not result in a significant residual impact on the environment due to soil erosion **Significant Residual Impacts** After implementing the mitigation hierarchy, the Proponent considers that there will be no significant residual impacts to Inland Waters.
Proposed environmental outcomes	In consideration of the proposed management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Inland Waters include: • Lowering the groundwater table as a result of mine dewatering to be no greater than a standing water level of -250 m RL • Abstraction of no more than 2.8 GL/a for Rimfire • Abstraction of approximately 1.0 GL/a for no more than two years for construction of the RAC • No impact to any major surface water feature as a result of the alteration of groundwater levels • No significant impacts to groundwater quality related to the MIA
Assessment of offsets (if relevant)	Not applicable

Key Environmental Factor 3: Flora and Vegetation	
Potential Impacts	**Direct Impacts** • Clearing of native vegetation • Increased fragmentation of native vegetation as a result of clearing • Clearing of significant flora individuals **Indirect Impacts** • Degradation or alteration of groundwater dependent vegetation (GDV) as a result of groundwater drawdown • Degradation of vegetation as a result of altered hydrological regimes • Degradation of vegetation as a result of the introduction or spread of weed species • Degradation of vegetation as a result of increased dust emissions or altered fire regimes **Cumulative Impacts** • Clearing of native vegetation • Clearing of significant flora species

Mitigation Hierarchy	**Avoid**
	• The Development Envelope and Conceptual Footprint have been modified during the design phase to avoid direct impacts to native vegetation where possible and to minimise the size of the footprint where practicable
	• The total extent of clearing will not exceed 4,878 ha within the 23,649 ha Development Envelope
	Minimise
	• Clearing of locally significant vegetation types will be restricted through authorised maximum extents, including:
	  ○ 26.0% of known extent in Vegetation Survey Area of D1
	  ○ 20.0% of known extent in Vegetation Survey Area of D2
	  ○ 20.0% of known extent in Vegetation Survey Area of D3
	  ○ 25.0% of known extent in Vegetation Survey Area of P1
	  ○ 20.0% of known extent in Vegetation Survey Area of P2
	  ○ 15.0% of known extent in Vegetation Survey Area of P3
	  ○ 10.0% of known extent in Vegetation Survey Area of P4
	  ○ 10.0% of known extent in Vegetation Survey Area of P8
	  ○ 1.0% of known extent in Vegetation Survey Area of C2
	  ○ 15.0% of known extent in Vegetation Survey Area of C4
	  ○ 15.0% of known extent in Vegetation Survey Area of R1

Key Environmental Factor 3: Flora and Vegetation	
	○ 10.0% of known extent in Vegetation Survey Area of R2 • Clearing of Priority flora individuals will be restricted through authorised maximum extents, including: ○ 5.0% of known records within Flora Survey Area of *Cynodon anisocarpus* (Priority 1 [P1]) ○ 20.0% of known records within Flora Survey Area of *Goodenia hartiana* (P2) ○ 0.2% of known records within Flora Survey Area of *Bonamia oblongifolia* (P2) ○ 5.0% of known records within Flora Survey Area of *Comesperma sabulosum* (P3) ○ 10.0% of known records within Flora Survey Area of *Corynotheca asperata* (P3) ○ 10.0% of known records within Flora Survey Area of *Dasymalla chorisepala* (P3) ○ 10.0% of known records within Flora Survey Area of *Indigofera ammobia* (P3) ○ 15.0% of known records within Flora Survey Area of *Synostemon arenosus* (P3) ○ 28.0% of known records within Flora Survey Area of *Terminalia kumpaja* (P3) ○ 30.0% of known records within Flora Survey Area of *Tribulopis marliesiae* (P3) ○ Subject to resolution of taxonomic status – 30% of known records within Flora Survey Area of *Amphipogon caricinus* (hairy lamina) (J. Paterson WB41138) (Species of Taxonomic Interest) ○ Subject to resolution of its taxonomic status – 0% of currently known records within Flora Survey Area of *Portulaca* sp. Nyangumarta (B. Eckermann BE Opp 01) (Species of Taxonomic Interest) • Known locations of native vegetation will be included in the Proponent's GIS system to ensure impacts are minimised and adhere to authorised extents • Where practicable, clearing will be minimised during construction and will be undertaken in areas required for future use • Vehicle traffic will be confined to defined roads and tracks • Develop targeted groundwater monitoring points within both the Percival Palaeovalley system and deeper fractured rock aquifer system to assess and monitor differences in water levels • Develop targeted vegetation health monitoring of potential GDV areas within zone of influence of groundwater drawdown to assess vegetation stress • Carry out regular groundwater level monitoring and contingency responses against: ○ Early response indicators ○ Trigger criteria ○ Threshold criteria • Proposed abstraction volumes to be within the sustainable yield of Rimfire Borefield's groundwater resources • The Proponent will take measures to ensure runoff is retained or diverted by flood protection bunds or floodway to minimise effects on natural flow regimes • Surplus clean water from operations will be directed into a CWD. Where surplus water cannot be managed in the CWD, MAR (preferentially) and infiltration ponds will be used

Key Environmental Factor 3: Flora and Vegetation	

	• Develop targeted vegetation health monitoring around the infiltration ponds and MAR borefield to assess vegetation stress within the modelled 10 m below ground level (mbgl) mounding contour
	• Minimise the spread of weeds in Management Area 1 by implementing the following:
	  ○ Undertake weed monitoring within Management Area 1
	• Minimise the entry and spread of weeds in Management Area 2 by implementing the following:
	  ○ Engage with the Nyangumarta People and rangers to undertake intermittent weed monitoring within Management Area 2
	  ○ Active guidance from and participation of the Nyangumarta Traditional Owner group representatives, including the installation of a washdown facility at the intersection of Management Area 2 and the Wallal Downs Pastoral Lease, which will include:
	  – Vehicle inspection and washdown at the entry to Management Area 2
	  – Equipment inspection and washdown at the entry to Management Area 2
	  ○ The washdown facility will be co-managed with the Nyangumarta People
	  ○ Treatment of identified weeds whether by application of appropriate herbicide and/or manual extraction from the ground
	• Prevent the introduction and spread of weeds in Management Area 3 by implementing the following:
	  ○ Undertake weed inspections on all vehicles and equipment entering Management Area 3
	  ○ Vehicle washdown before entry to Management Area 3 (will occur at the entry to Management Area 2)
	  ○ Equipment washdown before entry to Management Area 3 (will occur at the entry to Management Area 2)
	  ○ Include weed checks in routine work area inspections
	  ○ Undertake targeted weed monitoring within Management Area 3, including around the infiltration ponds, in consultation with the Traditional Owners
	  ○ Personnel to report any weed sightings
	  ○ Weed hygiene measures for incoming personnel
	  ○ Weed management measures in personnel inductions
	  ○ Treatment of identified weeds either by application of appropriate herbicide and/or manual extraction from the ground
	  ○ Follow up targeted weed monitoring of treatment areas
	• The RAC will be sealed to minimise dust emissions
	• Fixed plant dust suppression will be included in the design
	• Appropriate dust controls (including but not limited to water carts, non-toxic stabilisers, speed limits, and progressive rehabilitation) to be implemented throughout construction and operations as required
	• Vehicles will be required to travel at designated operating speeds on all roads and will be restricted from accessing rehabilitated surfaces except for management purposes
	• Develop and implement a Fire Management Plan
	Rehabilitate

Key Environmental Factor 3: Flora and Vegetation	
	• The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DEMIRS 2025a; 2025b) and in accordance with the requirements of the Mining Act Approvals Statement • Topsoil will be recovered and stockpiled before all construction activities to ensure a surplus of growth media available for revegetation of disturbed lands and permanent landforms post mining • Rehabilitation and seed harvesting processes will be undertaken in consultation with the Traditional Owners • Rehabilitation will be undertaken progressively, including areas not required for ongoing operations, to minimise disturbed areas, reducing fragmentation • All disturbed areas that are no longer required will be stabilised and, if appropriate, rehabilitated • Groundwater level recovery timeframes have been modelled and discussed in Section 7

Residual impacts, including assessment of significance	**Non-significant Residual Impacts**
	• Based upon upper clearing limits of clearing of vegetation types within the Development Envelope, the Proposal is not expected to result in significant impacts
	• The Conceptual Footprint has been designed to maintain connectivity between vegetation within the Development Envelope and the wider region. As such, the Proposal is not expected to result in genetic isolation or reduced flora reproduction
	• Implementing the Proposal is not expected to significantly impact any Priority flora species or cause any Priority flora to become threatened
	• The Proposal is not expected to pose a risk of impacts to any GDVs through groundwater drawdown
	• Mounding from infiltration ponds is not expected to result in a significant residual impact given the:
	  ○ Effect is expected to be temporary
	  ○ Relatively small are of potential impact
	  ○ Low abundance of most tree and tall-shrub species that have potential to be impacted by shallow groundwater
	  ○ Resilience of lower, shallow-rooted species, with at least 86% of these structural components of the vegetation within the potential zones of influence of mounding expected to remain intact
	  ○ Expected ability of *Acacia ancistrocarpa* to adapt to shallow groundwater
	• No significant residual impacts on vegetation condition from the spread of weeds are expected from the Proposal
	• The Proposal is not expected to result in a level of dust emissions that will significantly impact native vegetation
	• Through the implementation of management measures, the EMP and the Fire Management Plan, the Proposal is not expected to significantly increase the risk of fire leading to significant impacts to native vegetation
	Significant Residual Impacts
	After implementing the mitigation hierarchy, the Proponent considers that there will be no significant residual impacts to Flora and Vegetation.

Key Environmental Factor 3: Flora and Vegetation	

Proposed environmental outcomes	In consideration of the proposed management measures and the likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Flora and Vegetation include:
	• Clearing of native vegetation for the Proposal will not exceed:
	  ○ 4,878 ha of native vegetation in Excellent condition
	  ○ 4,878 ha of locally significant native vegetation, ensuring no more than 26.0% of the extent within the Vegetation Survey Area is cleared for any locally significant vegetation type
	  ○ Clearing of Priority (P) flora individuals will not exceed:
	  – 5.0% of known records within the Flora Survey Area of *Cynodon anisocarpus* (P1)
	  – 20.0% of known records within the Flora Survey Area of *Goodenia hartiana* (P2)
	  – 0.2% of known records within the Flora Survey Area of *Bonamia oblongifolia* (P2)
	  – 5.0% of known records within the Flora Survey Area of *Comesperma sabulosum* (P3)
	  – 10.0% of known records within the Flora Survey Area of *Corynotheca asperata* (P3)
	  – 10.0% of known records within the Flora Survey Area of *Dasymalla chorisepala* (P3)
	  – 10.0% of known records within the Flora Survey Area of *Indigofera ammobia* (P3)
	  – 15.0% of known records within the Flora Survey Area of *Synostemon arenosus* (P3)
	  – 28.0% of known records within the Flora Survey Area of *Terminalia kumpaja* (P3)
	  – 30.0% of known records within the Flora Survey Area of *Tribulopis marliesiae* (P3)
	  – Subject to resolution of taxonomic status – 30% of known records within Flora Survey Area of *Amphipogon caricinus* (hairy lamina) (J. Paterson WB41138) (Species of Taxonomic Interest)
	  – Subject to resolution of taxonomic status – 0% of currently known records of *Portulaca* sp. Nyangumarta (B. Eckermann BE Opp 01) (Species of Taxonomic Interest)
	• Within Management Area 3 – no decline in mapped vegetation condition due to the presence of weeds

Assessment of offsets (if relevant)	Not applicable

Key environmental Factor 4: Terrestrial Fauna	
Potential Impacts	**Direct Impacts** • Loss of fauna habitat as a result of clearing and fragmentation • Loss of fauna individuals as a result of clearing, infrastructure and mining operations • Loss of short-range endemic (SRE) individuals and SRE habitat as a result of clearing **Indirect Impacts** • Degradation or alteration of habitat as a result of altered hydrological regimes • Degradation of fauna habitat as a result of increased weeds, dust, introduced fauna and altered fire regimes • Disturbance and displacement of fauna from increased light, noise and/or vibration **Cumulative Impacts** • The Proposal will contribute to cumulative regional loss of fauna habitats and species present within the Development Envelope

Mitigation Hierarchy	**Avoid**
	• The Development Envelope and Conceptual Footprint have been modified during the design phase to avoid direct impacts to approximately 14,000 ha of critical or supporting habitat for significant fauna species. This includes complete avoidance of Rocky Outcropping habitat known to support Black-footed Rock-wallaby and Northern Quoll, and nesting/roosting and foraging habitat for Night Parrot
	• The Development Envelope and Conceptual Footprint have been modified during the design phase to avoid direct impacts to SRE habitat where practicable
	• The total extent of clearing will not exceed 4,878 ha within the 23,649 ha Development Envelope
	• Pre-clearance surveys for Greater Bilby will be undertaken to ascertain no active individuals are present within the clearing footprint
	• No-go zones will be established around any active Greater Bilby burrows (should they be identified during pre-clearance surveys). No-go zones will remain in place until either:
	  ○ A fauna specialist has relocated the individual or,
	  ○ The individual has been observed to have moved on from the area to adjoining suitable habitat, or the burrow is observed to no longer be active
	Minimise
	• The Development Envelope and Conceptual Footprint have been modified during the design phase to minimise direct impacts to Inland Sand Dunes habitat which provides critical and supporting habitat for significant fauna species
	• Known locations of fauna habitat will be included in the Proponent's GIS system to ensure impacts to known locations of significant habitat types are minimised and adhere to authorised extents
	• Known locations of suitable SRE habitat will be included in the Proponent's GIS system to ensure impacts to known locations of significant habitat types are minimised and adhere to authorised extents

Key environmental Factor 4: Terrestrial Fauna	

	• Clearing will be undertaken progressively to allow fauna to migrate away from clearing activities or machinery movements
	• Within 14 days prior to clearing, a fauna pre-clearance survey will be undertaken
	• Should Night Parrot individuals be visually identified during construction, work will cease immediately and all personnel will leave the vicinity
	• Construction of the Rimfire pipeline and borefield will only occur during daylight hours to not disturb Night Parrot behavioural patterns
	• Operational access to Rimfire (via the Rimfire pipeline) for routine maintenance activities will be planned for daylight hours (unless due to emergency circumstances or unplanned maintenance requirements) so as to not disturb Night Parrot behavioural patterns
	• Speed limits will be implemented to minimise the risk of fauna injury or mortality from vehicle strike, including a 40 km/h speed limit along the Rimfire pipeline adjacent to Night Parrot habitat
	• Vehicle traffic will be confined to defined roads and tracks and required to travel at designated operating speeds on all roads and will be restricted from accessing rehabilitated surfaces except for management purposes
	• Site induction programs will provide information on significant fauna, including their appearance and habitats. Training would also discuss standard operating procedures in the event of fauna interactions
	• Artificial water sources will have egress points
	• Wind turbine design will consider mitigation controls to reduce the likelihood of avian fauna strike
	• Implement a Bird and Bat Adaptive Management Plan that may include, but not be limited to:
	  ○ Survey and study findings
	  ○ Bird and bat risk assessment
	  ○ Monitoring program – including but not limited to carcass monitoring
	  ○ Adaptive management triggers
	• The airstrip will be fenced and fauna clearance runs will be undertaken prior to aircraft movements
	• Reflectors will be attached to fencing in accordance with the EMP to ensure it is visible and reduce the risk of fauna injury or mortality due to entanglement
	• No fencing will be constructed in areas adjoining known or potential Night Parrot roosting/nesting and foraging habitat
	• Investigate the effectiveness of noise deterrents and enhanced blade visibility of wind turbines
	• The length of any open trenches will be minimised and backfilled progressively where possible
	• Duration of open excavations will be minimised and backfilled immediately following completion of construction
	• Fauna egress and fauna refuge will be installed in all excavations left open overnight
	• Trench inspections for fauna and clearance are to be carried out within two hours of sunrise and before sunset unless backfilled, in which case inspection shall precede backfilling, as identified below
	• Construction crews shall inspect trenches half an hour before backfilling. If trapped fauna are present, a fauna handler will be notified and engaged to assist before backfilling

Key environmental Factor 4: Terrestrial Fauna	

	• Measures to reduce exposure to second-generation anticoagulant rodenticides (SGARs) such as non-lethal control or alternative products will be investigated by the Proponent and implemented where practicable
	• Perimeter bunds will be constructed on the upper surface and benches of the WRL to ensure surface water retained within the bunds infiltrates into the WRL or evaporates
	• A network of ponds, drains and flood protection bunds will be installed around the MIA to redirect stormwater from mining operations to be retained on site for re-use or to infiltrate/evaporate in situ
	• Waterway crossings will be installed along the RAC to prevent ponding upstream, water shadows downstream and to maintain flows downstream
	• Infiltration ponds and MAR bore management of surplus water is designed to minimise the potential for groundwater mounding on surface habitats
	• Infiltration ponds are designed to minimise the risk of overtopping due to storage capacity exceedance, or forming a surface expression of groundwater or near surface groundwater table
	• Infiltration ponds will be positioned to align with the existing dunes, to also minimise disturbance to the local topography
	• The RAC will be sealed to minimise dust emissions
	• Artificial water sources will be kept to the minimum required for operations. Leaking water sources will be repaired and minimised
	• Fixed plant dust suppression will be included in the design
	• Appropriate dust controls (including but not limited to water carts, non-toxic stabilisers, speed limits, and progressive rehabilitation) to be implemented throughout construction and operations as required
	• Minimise the spread of weeds in Management Area 1 by implementing the following:
	  ○ Undertake weed monitoring within Management Area 1
	• Minimise the entry and spread of weeds in Management Area 2 by implementing the following:
	  ○ Engage with the Nyangumarta People and rangers to undertake intermittent weed monitoring within Management Area 2
	  ○ Active guidance from and participation of the Nyangumarta Traditional Owner group representatives, including the installation of a washdown facility at the intersection of Management Area 2 and the Wallal Downs Pastoral Lease, which will include:
	  – Vehicle inspection and washdown at the entry to Management Area 2
	  – Equipment inspection and washdown at the entry to Management Area 2
	  ○ The washdown facility will be co-managed with the Nyangumarta People
	  ○ Treatment of identified weeds whether by application of appropriate herbicide and/or manual extraction from the ground
	• Minimise the introduction of feral fauna in Management Area 1 and 2 by implementing the following:
	  ○ Undertake opportunistic feral fauna monitoring within Management Area 2 with active guidance from and participation of the relevant Traditional Owner group representatives
	• Control any introduction of feral fauna to minimise impacts on fauna populations and habitat in Management Area 3 by implementing the following:

Key environmental Factor 4: Terrestrial Fauna	
	○ No domestic animals are permitted within Management Area 3 ○ Undertake feral fauna control within Management Area 3, with active guidance from and participation of the relevant Traditional Owner group representatives ○ Only where necessary, install and maintain fencing around landfills, airstrip and, where appropriate, water storage areas and infiltration ponds. Fencing will include reflectors to deter birds ○ Establish designated points to assess feral fauna presence • Prevent the introduction and spread of weeds in Management Area 3 by implementing the following: ○ Undertake weed inspections on all vehicles and equipment entering Management Area 3 ○ Vehicle washdown before entry to Management Area 3 (will occur at the entry to Management Area 2) ○ Equipment washdown before entry to Management Area 3 (will occur at the entry to Management Area 2) ○ Include weed checks in routine work area inspections ○ Undertake targeted weed monitoring within Management Area 3, including the area surrounding the infiltration ponds, in consultation with the Traditional Owners ○ Personnel to report any weed sightings ○ Weed hygiene measures for incoming personnel ○ Weed management training in personnel inductions ○ Treatment of identified weeds either by application of appropriate herbicide and/or manual extraction from the ground • Implement a Fire Management Plan • Lighting will be designed and managed in accordance with the National Light Pollution Guidelines for Wildlife (DCCEEW 2023b) • No permanent lighting will be installed along the RAC. Limited temporary lighting may be used during construction of the road to support safe operations • No permanent lighting will be installed along pipeline corridors or at the production or monitoring bores. Limited temporary lighting may be used occasionally if required to support safe operations • Lighting at Rimfire collection tanks will be limited to that required for safe operations noting that the borefield will be remotely operated so light usage will be minimal • Permanent lighting will only be installed where required, mainly operational areas • Permanent lighting and temporary lighting will be shielded and directed to active mine areas to minimise light spill • Ensure all vehicles and machinery are serviced and maintained to minimise machinery noise • Equipment design will be specified to be within Australia standard noise limits and/or fitted with noise mufflers in accordance with manufacturing specifications • Undertake post-construction noise and ongoing occupancy monitoring within Night Parrot habitat areas to minimise impacts of light and noise on Night Parrot

Key environmental Factor 4: Terrestrial Fauna	

	Rehabilitate
	• The Proponent will prepare regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DEMIRS 2025a; 2025b) and in accordance with the requirements of the Mining Act Approvals Statement
	• Habitat elements to be considered for Terrestrial Fauna as part of rehabilitation design includes:
	  ○ Vegetation that is known to provide preferred food or shelter preference
	  ○ Retaining and replacing woody debris
	• Rehabilitation will be undertaken progressively to minimise disturbed areas, reducing fragmentation and barriers to fauna movement
	• Groundwater bores will be decommissioned in accordance with DWER relevant guidelines, once no longer required
	• All disturbed areas that are no longer required will be stabilised and, if appropriate, rehabilitated
	• All surface water diversions remaining after closure are designed and engineered to minimise impacts on local hydrological regimes, ensure long term stability across the realistic range of expected flow events, and do not significantly cause or contribute to water quality impacts

Residual impacts, including assessment of significance	**Non-significant Residual Impacts**
	• The Proposal has been designed to avoid any direct impacts to:
	  ○ Roosting/ nesting and foraging habitat for Night Parrot
	  ○ Critical habitat for the Black-footed Rock-wallaby
	  ○ Approximately 18,658 ha of supporting habitat for Grey Falcon
	  ○ Approximately 15,645 ha of supporting habitat for Princess Parrot
	  ○ Critical habitat for Northern Quoll
	  ○ Approximately 16,301 ha of supporting habitat for Barn Swallow
	  ○ Approximately 13,423 ha of supporting habitat for Little Curlew
	  ○ Approximately 13,423 ha of supporting habitat for Oriental Plover
	  ○ Approximately 13,423 ha of supporting habitat for Oriental Pratincole
	  ○ Approximately 18,658 ha of supporting habitat for Pacific Swift
	  ○ Approximately 13,423 of supporting habitat for Australian (Gull-billed) Tern
	  ○ Approximately 18,658 ha of supporting habitat for Peregrine Falcon
	  ○ Approximately 13,422 ha of supporting habitat for Short-tailed Mouse
	• Following the implementation of mitigation actions, there is not expected to be a significant residual impact from the loss of fauna individuals as a result of clearing, infrastructure and mining operations
	• Clearing, earthworks and excavation may result in the loss of individual potential SRE taxa recorded within the Development Envelope

Key environmental Factor 4: Terrestrial Fauna	
	• Potential SRE species recorded within the Development Envelope are considered unlikely to be restricted to the Development Envelope and impacts to SRE habitat are not considered significant • Approximately 0.002% of the known extent of the Shrub and Spinifex on Sandplain habitat type within and surrounding the Development Envelope may be impacted by groundwater mounding • Impacts related to the introduction or spread of weeds within fauna habitat are expected to be localised to areas of disturbance • Given the amount of habitat surrounding the Development Envelope, susceptible fauna are likely to move away from any areas impacted by dust into adjacent habitat • Through the implementation of the EMP, the Proposal is not expected to have a significant impact on the native fauna as a result of increased abundance of introduced fauna within the Development Envelope • The Proponent considers that through the implementation of management measures, the EMP and the Fire Management Plan, the Proposal is not expected to significantly increase the risk of fire leading to significant impacts to native fauna • The Proponent considers that through the implementation of management measures and the EMP, the Proposal will not result in significant impacts to native fauna as a result of increase light and/or noise **Significant Residual Impacts** • Clearing of 4,498 ha of Greater Bilby critical habitat • Clearing of 3,700 ha of Brush-tailed Mulgara critical habitat • Clearing of 798 ha of Northern Marsupial Mole critical habitat • Clearing of 238 ha of Western Pebble-mound Mouse critical habitat • Clearing of 3,700 ha of Spectacled Hare-wallaby critical habitat • Clearing of 3,700 ha of Dampierland Plain Slider critical habitat

Proposed environmental outcomes	In consideration of the proposed management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Terrestrial Fauna include:
	• No more than 4,878 ha of fauna habitat will be cleared within the Development Envelope comprising the following approximate habitat extents for significant fauna species:
	  ○ 4,498 ha of critical habitat and 238 ha of supporting habitat for Greater Bilby
	  ○ 3,700 ha of critical habitat and 238 ha of supporting habitat for Brush-tailed Mulgara
	  ○ 798 ha of critical habitat and 3,700 ha of supporting habitat for Northern Marsupial Mole
	  ○ 238 ha of critical habitat for Western Pebble-mound Mouse
	  ○ 16 ha of supporting habitat for Northern Quoll
	  ○ 4 ha of supporting habitat for Black-footed Rock-wallaby
	  ○ 3,700 ha of critical habitat for Spectacled Hare-wallaby
	  ○ 3,739 ha of supporting habitat for Short-tailed Mouse

Key environmental Factor 4: Terrestrial Fauna	
	○ 3,700 ha of critical habitat for Dampierland Plain Slider ○ 4,775 ha of supporting habitat for Grey Falcon ○ 3,739 ha of supporting habitat for Oriental Plover ○ 3,739 ha of supporting habitat for Little Curlew ○ 3,739 ha of supporting habitat for Oriental Pratincole ○ 4,775 ha of supporting habitat for Pacific Swift ○ 4,775 ha of supporting habitat for Peregrine Falcon ○ 4,498 ha of supporting habitat for Princess Parrot ○ 3,977 ha of supporting habitat for Barn Swallow ○ 3,739 ha of supporting habitat for Australian (Gull-billed Tern) • No direct impacts to Rocky Outcropping habitat • No direct impacts to roosting/nesting or foraging habitat for Night Parrot • Minimise direct and indirect impacts from the Proposal to native fauna individuals and habitat in accordance with the EMP
Assessment of offsets (if relevant)	Following the application of the mitigation hierarchy, the following residual environmental impacts are considered significant impacts and therefore require and offset: • Clearing of 4,498 ha of Greater Bilby critical habitat at a rate of $3,127/ha • Clearing of 3,700 ha of Brush-tailed Mulgara critical habitat at a rate of $3,127/ha • Clearing of 798 ha of Northern Marsupial Mole critical habitat at a rate of $3,127/ha • Clearing of 238 ha of Western Pebble-mound Mouse critical habitat at a rate of $3,127/ha • Clearing of 3,700 ha of Spectacled Hare-wallaby critical habitat at a rate of $3,127/ha • Clearing of 3,700 ha of Dampierland Plain Slider critical habitat at a rate of $3,127/ha

Key Environmental Factor 5: Subterranean Fauna	
Potential Impacts	**Direct Impacts** • Loss of individuals as a result of groundwater drawdown • Loss of, or permanent reduction in stygofauna habitat as a result of groundwater drawdown **Indirect Impacts** • Changes to surface inputs to flow/volume of water, nutrients and oxygen from vegetation clearing and changed hydrological regime • Degradation of habitat as a result of contamination from spills, leaching and environmental incidents **Cumulative Impacts** The Proposal has potential to contribute to cumulative degradation or loss of subterranean fauna (stygofauna) habitat due to impacts on groundwater aquifers, particularly within the Percival Palaeovalley. The Proposal is not expected to contribute to cumulative impacts to stygofauna given the isolation of the Proposal from other existing and reasonably foreseeable projects, the difference in aquifer characteristics from those projects and the limits extent of drawdown in stygofauna habitat at Rimfire.

Mitigation Hierarchy	**Avoid**
	• The Development Envelop and Conceptual Footprint have been modified during the design phase to minimise the size of the footprint where practicable
	• The proposed Development Envelope has been reduced from 37,365 ha to 23,649 ha, representing a 36% reduction since the Proposal was referred
	• The total extent of clearing will not exceed 4,878 ha within the 23,649 ha Development Envelope
	• The Wallal and Texas Borefields were removed from the Proposal which has reduced the area in which groundwater abstraction is proposed to occur
	Minimise
	• The Proponent will implement the Rimfire Groundwater Licence Operating Strategy (Appendix C19) which will include:
	  ○ A groundwater level monitoring program within both the Percival Palaeovalley system and deeper fractured rock aquifer system to assess and monitor differences in water levels
	  ○ Groundwater level triggers to ensure the protection of stygofauna habitat
	  ○ Environmental criteria to inform ongoing performance assessments and contingency actions
	• Proposed abstraction volumes to be within sustainable yield of Rimfire Borefield's groundwater resources
	• Operational water demand will be supplied from mine dewatering in the first instance, anticipated to reduce the requirement for water supply from Rimfire Borefield
	• The Proponent will implement an Operational Surface Water Management Plan (Appendix C01) to ensure inputs are managed such that water flows and quality are maintained

Key Environmental Factor 5: Subterranean Fauna	
	• Rimfire pipeline will be buried ○ Limited infrastructure will be installed at Rimfire, including but not limited to, pumping bores, monitoring bores and collection tanks **Rehabilitate** • Groundwater bores will be decommissioned in accordance with relevant DWER guidelines, once no longer required • Groundwater level recovery timeframes will be modelled in future iterations of the MCP (Appendix A03) • The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement • All disturbed areas that are no longer required will be stabilised and, if appropriate, rehabilitated
Residual impacts, including assessment of significance	**Non-significant Residual Impacts** • The extent of drawdown for the worst-case scenario (Project licensing case) is expected to be much reduced with respect of the conservative (P90) Project water demand case. As such, the loss of some individuals is not anticipated to represent a significant residual impact • Under the worst-case Project licensing case abstraction model, the extent of palaeochannel that will be impacted is approximately 17 km from the centre of the borefield to the outermost drawdown contour (2 m). Of the total regional extent of the Percival Palaeovalley, only 0.15% will be impacted by groundwater drawdown under the Project license case • Under the conservative (P90) Project water demand case, modelling predicts a decreasing drawdown 7 m to 2 m, over a distance of approximately 6.4 - 8.8 km from the centre of the borefield as it propagates south along the line of palaeovalley, impacting five of the 17 locations where stygofauna were recorded • Under the conservative (P90) Project water demand scenario, one site (WINU1424) is modelled to be subject to a drawdown of 7 m, two sites (WINU1423 and WINU1425) are modelled to be subject to a drawdown of 5 m to 7 m and two sites (WINU1372 and WINU1436) are modelled to be subject to a drawdown of 2 m to5 m. Six sites (WINU1437, WINU1438, WINU1444, WINU1445, WINU1446 and AKD10) are modelled to be subject to a drawdown of 1 m to 2 m, within the expected range of natural fluctuation • Four stygofauna taxa have been recorded from the five locations predicted to be subject to greater than 2 m of drawdown under the P90 Project water demand case. The remaining 18 stygofauna taxa recorded from Rimfire will be outside of the area of impact under the P90 Project water demand case • Within the Percival Palaeovalley tributary in which the Rimfire Borefield is located, under the worst-case abstraction model approximately two-thirds of the available saturated habitat will remain intact at the single location where palaeovalley lithology has been identified. Spatially, this scenario also potentially impacts approximately 38% of the length of the tributary • Continuous suitable habitat extends southwards beyond the extent of the proposed groundwater drawdown, and a substantial volume of the palaeovalley habitat in the tributary would remain unaffected by even the worst-case Project licensing scenario. Stygofauna habitat is also predicted to increase in prospectivity further south along the tributary where calcrete outcropping has been noted, and beyond this where the tributary connects to the main body of the Percival Palaeovalley system

Key Environmental Factor 5: Subterranean Fauna	
	• The Proponent is seeking approval for abstraction from Rimfire in accordance with the annual worst-case abstraction scenario, however, is proposing trigger values to protect stygofauna to limit drawdown within a threshold defined by the predicted P90 Project water demand case • Given the limited extent of clearing and scale of infrastructure required to construct and operate Rimfire, the potential for any significant impact as a result of changes to surface water inputs to flow/ volume of water, nutrients and oxygen from vegetation clearing or changed hydrological regimes is considered very low • Site inspection, maintenance and implementation of a Spill Response Management Plan are expected to effectively mitigate the risk of contamination **Significant Residual Impacts** After implementing the mitigation hierarchy, the Proponent considers that there will be no significant residual impacts to Subterranean Fauna.
Proposed environmental outcomes	In consideration of the proposed management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Subterranean Fauna (stygofauna) include: • Abstraction of no more than 2.8 GL/a for Rimfire, expected to affect no more than approximately one-third of surrounding stygofauna habitat under the worst case Project licensing scenario, with the extent of drawdown expected to be much reduced with respect to the conservative (P90) Project water demand case • Minimise the Proposal's impact on stygofauna habitat, by implementing a groundwater monitoring and adaptive management program based on defined early response indicators and trigger and threshold mitigation criteria • Minimise the Proposal's impact on surface water and groundwater quality, by implementing mitigation measures consistent with leading industry practices and government regulations
Assessment of offsets (if relevant)	Not applicable

Key Environmental Factor 6: Terrestrial Environmental Quality	
Potential Impacts	**Direct and Indirect Impacts** • Soil contamination from waste rock plant feed or tailings spillage • Soil contamination from TSF seepage • Soil contamination from plant feed stockpile seepage and/or runoff • Soil contamination from WRL seepage and/or runoff • Soil erosion (wind and water) from clearing native vegetation and constructed landforms **Cumulative Impacts** Given the spatial scale of potential impacts resulting from the Proposal and the Telfer-Havieron Gold Mining Project in relation to the extent of the soil-landscape systems in the region, the cumulative impact to Terrestrial Environmental Quality is not considered to be significant.
Mitigation Hierarchy	**Avoid** • During operations, the HS tailings will be stored sub-aqueously within the TSF to avoid tailings exposure to oxygen and resulting acidification. Upon closure the HS tailings cells will also be progressively covered with low sulfur tailings followed by a thin rock cover **Minimise** • The Development Envelope and Conceptual Footprint have been modified during the design phase to minimise vegetation clearing where practicable • All waste rock will be characterised to inform the design of the WRL and TSF • PAF and NAF designations are within the geological and mining models to enable planning and safe storage of the PAF material • PAF material is to be stored within the core of the WRL, requiring ongoing waste rock identification and segregation of PAF waste • The WRL will be constructed bottom up to ensure effective PAF encapsulation • The internal slopes of the berms will be reverse sloped to ensure that the WRL drains internally • During Operations any AMD from plant feed stockpiles will be collected in perimeter drains and sumps and transported to the concentrator for amelioration during short-term processing • During Operations any AMD from mine stockpiles will be collected in perimeter drains and sumps and transported to the concentrator for amelioration during short-term processing • A basal clay layer will be laid before the placement of any PAF material in the WRL or stockpiles to avoid direct contact with any surface water flows and reduce AMD seepage volumes into the underlying soil • Visual inspection of the WRL and TSF for degradation of the outer competent material and NAF encapsulation material • Inspection and monitoring of the WRL perimeter drainage sumps, pumps and groundwater and surface water quality • The Proponent will prepare and regularly update the AMD S&MP (Appendix C07) consistent with the Leading Practice Sustainability Development Program or the Mining Industry (Australian Government 2016)

Key Environmental Factor 6: Terrestrial Environmental Quality	

	• Mine stockpiles containing PAF material will be built in small lifts and have traffic compacted low permeability layers underneath to minimise AMD percolation
	• Mine Stockpile operation procedures will include inspections and monitoring of drainage sumps, pumps, and ground and surface water quality
	• Minimisation of spillage risk will be central to TSF design, construction and operation
	• Emergency response and long-term recovery plans will be implemented in the event of a TSF failure
	• The Proponent will implement a TSF Operating and Maintenance Manual, which will include a:
	  ○ TARP to prevent loss of control to avoid potential TSF failures that could lead to spillage
	  ○ Emergency Preparedness Plan to monitor and address potential TSF failures
	• TSF design includes segregation of HS and LS materials
	• HS cells will be lined with a HDPE (or equivalent) geomembrane liner and a suitable subgrade layer
	• LS cells will be lined with a HDPE (or equivalent) liner
	• The final liner selection will be based upon liner laboratory testing and further review by industry experts
	• The TSF will be designed and operated in accordance with Global Industry Standard on Tailings Management (ICMM 2020), Rio Tinto standards and general good international practice
	• TSF design includes the WRL abutting and wrapping around the high sulfur storage cell as a further control preventing failure
	• The TSF will have internal drainage with the internal slopes of its embankments directing surface water flows into the TSF cells
	• Two reclaim water ponds will be constructed to receive supernatant from the TSF during operations. HS supernatant will only be directed to ponds during periods of excess water; however, since the HS tailings are not expected to oxidise the pH is expected to be circum-neutral
	• Perimeter bunds will be constructed on the upper surface and benches of the WRL to ensure surface water retained within the bunds infiltrates into the WRL or evaporates
	• Topsoil stockpiles will not exceed 2 m in height and will be placed in the direction of the natural sand dunes to minimise wind erosion
	• Topsoil stockpiles will be vegetated where possible to increase evapotranspiration and minimise soil loss to erosion
	• WRL and TSF will be constructed with competent NAF material on the outside to minimise erosion
	• Dispersive waste material will be encapsulated within NAF material to control wind erosion and allow vegetation establishment
	• Dust suppression controls will be implemented to minimise the effects of wind erosion
	• A Winu Spill Response Management Plan will be developed and implemented during construction and operation
	• Spill kits will be located strategically throughout the MIA, and employees trained in their use
	
	Rehabilitate

Key Environmental Factor 6: Terrestrial Environmental Quality	

	• The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement. This will include:
	  ○ Installation of a store and release cover, constructed of NAF material, on the WRL to limit water ingress
	  ○ Reducing the overall slope angle of the WRL to 11o to reduce the effects of erosion and the potential to expose PAF material
	• After mine closure, unprocessed stockpiles will be placed within the WRL. If the stockpile has PAF material, it will be stored in accordance with the AMD S&MP
	• At closure, the LS cells will be capped with a 0.5 m layer of NAF metasediment rock and a 0.2 m layer of topsoil. Meanwhile, the HS cells will have a 'tension saturated cover' consisting of 6.0 m LS tailings followed by a 0.5 m NAF metasediment rock capping layer. Further details will be provided in the MCP and will be refined through further study prior to mine closure (Appendix A03)
	• At closure, spillways and retention bunds will be constructed on top of the covered TSF to control water discharge during heavy rainfall events. The spillways will direct water away from the HS cells to the LS cells and will be constructed of durable NAF material and a maximum gradient of 1:10. Further details are provided in the Winu TSF Closure Design report (WWL 2025b) noting future amendments are possible as the feasibility studies continue to progress towards the final feasibility stage (Appendix G08)
	• Topsoil (from the two main soil units, Deep Sand and Gradational Sand) will be stockpiled for use in rehabilitation. Subsoils suitable for use in rehabilitation will also be stockpiled where practicable
	• Recovery and stockpiling of topsoil is intended for future use as a growth medium in rehabilitation works
	• Installation of a TSF store and release cover with topsoil and growth media placed over the top using competent material and final slope surface water runoff controls
	• WRL design entails a shallow slope with durable materials used on outer slopes to promote stability and minimise surface erosion

Residual impacts, including assessment of significance	**Non-significant Residual Impacts** • Through the implementation of management and mitigation measures the Proponent expects that the Proposal will not result in a significant residual impact on the environment due to TSF seepage or spillage • With the implementation of proposed design concepts, the Proposal is not expected to result in a significant residual risk to the environment from WRL seepage and/or runoff • With the application of mitigation measures the Proponent expects that the Proposal will not result in a significant residual impact on the environment due to soil erosion **Significant Residual Impacts** After implementing the mitigation hierarchy, the Proponent considers that there will be no significant residual impacts to Terrestrial Environmental Quality.
Proposed environmental outcomes	In consideration of the proposed management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Terrestrial Environmental Quality include: • Minimise the Proposal's impact on soil conditions, including erosion and contamination by implementing mitigation measures consistent with leading industry practices and government regulations

Key Environmental Factor 6: Terrestrial Environmental Quality	
Assessment of offsets (if relevant)	Not applicable

Key Environmental Factor 7: Landforms	
Potential Impacts	**Direct and Indirect Impacts** • Removal of dunal landforms as a result of clearing and infrastructure • Degradation of environmental values associated with dunal landforms as a result of disruption to sediment flow **Cumulative Impacts** • Removal of significant dunal landforms at a regional scale

Mitigation Hierarchy	**Minimise**
	• The Development Envelope and Conceptual Footprint have been modified during the design phase to minimise impacts to dunal landforms where practicable by:
	  ○ Relocating infrastructure that avoids dunes wherever possible
	  ○ Utilising natural breaks in the dunal landforms for linear infrastructure such as roads, pipelines and powerlines
	• A network of ponds, drains and flood protection bunds will be installed around the MIA to redirect stormwater from mining operations
	• The Development Envelope and Conceptual Footprint have been modified during the design phase to minimise vegetation clearing where practicable
	• Perimeter bunds will be constructed on the upper surface and benches of the WRL to ensure surface water retained within the bunds infiltrates into the WRL or evaporates
	• Drains and bunds will be monitored and managed to remove sediments to ensure they meet the designed volume requirements
	• Topsoil stockpiles will not exceed 2 m in height and will be placed in the direction of the natural sand dunes to minimise wind erosion
	• Topsoil stockpiles will be vegetated where possible to increase evapotranspiration and minimise soil loss to erosion
	• WRL will be constructed with competent NAF material on the outside to minimise erosion
	• Dispersive waste material will be encapsulated within NAF material to control wind erosion and allow vegetation establishment
	• Visual inspection of WRL and TSF for degradation of the outer competent material and NAF encapsulation material
	Rehabilitate
	• The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DEMIRS 2025a; 2025b) and in accordance with the requirements of the Mining Act Approvals Statement
	• Elements to be considered for Landforms as part of rehabilitation design includes:
	  ○ Rehabilitation will be undertaken progressively to minimise disturbed areas
	  ○ Ensuring landforms are safe, stable and non-polluting
	  ○ Landform compatibility with the agreed post-mining land use
	  ○ Landforms to be aesthetically compatible with the surrounding landscape
	  ○ Landforms are appropriately located

Key Environmental Factor 7: Landforms	
	○ Rehabilitation will include using appropriate surface treatments on landforms
Residual impacts, including assessment of significance	**Non-significant Residual Impacts** • The Proposal will not impact any significant landforms • The potential for degradation of environmental values associated with significant dunal landforms as a result of disruption to sediment flow is very low • The Proposal will not contribute to cumulative impacts to any significant landforms **Significant Residual Impacts** After implementing the mitigation hierarchy, the Proponent considers that there will be no significant residual impacts to Landforms.
Proposed environmental outcomes	In consideration of the proposed management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Landforms include: • Disturbance of locally important dunal landforms, but this is not significant in a regional context • No direct or indirect impacts to significant dunal landforms as a result of the Proposal
Assessment of offsets (if relevant)	Not applicable

Key Environmental Factor 8: Air Quality	
Potential Impacts	**Direct and Indirect Impacts** • Increased dust particulates as a result of the construction and operation of the Proposal (MIA and RAC) – affecting human health and amenity at sensitive receptors **Cumulative Impacts** • Given the localised and temporary nature of the dust emissions the absence of nearby sensitive receptors, the Proposal will not contribute to cumulative impacts to air quality
Mitigation Hierarchy	**Minimise** • The Development Envelope and Conceptual Footprint have been modified during the design phase to minimise vegetation clearing where practicable • Topsoil stockpiles will not exceed 2 m in height and will be placed in the direction of the natural sand dunes to minimise wind erosion • Topsoil stockpiles will be vegetated where possible to increase evapotranspiration and minimise soil loss to erosion • The WRL and TSF will be constructed with competent NAF material on the outside to minimise erosion • Dispersive waste material will be encapsulated within NAF material to control wind erosion and allow vegetation establishment • Visual inspection of WRL and TSF for degradation of the outer competent material and NAF encapsulation material • HS tailings will be stored sub-aqueously, limiting the potential for wind erosion • Dust emission controls will be implemented to minimise the effects of wind erosion, include the use of dust suppressants on working surfaces and stockpiles as required, speed limits, as well as training and education for staff • The RAC will be sealed, which will substantially minimise wheel-generated dust from transportation into and out of the MIA • The concentrate product will be transported in covered containers to ensure dust emissions are negligible during operations • The power solution incorporates approximately 85% renewable energy penetration • Key power station pollutants will be limited and controlled under the Power Purchase Agreement (PPA) • Ensuring proper maintenance, such as regular servicing, cleaning, and using quality fuel **Rehabilitate** • The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement • Topsoil (from the two main soil units, Deep Sand and Gradational Sand) will be stockpiled for use in rehabilitation. Subsoils suitable for use in rehabilitation will also be stockpiled where practicable • Recovery and stockpiling of topsoil is intended for future use as a growth medium in rehabilitation works • Installation of a TSF store and release cover with topsoil and growth media placed over the top using competent material, final slope surface water runoff controls

Key Environmental Factor 8: Air Quality	
	• WRL design has been reshaped to reduce slope, with durable materials used outer slopes to promote stability and minimise surface erosion
Residual impacts, including assessment of significance	**Non-significant Residual Impacts** • It is not considered that total suspended particles (TSP) or dust deposition associated with mining activities in the MIA is likely to impact nearby townsites, communities or station homesteads • The Proponent considers that human health and amenity will not be impacted at any of the receptors as a result of dust emissions from mining activities • Dust emissions from the construction of upgrades and operation of the RAC will be temporary in nature and negligible in extent and magnitude **Significant Residual Impacts** After implementing the mitigation hierarchy, the Proponent considers that there will be no significant residual impacts to Air Quality.
Proposed environmental outcomes	In consideration of the proposed management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Air Quality include: • The criteria for TSP, PM2.5 and PM10 are unlikely to be exceeded more than 20 km from the MIA • Dust emissions originating from the RAC will be temporary in nature and negligible in extent and magnitude • Human health and amenity will not be impacted at any of the receptors as a result of dust emissions from mining activities
Assessment of offsets (if relevant)	Not applicable

Key Environmental Factor 9: Greenhouse Gas Emissions	
Potential Impacts	**Direct and Indirect Impacts** • Direct and indirect emissions associated with land clearing of vegetation during the construction and operational phases of the Proposal (Scope 1 emissions). • Direct emissions from the combustion of diesel for mobile and stationary energy demands, including transportation directly related to the Proposal (Scope 1 emissions) • Burning of diesel for the production of electricity via a PPA (considered as Scope 1 emissions for the purposes of this assessment) • Indirect emission (other than Scope 2 emissions) as a consequence of the activities of the Proponent's suppliers and customers from sources not owned or controlled by the Proponent's business **Cumulative Impacts** Greenhouse gas emissions are inherently cumulative in nature. The Proposal's contribution for all Scope 1 and 2 emissions as an annual operational average is expected to be approximately 89,901 t $CO_{2\text{-}e}$ or approximately 0.11% of the State's annual emissions.
Mitigation Hierarchy	**Avoid** • The Development Envelope and Conceptual Footprint have been modified during the design phase to avoid direct impacts to native vegetation where possible • The total extent of clearing will not exceed 4,878 ha within the 23,649 ha Development Envelope • Ongoing optimisation of the mine plan and design of the Proposal to continue to improve logistical efficiencies **Reduce** • Investigating the adoption of Renewable Diesel for vehicles and machinery that are difficult to electrify • Utilisation of renewable energy infrastructure for power generation • Investigating electrification of heavy mobile equipment
Residual impacts, including assessment of significance	**Non-significant Residual Impacts** • The Proposal is expected to contribute net greenhouse gas emissions (Scope 1 and Scope 2 emissions) of approximately 2,769,150 t CO2-e through the approximate 32 year life of the Proposal • The GHG emissions associated with the Proposal are not significant in the context of state, national and global emissions, and will not impede the State GHG Policy aspiration of net zero emissions by 2050 given the relatively low emissions and the projected decarbonisation of the Project by 2050 **Significant Residual Impacts** After the mitigation hierarchy has been applied, the Proponent considers that the Proposal will not have a significant residual impact on GHG Emissions.

Key Environmental Factor 9: Greenhouse Gas Emissions	
Proposed environmental outcomes	In consideration of the proposed management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Greenhouse Gas Emissions include: • Scope 1 and 2 GHG emissions attributable to the Proposal are estimated to be 2,769,150 t $CO_{2\text{-}e}$ over the life of the mine
Assessment of offsets (if relevant)	Where offsets are required due to company targets commitments and/or changes to the Safeguard threshold, the Proponent proposes to use Australian Carbon Credit Units (ACCUs), to meet any EPA commitments. The amount of offsets required may change if technology advances allow the Proponent to reduce Scope 1 emissions further than estimates.

Summary of Holistic Impact Assessment

In addition to providing a detailed assessment of the potential environmental impacts and mitigation measures for individual environmental factors, the Proponent has also sought to understand the environment as a whole, including using information derived from technical surveys and investigations on the environment, and the views and concerns raised through consultation with relevant stakeholders, including the Nyangumarta People and Martu People. Elements of the assessment of the Social Surroundings factor are inherently holistic in nature with respect to the cultural traditions of the Traditional Owners, and their inputs and perspectives continue to be vital in growing this understanding of the whole environment and the balance between its many interconnected elements.

The Proponent recognises the complex linkages between Social Surroundings, Inland Waters, Flora and Vegetation, Terrestrial Fauna, Subterranean Fauna, Terrestrial Environmental Quality, Air Quality, Landforms and Greenhouse Gas Emissions.

When viewed at the timescale of the life of mine, greenhouse gas emissions from the Proposal are expected to have limited interaction with the other factors given the limited scale of emissions proposed.

There are no additional significant residual impacts or additional mitigation required when the Proposal is considered on a holistic basis. The combined effects of the Proposal on biological and social values holistically are not considered greater than any impacts to individual environmental factors.

TABLE OF CONTENTS

1	**INTRODUCTION**	**1**
1.1	Purpose and Scope	1
1.2	Proponent Details	2
1.3	Key Proposal Terminology	2
2	**PROPOSAL**	**4**
2.1	Proposal Content	4
2.1.1	Proposal Elements	6
2.1.2	Detailed Proposal Description	10
2.1.3	Proposal Exclusions	21
2.2	Proposal Alternatives	22
2.2.1	Justification of the Proposal	22
2.2.2	Location Alternative and Project Optimisation	22
2.3	Local and Regional Context	32
2.3.1	Bioregion	32
2.3.2	Climate	33
2.3.3	Regional Geology	35
2.3.4	Topography and Major Watercourses	36
2.3.5	Social Setting	36
2.3.6	Land Systems	37
2.3.7	Land Use	41
2.3.8	Conservation Reserves and Environmentally Sensitive Areas	41
2.3.9	Existing and Reasonably Foreseeable Projects	41
3	**LEGISLATIVE CONTEXT**	**45**
3.1	Environmental Impact Assessment Process	45
3.1.1	*Environmental Protection Act 1986*	45
3.1.2	*Environment Protection and Biodiversity Conservation Act 1999*	46
3.2	Other Approvals and Regulations	47
3.2.1	Native Title	47
3.2.2	Land Tenure	47
3.2.3	Decision-making Authorities and Other Approvals	48
4	**STAKEHOLDER ENGAGEMENT**	**58**
4.1	Stakeholder Identification	58
4.2	Stakeholder Engagement Process	61
4.3	Engagement Tools	62
4.4	Stakeholder Engagement Summary	63
4.4.1	Nyangumarta People and Martu People	63
4.4.2	Pastoral Stations	66
4.4.3	Government and Special Interest Groups	66
4.4.4	Ongoing Stakeholder Consultation and Outcomes	66

5	**ENVIRONMENTAL PRINCIPLES**	**68**
6	**SOCIAL SURROUNDINGS**	**72**
6.1	EPA Environmental Factor Objective	72
6.2	Relevant Policy and Guidance	72
6.3	Receiving Environment	73
6.3.1	Native Title	74
6.3.2	Land Use and Key Community Characteristics	82
6.3.3	Traditional Owner Social Surroundings Values	98
6.3.4	Other Social Surroundings Values	107
6.3.5	Sensitive Receptors	112
6.4	Potential Environmental Impacts	114
6.4.1	Overview	114
6.4.2	Impact Identification and Evaluation Methodology	115
6.4.3	Nyangumarta	118
6.4.4	Martu 125	
6.4.5	Other Stakeholder Potential Impacts	132
6.5	Mitigation	135
6.5.1	Overview	135
6.5.2	Avoidance and Minimisation	135
6.5.3	Mitigation of Impact at Closure	164
6.6	Assessment and Significance of Residual Impacts	164
6.6.1	Assessment of Direct and Indirect Residual Impacts	164
6.6.2	Assessment of Cumulative Residual Impacts	169
6.6.3	Significance of Residual Impacts	170
6.7	Likely Environmental Outcome	174
7	**INLAND WATERS**	**176**
7.1	EPA Environmental Factor Objective	176
7.1.1	Definitions	176
7.2	Relevant Policy and Guidance	176
7.3	Receiving Environment	178
7.3.1	Studies	178
7.3.2	Climate	185
7.3.3	Surface Water	185
7.3.4	Groundwater	188
7.3.5	Materials Characterisation	207
7.3.6	Proposed Water Management Strategy and Water Balance	210
7.4	Potential Environmental Impacts	220
7.4.1	Direct Impacts	220
7.4.2	Indirect Impacts – Reduction in Ground and/or Surface Water Quality	232
7.4.3	Cumulative Impacts	241
7.5	Mitigation	244
7.5.1	Avoidance	244

7.5.2 Minimise 244
7.6 Assessment and Significance of Residual Impact 268
7.6.1 Assessment of Direct Residual Impacts 268
7.6.2 Assessment of Indirect Residual Impacts 277
7.6.3 Assessment of Cumulative Residual Impacts 282
7.7 Likely Environmental Outcomes 283

8 FLORA AND VEGETATION 284
8.1 EPA Environmental Factor Objective 284
8.1.1 Definitions 284
8.2 Relevant Policy and Guidance 284
8.3 Receiving Environment 285
8.3.1 Studies 285
8.3.2 Vegetation 294
8.3.3 Flora 334
8.4 Potential Environmental Impacts 350
8.4.1 Direct Impacts 350
8.4.2 Indirect Impacts 376
8.4.3 Cumulative Impacts 385
8.5 Mitigation 388
8.5.1 Avoidance and Minimisation 388
8.5.2 Mitigation of Risks at Closure 389
8.6 Assessment of Significance of Residual Impacts 401
8.6.1 Assessment of Direct Impacts 401
8.6.2 Assessment of Indirect Impacts 410
8.6.3 Assessment of Cumulative Residual Impacts 414
8.7 Likely Environmental Outcomes 414

9 TERRESTRIAL FAUNA 416
9.1 EPA Environmental Factor Objective 416
9.2 Relevant Policy and Guidance 416
9.3 Receiving Environment 418
9.3.1 Studies 418
9.3.2 Fauna Habitat 435
9.3.3 Vertebrate Fauna Assemblages and Species Diversity 443
9.3.4 Significant Vertebrate Fauna 444
9.3.5 Short-range Endemic Invertebrate Fauna 516
9.4 Potential Environmental Impacts 525
9.4.1 Direct Impacts 525
9.4.2 Indirect Impacts 542
9.4.3 Cumulative Impacts 554
9.5 Mitigation 558
9.5.1 Avoidance and Minimisation 558
9.5.2 Mitigation of Risks at Closure 559

9.6	Assessment of Significance of Residual Impacts	573
9.6.1	Assessment of Direct Impacts	573
9.6.2	Assessment of Indirect Impacts	585
9.6.3	Assessment of Cumulative Impacts	589
9.7	Likely Environmental Outcomes	590
10	**SUBTERRANEAN FAUNA**	**591**
10.1	EPA Environmental Factor Objective	591
10.2	Relevant Policy and Guidance	591
10.2.1	Conservation Status and Short-Range endemic (SRE) Classification	592
10.3	Receiving Environment	592
10.3.1	Studies and Survey Effort	592
10.3.2	Hydrogeological Setting and Proposal Water Balance	597
10.3.3	Subterranean Fauna Habitat	602
10.3.4	Subterranean Fauna Species Values	607
10.4	Potential Environmental Impacts	618
10.4.1	Direct Impacts	618
10.4.2	Indirect Impacts	618
10.4.3	Cumulative Impacts	619
10.5	Mitigation	620
10.5.1	Avoidance and Minimisation	620
10.5.2	Mitigation of Risks at Closure	621
10.6	Assessment of Significance of Residual Impacts	625
10.6.1	Assessment of Direct Impacts	625
10.6.2	Assessment of Indirect Impacts	638
10.6.3	Assessment of Cumulative Impacts	638
10.7	Likely Environmental Outcomes	639
11	**TERRESTRIAL ENVIRONMENTAL QUALITY**	**640**
11.1	EPA Environmental Factor Objectives	640
11.1.1	Definitions	640
11.2	Relevant Policy and Guidance	640
11.3	Receiving Environment	642
11.3.1	Studies	642
11.3.2	Landforms and Soils	649
11.3.3	Material Characterisation	660
11.3.4	Geotechnical – Site Stability	665
11.4	Potential Environmental Impacts	667
11.4.1	Direct and Indirect Impacts	667
11.4.2	Cumulative Impacts	674
11.5	Mitigation	674
11.5.1	Avoidance and Minimisation	675
11.5.2	Mitigation of Risks at Closure	677
11.6	Assessment of Significance of Residual Impacts	693

11.6.1 Assessment of Direct and Indirect Impacts 693
11.7 Likely Environmental Outcomes 695

12 LANDFORMS 696
12.1 EPA Environmental Factor Objective 696
12.2 Relevant Policy and Guidance 696
12.3 Receiving Environment 697
12.3.1 Studies 697
12.3.2 Dominant Landform 697
12.3.3 Interim Biogeographic Regionalisation of Australia (IBRA) 697
12.3.4 Land Systems 697
12.3.5 Local Assessment Units 698
12.3.6 Dunal Landforms within the Development Envelope 698
12.4 Potential Environmental Impacts 702
12.4.1 Direct and Indirect Impacts 702
12.4.2 Cumulative Impacts 702
12.5 Mitigation 704
12.5.1 Avoidance and Minimisation 704
12.5.2 Mitigation of Risks at Closure 704
12.6 Assessment of Significance of Residual Impacts 709
12.6.1 Assessment of Direct and Indirect Impacts 709
12.6.2 Assessment of Cumulative Impacts 709
12.7 Likely Environmental Outcomes 709

13 AIR QUALITY 710
13.1 EPA Environmental Factor Objective 710
13.2 Relevant Policy and Guidance 710
13.3 Receiving Environment 711
13.3.1 Studies 711
13.3.2 Sensitive receptors 712
13.3.3 Climate 715
13.3.4 Types and Sources of Air Emissions 717
13.3.5 Air Quality Criteria 720
13.3.6 Baseline Air Quality 720
13.4 Potential Environmental Impacts 722
13.4.1 Cumulative Impacts 722
13.5 Mitigation 722
13.5.1 Avoidance and Minimisation 722
13.5.2 Mitigation of Risks at Closure 723
13.6 Assessment of Significance of Residual Impacts 726
13.6.1 Dust Emissions from MIA 726
13.6.2 Dust Emissions from the RAC 728
13.7 Likely Environmental Outcomes 734

14	**GREENHOUSE GAS EMISSIONS**	**735**
14.1	EPA Environmental Factor Objective	735
14.2	Relevant Policy and Guidance	735
14.2.1	Framework for International Cooperation	736
14.2.2	Commonwealth Policy and Guidance	736
14.2.3	Western Australia Policy and Guidance	736
14.3	Receiving Environment	737
14.3.1	Studies	737
14.3.2	Assessment Context	737
14.4	Potential Environmental Impacts	738
14.4.1	GHG Emissions Estimates	738
14.4.2	Safeguard Emissions	745
14.4.3	Non-Safeguard Emissions	746
14.4.4	Projected Emissions Intensity Benchmarking	747
14.4.5	Cumulative Impacts	749
14.5	Mitigation	749
14.5.1	Corporate Emissions Reduction Targets	749
14.5.2	Best Practice Design	750
14.5.3	Scope 1 – Mitigation Measures	750
14.5.4	Offsets	755
14.5.5	Scope 3 Emissions	755
14.6	Assessment of Residual Impacts	756
14.7	Likely Environmental Outcomes	756
15	**OFFSETS**	**757**
15.1	Objective	757
15.2	Relevant Policy and Guidance	757
15.2.1	EP Act 757	
15.2.2	EPBC Act	758
15.3	Summary of Significant Residual Impacts	758
15.3.1	State Environmental Values	758
15.3.2	Commonwealth Environmental Values	768
15.4	Proposed Offsets	768
15.4.1	Biodiversity Offsets	768
15.4.2	GHG Emissions Offsets	778
15.5	Consistency with Offset Policies	778
15.6	Stakeholder Consultation Regarding Offsets	781
15.7	Conclusion	781
16	**HOLISTIC IMPACT ASSESSMENT**	**782**
16.1	Connections and Interactions between Environmental Factors	782
16.2	Consideration of Holistic Effects	784
16.2.1	Land Clearing	784
16.2.2	Dust and Noise Emissions	785

16.2.3 Social Surroundings 786
16.2.4 Groundwater Aquifers 786
16.3 Holistic Impact Outcomes 788

17 CUMULATIVE ENVIRONMENTAL IMPACT ASSESSMENT 789
17.1 Existing and Reasonably Foreseeable Projects 789
17.2 Summary of Cumulative Impact Assessment of Key Environmental Factors 793
17.2.1 Social Surroundings 793
17.2.2 Inland Waters 793
17.2.3 Flora and Vegetation 794
17.2.4 Terrestrial Fauna 796
17.2.5 Subterranean Fauna 797
17.2.6 Terrestrial Environmental Quality 797
17.2.7 Landforms 798
17.2.8 Air Quality 798
17.2.9 Greenhouse Gas Emissions 798
17.3 Predicted Cumulative Outcomes 798

18 REFERENCES 799

List of Tables

Table 1-1: Proponent Details 2
Table 2-1: Proposal Elements 6
Table 2-2: Changes to the Proposal to Avoid or Minimise Environmental or ACH Impacts 23
Table 2-3: Climate Statistics of the Paterson Province 33
Table 2-4: Land Systems 37
Table 2-5: Existing and Reasonably Foreseeable Projects within 150 km^ of the Proposal 41
Table 3-1: Summary of Proposal Tenements 47
Table 3-2: Other Relevant Approvals 49
Table 4-1: Key Stakeholders for the Proposal 58
Table 4-2: Principles of Stakeholder Engagement 61
Table 4-3: NWAC Engagement Summary 64
Table 4-4: Martu Engagement Summary 65
Table 5-1: Environmental Principles of the EP Act 69
Table 6-1: Relevant Policy and Guidance for Social Surroundings 72
Table 6-2: Nyangumarta native title rights and interests 75
Table 6-3: Martu native title rights and interests 79
Table 6-4: Key Community Characteristics 82
Table 6-5: Key Stakeholders for Social Surroundings Consultation 84

Table 6-6: Summary of Key Studies for Social Surroundings 85

Table 6-7: Martu Field-Based Engagement Activities – Socio-economic Impact Assessment 97

Table 6-8: Other Social Surroundings Concerns identified via Broader Engagement Activities 108

Table 6-9: Sensitive Receptors Potentially Impacted by the Proposal 112

Table 6-10: Defining Magnitude Levels for Impact 116

Table 6-11: Defining Likelihood Levels for Impacts 116

Table 6-12: Modified Definitions of Magnitude Levels for Social Impacts Suitable in the Context of the Proposal's Social Surroundings Assessment 117

Table 6-13: Design Changes to Avoid and Reduce Impacts 135

Table 6-14: Application of the Mitigation Hierarchy for Impacts to Social Surroundings – Nyangumarta 142

Table 6-15: Application of the Mitigation Hierarchy for Impacts to Social Surroundings - Martu 154

Table 6-16: Application of the Mitigation Hierarchy for Impacts to Social Surroundings - Other Stakeholders 162

Table 7-1: Relevant Policy and Guidance for Inland Waters 176

Table 7-2: Summary of Technical Studies for Inland Waters 179

Table 7-3: Surface Water Features in the Vicinity of the Proposal 187

Table 7-4: Hydrostratigraphy Units Associated with the Proposal Area 192

Table 7-5: Key Aquifer Characteristics at the MIA and Rimfire 194

Table 7-6: Groundwater Quality – MIA Aquifer 196

Table 7-7: Groundwater Licences within the Canning-Kimberley Groundwater Area (Canning-Kimberley Sub Area) 205

Table 7-8: Excess water (ML/yr) (overflow from the Clean Water Dam sent to the MAR/Infiltration Ponds) 211

Table 7-9: Cumulative Impacts – Great Sandy Desert Lake Dora Catchment Area 243

Table 7-10: Groundwater Licences Overlapping the Development Envelope 243

Table 7-11: Water Management Strategies and Infrastructure 246

Table 7-12: Application of the Mitigation Hierarchy for Inland Waters 255

Table 7-13: Great Sandy Desert Lake Dora Catchment Area 274

Table 8-1: Relevant Policy and Guidance for Flora and Vegetation 284

Table 8-2: Summary of Technical Studies for Flora and Vegetation 287

Table 8-3: Pre-European Vegetation Associations within the Development Envelope 295

Table 8-4: Consolidated List of Vegetation Types Occurring within and Surrounding the Development Envelope 298

Table 8-5: Number of Patches and Areas of Vegetation Types within the Development Envelope 306

Table 8-6: Vegetation Condition of Remnant Vegetation in the Development Envelope 327

Table 8-7: Priority Flora Recorded within the Development Envelope 337

Table 8-8: Ecological Impact and Invasiveness Ratings of Weed Species within the Development Envelope 348

Table 8-9: Indicative Disturbance by Vegetation Condition 350

Table 8-10: Indicative Disturbance by Locally Significant Vegetation Types 351

Table 8-11: Indicative Disturbance by Vegetation Type 352

Table 8-12: Number of Patches and Areas of Vegetation Types within the Development Envelope 361

Table 8-13: Impacts on Significant Flora Species within the Development Envelope - Individuals 365

Table 8-14: Impacts on Significant Flora Populations 366

Table 8-15: Potential Indirect Impacts on Vegetation and Flora Surrounding the Winu Infiltration Ponds 384

Table 8-16: Cumulative Impacts on Beard (1975) Vegetation Associations 387

Table 8-17: Application of the Mitigation Hierarchy for Flora and Vegetation 392

Table 8-18: Assessment of Direct Impacts on Locally Significant Vegetation within the Development Envelope 402

Table 8-19: Impacts on Priority 3 Flora Species and Species of Taxonomic Interest within the Development Envelope 407

Table 8-20: Potential Disturbance Impacts of Tall Trees and Shrubs Within Vegetation Types Surrounding the Winu Infiltration Ponds 412

Table 8-21: Presence of Vegetation Types within Area of Influence of Mounding from the Winu Infiltration Ponds 412

Table 9-1: Relevant Policy and Guidance for Terrestrial Fauna 416

Table 9-2: Summary of Technical Studies for Terrestrial Fauna Environmental Factor 420

Table 9-3: Vertebrate Fauna Survey Effort Within and Surrounding the Development Envelope - Overview 430

Table 9-4: Relationship Between Land Systems and the Fauna Habitat Types within the Development Envelope 436

Table 9-5: Broad Fauna Habitat Types within and Surrounding the Development Envelope 438

Table 9-6: Summary of Vertebrate Fauna Species 443

Table 9-7: Significant Fauna Recorded or Considered Likely to or May Occur within the Development Envelope 446

Table 9-8: Night Parrot Survey Effort in the Proposal Locality 451

Table 9-9: Grey Falcon Supporting Habitat in the Locality of the Proposal 458

Table 9-10: Princess Parrot Supporting Habitat in the Locality of the Proposal 464

Table 9-11: Summary of Survey Effort targeting Black-footed Rock-wallaby in the Locality of the Proposal 470

Table 9-12: Black-footed Rock-wallaby Critical and Supporting Habitat in the Locality of the Proposal 473

Table 9-13: Summary of Survey Effort targeting Northern Quoll in the Locality of the Proposed Action 478

Table 9-14: Northern Quoll Critical and Supporting Habitat in the Locality of the Proposal 479

Table 9-15: Greater Bilby Survey Effort in Proposal Locality 485

Table 9-16: Summary of Survey Effort (2019–2025) Targeting Greater Bilby in the Locality of the Proposal 485

Table 9-17: Criteria used to Assess Greater Bilby Habitat 487

Table 9-18: Greater Bilby Habitat Prospectivity Mapping within the Development Envelope- Area Calculations 488

Table 9-19: Greater Bilby Critical and Supporting Habitat in the Locality of the Proposal 493

Table 9-20: Migratory Species Listed Under the BC Act 498

Table 9-21: Ecologically Significant Population Thresholds for Migratory-listed Bird Species 500

Table 9-22: Consolidated Survey Effort Suitable for Detecting Migratory Bird Species 501

Table 9-23: Migratory Bird Occurrence and Habitat Within and Surrounding the Development Envelope 502

Table 9-24: Priority Fauna Records within the Development Envelope 509

Table 9-25: Priority and Other Significant Fauna Species with the Potential to Occur within the Development Envelope 511

Table 9-26: Significant Vertebrate Fauna Species Unlikely to Occur within the Development Envelope 513

Table 9-27: Terrestrial Fauna – Range Extensions 514

Table 9-28: SRE Categorisation Used by WAM Taxonomists 516

Table 9-29: Consolidated Survey Effort Within and Surrounding the Development Envelope 517

Table 9-30: SRE Habitat Types within the Development Envelope (Biota 2025d) 520

Table 9-31: Potential SRE Species Recorded within the Development Envelope 522

Table 9-32: Indicative Clearing of Fauna Habitat 527

Table 9-33: Avifauna and Bats Recorded within a 50 km Radius of the Proposed Turbine Locations 534

Table 9-34: Summary of Risk Assessment and Environmental Outcomes for Significant Avifauna Species Recorded within a 50 km radius of the Proposed Turbine Locations 536

Table 9-35: Indicative Clearing of SRE Habitat 538

Table 9-36: Potential Indirect Impacts on Fauna Habitat Surrounding the Winu Infiltration Ponds 543

Table 9-37: Fauna Habitat Noise Levels 551

Table 9-38: Night Parrot Habitat Noise Levels 552

Table 9-39: Cumulative Impacts on Land Systems within the Pilbara Region 555

Table 9-40: Application of the Mitigation Hierarchy for Terrestrial Fauna 561

Table 9-41: Indicative Clearing for Fauna Habitat within the Development Envelope 574

Table 9-42: Assessment and Significance of Impacts to Migratory Species 577

Table 9-43: Assessment and Significance of Impacts to Priority and Other Significant Species Recorded within the Development Envelope 579

Table 10-1: Relevant Policy and Guidance for Subterranean Fauna 591

Table 10-2: Summary of Technical Studies for Subterranean Fauna Environmental Factor 594

Table 10-3: Criteria Used to Assess Habitat Prospectivity of Geological Units 602

Table 10-4: Overview of Subterranean Fauna Habitat Prospectivity at the MIA and Rimfire 606
Table 10-5: Stygofauna Taxa Records from Rimfire and Surrounds 610
Table 10-6: Existing and Foreseeable Projects within 100 km of Rimfire 619
Table 10-7: Active Groundwater Licences within the Vicinity of Rimfire 619
Table 10-8: Application of the Mitigation Hierarchy for Subterranean fauna (Stygofauna) 622
Table 10-9: Stygofauna Records Relative to Groundwater Drawdown at Rimfire 627
Table 10-10: Sites Recording Stygofauna by Drillhole Lithology, Groundwater Levels and Predicted Drawdown 630
Table 10-11: Assessment (2D) of Potential Stygofauna Habitat Impacted by Groundwater Abstraction at Rimfire under the Project Water Demand Case vs the Project Licencing Case 635
Table 11-1: Relevant policy and guidance for Terrestrial Environmental Quality 640
Table 11-2: Summaries of Technical Studies for Terrestrial Environmental Quality 643
Table 11-3: Soil-Landscape Systems within the Development Envelope 649
Table 11-4: Typical Physical and Chemical Characteristics of Development Envelope SMUs 653
Table 11-5: Waste Material by Destination 660
Table 11-6: Expected Volume of Ex-pit Waste to WRL 664
Table 11-7: Cumulative Impacts on Soil-Landscape Systems Underling the Proposal 674
Table 11-8: Application of the Mitigation Hierarchy for Terrestrial Environmental Quality 679
Table 12-1: Relevant Policy and Guidance for Landforms 696
Table 12-2: Summary of Technical Studies for Landforms Environmental Factor 697
Table 12-3: Land Systems within the MIA 698
Table 12-4: Assessment of Dunal Landforms within the Development Envelope 699
Table 12-5: Disturbance of Dunal Landforms 702
Table 12-6: Cumulative Impacts on Land Systems within the MIA and Pilbara Region 703
Table 12-7: Application of the Mitigation Hierarchy for Landforms 706
Table 13-1: Relevant Policy and Guidance for Air Quality 710
Table 13-2: Summary of Technical Studies for Air Quality Environmental Factor 711
Table 13-3: Distance of Sensitive Receptors to Proposal Infrastructure 712
Table 13-4: Rainfall and Temperature Data (2020) 715
Table 13-5: PM_{10} Emissions (Mining) for 2032 Operations (Mine Only) 717
Table 13-6: Key Material Types and their Dust Potential 718
Table 13-7: Average Emissions per Mega Watt hour (MWh) 2021/22-2023/24 (Kg/MWh) 719
Table 13-8: Air Quality Assessment Criteria Applicable to the Proposal 720
Table 13-9: Background Dust Concentrations 721
Table 13-10: Application of the Mitigation Hierarchy for Air Quality 724
Table 13-11: Winu Accommodation Village Dust Exceedances Peak Concentrations* 727
Table 13-12: Winu Accommodation Village Cumulative (including Background) Dust Predictions 727

Table 14-1: Relevant Policy and Guidance for Greenhouse Gas Emissions 735
Table 14-2: Summary of Technical Studies for Greenhouse Gas Emissions Environmental Factor 737
Table 14-3: Proposal GHG Emissions Estimates (t CO_{2-e}) 739
Table 14-4: Annual Operational Scope 1 Emissions Estimates for Winu (in t CO_{2-e}) 740
Table 14-5: Emissions Sources and Calculations Methods 743
Table 14-6: Emissions Covered by Safeguard Mechanism 745
Table 14-7: GHG Benchmarking Assessment 748
Table 14-8: Emissions Mitigation from Renewable Energy Sources 752
Table 14-9: Application of the Mitigation Hierarchy for GHG Emissions 754
Table 15-1: Summary of Impact Assessment Outcomes 759
Table 15-2: Quantum of Significant Residual Impact to be Offset 761
Table 15-3: Residual Impact Significance Model (RISM) 767
Table 15-4: Offset Funding Summary 772
Table 15-5: Priorities for On-ground Managements Actions 775
Table 15-6: Consideration of the Principles of the WA Offset Policy 779
Table 15-7: Consideration of the Principles of the Commonwealth Offset Policy 780
Table 17-1: Environmental Factors with Potential to be Cumulatively Impacted by the Proposal and Nearby Projects 790

List of Figures

Figure 1-1: Winu Project Regional Location and Development Envelope 3
Figure 2-1: Indicative Layout of the Proposal 5
Figure 2-2: Development Envelope and Conceptual Footprint 9
Figure 2-3: Winu Project - Process Flowsheet 11
Figure 2-4: Simplified LST and HST Tailings Separation Process 13
Figure 2-5: The Hierarchical Approach to AMD Management at the Winu Project 16
Figure 2-6: Development Envelope Modification to Avoid Environmental Impacts 26
Figure 2-7: Accommodation Village Modifications to Avoid Areas of Heritage Importance 27
Figure 2-8: Tailings Storage Facility Modifications to Avoid Cultural Heritage Impacts 28
Figure 2-9: ACH Exclusion Zones 29
Figure 2-10: Development Envelope Reduction at Rimfire 30
Figure 2-11: Stockpile Relocation to Minimise Impacts to P3 *Dasymalla chorisepala* 31
Figure 2-12: Graphical Representation of Climate Statistics 34
Figure 2-13: Average Annual Pan Evaporation Estimates 35
Figure 2-14: IBRA Regions and Subregions 38
Figure 2-15: Key Topographic Features 39
Figure 2-16: Land System Distribution 40

Figure 2-17: Conservation Reserves and ESAs within and Surrounding the Proposal 43

Figure 2-18: Existing and Reasonably Foreseeable Projects within 150 km of the MIA 44

Figure 3-1: Land Tenure 57

Figure 6-1: Project Location and Nyangumarta Native Title Determination and IPA 78

Figure 6-2: Project Location and Martu Native Title Determination 81

Figure 6-3: Archaeological and Ethnographic ACH Surveys within the Development Envelope (Overview) 88

Figure 6-4: Cultural Values Mapping 96

Figure 6-5: Survey Sites and Culturally Significant Sites 100

Figure 6-6: Direct and Indirect Impacts 114

Figure 6-7: Impact Matrix 116

Figure 6-8: Winu VIA photomontages: Copperhead Rd (NW approach) and TSF and WRL as viewed from the Nyangumarta-Martu NTD boundary 122

Figure 6-9: Rimfire Borefield and Pipeline Corridor 127

Figure 6-10: Rimfire Borefield and Pipeline Network 128

Figure 7-1: Surface Water Catchments and Surface Water Features 186

Figure 7-2: Example of a Claypan 187

Figure 7-3 Aquifers associated with the MIA 190

Figure 7-4: Conceptual Cross Section Through the MIA 198

Figure 7-5: Cross Sections of the Hydrogeological Conceptualisation between Winu Proposal and the Mandora Marsh 199

Figure 7-6: Conceptual Cross Section Through the Rimfire Area 200

Figure 7-7: Groundwater Levels (MIA & Rimfire) 201

Figure 7-8: Groundwater Depths (MIA & Rimfire) 202

Figure 7-9: Conceptual Cross Section Through the RAC (Nyangumarta Highway) 203

Figure 7-10: Conceptual Cross Section Through the RAC (Wirlkirr Wirlkirr Road) 204

Figure 7-11: TSF Conceptual Design (LST = Low Sulfur Tailings, HST = High Sulfur Tailings) – Plan View 209

Figure 7-12: Conceptual Water Management Strategy and Water Balance 212

Figure 7-13: Site Water Balance Conceptual Model 213

Figure 7-14: Median Annual Site Water Balance (ML/year) – Base Case 214

Figure 7-15: Annual Process Water Requirements (ML/yr) 216

Figure 7-16: Indicative Infiltration Pond and Managed Aquifer Recharge (MAR) Bore Locations 217

Figure 7-17: Conceptual Cross Section - Infiltration Pond (top) and Managed Aquifer Recharge (MAR) Bores (bottom) 218

Figure 7-18: Modelled Depth to Water at Infiltration Ponds and MAR – Pre-Mining (Not Affected by Pit Dewatering) 219

Figure 7-19: Winu Pit Dewatering Predicted Maximum Drawdown at End of Mining 224

Figure 7-20: Winu Pit Dewatering - Predicted Maximum Drawdown at End of Mining (Cross Section) 225
Figure 7-21: Rimfire Borefield Predicted Maximum Extent of Drawdown at End of Mining 226
Figure 7-22: Modelled Depth to Groundwater - Infiltration Ponds Option – Peak Rate (Year 9) 227
Figure 7-23: Modelled Depth to Groundwater - Infiltration Ponds Option – End of Mining 228
Figure 7-24: Modelled Depth to Groundwater - MAR Option – Peak Rate (Year 9) 229
Figure 7-25: Modelled Depth to Groundwater - MAR Option – End of Mining 230
Figure 7-26: TSF Location Relative to the Mine Pit 234
Figure 7-27: TSF Seepage Pathways Toward the Winu Pit - Conceptual 235
Figure 7-28: Pit Lake – West Wall Exposures – Conceptual 236
Figure 7-29: Pit Lake - East Wall Exposures – Conceptual 236
Figure 7-30: Modelled Solute Plume – Infiltration Pond Option (L) & MAR Option (R)- Peak Rate (Year 9) 238
Figure 7-31: Modelled Solute Plume – Infiltration Pond Option (L) & MAR Option (R)- End of Mining (Year 32) 239
Figure 7-32: Modelled Solute Plume – Infiltration Pond Option (L) & MAR Option (R)- 100 Years After Cessation of Injection 240
Figure 7-33: Proposed MIA Surface Water Management Infrastructure 247
Figure 7-34: Long Section of a Typical Floodway 248
Figure 7-35: Example of a Lined Pond 249
Figure 7-36: WRL Conceptual Design 251
Figure 7-37: Nominal Drain and Bund Cross Section 251
Figure 7-38: Predicted Residual Drawdown (Recovery) 300 Years After Cessation of Mining 271
Figure 7-39: Rimfire - Predicted Residual Drawdown (Recovery) 50 Years After Cessation of Pumping 272
Figure 7-40: P90 Predicted Drawdown of Winu and Rimfire Borefield at LoM, including a 2 m Superimposed Drawdown Contour 273
Figure 7-41: 1% AEP Maximum Flood Depth following RAC Construction 276
Figure 7-42: Pit at the End of Mining 281
Figure 7-43: Final Pit Lake Conditions 281
Figure 8-1: Extent of Flora and Vegetation Surveys Conducted for the Proposal 292
Figure 8-2: Flora Survey Effort within and Surrounding the Development Envelope 293
Figure 8-3: Pre-European Vegetation Associations within the Development Envelope 296
Figure 8-4: Vegetation Types within and Surrounding the Development Envelope (1 of 5) 307
Figure 8-5: Locally Significant Vegetation (1 of 5) 314
Figure 8-6: Percival Palaeovalley Vegetation Types 324
Figure 8-7: P19 Occurrence and Depth to Groundwater 325
Figure 8-8: Conceptual Hydrogeology of Soaks Surrounding the Proposal (Golder 2022b) 326

Figure 8-9: EHU 5 Lowland Sandplain Conceptualisation 327

Figure 8-10: Vegetation Condition within the Development Envelope (1 of 5) 329

Figure 8-11: Significant Flora Species Recorded within and Surrounding the Development Envelope (1 of 10) 338

Figure 8-12: Introduced Flora Species Recorded within the Development Envelope 349

Figure 8-13: Indicative Clearing (Conceptual Footprint) of Vegetation Types within the Development Envelope (1 of 5) 354

Figure 8-14: Indicative Clearing (Conceptual Footprint) of Significant Flora (1 of 8) 368

Figure 8-15: Potential GDV (P23a-d and C1+P23) of the Percival Palaeovalley and Baseline Deeper Fracture Rock Aquifer Groundwater Depths 378

Figure 8-16: Potential GDV (P23a-d and C1+P23) of the Percival Palaeovalley and Rimfire Borefield Modelled Maximum Drawdown 379

Figure 8-17: Potential GDV (P23a-d and C1+P23) of the Percival Palaeovalley and Rimfire Borefield Modelled P90 Drawdown 380

Figure 8-18: Potential Impact of Groundwater Mounding from Infiltration – Peak Rate (Year 9) 383

Figure 8-19: Management Areas within the Development Envelope 391

Figure 9-1: Terrestrial Fauna Studies Undertaken within and Surrounding the Development Envelope 431

Figure 9-2: Terrestrial Fauna Survey Effort within and Surrounding the Development Envelope – Systematic Trapping 432

Figure 9-3: Terrestrial Fauna Survey Effort within and Surrounding the Development Envelope – Targeted Sampling 433

Figure 9-4: Terrestrial Fauna Survey Effort within and Surrounding the Development Envelope – Targeted Searches 434

Figure 9-5: Fauna Habitat Recorded within and Surrounding the Development Envelope 441

Figure 9-6: Night Parrot Habitat Surrounding the Development Envelope 442

Figure 9-7: Significant Fauna Records within the Development Envelope 448

Figure 9-8: Location of ARUs Deployed in the Lake Waukarlicarly Area 452

Figure 9-9: Night Parrot Records and Potential Habitat Surrounding the Development Envelope 456

Figure 9-10: Grey Falcon Survey Effort 459

Figure 9-11: Grey Falcon Records and Potential Habitat within and Surrounding the Development Envelope 460

Figure 9-12: Grey Falcon Records in the Wider Region 461

Figure 9-13: The Geographical Range of the Princess Parrot 463

Figure 9-14: Princess Parrot Survey Effort 465

Figure 9-15: Princess Parrot Records and Potential Habitat within and Surrounding the Development Envelope 466

Figure 9-16: Records of the Princess Parrot in the Wider Region 467

Figure 9-17: Black-footed Rock-wallaby Survey Effort 471

Figure 9-18: Black-footed Rock-wallaby Records and Potential Habitat within and Surrounding the Development Envelope 474

Figure 9-19: Records of the Black-footed Rock-wallaby in the Wider Region 475

Figure 9-20: Northern Quoll Survey Effort 480

Figure 9-21: Northern Quoll Records and Potential Habitat within and Surrounding the Development Envelope 481

Figure 9-22: Records of the Northern Quoll in the Wider Region 482

Figure 9-23: Consolidated Greater Bilby Survey Effort in the Winu Development Envelope and Surrounding Locality 489

Figure 9-24: Greater Bilby Abundance Study 2025 Survey Effort 490

Figure 9-25: Greater Bilby Habitat Prospectivity 491

Figure 9-26: Greater Bilby Records and Potential Habitat within and Surrounding the Proposal 494

Figure 9-27: Greater Bilby Records as Determined through Molecular Genotyping (1 of 2) 495

Figure 9-28: Migratory Birds Survey Effort 506

Figure 9-29: Migratory Bird Records within and surrounding the Development Envelope 507

Figure 9-30: Priority and Other Significant Fauna Records within and Surrounding the Development Envelope 512

Figure 9-31: Range Extensions Recorded During Proposal Surveys 515

Figure 9-32: SRE Search Sites and Pitfall Trap Locations Within and Surrounding the Development Envelope 518

Figure 9-33: SRE Records and Habitat within the Development Envelope 524

Figure 9-34: Conceptual Footprint in the Context of Fauna Habitat (1 of 4) 528

Figure 9-35: Conceptual Footprint in the Context of SRE Records and Habitat within the Development Envelope (1 of 3) 539

Figure 9-36: Potential GDV (P23a-d and C1+P23) of the Percival Palaeovalley and Baseline Deeper Fracture Rock Aquifer Groundwater Depths 545

Figure 9-37: Potential GDV (P23a-d and C1+P23) of the Percival Palaeovalley and Rimfire Borefield Maximum Drawdown 546

Figure 9-38: Potential GDV (P23a-d and C1+P23) of the Percival Palaeovalley and Rimfire Borefield Project Demand Drawdown 547

Figure 9-39: Night Parrot Habitat and Predicted Noise Levels at the Airfield 553

Figure 9-40: Management Areas within the Development Envelope 560

Figure 9-41: Fauna Habitats Overlying Groundwater Mounding from Infiltration - Peak Rate (Year 9) 586

Figure 10-1: Subterranean Fauna Sampling in the Winu Project Area 598

Figure 10-2: Subterranean Fauna Sampling in the Winu Project Area - Rimfire 599

Figure 10-3: Subterranean Fauna Sampling in the Winu Project Area - MIA 600

Figure 10-4: Subterranean Fauna Sampling in the Winu Project Area - Wallal 601

Figure 10-5: Stygofauna Records from Rimfire and Surrounds 609

Figure 10-6: Stygofauna Records Relative to Direct and Indirect Impacts within Rimfire- Project Licensing Case 636

Figure 10-7: Stygofauna Records Relative to Direct and Indirect Impacts within Rimfire- Project Water Demand Case 637

Figure 11-1: Surface Soil Sampling Locations 647

Figure 11-2: Winu Project Environmental Geochemistry Sampling Locations 648

Figure 11-3: Soil Landscape Mapping across the Development Envelope 650

Figure 11-4: Winu Project SMU Mapping (1 of 5) 655

Figure 11-5: Winu Pit Hypogene Primary Sulfide Zone Carbon Sampling Locations 663

Figure 11-6: TSF Initial Configuration (HS Cell 1) – Embankment Breach Maximum Modelled Inundation Area (L - 'HS Flow Path 1', R – 'HS Flow Path 2') 669

Figure 11-7: TSF Final Configuration – Embankment Breach Maximum Modelled Inundation Area (L – 'LS 1 Flow Path 3', R – 'LS 1 Flow Path 4' (after stockpiles removed for use as closure borrow) 670

Figure 11-8: TSF Final Configuration – Embankment Breach Maximum Modelled Inundation Area (L - 'LS 2 Flow Path 5', R – 'LS 2 Flow Path 6') 671

Figure 11-9: WRL Conceptual Design 689

Figure 11-10: TSF Conceptual Design (During Mining Operations) – High and Low Sulfur Tailings Streams from the Process Plant 690

Figure 11-11: TSF Conceptual Design (LST = Low Sulfur Tailings, HST = High Sulfur Tailings) – Plan View 691

Figure 11-12: TSF Conceptual Design (After Closure) 692

Figure 12-1: Landscape Assessment Units 701

Figure 13-1: Sensitive Air Quality Receptors (Human) 714

Figure 13-2: Hybrid Wind Rose - Meteorological Wind Characteristics 2020 (modelled) 716

Figure 13-3: Material Types within the Winu Pit 718

Figure 13-4: Mine-Only TSP 24-Hr Ground Level Concentrations (µg/m^3) 729

Figure 13-5: Mine Only PM_{10} 24-Hr Ground Level Concentrations (µg/m^3) 730

Figure 13-6: Mine-Only PM_{10} Annual Ground Level Concentrations (µg/m^3) 731

Figure 13-7: Mine-Only $PM_{2.5}$ 24-hr Ground Level Concentrations (µg/m^3) 732

Figure 13-8: Mine-Only $PM_{2.5}$ Annual Ground Level Concentrations (µg/m^3) 733

Figure 14-1: Operational Scope 1 Emissions Baseline for Winu 742

Figure 14-2: Emissions Covered by the Safeguard Mechanism 746

Figure 14-3: Scope 1 – Land Clearing (t CO_2-e) Baseline for Winu 747

Figure 14-4: Comparison of Proposal Emissions Intensity against Comparable Projects 749

Figure 14-5: Emissions Mitigation from Renewable Energy Sources 753

Figure 15-1: Fauna habitat to be Offset due to Significant Residual Impact (series of 4) 763

Figure 15-2: Proposed Greater Offset Area 771

Figure 16-1: Holistic View of Links between Environmental Factors and Values 783

Figure 17-1: Existing and Reasonably Foreseeable Projects Relevant to Assessment of Cumulative Impacts 792

List of Plates

Plate 8-1: P23a - *Melaleuca lasiandra, M. glomerata (Eucalyptus victrix, Acacia colei* var. *colei)* Open Shrubland over *Triodia basedowii (Acacia stellaticeps)* 322

Plate 8-2: C1+P23a - Mosaic *Eucalyptus victrix* Open Woodland + *Melaleuca* spp. Open Shrubland 323

Plate 9-1: Night Parrot – Roosting/Breeding Habitat in Winu Area, South of Development Envelope 455

Plate 9-2: Night Parrot – Foraging Habitat in Winu Area, South of Development Envelope 455

Plate 9-3: Grey Falcon 457

Plate 9-4: Princess Parrot 462

Plate 9-5: Black-footed Rock-wallaby 468

Plate 9-6: Northen Quoll 476

Plate 9-7: Greater Bilby 483

Plate 9-8: Greater Bilby Burrow Entrance Example from AA2 493

Appendices

Appendix A Chapter 1-5 Introduction

A01 Winu Proposal Content Document

A02 Winu Environmental Scoping Document

A03 Winu Draft Mine Closure Plan

A04 Winu Stakeholder Consultation Register

A05 Winu Draft Environmental Management Plan

A06 ISA Submissions

Appendix B Social Surroundings

B01 Winu Nyangumarta Social Surroundings Assessment - confidential

B02 Rio Tinto Winu Borefields and Cultural Mapping Project - confidential

B03 Winu Summary of Archaeological and Ethnographic Surveys

B04 Nyangumarta Survey Sites and Culturally Significant Sites - confidential

B05 Winu Project Visual Impact Assessment

Appendix C Inland Waters

C01 Winu Operational Surface Water Management Plan

C02 Winu Mine Access Road Surface Water Management Plan Update 2024 / Peer review of the mine site and access road SWMPs and TUFLOW models

C03 Winu Closure Surface Water Management Plan Update 2023 Memorandum

C04 Winu Water Balance / Winu Water Balance - peer review

C05 Winu Baseline Groundwater Monitoring Plan

C06 Winu Surplus Water Management Report

C07 Winu AMD Strategy and Management Plan

C08 Winu Final Study: Updated Flood Risk Assessment - Access Route

C09 H3 Hydrogeological Assessment Winu Project Area / Winu H3 Peer Review / MIA H3 Hydrogeological Assessment - recovery model update

C10 Cyanide Management Plan

C11 Winu Mine Pit Lake Environmental Risk Assessment (ERA) - 2024 Update

C12 Rimfire H3 Assessment / Rimfire H3 Assessment- peer review

C13 Winu Access Road H2 Assessment

C14 Winu Pit Lake Model Report

C15 Winu Project - Percival Palaeovalley Assessment

C16 Winu Mine - review of water balance and quality modelling by Hydrogeologica

C17 Solute Transport Modelling (Groundwater); Quarry and Pond Options

C18 Winu Gold and Copper Project - Infiltration Pond Study

C19 Rimfire Draft Groundwater Operating Strategy

C20 Winu Hydrogeological Impact Assessment – Wallal Aquifer

C21 Peer Review of Winu Hydrogeological Impact Assessment – Wallal Aquifer

Appendix D Flora and Vegetation

D01 Consolidated Detailed Flora and Vegetation Assessment of the Winu Project

D02 Regional and Targeted Priority Flora Assessment of the Winu Project

D03 Significant Vegetation of the Winu Project

D04 Melaleuca Vegetation Mapping - Winu Project

D05 Winu Project Infiltration Pond Impact Assessment

D06 Winu Project Flora of Ethno-Botanical Significance

D07 Winu Ecohydrology Assessment

Appendix E Terrestrial Fauna

E01 Winu Project Vertebrate Fauna Consolidation Report

E02 Winu Project SRE Invertebrate Fauna Assessment

E03 Winu Project Targeted Night Parrot Survey Report / Winu Project Targeted Night Parrot Survey Report - peer review

E04 Winu Night Parrot Impact Assessment Report / Winu Night Parrot Impact Assessment Report - peer review

E05 Winu Project Bilby Population Abundance Study

E06 Winu Project Noise and Vibration Impact Assessment

E07 Wind Project Wind Turbine Avifauna and Bat Risk Assessment

E08 Winu Project Rimfire Bore Field Noise Assessment

E09 Ambient Noise Monitoring - Winu Copper-Gold Project WA

E10 Winu Project Bilby Habitat Assessment

E11 Winu Project Migratory Bird Review

E12 Winu Project MNES Fauna Supporting Information

E13 Winu Project Percival Palaeovalley Tributary and MNES Fauna

E14 Environmental Noise Assessment Winu Project, WA

E15 Winu Project: Aircraft Noise Assessment

Appendix F Subterranean Fauna

F01 Winu Project Subterranean Fauna Desktop Study and Basic Survey Report

F02 Winu Project Rimfire Borefield Stygofauna Assessment Report

Appendix G Terrestrial Environmental Quality

G01 Winu Waste Rock Characterisation Report - Primary Sulfide Zone

G02 Winu Waste Rock Characterisation Report - Secondary Sulfide Zone

G03 Winu Waste Rock Characterisation Report - Upper Oxide Zone

G04 Winu Tailings Characterisation Report

G05 Winu Soil Characterisation Report

G06 Winu HDTSF 5H 10 MTPA Pre-Feasibility ERD Design Report

G07 Winu TSF High Sulfur Cover System Numerical Modelling

G08 Winu HDTSF 5H 10 Mtpa Pre-Feasibility Closure Report

G09 Acid Sulfate Soils Desktop Study

G10 Winu Waste Rock Landform - Winu Project Mine Planning

G11 Tailings Storage Facility Seepage Modelling

G12 Winu Copper Project – Conceptual Cover System Modelling

Appendix H Landforms

H01 Winu Project Landforms Assessment

Appendix I Air Quality

I01 Dust Impact Assessment of Proposed Mining Operations

I02 Air Quality Emissions Comparison Assessment

Appendix J Greenhouse Gases

J01 Greenhouse Gas Emission Assessment Update

Appendix K Offsets

K01 Winu Offset Strategy

Abbreviations

Abbreviation	Description
µg/m3	micrograms per cubic metre
µm	micrometres
µS/cm	Microsiemens per centimetre
3D	Three dimensional
4WD	Four-wheel Drive
AA1	Additional Area 1
AA2	Additional Area 2
ABA	Acid Base Accounting
ABS	Australian Bureau of Statistics
ACCUs	Australian Carbon Credit Units
ACH	Aboriginal Cultural Heritage
ACHMP	Aboriginal Cultural Heritage Management Plan
AEP	Annual Exceedance Probability
AERMOD	Atmospheric Dispersion Modelling System
Ag	Silver
AH Act	*Aboriginal Heritage Act 1972* (WA)
AHD	Australian Height Datum
Al	Aluminium
AMD	Acid and Metalliferous Drainage
AMD MP	Acid and Metalliferous Drainage Management Plan
AMD S&MP	Acid and Metalliferous Drainage Strategy and Management Plan
AMIRA	AMIRA International Limited
ANC	Acid Neutralising Capacity
ANFO	Ammonium Nitrate and Fuel Oil
ANREU	Australia National Registry of Emissions Unit
ANZG	Australian and New Zealand Guidelines
ARD	Acid Rock Drainage
AREH	Australian Renewable Energy Hub
As	Arsenic
ASS	Acid Sulfate Soil
ATCW	ATC Williams

Abbreviation	Description
AWS	Automatic Weather Stations
AWT	Above water table
B	Boron
Ba	Barium
BACLG	Bidyadanga Aboriginal Community La Grange
BAM Act	*Biosecurity and Agricultural Management Act 2007* (WA)
BC Act	*Biodiversity Conservation Act 2016* (WA)
BCCI	Broome Chamber of Commerce & Industry
Be	Beryllium
BESS	Battery Energy Storage System
Biota	Biota Environmental Sciences
BMP	Blast Management Plan
BoM	Bureau of Meteorology
BWT	Below water table
C	Degrees Celsius
Ca	Calcium
CALM Act	*Conservation and Land Management Act 1984* (WA)
CASA	Civil Aviation Safety Authority
CEO	Chief Executive Officer
CER	Clean Energy Regulator
Cd	Cadmium
CH_4	Methane
CHMS	Cultural Heritage Management Systems
CIL	Carbon in Leach
Cl	Chlorine
CLH	Common Law Holder
cm	centimetres
CME	Chamber of Minerals and Energy of Western Australia
CN	Cyanide
Co	Cobalt
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2-e	Carbon Dioxide Equivalent

Abbreviation	Description
CPI	Consumer Price Index
CPS	Controlled Potential Sulfidisation
Cr	Chromium
CRC TiME	Cooperative Research Centre for Transformations in Mining Economies
CEP	Consultation and Engagement Plan
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cu	Copper
CWD	Clean Water Dam
DAL02	Pindanland Subregion
DAWE	Former Commonwealth Department of Agriculture, Water and the Environment
DAWR	Department of Agriculture and Water Resources
dB(A)	A-weighted decibel
DBCA	WA Department of Biodiversity, Conservation and Attractions
$dB_{Z\ Peak}$	The greatest absolute instantaneous sound pressure level in decibels using the Z-frequency weighting. Used to describe air blast noise levels (Biota 2025c)
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DEMIRS	Former WA Department of Energy, Mines, Industry Regulation and Safety
DEWHA	Former Commonwealth Department of Environment, Water, Heritage and the Arts
DISER	Former Commonwealth Department of Industry, Science, Energy and Resources
DJTSI	WA Department of Jobs, Tourism, Science and Innovation
DLGIRS	WA Department of Local Government, Industry Regulation and Safety
DMAs	Decision-making authority/authorities
DMIRS	Former WA Department of Mines, Industry Regulation and Safety
DMP	Former WA Department of Mines and Petroleum
DMPE	Department of Mines, Petroleum and Exploration
DMTI	Department of Transport and Major Infrastructure
DNA	Deoxyribonucleic Acid
DoE	Former WA Department of the Environment
DoEE	Former Commonwealth Department of the Environment and Energy
DoH	WA Department of Health
DoW	Former WA Department of Water
DPaW	Former WA Department of Parks and Wildlife

Abbreviation	Description
DPE	Department of Planning and Environment (NSW)
DPIRD	WA Department of Primary Industries and Regional Developments
DPLH	WA Department of Planning, Lands and Heritage
DSEWPaC	Former Commonwealth Department of Sustainability, Environment, Water, Population and Communities
dt	dry tonnes
DWER	WA Department of Water and Environmental Regulation
DWP	Dewatering Pond
EAQ	EAQ Consulting
EC	Electrical Conductivity
EHU	Ecohydrological Unit
EIA	Environmental Impact Assessment
ELA	Eco Logical Australia Pty Ltd
EMP	Environment Management Plan
EO	Environment Online
EOC	Environmental Offsets Calculator
EP Act	*Environmental Protection Act 1986* (WA)
EPA	WA Environmental Protection Authority
EPA Services	WA Environmental Protection Authority Services
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ERA	Environmental Risk Assessment
ERD	Environmental Review Document
ESA	Environmentally Sensitive Area
ESD	Environmental Scoping Document
ESG	Environmental, Social and Governance
EVT	Evaporation/evapotranspiration
F	Fluorine
Fe	Iron
FIFO	fly-in-fly-out
FMC	First Movers Coalition
FMG	Fortescue Metals Group
FPIC	Free, Prior and Informed Consent

Abbreviation	Description
FullCAM	Full Carbon Accounting Model
g/L	grams per Litre
g/m2/month	grams per square metre per month
g/m3/30 days	grams per cubic metre per 30 days
GARD	Global Acid Rock Management
GDE	Groundwater Dependent Ecosystem
GDV	Ground Dependent Vegetation
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GL	Gigalitres
GL/a	Gigalitres per annum
GoWA	Government of Western Australia
GRG	Gravity Recoverable Gold
GSD02	Mackay and McLarty Subregions
GWP	global warming potential
H_2SO_4/t	Sulfuric Acid per tonne
ha	hectares
HCl	Hydrochloric Acid
HCT	Humidity Cell Test
HDPE	High-density Polyethylene
HDSD	High-Density Slurry Deposition
HDTSF	High-density Tailings Storage Facility
HFCs	Hydrofluorocarbons
hr	hour
HS	High Sulfur
HSEC	Health, Safety, Environment and Communities
HSECQ	Health, Safety, Environment, Community and Quality
HST	High Sulfur Tailings
HSU	Hydrostratigraphic Units
IAIA	International Association for Impact Assessment
IBRA	Interim Biogeographic Regionalisation for Australia
IBSA	Index of Biodiversity Surveys for Assessments

Abbreviation	Description
ICMM	International Council on Mining & Metals
ICOMOS	International Council on Monuments and Sites
ICT	Information and Communication Technologies
IMO	International Maritime Organization
INAP	International Network for Acid Prevention
InSAR	Interferometric Synthetic Aperture Radar
IPA	Indigenous Protected Area
IPCC	Intergovernmental Panel on Climate Change
ITRB	Independent Technical Review Board
JYAC	Jamukurnu Yapalikurnu Aboriginal Corporation RNTBC
K	Potassium
KDE	Kernel Density Estimation
kg/d	kilograms per day
kg/MWh	Kilograms per Mega Watt hour
kL/a	kilolitres per annum
km	kilometres
km^2	square kilometre
km/h	kilometres per hour
KMIA	Karlkayn Mine Infrastructure Agreement
KMS	Kimberley Mineral Sands
KMSB	Kimberley Marine Support Base
kt	kiloton
L/s	Litres per second
LAU	Local Assessment Units
LGA	Local Government Authorities
Li	Lithium
LNG	Liquefied Natural Gas
LoM	Life of Mine
LOD	Limit(s) of Detection
LS	Low Sulfur
LST	Low Sulfur Tailings
LTE	Long-term Evolution
m/s	metres per second

Abbreviation	Description
m	metres
M	million
magl	metres above ground level
m AHD	metres with respect to the Australian Height Datum
MAR	Managed Aquifer Recharge
M BCM	Million Bank Cubic Metres
mbgl	metres below ground level
MCP	Mine Closure Plan
MDA	Mine Development Area
MDCP	Mine Development and Closure Proposal
M dt	Million dry tonnes
Mg	Magnesium
mg/L	Milligrams per Litre
MIA	Mine and Infrastructure Area
MinCP	Minimum Convex Polygons
Mining Act	*Mining Act 1978* (WA)
mm	millimetres
mm/a	millimetres per annum
mm/s	millimetres per second
Mn	Manganese
MNES	Matters of National Environmental Significance
Mo	Molybdenum
mRL	minimum reporting level
MRWA	Main Roads Western Australia
MSAVI	Modified Soil Adjusted Vegetation Index
Mt	Million tonnes
Mtpa	Million tonnes per annum
MW	Megawatt
MWh	Mega Watt hour
N_2O	Nitrous Oxide
Na	Sodium
NaCN	Sodium Cyanide

Abbreviation	Description
NAF	Non acid forming
NAFI	North Australia and Rangelands Fire Information
NaHs	Sodium Hydrogen Sulfide
NaOH	Sodium Hydroxide
NCCI	Newman Chamber of Commerce and Industry
NCST	National Committee on Soil and Terrain
NCT	Nyangumarta Consultation Team
NDC	Nationally Determined Contribution
NDVI	Normalised Differences Vegetation Index
NEPC	National Environment Protection Council
NEPM	National Environmental Protection Measure
NF_3	Nitrogen Trifluoride
NGBWM	Nyangumarta Glove Box Weed Manual
NGER	National Greenhouse and Energy Reporting
NGER Act	*National Greenhouse and Energy Reporting Act 2007* (Cth)
NGER Determination	*National Greenhouse and Energy Reporting (Measurement) Determination 2008*
NGER Scheme	National Greenhouse and Energy Reporting Scheme
Ni	Nitrogen
NNTT	National Native Title Tribunal
NO	Nitric Oxide
NOx	Nitrous Oxides
NO_2	Nitrogen Dioxide
NPI	Non-process Infrastructure
NSW	New South Wales
NT Act	*Native Title Act 1993* (Cth)
NTD	Native Title Determination
NVIS	National Vegetation Information System
NVCP	Native Vegetation Clearing Permit
NWAC	Nyangumarta Warrarn Aboriginal Corporation RNTBC
OAG	Offset Assessment Guide
Offset Fund	Winu Mine Managed Offset Fund
Offset Projects	Proposed offset actions
OMP	Offset Management Plan

Abbreviation	Description
P	Priority
p/a	Per annum
PAF	Potentially acid forming
PAF-LC	Potentially Acid Forming – Low Capacity
Pb	Lead
PCD	Proposal Content Document
PDC	Project demand case
PEC	Priority Ecological Community
PER	Public Environmental Review
PFCs	perfluorocarbons
PFS	Pre-feasibility Study
pH	power/potential of Hydrogen
PHCCI	Port Hedland Chamber of Commerce & Industry
PLC	Project licensing case
PM	Particulate Matter
PPA	Power Purchase Agreement
PoW	Programme of Work
PPE	Personal Protective Equipment
Proponent	Rio Tinto Winu Pty Limited
Proposed Offset Area	The Nyangumarta Warrarn Indigenous Protected Area and the Martu Indigenous Protected Area
PVC	Polyvinyl Chloride
PV	Photovoltaic
PWD	Pit Water Dam
pXRF	portable X-ray Fluorescence
RAC	Road Access Corridor
RAMSAR	Convention on Wetlands of International Importance Especially as Waterfowl Habitat
RED Strategy	Regional Economic Development Strategy
RFDS	Royal Flying Doctor Service
Rimfire	Rimfire Borefield
Rio Tinto	Rio Tinto Group
RISM	Residual Impact Significance Model

Abbreviation	Description
RiWI	*Rights in Water and Irrigation Act 1914* (WA)
RNTBC	Registered Native Title Body Corporate
ROM	Run of Mine
RP	Reclaim Pond
RSA	Rotor Swept Area
SABC	SAG Mill – Ball Mill – Crushing
SAG	Semi-Autogenous Grinding
SAVI	Soil Adjusted Vegetation Index
Sb	Antimony
SCHMP	Social Cultural Heritage Management Plan
Se	Selenium
SEIA	Socio-economic Impact Assessment
SF_6	Sulfur Hexafluoride
SBAR	Second-generation Anticoagulant Rodenticide
Si	Silicon
SIA	Social Impact Assessment
SMUs	Soil Mapping Units
Sn	Tin
SO_2	Sulfur Dioxide
SO_4	Sulfate
SoEP	Shire of East Pilbara
SPRAT	Species Profile and Threats Database
Sr	Strontium
SRE	Short-range Endemic
SRK	SRK Consulting
SSA	Social Surroundings Assessment
State GHG Policy	State Greenhouse Gas Emissions Policy for Major Projects (WA)
STEM	Science, Technology, Engineering and Mathematics
SWMP	Surface Water Management Plan
TAFE	Technical and Further Education
TAPM	The Air Pollution Model
TARP	Trigger Action Response Plan
TBA	To be assessed/announced

Abbreviation	Description
TBC	To be confirmed
t CO_{2-e}	tonnes of carbon dioxide equivalence
TDS	Total Dissolved Solids
TEC	Threatened Ecological Community
TEK	Traditional Ecological Knowledge
TEQ	Terrestrial Environmental Quality
The Cyanide Code	International Cyanide Management Institute Code
Tl	Thallium
TMP	Traffic Management Plan
TSF	Tailings Storage Facility
TSI	Torres Strait Islander
TSP	Total Suspended Particulate
TSSC	Threatened Species Scientific Committee
U	Uranium
UCL	Unallocated Crown Land
Umwelt	Umwelt Environmental and Social Consultants
UNEP	United Nations Environment Programme
UNFCC	United Nations Framework Convention on Climate Change
UQ	University of Queensland
V	Vanadium
VIA	Visual Impact Assessment
VMO	Visual Management Objective
VMR	Voice Mobile Radio
VOCs	Volatile Organic Compounds
VP	Viewpoint
VU	Vulnerable
WA	Western Australia
WAD CN	Weak Acid Dissociative Cyanide
WAM	Western Australian Museum
WAPC	Western Australian Planning Commission
WHS Act	*Work Health and Safety Act 2020*
WQPN	Water Quality Protection Notes
WMP	Weed Management Plan

Abbreviation	Description
WoNS	Weeds of National Significance
WRL	Waste rock landform
WSP	Water Storage Pond
WWL	Water, Waste & Land Pty Limited
WWTP	Waste Water Treatment Plant
YMAC	Yamatji Marlpa Aboriginal Corporation
Zn	Zinc

Definitions

Proposal Terminology	Definition
Additional Area 1	One of the two additional areas located within the vicinity of the Winu Project Bilby Population Abundance Study (Biota 2024) but outside of the extent of the fire in 2023
Additional Area 2	One of the two additional areas located within the vicinity of the Winu Project Bilby Population Abundance Study (Biota 2024) but outside of the extent of the fire in 2023
Clean Water Dam (CWD)	A facility to manage surplus water. Only water classified as clean will be discharged into the clean water dam
Conceptual Footprint	The indicative direct disturbance of the Proposal. To provide project flexibility, this footprint is indicative only and includes key elements such as mine pit, waste rock landform (WRL), Tailings Storage Facility (TSF) and other infrastructure. The final location of key elements and infrastructure may occur outside of an in different locations to the Conceptual Footprint but will be contained within the Development Envelope and within any approval limits
Development Envelope	The combined areas of the Mines and Infrastructure Area (MIA), Road Access Corridor (RAC) and the Rimfire Borefield. All Proposal activities will occur within this area
Aboriginal Cultural Heritage (ACH) Exclusion Zone	An area within the Development Envelope where no direct disturbance is permitted unless in response to contingency action associated with monitoring and management
Mine and Infrastructure Area (MIA)	The area containing the mineralised deposit, waste rock landform (WRL), Tailings Storage Facility (TSF), processing plant and related infrastructure. This is the Winu mine site
Mine Development Area	A 20,407 ha area comprising the Mine Infrastructure Area (MIA) and surrounding area defined for the purposes of the Winu Project Landforms Assessment (SLR 2025)
Rimfire Borefield (Rimfire)	The regional borefield located at Rimfire, which is approximately 31 km from the Mine and Infrastructure Area (MIA). This includes the pipelines, infrastructure and access tracks back to the MIA
Road Access Corridor (RAC)	The Access Road, which encompasses the entire length of the existing access road from the Great Northern Highway to the Mine and Infrastructure Area (MIA)

Proposal Terminology	Definition
The Proposal	Includes the development of a new below watertable (BWT) copper-gold deposit and associated infrastructure and activities required to access, process and transport copper concentrate, as further indicated in this Environmental Review Document (ERD)

1 INTRODUCTION

Winu Services Pty Ltd (the Proponent) plans to develop a new copper-gold mine, referred to as the Winu Project (the Proposal), approximately 300 km south of Broome and 320 km east of Port Hedland in the northern Pilbara region of Western Australia (Figure 1-1).

The Proposal is located on the traditional lands of both Nyangumarta People and Martu People, within their respective native title determination areas. Extensive and ongoing consultation with the Traditional Owners has resulted in substantial changes to the design of the Proposal and improved social and environmental outcomes.

The Proponent recognises the Nyangumarta and Martu Peoples' intrinsic and continuous connection to Country, culture and community of both the land and waters on which the Proposal is located.

The Proponent respects and honours the rights and obligations Nyangumarta and Martu have to Country by caring for Country and is committed to developing the Proposal in a genuine partnership that is open, honest, culturally appropriate and benefits all.

Through meaningful consultation, co-development and co-management, combining both traditional knowledge and western science, throughout the development, operation and closure of the Proposal, the Proponent aims to minimise impact to Country, intangible and tangible culture, and support the economic, social aspirations and opportunities for current and future generations of Nyangumarta People and Martu People.

These commitments have been and will continue to be formalised in separate agreements with the Nyangumarta People and the Martu People.

1.1 Purpose and Scope

The purpose of this Environmental Review Document (ERD) is to provide the necessary information to allow the assessment of the Proposal under Part IV of the *Environmental Protection Act 1986* (EP Act) (Section 3). This ERD has been prepared in accordance with an Environmental Scoping Document (ESD), which was approved by the Western Australian Environmental Protection Authority (EPA) on 18 November 2025 (Appendix A02).

The ERD content, format and environmental assessment has considered and applied relevant EPA guidance and policy.

This ERD presents information on each environmental factor nominated by the EPA as a potential 'key' environmental factor related to the Proposal.

The objectives of the ERD are to:

- Describe all operational components of the Proposal that have the potential to have a significant effect on the environment
- Describe the local and regional context within which the Proposal would be implemented, drawing upon Proposal specific biological and other technical studies
- Identify and assess the potential impacts of the Proposal implementation
- Describe the mitigation strategies the Proponent would use to avoid, minimise, rehabilitate and offset adverse impacts.

This ERD summarises and describes the Proposal specific environmental studies conducted for the Proposal as relevant to the Environmental Impact Assessment (EIA). Key technical reports used in preparing this ERD are provided as appendices and relevant Index for Biodiversity Surveys for Assessments (IBSA) submissions are provided in Appendix A06.

1.2 Proponent Details

The Proponent is a wholly owned subsidiary of Rio Tinto Limited (Rio Tinto). The Proponent details are provided in Table 1-1.

Table 1-1: Proponent Details

Item	Detail
Company	Winu Services Pty Ltd (Proponent)
ACN	684 213 796
Address	Level 18, Central Park,152-158 St Georges Terrace, Perth WA 6000 Australia

1.3 Key Proposal Terminology

The Proposal: Includes the development of a new below watertable (BWT) copper-gold deposit and associated infrastructure and activities required to access, process and transport copper concentrate, as further indicated in this ERD.

Development Envelope: Refers to the combined areas of the Mine and Infrastructure Area, Road Access Corridor and the Rimfire Borefield. All Proposal activities will occur within this area.

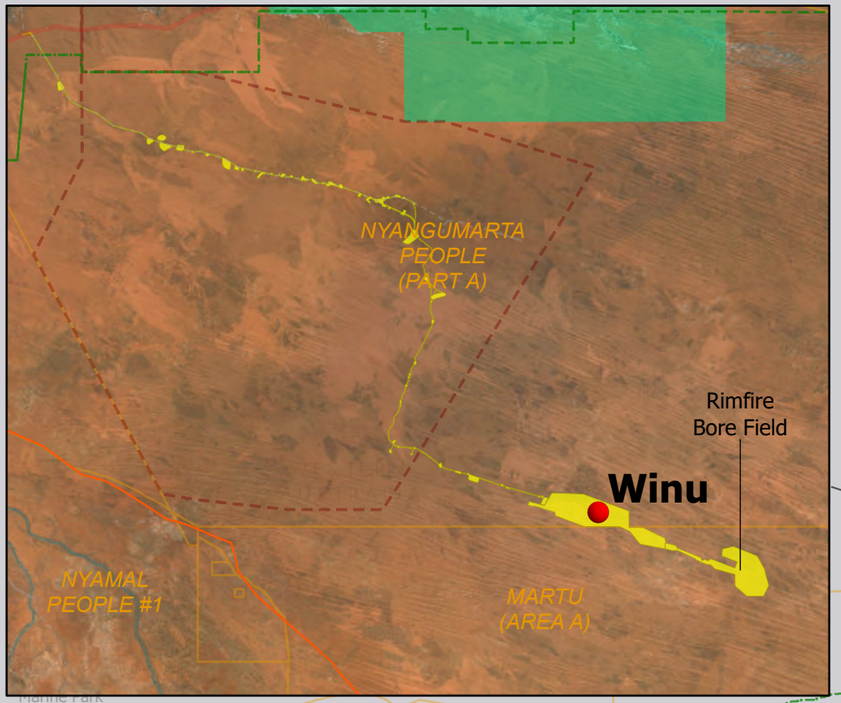
Conceptual Footprint: Refers to the indicative direct disturbance of the Proposal. To provide project flexibility, this footprint is indicative only and includes key elements such as mine pit, waste rock landform (WRL), Tailings Storage Facility (TSF) and other infrastructure. The final location of key elements and infrastructure may occur outside of and in different locations to the Conceptual Footprint but will be contained within the Development Envelope and within any approval limits.

Mine and Infrastructure Area (MIA): Refers to the area containing the mineralised deposit, WRL, TSF, processing plant and related infrastructure. This is the Winu mine site.

Rimfire Borefield (Rimfire)**:** Refers to the regional borefield located at Rimfire, which is approximately 31 km from the MIA. This includes the pipelines, infrastructure and access tracks back to the MIA.

Road Access Corridor (RAC): Refers to the Access Road, which encompasses the entire length of the existing access road from the Great Northern Highway to the MIA.

Aboriginal Cultural Heritage (ACH) Exclusion Zone: Refers to an area within the Development Envelope where no direct disturbance is permitted unless in response to a contingency action associated with monitoring and management.



116°0'0"E
118°0'0"E
120°0'0"E
122°0'0"E
124°0'0"E
18°0'0"S
20°0'0"S
22°0'0"S

N

Rowley Shoals Marine Park
INDIAN OCEAN
BROOME
Yawuru Nagulagun / Roebuck Bay Marine P
Bidyadanga
BROOME, SHIRE OF
Eighty Mile Beach Marine Park
Great Northern Hwy
Sandfire Roadhouse
Walyarta Conservation Park
Pardoo Irrigation Project
Pardoo Roadhouse
PORT HEDLAND
Mt Goldsworthy
Strelley
Warralong
Goldsworthy
Winu
Barrow Island Nature Reserve
Barrow Island Marine Management Area
KARRATHA
KARRATHA, CITY OF
PORT HEDLAND, TOWN OF
Marble Bar Rd
Manuwarra Red Dog Hwy
Millstream Chichester National Park
Mungaroona Range Nature Reserve
Ripon Hills Rd
Purungunya National Park
Purungunya Conservation Park
Woodie Woodie
Nifty
Telfer
EAST PILBARA, SHIRE OF
North West Coastal Hwy
Cane River Conservation Park
Roebourne-Wittenoom Rd
Munjina Rd
Fortescue Marsh Nature Reserve
Karijini Dr
ASHBURTON, SHIRE OF
Karijini National Park
Karlamilyi National Park
Punmu
Parnngurr
NEWMAN
Jigalong

0 100 200 Kilometres

Legend

- Homestead
- Roadhouse
- Aboriginal Communities and Town Reserves (DPLH-002)
- Mine
- Highway
- Main Road, Sealed
- Main Road, Unsealed
- Minor Road, Sealed
- Minor Road, Unsealed
- Major River
- Mainstream
- Major Tributary
- Development Envelope
- AREH Project (indicative footprint)

DBCA - Legislated Lands and Waters

- National Park
- Nature Reserve
- Conservation Park
- Section 5(1)(g) Reserve
- Section 5(1)(h) Reserve
- Marine Park
- Marine Management Area
- Gas Pipeline
- Pardoo Station
- Pardoo Irrigation Project
- Native Title Determinations
- Local Government Authorities

RioTinto

Figure 1-1: Winu Project Regional Location and Development Envelope

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Friday, 29 May 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:2,500,000
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2 PROPOSAL

2.1 Proposal Content

The Proposal involves developing a single open pit that extends BWT and associated infrastructure, including material waste and waste management infrastructure, mineral processing facilities, mine dewatering infrastructure, water supply infrastructure, energy supply infrastructure, linear infrastructure and support facilities. Access to the mine site will be via the access road within the RAC, which extends approximately 183 km from the Great Northern Highway to the western edge of the MIA.

A Proposal Content Document (PCD) is provided in Appendix A01.

The Development Envelope is 23,649 ha in extent, comprising these subset areas of the Proposal (Figure 2-2):

- MIA – 10,182 ha
- RAC – 6,647 ha
- Rimfire – 6,820 ha.

The Conceptual Footprint refers to the indicative direct disturbance footprint for the Proposal (Figure 2-2). To provide project flexibility, this footprint is indicative only and includes key elements of the Proposal to a maximum of 4,878 ha. The final location of key elements and infrastructure will be within the Development Envelope and any approval limits.

Various exploration and investigation activities have been completed to support this Proposal. These include clearing access tracks and drill pads for resource and groundwater studies. Clearing of approximately 154 ha has occurred for these purposes, with clearing undertaken under the *Mining Act 1978* (WA) (Mining Act) and clearing for upgrades to existing roads between Great Northern Highway and the MIA under Native Vegetation Clearing Permit (CP9561/1) (expiry February 2028).

The indicative layout of the Proposal is shown in Figure 2-1, and the Development Envelope and Conceptual Footprint are shown in Figure 2-2.

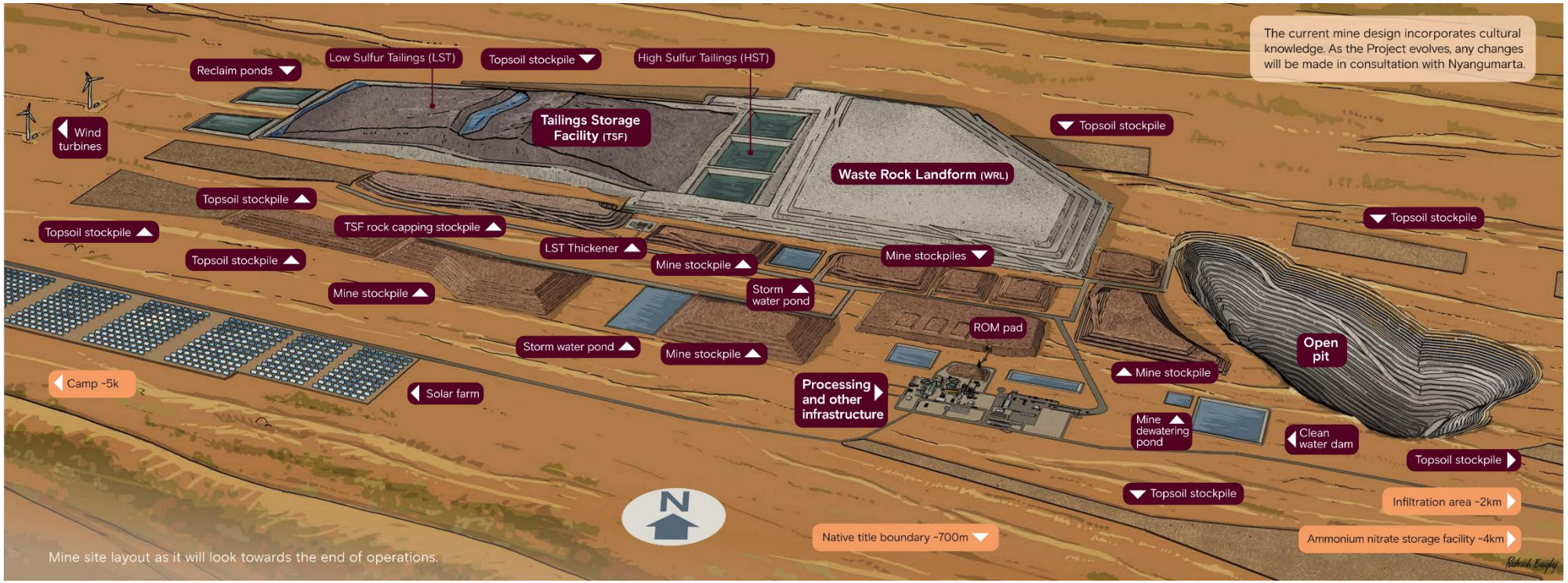

Figure 2-1: Indicative Layout of the Proposal

2.1.1 Proposal Elements

Table 2-1 outlines the details of relevant Proposal elements.

Table 2-1: Proposal Elements

Proposal Element	Location/Description	Maximum Extent, Capacity or Range
Physical Elements		
Mine elements, including: • A below watertable open pit • Material stockpile management including mine and topsoil stockpiles	Mining Lease 45/1288 Figure 2-2 Figure 3-1	Clearing up to 4,878 ha of new native vegetation for the Conceptual Footprint within the 23,649 ha Development Envelope.
Mineral waste elements, including: • Waste rock landform (WRL) • Topsoil stockpiles • Tailings Storage Facility (TSF)	Mining Lease 45/1288 Figure 2-2 Figure 3-1	
Processing elements, including: • Run of Mine (ROM) pad • Crushing, stockpiling and reclaiming • Grinding with oversized recycle pebble crushing • Flotation, concentrate dewatering and handling • Carbon-in-leach (CIL), carbon acid washing and gold elution/desorption • Carbon reactivation, electrowinning, doré production and cyanide detoxification • Tailings thickening • Reagent receival, storage and delivery systems	Mining Lease 45/1288 Figure 2-2 Figure 3-1	
Water management elements, including: • Dewatering of pit with in-pit and ex-pit bores • Borefield and associated infrastructure • Process water dams/ponds • Water storage dams • Water diversion channels and catchment ponds • Infiltration areas	Mining Lease 45/1288 Miscellaneous licence 45/755 Figure 2-2 Figure 3-1	
Infrastructure elements, including: • Accommodation camps • Energy supply infrastructure • Mine workshops and maintenance infrastructure • Bores, pipelines, turkeys nests and supporting facilities • Haul, heavy and light vehicle roads • Pipelines, powerlines, fibre-optic cable, and communications distributions networks • A possible copper concentrate transfer area • Ancillary buildings • Waste water treatment plants and reverse osmosis plants • Explosives storage and preparation facilities and hydrocarbon storage	Mining Lease 45/1288 Miscellaneous licences 45/476, 45/491, 45/494, 45/548, 45/549, 45/550, 45/551, 45/552, 45/559, 45/623, 45/722, 45/723, 45/725, 45/755 & L45/857 Figure 2-2 Figure 3-1	

Proposal Element	Location/Description	Maximum Extent, Capacity or Range
• Laydown areas • Drill core processing and storage facilities • Information and communications technology • Aerodrome facilities including airstrip • Site fire emergency and medical facilities • Waste Management and landfill facilities		
Operational Elements		
Groundwater abstraction for mine dewatering	Mining Lease 45/1288 Figure 2-2 Figure 3-1	Lowering the groundwater table to no greater than a standing water level of -250 m RL.
Groundwater abstraction from the Rimfire regional borefield	Miscellaneous licence 45/755 Figure 2-2 Figure 3-1	Abstraction of no more than 2.8 gigalitres per annum (GL/a).
Groundwater abstraction for RAC road construction	Miscellaneous licences 45/491, 45/548, 45/549, 45/550, 45/551, 45/552, 45/623, and 45/857 Figure 2-2 Figure 3-1	Temporary water abstraction required for new road construction (approximately 0.7 GL for 12-months) and dust suppression on an existing road until the new road is constructed (0.3 GL for approximately 18-months).
Waste Rock Landform (WRL)	Mining Lease 45/1288 Figure 2-2 Figure 3-1	Up to 490 Mt of waste rock will be mined throughout the life of the Proposal.
Management of surplus water	Mining Lease 45/1288 Figure 2-2 Figure 3-1	Surplus water, exceeding the operational requirement (no more than 4 GL/a), is discharged to infiltration areas (up to 4 GL/a) or managed aquifer recharge bores (up to 4 GL/a) within the Development Envelope.
Proposal Elements with Greenhouse Gas Emissions*		
Peak Annual		
Scope 1	Plant and equipment, land clearing, haulage and electricity generation: 109,166 t CO_2-e	
Scope 2	Electricity generation: 0 t CO_2-e	
Annual Average Life of Mine		
Scope 1	Plant and equipment, land clearing, haulage and electricity generation: 89,901 t CO_2-e	
Scope 2	Electricity generation: 0 t CO_2-e	

Proposal Element	Location/Description	Maximum Extent, Capacity or Range
Scope 3	Estimated: 162,662 t CO_2-e	
Rehabilitation and Closure		
Where practicable, progressive rehabilitation will be undertaken over the life of the mine. Areas disturbed through the implementation of the Proposal will be designed to be safe and non-polluting and will be constructed so the final shape, size and stability meet the closure objectives documented in the Mine Closure Plan (MCP).		
Commissioning		
Commissioning of the processing facility will be undertaken subject to the operational limits above.		
Other Elements which Affect Extent of Effects on the Environment		
Proposal timeframe	Maximum project life	Approximately 32 years

**National and international reporting standards define the following set of distinct scopes of GHG emissions, demarcating sources of emissions and associated responsibilities:*

- *Scope 1: emissions generated as a direct result of an activity e.g. diesel combustion by vehicles or gas*
- *Scope 2: emissions generated from the consumption of an energy commodity*
- *Scope 3: indirect emissions, other than Scope 2 emissions, that are generated in the wider community.*

Notwithstanding the above, the EPA has identified through the ESD that it considers for the purpose of the assessment of this Proposal that GHG emissions from:

- *Electricity generation produced for the Proposal as Scope 1 (not Scope 2) - given this, no Scope 2 emissions will occur as a result of the Proposal*
- *Haulage of concentrate (from mine to port), regardless of third-party contractual arrangements as Scope 1 (not Scope 3).*

121°0'0"E
122°0'0"E
123°0'0"E
20°0'0"S
21°0'0"S

Great Northern Hwy

N

Road Access Corridor

Mine Infrastructure Area

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

0 2 4
Kilometres

Road Access Corridor

Road Access Corridor

0 2 4
Kilometres

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

Rimfire Bore Field

0 2 4
Kilometres

MARTU (AREA A)

MARTU #3

YAMAL PEOPLE #1

MARTU #3

NYAN

Legend

- Highway
- Development Envelope
- Native Title Determinations

Conceptual Footprint

- Aerodrome
- ANFO
- Bore Fields and Pipelines
- Camps
- Mine Construction Areas
- Mine Pit
- Ore Stockpiles
- Ponds (Infiltration) and MAR
- Power Generation (Wind and Solar)
- Processing Infrastructure
- Roads and Borrow Pits
- Tailings Storage Facility
- Topsoil Stockpiles
- Waste Rock Landform

0 20 40
Kilometres

RioTinto

Figure 2-2: Development Envelope and Conceptual Footprint

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Friday, 29 May 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:800,000
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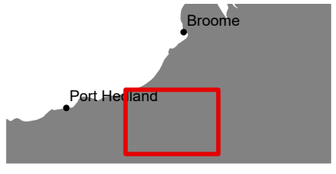

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2.1.2 Detailed Proposal Description

2.1.2.1 Native Vegetation Clearing and Topsoil Removal

Clearing up to 4,878 ha of native vegetation is proposed within the 23,649 ha Development Envelope. Clearing will occur during the implementation, operation and closure of the Proposal. Disturbance of native vegetation will be restricted to the minimum extent necessary. Progressive rehabilitation will be undertaken wherever practicable.

Where possible, topsoil and vegetation removed during clearing, will be stockpiled in adjacent well-drained areas. Topsoil stockpiles will be managed appropriately so the material will be available for future rehabilitation operations.

2.1.2.2 Mining

The Proposal includes the development of a single BWT open-cut pit, mined via a series of cutbacks to an approximate depth of 480 m below ground level (mbgl). The pre-mining watertable will be encountered early in operations at approximately 50 to 60 mbgl with the mineral resource BWT. Infrastructure to abstract and manage water will be installed early in the pre-strip period to dewater the pit and depressurise the pit walls ahead of mining (Section 2.1.2.7).

At closure there will be a pit lake which is expected to be a terminal sink with neutral pH. Closure studies will be progressively developed throughout the mine life to build confidence in predictions and reduce residual risk from final landforms.

Mining operations are anticipated to involve conventional drill, blast, load and haul techniques whereby the blasted material (mined process feed) will be excavated and transported to ROM stockpiles ahead of the process plant or to long-term mine stockpiles to be fed to the plant later in the mine life. Mining equipment will include conventional excavators, haul trucks, drill rigs, bulldozers, water trucks, service trucks and graders.

In line with relevant Australian standards, an explosives magazine will store explosives for open pit blasting activities (Section 2.1.2.12).

ROM material will be trucked to pre-crusher stockpiles, with waste rock transported to a dedicated, permanent WRL. Prior to commencement, disturbance footprints will be grubbed of vegetation, topsoil stripped and stored in designated topsoil stockpiles for subsequent use in mine rehabilitation. Waste rock will be characterised and placed according to its deleterious or beneficial classifications. This may result in some materials being stockpiled for future use in closure management activities.

2.1.2.3 Processing

The mineral processing plant will be located adjacent to the mine pit area with the capacity to be fed directly from the pit or from stockpiles to process the mineral resource (Figure 2-2).

The processing facilities will incorporate conventional equipment for crushing, stockpiling, and reclaiming, grinding with oversize recycle pebble crushing, flotation, concentrate dewatering and handling, Carbon-in-leach (CIL), carbon acid washing and gold elution/desorption, carbon reactivation, electrowinning, doré production, cyanide detoxification and tailings thickening. A simplified flowsheet is shown in Figure 2-3.

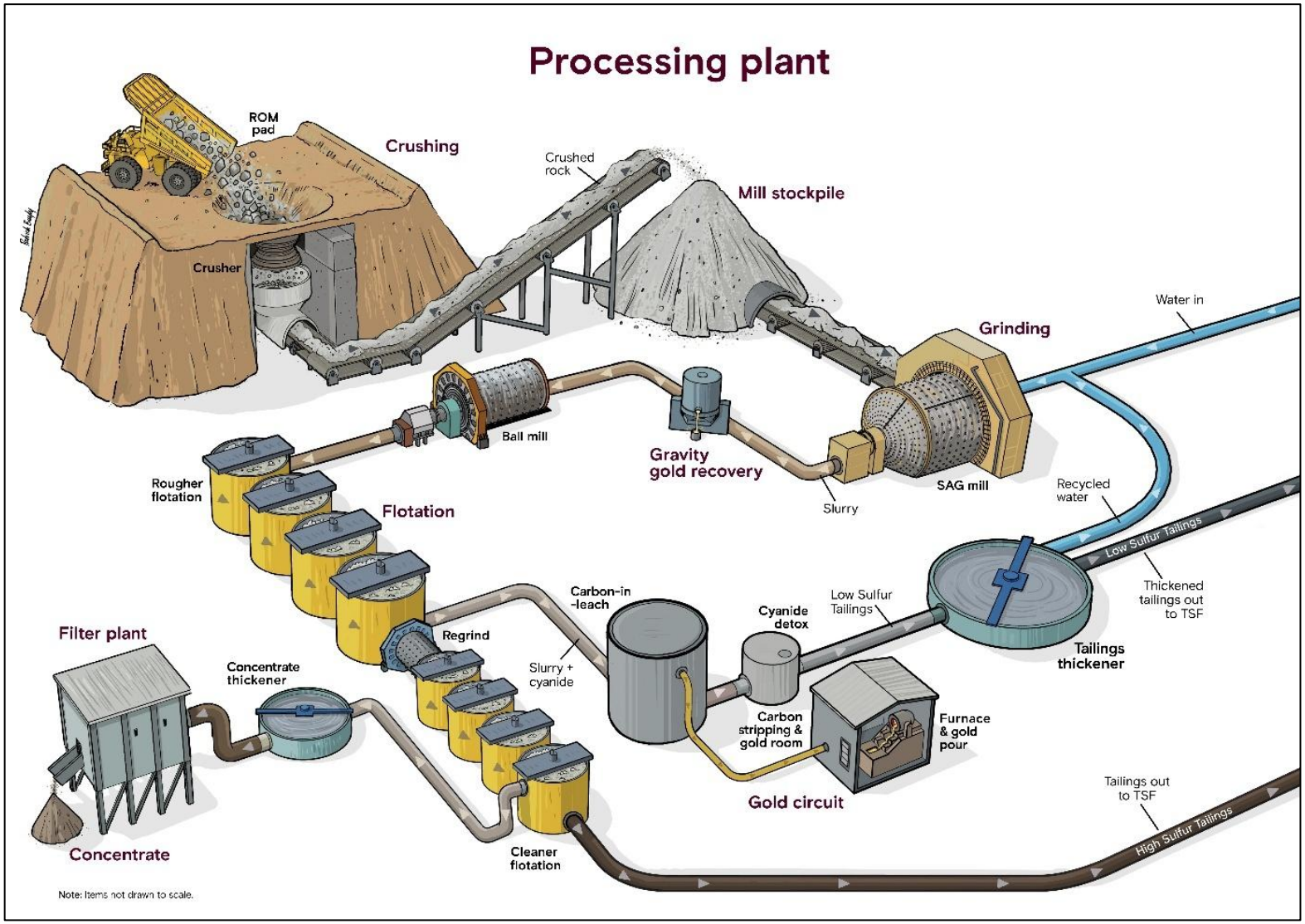

Figure 2-3: Winu Project - Process Flowsheet

The design of the comminution circuit will include a single-stage primary crushing circuit with a conventional semi-autogenous grinding (SAG) mill and ball mill grinding circuit with pebble recycle, however without pebble crushing. Sufficient footprint has been allowed for in the Conceptual Footprint for the installation of recycle pebble crushing should this be required in future, resulting in a SAG mill – ball mill – crushing (SABC) circuit and for a second ball mill and other associated facilities, as required due to mineral resource hardness.

The key step in the process for separation of Low Sulfur Tailings (LST) and High Sulfur Tailings (HST) is the Rougher Flotation circuit. Here, tails with a sulfur grade of less than 0.3% are produced, and treated as Non Acid Forming (NAF), and sent to the LST cells. The cleaner circuit is then used to separate the Rougher Flotation concentrate into copper sulfides (concentrate) and iron sulfide tailings, which are sent to the HST cells. Figure 2-4 depicts this process. Tailings generated from the gold plant are also sent to the LST cells.

The flotation circuit will include rougher and cleaner flotation cells with the rougher circuit functioning as sulfide flotation only for secondary sulfides and primary sulfides. When oxides are campaigned, the rougher circuit will change to the first cells as sulfide flotation followed by the next cells as controlled potential sulfidisation (CPS) conditioning tanks using sodium hydrogen sulfide (NaHS) reagent. The remaining rougher cells will float the resulting oxide rougher concentrate.

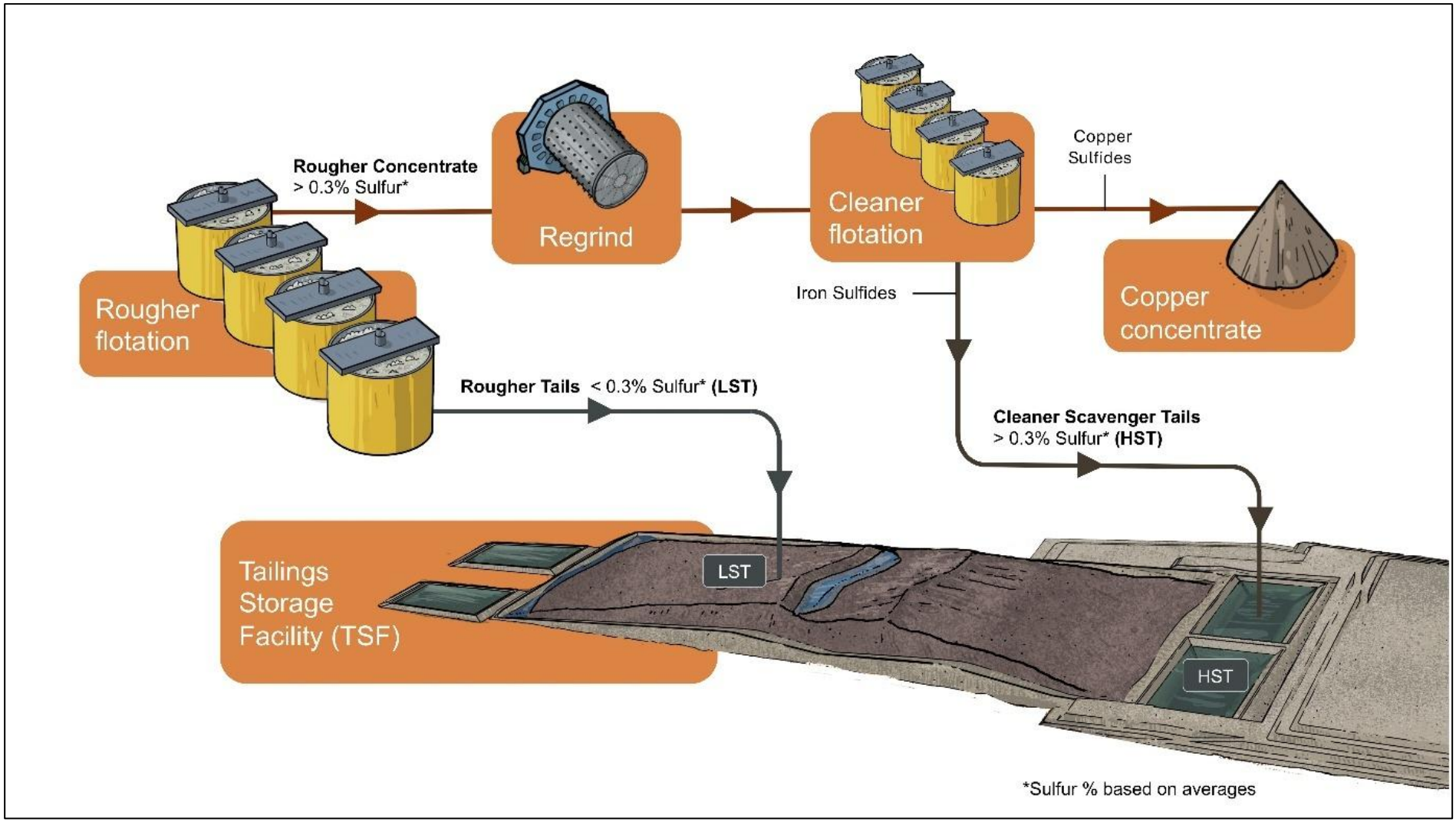

Figure 2-4: Simplified LST and HST Tailings Separation Process

All rougher concentrates will be reground and directed to the cleaner circuit. First cleaner concentrate feeds the second cleaner and second cleaner concentrate is final flotation concentrate. Second cleaner tailing recycles to first cleaner feed. First cleaner tailing flows to the cleaner-scavenger. Cleaner-scavenger concentrate recycles to first cleaner feed.

The processing facility will also include concentrate dewatering and handling, tailings thickening, reagents, utilities and a TSF (Section 2.1.2.6).

For selected primary sulfides, rougher tailing is thickened and fed to CIL tanks in which cyanide dissolves the gold. The dissolved gold is then adsorbed on activated carbon which is removed from the tanks by screening and then the gold is desorbed by elution and precipitated by electrowinning. Following this the gold is then smelted into bars for dispatch from site. Appropriate security facilities and measures will be in place for the management of the doré.

The desorbed carbon is thermally reactivated and returned to the CIL tanks. The CIL circuit tailing passes through a cyanide detoxification circuit, which reduces the cyanide concentration, and is then directed to the low-sulfur cell of the TSF (Section 2.1.2.6).

For other primary sulfides, and secondary sulfides and oxides, the thickened rougher tailing is directed to the TSF low-sulfur cells. For all feeds, cleaner-scavenger tailing is directed unthickened to the TSF high-sulfur cells (Section 2.1.2.6).

Gravity gold concentrators will be included in the milling circuit. A portion of the milled slurry will continuously feed the concentrators to recover gravity recoverable gold (GRG) in an enriched concentrate. The GRG concentrate will discharge to an intensive cyanidation reactor where gold is leached from the enriched concentrate in a batch process. The gold-rich pregnant liquor will be processed in a dedicated electrowinning circuit.

Reagents and consumables will be received and stored on site in bulk or in containers. Dedicated mixing, wet storage and dosing facilities will be provided for each reagent as required.

A range of reagents and consumables will be required to operate including:

- Processing reagents such as:
  - Grinding media
  - Lime for pH control
  - Collectors, frothers, depressants (including sodium cyanide), and activators for use in flotation circuit
  - Sodium hydrogen sulfide (NaHS) used for CPS on oxides
  - Flocculants
  - Sodium cyanide (NaCN), sulfur dioxide (SO_2), hydrochloric acid (HCl), caustic soda / sodium hydroxide (NaOH), and activated carbon for gold CIL plant
- Wear parts
- Diesel and lubricants.

2.1.2.4 Product Handling and Transport

The Proposal will produce two key products - a copper concentrate (containing gold and silver) and a gold doré.

The copper concentrate (containing gold and silver) will be produced on-site for sale to mainly international customers. The concentrate will be loaded into covered containers onto road transport from site via the upgraded access road within the RAC and then via the Great Northern Highway to a staging facility at a nearby port by a licensed third party, prior to shipping via public access port facilities.

Product will be stored in a closed bulk storage shed or containers at the third-party facility at the port prior to shipping. Concentrate product will be transferred onto ships by a licensed stevedoring company under fee-for-service agreements.

The current product logistics plan proposes the use of a third-party staging facility at Port Hedland (approximately 440 km from the MIA) with shipping occurring from Port Hedland; however, this is to be confirmed based on further studies.

While the transportation of doré is still being evaluated, the most likely outcome is transport from the Proposal airstrip on scheduled air charters direct to Perth for delivery to the Perth Mint.

2.1.2.5 Mineral Waste

Mining and processing unavoidably generate large volumes of mineral waste. This waste may be Non-Acid Forming (NAF) or Potentially Acid Forming (PAF) and can have long-term social and environmental impacts.

Mined waste material of approximately 490 Mt will be produced, predominantly sent to either the WRL, up to approximately 80 m high, or used in the embankments of the TSF. Some waste rock will be used to construct the process plant pad, ROM pad, TSF and other minor civil earthworks infrastructure. Aggregate will be produced from NAF waste for road and pad maintenance purposes.

Waste rock will be classified according to acid-generation potential and stored appropriately. Waste rock with potential to form acid will be encapsulated within the NAF waste in the WRL, which will include the construction of a store-and-release cover at mine closure. Approximately 20-30% of waste rock is expected to be PAF.

The WRL has been designed to minimise surface disturbance and minimise generation of acid and metalliferous drainage (AMD). The ultimate design of the permanent WRL will ensure it is geotechnically stable and safe over the long term. The permanent WRL will be rehabilitated in line with closure requirements.

Several factors are taken into consideration for the locations of the permanent WRL; these include but are not limited to the following:

- Minimising the potential impact on known environmental, cultural and social values
- Waste rock characterisation, including erosion and AMD potential
- Minimising the economic haul distance
- Allowing for future battering to achieve ultimate WRL stability at closure
- Allowing for contingency mine pit cutbacks if pit wall stability is compromised.

The Proposal's AMD management strategy will follow a hierarchical approach (Figure 2-5).

Some mine stockpiles will contain PAF material, and these stockpiles will be placed over a low permeability basal layer of NAF material. AMD runoff will be collected in perimeter drains and transferred to the process plant.

A Winu Mine Operational AMD Strategy and Management Plan (AMD S&MP; Appendix C07) has been developed to ensure the development and implementation of appropriate measures to reduce the risk for AMD generation. The AMD MP outlines the activities for the management associated with:

- Non-mineralised waste rock (mining overburden)
- Mineralised waste rock (low grade)
- Mineralised rock
- Processed waste rock (tailings)
- Waste rock exposures (pit walls)
- Quarried rock extracted for construction
- AMD that may be generated from these PAF sources.

PAF material will be unavoidably exposed on the pit wall during mining. Mine-impacted water will be retained on site and re-used in the process plant.

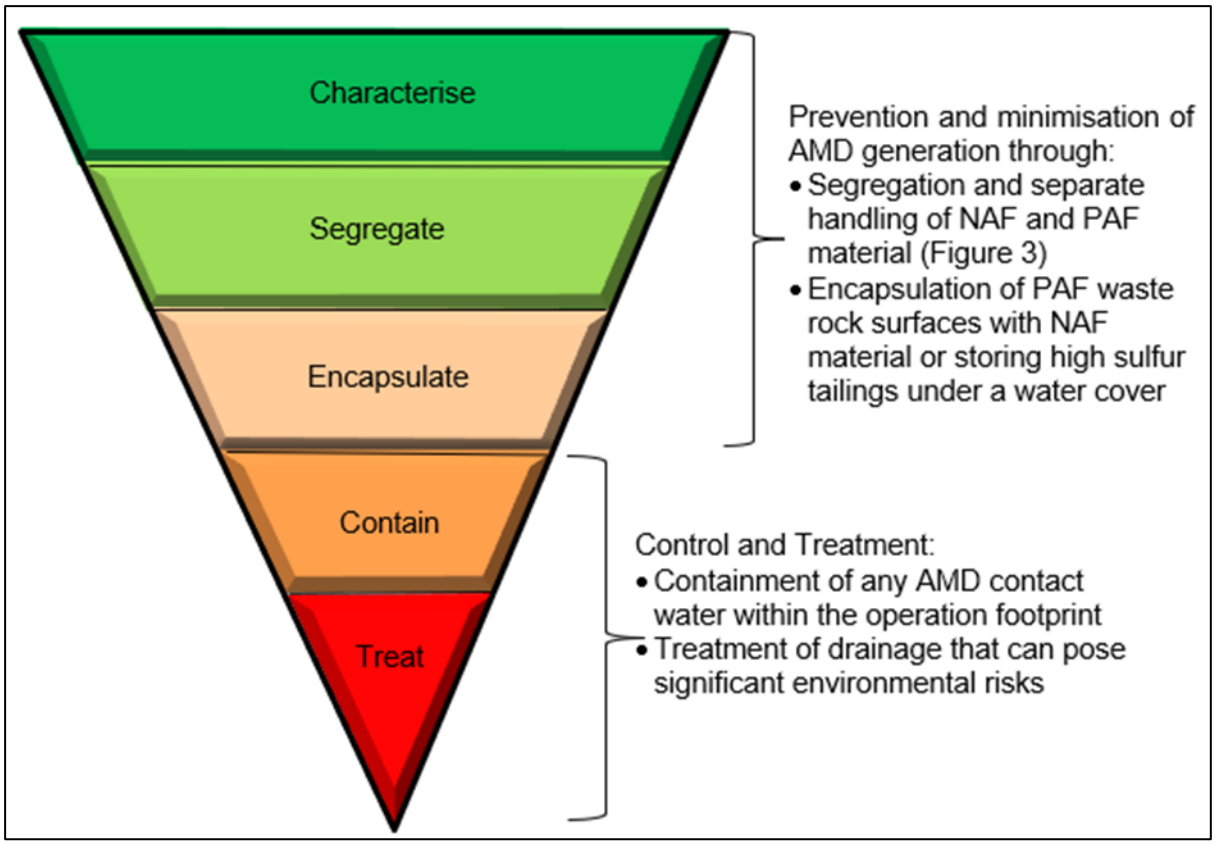

Figure 2-5: The Hierarchical Approach to AMD Management at the Winu Project

2.1.2.6 Tailings Management

A TSF is required to appropriately manage the mineral waste slurry stream(s) from the processing plant and will be constructed from mine waste. It will be the permanent storage location with separate cells to store high-sulfur tailings and low-sulfur tailings. Over 90% of the TSF will include low-sulfur tailings.

The high-sulfur tailings will be discharged into the high-sulfur tailing cells via sub-aqueous (underwater) deposition during mine operations to prevent acidification of this waste stream. At closure, a dry cover will be built to maintain saturation and reduce the risk of acidification.

The high-sulfur tailings cells will be lined with a High-density polyethylene (HDPE) (or equivalent) liner and a suitable subgrade layer and the low-sulfur tailings cells will also be lined with a HDPE (or equivalent) liner. The low-sulfur tailings cells will use high-density slurry deposition (HDSD) from spigots on the eastern perimeter of the landform.

The high-sulfur tailings cells and the low-sulfur tailings cells of the TSF will be built out progressively to a final height of approximately 50 m and approximately 65 m, respectively, subject to ongoing design processes.

Reclaim collection ponds are located to the west of the TSF which will capture decant water and pump it back to the process plant.

2.1.2.7 Mine Pit Dewatering

Mining will be BWT and therefore require mine dewatering via a network of in-pit and ex-pit bores. The pit dewatering system will include a series of dewatering bores to minimise pit inflow and increase pit wall slope stability. Water from the pit perimeter bore pumps and in-pit bore pumps will feed the pit perimeter piping ring main around the pit. The water from this ring main is classified as clean and will discharge to a clean water dam (CWD) that has a capacity of 0.4 GL (refer to Section 2.1.2.9).

Mine pit dewatering water will be distributed from the CWD to the process plant and supporting facilities.

In-pit mine dewatering is also required via in-pit sumps to manage inflows from rain, run-off and seepage. There will be in-pit sump pumps and pit storm water pumps to support this requirement. The water discharge from in-pit dewatering is considered potentially contaminated and as such will be directed to the pit water dam (PWD; Section 2.1.2.9).

2.1.2.8 Water Supply and Surplus Water Management

Water will be required for both the construction and operation of the Proposal, for construction, dust suppression, mineral processing and as a potable water supply.

During operations, the largest water demand will be from the process plant with a high degree of recycle. Other key demands include the accommodation camps and dust suppression.

The largest water losses from the operation will occur from water trapped in the tailings (entrained) and from evaporation from the TSF.

The majority of the water required will be sourced from pit dewatering and additional water will be sourced from Rimfire.

Pit dewatering will be via a network of in-pit and ex-pit bores. The dewatering rate from the pit will be approximately 3-4 GL/year, with an initial peak estimated of up to 7 GL/year.

Additional water will be sourced from Rimfire and piped back to the MIA. The borefield is located approximately 32 km east of the MIA. Rimfire will include a network of production bores feeding a pipeline for transfer of the water to the processing and non-processing areas. Transfer pumping station(s) and storage tanks may also be required. An associated network of monitoring bores would also be required to manage the borefield.

Water management infrastructure will be installed to manage the groundwater abstraction and water distribution and return. This will comprise bores and pipelines as well as pumping and storage infrastructure.

Storage facilities for clean and potentially contaminated water will be required to manage movement and quality of water. A CWD will be constructed and is essential for managing surplus water. Where surplus water cannot be managed in the CWD, infiltration ponds and adjacent bores for managed aquifer recharge (MAR), all within the MIA, will be used. Only clean water will be used in the CWD and for infiltration and MAR processes. Any surface expression of water from the CWD will be contained within the Development Envelope except in emergency circumstances linked to major rainfall events.

Processing water will be recirculated as much as possible, with thickeners playing a key role in water recovery within the process plant. Reclaim collection ponds at the TSF will capture decant water from tailings and recirculate it to the process plant.

Potable water will be generated from reverse osmosis unit/s.

2.1.2.9 Surface Water Management

Surface water management is detailed in the Proposal's Operational Surface Water Management Plan (SWMP; Appendix C01).

Surface water management infrastructure will be required to manage run-off in accordance with the SWMP including:

- Clean water run-off
- Potentially contaminated runoff:
    - Oils, chemical, metals
    - Sediment-loaded.

The infrastructure will typically include drains, levees/flood protection bunds, ponds, pumping, and culverts/piping to provide segregation, collection and storage based on the drainage categorisation and modelling.

Clean water is defined as non-contaminated surface water run-off generated in uncleared and natural ground areas. Strategic flood protection bunds and windrow/environmental bunds will separate clean water from mining activities and allow for infiltration/evaporation of this water and minimise potentially contaminated water that will require additional management.

Potentially contaminated (oils, chemicals, metals) run-off includes that from some mine stockpiles, the ROM pad, process plant, support facilities and the mine pit. Lined toe drains around the stockpiles will direct run-off to lined potentially contaminated water settling ponds from where it can be sent to, and used directly in, mineral processing. Those mine stockpiles that could generate AMD will be built on a low permeability basal layer. Potentially contaminated water from the pit will report to a centralised sump at the base of the pit and transferred to the PWD, where it can then be used in processing.

Potentially contaminated (sediment-loaded) run-off is considered to be that from topsoil stockpiles, WRL and TSF outer embankments. Run-off from these areas is considered chemically clean, but requires segregation from clean water. Such run-off will be managed through unlined drains directing to localised ponding areas for use in dust suppression or allowed to infiltrate/evaporate.

Drainage at the accommodation camps, the explosive facility and airstrip will be managed through local sumps, oily water collectors and ponding locations in accordance with the same categorisations in the Site SWMP.

2.1.2.10 Power Supply

Power will be required to support operations. The majority of power demand will be used to support minerals processing and the associated infrastructure. The Proposal's average power demand is 58 MW with a peak demand of 65 MW. The Proposal is approximately 170 km from a fixed power grid.

To support this the Proponent is making a significant up-front investment installing a combination of wind turbines, photovoltaic solar panels, battery energy storage systems (BESS) along with diesel-fired power generation. Accordingly, approximately 85% of supply will come from renewable energy under this arrangement. The proposed renewable energy infrastructure installed will deliver significant greenhouse gas emissions reductions in comparison to conventional electricity supply arrangements (Section 14).

A combination of overhead lines, cable trays and buried cables will be used to reticulate power across the site.

2.1.2.11 Site Access Road

Access to the Proposal will be required to be upgraded to meet the requirements for in-bound supplies (e.g. diesel, processing reagents, camp supplies) and out-bound haulage of copper concentrate. Currently access to the MIA is via existing access roads and exploration tracks. The majority of these existing roads and tracks are poor quality dirt roads of varying width.

The current route to site begins at its western end at a Great Northern Highway turn off, approximately 45 km west of Sandfire Roadhouse. The route then follows Nyangumarta Highway south-eastward for approximately 97 km before heading in a southerly direction for approximately 54 km on an exploration track named Wirlkirr Wirlkirr Road. Finally the route heads south-eastward again for approximately 32 km on an exploration track named Copperhead Road to the western edge of the MIA (Figure 3-1).

The existing route will require modification through a deviation to avoid Black-footed Rock-wallaby (Mooroorong) habitat (Section 9; Figure 2-6). An adjoining road and new intersections will be constructed to run between Nyangumarta Highway and Wirlkirr Wirlkirr Road, for approximately 15 km before the current intersection, to re-join Wirlkirr Wirlkirr Road approximately 7 km from the existing intersection.

The final cleared road surface will be sealed at 7 m width (dual-lane) in a 9 m wide formation within the RAC. Drainage will be improved by use of floodway crossings. Borrow pits will be established at regular intervals along the access road and in some instances retained for road maintenance during operations (Figure 2-2). A copper concentrate transfer area may be required to support driver transfer and fatigue management in the transport of copper concentrate from the MIA to the port via the RAC and Great Northern Highway.

Significant consultation with Main Roads Western Australia (MRWA) has been undertaken in relation to the intersection of the site access road with the Great Northern Highway and the construction of the site access road itself (Appendix A04). MRWA have confirmed that a MRWA "Application for a New Access" Form is required to be completed to enable MRWA assessment of the Winu road intersection with Great Northern Highway. Engagement with MRWA regarding the design of the intersection is continuing through direct liaison between the Proponent's engineering teams and MRWA officers. The Proponent expects that MRWA will formally provide approval on the intersection basis of design.

MRWA have also confirmed that outside of the Great Northern Highway intersection, the site access road will be a private road over which there are no formal MRWA requirements. As noted in Appendix A04, the Proponent continues to consult with MRWA on the access road, taking advantage of MRWA expertise.

Up to five discrete bores will be installed to provide the necessary water supply for the initial road construction upgrade, with a significantly lower ongoing requirement for maintenance due to the main access road being sealed. These bores will have localised water supply pipelines, with water storage and pumps, and will be installed adjacent to the road to provide water initially for construction of the road and then in some instances retained for ongoing road maintenance and limited dust suppression during operations given the road will be sealed.

Various unsealed heavy vehicle and light vehicle access roads will be required to support mining, processing and other supporting purposes.

2.1.2.12 Mine Support Facilities and Infrastructure

The Proposal includes, but is not limited to, the following support infrastructure and facilities:

2.1.2.12.1 Airstrip and Facilities

The Proposal requires a suitably sized airstrip to support the construction and operations phases. There is an existing unsealed airstrip located approximately 10 km east of the Winu deposit. The airstrip supports the Royal Flying Doctor Service (RFDS) and small commercial planes used by the Proponent.

A larger, sealed new airstrip will be constructed adjacent to the existing runway as part of the Proposal construction works and support a predominantly fly-in-fly-out (FIFO) workforce over the life of the Proposal. This airstrip will be designed and constructed to support operations of the approximate 100-seat (or smaller) aircraft commonly used in the Western Australia (WA) resources industry (e.g. Fokker 100, Embraer E190 or Dash 8 Q400). The airstrip will be sealed with an apron parking area for two planes and will only include basic supporting facilities such as an ablutions, undercover shelter and refuelling facilities as all administration, check-in and baggage handling will be carried out at the accommodation camp. Buses will deliver passengers to and from the airstrip where they will proceed directly to boarding. Baggage handling will be delivered from the accommodation camps directly to the aircraft.

A new road will be established to link the airstrip back to the mine and accommodation camps.

2.1.2.12.2 Accommodation

On-site accommodation camps are proposed to house construction and operations personnel. During construction the capacity will be approximately 900 personnel, with this reduced during operations. The camps will be a dual-purpose facility, initially constructed to provide sufficient accommodation for

construction and later reconfigured to provide permanent accommodation for operations. The camps will comprise, but not be limited to, ensuite rooms, kitchen, dining hall, gym, shop, offices and recreation facilities.

2.1.2.12.3 Wastewater and General Waste

A wastewater treatment plant (WWTP), spray-field and landfill will be installed at the accommodation camps (Section 2.1.2.8). The spray-field will be installed for discharge of treated effluent from the WWTP during most of the construction period and during operations.

A WWTP will also be installed at the MIA.

General waste

Waste types are generally classified as non-mineral waste or mineral waste. Mineral waste (e.g. waste rock & tailings) will be handled within the mining operations. Non-mineral waste will be classified as hazardous or non-hazardous (inert) and within both some of the waste streams are recyclable. Disposal methods will be categorised as a) on-site landfill (for non-recyclable inert waste), b) off-site utilising a licenced waste facility, or c) off-site recycled. The Proposal will operate with a waste minimisation philosophy as follows:

- Eliminate
- Minimise or reduce
- Recycle and reuse
- Treat and process
- Dispose.

During construction a landfill will be built and become accessible for the disposal of putrescible and inert waste streams (that cannot be recycled).

2.1.2.12.4 Explosives Storage

The detonators, emulsion, ammonium nitrate and fuel oil (ANFO) used for blasting will be stored in a licenced explosive magazine and ANFO facility approximately 5 km east of the pit.

2.1.2.13 Non-Process Infrastructure

Non-process infrastructure will be required to support the Proposal's operations. The infrastructure required includes but is not limited to the following:

- Heavy and light vehicle maintenance workshops
- Wash-down facilities
- Refuelling facilities
- Tyre change facilities
- Laydown areas
- Storage in warehouse and open yards
- Boilermaker workshop
- Bulk diesel and lubricant storage
- Drill core processing and storage facilities
- Oily water treatment
- Laboratories
- Site fire emergency and medical facilities
- Administration facility.

Controlled waste (e.g. oil, grease, coolant, hydrocarbons, tyres) will be sent off-site for disposal as required. A landfill facility will be installed for general and putrescible waste disposal.

2.1.2.13.1 Fuel Facility

Diesel fuel storage facilities will be required at the power station and workshops with road access for both areas to accommodate fuel deliveries. Power station diesel fuel will be stored in bunds that meet Western Australian industry standards and regulatory requirements. Diesel fuel for the mining fleet and operations vehicles will be stored in several self-bunded diesel storage tanks where they can be accessed for refuelling purposes.

2.1.2.14 Communications

2.1.2.14.1 Information Communications Technology

The Proposal's information and communication technologies (ICT) will incorporate site connection, camps, process plant, airport and corporate communications.

2.1.2.14.2 Site Connectivity Communications Infrastructure

Communications will comprise a combination of voice mobile radio (VMR) towers, microwave towers and fibre optic cabling.

VMR towers are required along the access roads, to provide two-way radio service for reliable communications route to ensure safety and support emergency response requirements during both the construction and operations phase.

Telecommunications towers will be required next to the camps, process plant and airstrip, to provide mobile phone, radio across site and internet network. It will also provide infrastructure for future functionality across the site (i.e. safety services and internet).

Fibre-optic cable will be connected to the existing Telstra regional fibre 'backbone' that runs along the Great Northern Highway installed below-ground alongside the access road to the camp and MIA. This cable will run parallel to the main access road to the MIA and accommodation camp.

To support the various ICT networks involved in plant operations a resilient fibre optic cable ring will be installed to transport instrumentation and control, communications and corporate networks around site.

Communications to support the Proposal will include, but is not limited to, a combination of a VMR network and a private long-term evolution (LTE) radio network. The infrastructure for these will include towers, semi-permanent skids, mobile trailers and microwave networks.

Site radio communications will also include communication to Rimfire for telemetry control as the borefield is automated.

2.1.3 Proposal Exclusions

The scope of this Proposal is subject to assessment under Part IV of the EP Act and, separately, the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and; therefore, excludes the following low-impact activities:

- Utilisation and/ or upgrade of existing infrastructure, including access road/tracks, existing airstrip and current exploration accommodation camp required to inform Proposal planning and investigations. An existing Native Vegetation Clearing Permit (NVCP) CPS9561/1 was granted in 2022 to cover the existing unsealed road and enable any safety-based improvements for exploration and evaluation activities. This NVCP will be relinquished once the new (sealed) road has been constructed under this Proposal
- Ongoing low-impact exploration and investigation activities to inform the environmental impact assessment of this Proposal including, but not limited to, drilling and associated activities for resource evaluation, geotechnical assessments, and hydrogeology investigations
- Development and use of groundwater supplies to support the exploration and investigation activities.

Any new ground disturbance to support the mentioned activities will be minimised and located to avoid environmental and ACH values. Approvals for the ongoing exploration and investigations activities have been or will be, sought separately under the EP Act, Mining Act and *Rights in Water and Irrigation Act 1914* (WA) (RiWI Act), as required.

EPA consent may be sought for minor or preliminary works associated with the Proposal under s 41A(3) of the EP Act.

2.2 Proposal Alternatives

2.2.1 Justification of the Proposal

The Proposal will recover and process a high-quality mineral inventory comprising copper and gold (and silver). Copper and gold are critical materials required in the energy and technology sectors to develop various low emissions technologies such as wind turbines and batteries. The growing demand for these metals in renewables and other markets demonstrates that the Proposal represents a long-term and reliable economic resource.

The Proposal will result in economic benefits for WA and Australia through:

- Contribution to the value of mineral exports, particularly those required for decarbonisation processes
- Royalties and taxation payments
- Mining benefit payments and other economic benefits to both Traditional Owner groups.
- Development and ongoing sustaining capital investment
- Sustaining direct and indirect employment opportunities in the region
- Sustaining demand for goods and services supporting the National, State and local economy.

The ongoing activities of the Proponent, and more broadly Rio Tinto, within Western Australia will continue to support social and economic development projects, including:

- Continued education, training, employment and business opportunities for local people, including Nyangumarta People and Martu People, and other locally-based Aboriginal people
- Continued funding for various regional organisations, including sporting and cultural groups.

2.2.2 Location Alternative and Project Optimisation

The location of the economic mineral deposit defines the location of the Proposal. No alternative copper-gold deposits have been identified as suitable for the development. Furthermore, as the Proposal is a single mining pit operation, backfilling of the pit (either progressively or at closure) would render the Proposal uneconomic and result in the sterilisation of the remaining mineral resource. However, the Proposal design and scope have been optimised to mitigate environmental, cultural and social impacts through various considerations such as design, layout and mitigation strategies. The approach to mitigation through developing the final Development Envelope is described below.

2.2.2.1 Changes to the Proposal to Avoid or Minimise Environmental or ACH Impacts

The proposed Development Envelope has been reduced from 37,744 ha to 23,649 ha. The Development Envelope and Conceptual Footprint has been adjusted where possible to avoid or minimise impacts on known significant environmental and ACH values, and to allow more time for consultation and assessment of some of the removed areas from an environmental and cultural perspective (Figure 2-7).

EPA approval under s 43A of the EP Act was granted on 3 September 2025 to amend the Proposal during the assessment, accommodating the changes outlined in Table 2-2.

Table 2-2: Changes to the Proposal to Avoid or Minimise Environmental or ACH Impacts

Changes Made	Relevant Figure	Outcome Achieved
The RAC has been redesigned	Figure 2-6, Inset 1	Avoidance of rocky outcrops - potential habitat critical to the survival of the Black-footed Rock-wallaby/Moororong, listed as Endangered under the *Biodiversity Conservation Act 2016* (WA) and the EPBC Act (Cth) as shown in Figure 2-6, Inset 1. Mitigation actions regarding potential impacts to Black-footed Rock-wallaby/Moororong are discussed in Section 9.
Amendment to the MIA Development Envelope to avoid an active Bilby population	Figure 2-6, Inset 4	Areas of current Bilby occupation and active burrows were identified south-east of the MIA during a survey in 2019. Subsequent 2-yearly Bilby Abundance studies have confirmed the continued presence of that population. As shown in Figure 2-6, Inset 4, this area has been excluded from the Development Envelope.
The accommodation camp has been relocated	Figure 2-7	The accommodation camp site as originally planned was moved in consultation with Nyangumarta Traditional Owners to avoid areas of ACH as shown in Figure 2-7. Mitigation actions regarding potential impacts to ACH values are discussed in Section 6.
The Development Envelope was subject to a co-design process with the Nyangumarta People	Figure 2-7	Culturally important tree stands identified by the Nyangumarta People were incorporated within the accommodation camp that has been co-designed with the Nyangumarta People as shown in Figure 2-7. Mitigation actions regarding potential impacts to ACH values are discussed in Section 6.
The TSF was redesigned and relocated	Figure 2-8	Areas of ACH importance were avoided by the redesign and relocation process associated with the TSF, conducted in consultation with the Nyangumarta People. Multiple options were considered by the Proponent and the Nyangumarta People, as shown in Figure 2-8, before the preferred location was selected. Mitigation actions regarding potential impacts to ACH values are discussed in Section 6.
A potential aquifer reinjection (managed aquifer recharge) area was removed from the Proposal prior to the initial EPA referral	Figure 2-6, Inset 2	A review of a potential opportunity for reinjection of surplus water into the aquifer to the north of the Development Envelope demonstrated this form of surplus water disposal was not technically feasible, and was removed in

Changes Made	Relevant Figure	Outcome Achieved
		favour of infiltration areas and localised managed aquifer recharge within the MIA (Section 2.1.2.8). This decision was made prior to the initial EPA referral and reduced the area of impact by approximately 2,410 ha as shown in Figure 2-6, Inset 2. Mine water supply, water balance and mitigation actions regarding potential impacts to Inland Waters are discussed in Section 7.
The Wallal Borefield was removed from the Proposal	Figure 2-6	Avoidance of potential impacts to sensitive (groundwater dependent) receptors at Eighty Mile Beach and Walyarta (Mandora) Marsh, in response to regulator concerns. This reduced the Development Envelope by approximately 904 ha as shown in Figure 2-6. Ongoing water balance refinements and borefield investigations have confirmed that pit dewatering water, recycled process water, captured surface water and water abstracted from Rimfire will meet Proposal needs. Mitigation actions regarding impacts to groundwater dependent ecosystems are discussed in Section 8.
The Texas Borefield was removed from the Proposal	Figure 2-6, Inset 3	Avoidance of potential impacts on known or potential Night Parrot roosting and foraging habitat. This reduced the Development Envelope by approximately 10,213 ha as shown in Figure 2-6, Inset 1. The removal of the Texas Borefield has prevented the potential clearing of up to 322,029 *Cynodon anisocarpus* individuals. As stated above, Proposal water needs can be met through other sources. Mitigation actions regarding potential impacts to Night Parrot and its habitat are discussed in Section 9.
Inclusion of ACH Exclusion Zone	Figure 2-6	Refers to an area within the Development Envelope where no direct disturbance is permitted unless in response to an emergency event or a contingency action associated with monitoring and management. These zones have been requested by the Traditional Owners as outlined in Figure 2-9.
Reduction of the Development Envelope at Rimfire	Figure 2-10	Avoidance of potential impacts on known or potential Night Parrot roosting and foraging habitat. Eastern parts of the original Development Envelope including borefield pipeline routes were amended and optimised to enable a reduction in Development Envelope and avoid potential habitat. This

Changes Made	Relevant Figure	Outcome Achieved
		reduced the Development Envelope by approximately 2,757 ha as shown in Figure 2-10. Mitigation actions regarding potential impacts to Night Parrot and its habitat are discussed in Section 9.
The pipeline route from the MIA to Rimfire has been rerouted.	Figure 2-10	Following consideration and ACH survey works by the Martu People, a preferred pipeline route from the MIA to Rimfire was agreed that minimised dune crossings and any sensitive areas. This included a diversion to increase the distance away from Night Parrot habitat as shown in Figure 2-10. Mitigation actions regarding potential impacts to ACH values are discussed in Section 6.
An ore stockpile has been relocated	Figure 2-11	The ore stockpile as originally planned was moved to minimise impacts to *Dasymalla chorisepala.* This relocation has prevented the potential clearing of up to 91.3% of *D. chorisepala* individuals within the population (Figure 2-11). Mitigation actions regarding potential impacts to *Dasymalla chorisepala* are discussed in Section 8.

120°30'0"E
121°0'0"E
121°30'0"E
122°0'0"E
20°0'0"S
20°30'0"S

Great Northern Hwy

N

Wallal Bore Field

NYANGUMARTA PEOPLE (PART A)

Legend

- Highway
- Current Development Envelope
- Historic Development Envelope Boundaries
- Mining Lease
- Rock outcropping
- Bilby Populations

Night Parrot Habitat

- Foraging
- Roosting
- Native Title Determinations

INSET 1

INSET 2

INSET 3

INSET 4

Reinjection Area

Rimfire Bore Field

MARTU (AREA A)

Texas Bore Field

0 10 20 Kilometres

RioTinto

Figure 2-6: Development Envelope Modifications to Avoid Environmental Impacts

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Friday, 29 May 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:475,000
Rio Tinto © Copyright

Path: _\\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx - ERD - Development Envelope Modifications to Avoid Enviro Impacts

121°36'0"E

121°38'0"E

20°42'0"S

N

Legend

- Previous Accommodation Village Location
- New Accommodation Village Location
- Current Development Envelope
- Historic Development Envelope Boundaries
- Mining Lease

Heritage Survey Sites and Exclusion Areas

- Conditionally Cleared
- Sites and Exclusion Areas

Stand of Trees

RioTinto

Figure 2-7: Accommodation Village Modifications to Avoid Areas of Heritage Importance

Rio Tinto Copper (RTC)

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Date Published: Friday, 29 May 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:20,000
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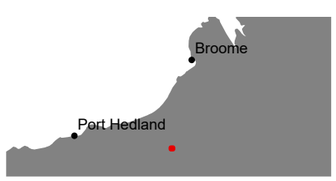

0 500 1,000 Meters

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121°36'0"E

121°38'0"E

121°38'0"E
121°40'0"E
121°42'0"E
121°44'0"E
20°42'0"S
20°44'0"S

N

Legend

- Proposed TSF
- TSF Options Considered
- Historic Development Envelope Boundaries
- Current Development Envelope
- Mining Lease

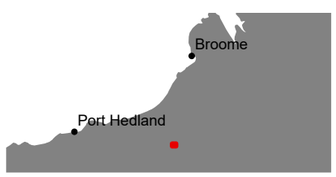
Heritage Survey Sites and Exclusion Areas

- Conditionally Cleared
- Sites and Exclusion Areas

0 1 2 Kilometres

RioTinto

Figure 2-8: Tailings Storage Facility Modifications to Avoid Cultural Heritage Impacts



Rio Tinto Copper (RTC)

Publisher: B.Gardiner
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Coordinate System:
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Datum: GDA 1994
Units: Degree
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121°52'0"E
121°54'0"E
121°56'0"E
121°58'0"E
122°0'0"E

20°48'0"S
20°50'0"S
20°52'0"S

Deviation to avoid
Night Parrot Habitat

N

Legend

- Proposed Rimfire Pipeline
- Previous Rimfire Pipeline Alignment
- Current Development Envelope
- Historic Development Envelope Boundaries

Night Parrot Habitat

- Foraging
- Roosting

RioTinto

Figure 2-10: Development Envelope Reduction at Rimfire

Rio Tinto Copper (RTC)

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Date Published: Friday, 29 May 2026

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Datum: GDA 1994
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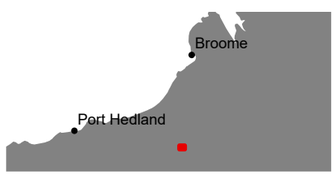

0 1 2 Kilometres

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Originally Planned Layout

Stockpile Relocated

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

Legend

- Native Title Determinations
- Dasymalla Chorisepala (50m buffer)
- Development Envelope

Proposal Elements

- Topsoil Stockpiles
- Roads
- Borrow Pits
- Laydown
- Wind Farm
- Ore Stockpiles
- Ponds
- Mine Construction Area
- Processing Plant
- ROM Pad
- Solar Farm
- Tailings Storage Facility
- Waste Rock Landform

RioTinto

Figure 2-11: Stockpile Relocation to Minimise Impacts to P3 Dasymalla chorisepala

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Thursday, 4 June 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:42,221
Rio Tinto © Copyright

N

0 2 4 Kilometres

Path: \\pe1-shared\Wins\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Topsoil Stockpile Reolcation Impact Reduction

2.3 Local and Regional Context

2.3.1 Bioregion

The Proposal is predominantly situated within the Mackay (GSD02; Section 2.3.1.1) and McLarty (GSD01; Section 2.3.1.2) subregions of the Great Sandy Desert Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (DCCEEW 2021). The MIA is within the Mackay subregion, while the RAC and Rimfire stretch from the south in the Mackay subregion through the McLarty subregion in the north.

Part of the RAC, approximately 6 km at its westernmost end, is located in the Pindanland subregion (DAL02; Section 2.3.1.3) of the Dampierland bioregion. Mapping of the relevant IBRA regions and subregions are provided in Figure 2-14.

2.3.1.1 Mackay Subregion (GSD02)

“Mainly tree steppe grading to shrub steppe in south; comprising open hummock grassland of *Triodia pungens* and *Triodia schinzii* with scattered trees of *Owenia reticulata* and bloodwood (*Corymbia* spp.), and shrubs of *Acacia* spp., *Grevillea wickhamii* and *G. refracta*, on Quaternary red longitudinal sand dune fields overlying Jurassic and Cretaceous sandstones of the Canning and Armadeus Basins. *Casuarina decaisneana* (Desert Oak) occurs in the south and east of the region. Gently undulating lateritised uplands support shrub steppe such as *Acacia pachycarpa* shrublands over *Triodia pungens* hummock grass. Calcrete and evaporite surfaces are associated with occluded palaeo-drainage systems that traverse the desert; these include extensive salt lake chains with samphire low shrublands, and *Melaleuca glomerata - M. lasiandra* shrublands. Monsoonal influences are apparent in the north-western sector of this region” (Kendrick 2001).

2.3.1.2 McLarty Subregion (GSD01)

“Mainly tree steppe grading to shrub steppe in south; comprising open hummock grassland of *Triodia pungens* and *Triodia schinzii* with scattered trees of *Owenia reticulata* and Bloodwoods, and shrubs of *Acacia* spp, *Grevillea wickhamii* and *G. refracta,* on Quaternary red longitudinal sand dune fields overlying Jurassic and Cretaceous sandstones of the Canning and Armadeus Basins. *Casuarina decaisneana* (Desert Oak) occurs in the far east of the region. Gently undulating lateritised uplands support shrub steppe such as *Acacia pachycarpa* shrublands over *Triodia pungens* hummock grass. Calcrete and evaporite surfaces are associated with occluded palaeo-drainage systems that traverse the desert; these include extensive salt lake chains with samphire low shrublands, and *Melaleuca glomerata - M. lasiandra* shrublands. It includes the Mandora Paleoriver System. Red-brown dunefields with finer texture than further south. Includes gravely surfaces of Anketell Ridge along its northern margin” (Graham 2001b).

2.3.1.3 Pindanland Subregion (DAL02)

“The Pindanland subregion comprises sandplains of the Dampier Peninsular and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. it is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. The vegetation is described primarily as pindan. This is the coastal, semi-arid, north-western margin of the Canning Basin... Quaternary sandplain overlying Jurassic and Mesozoic sandstones with Pindan. There are hummock grasslands on hills. Quaternary marine deposits on coastal plains, with mangal, samphire – *Sporobolus* spp. grasslands, *Melaleuca alsophila* low forests, and *Spinifex* spp. – *Crotalaria* spp. strand communities. Quaternary alluvial plains associated with the Permian and Mesozoic sediments of Fitzroy Trough support tree savannahs of ribbon grass (*Chrysopogon* spp.) – bluegrass (*Dichanthium* spp.) grasses with scattered coolibah (*Eucalyptus microtheca*) - *Bauhinia cunninghamii*. There are riparian forests of river red gum (*Eucalyptus camaldulensis*) and Cadjeput (*Melaleuca* spp.) fringe drainages” (Graham 2001a).

2.3.2 Climate

The Paterson Province has a semi-arid climate with extremely hot summers and warm winters. The Bureau of Meteorology (BoM) weather stations at Telfer Aero (Station Number 013030), Marble Bar (Station Number 004106), and Mandora (Station Number 004019) provide a relevant range of climate statistics. The Telfer station has been operating since 1974, providing approximately 50 years of data, while the Mandora station has been operating since 1913, providing 111 years of data (62 years of temperature data), and the current Marble Bar station has been operating since 2000, providing 24 years of data.

Average monthly minimum and maximum temperature at Telfer Aero, Marble Bar and Mandora, along with rainfall are provided in Table 2-3 and Figure 2-12. The hottest months are November, December, and January while the coolest months are June, July, and August. Mandora has noticeably cooler maximum temperatures as it is situated near the coast while Telfer and Marble Bar are further inland.

Most rain falls between January and March, during the monsoon season. The average annual rainfall for Telfer is 371.6 mm while it is 394.7 mm in Marble bar and 379 mm in Mandora, indicating there is some minor variability in rainfall across the area.

Pan evaporation for the south-western Little Sandy Desert bioregion ranges from 16 mm/day in January to 4 mm/day in June at an annual daily average of 10 mm (van Leeuwen 2002) as shown in Figure 2-13. The predominant wind direction is from the east.

Table 2-3: Climate Statistics of the Paterson Province

Climate Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Telfer Aero (BoM Station 013030)												
Mean maximum temperature (°C)	40.3	38.9	37.6	34.6	29.1	25.4	25.6	28.6	33.0	37.5	39.5	40.5
Average minimum temperature (°C)	26.1	25.5	24.3	20.7	15.5	12.0	10.8	12.7	16.7	21.2	23.7	25.7
Average rainfall (mm)	63.7	95.9	75.2	19.2	18.8	12.4	10.6	5.2	3.2	3.5	15.2	48.7
Marble Bar (BoM 004106)												
Mean maximum temperature (°C)	40.9	39.8	38.3	36.2	31.1	27.1	27.7	30.5	34.9	38.9	40.7	42.0
Average minimum temperature (°C)	26.5	26.1	25.2	22.1	17.0	13.3	12.1	13.3	17.1	21.7	24.1	26.4
Average rainfall (mm)	107.3	82.7	77.9	22.5	13.4	22.5	11.8	1.3	4.6	2.8	12.5	35.4
Mandora (BoM Station 004019)												
Mean maximum temperature (°C)	36.0	35.7	37.0	36.3	32.3	29.2	29.1	31.0	33.9	36.1	36.7	36.8

Climate Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average minimum temperature (°C)	25.5	25.0	24.1	20.9	17.0	14.2	12.5	13.3	15.8	19.2	22.0	24.6
Average rainfall (mm)	89.0	103.6	72.2	18.7	25.1	16.9	8.4	2.4	1.1	1.2	6.3	34.1

Source: (BoM 2023)

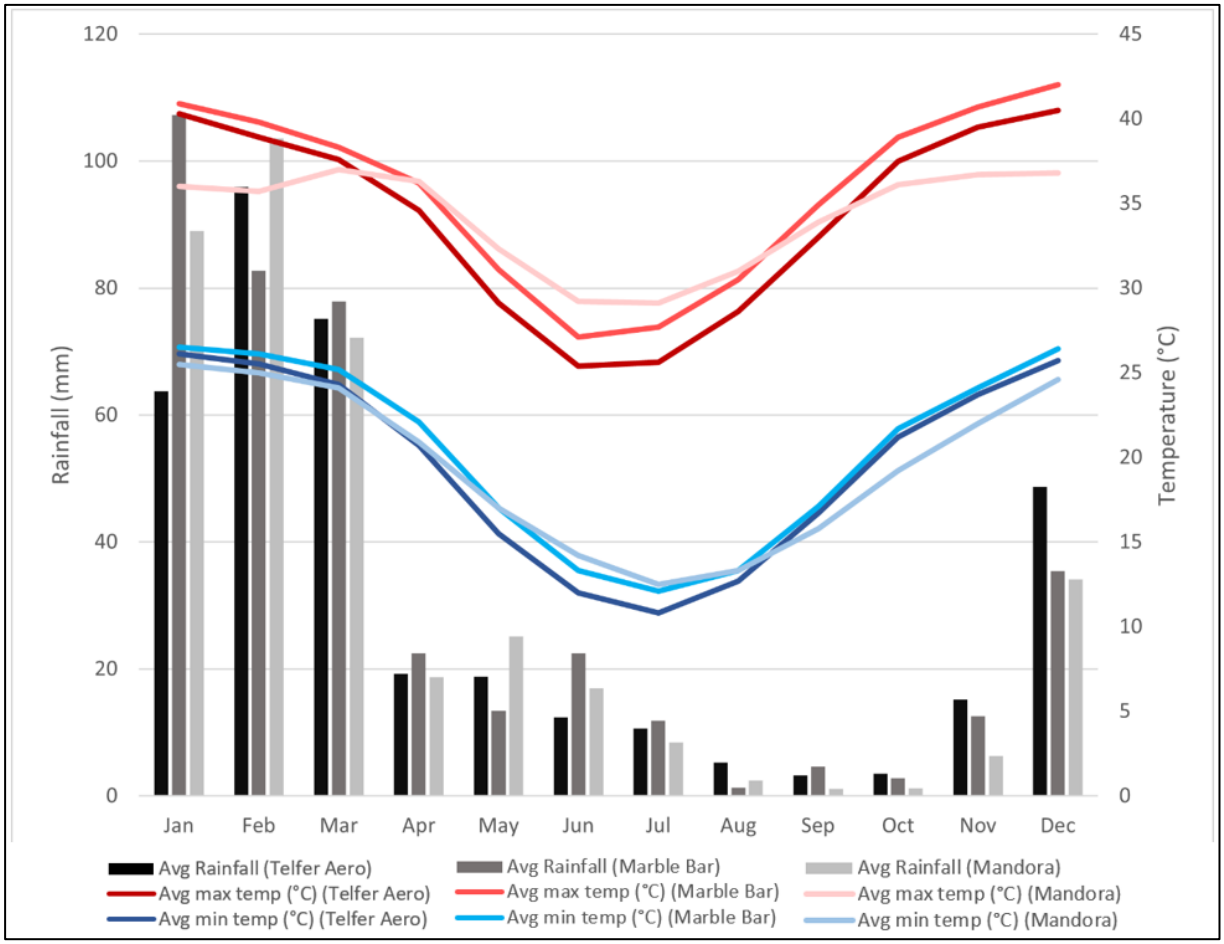

Figure 2-12: Graphical Representation of Climate Statistics

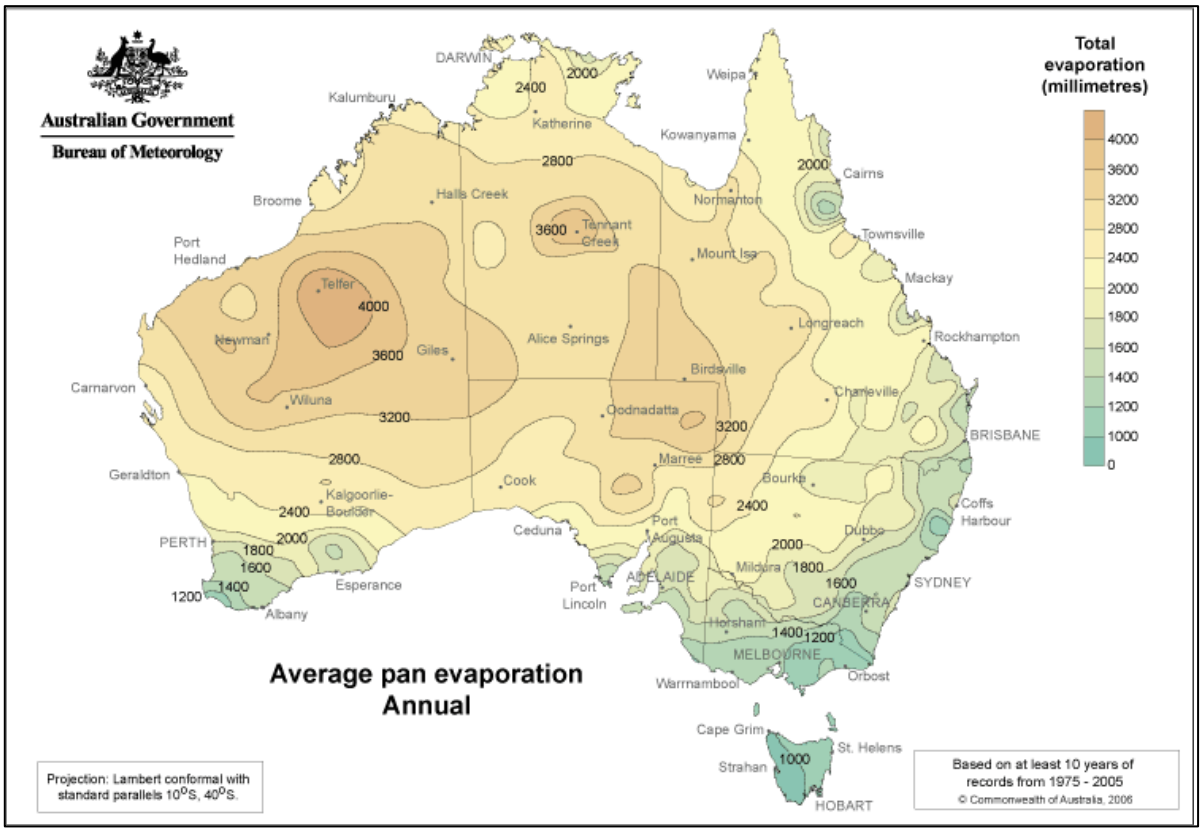

Figure 2-13: Average Annual Pan Evaporation Estimates

2.3.2.1 Climate Change

Climate projections show very high confidence for substantial temperature increases to continue in the Pilbara due to the effects of climate change, with the north-west of Western Australia warming more than elsewhere in Australia. Under an intermediate ($CO_{2\text{-}e}$) emissions scenario, mean annual warming in the region (Rangelands) is projected to be 1°C (range 0.6-1.4°C) by 2030 and 2.1°C (1.5-2.9°C) by 2090 relative to 1986-2005 levels, respectively (GoWA 2021; DPIRD 2025). Under a high emissions scenario this increases to 1°C (0.8-1.4°C) by 2030 and 4.3°C (2.9-5.3°C) by 2090, with the intensity of hot spells also projected to increase under both scenarios.

Annual rainfall in the Rangelands is predicted to decline by 2% for a high-emission scenario, with little change under an intermediate-emission scenario (DPIRD 2025). The frequency of tropical cyclones may decrease by as much as 50% by 2090; however, rainfall and cyclone intensity are predicted to increase.

In an intermediate-emission scenario, median annual evaporation in the Rangelands will increase by 3.0% by 2030, and 3.4% in a high-emission scenario. By 2090, median annual evaporation will increase by 4.6% to 6.5% in mid to high-emission scenarios, respectively.

Fire frequency and severity are expected to increase with the number of days with severe fire danger rating likely to increase over most of WA in response to increased temperatures and decreased rainfall (DPIRD 2025). The greatest projected increases in severe fire days are in the Pilbara and northern rangelands for intermediate- or high-emission scenarios.

2.3.3 Regional Geology

The MIA is located on the Anketell Shelf of the Yeneena Basin. The Winu deposit lies within metamorphosed sandstone, siltstone and lesser mafic rocks, which are considered correlatives of the upper Malu Formation of the Yeneena Basin and host to the large Telfer gold-copper deposit. The evolution of the Basin represents the later stages of long-lived convergence of the North and West Australian cratons when plate collision stopped subduction (Hickman and Bagas 1999). In the MIA,

copper-gold mineralisation occurs in a series of lodes with strike lengths between 350 m and 750 m, northerly trends and moderate easterly dips surrounded by a more extensive halo of low-grade mineralisation. The host rocks are covered by at least 50 m of younger, unmineralised rocks, sand and soil. Largely undeformed Permian sandstone, mudstone and diamictite unconformably overlie the host rocks covered with windblown sand.

On a regional scale, the geology comprises a north-north-west trending belt of folded and metamorphosed Proterozoic sedimentary and igneous rocks in north-western Australia. The rocks are more than 9 km thick and were intruded by dolerite sills, dykes and granite plutons approximately 650 to 600 million years ago. The current interpretation of the lithological succession of the Yeneena Basin is deposition in a series of strike-slip basins in a continental margin setting with a landmass to the south-west (Hickman and Bagas 1999). The Miles Orogeny (over 800 million years ago; Cross et al. 2011) produced north-east to north-north-west trending folds and thrusts (Czarnota et al. 2010; Huston et al. 2010).

Phanerozoic sedimentary rocks of the Canning Basin are present in the MIA. These sedimentary units include large confined and unconfined sandstone-hosted aquifers north of Winu, part of the Wallal aquifer. Regionally, the sedimentary sequences of the Canning Basin both unconformably overlie and are faulted against the older Proterozoic rocks of the Yeneena Basin.

Further description of Proposal geology is provided in Section 7.

2.3.4 Topography and Major Watercourses

Regionally, linear sand dunes and aeolian plains of red sand dominate the Great Sandy Desert landscape (Van Etten 2020). Dunes are typically oriented east-west to west-north-west. However, the dunes run in and around the Development Envelope in a west-north-west to east-south-east alignment (SLR 2025). Interdunal depressions occur in the lowland areas between the linear dunes. Jurassic and Cretaceous sandstones form gently undulating laterised uplands in areas of the Great Sandy Desert (Van Etten 2020).

The region experiences little to no surface water runoff, surface water features tend to be ephemeral and sparse, and no major watercourses intersect the Development Envelope.

There are no significant lakes or wetlands in the vicinity of the Proposal, with the nearest the Ramsar-listed Eighty Mile Beach wetland system, which includes the Mandora Salt Marsh (Walyarta) and intertidal mudflats, located approximately 85 km north-west of the MIA and 30 km north of the RAC (Figure 2-15).

2.3.5 Social Setting

The Development Envelope is within the Nyangumarta and Martu native title determination areas and predominantly within the Shire of East Pilbara (SoEP) with a small section (approximately 18 km) of the RAC from the Great Northern Highway end within the Shire of Broome (Figure 1-1; Figure 3-1). The SoEP is a sparsely populated region encompassing an area of 372,571 km^2 with approximately 10,304 residents, most of which are concentrated in the Shire's main towns – Newman, Marble Bar and Nullagine, and several smaller Aboriginal communities, including Jigalong, Punmu, Parngurr, Irrungadji (at Nullagine) and Parnpajinya (at Newman) (Shire of East Pilbara 2023; ABS 2023).

Marble Bar and Nullagine are the nearest townsites to the MIA and Rimfire, approximately 190 km south-west and 210 km south-south-west, respectively. The nearest Aboriginal communities in the SoEP are Punmu, approximately 200 km south-east of the MIA, and Irrungadji at Nullagine (Figure 1-1). The Aboriginal community of Bidyadanga is located in the neighbouring Shire of Broome. The community is located approximately 170 km north-east of the RAC intersection with the Great Northern Highway. Bidyadanga is in Karajarri country but is also currently home to many Nyangumarta People (along with Port Hedland and Broome). The RAC-Great Northern Highway intersection is 1 km north of the Eighty Mile Beach Caravan Park turnoff, approximately 40 km west-south-west of the Sandfire Roadhouse and

approximately 90 km east-north-east of the Pardoo Roadhouse. The RAC is approximately 160 km from Marble Bar at its nearest point.

2.3.6 Land Systems

Land systems of the Western Australian rangelands have been mapped and described by the Department of Primary Industries and Regional Development (DPIRD), outlining the distributions and providing comprehensive descriptions of biophysical resources, including soil and vegetation condition.

The Proposal occurs within six land systems, with Little Sandy and Nita covering most of the Development Envelope (Table 2-4 and Figure 2-16).

Table 2-4: Land Systems

Land System	Description	Current Extent in IBRA Subregions^		Extent in Development Envelope	
		ha	%	ha*	%
Little Sandy	Sandplains with linear and reticulate dunes supporting shrubby spinifex grasslands	1,287,831	3.0	11,839	50.1
Nita	Sandplains supporting shrubby spinifex grasslands with occasional trees	1,443,080	3.3	2,221	9.4
Callawa	Highly dissected low hills, mesas and gravelly plains on sandstone and conglomerate supporting spinifex grasslands	97,602	0.2	2,061	8.7
Buckshot	Gravelly sandplains and sporadic sand dunes supporting shrubby hard spinifex grasslands	8,775	<0.01	96	0.4
AB40	Gently undulating plain and dominated by longitudinal dunes, many exposures of ironstone gravels and some breakaways capped by ironstone	5,183,380	11.9	7,241	30.6
B30	Largely stable linear dune fields with swales opening locally into sand plains	195,230	0.5	191	0.8

**Area has been rounded up to the nearest ha.* Source: *(van Vreeswyk et al. 2004) ^Mackay, McLarty and Pindanland subregions*

120°30'0"E
121°0'0"E
121°30'0"E
122°0'0"E
20°0'0"S
20°30'0"S
21°0'0"S

N

Legend

- Development Envelope
- Native Title Determinations

IBRA subregions

- DAL02
- GSD01
- GSD02
- PIL01

KARAJ

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

0 10 20 Kilometres

RioTinto

Figure 2-14: IBRA Regions and Subregions

Rio Tinto Copper (RTC)

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Date Published: Friday, 29 May 2026

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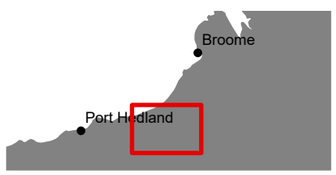

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250213_Mine_Closure_Plan_MCP\W21_012_Mine_Closure_Plan_MCP.aprx Layout: IBRA Sub Regions

120°30'0"E
121°0'0"E
121°30'0"E
122°0'0"E
20°0'0"S
20°30'0"S

Eighty Mile Beach System
Great Northern Hwy
Mandora Salt Marsh
N
NYANGUMARTA PEOPLE (PART A)
MARTU (AREA A)

Legend

- Development Envelope
- Native Title Determinations
- Wetlands (DBCA)

Fauna Habitat

- Inland sand dunes
- Rock outcropping

0 10 20 Kilometres

RioTinto

Figure 2-15: Key Topographic Features

Rio Tinto Copper (RTC)

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Date Published: Friday, 29 May 2026

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Datum: GDA 1994
Units: Degree
Scale: 1:500,000
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Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Key Topographic Features

120°30'0"E
121°0'0"E
121°30'0"E
122°0'0"E
20°0'0"S
20°30'0"S

N

Legend

- Development Envelope
- Native Title Determinations

DPIRD Soil Systems

- AB21 atlas system
- AB22 atlas system
- AB40 atlas system
- Anna System
- AY1 atlas system
- B28 atlas system
- B29 atlas system
- B30 atlas system
- Boolgeeda System
- Buckshot System
- Calcrete System
- Callawa System
- Capricorn System
- Coongimah System
- Eighty Mile System
- Great Sandy System
- Little Sandy System
- Lochinvar System
- Mallina System
- Mandora System
- Mannerie System
- McKay System
- Nita System
- Oakover System
- Paterson System
- Pullgarah System
- River System
- Robertson System
- Rocklea System
- Uaroo System

NYANGUMARTA-KARAJARRI OVERLAP PROCEEDING (YAWINYA)
NYANGUMARTA PEOPLE (PART A)
MARTU (AREA A)
Phire
Anna system
Mandora system
Nita system
Great Northern Hwy
72 m
111 m
Nita system
AB21 atlas system
AB40 atlas system
AB22 atlas system
287 m
286 m
279 m
273 m
AY1 atlas system
Little Sandy system
Callawa system
Callawa system
Capricorn system
Nita system
Mallina system
B30 atlas system
319 m
Lochinvar system
Coongimah system
Rocklea system
311 m
318 m
325 m
Little Sandy system
Little Sandy system

0 10 20 Kilometres

RioTinto

Figure 2-16: Land System Distribution

Rio Tinto Copper (RTC)

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Date Published: Friday, 29 May 2026

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Datum: GDA 1994
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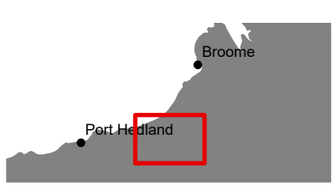

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250213_Mine_Closure_Plan_MCP\W21_012_Mine_Closure_Plan_MCP.aprx Layout: Land Systems

2.3.7 Land Use

Most of the region around the Proposal is Unallocated Crown Land (UCL). Current land use in and around the Development Envelope mostly involves Nyangumarta People and Martu People's management and enjoyment of, and interaction with, 'Country' in accordance with their Native Title rights and cultural responsibilities.

The majority of the Development Envelope, including all active mining areas, occurs within the Nyangumarta native title determination area (NTT no WCD2009/001; -Federal Court no WAD6281/1998; WAD234/2007) and the Nyangumarta Indigenous Protected Area (IPA), which the Nyangumarta Rangers actively manage through the implementation of the Nyangumarta Warrarn IPA Management Plan 2022-2032.

Part of the Development Envelope, including the airstrip occurs on the Martu native title determination area (NNTT no WCD2003/002, Federal Court no WAD6110/1998).

Additional land use in the region includes pastoral grazing. A portion of the Development Envelope in the RAC (close to the Great Northern Highway) is within the Wallal Downs pastoral lease, with the highway intersection approximately 8 km south-south-east of the station homestead (Figure 1-1; Figure 3-1). The Development Envelope does not intersect any other pastoral leases - the closest to the MIA is Warrawagine Station, approximately 100 km to the west.

The Australian Renewable Energy Hub (AREH) development area is a potential additional land use in the region.

The Great Northern Highway is the only sealed road in the region, which otherwise hosts a sparse network of non-dedicated, unsealed, single-lane, four-wheel drive only tracks. The existing Access Road will be used where possible to form the basis of the proposed RAC. This includes 97 km of the western end of an existing track known as the Nyangumarta Highway, 54 km of track known as Wirlkirr Wirlkirr Road and 32 km of a track locally named Copperhead Road.

2.3.8 Conservation Reserves and Environmentally Sensitive Areas

There are no conservation reserves or Environmentally Sensitive Areas (ESAs) near the Proposal, with the nearest being Walyarta Conservation Park (encompassing the Mandora Salt Marsh), located approximately 40 km north of the RAC at its nearest point (Figure 2-17). Both the Nyangumarta IPA and the Martu IPA are within (being Nyangumarta) or in the vicinity of (being Martu) the Development Envelope.

2.3.9 Existing and Reasonably Foreseeable Projects

Eight existing and reasonably foreseeable projects are within 150 km of the Proposal. Table 2-5 lists existing projects that are either operational or have been recently approved within the Mackay, McLarty and Pindanland Subregions; these projects are also shown in Figure 2-18.

Table 2-5: Existing and Reasonably Foreseeable Projects within 150 km^ of the Proposal

Project	Status	Approximate Distance to MIA^ (km)	Nearest Distance to Development Envelope (km)
Asian Renewable Energy Hub (now known as the Australian Renewable Energy Hub [AREH])	Pending	35	0 (intersects RAC)
Gas Pipeline to Nifty Copper Operations / Nifty Copper Operations	Existing	85	70 (Rimfire)
Pardoo Irrigated Agriculture Project – Stage 3	Existing	190	70 (RAC)

Project	Status	Approximate Distance to MIA^ (km)	Nearest Distance to Development Envelope (km)
Woodie Woodie Manganese Mine & Woodie Continued Operations Project	Existing	105	105 (MIA)
Telfer-Havieron Gold Mining Project	Telfer -Existing Havieron – Existing/Pending	120	95 (Rimfire)
Telfer Project, Expansion of Telfer Gold Mine	Existing	115	92 (Rimfire)
Telfer Project, Power Supply and Infrastructure Corridor	Existing	55	40 (RAC)
Goldsworthy Iron Ore Mines Extension Project	Existing	145	80 (RAC)

^Distance to MIA is calculated from the centre of the MIA

120°0'0"E

122°0'0"E

20°0'0"S

22°0'0"S

Legend

- Development Envelope
- Native Title Determinations
- Indigenous Protected Areas
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)

DBCA - Legislated Lands and Waters (DBCA-011)

- National Park
- Nature Reserve
- Conservation Park
- Section 5(1)(h) Reserve
- Marine Park

N

Jinmarnkur Conservation Park

Jinmarnkur Kulja Nature Reserve

Kujungurru Warrarn Nature Reserve

Eighty Mile Beach Nature Reserve

North Turtle Island Nature Reserve

Shared Nyangumarta-Wanparta 'Gap' Nature Reserve

Kujungurru Warrarn Conservation Park

Walyarta Conservation Park

Kurriji Pa Yajula Nature Reserve

Eighty Mile Beach Marine Park

Jarrkunpungu Nature Reserve

Purungunya Conservation Park

Purungunya National Park

Karlamilyi National Park

NYIKINA MANGALA and NYIKINA MANGALA #2
NYIKINA MANGALA

KARAJARRI PEOPLE (AREA A)

Karajarri / Karajarri Kura Jurrar IPA

KARAJARRI PEOPLE (AREA B)

NGARLA AND NGARLA 2 (AREA A)

NYANGUMARTA PEOPLE (PART A)

Nyangumarta Warrarn IPA

NGURRARA (AREA A)

NYAMAL PEOPLE #10

NYAMAL PEOPLE #1

KARIYARRA PEOPLE

MARTU (AREA A)

KULYAKARTU & KULYAKARTU 2 PART A

NYIYAPARLI PEOPLE

GREAT SANDY DESERT

EDGAR RANGE

PUNTAPONTA HILLS

Great Northern Hwy

Port Hedland

Nullagine

262 m
232 m
128 m
155 m
327 m
319 m
325 m
353 m
395 m
481 m
364 m
336 m
255 m

0 25 50 Kilometres

RioTinto

Figure 2-17: Conservation Reserves and ESAs within and Surrounding the Proposal

Rio Tinto Copper (RTC)

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Date Published: Friday, 29 May 2026

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120°0'0"E

122°0'0"E

20°0'0"S

22°0'0"S

Legend

- Project Locations
- Gas Pipeline to Nifty Copper Operations
- Goldsworthy Iron Ore Mines Extension Project (indicative)
- Pardoo Irrigated Agriculture Project – Stage 3 (indicative)
- Telfer Project, Power Supply and Infrastructure Corridor (indicative)
- Australian Renewable Energy Hub (File Notation Areas - DEMIRS)
- 150km Buffer from MIA
- Development Envelope
- Native Title Determinations

N

NYIKINA MANGALA

KARAJARRI PEOPLE (AREA B)

KARAJARRI PEOPLE (AREA A)

GREAT SANDY DESERT

NGARLA AND NGARLA 2 (AREA A)

NYANGUMARTA PEOPLE (PART A)

Port Hedland

Goldsworthy

NYAMAL PEOPLE #10

KARIYARRA PEOPLE

NYAMAL PEOPLE #1

RIPON HILLS

THE DYKE RANGE

KULYAKARTU & KULYAKARTU 2 PART A

MARTU (AREA A)

Woodie Woodie Continued Operations Project

Nifty

Telfer-Havieron Gold Mining Project

Telfer Project, Expansion of Telfer Gold Mine

NYAMAL PALYKU PROCEEDINGS

NGARLUMA / YINDJIBARNDI

Nullagine

Rudall River National Park

Kintyre Uranium Project

NYIYAPARLI PEOPLE

Great Northern Hwy

0 25 50 Kilometres

RioTinto

Figure 2-18: Existing and Reasonably Foreseeable Projects within 150 km of the MIA

Rio Tinto Copper (RTC)

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Date Published: Sunday, 21 June 2026

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Datum: GDA 1994
Units: Degree
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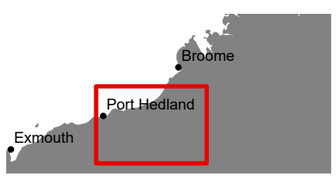

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Existing and Foreseeable Projects

3 LEGISLATIVE CONTEXT

3.1 Environmental Impact Assessment Process

The Proposal is subject to assessment under the State EP Act and Commonwealth EPBC Act.

The Proponent has opted to request the Proposal be assessed separately under these acts (i.e. the Proponent has not sought to have the Proposal assessed as an accredited assessment, in which the Commonwealth Minister relies on the assessment outcomes prepared by the WA EPA to inform an approval decision in respect of a proposal under the EPBC Act).

The content, format and environmental assessment in this ERD were considered with the following EPA guidance:

- Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures (EPA 2024b) (Administrative Procedures)
- Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual (EPA 2024c) (Procedures Manual)
- Statement of Environmental Principles, Factors and Objectives and Aims of EIA (EPA 2023b)
- Instructions – How to identify the content of a Proposal (EPA 2024d)
- Instructions – How to Prepare an Environmental Review Document (EPA 2024e)
- Interim Guidance – Environmental Outcomes and Outcomes-based Conditions (EPA 2021b)
- Instructions for preparing data packages for the Index of Biodiversity Surveys for Assessments (IBSA) (EPA 2021c)
- Instructions – How to Prepare *Environmental Protection Act 1986* Part IV Environmental Management Plans (EMPs) (EPA 2024f)
- Interim Guidance – Taking Decision-Making Processes into Account in EIA (EPA 2021d).

3.1.1 Environmental Protection Act 1986

Western Australia's primary environmental legislation governing environmental protection and impact assessment is the EP Act. Part IV, Division 1 of the EP Act provides for the referral and assessment of proposals that may significantly impact the environment. The Environmental Protection Authority Services (EPA Services) division within the Department of Water and Environmental Regulation (DWER) administers the impact assessment process in accordance with the relevant policies and guidelines.

The Proposal was referred to the EPA on 17 November 2023. On 20 December 2023, the EPA determined that the Proposal would be assessed under Part IV of the EP Act (Environment Online [EO] assessment number: APP- 0025007). The level of assessment was set at Environmental Review – with public consultation required (8-week period).

The EPA identified the key environmental factors as:

- Social Surroundings (Section 6)
- Inland Waters (Section 7)
- Flora and Vegetation (Section 8)
- Terrestrial Fauna (Section 9)
- Subterranean Fauna (Section 10)
- Terrestrial Environmental Quality (Section 11)
- Landforms (Section 12)
- Air Quality (Section 13)
- Greenhouse Gas Emissions (Section 14).

The environmental factors Benthic Communities and Habitat and Marine Fauna were initially identified by the EPA as relevant to the Proposal; however, following amendments to the Proposal pursuant to s 43A of the EP Act (Section 2.2.2.1), the EPA recognised these as no longer applicable.

No new environmental issues have emerged during the assessment, so no additional key environmental factors have been identified.

EPA produced the ESD, providing a draft for Proponent comment on 8 May 2024 with the final ESD approved on 18 November 2025 (Appendix A02).

This ERD has been prepared in accordance with the ESD (Appendix A02) and the EPA guidance listed above to meet the requirements of s 40(2)(b) of the EP Act. This ERD is now published for eight weeks, during which time the public is invited to comment on the ERD. Refer to the **Invitation to make a submission** section at the beginning of this ERD for guidance on how to make a submission and the closing date for submissions.

After the public review period, the EPA will assess the Proposal through consideration of the ERD, any submissions received, and the Proponent's responses to any submissions received. The EPA also considers applicable policies and guidelines and may seek advice from relevant government agencies. The EPA will then prepare an assessment report recommending whether the Proposal should be approved and, if so, any implementation conditions that should apply. The EPA Assessment Report and Recommendations (EPA Report) will be made public. The EPA Report will be provided to the Minister for the Environment, who will decide whether the Proposal may be implemented and, if so, any implementation conditions and procedures that will apply.

3.1.2 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the primary Commonwealth environmental legislation protecting MNES and is administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW).

The Proposal was referred to DCCEEW under the EPBC Act on 29 May 2025. The Commonwealth Minister for the Environment determined the Proposal to be a Controlled Action under s 75 of the EPBC Act on 11 July 2025; therefore, it will also require assessment and approval under the EPBC Act to determine if it can proceed.

The relevant Matters (the controlling provisions) are:

- Ramsar wetlands (ss 16 and 17B of the EPBC Act)
- Listed threatened species and communities (ss 18 and 18A of the EPBC Act)
- Listed migratory species (ss 20 and 20A of the EPBC Act).

A determination was made by DCCEEW on 11 July 2025 that the Proposal would be assessed at the level of assessed by preliminary documentation.

Under this EPBC Act assessment process, the Minister requested further information from Proponent on 28 July 2025. Referral information and any further requested material will be published for public comment for at least 10 business days, at which time the Proponent's information is revised taking into account public comments.

The Proponent then provides the Minister with the revised information, or a notice stating that no comments were received. The Proponent must publish revised information and comments for assessment. DCCEEW is then required to assess the information within 40 business days and to prepare a recommendation report for Minister, including a proposed decision, for the Minister's final decision. If approved, the decision is expected to include approval conditions.

3.2 Other Approvals and Regulations

3.2.1 Native Title

The Proposal is located within the boundaries of the native title determination areas of the Nyangumarta People (NNTT no WCD2009/001; Federal Court no WAD6281/1998, WAD234/2007) and Martu People (NNTT no WCD2003/002; Federal Court no WAD6110/1998) (Figure 1-1).

Most of the Proposal, including all active mining areas, is situated within the Nyangumarta native title determination area and the Nyangumarta Indigenous Protected Area.

The south-east of the Development Envelope, which contains the airstrip and Rimfire, is situated within the Martu native title determination area.

The Proponent has negotiated and is negotiating specific and separate agreements with the Nyangumarta People and Martu People.

3.2.2 Land Tenure

The Proposal is located on Mining lease M45/1288 and other miscellaneous licences, pursuant to the Mining Act, all held or applied for by the Proponent and its related companies (Table 3-1 and Figure 3-1). Additional tenure may be applied for to support the Proposal as detailed studies and Traditional Owner engagements continue.

Table 3-1: Summary of Proposal Tenements

Lease/Licence Number	Status	Description
Mining		
M45/1288	Application	Mine and Infrastructure Area
Miscellaneous		
L45/476	Granted	Existing airstrip
L45/491	Granted	Existing Access Road east of Camp
L45/494	Granted	Existing Access Road to the existing airstrip from the mining lease
L45/548	Granted	Great Northern Highway and the initial western section of the Existing Access Road (section of the Nyangumarta Highway)
L45/549	Granted	Access Road and borrow pits - from Great Northern Highway end (section of the Nyangumarta Highway)
L45/550	Granted	Access Road diversion and borrow pits – start of Wirlkirr Wirlkirr Road
L45/551	Granted	Access Road diversion and borrow pits – Wirlkirr Wirlkirr Road
L45/552	Granted	Access Road and borrow pits - Wirlkirr Wirlkirr Road to mining lease
L45/559	Application	New airstrip
L45/623	Granted	Hairpin Bend Access Road
L45/722	Application	Camp Location

Lease/Licence Number	Status	Description
L45/723	Application	Northern Monitoring Bores
L45/725	Granted	Southern Access Road
L45/755	Application	Rimfire Borefield
L45/857	Granted	Access Road Upgrade Fly Camp

3.2.3 Decision-making Authorities and Other Approvals

In addition to the EPA assessment of the Proposal under Part IV of the EP Act, numerous other environment-related assessments and authorisations will be required before the Proposal can be implemented (Table 3-2). The authorities listed in Table 3-2 have been identified as decision-making authorities (DMAs) for this Proposal. Additional DMAs may be identified during the EPA assessment of the Proposal.

Table 3-2: Other Relevant Approvals

Decision Making Authority	Legislation or Agreement Regulating the Activity	Approval Required and Relevant Proposal Element	Whether and How Statutory Decision-Making Processes Can Mitigate Impacts on the Environment?	
			Relevant Impact	Can the DMA Mitigate Proposal Impacts? How?
Chief Executive Officer, DWER	EP Act 1986 – Part V	**Works Approval and Licence:** Activities and prescribed premise categories applicable to the Proposal include, but not limited to: 5 – Processing of ore (including containment of tailings) 6 – Mine dewatering 7 – Vat or in situ leaching of metal 12 – Screening, etc. of materials 52 – Electric power generation 54 – Sewage facility 57 – Used tyre storage (general) 64 – Class II Putrescible landfill 73 – Bulk storage of chemicals etc	Alteration of groundwater levels through: • Mine pit dewatering • Water supply, including borefield abstraction Ground and/or surface water quality impacts due to mineral waste management and/or stormwater runoff from disturbed areas Threatened and Migratory species habitat degradation associated with construction and operational activities, including increased weeds, dust and abundance of introduced species, and altered fire regimes	**Yes** Works approvals and licences regulate industrial emissions and discharges to air, land or water and apply to 'prescribed premises' categories defined in Schedule 1 of the Environmental Protection Regulations Applications are open for public comment, and DWER will also seek comments and advice from people and public authorities deemed to be directly interested in the application Assessments consider the environmental risk, public health and amenity and the controls proposed to mitigate these risks Compliance monitoring and reporting are included in standard conditions of approval
Minister for Environment and Chief Executive Officer, Department of Biodiversity, Conservation and Attractions (DBCA)	*Biodiversity Conservation Act 2016* (BC Act) *Biodiversity Conservation Regulations 2018*	**Section 40 Authorisation** is required from the Minister to take and/or disturb threatened flora and/or fauna species **Section 5 Licence** to take flora and fauna (other than threatened species).	Clearing of native vegetation Loss of Threatened and Migratory fauna habitat as a result of clearing and habitat fragmentation Loss of Threatened and Migratory fauna individuals	**Yes** Authorisation to take threatened species is always required irrespective of any approval granted or exemption under the EP Act. The BC Act provides the ability to impose conditions on authorisations to take threatened species that mitigate or offset the impact of such actions
Registrar of Aboriginal Sites for all	*Aboriginal Heritage Act 1972* (AH Act)	**AH Act approvals:**	Ground and/or surface water quality impacts due to mineral waste management and/or	The AH Act makes it an offence to impact (including to excavate, destroy, damage, conceal, alter or remove) ACH

Decision Making Authority	Legislation or Agreement Regulating the Activity	Approval Required and Relevant Proposal Element	Whether and How Statutory Decision-Making Processes Can Mitigate Impacts on the Environment?	
			Relevant Impact	Can the DMA Mitigate Proposal Impacts? How?
approvals except section 18 and the Minister of Aboriginal Affairs, Department of Planning, Lands and Heritage (DPLH) for section 18 and can also approve regulation 7 and regulation 10 approvals		**Section 16 Authorisation** is required to enter, excavate, examine or remove anything on an Aboriginal site (generally related to research) **Section 18 Consent** is required to impact an Aboriginal site (being a place to which the AH Act applies by the operation of s 5 of the act) **Regulation 7 approval** to take digging or lifting equipment or explosives onto an Aboriginal site **Regulation 10 approval** for minor activities and impacts on an Aboriginal site	stormwater runoff from disturbed areas Degradation of Aboriginal social, cultural and heritage values	without approval. The AH Act, in some respects, consider matters relevant to the environmental factor of Social Surroundings. However, the AH Act does not expressly deal with 'Aboriginal use and enjoyment of cultural landscapes' and 'Country' Accordingly: • **Yes** - for impacts to ACH the subject of and within area of an AH Act approval • **No** – for impacts to ACH not the subject of or outside area of an AH Act approval
Minister for Environment and Water, DWER	*Rights in Water and Irrigation Act 1914* (RiWI Act)	**Section 26D licence** required to construct dewatering and water supply bores **Section 5C licence** is required for the abstraction of groundwater	Abstraction of groundwater from mining activities	**Yes** RiWI Act processes regulate the extraction of water associated with mine dewatering, but not disposal The licence application is advertised for public comment when a significant impact on the water resource is expected or the request is to take more than 1000,000 kilolitres per annum. No appeal rights exist to the public on licence decisions Assessments of licence applications to take groundwater include consideration of environmental and social impacts, including effects on: • Groundwater resource - availability, allocation and quality

Decision Making Authority	Legislation or Agreement Regulating the Activity	Approval Required and Relevant Proposal Element	Whether and How Statutory Decision-Making Processes Can Mitigate Impacts on the Environment?	
			Relevant Impact	Can the DMA Mitigate Proposal Impacts? How?
				• Groundwater dependent ecosystems • Other groundwater users Hydrogeological studies are required to inform the assessment, including the potential impacts of taking water Licence conditions will usually include requirements to undertake and report groundwater volume and quality monitoring to ensure detrimental impacts on the environment, other users and the groundwater resource are no more than predicted Surface water impacts may be considered in the assessment but are not essential
Minister for Environment and Water, DWER	RiWI Act	**Rimfire Groundwater Operating Strategy** required to manage significant volumes of water proposed to be taken from several sources and multiple bores	Abstraction of groundwater from bores along the RAC during construction and Rimfire during operation	**Yes** The Rimfire Groundwater Operating Strategy supplements a section 5C licence detailing how the licensee will manage its operations to address broader management issues associated with taking and using water (DWER 2020). The Rimfire Groundwater Operating Strategy must include the following: • Details of the water source to be used • Land use, water abstraction regime and methods and infrastructure used to abstract and distribute water • Monitoring and reporting requirements

Decision Making Authority	Legislation or Agreement Regulating the Activity	Approval Required and Relevant Proposal Element	Whether and How Statutory Decision-Making Processes Can Mitigate Impacts on the Environment?	
			Relevant Impact	Can the DMA Mitigate Proposal Impacts? How?
				• Methods to manage impacts on the aquifer, the environment and other water users • Contingency plans • Water efficiency measures
WorkSafe Commissioner, Department of Local Government, Industry Regulation and Safety (DLGIRS)	*Work Health and Safety Act 2020* *Work Health and Safety (Mines) Regulations 2022*	A **Mine Safety Management System** is a framework that brings together the mine's policies, systems, procedures and plans to enable a mine operator to ensure the safe operation of a mine	Habitat degradation associated with construction and operational activities, including an increase in weeds, dust and abundance of introduced species, and altered fire regimes	**No** A Mine Safety Management System is concerned with occupational health and safety
Minister for Mines and Petroleum, DMPE Executive Director, DMPE	*Mining Act 1978* Guidelines for Preparing Mining Development and Closure Proposals (DEMIRS 2025) Mining Development and Closure Proposal and Approvals Statement Framework (DMPE 2025c) *Mining Act 1978* - Guidelines for Preparing Mine	A **Mine Development and Closure Proposal** (MDCP) is required prior to undertaking any activity for the purposes of, or in preparation for, mining operations or carrying out mining operations within tenements **Mine Closure Plan** (MCP) (for areas administered under the Mining Act tenure) is required to address mine closure and rehabilitation	Clearing of native vegetation comprising habitat for Threatened and Migratory species Ground and/or surface water quality impacts due to mineral waste management and/or stormwater runoff from disturbed areas Threatened and Migratory species habitat degradation associated with construction and operational activities, including increased weeds, dust and abundance of introduced species, and altered fire regimes Unauthorised access post-closure	**Yes** DMPE has developed its own environmental objectives, which reflect EPA factor objectives for Inland Water, Flora and Vegetation, Terrestrial Fauna and Terrestrial Environmental Quality (DMPE 2025a) MDCPs address all Proposal elements and activities and consider the likely environmental impacts within the Proposal's 'activity envelope' (the spatial extent within which the mining activities will be located). An MDCP must detail all relevant environmental approvals or regulatory requirements that will affect the environmental management of the mining activities. As far as practicable, DMPE will not duplicate assessment of any component of an activity that also requires approval from another

Decision Making Authority	Legislation or Agreement Regulating the Activity	Approval Required and Relevant Proposal Element	Whether and How Statutory Decision-Making Processes Can Mitigate Impacts on the Environment?	
			Relevant Impact	Can the DMA Mitigate Proposal Impacts? How?
	Closure Plans (DMPE 2025b)			regulatory agency (e.g. key environmental factors assessed under Part IV of the EP Act) Stakeholder engagement will occur during preparation, but there is no provision for public comment or appeal on an MDCP. An Approvals Statement will be issued on approval of an MDCP and will define the scope and limits of the mining activities approved, along with any relevant conditions (environmental outcomes), and closure outcomes, and date for submission of the MCP. The Approvals Statements will be publicly available It is a requirement of the Mining Act that standalone MCPs are submitted to DMPE in order to demonstrate that the mining operation is planning and progressing towards successful closure and achievement of the closure outcomes for the operation A preliminary MCP has been developed as per the Guidelines for Preparing Mine Closure Plans (DMPE 2025b) MCPs address all requirements applicable to mine rehabilitation and closure, including: • Baseline and closure data that inform successful rehabilitation, environmental closure risks, monitoring and performance and closure objectives • Post-mining land use

Decision Making Authority	Legislation or Agreement Regulating the Activity	Approval Required and Relevant Proposal Element	Whether and How Statutory Decision-Making Processes Can Mitigate Impacts on the Environment?	
			Relevant Impact	Can the DMA Mitigate Proposal Impacts? How?
				• Closure risk, outcomes and completion criteria • Implementation, including abandonment bunding and other measures to minimise potential unauthorised access • Monitoring and maintenance There is no provision for public comment or appeal on an MCP (although stakeholder engagement will be undertaken to support the development of the MCP and ongoing revision). MCPs are submitted in accordance with the requirements of the Approvals Statement. DMPE acknowledges that MCPs are continuously developed over the life mine and as such DMPE may consider the MCP acceptable subject to aspects of closure planning being further developed and refined in subsequent MCP revisions (DMPE 2025b) Notwithstanding the recent changes in DMPE requirements - under which a full MCP is not required until a future date determined by DMPE, the Proponent has prepared the draft MCP for the State EP Act Part IV assessment and provided here (Appendix A03)
Minister for Mines and Petroleum, DMPE	*Mining Act 1978*	**Mining leases/exploration licences/general purpose leases/retention licences/exploration permits** are, variously, required in order to ensure appropriate tenure for the Proposal	Provides the mining tenure, licence and permit framework defining the boundaries, rights and responsibilities applicable to the Proponent with respect to management of Threatened and Migratory species and their habitat	**Yes** Activities conducted under MDCPs, MCPs and POWs are limited to the specified areas and requirements of the relevant lease, licence or permit

Decision Making Authority	Legislation or Agreement Regulating the Activity	Approval Required and Relevant Proposal Element	Whether and How Statutory Decision-Making Processes Can Mitigate Impacts on the Environment?	
			Relevant Impact	Can the DMA Mitigate Proposal Impacts? How?
Mining Registrar, DMPE				
Director WorkSafe Petroleum Safety and Dangerous Goods, DLGIRS	*Dangerous Goods Safety Act 2004*	**Dangerous Goods Licence** is required for the storage and handling of dangerous goods	Contamination of soils and groundwater (hydrocarbon spills) Fire (combustion of stored hydrocarbons)	**Yes** Dangerous goods licence applications require risk assessments demonstrating the dangerous goods site can be operated with minimal risk to people, property and the environment DLGIRS will notify DWER of all new licence applications or amendments to existing licences, resulting in additional environmental assessment and approval (i.e. under the EP Act)
Commissioner of Main Roads Western Australia, Department of Transport and Major Infrastructure (DMTI)	*Road Traffic (Vehicles) Act 2012*	**Heavy haulage licensing and standards** are required	Consideration of heavy haulage loads' potential risk of harm to the environment	**No**
Local Government Chief Executive Officer (CEO), Shire of East Pilbara	*Building Act 2011*	**Building approvals** are required	Habitat degradation associated with construction and operational activities, including increased dust and altered fire regimes Disturbance from light, noise and/or vibration associated with construction and operation activities	**No**

Decision Making Authority	Legislation or Agreement Regulating the Activity	Approval Required and Relevant Proposal Element	Whether and How Statutory Decision-Making Processes Can Mitigate Impacts on the Environment?	
			Relevant Impact	Can the DMA Mitigate Proposal Impacts? How?
Chief Health Officer, Department of Health	*Health Act 1911* *Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulation 1974*	**Sewerage/Health approvals** are required	Contamination and health impacts of sewage	**Yes** On-site wastewater systems require approval including evaluation of soil properties at disposal site, distances from sensitive receptors (e.g. watercourses), treatment and disposal options and effluent quality
Main Roads WA	N/A	**Application for New Access form** is required to enable Main Roads WA to assess the proposed site access road intersecting with the Great Northern Highway	Nil	**No**

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121°0'0"E
121°30'0"E
122°0'0"E
20°0'0"S
20°30'0"S
21°0'0"S

N

Great Northern Hwy

WALLAL DOWNS

MANDORA

L 45/548

L 45/549

Nyangumarta Hwy

L 45/857

L 45/491

L 45/550

L 45/551

L 45/623

Nyangumarta Warrarn IPA

NYANGUMARTA PEOPLE (PART A)

L 45/552

L 45/723

L 45/725

L 45/494

L 45/476

L 45/722

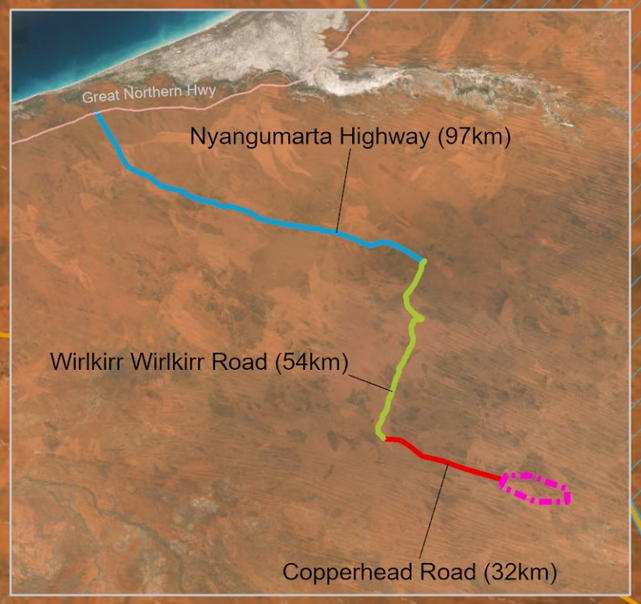
MARTU (AREA A)

L 45/559

L 45/755

Legend

- Minor Road, Sealed
- Minor Road, Unsealed
- Track
- Highway
- Development Envelope
- Mining Lease
- Native Title Determinations
- Mandora Pastoral Station
- Wallal Downs Pastoral Station
- Rio Tinto Live Tenements
- Rio Tinto Pending Tenements
- Indigenous Protected Areas



RioTinto

Figure 3-1: Land Tenure

Rio Tinto Copper (RTC)

Publisher: Michael.Rouse
Date Published: Friday, 7 August 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:500,000
Rio Tinto © Copyright

0 10 20 Kilometres

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20230627_Referral_Figures\W21_012_Referral_Figures.aprx/Proposal Tenure and NTD Areas

4 STAKEHOLDER ENGAGEMENT

Stakeholder consultation for the activities within the Paterson Province commenced in 2017. The Proponent engaged stakeholders early in the planning phase, primarily in the interests of achieving a collaborative approach and to ensure that local knowledge is considered in the design and management of activities.

The Proponent has undertaken a thorough stakeholder engagement process to define the potential environmental, social and safety risks. Activities undertaken to date include (but are not limited to):

- Identify key stakeholders for the Proposal
- Establishing and maintaining relationships with stakeholders
- Issue communication to stakeholders
- Managing the Proponent's consultation register of stakeholders.

The Proponent has actively consulted with identified stakeholders since the early exploration stages of the Proposal. This consultation has evolved throughout the Proposal's design and will continue throughout the assessment, construction, operation and closure stages.

Key details from stakeholder engagement are provided below. A stakeholder consultation register is provided in Appendix A04.

4.1 Stakeholder Identification

Relevant stakeholders identified and consulted with for the Proposal, including decision-making authorities (DMAs), other relevant State government agencies, local government authorities, local communities and environmental non-government organisations, are listed in Table 4-1.

Table 4-1: Key Stakeholders for the Proposal

Stakeholder Sector	Organisation	Key Interest
Government of Western Australia	Environmental Protection Authority (EPA)	Conduct environmental impact assessments under Part IV (EP Act)
	Department of Planning, Lands and Heritage (DPLH)	• Administers AH Act • Native title requirements • Heritage, cultural, ethnographic and archaeological
	Department of Premier and Cabinet	Aboriginal Policy
	Department of Mines, Petroleum and Exploration (DMPE)	• Administers Mining Act and regulations • Tenement conditions • MDCPs and programs of work • Mine closure • Mining rehabilitation fund • Rehabilitation standards • Safety in resource sector
	Department of Water and Environmental Regulation (DWER)	• Administers RiWI Act • Provision of licences to abstract water • Groundwater quality and quantity • Administers Part V (EP Act), industry regulation and licensing
	Department of Biodiversity, Conservation and Attractions (DBCA)	• Administers BC Act • Flora, fauna and habitat conservation

Stakeholder Sector	Organisation	Key Interest
		• Interest in projects that are located on DBCA managed land • Baseline surveys and licenses to take flora and fauna
	Department of Health	Environmental health, building and planning compliance
	Main Roads WA	• Road usage, maintenance and future development • Heavy vehicle access and route planning • Road safety, permitting approvals and compliance
Commonwealth Government	Department of Climate Change, Energy, the Environment and Water (DCCEEW)	• Environmental impact assessments under the EPBC Act • Offset strategy
Local Government Authorities (LGA)	SoEP	• Rates • Local economy • Benefits to local economy and community • Safety of locals and passers-by • Use of public roads and infrastructure • Compliance with building, health, sewage and other • Local government regulation • RED strategy • Social Investment opportunities • Supporting communities within the LGA • Local employment, training and business development opportunities
	Shire of Broome	
	Town of Port Hedland	
Traditional Owner Groups	Nyangumarta Warrarn Aboriginal Corporation (NWAC) registered native title body corporate (RNTBC) with support of Yamatji Marlpa Aboriginal Corporation (YMAC)	• Ensuring ongoing access to and use of land to exercise native title rights and interests • Protecting ACH, environment and Country from direct and indirect impacts of the Proposal • Social and ACH values • Participating in potential socio-economic opportunities resulting from the Proposal • Employment, training and business development opportunities • Organisational capacity building • Agreements with the Proponent • Operational interactions (e.g. traffic, road condition, noise, and other amenity issues)
	Jamukurnu Yapalikurnu Aboriginal Corporation (JYAC) (Martu)	

Stakeholder Sector	Organisation	Key Interest
Pastoralists	Wallal Downs	• Access and use of pastoral land • Operational interactions (e.g. traffic, road condition, noise) • Provisions of emergency services • Water use and management, impacts on other users
Industry	Australian Renewable Energy Hub (AREH)	• Neighbouring proponent situated on Nyangumarta Country • Opportunity to leverage power from AREH in the future • Information sharing to ensure greater understanding of local context, cumulative impacts and opportunities for shared value • Understanding of operations - including road access
	IGO Limited	• Information sharing to ensure greater understanding of local context, cumulative impacts and opportunities for shared value • Supply chain and logistics optimization • Infrastructure development and shared access • ESG alignment and reporting
	Fortescue Metals Group (FMG)	
	Greatland Gold (Telfer)	
	Kimberley Mineral Sands (KMS)	
	Chamber of Minerals and Energy of Western Australia (CME)	
	Kimberley Marine Support Base (KMSB)	
Chambers of Commerce and Industry	Broome Chamber of Commerce & Industry (BCCI) Inc	• Business Development • Business Contracting • Local content – capacity and capability building of local businesses
	Port Hedland Chamber of Commerce & Industry (PHCCI)	
	Newman Chamber of Commerce and Industry (NCCI)	
	Regional Chambers of Commerce Western Australia	
Local and regional service providers	Pilbara Development Commission	• Regional economic growth and diversification • Local employment and workforce development • Community infrastructure and investment opportunities • Housing, transport and service accessibility
	Kimberley Development Commission	
	Port Hedland International Airport	• FIFO worker transport logistics • Flight scheduling and capacity for workforce needs • Infrastructure upgrades • Partnerships for tourism and regional development • Emergency response and medical evacuation capabilities
	Broome International Airport	
	Aviair	
	Royal Flying Doctor Service	

Stakeholder Sector	Organisation	Key Interest
Education	North Regional TAFE - Broome Campus	• STEM education and career pathways • Industry led curriculum development and training alignment • Apprenticeships, traineeships and scholarship programs • Regional training and employment • Social investment opportunities • School based work experience and site visits • Supporting community education initiatives and resources
	North Regional TAFE - Pilbara Region	
	Broome Senior High School	
	Port Hedland Senior High School	
	Newman Senior High School	
	Martuku Jijiku Maya (Martu Student Hostel)	
	La Grange Remote Community School	
Port Authority	Pilbara Ports Authority	• Port Hedland port usage and berth planning
	Kimberly Ports Authority	• Broome port usage and berth planning
Local and regional communities	Bidyadanga Aboriginal Community La Grange (BACLG)	• Social investment / partnerships • Employment opportunities • Business development and contracting
	Parnngurr	
	Kunawarritji	
	Punmu	
	Jigalong	
Tourism, recreation and related interests	Sandfire Roadhouse	• Social investment / partnerships
	Eighty Mile Beach Caravan Park	

4.2 Stakeholder Engagement Process

Stakeholder engagement is a key part of the Proposal approval process as it ensures that the expectations of stakeholders are understood by the Proponent, and these can be considered and managed during the planning and implementation phase of the Proposal. The Proponent has established processes for consultation with stakeholders which are embedded in both the Community and Social Performance Standard (Rio Tinto 2022) and the Closure Standard. The core principle of the stakeholder engagement strategy adopted for activities within the Paterson Province is outlined in Table 4-2.

Table 4-2: Principles of Stakeholder Engagement

Principles	Requirements
Communication	Communication must be open, accessible, clearly defined, two-way and appropriate
Transparency	The process and outcomes of community and stakeholder engagement should, wherever possible, be made open and transparent, agreed upon and documented
Collaboration	The process and outcomes of community and stakeholder engagement should, wherever possible, be made open and transparent, agreed upon and documented

Principles	Requirements
Inclusiveness	The process and outcomes of community and stakeholder engagement should, wherever possible, be made open and transparent, agreed upon and documented
Integrity	Community and stakeholder engagement should establish and foster mutual trust and respect

The overarching objectives of the consultation program included the following:

- Identify relevant external stakeholders
- Ensure stakeholders understand the nature of the Proposal, including likely impacts and benefits that may be derived from the Proposal
- Communicate the Proposal's vision by ensuring open and transparent communication of the Proposal development process, impacts and risk management
- Enable individuals, groups and agencies with interest in the Proposal to have access to up-to date relevant information
- Establish opportunities for two-way feedback to engage stakeholders and maximise the Proposal outcomes through obtaining local knowledge and expertise
- Provide a means through which stakeholders can raise concerns and issues and the Proponent with the means to respond to these
- Assess stakeholder issues and concerns so that proposed impacts can be minimised to as low as reasonably practicable and in-line with stakeholder expectations
- Free, Prior and Informed Consent (FPIC).

Although not defined under Australian law, the Proponent is implementing FPIC for the Proposal. The Proponent is seeking to ensure that all activities associated with seeking consent to access, develop and/or operate on traditional lands and waters are done with FPIC. Specifically, the Proponent is seeking to ensure that the Nyangumarta People (as represented by NWAC) and the Martu People (as represented by JYAC) are:

- Able to freely make decisions without coercion, intimidation, or manipulation
- Given sufficient time to be involved in Proposal decision making before key decisions are made and impacts occur
- Fully informed about the Proposal and its potential impacts and benefits.

The Proponent has made a commitment to strive to achieve and maintain FPIC when seeking consent from and working with Nyangumarta and Martu Peoples in relation to the Proposal.

NWAC provided the Proponent with their own definition of FPIC which is captured in agreements with the Proponent and Nyangumarta.

4.3 Engagement Tools

In line with the Proponent's commitment to achieve and maintain FPIC and ensuring genuine and transparent engagement with Traditional Owners and external stakeholders, a number of engagement tools have been developed.

These engagement tools (listed below) support the FPIC process by helping to keep Nyangumarta People and Martu People fully informed of the Proposal, as well as the potential cultural, environmental and social impacts and benefits. These tools continue to be updated annually and/or as Study/Scope is changed/confirmed.

- **Flyover** provides a virtual representation and flyover of the Proposal during operations, displaying the elements of the mine and the scale of the operation in relation to the landscape

- **3D model with projected imagery**: a series of 3D-printed tiles over which the Proponent can project imagery in layers; such as aerial photography, locations of culturally significant places in relation to the mine, extent of ACH surveys; and infrastructure locations including videos from the flyover
- **Virtual reality:** a select number of locations (i.e. TSF, mine pit, airstrip, WRL, etc.) with different timestamps to show the progression over the life of the Proposal (i.e. prior to any mining operations; year 2; year 5; year 10 and closure)
- **Glossary** of mining terms to ensure common understanding that supports Traditional Owners to understand all aspects of a copper/gold mine operation
- **Fact Sheets** to provide additional information on topics requested by Traditional Owners (i.e. due to Nyangumarta's concerns about cyanide, a factsheet was produced outlining what it is, how it is used, and information on safe transportation and storage)
- **Common Law Holder Meeting brochures** and **Mine Site Layout** produced to provide a Proposal update, timeframes, life of mine information, location and scale of infrastructure, etc.
- **EPA booklet** to articulate the process, timeframes and requirements from the EPA for the Referral and ERD
- **Illustrations**: all communication is presented in way that is easy to understand, doesn't use jargon and follows similar design/brand elements (e.g. Illustrations are used and updated as required to present technical information).

4.4 Stakeholder Engagement Summary

Consultations undertaken to support the understanding of the Social Surroundings of the Proposal are listed in the Social Surroundings chapter and not included in this section.

4.4.1 Nyangumarta People and Martu People

The Proponent has undertaken ongoing consultation with the Nyangumarta People and Martu People since the exploration phase of the Proposal in 2019. The Proponent is committed to establishing a genuine partnership with Nyangumarta People and Martu People, the Traditional Owners on whose land the Proposal is situated, and to achieve and maintain FPIC for the Proposal. As the Proponent will be the first mining operation in Nyangumarta Country, there has been a strong focus on building the capacity of Nyangumarta to ensure a transparent co-design process is implemented throughout the lifecycle of the Proposal, working together to minimise the impact on Country and increase mutual benefit.

The Proponent has been engaging with NWAC and YMAC since 2019 through a range of engagement methods, including monthly Technical Meetings and Board of Director and Nyangumarta Elders Meetings, as well as providing financial support, training and the cost of resourcing subject matter experts to ensure the Nyangumarta People are fully informed. A summary of engagement with Nyangumarta People is outlined in Table 4-3. Key details from the engagement are captured in the stakeholder consultation register provided in Appendix A04.

The Proponent has also facilitated many on Country visits for Nyangumarta People and in 2023, a visit to Rio Tinto's Oyu Tolgoi copper-gold mine in Mongolia to understand the impacts of an operating copper mine. Aligning with the Proponent's commitment to complete openness and transparency around the potential impacts of the developing project on their lands. During this visit, there was recognition by Nyangumarta Elders and Board members of previous information provided by the Proponent through consultations over the past four years, with the visit helping to solidify these discussions. The Nyangumarta Planning Agreement was endorsed at the Nyangumarta Common Law Holders Meeting in July 2023, which was a significant milestone for the relationship with Nyangumarta and the Proponent.

Table 4-3: NWAC Engagement Summary

Type of Engagement	Description	Number of Engagements between 2019 - 2026
Technical Meetings	• Technical Meetings between NWAC, YMAC and the Proponent to present and discuss key Proposal updates and ensure FPIC is considered before presenting information to the Board of Directors • The Proponent must ensure to provide NWAC Advisors with any, and all, information that is reasonably necessary for the NWAC Advisors to provide accurate and timely advice to NWAC and the Nyangumarta People • Technical Meetings provide an opportunity for the negotiation teams to review and discuss significant items prior to presenting to the Board • Agenda typically include Proposal update; agreement discussion; ACH and social surroundings; action review; update on the Proponent's Government engagements; and schedule review • Frequency: Approximately monthly • Attended by NWAC negotiation team and the Proponent's negotiation team	67 meetings
Board of Director Meetings	• Meeting with NWAC Board of Directors and Elders Committee to present and discuss key Proposal updates; discuss potential impacts to Country, culture and environment and explore mitigation strategies; agreement negotiations; seek guidance, resolution or consent on Proposal elements from NWAC, etc. • The Board of Director meetings are an opportunity for the Proponent to continue building a positive relationship with Nyangumarta People, and continue its efforts towards FPIC for all elements of the Proposal • Agenda typically includes Proposal update; Proposal agreement discussion; ACH and social surroundings; economic development (business development, training and employment); regional development; community investment; action review; update on the Proponent's Government engagements; and schedule review • Frequency: Approximately monthly • Attended by NWAC Board and Nyangumarta Elders Committee; NWAC negotiation team; and the Proponent's negotiation team	40 meetings
Common Law Holder Meetings	• Approximately annual or bi-annual • Attended by members of the Nyangumarta People; NWAC Board and Nyangumarta Elders Committee; NWAC Negotiation Team; and the Proponent's Negotiation Team	8 meetings
Social Surroundings Engagements	• Refer to Social Surroundings (Section 6)	5 engagements (3 on Country at Winu and 2 in Perth)

Similarly, with Martu, the Proponent has been working with JYAC since 2019 to discuss the potential impacts and opportunities of the Proposal. Engagement has focused on protecting Martu ngurra (Country) in relation to the Proposal and the region more generally, opportunities for Martu People in relation to the airstrip and exploring water stewardship engagement with Martu. The Karlkayn Stage 1 Agreement was endorsed at the Martu Common Law Holders (CLH) meeting in September 2023, another significant milestone in the Proposal journey. A summary of engagement with Martu People is outlined in Table 4-4. Key details from the engagement are captured in stakeholder consultation register provided in Appendix A04.

Table 4-4: Martu Engagement Summary

Type of Engagement	Description	Number of Engagements between 2019 - 2026
Technical / Negotiation Meetings	• Technical meetings between JYAC and the Proponent to present and discuss key project updates and ensure FPIC is considered before presenting information to the Board of Directors • The Proponent must ensure to provide JYAC Advisors with any, and all, information that is reasonably necessary for the JYAC Advisors to provide accurate and timely advice to JYAC Board and the Martu People • Technical meetings provide an opportunity for the negotiation teams to review and discuss significant items prior to presenting to the Board • Agenda typically includes Proposal update; agreement discussion; ACH and social surroundings; action review; update on the Proponent's Government engagements; and schedule review • Attended by JYAC negotiation team and the Proponent's negotiation team	16 meetings
Board of Director Meetings	• Meeting with JYAC Board of Directors to present and discuss key project updates; discuss potential impacts to Country, culture and environment and explore mitigation strategies; Karlkayn Agreement negotiations; seek guidance, resolution or consent on Project elements from Martu People, etc. • The Board of Director meetings are an opportunity for the Proponent to continue building a positive relationship with Martu People, and continue its efforts towards FPIC for all elements of the Proposal • Agenda typically include Proposal update; agreement discussion; ACH and social surroundings; economic development (business development, training and employment); regional development; community investment; action review; update on the Proponent's Government engagements; and schedule review • Attended by JYAC Board; JYAC negotiation team; and the Proponent's negotiation team	12 meetings
Community Information Days and Common Law Holder Meetings	• The Proponent presents Proposal updates to Martu People • Attended by members of the Martu People; JYAC Board; JYAC negotiation team; and the Proponent's negotiation team	4 meetings
Social Surroundings Engagements	• Cultural Landscape Mapping • Refer to Social Surroundings (Section 6)	2 engagements

The Proponent has also recognised the cumulative impacts of the Proposal and working with Nyangumarta and Martu to further understand and co-design strategies and management plans to minimise impacts of the Proposal and to protect and care for Country.

As the Proposal progresses, the Proponent looks forward to continued collaboration with the Nyangumarta People and Martu People.

4.4.2 Pastoral Stations

The Proponent has undertaken regular and ongoing consultation with Wallal Downs Pastoral Station since 2019. Key areas of interest include, but not limited to:

- Agreements on land access and road usage
- Operational interactions (e.g., traffic, road condition, noise, notice and approval to utilise lay-down areas as required, etc.)
- Water use and management, impacts on other users
- Respect for mustering season and cattle movements along access roads
- Protocols and compensation for beast strikes
- Advanced notice of scheduled helicopter flights
- Inclusion and co-design of emergency responses and practices
- Consideration of possibly fencing the areas of the sealed access road within the station once all construction activities have been completed.

As the Proposal progresses, consultation with Wallal Downs will increase significantly to ensure transparent engagement continues and potential risks are acknowledged and mitigated. A formal agreement is being prepared to recognise the impacts and outline the mitigations as agreed between Wallal Downs Pastoral Station and the Proponent.

Further information is contained within the stakeholder consultation register provided in Appendix A04.

4.4.3 Government and Special Interest Groups

Consultation with several State (and Commonwealth) agencies has occurred since 2019, with increased consultation in recent years.

There have been several opportunities for public involvement in the impact assessment process. Opportunities for formal involvement to date have included:

- Comment on the level of assessment appropriate for the project under Part IV of the EP Act (6 to 13 November 2023). The EPA received four separate submissions with the common theme recommending the use of the Public Environmental Review (PER) process for project impact assessment
- Comment on the EPBC referral (13 to 27 June 2025) prior to the decision on referral and assessment approach of the Proposal under the EPBC Act.

4.4.4 Ongoing Stakeholder Consultation and Outcomes

Stakeholder consultation is ongoing and will continue throughout the Proposal approvals process and construction, operation, and closure stages. This will include the following levels of engagement:

- Information: The Proponent will continue to publish and distribute information to stakeholders
- Consultation: The opportunity for two-way exchange of information
- Participation: Active, multi-directional interaction and more intensive forms of consultation
- Negotiation: Face-to-face discussion with the intent of reaching agreement on a specific issue.

This ERD allows stakeholders to provide feedback and comment on the Proposal, which will be responded to in the Response to Submissions on the final ERD. If approved, the Proponent will continue to implement a Consultation and Engagement Plan (CEP) during the construction and operations phase

of the Proposal. This program would ensure stakeholders are well informed of Proposal development and identify, monitor, and manage relevant issues raised by stakeholders and the community due to the Proposal.

5 ENVIRONMENTAL PRINCIPLES

Section 4A of the EP Act identifies the object and principles of the Act, which is to protect the Environment of the State, having regard to a list of specific principles. These principles are the highest order the EPA must have regarded as a condition of the valid exercise of its powers when assessing and reporting on proposals under the EP Act.

The Proponent has considered these principles concerning the development and implementation of the Proposal. Table 5-1 outlines how the principles relate to the Proposal.

Table 5-1: Environmental Principles of the EP Act

Principle	Consideration Given in the Proposal
The precautionary principle Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation In the application of the precautionary principle, decisions should be guided by: (a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment (b) an assessment of the risk-weighted consequences of various options	The Proponent has conducted numerous, comprehensive studies to understand the social, cultural and environmental values within the Development Envelope and the potential threats to these due to the Proposal. These studies have informed the detailed design of the Proposal, and modifications to the Proposal have been made to avoid and minimise impacts, where practicable. All applicable studies were conducted to conform with the EPA's Environmental Factors guidelines, technical guidance documents, and other best practice guidelines, ensuring the robust collection of data to predict the effect or impact of the Proposal on social, cultural and environmental values Any uncertainties of the studies have been addressed in the impact assessment using conservative assumptions, scenario modelling and proposed outcome-based conditions. Uncertainties that have been addressed throughout the ERD include: • The Proposal will impact several Priority flora species; however, no flora species or ecological communities listed as Threatened are present within the Development Envelope (Section 8) • The Development Envelope supports several significant values. Critical habitat for Northern Quoll and Black-footed Rock-wallaby/Mororong (Rocky Outcropping) have been completely avoided as a result of revising the RAC (Section 9) • All known and potential Night Parrot roosting and foraging habitat has been completely avoided as a result of revising the borefields within the Development Envelope. Potential indirect impacts on Night Parrots from noise and light have been assessed on a conservative basis in accordance with the precautionary principle with the impacts and outcomes detailed in Section 9 Terrestrial Fauna The Proponent has set out key mitigation measures to prevent significant environmental impacts and demonstrate application of the precautionary principle. These include: • Re-design of the Development Envelope to completely avoid all known and potential Night Parrot roosting and foraging habitat and critical habitat for Northern Quoll and Black-footed Rock-wallaby/Mororong • Pre-clearance burrow surveys for Greater Bilby within areas of suitable habitat • Maximum clearing extents of Priority flora species The Proponent will monitor all significant environmental issues to provide assurance that anticipated environmental outcomes are achieved, and that mitigation measures are effective The Proponent has consulted with and continues to engage extensively with Nyangumarta People and Martu People. These Traditional Owners of lands that intersect the Development Envelope have a particular interest regarding the potential impacts of the Proposal on their social and ACH values In recognition of the known or likely occurrence of significant social and ACH values, the Conceptual Footprint has undergone revision, and other controls have been implemented, to avoid direct disturbance to culturally sensitive areas identified or confirmed through social surroundings consultation with the Nyangumarta People and Martu People

Principle	Consideration Given in the Proposal
The principle of intergenerational equity The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations	The Proposal has been designed to address the EPA's objectives for the identified environmental factors, with mitigation measures to reduce residual environmental impacts and offsets proposed to compensate for any significant residual impacts. The maintenance of biological diversity and natural resources and reducing greenhouse gas emissions are of particular importance in relation to this principle The Proposal will make a long-term contribution to the economic prosperity of Western Australia The Proponent has invested in substantial renewable energy infrastructure from the commencement of operations resulting in, on average, approximately 85% of power station energy produced by renewables. Rio Tinto redefined its approach to operational decarbonisation in 2023 to deliver on commitments made in 2021 to halve emissions by 2030 and achieve net zero by 2050. The decarbonisation approach has six pillars (renewable energy, diesel use, minerals processing, alumina refining, aluminium anodes and nature-based solutions). The Proposal will benefit from the global company research and partnerships focusing on reducing diesel use for both its Scope 1 and 2 emissions The Proposal will not compromise the area's current or foreseeable future land use options. Consultation with the Nyangumarta People and Martu People, including co-design of relevant planning and collaboration on relevant management, will remain ongoing through all Proposal phases to ensure adverse effects on Country and social and ACH values are minimised, employment opportunities are provided and future generations can continue the enjoyment of Country and maintain their heritage The Proposal can be effectively managed through avoidance, management and mitigation measures to ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations The Proponent has completely avoided critical habitat (Rocky Outcropping) for the Northern Quoll and Black-footed Rock-wallaby/Moororong. In addition, all known and potential Night Parrot habitat has been removed from the Development Envelope and will be avoided Offsets will be implemented for the significant residual impacts to Greater Bilby critical habitat
The principle of conservation of biological diversity and ecological integrity Conservation of biological diversity and ecological integrity should be a fundamental consideration	The Proponent has considered the relevant environmental factors and has modified the mine and infrastructure design to avoid and minimise impacts to significant environmental values associated with flora and vegetation, terrestrial fauna, marine fauna, benthic habitat, and subterranean fauna where practicable, including: • Avoiding direct disturbance to critical habitat (Rocky Outcropping) for Northern Quoll and Black-footed Rock-wallaby/Moororong (realigning the RAC) • Reducing the Development Envelope from 37,744 ha to 23,649 ha • Redefining the scope of the Proposal to withdraw development of the Wallal Borefield to avoid all potential impacts to marine fauna and benthic habitat • Redefining the scope of the Proposal to withdraw development of the Texas Borefield to avoid potential impacts to known and potential Night Parrot roosting and foraging habitat • Redefining the scope of the Proposal to reduce the Rimfire Development Envelope to avoid potential impacts to known and potential Night Parrot roosting and foraging habitat

Principle	Consideration Given in the Proposal
	• Implementing maximum clearing limits for Priority flora species and critical habitat for conservation significant fauna The Proponent will implement an Environmental Management Plan (EMP) (Appendix A05) and Surface Water Management Plans (Appendix C01, C02 and C03) to manage potential impacts to environmental values within the Development Envelope and implement an MCP (Appendix A03) The Proponent's Management System has established rehabilitation procedures for restoring disturbed environments The conservation of biological diversity and ecological integrity has been a fundamental consideration in developing the Proposal and applying the mitigation hierarchy
Principles relating to improved valuation, pricing and incentive mechanisms (a) Environmental factors should be included in the valuation of assets and services (b) The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance or abatement (c) The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes (d) Environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentives structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems	The Proponent acknowledges the need for improved valuation, pricing and incentive mechanisms and endeavours to pursue these principles when practicable. For example: • Detailed flora, vegetation, and terrestrial fauna field surveys have been undertaken to identify and confirm the environmental values within the Development Envelope. From this, the consideration of environmental factors has been fundamental in determining the mine design and location of infrastructure • Procedures will be in place to ensure that emissions and discharges are minimised as far as practicable • Potential impacts on the identified ecological values within the Development Envelope have been fundamental in the detailed design of the Proposal, given the mine layout has been modified to reduce impacts to significant environmental values The Proposal will be subject to an MCP prepared in accordance with the *Guidelines for Preparing Mine Closure Plans* (DMPE 2025b) and the Rio Tinto Closure Standard. This will provide the basis for ensuring that post-mining land use objectives are identified (through a consultative process) and can be met. The Proponent will undertake land rehabilitation activities to underpin the mine closure process
The principle of waste minimisation All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment	The Proponent has considered the principle of waste minimisation, including the destination and use of removed materials. Waste will be minimised during construction, operation and closure by adopting the hierarchy of waste controls: avoid, minimise, reuse, recycle and safe disposal Application of the Proponent's management policies, systems and procedures, combined with the MCP, will provide the basis for minimising waste generation and its discharge into the environment

6 SOCIAL SURROUNDINGS

6.1 EPA Environmental Factor Objective

The EPA Statement of Environmental Principles, Factors, Objectives and Aims for EIA (EPA 2023b) lists the following as its objective for Social Surroundings:

To protect social surroundings from significant harm

Social Surroundings under the EP Act refers to, in the case of humans, "aesthetic, cultural, economic and other social surroundings to the extent to which they directly affect or are affected by physical or biological surroundings."

As such, there is a specific focus on a clear linkage between the Proposal's potential impact on the physical and biological surroundings and the subsequent impact on a person's aesthetic, cultural, economic or social surroundings. In addition, an impact must be significant in terms of its effect on the physical or biological environment.

6.2 Relevant Policy and Guidance

Table 6-1 presents the relevant policy and guidance for Social Surroundings.

Table 6-1: Relevant Policy and Guidance for Social Surroundings

Policy and Guidance	Explain how the Policy and Guidance have been Considered
Environmental Protection Authority	
Statement of Environmental Principles, Factors, Objectives and Aims for EIA (EPA 2023b)	The EPA objective for social surroundings forms the basis of this assessment. This assessment has regard to the aims of EIA, consideration of significance and the application of the mitigation hierarchy
Environmental Factor Guideline: Social Surroundings (EPA 2023a)	Considered in: • Planning and design of relevant surveys, consultation and investigations undertaken to date • Consultation with Traditional Owners • Consultation with pastoral and community stakeholders • Preliminary assessment of potential impacts • Project design and refinement • Development of mitigation measures
Instructions on how to prepare an Environmental Review Document (EPA 2024f)	This document forms the basis of the headings and content provided in this ERD
Instructions on how to prepare *Environmental Protection Act 1986* Part IV Environmental Management Plans (EPA 2024f)	This document was considered in preparing the Winu EMP (Appendix A05)
Technical Guidance – Environmental impact assessment of social surroundings – Aboriginal cultural heritage (EPA 2023d)	Considered in understanding: • The EPA's EIA process for social surroundings in relation to ACH • Whether the Proposal is likely to have a significant effect on social surroundings as it relates to ACH and the information needed to assess this • The role of AH Act processes in mitigating potential effects on ACH

Policy and Guidance	Explain how the Policy and Guidance have been Considered
Other State or Commonwealth	
Guidelines for preparing Mine Closure Plans (DEMIRS 2025a)	The MCP has been prepared in accordance with the guidance and recognises the importance of social surroundings and related consultation in informing closure strategies (Appendix A03)
Guidelines for preparing Mining Development and Closure Proposals (DEMIRS 2025b)	
Interim Engaging with First Nations People and Communities on Assessments and Approvals under the Environment Protection and Biodiversity Conservation Act (DCCEEW 2023)	Considered with respect to engagement and participation of stakeholders most affected by the Proposal
Other Industry or Proponent	
ESG: Change for the Better (MCA 2021)	Considered with respect to industry-standard policies, strategies and partnerships that support and improve the mining industry's environmental, social and governance (ESG) performance, including Indigenous partnerships
Integrated Mine Closure Good Practice Guide (ICMM 2019)	Considered with respect to engagement and participation of stakeholders most affected by the Proposal through the LOM, including closure
Communities and Social Performance Standard (Rio Tinto 2022)	The Standard the Proponent expects of itself in regard to its performance in relation to, and management of, Health, Safety, Environment and Communities (HSEC) and Human Rights risks and opportunities associated with the proposed activities which could adversely impact the social surroundings of Traditional Owners and local communities
Communities and Social Performance Commitments Disclosure Interim Report (Rio Tinto 2021)	Considered with respect to commitments the Proponent has made regarding partnerships and engagement with Traditional Owner groups within the Pilbara and Kimberley
The Burra Charter the Australia International Council on Monuments and Sites (ICOMOS) Charter for Places of Cultural Significance (ICOMOS 2013)	Used as Guidance for ACH Surveys considered with respect to the practice of ACH management and guidance on the Burra Charter and its application
Cultural Heritage Management System (CHMS)	Policies, procedures, instructions and frameworks for ACH related items including: • Identification and management of ACH sites and places • Consultation processes with Traditional Owners • Protection and / or management, e.g. exclusion / restriction zones or application of legislative guidelines as specified above

6.3 Receiving Environment

This section details the receiving environment for the Proposal, which for the purposes of the assessment includes the 'aesthetic, cultural, economic and social surroundings.' This section provides an overview of the native title rights and interests of the Nyangumarta People and Martu People, who are the "surrounding communities" for consideration in the assessment. Surrounding communities and other proximal projects and stakeholder interests including pastoral stations, mining projects, tourism values and conservation estates are discussed in Section 6.3.2.

This section further outlines previous consultation and social studies undertaken that have informed the understanding of social surrounding values. Moreover, it details Nyangumarta People and Martu People

values relevant to the Social Surroundings Assessment (SSA), and those of other stakeholder groups, prior to the assessment of potential impacts on identified values as discussed in Section 1.1.

6.3.1 Native Title

The Proposal is located within the boundaries of the Nyangumarta People and Martu People native title determination (NTD) areas.

The majority of the Proposal, including all active mining areas, occurs within the Nyangumarta NTD area (NNTT no WCD2009/001; Federal Court no WAD6281/1998, WAD234/2007) which was determined in 2009 and covers approximately 35,000 km^2 and the Nyangumarta Indigenous Protected Area (IPA), which was declared in 2015 and covers 28,420 km^2. The Nyangumarta Warrarn IPA stretches from Eighty Mile Beach to the Ramsar listed wetlands and the sand dunes of the Great Sandy Desert. It is a rich and varied landscape with high ecological values (refer to Figure 6-1).

6.3.1.1 Martu Determination Area

Part of the Development Envelope, covering the below listed matters is within the Martu native title determination area (NTT no WCD2003/002, Federal Court no WAD6110/1998; Figure 6-2). Martu native title rights and interests are held in trust by Jamukurnu Yapalikurnu Aboriginal Corporation (Western Desert Lands) RNTBC (JYAC).

The Development Envelope within the Martu Determination covers:

- The new airstrip to be constructed under this Proposal including:
  - A sealed runway that will support the landing of flights
  - Apron
  - Aircraft parking area
  - Bus and light vehicle parking area
  - Toilet block and waiting/assembly areas/building
  - Equipment shed
  - Fencing
  - Communication tower
  - Wind masts, weather station and other weather monitoring/observation infrastructure
  - Fuel storage and refuel infrastructure
  - Power, water, sewerage and fire system infrastructure
  - Infrastructure reasonably required for construction, operation, maintenance and closure of the aerodrome such as temporary construction areas, borrow pit areas, laydown areas and topsoil stockpiles
  - Any other ancillary infrastructure that reasonably forms part of the above matters.
- The Rimfire Borefield including:
  - A network of underground pipelines and pump stations that include generators and associated equipment
  - Control room, power and electrical infrastructure
  - Communications and data monitoring equipment
  - Water production and monitoring bores and associated equipment
  - Access tracks
  - Toilet block
  - Infrastructure reasonably required for construction, operation, maintenance and closure of the borefield, such as temporary construction areas, borrow pit areas, laydown areas and topsoil stockpiles
  - Any other ancillary infrastructure that reasonably forms part of the above matters.
- The proposed road between the proposed new airstrip and the Winu camp, including:
  - Culverts and floodway crossings, if required

- Infrastructure reasonably required for construction, operation, maintenance and closure of the road such as temporary construction areas, borrow pit areas, laydown areas and topsoil stockpiles
- Pipeline and other communications infrastructure
- Any other ancillary infrastructure that reasonably forms part of the above matters.

The pipeline length from the Martu NTD to the Rimfire Borefield collection tanks is 30 km while the length of the pipeline from the Karlkayn airstrip to the Rimfire Borefield collection tanks is 20 km (Figure 6-2and Figure 6-9).

Martu People have raised a number of concerns in relation to the impact of the Proposal on their native title rights and interests and social surrounds, including impacts on ethnobotanical (for the purposes of this assessment, ethnobotanical relates to both flora and fauna values), social, cultural and heritage values, which are discussed in more detail in Section 6.4.4. Key issues for Martu include impacts on visual amenity, sand dunes, groundwater and endangered and threatened species.

In 2023, the Proponent entered into an agreement with JYAC in relation to the conduct of certain feasibility investigation works in connection with the proposed Rimfire and Texas Borefields (Stage 1 Agreement).

The Proponent and JYAC are currently negotiating an agreement with the working title *Karlkayn Mine Infrastructure Agreement* (KMIA) in relation to the Proposal to the extent it relates to the Martu determination area including:

- The proposed new airstrip and associated infrastructure
- The proposed Rimfire Borefield, associated infrastructure and the taking of up to 2.8 GL of groundwater from Martu ngurra (Martu Country) per year
- The proposed road between the new airstrip and the Winu camp.

The KMIA is proposed to cover – amongst other things – consent to the grant of tenure required for implementing the Proposal, consent to the conduct of activities involved in implementing the Proposal, agreed measures for mitigating impacts on native title, Aboriginal cultural heritage and social surrounds more broadly (including a Social and Cultural Heritage Management Plan) and ongoing engagement in relation to the implementation of the Proposal and the monitoring of impacts.

6.3.1.2 Nyangumarta Determination Area

The Nyangumarta People have a long history of land use of the Development Envelope, which predates European colonisation by many thousands of years. The native title rights and interests of the Nyangumarta People, recognised in the Nyangumarta native title determination (Hunter v State of Western Australia [2009] FCA 654) include both exclusive and non-exclusive rights and interests, extracted in Table 6-2.

Table 6-2: Nyangumarta native title rights and interests

Determination Paragraph Reference	Nyangumarta Native Title Rights and Interests
Exclusive native title rights and interests	
Subject to paragraphs 9, 10 and 11, the nature and extent of the native title rights and interests in relation to each part of the Determination Area referred to in Schedule 3 (being areas where there has been no extinguishment of native title or areas where any extinguishment must be disregarded) are:	
5(a)	Except in relation to flowing and underground waters, an entitlement as against the whole world to possession, occupation, use and enjoyment of the land and waters of that part to the exclusion of all others
5(b)	In relation to flowing and underground waters, the right to use and enjoy the flowing and underground waters, including:

Determination Paragraph Reference	Nyangumarta Native Title Rights and Interests
	i. the right to hunt on and gather and fish from the flowing and underground waters for personal, domestic or non-commercial communal needs
	ii. the right to take and use the flowing and underground waters for personal, domestic or non-commercial communal needs
Non-exclusive native title rights and interests	
Subject to paragraphs 9, 10 and 11, the nature and extent of the native title rights and interests in relation to each part of the Determination Area referred to in Schedule 4 (being areas where there has been a partial extinguishment of native title, where any extinguishment is not required to be disregarded and that are not inter-tidal or sea areas) are that they confer the following non-exclusive rights on the Native Title Holders, including the right to conduct activities necessary to give effect to them:	
6(a)	The right to access and move freely through and within each part of the Determination Area referred to in Schedule 4 (of the determination)
6(b)	The right to live, being to enter and remain on the land, to camp and erect shelters and other structures for that purpose
6(c)	The right to do the following activities:
	i. hunt and fish for personal, domestic and non-commercial communal needs
	ii. take flora and fauna
	iii. take other natural resources of each part of the Determination Area referred to in Schedule 4 (of the determination) including soil, sand, clay, gravel, ochre, timber and stone for personal, domestic and non-commercial communal needs
	iv. share and exchange natural resources of each part of the Determination Area referred to in Schedule 4 including soil, sand, clay, gravel, ochre, timber and stone for personal, domestic and non-commercial communal needs
	v. engage in cultural activities in the area, including the transmission of ACH knowledge
	vi. conduct ceremonies
	vii. conduct burials and burial rites
	viii. hold meetings
	ix. visit, maintain and protect from physical harm, places and sites of importance in each part of the Determination Area referred to in Schedule 4
	x. access and take water for personal, domestic or non-commercial communal purposes, and for the sake of clarity and the avoidance of doubt, this right does not include the right to take or use water lawfully captured or controlled by the holders of pastoral leases numbered 3114/485 (Mandora), 3114/1079 (Wallal Downs) and 3114/1154 (Anna Plains)
6(d)	The right to be accompanied onto each part of the Determination Area referred to in Schedule 4 by those people who, though not native title holders and who (for the avoidance of doubt) cannot themselves exercise any native title right set out in this determination:
	i. spouses, parents, children of native title holders
	ii. people required by traditional law and customs for the performance of ceremonies or cultural activities on any part of the Determination Area referred to in Schedule 4 (of the determination)

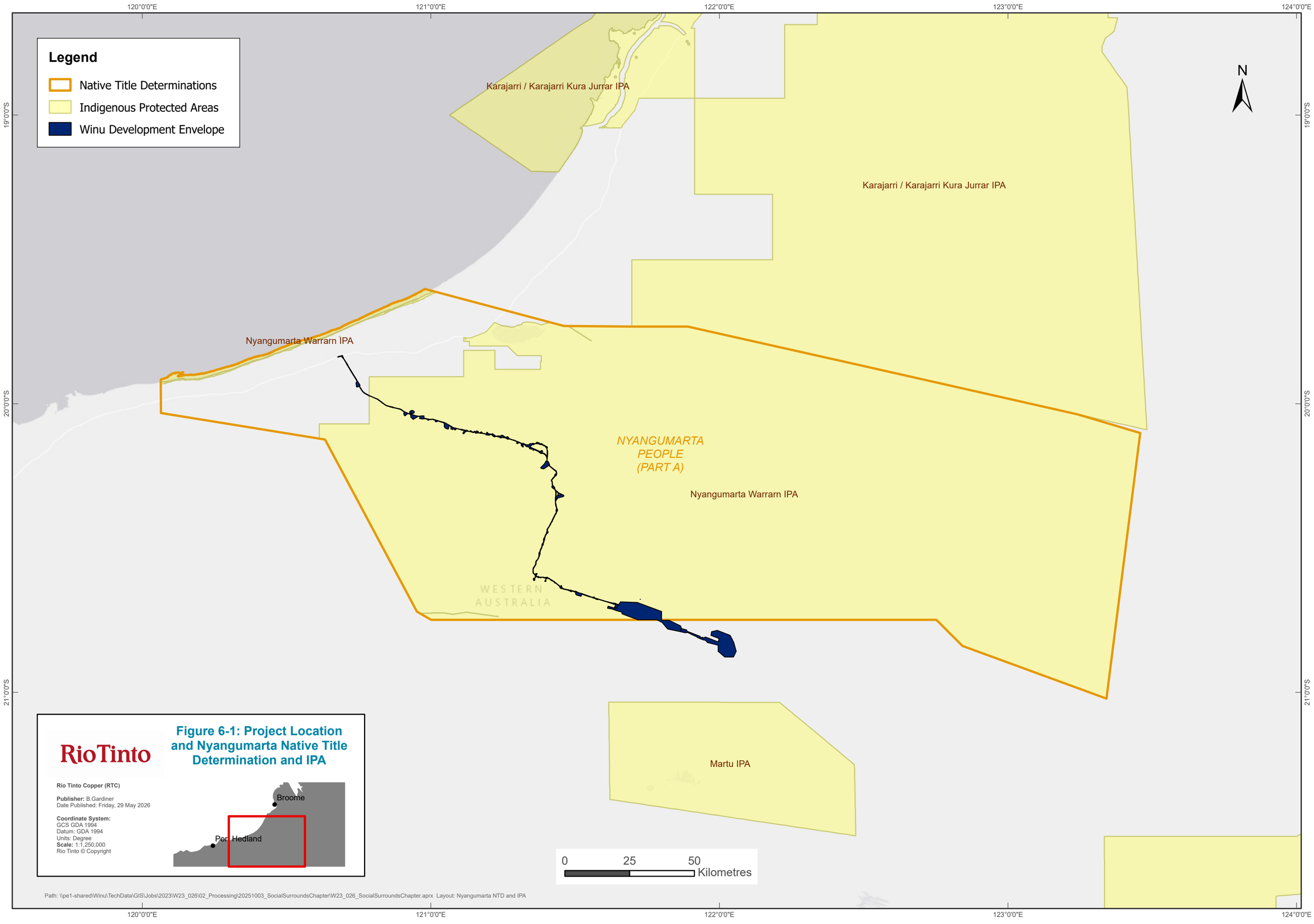
Determination Paragraph Reference	Nyangumarta Native Title Rights and Interests
	iii. people who have rights in relation to any part of the Determination Area referred to in Schedule 4 (of the determination) according to the traditional laws and customs acknowledged by the native title holders

Source: Hunter v State of Western Australia *2009 FCA 654*

Nyangumarta native title rights and interests are held on trust by Nyangumarta Warrarn Aboriginal Corporation RNTBC (NWAC). NWAC is the registered native title body corporate under the Native Title Act 1993 (Cth) for all Nyangumarta native title holders in relation to the Nyangumarta NTD, and has over 200 members who reside across the northern Pilbara and southern Kimberley region in towns and communities.

Prior to colonisation, the Nyangumarta People lived across their Country. With the arrival of pastoralists in the late 19th century, the Nyangumarta People gradually (forcibly and voluntarily) moved towards the coastal stations and the La Grange Mission, now known as the Bidyadanga community. The Nyangumarta People found work on the stations, however, Aboriginal labour was often coerced and occurred under poor conditions. Consequently, in 1946 the Pilbara Strike occurred, spurring a movement of Aboriginal self-supporting economic and ultimately social / cultural endeavours. By the 1960s, award wages were introduced and many Nyangumarta People were moved off the stations (Hale 2012; NWAC 2025).

The Nyangumarta People maintain strong cultural and spiritual ties to their Country, which is central to their identity, Law, and language. Their connection to Country is expressed through ongoing visits, cultural practices, and language preservation efforts. Today a large number of Nyangumarta People reside in Bidyadanga, Port Hedland and Broome. Nyangumarta People also reside in Strelley, Warralong, Woodstock and Yandeyarra.


120°0'0"E
121°0'0"E
122°0'0"E
123°0'0"E
124°0'0"E
19°0'0"S
20°0'0"S
21°0'0"S
Legend
Native Title Determinations
Indigenous Protected Areas
Winu Development Envelope
N
Karajarri / Karajarri Kura Jurrar IPA
Karajarri / Karajarri Kura Jurrar IPA
Nyangumarta Warrarn IPA
NYANGUMARTA
PEOPLE
(PART A)
Nyangumarta Warrarn IPA
WESTERN
AUSTRALIA
Martu IPA
0
25
50
Kilometres
RioTinto
Figure 6-1: Project Location and Nyangumarta Native Title Determination and IPA
Rio Tinto Copper (RTC)
Publisher: B.Gardiner
Date Published: Friday, 29 May 2026
Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:1,250,000
Rio Tinto © Copyright
Broome
Port Hedland
Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2023\W23_026\02_Processing\20251003_SocialSurroundsChapter\W23_026_SocialSurroundsChapter.aprx Layout: Nyangumarta NTD and IPA

6.3.1.3 Martu

The Martu People have a long history of land use of the Development Envelope, which predates European colonisation by many thousands of years.

The exclusive possession native title rights and interests of the Martu People, recognised in the Martu native title determination (James on behalf of the Martu People v Western Australia [2002] FCA 1208) are extracted in Table 6-3.

Table 6-3: Martu native title rights and interests

Determination Paragraph Reference	Martu native title rights and interests
Exclusive possession native title rights and interests	
Subject to paragraphs 6, 7, 8 and 9, the nature and extent of the native title rights and interests held by the common law holders in the determination area are:	
5(1)	(a) the right to possess, occupy, use and enjoy the land and waters of the determination area to the exclusion of all others, including:
	i. the right to live on the determination area;
	ii. the right to make decisions about the use and enjoyment of the determination area;
	iii. the right to hunt and gather, and to take the waters for the purpose of satisfying their personal, domestic, social, cultural, religious, spiritual, ceremonial, and communal needs;
	iv. the right to control access to, and activities conducted by others on, the land and waters of the determination area;
	v. the right to maintain and protect sites and areas which are of significance to the common law holders under their traditional laws and customs; and
	vi. the right as against any other Aboriginal group or individual to be acknowledged as the traditional Aboriginal owners of the determination area;
	(b) the right to use the following traditionally accessed resources: i. ochre; ii. soils; iii. rocks and stones; and iv. flora and fauna for the purpose of satisfying their personal, domestic, social, cultural, religious, spiritual, ceremonial and communal needs; and
	(c) the right to take, use and enjoy the flowing and subterranean waters in accordance with their traditional laws and customs for personal, domestic, social, cultural, religious, spiritual, ceremonial and communal needs, including the right to hunt on and gather and fish from the flowing and subterranean waters.

Source: James on behalf of the Martu People v Western Australia 2002 FCA 1208

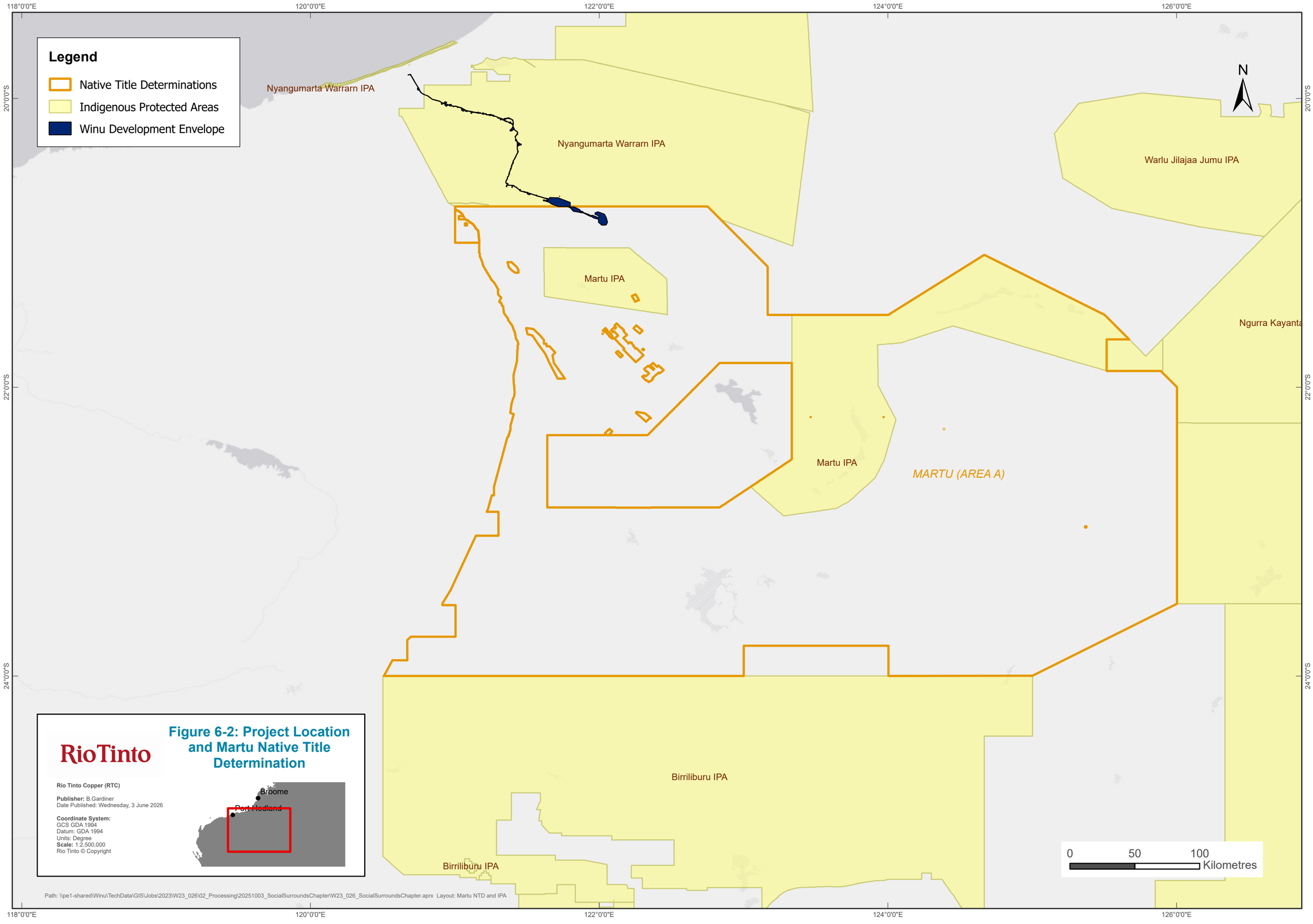
The common law holders of this native title – the Martu People – are described in the third schedule to the determination.

While the Martu identify as one people, Martu include people from several related traditional language groups including Manyjilyjarra, Kartujarra, Putijarra, Warnman, Nyangajarra, Pijakarli, Mangala and Ngulipartu.

JYAC is the registered native title body corporate for the Martu determination and as noted above has been determined to hold the determined native title rights and interests on trust for the common law holders, the Martu People.

Membership of JYAC is open to all Martu common law holders who are at least 18 years old. JYAC has over 1,500 members who primarily reside in the communities and towns of Jigalong, Parnngurr, Punmu, Kunawarritji, Newman, Nullagine, Port Hedland, Bidyadanga, Looma, Fitzroy Crossing, Warralong and Strelley as outlined in Section 6.3.1.

In accordance with the traditional law and custom of the Martu People and the normative processes required in relation to Martu cultural decision making, specific Martu People, with cultural knowledge and authority are required to be consulted and provide their consent in relation to any land use proposals on Martu Country. Pitjikarli Elders are required to be consulted in relation to the Proposal as well as other Martu Elders who hold cultural knowledge and authority under Martu traditional law and custom.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Native Title Determinations
Indigenous Protected Areas
Winu Development Envelope
Nyangumarta Warrarn IPA
Nyangumarta Warrarn IPA
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Martu IPA
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Figure 6-2: Project Location and Martu Native Title Determination
Rio Tinto Copper (RTC)
Publisher: B.Gardiner
Date Published: Wednesday, 3 June 2026
Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:2,500,000
Rio Tinto © Copyright
Broome
Port Hedland
Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2023\W23_026\02_Processing\20251003_SocialSurroundsChapter\W23_026_SocialSurroundsChapter.aprx Layout: Martu NTD and IPA

6.3.2 Land Use and Key Community Characteristics

The Proposal's Development Envelope covers 23,649 ha within the Yeneena Basin of the Paterson Province in Western Australia, approximately 320 km east of Port Hedland. The Proposal is primarily located within the sparsely populated Shire of East Pilbara, which is home to approximately 10,400 residents in an area of around 372,571 km^2 (Shire of East Pilbara 2023; ABS 2023). Newman is the administrative centre and the largest town within the Shire. Site access to the Proposal is via the Great Northern Highway. Other than Newman, the nearest town centres from the Proposal are Nullagine, Marble Bar, Port Hedland and South Hedland.

A small section (approximately 18 km) of the Proposal's RAC (from the Great Northern Highway end) is located within the Shire of Broome. The Aboriginal community of Bidyadanga is also located in the neighbouring Shire of Broome with this community located approximately 170 km north-east of the RAC intersection with the Great Northern Highway. Refer to Table 6-4 below with regards to regional communities and their distance from the Proposal.

The current product logistics plan proposes the use of a third-party staging facility at Port Hedland, with shipping occurring from Port Hedland; however, this is to be confirmed based on further studies. Access to the Proposal will be via the Great Northern Highway and new, or upgraded, access roads, including the Nyangumarta Highway (currently unsealed) and existing, unsealed exploration tracks, Wirlkirr Wirlkirr Road and Copperhead Road. A transit permit issued by NWAC is required to travel the Nyangumarta Highway, with permits allowing access for tourism and camping (in designated areas). The Great Northern Highway forms part of the National Highway Network and provides access to many parts of the Pilbara including townships, nearby tourism attractions and proximal projects.

A summary of the key communities' characteristics is provided in Table 6-4 with the location of the Proposal visually represented in Figure 1-1.

Table 6-4: Key Community Characteristics

Community	Distance from the Proposal	Population Size	Proportion Identifying as Aboriginal
Punmu	200 km SE	126	87.3%
Bidyadanga	200 km NW	517	87.2%
Marble Bar	210 km SW	153	45.1%
Nullagine	215 km SW	1,159	13.8%
Warralong	225 km W	87	96.6%
Parnngurr	250 km SE	117	84.6%
Strelley	280 km NW	41	75.6%
Jigalong	300 km SW	306	90.2%
Woodstock	300 km SW	-	-
Pippingarra	300 km NW	49	57.1%
South Hedland	315 km W	11,046	22.2%
Port Hedland	320 km W	4,253	7.3%
Kunawarritji	30 km SE	75	90.3%

Community	Distance from the Proposal	Population Size	Proportion Identifying as Aboriginal
Yandeyarra	350 km SW	59	89.8%
Newman	360 km SW	4,239	13.1%
Broome	460 km NW	14,660	23.4%

Source: (ABS 2023; Umwelt 2024). Note It is widely acknowledged that there is limited amount of Aboriginal household data generally available through secondary data sources, such as ABS Census data. Its reliability also diminishes when applied to smaller or remote communities with smaller sample sizes.

6.3.2.1 Pastoral Stations

Additional land use in the region includes pastoral grazing. A portion of the Proposal's Development Envelope within the RAC is within the Wallal Downs pastoral lease, with the highway intersection approximately 8 km south-south-east of the station homestead. The Proposal's Development Envelope does not intersect any other pastoral leases. The closest, Warrawagine Station, is located approximately 100 km to the west.

Mandora Pastoral Station is also in the broader regional vicinity, covering approximately 94,000 ha. It is in proximity to Mandora Marsh and Eighty Mile Beach (DPLH 2025).

Pastoral stations within and in the vicinity of the Proposal are shown in Figure 3-1.

6.3.2.2 Existing and Reasonably Foreseeable Projects

Although there are few existing projects in the immediate proximity to the Proposal, several new developments (including mining and other sectors, such as renewable energy) are currently being proposed). Eight existing and reasonably foreseeable projects (i.e. currently operational or have been recently approved) are within 150 km of the Proposal (Table 2-5). While these are some distance from the Proposal, they have been identified in the context of causing potential cumulative impacts such as traffic movements and other cumulative changes to cultural values and other social amenity aspects.

6.3.2.3 Tourism

Tourism plays a vital role in the regional economy, particularly in the Shire of East Pilbara, which forms part of the North-West Tourism region. This area leverages its rich natural features and ACH, including Aboriginal culture, gorges, landscapes, waterfalls, and other attractions (Shire of East Pilbara 2023).

While the Proposal is situated in a remote part of the Great Sandy Desert, the broader surrounding region attracts tourism due to its natural beauty and ecological significance. Areas of particular note include Eighty Mile Beach and Mandora Marsh (located 140 km northwest of the Proposal). The broader Great Sandy Desert also attracts tourists for a range of activities including camping, 4WD, and landscape photography (Australian Government 2025).

The intersection of the RAC with the Great Northern Highway is 1 km north of the Eighty Mile Beach Caravan Park turnoff, approximately 40 km west-south-west of the Sandfire Roadhouse and approximately 90 km east-north-east of the Pardoo Roadhouse.

6.3.2.4 Conservation Estates

The Proposal is situated 200 km north-west of Karlamilyi National Park and 130 km south-east of Eighty Mile Beach Marine Park. Karlamilyi National Park spans approximately 1.3 million hectares and features diverse landscapes such as desert dunes, spinifex grasslands, and salt lakes. The park's flora includes river gums and various shrubs, while its fauna comprises species like Stimson's python, red kangaroos, and over 140 bird species. The Rudall River, located within the park, provides a crucial water source in this arid environment (Australian Government 2025).

Eighty Mile Beach Marine Park covers approximately 10,785 km^2. This marine park is renowned for its extensive intertidal zone, which stretches up to 4 km wide at low tide. The park's habitat includes sandy beaches, mudflats, and shallow coastal waters, providing crucial feeding grounds for migratory shorebirds and nesting sites for flatback turtles (Australian Government 2025).

The Walyarta Conservation Park, covering approximately 230,000 hectares, lies inland and adjacent to the Eighty Mile Beach Marine Park with parts of the park falling within the Nyangumarta Warrarn IPA. The Park is jointly managed by the Nyangumarta, Karajarri and Ngarla Traditional Owners in partnership with the Western Australian State Government.

6.3.2.5 Consultation and Social Studies Undertaken

The Proponent has undertaken dedicated consultation focused on the social surroundings key environment factor to inform this assessment. Key stakeholders consulted are outlined in Table 6-5. Consultation with respect to the Proposal more broadly, including with other stakeholders, is listed in Section 4.

Table 6-5: Key Stakeholders for Social Surroundings Consultation

Traditional Owner Group	Registered Native Title Bodies Corporate	Pastoral Stations	Community	Other Relevant Parties
Nyangumarta	NWAC	Wallal Downs	Community, including the Shire of East Pilbara and the Shire of Broome	N/A
Martu	JYAC			

6.3.2.6 Traditional Owner Consultation Program

The Proponent has undertaken consultation with the Traditional Owners as outlined in Section 4 and Appendix A04. Important context and key issues, concerns and values raised by Traditional Owners and key stakeholders are further detailed in Section 6.3.5.

Since 2019, the Proponent has undertaken consultation with each Traditional Owner group to inform the EIA for the Proposal. Both the Nyangumarta People and Martu People have a long association with their Country. One of the Proponent's strategic pillars is to 'create value with partners' with the objective to 'connect, partner and restore trust with the community'. Since the exploration phase of the Proposal in 2019, the Proponent has developed and implemented annual Consultation and Engagement Plans. These Plans define the engagement approach, principles, and objectives to inform stakeholders of the Proposal and establish positive relationships and partnerships.

A number of ACH and environmental surveys and investigations have also been undertaken within the Development Envelope of the Proposal. Relevant studies and consultations relevant to social surroundings are summarised in Table 6-6 and Appendix B03.

The extent of archaeological and ethnographic survey assessments within the Development Envelope are presented in Figure 6-3.

Table 6-6: Summary of Key Studies for Social Surroundings

Studies / Surveys / Prepared for	Study Area, Type, Timing	Consistency with Guidance
Nyangumarta SSA No. 1	Area: Nyangumarta NTD area Type: Consultation including on-Country assessment Timing: August 2023	The consultation process has been undertaken in accordance with: • The Proposal ESD (Appendix A02) • Engaging with First Nations People and Communities on Assessments and Approvals under the EPBC Act interim guidance (DCCEEW 2023a) • Agreements between the Proponent and the Nyangumarta People
Nyangumarta SSA No. 2	Area: Nyangumarta NTD area Type: Consultation Timing: October 2023	
Nyangumarta SSA No. 3	Area: Nyangumarta NTD area Type: Consultation including on-Country assessment Timing: April 2024	
Nyangumarta SSA No. 4	Area: Nyangumarta NTD area Type: Consultation including on-Country assessment Timing: June 2024	
Nyangumarta SSA No. 5	Area: Nyangumarta NTD area Type: Consultation Timing: April 2025	
Martu Cultural Values Mapping Project	Area: Texas and Rimfire regions, and the distance in-between and back to the MIA Type: On-Country preliminary assessment to identify a preferred pipeline corridor and capture cultural values Timing: 15 to 26 June 2024	The consultation process has been undertaken in accordance with: • The Proposal ESD (Appendix A02)
Winu Project Visual Impact Assessment	Area: Observer locations within and surrounding the Development Envelope Type: Viewshed analysis and analysis of photomontages Timing: 2024 & 2025	Developed in accordance with the Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design, Western Australian Planning Commission (WAPC, 2007)

Studies / Surveys / Prepared for	Study Area, Type, Timing	Consistency with Guidance
Technical social surroundings consultation	Area: Proposal update – key Proposal changes and environmental approvals; ACH; flora and fauna; mine size comparison; water – current understanding, statis ad use; Karlkayn airstrip; safe closure of the pit; TSF – design and closure, renewable energy – construction and closure; VIA; air quality, noise and vibration; land access Type: Consultation Timing July 2025	The consultation process has been undertaken in accordance with: • The Proposal ESD (Appendix A02)
Paterson (Karlkayn) Regional Forum	Area: Cumulative impact of native title determination area by all proponents Type: Consultation and collaboration Timing: 2022 to 2025 (biannually)	N/A
Winu Baseline Groundwater Monitoring Plan Baseline Assessment- Update 2024	Area: Groundwater sources within and surrounding the Development Envelope Type: Baseline study developed to assist in monitoring and assessing environmental risks relating to groundwater Timing: 2024	This assessment was developed in accordance with: • EPA Environmental Factor Guideline: Inland Water (EPA 2018a) • Western Australian Water in Mining Guideline (DoW 2013) and Operational Policy 5.12 – Hydrogeological reporting associated with a groundwater well licence (DoW 2009)
Surface Water Heritage Assessment (Worley 2024d)	Area: ACH sites within and surrounding the Development Envelope Type: TUFLOW modelling to predict potential surface water impacts to identified ACH sites Timing: 2024	N/A
Landforms Assessment	Area: 288,266 ha including the MIA and 20 km buffer; and sites in the Great Sandy Desert and Simpson Desert Type: Significance assessment of dunal landforms Timing: 2024	Consistent with the EPA criteria for determining the significance of a landform (EPA 2018b)
Flora and Vegetation Assessment	Area: Sampling sites within the Development Envelope Type: Botanical surveys	Developed in accordance with the EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016f)

Studies / Surveys / Prepared for	Study Area, Type, Timing	Consistency with Guidance
	Timing: 2021- 2024	
Terrestrial Fauna Assessment	Area: Sampling sites within the Development Envelope Type: Biological surveys Timing: 2023	This assessment was consistent with: • EPA Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA 2020b) • EPA Environmental Factor Guideline: Terrestrial Fauna (EPA 2016e)
Dust Impact Assessment of Proposed Mining Operations	Area: Receptor locations with and around the Development Envelope Type: Predictive dust modelling and assessment to predict cumulative mining activities' impacts for TSP deposition, PM_{10} and $PM_{2.5}$ at peak throughput, where the cumulative mining activities include the mine itself and haulage routes, and the RAC Timing: 2024	This assessment was consistent with: • EPA Guideline for Air Quality (EPA 2020a) • National Environmental Protection Measure (NEPM) for Ambient Air Quality (NEPC 2021) • Western Australia Air Emissions Guideline (DWER 2019b)
Greenhouse Gas Emissions Assessment	Area: Components within and surrounding the Proposal Type: Predictive modelling of emissions generated as a direct result of the Proposal's activities, emissions generated from the consumption of an energy commodity and indirect emissions of the Proposal Timing: 2025	This assessment was consistent with: • EPA Environmental Factor Guideline: Greenhouse Gas Emissions (EPA 2019)
Winu Project Noise and Vibrations Impact Assessment	Area: Locations within and surrounding the Proposal Type: Noise modelling of noise generated as a direct result of the Proposal's activities Timing: 2025	This assessment was conducted in accordance with: • DWER Guideline – Assessment of Environmental Noise Emissions (DWER 2021b) • EPA Environmental Factor Guideline – Human health. December 2016 (EPA 2016b) • DWER Noise Regulations fact sheet. Regulation 11: Blasting operations. June 2021 (DWER 2021d)

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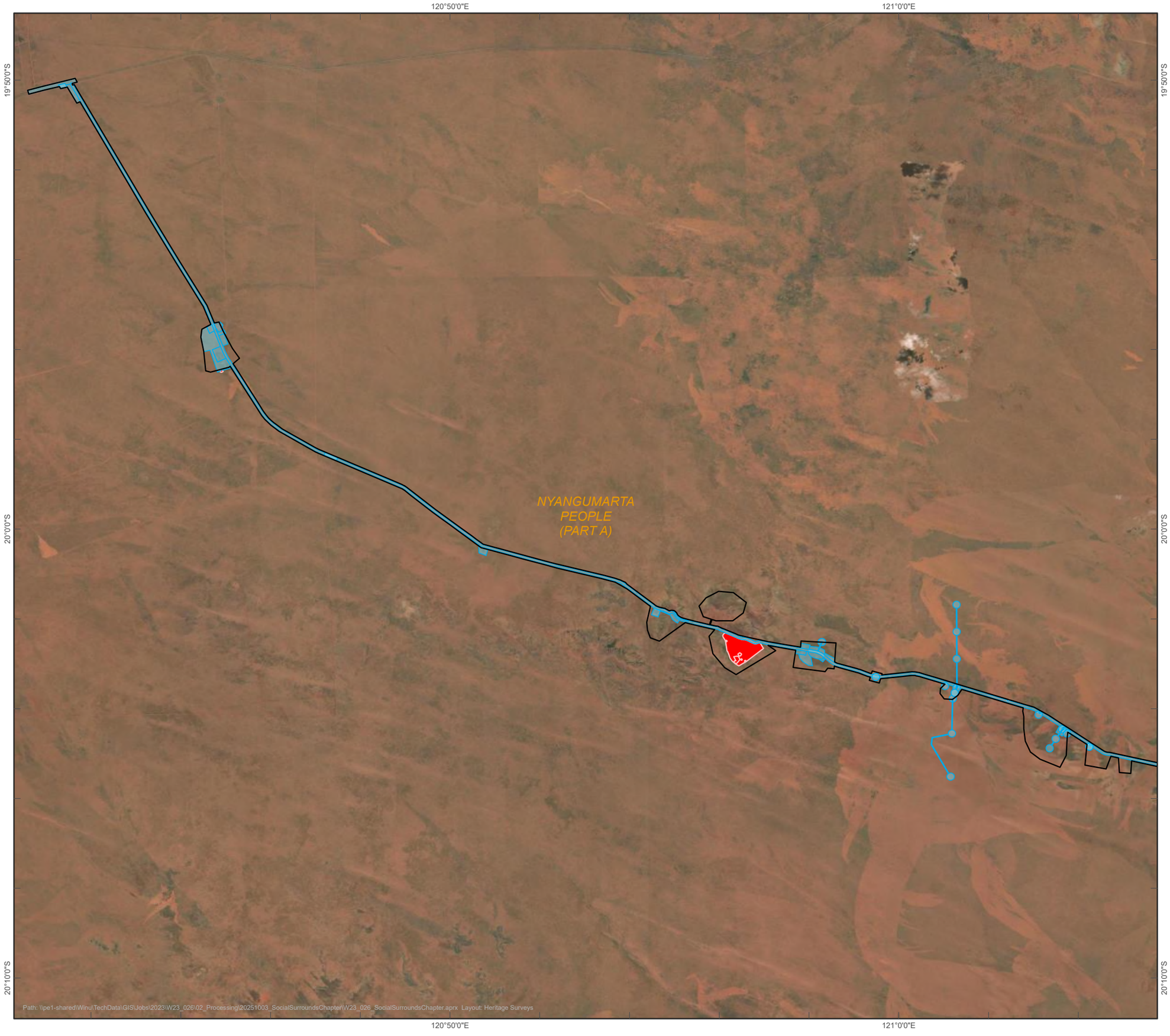
Figure 6-3: Archaeological and Ethnographic ACH Surveys within the Development Envelope

Sheet 1 of 5



Legend

- Native Title Determinations
- Winu Approvals Development Envelope

Heritage Survey Cleared Areas

- Cleared Areas

Heritage Survey Sites and Exclusion Areas

- Conditionally Cleared
- Sites and Exclusion Areas

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Publisher: B.Gardiner
Date Published: Wednesday, 3 June 2026

Coordinate System:
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Datum: GDA 1994
Units: Degree

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OVERVIEW MAP

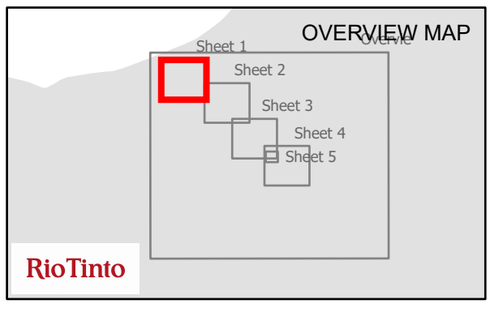

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Figure 6-3: Archaeological and Ethnographic ACH Surveys within the Development Envelope

Sheet 2 of 5

Legend

- Native Title Determinations
- Winu Approvals Development Envelope

Heritage Survey Cleared Areas

- Cleared Areas

Heritage Survey Sites and Exclusion Areas

- Conditionally Cleared
- Sites and Exclusion Areas

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Publisher: B.Gardiner
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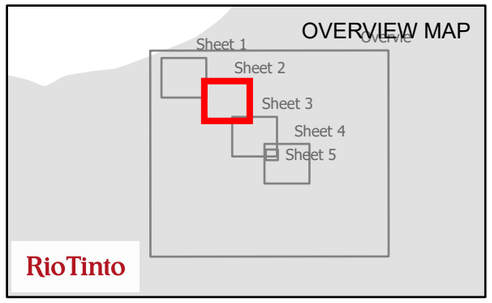

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NYANGUMARTA PEOPLE (PART A)

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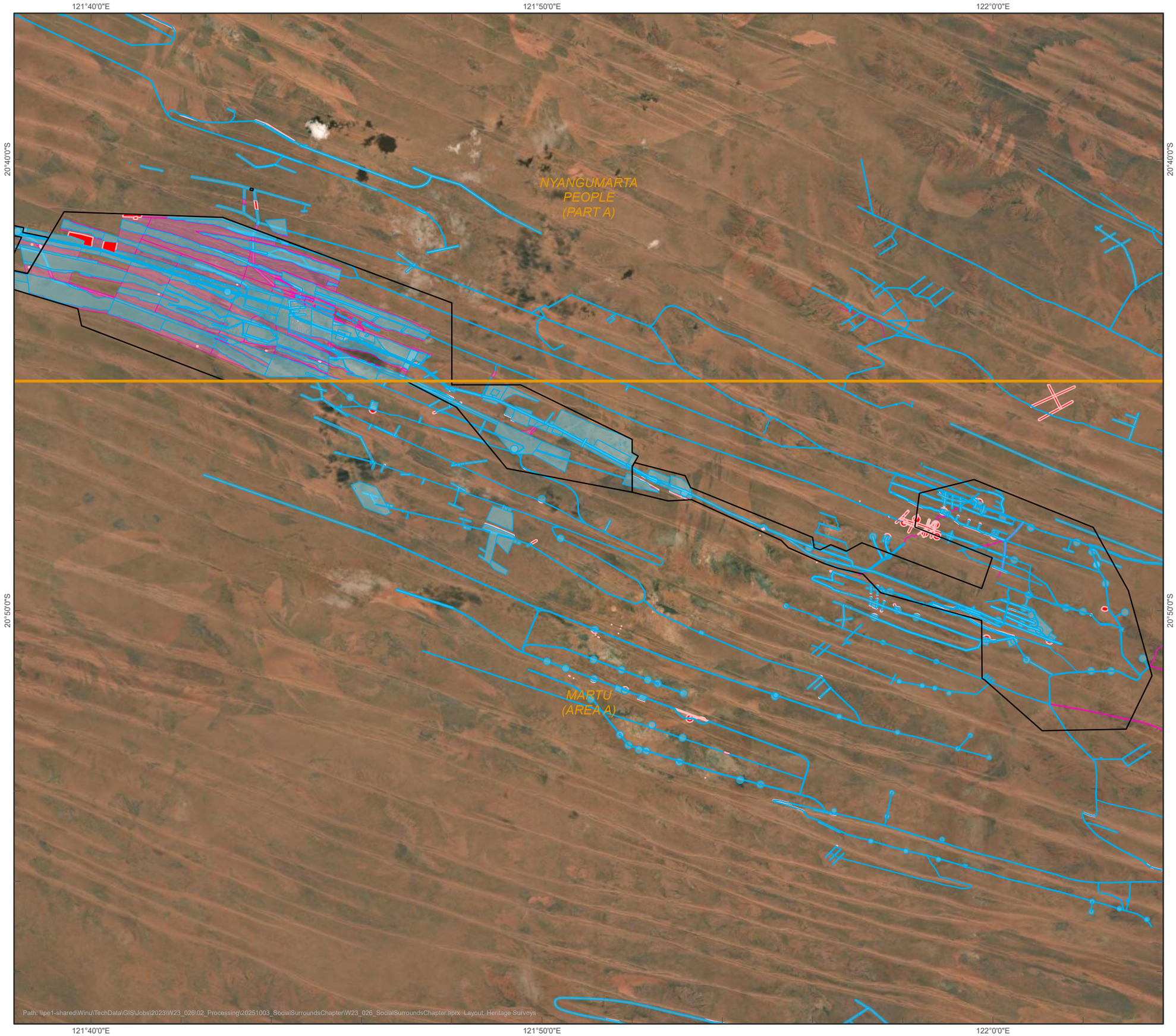
Figure 6-3: Archaeological and Ethnographic ACH Surveys within the Development Envelope

Sheet 4 of 5



Legend

- Native Title Determinations
- Winu Approvals Development Envelope

Heritage Survey Cleared Areas

- Cleared Areas

Heritage Survey Sites and Exclusion Areas

- Conditionally Cleared
- Sites and Exclusion Areas

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Publisher: B.Gardiner
Date Published: Wednesday, 3 June 2026

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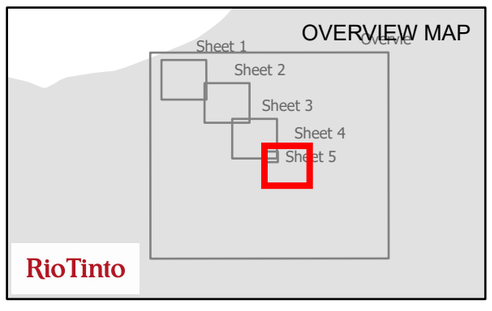

Figure 6-3: Archaeological and Ethnographic ACH Surveys within the Development Envelope

Sheet 5 of 5

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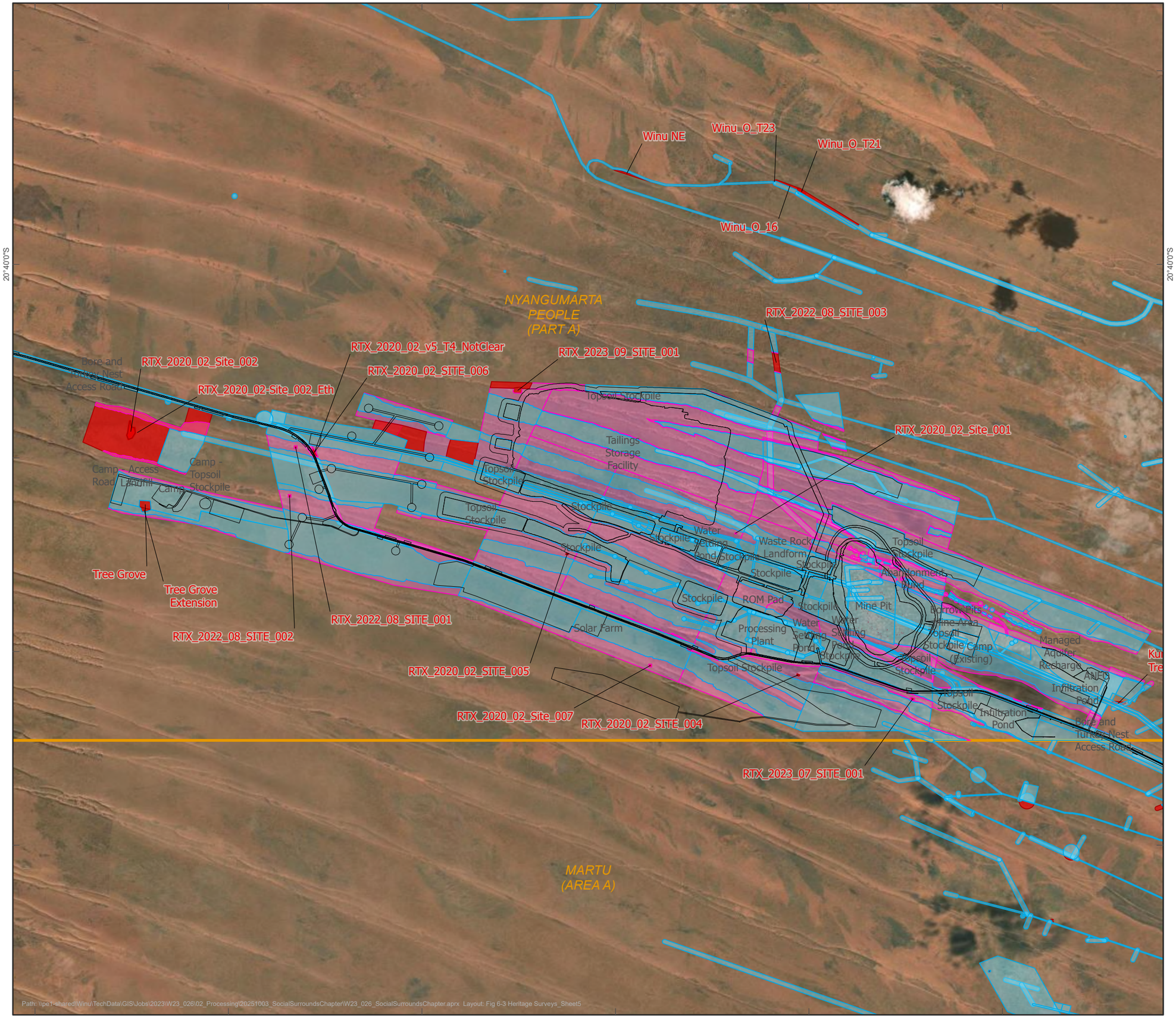

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Legend

- Conceptual Footprint

Heritage Survey Cleared Areas

- Cleared Areas

Heritage Survey Sites and Exclusion Areas

- Conditionally Cleared
- Sites and Exclusion Areas
- Native Title Determinations

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Publisher: B.Gardiner
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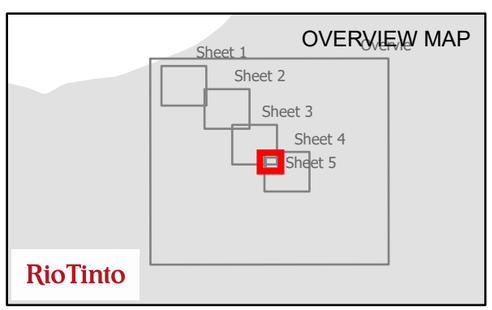

6.3.2.7 Nyangumarta Consultation

As the Proposal will be the first mining operation on Nyangumarta Country, there has been a strong focus on building the capacity of Nyangumarta People to ensure a transparent co-design process is implemented throughout the lifecycle of the Proposal, working together to minimise impacts on Country and increase mutual benefit. The Proponent has been engaging with NWAC and the Nyangumarta People through a range of engagement methods, including monthly technical meetings and Board of Directors and Nyangumarta Elders Meetings, presentations to Nyangumarta CLH, as well as providing financial support, training, and the cost of resourcing subject matter experts to ensure the Nyangumarta People are fully informed.

The Proponent has facilitated several visits on Country for Nyangumarta People, and a visit to the Proponent's Oyu Tolgoi copper-gold mine in Mongolia to understand the impacts of an operating copper mine. This aligns with the Proponent's commitment to openness and transparency around the potential impacts of developing the Proposal on their lands. The visit further informed previous information provided to Nyangumarta Elders and NWAC Board members by the Proponent through ongoing consultations. The Nyangumarta Winu Project Planning Agreement was authorised at the Nyangumarta CLHs meeting in July 2023 and signed by the parties in September 2023, an important milestone for the relationship between NWAC, the Nyangumarta People and the Proponent.

As identified in Table 6-6, a series of targeted consultation activities have also been undertaken to inform the SSA. The primary objective of the SSA consultation activities has been to facilitate ongoing, transparent, and respectful dialogue between Nyangumarta CLHs and the Proponent regarding the design, construction, operation, and closure of the Proposal, and to ensure that Nyangumarta CLHs were provided the opportunity to be actively engaged in decision making regarding impacts to their Country and cultural values. A key aim of this dialogue has been to ensure that the Proposal is developed by the Proponent in a manner that is sensitive to the aesthetic, cultural, economic, and social values embedded in Nyangumarta People's traditional laws, lore, customs, and Country. Throughout the SSA consultations, Nyangumarta CLHs and representatives from NWAC are referred to as the NCT.

Five specific social surroundings consultation activities have been undertaken by NWAC with Nyangumarta Traditional Owners between August 2023 and May 2025. These have included three field-based activities held in August 2023, April and June 2024 and two roundtables held in Perth in October 2023 and April 2025.

6.3.2.8 Martu Consultation

The Proponent has been working with JYAC (or Western Desert Lands Aboriginal Corporation RNTBC as it was previously known) since 2019 to understand the potential impacts the Proposal may entail for Martu Peoples and cultural values associated with Martu ngurra (Country). An important milestone was reached when the Karlkayn Stage 1 Agreement was authorised at the Martu Common Law Holders meeting in September 2023.

In addition to ongoing discussions, and in particular attendance and participation at JYAC Board meetings, technical meetings and CLH meetings held since 2019, key inputs into this SSA have included:

- Cultural mapping fieldwork undertaken between 15 and 26 June 2024
- Field based engagement activities (community visits) undertaken by Umwelt to support preparation of the Socio-economic Impact Assessment (SEIA) during June and July 2024
- Technical Social Surroundings consultation in July 2025 between JYAC and the Proponent.

6.3.2.8.1 Cultural Values Mapping Exercise

The cultural mapping fieldwork was undertaken to:

- Capture the cultural values in the Texas and Rimfire regions, and the distance in-between and back to the Proposal area, to ensure that any proposed development would be culturally acceptable
- Guide JYAC to provide instructions to the Proponent as to which pipeline options (provided as examples only) should be explored
- Inform any additional biological surveys (flora and fauna) which may be required for the ERD submission
- Contribute to the capturing of Martu social and cultural values in the region and how the Proposal may affect these values (supporting the social surroundings submission for the ERD)
- Contribute to JYAC's goal of conducting cultural mapping over all of Martu Country.

The fieldwork involved the engagement of 12 Pitjikarli-identifying Martu/Marnngu with traditional connections to the area, and two anthropologists.

The methodology included a combination of aerial and ground-based assessments over 10 consecutive days.

Martu Elders utilised a helicopter over a five day period during the fieldwork to generally view the cultural landscape in the vicinity of the Proposal and visit a number of culturally significant places, including places that Martu are concerned may be impacted by the Proposal (in particular the proposed taking of groundwater from Martu ngurra).

This fieldwork helped some of the relevant Martu Elders who hold cultural knowledge and authority for the Proposal area to more deeply understand the direct and indirect impacts that the Proposal may have and broadly consider potential impacts associated with the pipeline corridor and proposed water drawdown. Some of the key areas of concern identified during this fieldwork are being used by the Proponent and JYAC to inform their negotiations around culturally framed mitigation and management measures, which are intended to be finalised by way of the KMIA and is ongoing implementation.

The places visited during the fieldwork included:

- Texas Borefield
- Lake Waukarlicarly
- Camp 3
- Minyari (women's site)
- Katakata (boundary site)
- Desert Gully Caves
- Rimfire Borefield.

Places visited during the fieldwork are shown in Figure 6-4.

In addition, the Proponent's proposed Rimfire conceptual route, which largely followed an existing track, was assessed by 4WD convoy. GPS points were recorded, and consultants made on-site observations to propose adjustments.

Martu Elders confirmed during the fieldwork that this was not an ACH survey but an early-stage cultural values exercise to guide future planning.

The result of this fieldwork, and consultation sessions, was that the Rimfire pipeline corridor was refined. The refined corridor further considered in ACH surveys in 2025 including deviation requirements to avoid areas of environmental sensitivity such as potential Night Parrot habitat as well as options for the proposed construction methodology.

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NYANGUMARTA-KARAJARRI OVERLAP PROCEEDING (YAWINYA)
KARAJARRI PEOPLE (AREA B)
KARAJARRI PEOPLE (AREA A)
Great Northern Hwy
NYANGUMARTA PEOPLE (PART A)
N

Winu
Texas Borefield
Rimfire Borefield
Desert Gully Caves
Kutakuta (also known as Cuttacutta soak)
Camp 3
Lake Waukarlycarly
Minyari

MARTU #2
MARTU #3
MARTU (AREA A)
MARTU (PART B)
NYAMAL PEOPLE #1
KULYAKARTU & KULYAKARTU
KULYAKARTU

Legend

- Sites Visited
- Highway
- Native Title Determinations
- Development Envelope

RioTinto

Figure 6-4: Cultural Values Mapping

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Wednesday, 3 June 2026

Coordinate System:
GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994
Units: Meter
Scale: 1:800,000
Rio Tinto © Copyright

0 20 40 Kilometres

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2023\W23_026\02_Processing\20251003_SocialSurroundsChapter\W23_026_SocialSurroundsChapter.aprx Layout: Cultural Values

6.3.2.8.2 Socio-economic Impact Assessment – Field Based Engagement (Community Visits)

In addition to the cultural mapping fieldwork identified above, Umwelt undertook two field-based engagement activities, being visits to six Martu communities alongside two Martu community members/researchers (one male and one female), during June / July 2024 (Based on the advice of JYAC representatives and following discussion with the JYAC Board, consultation visits were undertaken in a number communities which were selected in acknowledgement that Martu live on-Country (i.e. Parnngurr, Punmu and Kunawarritji) and also in adjacent towns and communities (i.e. Jigalong, Newman, and Port Hedland).

Table 6-7) to explain and discuss the Proposal.

The design and development of this engagement exercise was directly informed by discussions with JYAC representatives and following the sharing of an engagement concept paper to members of the JYAC Board in December 2023 for input on preferred involvement and approach.

The Martu researchers were selected by JYAC to assist in the planning and implementation of these field-based activities with selection based on interested individuals either based in or who have strong connections to Martu communities.

Prior to engagement, an onboarding session was undertaken with Martu / JYAC representatives to share and discuss:

- An overview of the Proposal
- Outcomes of engagement that had been undertaken with other regional key stakeholders to date to support the preparation of the SEIA
- Proposed topics for discussion during upcoming engagement
- The best approach to and timing of engagement with Martu community members and the materials required.

The nominated Martu researchers assisted in the planning of community visits and recruitment of participants to engagement activities with these activities largely being informal small group discussions supported by an information sheet outlining the Proposal, a brief slide pack, community information session flyer for distribution in communities and an A0 size map showing location of the Proposal in relation to Martu communities.

Based on the advice of JYAC representatives and following discussion with the JYAC Board, consultation visits were undertaken in a number communities which were selected in acknowledgement that Martu live on-Country (i.e. Parnngurr, Punmu and Kunawarritji) and also in adjacent towns and communities (i.e. Jigalong, Newman, and Port Hedland).

Table 6-7: Martu Field-Based Engagement Activities – Socio-economic Impact Assessment

Dates	Location	No. of Participants
24-28 June 2024	Newman	5
	Jigalong	2
	Parnngurr	6
15-19 July 2024	Port Hedland	3
	Kunawarritji	4
	Punmu	14

Source: (Umwelt 2024)

A total of 34 Martu People participated in discussions with the two Martu researchers also providing their insights over the course of the fieldwork. Service providers and community managers were also engaged as available during these visits, e.g. Parnngurr Medical centre.

It is important to note that the above field-based activities undertaken to support the SEIA process were targeting the broader Martu community with engagement designed to understand community awareness of the Proposal, possible social impacts and opportunities with regards to the Proposal and existing challenges and aspirations that may be relevant in the context of the Proposal and development of appropriate mitigation and management strategies. Given the broader engagement objectives associated with these activities, it is important to note that those engaged were not authorised to speak with regards to on Country impacts specific to the Proposal Area and hence to the SSA, however these fields trips and associated discussions, particularly with the participating Martu researchers provided relevant insights that are reflected throughout.

A subsequent meeting between JYAC representatives and Umwelt in September 2025 sought further discussion and clarification of potential impacts of relevance to this SSA that had been identified both during the cultural values mapping exercise and Umwelt led field-based engagement.

6.3.3 Traditional Owner Social Surroundings Values

The following sections provide an overview of the SSA values identified throughout the above processes, with a particular focus on those which may be impacted by physical and biophysical changes as a result of the Proposal. It should be noted that Traditional Owners have reserved the right to withhold restricted cultural knowledge in accordance with traditional laws, lore and customs. Therefore, some descriptions and understanding by the Proponent (and wider public) of elements of social surroundings values must remain limited or non-specific through cultural necessity and out of respect for those laws, lore and customs.

As a result of the fieldwork mentioned above and ongoing, discussions with Traditional Owner groups, a number of changes have been made to Proposal components. These include:

- In relation to Nyangumarta Country: the redesign and relocation of the proposed WRL, TSF and camp, implementation of ACH exclusion zones, relocation and refinement of the topsoil stockpile and the redesign of the Proposal to avoid and minimise impacts to ACH sites
- In relation to Martu Country: Further, engagement with Martu for the cultural landscape mapping fieldwork has assisted to refine the Proponent's preferred pipeline corridor between Rimfire and the MIA.

6.3.3.1 Nyangumarta

6.3.3.1.1 ACH and Cultural Values

ACH and cultural values for Nyangumarta People encompasses tangible and intangible elements with a cultural significance informed by lore, beliefs, customs / traditions, and history. These may be tangible or intangible ACH features. Tangible ACH refers to the physical places and objects of cultural significance. This includes archaeological sites such as artefact scatters, grinding stones, manuports, and stone arrangements, as well as natural features like claypans, soaks, sand dunes, and specific vegetation (e.g. desert walnut and Dargl Dargl trees). These elements are often linked to traditional subsistence practices, ceremonial activities, and historical occupation.

Intangible ACH encompasses the non-physical, spiritual, and social associations with the landscape. This includes creation stories, songlines, ancestral beings (such as Pulany water snakes), and the ongoing cultural practices and beliefs that connect Nyangumarta People to their Country. Intangible ACH also includes the spiritual sentience of the land, the presence of ancestral spirits and the cultural protocols around sacred sites, burial grounds, and lore ceremonies. These values are deeply embedded in Nyangumarta cosmology and are critical to maintaining cultural identity, continuity and connection to Country (NWAC and YMAC 2022).

Nyangumarta People's culture and connection to Country is rich and complex with roots in the Dreamtime, called Pukarrikarra. In conceptions of the Pukarrikarra, the ancestral beings responsible for the creation of everything remain present on Country. Country embodies the stories, songlines and

dance, and defines the rights, roles, responsibilities, and modes of correct conduct for individuals (ngurlu). In this way, the social world maps onto, and is intrinsically interconnected with, the natural environment highlighting the importance of cultural values of broader landscapes in addition to individual sites of ACH significance.

The Proposal's SSA provides the following definition of ACH for the Nyangumarta People:

> *[H]eritage for Nyangumarta people includes the tangible and intangible elements. The tangible includes the physical places and objects of cultural significance, and the intangible includes the non-physical spiritual and social associations of the landscape as well as the cultural activities on their traditional lands and interaction with the natural world.* (Vaughan 2025)

Consultation undertaken for the SSA further emphasises the value and importance of ecological and ethnobotanical features, particularly related to food sources and ephemeral landscape features such as imprinted tracks of various animals.

During the survey and consultation process for the SSA, Nyangumarta representatives identified a number of sites that hold significant cultural values in the vicinity of the Proposal (refer to Table 6-9, Figure 6-5 and Appendix B04). It is expected that these values will be subject to processes associated with the AH Act, as they are protected under the AH Act. Section 18 applications under the AH Act will only be submitted in consultation with, and the approval of, the Nyangumarta People. The Proponent continues to engage with the Nyangumarta People to avoid impact and disturbance of ACH sites.

Avoidance of ACH sites or approval of a Section 18 application to disturb ACH sites, with the full support of the Nyangumarta People, will be consistent with the EPA's objective to protect social surroundings from significant harm.

121°30'0"E

121°45'0"E

20°30'0"S

20°45'0"S

Legend

- Survey and Culturally Significant Sites
- Native Title Determinations
- Winu Development Envelope
- Conceptual Footprint

N

Winu_Soak

RTX_2023_09_SITE_001

RTX_2020_02_Site_001

RTX_2020_02_Site_002

RTX_2020_02_SITE_004

Established Tree Stand

RTX_2020_02_SITE_005

Hakea Tree Stand

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

0 2 4 Kilometres

RioTinto

Figure 6-5: Survey Sites and Culturally Significant Sites

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Friday, 12 June 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:125,000
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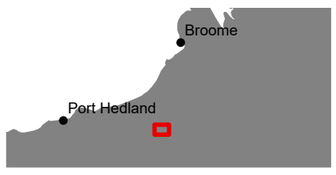


Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2023\W23_026\02_Processing\20251003_SocialSurroundsChapter\W23_026_SocialSurroundsChapter.aprx Layout: Survey Sites and Culturally Significant Sites

6.3.3.1.2 Water

Water is central to Nyangumarta People's worldview, in which every element of the landscape is interconnected, and caring for water is a vital part of caring for Country. It holds significant cultural, spiritual, ecological, and practical value for the Nyangumarta People (Warburton 1981).

This value and belief is reflected in the Nyangumarta Warrarn IPA Management Plan 2022–2032 (NWAC and YMAC 2022), which identifies access to good water via surface sources and aquifer as a key concern. Despite its legal status under the Native Title Act, Nyangumarta People maintain that they have a deep responsibility for and ownership of groundwater and surface water as part of their Country. Nyangumarta's native title rights and interests are closely tied to the health of hydrological systems, which sustain not only people but also the flora and fauna integral to Nyangumarta People's way of life.

Nyangumarta People's seasonal travel and foraging practices historically followed lines of enduring or permanent water across the Western Desert. These routes, often depicted in traditional drawings as strips of good Country (pirra) separated by dune crests, highlight the importance of water in shaping cultural memory and land use (Ecoscape 2025; Trindale 1974). Further, water places such as jilas (surface water), rock holes, wetlands, springs, and other saline and freshwater systems are not only vital for survival but are also spiritually significant. Many are believed to be created or inhabited by Pulany, powerful mythical water snakes, and are approached with care and reverence. The term kurtany, used to describe the water table and also meaning "mother," reflects the nurturing and life-giving role of water in Nyangumarta culture. As expressed by elders, "without living water, Country has no meaning."

Sites like Walyarta (Mandora Marsh) exemplify this deep connection. Walyarta is not only a place of high cultural and ceremonial significance but also an ecologically important wetland listed under the Ramsar Convention. It plays a key role in regional Dreaming stories and supports diverse wildlife, including migratory birds.

The enduring nature of these beliefs was reaffirmed during consultations for the SSA, where senior Nyangumarta knowledge holders emphasised the sacredness of water-related sites (Vaughan 2025).

In the vicinity of the Proposal are several ACH sites that contain culturally important water resources in the vicinity of the Proposal. Both ethnographic surveys and the Nyangumarta SSA have identified RTX_2020_02_Site_002 and Winu Soak as particularly significant. An additional two soaks of significant value are located within approximately 50 km of the Proposal (Djimakarra and Toramah Soak) (Vaughan 2025).

At site RTX_2020_02_Site_002, Nyangumarta ACH is reflected in the presence of stone tools, particularly grinding stones, found around a shallow claypan; a feature that temporarily holds water after rain. This site, along with another nearby on a dune ridge, highlights the connection between water sources and valuable camp sites. The claypan is ecologically distinct, with wet-clay anthills and unique grasses like Eragrostis replacing the usual spinifex. These claypans are valuable camping spots due to their intermittent freshwater availability (ngapa), especially after winter rains. Historically important to the Nyangumarta People, they remain vital today as water sources for desert wildlife, reinforcing their ongoing cultural and ecological significance.

The Winu Soak is situated 20 km north of the MIA. The Winu Soak holds significant cultural value for the Nyangumarta People, particularly due to its association with water. ACH surveys in the area highlight the importance of claypans and other water-holding features as vital sources of intermittent surface water. The Winu Soak supports unique vegetation, such as desert eucalypts and walnut trees, and provides water for wildlife, reinforcing its ecological and cultural relevance. For Nyangumarta People, water sources like the Winu Soak are deeply tied to both tangible ACH and intangible ACH including spiritual beliefs and traditional practices. The area's water features continue to be recognised as essential to Nyangumarta People's survival, identity, and cultural continuity.

6.3.3.1.3 Visual Amenity

Nyangumarta ACH values are deeply interlinked with visual landscape. Understanding how Nyangumarta People perceive the landscape is essential to understanding the cultural and spiritual consequences of changes to it. Nyangumarta People's sense of place and wellbeing is closely linked to the visual character of the land, which remains largely undisturbed across the Proposal (Vaughan 2025).

The Winu Visual Impact Assessment (VIA) Report (Ecoscape 2025) highlights that the visual landscapes are not just aesthetic, but are also deeply connected to cultural identity and quality of life. A key aspect of this connection is the importance of visual continuity between culturally significant sites. As noted above, according to Nyangumarta belief systems, the land has been shaped by supernatural beings during the Pukarrikarra, whose movements across the landscape created its distinctive features. Maintaining unbroken lines of sight between these features is vital to preserving the spiritual connections between them, and thus the integrity of the cultural landscape. This connection is further strengthened by the vast temporal scale of Nyangumarta occupation and stewardship, with the landscape remaining largely unchanged over thousands of years. Therefore, any disruptions or changes to the visual landscape are of a significant cultural and environmental concern, if not managed with Nyangumarta People's consent.

6.3.3.1.4 Ethnobotanical Values

For Nyangumarta People, flora and fauna are deeply embedded in their cultural, spiritual, and ecological identity. Nyangumarta People's ability to maintain their customary practices and sustain livelihoods is deeply tied to the health of their environment, particularly the flora and fauna that inhabit their Country. These species are not only vital for physical sustenance but also serve as indicators of environmental wellbeing, guiding Nyangumarta People's understanding of Country's health. Even minor disruptions to plant and animal populations are perceived as serious concerns, especially given the stark contrast between the pristine condition of most of the Nyangumarta IPA and areas affected by industrial activity. This contrast amplifies concerns about cumulative impacts from ongoing development.

Moreover, flora and fauna are inseparable from Nyangumarta lore, culture, language, and have been since the beginning of time (NWAC and YMAC 2022). This remains true of the traditional ecological knowledge (TEK) passed from generation to generation to enable the sustenance of human life through the effective exploitation of these natural resources. For example, many of the names of flora and fauna as well as rules about how to prepare and cook them or when to pick them were 'given' to Nyangumarta during Pukarrikarra (the Dreaming) (NWAC and YMAC 2022).

During surveys conducted for the SSA, Nyangumarta representatives identified the presence of native fauna in sand dune formations proximal to the Proposal. Observations of native fauna included bush turkeys, native mice, goannas, smaller lizards, snakes, and marsupial moles. These observations prompted concerns regarding the potential population decline of bush turkeys, emus, and plain kangaroos in the region with Nyangumarta People noting concerns with cumulative impacts on native fauna due to increasing mining activities. Nyangumarta People have emphasised the need to avoid similar declines and assess the risks to these species to ensure their protection and the continued ecological integrity of the region.

Further, Nyangumarta People expressed concern about the impact of the Proposal on local flora, particularly the removal of numerous species from Country during the Proposal development.

To support rehabilitation and ensure ongoing involvement in restoration efforts, Nyangumarta People representatives requested the Proponent's assistance in establishing a nursery through NWAC to cultivate both traditionally significant plants and native shrubs, and annuals that attract birdlife and other fauna. Concerns were also raised for dune-specific species, including *Thinicola incana* (closely related to Mangarr), *Crotalaria cunninghamii*, and *Corymbia chippendalei*.

6.3.3.1.5 Access to Country

The ability for Nyangumarta People to access their Country fundamentally underpins the native title rights and interests held by all Nyangumarta People. For Nyangumarta, having unrestricted access to Country is essential not only for maintaining a physical presence on the land, but also for preserving the deep spiritual connection they hold.

Access to Country will likely be impacted by the Proposal in a variety of ways, both positively and negatively. Positively, the involvement of Nyangumarta knowledge holders in archaeological and ethnographic investigations undertaken to date have increased access and the number of days spent on Country, including access to sites of ACH significance, ecosystem services (ethnobotanical resources), and landscape features (water courses and sand dunes).

As noted in Section 6.3.1.2, prior to European colonisation of Australia, Nyangumarta People lived across their Country. With the arrival of pastoralists in the late 19th century, Nyangumarta People gradually (forcibly and voluntarily) moved towards the coastal stations and the La Grange Mission, now known as the Bidyadanga community, finding work on the stations there and further afield. Today, Nyangumarta People are spread across the Kimberley and Pilbara region and, as the native title holders, recognise that a key challenge is that they currently do not have a community in their Country and that they do not permanently reside in Nyangumarta Country. Being on Country is regarded as the best place for Elders to pass on important cultural knowledge to the younger generations, however, getting people out on Country involves substantial costs, planning, and coordination and raises several health and safety issues, particularly for Elders.

Across Nyangumarta Country there are many special areas sacred to the community, some of which have not been cared for or visited for decades (due to access challenges). A positive aspect in the early stages of the Proposal's planning and development has been the opportunity for the involvement of Nyangumarta knowledge holders:

> *The good side of this Project is getting back and restoring all our significant sites. This makes our feelings and health and wellbeing for us, when we go to Country, the Spirit gets inside of our body and we can feel it and we change, we know we are back home. Once we hit the boundary our nana starts singing as she gets the feeling, and the Spirit comes, and she sings the stories of our grandfather* - Nyaparu Rose (NWAC and YMAC 2022).

Continuing this partnership and access to care for Country in respect of the Proposal area means the potential benefits could mirror those experienced in the management of the nearby IPA. For instance, the Nyangumarta Warrarn IPA Plan 2022–2032 (NWAC and YMAC 2022) notes the following:

> *Nyangumarta Country is healthy, and we are managing it sustainably using traditional knowledge combined with walypala (scientific) knowledge. Our Yinta (special places) are protected, and Rangers are working to care for the Country and keep it healthy. Our Mirtanya and Mirtawari (Elder men and women) are passing on knowledge to young people. In this way we too will stay ngarlu nyalpa (healthy).*

Despite the potential for the Proposal to increase access to Country in a variety of ways, Nyangumarta People have raised a number of concerns. These include the decreased ability of Nyangumarta People to:

- Safely use Nyangumarta Highway given the extensive increase in heavy vehicle traffic
- Safely enjoy the use of Camp 1 given the significant increase of vehicle movements through the area
- Access the part of their Country covered by the MIA due to the Proponent's access and health and safety policies.

6.3.3.2 Martu

6.3.3.2.1 ACH and Cultural Values

Martu hold a holistic worldview in which the cultural landscape is not seen as separate from the natural environment. Instead, it is understood as a deeply interconnected system of place, practice, process, and management, all of which are essential to the health of Martu ngurra, and continuity of Martu culture. Martu cultural values encompass objects and places with a cultural significance informed by lore, beliefs, law, customs/traditions, and history. These may be tangible or intangible ACH features such as individual objects and sites of cultural significance (artefacts, artefact scatters, water sources, burial and ceremonial grounds), broader cultural landscapes (landscape features such as mountain ranges or waterways), ethno-botanical features (bush-tucker), and the stories, songlines, and related ritual practices (such as dance) that connect people with Country.

Martu's culture and connection to Country is rich and complex, with roots in the Dreamtime, called Tjukurrpa. In conceptions of the Tjukurrpa, the ancestral beings responsible for the creation of everything remain present on Country. Country embodies the stories, songlines and dance, and defines the rights, roles, responsibilities, and modes of correct conduct for individuals (ngurlu). For Martu, Country is inseparable from culture and is connected through time and place. Country comes alive through ongoing interaction with the people who have known, cared for, and belonged to it for thousands of years, and it depends on their descendants continuing that responsibility. This relationship is not symbolic, but rather it is practiced in everyday life.

In June 2024, Martu Elders participated in the cultural values mapping fieldwork identified in Section 6.3.2.8 above, with a particular focus on the pipeline corridors. Martu / Marnngu consultants did not identify specifically named sites of ACH significance that could be impacted by the preferred pipeline corridors with it acknowledged that "spiritual significance is not necessarily site specific"; although also that some locations carry greater significance than others. Rather, the whole of the landscape is intricately interconnected so that damage to Country at one location can have spiritual impacts on Country (including the people belonging to that Country) at locations that are seemingly a great distance away (Lynnes and Calderwood 2025).

Tjukurrpa stories pass through the vicinity of the Proposal from the coast to the desert and in all directions. Tjukurrpa is the basis of Martu People's connection to specific, significant places, and also their connection to other Aboriginal Peoples throughout Australia. The significant places may therefore not be physically close to the Proposal, but the paths the stories travel on form part of the connection and knowledge. This knowledge defines the cultural identity and responsibilities of those with custodianship over the area. This is further discussed in Section 6.4.4.

While no specific sites of ACH were identified, any ACH values identified during Proposal activities will be subject to processes associated with the AH Act, as they will be protected under the AH Act. Section 18 applications under the AH Act will only be submitted in consultation with, and the approval of, the Martu People. The Proponent continues to engage with the Martu People to avoid impact and disturbance of ACH sites.

Avoidance of ACH sites or approval of a Section 18 application to disturb ACH sites, with the full support of the Martu People, will be consistent with the EPA's objective to protect social surroundings from significant harm.

6.3.3.2.2 Water

In Martu culture, all water has deep spiritual and cultural value. Waterholes are not only vital sources of life in the arid landscape but are also central to Martu identity, law, Tjukurrpa and cultural practices. Each waterhole is embedded in traditional songlines and stories passed down through generations, forming part of a sacred map of Country. In the past, water was critical for Martu People as they moved through their Country and remains extremely important for Martu People today with cultural and ecological values of Country being deeply intertwined. Water sources, along with the surrounding flora

and fauna, form a living cultural landscape where Martu beliefs, sacred sites, and traditional livelihoods are embedded (Jupp et al. 2015).

Martu have an inherent understanding of the interconnectedness of ground and surface water resources in the desert and hold concerns that the Proposal's impacts of water extraction will extend beyond the Proposal area. Martu have expressed concerns that groundwater drawdown could affect soaks and other water sources further south along the Percival Palaeovalley. Water sources that lie between the Proposal area and Lake Waukarlicarly, including Lake Waukarlicarly itself are noted as being of the greatest risk.

Further, there is particular concern regarding groundwater drawdown and the potential impact this may have on the ability of claypans to retain water over time. While the claypans in the Proposal area may not have specific names, they are highly significant to Martu. These places are known as camp sites of ancestors (often with grindstones and artefacts located nearby), sources of water for animals, indicators of subsurface water and as important habitat for bush foods. It is important that their cultural and ecological value must be recognised and considered in any planning process.

Likewise, during the community visits for the SEIA (Section 6.3.2.8), concerns were raised relating to potential impacts from groundwater drawdown, and the potential flow on impacts to sacred sites, Tjukurrpa, flora, and fauna across all of Martu Country were widely expressed.

> *"The aquifer they are going to tap into will affect the natural soaks, which will become a problem for songlines and the significance of the sites. Will they tap into the main aquifer. The animals will start to disappear. If the animals leave it will affect the songlines."*

Concerns about the potential impacts of groundwater drawdown, including cumulative impact of the proposed drawdown for both the Proposal and other projects in the region, were also raised at the Wanajarri and Yina (Elders Council) meeting and common law holders' meeting on 24–25 October 2025.

Particular concerns are held for Punmu, the closest Martu community to the Proposal. During engagement, a number of culturally significant natural soaks and springs were identified in Punmu. Engaged Martu community members therefore raised concerns that the water table may drop as a result of the Proposal and thereby have flow on effects to soaks and springs located in Punmu.

6.3.3.2.3 Visual Amenity

For Martu People, the amenity of the landscape is highly valuable as it is deeply embedded in their cultural identity and connection to Country. Landscapes are seen as living cultural systems where human and natural values are inseparable. The landscape surrounding the Proposal remains largely intact and holds significant amenity values as it remains unchanged from the time it was created by Tjukurrpa and how it was cared for and known by Martu ancestors. For Martu the continuity of this unchanged landscape is of high value and contributes to a sense of belonging and ongoing cultural connection (pers comms, JYAC September 2025).

Martu People have raised concerns for the increase of noise, light, dust and vibrations and the potential for the Proposal to interfere with amenity values of these factors. During the community visits for the SEIA (Section 6.3.2.8), concerns were specifically raised in relation environmental impacts from dust.

> *"What is going to happen to the community if the Project is going to blow all the dust?"*
>
> *"Dust will kill all the plants."*

These concerns reflect a broader cultural understanding that dust is not merely a physical pollutant, but a disruptive force that can damage vegetation, obscure visibility, and interfere with spiritual and ecological relationships with Country. The health of plants, animals, and the land itself is integral to Martu wellbeing and cultural practice. Dust emissions pose a direct threat to these values.

In relation to noise, Martu People have raised concerns about the impact of noise on the stillness and tranquillity of Country, which are essential to:

- Ceremonial practices and storytelling
- Animal behaviour and hunting practices
- Spiritual connection to Tjukurrpa.

6.3.3.2.4 Ethnobotanical Values

Plants on Martu Country are not only important as sources of food, medicine, shelter, and materials, but also play critical roles in cultural practices, environmental understanding, and seasonal knowledge. Martu People place high value on the flora found within the Proposal for a range of cultural, practical, and ecological reasons. Unlike Western scientific approaches, which prioritise species based on rarity or conservation status, Martu values are grounded in cultural knowledge, traditional use, and connection to Country and as such all flora within the Proposal hold ethnobotanical values. The value of flora and fauna was also highlighted during engagement.

Martu People's knowledge of flora and fauna is extensive and rooted in generations of lived experience and cultural transmission. The act of hunting and gathering is central to Martu life. Ethnoecological studies have documented Martu harvesting practices, which include the collection of over 43 animal species and 37 plant food species, as well as plants used for firewood, medicine, and tools (Walsh 2008).

Martu People have expressed concern in relation to the restoration of habitat and the retention of vegetation that is essential for species who are dependent on specific conditions to survive. This includes, but is not limited to, old spinifex or hollow tree branches which will not be able to be rehabilitated, and therefore must be retained.

Sand dunes are of important cultural significance to Martu. Sand dunes also hold ethnobotanical value and act as an important ecological habitat for fauna. Martu / Marnngu consultants raised concerns for the presence of marsupial moles, a rare and little-understood species observed during field visits and supported by ecological surveys.

During the cultural values mapping fieldwork identified at Section 6.3.2.8, Martu further identified several non-threatened species in the area, including emu (kalaya), kangaroo (marlu), bush turkey (ralgulji / kipara), goanna (parnka) and frilled neck lizard. While these species may be common, they hold practical significance as a source of traditional food, and also cultural importance as totems, Tjukurrpa beings and use in ceremonies.

The Proposal Area is also home to the critically endangered night parrot (ngartijirri), a significant species to both Martu and the wider scientific community. When sound recordings of the bird were captured, they confirmed what Martu had always said- that night parrot was present on their Country. Protecting the night parrot's habitat and ensuring its future is deeply important to the Martu, as it continues the work begun by their ancestors and shows the stories passed down through generations are verifiable, even about a bird once thought to be extinct. As detailed at Section 6.5, the Proposal has been re-designed and refined to avoid potential impacts on known or potential Night Parrot roosting and foraging habitat and other associated impacts.

Martu People have expressed concern that mining activity the Proposal may alter habitats and impact animal populations in Martu Country as well as Nyangumarta Country. For example, noise, light, and increased human presence from the mine may disturb wildlife, causing animals to avoid their usual habitats. Alternatively, animals may become accustomed to human activity, losing their natural wariness of people and vehicles. Both outcomes result in a disruption of natural behaviours, which in turn affects Martu's ability to track, hunt, and understand the animals.

During the community visits for the SEIA (Section 6.3.2.8), further concerns were raised to the impact to fauna in relation to increased truck movements from the Proposal. It was noted that the presence of native fauna, such as emus, have been declining. This was attributed to the cumulative impact of the increased truck movements directly linked to projects more broadly on Martu Country.

6.3.3.2.5 Access to Country

For Martu People, access to Country is essential for the transmission of cultural knowledge. Cultural knowledge is handed down from parents to children through sharing song cycles, and through everyday activities like hunting, fishing and daily interactions.

> *"from early years, and even in their games, the laws of sharing are never forgotten"* (Oderman 1957).

For Martu People, foraging, and in particular, burning, is an important cultural activity that is both shaped by, and perpetuates cultural knowledge regarding the relationships between humans and other species and how those relationships were maintained according to Jukurr (the Word).

For generations Martu People have been able to freely access the Proposal area to undertake cultural activities such as hunting, visiting sites or conducting law. During engagement undertaken by Umwelt, Martu People raised concern for the potential altered access to Country arising from the Proposal and the flow on impacts to cultural associations. Martu participants reflected on past experiences in which access to other project areas was restricted by proponents:

> *"White man would not let you go in there. No Aboriginal people were allowed to work, you could not access the area during the 70s. The agreement to purchase the mining area was made through rations (flour, sugar). Then we were locked out of that area. It was a promise given that was broken…the promises went down the drain as soon as they started."*

Martu People have also observed neighbouring groups in the Pilbara region lose control over significant parts of their Country through development agreements and tenure arrangements, and there are concerns that Martu may face a similar outcome as a result of the Proposal.

These concerns are not only correlated to land tenure or access but are also held in relation to the deeper cultural consequences of relinquishing control. For Martu People, ceding authority over *ngurra* risks weakening cultural connection, disrupting intergenerational knowledge transfer, and could lead to a loss of culture.

6.3.4 Other Social Surroundings Values

While a range of points associated with the Proposal have been discussed during engagement activities throughout the assessment process, particular matters raised during consultation with community and agency stakeholders pertinent to social surroundings are summarised at Table 6-8, including any key concerns relating to potential impacts. Mitigation measures related to these concerns are discussed in Section 6.5.

In the broader Pilbara region, there is a strong regional identity aligning with the landscapes. National Parks are important places for Traditional Owners and are protected from residential and industrial impacts. In the receiving environment there are two national parks: Karlamilyi and Eighty Mile Beach. The natural environment is also seen by the Port Hedland community as an asset that should be protected and nurtured.

The region also attracts tourists because of its iconic natural attractions. In particular, the coast is a tourist hotspot with an abundance of different habitats and marine life.

Table 6-8: Other Social Surroundings Concerns identified via Broader Engagement Activities

Stakeholder	Date	Issues Raised	How Issues Raised were Addressed
Track Care	12 April 2023	Mine closure management Rehabilitation and environmental management Impact to ACH	• Preparation of a MCP • Progressive rehabilitation over the LoM to reduce disturbed areas • Implementation of an EMP • Development of a CHMP in collaboration and co-designed with the Traditional Owners • Establishment of ACH exclusion zones
North Regional TAFE- Pilbara Region	3 August 2023	Road safety risks	• Develop and implement a Traffic Management Plan (TMP) • Sealing and upgrading of the RAC to improve safety and reduce dust
Regional Chamber of Commerce	17 August 2023	Early and transparent engagement	• Develop and implement a Consultation and Engagement Plan (CEP) that identifies relevant stakeholder groups and which tailors communication and engagement mechanisms to facilitate meaningful involvement based on stakeholder needs
Newman Hospital	24 August 2023	Transport route Road safety risks	• Develop and implement a TMP
Western Australia Country Health Service	30 August 2023	Increase in traffic impacting drive times for emergency response and staff Road safety risks	• Develop and implement a TMP
Pilbara Development Commission	27 September 2023	Increased construction traffic	• Develop and implement a TMP • Road upgrades and access controls along the RAC
Broome Chamber of Commerce	5 October 2023	Contribution to net zero	• Power supply strategy incorporating approximately 85% renewable energy (wind, solar, battery storage)
Town of Port Hedland	5 October 2023	Heavy vehicle truck movements and traffic Road infrastructure and upgrades	• Develop and implement a TMP • Engagement with MRWA and local government on road condition, safety and upgrades
Shire of Broome	6 October 2023	Heavy vehicle truck movements around Broome Impacts to tourism	• Develop and implement a TMP

Stakeholder	Date	Issues Raised	How Issues Raised were Addressed
Sandfire Roadhouse	10 October 2023	Environmental impacts Road infrastructure and upgrades Extension of railway	• Implementation of the EMP • Develop and implement a TMP
Port Hedland Chamber of Commerce and Industry	17 October 2023	Deterioration of roads Road safety risks Impacts to tourism Timely and transparent engagement	• Develop and implement a TMP • Develop and implement a CEP that identifies relevant stakeholder groups and which tailors communication and engagement mechanisms to facilitate meaningful involvement based on stakeholder needs • Development of appropriate communication materials for relevant stakeholder groups • Develop and implement a robust grievance mechanism for the Proposal that documents stakeholder community concerns in accordance with trends to be tracked for monitoring purposes
Bidyadanga Aboriginal Community La Grange	30 October 2023 11 March 2024	Environmental Impacts Impact and protection of ACH Timely and transparent engagement Increase in truck movements Impacts to ground and surface water Loss of native fauna	• Co-designed CHMP and ACH exclusions zones • Develop and implement a TMP • Develop and implement a CEP that identifies relevant stakeholder groups and which tailors communication and engagement mechanisms to facilitate meaningful involvement based on stakeholder needs • Development of appropriate communication materials for relevant stakeholder groups • Develop and implement a robust grievance mechanism for the Proposal that documents stakeholder community concerns in accordance with trends to be tracked for monitoring purposes • Implementation of EMP
Newman Chamber of Commerce	2 November 2023	Mine closure and decommissioning Employment opportunities around mine closure Post-mining management and cultural significance Timely and transparent community engagement Management of community concerns Flora and fauna	• Preparation and ongoing refinement of the MCP • Progressive rehabilitation undertaken over the life of mine to reduce disturbed areas • Implementation of EMP • Development of a CHMP in collaboration and co-designed with the Traditional Owners

Stakeholder	Date	Issues Raised	How Issues Raised were Addressed
		Deterioration of roads	• Develop and implement a CEP that identifies relevant stakeholder groups and which tailors communication and engagement mechanisms to facilitate meaningful involvement based on stakeholder needs • Development of appropriate communication materials for relevant stakeholder groups • Develop and implement a robust grievance mechanism for the Proposal that documents stakeholder community concerns in accordance with trends to be tracked for monitoring purposes • Seek to work in partnership with high schools and North West TAFE in the development / creation of entry level pathways programs • Seek to maximise opportunities related to local and regional participation in the Proposal
JTSI (former Department of Jobs, Tourism, Science and Innovation)	9 November 2023	Loss of native flora and fauna Management of environmental impacts Closure outcomes and final landforms Free, Prior, and Informed Consent (FPIC) Environmental impacts from copper processing Early engagement with stakeholders Intergenerational anxiety for Traditional Owners	• Avoidance and minimisation through Development Envelope refinement • Progressive rehabilitation and closure planning • FPIC-aligned engagement with Traditional Owners • Environmental controls for processing, including AMD management • Long-term engagement and co-design processes
Kimberley Aboriginal Medical Service	30 November 2023	The agreement process and family division Exclusion from the decision-making process Opportunity for co-design and early engagement	• Development of a CHMP in collaboration and co-designed with Traditional Owners • Develop and implement a CEP that identifies relevant stakeholder groups and which tailors communication and engagement mechanisms to facilitate meaningful involvement based on stakeholder needs • Development of appropriate communication materials for relevant stakeholder groups • Develop and implement a robust grievance mechanism for the Proposal that documents stakeholder community concerns in accordance with trends to be tracked for monitoring purposes

Stakeholder	Date	Issues Raised	How Issues Raised were Addressed
MRWA	28 February 2024	Lack of mine haulage infrastructure on Nyangumarta Highway and Great Northern Highway Road closures Traffic incidents	• Develop and implement a TMP • Engagement with MRWA and local government on road condition, safety and upgrades
La Grange Remote Community School	11 March 2024	Environmental impacts Impact to ACH and connection to Country	• Development of a CHMP in collaboration and co-designed with Traditional Owners • Implementation of EMP
Kimberley Development Commission	3 September 2024	Impact to the environment and ACH Levels of acceptance in Broome	• Development of a CHMP in collaboration and co-designed with Traditional Owners • Implementation of EMP • Develop and implement a CEP that identifies relevant stakeholder groups and which tailors communication and engagement mechanisms to facilitate meaningful involvement based on stakeholder needs • Development of appropriate communication materials for relevant stakeholder groups • Develop and implement a robust grievance mechanism for the Proposal that documents stakeholder community concerns in accordance with trends to be tracked for monitoring purposes
Eighty Mile Beach Caravan Park	5 September 2024	Turtle nesting and hatching sites at Eighty Mile Beach Reduced access to Eighty Mile Beach Degradation of Great Northern Highway Increased heavy vehicle truck movements	• Proposed FIFO rostering arrangements does not consider time for on-site 'R&R' • Develop and implement a TMP • Engagement with MRWA and local government on road condition, safety and upgrades
Australian Renewable Energy Hub	5 March 2025	Early project planning, shared services and cumulative impacts Opportunities for collaboration with the Proponent	• Early engagement and coordination • Ongoing collaboration discussions
Warrawagine Pastoral Company (Wallal Downs Pastoral Station)	8 April 2025	Cumulative impacts to groundwater Potential for cattle strike along the transport corridor	• Groundwater modelling and ongoing monitoring • Develop and implement a TMP • Ongoing engagement and discussions

Source: (Umwelt 2025)

6.3.5 Sensitive Receptors

There are a number of key sensitive receptors within and surrounding the Development Envelope that have the potential to do be directly and indirectly impacted by the Proposal. While some of these sensitive receptors have a distinct physical location, others are tied to impacts to the broader landscape, acknowledging the holistic worldview held by Nyangumarta People and Martu People. These are detailed in Table 6-9.

All remaining receptors discussed in Section 6.3 are not anticipated to be directly or indirectly impacted by the Proposal.

Table 6-9: Sensitive Receptors Potentially Impacted by the Proposal

Stakeholder	Issues / Themes	Sensitive Receptor

Nyangumarta	ACH and cultural values protected by the AH Act	• Intangible cultural values, including cultural landscapes and songlines connected to land and water
		• Specific receptors:
		  ○ RTX 2023 09 SITE 001
		  ○ RTX 2020 02 SITE 001
		  ○ RTX 2020 02 SITE 002
		  ○ RTX 2020 02 SITE 003
		  ○ RTX 2020 02 SITE 004
		  ○ RTX 2020 02 SITE 005
		  ○ Established Tree Stand
		  ○ Winu Soak
		  ○ Culturally significant sand dune systems intersected by the MIA, RAC or associated infrastructure

	Water	• Winu Soak • Culturally significant soaks and groundwater systems connected to the Percival Palaeovalley • Groundwater resources within the modelled drawdown extent associated with pit dewatering and Rimfire Borefield abstraction

	Visual amenity	• Views from culturally significant places towards:
		  ○ The WRL
		  ○ The TSF
		  ○ Wind turbines and associated infrastructure

	Access to Country	• Nyangumarta Highway • Access to culturally significant places within the Development Envelope (refer to Figure 6-5) • Camp 1
	Dust and noise	• Nyangumarta Highway and RAC • Amenity and ethnobotanical values across the MIA and RAC • RTX 2020 02 SITE 002

Stakeholder	Issues / Themes	Sensitive Receptor
Martu	ACH and cultural values protected by the AH Act	• Cultural Landscapes and intangible heritage, including Tjukurrpa (Dreaming) songlines • Sand dune systems intersected by the pipeline corridor, RAC and access tracks (refer to Figure 6-9) • Culturally significant soaks and claypans within the vicinity of the Proposal
	Water	• Rimfire Borefield • Culturally significant groundwater systems connected to the Percival Palaeovalley • Groundwater resources within the modelled drawdown extent associated with pit dewatering and Rimfire Borefield abstraction
	Visual amenity	• Martu NTD Boundary (viewpoint [VP] location VP8 – refer to Section 6.4.4.3)
	Ethnobotanical values	• Culturally significant flora and fauna affected by vegetation clearing, light, human presence, dust or groundwater changes within and surrounding the Development Envelope
	Access to Country	• Development Envelope situated within the Martu NTD
	Dust and noise	• RAC leading to aerodrome
Other Stakeholders	Traffic and road safety	• Portions of the Great Northern Highway
	Pastoral stations	• Wallal Downs Pastoral Lease

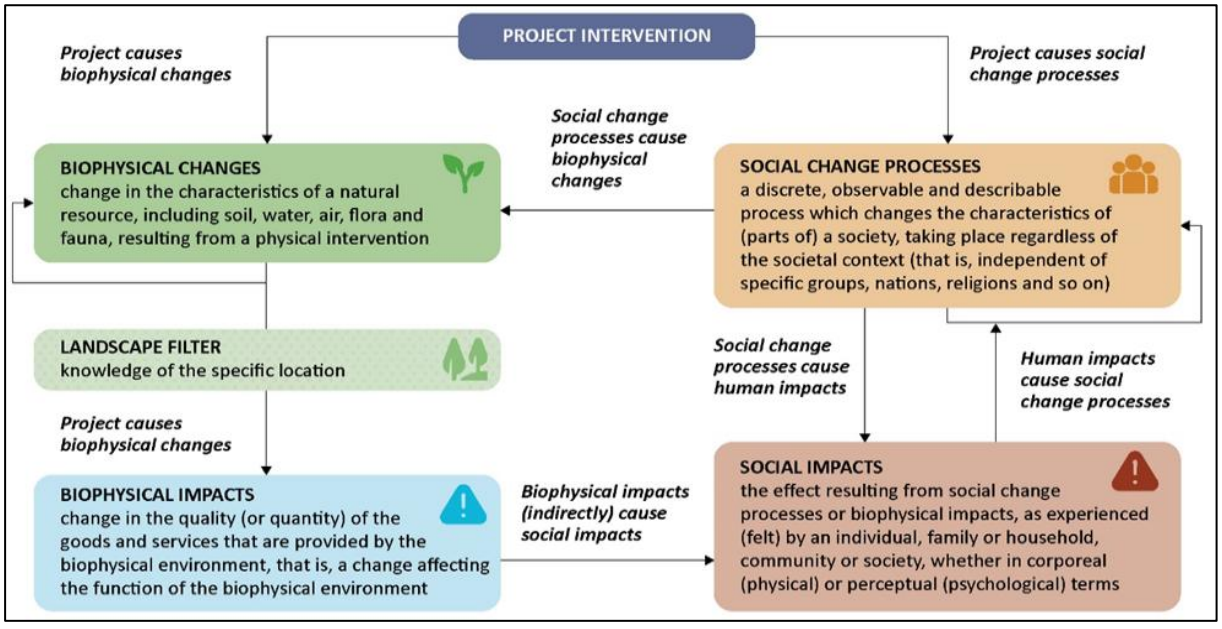
6.4 Potential Environmental Impacts

6.4.1 Overview

The Proposal has the potential to impact social surrounding values directly, indirectly and cumulatively. As indicated by the Traditional Owners in subsequent sections, potential impacts to social surrounding values cannot be meaningfully assessed through the conventional separation of 'direct', 'indirect', and 'cumulative' impacts and rather must be approached through a culturally informed lens that reflects the holistic worldview of the Nyangumarta People and Martu People. For Nyangumarta People and Martu People, all elements of the landscape are interrelated with changes to one aspect of Country inherently affecting others. Consequently, any disturbance, whether physical or spiritual, may have broad and integrated consequences that cannot be meaningfully isolated or compartmentalised.

In recognition of the holistic worldview held by both the Nyangumarta People and Martu People, the assessment of potential impacts presents impacts thematically as provided by the SSA and discussions with Traditional Owners.

It should also be noted that impacts are often not mutually exclusive, with certain impacts relevant to a number of impact categories and are often highly interrelated. For example, potential impacts to water quality as a result of dust, can be perceived to also impact on the way of life, health and well-being, and the environment of relevant stakeholders and rights holders. Similarly, while some social impacts can occur because of a project, others may be indirectly caused by changes in the biophysical environment and biophysical impacts, as outlined in Figure 6-6. Consequently, both direct and indirect impacts should be considered and are equally important.



Source: (Umwelt 2025), adapted from (Slootweg et al. 2003).

Figure 6-6: Direct and Indirect Impacts

Potential impacts to social surrounding values are outlined in Appendix B01 and B02 are discussed in further detail in the sections below. These impacts are drawn from outcomes of the consultation activities outlined above at Section 6.3.2.5 and again reflecting on the holistic worldview held by both the Nyangumarta People and Martu People, some of these identified impacts extend beyond what may be strictly and traditionally considered in the context of the SSA as per EPA guidance.

6.4.2 Impact Identification and Evaluation Methodology

The assessment of impact significance for the Social Surroundings environmental factor has been undertaken in accordance with EP Act objectives and the *Environmental Factor Guideline: Social Surroundings* (EPA 2023a).

While the guideline provides clear direction on the types of values to be protected, it does not prescribe quantitative thresholds or definitions for determining whether residual impacts are 'significant' or 'non-significant'. Subsequently, the determination of significance for Social Surroundings impacts, detailed below, has been informed by a qualitative, risk-based and context-specific methodology that has been adopted by Nyangumarta People and Martu People through their respective self-determined processes (detailed in Sections 6.4.2.1 and 6.4.2.2).

Consistent with contemporary participatory and First Nations-led impact assessment practice, the identification and evaluation of Social Surroundings impacts have been informed and defined by the perspectives, values and priorities articulated, by the Nyangumarta People and Martu People. Impacts have been understood as context-specific and not uniformly experienced and have therefore been assessed with reference to how proposed activities may affect cultural practices, connection to Country, community wellbeing and values. This approach recognises that significance is best determined through First Nations-defined processes that emphasise qualitative judgement, lived experience, and the consideration of both direct and cumulative effects over time (Dale and Lane 1994).

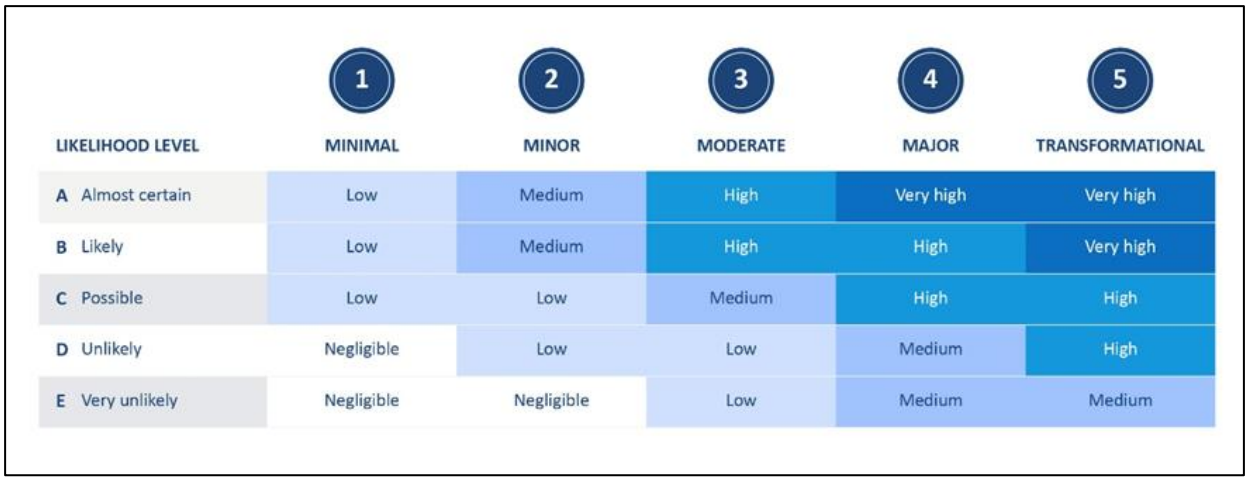
In accordance with this approach, impacts may be considered significant where they arise from irreversible changes to Country, cultural values, or the ability of Traditional Owners to maintain ongoing connection and practices. However, through this approach the identification of an impact as significant does not, of itself, determine the acceptability of a project. Rather, significance informs the need for ongoing engagement and decision-making regarding mitigation and management.

6.4.2.1 Nyangumarta

A risk-based framework was adopted as the primary method for assessing the relative significance of impacts on Social Surroundings by Nyangumarta People (Appendix B). In the absence of EPA-defined significance thresholds for Social Surroundings, impacts were ranked using a qualitative risk-based framework (DPHI 2026) based on international practice (Vanclay et al. 2015), that considers the interaction between consequence and likelihood.

In applying this framework, '*Consequence*' reflects the severity of change to Nyangumarta values, having regard to the sensitivity of the value affected, the magnitude and spatial extent of change, and the duration and reversibility of impacts; while '*Likelihood'* reflects the probability of an impact occurring based on the nature of the activity, exposure pathways and duration across construction, operation, and closure phases. Consequence and likelihood ratings were combined to assign a qualitative significance rating using an impact matrix which was adapted to suit the context of the SSA (refer to Table 6-10, Table 6-11 and Figure 6-7). Social risk was assessed both prior to mitigation, and after implementation of agreed designed changes and management measures, with the residual social risk used to inform significance determinations.

Residual impacts with a High or Very High social risk rating are considered significant, reflecting the high sensitivity of Nyangumarta Social Surroundings values and the potential for long-term or intergeneration effects, rather than the acceptability of the Proposal. Nyangumarta perspectives on acceptability and cultural consequence were integral to the risk ranking process, ensuring that social risk ratings reflect both technical assessment and Traditional Owner judgment.



LIKELIHOOD LEVEL	1 MINIMAL	2 MINOR	3 MODERATE	4 MAJOR	5 TRANSFORMATIONAL
A Almost certain	Low	Medium	High	Very high	Very high
B Likely	Low	Medium	High	High	Very high
C Possible	Low	Low	Medium	High	High
D Unlikely	Negligible	Low	Low	Medium	High
E Very unlikely	Negligible	Negligible	Low	Medium	Medium

Source: (DPHI 2026)

Figure 6-7: Impact Matrix

Table 6-10: Defining Magnitude Levels for Impact

Magnitude Level	Meaning
Transformational	Substantial change experienced in community wellbeing, livelihood, infrastructure, services, health, and/or heritage values; permanent displacement or addition of at least 20% of community
Major	Substantial deterioration/improvement to something that people value highly, either lasting for an indefinite time, or affecting many people in a widespread area
Moderate	Noticeable deterioration/improvement to something that people value highly, either lasting for an extensive time, or affecting a group of people
Minor	Mild deterioration/improvement, for a reasonably short time, for a small number of people who are gen early adaptable and not vulnerable
Minimal	Little noticeable change experienced by people in the locality

Source: DPHI 2025

Table 6-11: Defining Likelihood Levels for Impacts

Likelihood Level	Meaning
Almost certain	Definite or almost definitely expected (e.g. has happened on similar projects)
Likely	High probability
Possible	Medium probability
Unlikely	Low probability
Very unlikely	Improbable or remote probability

Source: (DPHI 2026)

Table 6-12: Modified Definitions of Magnitude Levels for Social Impacts Suitable in the Context of the Proposal's Social Surroundings Assessment

	Minimal	Minor	Moderate	Major	Catastrophic
Aesthetic	Temporary, minor visual or noise disturbance with no lasting impact on landscape qualities valued by Nyangumarta People	Short-term change to landscape or soundscape; noticeable but not offensive or degrading to cultural sense of place	Permanent or long-term change to valued views, natural features, or tranquillity; moderate impact on sense of place	Substantial permanent alteration of highly valued natural landscape features resulting in strong impact to sense of identity or connection	Irreversible degradation or destruction of key aesthetic elements (e.g. sacred landscapes, untouched natural vistas); causes community distress or alienation
Cultural	No impact or negligible impact on cultural practices, places, or stories	Mild disruption to cultural activities or minor changes to access, with alternative options available	Noticeable disturbance or reduced access to culturally significant places	Permanent damage to a culturally significant site, or serious interference with cultural practices	Destruction or desecration of a culturally significant site, loss of cultural knowledge, or irreparable harm to Nyangumarta cultural practices
Economic	Minimal or indirect economic disruption; no effect on livelihoods or traditional economies	Mild short-term impact on traditional resource use (e.g. bush foods, medicines)	Noticeable reduction in access to natural resources requiring community adjustment	Substantial disruption to the viability of traditional and contemporary economies (e.g. existing tourism ventures)	Severe, long-term harm to community livelihoods or traditional economies; causes community-wide economic decline
Social	Negligible impact on social cohesion, well-being, or daily life.	Minor increase in stress and community conflict; temporary and manageable	Ongoing social friction, mental distress, or degradation of community cohesion	Substantial division or distress within the community; loss of social harmony or well-being	Profound and lasting social harm including breakdown of community structures, displacement, or intergenerational trauma

Source: (Vaughan 2025)

6.4.2.2 Martu

For Martu People, Social Surroundings impacts were scoped using a holistic, Country-based methodology that reflects the Martu worldviews and relationships to Country. Rather than limiting impact identification to the Development Envelope and its immediate surrounds, the Martu People considered it necessary to assess the broader potential impacts of the Proposal across the cultural landscape, recognising that cultural values, spiritual connections and social wellbeing are embedded across interconnected Country and may be affected beyond the physical footprint of the Proposal. Accordingly, a cultural landscape mapping exercise was undertaken to inform impact identification, enabling consideration of how proposed activities could affect Country, cultural values and ongoing Martu connections and practices at a broader spatial and cultural scale. Impacts were also identified via the

SEIA, technical studies, review of previous ethnographic studies in the area, and subsequent discussions held with JYAC (refer to Section 6.3.2.8).

The determination of impact significance was undertaken after mitigation and management strategies were identified through the cultural mapping exercise, technical assessment outcomes, the SEIA and consultation with Martu People as part of Proposal agreement process. Impacts were qualitatively assessed as either significant or not significant, having regard to whether, following mitigation, the impact would result in irreversible or widespread changes to Country, cultural values, or the ability of Martu People to maintain ongoing connections to, and practises on Country. Utilising the methodology, the presence of irreversible impacts and widespread changes was a key determinant of significance, while significance itself informed consideration of mitigation, management and agreed offsets rather than constituting a determination of acceptability. Mitigations will be further co-developed with Martu People under the CHMP, ensuring ongoing collaboration in the design and implementation of measures to manage impacts to Country and cultural values.

6.4.3 Nyangumarta

The following sections provide an assessment of potential impacts associated with the Proposal based on the identified perspectives of consulted Nyangumarta People and outcomes of relevant technical studies undertaken for the ERD process.

6.4.3.1 ACH and Values

Cultural values and resources of cultural significance may be directly impacted through a variety of ground disturbance activities during construction. Within the Nyangumarta NTD these include establishment and construction of the mine pit, WRL, mine and topsoil stockpiles, a TSF, mineral processing infrastructure, energy supply infrastructure, camp and access roads.

During operations, cultural values may be directly and indirectly impacted through ongoing ground disturbance activities at the open pit, dust generation through mining operations, haulage, and stockpiling, and through human activities such as unofficial visitation into sensitive areas.

Potential ACH impacts have been identified through consultation with the Nyangumarta People, including via heritage surveys.

Potential impacts on Nyangumarta ACH values include:

- RTX_2023_09_SITE_001 – Tailings Storage Facility: Potential subsurface archaeological materials may be disturbed by the original TSF design. An optimised “Option 5H Current Design" avoids the site, thereby reducing the likelihood of these impacts
- RTX_2020_02_Site_001 – Waste Rock Landform: As the proposed WRL designs presented significant impacts to the site, it was agreed to salvage the site’s artefacts and relocate them to RTX_2020_02_Site_005
- RTX_2020_02_Site_005 – Tailings Storage Facility: Potential impacts to the site are due to its proximity to the TSF. Option 1B directly overlaps the site and would result in its complete destruction while TSF Options 4H and 5H were designed to avoid direct impacts. Option 5H was preferred by the NCT because it places the TSF at a greater distance from known ACH values and presents fewer long-term closure risks
- RTX_2020_02_Site_002 – Previously proposed camp location. The site faces potential impacts from dust, noise and unauthorised visitation due to its location adjacent to the proposed RAC and planned camp within the Proposal. To mitigate these risks, recommendations include sealing the adjacent road, designating the site as an exclusion zone, implementing cultural awareness training for staff, and conducting regular monitoring to assess and manage any emerging impacts
- Established Tree Stand: While infrastructure plans avoid direct disturbance to the area, potential indirect impacts may include groundwater drawdown from nearby water bores reducing water availability for the trees, noise impacts from machinery disrupting the amenity of the area, and unauthorized visitation. A number of recommendations are provided to sensitively incorporate the area into the camp design

- RTX_2020_02_Site_004: The site may be indirectly impacted due to its proximity to the topsoil stockpile. This proximity could affect the site's cultural and archaeological values through dust, vibration, and unauthorised visitation. It is recommended that the stockpile be partially or fully relocated to an alternative location. The Proponent has acknowledged this recommendation and committed to reviewing and refining the design and extent of the stockpile, to avoid impacting the site
- Winu Soak: Potential indirect impacts to the Winu Soak may occur due to changes in the surrounding hydrological environment and groundwater drawdown. Management recommendations include ongoing monitoring and updated hydrogeological modelling, designating an exclusion zone around the soak, conducting regular vegetation health monitoring, and facilitating further site visits to assess subsurface water depth
- Sand Dunes: Direct impacts to sand dunes within the Proposal area are expected from the construction of the mine pit, ROM pad, TSF, WRL and upgrades to access roads. Loss of subsurface archaeological material may lead to other impacts including the erosion of cultural knowledge and sever connections to ancestral spirits, which are deeply embedded in the landscape, further degrading the cultural landscape.

Relevant mitigation measures to address the above are discussed further in Section 6.5. If impacted it is expected that these values will be subject to processes associated with the AH Act, as they are protected under the AH Act. Section 18 applications under the AH Act will only be submitted in consultation with, and the approval of, the Nyangumarta People. The Proponent continues to engage with the Nyangumarta People to avoid impact and disturbance of ACH sites.

To the extent that the Proponent has obligations under the AH Act to report ACH (e.g. Section 15 of the AHA) or to seek approvals under the AH Act, this will be managed with DPLH at the appropriate time. Any such reporting will only be done with the consent of the Nyangumarta People.

6.4.3.2 Water

As demonstrated in Section 6.3.3.1, water is a foundational element of both the physical and cultural landscape of Nyangumarta Country and several ACH sites within the vicinity of the Proposal contain culturally important water resources. During consultation undertaken for the SSA, Nyangumarta People identified a number of concerns relating to water.

The development of the Proposal may result in a range of direct and indirect impacts to water within and surrounding Nyangumarta Country. Technical assessments, including the Winu Surface Water Heritage Assessment (Worley 2024d) and the Winu Baseline Groundwater Monitoring Plan (Appendix C05), have identified groundwater abstraction and pit dewatering as key activities with the potential to affect the regional aquifer system. The Proposal proposes to meet its water requirements through dewatering of the mine pit and abstraction from Rimfire. This may result in drawdown effects to the surrounding surface and groundwater system. The effects of drawdown on aquifers from pit dewatering and borefield abstraction are assessed in Sections 7.4.1.1 and 7.6.1.1.

In addition to drawdown risks, the Proposal has the potential to impact water quality through groundwater contamination. The TSF, particularly the HST component, relies on a synthetic HDPE (or equivalent) liner to prevent seepage into ground water and the surrounding environment. Due to the arid conditions prevalent in the Pilbara, however, Nyangumarta People have concerns due to long-term risks of degradation of this liner and subsequent water contamination. It is also considered that the WRL presents contamination risks if potentially acid-forming materials are not adequately encapsulated. Groundwater contamination is therefore a key concern for Nyangumarta People during the operations phase of the Proposal, and also long-term contamination related risks post-closure. These concerns are discussed further in the Proposal closure section of this report (Section 6.5.3). An assessment of impacts related to groundwater contamination concerns are also addressed in Sections 7.4.2.1, 7.4.2.2 and 7.6.2.1.

Nyangumarta People’s concerns relating to water have been acknowledged and co-designed mitigations have been developed to avoid and minimise impacts as discussed at Section 6.5.2.2.

6.4.3.3 Visual Amenity

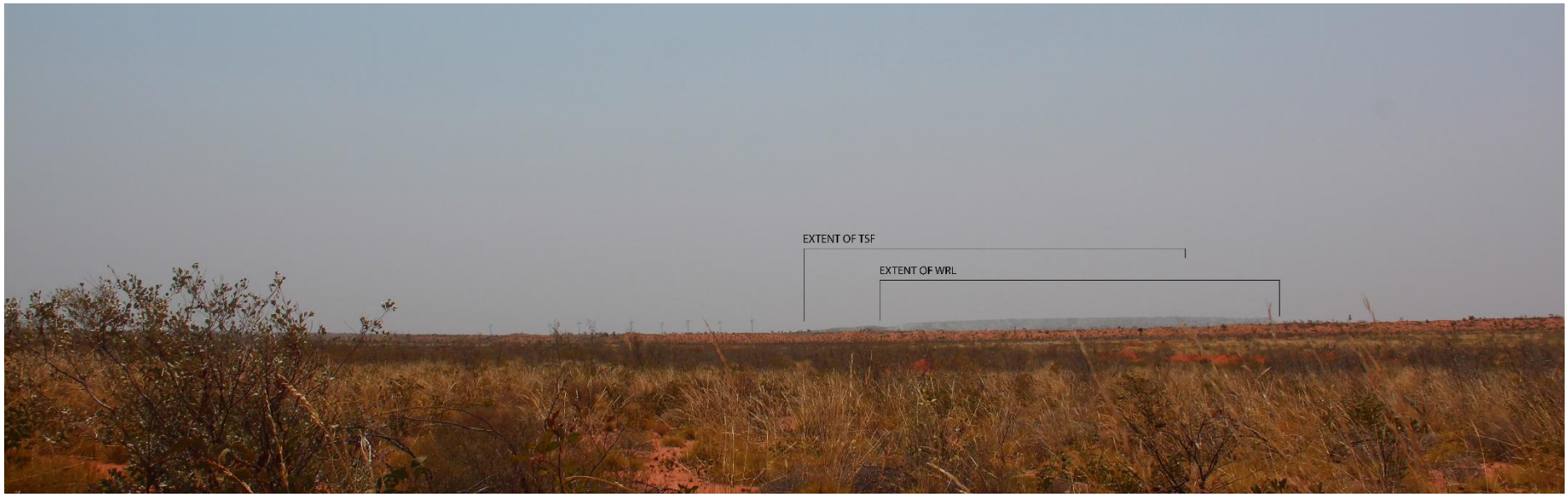
The Proposal will result in a loss of visual amenity due to the development of the landscape, including through the installation of wind turbines (proposed to be approximately 236 m in height), the WRL (approximately 80 m high) and the construction of the TSF (approximately 65 m high).

The VIA has determined that five viewpoint locations will be of a level one of visual impact, which implies that the proposed infrastructure will be highly visible and at variance with the Visual Management Objective (VMO) of best practice siting and design. Viewpoints (VPs) assessed at a level one visual impact include VP 3 (Wirlkirr Wirlkirr Rd & Copperhead Rd), VP4 (Copperhead Rd north-west Approach), VP5 (Copperhead Rd intersecting mining lease), VP8 (Martu NTD Boundary), and VP9 (Proposed Camp). These locations are within mid-ground proximity (0.5–6.5 km) and have direct lines of sight to the wind turbines, which are consistently rated as prominent visual elements due to their vertical form, colour, and movement, all of which contrast sharply with the horizontal dune ridges, muted tones, and stillness of the surrounding landscape. The WRL is also rated as prominent at VP8 (Martu NTD Boundary), due to its size and colour contrast with the natural orange dune ridges, while the TSF is generally rated as blending or not visible, depending on topographic screening (Appendix B05).

As highlighted in Section 6.3.3.1, visual landscape is highly significant to Nyangumarta People with the visual landscape directly related to peoples' sense of place and quality of life. The landscape surrounding the Proposal area is largely undisturbed, and its natural character is still central to Nyangumarta People's identity and wellbeing. Any changes to this landscape, including the installation of wind turbines, the TSF and WRL, are seen as direct impacts to visual amenity, and are rated as being of high significance by Nyangumarta People in the SSA. The retention of natural landscape values is also considered more important in areas of high cultural significance. During consultation, the Nyangumarta People emphasised the importance of maintaining unimpeded lines of sight between culturally significant sites across the landscape, as this visual connectivity is vital to sustaining spiritual connections and preserving the integrity of the cultural landscape. This importance applies to ethnographic sites that are part of a dreaming narrative or songline, where visual continuity plays a central role and does not apply to the archaeological sites within the WPA.

Examples of likely landscape changes from key vantage points associated with the Proposal and as presented in the VIA's photomontages are provided below at Figure 6-8.

EXTENT OF TSF
EXTENT OF WRL



Source: (Vaughan 2025)

Figure 6-8: Winu VIA photomontages: Copperhead Rd (NW approach) and TSF and WRL as viewed from the Nyangumarta-Martu NTD boundary

An assessment of impacts related to visual amenity are also addressed in Sections 6.6.1.1 and 6.6.3.1. A number of mitigations have been proposed to address these concerns and are outlined in Section 6.5.2.2.

6.4.3.4 Ethnobotanical Values

As demonstrated in Section 6.3.3.1, the Nyangumarta People's ability to maintain their customary practices and sustain livelihoods is deeply tied to the health of their environment, particularly the flora and fauna that inhabit their Country. Concerns were expressed around potential impacts to a wide variety of flora species including Mangarr (*Thinicola incana*), *Crotalaria cunninghamii*, *Corymbia chippendalei*, Parntarl (*Owenia reticulata*), Junyju (*Erythrophleum chlorostachys*), Kumpaly (including *Hakea macrocarpa* and *Hakea lorea* species), and a mulga shrub (*Acacia aneura*). Concerns were also expressed regarding potential impacts to culturally important fauna including bush turkey, native mice and various reptiles such as goannas, smaller lizards and snakes. Specific concern was also raised for the marsupial mole, a rare species likely present in the sand dunes throughout the Development Envelope. These values may be impacted through ground disturbance activities for all infrastructure components which involve removal of vegetation and disturbance of potential fauna habitat, and through operational disturbance such as from noise, dust and unauthorised visitation.

A number of avoidance and mitigation measures have been developed and proposed to address potential impacts on ethnobotanical values, with the majority of these put forward by the NCT during social surrounds consultation activities. These include establishment of exclusion zones and visitation management (such as for the small but dense stand of Kumpaly on the southern side of the proposed ANFO facility and the established Tree Stand adjacent to the proposed camp location), the preservation of trees for as long as possible to allow for seed collection to take place and continued support for NWAC to establish a nursery to cultivate native species to be used in revegetation efforts.

Further context and the effects of disturbance of the vegetation and fauna habitats that support these ethnobotanical values are also addressed in Sections 8.4.1.1, 8.4.1.2, 8.4.2.2, 8.4.2.3, 8.6.1.1, 8.6.1.2, 8.6.2.2, 8.6.2.3, 9.3.4.3, 9.3.4.6, 9.3.4.8, 9.4.1.1, 9.4.1.2, 9.4.2.1, 9.4.2.2, 9.4.2.3, 9.6.1.1, 9.6.1.2, 9.6.2.1, 9.6.2.2and 9.6.2.3.

6.4.3.5 Access to Country

Access to Country is a foundational value for the Nyangumarta People and is central to the exercise of their native title rights and interests.

Potential impacts to Nyangumarta People's ongoing ability to safely access their Country include:

- Decreased ability of Nyangumarta People to safely use Nyangumarta Highway given increases in heavy vehicle traffic
- Decreased ability of Nyangumarta People to safely enjoy the use of Camp 1 given the significant increase of vehicle movements through the area
- Decreased ability of Nyangumarta People to access the part of their Country covered by the Proposal due to the Proponent's access and health and safety policies.

Access roads to the MIA will be required to be constructed or upgraded to meet the requirements for in-bound supplies (e.g. diesel, processing reagents, village supplies) and out-bound haulage of copper ore concentrate. Currently access to the MIA is via existing access roads and exploration tracks. The majority of these existing roads and tracks are poor quality dirt roads of varying width. The proposed access route therefore includes constructing new sections or potentially upgrading existing roads.

It is estimated that around 25 heavy vehicle movements per day would occur between the Great Northern Highway and the MIA during operations. This raised significant concerns from the NCT, particularly regarding the safety of Nyangumarta Rangers, community members, and tourists who regularly use the Nyangumarta Highway. The NCT highlighted that sharing the road with heavy haulage vehicles posed serious safety risks and could interfere with the implementation of the Nyangumarta IPA Management Plan, which is essential for securing funding for the Nyangumarta Ranger Program.

Additionally, the NCT expressed concern that using the Nyangumarta Highway as an access road could reduce its appeal for tourism, potentially impacting the income generated through NWAC's permit system. Although tourist use is sporadic, permit sales provide a stable revenue stream used to maintain infrastructure at camp locations along the highway.

Nyangumarta People also expressed concerns about impacts to Camp 1 (Djimo Ngurra), a place of high cultural significance located ~90 km down the Nyangumarta Highway. The camp experiences high visitation by Nyangumarta Rangers, Elders, and others visiting Country. A proposed road diversion between the Nyangumarta Highway and Wirlkirr Wirlkirr Road would effectively bypass Camp 1, reducing potential impacts from proximity to the upgraded access route. However, the use of existing infrastructure (built by Nyangumarta) as a pit stop and laydown area by non-Nyangumarta People is of ongoing concern.

An assessment of impacts related to access to Country are also addressed in Sections 6.6.1.1 and 6.6.3.1. Nyangumarta People's concerns have been acknowledged, and a number of mitigations measures have been proposed to avoid and minimise impacts (refer to Section 6.5.2).

6.4.3.6 Dust and Noise Impacts

Potential impacts from nuisance dust and noise emissions are a key concern for Nyangumarta People in relation to the Proposal. Without mitigations, the Proposal is expected to result in increased dust and noise emissions within the Nyangumarta NTD, particularly in proximity to the MIA and the RAC. These impacts have the potential to interfere with the amenity and ethnobotanical values across the MIA and RAC, which Nyangumarta People have identified as culturally significant and sensitive to environmental disturbance (Section □).

Dust emissions are expected to occur from multiple sources, including drilling, blasting, dozing, excavation loading, haul truck unloading, stockpiling, wheel-generated dust, and wind erosion from exposed surfaces. Modelling undertaken for the Dust Impact Assessment (EAQ 2026) indicates that particulate matter (PM) concentrations will exceed health-based criteria under worst-case conditions (and in the absence of dust suppression measures), with visible dust plumes extending up to 40 km from the MIA. Dust deposition is also predicted to affect nearby ACH sites, flora and fauna along the RAC.

Without mitigations, Nyangumarta People have particularly expressed specific concerns regarding the potential for dust associated with increased traffic on the proposed access road which may indirectly impact the cultural and environmental integrity of surrounding environs, particularly RTX_2020_02_Site_002. Concerns include that dust could degrade both the physical condition and the cultural value of these places. These concerns were not limited to physical degradation, with Nyangumarta People highlighting the symbolic and spiritual implications of dust settling on culturally significant sites. Further, SSA consultations noted that dust emissions could indirectly affect vegetation, including species used for bush tucker and medicine, thereby threatening traditional ecological knowledge and cultural practices, particularly within the IPA.

The Proposal's noise and vibration emitting activities, include open pit mining using conventional drill and blast techniques, construction of WRL and TSF, ore processing activities such as crushing, screening and stockpiling and operation of a processing plant.

Noise emissions from the Proposal have been assessed as a potential impact to both fauna and Nyangumarta ACH values. The Winu Noise and Vibration Impact Assessment (Biota 2025c) identified that while some habitats fall within areas where noise levels may exceed 50 dB(A) (a conservative threshold for behavioural disturbance) the overall risk to significant species and cultural values is considered low. Day-to-day operational noise is predicted to affect only a small proportion of mapped habitat (e.g. 2.2% for Mine Operations) and be infrequent. Nonetheless, Nyangumarta People's concerns regarding amenity and cultural connection to Country have been acknowledged, and mitigation measures have been incorporated to minimise impacts (Section 6.5.2.2).

The effects of noise and dust are also assessed in Sections 9.4.2.2, 9.4.2.3 and 13.

6.4.4 Martu

The following sections provide an assessment of potential impacts associated with the Proposal based on the identified perspectives of consulted Martu and outcomes of relevant technical studies undertaken for the ERD process.

It is noted that the primary source of Martu input about the impacts of the Proposal from Martu Elders who have cultural authority to speak for the Development Envelope is the cultural mapping fieldwork undertaken in June 2024. This input from Martu Elders has been supplemented by input from JYAC in the course of negotiations.

Negotiations are ongoing with the Martu People in relation to the KMIA, including agreed measures for monitoring, managing and mitigating adverse impacts of the Proposal on social surroundings of relevance to Martu.

6.4.4.1 ACH and Values

6.4.4.1.1 Summary of Specific Concerns Identified by the Martu People

The Martu People have raised a number of concerns in relation to the potential impacts of the Proposal on the following specific aspects of the environment which have aesthetic, cultural, economic and/or social values for Martu:

- Water including:
  - The impact of draw down of groundwater on surrounding soaks and claypans (some with cultural significance attached to them) as well as flora and fauna (and consequently Martu's ability to continue to exercise a number of their native title rights and interests in the vicinity of the Proposal)
  - Changes to surface water flows and quality
- Fauna, including endangered and threatened species (e.g. Night Parrot) and the management of invasive species (not including the Dingo)
- Flora, including bush foods and medicine, including impacts from clearing and dust and management of invasive species
- Visual amenity
- Sand dunes, the integrity of which are particularly culturally important
- Continued access by Martu to Country
- Impacts on amenity associated with dust and noise
- Land and water quality – e.g. contamination or other adverse effects from
  - Migration of infiltration pond water (and movement of solute from these ponds) onto Martu Country
  - Hydrocarbon spillage.

Impacts relating to ACH have also been acknowledged and a number of mitigation measures will be implemented to avoid and minimise these (refer to Section 6.5.2). While no specific sites of ACH were identified, any ACH values identified during Proposal activities will be subject to processes associated with the AH Act, as they will be protected under the AH Act. Section 18 applications under the AH Act will only be submitted in consultation with, and the approval of, the Martu People. The Proponent continues to engage with the Martu People to avoid impact and disturbance of ACH sites.

To the extent that the Proponent has obligations under the AH Act to report ACH (e.g. Section 15 of the AH Act) or to seek approvals under the AH Act, this will be managed with DPLH at the appropriate time. Any such reporting will only be done with the consent of the Martu People.

6.4.4.1.2 Interconnected Nature of Martu Social and Cultural Values and the Physical Environment

As noted further above, Martu People hold a holistic worldview that can be understood as a deeply interconnected system of place, practice, process and management, all of which are essential to the health, continuity and integrity of Martu Country, Martu People and Martu culture. Impact to Martu Country can be physical, cultural and spiritual. All forms of impact are equally significant and harmful, requiring careful management to maintain the health, continuity and integrity of Martu Country, Martu People and Martu culture.

As the Martu social and cultural landscape is intricately interconnected, impact to Country at one location can have spiritual impacts on the Country (including the people belonging to that Country) at locations which to non-Martu People may seem a great distance away. In this way disruption to the landscape within the broader vicinity of the Proposal has the potential to directly affect these relationships and diminish the cultural integrity of Country. As Tjukurrpa stories pass through the vicinity of the Proposal. Martu have expressed that such impacts may not be visible or measurable but are nonetheless deeply experienced and significant. Martu have stated that protecting these intangible values requires a culturally informed approach extending beyond physical site avoidance to include the preservation of landscape function, ecological balance, and the ability to maintain cultural practices on Country. In addition to any direct 'tangible' impacts, harm may also arise from such things as the prevention of access to Martu ngurra, limiting the ability of Martu to carry out their social and cultural responsibilities, impacts from changes to water flow, disturbance of fauna or the removal of culturally significant plants. Social and cultural impacts can also occur through unintentional breaches of cultural norms and protocols, such as unauthorised access of uninitiated people entering culturally important areas, the filming or photographing of sites without consent, or inappropriate behaviour on Martu ngurra.

During the cultural mapping fieldwork between 15 to 16 June 2025 (Lynnes and Calderwood 2025), Martu have described Country as a living system within which sand dunes, water sources and flora are not just physical features but have deep cultural and spiritual connections. The importance of intangible ACH values, such as spiritual connection, ancestral presence and cultural knowledge which are expressed through the relationships between people and place have also been documented. These elements support ceremony, storytelling and custodianship and is felt that any disruption to these connections can have extensive consequences. For example, impacts to one part of Country can indirectly affect the integrity of surrounding places, including burial sites, artefacts and areas used for cultural practices.

In addition to direct and indirect impacts to intangible ACH values, there is the potential for the Proposal to directly impact on tangible values, such as sacred sites, sand dunes, Martu ethnobotanical cultural values associated with flora and fauna, ground water and surface water (Section 6.4.4.2).

Martu have highlighted that damage to *Tjukurrpa* and associated cultural places may occur through unintentional breaches of cultural protocol such as uninitiated individuals entering sacred areas, the filming or photographing of sites without consent or inappropriate behaviour on Martu Country.

Further, there is potential for sand dunes to be impacted through the construction of the pipeline corridor (Figure 6-9 and Figure 6-10). To minimise impacts to sand dunes, Martu have recommended where possible that the pipeline construction be carried out at the lowest point of all sandhills sand dunes. The Proponent has also identified with Martu People that an alternative and less impactful mechanism is for placement of the pipeline within the proposed road realignment.

121°45'0"E

122°0'0"E

20°45'0"S

N

Clean Water Dam

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

Airport Drive

Existing Airstrip

Dune Crossing
(proposed road alignment)

Pipeline Header

Rimfire
Borefield

Legend

- Rimfire Pipeline Corridor
- Existing Tracks
- Conceptual Footprint
- Native Title Determinations
- Inland Sand Dune (Habitat Mapping)

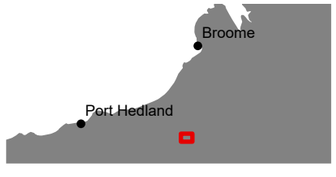
RioTinto

Figure 6-9: Rimfire Borefield and Pipeline Corridor

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Thursday, 4 June 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:100,000
Rio Tinto © Copyright



0 2 4 Kilometres

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2023\W23_026\02_Processing\20251003_SocialSurroundsChapter\W23_026_SocialSurroundsChapter.aprx Layout: Rimfire pipeline corridor

121°45'0"E

122°0'0"E

121°45'0"E

122°0'0"E

20°45'0"S

N

Clean Water Dam

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

Airport Drive

Existing Airstrip

Dune Crossing
(proposed road alignment)

Pipeline Header

Rimfire
Borefield

Legend

- Rimfire Pipeline Corridor
- Existing Tracks
- Conceptual Footprint
- Native Title Determinations
- Inland Sand Dune (Habitat Mapping)

RioTinto

Figure 6-10: Rimfire Borefield and Pipeline Corridor

Rio Tinto Copper (RTC)

Publisher: Michael.Rouse
Date Published: Friday, 15 May 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:100,000
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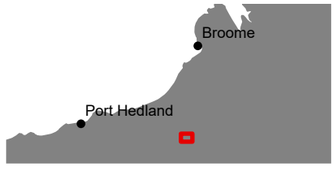


0 2 4 Kilometres

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2023\W23_026\02_Processing\20251003_SocialSurroundsChapter\W23_026_SocialSurroundsChapter.aprx Layout: Rimfire pipeline corridor

121°45'0"E

122°0'0"E

6.4.4.2 Water

As highlighted at Section 6.3.3.2, water is a foundational element of Martu Country, both physically and spiritually.

The development of the Proposal may result in a range of direct and indirect impacts to water within and surrounding Martu Country. Technical assessments, including the Winu Surface Water Heritage Assessment (Worley 2024d) and the Winu Baseline Groundwater Monitoring Plan (Appendix C05), have identified groundwater abstraction and pit dewatering as key activities with the potential to affect the regional aquifer system. The Proposal proposes to meet its water requirements through dewatering of the mine pit and abstraction from Rimfire. This may result in drawdown effects to the surrounding surface and groundwater system. The effects of drawdown on aquifers from pit dewatering and borefield abstraction are assessed in Sections 7.4.1.1 and 7.6.1.1.

Martu have expressed concerns that water abstraction from this interconnected system may have impacts that extend beyond the Proposal, potentially impacting water sources further south along the Percival Palaeovalley and extend to sites near Punmu. These concerns are not limited to physical access or water availability but extend to the spiritual and cultural consequences of disrupting ancestral connections. For example, claypans are known as ancestral camp sites, indicators of subsurface water, and habitats for bush foods. Their loss or degradation would represent both an environmental and cultural impact. Martu have called for greater recognition of these values in water planning, noting that the disappearance of animals and drying of water sources would affect songlines and the significance of sacred sites across the region not just within the Proposal area. The effects of the Proposal on water sources outside the Development Envelope are explored in Sections 7.3.3.1, 7.3.4.5, 7.4.1.1, 7.6.1.1

In addition to drawdown risks, the Proposal has the potential to impact water quality through groundwater contamination. The TSF, particularly the HST component, relies on a synthetic HDPE (or equivalent) liner to prevent seepage into ground water and the surrounding environment. Due to the arid conditions prevalent in the Pilbara, however, concerns have been expressed due to long-term risks of degradation of this liner and subsequent water contamination. It is also considered that the WRL presents contamination risks if potentially acid-forming materials are not adequately encapsulated. Operational and long-term groundwater contamination related risks due to HST post-closure. These concerns are discussed further in the Proposal Closure section of this report (Section 6.5.3). An assessment of impacts related to groundwater contamination concerns are also addressed in Sections 7.4.2.1, 7.4.2.2and 7.6.2.1.

Mitigation impacts relating to water are detailed in Section 6.5.2.

6.4.4.3 Visual Amenity

The Proposal will result in a loss of visual amenity within the Martu NTD Boundary due to the industrialisation of the landscape. This is particularly evident through the installation of wind turbines (approximately 236 m high) and the WRL (approximately 80 m high).

According to the VIA, the Martu NTD Boundary (VP8) has been assessed as having a level one visual impact, indicating that the proposed infrastructure will be highly visible and inconsistent with the Visual Management Objective (VMO) of best practice siting and design.

Further, at VP8 (Martu MTD Boundary) the assessment has identified that:

- The wind turbines are identified as dominant visual features, with their height, movement, and colour creating a stark contrast against the horizontal dune ridges and subdued tones of the natural landscape. While partially filtered by vegetation, the wind turbines introduce a new vertical element that alters the visual amenity of the landscape
- The WRL will stands out prominently due to its scale and colour, which will disrupt the visual amenity of the surrounding dunes
- The TSF is not expected to contribute significantly to visual impact at VP8, as natural topography provides effective screening from this viewpoint.

JYAC was asked to provide the locations on Country that they believed held cultural value for the initial study. Martu People were consulted about these visual impacts during the Martu Cultural Values mapping fieldwork; at the JYAC community information day in Parnngurr in November 2024, the technical social surroundings consultation in 2025 and the CLH meeting in Hedland in October 2025. The VIA was provided to JYAC for review and comment resulting in an additional viewpoint being included/added and amendments to the photographic contrast undertaken.

As highlighted in Section 6.3.3, the visual integrity of the landscape is inseparable from Martu cultural identity and spiritual connection to Country. In this way, the physical environment is deeply embedded in spiritual, historical and social meaning with the visual character of landscape reflecting the enduring presence of *Tjukurrpa* and the ancestral narratives that shape Martu identity and custodianship. The introduction of large-scale industrial infrastructure, particularly the WRL and wind turbines, represents a significant change from the visual continuity of the landscape as it has been known and cared for by Martu ancestors. These changes risk fragmenting the visual and cultural integrity of Country, thereby impacting Martu's ability to maintain ongoing relationships, responsibilities, and practices that are intimately tied to the land. Moreover, these changes risk disrupting Martu's sense of belonging and custodianship, and may diminish the ability to engage with Country in culturally meaningful ways.

An assessment of impacts related to visual amenity are also addressed in Sections 6.6.1.2 and 6.6.3.2. Martu concerns relating to visual amenity have been acknowledged and mitigation measures will be implemented to avoid and minimise impacts (Section 6.5.2).

6.4.4.4 Ethnobotanical Values

Martu have highlighted that there a number of culturally significant flora and fauna within and surrounding the Proposal (Section 6.3.3.2). As such, concerns have been raised by Martu about the Proposal's potential to:

- Degrade culturally and environmentally significant flora and fauna
- Reduce the presence and / or abundance of fauna
- Destruct and / or disturb fauna habitats through noise, light, and increased human presence
- Disrupt natural behaviours of fauna and thereby affect Martu's ability to track, hunt, and understand animals
- Contribute to a decline in native fauna and fauna through changes to surface water flows.

Martu have also observed declining rates of native fauna, particularly emu, which has been attributed to increased truck movements from mining operations. Martu have expressed concern that the Proposal may have a cumulatively contribute to the decline of native fauna.

The Proposal will require the use of heavy vehicles for the transportation of materials and infrastructure needed during the construction phase of the Proposal. Access to the Proposal site will be via a turn off from the Great Northern Highway (approximately 45 km west of the Sandfire Roadhouse). During operations it is anticipated that there will be approximately 25 truck movements along Great Northern Highway per day between the Proposal site and Port Hedland. Therefore, cumulative impacts will be limited.

To mitigate these impacts a number of measures will be implemented (refer to Section 6.5.2).

Further context and the effects of disturbance of the vegetation and fauna habitats that support these ethnobotanical values are also addressed in Sections 8.4.1.1, 8.4.1.2, 8.4.2.2, 8.4.2.3, 8.6.1.1, 8.6.1.2, 8.6.2.2, 8.6.2.3, 9.3.4.3, 9.3.4.6, 9.3.4.8, 9.4.1.1, 9.4.1.2, 9.4.2.1, 9.4.2.2, 9.4.2.3, 9.6.1.1, 9.6.1.2, 9.6.2.1, 9.6.2.2and 9.6.2.3.

6.4.4.5 Access to Country

Access to Country is a foundational value for the Martu People and is central to the exercise of their native title rights and interests. As noted in Section 6.3.1, part of the Proposal lies within the Martu NTD, which is subject to exclusive native title. Maintaining physical access to Country is not only a legal entitlement but is also considered vital cultural and spiritual wellbeing.

As noted in Section 6.3.3.2, the Martu People are concerned about the potential for the Proposal to cause damage to Tjukurrpa and associated cultural places. For Martu, this damage can manifest in a variety of ways: physical, cultural, or spiritual, and all forms are considered equally significant and harmful. This harm may arise through altered access arrangements and the resulting prevention of access to important areas, which limits the ability of Martu People to carry out cultural responsibilities. For generations Martu have been able to freely access the Proposal area to undertake cultural activity such as hunting, visiting sites or conducting law. The Proposal could affect these cultural associations, which are not only about land tenure or access but also about the deeper cultural consequences of relinquishing control. For Martu, ceding authority over ngurra risks weakening cultural connection, disrupting intergenerational knowledge transfer, and could lead to a loss of culture.

Related to altered access arrangements, harm to Tjukurrpa can also occur through unintentional breaches of cultural protocol, such as uninitiated individuals entering sacred areas, and consequences of other unauthorised visitation which could include the filming or photographing of sites without consent, or inappropriate behaviour on Martu Country.

An assessment of impacts related to access to Country are also addressed in Sections 6.6.1.2 and 6.6.3.2. To mitigate these impacts a number of measures will be implemented (Section 6.5.2).

6.4.4.6 Dust and Noise Impacts

Dust and noise emissions are a key concern for Martu People in relation to the Proposal. The Proposal is expected to result in increased dust emissions within the Martu NTD, particularly in relation to the RAC leading to the aerodrome (EAQ 2026). Further, infrequent noise emissions are anticipated to occur as a result of the aerodrome (Appendix E06). These emissions have the potential to interfere with the amenity values of the Proposal area and beyond, which Martu have identified as culturally significant and sensitive to environmental disturbance (Section 6.3.3.2).

Dust emissions are expected to occur from multiple sources, including drilling, blasting, dozing, excavation loading, haul truck unloading, stockpiling, wheel-generated dust, and wind erosion from exposed surfaces. Modelling undertaken for the Dust Impact Assessment (EAQ 2026) indicates that particulate matter (PM) concentrations will exceed health-based criteria under worst-case conditions (and in the absence of dust suppression measures), with visible dust plumes extending up to 40 km from the MIA. Dust deposition is also predicted to affect nearby ACH sites and flora and flora along the RAC, however none of this is located on Martu Country.

Martu community members have expressed concern that dust may damage vegetation, obscure visibility, and interfere with the ecological and spiritual integrity of Country. During engagement undertaken with Martu People community members, concerns were raised in relation environmental impacts from dust and from toxic chemicals used in mining processes, and the potential for these to be spread during annual cyclone events.

These concerns were further emphasised through the cultural values mapping exercise, which highlighted the significance of sand dunes, water sources, and vegetation as interconnected elements of the cultural landscape. Disturbance to these features may result in irreversible damage to ancestral places, burial sites, and artefacts. Martu People have also raised concerns about the limitations of western scientific dust thresholds in capturing the “felt” impacts of dust on cultural values, including the ability to hunt, camp, and conduct ceremony.

Noise emissions from the Proposal have been assessed as a potential impact to both fauna and Martu cultural values. The Winu Noise and Vibration Impact Assessment (Appendix E06) identified that while

some habitats fall within areas where noise levels may exceed 50 dB(A) - (a conservative threshold for behavioural disturbance) the overall risk to significant species and cultural values is considered low. Day-to-day operational noise is predicted to affect only a small proportion of mapped habitat (e.g. 2.2% for Mine Operations), and infrequent, short-duration noise from the Airstrip is not expected to cause hearing damage or significant behavioural disruption. Importantly, no night parrot habitat falls within high-noise zones, and predicted blast levels remain well below thresholds known to cause harm.

To mitigate impacts associated with dust and noise several measures will be implemented (Section 6.5.2).

The effects of noise and dust are also assessed in Sections 9.4.2.2, 9.4.2.3 and 13.

6.4.5 Other Stakeholder Potential Impacts

6.4.5.1 Traffic and Road Safety

Increased vehicle movements associated with both the construction and operational phases of the Proposal will result in increased road traffic which in turn has the potential to exacerbate traffic safety for community members and other road users, such as tourists.

The Proposal will require the use of heavy vehicles for the transportation of materials and infrastructure needed during the construction phase of the Proposal. Access to the Proposal will be via a turn off on the Great Northern Highway (approximately 45 km west of the Sandfire Roadhouse), a road which is currently used by in excess of approximately 29,380 people per year (Great Northern Highway east of Marble Bar Road). Of these, 32.2% are trucks and 67.8% are cars on a weekly basis. Vehicle movements increase west of Marble Bar Road with an average of 92,166 vehicles. Based on weekly statistics, 53.2% of these movements are trucks, while 46.8% are cars (Main Roads WA 2023). Further, during operations it is anticipated that there will be approximately 25 truck movements along Great Northern Highway per day between the Proposal site and Port Hedland.

Engagement undertaken with MRWA has indicated that there are some concerns regarding the existing condition of portions of Great Northern Highway due to mine haulage and potential further wear and tear. During engagement, concerns regarding the increase in heavy vehicle movements were also noted, particularly potential impacts on public safety from increased traffic, and longer travel times from the absence of overtaking lanes on the Great Northern Highway.

While it was acknowledged that an additional 25 truck movements in isolation would not cause a significant effect on traffic volumes, concerns were expressed regarding potential cumulative increases in traffic on the Great Northern Highway with respect to proximal projects, such as the potential future development of the AREH.

Depending on which Port infrastructure the Proposal ultimately intends to utilise for the transportation of construction materials and the shipment of product, there is the possibility that enhanced traffic impacts may be felt in either Broome or Port Hedland and on roads that are already experiencing high numbers of road safety incidences (RAC 2025).

Within the Proposal area itself, roads are currently of poor quality and are dirt, single lane roads 3-4 m in width. It is intended that diversion between Nyangumarta Highway and Wirlkirr Wirlkirr Road will be created to accommodate heavy vehicle movements on the site. It is also intended that the RAC will be constructed to meet requirements for in-bound supplies (e.g. diesel, processing reagents, camp supplies) and out-bound haulage of product (copper concentrate).

6.4.5.2 Amenity

6.4.5.2.1 Visual Amenity

The development of the Proposal, including associated vegetation clearing and infrastructure installation, will result in altered local landforms and a change in the visual landscape and associated amenity, particularly due to the planned construction of 11 wind turbines, each reaching up to approximately 236 m in height.

Due to the remote location of the Proposal, visual amenity impacts will largely be limited to Traditional Owners as described in Sections 6.4.3.3 and 6.4.4.3.

6.4.5.2.2 Dust and Noise

Dust and noise generating activities will be limited to increased truck movements.

An air quality assessment was conducted for the Proposal to evaluate dust impacts from mining and processing activities projected for the year 2032. The study focused on total suspended particulates (TSP), PM10, and PM2.5 concentrations at peak operational throughput, considering cumulative sources such as the mine itself, haulage routes, and the RAC. Impacts were assessed against human, flora, and fauna receptors, with background dust levels deemed negligible due to the Proposal's isolation from other mining operations.

To mitigate the impacts of dust, the Proposal will implement a number of measures as outlined in Section 6.5.2.

6.4.5.3 Environmental Impacts

As outlined in Section 6.3.4, stakeholders place a high value on the natural environment of the Pilbara region. As such, during engagement activities undertaken to support the SEIA a number of concerns were raised with regards to the potential degradation of the landscape and the loss of flora and fauna more broadly as a result of the Proposal (Umwelt 2025).

6.4.5.3.1 Flora

The Consolidated Detailed Flora and Vegetation Assessment of the Proposal (Western Botanical 2026a) has identified 338 flora species within the Development Envelope. These are outlined in Section 8.

No flora taxa listed as Threatened under either the BC Act or EPBC Act were identified as occurring within the search radius. Further, there are no Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) occurring within the Development Envelope

The Flora and Vegetation Assessment has however identified there to be a potential risk for the introduction of weeds as a result of the Proposal with this having the potential to directly affect native flora, and in turn have indirect impacts to fauna. Potential impacts more specifically associated with the introduction of weed species within the Development Envelope are outlined in Section 8.

6.4.5.3.2 Fauna

The Winu Vertebrate Fauna Consolidation Report (Appendix E01) identified a diverse assemblage of fauna within the Proposal, including 157 vertebrate species such as reptiles, birds, mammals, and amphibians. Eight conservation-significant species were recorded within the Development Envelope, including the Bilby, Brush-tailed Mulgara, Northern Marsupial Mole, and several migratory birds. The Development Envelope also comprises seven distinct habitat types, with shrub and spinifex on sandplain being the most dominant, supporting a range of burrowing and spinifex-dependent species.

The assessment of the Proposal has a identified a number of potential impacts to fauna resulting from the Proposal which may in turn impact on identified environmental values of non-Traditional Owner stakeholders. This is discussed further in Section 9.

Concerns were also expressed regarding potential antisocial behaviour of fly-in-fly-out workers and how this may potentially impact on environmental values. Given the Proposal's relative proximity to the Eighty Mile Beach Marine Park, the park manager and operator noted the possibility for an increase in disruptive behaviour at the marine park after hours or on rostered days off, with stories recounted of previous examples of poor behaviour with miners from other proponents residing in nearby camps accessing the beach after hours and posing a threat to turtle nesting sites. Proposed FIFO rostering arrangements does not consider time for on-site Rest and Relaxation (R&R) with chartered flights operating directly to and from site.

6.4.5.3.3 Post Closure Land use and Rehabilitation

Additionally, engaged regional stakeholders raised concerns regarding post-closure mine site rehabilitation and environmental management acknowledging that mining can leave behind substantial environmental change, particularly open pit mining such as the Proposal. Engaged stakeholders particularly noted the importance of adequate rehabilitation and environmental care and the need to consider post-closure land rehabilitation early on in the Proposal's life cycle in order to minimise environmental change.

6.4.5.4 Pastoral

Engagement with Wallal Pastoral Station highlighted concerns for cattle strike. The Proposal is proposing to transport its product via Great Northern Highway and as such the first 18 km of the transport route off Great Northern Highway onto the Nyangumarta Highway will traverse through Wallal Downs Pastoral Station lease area.

As highlighted in Sections 6.3.3 and 6.3.4, water is highly valued in the Pilbara region with water security being an issue across the region. This is a result of the climatic and environmental context of the region, with the majority of water in the Pilbara being a result of cyclonic activities which do not provide a consistent and reliable water source.

The Proposal proposes to source its water utilising groundwater from mine dewatering, surface water that reports to dams and a the Rimfire Borefield. Engagement with Wallal Downs Pastoral Station and other regional stakeholders have noted concerns for decreasing water security as a result of the Proposal and the increasing number of projects in the region more generally.

While not specifically raised during the engagement process, there is also the potential for unplanned contamination of water that may affect surrounding pastoralists and the environment more broadly.

6.5 Mitigation

6.5.1 Overview

The Proponent will apply the mitigation hierarchy to the Proposal to ensure it meets the EPA's objective in relation to social surroundings. General principles in this regard include:

- **Avoid:** The Proponent is to undertake engagement and consultation, including in-field consultation, with Traditional Owner groups, pastoralists and other key stakeholders which will inform the Proposal design, with the aim of avoiding impacts to social surroundings, wherever practicable
- **Minimise:** The Proponent in consultation with Traditional Owners, pastoralists and other key stakeholders will identify significant impacts to social surroundings values and seek to minimise direct and indirect impacts that may be a result of the implementation of the Proposal, wherever practicable
- **Rehabilitate:** Rehabilitation and final landform design will consider Traditional Owner, pastoralists and other key stakeholder views. Rehabilitation activities will also be undertaken progressively over the life of the mine where possible, and opportunities to involve Traditional Owner groups in the rehabilitation of their Country will be undertaken.

Management Plans will be jointly developed with each Traditional Owner group. These plans will address Traditional Owner concerns regarding impacts to social surroundings and facilitate Traditional Owner consultation and ongoing involvement with respect to concerns raised. Ongoing engagement and consultation with each Traditional Owner group will occur throughout the life of the mine to assess opportunities during mine design and planning, and then in closure planning, to avoid and minimise impacts to ACH values, Country, water and the environment, in particular where previously unknown important areas are identified.

6.5.2 Avoidance and Minimisation

6.5.2.1 Design Changes to Avoid and Reduce Impacts

Significant work has been undertaken to include Traditional Owner and other stakeholders' feedback from SSA consultation in Proposal decisions and to refine the mine design. An overview of key design changes to avoid or reduce impacts are outlined in Table 6-13.

Table 6-13: Design Changes to Avoid and Reduce Impacts

Aspect	Design Change
Nyangumarta	
Visual amenity	To mitigate significant impacts to the visual landscape in the vicinity of cultural sites, the Proponent has revised TSF designs and will revegetate the larger LST cells, however the top surface of the smaller HST cells will not be vegetated With regards to the WRL, the current design was revised to take into account the Nyangumarta People's, preference regarding the height versus disturbance footprint trade off
ACH sites	The Proponent has pursued design option 5H to remove direct impacts to RTX_2020_02_Site_005 The Proponent and NWAC will salvage and relocate site RTX_2020_02_Site_001 The Proponent has adjusted the spatial footprint of proposed topsoil stockpile to ensure that potential impacts to the integrity of RTX_2020_02_Site_004 are effectively reduced The Proponent has adjusted the footprint of the WRL adjacent to RTX_2023_09_Site_001 to ensure the WSP does not interact with the site

Aspect	Design Change
	The Proponent will construct key infrastructure over dunes to ensure that impacts to dune structures and potential sub-surface archaeological material is effectively limited While the Proponent seeks to avoid impacts to ACH sites, any requirement to disturb such sites will be subject to Section 18 applications under the AH Act which will only be submitted in consultation with, and the approval of, the Nyangumarta People While considering the placement of noise generating machinery including generators, the Proponent will place them in a way that limits noise related impacts to the Established Tree Stand area as much as possible Culturally important Established Tree Stand identified by the Nyangumarta People were incorporated within the camp that has been co-designed with the Nyangumarta People
Dust and noise	The access roads within the RAC, including Copper Head Road (adjacent to site RTX_2020_02_Site_002) will be sealed, effectively reducing dust emissions from the road
Water	The Proponent has removed the Wallal Aquifer from the Winu Proposal. This has removed the most significant potential risk to spiritual elements of Nyangumarta's cultural landscape
Ethnobotanical values	Avoidance of potential impacts on known or potential Night Parrot roosting and foraging habitat. Eastern parts of the original Development Envelope including borefield pipeline routes were amended and optimised to enable a reduction in Development Envelope and avoid potential habitat. This reduced the Development Envelope by approximately 2,757 ha
Martu	
ACH and Values	Following consideration and on ground ACH survey works by the Martu People, a preferred pipeline route from the MIA to Rimfire was agreed that minimised dune crossings and any sensitive areas. This included a diversion to increase the distance away from Night Parrot habitat While no specific sites of ACH were identified, should there be any requirement to disturb identified ACH sites they will be subject to Section 18 applications under the AH Act which will only be submitted in consultation with, and the approval of, the Martu People
Ethnobotanical values	Avoidance of potential impacts on known or potential Night Parrot roosting and foraging habitat. Eastern parts of the original Development Envelope including borefield pipeline routes were amended and optimised to enable a reduction in Development Envelope and avoid potential habitat. This reduced the Development Envelope by approximately 2,757 ha The Texas Borefield was also subsequently removed from the Proposal. The removal of the Texas Borefield has prevented the potential clearing of up to 322,029 *Cynodon anisocarpus* individuals. Avoidance of potential impacts on known or potential Night Parrot roosting and foraging habitat has reduced the Development Envelope by approximately 10,213 ha
The pipeline route from the MIA to Rimfire has been rerouted	Following consideration and on ground ACH survey works by the Martu People, a preferred pipeline route from the MIA to Rimfire was agreed that minimised dune crossings and any sensitive areas. This included a diversion to increase the distance away from Night Parrot habitat
Reduction of the Development Envelope at Rimfire	Avoidance of potential impacts on known or potential Night Parrot roosting and foraging habitat. Eastern parts of the original Development Envelope including borefield pipeline routes were amended and optimised to enable a reduction in Development Envelope and avoid potential habitat. This reduced the Development Envelope by approximately 2,757 ha

Aspect	Design Change
Other	
The RAC has been redesigned	Avoidance of rocky outcrops - potential habitat critical to the survival of the Black-footed Rock-wallaby / Mororong, listed as Endangered under the Biodiversity Conservation Act 2016 (WA) and the EPBC Act (Cth)
Amendment to the MIA Development Envelope to avoid an active Bilby population	Areas of current Bilby occupation and active burrows were identified south-east of the MIA during a survey in 2019. Subsequent 2-yearly Bilby Abundance studies have confirmed the continued presence of that population

6.5.2.2 Nyangumarta

6.5.2.2.1 ACH and Values

The Proponent has applied the mitigation hierarchy during the Proposal design process to address potential impacts to Nyangumarta ACH values, as detailed below and in Table 6-14. These measures were developed in close consultation with Nyangumarta Traditional Owners and apply specifically to Nyangumarta Country within the Proposal and surrounds.

6.5.2.2.2 Avoidance – Proposal Design

The Proponent revised infrastructure designs to avoid direct impacts to known ACH sites. TSF Design Option 5H was adopted to remove interaction with RTX_2020_02_SITE_005, and the spatial footprint of the topsoil stockpile and WSP were adjusted to avoid impacts to RTX_2020_02_SITE_004 and RTX_2023_09_SITE_001 respectively.

Known ACH sites within and adjacent to the Proposal are to be recognised as Exclusion Zones under the Project Agreement (excluding RTX_2020_02_SITE_001). These sites will be physically demarcated and signposted to a co-developed specification. The co-designed CHMP will outline the agreed monitoring and reporting regimes for these sites.

Avoidance of ACH sites, in consultation with the Nyangumarta People, will be consistent with the EPA's objective to protect social surroundings from significant harm.

6.5.2.2.3 Minimisation – Site Specific Management

Where avoidance was not feasible, such as at RTX_2020_02_SITE_001, the Proponent has committed to a supervised salvage and relocation of artefacts and will be subject to Section 18 applications under the AH Act which will only be submitted in consultation with, and the approval of, the Nyangumarta People. This process will be undertaken by appropriate Nyangumarta Traditional Owners following enactment of the Winu Project Agreement and in accordance with the 'Guidelines for Best Practice: Artefact Relocation and Excavation Guidance for Nyangumarta Country.'

Approval of a Section 18 application, under the AH Act, to disturb ACH sites, with the full support of the Nyangumarta People, will be consistent with the EPA's objective to protect social surroundings from significant harm.

6.5.2.2.4 Minimisation – Ongoing Management

To minimise impacts to Nyangumarta ACH values a number of ongoing management measures will be put in place. This includes the formal recognition of known ACH sites within and adjacent to the Proposal as Exclusion Zones in the Project Agreement as outlined above. These zones will be subject to an agreed monitoring regime by Nyangumarta Traditional Owners, as outlined in the CHMP, to ensure their integrity is maintained.

All ground-disturbing works proposed to take place within "Not Clear" areas will involve Nyangumarta ACH Monitors, and the Proponent will continue to support NWAC in delivering cultural awareness

training, as outlined in the Project Agreement, for all personnel working within the area. Further, if additional, unforeseen impacts to dunes are required for the Proposal, the Proponent will consult with NWAC and continue to apply the dune minimisation strategies. It will be for the Nyangumarta People to determine whether impacts to particular dunes represent ACH values that would be subject to the AH Act.

A CHMP will be co-designed with Nyangumarta People to ensure appropriate ACH management measures are in place.

6.5.2.2.5 Water

The Proponent has applied the mitigation hierarchy during the Proposal design process to address potential impacts to Nyangumarta ACH values associated with water, as outlined below. These measures were developed in collaboration with Nyangumarta Traditional Owners and NWAC, and apply specifically to culturally significant water sources, hydrological systems, and associated ecological and spiritual values within and adjacent to the Proposal.

6.5.2.2.6 Avoidance – Proposal Design

The Proponent removed the Wallal regional borefield from the Proposal following concerns raised by regulators and stakeholders regarding potential impacts to Walyarta (Mandora Marsh) and surrounding mound springs. Notwithstanding, technical studies conducted by the Proponent and reviewed by NWAC's independent technical team indicate that potential drawdown related risks to surrounding soaks are minimal and further that ground water dependent vegetation does not occur within the Proposal Area (Vaughan 2025).

Further, the Proponent will implement the following:

- Runoff from landforms and stockpiles will be managed as per the Surface Water Management Plan
- The RAC will include waterway crossings designed to maintain flow and prevent upstream ponding
- Potentially acid-forming materials will be encapsulated to prevent contamination of groundwater and surface water systems.

6.5.2.2.7 Minimisation– Proposal Design

Measures drawn from completed relevant technical studies include the following:

- Where practicable, optimisation of dewatering schedules to align with seasonal rainfall patterns, reducing the magnitude of water deficits and excess discharge volumes to the infiltration ponds and MAR bores
- Trialling of evaporation inhibitors on the site will be undertaken to reduce water evaporation
- Implementation of a monitoring framework to track water levels in the TSF. This will guide operational adjustments such as water release
- Groundwater studies (field and desktop) will continue to quantify additional sources to meet supplementary water demands
- Groundwater drawdown scenarios have been modelled to assess impacts on aquifer systems and will inform adaptive management
- Borrow pit bases may be ripped post-construction, where practicable, to reduce long-term ponding and improve infiltration.

6.5.2.2.8 Minimisation – Ongoing Management

To ensure ongoing protection of water values, the Proponent has committed to co-develop the water stewardship provision under the Project Agreement and subsequent Management Plan. This plan will include:

- Installation of monitoring bores at suitable locations in collaboration with NWAC within the Proposal and other locations subject to tenure access and processes
- Co-designed monitoring program
- Co-development of water quality / level triggers
- Contribution towards cultural mapping to locate two additional soaks known to be within the general vicinity of the Proposal
- Cadence for discussing water stewardship within the life of mine planning meetings, as part of the implementation of the Project Agreement.

The Proponent will also work with NWAC to incorporate two-way science principles into appropriate water-related monitoring and management activities. This includes integrating Traditional Owner knowledge with western scientific methods to assess the health of water sources and guide decision-making. Management Plans will be co-developed with NWAC to ensure the identification, protection, conservation and management of the identified culturally important environmental values within the Proposal.

6.5.2.2.9 Visual Amenity

The Proponent has applied the mitigation hierarchy during the Proposal design process to address potential impacts to the visual landscape and aesthetic values held by Nyangumarta Traditional Owners. These measures were developed by the Proponent and endorsed through consultation with NWAC and apply specifically to the visual integrity of the MIA and surrounding Country.

6.5.2.2.10 Avoidance – Proposal Design

In order to mitigate impacts to visual amenity, there have been revisions to the layout and design of key infrastructure which have included:

- Adoption of TSF Design Option 5H, which places the facility further from culturally significant sites
- Commitment to revegetate the larger LST cells, improving visual integration with the surrounding landscape
- The WRL has been designed following confirmation from the Nyangumarta People about the preferred height against the disturbance footprint
- Placement of infrastructure behind natural landforms where possible to reduce visibility from culturally sensitive vantage points.

6.5.2.2.11 Minimisation- Proposal Design

To further minimise visual impacts, the Proponent will adopt the management measures proposed in the VIA. This includes:

- Using muted colours and non-reflective materials for infrastructure, including wind turbines
- Avoiding the use of logos or text on turbine structures
- Minimising the height of ancillary buildings and placing them behind landforms where feasible

The Proponent also acknowledges the requirement for obstacle lighting on wind turbines under CASA regulations.

6.5.2.2.12 Ethnobotanical Values

The Proponent has applied the mitigation hierarchy during the Proposal design process to address potential impacts to Nyangumarta ethno-botanical values. The measures outlined below apply specifically to culturally significant flora, fauna, and ecological systems within and adjacent to the Proposal (refer to Table 6-14 for further details).

6.5.2.2.13 Avoidance – Proposal Design

The Proponent has revised infrastructure placement to avoid impacts to key vegetation stands and culturally significant habitats. This has included:

- Designation of a Kumpaly Tree Stand (*Hakea macrocarpa* and *Hakea lorea*) as an Exclusion Zone within the Project Agreement
- Adjustments to infrastructure layouts to avoid impacts to sand dune vegetation and known bush tucker species
- Commitment to avoid disturbance to flagged trees in the Primary Drilling Area until seed collection and cultural harvesting activities are completed.

6.5.2.2.14 Minimisation – Ongoing Management and Rehabilitation

To ensure the long-term protection of and minimisation of impacts on ethnobotanical values, including effective rehabilitation, a number of mitigation measures will be implemented as a means of ongoing management with committed management measures including:

- Supporting the establishment of a Nyangumarta plant nursery in Bidyadanga for propagation and revegetation
- Collection of seed stocks for progressive revegetation undertaken within the MIA and RAC at an appropriate time
- Provision of access for NWAC and Nyangumarta Rangers to collect nuts from Parntarl trees and Kumpaja trees prior to them being cleared
- Development of a rehabilitation research strategy to identify and close knowledge gaps during operations
- Development of a rehabilitation monitoring methodology to continuously improve implemented approaches to revegetation and produce baseline information to assess revegetation efforts during closure
- Development of appropriate frameworks required for seed collection and storage to support revegetation activities
- Co-designing a drill pad monitoring program to assess revegetation success and inform closure planning
- Co-designing a soak monitoring strategy using both Traditional Owner knowledge and western science methods, noting monitoring that is supported by the Proponent may be restricted to the Proponent's tenure.

6.5.2.2.15 Noise and Dust

The Proponent has applied the mitigation hierarchy during the Proposal design process to develop mechanisms to address potential impacts to cultural values due to dust and noise.

6.5.2.2.16 Avoidance – Proposal Design

Noise-generating infrastructure, including wind turbines and processing facilities, has been strategically placed to reduce acoustic intrusion into culturally significant areas. Where feasible, infrastructure has been located behind natural landforms to buffer sound propagation and reduce disturbance to the surrounding landscape.

6.5.2.2.17 Minimisation – Proposal Design

To address impacts to Nyangumarta ACH values associated with dust emissions, the Proponent will seal the RAC. This decision was, in part, made in response to concerns raised by Nyangumarta representatives regarding dust deposition on sensitive vegetation and ACH sites, particularly those located near the road and infrastructure corridors. The sealing of the road within the RAC is expected to significantly reduce dust generation and minimise the need for water-based dust suppression.

6.5.2.2.18 Minimisation – Ongoing Management

As part of the ongoing management of ACH, NWAC and the Proponent will work in collaboration to develop a scientifically rigorous methodology for monitoring dust impacts on vegetation and cultural sites. The Proponent has also committed to seal the RAC to reduce impacts arising from dust. This includes co-developing a Care for Country Management Plan that outlines monitoring regimes.

6.5.2.2.19 Access to Country

The Proponent has applied the mitigation hierarchy during the Proposal design process to address potential impacts to Nyangumarta People's ability to access and care for their Country, as outlined below and in Table 6-14. These measures were developed in close consultation with Nyangumarta Traditional Owners and NWAC and apply specifically to the Proposal and surrounding access routes. The Proponent will co-develop the Access to Country Management Plan with NWAC.

6.5.2.2.20 Avoidance – Proposal Design

To reduce impacts on culturally significant locations and maintain access, the Proponent has committed to:

- Constructing a diversion road to bypass Camp 1, a culturally important site regularly used by NWAC and Nyangumarta Rangers
- Rio Tinto will upgrade Nyangumarta Highway and to a dual lane sealed road
- Ensuring that no access restrictions, apart from temporary or emergency safety related issues, will be imposed on the Nyangumarta Highway throughout the life of the Proposal.

6.5.2.2.21 Minimisation – Ongoing Management

Recognising the cultural obligation of Nyangumarta People to ensure the safety of all visitors to their Country, the Proponent will:

- Co-develop an Access to Country Protocol to ensure that Nyangumarta People can safely and respectfully access the Proposal area
- An Access Protocol will be developed to ensure a process which enables safe access, within the Proposal area, excluding the pit void
- The Proponent will work with Nyangumarta People to co-develop a section within the Traffic Management Plan to ensure Nyangumarta People can safely access their Country
- Support the development and delivery of cultural awareness training for all personnel working on Nyangumarta Country.

Further, the Proponent will continue to support safe access to Nyangumarta Country by constructing a dual-lane sealed road to accommodate increased traffic while maintaining safety for Traditional Owners and Rangers.

Prior to closure, the Proponent will work with NWAC to establish safe post-closure access routes co-designed and established for Nyangumarta People and other future land use manager(s)/owner(s), excluding the pit void exclusion area.

Table 6-14: Application of the Mitigation Hierarchy for Impacts to Social Surroundings – Nyangumarta

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant?	Effectiveness of Nominated Control
ACH	**Measures to Avoid**			
	Known ACH sites within and adjacent to the Proposal are to be recognised as Exclusion Zones under the Project Agreement (excluding RTX_2020_02_SITE_001) The Proponent has pursued design option 5H to remove direct impacts to RTX_2020_02_Site_005 The Proponent has adjusted the spatial footprint of the proposed topsoil stockpile to ensure that potential impacts to the integrity of RTX_2020_02_Site_004 are effectively reduced The Proponent has adjusted the footprint of the WSP adjacent to RTX_2023_09_Site_001 to ensure the WSP does not interact with the site As far as practicable, the Proponent will construct key infrastructure over dunes to ensure that impacts to dune structures and potential sub-surface archaeological material is effectively limited While considering the placement of noise generating machinery including generators, the Proponent will locate them in a way that limits noise related impacts to the established tree stand area as much as is practicable No helicopter landings to occur within ACH exclusion zones	CHMP and associated Management Plans to be developed in consultation with the Nyangumarta People, which identifies processes to be followed with regards to ACH sites and values to be avoided	Yes – DPLH for administration of AH Act approvals processes (for impact to ACH sites)	Avoidance is the most effective mechanism for reducing impacts of the Proposal to ACH values Exclusion zones and the location of the revised Development Envelope will ensure important ACH areas will not be subject to direct disturbance The Proponent's Cultural Heritage Management System is an established mechanism for prioritising avoidance of higher value areas All potential disturbance will be subject to relevant AH Act approvals processes
	The Proponent has assisted NWAC to develop "*Guidelines for best practice: artefact relocation and excavation guidance for Nyangumarta Country*",		No	Implementation of this guideline is to ensure that the relocation of artefacts will be done in accordance with the standards expected by Nyangumarta People

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant?	Effectiveness of Nominated Control
	which has been used to inform decisions around mitigating potential sub-surface impacts			
	Measures to Minimise			
	The Proponent and NWAC will salvage and relocate site RTX_2020_02_Site_001 ACH sites, as currently mapped, will be physically demarcated and signposted at a co-developed specification	CHMP to be developed in consultation with the Nyangumarta People, which identifies processes to be followed with regards to the minimisation of impacts to ACH sites and values	Yes – DPLH for administration of AH Act approvals processes (for impact to ACH sites)	Salvage of cultural material is considered the most effective mechanism for mitigation when an ACH site is impacted Implementation of *"Guidelines for best practice: artefact relocation and excavation guidance for Nyangumarta Country"* is to ensure that the relocation of artefacts will be done in accordance with the standards expected by Nyangumarta People The Proponent's Cultural Heritage Management System is also an established supporting mechanism for prioritising avoidance of higher value areas and minimisation of impacts to these areas All potential disturbance will be subject to AH Act approvals processes Exclusion zones and the location of the revised Development Envelope are to ensure important cultural areas will not be subject to direct disturbance Relevant monitoring measures are to be included in the Management Plans Ongoing consultation with Traditional Owners will be addressed in the Management Plans
	Recognition of known ACH sites within and adjacent to the Proposal as Exclusion Zones Proponent staff and contractors to undergo cultural awareness training	Standard practice		
	Culturally important tree stands identified by the Nyangumarta People have been incorporated into the camp that has been co-designed with the Nyangumarta People The Proponent will periodically engage Nyangumarta ACH Monitors when undertaking ground disturbing works within sand dunes as set out in the Project Agreement, CHMP and associated Management Plans The Proponent will consult with NWAC and continue to apply dune impact minimisation strategies The Proponent will work with NWAC to develop a 'Chance Finds Procedure'	Proposal specific		Established and proven practice Sealing of roads has been proven to mitigate dust impacts in other project cases

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant?	Effectiveness of Nominated Control
	The access roads within the RAC, including Copper Head Road (adjacent to site RTX_2020_02_Site_002 will be sealed, effectively reducing dust emissions from the road. This will also minimise effect on ACH and ethnobotanical values and improve access to Country for Nyangumarta People			
Water	**Measures to Avoid**			
	The Proponent has removed the Wallal Borefield from the Proposal	Proposal specific	No	This measure will ensure that the Wallal Aquifer will not be impacted
	Water bores to be placed a sufficient distance away from the established tree stand camp area to avoid localised impacts	Proposal specific	Yes - DPLH for administration of AH Act approvals processes (for impact to ACH sites)	Ongoing monitoring of groundwater levels across the Proposal will ensure that the established tree stand will not be impacted
	The RAC will include waterway crossings designed to maintain flow and prevent upstream ponding	Proposal specific	No - Proposal Design Plan	Established and proven practice
	Runoff from landforms and stockpiles will be managed as per the Operational Surface Water Management Plan			Established and proven practice The measure will avoid contamination of water sources
	Potentially acid-forming materials will be encapsulated to prevent contamination of groundwater and surface water systems	Proposal specific	Yes – DMPE approval is required under the Mining Act for the implementation of the MDCP and MCP	Established and proven practice
	Measures to Minimise			
	Co-design of a monitoring program and a Winu soak monitoring strategy	Proposal specific	No	Ongoing monitoring of groundwater levels across the area will be used to adapt the program as necessary to achieve the outcome

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant?	Effectiveness of Nominated Control
	The Proponent will co-design the Management plans with NWAC to ensure the inclusion of Indigenous epistemologies in monitoring regimes			
	The Proponent will continue to provide NWAC copies of water study reports as they become available and agree to a co-design water stewardship program under the Project Agreement	Proposal specific	No	Ongoing engagement with Nyangumarta People will ensure that impacts related to water can be mitigated and avoided as soon as possible
	The Proponent will support NWAC to undertake cultural mapping activities to locate two additional soaks known to be within the general vicinity of the Proposal	Proposal specific	No	Ongoing consultation with Traditional Owners will be addressed in the Management Plans
	The Proponent and NWAC will co-design the Proposal Caring for Country Management Plan	Proposal specific	No	Ongoing monitoring and care of Country are to ensure that impacts related to water mitigated and avoided as soon as possible
	To reduce long-term ponding, borrow pit bases may be ripped, where practical, post-construction to improve infiltration	Proposal specific	No	Established and proven practice
Visual Amenity	**Measures to Avoid**			
	The Proponent has revised the TSF designs to enable revegetation of the larger LST cells	Proposal specific	No	Project design changes and revegetation will ensure impacts will be avoided
	Measures to Minimise			
	The Proponent and NWAC co-designed a VIA which effectively ascertained the impacts to the visual landscape with a particular focus on views from culturally significant locations outside of the Proposal	Proposal specific	No	Continued collaboration with NWAC to determine the viewpoints for the VIA is to ensure that the visual impact on culturally significant sites can be understood and minimised
	The Proponent has agreed to engage several mitigation measures aimed at minimising visual impacts resulting from the instillation of wind turbines. These include:	Standard industry practice	No	Ongoing consultation with Traditional Owners will be addressed in the Management plans

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant?	Effectiveness of Nominated Control
	• Using muted colours and non-reflective materials • Avoiding the use of logos and text on the turbines • Minimising the height of ancillary buildings, place behind landforms where possible and use low reflective materials			
	Measures to Rehabilitate			
	The iterative process of closure planning is to ensure that the completion criteria for mine closure will continue to evolve and refine as Proponent knowledge increases The Proponent will continue to work with NWAC to refine the closure completion criteria	Standard practice Proposal specific Management Plans and the MCP will be developed in consultation with the Nyangumarta People which identifies processes to be followed with regards to closure and associated rehabilitation of the landscape	Yes – DMPE approval is required under the Mining Act for the implementation of the MDCP and MCP	Ministerial conditions requiring preparation and implementation of an MCP is expected Statutory Guidelines for MCPs set the standard for industry closure planning and practice. The MCP must detail all consultation and legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes
Noise and Dust	**Measures to Avoid**			
	Noise-generating infrastructure, including wind turbines and processing facilities, has been strategically placed to reduce acoustic intrusion into culturally significant areas	Industry standard	No	High level of certainty that the measure minimises substantial impacts resulting from mining activities
	Measures to Minimise			

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant?	Effectiveness of Nominated Control
	The access roads within the RAC, including Copper Head Road (adjacent to site RTX_2020_02_Site_002 will be sealed, effectively reducing dust emissions from the road NWAC and the Proponent will establish an appropriate monitoring and response regime in the co-development of a CHMP	Proposal specific	No	Monitoring of dust management in relation to impacts on social surroundings will be undertaken through the Management Plans. Nyangumarta People will remain informed on results of, and have opportunities to be involved in, investigations into dust management strategies and dust monitoring throughout Proposal implementation
Ethnobotanical Values	**Measures to Avoid**			
	The Proponent has designated the stand of Kumpaly Trees as an exclusion zone under the Project Agreement and direct impacts to the area will be avoided	Proposal specific	Yes - DPLH for administration of AH Act approvals processes (for impact to ACH sites)	This measure is to ensure that the direct impacts to the area will be mitigated
	The Proponent has removed the Wallal Borefield from the proposal	Proposal specific	No	This measure is to ensure that the Wallal Aquifer will not be impacted
	Measures to Minimise			
	Proponent staff and contractors will use the Nyangumarta Weed Glove Box Manual to supplement other weed management controls and actions The Proponent and NWAC will co-design a weed washdown facility for vehicle washdowns upon entering the Nyangumarta IPA	Proposal specific	No	The measure will minimise the spread and introduction of weed species within the Proposal area This measure is consistent with industry practice

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant?	Effectiveness of Nominated Control
	The Proponent will continue to investigate alternative low impact installation options for proposed solar infrastructure	Proposal specific	No	This measure will ensure that the direct impacts to this area are minimised
	Water bores will be placed a sufficient distance away from the established tree stand to avoid localised impacts	Proposal specific	Yes - DPLH for administration of AH Act approvals processes (for impact to ACH sites)	Ongoing monitoring of groundwater levels across the Proposal surrounds is to ensure that the established tree stand will not be impacted
	The Proponent will seal the RAC from the Great Northern Highway to the MIA	Standard industry practice	No	This measure is consistent with industry practice
	The Proponent will work with NWAC to ensure the principles of two-way science inform the development of monitoring and management actions undertaken throughout the Proposal	Proposal specific	No	This proposed measure is considered effective in mitigating and monitoring impacts to culturally significant flora and fauna
	Measures to Rehabilitate			
	The Proponent will support Nyangumarta People to collect seed stock for progressive revegetation undertaken within the MIA and RAC at an appropriate time The Proponent will support NWAC and the Nyangumarta Rangers to access the Proposal area to collect nuts from Parntarl trees and Kumpaja trees prior to them being cleared The Proponent will develop a rehabilitation monitoring methodology in consultation with NWAC to continuously improve implemented approaches to revegetation and produce baseline information to assess revegetation efforts during closure The Proponent and Nyangumarta People will work together to develop appropriate frameworks required for seed collection and storage to support revegetation activities	Standard practice	No	Ministerial conditions requiring preparation and implementation of an MCP are expected Statutory Guidelines for MCPs set the standard for industry closure planning and practice. The MCP must detail all consultation and legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant?	Effectiveness of Nominated Control
	The iterative process of closure planning is to ensure that the completion criteria for mine closure will continue to evolve and refine as Proponent knowledge increases	Standard practice	Yes – DMPE approval is required under the Mining Act for the implementation of the MDCP and MCP	
Access to Country	**Measures to Avoid**			
	The Proponent will construct a diversion road to bypass Camp 1	Proposal specific	Yes – native title boundaries as administrated under the NT Act	Ongoing engagement with Nyangumarta People regarding access to Country will be addressed in the Management Plans
	Measures to Minimise			
	Nyangumarta Traditional Owners visiting the MIA will be classified as visitors for workplace safety purposes. Visitors would not be subject to mandatory medical or induction requirements The Proponent will continue to provide ad hoc support, on a case-by-case basis to the Nyangumarta Rangers to upgrade and maintain facilities at Camp 1 and Camp 2	Proposal and operations specific	No (managed through Project Agreement and internal procedures)	Measures support continued access to Country while maintaining safety requirements Flexible visitor arrangements and case-by-case support enable practical access for Nyangumarta People Ongoing engagement with Nyangumarta People regarding access to Country will be addressed in the Management Plans
	The Proponent will work with NWAC to ensure that medicals and inductions for Nyangumarta People and Rangers are as accessible as possible	Operations specific		
	The Proponent will upgrade Nyangumarta Highway and to a dual lane sealed road	Proposal specific	Yes – subject to relevant MDCP/MCP approvals and heritage approval processes	Upgrading to a sealed dual-lane road will improve safe and reliable access to Country Reduced travel time, improved road conditions, and lower dust will enhance usability for Nyangumarta People Improves regional access and connectivity

6.5.2.3 Martu

6.5.2.3.1 ACH and Values

The Proponent has applied the mitigation hierarchy during the planning and design of borefield infrastructure and associated pipeline corridors to address potential impacts to Martu cultural values. While no named ACH sites were identified along the preferred corridors, the cultural significance of sand dunes, potential for burial sites, and ancestral connections mean that any disturbance carries cultural risk. The following measures were developed through heritage surveys with Martu Traditional Owners in the course of the Work Program Clearance ACH surveys and are summarised below.

6.5.2.3.2 Avoidance – Proposal Design

In order to reduce impacts to sand dunes, which are culturally significant and may contain burial sites, artefacts, and ancestral connections, various design changes were made to avoid disturbance. These include:

- Martu selection of preferred pipeline corridors for the Rimfire Borefield that minimise sand dune crossings and follow existing tracks where possible
- Development of the pipeline corridor using low points in sand dunes for potential crossings to reduce physical and visual disturbance
- Removal of the Texas Borefield from the Proposal.

6.5.2.3.3 Minimisation – Proposal Design

Where avoidance has not been feasible, the following design modifications will be put in place to reduce impacts, as proposed by Martu/JYAC:

- All pipeline crossings to occur at the lowest local point of sand dunes, with the only dune crossing now required post removal of the Texas Borefield to be within the existing road realignment.

In addition to the above, additional variations have been made to conceptual routes to reduce the number and extent of impacts on the sand dunes. It will be for the Martu People to determine whether impacts to particular dunes represent ACH values that would be subject to the AH Act.

6.5.2.3.4 Minimisation – Ongoing Management

To ensure cultural values are respected during construction and operation, the Proponent will ensure the following:

- Martu monitors will be considered during initial earthworks and construction activities in proximity to cultural sites, as identified in co-developed Management Plans
- Any newly proposed tracks or changes to the corridor will be referred to JYAC, who will consult with relevant Martu representatives before approval
- Formation of an Implementation Committee to liaise with the Proponent
- Ongoing engagement / communication with Martu / JYAC will be undertaken by the Proponent to ensure Martu remained informed in relation to planned water extraction and associated potential impacts to the aquifer.

6.5.2.3.5 Water

The Proponent has applied the mitigation hierarchy during the Proposal design process to address potential impacts to Martu cultural values associated with water, as outlined below. These measures were developed in collaboration with Martu Traditional Owners and JYAC and draw from the technical studies outlined previously (Section 6.4.4.2).

6.5.2.3.6 Avoidance – Proposal Design

The Proponent has worked collaboratively with Martu Traditional Owners to identify preferred pipeline corridors that avoid direct impacts to culturally sensitive water features. Specifically, the preferred pipeline corridors were selected to avoid unnecessary disturbance to sand dunes, which may contain water-related cultural features such as rock holes or soakages.

In addition to this, the following measures applicable to the Proposal design will be implemented as outlined in the technical studies:

- Runoff from landforms and stockpiles will be managed as per the Surface Water Management Plan
- The RAC will include waterway crossings designed to maintain flow and prevent upstream ponding
- Potentially acid-forming materials will be encapsulated to prevent contamination of groundwater and surface water systems.

6.5.2.3.7 Minimisation – Proposal Design

To reduce potential impacts to water-related cultural values, consulted Martu Traditional Owners have provided the following guidance:

- Pipeline crossings should occur at the lowest local point of sand dunes to reduce surface disturbance and erosion
- Sand dunes must remain intact where practicable, as they may contain hidden water sources, burial sites, or ancestral pathways.

Additional measures drawn from completed relevant technical studies include the following:

- Where practicable, optimisation of dewatering schedules to align with seasonal rainfall patterns, reducing the magnitude of water deficits and excess discharge volumes to the infiltration ponds and MAR bores
- Trialling of evaporation inhibitors on the site will be undertaken to reduce water evaporation
- Implementation of a monitoring framework to track water levels in the TSF. This will guide operational adjustments such as water release
- Groundwater studies (field and desktop) will continue to quantify additional sources to meet supplementary water demands
- Groundwater drawdown scenarios have been modelled to assess impacts on aquifer systems and will inform adaptive management
- Borrow pit bases may be ripped post-construction, where practicable, to reduce long-term ponding and improve infiltration.

6.5.2.3.8 Minimisation – Ongoing Monitoring

To ensure that water values are respected throughout the life of the Proposal, the following minimum measures have been agreed to by the Martu/JYAC:

- Martu monitors will be considered during initial earthworks and construction activities in proximity to cultural sites, as identified in co-developed Management Plans
- Any newly proposed infrastructure must be reviewed by JYAC and Martu representatives to assess potential impacts to water systems
- The Proponent has committed to working with Martu Traditional Owners to ensure transparency and long-term stewardship of water resources.

6.5.2.3.9 Visual Amenity

The Proponent has applied the mitigation hierarchy during the Proposal design process to develop mechanisms to address potential impacts to Martu Traditional Owners in relation to impacts on visual amenity.

6.5.2.3.10 Avoidance – Proposal Design

Amendments have been made to the conceptual pipeline corridors to avoid visually intrusive impacts on culturally significant sand dunes and claypans, which are part of the ancestral landscape shaped by Tjukurrpa.

6.5.2.3.11 Minimisation – Proposal Design

A number of design mitigation measures will be implemented to minimise visual amenity impacts in collaboration with Martu / JYAC:

- The Rimfire pipeline corridor will be aligned with existing tracks to minimise new visual disturbances
- Construction will occur at the lowest local point of the sand dunes.

Additional mitigation measures to address potential impacts on visual amenity will be implemented as outlined in the VIA. Those of specific relevance to Martu and Martu-identified impacts include:

- Use of muted colours and non-reflective materials
- Avoiding the use of logos and text on the turbines
- Minimising the height of ancillary buildings where practicable, place behind landforms where possible and use low reflective materials.

6.5.2.3.12 Dust and Noise

The Proponent has applied the mitigation hierarchy during the Proposal design process to develop mechanisms to address potential impacts in relation to noise and dust.

6.5.2.3.13 Avoidance – Proposal Design

Noise-generating infrastructure, including wind turbines and processing facilities, will be strategically placed to reduce acoustic intrusion into culturally significant areas and avoid key habitats. Where feasible, infrastructure has been located behind natural landforms to buffer sound propagation and reduce disturbance to the surrounding landscape.

6.5.2.3.14 Minimisation – Proposal Design

To minimise impacts of dust, the Proposal have committed to the following:

- Water Cart Application
  - The use of water carts is proposed across the MIA haul roads to suppress wheel-generated dust
  - This method is expected to achieve up to a 50% reduction in airborne dust from haulage activities
- Operational Adjustments
  - During the planning and preparation stages, the Proponent anticipates refinements to mining activities to further reduce dust generation
  - This includes adjustments to stockpiling practices and haulage routes to minimise dust dispersion
  - Road base material will be sourced from local borrow pits on site and every effort will be made to minimise haulage distances.

6.5.2.3.15 Minimisation – Ongoing Management

The Dust Impact Assessment has informed the development of dust management strategies and control plans when required, including ongoing monitoring and adaptive management based on observed impacts.

6.5.2.3.16 Ethnobotanical Values

The Proponent has applied the mitigation hierarchy during the Proposal design process to address potential impacts to Martu ethno-botanical values. The measures outlined below apply specifically to culturally significant flora, fauna, and ecological systems within and adjacent to the Proposal.

6.5.2.3.17 Avoidance – Proposal Design

To assist in avoiding impacts to Martu ethnobotanical values, the Proponent has removed the Texas Borefield from the Proposal. The removal of the Texas Borefield has prevented the potential clearing of up to 322,029 *Cynodon anisocarpus* individuals. Avoidance of potential impacts on known or potential Night Parrot roosting and foraging habitat has reduced the Development Envelope by approximately 10,213 ha.

6.5.2.3.18 Minimisation – Proposal Design

Three Managements Areas have been delineated to manage any increase in abundance or introduction of pest species (feral / invasive fauna and weeds) across the Development Envelope attributable to the Proposal. The different Management Areas have been selected based on the management targets and operational controls that can be reasonably expected to be implemented given the size, access and abundance of existing pest species for each of the Management Areas (Section 9).

6.5.2.3.19 Access to Country

The Proponent has applied the mitigation hierarchy during the Proposal design process to address potential impacts to Martu People's ability to access and care for their Country, as outlined below.

6.5.2.3.20 Avoidance – Proposal Design

To reduce impacts on culturally significant locations and maintain access, the Proponent has committed to:

- Ensuring that no access restrictions, apart from temporary or emergency safety related issues, will be imposed on the Nyangumarta Highway throughout the life of the Proposal.

6.5.2.3.21 Minimisation – Ongoing Management

Recognising the cultural obligation of Martu People to ensure the safety of all visitors to their Country, the Proponent will:

- Co-develop an Access to Country Protocol to ensure that Martu People can safely and respectfully access the Proposal area
- Support the development and delivery of cultural awareness training for all personnel working on Martu Country.

Table 6-15: Application of the Mitigation Hierarchy for Impacts to Social Surroundings - Martu

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant	Effectiveness of Nominated Control
ACH	**Measures to Avoid**			
	Removal of the Texas Borefield from the Proposal Selection of the preferred pipeline corridor for the Rimfire Borefield that minimises sand dune crossings and follows existing tracks where possible Development of the pipeline corridor using local low points in sand dunes for potential crossings to reduce physical and visual disturbance	Management plans to be developed in consultation with the Martu People, which identifies processes to be followed with regards to ACH sites and values to be avoided	Yes – DPLH for administration of AH Act approvals processes (for impact to ACH sites)	Avoidance is the most effective mechanism for reducing impacts of the Proposal to ACH values The selection of the preferred pipeline corridor is to ensure important cultural areas will not be subject to direct disturbance The Proponent's Cultural Heritage Management System is established mechanism for prioritising avoidance of higher value areas All potential disturbance will be subject to relevant AH Act approvals processes CHMP is being developed with Martu to be contractually enforceable through the KMIA
	Measures to Minimise			
	All pipeline crossings to occur at the lowest local point of sand dunes	Management plans to be developed in consultation with the Martu People, which identifies processes to be followed with regards to the minimisation of impacts to ACH sites and values Proposal specific	Yes – DPLH for administration of AH Act approvals processes (for impact to ACH sites)	The Proponent's Cultural Heritage Management System is also an established supporting mechanism for prioritising avoidance of higher value areas and minimisation of impacts to these areas All potential disturbance will be subject to AH Act approvals processes

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant	Effectiveness of Nominated Control
	Any newly proposed tracks or changes to the corridor will be referred to JYAC, who will consult with relevant Martu People and arrange further ACH surveys before approval	Industry standard Standard practice		Relevant monitoring measures are to be included in the Management plans Ongoing consultation with Traditional Owners will be addressed in the Management Plans Ongoing collaboration and monitoring is to ensure impacts can be identified and minimised as soon as possible CHMP and water stewardship plan being developed with Martu to be contractually enforceable through the KMIA
	Martu monitors will be considered during initial earthworks and construction activities in proximity to cultural sites, as identified in co-developed management plans Formation of an Implementation Committee to liaise with the Proponent Ongoing engagement / communication with Martu / JYAC will be undertaken by the Proponent to develop a Martu water stewardship plan for Martu to remained informed in relation to planned water extraction and associated potential impacts to the aquifer, and to document agreed joint monitoring and management measures	Proposal specific		
Water	**Measures to Avoid**			
	The RAC will include waterway crossings designed to maintain flow and prevent upstream ponding	Proposal specific	No - Proposal Design Plan	Established and proven practice
	Potentially acid-forming materials will be encapsulated to prevent contamination of groundwater and surface water systems Runoff from landforms and stockpiles will be managed as per the Operational Surface Water Management Plan			Established and proven practice The measure will avoid mixing and contamination of water sources
	Measures to Minimise			

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant	Effectiveness of Nominated Control
	Pipeline crossings to occur at the lowest local point of sand dunes to reduce surface disturbance and erosion Retention of sand dunes where possible given hidden water sources, burial sites, or ancestral pathways	Proposal specific	No	Ongoing consultation with Traditional Owners will be addressed in the Management plans
	Trialling of evaporation inhibitors on the site will be undertaken to reduce water evaporation To reduce long-term ponding, borrow pit bases may be ripped, where practicable, post-construction to improve infiltration	Proposal specific	No	Established and proven practice
	Implementation of a monitoring framework to track water levels in the TSF to guide operational adjustments such as water release	Proposal specific	No	Ongoing monitoring and care of Country is to ensure that impacts related to water mitigated and avoided as soon as possible (also see reference to Martu water stewardship plan above)
	Groundwater studies (field and desktop) to continue to quantify additional sources to meet supplementary water demands Groundwater drawdown scenarios have been modelled to assess impacts on aquifer systems and will inform adaptive management	Proposal specific	Yes – DWER – Groundwater Licence (5C) and the Rimfire Groundwater Operating Strategy (Appendix C19) developed as part of the Groundwater Licences	Established and proven practice

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant	Effectiveness of Nominated Control
	Martu monitors will be considered during initial earthworks and construction activities in proximity to cultural sites, as identified in co-development Management Plans	Proposal specific	No	Ongoing monitoring and care of Country is to ensure that impacts related to water mitigated and avoided as soon as possible CHMP to be contractually enforceable through KMIA
	Any Proposal adjustments or proposal of new associated infrastructure to be agreed by JYAC to enable appropriate consultation with Martu representatives to assess potential impacts to water and other systems, and co-design of mitigation measures	Proposal specific	No	Ongoing monitoring and care of Country is to ensure that impacts related to water mitigated and avoided as soon as possible (also see reference to Martu water stewardship plan above) Commitments regarding new or additional activities to be reflected in KMIA
	The Proponent has committed to working with Martu Traditional Owners to ensure transparency and long-term stewardship of water resources	Proposal specific	No	Ongoing monitoring and care of Country is to ensure that impacts related to water mitigated and avoided as soon as possible (also see reference to Martu water stewardship plan above)
Visual Amenity	**Measures to Avoid**			
	Removal of the Texas Borefield from the Proposal	Proposal specific	No	Pipeline design changes is to ensure impacts will be avoided
	Measures to Minimise			
	Rimfire corridor has been aligned with existing tracks to minimise new visual disturbances	Proposal specific	No	Ongoing consultation with Traditional Owners will be addressed in the Management Plans
	Construction is to occur at the lowest local point of the sand dunes			

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant	Effectiveness of Nominated Control
	Commitment to implementation of mitigation measures aimed at minimising visual impacts resulting from the installation of wind turbines, including: • Use of muted colours and non-reflective materials • Avoidance of logos and text on the turbines • Minimising the height of ancillary buildings, place behind landforms where possible and use low reflective materials	Standard industry practice	No	
Noise and Dust	**Measures to Avoid**			
	Noise-generating infrastructure, including wind turbines and processing facilities, has been strategically placed to reduce acoustic intrusion into culturally significant areas	Industry standard	No	High level of certainty that the measure minimises substantial impacts resulting from mining activities
	Measures to Minimise			
	Water cart application across the MIA haul roads to suppress wheel-generated dust The Proponent plans to use selective road construction materials that are less prone to generating dust, particularly in areas approaching the camp and culturally sensitive sites Adjustments to stockpiling practices and haulage routes to minimise dust dispersion	Proposal specific	No	Established and proven practice
Ethnobotanical Values	**Measures to Avoid**			
	Removal of the Texas Borefield to avoid clearing	Proposal specific	No	This measure is to ensure that the direct impacts to the area will be avoided
	Measures to Minimise			

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant	Effectiveness of Nominated Control
	Three Managements Areas have been delineated to manage any increase in abundance or introduction of pest species	Proposal specific	No	The measure will minimise the spread and introduction of weed species within the Proposal area This measure is consistent with industry practice
Access to Country	**Measures to Avoid**			
	No permanent access restrictions to be imposed on the Nyangumarta Highway throughout the life of the Proposal	Proposal specific	Yes – native title boundaries as administrated under the NT Act	Ongoing engagement with Martu regarding access to Country will be addressed in the KMIA
	Measures to Minimise			
	The RAC will be dual lane and sealed Co-development of an Access to Country Protocol to ensure that Martu People can safely and respectfully access the Proposal area Support the development and delivery of cultural awareness training for all personnel working on Martu Country	Proposal specific	Yes – native title boundaries as administrated under the NT Act	Ongoing engagement with Martu regarding access to Country will be addressed in the KMIA

6.5.2.4 Other Stakeholders

6.5.2.4.1 Traffic and Road Safety

6.5.2.4.2 Minimisation– Project Design

To mitigate traffic impacts on road safety it is intended that an appropriately designed diversion of the road will be constructed from Nyangumarta Highway onto Wirlkirr Wirlkirr Road will be created to accommodate the increased traffic. The Proposal's RAC will be constructed to meet requirements for in-bound supplies (e.g. diesel, processing reagents, camp supplies etc) and out-bound haulage.

In addition, the Proponent will develop and implement a Traffic Management Plan which includes:

- Management of workforce and community health and safety risks
- Regular vehicle inspection and maintenance.

6.5.2.4.3 Amenity

6.5.2.4.4 Avoidance – Project Design

Noise-generating infrastructure, including wind turbines and processing facilities, has been strategically placed to reduce acoustic intrusion. Where feasible, infrastructure has been located behind natural landforms to buffer sound propagation and reduce disturbance to the surrounding landscape.

6.5.2.4.5 Minimisation – Project Design

To minimise impacts of dust, the Proponent has committed to the following:

- Water Cart Application:
  - The use of water carts is proposed across the MIA haul roads to suppress wheel-generated dust
  - This method is expected to achieve up to a 50% reduction in airborne dust from haulage activities
- Sealing of the RAC:
  - The RAC will be sealed to reduce dust emissions from vehicle movements
  - Sealing is projected to reduce wheel-generated dust by up to 100%
- Material Selection for Road Construction:
  - The Proponent plans to use selective road construction materials that are less prone to generating dust, particularly in areas approaching the camp and culturally sensitive sites
- Operational Adjustments:
  - During the planning and preparation stages, the Proponent anticipates refinements to mining activities to further reduce dust generation
  - This includes adjustments to stockpiling practices and haulage routes to minimise dust dispersion.

6.5.2.4.6 Environmental Values

6.5.2.4.7 Minimisation – Project Design

As highlighted in Section 6.4.5.3, a number of potential impacts to flora and fauna resulting from the Proposal may in turn impact on identified environmental values of non-Traditional Owner stakeholders.

Three Managements Areas have been delineated to manage any increase in abundance or introduction of pest species (feral/invasive fauna and weeds) across the Development Envelope attributable to the Proposal. The different Management Areas have been selected based on the management targets and operational controls that can be reasonably expected to be implemented given the size, access and abundance of existing pest species for each of the Management Areas (Section 9).

6.5.2.4.8 Pastoral

6.5.2.4.9 Minimisation – Project Design

Engagement with Wallal Pastoral Station highlighted concerns for cattle strike. In order to mitigate this risk, the Proponent will work with Wallal Pastoral Station on an agreed solution.

Further, due to the potential livelihood impacts associated with water (Section 6.4.5) a number of mitigation measures drawn from the technical studies are of relevance. These include:

Runoff from landforms and stockpiles will be managed as per the Surface Water Management Plan.

- The RAC will include waterway crossings designed to maintain flow and prevent upstream ponding
- Potentially acid-forming materials will be encapsulated to prevent contamination of groundwater and surface water systems.

Table 6-16: Application of the Mitigation Hierarchy for Impacts to Social Surroundings - Other Stakeholders

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant	Effectiveness of the Controls
Traffic and Road Safety	**Measures to Minimise**			
	Development and implementation of a Traffic Management Plan which includes: • Management of workforce and community health and safety risks. • Regular vehicle inspection and maintenance	Industry standard	No	Established and proven practice
	Inclusion of traffic aspects in ongoing engagement activities, including road safety campaigns where necessary	Proposal specific		
	Development of a diversion from Nyangumarta Highway onto Wirlkirr Wirlkirr road	Proposal specific		This measure is to ensure that safety impacts can be mitigated and minimised
Amenity	**Measures to Minimise**			
	The Proponent has agreed to engage several mitigation measures aimed at minimising visual impacts resulting from the instillation of wind turbines. These include: • Use of muted colours and non-reflective materials • Avoidance of logos and text on the turbines • Minimisation of the height of ancillary buildings, place behind landforms where possible and use low reflective materials	Standard industry practice	No	Established and proven practice

Impact Theme	Mitigation	Standard Business Practice or Proposal Specific	Other Decision-making Process Relevant	Effectiveness of the Controls
	Water cart application across the MIA haul roads to suppress wheel-generated dust The Proponent plans to use selective road construction materials that are less prone to generating dust Adjustments to stockpiling practices and haulage routes to minimise dust dispersion The RAC will be sealed to reduce dust emissions from vehicle movements	Proposal specific	No	
Environmental Values	**Measures to Minimise**			
	Three Management Areas have been delineated to manage any increase in abundance or introduction of pest species The Proponent will undertake progressive rehabilitation wherever practicable	Proposal specific	No	Established and proven practice
Pastoral	**Measures to Minimise**			
	Runoff from landforms and stockpiles will be managed as per the Surface Water Management Plan The RAC will include waterway crossings designed to maintain flow and prevent upstream ponding	Proposal specific	Yes – DWER – Groundwater Licence (5C) and the Rimfire Groundwater Operating Strategy (Appendix C19) developed as part of the Groundwater Licences	Established and proven practice The measure will avoid mixing and contamination of water sources
	Potentially acid-forming materials will be encapsulated to prevent contamination of groundwater and surface water systems	Proposal specific	No - Proposal Design Plan	Established and proven practice

6.5.3 Mitigation of Impact at Closure

In preparing for closure, the Proponent recognises the native title rights and interests of the Traditional Owners. As native title holders the Nyangumarta People and Martu People have a deep connection to the Country the Proposal is located on and this will continue during Proposal operation and after it has completed. Being mindful of this, the Proponent recognises the importance of their involvement in closure planning. The Proponent will continue to consult with Nyangumarta People, Martu People and Wallal Downs Pastoral Station along with other key stakeholders where relevant via existing consultation forums or dedicated forums to incorporate consideration of their involvement, feedback and values into rehabilitation and closure planning and outcomes.

The Proponent will prepare, and implement an MCP, in accordance with the Statutory Guidelines for Mine Closure Plans (DMPE, 2025) for the Proposal. The MCP will be a progressive and evolving document that reflects the stage of mine development and closure planning. It will include a comprehensive closure risk assessment, a register of legal obligations and commitments, and clearly defined closure outcomes and completion criteria. The plan will address decommissioning, rehabilitation, and post-mining land use(s). Key components will include landform design, materials characterisation, soil resource management, and progressive rehabilitation, supported by baseline and operational data. The MCP will also incorporate a stakeholder engagement strategy, including ongoing consultation with Nyangumarta People and Martu People to ensure cultural values are respected and integrated into closure planning. Closure implementation will be supported by a domain-based model, a closure works schedule, and contingencies for early or unplanned closure, with monitoring and maintenance plans to ensure long-term success. The draft MCP is provided in Appendix A03.

Ongoing engagement with Nyangumarta People and NWAC has and will continue to be further undertaken in relation to the HST. Nyangumarta have advised that subaqueous disposal of HST into the pit void should be considered as the final walk-away closure solution following the economic depletion of the resource, citing long-term risks associated with the current dry cover strategy.

In response, the Proponent has committed to conducting a conceptual study to assess the feasibility of in-pit disposal of HST once the resource is depleted. This study will be co-designed with Nyangumarta representatives and incorporated into future revisions of the MCP. It will include multi-criteria analysis comparing closure options and involve Nyangumarta People at key decision points. While the Proponent maintains that the current TSF-based strategy is acceptable for this Proposal, it is also acknowledged that further technical, environmental, and economic assessments would be useful to evaluate future in-pit disposal. This collaborative approach will ensure that closure planning remains adaptive, transparent, and culturally informed as the Proposal progresses.

6.6 Assessment and Significance of Residual Impacts

6.6.1 Assessment of Direct and Indirect Residual Impacts

This section identifies residual impacts to social surroundings after the application of the avoidance, minimisation and mitigation hierarchy and assesses whether these are significant. The significance of the impacts of the Proposal are assessed in a local and regional context as appropriate. It should be noted that in relation to impacts to Country, it is considered that whether an impact is deemed significant or not can only be determined based on the views of Traditional Owners and therefore, ongoing consultation with Nyangumarta People and Martu People is vital.

6.6.1.1 Nyangumarta

6.6.1.1.1 ACH and Values

The Proponent has endeavoured to avoid, manage and mitigate as many significant impacts as practicable when developing this Proposal. Though changes to the Proposal have been made to minimise and avoid impacts to ACH and values, disturbance is required to implement the Proposal and therefore will still result in some direct and indirect impacts.

Revisions to the Proposal design have removed direct impacts to RTX_2020_02_Site_005 and have adjusted the footprint of the WSP adjacent to RTX_2023_09_Site_001 to ensure the WSP does not interact with the site. In cases where avoidance is not feasible, such as RTX_2020_02_Site_001, the Proponent and NWAC will salvage and relocate the site in accordance with guidance provided by NWAC. ACH sites, as currently mapped, will be physically demarcated and signposted at a co-developed specification and ongoing monitoring, as outlined in the co-designed Management Plans, will take place to ensure impacts are minimised.

While cultural heritage surveys have been undertaken for nearly all of the proposed Proposal footprint, detailed site assessments are yet to been undertaken to inform whether an application under the AH Act will be required. Any such application under the AH Act will be developed in collaboration with the Nyangumarta People / NWAC and be made with the explicit consent from NWAC.

The Proponent acknowledges that Proposal will represent a significant residual impact to Country for Nyangumarta People. Ongoing consultation with Nyangumarta People will be maintained to ensure the ongoing monitoring and protection of sites which hold ACH values. The Proponent will continue to work with Nyangumarta People / NWAC to identify other areas of potential ACH significance throughout the life of the Proposal. Guidance on the significance of any such location will be sought from Nyangumarta People to inform later assessment stages and/or incorporated as appropriate into management through the Management Plans.

6.6.1.1.2 Water

Following implementation of the mitigation measures outlined in Section 6.5.2.2, Nyangumarta People have indicated that residual impacts to water will be negligible or low, reflecting confidence in the proposed management actions and mitigation measures.

Nonetheless, the importance of water to cultural practices indicates that even minor changes can carry emotional and cultural weight. The Proponent acknowledges this and remains committed to ongoing consultation with Nyangumarta People throughout mine planning and closure processes, including the design of water management systems and rehabilitation of water-dependent areas.

These discussions are being incorporated into the management plans to ensure that water-related cultural values are respected and protected. The Proponent will continue to work with Nyangumarta People to monitor water-related impacts and ensure that culturally significant water places are maintained or rehabilitated wherever possible.

6.6.1.1.3 Amenity

The Proposal will result in irreversible changes to the natural landforms of the area, permanently altering the visual character and cultural landscape of this part of Country. These changes will permanently impact how that specific part of Country is used, enjoyed and connected to. The transformed terrain will no longer resemble the Country walked by Ancestors, nor will it reflect the landscape that future generations would have otherwise experienced.

Certain areas will be permanently excised from use, with native title rights and interests restricted post-mining. The visual transformation of these areas, combined with restricted access, is expected to diminish the desire to be on and the enjoyment of this part of Country. These impacts will be deeply felt

by Nyangumarta People, not only as a loss of ACH but also as a disruption to the visual and spiritual continuity of the landscape.

Ongoing consultation with the Nyangumarta People is central to mine planning and closure design. This includes discussions around final landforms, rehabilitation strategies to reduce visual and physical disruption, and the long-term implications of permanent access restrictions and native title limitations. Visual amenity impacts are being addressed through the management plans.

As a result of this consultation, several design changes have been incorporated into the Proposal (see Section 6.5.2.2), significantly reducing visual impacts from key cultural vantage points. Despite these efforts, the enduring alteration of the landscape is expected to result in a significant residual impact on the social and cultural surroundings, particularly in areas of high ethnobotanical and spiritual value.

6.6.1.1.4 Ethnobotanical Values

To ensure that direct and indirect impacts to ethnobotanical values are avoided and minimised, the Proponent has implemented a number of mitigation measures in collaboration with Nyangumarta People (detailed in Section 6.5.2.2).

The Proponent acknowledges the cultural and ecological importance associated with ethnobotanical values and is committed to ongoing collaboration with Nyangumarta People / NWAC to further avoid and minimise impacts wherever possible. In addition to this, the Proponent will support Nyangumarta People to collect seed stock for progressive revegetation undertaken within the MIA and RAC and will support the Nyangumarta Rangers to access the Proposal area to collect nuts from Parntarl trees and Kumpaja trees prior to them being cleared.

The Proponent will develop a rehabilitation monitoring methodology in consultation with NWAC to continuously improve implemented approaches to revegetation and produce baseline information to assess revegetation efforts during closure. Further, the Proponent and Nyangumarta People will work together to develop appropriate frameworks required for seed collection and storage to support revegetation activities.

To further enhance knowledge regarding cultural association and values attached to ethnobotanical values, continued consultation and engagement will occur with Nyangumarta People to understand and manage these throughout the approval process and during the life of the Proposal (from mine planning to operation to closure), to be included within the management plans as relevant.

6.6.1.1.5 Access to Country

To ensure safety during the implementation of the Proposal, certain areas within the Development Envelope will be subject to restricted access during operations. In these zones, unrestricted access will not be possible; instead, escorted access will be facilitated by the Proponent. This represents a temporary or conditional limitation on access.

The Proponent remains committed to enabling safe and ongoing access to Country, in accordance with health and safety requirements, to support Nyangumarta People in conducting cultural practices, including the transmission of cultural knowledge to future generations. Where changes to existing access are necessary, the Proponent will strive to ensure that access to culturally significant locations identified by Nyangumarta People is not diminished, and that access is preserved wherever feasible.

Permanent safety measures, such as bunding and the removal of parts of the haul road ramp, will restrict access to the pit and may also affect some culturally significant sites following mine closure. However, consultation with Nyangumarta People is ongoing throughout mine planning, with the goal of maintaining access during operations and reinstating access to most relevant areas as part of closure planning.

It is acknowledged that the permanent loss of access to parts of Country, particularly those that remain as a pit void or are not rehabilitated, will have a lasting impact. This includes ACH loss and the restriction of native title rights and interests.

6.6.1.2 Martu

6.6.1.2.1 ACH and Values

There are no named Martu ACH sites in proximity to the Proposal, however it is located within a landscape of deep cultural significance to Martu People.

The Proponent has endeavoured to avoid, manage and mitigate impacts on Martu ACH values to the greatest extent practicable in the development of the Proposal with changes throughout the planning and design of borefield infrastructure and associated pipeline corridors. These have included, among others noted above at Section 6.5, collaboration with Martu People in the selection of preferred pipeline corridors to minimise sand dune crossings and follow existing tracks where possible, development of the pipeline corridor using low points in sand dunes for potential crossings to reduce physical and visual disturbance and removal of the Texas Borefield from the Proposal.

The Proponent acknowledges that Proposal has the potential for ongoing residual impacts to ACH values given the significance of the existing landscape to Martu People and is committed to ongoing consultation with Martu People to ensure the continued protection of these values where possible. Requirements and mechanisms for this consultation are to be set out in a co-designed CHMP and via the establishment of an Implementation Committee with unintentional breaches of cultural protocol to be minimised through the delivery of cultural awareness training for all personnel working within the area.

6.6.1.2.2 Water

Following implementation of the mitigation measures outlined in Section 6.4.4.2, it is considered that any residual impacts to water and culturally sensitive water features can be thoughtfully managed reflecting confidence in the proposed management actions and mitigation measures.

The Proponent acknowledges the cultural and ecological importance of water values and the concerns raised by Martu People, particularly given past experiences with mining on their Country. While concerns around water remain, Martu People have indicated that impacts can be managed through transparent and timely collaboration and consultation. Continued engagement will occur throughout the approval process and during the life of the Proposal to ensure water-related cultural values are respected and protected and allow for long-term stewardship of water resources, including by way of a co-designed water stewardship plan.

6.6.1.2.3 Amenity

While amendments have been made to the Proposal design to avoid and minimise impacts where practicable, the Proposal will result in permanent modifications to the natural landforms within the area, altering the visual character and cultural landscape of this part of Martu Country. It is acknowledged that these changes may lead to some loss of visual amenity for Martu People due to the installation of wind turbines and the WRL itself. Although this concern was raised during consultation activities, it is understood that the overall impact on the visual landscape will be minimal, particularly in light of existing mining developments within the broader Martu NTD and the majority of the Proposal infrastructure being located on Nyangumarta Country.

While it has been identified and acknowledged that dust and noise emissions have the potential to interfere with the amenity values of the Martu People, it is considered that these emissions and the potential for disturbance to Martu cultural values and culturally significant landscapes can be managed via the mitigation and management measures proposed. Ongoing consultation with Martu People is acknowledged as highly important to ensure the ongoing monitoring of and adaptative management of amenity impacts.

6.6.1.2.4 Ethnobotanical Values

The Proponent has endeavoured to avoid, manage and mitigate impacts to ethnobotanical values when developing this Proposal, with management measures developed in consultation and collaboration with the Martu People and JYAC representatives. These measures are detailed in Section 6.5, with a key measure of note being a reduction in proposed clearing due to the removal of the Texas Borefield and avoidance of associated impacts on known or potential Night Parrot roosting and foraging habitat.

Although measures have been taken to avoid, manage and mitigate impacts to ethnobotanical values Martu People hold concerns in relation to a loss of culturally significant flora and fauna, particularly due to the observed decline of native fauna species on Marty Country more broadly. The Proponent acknowledges the cultural and ecological importance associated with ethnobotanical values and is committed to ongoing collaboration and consultation with Martu People/JYAC.

6.6.1.2.5 Access to Country

To ensure safety during the implementation of the Proposal, certain areas will be subject to restricted access to any individuals during operations with unrestricted access not be possible in particular zones representing a temporary or conditional limitation on access.

It is acknowledged that the permanent loss of access to parts of Country can have a lasting impact which includes loss of access to ACH and the restriction of native title rights and interests.

The Proponent has committed to the co-development of an Access to Country Protocol with Martu People to ensure their safe and respectful access the Proposal area to reduce the significance of unintended impacts on access to Country. Impacts to this access is therefore considered to be moderate pre-mitigation, and low in the residual impact significance scenarios.

6.6.1.3 Other Stakeholders

6.6.1.3.1 Traffic and Road Safety

Increased vehicle movements associated with both the construction and operational phases of the Proposal will result in increased road traffic which in turn has the potential to exacerbate traffic safety for community members and other road users such as tourists, and lead to deterioration in road surface quality.

To mitigate traffic impacts on road safety it is intended that an appropriately designed diversion of the road will be constructed from Nyangumarta Highway onto Wirlkirr Wirlkirr Road to accommodate the increased traffic. The Proposal's RAC will be constructed to meet requirements for in-bound supplies (e.g. diesel, processing reagents, camp supplies etc) and out-bound haulage.

In addition, the Proponent will develop and implement a Traffic Management Plan which includes:

- Management of workforce and community health and safety risks
- Regular vehicle inspection and maintenance.

Following the implementation of these mitigations, it is anticipated that this impact will be of a moderate residual impact significance.

6.6.1.3.2 Amenity

The development of the Proposal, including associated vegetation clearing and infrastructure installation, will result in altered local landforms and a change in the visual landscape and associated amenity particularly due to the planned construction of 11 wind turbines, each reaching up to approximately 236 m in height. Dust and noise also have the potential to cause amenity disturbances.

Where possible, the utilisation of muted colours and non-reflective materials to reduce glare will be adopted. Noise-generating infrastructure, including wind turbines and processing facilities, has been strategically placed to reduce acoustic intrusion. Where feasible, infrastructure has been located behind

natural landforms to buffer sound propagation and reduce disturbance to the surrounding landscape. The use of water carts and sealing of the RAC will mitigate dust generation. Visual amenity impacts are anticipated to have low pre-mitigation and residual impact significances for non-Traditional Owner stakeholders, given the remote location of the Proposal. Noise and dust impacts are anticipated to have low impact significances in the pre-mitigation and residual impact scenarios.

6.6.1.3.3 Environmental Values

A number of potential impacts to identified environmental values of non-Traditional Owner stakeholders from the Proposal includes flora impacts from introduced weeds and potential fauna impacts from worker behaviour off-roster. To minimise impacts, the Proponent will implement vehicle washdown procedures, undertake progressive rehabilitation wherever practicable, and develop and implement a workforce code of conduct. These impacts are considered to be low in the pre-mitigation and residual impact significance scenarios.

6.6.1.3.4 Pastoral

Potential impacts on livelihoods primarily relate to concerns raised during engagement with Wallal Pastoral Station, which highlighted concerns for cattle strike from increased Proposal related traffic. Potential impacts to water quality may also impact pastoral operations. In order to mitigate these risks, the Proponent will work with Wallal Pastoral Station on an agreed solution and implement a number of mitigation measures identified in relevant technical studies to manage surface and groundwater quality. These impacts are considered to be moderate pre-mitigation, and low in the residual impact significance scenarios.

6.6.2 Assessment of Cumulative Residual Impacts

The Proposal adds to the potential for cumulative impacts to social surroundings, including effects upon amenity, traffic, and cultural values. There are a number of projects that already operate, albeit at some distance from the Development Envelope (approximately 100 km away or greater). Additionally, several new developments including mining and renewable energy projects are currently being proposed. Major projects that are either operational or proposed and their approximate distance from the Proposal.

During surveys conducted for the SSA, Nyangumarta People noted a number of cumulative impact concerns related to mining across the region. Observations of native fauna such as bush turkeys, native mice, goannas, smaller lizards, snakes, and marsupial moles prompted concerns regarding the potential population decline of several species due to cumulative impacts from increasing mining activities in the region. Nyangumarta People have emphasised the need to avoid similar declines and assess the risks to these species to ensure their protection and the continued ecological integrity of the region. Related to individual species, the pristine nature of the vast majority of the Nyangumarta IPA also serves to creates a stark contrast between pristine and impacted areas. This highlights the potential impact and heightening concerns related to the broader cumulative impacts to Country associated with the inevitable further industrialisation.

Nyangumarta People also expressed concerns with regards to cumulative impacts to water and the need to develop a determination-wide water management plan with a view to minimise any cumulative impacts to Nyangumarta Country and cultural values due to increased water usage by future projects. In order to better understand cumulative impacts, Nyangumarta People have requested support for future studies to develop a regional mining/exploration impact analysis which can consider the long-term cumulative impacts of all resource development activities on Nyangumarta Country. Engagement with Wallal Downs noted similar concerns around cumulative impacts to groundwater resources.

During Martu engagement, concerns were raised regarding potential impacts to fauna associated with an increase in truck movements from the Proposal.

The cumulative impact assessment concludes that the Proposal is not expected to result in significant cumulative impacts to any key environmental factor. The combination of limited spatial overlap with other

projects, localised nature of potential impacts, and the resilience of regional environmental systems supports this conclusion (Section 17).

6.6.3 Significance of Residual Impacts

6.6.3.1 Nyangumarta

6.6.3.1.1 Non-Significant Residual Impacts

The residual risk rankings undertaken by Nyangumarta People have determined the following impacts relevant to social surroundings to be of negligible residual significance rating:

- Water
  - Indirect impacts to the health of and prevalence of culturally significant species of flora and fauna resulting from the depletion of groundwater resources
- Ethnobotanical Values
  - Indirect impacts to flora throughout and beyond the RAC associated with dust emissions associated with heavy haulage
- Access to Country
  - Impacts to the amenity of Camp 1 resulting from a significant increase in vehicle movements through the area.

The residual risk rankings undertaken by Nyangumarta People have determined the following impacts to be of low to moderate residual significance rating:

- ACH and values
  - Direct impacts to Nyangumarta People's ACH, primarily archaeological sites RTX_2020_02_SITE_001, RTX_2020_02_SITE_005, and multiple sand dunes throughout the Proposal area
  - Direct impacts to sub-surface archaeological material
  - Loss of cultural knowledge resulting from the destruction of tangible elements of Nyangumarta People's ACH
  - Loss of connection to ancestral spirits resulting from the destruction of tangible elements of Nyangumarta People's ACH
  - Loss of connection to Country resulting from the destruction of the integrity of the cultural landscape throughout the Proposal
  - Loss of connection to a rich and complex cultural history resulting from direct impacts to the cultural landscape
  - Indirect impacts to archaeological sites resulting from dust emissions associated with mining activities and increased road traffic
  - Indirect impacts to surrounding culturally significant soaks resulting from mine related abstraction activities
  - Impacts to the amenity of cultural sites resulting from proximity to key infrastructure
- Water
  - Impacts to the integrity of the cultural landscape resulting from the depletion of groundwater resources
  - Indirect impacts to surrounding culturally significant soaks resulting from mine related abstraction activities
  - Loss of cultural knowledge resulting from impacts to spiritual elements of Nyangumarta People's ACH
  - Impacts to regionally significant songlines that are connected to 'water places'
  - Loss of connection to Country resulting from the destruction of the hydrologically reliant elements of the cultural landscape
  - Reduction in availability of bush tucker resources resulting from the depletion of groundwater resources

    - Impacts to the physical, social, and psychological health of Nyangumarta People resulting from the degradation of elements of the environment that rely on the healthy function of hydrological systems
- Visual amenity
    - Direct impacts to the visual amenity of the Proposal resulting from the instillation of wind turbines
- Ethnobotanical values
    - Impacts to the integrity of the visual landscape resulting from the unintended introduction of weeds and non-native species of flora
    - Habitat loss for culturally important species of fauna resulting from the clearing of vegetation
    - Indirect impacts to the health of and prevalence of culturally significant species of flora and fauna resulting from the depletion or contamination of groundwater resources
    - Loss of capacity to continue customary practices resulting from impacts to the health of the environment throughout and beyond the Proposal
    - Loss of cultural knowledge resulting from the reduced prevalence of culturally important species of flora and fauna
    - Loss of Nyangumarta language resulting from the reduced prevalence of culturally important species of flora and fauna
    - Reduction in availability of bush tucker resources resulting from the depletion of groundwater resources
    - Loss of the ability for Nyangumarta People to derive or supplement their livelihood with bush tucker sourced from their Country
    - Sense of loss experienced at a community level resulting from the degradation of the prevalence and health of different types of plants and animals
- Access to Country
    - Impacts to the ability of Nyangumarta People to exercise their native title rights and interests resulting from impacts to their ability to safely access their Country via Nyangumarta Highway
    - Impacts to the ability of Nyangumarta People to enact their native title rights and interests resulting from impacts to their ability to access their Country within the Proposal Area
    - Loss of physical connection to Country resulting from impacts to Nyangumarta People's ability to safely access their Country via Nyangumarta Highway
    - Loss of spiritual connection to Country resulting from impacts to Nyangumarta People's ability to safely access their Country via Nyangumarta Highway
    - Loss of cultural knowledge resulting from impacts to Nyangumarta People's ability to safely access their Country via Nyangumarta Highway
    - Spiritual retribution resulting from failure to ensure the safe passage of visitors across Nyangumarta Country
    - Loss of the ability for Nyangumarta People to derive or supplement their livelihood with bush tucker sourced from their Country
    - Loss of funding for the Nyangumarta Ranger Program resulting from the inability of Nyangumarta Rangers to safely access Country which is critical for the practical implementation of the IPA Management Plan
    - Loss of income associated with a reduction in tourist visitation to Nyangumarta Country via the Nyangumarta Highway
    - Exhaustion of significant resources to meet the Proponent's Health and Safety requirements relating to Nyangumarta Rangers/People carrying out fee-for-service work within the Proposal area
    - Decreased ability of Nyangumarta People to safely enjoy the use of Camp 1 resulting from a significant increase in vehicle movements through the area
    - Loss of ability for opportunistic visitation of the Proposal area by Nyangumarta People during operations resulting from the Proponent's access policies and requirements

6.6.3.1.2 Significant Residual Impacts

The residual risk rankings undertaken by Nyangumarta People have determined the following impacts to be of high or very high (but not extreme) residual significance rating:

- ACH and values
  - Significant impacts to the visual landscape in the vicinity of cultural sites
- Visual amenity
  - Direct impacts to the amenity of the visual landscape within the Proposal area resulting from the development of the WRL
  - Direct impacts to the amenity of the visual landscape within the Proposal area resulting from the construction of the TSF[1]
  - Direct impacts to the amenity of the visual landscape beyond the Proposal area resulting from the development of the WRL and TSF
  - Impacts to the integrity of the cultural landscape resulting from significant visual impacts associated with the development of large-scale infrastructure
- Ethnobotanical values
  - Direct impacts to culturally significant flora resulting from the clearing of vegetation to facilitate the construction of infrastructure.

As noted in Section 6.7, these impacts will be managed to meet the EPA's objective “to protect social surroundings from significant harm”. This includes through:

- A range of measures developed with the Nyangumarta People, with relevant Management Plans to continue to be co-developed
- There is a process of consultation and engagement in place that applies the mitigation hierarchy framework, including in relation to ACH sites and places.

Notwithstanding the presence of significant residual impacts, the Nyangumarta People acknowledge that such impacts remaining after mitigation will be addressed through negotiated Proposal agreements and ongoing engagement throughout the Proposal lifecycle.

It is also noted that the only remaining concern from NWAC’s perspective is the ongoing possibility that the Proponent may pursue its current HST closure solution. NWAC and the Proponent are currently undertaking a multi-criteria analysis of HST closure solutions, which is progressing well.

Accordingly, the identification of significant residual impacts does not determine the acceptability of the Proposal; instead, residual impacts to Country and amenity are recognised as being offset through agreed benefit-sharing and compensation arrangements

Impacts remain significant where they result in irreversible changes to Country, with Nyangumarta indicating that these outcomes are accepted in the context of negotiated Project agreements that balance impacts to Country with agreed benefits, protections and ongoing involvement.

[12] Note that Section 2.1 describes existing clearing of approximately 154 ha, as reported under relevant native vegetation clearing permit requirements. The discrepancy is understood to be a function both of time, as some natural regeneration has likely occurred within older cleared areas, thus being mapped under the more recent surveys as containing native vegetation, and as some reporting may have provided larger areas than the extent actually cleared.

6.6.3.2 Martu

6.6.3.2.1 Non-Significant Residual Impacts

Following consultation activities with Martu People and JYAC representatives, alongside a review of the outcomes of the cultural values mapping exercise and relevant technical studies, it has been determined the following impacts have a residual significance, however these have been determined by the Proponent to be non-significant, i.e. of low to moderate significance post the application of committed avoidance, mitigation and management measures.

- ACH and values
  - Potential for loss of connection to a rich and complex cultural history resulting from change to the cultural landscape, including the Tjukurrpa stories which pass through the vicinity of the Proposal
  - Indirect impacts to surrounding culturally significant soaks resulting from mine related abstraction activities
- Visual amenity
  - Direct impacts to visual amenity of the landscape resulting from the instillation of wind turbines
  - Changes to visual integrity of the landscape given its connection with Martu cultural identity and spiritual connection to Country
  - Ethnobotanical values
  - Impacts to the integrity of the visual landscape resulting from the unintended introduction of weeds and non-native species of flora.

6.6.3.2.2 Significant Residual Impacts

The following impacts are considered to be of a perceived high residual significance to Martu People, post the application of committed avoidance, mitigation and management measures.

Negotiations are ongoing between the Proponent and JYAC in relation to agreed measures to mitigate and manage residual impacts, including but not limited to continued consultation with the Martu People throughout the life of the Proposal, and through collaboration and information sharing via the proposed Implementation Committee. Such engagement will also enable the identification of any additional and / or unexpected impacts should these occur or should the significance of impacts change over time, allowing for an adaptive management regime to be adopted as appropriate.

- Water
  - Impacts to the integrity of the cultural landscape resulting from the depletion of groundwater resources
  - Indirect impacts to surrounding culturally significant soaks resulting from mine related abstraction activities
  - Impacts to regionally significant songlines that are connected to ‘water places’.
- Ethnobotanical Values
  - Potential for a changed occurrence native flora and fauna through changes to surface water and groundwater flows and emissions (i.e. lighting, dust and noise).

As noted in Section 6.7, these impacts will be managed to meet the EPA's objective “to protect social surroundings from significant harm”. This includes through:

- A range of measures developed with the Martu People, with relevant Management Plans to continue to be co-developed
- There is a process of consultation and engagement in place with application of the mitigation hierarchy.

JYAC have provided a letter of support to lodge the ERD on behalf of the Martu People. JYAC understands the Proposal may result in permanent impacts to areas of cultural and environmental significance on Country. Following review of the ERD, and on the basis of continuing consultation, negotiation, and development of management plans, JYAC supported its lodgement.

In this context, the presence of significant residual impacts does not determine the acceptability of the Proposal. For Martu People, impacts are considered to remain significant where they give rise to irreversible effects on Country, cultural values, or the continuity of Martu connections and practices across the landscape.

6.6.3.3 Other Stakeholders

6.6.3.3.1 Non-Significant Residual Impacts

Following a review of the technical studies and consultation undertaken with key stakeholders, the following impacts have been determined to have a non-significant risk ranking (low to moderate):

- Loss of visual amenity due to development of the landscape
- Loss of amenity due to nuisance noise
- Loss of amenity and degradation of native habitat due to nuisance dust affecting flora and vegetation
- Flora impacts and introduced weeds
- Fauna impacts, including from workers off-roster
- Cattle strike from increased traffic volumes
- Changed access to water and reduced water quality
- Traffic and increased vehicle movements exacerbating road safety impacts from increased risk of vehicle collision.

6.7 Likely Environmental Outcome

In consideration of the proposed avoidance and management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Social Surroundings are: avoid, where practicable and otherwise minimise direct and indirect impacts as a result of implementation of the Proposal to Nyangumarta People's and Martu People's social surroundings values in accordance with the respective Management Plans.

The Proponent will avoid, where practicable, and otherwise minimise direct and indirect impacts in relation to Wallal Downs Pastoral Station social surroundings, particularly water values. The Proponent has outlined ongoing commitments to avoid impacts and implement controls to minimise and monitor residual impacts.

The Proponent has ensured implementation of dedicated water monitoring practices and management occur throughout operations of the Proposal as an ongoing commitment to avoid impacts and implement controls to minimise and monitor residual impacts that are of a concern. Ongoing consultation regarding designs, impacts and management through life of the Proposal will continue.

Based on this assessment, the Proposal was assessed as having a significant residual impact on Nyangumarta People's social surroundings with respect to its permanent effects on amenity and ACH values, particularly with respect to the visual landscape in the vicinity of ACH sites and landform changes which impact sense of place, connection to Country, enjoyment of and desire to be on Country and undertake cultural practices within and in proximity to the Proposal.

The Proposal was assessed as having a significant residual impact on Martu People's social surroundings in relation to the potential disruption to ACH values associated with water, given its significance in Martu culture; and ethnobotanical values.

The Proposal was assessed as having a low residual and cumulative impact on Wallal Downs Pastoral Station and will continue with dedicated consultation forums with this stakeholder and other key stakeholders regarding designs, impacts and management.

A range of measures have been developed with both Nyangumarta People and Martu People, and Management Plans will continue to be co-developed with each group.

The Proponent considers that there is a process of consultation and engagement in place with application of the mitigation hierarchy. The Management Plans will ensure the Proponent continues to apply the EPA mitigation hierarchy (avoid, minimise, rehabilitate) to all planning and activities in consultation and in partnership with Nyangumarta and Martu and their representatives, while acknowledging that permanent residual impacts to amenity will remain in perpetuity.

The Proponent also attests to a process of consultation and engagement with application of mitigation hierarchy in relation to ACH sites and places that will ensure that the Proposal meets the EPA's objective for this factor in this regard. Potential direct impacts to such ACH values will be appropriately managed via Aboriginal heritage legislation and the Management Plans. Any disturbance will be in accordance with approvals under the relevant heritage legislation if required and as agreed with Traditional Owners through ongoing engagement and consultation, based on the principle of free, prior and informed consent.

In addressing the proposed commitments and implementation of the Management Plans in addition to meeting the requirements of other legislation (AH Act), the Proponent considers the Proposal can be managed to meet the EPA's objective "to protect social surroundings from significant harm".

7 INLAND WATERS

7.1 EPA Environmental Factor Objective

The EPA Statement of Environmental Principles, Factors, Objectives and Aims of EIA (EPA 2023b) lists the following as its objective for Inland Waters:

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

7.1.1 Definitions

For assessment by the EPA, the term Inland Waters includes (EPA 2018a):

- **Groundwater** features, such as superficial and confined aquifers
- **Surface water** features, such as waterways, wetlands and estuaries (including springs and pools)
- A '**waterway**' is any river, creek, stream, or brook, including its floodplain, estuary, or inlet. This includes systems that flow permanently, for part of the year or occasionally, and waterways that have been artificially modified.

7.2 Relevant Policy and Guidance

Table 7-1 presents the relevant policy and guidance for Inland Waters.

Table 7-1: Relevant Policy and Guidance for Inland Waters

Policy and Guidance	Explain how the Policy and Guidance have been Considered
Environmental Protection Authority	
Statement of Environmental Principles, Factors, Objectives and Aims for EIA (EPA 2023b)	The EPA objective for inland waters forms the basis of this assessment. This assessment has regard to the aims of EIA, consideration of significance and the application of the mitigation hierarchy
Environmental Factor Guideline: Inland Waters (EPA 2018)	The information required for impact assessment has been considered in the scope of this chapter
Instructions on how to prepare an Environmental Review Document (EPA 2024e)	This document forms the basis of the headings and content provided in this ERD, which has been prepared by WA EIA practitioners
Instructions on how to prepare *Environmental Protection Act 1986* Part IV Environmental Management Plans (EPA 2024f)	This document was considered in the preparation of the AMD S&MP; Appendix C07) for the Proposal
Other State or Commonwealth	
Guidelines for preparing Mine Closure Plans (DMPE 2025b)	The MCP has been prepared in accordance with the guidance and addresses matters related to Inland Waters (Appendix A03) Note that since Proposal referral and commencement of preparation of the MCP, mine closure planning requirements under the Mining Act have been amended. Proponents no longer need to submit an MCP at the mining approval stage, instead are required to submit a Mine Development and Closure Proposal (MCDP). MCPs submission dates are then
Guidelines for preparing Mining Development and Closure Proposals (DEMIRS 2025)	
Mining Development and Closure Proposal and Approvals Statement Framework (DMPE 2025c)	
Mine Closure Plan Guidance – How to prepare in accordance with Part 1 of the Statutory Guidelines for Mine Closure Plans (DEMIRS 2023a)	

Policy and Guidance	Explain how the Policy and Guidance have been Considered
A framework for developing mine-site completion criteria in Western Australia (Young et al. 2019)	defined in an Approvals Statement should the mining activities outlined in the MDCP be approved
Draft Guidance – Material Characterisation Baseline Data Requirements for Mining Proposal (DMP 2016)	Used to guide the analysis of materials to be extracted and processed or reused
Guide to Departmental requirements for the management and closure of tailings storage facilities (TSFs) (DMP 2015a)	Considered in TSF design
Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes (DER 2015a)	Section 7.3.5 and 11 summarises the efforts and findings of investigations into AMD risk for the Proposal and sets out the risk profile based on mine lithologies
Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes (DER 2015b)	Section 7.5 and 11 describes the management controls that will be applied to ensure AMD risk is as low as reasonably practicable
Western Australian Water in Mining Guidelines (DoW 2013)	Considered in the impact assessment y for Inland Waters
Operational Policy 5.12 – Hydrogeological Reporting Associated with a Groundwater Well Licence (DoW 2009)	Considered in the development of the Proposal water management strategy and water balance. The Rimfire Groundwater Operating Strategy (Appendix C19) governs the abstraction and use of groundwater and disposal of excess groundwater, with associated reporting guided by Operational Policy 5.12
Use of mine dewatering surplus – formerly Strategic Policy 2.09 (DoW 2020)	
Use of Operating Strategies in the Water Licensing Process (DWER 2020)	
Water Quality Protection Notes (DoW various)	Several of the Water Quality Protection Notes (WQPN) published by the WA Government are relevant to the Proposal and have been used to inform the impact assessment and well as mitigation approaches
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ 2000)	Guides the management of water quality in Australia and New Zealand. This guidance has been used in consideration of surface water management and the preparation of the AMD S&MP (Appendix C07) for the Proposal
Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2019 (ANZG 2018)	
Environmental Management Plan Guidelines (DCCEEW 2024b)	Considered in the preparation of the AMD S&MP (Appendix C07) for the Proposal
Preventing Acid and Metalliferous Drainage: Leading Practice Sustainability Development Program for the mining industry (Australian Government 2016)	Used as guidance during EIA for Inland Waters and the preparation of the AMD S&MP (Appendix C07) for the Proposal
Global Acid Rock Drainage (GARD) Guide (INAP 2024)	
ARD Test Handbook: Project P387A: Prediction and kinetic control of acid mine drainage (AMIRA 2002)	
Acid Rock Drainage Prediction Manual (MEND Program 1991)	
Climate Change in Western Australia Issues Paper (DWER 2019a)	Used as context and guidance for climate change scenarios informing the modelling of the Proposal's groundwater setting and water management strategy.
Western Australian Climate Policy 2020 (GoWA 2020)	

Policy and Guidance	Explain how the Policy and Guidance have been Considered
Climate Adaptation Strategy (DWER 2023)	
Guide to future climate projections for water management in Western Australia (DWER 2024a)	

7.3 Receiving Environment

7.3.1 Studies

Hydrological and hydrogeological investigations within the Development Envelope commenced in 2018. Table 7-2 summarises the types and timing for each of the surveys/studies and which guidelines/procedures they are considered in accordance with.

Table 7-2: Summary of Technical Studies for Inland Waters

Title	Location	Type	Timing	Consistency with Guidance
Surface water				
Winu Operational Surface Water Management Plan Update 2023 (Worley 2024c) (Appendix C01)	Development Envelope	Surface water management plan	November 2024	Prepared in accordance with the information requirements in: • EPA Environmental Factor Guideline: Inland Waters (EPA 2018)
Winu Mine Access Road Surface Water Management Plan Update 2024 (Worley 2024b) (Appendix C02)	RAC	Surface water management plan	November 2024	
Peer review of the mine site and access road SWMPs and TUFLOW models (ATCW 2025a) (Appendix C02a)	MIA/RAC	Peer review	May 2025	
Winu Closure: Surface Water Management Plan Update 2023 Memorandum (Worley 2024a) (Appendix C03)	MIA	Surface water management plan	September 2024	
Winu Final Study: Updated Flood Risk Assessment - Access Route (Golder 2020a) (Appendix C08)	RAC	Flood risk assessment	October 2020	
Groundwater				
Rimfire H3 Assessment – 2025 Update (Worley 2025c) (Appendix C12)	Rimfire	Hydrogeological investigations, hydrogeological conceptualisation and results of groundwater modelling to provide assessment of impact of dewatering and recovery	April 2025	Prepared consistent with the information requirements in: • EPA Environmental Factor Guideline: Inland Waters (EPA 2018)
Rimfire H3 Assessment - Peer Review (AQ2 2025a)	Rimfire	Peer review	June 2025	

Title	Location	Type	Timing	Consistency with Guidance
(Appendix C12a)				• Water in Mining Guidelines (DoW 2013) and Operational Policy 5.12 – Hydrogeological reporting associated with a groundwater well licence (DoW 2009)
Winu Project – Percival Palaeovalley Assessment (Worley 2025i) (Appendix C15)	Rimfire and Percival Palaeovalley	Assessment of potential impacts to the Percival Palaeovalley by abstraction from Rimfire	July 2025	
H3 Hydrogeological Assessment – Winu Project Area (Worley 2025b) (Appendix C09)	MIA	Hydrogeological investigations, hydrogeological conceptualisation and results of groundwater modelling to provide assessment of impact of dewatering and recovery	March 2025	
Winu H3 Peer Review (AQ2 2025b) (Appendix C09a)	MIA	Peer review	April 2025	
Winu Access Road H2 Assessment (Worley 2025f) (Appendix C13)	RAC	Hydrogeological assessment	July 2025	
Winu Baseline Groundwater Monitoring Plan (Worley 2025g) (Appendix C05)	MIA	Baseline groundwater monitoring	July 2025	
Winu Pit Lake Model (HGL 2024a) (Appendix C14)	MIA	Pit lake model	June 2024	
Rio Tinto, Winu Mine - review of water balance and quality modelling by Hydrogeologica (Mine Lakes Consulting 2024) (Appendix C16)	MIA	Peer review	July 2024	
Solute Transport Modelling (Groundwater), Quarry and Pond Options (Advisian 2024) (Appendix C17)	MIA	Solute transport groundwater modelling	February 2024	

Title	Location	Type	Timing	Consistency with Guidance
Winu Gold and Copper Project – Infiltration Pond Study (Advisian 2023b) (Appendix C18)	MIA	Infiltration pond Order of Magnitude study	July 2023	
Surplus Water Management PFS (Worley 2025d) (Appendix C06)	MIA	Hydrogeological assessment and modelling, basis of design base case, for surplus water management	June 2025	
Winu Project Infiltration Pond Impact Assessment (Biota 2025) (Appendix D05)	MIA	Assessment of potential impact to vegetation and flora	June 2025	
Winu Mine Pit Lake Environmental Risk Assessment (ERA) – 2024 Update (Mine Lakes Consulting 2025) (Appendix C11)	MIA	Pit lake environmental risk assessment	February 2025	
Winu H3 Hydrogeological Assessment - Recovery Model Update (Worley 2025h) (Appendix C09b)	MIA	Pit lake recovery	July 2025	
Winu Hydrogeological Impact Assessment – Wallal Aquifer (Worley 2026) (Appendix C20)	Development Envelope	Hydrogeology Impact Assessment	May 2026	
Peer Review of Winu Hydrogeological Impact Assessment – Wallal Aquifer (AQ2 2026) (Appendix C21)	Development Envelope	Peer Review	June 2026	
Water balance				
Water Balance – Winu Copper Gold Project (Worley 2025e) (Appendix C04)	Development Envelope	Water balance model	March 2025	

Title	Location	Type	Timing	Consistency with Guidance
Winu Site-Wide Water Balance Peer Review (ATCW 2025b) (Appendix C04a)	Development Envelope	Peer review	May 2025	Prepared consistent with the information requirements in: • EPA Environmental Factor Guideline: Inland Waters (EPA 2018)
Geochemistry/waste characterisation/tailings storage facility				
Winu AMD S&MP (Rio Tinto 2025c) (Appendix C07)	MIA	AMD S&MP	August 2025	Prepared consistent with the information requirements in: • Preventing Acid and Metalliferous Drainage: Leading Practice Sustainability Development Program for the mining industry (Australian Government 2016) • Global Acid Rock Drainage (GARD) Guide (INAP 2024) • Environmental performance standard E13: Chemically Reactive Mineral Waste Control Standard (Rio Tinto 2017)
Winu Waste Characterisation - Primary Sulfide (Hypogene) Zone (Rio Tinto 2025e) (Appendix G01)	MIA	Waste rock characterisation	July 2025	Prepared in accordance with:

Title	Location	Type	Timing	Consistency with Guidance
Winu Waste Characterisation - Upper (Oxidised and Overburden) Zone (Rio Tinto 2024b) (Appendix G03)	MIA	Waste rock characterisation	July 2024	• ARD Test Handbook: Project P387A: Prediction and kinetic control of acid mine drainage (AMIRA 2002) • Preventing Acid and Metalliferous Drainage: Leading Practice Sustainability Development Program for the mining industry (Australian Government 2016) • Global Acid Rock Drainage (GARD) Guide (INAP 2024) • Acid Rock Drainage Prediction Manual (MEND Program 1991)
Winu Waste Characterisation -Secondary Sulfide (Enriched) Zone (Rio Tinto 2024a) (Appendix G02)	MIA	Waste rock characterisation	July 2024	
Winu Waste Characterisation - Tailings (Rio Tinto 2025f) (Appendix G04)	MIA	Tailings characterisation	July 2025	
Winu TSF Closure Design (WWL 2025b) (Appendix G08)	MIA	TSF closure design, including geotechnical, stability, erosion, surface water and seepage assessments	March 2025	Prepared in accordance with: • Guide to Departmental requirements for the management and closure of tailings storage facilities (TSFs) (DMP 2015a) • Global Industry Standard for Tailings Management (ICMM 2020)
Winu HDTSF 5H 10 Mtpa Pre-feasibility Design Report (WWL 2025a) (Appendix G06)	MIA	TSF pre-feasibility, including geotechnical and design investigations, water balance, stability assessment, seepage modelling, and surface water management assessment	March 2025	

Title	Location	Type	Timing	Consistency with Guidance
				• Integrated Mine Closure Good Practice Guide (ICMM 2019) • EPA Environmental Factor Guideline: Inland Waters (EPA 2018)
Tailings Storage Facility Seepage Modelling (SRK 2025) (Appendix G11)	MIA	TSF seepage	May 2025	Prepared consistent with the information requirements in: • EPA Environmental Factor Guideline: Inland Waters (EPA 2018)

7.3.2 Climate

The Proposal is subject to the semi-arid tropical environment of the Paterson Province, characterised by hot summers including a wet monsoon (typically January to March) and with coolest conditions June to August (Section 2.3.2).

The average annual rainfall for the nearest and surrounding weather stations ranges from 371.6 mm to 394.7 mm indicating there is some minor variability in rainfall across the area. Pan evaporation for the south-western Little Sandy Desert bioregion ranges from 16 mm/day in January to 4 mm/day in June at an annual daily average of 10 mm (van Leeuwen 2002).

7.3.2.1 Climate Change

Climate projections show very high confidence for substantial temperature increases due to the effects of climate change, with the north-west of Western Australia warming more than elsewhere in Australia. Annual rainfall is predicted to decline by 2% for a high-emission scenario, with little change under an intermediate-emission scenario (Section 2.3.2.114). The frequency of tropical cyclones may decrease by as much as 50% by 2090; however, rainfall and cyclone intensity are predicted to increase. Evaporation rates are expected to increase, with median annual evaporation increased by 4.6% to 6.5% under mid to high-emission scenarios, respectively.

7.3.3 Surface Water

Watercourses within the Pilbara region are ephemeral and exhibit high temporal variability, with flows occurring in response to high rainfall events. The primary mechanism for runoff occurs when the rate of rainfall exceeds the infiltration capacity of the soil. This mechanism is commonly associated with high-intensity cyclonic rainfall and impervious catchments.

7.3.3.1 Catchment Setting and Surface Water Features

Regionally, the Proposal is located within the Sandy Desert Lake Dora catchment within the Sandy Desert Basin (DWER 2024b) (Figure 7-1). The Sandy Desert Lake Dora catchment is expansive, covering an area of nearly 29 million hectares (290,000 km^2). The Greater Sandy Desert region experiences little to no surface water runoff (V & C Semeniuk Research Group 2000), with no clearly defined surface water courses intersecting the Proposal (Worley 2025b). This is due to the dominance of dunal landforms and aeolian sand cover (Worley 2025b).

In the region around the Proposal, the most prominent - albeit sparsely located - surface water features are soaks. These surface water features are fed by infiltrated rainfall and surface water runoff, separate from the deeper regional watertable (Worley 2025b). Four soaks are considered to occur in proximity to the Proposal, the nearest approximately 20 km from the MIA (Table 7-3, Figure 7-1). These soaks have significant cultural value, used by the Nyangumarta People, Martu People and other Aboriginal people for drinking water and cultural purposes, and are discussed further in Section 6.

The internal drainage system in the area has also resulted in the formation of several claypans, which are also likely to be associated with localised areas of ephemeral, shallow watertables which express at surface after high rainfall events (Worley 2025b) (Table 7-3; Figure 7-1; Figure 7-2). These claypans also have cultural significance. The nearest prominent (approximately 250 m wide) claypan to the MIA, is approximately 5 km south of the Development Envelope (Figure 7-2).

120°0'0"E
122°0'0"E
124°0'0"E
20°0'0"S
22°0'0"S

Eighty Mile Beach System
Great Northern Hwy
KARAJARRI PEOPLE (AREA B)
Cudalgarra
KARAJARRI PEOPLE (AREA A)
Mandora
Mandora Salt Marsh
Dragon Tree Soak
Dragon Tree Soak Reserve
Wallal Well
Bedamoral Well
NGARLA AND NGARLA 2 (AREA A)
Leslie (Port Hedland) Saltfields System
NYANGUMARTA PEOPLE (PART A)
NGURRARA (AREA A)
Bulgamulgardy Soak
Djimakarra Soak
South West Creek
De Grey
DeGrey River
Winu Soak
Toramah Soak
Rimfire
Oakover
Oakover River
Wallal
Sandy Desert Lake
Dora Catchment
NYAMAL PEOPLE #1
Yandicoogina Creek
Talga River
Nullagine River
Lake Waukarlycarly
KULYAKARTU & KULYAKARTU 2 PART A
Boodalyerri Creek
NYAMAL PALYKU PROCEEDINGS
Town Pool
Davis River
Lake Dora (Rudall River) System
Nullagine
Davis
Percival
Dales Gorge
Karijinni (Hamersley
Carrowina Creek
Christmas Creek
Bulldog Creek
MARTU (AREA A)
Lake Disappointment (Savory Creek) System
Jiggalong Creek
Caramulla Creek
Sylvania
Disappointment

N

0 50 100 Kilometres

Legend

- Regional Surface Water Features (Golder)
- Major River
- Mainstream
- Major Tributary
- Development Envelope
- Native Title Determinations
- Claypan Occurance Areas
- Water Bodies (Geoscience Aust.)
- Wetlands (DBCA)
- Palaeovalleys (Geoscience Aus. 2012)
- Sandy Desert Lake Dora Catchment

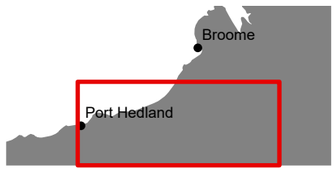
RioTinto

Figure 7-1: Surface Water Catchments and Surface Water Features

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Friday, 5 June 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:1,750,000
Rio Tinto © Copyright



Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_InlandWaters.aprx Layout: ERD - Inland Waters - Surface Water Catchments and Features

Other surface water features that have been identified surrounding the Proposal include the Oakover River, the Mandora Salt Marsh Ramsar wetland area, Lake Waukarlycarly and the Wallal and Percival palaeovalley systems, although it should be noted that palaeovalleys are geologically ancient, buried river valleys which no longer function as active surface water systems (Geoscience Australia 2014).

All surface water features identified within the Greater Sandy Desert Region are presented in Figure 7-1 with their approximate distance from the MIA and Rimfire described in Table 7-3. Given its length, the distance from the RAC has not been included in Table 7-3.

Figure 7-2: Example of a Claypan

Table 7-3: Surface Water Features in the Vicinity of the Proposal

Surface Water Feature	Approx. distance from MIA (km)	Approx. distance from Rimfire (km)
Winu Soak	20	40
Toramah Soak	55	75
Djimakarra Soak	45	50
Bulgamulgardy Soak	90	115
Oakover River	100	105
Mandora Salt Marsh Ramsar wetland area	>100	>100
Lake Waukarlycarly	60	50
Nearest claypans	5	14
Wallal Palaeovalley	20	20
Percival Palaeovalley	30	0

7.3.3.2 Development Envelope Topography

The topography within the Development Envelope is typically characterised by north-west to south-east orientated longitudinal aeolian sand dunes separated by interdunal corridors and endorheic (i.e. internally draining with no exit flow to the ocean) basins (Worley 2024b, 2024c). Flood risk is, accordingly, typically controlled by the infiltrative capacity of the underlying geomaterials. The height of dunes in the Proposal area typically range from 5 m to 15 m above the adjacent endorheic basin floor.

7.3.3.3 Surface Water Quality

Surface water quality monitoring for the Proposal was not undertaken due to the ephemeral nature of the surface water features surrounding the Proposal. However, some water sampling of the shallow groundwater below the Toramah Soak was conducted (Golder 2022b). This indicated that the water was saline (11,531 µS/cm), likely a result from evapo-concentration, and had a basic pH of 9.6 (as a result of high bicarbonate concentrations) and had elevated concentrations of both aluminium (488 mg/L) and iron (1010 mg/L), likely associated with partially soluble soil minerals contained with the unfiltered water sample. This data gives a rough indication of surface water and shallow groundwater quality surrounding the Proposal. However, since these bodies are solely fed by rainwater the water quality is expected to fluctuate significantly seasonally and due to climatic events, such as episodic high rainfall (Worley 2025b).

7.3.4 Groundwater

7.3.4.1 Conceptual Hydrogeological Model

Hydrogeological conceptual models were developed for the MIA and Rimfire to identify and assess potential impacts associated with the proposed abstraction of groundwater to facilitate the Proposal. These models have been updated annually since 2019 and 2023, respectively, coinciding with the collection of additional groundwater data and refinement of the Proposal layout (Worley 2025b, 2025c).

7.3.4.2 Regional Groundwater Setting

The Proposal and its surrounds are located within the Anketell Shelf subdivision of the Canning Basin, comprised of metasedimentary and intrusive rocks. The Proposal is located along the eastern margin of the Anketell fault, which separates the stratigraphic units of the Barnicarndy Graben (previously named the Waukarlycarly Embayment; a fault-bounded depression) in the west to the Anketell Shelf in the east. Regional tectonic movement and development of these units created structural, brittle deformations within the Proterozoic basement (metasediments). The brittle deformations are inferred to have enhanced permeability in both the fresh and weathered metasediments (Worley 2025b).

There are four Palaeovalleys systems that occur within the Winu region: Cudalgarra, Mandora, Percival and Wallal. The Proposal is located between the Percival Palaeovalley to the south, and which intersects the Development Envelope at Rimfire, and the Wallal Palaeovalley, approximately 20 km to the north (Figure 7-1) (Golder 2022b).

The Canning-Wallal aquifer is the predominant groundwater resources for the region and is continuous across the Canning Basin, a deep sedimentary basin deposited mainly during the Jurassic and Cretaceous period, with an approximate thickness onshore of 425 m (Advisian 2023a; Worley 2026). The Wallal Aquifer and the Eighty Mile Beach Ramsar Wetland including Walyarta (Mandora) Marsh are situated in the West Canning Basin. The aquifer occurs within the various cemented and uncemented sandstones of the Canning Basin, with the saturation thickness increasing in the aquifer's northern extents as the sandstone layers deepen (Golder 2022). For most of its extent the aquifer is unconfined except where it is overlain by the Jarlemai Siltstone, north-north-west of the MIA, separating it from the overlying Broome Sandstone unconfined aquifer (Golder 2022b). The Proposal is separated from the regional Canning-Wallal aquifer by a significant groundwater gradient drop (Worley 2026). The Broome Aquifer consists of poorly consolidated interbedded and cross-bedded sequences up to 120 m thick

close to the coast and which thins out to the east. The Broome Aquifer becomes unsaturated to the east of the West Canning Basin.

Underlying the Broome Aquifer is the Lower Callawa Formation, comprised of a sandy, clayey siltstone deposited within a lacustrine or near-shore marine to littoral environment (Worley 2025f). The Lower Callawa Formation is thought to potentially act as a leaky aquitard with low to moderate hydraulic conductivity in comparison to the Broome Aquifer. Recent test and data suggest that the Lower Callawa Formation should be distinguished from the Jarlemai Siltstone.

7.3.4.3 Local Groundwater Setting and Aquifer Geochemistry

7.3.4.3.1 MIA and Rimfire

The Proposal mining operation will be BWT therefore abstraction within the MIA for pit dewatering will be required. Operational water will also be supplied by abstraction from Rimfire when it is required. The local groundwater setting associated with dewatering at the MIA and abstraction at Rimfire is described below.

The MIA is conceptualised as having groundwater throughflow occurring within two main aquifer systems, the unconfined Permian sandstone aquifer (primary porosity) and the Proterozoic metasediments aquifer (secondary/fractured porosity; Figure 7-3) (Worley 2025b). The two aquifer systems are separated by the Permian mudstone, where present. The mudstone unit thickness varies significantly (>200 m) increasing toward the west, coinciding with the Anketell Fault and the Barnicarndy Graben.

The Permian sandstone formation is that described as the Triwhite sandstone (Worley 2026). The groundwater flow gradients and levels in the Triwhite sandstone at Winu and the regional Wallal sandstone suggest there is no to negligible hydraulic pathway or connection between the two, due to a 124 m gradient drop over less than 40 km (Figure 7-5). This groundwater level drop occurs over a relatively small distance to the north-east of the MIA. This corresponds to a groundwater gradient that is substantially steeper than gradients observed in the regional aquifers and these observations strongly suggest the presence of a groundwater divide (geological control) or hydraulic obstruction between the Winu aquifer system and the regional aquifer system to the north-east (Broome and Wallal). This relatively sharp change in hydraulic gradient implies restricted connectivity; with the unconfined sandstone aquifer at the MIA and the deeper Proterozoic metasedimentary aquifer forming relatively isolated groundwater systems.

Within the unconfined systems Broome, Lower Callawa and unconfined Wallal aquifers, west and north-west of the MIA, beyond the Development Envelope, the hydraulic gradient is relatively low at approximately 0.0005 (equivalent to 0.5 m of potentiometric head decline per 1,000 m of horizontal distance) (Worley 2026). The confined Wallal Aquifer (not present at the MIA or Rimfire) exhibits a flatter gradient of approximately 0.00017. The partially saturated sandstone aquifer within the Development Envelope (likely part of the Triwhite Sandstone) has a hydraulic gradient of approximately 0.0003. The Proterozoic metasediment fractured rock aquifer underlying the Proposal shows a substantially steeper gradient of approximately 0.0016.

Groundwater levels imply regional groundwater flow in the West Canning Basin is from the east-south-east to west-north-west, turning perpendicular to the coast (Worley 2026). This means that the direction of natural groundwater flow from MIA area, west-north-west towards the coast, does not intercept Walyarta (Mandora) Marsh which is further to the east.

The MIA is divided into seven hydrostratigraphic units (HSU) and the Rimfire area is divided into six HSUs based on lithology and their hydrogeological function (Table 7-4; Figure 7-4; Figure 7-5) (Worley 2025b, 2025c).

Mafic intrusive units were encountered at several locations at Rimfire and the MIA but are considered relatively sparsely distributed and unlikely to act as significant confining units, regionally. However,

locally, they may behave as partially impermeable flow barriers and partly compartmentalise groundwater flow (Worley 2025b, 2025c). As such the hydraulic role of both the Thorny Devil Fault and pre-mineralisation mafic sill is important at the MIA due to these compartmentalisation effects influencing groundwater flow patterns and levels (Figure 7-4) (Worley 2025b).

Geological lineaments were also identified using aeromagnetic data which generally show, in the MIA area, a strong north-west to south-east trend, and in the Rimfire area a strong west-north-west trend with minor lineaments extending radially from the broadly circular granitic pluton intrusion at the centre of Rimfire (Worley 2025b, 2025c). These lineaments likely comprise faults and fractures within the weathered metasediment and granite and have the potential to store and convey water. North-westerly groundwater throughflow occurs within the metasediment aquifer, confined by the Permian mudstone strata, where present.

The Rimfire area is conceptualised as having groundwater throughflow occurring within the Proterozoic metasediment and granite aquifers (Worley 2025c). The weathered granite zone functions as an unconfined aquifer.

Groundwater recharge is not reliably estimated but expected to occur episodically following cyclonic rainfall events (Worley 2025b). A potential regional groundwater recharge area has been identified south of the Rimfire area (Figure 7-7 and Figure 7-8). Upward leakage through the mudstone layer at the MIA is suggested by water level data in areas where the metasediment aquifer is sufficiently pressurised, and the mudstone is silty, weathered or thin (Worley 2025b).

The key characteristics and geochemistry of the MIA and Rimfire aquifers have been summarised in Table 7-5. A summary of aquifer water quality parameters is provided in Table 7-6, based on analysis undertaken by the Proponent between 2020 and 2024 (Worley 2025g). Water quality in the overlying aeolian sands, where present, is expected to be broadly consistent with the sandstone.

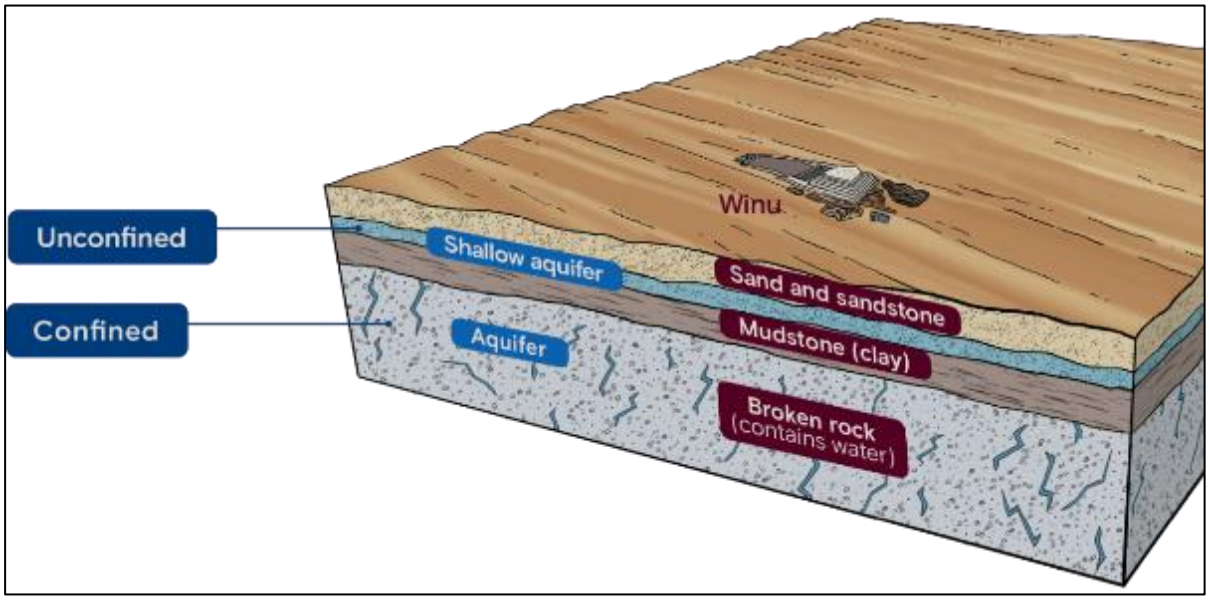


Figure 7-3 Aquifers associated with the MIA

7.3.4.3.2 Percival Palaeovalley

The Percival Palaeovalley in the south Rimfire area (within and south of the Development Envelope) appears to be an infilled tributary valley for a river that once discharged into the main Percival Palaeoriver 40 km to the south (Worley 2025i). The sedimentary infill geology of the Canning Basin palaeovalleys typically comprises basal gravels and sands, overlayed by fine-grained fluvial-lacustrine sediments. As conditions became drier in the late Cenozoic, salt lakes and sand dunes formed, resulting in the deposition of calcrete.

Limited drilling has been completed into the palaeovalley. 17 historic exploration bores are located within the palaeovalley south of Rimfire; however, the lithology data is limited. Lithological logs from the recent Stygofauna monitoring bore drilling program involving 21 holes indicate a palaeovalley depth of 40 m, overlying metasandstone and granite (Worley 2025i). The basal unit of the palaeovalley strata is 10 m off fine-grained sand overlain by highly weathered claystone and sands. This recent drilling program and airborne geophysics has refined the tributary palaeovalley extent as previously delineated (Worley 2025i).

The groundwater flow direction in the tributary palaeovalley is thought to be south, although there is currently insufficient field data to verify this (Worley 2025i). This flow direction differs from the metasedimentary aquifer at Rimfire, which is inferred to be north-north-east.

Depth to water at two bores in the palaeovalley is 3-6 m (Worley 2025i). The level of hydraulic connection between the palaeovalley aquifer and the metasedimentary aquifer has not been sufficiently assessed, although the test pumping 2.8 km north of inferred palaeovalley induced a drawdown of 0.12 m at the historic exploration palaeovalley bore, suggesting a potential hydraulic connection. Further seismic surveys have been completed and additional monitoring and test pumping bores are being installed to continue the investigations of the palaeovalley aquifer.

7.3.4.3.3 RAC

Recharge to the Broome Aquifer is generally unrestricted and occurs by direct infiltration of rainfall through overlying sediment, or through concentrated infiltration in streams and floodways (Worley 2025f). Recharge to the deeper Wallal Aquifer occurs through vertical leakage from the upper units, however it is restricted to areas where the Lower Callawa Formation and Jarlemai Siltstone are absent. Groundwater recharge to the Wallal aquifer also takes place in areas where hydraulic heads within the Wallal Aquifer are lower than those within the Broome Aquifer. Recharge to the Lower Callawa aquifer is considered to a combination of vertical infiltration through the overlying units, which are mostly permeable sands, and lateral throughflow from outcrop/subcrop(s) in the southeast.

Given the hydraulic characteristics of the Lower Callawa Formation, recharge to the unconfined Wallal aquifer may occur in areas where the Jarlemai Siltstone is absent and therefore extending the effective zone of recharge to the Wallal Sandstone Aquifer (Worley 2025f).

Groundwater flow in the Broome Aquifer is from east to west, from the hinterlands toward the coast. Groundwater flow in the Wallal Aquifer is from the east-south-east to west-north-west, with isopotentials occurring sub-parallel to the coastline (Worley 2026).

Testing from the target aquifers (Broome, Lower Callawa and unconfined Wallal) along the RAC indicates groundwater is generally fresh, with results between 419 µS/cm to 1,750 µS/cm (Worley 2025f).

Figure 7-9 and Figure 7-10 show RAC conceptual hydrology.

Table 7-4: Hydrostratigraphy Units Associated with the Proposal Area

Area	HSU	Lithology	Thickness (metres)	Hydrogeological function	Description
MIA	Quaternary aeolian sand	Silty sand, very fine to medium grained	0 to 10 (to 30)	Unsaturated	Occurs over majority of the MIA, largely unsaturated except following periods of increased rainfall. Can be up to 30 m thick under dunes, and largely unsaturated.
	Silcrete/ferricrete	Silcretised sandstone with variable ferricrete	10 to 30	Unsaturated	Occurs over majority of the MIA, largely unsaturated/partially saturated. The hydraulic parameters of the silcrete/ferricrete units have yet to be fully tested; however, it is assumed to form a no flow boundary between the surficial sands and the deeper sandstone aquifer (Advisian 2023b).
	Sandstone	Fine to medium grained sandstone	10 to 30	Unconfined sedimentary aquifer	Variable spatial coverage and thickness, partially saturated. The watertable within the MIA occurs around 50 to 60 mbgl, near the base of the unconfined aquifer.
	Permian mudstone	Mudstone, claystone, diamictite	0 to 250 (to 500)	Sedimentary aquitard	Discontinuous, low permeability confining unit. At the MIA, forms a 30 to 40 m thick aquitard that hydraulically separates the unconfined sandstone aquifer and Proterozoic metasediment aquifer. The unit's thickness varies significantly (>200 m) towards the west, coinciding with the Anketell Fault and Barnicarndy Graben. One interpretation notes a depth of 500 m.
	Mafic intrusions (dykes / sills) within the Proterozoic metasediments	Slightly weathered to fresh, hornblende phenocrysts, micaceous/schistose in some intervals	5 to 40	Intrusive aquitard	These are interpreted to act as a low permeability facies and presumably inhibit groundwater flow in the metasediment aquifer, but are relatively sparsely distributed and unlikely to act as significant confining units. Locally, they may behave as partially impermeable flow barriers and partly compartmentalise groundwater flow.
	Granite and felsic intrusions within the Proterozoic metasediments	Moderately to highly weathered granite/felsic intervals, typically 20 to 80 mbgl. Variably consolidated sandy silt comprising quartz, feldspar grains, little to no biotite. Fresh granite underneath the weathered horizon.	>100	Intrusive aquitard	These are interpreted to function as a low permeability facies and presumably inhibit groundwater flow in the metasediment aquifer, where present.

Area	HSU	Lithology	Thickness (metres)	Hydrogeological function	Description
	Proterozoic metasediment	Includes metasiltstone and metasandstone, and an upper 'weathered' profile and lower 'fresh' profile	>300	Fractured aquifer	Divided into different zones, and secondary porosity and permeability occur, due to fracturing, faulting and weathering. The fresh and weathered zones are inferred to act as a fractured aquifer.
Rimfire	Quaternary aeolian sand / silcrete / sandstone	Silty sand, very fine to medium grained and variable ferricrete	0 to 30	Unsaturated	Occurs over majority of Rimfire, unsaturated except following periods of increased rainfall.
	Weathered metasediment	Moderately to highly weathered metasediment	20 to 80	Aquifer	The weathered zones function as an unconfined primary aquifer.
	Fresh metasediment	Slightly weathered to fresh metasediment, massive, fine to coarse grained	>80	Fractured aquifer	The fresh are inferred to act as a fractured aquifer.
	Weathered granite	Moderately to highly weathered granite, generally occurs as quartz, feldspar, and biotite in a matrix	20 to 80	Aquifer	Exists over the granitic plutons only and acts as a primary weathered aquifer.
	Fresh granite	Slightly weathered to fresh granite, massive, fine to coarse grained	>80	Fractured aquifer	Fresh granite is inferred to act as a fractured aquifer.
RAC	Broome Sandstone	Very fine to coarse grained sandstone with occasional interbedded shale and conglomerate (pebble to boulder size)	Up to 120	Aquifer	Within coastal region. Fully saturated in proximity to the coastline, becomes unsaturated with increasing distance from the coast, and with increasing elevation of the top of the Lower Callawa Formation/Jarlemai Siltstone. Unconfined. Groundwater flow towards the coast.
	Lower Callawa Formation	Sandy, clayey, siltstone	50 to 79	Aquifer	Moderately yielding aquifer (depending on degree of sand and clay). Low to moderate hydraulic conductivity compared with Broome and Wallal sandstones.
	Jarlemai Siltstone	Puggy, silty clay, interbedded with silt and fine sand	20 to 30	Aquiclude	Main confining layer separating the Broome and Lower Callawa from the Wallal Sandstone.
	Wallal Sandstone	Fine to medium grained quartzose sandstone with minor siltstone, conglomerate and minor coal fragments	Up to 425 onshore, increasing offshore	Aquifer	Confined to unconfined aquifer underlying the majority of the RAC. Artesian pressures occur along the coast.

Source: (Worley 2025b, 2025c, 2025f)

Table 7-5: Key Aquifer Characteristics at the MIA and Rimfire

Element	MIA*		Rimfire^
Aquifer	**Unconfined sandstone**	**Proterozoic metasediment**	**Proterozoic metasediment**
Groundwater recharge	Recharge to the groundwater system expected to occur episodically in association with cyclone events, where rainfall has infiltrated surficial sediments sufficiently to overcome the high rates of evapotranspiration. A potential outcrop/subcrop has been identified south-east of the Rimfire area that may provide a recharge source. Recharge rates of between 0.4 to 2.4% of mean annual rainfall (1.5 to 8.7 mm) are interpreted from isotope studies.		Recharge to the groundwater system at Rimfire has not been quantified due to the lack of significant rainfall events following completion of monitoring bores that would provide the basis for evaluation of recharge signals in groundwater levels. Recharge is likely a combination of direct vertical infiltration and lateral throughflow from the outcrop/subcrop(s) in the south-east.
Groundwater discharge	Lateral outflow is expected to be the main mechanism of groundwater loss. Discharge via evaporation/evapotranspiration (EVT) is also expected; however, EVT losses are expected to be minor in comparison to lateral outflow due to groundwater levels within the MIA being greater than 20 mbgl, well below the extinction depth of EVT processes. The potential EVT rate is an order of magnitude higher than rainfall, with most rainfall expected to be removed by this process with the potential exception of cyclonic rainfall events. No groundwater abstraction occurs nearby that may add to discharge.		Lateral outflow is expected to be the main mechanism of groundwater loss. Discharge via EVT is also expected; however, EVT losses are expected to be minor in comparison to lateral outflow due to groundwater levels, greater than 17 mbgl. However, EVT losses are possible in the Percival Palaeovalley approximately 2 km south of the hydrogeological study area due to the shallow groundwater level (<5 mbgl). No groundwater abstraction occurs nearby that may add to discharge.
Flow direction	Gravimetric, flowing north-north-west to the Indian Ocean (Figure 7-7and Figure 7-8).	Gravimetric and pressure driven, depending on the presence and thickness of the overlying Permian mudstone layer. Flow direction is also toward the north-north-west. The groundwater gradient across the MIA is approximately 0.0016 (i.e. 1.6 m per 1000 m).	Groundwater flow direction is regionally from the south-south-east to the north-north-west, aligned with the inferred recharge source(s) in the south-east (Figure 7-7 and Figure 7-8). Locally, there may be some flow south-east toward the Percival Palaeovalley, the lowest topographical feature in the area and where groundwater is close to surface. The groundwater gradient across Rimfire is approximately 0.0025 (i.e. 2.5 m per 1000 m).
Water levels	Groundwater levels range between approximately 252 m AHD to the south-east in the Texas study area (Bore ID WINU0946) to approximately 173 m AHD to the north-west of the MIA (WINU0982) (Figure 7-7). Groundwater depths range between 20 to 50 mbgl (Figure 7-8). Groundwater depths at the pit are approximately 50 mbgl.		Groundwater levels range between 244 m AHD and 226 m AHD (Figure 7-7). Groundwater depths range between 17 mbgl and 43 mbgl, with no consistent confining layer (Figure 7-8). Shallower groundwater levels in the south-east correlate with the Percival Palaeovalley system, suggesting the presence of a shallow groundwater system.

Element	MIA*		Rimfire^
	Upward leakage is thought to occur in areas where the metasediment aquifer is sufficiently pressurised and where the mudstone layer is silty, weathered or thin.		
Groundwater-surface water interaction	No significant groundwater-surface water interaction is present around the MIA, based on the observed water levels and the absence of any groundwater supported hydrological features. Groundwater-surface water interaction is likely to be temporally constrained during and immediately following periods of intense rainfall and/or cyclonic events.		Groundwater surface water interaction is unlikely within the majority of the Rimfire study area based on the observed water levels and the lack of any surface hydrological features. There may be some occasional interaction approximately 2 km south of the Rimfire area where groundwater levels are shallow (below 5 mbgl). This interaction is temporally limited, occurring during and immediately following periods of intense rainfall and/or cyclonic events. Refer to Sections 7.3.4.5 and 8 regarding the potential for groundwater dependent ecosystems in the Percival Palaeovalley.
Salinity and pH	Circum-neutral at 7.4 pH (median) but can range between 6.5 to 9.0. The median electrical conductivity (EC) is 700 µS/cm but can range between 400 to 1,800 µS/cm (i.e. groundwater is 'fresh to brackish'). Median total dissolved solids (TDS) is 482 mg/L with a range of 235 to 1200 mg/L.	Confined Circum-neutral at 7.5 pH (median) but can range between 5.7 to 9.5. The median EC is 1,500 µS/cm ('brackish') but can range between 300 to 7,100 µS/cm (i.e. 'fresh to brackish'). TDS between 212 and 5,390 mg/L and a median value of 1,240 mg/L.	Generally fresh, with an EC ranging between 580 and 1,330 µS/cm ('fresh to brackish'), and a neutral to slightly basic pH between 7.4 to 8.0. Groundwater has largely a sodium-potassium chloride signature, which indicates the presence of dissolved salt in the system, likely attributed to factors relating to evapoconcentration and/or episodic flushing of salts from the unsaturated zone.
		Unconfined Similar pH to confined but is slightly fresher, with a median EC of around 1,400 µS/cm (ranges between 500 to 1,700 µS/cm [i.e. 'fresh to brackish']). TDS between 328 and 1,130 mg/L and a median value of 777 mg/L.	

*Source: *(Worley 2025b; Worley 2025g) (SRK 2025) ^(Worley 2025c)*

Table 7-6: Groundwater Quality – MIA Aquifer

Analyte	Aquifer	Minimum	Median	Maximum
pH (Field) (pH units	Unconfined sandstone	6.5	7.35	9.03
	Metasediment - Unconfined	6.6	7.42	8
	Metasediment - Confined	5.74	7.48	9.45
TDS (calc) (mg/L)	Unconfined sandstone	235	482	1200
	Metasediment - Unconfined	328	777	1130
	Metasediment - Confined	212	1240	5390
Total Alkalinity as $CaCO_3$ (mg/L)	Unconfined sandstone	15	106	610
	Metasediment - Unconfined	97	124	148
	Metasediment - Confined	<1	92	160
Total Kjeldahl Nitrogen (mg/L)	Unconfined sandstone	<0.1	0.6	5
	Metasediment - Unconfined	<0.1	0.4	0.8
	Metasediment - Confined	<0.1	0.4	2.1
Nitrate as N (mg/L)	Unconfined sandstone	<0.01	2.40	13
	Metasediment - Unconfined	<0.01	3.02	4.43
	Metasediment – Confined	<0.01	0.35	9.51
Sulfate as SO_4 (mg/L)	Unconfined sandstone	<5	25	140
	Metasediment - Unconfined	7	58	127
	Metasediment - Confined	<1	108	382
Total Phosphate (mg/L)	Unconfined sandstone	<0.1	0.41	16.50
	Metasediment - Unconfined	<0.1	<0.1	0.13
	Metasediment - Confined	<0.1	<0.1	0.97
Ammonia as N (mg/L)	Unconfined sandstone	<0.01	0.04	2.01
	Metasediment - Unconfined	<0.01	0.01	0.11
	Metasediment - Confined	<0.01	0.02	1.71
Aluminium (Dissolved) (mg/L)	Unconfined sandstone	<0.005	0.005	0.45
	Metasediment - Unconfined	<0.005	< 0.01	0.031
	Metasediment - Confined	<0.005	< 0.01	0.05
Arsenic (Dissolved) (mg/L)	Unconfined Sandstone	<0.0002	0.002	0.008
	Metasediment - Unconfined	<0.0002	< 0.001	0.004
	Metasediment - Confined	<0.0002	< 0.001	0.0081
Cadmium (Dissolved) (mg/L)	Unconfined sandstone	<0.00005	<0.00005	<0.00005
	Metasediment - Unconfined	0.000025	< 0.0001	0.0001
	Metasediment - Confined	0.000025	< 0.0001	0.0003
Chromium (Dissolved) (mg/L)	Unconfined sandstone	<0.0002	< 0.001	0.003
	Metasediment - Unconfined	<0.0002	< 0.001	0.002
	Metasediment - Confined	<0.0002	< 0.001	0.005
	Unconfined sandstone	<0.0005	0.0005	0.032

Analyte	Aquifer	Minimum	Median	Maximum
Copper (Dissolved) (mg/L)	Metasediment - Unconfined	<0.0005	< 0.001	0.014
	Metasediment - Confined	<0.0005	< 0.001	0.081
Iron (Dissolved) (mg/L)	Unconfined sandstone	<0.002	< 0.05	1.97
	Metasediment - Unconfined	<0.002	< 0.05	1.86
	Metasediment - Confined	<0.002	0.025	148
Lead (Dissolved) (mg/L)	Unconfined sandstone	<0.0001	< 0.001	<0.001
	Metasediment - Unconfined	<0.0001	< 0.001	<0.001
	Metasediment - Confined	<0.0001	< 0.001	0.002
Manganese (Dissolved) (mg/L)	Unconfined sandstone	<0.0005	0.049	1.46
	Metasediment - Unconfined	<0.0005	0.002	0.295
	Metasediment - Confined	<0.001	0.038	7.75
Mercury (Dissolved) (mg/L)	Unconfined sandstone	<0.00004	< 0.00004	<0.00004
	Metasediment - Unconfined	<0.00004	< 0.00004	0.00008
	Metasediment - Confined	<0.00004	< 0.00004	<0.00004
Nickel (Dissolved) (mg/L)	Unconfined sandstone	<0.0005	0.0008	0.0528
	Metasediment - Unconfined	<0.0005	< 0.001	0.007
	Metasediment - Confined	<0.0005	0.0007	0.173
Strontium (Dissolved) (mg/L)	Unconfined sandstone	0.17	0.26	0.81
	Metasediment - Unconfined	0.20	0.30	0.32
	Metasediment - Confined	0.17	0.37	0.82
Zinc (Dissolved) (mg/L)	Unconfined sandstone	<0.001	0.0035	0.54
	Metasediment - Unconfined	<0.001	< 0.005	0.27
	Metasediment - Confined	<0.001	< 0.005	0.15

Source: (Worley 2025g)

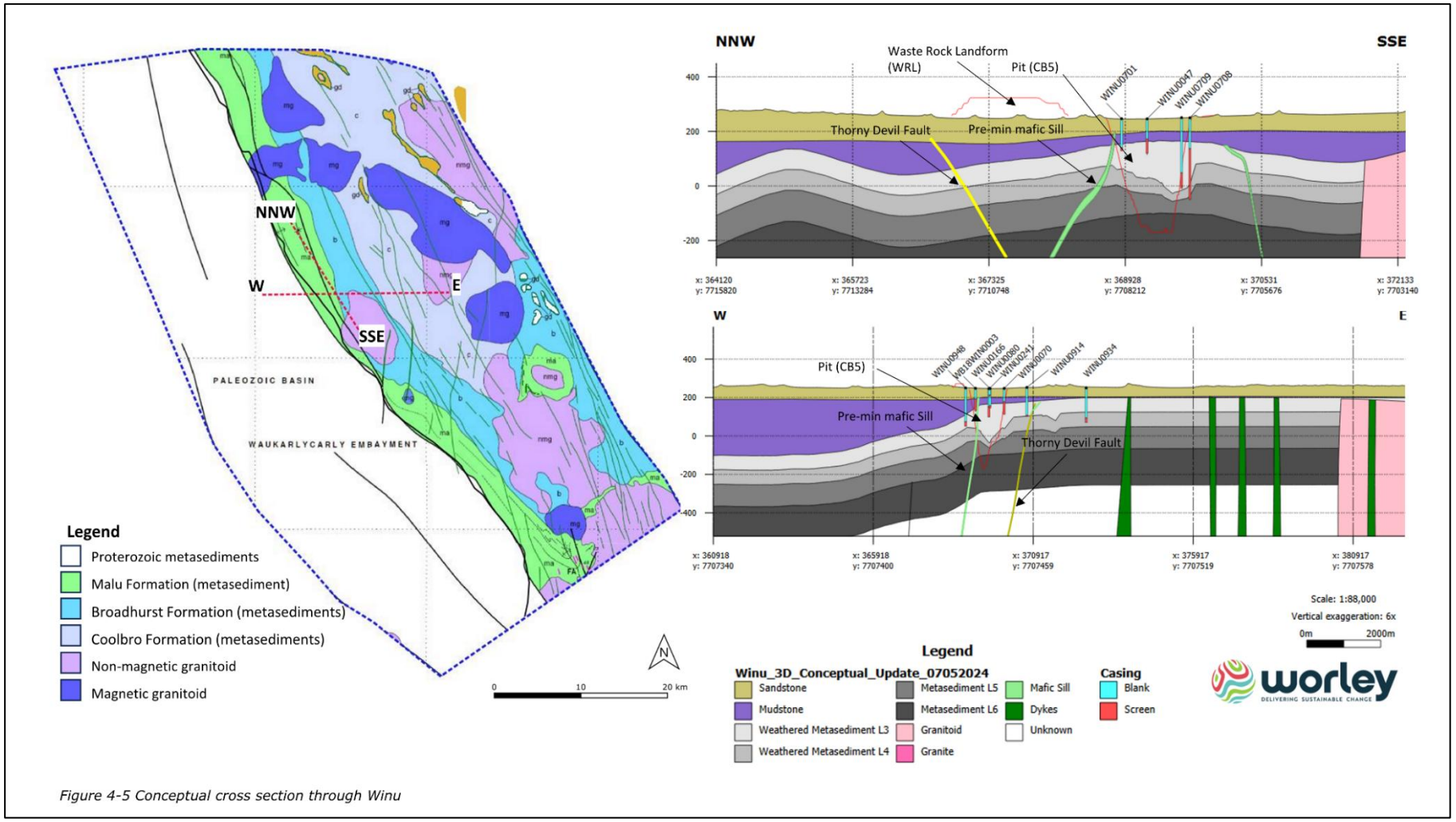
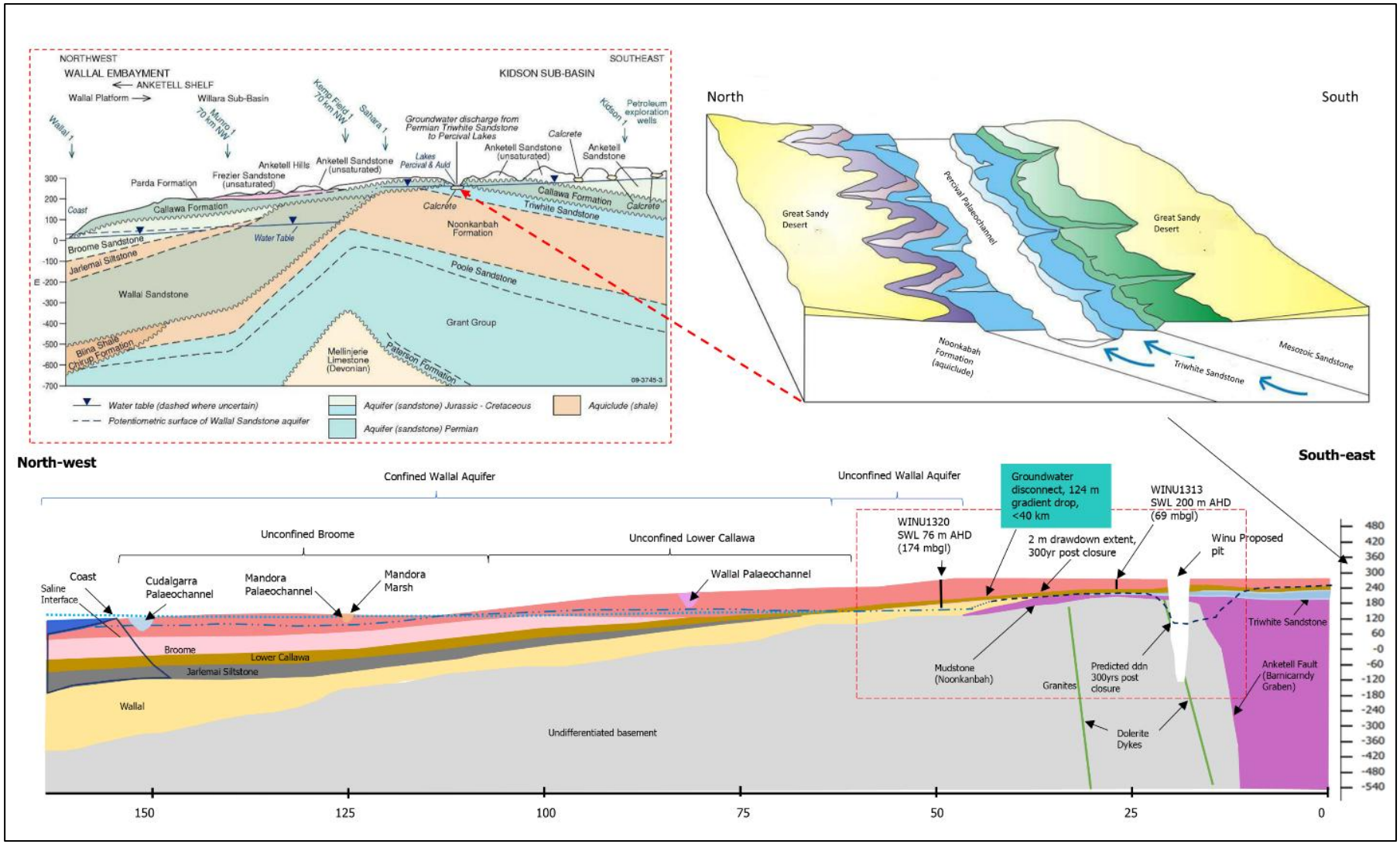


Figure 4-5 Conceptual cross section through Winu

Source: (Worley 2025b)

Figure 7-4: Conceptual Cross Section Through the MIA



Source: (Top Left: after Commander 1985; Laws 1991. Top Right: Englis 2010)

Figure 7-5: Cross Sections of the Hydrogeological Conceptualisation between Winu Proposal and the Mandora Marsh

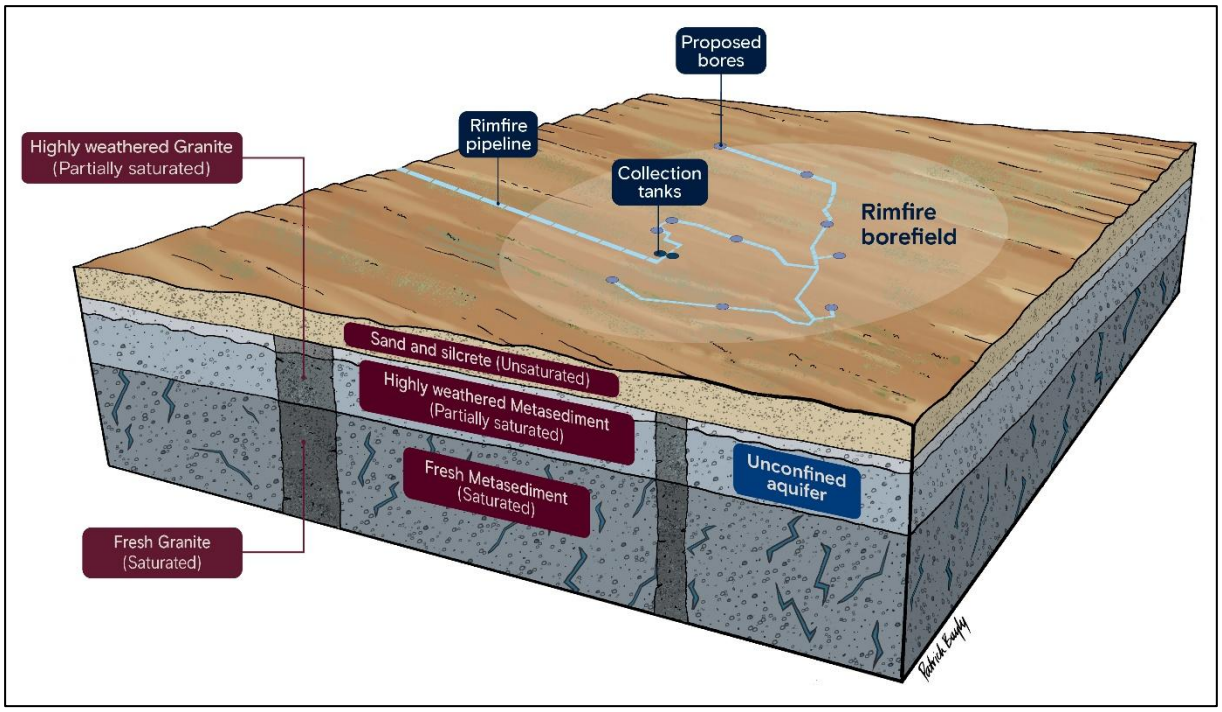


Figure 7-6: Conceptual Cross Section Through the Rimfire Area

122°0'0"E

195
200
205
210
215
220
225
230
235
240
245
250
255
260
260
265
270

N

NYANGUMARTA PEOPLE (PART A)

Direction of Groundwater Flow

Mine Infrastructure Area (MIA)

WINU0982

Rimfire

WINU0946

AKD10

MARTU (AREA A)

Legend

- Bores
- Groundwater Level (mAHD)
- Subcrop/Outcrop
- Development Envelope
- Native Title Determinations

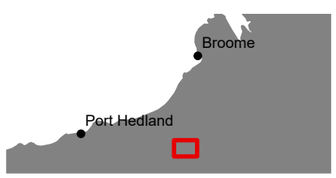
RioTinto

Figure 7-7: Groundwater Levels (MIA & Rimfire)

Rio Tinto Copper (RTC)

Publisher: Gavin.Jackson
Date Published: Tuesday, 9 June 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:200,000
Rio Tinto © Copyright



0 5 10 Kilometres

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_InlandWaters.aprx Layout: ERD - Inland Waters - Groundwater Levels

122°0'0"E

122°0'0"E

N

Mine Infrastructure Area (MIA)

WINU0982

WINU0946

AKD10

Rimfire

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

Direction of Groundwater Flow

Legend

- Bores
- Groundwater Depth (mBGL)
  - 1
  - 2
  - 5
  - 10
  - 20
  - 30
  - 40
  - 50
  - 60
  - 70
  - 80
  - 90
  - 100
  - 125
- Subcrop/Outcrop
- Development Envelope
- Native Title Determinations

0 5 10 Kilometres

RioTinto

Figure 7-8: Groundwater Depths (MIA & Rimfire)

Rio Tinto Copper (RTC)

Publisher: Gavin.Jackson
Date Published: Tuesday, 9 June 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:200,000

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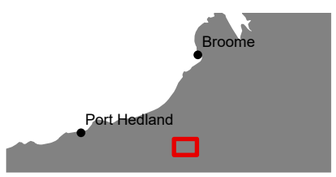
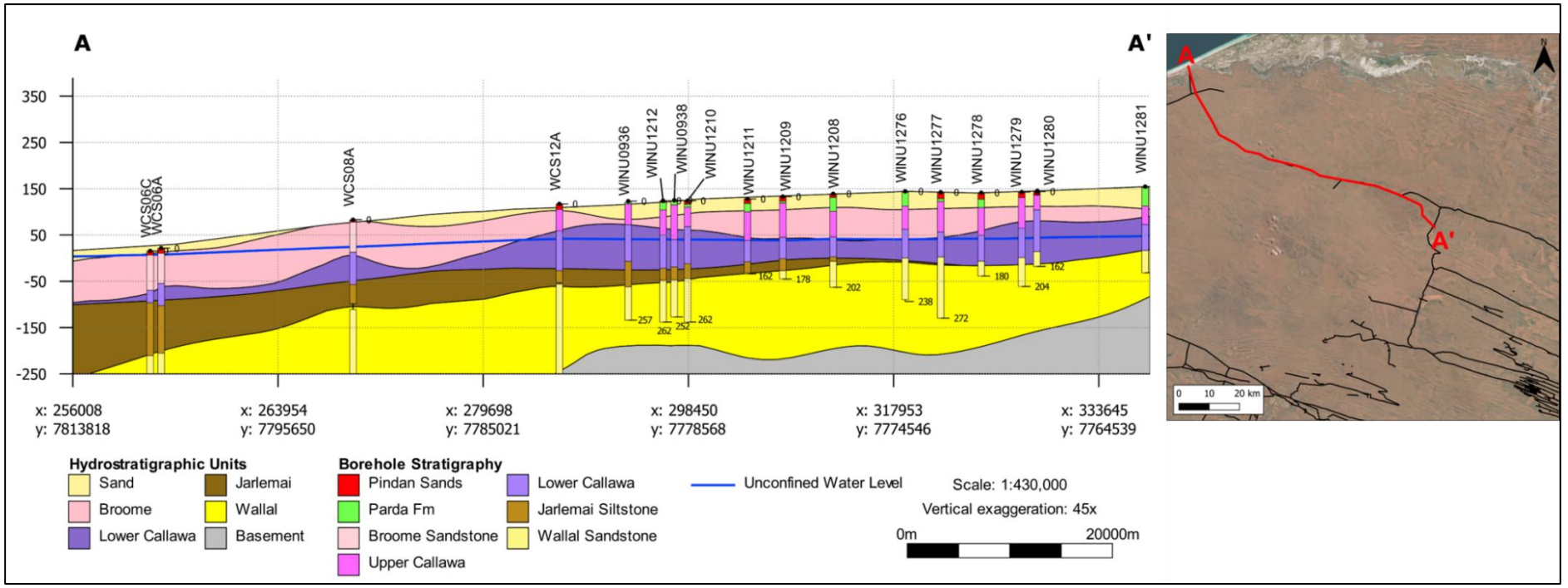


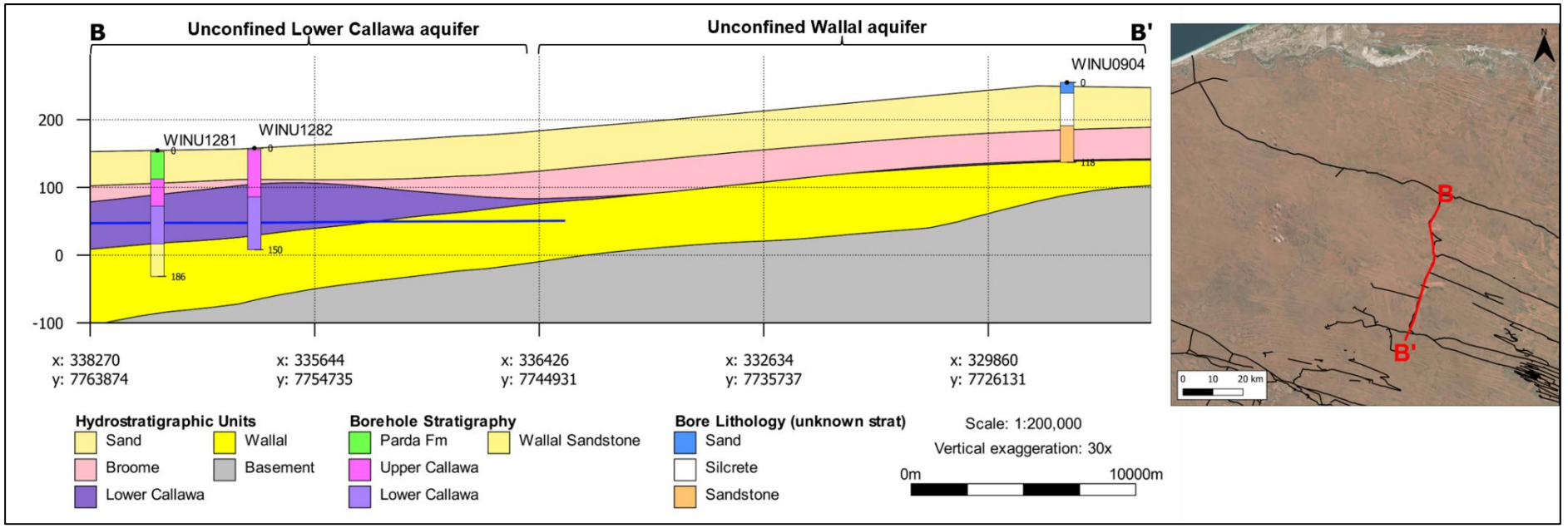
Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_InlandWaters.aprx Layout: 7.8 - Inland Waters - Groundwater Depths

122°0'0"E



Source: (Worley 2025f)

Figure 7-9: Conceptual Cross Section Through the RAC (Nyangumarta Highway)



Source: (Worley 2025f)

Figure 7-10: Conceptual Cross Section Through the RAC (Wirlkirr Wirlkirr Road)

7.3.4.4 Existing Groundwater Use

The Proposal occurs in the Canning-Kimberley Groundwater Sub-Area of the Canning-Kimberley Groundwater Area. Canning-Kimberley Sub-Area licence holders that abstract water from the Canning-Wallal aquifer are detailed below in Table 7-7 (DWER 2024c). The Proponent has a current allocation entitlement for approximately 0.3 GL/a, required for pre-development activities.

Nearby pastoral stations generally utilise the shallow Broome and Wallal aquifers for stock and domestic water supply, although since 2010, large scale abstraction from the artesian Wallal aquifer, in the West Canning Sub Area, has also been used for centre pivot irrigation (Worley 2025f).

Within the Canning-Wallal Basin, groundwater allocation limits within the Broome Aquifer are not fully utilised and are smaller in comparison to the Wallal Aquifer, with 0.126 GL/a known to be licensed out of a total allocation limit of 10 GL/a (Worley 2025f). The Wallal aquifer on the other hand is thought to be nominally over-allocated by DWER at 50.73 GL/y with additional allocations being requested from the currently unused 10 GL/y public water supply reserve.

Table 7-7: Groundwater Licences within the Canning-Kimberley Groundwater Area (Canning-Kimberley Sub Area)

Licence Holder*	Licence Number(s)	Sub Area	Allocation kL/a
Armada Mining Pty Ltd	204919	Canning-Kimberley	150
Buru Energy Limited	174785		40,500
Fortescue Metals Group Limited	208075, 209741		159,000
Greatland Exploration Pty Ltd	209201, 209754, 210004		1000
Gungalla Mackay Pty Ltd	178689		600
Hans Willem Leenaarts	202100		1,500
Kenworthy, Margaret Jean	161175		8,000
Main Roads	168483		60,000
Mowanjum Aboriginal Corporation	180441		750,000
Greatland Pty Ltd	202749		1,550,000
Nifty Copper Pty Ltd	66212		75,000
Rio Tinto Exploration Pty Limited	200009, 201165, 204033, 206212		351,500
Pearce, Anthony	169503		2000

**It should be noted that Table 7-7 is not a complete list of Canning-Wallal (Canning-Kimberley Sub Area) aquifer allocations, there are several licences outside of the Canning-Kimberley Groundwater Area that abstract from the aquifer most notably within the Derby Groundwater Area (DWER 2024c).*

7.3.4.5 Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems (GDEs) are ecosystems that require access to groundwater to persist in the landscape (Biologic 2021). There are three main types of GDEs:

- Aquatic ecosystems: that rely on the surface expression of groundwater, including surface water ecosystems that may have a groundwater component, such as rivers, wetlands and springs
- Terrestrial ecosystems: that rely on the subsurface presence of groundwater, including Groundwater Dependent Vegetation (GDV)
- Subterranean ecosystems: stygofauna ecosystems in aquifers.

The nearest GDEs to the Development Envelope as mapped by the online GDE Atlas tool hosted by BoM, all rated as low GDE potential, are located between 26 and 35 km to the west-south-west and north-north-east, respectively, from the MIA and all beyond the potential influence of groundwater drawdown attributable to the Proposal (Worley 2025b).

Aquatic Ecosystems (Wetlands, Soaks and Claypans)

The Ramsar-listed Eighty Mile Beach wetland system, which includes the Mandora Salt Marsh (Walyarta) and intertidal mudflats, is located approximately 40 km north of the RAC at its nearest point. The marine section of the Eighty Mile Beach Ramsar site, bounded by the coastal high water mark, is approximately 9 km north-west of the RAC-Great Northern Highway intersection at its nearest point. Broome Aquifer groundwater inputs into the intertidal mudflats of Eighty Mile Beach are considered likely to be important for the ecological character of the wetlands and groundwater from the Broome and Wallal aquifers may also support several freshwater springs that flow along the coast (Worley 2025f). The Wallal Borefield was removed from the Proposal to avoid any potential impact on the sensitive groundwater dependent values of the Eighty Mile Beach wetlands (Section 2). With the removal of the Wallal Borefield, the only Proposal infrastructure in the vicinity of Eighty Mile Beach will be the sealed road within the RAC, as such the potential for any impact is negligible.

None of the soaks or claypans in the vicinity of the Proposal are considered dependent on the regional groundwater (Section 7.3.3.1) and given their distance from the Development Envelope (Table 7-3) in relation to potential surface water impacts, are not discussed further in this chapter.

Terrestrial Ecosystems (Groundwater Dependent Vegetation)

Generally, no evidence of GDV has been identified by vegetation surveys within the Development Envelope, with the potential exception of possible GDV occurring within the Percival Palaeovalley within and south of the Development Envelope at Rimfire (Western Botanical 2025a). This feature is discussed in Section 8, including an assessment of potential impacts based on the Proposal's effects on groundwater as described in this chapter.

No other shallow/perched watertable systems have been observed in the vicinity of the Development Envelope. The regional watertable at Rimfire and the MIA is considered too deep to support GDEs, given observed depths of over 17 mbgl at Rimfire and over 20 mbgl at the MIA.

Subterranean Fauna

No troglobitic or stygobitic fauna were found at the MIA, and it is considered unlikely that subterranean fauna occur in most of the geological units of the MIA. Stygofauna have been recorded at Rimfire, and are discussed in Section 10 including an assessment of potential impacts based on the Proposal's effects on groundwater as described in this chapter.

7.3.5 Materials Characterisation

7.3.5.1 Waste Rock Geochemistry

The geology of the Winu deposit is divided into three waste rock strata:

- Leached Cap / Upper Oxidised
- Enrichment Secondary Sulfide Zone
- Hypogene Primary Sulfide Zone.

An extensive geochemical characterisation program has been conducted on the waste rock lithologies associated with the Proposal (Rio Tinto 2025e, 2024b, 2024a). Given the results, the Proponent has completed an AMD S&MP to inform waste rock and tailings management across the proposal (Rio Tinto 2024a). A detailed description of the geochemistry of waste rock lithologies and the quantities of waste rock produced is discussed in Section 11; however, in summary:

- Leached Cap / Upper Oxidised:
  - Mainly contains NAF material, mostly identified as 'Barren' as it has a limited Acid Neutralising Capacity (ANC)
  - No significant metalliferous leaching observed during sample analysis
- Enrichment Secondary Sulfide Zone:
  - Approximately 83% of samples tested were classified as PAF (Rio Tinto 2024a)
  - Remaining fraction classified as 'Barren' as ANC mostly absent or unavailable
  - An increased risk identified of heavy metals (Cd, Co, Cu, Mn, Ni and Zn) being released from some of the lithologies under acidic conditions
- Hypogene Primary Sulfide Zone
  - Lower proportion of PAF samples compared with the secondary sulfide zone
  - 58% of waste samples may be PAF (Rio Tinto 2025e)
  - PAF material exhibited readily available ANC properties, making it unlikely that any acidification will occur in the short term (<eight years)
  - Heavy metals (Cd, Co, Cu, Mn, Ni and Zn), are expected to be released if PAF material acidifies – although large concentrations have not been observed in kinetic laboratory testing.

7.3.5.2 Tailings

Two types of tailings streams will be generated (Figure 2-4; Figure 7-11) (Rio Tinto 2025f):

- High Sulfur (HS) flotation tailings; from the 'cleaner' scavenger flotation processing circuits - containing up to 300 kg $H2SO_4$/t. Low to Negligible ANC. Due to the high sulfide content and negligible ANC, all samples were classified as PAF
- Low Sulfur (LS) flotation tailings; from the 'rougher' flotation processing circuits - containing up to 35 kg $H2SO_4$/t. Low to Negligible ANC:
  - 53% of the samples were classified as PAF – noting that although some LS tailings samples were classified as PAF, the low sulfide content means that their acid-generating capacity is low and thus referred to as PAF-LC
  - 47% were classified as NAF or Barren.

The dominant sulfide minerals in both tailings streams were pyrite and chalcopyrite.

Under the unsaturated conditions expected on the beaches for the LS tailings, metal leaching was typically only observed in samples with low pH levels. However, sulfide materials in these shallow unsaturated zones would be exposed to oxidising conditions for a relatively short period between tailing deposition events, after which the previously exposed tailings would become saturated, in anoxic conditions. During leach testing of samples with extreme to particularly high sulfur concentrations, elevated concentrations of Al, Be, Cd, Co, Cu, Cr, Mn, Ni, Pb, U and Zn were recorded at the onset of acidic conditions (Rio Tinto 2025f). Cyanide concentrations remained consistently low in both streams despite changes in pH. The LS tailings are expected to be NAF overall based on:

- The bulk of the tailings containing primary sulfide feed material (85%)
- The alkaline process solutions
- The lag time until acidification for tailings classified as PAF and likely burial with new tailings
- The expected high degree of saturation.

Proposal tailings are to be maintained in saturated conditions, with the exception of the unsaturated zone along LS tailings beaches. During leach test conditions, neutral pH was maintained for the HS and LS tailings streams under saturated conditions, due to limited oxygen ingress (and subsequent sulfide oxidation) (Rio Tinto 2025f). Additionally, under these conditions, leached metals will be at very low concentrations after the first flush. Similarly to the unsaturated testing, the cyanide concentrations in both streams remained low. Hence HS tailings are PAF, but if maintained in a saturated state are not expected to generate AMD.

N

Legend

- Development Envelope
- Native Title Determinations
- Mining Lease

EMBANKMENT

RETURN WATER PONDS

LST 2

LST 1

HST

WASTE ROCK LANDFORM

EMBANKMENT

RioTinto

Fig 7-11: TSF Conceptual Design (LST = Low Sulfur Tailings, HST = High Sulfur Tailings) – Plan View

Rio Tinto Copper (RTC)

Publisher: Michael.Rouse
Date Published: Monday, 6 July 2026

Coordinate System:
GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994
Units: Meter
Scale: 1:20,000
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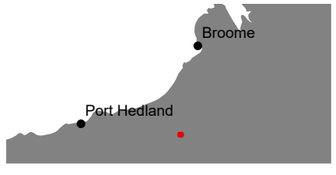


0 1 2 Kilometres

7.3.6 Proposed Water Management Strategy and Water Balance

This section provides a description and rationale for the Proposal's Water Management Strategy and description of the Proposal's water balance (Figure 7-12 to Figure 7-14). This information will be used to appropriately define relevant potential environmental impacts applicable to the Inland Waters factor.

Water balance modelling sensitivity analysis incorporated, along with a range of key assumptions, 'low' and 'high' climate change scenarios as defined in the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (IPCC 2023, cited in Worley 2025e).

In summary (Worley 2025e, 2025b, 2025c, 2025d, 2025f; Mine Lakes Consulting 2024); (Appendix C09, C12, C06, C04, C13, C16):

- The BWT pit will require dewatering to facilitate mining. Water recovered from pit dewatering is expected to be adequate to supply the Proposal for approximately the first 16 years of operation. The groundwater table will require lowering to maintain groundwater levels to 10 m beneath the actively mined pit floor
- Pit dewatering will be the primary source of water supply over the life of the Proposal, with contributions from runoff, direct rainfall and pit seepage, along with supplementary supply from Rimfire
- The Proposal will have surplus water until approximately Year 17 with excess water management required during that time. Peaks in surplus are expected to occur in approximately Years 3 and 9, with a near-neutral water balance in Years 6 and 7 and Years 12 to Year 16
- Without its water supply being supplemented from Rimfire the Proposal would be in water deficit from approximately Year 17 to cessation of operations. The borefield is proposed to be ready for use by Year 13 of operation, to ensure reliable supply under all climatic conditions (i.e. in the event conditions are drier than expected)
- Water supply is required for mineral resource processing, tailings management and other non-process uses, such as dust control and potable water.
- A temporary (approximately two year) water supply is also required during construction of the new access road within the RAC
- Water from pit dewatering and Rimfire will be transferred to a CWD before distribution.
- Surface water runoff from within the MIA, including potentially contaminated, sediment-laden and clear water, generated from stockpiles, WRL, TSF, other infrastructure areas and uncleared areas, will be separated and controlled through perimeter bunds, toe drains and ponds
- Potentially contaminated water (e.g. from secondary sulfide PAF stockpiles) will be directed by lined drains to lined sumps or water settling ponds before use in mineral resource processing circuit
- Potentially contaminated supernatant and drainage water from the TSF will be directed to a reclamation pond before use in mineral resource processing
- Excess water generated from pit dewatering during initial phases of operation will require management through use of infiltration ponds and adjacent bores for MAR, all within the MIA. Only clean water will be used for infiltration and MAR processes. Potentially contaminated surface water will be used only in the processing circuit. Table 7-8 shows the modelled excess water clean water to be sent to the infiltration ponds and MAR bores from the CWD, based on a number of scenarios, with the P90 scenario informing the design basis for surplus water management (shown as overflow in Figure 7-14).

Table 7-8: Excess water (ML/yr) (overflow from the Clean Water Dam sent to the MAR/Infiltration Ponds)

Year	Min	P10	P20	P50	P80	P90	Max
1	507	519	524	536	558	569	615
2	2649	2665	2668	2683	2707	2720	2772
3	2981	2997	3001	3015	3040	3052	3104
4	1555	1834	1962	2262	2989	3325	4008
5	1124	1458	1627	2041	2866	3201	4116
6	0	250	363	830	1775	2075	3186
7	0	300	441	890	1850	2131	3251
8	485	888	1036	1526	2589	2860	4057
9	1696	2041	2236	2694	3680	4025	5196
10	1370	1759	1910	2389	3375	3752	4877
11	547	868	1005	1486	2446	2805	3931
12	0	272	431	893	1836	2145	3231
13	0	0	50	479	1322	1616	2668
14	0	0	0	354	1325	1583	2832
15	0	10	151	574	1594	1849	2993
16	0	0	0	402	1262	1553	2668
17	0	0	0	299	1160	1420	2547
18	0	0	0	135	868	1096	1998
19	0	0	0	43	615	833	1546
20	0	0	0	0	415	572	1185
21	0	0	0	0	334	480	1014
22	0	0	0	0	311	459	993
23	0	0	0	0	216	376	782
24	0	0	0	0	136	274	620
25	0	0	0	0	89	214	542
26	0	0	0	0	31	135	439
27	0	0	0	0	108	253	663
28	0	0	0	0	148	290	711
29	0	0	0	0	143	290	723
30	0	0	0	0	143	292	719
31	0	0	0	0	126	274	703
32	0	0	0	58	523	740	1203
Average	**404**	**496**	**544**	**737**	**1268**	**1477**	**2184**
Peak	**2981**	**2997**	**3001**	**3015**	**3680**	**4025**	**5196**

Source: Worley 2025e

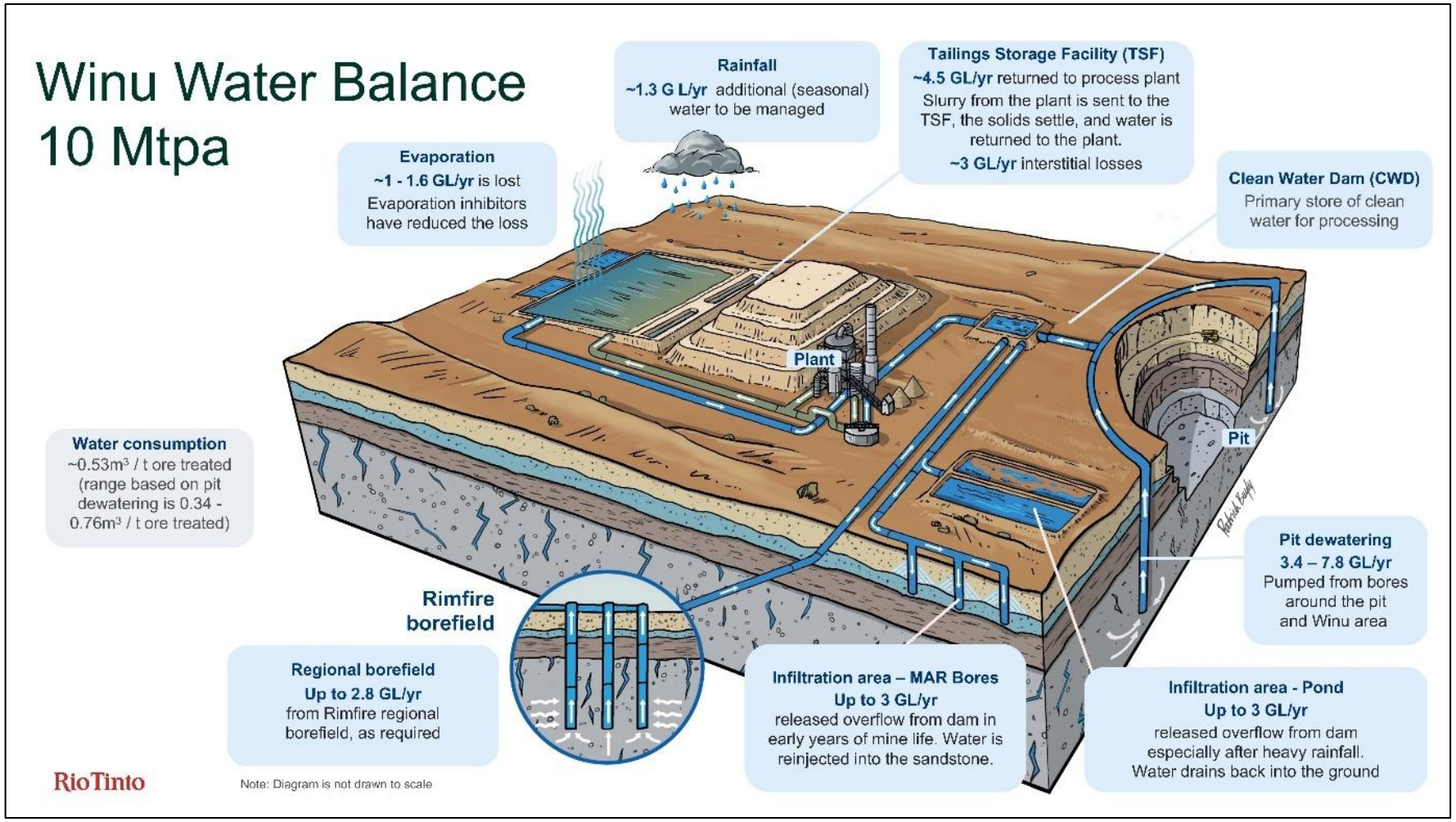
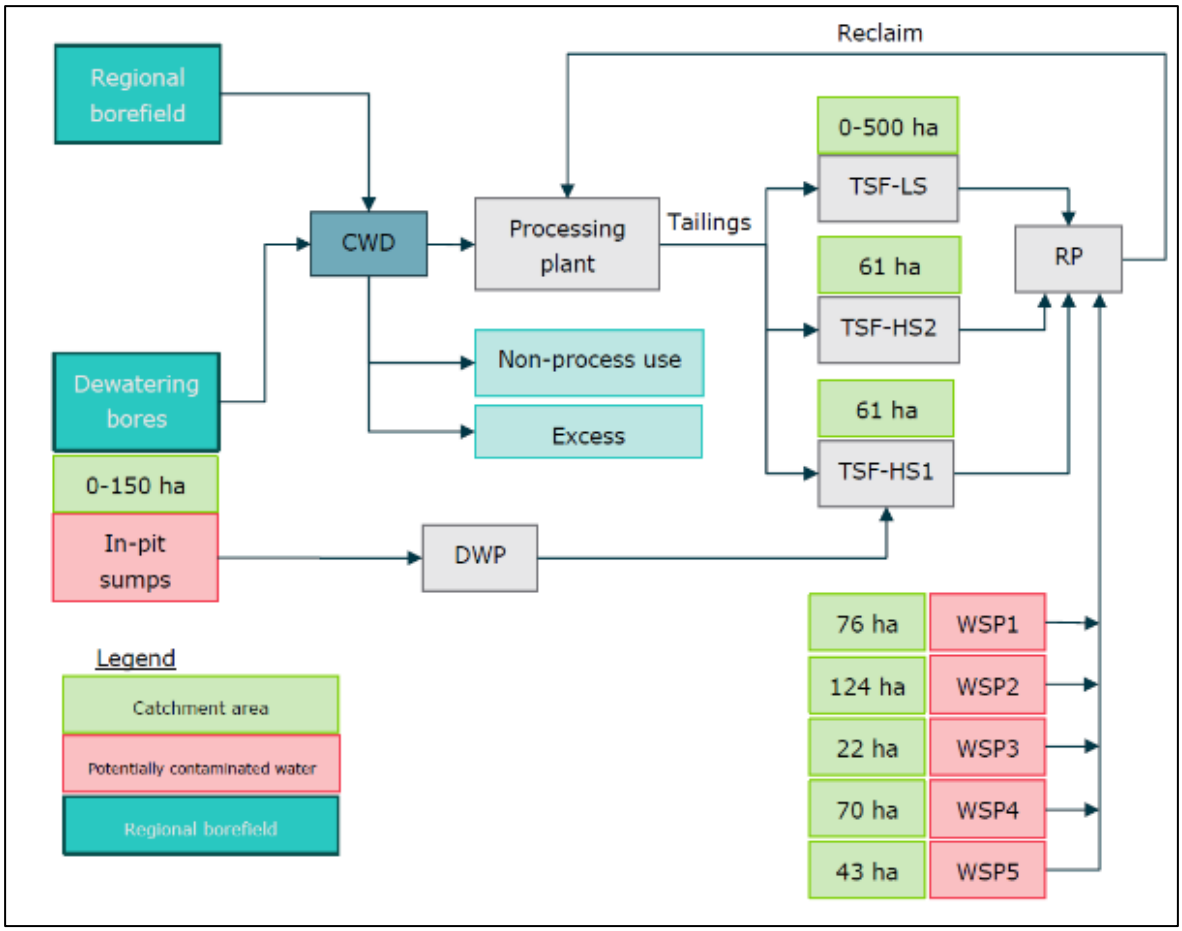
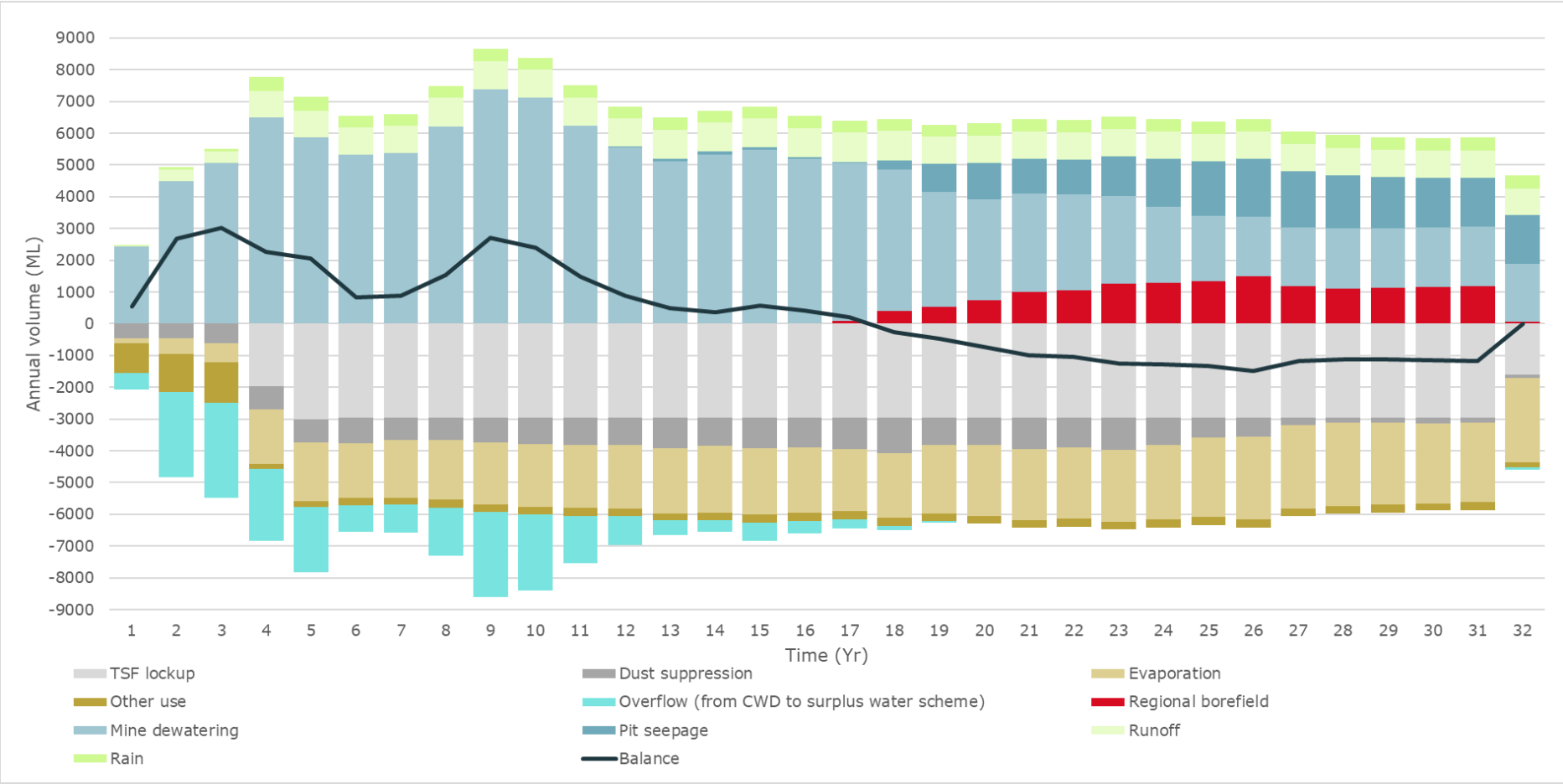


Figure 7-12: Conceptual Water Management Strategy and Water Balance



CWD: Clean Water Dam, DWP: Dewatering Pond, RP: Reclaim Pond, WSP: Water Storage Pond. Source: (Worley 2025e)

Figure 7-13: Site Water Balance Conceptual Model



Source: (Worley 2025e)

Figure 7-14: Median Annual Site Water Balance (ML/year) – Base Case

7.3.6.1 Pit Dewatering

The Proposal includes BWT mining which requires the mining pit to be appropriately dewatered so the mineral resource can be safely and efficiently accessed.

The pit dewatering system will include a series of dewatering bores to minimise pit inflow and increase pit wall slope stability. Water from the pit perimeter bore pumps, classified as clean, will discharge to a CWD.

In-pit mine dewatering is also required via in-pit sumps to manage inflows from rain, run-off and seepage. There will be in-pit sump pumps and pit storm water pumps to support this requirement. Discharge from in-pit dewatering is considered potentially contaminated and will be directed to a separate water storage (dewatering pond).

7.3.6.2 Rimfire

The Proponent proposes to address a predicted water deficit from approximately year 17 by pumping water from Rimfire, approximately 32 km east of the MIA. Rimfire will include a network of production bores (nine expected to be required) feeding a pipeline for transfer of the water to the processing and non-processing areas (Worley 2025c; Fortin 2025). Transfer pumping station(s) and storage tanks at the borefield are also expected to be required. An associated network of monitoring bores would also be required to manage the borefield. The main pipeline to the MIA would be buried, following a route based on significant consultation with Traditional Owners.

7.3.6.3 RAC

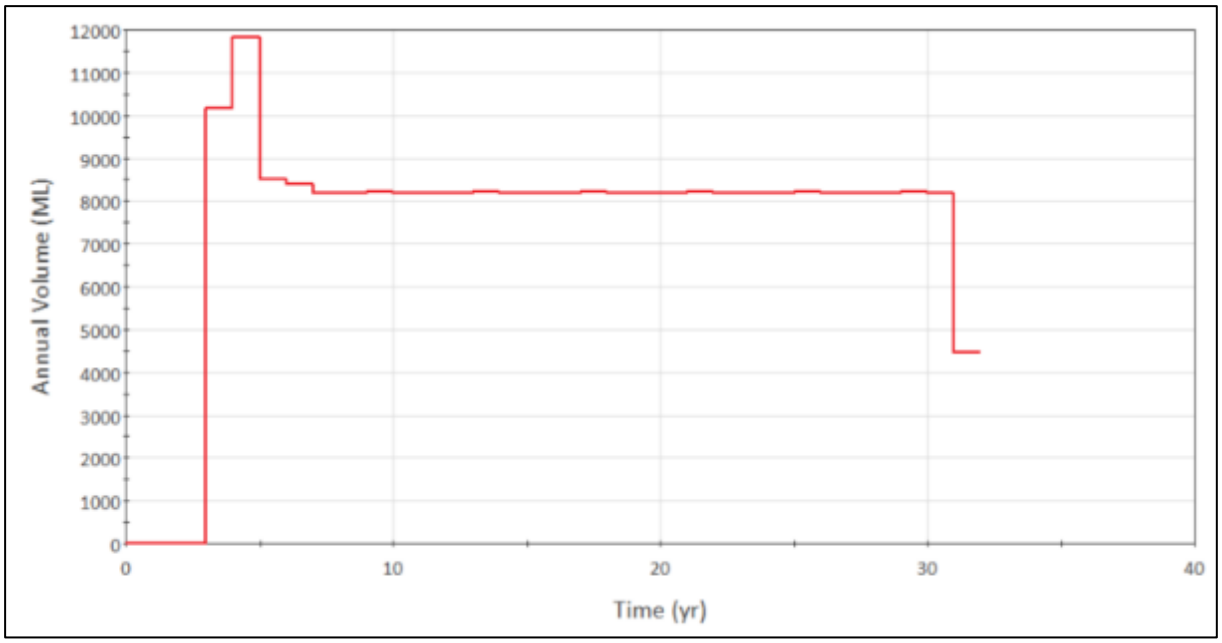
The Proponent proposes to access groundwater, along the access road, to serve as the primary water supply for construction of the new access road and for dust suppression/maintenance. Temporary groundwater abstraction licences under s 5C of the RiWI Act will be sought for abstraction of approximately 1.0 GL/a over approximately 2 years (Worley 2025f), for:

- Approximately 0.7 GL/a (approximately 12 to 18 month requirement) for construction
- Approximately 0.3 GL/a (approximately 18 to 24 month requirement) for dust suppression required on the existing access road until the new sealed access road is completed with ongoing water used expected to be negligible.

7.3.6.4 Operational Use

The major water demand for the Proposal is associated with the operation of the processing plant, with different water requirements for each type of resource type encountered (oxide, secondary and primary resource). The water balance model indicates that the water requirements for the processing plant will remain relatively constant over the LoM; reaching a maximum of 12 GL/a following commencement of plant operations but is otherwise steady at approximately 8 GL/a (Figure 7-15) (Worley 2025e). Up to approximately 1 GL/a of water will also be required for several non-processing activities, namely:

- On-site haul road dust suppression - note that dust suppression for the construction and maintenance of the access road will be sourced from local supplies along the proposed route
- Water requirements for construction earthworks and dust suppression
- Non-processing mine infrastructure
- Potable requirement for mine and accommodation
- Cooling tower.



Source: (Worley 2025e)

Figure 7-15: Annual Process Water Requirements (ML/yr)

7.3.6.5 Tailings Storage Facility

As stated in Section 7.3.5.2, the tailings generated from the processing plant will be split into high and low-sulfur streams and stored within separate cells within the TSF (Section 11).

A water balance model and seepage modelling were developed for the TSF to ensure that it can be operated at the target storage under likely projected climatic conditions and seepage rates remain within acceptable limits (WWL 2025a; SRK 2025).

7.3.6.6 Surplus Water – Infiltration Ponds and Reinjection Bores

Where surplus water from pit dewatering cannot be managed in the CWD (Figure 7-15), two infiltration ponds and 15 adjacent bores for MAR will be used. Up to five additional bores may be required if required reinjection rates cannot be achieved (Figure 7-16). The ponds and MAR borefield will be located within the MIA, approximately 2 to 2.5 km south-east of the mine pit. The aquifer that the MAR borefield will target for re-injection is the Triwhite sandstone. It has a current depth to groundwater of 35 to 42 mbgl in the area of the proposed MAR borefield. Contaminated water from stockpiles, WRL, TSF, other infrastructure areas and uncleared areas will be directed to the processing plant for use, not to the infiltration ponds or MAR reinjection bores.

Field investigations and numerical modelling support the pond infiltration and MAR options both being technically feasible; however, some site-specific constraints and uncertainty with respect to the distribution and continuity of the underlying sandstone (as the target aquifer for surplus water discharge) has potential to limit the effectiveness of either option as a standalone option (Worley 2025d). Hence the Proponent is proposing to utilise the infiltration ponds and MAR as a hybrid system (Figure 7-17). The use of this combination also provides contingency and buffer elements for potential peak surplus water management demands and allows for regular maintenance of the MAR bores.

Preferential flow of surplus water would be directed to the MAR bores, with excess or overflow diverted to the infiltration ponds.

The existing observed groundwater table at the location of the infiltration ponds and MAR bores is around 35 to 42 mbgl, in the deeper sandstone aquifer (Figure 7-18) (Worley 2025d).

121°0'0"E

122°0'0"E

20°0'0"S

21°0'0"S

N

NYANGUMARTA PEOPLE (PART A)
MARTU (AREA A)

0 500 1,000
Metres

NYANGUMARTA PEOPLE (PART A)
MARTU (AREA A)

0 1 2
Kilometres

NYANGUMARTA PEOPLE (PART A)
MARTU (AREA A)

RioTinto

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Wednesday, 10 June 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
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Figure 7-16: Indicative Infiltration Pond and Managed Aquifer Recharge (MAR) Bore Locations

Legend

- Managed Aquifer Recharge (MAR) Bores
- Contingency Managed Aquifer Recharge (MAR) Bores
- Development Envelope
- Native Title Determinations

Conceptual Footprint

- Aerodrome
- ANFO
- Bore Fields and Pipelines
- Camps
- Mine Construction Areas
- Mine Pit
- Ore Stockpiles
- Ponds
- Power Generation (Wind and Solar)
- Processing Infrastructure
- Roads and Borrow Pits
- Tailings Storage Facility
- Topsoil Stockpiles
- Waste Rock Landform
- Infiltration Pond

0 10 20
Kilometres

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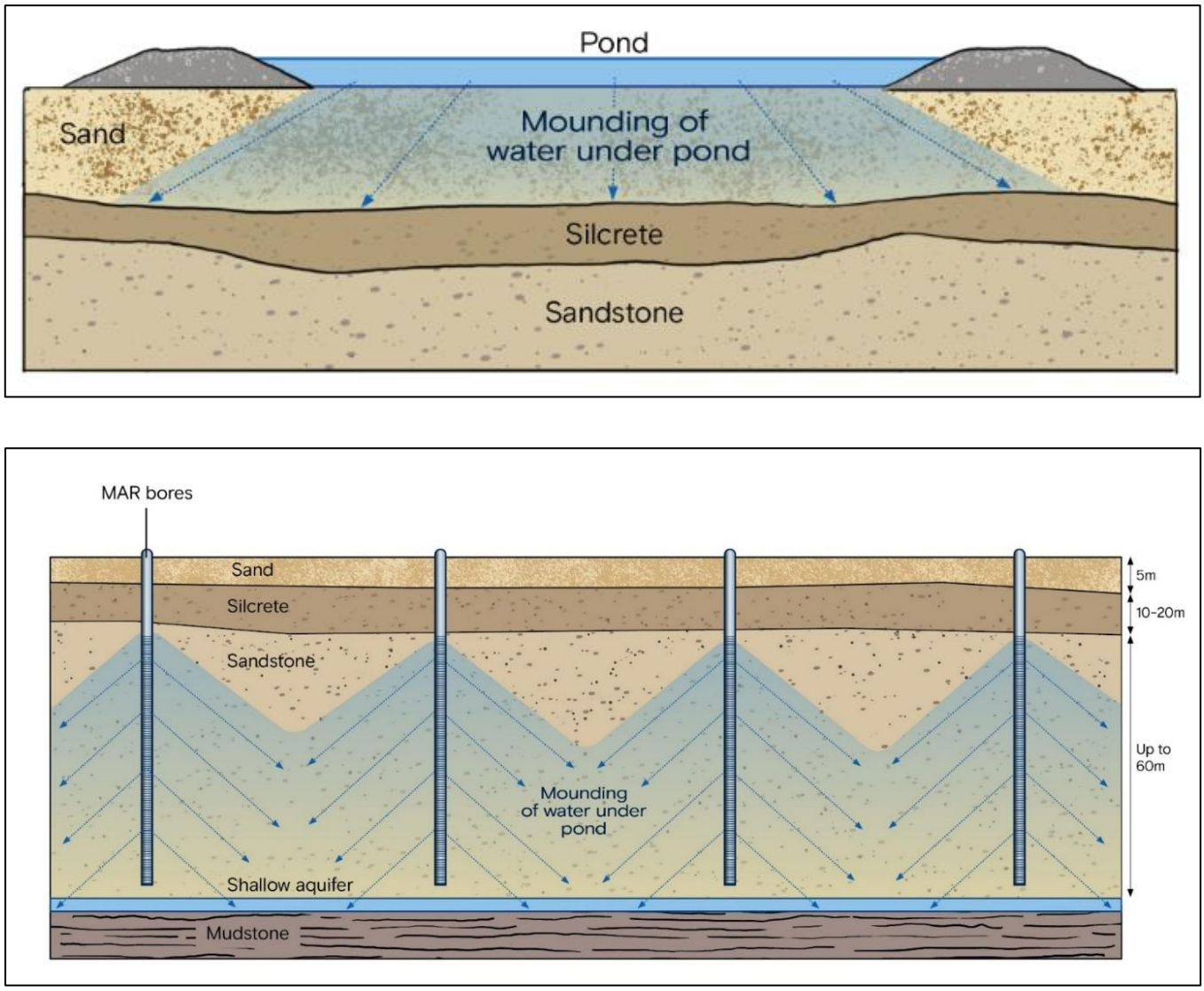

Figure 7-17: Conceptual Cross Section - Infiltration Pond (top) and Managed Aquifer Recharge (MAR) Bores (bottom)

N

Legend

DTW (m BGL)
- 35
- 40
- 45
- >50

Infiltration Ponds

Native Title Determinations

Proposed Infrastructure

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

0 1 2 Kilometres

RioTinto

Figure 7-18: Modelled Depth to Water at Infiltration Ponds and MAR – Pre-Mining (Not Affected by Pit Dewatering)

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Wednesday, 10 June 2026

Coordinate System:
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Datum: GDA 1994
Units: Degree
Scale: 1:30,000
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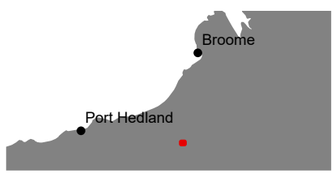

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_InlandWaters.aprx Layout: ERD - Inland Waters - Modelled Depth to Water at Infiltration Ponds and MAR - Pre Mining

7.4 Potential Environmental Impacts

7.4.1 Direct Impacts

Potential direct impacts of the Proposal to Inland Waters have been identified as:

- Lowering of groundwater levels through:
  - Mine pit dewatering at the MIA
  - Abstraction of water from Rimfire for operational water supply
  - Abstraction of water for construction of the new access road
- Mounding of groundwater levels through discharge of surplus water within infiltration ponds and aquifer recharge bores
- Mounding of groundwater levels from TSF seepage
- Alteration to surface hydrological regimes from the development and placement of open mine pits and associated infrastructure.

7.4.1.1 Lowering of Groundwater Levels from Mine Pit Dewatering and Borefields

7.4.1.1.1 MIA

Pit dewatering will reduce groundwater levels in the groundwater system surrounding the pit. The pit dewatering rate will be approximately 3-4 GL/year, with an initial peak estimated of up to 7.9 GL/year in approximately Year 3 (Worley 2025b).

Mining of the mineral deposit will occur to an approximate depth of 480 mbgl. The pre-mining watertable will be encountered early in operations at approximately 50 mbgl, and therefore dewatering will be required to enable access to the mineral deposit, i.e. groundwater drawdown of approximately 440 m is required to maintain groundwater levels 10 m beneath the final pit floor, at a standing water level of -250 m RL (-250 m AHD).

A numerical groundwater model was developed for the Proposal to predict the groundwater drawdown associated with dewatering (Worley 2025b) (Appendix C09).

The dewatering of the pit will result in a cone of depression within the aquifer and cause groundwater to flow towards the pit, including seepage water from the infiltration ponds and surplus water discharged via the MAR borefield (Section 7.4.1.2). In the long term (closure) the pit will continue to act as groundwater sink due to evaporation, resulting in continued propagation of the drawdown away from the pit.

The maximum modelled drawdown due to groundwater abstraction at the end of mining is shown in Figure 7-19 and Figure 7-20.

Hydrogeological model sensitivity testing addressed the influence of the major geological structures (Thony Devil Fault and mafic sill, as no flow and partial flow barriers) on dewatering rates and volumes (Worley 2025b). The drawdown shown in Figure 7-19 is based on parameters that include the partial flow boundaries at the pre-mining mafic sill and the Thorny Devil Fault at the end of mining. As such the predictive modelling set up tested the effect of low- and higher- permeability horizontal flow barriers through two separate model runs. Amongst other assumptions used for the LoM predicted drawdown was a target of 10 m below the pit wall.

An uncertainty analysis on the hydrogeological model was undertaken with the aim of quantifying the uncertainty in predicted groundwater levels over the life of the mine, based on likely/very likely (P33/P10), median (P50 – a 50% probability that the outcome will occur) and unlikely/very unlikely (P67/P90) probability inputs (Worley 2025b). Key parameters informing the uncertainty analysis – hydraulic conductivity, specific storage specific yield – were included within ranges identified in hydrogeological conceptualisation. The required peak dewatering rate of 7.9 GL/a was derived considering the likely (P33) and unlikely (P67) scenario deviations from the median (P50) probability

scenario, with the uncertainty analysis results indicating that the pit inflow rate is unlikely to range by more than 10% of the predicted inflow.

7.4.1.1.2 Rimfire

Rimfire abstraction will reduce groundwater levels and produce a cone of depression in the groundwater system surrounding the borefield (Worley 2025c) (Appendix C12). Modelled maximum drawdown due to groundwater abstraction at the end of mining is shown in Figure 7-21, based on 32 years of abstraction at a rate of 2.8G L/a.

Rimfire is expected to provide a sustainable supply of operational water sufficient to meet demand for the mine life, estimated at a maximum of 2.8 GL/a. The base case of modelling under normal climatic conditions indicate that the peak supply from the borefield would be required in approximately Year 26 of operations. This supply is predicted to be sustainable over the LoM based on test pumping and modelling (Worley 2025c) (Appendix C12).

Modelled drawdown at the end of borefield groundwater abstraction for the median P50 case was very similar to the base case prediction (Worley 2025c) (Appendix C12). The volume of groundwater abstracted did not change between the scenarios, only modelling parameters. The P10 (very likely) and P90 (very unlikely) cases suggested marginally smaller and larger drawdown footprints, respectively, suggesting that applied model parameter perturbation ranges do not result in large deviations from predicted drawdown extents.

A hydrogeological conceptualisation overview of the Percival Palaeovalley was prepared to assess the potential impacts to the palaeovalley given the potential occurrence of groundwater dependent vegetation there (Section 8) (Worley 2025i). The modelled 2 m drawdown contour from Rimfire groundwater at the end of mining under the maximum 2.8 GL/a scenario intersects the northern part of the palaeovalley (Figure 7-21); therefore, there is potential for groundwater dependent values to be affected within that zone of influence, and this is assessed in Section 8.

The predicted drawdown associated with Rimfire and the proposed dewatering at the MIA do not spatially overlap (Worley 2025a).

7.4.1.1.3 RAC

Water abstraction for road construction and dust suppression is proposed to occur from series of bores as construction progresses. Each bore would be utilised for approximately 6 months, resulting in a total operational period of approximately 24 months across all bores.

Abstraction would occur from two aquifers (Worley 2025f):

- 0.4 GL/a from the Broome Aquifer and Lower Callawa Formation, at the western end of the RAC
- 0.6 GL/a from the Lower Callawa and Unconfined Wallal Aquifer, where the Jarlemai Siltstone is absent.

An assessment of the potential effects of groundwater abstraction for the RAC was undertaken utilising a review of existing relevant assessments supported by a field hydrogeological investigation program including drilling, installation and pumping tests of production and monitoring bores (Worley 2025f) (Appendix C13).

Groundwater drawdown will occur with abstraction at the production bores installed along the RAC. Predictive analysis of groundwater levels for each proposed production bore was performed based on the proposed construction schedule and water usage rates, using the estimated hydraulic properties derived from ‘Aqtesolv’ software, an aquifer testing analysis tool (Worley 2025f). The results indicate:

- Peak pumping rate (approximately 15 L/s [i.e. approximately 0.47 GL/a]) at each bore can likely be maintained for the duration of road construction with negligible drawdown in surrounding aquifers

- Bore WINU1328, the westernmost bore assessed and screened in the Broome Aquifer, had the deepest predicted drawdown at approximately 34.5 mbgl (i.e. from approximately 51.0 mbgl static groundwater level to approximately 85.5 mbgl)
- All other bores indicate a predicted maximum drawdown of less than 4 m
- Groundwater recovery rates (to 95%) once abstraction stops were predicted to be less than one day for all bores.

7.4.1.2 Groundwater Mounding from Management of Surplus Water

Mine pit dewatering water will be distributed from the CWD to the process plant, support facilities and village. Where surplus water cannot be managed in the 0.4 GL capacity CWD, two infiltration ponds of conceptual design coverage of 84 ha and 103 ha respectively and 15 adjacent bores for MAR will be used. Up to five additional bores may be required if required reinjection rates cannot be achieved (Figure 7-16). This will allow infiltration into the surficial sands and underlying silcrete and sandstone via the ponds, and direct recharge of the deeper sandstone aquifer via the bores, as well as some loss through evaporation (Figure 7-17).

In the location of the infiltration ponds, the partially saturated sandstone aquifer extends approximately 40 to 50 mbgl. The infiltration ponds will be located to provide distance from and reduce circulation back into the mine pit. The preferred location of the MAR bores is to the eastern side of the ponds, for the same reason. A nominal spacing of 200 m between each bore is to be applied to distribute the surplus water into the sandstone aquifer, with the bores arranged in a chevron pattern (Worley 2025d).

Pond positioning is also to align with the existing dune system, to also minimise disturbance to local landforms.

Infiltration pond design was based on minimising risk of (Advisian 2023b):

- Overtopping due to storage capacity exceedance
- Recirculation of infiltrated water back to the mine pit
- Forming a surface expression of groundwater or near-surface groundwater table.

Surplus water discharge is expected to peak in Year 9 when pit dewatering requirements will be at their greatest. The Year 9 peak is estimated to be approximately 4.0 GL/a based on the P90 (‘worst case’) scenario, gradually reducing to less than 0.6GL/a by approximately Year 20 when operational water demand is modelled to exceed dewatering rates (Table 7-8; Figure 7-15) (Worley 2025e).

Discharge of excess dewatering water into the infiltration ponds and MAR borefield has potential to lead to localised groundwater mounding and surface water expression in adjacent areas. The potential impact of this on vegetation is assessed in Section 8.

Field investigations and numerical groundwater modelling, including uncertainty analysis, was used to compare the infiltration pond and MAR options and estimate effects on groundwater over the estimated 32 year LoM (Worley 2025d). The modelling indicated that both the infiltration pond and MAR options would be able to accept all the surplus water as standalone arrangements; however, given inherent uncertainty on the distribution and competency of the underlying sandstone layer, the Proponent proposes utilising both options to ensure that all excess water can be recharged (i.e. the joint capacity of the options is approximately 8.0 GL/a, double the maximum peak excess of approximately 4.0 GL/a [Figure 7-15]). Note that, as depicted in Figure 7-15, ‘overflow’ in relation to the CWD means any excess water directed from the CWD to the infiltration ponds and MAR borefield. Given the high capacity of the recharge options to accept that water, no emergency overtopping of the CWD leading to uncontrolled ‘overflow’ to the environment is anticipated.

Infiltration trials support the assumption that the silcrete aquitard below the surficial sands is sufficiently leaky to allow pond seepage to percolate vertically into the underlying sandstone aquifer. The study also found that some of the discharged surplus water will return to the open mining pit, mostly via the sandstone aquifer; however, the rates are considered by Worley (2025d) to be manageable. The study results are described below.

7.4.1.2.1 Infiltration Ponds Option

Groundwater levels will rise in the surficial sand around the perimeter of the ponds, creating two groundwater mounds (Figure 7-22 and Figure 7-23).

The groundwater mounds will occur around the ponds; however, most of the water volume seeps into the sandstone aquifer.

Mounding in the surficial sands will be relatively localised and cover a smaller footprint (approximately 102 ha) at the peak period of surplus water management in Year 9 (Biota 2025a).This has been calculated on the 10 m depth to groundwater contour (Figure 7-23).

Mounding of the deeper sandstone aquifer will occur over a larger footprint (approximately 344 ha) at the peak period of surplus water management in Year 9, with some of the infiltrated water reporting back to the mine pit. This has been calculated on the 30 m depth to groundwater contour (Figure 7-22).

The extent of mounding will reduce as surplus water volumes decrease after the Year 9 peak.

Pit inflows of an average 11 L/s are predicted, or 23% of the infiltrated volume.

7.4.1.2.2 MAR Option

Bore discharge into the sandstone aquifer is not predicted to result in any effect, including groundwater mounding, on the overlying surficial sand aquifer even during the peak year of surplus water management (Year 9) (Figure 7-24 and Figure 7-25).

During the peak year (Year 9), depth to water is predicted to be more than 35 mbgl at Pond 1 and 30 mbgl at Pond 2 in the vicinity of the MAR bore lines.

Pit inflows of an average 15 L/s are predicted, or 31% of infiltrated volume.

121°40'0"E 121°50'0"E 122°0'0"E

20°40'0"S 20°50'0"S

N

Legend

- Dewatering Bores
- Pit Dewatering Predicted Maximum Drawdown (m)
- Development Envelope
- Native Title Determinations
- Conceptual Footprint
- Palaeovalleys (Geoscience Aus. 2012)
- Claypan Occurance Areas

2
5
10
20
50
100
200
1

NYANGUMARTA PEOPLE (PART A)

Mine Infrastructure Area (MIA)

MARTU (AREA A)

Rimfire

Percival

0 5 10 Kilometres

RioTinto

Figure 7-19: Winu Pit Dewatering Predicted Maximum Drawdown at End of Mining

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Wednesday, 10 June 2026

Coordinate System:
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Datum: GDA 1994
Units: Degree
Scale: 1:125,000
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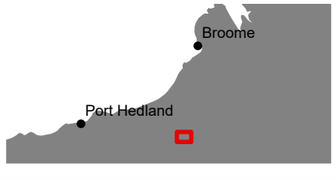


Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_InlandWaters.aprx Layout: ERD - Inland Waters - Pit Dewatering - Predicted Max DD

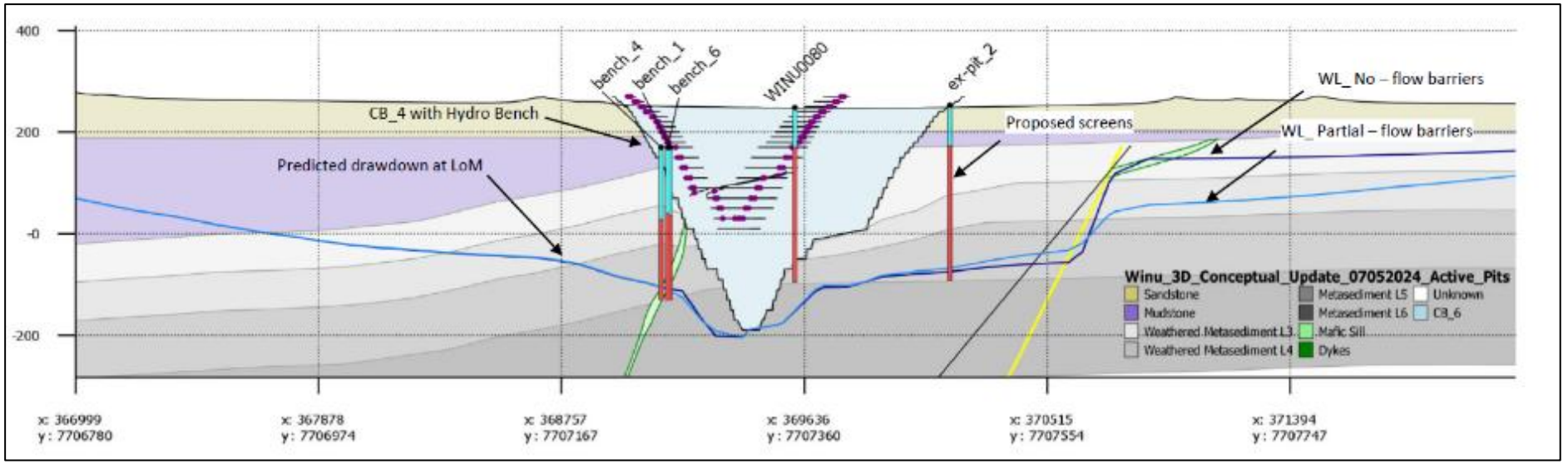
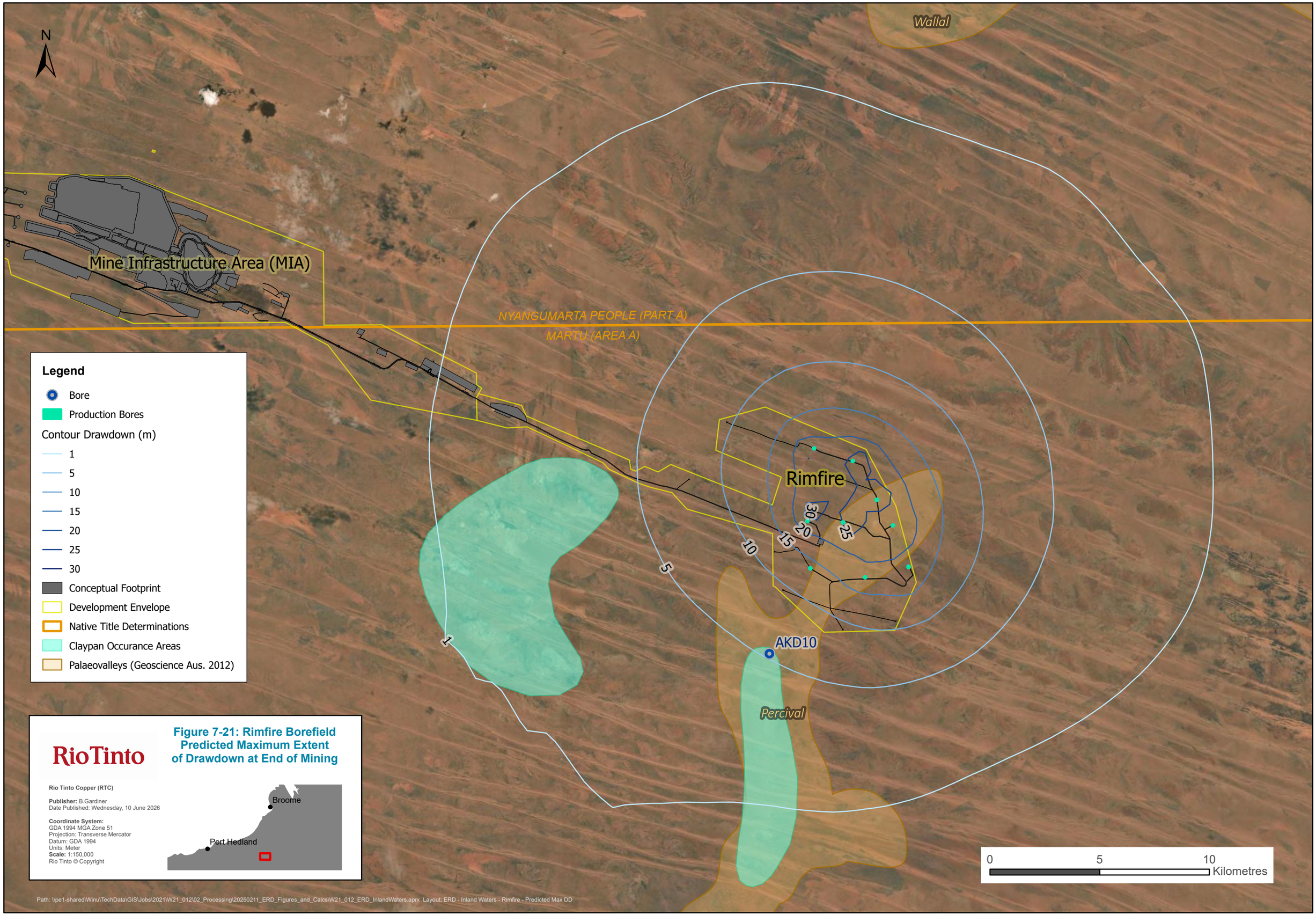


Figure 7-20: Winu Pit Dewatering - Predicted Maximum Drawdown at End of Mining (Cross Section)


N
Wallal
Mine Infrastructure Area (MIA)
NYANGUMARTA PEOPLE (PART A)
MARTU (AREA A)
Rimfire
30
25
20
15
10
5
1
AKD10
Percival
0
5
10
Kilometres
Legend
Bore
Production Bores
Contour Drawdown (m)
1
5
10
15
20
25
30
Conceptual Footprint
Development Envelope
Native Title Determinations
Claypan Occurance Areas
Palaeovalleys (Geoscience Aus. 2012)
RioTinto
Figure 7-21: Rimfire Borefield Predicted Maximum Extent of Drawdown at End of Mining
Rio Tinto Copper (RTC)
Publisher: B.Gardiner
Date Published: Wednesday, 10 June 2026
Coordinate System:
GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994
Units: Meter
Scale: 1:150,000
Rio Tinto © Copyright
Broome
Port Hedland
Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_InlandWaters.aprx Layout: ERD - Inland Waters - Rimfire - Predicted Max DD

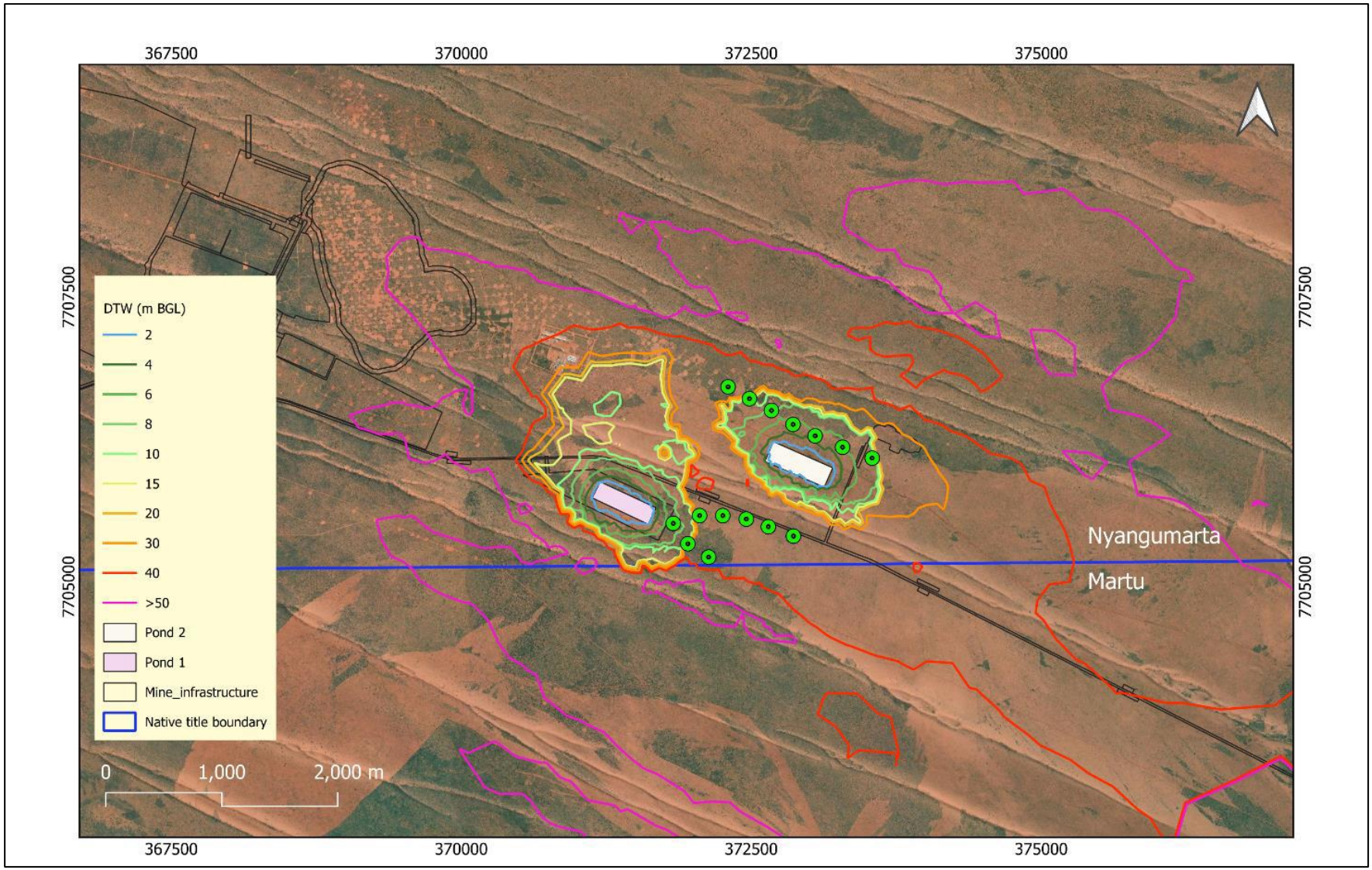


Figure 7-22: Modelled Depth to Groundwater - Infiltration Ponds Option – Peak Rate (Year 9)

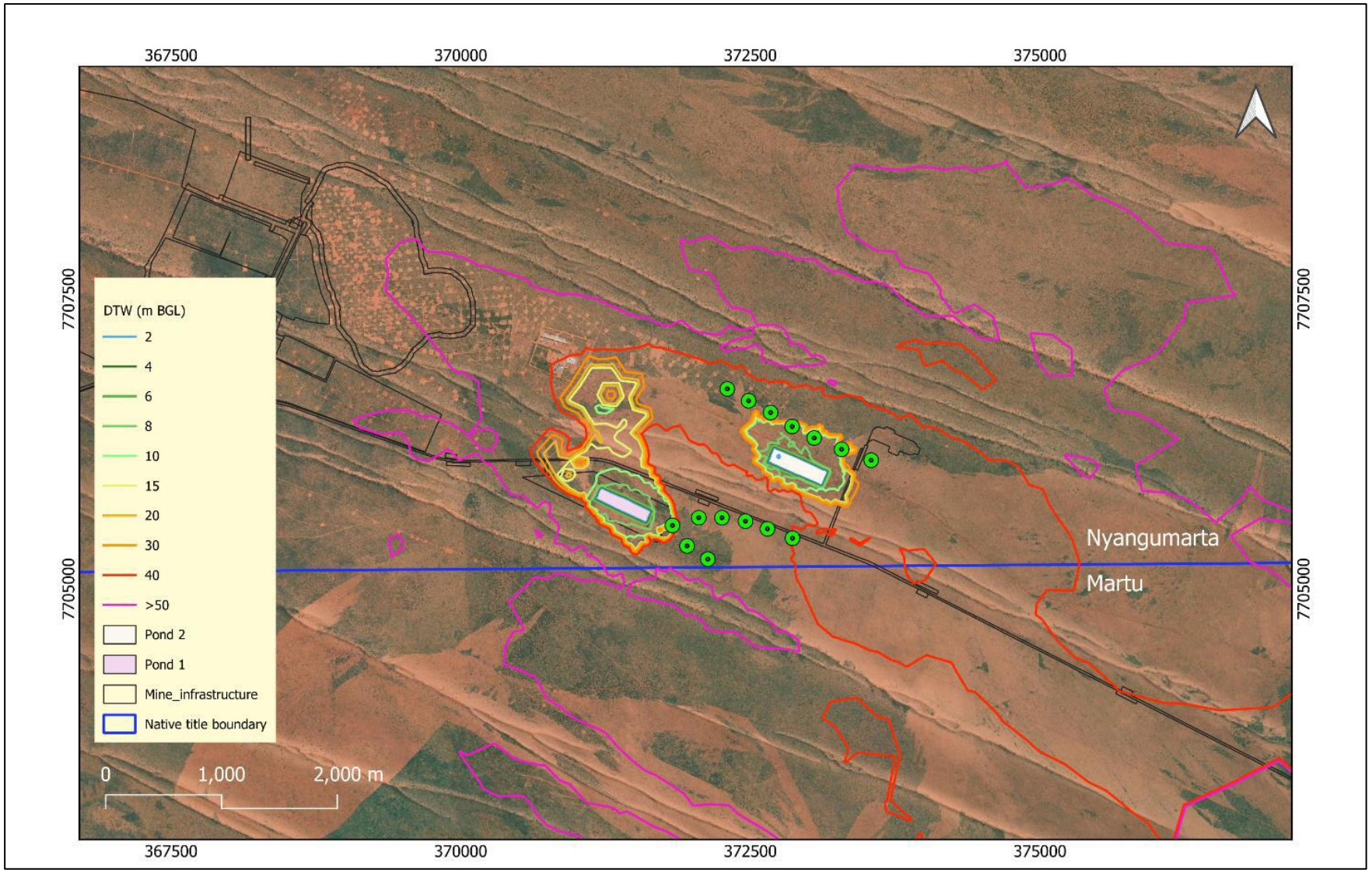


Figure 7-23: Modelled Depth to Groundwater - Infiltration Ponds Option – End of Mining

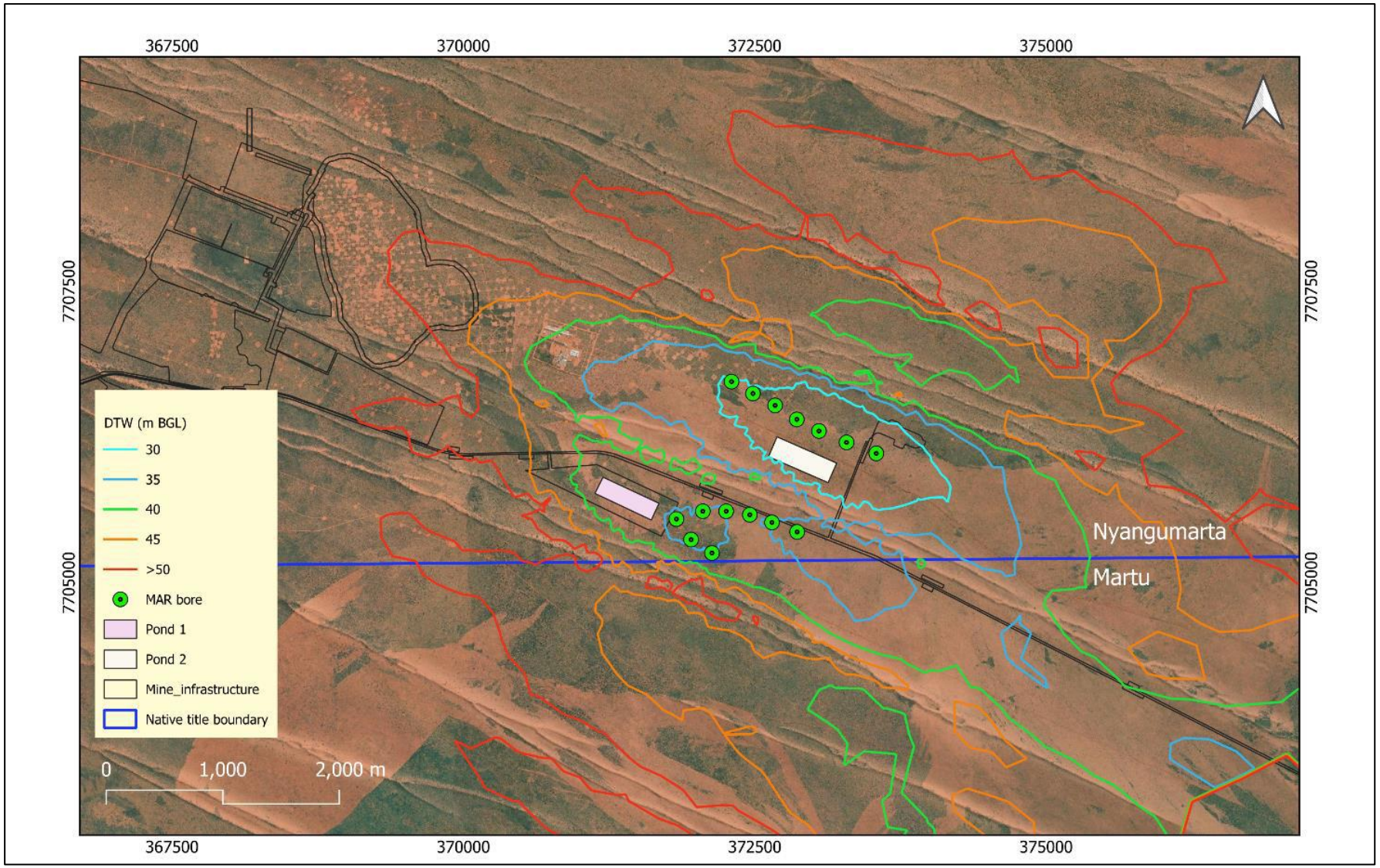


Figure 7-24: Modelled Depth to Groundwater - MAR Option – Peak Rate (Year 9)

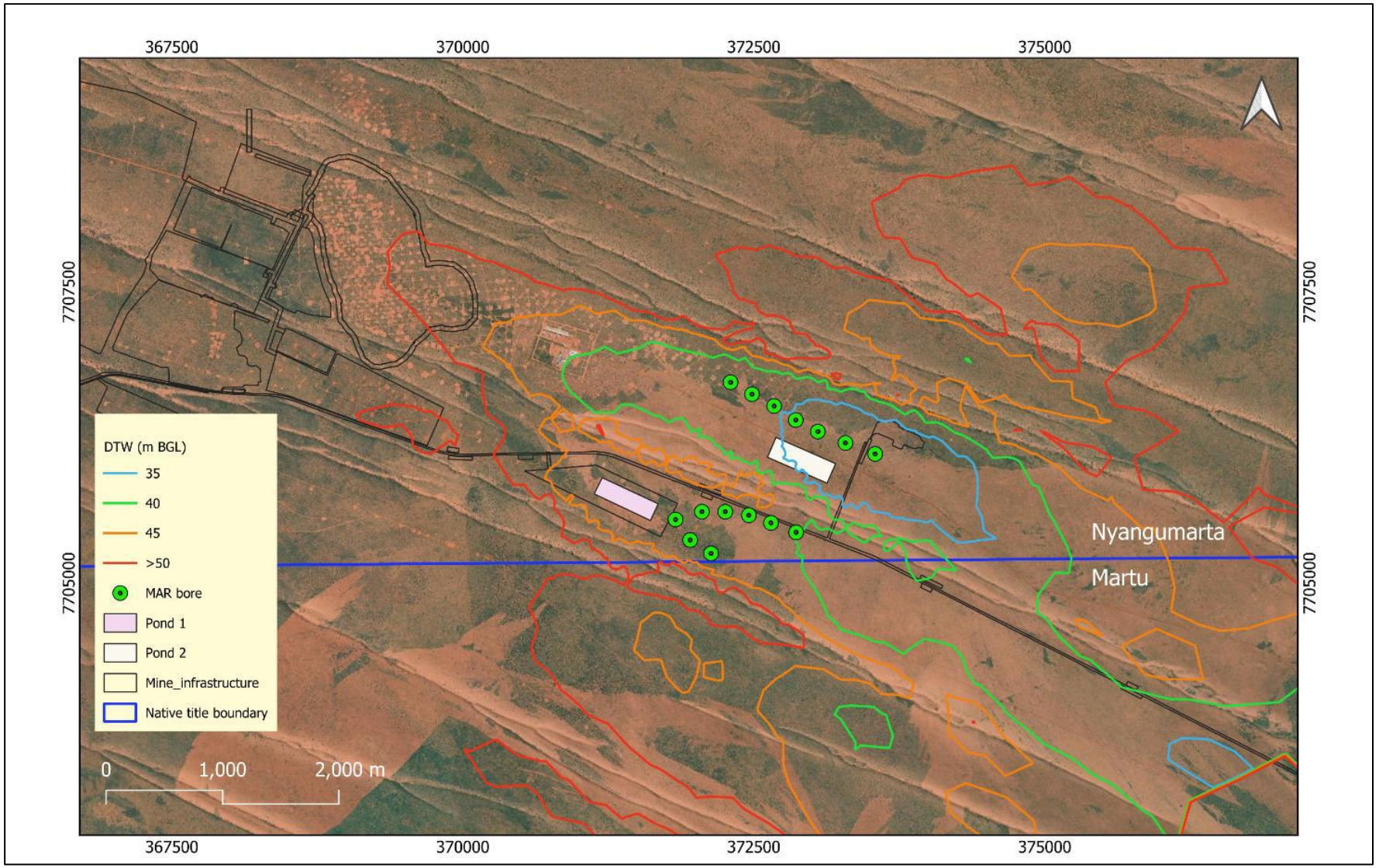


Figure 7-25: Modelled Depth to Groundwater - MAR Option – End of Mining

7.4.1.3 Groundwater Mounding from TSF Seepage

TSF seepage has the potential to lead to groundwater mounding during operations and after closure.

The silcrete layer below the TSF will potentially act as an aquitard (Advisian 2023b; Worley 2025e; SRK 2025) which has the potential to result in mounding; however, mounding is not considered by the Proponent to be a significant concern due to:

- The TSF being immediately underlain by an unsaturated surficial sand layer (Section 7.3.4.3)
- Indications the silcrete layer in the area, although an aquitard, is not continuous, and therefore leaky (Worley 2025d)
- Modelling that indicates that rates of seepage from the TSF will be negligible, controlled by minor imperfections in the TSF liner (SRK 2025)
- If low permeability layers are encountered by any seepage, then, although a perched watertable has the potential to occur which may result in lateral transport depending on silcrete topography; the silcrete layer intersects the pit shell (SRK 2025)
- The mine pit will act as terminal groundwater sink during operations due to pit dewatering, and continue post-closure, which will draw any TSF seepage towards the pit as the TSF is located within the drawdown cone of the pit (Figure 7-21; Figure 7-28; Section 7.4.1.1).

Given this, groundwater mounding due to TSF seepage is not discussed further. The related potential effects of TSF seepage on groundwater quality and the mine pit are discussed under indirect impacts, below (Sections 7.4.2.1 and 7.4.2.4).

7.4.1.4 Alteration to Surface Hydrological Regimes

The implementation of the Proposal has the potential to impact regional hydrology surrounding the Development Envelope through:

- The construction of the Proposal reducing the total area of the Great Sandy Desert Lake Dora Catchment, which supports key Inland Water environmental values. The maximum direct disturbance footprint of the Proposal is 4,878 ha
- Construction of the MIA altering the surface water flows to the surrounding environment. The MIA Development Envelope extent is 10,182 ha and includes the pit, WRL, TSF, processing plant and related infrastructure
- Construction of the RAC causing ponding upstream, water shadows downstream and altering the surface water flows downstream. The RAC will extend approximately 183 km from the Great Northern Highway to the MIA and its Development Envelope is 6,647 ha. The access road will run parallel to the current access road and will be elevated above the natural surface level. The final cleared road surface will be sealed at a 7 m width (dual-lane) in a 9 m wide formation within the RAC. Borrow pits will be established at regular intervals along the access road and in some instances retained for road maintenance during operations.

Hydraulic modelling informing Proposal flood mapping has been developed for the MIA (Worley 2024c) and RAC (Worley 2024b) based on 1%, 5% and 10% (RAC only) Annual Exceedance Probability (AEP) rainfall scenarios, to inform surface water design, management and mitigation measures.

7.4.1.4.1 MIA

Within the MIA the 1% AEP flood mapping shows floodwater of approximately 0.2 m depth in free-draining inter-dune areas and ponding depths in the basin inverts of 1.5 to 3.5 m, depending on the size of the upstream catchment (Worley 2024c). Flood mapping of the 5% AEP indicated the peak depths in the basin inverts of 1 m to 2 m.

7.4.1.4.2 RAC

The access road will run parallel to the current access road and will be elevated above the natural surface level.

Within the RAC, the 1% AEP flood modelling was initially used to identify the 28 waterway crossings required along the transport corridor, then the modelling results for the 1%, 5% and 10% AEP scenarios were used to define maximum flood depth, duration of inundation, peak flow and peak velocity (Worley 2024b). The data were also used to understand flood depths and durations within each borrow pit proposed along the RAC.

7.4.2 Indirect Impacts – Reduction in Ground and/or Surface Water Quality

Implementation of the Proposal has the potential to result in the reduction in ground and/or surface water quality. Particular aspects of the Proposal which have this potential have been identified as:

- Groundwater contamination from TSF seepage or spillage
- Groundwater or surface water contamination from pit walls, waste rock landforms and/or mine stockpiles AMD
- Management of surplus mine dewatering within infiltration ponds and MAR
- Post-closure formation of a pit lake
- Seepage, leaks or spills of chemicals (including hydrocarbons)
- Increases in sediment load from infrastructure and drainage, and as a result of clearing and soil disturbance.

Due to AMD from waste landforms having the potential to impact both soil and water quality, this issue is also discussed jointly in Section 11 (Terrestrial Environmental Quality). AMD refers to both the risk of acidic drainage and potential for elevated metals or metalloids in neutral mine drainage

Related potential impacts to soils, e.g. from chemical or TSF seepage, leaks, spills and AMD, are assessed in Section 11 – Terrestrial Environmental Quality.

7.4.2.1 Groundwater Contamination from TSF Seepage or Spillage

Some tailings generated by the Proposal have been identified as being PAF and have the potential to contain elevated concentrations of heavy metals and cyanide (used in processing the mineral resource), with potential to leach AMD. oxidation of the PAF materials would be expected to lead to acidic conditions. Seepage through the TSF walls or floor, or spillage through overtopping or failure of the TSF walls would have the potential to detrimentally impact surface water and groundwater quality, including the pit lake water, given the proximity of the TSF to the pit and groundwater flow post-closure would be towards the pit (Figure 7-20; Figure 7-27; Section 7.4.2.4).

Seepage from the TSF is expected to be most relevant to the sandstone aquifer not the Proterozoic metasediment aquifer (SRK 2025).

The silcrete layer will potentially act as an aquitard, preventing infiltration and seepage to the deeper aquifers (Advisian 2023b; Worley 2025e; SRK 2025). Should seepage pass through the silcrete layer, or where the layer is not continuous, seepage is expected to continue to percolate downwards to the sandstone aquifer, approximately 20 to 60 mbgl. The seepage is then anticipated to report laterally towards the pit, as both the silcrete layer and the shallow sandstone aquifer intersect the pit (Figure 7-27) (SRK 2025). Borehole logs suggest that the silcrete layer beneath the TSF is not continuous; therefore, the sandstone aquifer is considered by the seepage modellers, SRK (2025) to be the most relevant for transport of seepage-affected groundwater towards the pit.

The water quality risks associated with neutral (circum-neutral pH) and saline conditions in the TSF have been evaluated through static leach tests, saline leach tests, saturated column leach tests, kinetic (unsaturated) leach tests, and sequential extraction. These tests were conducted on both LS and HS tailings, with LS tailings forming the majority (approximately 93%) of total tailings.

Saline leach tests (2 g/L and 10 g/L NaCl) were undertaken to determine if salinity influenced leaching behaviour, reflecting conditions in a TSF with evaporative concentration. Saturated column leach tests were used to evaluate anoxic and saturated conditions, representative of the TSF interior. Unsaturated

kinetic tests (Humidity Cell Tests [HCTs] and AMIRA columns) simulate moisture cycling and use of deionised water, revealing sensitivity to drying, but also provide data for: metal release at neutral pH and potential for transition to acidic conditions (not the focus of this question). Sequential extraction was undertaken to identify mineralogical hosts and binding phases for metals, illuminating whether metals will mobilise under:

- Neutral conditions
- High salinity
- Reducing saturated conditions.

Overall, no obvious trends were observed for constituent release from low sulfur tailings using leachate of varied salinity (as discussed in Section 3.4.4 of Rio Tinto 2025f). There were only minor differences for some elements at low concentrations.

Sequential extractions were undertaken on two LS tailings samples (as discussed in Section 3.4.5 of Rio Tinto 2025f). These tests found a significant proportion of trace element content is associated with iron and manganese oxide (amorphous and crystalline) and residual mineral content. The iron and manganese oxide content, especially if crystalline, is expected to be unreactive unless conditions become strongly acidic, or strongly reducing. The tailings have been classified as PAF, and acidic conditions are possible if the material is not managed properly. The low sulfur content of the tailings would suggest that strongly acidic conditions are unlikely. Strongly reducing conditions are not considered likely unless a reducing agent is introduced (e.g. decomposing organic matter). Overall, if the materials are managed to mitigate risk of acid onset, the leaching potential is low.

Other tests and details are available in Appendix G.

N

Legend

- Development Envelope
- Native Title Determinations
- Mining Lease

RECLAIM PONDS

CELL 2 LOW SULFUR TAILINGS

CELL 1 LOW SULFUR TAILINGS

CELL 2 HIGH SULFUR TAILINGS

WASTE ROCK LANDFORM

EXTENT OF CLOSURE ROCK COVER

CELL 1 HIGH SULFUR TAILINGS

MINE PIT

Mine Infrastructure Area (MIA)

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

0 1 2 Kilometres

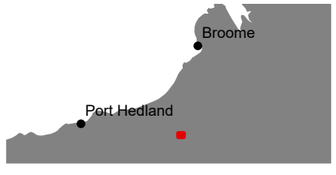
RioTinto

Fig 7-26: TSF Location Relative to the Mine Pit

Rio Tinto Copper (RTC)

Publisher: Michael.Rouse
Date Published: Monday, 6 July 2026

Coordinate System:
GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994
Units: Meter
Scale: 1:45,000
Rio Tinto © Copyright



Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_InlandWaters.aprx Layout: ERD - Inland Waters - TSF and Pit

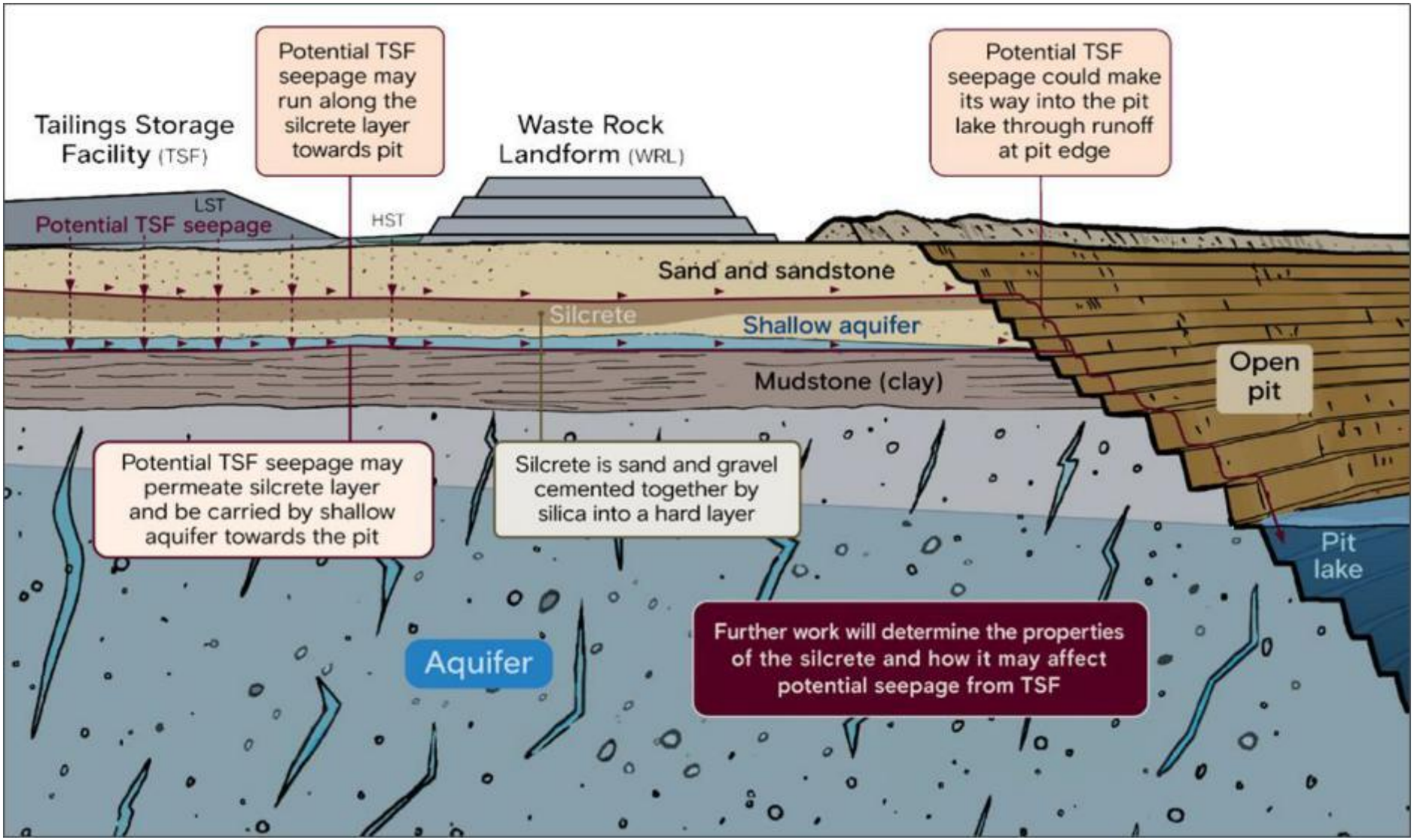


Figure 7-27: TSF Seepage Pathways Toward the Winu Pit - Conceptual

7.4.2.2 Groundwater or Surface Water Contamination from Pit Walls, Waste Rock Landforms and/or Mine Stockpiles AMD

The Proposal includes the development of a BWT mining pit which will disturb PAF material during operation and therefore potentially result in AMD seepage. This may occur through the exposure of PAF in the pit walls (Figure 7-28 and Figure 7-29) and their subsequent storage within waste rock landforms, as well as through the operation of the mine stockpiles, particularly the secondary sulfide and mafic stockpiles, which have the potential to generate AMD more rapidly than primary sulfide material.

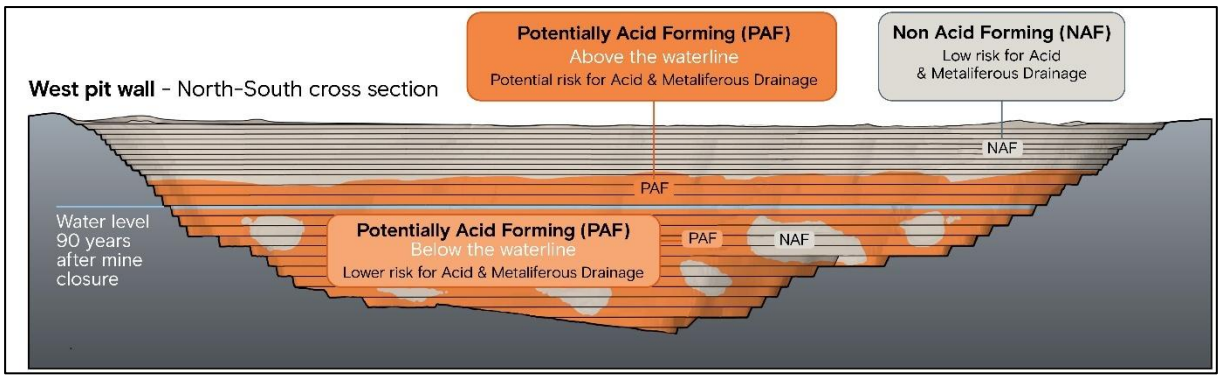


Figure 7-28: Pit Lake – West Wall Exposures – Conceptual

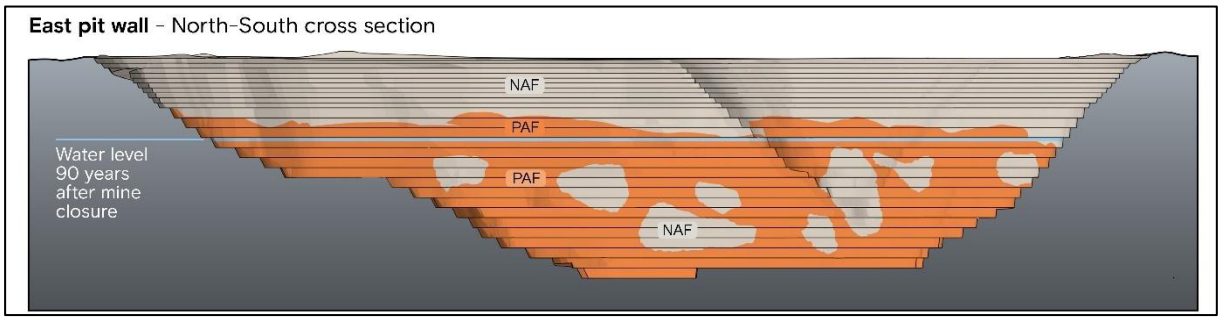


Figure 7-29: Pit Lake - East Wall Exposures – Conceptual

Geochemical characterisation was undertaken on overburden and oxides, secondary sulfides and primary sulfide material to understand the acidity, metalliferous drainage and neutral mine drainage risks; with detail provided in Section 11.4.1.4 and Appendix G.

In summary, chemical mobilisation from NAF wastes is low under non acidic conditions. Test work showed that the environmentally available fraction of molybdenum is extremely small, and tungsten is mostly locked in mineral phases resistant to rapid dissolutions.

7.4.2.3 Management of Surplus Water

Where surplus water cannot be managed in the CWD, an infiltration area will be used (infiltration ponds and MAR). Only clean water will be used for infiltration and MAR processes. Potentially contaminated surface water will be used only in the processing circuit. This will allow infiltration in the surficial sands and sandstone as well as some evaporation. Discharge of excess dewatering water into infiltration areas has potential to impact groundwater quality in areas around the ponds.

Solute transport modelling was undertaken to simulate plume migration of concentrated solutes from the water directed to the infiltration ponds and MAR bores, within the sandstone aquifer (Worley 2025d). The modelling considered solute concentrations based on test pumping data from close to the pit to represent the expected quality of water requiring surplus management, although in reality this may vary over time in response to the dewatering network abstracting water from different quality (in this case salinity as TDS). Modelling results are described below:

7.4.2.3.1 Infiltration Pond Option

- The main plume will develop in the sandstone aquifer due to the largely vertical flow through unsaturated surficial sand and silcrete, and due to injection into this aquifer through the MAR option
- The plume will develop a circular shape of approximately 3 km radius extending to the north and west of the infiltration ponds during the peak infiltration year (Year 9) with similar dimension retained at end of mining (Year 32) (Figure 7-30 and Figure 7-31)
- Following the cessation of infiltration the plume will start to move towards the north but also maintaining the capture pattern at the mining pit
- Plume solute concentrations will remain high at the centre. Vertical recharge, that may dilute the plume, is considered negligible in the model; however, in reality, cyclonic events may represent intermittent opportunities for recharge reaching the sandstone aquifer and providing further dilution
- The plume is predicted to experience slow dissipation, migration towards north, and redistribution, partly delayed by the capturing effect of the mining pit (Figure 7-32).

In addition, the plume modelling of the two surplus water management systems predicts there will be no contamination of the Mandora Marsh (Walyarta) or Eighty Mile Beach (Worley 2026). The possible contaminant plume is not expected to reach within 85 km of Mandora Marsh (Walyarta).

7.4.2.3.2 MAR Option

- The plume is predicted to have slightly different shape but similar footprint to the modelled infiltration ponds plume (Figure 7-30 and Figure 7-31)
- The plume behaviour is also predicted to be similar, but with comparatively faster dissipation, and redistribution, especially during the post-operational period (Figure 7-31). This is attributed to the direct injection into the sandstone, without delaying effects present with the more complex pathway (and longer residence times) associated with the Pond option.

Access to water is a key component of the pest Cane Toads advance from northern Australia southwards. The State Government's Cane Toad 'waterless' barrier plan (Toad Containment Zone) aims to prevent the toad's further spread and involves upgrading pastoral and irrigation infrastructure across a 150 km stretch between the coast and the Great Sandy Desert, and is therefore relevant to the western end of the RAC (GoWA 2024a).

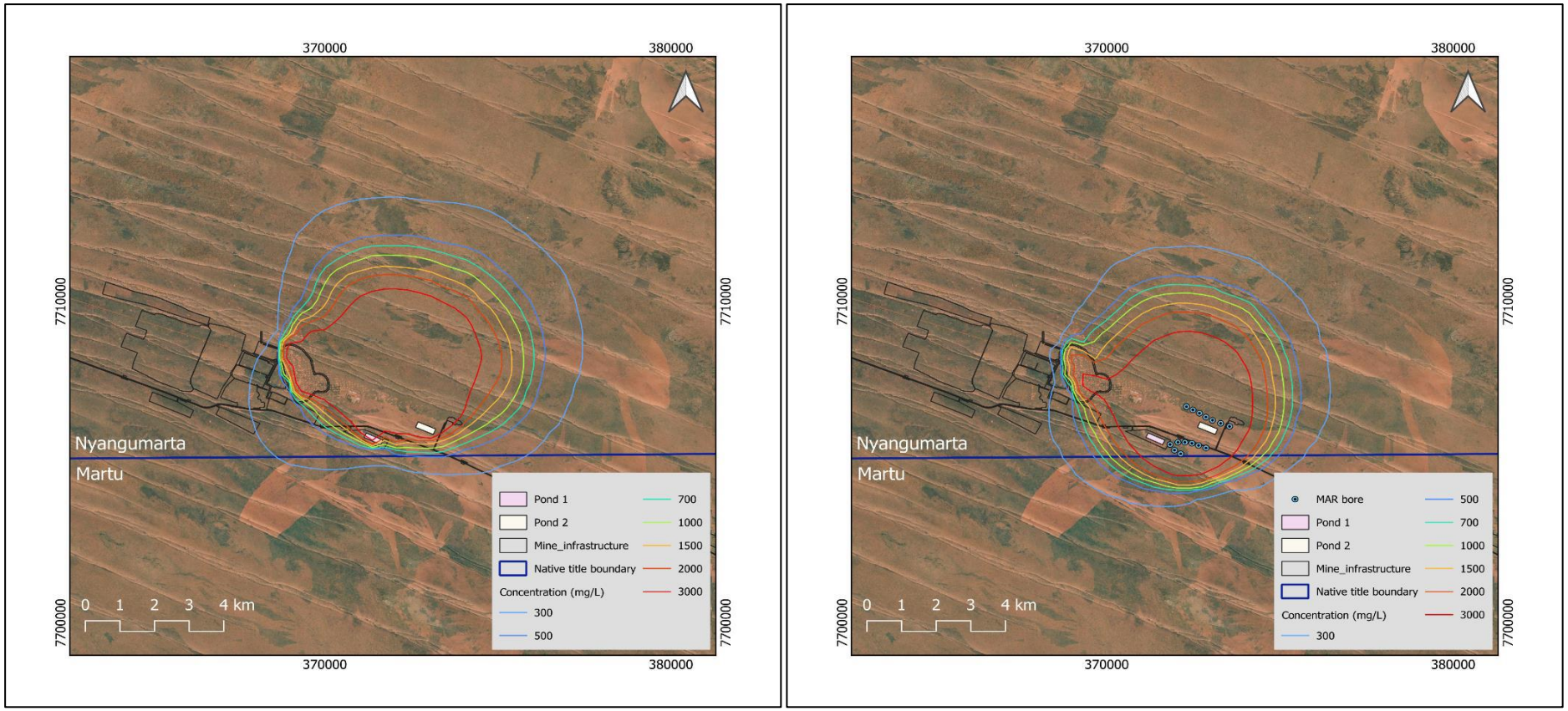


Figure 7-30: Modelled Solute Plume – Infiltration Pond Option (L) & MAR Option (R)- Peak Rate (Year 9)

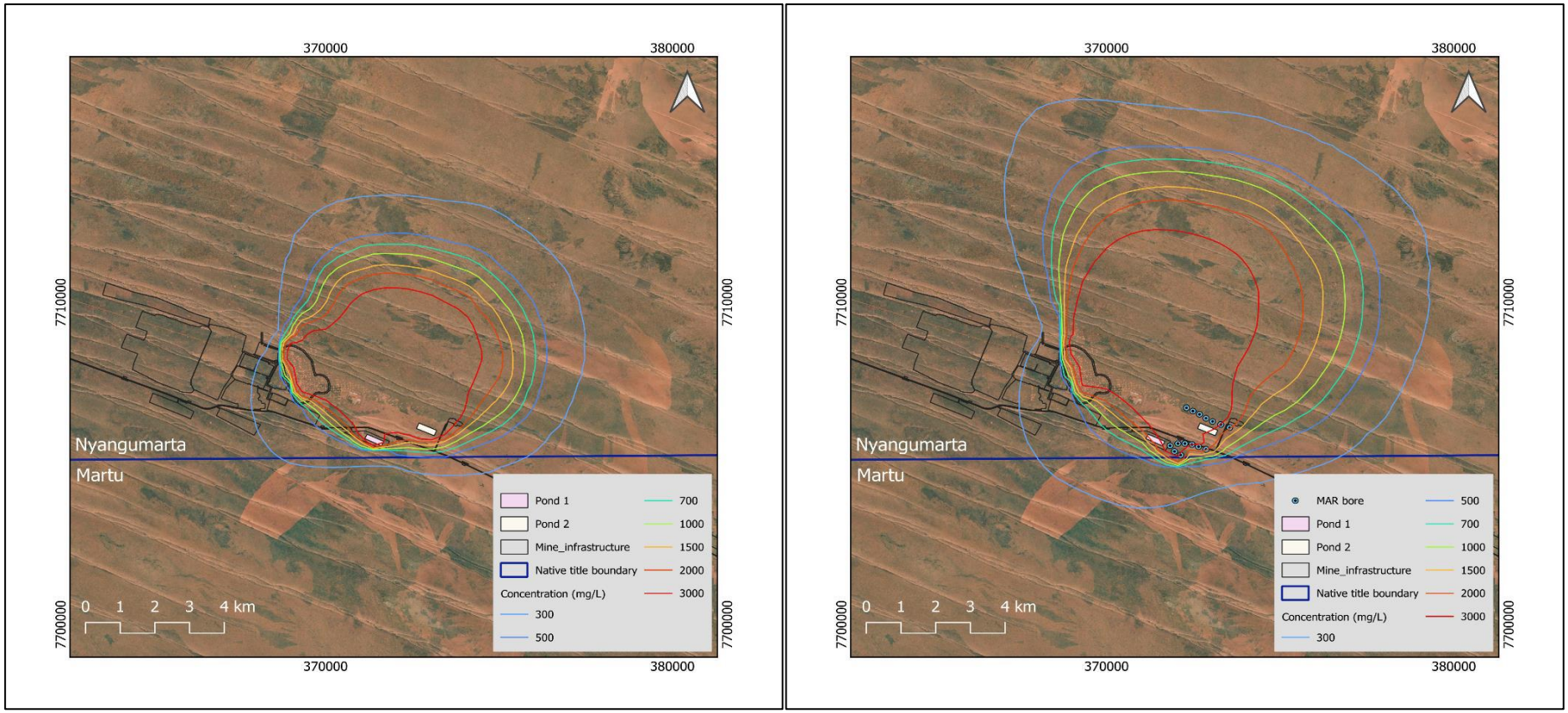


Figure 7-31: Modelled Solute Plume – Infiltration Pond Option (L) & MAR Option (R)- End of Mining (Year 32)

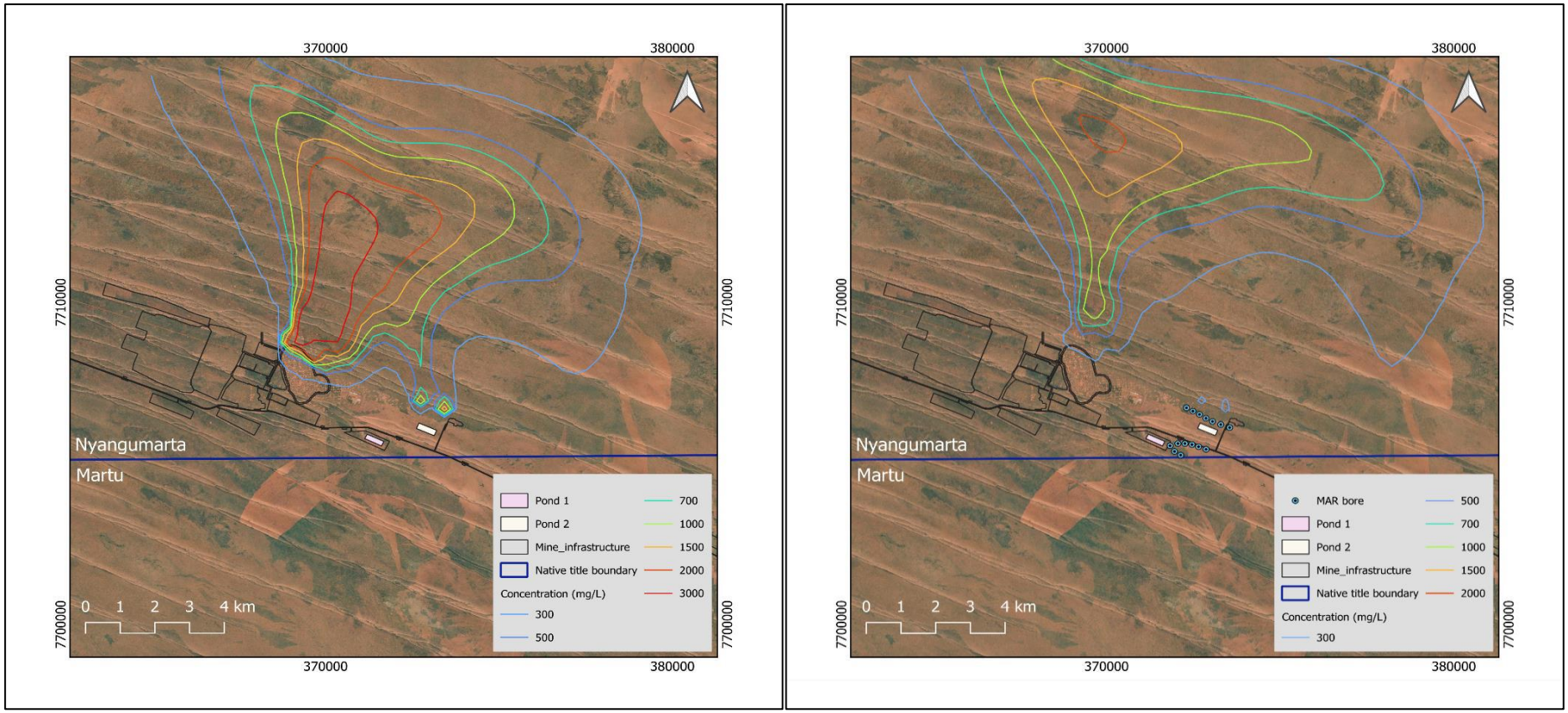


Figure 7-32: Modelled Solute Plume – Infiltration Pond Option (L) & MAR Option (R)- 100 Years After Cessation of Injection

7.4.2.4 Post Closure Formation of a Pit Lake

Based on filling and geochemical modelling (HGL 2024a) (Appendix C14) at closure the mine pit void will result in the development of a pit lake. The open pit is predicted to act as a long-term, evaporative hydraulic sink with no expected discharge to the environment. All sensitivity analyses undertaken during modelling indicate a similar or lower pit lake elevation than the base case providing confidence that the hydraulic sink conclusion is reliable (HGL 2024a). Based on this the key potential impact associated with the formation of a pit lake is in-situ water quality of the pit lake.

7.4.2.5 Seepage, Leaks or Spills of Chemicals (including Hydrocarbons)

Hydrocarbons (including aviation fuel), explosives and other chemicals will be used regularly during the construction and operational activities of the Proposal. If during these activities the substances spill or leak into the soil, there is the potential for the surface water and/ or groundwater to be contaminated.

7.4.2.6 Sediment Loads

Clearing and soil disturbance across the MIA and access road increase the potential for surface water contamination via suspended sediments. However, owing to the climate, vegetation and pastoral land use of the Pilbara, the water quality of ephemeral watercourses in the region is often highly turbid (coloured) and flows can naturally carry large volumes of suspended sediments (van Vreeswyk et al. 2004), however, there is potential for the increased turbidity or sediment load to have local impacts.

7.4.3 Cumulative Impacts

The following section outlines the potential cumulative impacts to Inland Waters environmental values as a result of the Proposal and any existing or reasonably foreseeable projects that occur. Cumulative impacts have been considered against the following inland water aspects:

- Surface water catchment area
- Groundwater drawdown.

In undertaking a cumulative impact assessment, a number of assumptions need to be made. For this assessment it has been assumed that:

- Cumulative impact calculations do not take into consideration areas outside of those assessed under Part IV of the EP Act for each relevant proposal
- The accuracy of data from external sources has not been verified and it is assumed that data publicly available is accurate and collected in accordance with standard industry guidelines
- Cumulative impact calculations do not take into consideration areas outside of those assessed by each relevant proposal
- Cumulative impacts to catchment areas resulting from third-party operations are conservative and based on information available in the public domain and may not represent the most accurate levels of disturbance.

7.4.3.1 Surface Water – Catchment Area

7.4.3.1.1 Great Sandy Desert Lake Dora Catchment

In the context of surface water, a review of potential cumulative impacts is based on catchment area reduction. The Proposal occurs within the Great Sandy Desert Lake Dora catchment, an area of approximately 290,000 km^2. The total cumulative area of the Great Sandy Desert Lake Dora catchment impacted by the Proposal and existing or reasonably foreseeable projects is anticipated to be approximately 581 km^2, representing a less than 1% reduction of the Great Sandy Desert Lake Dora catchment (Table 7-9).

It is important to note that a reduction in catchment area is not a direct link to reduced surface water flow or volume. Regardless, no significant reductions in surface water flow and volume are expected

during mining operations given little to no surface water runoff due to the dominance of dunal landforms and aeolian sand cover, with no clearly defined surface water courses in the region and within the Development Envelope (Section 7.3.3.1).

The Proposal does not substantially contribute to cumulative reduction of the Great Sandy Desert Lake Dora catchment.

7.4.3.2 Groundwater Drawdown

Modelling indicates that there is sufficient distance between Rimfire and the MIA so that there will be no obvious spatial or temporal cumulative effects to the local groundwater aquifers and its values (Worley 2025b, 2025c).

The confined metasediment aquifer will be the main aquifer requiring dewatering to facilitate BWT mining. Drawdown from BWT within the metasediment aquifer will be largely contained within the Thorny Devil Fault and the Mafic sill as these features act as flow barriers (Worley 2025b). The aquifer system at Winu is disconnected from the regional Canning-Wallal aquifer by a ground gradient drop (Figure 7-5). Therefore, drawdown from BWT mining within this aquifer is unlikely to contribute to existing groundwater drawdown related effects on the regional Canning-Wallal aquifer and its values.

The unconfined sandstone aquifer will not be actively dewatered due to the small saturated thickness, but will have some passive drainage once the low permeability Permian mudstone is removed during mining. This is expected to have a localised impact on the unconfined sandstone aquifer and not impact the regional scale aquifer. No response to rainfall recharge has been observed to date in bores screened in the unconfined sandstone aquifer within the Proposal area, which indicated this is not a recharge area for the aquifer. The metasediment aquifer associated with Rimfire is not considered part of the regional Canning-Wallal aquifer.

Five groundwater licences overlap with the Development Envelope as detailed in Table 7-10. Four of these are issued to Rio Tino Exploration Pty Ltd, one of which is associated with the Proponent (Worley 2025b). Given the low annual allocation limits of these licences, they are unlikely to have any discernible impact on groundwater levels within the Development Envelope.

Table 7-9: Cumulative Impacts – Great Sandy Desert Lake Dora Catchment Area

Total Catchment Area (km^2)	Area Reduction from Proposal (km^2)	Impact of Existing and Reasonably Foreseeable Projects (Potential Disturbance [ha])					Cumulative Impact	
		Australian Renewable Energy Hub	Telfer – Havieron Gold Mining Project	Woodie Woodie Continued Operations Project	Goldsworthy Iron Ore Mines Extension Project	Pardoo Irrigated Agriculture Project*	Total Area (km^2)	Total Reduction %
288,153	49	120	355	50	3	4	581	<1

**Not included in Table 2-5 as further than 150 km from MIA, however the project is located within the Great Sandy Desert Lake Dora Catchment*

Table 7-10: Groundwater Licences Overlapping the Development Envelope

Licence number	Licenced party	Issue date	Expiry date	Licenced aquifer (Groundwater Sub area)	Annual allocation (GL)
179796	New Standard Onshore Pty Ltd	18/09/2014	17/09/2024	Canning-Grant (Canning-Kimberley)	0.00035
200009	Rio Tinto Exploration Pty Limited	22/06/2017	21/06/2027	Canning-Wallal (Canning-Kimberley)	0.0015
201165(7)	Rio Tinto Exploration Pty Limited (Winu)	18/12/2023	17/12/2025	Canning-Wallal (Canning-Kimberley)	0.3
204033	Rio Tinto Exploration Pty Limited	16/09/2021	15/09/2031	Canning-Wallal (Canning-Kimberley)	0.02
206212	Rio Tinto Exploration Pty Limited	9/08/2021	8/08/2031	Canning-Wallal (Canning-Kimberley)	0.03

7.5 Mitigation

The Proponent is committed to ensuring that the Proposal avoids or minimises, where practicable, impacts on Inland Waters key environmental values and to use best practice to achieve agreed rehabilitation outcomes relevant to Inland Waters. During the planning process, the mitigation hierarchy (avoid, minimise and rehabilitate) was applied to avoid and minimise potential impacts to key environmental values associated with Inland Waters. The measures proposed by the Proponent to minimise impacts to Inland Waters is described below and summarised in Table 7-12.

7.5.1 Avoidance

As part of the mine planning process the Proponent has implemented the following avoidance measures:

- The proposed Development Envelope has been reduced from 37,365 ha to 23,649 ha, representing a 36% reduction since the Proposal was referred
- The Wallal Borefield was removed from the Proposal. The Wallal Borefield was originally proposed in the referral as an option for groundwater abstraction for operational use. However, due to the Proposal's proximity to Eighty Mile Beach and Mandora Marsh, Wallal was omitted as a Borefield option
- The Texas Borefield was removed from the Proposal which has reduced the area in which groundwater abstraction is proposed to occur.

7.5.2 Minimise

As part of the mine planning process the Proponent has implemented the following minimisation measures:

- The proposal will utilise a CWD in the first instance and only infiltration areas or MAR bores where required to manage excess mine dewatering to avoid discharge to the environment
- The Proposal will use mine water to meet most operational water demand, and the TSF has been designed to ensure maximum water recovery throughout the processing circuit, avoiding the need for additional non-potable water supply borefields.

To mitigate potential impacts on stygofauna and groundwater dependent vegetation values within the Percival Palaeovalley as a result of groundwater drawdown from operation of the Rimfire Borefield, the Proponent will implement a groundwater monitoring and management strategy under the Rimfire Groundwater Operating Strategy (Appendix C19). The Rimfire Groundwater Operating Strategy uses specific triggers to inform appropriate contingency actions and is discussed in further detail in Sections 8.5.1.1and 10.5.1.1.

7.5.2.1 Groundwater Mounding

The infiltration ponds and MAR have been designed to minimise the risk of:

- Overtopping of the ponds due to storage capacity
- Recirculation of infiltrated water back into the mine pit
- Forming a surface expression of groundwater or near surface groundwater table.

The design also protects against floodwaters in the 1% AEP event (Advisian 2023b).

Directing surplus water preferentially to the MAR bores, with excess or overflow diverted to the infiltration ponds, is expected to minimise groundwater mounding in the area around the ponds.

7.5.2.2 Alterations to Surface Hydrological Regimes

7.5.2.2.1 MIA

To minimise the impacts of altered hydrological regimes the MIA will require the construction of a network of ponds, drains and flood protection bunds to redirect stormwater from mining operations

(Figure 7-33). An Operational Surface Water Management Plan (Worley 2024c) (Appendix C01) has been prepared to outline the different stormwater management strategies and infrastructure for handling surface water runoff depending on the level of contamination present and where the runoff originates. Table 7-11 outlines these different stormwater management strategies.

Table 7-11: Water Management Strategies and Infrastructure

Water Type	Description	Treatment Type	Water Management Method	Runoff Areas Included
Clean	Non-contaminated surface water runoff generated in uncleared/natural ground areas	No treatment required	Water is retained by flood protection bunds and infiltrate/evaporate in situ	Natural and undisturbed catchment areas
Sediment Laden	Surface water runoff that may contain entrained natural sediment but is chemically clean	Primary treatment required (sediment removed by gravity)	Water is retained on landforms by perimeter bunds OR is collected at the base of landforms by unlined toe drains and perimeter bunds. This water can then infiltrate/evaporate in situ	Primary sulfides (<8-year lifetime), oxide, leach cap and topsoil stockpiles, WRL embankments, and TSF embankments
Potentially Contaminated	Surface water runoff which may potentially contain oils, chemicals, metals etc	Secondary and/or tertiary treatment	Water is collected at the base of landforms by lined toe drains. Contaminated floodwater is to be conveyed to lined WSP's to evaporate. If necessary, this water can be sent to the processing plant to empty ponds. This water is not discharged to the environment under normal operating conditions	Primary sulfides (>8-year lifetime) and secondary sulfides stockpiles. ANFO, mine pit, ROM pad, process plant and washdown areas

Source: (Worley 2024c)

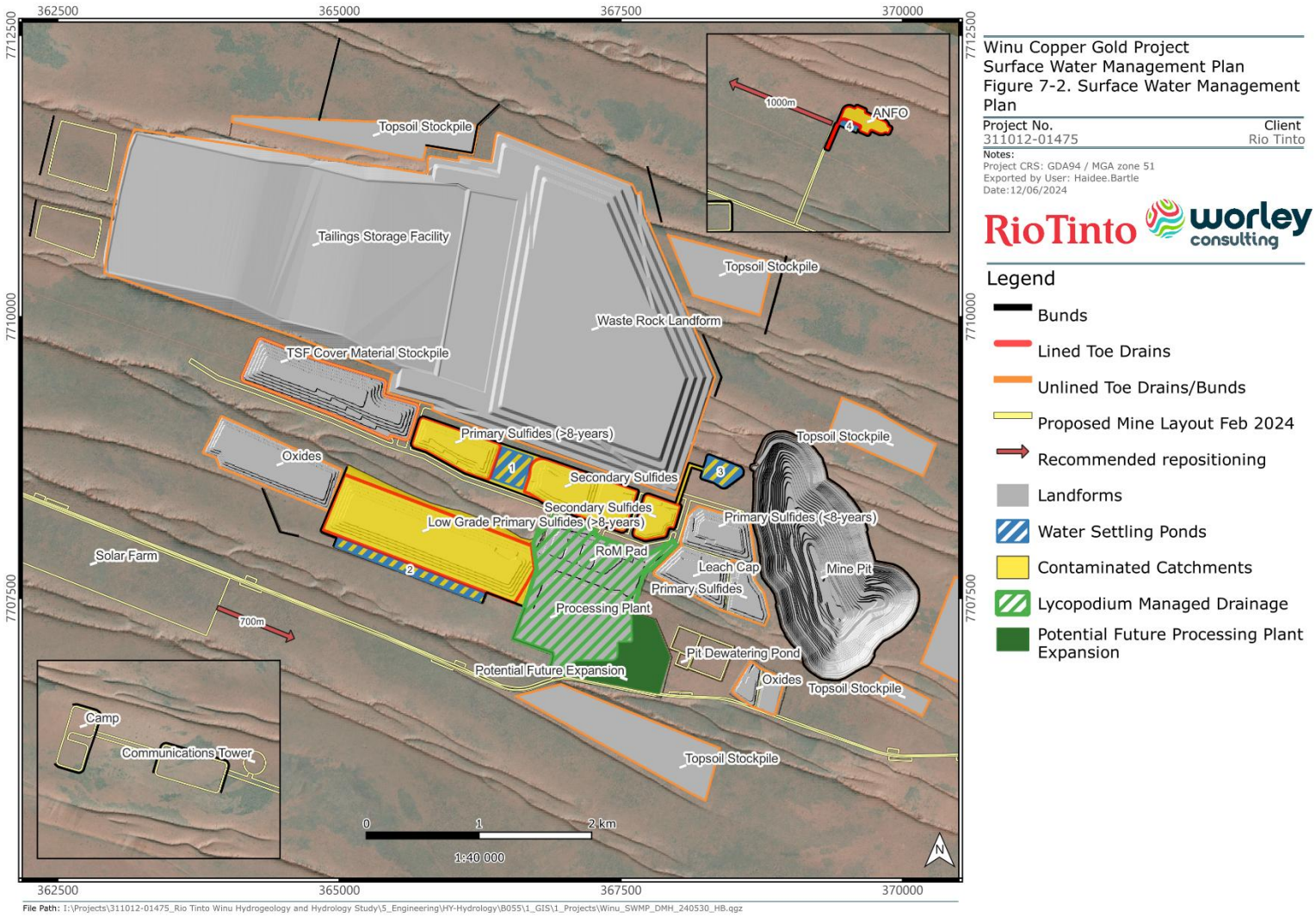
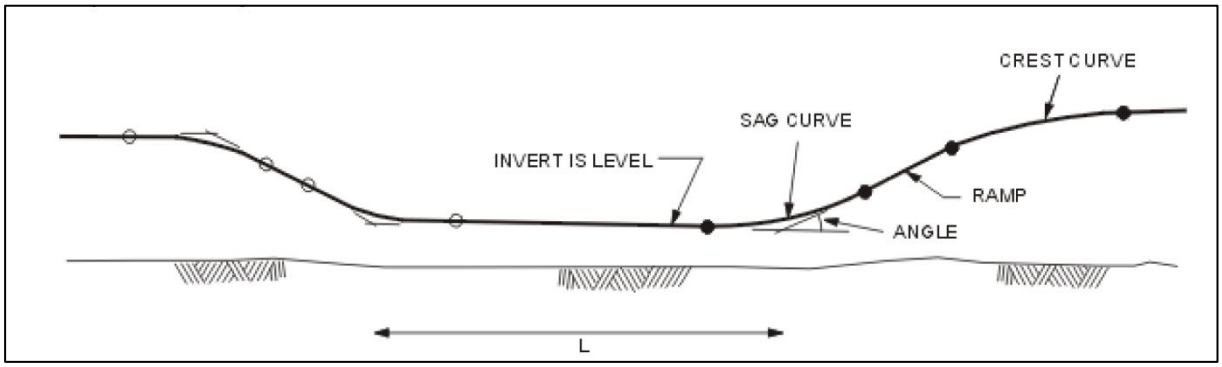


Figure 7-33: Proposed MIA Surface Water Management Infrastructure

7.5.2.2.2 RAC

Within the RAC the Proponent will minimise impacts to hydrological regimes by designing waterway crossings to prevent ponding upstream, water shadows downstream and to maintain flows downstream. This will be achieved by ensuring waterway crossings are large enough to accommodate flows up to 1:10 AEP or higher, and are positioned so that disruptions to low flows are minimised (Worley 2024b). In addition, crossings will be designed to act as floodways in larger flows to minimise upstream flooding and scouring downstream (Figure 7-34).

A RAC Surface Water Management Plan has been prepared to characterise flooding behaviour adjacent to the proposed access road and develop conceptual risk management design measures to mitigate potential operational flood risks and impacts (Worley 2024b) (Appendix C02). The waterway crossings have been designed for 5% AEP flow rate, which will allow all creekline ephemeral flow up to the 5% AEP event to pass through the crossings (Worley 2024b). More extreme events will result in the planned overtopping of the crossing.



Source: (Worley 2024b)

Figure 7-34: Long Section of a Typical Floodway

7.5.2.3 Reduction in Ground and/or Surface Water Quality

7.5.2.3.1 Groundwater Contamination from TSF Seepage or Spillage

The Proponent has designed the TSF system in accordance with the Global Industry Standards on Tailings Management (ICMM 2020). Key elements of the TSF design include:

- The TSF has been specifically designed to minimise both short and long term AMD risks via:
  - Segregation of tailings streams
  - Installation of liners
  - Maintaining saturation of HS tailings
  - Locating the TSF such that any seepage reports to the pit lake
- Prepare an emergency response and long-term recovery plan in the event of a TSF failure
- Designing final covers to meet mine closure objectives.

The TSF has been subject to at least eight design iterations, in consultation with NWAC, including to avoid heritage sites and reduce water requirements. Design has incorporated slope stability analyses to ensure TSF embankments meet requirement safety factors, and cells are appropriately supported, including through placement of suitable materials, location between dunes to the north and south and use of the WRL at its eastern end (WWL 2025a).

The TSF system will segregate the HS and LS tailings into different TSF cells (Figure 7-26). During operations, the LS tailings will be placed as a slurry (68% solids by weight). With the liner limiting drain down, and continual placement of tailings, it is expected that much of the LS tailings will maintain a relatively high degree of saturation during operations. The TSF system has also been designed to drain

internally with two reclaim water ponds available for operational water management and where there is excess water from extreme rainfall events.

Rehabilitation and closure of the TSF will also be undertaken as per the requirements of the MCP (Appendix A03) to ensure closure outcomes and post-mining land uses can be achieved.

The HS stream, representing approximately 6% of the total tailings, will be deposited sub-aqueously into two cells in the TSF to reduce the risk for oxidation and AMD generation (Figure 7-26) (WWL 2025a). A permanent water cover, of at least 0.5 m above the surface of the tailings, will be maintained over the life of mine. Some of this water will be lost to evaporation, leaving a component retained in the pore space of the deposited tailings, also referred to as interstitial water. Excess water, not required to saturate and cover the tailings, will be recovered from the HS cells by pumping to the lined reclaim water ponds. The HS slurry will be dosed with lime to ensure the pH of water pumped to the reclaim ponds will be alkaline or close to neutral. At closure covers will be placed to promote saturation of the HS cells, and to control dust emissions and erosion of the LS cells.

The LS tailings will be deposited to a separate cell, sub-aerially as the potential level of acidification and mineral leaching is significantly less than the HS tailings (WWL 2025a).

Liners are proposed for both the LS and HS cells and within the reclaim water ponds with a HDPE (or equivalent) liner employed for the HS cells and the LS cells (Figure 7-35) (WWL 2025a). The liners will be used to limit potential for surface and groundwater impact via seepage and conserve water from the LS cells for reuse in processing. Further liner studies are in process to confirm the appropriate liner type for each cell. These studies will progress in the next phase of the study and will likely be supported by additional liner test work. The liner selection requires consideration of the specific conditions within each cell which include the potential for larger deformations in the LS cells, due to the presence of the central dunes. A recognised international liner expert has been added to the Independent Technical Review Board (ITRB) for the process to support the liner component of the design.

In addition to the liner minimising seepage, the approximately 50 m unsaturated zone beneath the TSF and the groundwater table will serve to minimise seepage due to the low permeability of the material in the unsaturated zone (WWL 2025a).

A filter drainage system is proposed above the LS tailings liner, with the drainage pipes leading to sumps in topographic low points in the floor of each cell. LS cell drainage water from the sumps will be mixed with the tailings supernatant and pumped to reclaim ponds. The drainage system will aid to consolidate deposited tailings and reduce the hydraulic head on the liner.

Figure 7-35: Example of a Lined Pond

All surface water from the outer edge of the TSF embankments will be directed internally into the cells. TSF design incorporated stormwater controls, based on scenarios that reflect the progressive development of the TSF over the life of mine and addressing rare and extreme rainfall events (i.e. 1:5000 [or 0.02%] 72-hour AEP) (WWL 2025a). This will result in the following, minimising external spillage:

- Scenario 1 - only LST Cell 2 and HST Cell 1 are in operation. The confining embankments will be maintained at an elevation able to store the stormwater, in an area between the dunes in the yet-to-be developed LST Cell 1 area. Supernatant water and stormwater that reaches the western perimeter of LST Cell 2 will be discharged via a spillway to the reclaim ponds. Water on HST Cell 1 will be retained within the cell
- Scenario 2 – once LST Cell 1 is commissioned. Rockfill detention bunds will be constructed across LST Cell 2 to detain stormwater flowing down the cell beach and regulate spillway outflow rates. Stormwater will be retained within that cell as well as LST Cell 1. LST Cell 2 stormwater will be decanted via two spillways to the reclaim ponds
- Scenario 3 – LST Cell 2 is dormant with temporary detention bunds and LST Cell 2 is in operation. As LST Cell 1 rises closure measures can be progressively constructed on the eastern slope face adjacent to the HST cells. Stormwater will be retained on the HST cells and LST Cell 1. LST Cell 2 stormwater will be decanted via two spillways to the reclaim ponds
- Scenario 4 – one year before closure. Stormwater will be retained on the HST cells and LST Cell 1a. Stormwater will be decanted off LST Cell 2 via a spillway. Stormwater will be decanted off LST Cell 1b by spillways to the north and south over extensions to the WRL.

As a part of closure, the LS tailings will undergo drain down, via the TSF underdrains, and a closure cover will be installed. While a lower degree of saturation is expected at closure and post-closure, the cover and fine-grained nature of the tailings are expected to maintain a degree of saturation that will limit oxygen ingress for a significantly long time. Nonetheless, some oxidation will occur post closure.

7.5.2.3.2 Groundwater or Surface Water Contamination from Pit Walls, Waste Rock Landforms and/or Mine Stockpiles AMD

Due to the PAF material being associated with the secondary and primary sulfide orebody and waste material at depth, the avoidance of PAF material is not possible.

With consideration of PAF, the WRL will be built to minimise long term risks using leading practice source control methods such as small dump lifts and traffic compaction (HGL 2024a; INAP 2024). To minimise the risk of AMD within the Development Envelope the Proponent has undertaken a comprehensive geochemical characterisation program and the findings from these studies have been incorporated into geological and mining models, which enables the PAF material to be identified and managed in accordance with the AMD S&MP (Appendix C07). All waste rock identified as PAF will be stored within the core of the WRL and gradually encapsulated with NAF material and dumped in small paddock lifts (Figure 7-36) (HGL 2024a). The PAF material will be placed on a low permeability pad to raise the PAF material above the original ground level and prevent direct contact between PAF material and any water flows. The PAF material layers will be traffic compacted to reduce preferential flow paths, minimise water seepage and restrict the movement of some oxygen within the WRL, thus limiting the availability of key components of the AMD reaction. Beneficial (NAF) waste will be managed to ensure appropriate volumes are available to encapsulate the PAF material.

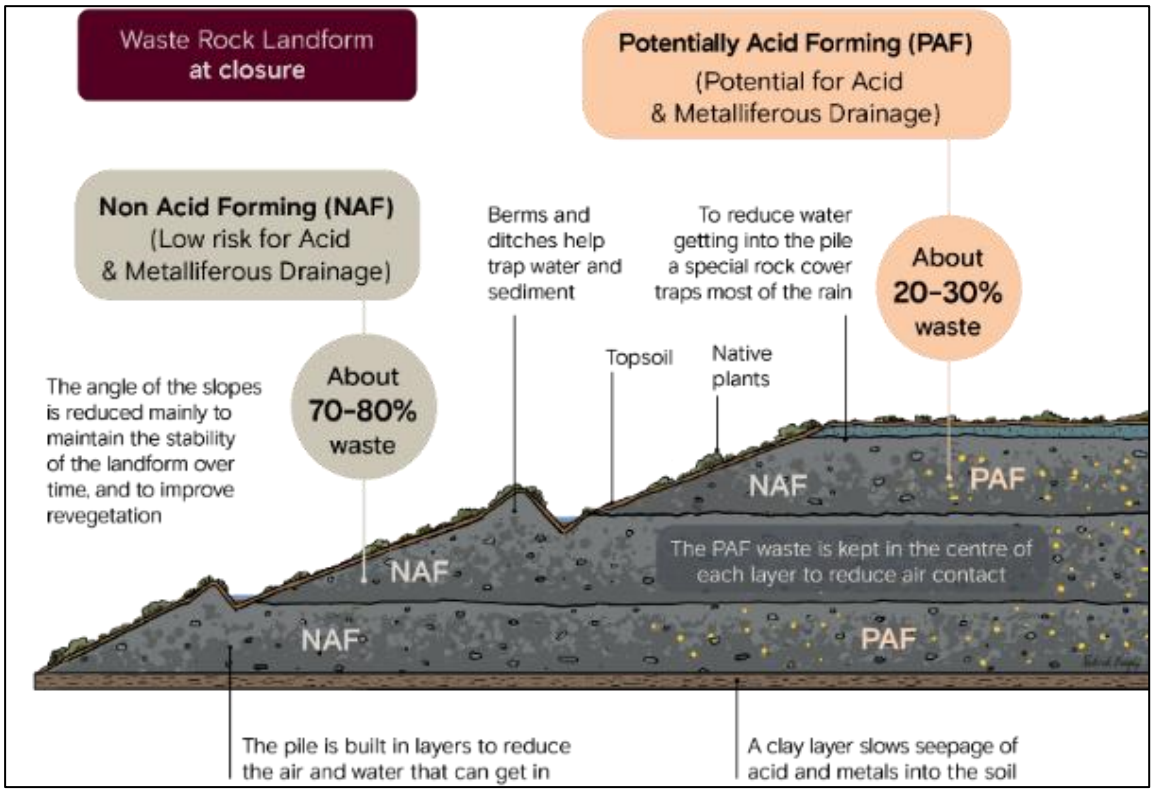


Figure 7-36: WRL Conceptual Design

Flood bunds, perimeter bunds, toe drains, internal bunds and the WSPs will be designed and utilised to contain and manage potentially contaminated water from relevant landforms (Figure 7-37). Potentially contaminated (AMD) water runoff will be collected at the base of PAF mine stockpiles that have formed AMD by lined toe drains to be conveyed to lined sumps/WSPs (Worley 2024c). This water is therefore not discharged under normal operating conditions. Water from WSPs will be sent to the processing plant, where lime adjustment will occur if required.

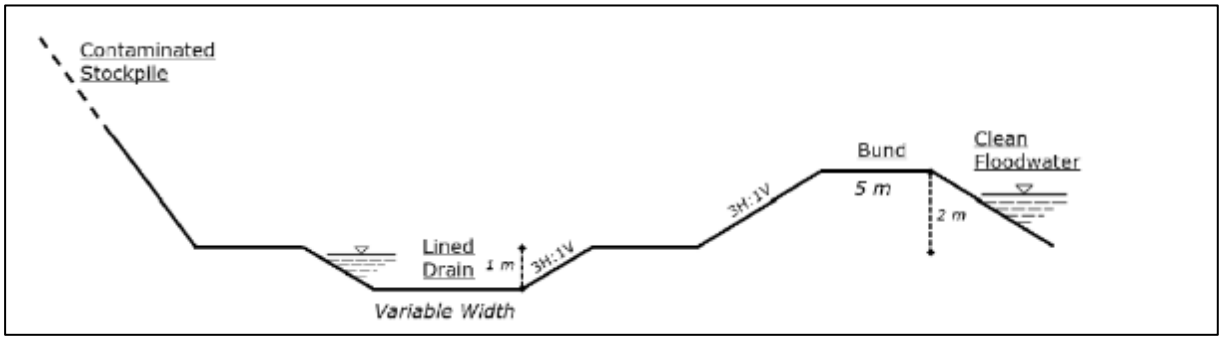


Figure 7-37: Nominal Drain and Bund Cross Section

The Proponent will also develop, implement and regularly update an AMD S&MP (Appendix C07) to be consistent with leading industry practices and government regulations. The AMD S&MP includes provision for internal slopes of the berms to be reverse sloped to ensure that the WRL drains internally.

Samples from the Proposal have been used as part of CRC TIME Project 3.10 to better understand the long-term performance of waste rock landforms. Studies such as this project will help improve the mine closure knowledge base for the industry and the Proposal.

At closure, a store and release cover, constructed of low erodibility NAF material, will be installed on the WRL to limit water ingress. In addition, the overall slope angle of the WRL will be reduced to 11° to minimise the effects of erosion and the potential to expose PAF Material. Further details of closure

design will be provided in the MCP and will be refined through further study prior to mine closure (Appendix A03).

The Proponent also commits to ensuring no significant ecological risk posed by the permanent pit lake proposed to remain at closure.

7.5.2.3.3 Management of Surplus Water

To minimise the risk of contamination of receiving groundwater or surface water, excess water will be sent to the infiltration ponds or reinjected into bores for MAR, located within the MIA, with no discharge to surface water features leading beyond the Development Envelope. Management of this surplus water in this way is expected for approximately the first 16 years of operations, and will not be continuous, only required when the CWD capacities are exceeded, minimising the time and volume required relative to the life of mine. The excess water to be managed will be restricted to classified-clean pit dewatering water. Although placed to minimise recirculation to the pit during operations, the infiltrated and reinjected water will be within the zone of influence of the pit lake, which will act as a terminal sink, and will eventually flow there. This will ensure that water of similar quality to the existing aquifer re-enters the system and will be contained within the aquifer within the MIA and in the pit lake.

The Proponent recognises the Cane Toad 'waterless' barrier plan and in support of this initiative will ensure that any artificial water sources within the 'waterless' barrier area is appropriately contained to prevent Cane Toad access, e.g. in tanks or bladders, and not in open structures such as turkeys nests.

7.5.2.3.4 Seepage, Leaks or Spills of Chemicals (Including Hydrocarbons)

The Proponent will avoid surface water and groundwater contamination from chemicals (including hydrocarbons) by ensuring that all potentially hazardous substances are managed following the requirements of the *Dangerous Good Safety Act 2004* (WA) and the following regulations, industry guidelines and Australian standards:

- Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007
- Dangerous Goods Safety (Explosives) Regulations 2007
- Dangerous Goods Safety (Security Sensitive Ammonium Nitrate) Regulations 2007
- Dangerous Goods Safety (Road and Rail Transport of Non-Explosives) Regulations 2007
- Dangerous Goods Safety (General) Regulations 2007
- Australian Dangerous Goods Code
- AS 1940:2017 - The storage and handling of flammable and combustible liquids
- AS NZ 4452: 2025 - The storage and handling of toxic substances
- AS 2187.1:1998 - Explosives Storage, transport and use
- AS 3780-2023 - The storage and handling of corrosive substances
- AS 3833:2024 – The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers
- International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold (The Cyanide Code) (ICMI 2023).

To further minimise potential surface water and groundwater contamination, the Proponent has developed and will implement a Spill Response Management Plan and a Cyanide Management Plan (ELA 2024) (Appendix C10). The key management actions outlined in this plan are listed below:

- A written agreement will be included within the cyanide supply contract(s) that addresses the safe transport of cyanide, whether by the supplier or a third party engaged by the supplier
- All cyanide facilities will be away from offices and workshops
- All cyanide facilities will be fenced and locked in a compound where access is security controlled
- Leak detection and electronic overtopping controls will be installed on any tanks that are used for liquid cyanide storage, including liquors generated from the dissolution of briquettes

- The use of double skinned tanks and retention bunds to minimise the potential for hydrocarbon spills and contamination
- Continuous monitoring of proceed feed characteristics, throughput rates, gold recovery and reagent consumption will be undertaken to optimise reagent use and minimise Weak Acid Dissociative cyanide (WAD CN) concentrations in plant waste streams.

The use and storage of these substances will generally be concentrated within specific areas of the Development Envelope, such as the mine pit, fuel facility, processing plant, diesel power plant and aerodrome, with lower-level usage and storage within vehicles, mobile plants, equipment, and along access routes. In addition, site drainage infrastructure will be designed to minimise or eliminate surface water runoff into areas where hydrocarbon contamination may occur.

7.5.2.3.5 Sediment Loads

Soil erosion resulting in increased suspended sediments during implementation of the Proposal cannot be wholly avoided only minimised; however, any increased sediment loads that may occur is expected to be confined to the Conceptual Footprint. Minimising the potential for increased sediment load to the surrounding environment has been achieved by optimising the Development Envelope and Conceptual Footprint to reduce vegetation clearing and maintain intact and undisturbed soil surfaces as far as practicable. Any cleared soil will be appropriately stockpiled using methods that reduce erosion, such as maintaining low (<2 m) stockpile heights and establishing vegetation. Dispersive waste material will be suitably encapsulated within the WRL, and areas of increased susceptibility will be armoured with competent NAF material. All these measures will be undertaken in accordance with the requirements of the MCP (Appendix A03) to ensure closure objectives and post-mining land uses can be achieved.

As mentioned (Section 7.5.2.2), an Operational Surface Water Management Plan (Worley 2024c) (Appendix C01) has been prepared to outline the different stormwater management strategies and infrastructure for handling surface water runoff depending on the level of contamination present and where the runoff originates.

In order to keep the risk of sediment-laden stormwater runoff from disturbed areas impacting local surface water resources, the Proponent will ensure drainage from at-risk areas includes appropriate erosion and sediment controls (Table 7-11). Unlined drains and perimeter bunds surrounding uncontaminated mine structures will be positioned to capture and contain sediment laden water, minimising uncontrolled sediment laden discharge to the environment. Drains and bunds will be monitored and managed to remove sediments to ensure they meet the designed volume requirements.

Water on the outer slopes of the TSF external embankments will be captured in catchment paddocks around the toes of the TSF embankments, and evaporated (WWL 2025a). The paddocks will ensure that sediment eroded from the outer slope embankments are captured and controlled. At the TSF, runoff from the WRL will be captured and evaporated in the void between the outer slope of the TSF embankment and the slope of the WRL. This will be achieved using a series of paddock cross-bunds connecting the two slopes.

7.5.2.4 Mitigation of Risks at Closure

An MCP has been prepared to address closure requirements for the Proposal (Appendix A03). The MCP will be updated regularly (at intervals not exceeding five years), in accordance with the relevant Mining Act Approvals Statement, to ensure its objectives remain relevant and aligned with stakeholder expectations and that its strategies and plans are appropriate to achieve closure outcomes.

To meet closure outcomes and manage closure risks, the following strategies that relate to the Inland Waters environmental factor will be implemented at the Proposal:

- Rehabilitation of ex-pit WRLs, with design informed by waste characterisation, to ensure long term stability and minimise the risk of erosion
- Implementation of progressive rehabilitation to promote revegetation

- Surface water and groundwater modelling to inform operations, closure planning and design and ensure no unacceptable impacts to sensitive receptors
- Rehabilitation monitoring of progressive rehabilitation to inform closure planning, closure outcomes and completion criteria development and refinement.
- Ongoing closure engagement with internal and external stakeholders to ensure technical and stakeholder input is considered and incorporated, where appropriate, into life of mine and closure planning and decision-making processes
- Contaminated sites assessment and remediation, where required.

Table 7-12: Application of the Mitigation Hierarchy for Inland Waters

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
Direct Impacts				
Lowering and/or mounding of groundwater levels	**Measure to Avoid**			
	Removal of two potential aquifer reinjection (managed aquifer recharge) areas from the Development Envelope to minimise the impacts from groundwater mounding	Proposal specific	No	Project optimisation through reducing Proposal extents is the most effective control to ensure impacts are as low as reasonability practicable
	The Wallal Borefield was removed from the Proposal which has reduced the area in which groundwater abstraction is proposed to occur	Proposal specific	No	
	The Texas Borefield was removed from the Proposal which has reduced the area in which groundwater abstraction is proposed to occur	Proposal specific	No	
	Discharge of surplus mine dewatering into the environment has been avoided by the use of CWD and infiltration/MAR bore areas	Proposal specific	No	Impact avoided by use of CWD and infiltration areas
	The Proposal will use mine water to meet most operational water demand, and the TSF has been designed to ensure maximum water recovery throughout the processing circuit, avoiding the need for additional non-potable water supply borefields	Standard practice with Proposal specific elements	No	TSF decant and surface water run-off management design is aimed at maximising re-use of water
	Measure to Minimise			
	Groundwater is abstracted according to programs that have been modelled to ensure dewatering volumes are minimised while ensuring safe and efficient access to the BWT mine pit. Ongoing groundwater level monitoring is used to verify the models and adjust dewatering programs as required	Standard practice with Proposal specific limits	Yes – DWER – Groundwater Licence (5C) and the Rimfire Groundwater Operating Strategy (Appendix C19) developed as part of the Groundwater Licences	The models used to optimise and balance the dewatering programs are recognised across the industry and have been used successfully by the Proponent across numerous projects in the region Ongoing groundwater level monitoring is used to verify the models and adjust dewatering programs as required

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	Operational water demand will be supplied from mine dewatering in the first instance, reducing the requirement for water supply from Rimfire	Proposal specific in line with standard business approach to groundwater management	No – the use of surplus water does not need approval for production use	Impact minimised by use of existing water resource from MIA
	Proposed abstraction volumes to be within the sustainable yield of Rimfire Borefield's groundwater resources	Standard practice with Proposal specific limits	Yes – DWER – Groundwater Abstraction Licence (5C)	Abstraction from the Proposal's groundwater resources and associated limits will be subject to assessment from DWER
	Surplus clean water from operations will be directed into a CWD. Where surplus water cannot be managed in the CWD, MAR (preferentially) and infiltration ponds will be used	Proposal specific	No	Impact minimised by use of CWD reducing the extent of mounding and seepage associated with infiltration/MAR bore areas
	The infiltration ponds and MAR area will be situated in a part of the MIA that contains a deep sand profile of approximately 10 m, a low permeability silcrete layer and partially-to unsaturated deeper sandstone profile capable of accepting infiltrated/injected water	Proposal specific	Yes – DWER – Groundwater Bore Licence (26D) to construct or alter a well and EP Act Part V licence and works approval	Construction and operation of the MAR bores and associated limits will be subject to assessment from DWER
	Measure to Rehabilitate			
	Groundwater bores will be decommissioned in accordance with relevant DWER guidelines, once no longer required	Standard practice, in accordance with DWER bore decommissioning guidelines and licence conditions	Yes – DWER – Groundwater Bore Licence (26D) to construct or alter a well	The bore decommissioning guidelines in place at the time would be recognised by industry and relevant government stakeholders
	Groundwater level recovery timeframes will be modelled in future iterations of the MCP (Appendix A03) At closure the infiltration ponds can be rehabilitated to natural surface	Standard practice	Yes – DMPE for the implementation of the MCP (Appendix A03)	Groundwater recovery trends have already been recorded where other dewatering programs have concluded

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
				across projects operated by the Proponent
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	Lowering the groundwater table as a result of mine dewatering to be no greater than a standing water level of -250 m RL (-250 m AHD)		Outcome based condition to be stipulated in Ministerial Statement, and addressed in the Rimfire Groundwater Operating Strategy (Appendix C19)	
	Abstraction of no more than 2.8 GL/a for Rimfire		Addressed in the Rimfire Groundwater Operating Strategy (Appendix C19)	
Alteration to surface hydrological regimes	**Measure to Avoid**			
	The Development Envelope and Conceptual Footprint have been modified during the design phase to minimise the size of the footprint where practicable	Standard practice	No	Project optimisation through reducing Proposal extents is the most effective control to ensure impacts are as low as reasonability practicable
	Measure to Minimise			
	The Proponent will implement an Operational Surface Water Management Plan (Appendix C01) to ensure inputs are managed such that water flows and quality are maintained A network of ponds, drains and flood protection bunds will be installed around the MIA to redirect stormwater from mining operations Waterway crossings will be installed along the RAC to prevent ponding upstream, water shadows downstream and to maintain flows downstream	Standard practice	No	Minimum design requirements for mine and linear infrastructure are standard practice and effective at preventing ponding and maintaining flow regimes downstream
	Measure to Rehabilitate			
	The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement	Standard practice	Yes – DMPE approval is required under the Mining Act for the implementation of	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c)

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	All disturbed areas that are no longer required will be stabilised and, if appropriate, rehabilitated All surface water diversions remaining after closure are designed and engineered to minimise impacts on local hydrological regimes, ensure long term stability across the realistic range of expected flow events, and do not significantly cause or contribute to water quality impacts		the MDCP and MCP	The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) The MDCP must also detail all mitigation and management actions for all potentially environmentally hazardous mining activities undertaken as part of the Proposal (DEMIRS 2025)
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	No limits proposed		N/A	
Indirect Impacts				
Groundwater contamination from TSF seepage or spillage	**Measure to Avoid**			
	HS tailings will be stored sub-aqueously during operations within the TSF to avoid tailings exposure to oxygen and resulting acidification	Proposal specific	Yes - DWER works approval is required for the construction and licence for operation of a TSF and DMPE approval is required under the Mining Act for the implementation of a MDCP and MCP	A Works Approval will contain legally enforceable conditions to prevent, control, abate or mitigate pollution or environmental harm during the construction and commissioning of the Projects Prescribed Activities (DWER 2019c). An Operational Licence has similar conditions for the Operation of the Projects Prescribed Activities Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
				leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) The MDCP must also detail all mitigation and management actions for all potentially environmentally hazardous mining activities undertaken as part of the Proposal (DEMIRS 2025)
	Measure to Minimise			
	TSF design includes segregation of HS and LS tailings materials	Proposal specific	Yes - DWER works approval is required for the construction and licence for operation of a TSF and DMPE approval is required under the Mining Act for the implementation of the MDCP and MCP	A Works Approval and Operational Licence will contain legally enforceable conditions to prevent, control, abate or mitigate pollution or environmental harm during the construction and commissioning of the TSF (DWER 2019c) Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b)
	HS cells will be lined with a HDPE (or equivalent) geomembrane liner and a suitable subgrade layer LS cells will be lined with a HDPE (or equivalent) liner The final liner selection will be based upon liner laboratory testing and further review by industry experts	Proposal specific		
	The TSF will be designed and operated in accordance with Global Industry Standard on Tailings Management (ICMM 2020), Rio Tinto standards and general good international practice	Standard practice		
	TSF design includes the WRL abutting and wrapping around the high sulfur storage cell as further control preventing failure	Proposal specific		
	The TSF will have internal drainage with the internal slopes of its embankments directing surface water flows into the TSF cells	Standard practice		
	Two reclaim water ponds will be constructed to receive supernatant from the TSF during operations. HS supernatant will only be directed to	Proposal specific		

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	ponds during periods of excess water; however, this will be dosed with lime to keep water as close to pH neutral as possible			The MDCP must also detail all mitigation and management actions for all potentially environmentally hazardous mining activities undertaken as part of the Proposal (DEMIRS 2025)
	Minimisation of spillage risk will be central to TSF design, construction and operation Emergency response and long-term recovery plans will be implemented in the event of a TSF failure The Proponent will implement a TSF Operating and Maintenance Manual, which will include a: • TARP to prevent loss of control to avoid potential TSF failures that could lead to spillage • Emergency Preparedness Plan to monitor and address potential TSF failures	Standard practice		
	Measures to Rehabilitate			
	At closure, the LS cells will be capped with a 0.5 m layer of NAF metasediment rock and a layer of topsoil. Meanwhile, the HS cells will have a 'tension saturated cover' consisting of 6.0 m LS tailings followed by a 0.5 m NAF metasediment rock capping layer Further details will be provided in the MCP and will be refined through further study prior to mine closure (Appendix A03)	Standard practice	Yes – DMPE approval is required under the Mining Act for the implementation of the MDCP and MCP	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) The MDCP must also detail all mitigation and management actions for all potentially environmentally hazardous mining activities undertaken as part of the Proposal (DEMIRS 2025)
	At closure, spillways and retention bunds will be constructed on top of the covered TSF to control water discharge during heavy rainfall events. The spillways will direct water away from the HS cells to the LS cells and will be constructed of durable NAF material and a maximum gradient of 1:10 Further details are provided in the Winu TSF Closure Design report (WWL 2025b) (Appendix G08)	Standard practice		
	The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement	Standard practice		

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	No limits proposed		N/A	
Groundwater or surface water contamination from pit walls, WRLS, mine stockpiles AMD	**Measure to Avoid**			
	N/A			
	Measure to Minimise			
	The Proponent will implement an Operational Surface Water Management Plan (Appendix C01) to ensure inputs are managed such that water flows and quality are maintained All waste rock will be characterised to inform the design of the WRL PAF material is to be stored within the core of the WRL, requiring ongoing waste rock identification and segregation of PAF waste The WRL will be constructed bottom up to ensure effective PAF encapsulation. The movement of Heavy Mobile Equipment on the WRL will form compacted layers that will minimise seepage and restrict oxygen movement The internal slopes of the berms will be reverse sloped to ensure that the WRL drains internally During Operations any AMD from mine stockpiles will be collected in perimeter drains and sumps and transported to the concentrator for amelioration during short-term processing A basal clay layer will be laid before the placement of any PAF material in the WRL or mine stockpiles to reduce significant AMD seepage into the underlying groundwater Visual inspection of the WRL for degradation of the outer competent material slopes and NAF encapsulation material Inspection and monitoring of the WRL perimeter drainage sumps, pumps and groundwater and surface water quality	Standard practice	Yes – DMPE approval is required under the Mining Act for the implementation of the MDCP and MCP	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) The MDCP must also detail all mitigation and management actions for all potentially environmentally hazardous mining activities undertaken as part of the Proposal (DEMIRS 2025)

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	The Proponent will regularly update the AMD S&MP consistent with the Leading Practice Sustainability Development Program for the Mining Industry (Australian Government 2016) Mine stockpiles containing PAF material will be built in small lifts and have low permeability layers underneath to minimise AMD percolation Mine stockpile operating procedures will include inspections and monitoring of drainage sumps, pumps, and ground and surface water quality			
	Measure to Rehabilitate			
	The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement. This will include: • Installation of a store and release cover, constructed of NAF material, on the WRL to limit water ingress • Reducing the overall slope angle of the WRL to 11° to reduce the effects of erosion and the potential to expose PAF Material	Standard practice	Yes – DMPE approval is required under the Mining Act for the implementation of the MDCP and MCP	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) The MDCP must also detail all mitigation and management actions for all potentially environmentally hazardous mining activities undertaken as part of the Proposal (DEMIRS 2025)
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	No limits proposed		N/A	
	Measure to Avoid			

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
Management of surplus water	Discharge of surplus mine dewater into the environment has been avoided by the use of CWD and infiltration/MAR bore areas	Proposal specific	No	Impact avoided by use of CWD and infiltration/MAR bore areas
	Measure to Minimise			
	Surplus clean water from operations will be directed into a CWD. Where surplus water cannot be managed in the CWD, MAR (preferentially) and infiltration ponds will be used	Proposal specific	No	Impact minimised by use of CWD reducing the extent of mounding and seepage associated with infiltration/MAR bore areas
	Each infiltration area may include two cells (to allow for maintenance) with perimeter and central embankments The infiltration areas will be designed to protect against floodwaters in the 1% AEP event (Advisian 2023b)	Proposal specific	Yes – DMPE approval is required under the Mining Act for the implementation of the MDCP and MCP	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) The MDCP must also detail all mitigation and management actions for all potentially environmentally hazardous mining activities undertaken as part of the Proposal (DEMIRS 2025)
	Water required for any artificial water sources within the 'waterless' barrier area will be appropriately contained to prevent Cane Toad access, e.g. in tanks or bladders	Proposal specific	No	Consistent with the Cane Toad waterless barrier plan (GoWA 2024a) to upgrade pastoral and irrigation water infrastructure
	Measure to Rehabilitate			

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement The infiltration ponds and MAR bores will be removed and rehabilitated at closure, with the ponds backfilled to ground level	Proposal specific	Yes – DMPE approval is required under the Mining Act for the implementation of the MDCP and MCP	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) The MDCP must also detail all mitigation and management actions for all potentially environmentally hazardous mining activities undertaken as part of the Proposal (DEMIRS 2025)
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	No limits proposed		N/A	
Seepage, leaks or spills of chemicals (including hydrocarbons)	**Measure to Avoid**			
	Potentially contaminating substances, such as solid and liquid wastes and bulk hydrocarbons (including aviation fuel) will be stored and handled per the requirements *Dangerous Good Safety Act (2004),* industry guidelines, and relevant standards including within secondary containment	Standard practice	Yes – Part V of EP Act works approval and operational licence and DLGIRS Dangerous Goods Licence will be required for bulk chemical and waste storage and management	A Part V of EP Act works approval, and licence will contain legally enforceable conditions to prevent, control, abate or mitigate pollution or environmental harm during the construction, commissioning and operation of prescribed activities (DWER 2019c)
	Measure to Minimise			

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	A Winu Spill Response Management Plan will be developed and implemented during construction and operation Spill kits will be located strategically throughout the MIA, and employees trained in their use The Proponent has prepared and will implement a Cyanide Management Plan (ELA 2024) (Appendix C10) consistent with the Cyanide Code (ICMI 2023) The Proponent will implement an Operational Surface Water Management Plan (Appendix C01) to ensure inputs are managed such that water flows and quality are maintained	Standard practice	Yes – DWER operational licence will required for appropriate management of potential emissions from the Proposal and a DMPE Dangerous Goods Licence will be required for the storage and transportation of chemicals including cyanide	A Part V of EP Act works approval, and licence will contain legally enforceable conditions to prevent, control, abate or mitigate pollution or environmental harm during the construction, commissioning and operation of prescribed activities (DWER 2019c) A Dangerous Goods Site Licence will contain conditions pertaining to the storage of all dangerous goods present at the premises. Conditions will usually reflect requirements specified in the relevant Australian Standards
	Measure to Rehabilitate			
	The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement	Standard practice	Yes – DMPE approval is required under the Mining Act for the implementation of the MDCP and MCP	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) The MDCP must also detail all mitigation and management actions for all potentially environmentally hazardous mining activities undertaken as

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
				part of the Proposal (DEMIRS 2025)
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	No limits proposed		N/A	
Sediments loads	**Measure to Avoid**			
	N/A			
	Measure to Minimise			
	The Development Envelope and Conceptual Footprint have been modified during the design phase to minimise vegetation clearing where practicable The Proponent will implement an Operational Surface Water Management Plan (Appendix C01) to ensure inputs are managed such that water flows and quality are maintained	Standard practice	No	Project optimisation through reducing clearing extents is the most effective control to ensure impacts are as low as reasonability practicable
	Perimeter bunds will be constructed on the upper surface and benches of the WRL to ensure surface water retained within the bunds infiltrates into the WRL or evaporates Drains and bunds will be monitored and managed to remove sediments to ensure they meet the designed volume requirements Topsoil stockpiles will not exceed 2 m in height and will be placed in the direction of the natural sand dunes to minimise wind erosion Topsoil stockpiles will be vegetated where possible to increase evapotranspiration and minimise soil loss to erosion WRL and TSF will be constructed with competent NAF material on the outside to minimise erosion Dispersive waste material will be encapsulated within NAF material to control wind erosion and allow vegetation establishment Visual inspection of WRL for degradation of the outer competent material slopes and NAF encapsulation material	Standard practice	Yes – DMPE approval is required under the Mining Act for the implementation of the MDCP and MCP	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) The MDCP must also detail all mitigation and management actions for all potentially environmentally hazardous mining activities undertaken as part of the Proposal (DEMIRS 2025)

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	Measure to Rehabilitate			
	The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement Topsoil (from the two main soil units, Deep Sand and Gradational Sand) will be stockpiled separately from subsoils for use in rehabilitation. Subsoils suitable for use in rehabilitation will also be segregated and stockpiled where practicable Recovery and stockpiling of topsoil is intended for future use as a growth medium in rehabilitation works Installation of a TSF LS tailings cover with topsoil and growth media placed over the top using competent material. Erosion resistant material at appropriate slope will be used to minimise erosion. Water on the embankment crests will be directed internally into TSF and prevent from flowing down the outer slopes	Standard practice	Yes – DMPE approval is required under the Mining Act for the implementation of the MDCP and MCP	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) The MDCP must also detail all mitigation and management actions for all potentially environmentally hazardous mining activities undertaken as part of the Proposal (DEMIRS 2025)
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	No limits proposed		N/A	

7.6 Assessment and Significance of Residual Impact

7.6.1 Assessment of Direct Residual Impacts

7.6.1.1 Lowering of Groundwater Levels from Mine Pit Dewatering and Borefields

7.6.1.1.1 MIA

Mine pit dewatering will reduce groundwater levels in the surrounding groundwater system. Predicted maximum drawdown contours from dewatering at the end of mining are presented in Figure 7-19 and Figure 7-20.

Sensitivity testing and uncertainty analysis applied to the numerical hydrogeological model indicated drawdown of more than two metres is not expected to extend beyond 15 km from the pit (Worley 2025b). A 2 m drawdown threshold was chosen based on the assumption that this variance is within natural seasonal groundwater table fluctuations. The hydrogeological model predicts negligible drawdown effect from pit dewatering at the MIA on proposed abstraction at Rimfire.

Post closure, recharge rates are low so groundwater recovery is expected to be slow, with pit lake levels predicted to stabilise after 100 to 200 years once TSF seepage inflow rates become near-constant (Section 7.4.2.4) (HGL 2024a). Long term drawdown of up to 150 m is expected to remain due to the continued effect of evaporation from the pit lake (Figure 7-38) (Worley 2025h). Note that the drawdown depicted in Figure 7-38 is based on a long term (i.e. 300 year) post closure timeframe, in contrast to Figure 7-20, which shows predicted drawdown at the end of mining. Both predictions are based on the required modelled pit dewatering rates over the LoM (i.e. an average 3-4 GL/a and a peak of 7.9 GL/a), with drawdown after the end of mining initially extending further laterally once pumping ceases as the groundwater table rebounds and equilibrates over time.

Receptors in or users of the Wallal and/or Broome aquifers are predicted not to be impacted by lowering of groundwater within the MIA.

The predicted drawdown associated with Rimfire (see below) and the proposed dewatering at the MIA do not spatially overlap. Both activities abstract groundwater from similar geological units and there is a possibility that groundwater abstracted from Rimfire will reduce throughflow in the metasediments to the MIA (Figure 7-40). Even under a conservative assumption that the 2 m drawdown contours from the MIA and the Rimfire Borefield will intersect, the resulting drawdown remains confined to the Proterozoic metasediment aquifer. The furthest extent of this contour remains more than approximately 75 km south of the Mandora Marsh (Walyarta). Therefore, no influence on the regional hydraulic gradients towards the Wallal aquifer or Mandora Marsh is predicted.

Predicted drawdown during operation does not extend into the conceptual recharge area of the unconfined Wallal Aquifer, therefore, no impacts to aquifer recharge is predicted during the operational phase (Worley 2026). However, to gauge this, the total predicted pit inflow during closure was assessed as 2,855 Kl/d. Based on the extent of predicted residual drawdown, and assuming that 50% of the inflow (1,428 kL/d) originates from the unconfined Wallal Aquifer recharge zone north of the proposed pit, this represents a potential reduction in recharge of 1,428 kL/d (0.5 GL/a). The Wallal Caning Basin model (Pells Sullivan Meynink 2017 cited in Worley 2026) estimates the total annual recharge is 375 GL/a. Accordingly, even under an unlikely worst-case scenario, the potential reduction in annual recharge to the WCB would be less than 0.14% after closure. Modelled groundwater gradients and depth to water in this area indicate the drawdown contours will have a localised reduction of the groundwater gradient and have no impact on the unconfined Wallal aquifer's water balance.

No other environmental or cultural heritage values that may be potentially sensitive to groundwater drawdown have been identified within the zone of influence of the cone of depression (Section 7.4.1.1).

During proposed mining operations, monitoring will measure groundwater level responses from mine dewatering through a series of near-mine and regional bores. Dewatering bore abstraction rates, pit wall

seepage rates (from unconfined formations and metasediments), supplementary borefield pumping, and surrounding groundwater levels will be reviewed regularly and compared to predicted trends.

A critical aspect of the review and reporting of monitoring data will be the verification of numerical model predictions (within acceptable limits or errors). The data collected during future hydrogeological investigations (e.g. aquifer yields, transmissivity, and other hydraulic properties, mudstone continuity) will be used to further refine the hydrogeological conceptual model, and subsequently update and recalibrate the numerical groundwater model and mine water balance. This will improve confidence in model predictions through periodic review and verification of results.

Given the information above and the proposed mitigation measures detailed in Section 7.5 and in Appendix C09 the lowering of groundwater levels at the MIA is not expected to result in a significant residual impact to Inland Waters.

7.6.1.1.2 Rimfire

Groundwater abstraction at Rimfire will create a groundwater drawdown cone of depression radially extending from the borefield into the surrounding area. Sensitivity testing and uncertainty analysis predicted drawdown of more than two metres is not expected to extend beyond approximately 15 km from the borefield. A 2 m drawdown threshold was chosen based on the assumption that this variance is within natural seasonal groundwater table fluctuations. The modelled drawdown was based on a simulation of 32 years of pumping, which far exceeds what is forecast to be actually required.

Rimfire is located more than 30 km from the MIA, therefore water levels at the MIA are not expected to be affected by abstraction at the borefield.

There is a potential occurrence of groundwater dependent vegetation within the Percival Palaeovalley, within and to the south of the Development Envelope, within the zone of influence of the drawdown cone of depression. This is discussed in Section 8.

Potential impacts to subterranean fauna are discussed in Section 10.

No other environmental or cultural heritage values that may be potentially sensitive to groundwater drawdown have been identified within the zone of influence of the cone of depression.

Predictive simulations indicate that water levels would recover to within two metres of original levels more than 150 years after cessation of pumping (Worley 2025c) (Appendix C12). Recovery to within five metres of original groundwater levels is predicted to occur in approximately 50 years (Figure 7-39).

Given the information above and the proposed mitigation measures detailed in Section 7.5 and in Appendix C12, the lowering of groundwater levels at Rimfire is not expected to result in a significant residual impact to Inland Waters.

7.6.1.1.3 RAC

Given the short duration and limited volumes proposed to be abstracted to support construction of the RAC, the drawdown estimation results obtained from the analytic assessment and forward predictions of groundwater abstraction indicate:

- 0.4 GL/a from the Broome Aquifer and Lower Callawa Formation above the Jarlemai Siltstone can be sustained with negligible impacts on any receptors
- 0.6 GL/a from the Lower Callawa and Unconfined Wallal aquifer where the Jarlemai Siltstone is absent can be sustained with negligible impacts on any receptors.

Drawdowns extend less than 200 m from proposed bores, with the closest bore (WINU1323) approximately 52 km from the Mandora Marsh (Walyarta) (Worley 2026). Sensitive receptors including the Eighty Mile Beach Ramsar wetland including Mandora Marsh (Walyarta) will not be affected by any water level drawdowns induced by pumping from proposed production bores for road construction. Water levels and water pressure at the environmental receptors will not be affected by any water level drawdowns induced by pumping from proposed production bores for road construction.

Nearby pastoral station or regional mining groundwater users will also not be affected (Worley 2025f).

Given the information above and the proposed mitigation measures detailed in Section 7.5 and in Appendix C13, the lowering of groundwater levels along the RAC is not expected to result in a significant residual impact to Inland Waters.

122°0'0"E

N

Winu Soak

Wallal

NYANGUMARTA PEOPLE (PART A)

5

2

1

50

100

20

10

Mine Infrastructure Area (MIA)

Rimfire

MARTU (AREA A)

Legend

- Predicted Residual Drawdown (m)
- Regional Surface Water Features (Golder)
- Development Envelope
- Native Title Determinations
- Palaeovalleys (Geoscience Aus. 2012)
- Claypan Occurance Areas
- Conceptual Footprint

0 5 10 Kilometres

RioTinto

Figure 7-38: Predicted Residual Drawdown (Recovery) 300 Years After Cessation of Mining

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Wednesday, 10 June 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:250,000
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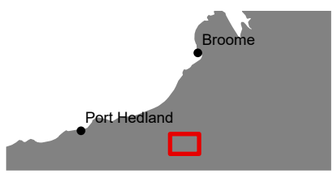

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_InlandWaters.aprx Layout: ERD - Inland Waters - Winu - Predicted Residual DD Cessation Pumping

122°0'0"E

121°30'0"E

122°0'0"E

20°30'0"S

21°0'0"S

N

Winu Soak

Wallal

NYANGUMARTA PEOPLE (PART A)

Mine Infrastructure Area (MIA)

Rimfire

AKD10

MARTU (AREA A)

Percival

Legend

- Bore
- Regional Surface Water Features (Golder)
- Production Bores
- Predicted Residual Drawdown 2-5m (Recovery - 50yrs)
- Development Envelope
- Native Title Determinations
- Palaeovalleys (Geoscience Aus. 2012)
- Claypan Occurance Areas
- Conceptual Footprint

0 5 10 Kilometres

RioTinto

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Wednesday, 10 June 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:250,000
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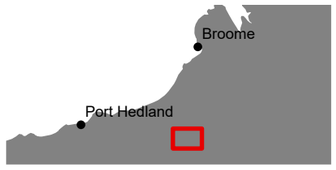
Figure 7-39: Rimfire - Predicted Residual Drawdown (Recovery) 50 Years after Cessation of Pumping



Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_InlandWaters.aprx Layout: ERD - Inland Waters - Rimfire - Predicted Residual DD 50yr from Cessation Pumping

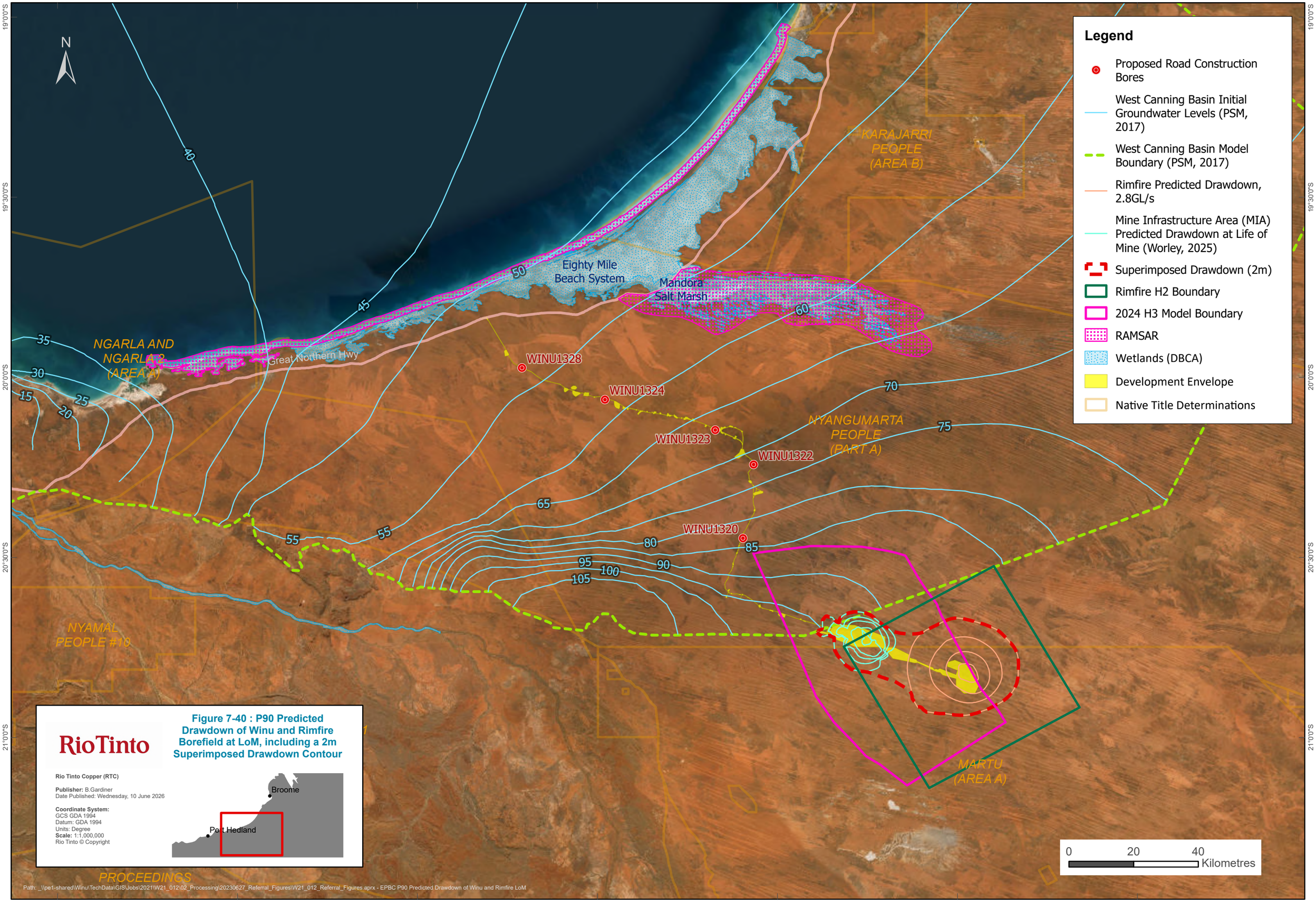


Figure 7-40 : P90 Predicted Drawdown of Winu and Rimfire Borefield at LoM, including a 2m Superimposed Drawdown Contour

Rio Tinto

Rio Tinto Copper (RTC)

Publisher: B.Gardiner
Date Published: Wednesday, 10 June 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:1,000,000
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Path: _\\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20230627_Referral_Figures\W21_012_Referral_Figures.aprx - EPBC P90 Predicted Drawdown of Winu and Rimfire LoM

7.6.1.2 Groundwater Mounding from Management of Surplus Water

As assessment of options, including field investigations and modelling, concluded that a hybrid system employing two infiltration ponds and MAR borefield are required to provide the most effective way to manage Proposal surplus water.

Utilisation of the infiltration ponds is expected to result in groundwater mounding in the surrounding surficial and sandstone aquifers.

The MAR borefield is not expected to lead to mounding in the surficial aquifer.

Mounding of the surficial aquifer from the infiltration ponds will be localised, with flow reporting towards the mine pit. The rate of inflow to the pit from this recirculation is anticipated to be manageable under the proposed dewatering regime (Worley 2025d). Mounding from the infiltration ponds presents a small potential risk of occasional prolonged periods with occurrences of near surface groundwater and the artificial establishment of associated GDEs, or if connectivity between sands and the sandstone aquifer is partly compromised, reducing infiltration rates. Potential impacts from mounding on vegetation is discussed in Section 8.

Mounding in the sandstone aquifer, which will also report towards the mine pit, is too deep to impact the surface (Worley 2025d).

Mounding will decrease following the peak surplus year, predicted in Year 9 (Worley 2025d).

Given the limited and localised effect on groundwater, and in consideration of the mitigation measures outlined in Section 7.5, the proposed management of surplus water is not expected to have a significant residual impact on Inland Waters.

7.6.1.3 Changes to Surface Hydrological Regimes

7.6.1.3.1 Catchment Area

Following implementation of the Proposal, the Great Sandy Desert Lake Dora Catchment area will be reduced by less than 50 km^2, a fraction of the total catchment area (Table 7-13). Furthermore, the Proposal does not intersect any major surface water features and this negligible reduction in catchment size will not affect any key regional surface water hydrological regimes.

Table 7-13: Great Sandy Desert Lake Dora Catchment Area

Total Catchment Area (km^2)	Area Reduced by Proposal (km^2)	Difference (%)
Approx. 290,000	48.78	<0.02

7.6.1.3.2 MIA

The stormwater management infrastructure will be operational throughout life of mine to avoid flooding of mining operations, and to minimise impacts on the quantity and quality of surface water flows within the surrounding environment. The proposed stormwater management infrastructure has been designed with a 1% AEP design flood.

While the surface water flows will be diverted around the MIA, it is important to note that no major surface water features are known to occur within proximity to the MIA. In consideration of the information provided above and the proposed mitigation measures detailed within Table 7-12 and the Operational Surface Water Management Plan (Worley 2024c) (Appendix C01), no significant residual impacts to surface water hydrology are expected as a result of the construction of the MIA.

7.6.1.3.3 RAC

The attenuation of surface water upstream of the access road crossings may result in a localised increase in flood depths in this area to 1.1 m (Worley 2024b). Model results indicate that depths downstream of the crossing are expected to change slightly, with difference mapping (Figure 7-41) indicating water levels directly adjacent to the access road are generally below 0.1 m in all modelled AEP events (Worley 2024b).

In consideration of the information provided above, the proposed mitigation measures detailed within Section 7.5.2.2 and the RAC Surface Water Management Plan (Worley 2024b) (Appendix C02), and the lack of major surface water features in proximity to the proposal, changes to the surface water depth and velocity as a result of the construction of the RAC is not expected to result in a significant impact to surface water hydrological regimes.

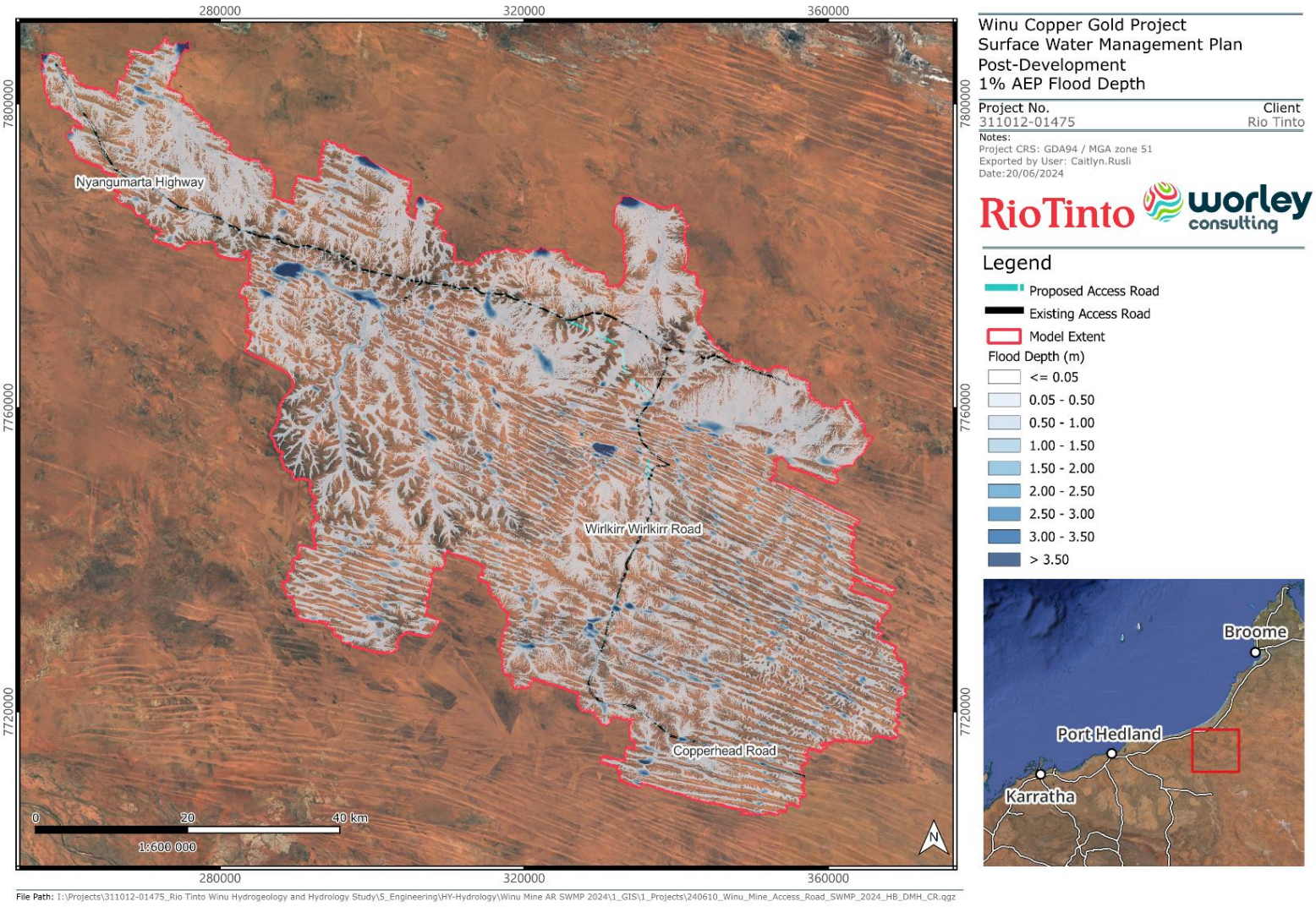

Figure 7-41: 1% AEP Maximum Flood Depth following RAC Construction

7.6.2 Assessment of Indirect Residual Impacts

7.6.2.1 Reduction in Ground and/or Surface Water Quality

7.6.2.1.1 Groundwater Contamination from TSF Seepage or Spillage

The Proposal will generate tailings as a copper and gold processing by-product. These tailings will be stored within a TSF and segregated into HS and LS cells to be appropriately managed according to their potential environmental risks. The HS tailings have the potential to become highly acidic and result in mineral leaching if unmanaged. As such, they will be stored sub-aqueously to minimise the level of acidification due to oxygenation. The HS cell will be lined with a HDPE (or equivalent) membrane liner and constructed to abut the WRL. This will limit overtopping during extreme rainfall events and prevent lateral and vertical leakage (Figure 7-11). The LS tailings will be stored sub-aerially as these materials have a lower potential for acidification and associated mineral leaching. The LS cells will also be lined with a HDPE (or equivalent) liner. The final liner selection will be based upon laboratory testing and further review by industry experts.

The liner will deteriorate over time; however, not significantly during operations, when negligible seepage is expected (SRK 2025). During operations, seepage would be extremely limited and controlled only by minor imperfections in the liners, with no significant liner degradation expected during the operational period. A basal seepage flux of only 0.15 mm/year is predicted, equivalent to 0.04% of annual rainfall, meaning any seepage would only move a few centimetres into underlying soils over the life of mining. Two lined reclaim ponds will be constructed to the west of the TSF as an additional water management option. The ponds enhance operational water recovery and reduce hydraulic head on the LS tailings liners, helping minimise seepage.

Water can be transferred from cell to cell, or to the reclaim ponds, before returning to the processing plant. These ponds are part of the closed-loop water recovery system and are not intended to discharge to the environment. The TSF design philosophy emphasises liner integrity and extremely low seepage rates for the water holding structures.

The TSF and ponds sit above a thick unsaturated zone (15–70 m), meaning even hypothetical leakage could not reach groundwater within the operational period. Hence TSF seepage to groundwater during operations is negligible and not expected to reach the watertable.

Oxidation rates of the LS and HS cells are predicted to be very slow - multi-century timescales for the former and only the 0.1 to 0.2 m topmost layer affected after 300 years for the latter. The top 1 m of the TSF is expected to oxidise in the order of 10,000 years. In the short-term, post-closure, no impacts on pit water are expected before approximately 300 years. In the long term, several hundred to thousands of years, the seepage could have increasing constituent concentrations, relative to initial seepage phases; however, any impact on pit lake water quality expected to be negligible under the base case assumptions. However, it is extremely difficult to accurately predict so long into the future and more impacts on the pit lake chemistry are possible if the liner degrades significantly more than predicted and there is more net percolation.

The whole TSF has been designed to be internally draining, with the two water reclamation ponds regularly receiving supernatant from the cells, and any excess water generated during extreme rainfall events.

During mineral processing, the HS supernatant will be dosed with lime before it is released to the TSF and the reclaim water ponds.

Once deposition into the TSF has ceased the TSF will be closed with measures designed to minimise the long-term impact of the facility. A cover will be placed over the saturated HS tailings to limit the upward loss of water due to capillary rise. The cover over the LS tailings will encourage vegetation and aim to limit dust. Post-closure modelling of a range of cover designs over a 300 year simulation period and slow rates of rainwater infiltration and seepage from the TSF suggest that extremely long

timeframes (many centuries, even millennia) would elapse before seepage would reach and mix with underlying groundwater (SRK 2025). Should seepage occur, it will flow toward the pit lake. Closure measures will also take into consideration erosion of the embankments and the potential for this to result in dispersion of the tailings to the environment..

Spillways and retention bunds will be constructed on top of the covered LS tailings cells to control water discharge during heavy rainfall events and discharge surface water from the facility. Spillways will also be constructed at the HS cells to direct excess water away from the HS cells to the LS cells. The spillways will be constructed of durable NAF material and will have a maximum gradient of 1:10 (WWL 2025b). Further details are provided in the MCP and Winu TSF Closure Design Report and will be refined through further study prior to mine closure (Figure 7-11; Appendix A03, G08).

Through these mitigation measures and the implementation of the EMP (Appendix A05) and the AMD S&MP (Appendix C07), the Proponent expects that the Proposal will not result in a significant residual impact on the environment due to TSF seepage or spillage.

7.6.2.1.2 Groundwater or Surface Water Contamination from Pit Walls, Waste Rock Landforms and/or Mine Stockpiles AMD

The excavation of PAF material as part of the Proposal will likely result in the formation of AMD, if unmanaged. Specifically, exposure of PAF on the pit walls and storage in mine stockpiles, particularly the secondary sulfide and mafic stockpiles. The Proposal's AMD strategy and management plan follows a hierarchical approach, with prevention and minimisation of AMD generation priorities and where this is not possible control and treatment will be undertaken.

AMD runoff from within the pit (particularly during the wet season) will be retained onsite and discharged into the process circuit.

The critical design features to note that will limit AMD are:

- PAF will be stored within the interior and encapsulated with NAF waste. This will limit exposure to oxygen and water, required to generate AMD
- A low permeability basal layer. This purpose of this basal layer is to ensure seepage collection at the toe drain (and limit infiltration through to groundwater) and to raise the PAF material above the original ground to prevent direct contact of the PAF with any water flowing at the interface of the original ground and constructed landform
- Bottom up construction - small lifts. Small lifts will limit the risk of material segregation and tightly compact the WRL to reduce oxygen ingress. Each layer will be compacted using dump truck compaction to limit net percolation of incident rainfall
- Final store and release cover to limit net percolation of rainfall. Cover design modelling is provided in Okane (2020). The modelling results indicate that increasing the closure cover system thickness to greater than 2.5 m had little effect on simulated net percolation. Closure planning for the WRL (and TSF) will be supported by the final cover trials conducted during operations.

The rainfall runoff contacting exposed PAF material on the mine stockpiles will be collected via surface drains and discharged into the process circuit. PAF stockpiles will be processed through the process plant or encapsulated at closure with low erodibility NAF covers.

In regard to seepage, (HGL 2024b) used Hydrus-1D modelling to quantify deep percolation of rainfall through WRL materials during operations. Results show that infiltration represents only a small fraction of annual rainfall, and the majority is stored temporarily and then lost to evaporation. The analytical seepage modelling (vertical one-dimensional) demonstrated that moisture does not progress through the full WRL thickness (up to 80 m), with:

- Only the upper lifts wet during rainfall
- A substantial portion of the WRL's internal pore space remains unsaturated, retaining infiltrated water.

The modelling did not include beneficial features that would reduce seepage risk, such as the WRL layers with compaction and low permeability basal layer. Thus, the prediction of zero seepage to groundwater is conservative.

Even if small amounts of water reached the WRL base, the underlying vadose zone has sufficient storage capacity to retain this moisture. Hence no excess water is predicted to drain through to groundwater.

At closure, a cover will be placed on the surface of the WRL, reducing infiltration of rainfall from approximately 21% of precipitation (based on Hydrus-1D modelling of operations) to approximately 3 to 6% of precipitation (Okane 2020). As a result, the progression of a wetting front through the WRL is expected to be negligible after closure.

The likelihood of any WRL seepage occurring, reaching the water table and migrating towards the pit lake is negligible.

These mitigation measures and the proposed monitoring methodologies are discussed in further detail in the EMP (Appendix A05) and AMD S&MP (Appendix C07). Through the implementation of these measures, the amount of AMD generation is expected to be minimised and its interactions with surface water and groundwater limited. As such, the Proponent expects the Proposal will not have a significant residual impact on the environment due to surface water and groundwater AMD contamination.

7.6.2.1.3 Management of Surplus Water

Water quality results from local groundwater bores indicate that water reporting to the infiltration areas is expected to be slightly alkaline with a pH of 7.8 and moderately saline (approximately 2,500 uS/cm) (Advisian 2023b). The water appears cloudy, with high suspended solids (26 mg/L), which is expected to settle once the water is stagnant. The iron content is elevated (but generally less than 2 mg/L), which is expected to oxidise rapidly at the given pH, once in contact with oxygen. The oxidised iron (and other metals) is considered to have caused the elevated suspended solids value.

In general terms the water can be considered good quality (Advisian 2024). When discharging groundwater with elevated suspended solids values to infiltration ponds, sediment loads are the key concern. If surplus water is pumped directly from the dewatering bores to the infiltration area, at a peak inflow (11 ML/d), it is expected that approximately 290 kg/d of solids would settle in the infiltration areas. The infiltration areas will be monitored during operations and if required solids will be removed every few years.

Any impact to groundwater quality is not expected to be significant, given:

- Management of surplus water through utilisation of the infiltration ponds and MAR will only occur when the CWD operating capacity is exceeded
- The prioritisation of clean water from pit dewatering directed to the CWD and then infiltration ponds/MAR
- MAR will be used preferentially to the infiltration ponds.

Given management of surplus water through utilisation of the infiltration ponds and MAR will only occur when necessary when the CWD capacity is exceeded, and the prioritisation of clean water from pit dewatering directed to the CWD and then infiltration ponds/MAR, any impact to groundwater quality is not expected to be significant.

7.6.2.1.4 Post Closure Formation of a Pit Lake

No significant ecological risk is expected to be posed by the permanent pit lake post closure. This conclusion is supported by the hydrogeological behaviour of the lake, its water balance, and the physical constraints that limit contact between terrestrial environments and pit lake water. The pit lake ecological risk assessment (Mine Lakes Consulting 2025) demonstrated the only valid pathway were through direct contact, drinking and biomagnification of pit lake aquatic organisms to birds and terrestrial wildlife. The assessment further identified that birds and specifically waterfowl were the key wildlife of risk from the pit lake, but it is a very low risk.

At closure the open pit is predicted to act as a long-term, evaporative hydraulic sink with no expected discharge to the environment (Figure 7-42, Figure 7-43) (HGL 2024a). Therefore, migration of solutes from the pit lake into surrounding soils or terrestrial environments is not expected. The pit lake has no predicted surface water decant, including during extreme rainfall events. No surface pathways exist to transport lake water, salts or metals into surrounding terrestrial soil or vegetation.

Groundwater from the metasediment aquifer will be the dominant inflow to the open pit. Inflow from the overlying unconfined (Permian sandstone) aquifer is at this stage assumed to be negligible due to the saturated thickness of the aquifer being limited and of low permeability (Mine Lakes Consulting 2025). Pit lake water quality is expected to be initially dominated by groundwater; however, due to its role as a terminal sink, evaporative processes will concentrate all solutes. Acting as a sink, there will be no migration of groundwater from the pit lake to other aquifers or environmental receptors.

Geochemical modelling predicts that the pit lake will have a slightly alkaline pH during filling and throughout the simulated post-closure period (300 years post-closure). Due to the long acidification lag time and the chemical nature of the groundwater, the resulting pit lake chemistry is predicted to be circumneutral with abundant buffering capacity to maintain circumneutral conditions over the long term (i.e. centuries to millennia). The pit lake will also have a moderate to high concentration of TDS due to evapoconcentration, characteristic of a hydraulic sink (HGL 2024a; Mine Lakes Consulting 2025). Salinity increases over time due to evapoconcentration, making the water unpalatable to terrestrial fauna and further reducing any chance of usage or incidental contact.

The lake is steep sided and deep, with no littoral zone and no rehabilitated catchment. This means terrestrial animals are unlikely to access or contact lake water, and hence no soil contamination vectors (e.g. trampling, tracking, or deposition) exist.

The potential for contaminants in the pit lake to enter terrestrial food webs via emergent insects has been assessed via the environmental risk assessment undertaken by Mine Lakes Consulting (2025). The assessment concluded that the pit lake will be an oligotrophic, steep sided and low productivity waterbody with extremely limited littoral habitat and very low biomass of aquatic invertebrates. While some aquatic insects may develop during early filling, their abundance is expected to be minimal, and the lake will rapidly become increasingly saline and unproductive. Consequently, emergent insects are not expected to form a significant dietary component for waterbirds or bats. The assessment therefore concluded that the risk of bioaccumulation or biomagnification of metals through the pit lake food web and into terrestrial receptors is very low.

Although the risk is considered very low, the Proponent will implement a monitoring program after mine closure to determine whether insects emerging from the pit lake water during the early post-closure period, prior to the lake becoming highly saline, are acting as a significant exposure pathway for bioaccumulation of metals into the food web. The monitoring program is anticipated to be based on an initial phase using remotely operated cameras to determine whether there is a significant level of interaction between birds and bats with the pit lake surface. If this is found to be the case, the next phase is anticipated to involve tissue sampling of birds and bats to determine whether metals are bioaccumulating within these groups due to interactions with the pit lake. Adaptive responses will then be determined as appropriate.

Given the above, the creation of a pit lake is not expected to result in a significant impact to surface water and groundwater quality. Section 9 also discusses the potential impact on fauna. Closure studies will be progressively developed throughout the mine life to build confidence in predictions and reduce residual risk from final landforms.

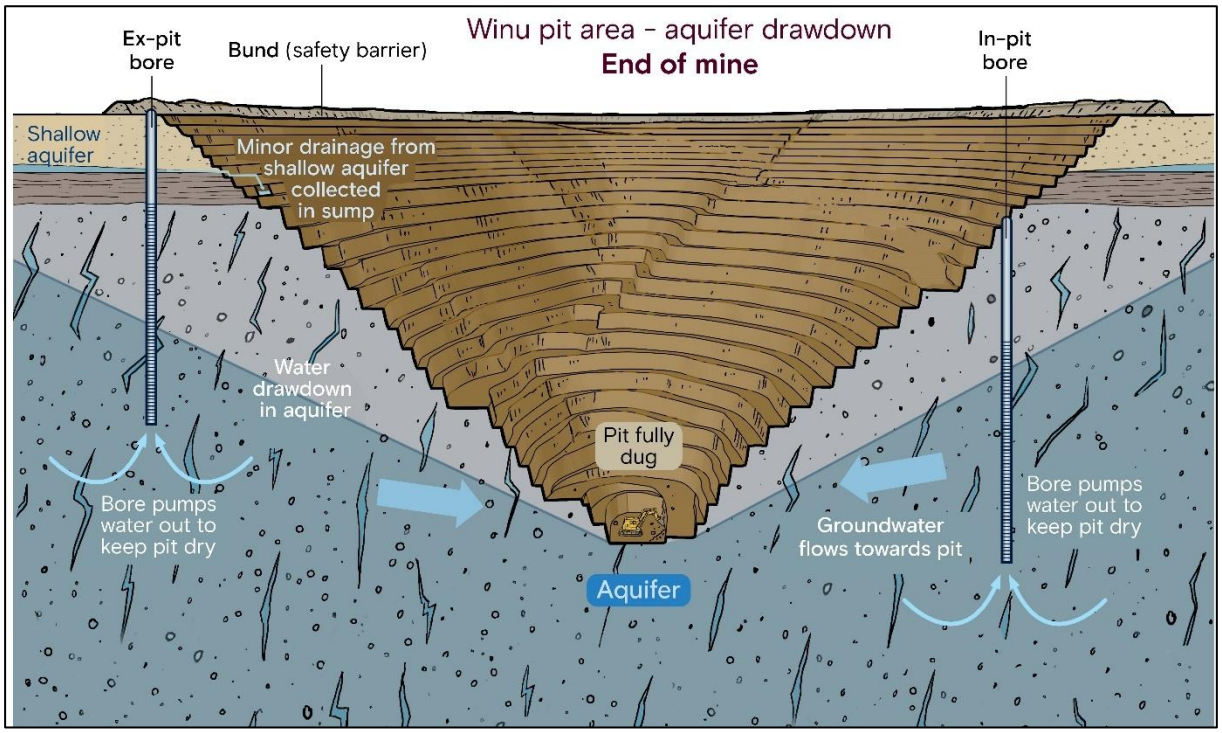

Figure 7-42: Pit at the End of Mining

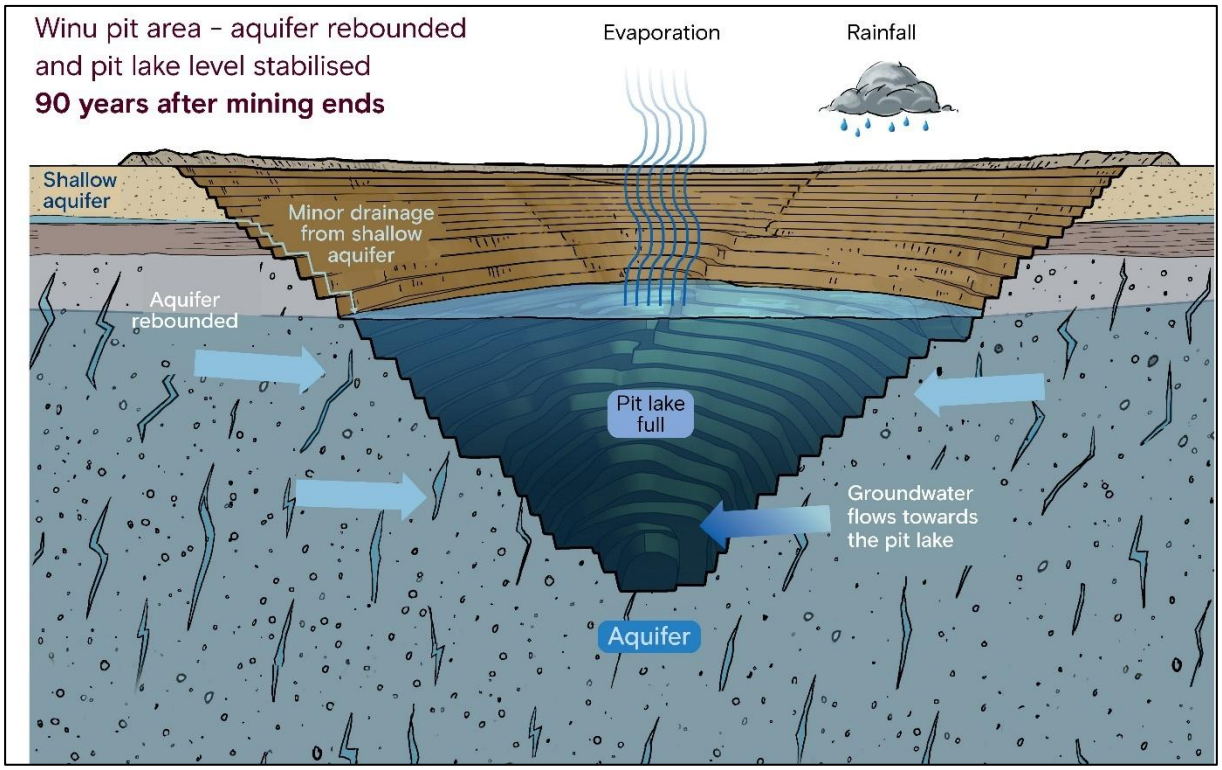

Figure 7-43: Final Pit Lake Conditions

7.6.2.1.5 Seepage, Leaks or Spills of Chemicals (including Hydrocarbons)

Implementing the Proposal will require the regular use and storage of hydrocarbons (including aviation fuel), explosives and other chemicals within the Development Envelope. More concentrated use and storage of these substances will be confined to specific areas within the Development Envelope. Site drainage infrastructure will be designed to minimise or eliminate surface water runoff into areas where hydrocarbon contamination may occur. Hydrocarbon storage facilities will be appropriately constructed and bunded in accordance with Australian Standards and all handling of these materials will be per statutory requirements, relevant industry guidelines and Australian standards. This is expected to ensure that potential impacts will be limited and localised.

Site inspection, maintenance and implementation of a Spill Response Management Plan and Cyanide Management Plan (Appendix C10) are expected to effectively mitigate the risk of contamination. The Spill Response Management Plan and Cyanide Management Plan will guide ongoing management throughout construction and operation as appropriate. As part of closure management, relevant equipment and facilities will be decommissioned prior to removal, include decontamination as required and in compliance with the Cyanide Management Code for decommissioning of all facilities related to cyanide (refer to the MCP; Appendix A03). With these mitigation measures the Proponent expects the Proposal will not have a significant residual impact on the environment due to surface water and/or groundwater chemical contamination.

7.6.2.1.6 Sediment Loads

The occurrence of soil erosion resulting in increased suspended sediments within the Development Envelope is unavoidable. This is due to the cohesionless and sandy soil units that dominate the surface and near-surface parts of the Development Envelope. However, this will be limited to disturbance areas within the Conceptual Footprint, and the Proponent is committed to implementing mitigation measures in line with best practice industry standards to minimise the extent and severity of any erosion within those areas. These mitigation measures include Conceptual Footprint optimisation, surface water management, topsoil and subsoil stockpile measures, appropriate WRL design and construction, and best practice rehabilitation and closure actions. Through implementing these mitigation measures the potential for increased sediment loads will be minimised, with unlined drains and perimeter bunds surrounding uncontaminated mine structures used to capture and contain any sediment laden water, minimising uncontrolled sediment laden discharge to the environment. Drains and bunds will be monitored and managed to remove sediments to ensure they meet the designed volume requirements. With the application of these mitigation measures the Proponent expects that the Proposal will not result in a significant residual impact on the environment due to soil erosion.

7.6.3 Assessment of Cumulative Residual Impacts

7.6.3.1 Cumulative Impacts Resulting from reducing the Great Sandy Desert Lake Dora catchment

The estimated cumulative impacts from this Proposal, existing and reasonably foreseeable projects within the region on Great Sandy Desert Lake Dora catchment are anticipated to be less than 1% (Table 7-9).

The assessment shows that the Proposal will have negligible cumulative effects at these scales, with approximately 99% or more of Great Sandy Desert Lake Dora catchment remaining following the implementation of the Proposal, including existing and reasonably foreseeable projects.

7.6.3.2 Cumulative Impacts Resulting from Altering Groundwater Levels

No obvious spatial or temporal cumulative effects to the local groundwater aquifers and associated values are expected in relation to the interaction of mine pit dewatering and Rimfire (Section 7.4.3.2).

Five groundwater licences overlap with the Development Envelope (Table 7-10). Given the low annual allocation limits of these licences, they are unlikely to have any discernible impact on groundwater levels within the Development Envelope.

Given the low allocation limits associated with these licences and the confined nature of the metasediments aquifer associated with BWT mining, the Proposal is unlikely to contribute to existing groundwater drawdown related effects on the regional Canning-Wallal aquifer and its values.

7.7 Likely Environmental Outcomes

In consideration of the proposed management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Inland Waters include:

- Lowering the groundwater table as a result of mine dewatering to be no greater than a standing water level of -250 m RL
- Abstraction of no more than 2.8 GL/a for the Rimfire Borefield
- Abstraction of approximately 1.0 GL/a for no more than two years for construction of the RAC
- No impact to any major surface water feature as a result of the alteration of groundwater levels
- No significant impacts to groundwater quality related to the MIA
- Minimise the Proposal's impact on surface water and groundwater quality, by implementing mitigation measures consistent with leading industry practices and government regulations.

The Proponent will implement the EMP (Appendix A05), Operational Surface Water Management Plan (Appendix C01), Access Road Surface Water Management Plan (Appendix C02), AMD S&MP (Appendix C07), Cyanide Management Plan (Appendix C10), Mine Closure Plan (Appendix A03) and a Spill Response Management Plan to achieve these outcomes.

Following the implementation of the mitigation hierarchy, no significant residual impacts were identified. As such, the Proponent considers that the Proposal can be implemented to meet the EPA’s objective for the Inland Waters factor to maintain the quality of land and soils so that environmental values are protected.

8 FLORA AND VEGETATION

8.1 EPA Environmental Factor Objective

The EPA Statement of Environmental Principles, Factors, Objectives and Aims of EIA (EPA 2023b) lists the following as its objective for Flora and Vegetation:

To protect flora and vegetation so that biological diversity and ecological integrity are maintained

8.1.1 Definitions

For assessment by the EPA, the following terms have been defined:

- **Flora** - native vascular plants (EPA 2016a)
- **Vegetation** - groupings of different flora patterned across the landscape that occur in response to environmental conditions (EPA 2016a)
- **Significant flora and vegetation** - as any flora species or vegetation community protected under legalisation, listed as a Priority under DBCA or important locally.

8.2 Relevant Policy and Guidance

Table 8-1 presents the relevant policy and guidance for Flora and Vegetation.

Table 8-1: Relevant Policy and Guidance for Flora and Vegetation

Policy and Guidance	Explain how the Policy and Guidance have been Considered
Environmental Protection Authority	
Statement of Environmental Principles, Factors, Objectives and Aims for EIA (EPA 2023b)	The EPA objective for flora and vegetation forms the basis of this assessment. This assessment has regard to the aims of EIA, consideration of significance and the application of the mitigation hierarchy
Environmental Factor Guideline: Flora and Vegetation (EPA 2016a)	Considered in the impact assessment for flora and vegetation and the design (methods and approach) of flora and vegetation surveys (previous guidance were used where surveys were undertaken before current guideline where available)
EPA Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016f)	
Instructions on how to prepare an Environmental Review Document (EPA 2024e)	This document forms the basis of the headings and content provided in this ERD, that has been prepared by WA EIA practitioners
Instructions on how to prepare *Environmental Protection Act 1986* Part IV Impact Reconciliation Procedures and Impact Reconciliation Reports (EPA 2024g)	Considered in the impact assessment and offset strategy for flora and vegetation
Template for *Environmental Protection Act 1986* Part IV Reconciliation Procedures (EPA 2021f)	
Cumulative environmental impacts of development in the Pilbara region – Advice of the Environmental Protection Authority to the Minister for Environment	Considered in understanding cumulative impacts and supports conclusions on significance, and therefore

Policy and Guidance	Explain how the Policy and Guidance have been Considered
under Section 16(e) of the *Environmental Protection Act 1986* (EPA 2014)	offsets required for clearing, of vegetation based on its condition
Instructions on how to prepare *Environmental Protection Act 198*6 Part IV Environmental Management Plans (EPA 2024f)	The EMP has been prepared in accordance with the instructions and addresses relevant matters related to flora and vegetation (Appendix A05)
Guidance Statement 6 – Rehabilitation of Terrestrial Ecosystems (EPA 2006)	This document has been considered in the design and planning of the Proposal, it has also been considered in the preparation of mitigation measures for the Proposal, including the preparation of the rehabilitation strategy for the WRL and TSF, which forms part of the Proposal's MCP
Instructions for the preparation of data packages for the Index of Biodiversity Surveys for Assessments (IBSA) (EPA 2021c)	Considered in the compilation of biological data packages and during the submission process of these packages
Other State or Commonwealth	
Guidelines for preparing Mine Closure Plans (DMPE 2025b)	The MCP has been prepared in accordance with the guidance and addresses matters related to flora and vegetation (Appendix A03)
Guideline for preparing Mining Development and Closure Proposals ((DEMIRS 2025)	
Mining Development and Closure Proposal and Approvals Statement Framework (DMPE 2025c))	
WA Environmental Offsets Policy (GoWA 2011)	Considered in the impact assessment and offset strategy for flora and vegetation
WA Environmental Offsets Guidelines (GoWA 2014a)	
EPA Public Advice - Considering environmental offsets at a regional scale (EPA 2024h)	
Australian Weeds Strategy 2017-2027 – Invasive Plants and Animals Committee Commonwealth of Australia (DAWR 2017)	Considered in mitigating potential impacts to flora and vegetation, particularly as a result of weeds
Weed Impact and Invasiveness Rating for the Pilbara Region (DBCA 2023a)	
Conservation and Land Management Act 1984 (CALM Act) joint management plan for parks and reserves of the south-west of Kimberley and north-west Pilbara (DBCA 2019)	Considered in understanding management objectives for biodiversity conservation, and for parks and reserves, within the region
Pilbara Conservation Strategy (GoWA 2018)	

8.3 Receiving Environment

8.3.1 Studies

The flora and vegetation values within the Development Envelope are well understood. More than 40 separate mobilisations for flora and vegetation surveys have been conducted within the area including reconnaissance surveys, baseline surveys and targeted conservation significant species and ecological community surveys (Western Botanical 2026a).

The most recent flora and vegetation surveys included a review and consolidation of all previous survey efforts into a report (Western Botanical 2026a) (Appendix D01). The extent of the consolidated survey

area (the Vegetation Survey Area, in this chapter) is 69,328 ha and covers the entirety of the Development Envelope.

The Western Botanical (2026a) survey did not include flora records from the AREH project, which partly intersects the Development Envelope within the RAC. This assessment has considered the known flora records from the AREH project. The extent of known flora records is herein referred to as the Flora Survey Area, which includes the AREH project and the Vegetation Survey Area.

Table 8-2 provides the location, types and timing for each of the surveys/studies. Figure 8-1 shows the survey coverage and Figure 8-2 the sampling effort within and surrounding the Development Envelope. Further granularity associated with the survey sampling effort can be found in Appendix D01

Table 8-2: Summary of Technical Studies for Flora and Vegetation

Title	Location	Area (ha)	Type	Survey Season and Dates	Consistency with Guidance
Consolidated Detailed Flora and Vegetation Assessment of the Winu Project, June 2026 (Western Botanical 2026a) (Appendix D01)	MIA	13,402	Assessment of seasonal limitations of previous botanical survey work across the MIA Targeted Priority flora surveys across the MIA Annual weed survey	Wet season 15 June – 17 June 2022 24 March – 28 March 2023	These surveys and report have been conducted and prepared in accordance with: • EPA Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016f)
	Proposed MIA Extensions	3,533	Two-phase Detailed flora and vegetation survey	Multiple seasons (i.e. wet and dry) Phase 1: 19 June- 23 June 2022 Phase 2: 8 October – 11 October 2022	
	RAC	6,477	Second phase detailed flora and vegetation survey (rescore RAC quadrats > 5 years) Targeted Priority flora searches	Wet season 29 March – 5 April 2023 16 June – 22 June 2023	
	Rimfire	8,007	Two-phase detailed flora and vegetation survey (Phase 1: only proposed drill pads and access tracks, Phase 2: broader survey area)	Multiple seasons (i.e. wet and dry) Phase 1: 12 October – 16 October 2023 Phase 2: 24 June – 29 June 2023 Phase 3: 24 October – 29 October 2024 Phase 4: 19 March – 24 March 2024	
	Texas Borefield	3,294	Two-phase detailed flora and vegetation survey (Phase 1: only proposed drill pads and access tracks, Phase 2: broader survey area)	Multiple seasons (i.e. wet and dry) Phase 1: 12 October – 16 October 2023 Phase 2: 24 June – 29 June 2023 Phase 3: 24 October – 29 October 2024 Phase 4: 19 March – 24 March 2024	

Title	Location	Area (ha)	Type	Survey Season and Dates	Consistency with Guidance
	Wallal Borefield	471	Reconnaissance survey	Wet season 29 March – 5 April 2023	
	Regional (outside Development Envelope)	N/A	Targeted Priority flora search	Wet season 15 April – 28 April 2024	
	Revised Development Envelope (Rimfire and Texas Borefield extensions)	Not stated	Two-phase flora and vegetation survey Aerial targeted Priority flora searches across sand dunes	Wet season Phase 1: 10 June – 17 June 2024 1 June – 7 June 2024 Phase 2: snipped	
	Winu South	1,577	Single-phase flora and vegetation survey Targeted Priority flora searches across sand dunes	Dry season Phase 1: 28 October – 3 November 2024 6 December – 8 December 2024	
	MIA	Not stated	Detailed survey of additional quadrats established to ensure a minimum of three quadrats in relevant vegetation associations Intensive targeted searches for Priority flora across remaining unsurveyed areas	Wet season March 2026 15 April 2026 – 21 April 2026 30 April 2026 – 6 May 2026 17 May 2026 – 28 May 2026 25 May – 5 June 2026	
Regional and Targeted Priority Flora Assessment of the Winu Project (Western Botanical 2025c)	Development Envelope and regional	252,114	Targeted Priority flora searches	4 May – 8 May 2025 29 May – 4 June 2025	This survey was conducted in accordance with: • EPA Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016f)

Title	Location	Area (ha)	Type	Survey Season and Dates	Consistency with Guidance
(Appendix D02)					
Significant Vegetation of the Winu Project (Western Botanical 2025d) (Appendix D03)	Development Envelope and regional	64,399	Assessment of significance of vegetation types within and surrounding the Development Envelope	N/A	This report was prepared based on survey reports that were conducted in accordance with: • EPA Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016f)
Melaleuca Vegetation Mapping for the Winu Project (Western Botanical 2025a) (Appendix D04)	Percival Palaeovalley (south of Rimfire)	8,866	Assessment of *Melaleuca*-dominated vegetation	2 May – 3 May 2025 7 May 2025	These surveys were conducted consistent with: • EPA Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016f)
Summary of Findings from April 2025 Targeted Weed Survey of the Winu and Magnum Camps and Surrounding Infrastructure (Western Botanical 2025b)	Winu and Magnum Camp, infrastructure areas and RAC	Not stated	Targeted weed survey	28 April – 29 April 2025 9 May 2025	
Winu Project Infiltration Pond Impact Assessment (Biota 2025a) (Appendix D05)	MIA	532	Impact assessment of proposed infiltration strategies and their potential impact on environmental values, primarily vegetation and flora	N/A	This assessment was undertaken with reference to: • EPA Statement of environmental principles, factors, objectives and aims of EIA (EPA 2023b) • EPA Instructions: How to prepare an environmental review document Environmental Protection Authority March 2024 (EPA 2024e)

Title	Location	Area (ha)	Type	Survey Season and Dates	Consistency with Guidance
					• Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016f) • Environmental Factor Guideline: Flora and Vegetation (EPA 2016a)
Winu Project Flora of Ethno-Botanical Significance (Western Botanical 2023) (Appendix D06)	Development Envelope	Not Stated	Ethno-Botanical significance Report	N/A	This assessment was undertaken with reference to: • Traditional Ecological Knowledge of Nyangumarta Warrarn Indigenous Protected Area (NWAC 2016)
Winu Project Detailed Flora and Vegetation Survey (Biota 2021)	MIA and RAC	30,159	Two-phase Detailed Flora and Vegetation Survey Reconnaissance Flora Survey	Multiple seasons (i.e. wet and dry) 12 May – 17 May 2019 22 August – 27 August 2019 18 September – 24 September 2019 12 July – 20 July 2020	This survey was conducted in accordance with: • Environmental Factor Guideline: Flora and Vegetation (EPA 2016a) • EPA Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016f)
Winu Ecohydrology Assessment - Initial Findings (Richardson Consulting 2026) (Appendix D07)	Rimfire	Not stated (approx. 15,000 ha)	Ecohydrology Assessment	N/A	N/A
Paterson Road Corridor Reconnaissance Flora and Vegetation and Level 1 Fauna	RAC	852	Reconnaissance Surveys	Dry season 29 April – 9 May 2019	These surveys were conducted in accordance with: • Statement of Environmental Principles, Factors, Objectives and Aims for EIA (EPA 2023)

Title	Location	Area (ha)	Type	Survey Season and Dates	Consistency with Guidance
Survey (Astron 2019)					• Environmental Factor Guideline: Flora and Vegetation (EPA 2016a) • EPA Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016f)
Paterson Flora, Vegetation and Fauna Habitat Assessment Survey October/November 2018 (Astron 2018)	Airstrip	116	Single-phase flora and vegetation survey Targeted Threatened and Priority flora searches	29 October – 2 November 2018	
Asian Renewable Energy Hub Detailed Vegetation and Flora Survey (Biota 2018a)	AREH	660,774	Detailed Flora and Vegetation Survey	Multiple seasons (i.e. wet and dry) 24 August – 3 September 2017 13 March – 22 March 2018	This survey was conducted in accordance with: • Environmental Factor Guideline: Flora and Vegetation (EPA 2016a) • EPA Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016f)

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N

Great Northern Hwy

Nyangumarta Hwy

MARTU (AREA A)

Legend

- Winu Flora and Vegetation Surveys
- AREH Flora and Vegetation Surveys
- Minor Road, Sealed
- Minor Road, Unsealed
- Track
- Highway
- Mining Lease
- Development Envelope
- Native Title Determinations

0 10 20 Kilometres

RioTinto

Figure 8-1: Extent of Flora and Vegetation Surveys Conducted for the Proposal

Rio Tinto Copper (RTC)

Publisher: Gavin.Jackson
Date Published: Thursday, 4 June 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:550,000
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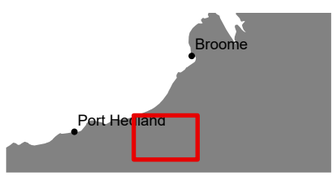

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20230627_Referral_Figures\W21_012_Referral_Figures.aprx | Layout: Key Flora and Veg Studies

121°0'0"E
121°30'0"E
122°0'0"E
20°0'0"S
20°30'0"S
Great Northern Hwy
Rimfire Borefield Enlargement
Mine Infrastructure Area Enlargement
PEOPLE
(PART A)
MARTU
(AREA A)
0
10
20
Kilometres
RioTinto
Figure 8-2: Flora Survey Effort within and Surrounding the Development Envelope
Rio Tinto Copper (RTC)
Publisher: Michael.Rouse
Date Published: Thursday, 2 July 2026
Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:500,000
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Broome
Port Hedland
Legend
Tracklogs (Flora and Vegetation surveys)
Highway
Development Envelope
Disturbance Area
Conceptual Footprint
Native Title Determinations
Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Flora Survey Effort within and Surrounding the DE

8.3.2 Vegetation

8.3.2.1 IBRA Regions

The Proposal is predominantly situated within the Great Sandy Desert IBRA bioregion (DCCEEW 2021). This bioregion is divided into six subregions, of which the Mackay and McLarty subregions are relevant to the Proposal. The MIA is within the Mackay subregion, while the RAC and Rimfire stretch from the south in the Mackay subregion through the McLarty subregion in the north.

Part of the RAC, approximately 6 km at its westernmost end, is located in the Pindanland subregion of the Dampierland bioregion.

8.3.2.2 Pre-European Vegetation

The Proposal intersects five vegetation associations mapped by Beard (1975). The vegetation associations were defined from the broadscale (1:1,000,000 and 1:250,000) vegetation mapping of WA, completed by Beard (1975). Shepherd et al. (2002) reassessed and updated the mapping to account for clearing in WA's intensive land use zone and to divide some of the larger vegetation associations.

None of the vegetation associations within the Development Envelope are considered regionally significant, given the extents remaining within the subregions (Table 8-3 and Figure 8-3).

Table 8-3: Pre-European Vegetation Associations within the Development Envelope

Pre-European Vegetation Association and Description	Extent within the Mackay, McLarty and Pindanland Subregions*			Pre-European Extent with Formal Protection*	Extent within the Development Envelope*	
	Pre-European (ha)	Current (ha)	% Remaining	(%)	(ha)	% of Development Envelope (% of Current Extent)
Great Sandy Desert 134 Mosaic: Hummock grasslands, open low tree steppe; Desert Bloodwood and Feathertop Spinifex (*Triodia schinzii*) on sandhills/Hummock grasslands, shrub steppe; mixed shrubs over spinifex between sandhills	13,595,888	13,593,951	99.9	4.97	19,246	81.4 (0.1)
Mandora East 80 Hummock grasslands and low tree steppe with Desert Walnut over soft spinifex between sand ridges	294,534	294,534	100	-	631	2.7 (0.2)
Mandora East 101 Hummock grasslands and shrub steppe with *Acacia pachycarpa* over soft spinifex	963,087	963,041	99.9	-	664	2.8 (0.1)
Mandora East 117 Hummock grasslands and grass steppe with soft spinifex	496,473	489,195	98.5	0.5	2,977	12.6 (0.6)
Pindan 32 Pindan sandplain with Acacia shrubland with scattered low trees over *Triodia* spp	244,378	244,347	99.9	0.3	131	0.6 (0.1)
Total	**15,594,360**	**15,585,068**	**99.9**	**4.3**	**23,649**	**100 (0.2)**

**Extent rounded up to nearest ha. The information presented in Table 8-3 is accurate as of 2019 (GoWA 2019)*

120°30'0"E
121°0'0"E
121°30'0"E
122°0'0"E
20°0'0"S
20°30'0"S

PINDAN 41
PINDAN 32
Great Northern Hwy
KARAJARRI PEOPLE (AREA A)
N
MANDORA - EAST 117
MANDORA - EAST 80
MANDORA - EAST 101
MYANGUMARTA PEOPLE (PART A)
MANDORA - EAST 117
MANDORA - WEST 101
GREAT SANDY DESERT 117
GREAT SANDY DESERT 134
GREAT SANDY DESERT 41
GREAT SANDY DESERT 178
GREAT SANDY DESERT 101
GREAT SANDY DESERT 117
MARTU (AREA A)

Legend

- Development Envelope
- Native Title Determinations

Pre-European Vegetation System

- GREAT SANDY DESERT 101
- GREAT SANDY DESERT 117
- GREAT SANDY DESERT 134
- GREAT SANDY DESERT 178
- GREAT SANDY DESERT 41
- MANDORA - EAST 80
- MANDORA - EAST 101
- MANDORA - EAST 117
- MANDORA - WEST 101
- PINDAN 32
- PINDAN 41

RioTinto

Figure 8-3: Pre-European Vegetation Associations within the Development Envelope

Rio Tinto Copper (RTC)

Publisher: Michael.Rouse
Date Published: Thursday, 2 July 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:500,000

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0 10 20 Kilometres

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Pre-European Vegetation

8.3.2.3 Local Vegetation Types

Fifty (50) distinct vegetation types across five broad landforms have been identified and mapped within the Vegetation Survey Area. A further 28 vegetation types forming mosaics, in which a single vegetation type could not be distinguished, were also identified (Table 8-4 and Figure 8-4) (Western Botanical 2026a, 2025d) (Appendix D01 and D03).

Of these, 31 distinct vegetation types and 10 mosaic vegetation types occur within the Development Envelope.

Note that the vegetation codes described in this section were mapped at the National Vegetation Information System (NVIS) level 5 'Association' (Western Botanical 2026a). They have been designated 'vegetation types' in this ERD to distinguish from the Beard (1975) and Shepherd et al. (2002) vegetation associations introduced in Section 8.3.2.2.

Dominant vegetation types within the Development Envelope include:

- P1: *Acacia platycarpa* (*Acacia tumida* var. *kulparn*) Open Shrubland over *Triodia schinzii* (6,823 ha)
- P2: *Acacia ancistrocarpa* Tall Shrubland over *Triodia schinzii* (1,978 ha)
- D1: *Corymbia chippendalei* Low Open Woodland over *Triodia schinzii* (1,951 ha).

Vegetation types display clear associations with the IBRA subregions intersecting the Development Envelope with vegetation types intercepted in relatively small areas along narrow parts of the Development Envelope (i.e. along the RAC) compared to the vast scale of the McLarty and Mackay IBRA subregions. Given this, and the extensive and relatively uniform occurrence of the IBRA subregions of the Great Sandy Desert, it is expected that all vegetation types will be found more widely distributed and occupying significantly greater areas in numerous patches outside the Development Envelope (Western Botanical 2026a). The number of patches for each vegetation type occurring within the Development Envelope is presented in Table 8-5.

Approximately 100 ha of the Development Envelope was mapped as comprising existing disturbed areas, including roads and tracks (Western Botanical 2026a)[2].

[2] Note that Section 2.1 describes existing clearing of approximately 154 ha, as reported under relevant native vegetation clearing permit requirements. The discrepancy is understood to be a function both of time, as some natural regeneration has likely occurred within older cleared areas, thus being mapped under the more recent surveys as containing native vegetation, and as some reporting may have provided larger areas than the extent actually cleared.

Table 8-4: Consolidated List of Vegetation Types Occurring within and Surrounding the Development Envelope

Landform	Vegetation Type	Description	Total Extent in Vegetation Survey Area (ha)*	Total Extent in Development Envelope (ha)*
Sand Dunes and Associated Swales	D1	*Corymbia chippendalei* Low Open Woodland over *Triodia schinzii*	3,000	1,951
	D2	*Owenia reticulata* Scattered Low Trees over *Triodia schinzii*	3,450	1,099
	D3	*Grevillea stenobotrya, Grevillea wickhamii* & *Acacia anaticeps* Tall Shrubland over *Triodia schinzii*	261	81
	D4	*Melaleuca lasiandra* Open Low Shrubland over *Triodia schinzii*	168	0
Interdunal Sand Plains	P1	*Acacia platycarpa* (*Acacia tumida* var. *kulparn*) Open Low Shrubland over *Triodia schinzii*	10,725	6,823
	P2	*Acacia ancistrocarpa* Open Shrubland over *Triodia schinzii*	6,045	1,978
	P3	*Acacia drepanocarpa* subsp. *latifolia* Open Shrubland over *Triodia schinzii*	3,114	1,353
	P4	*Acacia orthocarpa* Open Shrubland over *Triodia schinzii*	3,325	722
	P5	*Acacia* spp. Scattered Shrubs over *Triodia schinzii*	552	551
	P6	*Owenia reticulata* & *Erythrophleum chlorostachys* Scattered Low Trees over *Triodia schinzii (Triodia epactia*)	221	104
	P7	*Calytrix carinata* Low Shrubland over *Triodia schinzii*	129	0
	P8	*Acacia eriopoda* & *Acacia sericophylla* Open Shrubland over *Triodia schinzii* (*Triodia epactia*)	5,143	919
	P9	*Acacia ancistrocarpa* & *Acacia monticola* Open Shrubland over *Triodia schinzii* (*Triodia epactia*)	732	533

Landform	Vegetation Type	Description	Total Extent in Vegetation Survey Area (ha)*	Total Extent in Development Envelope (ha)*
	P10a	*Corymbia zygophylla* Scattered Tree Mallees over *Triodia epactia*	527	72
	P10b	*Corymbia zygophylla* Scattered Tree Mallees over *Triodia schinzii* and *Triodia epactia* (*Acacia stellaticeps*)	343	325
	P10c	*Corymbia zygophylla* Scattered Tree Mallees over *Triodia schinzii*	1,845	424
	P10d	*Corymbia zygophylla* Scattered Tree Mallees over *Triodia brizoides*	51	0
	P11	*Grevillea refracta* (*Acacia ancistrocarpa* & *Acacia monticola*) Scattered Tall Shrubs over *Triodia epactia*	1,975	917
	P12	*Grevillea refracta*, *Acacia monticola* & *Acacia colei* var. *colei* Open Shrubland over *Acacia adoxa* var. *adoxa* & *Triodia epactia*	164	143
	P13	*Gardenia pyriformis* subsp. *keartlandii* Scattered Low Trees over *Triodia schinzii*	942	625
	P14	*Acacia monticola* & *Acacia drepanocarpa* (*Acacia orthocarpa* & *Acacia ancistrocarpa*) Open Shrubland over *Triodia schinzii*	1,099	318
	P15a	*Corymbia candida* Open Low Woodland over *Triodia schinzii*	221	49
	P15b	*Corymbia candida* Open Low Woodland over *Acacia monticola* shrubland over *Triodia epactia*	86	19
	P15c	*Corymbia candida* Open Low Woodland over *Triodia brizoides*	106	0
	P16	*Eucalyptus odontocarpa* Very Open Shrub Mallee over *Triodia schinzii*	21	14

Landform	Vegetation Type	Description	Total Extent in Vegetation Survey Area (ha)*	Total Extent in Development Envelope (ha)*
	P18	*Corymbia opaca* Open Woodland over *Triodia schinzii*	475	192
	P19	*Melaleuca lasiandra* Low Open Shrubland over *Triodia schinzii*	320	243
	P20	*Acacia ancistrocarpa* & *Acacia orthocarpa* Open Shrubland over *Triodia schinzii* and *Triodia epactia*	921	249
	P21	*Acacia sericophylla* Open Shrubland over *Triodia schinzii*	45	0
	P22	*Acacia stipuligera* Open Shrubland over *Triodia schinzii*	40	0
	P23	*Melaleuca* spp. (boundaries defined, excludes subcategorisation)	7,082	0
	P23a	*Melaleuca lasiandra*, *Melaleuca glomerata* (*Eucalyptus victrix*, *Acacia colei* var. *colei*) Open Shrubland over *Triodia basedowii* (*Acacia stellaticeps*)	929	0
	P23b	*Melaleuca lasiandra* (*Hakea lorea*, *Melaleuca glomerata*) Open Shrubland over *Triodia epactia* (*Euploca glandulifera*, *Ptilotus axillaris*)	92	0
	P23c	Interzone - *Melaleuca lasiandra*, *Melaleuca glomerata*, *Acacia ancistrocarpa* (*Acacia drepanocarpa*, *Acacia monticola*) Open Shrubland over *Triodia schinzii*	566	0
	P23d	*Melaleuca glomerata* Scattered Low Shrubs over *Trianthema turgidifolium* (*Triodia basedowii*)	50	0
Claypans and Low-Lying Clay Flats	C1	*Eucalyptus victrix* Open Woodland over *Triodia epactia*	230	0
	C2	*Acacia bivenosa* Scattered Low Shrubs over *Triodia brizoides* & *Triodia epactia (Triodia schinzii)*	1,449	15
	C3	*Acacia bivenosa (Acacia stellaticeps)* Low Shrubland over *Triodia epactia*	898	0

Landform	Vegetation Type	Description	Total Extent in Vegetation Survey Area (ha)*	Total Extent in Development Envelope (ha)*
	C4	*Acacia ancistrocarpa* Open Low Shrubland over *Eulalia aurea* & *Triodia epactia*	379	146
	C5	Claypan Playa *(Diplachne fusca subsp. muelleri, Eragrostis falcata)* with Scattered Herbs	5	0
	C6	Claypan (*Cullen pustulatum, Gossypium australe*) over *Eulalia aurea (Eragrostis xerophila)*	8	0
	C7	Claypan with annual herbs and grasses (*Sporobolus actinocladus*, *Eragrostis cumingii* & *Eriachne obtusa*)	2	0
	C8	Claypan (*Eragrostis cumingii*) with Scattered Herbs and Grasses	3	0
Stony Rises and Gentle Rocky Outcroppings	R1	*Acacia bivenosa* (*Acacia ancistrocarpa*) Scattered Shrubs over *Triodia brizoides* (*Triodia schinzii*)	642	234
	R2	*Grevillea wickhamii* Scattered Tall Shrubs over *Mirbelia viminalis* (*Acacia hilliana*) and *Triodia brizoides* (*Triodia epactia*)	1,871	1,395
	R3	*Acacia hilliana* (*Acacia adoxa* var. *adoxa*) Low Open Shrubland over *Triodia epactia*	3,114	1,675
	R4	*Ficus brachypoda* Scattered Low Trees over *Acacia monticola*, *Grevillea pyramidalis* and *Triodia epactia*	< 1	< 1
	R5	*Senna artemisioides subsp. oligophylla, Senna sericea* (*Acacia bivenosa*) Scattered Low Shrubs over *Triodia epactia* (*Aristida contorta, Dactyloctenium radulans*)	1	0
	R6	*Grevillea wickhamii*, *Acacia monticola* and *Acacia ancistrocarpa* Open Shrubland over *Triodia epactia*	76	76
	R7	Isolated outcropping with *Acacia colei* Scattered Low Shrubs over *Eriachne mucronata*	< 1	0

Landform	Vegetation Type	Description	Total Extent in Vegetation Survey Area (ha)*	Total Extent in Development Envelope (ha)*
Mosaic Units	D2+P8	Mosaic: *Owenia reticulata* Scattered Low Trees over *Triodia schinzii* + *Acacia eriopoda* & *Acacia sericophylla* Open Shrubland over *Triodia schinzii (Triodia epactia)*	34	0
	P1+D2	Mosaic: *Acacia platycarpa (Acacia tumida* var. kulparn) Open Low Shrubland over *Triodia schinzii* + *Owenia reticulata* Scattered Low Trees over *Triodia schinzii*	3	3
	P1+P2	Mosaic: *Acacia platycarpa (Acacia tumida* var. kulparn) Open Low Shrubland over *Triodia schinzii* + *Acacia ancistrocarpa* Open Shrubland over *Triodia schinzii*	50	0
	P1+P3	Mosaic: *Acacia platycarpa (Acacia tumida* var. kulparn) Open Low Shrubland over *Triodia schinzii* + *Acacia drepanocarpa* subsp. *latifolia* Open Shrubland over *Triodia schinzii*	16	0
	P1+P4	Mosaic: *Acacia platycarpa (Acacia tumida* var. kulparn) Open Low Shrubland over *Triodia schinzii* + *Acacia orthocarpa* Open Shrubland over *Triodia schinzii*	15	7
	P1+P5	Mosaic: *Acacia platycarpa (Acacia tumida* var. kulparn) Open Low Shrubland over *Triodia schinzii* + *Acacia spp.* Scattered Shrubs over *Triodia schinzii*	87	87
	P1+P14	Mosaic: *Acacia platycarpa (Acacia tumida* var. kulparn) Open Low Shrubland over *Triodia schinzii* + *Acacia monticola* & *Acacia drepanocarpa* (*Acacia orthocarpa* & *Acacia ancistrocarpa*) Open Shrubland over *Triodia schinzii*	37	5
	P1+P18	Mosaic: *Acacia platycarpa (Acacia tumida* var. kulparn) Open Low Shrubland over *Triodia schinzii* + *Corymbia opaca* Open Woodland over *Triodia schinzii*	39	8
	P2+P3	Mosaic: *Acacia ancistrocarpa* Open Shrubland over *Triodia schinzii* + *Acacia drepanocarpa* subsp. *latifolia* Open Shrubland over *Triodia schinzii*	142	50

Landform	Vegetation Type	Description	Total Extent in Vegetation Survey Area (ha)*	Total Extent in Development Envelope (ha)*
	P2+P14	Mosaic: *Acacia ancistrocarpa* Open Shrubland over *Triodia schinzii* + *Acacia monticola* & *Acacia drepanocarpa* (*Acacia orthocarpa* & *Acacia ancistrocarpa*) Open Shrubland over *Triodia schinzii*	17	11
	P2+C3	Mosaic: *Acacia ancistrocarpa* Open Shrubland over *Triodia schinzii* + *Acacia bivenosa (Acacia stellaticeps*) Low Shrubland over *Triodia epactia*	41	0
	P4 + C7	*Acacia orthocarpa* Open Shrubland over *Triodia schinzii* + Claypan with annual herbs and grasses (*Sporobolus actinocladus*, *Eragrostis cumingii* & *Eriachne obtusa*)	8	0
	P4+P14	Mosaic: *Acacia orthocarpa* Open Shrubland over *Triodia schinzii* + *Acacia monticola* & *Acacia drepanocarpa (Acacia orthocarpa* & *Acacia ancistrocarpa*) Open Shrubland over *Triodia schinzii*	32	0
	P4+R1	Mosaic: *Acacia orthocarpa* Open Shrubland over *Triodia schinzii* + *Acacia bivenosa (Acacia ancistrocarpa*) Scattered Shrubs *Triodia brizoides (Triodia schinzii*)	10	2
	P4+R4	Mosaic: *Acacia orthocarpa* Open Shrubland over *Triodia schinzii* + *Ficus brachypoda* Scattered Low Trees over *Acacia monticola, Grevillea pyramidalis* & *Triodia epactia*	2	2
	P10c+P8	Mosaic*: Corymbia zygophylla* Scattered Tree Mallees over *Triodia schinzii* + *Acacia eriopoda* & *Acacia sericophylla* Open Shrubland over *Triodia schinzii (Triodia epactia)*	34	0
	P15a+P3	Mosaic: *Corymbia candida* Open Low Woodland over *Triodia schinzii* + *Acacia drepanocarpa* subsp. *latifolia* Open Shrubland over *Triodia schinzii*	37	0
	P15c+P18	Mosaic: *Corymbia candida* Open Low Woodland over *Triodia brizoides* + *Corymbia opaca Open* Woodland over *Triodia schinzii*	48	0

Landform	Vegetation Type	Description	Total Extent in Vegetation Survey Area (ha)*	Total Extent in Development Envelope (ha)*
	P18+C2	Mosaic: *Corymbia opaca* Open Woodland over *Triodia schinzii* + *Acacia bivenosa* Scattered Low Shrubs over *Triodia brizoides* & *Triodia epactia (Triodia schinzii)*	27	0
	P20+C3	Mosaic: *Acacia ancistrocarpa* & *Acacia orthocarpa Open* Shrubland over *Triodia schinzii* & *Triodia epactia* + *Acacia bivenosa* (*Acacia stellaticeps*) Low Shrubland over *Triodia epactia*	24	0
	R1 + C7	*Acacia bivenosa* (*Acacia ancistrocarpa*) Scattered Shrubs over *Triodia brizoides* (*Triodia schinzii*) + Claypan with annual herbs and grasses (*Sporobolus actinocladus*, *Eragrostis cumingii* & *Eriachne obtusa*)	42	0
	R2+P2	Mosaic: *Grevillea wickhamii* Scattered Tall Shrubs over *Mirbelia viminalis (Acacia hilliana*) & *Triodia brizoides (Triodia epactia)* + *Acacia ancistrocarpa* Open Shrubland over *Triodia schinzii*	5	0
	R2+P3	Mosaic: *Grevillea wickhamii* Scattered Tall Shrubs over *Mirbelia viminalis (Acacia hilliana*) & *Triodia brizoides (Triodia epactia*) + *Acacia drepanocarpa* subsp. *latifolia* Open Shrubland over *Triodia schinzii*	134	133
	R2+P4	Mosaic: *Grevillea wickhamii* Scattered Tall Shrubs over *Mirbelia viminalis (Acacia hilliana*) & *Triodia brizoides (Triodia epactia*) + *Acacia orthocarpa* Open Shrubland over *Triodia schinzii*	4	0
	R2+P18	Mosaic: *Grevillea wickhamii* Scattered Tall Shrubs over *Mirbelia viminalis (Acacia hilliana*) & *Triodia brizoides (Triodia epactia*) + *Corymbia opaca* Open Woodland over *Triodia schinzii*	34	0
	C1 + P8	*Eucalyptus victrix* Open Woodland over *Triodia epactia* + *Acacia eriopoda* & *Acacia sericophylla* Open Shrubland over *Triodia schinzii* (*Triodia epactia*)	11	0

Landform	Vegetation Type	Description	Total Extent in Vegetation Survey Area (ha)*	Total Extent in Development Envelope (ha)*
	C1 + P23	*Eucalyptus victrix* Open Woodland over *Triodia epactia* + *Melaleuca* spp.	21	0
	P3 + P4 + P14	*Acacia drepanocarpa* subsp. *latifolia* Open Shrubland over *Triodia schinzii* + *Acacia orthocarpa* Open Shrubland over *Triodia schinzii* + *Acacia monticola* & *Acacia drepanocarpa* (*Acacia orthocarpa* & *Acacia ancistrocarpa*) Open Shrubland over *Triodia schinzi*	8	0
Disturbed		Cleared or disturbed vegetation	108	100
Total			**69,326**	**23,649**

**Extent rounded up to nearest ha.*

Table 8-5: Number of Patches and Areas of Vegetation Types within the Development Envelope

Vegetation Type	Total Extent in Vegetation Survey Area (ha)	No. of Patches within the Development Envelope			No. of Patches outside the Development Envelope
		MIA	Rimfire	RAC	
D1	3,000	11	1	0	22
D2	3,450	10	24	3	55
D3	261	0	18	0	20
P1	10,725	25	25	11	112
P2	6,045	28	11	11	102
P3	3,114	16	25	2	64
P4	3,325	6	15	0	55
P5	552	10	1	0	1
P6	221	2	1	1	9
P8	5,143	0	0	18	37
P9	732	0	0	22	35
P10a	527	0	0	5	3
P10b	343	0	0	3	5
P10c	1,845	1	3	8	49
P11	1,975	0	0	40	57
P12	164	0	0	10	16
P13	942	0	0	17	37
P14	1,099	2	16	0	51
P15a	221	0	3	0	13
P15b	87	1	0	0	2
P16	21	0	1	0	1
P18	475	0	10	0	14
P19	320	0	3	0	4
P20	921	0	5	0	22
C2	1,449	0	2	0	20
C4	379	1	0	1	7
R1	642	3	8	0	15
R2	1,871	16	29	0	38
R3	3,114	0	2	36	89
R4	<1	0	0	1	1
R6	76	0	1	0	0
P1+D2	3	0	1	0	0
P1+P4	15	0	2	0	2
P1+P5	87	0	1	0	0
P1+P14	37	0	1	0	3
P1+P18	39	0	1	0	1
P2+P3	142	1	4	0	5
P2+P14	17	0	1	0	1
P4+R1	10	0	1	0	1
P4+R4	2	0	1	0	0
R2+P3	134	0	5	0	3

Figure 8-4: Vegetation Types within and Surrounding the Development Envelope Sheet 1 of 5

Legend

- Highway
- Development Envelope
- Conceptual Footprint
- Native Title Determinations

Vegetation Type

- P11
- P12
- P2
- P3
- P8
- P9
- R3
- Disturbed
- P10b

Vegetation Type (AREH)

- H1
- P2
- P3
- R1
- S2

0 3 6
Kilometres

Publisher: Michael.Rouse
Date Published: Thursday, 2 July 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree

Scale: 1:155,000

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N

OVERVIEW MAP

1 2 3 4 5

RioTinto

120°40'0"E 120°50'0"E 121°0'0"E

19°50'0"S

20°0'0"S

20°10'0"S

Great Northern Hwy

NYANGUMARTA PEOPLE (PART A)

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_[illegible]\02_Processing\20250211_ERD_Figures_and_Calcs\W21_[illegible]_ERD_Figures_and_Calcs.aprx, Layout: ERD - Vegetation Types (Map Series)

Figure 8-4: Vegetation Types within and Surrounding the Development Envelope Sheet 2 of 5

Legend

- Development Envelope
- Conceptual Footprint
- Native Title Determinations

Vegetation Type

- D3
- P11
- P12
- P13
- P8
- P9
- R3
- R4
- P10c
- P10a

Vegetation Type (AREH)

- H1
- P3
- R1
- S2

0 3 6

Kilometres

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N

OVERVIEW MAP

1 2 3 4 5

RioTinto

121°10'0"E 121°20'0"E 121°30'0"E

20°10'0"S

20°20'0"S

NYANGUMARTA PEOPLE (PART A)

Figure 8-4: Vegetation Types within and Surrounding the Development Envelope Sheet 3 of 5

Legend

- Development Envelope
- Conceptual Footprint
- Native Title Determinations

Vegetation Type

- D1
- D2
- D3
- P1
- P11
- P13
- P2
- P3
- P6
- P8
- P9
- Disturbed
- P10c
- P14
- C4
- P15b

Vegetation Type (AREH)

- P3
- S2

0 3 6

Kilometres

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OVERVIEW MAP

1 2 3 4 5

RioTinto

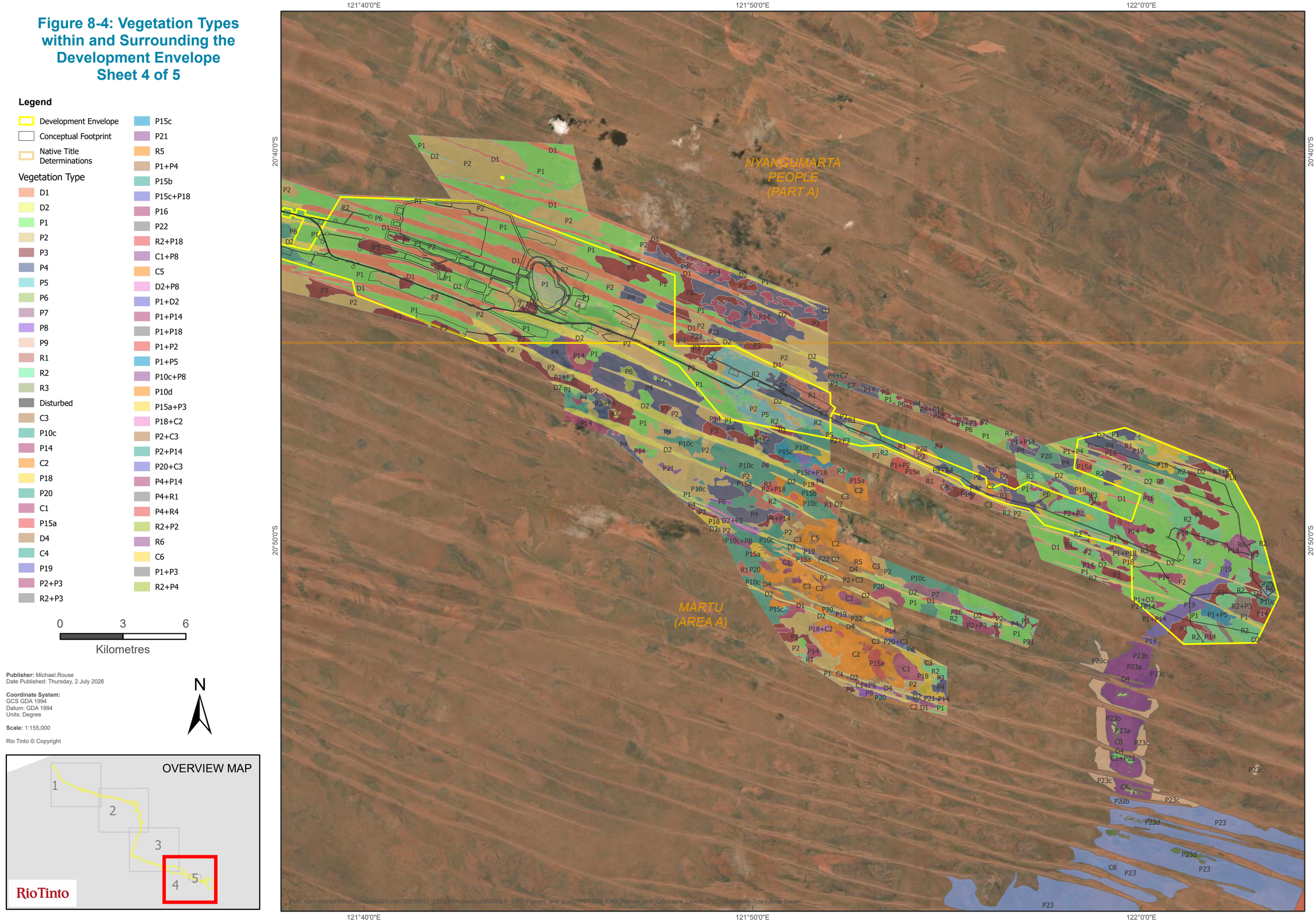
121°20'0"E 121°30'0"E 121°40'0"E

20°30'0"S 20°40'0"S

NYANGUMARTA PEOPLE (PART A)

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Vegetation Types (Map Series)

Figure 8-4: Vegetation Types within and Surrounding the Development Envelope Sheet 4 of 5



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Units: Degree

Scale: 1:155,000

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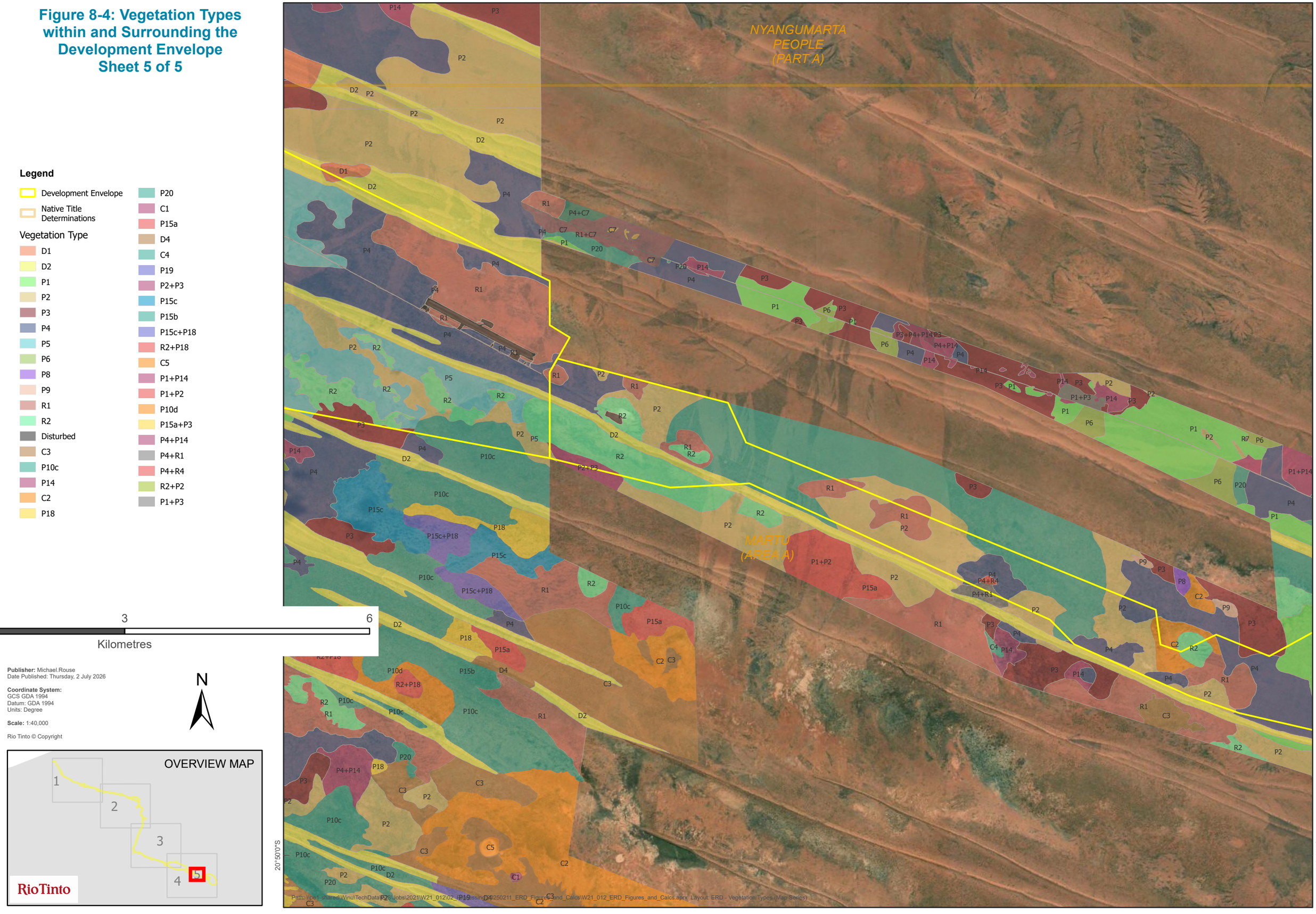
Figure 8-4: Vegetation Types within and Surrounding the Development Envelope Sheet 5 of 5



8.3.2.4 Significant Vegetation

EPA defines vegetation as significant for a range of reasons, including but not limited to the following (EPA 2016f):

- Being identified as Threatened or Priority Ecological Communities
- Restricted distribution
- Degree of historical impact from threatening processes
- A role as a refuge
- Providing an important function required to maintain ecological integrity of a significant ecosystem.

None of the vegetation types identified within the Development Envelope represent Threatened Ecological Communities (TECs) listed under either the EPBC Act or BC Act, or Priority Ecological Communities (PECs) listed by the DBCA (Western Botanical 2026a) (Appendix D01).

Twelve vegetation types (D1, D2, D3, P1, P2, P3, P4, P8, C2, C4, R1 and R2) within the Vegetation Survey Area and Development Envelope are considered to have moderate local significance due to the abundance of Priority flora species they support (Western Botanical 2025d) (Figure 8-5), but are likely to be widespread across the Great Sandy Desert bioregion despite being under-surveyed. The presence of *Eucalyptus victrix* and/or *Melaleuca glomerata* indicates that vegetation is potentially GDV and considered significant (Brim Box et al. 2022). No vegetation types containing these indicator species, and therefore no GDV, occurs within the Development Envelope. Potential GDV units assumed to occur within the Percival Palaeovalley outside the Development Envelope are discussed further in Section 8.3.2.5.1.

Vegetation types R5 and C5, occur outside the Development Envelope and the locations where these vegetation types were identified are considered culturally significant by the respective Traditional Owners. As such, no quadrats were established within these vegetation types; however, vegetation type R5 is considered representative of rocky outcrops and vegetation type C5 a large claypan (Western Botanical 2025d). Culturally significant vegetation is discussed further in Section 6.3.3.

All other vegetation types have low to negligible local significance. The significance ranking for all vegetation types within the Vegetation Survey Area is provided in Appendix D03 (Western Botanical 2025e).

No riparian vegetation occurs within the Development Envelope.

No vegetation types of restricted distribution have been identified within the Development Envelope.

At its nearest point, the coastal portion of the Eighty-Mile Beach Ramsar site is situated approximately 9 km north-west of the northern end of the RAC (at Great Eastern Highway). The MIA is situated approximately 135 km from the coastal portion of the Eighty Mile Beach Ramsar Wetland system (Western Botanical 2026a).

The Walyarta (Mandora Marsh) portion of the Eighty-Mile Beach Ramsar site (Critically Endangered under the BC Act) is located approximately 35 km north of the RAC and includes four vegetation groups, considered critical components of the wetlands' ecological character (Western Botanical 2026a):

- Paperbark (*Melaleuca leucadendra*) or *Melaleuca cajuputi* forest and *Sesbania formosa* (white dragon tree) woodland, with or without an understorey of *Acrostichum speciosum* (mangrove fern)
- Stands of bulrush *Typha domingensis* and sedgelands dominated by *Schoenoplectus* spp. with *Fimbristylis* spp., along with patches *Sporobolus virginicus* (marine couch grass)
- Few *Avicennia marina* (white mangroves) on the more brackish springs. *Acacia ampliceps* often present in the mid-storey but is not abundant
- *Typha domingensis* (bulrush) and sedges with a few emergent trees or mangroves dominate the vegetation on some of the small mound springs.

Neither the Ramsar site nor these vegetation groups are present in, or nearby, the Development Envelope and will; therefore, not be affected by the Proposal.

The nearest PEC is the Eighty Mile Beach Land System (P3), situated along the coastline approximately 7 km north-west of the RAC at the Great Northern Highway intersection (Western Botanical 2026a). This PEC is not in the Development Envelope and will not be impacted by the Proposal.

Regional PECs are listed below; however, all are located over 30 km away from the Development Envelope (Western Botanical 2026a):

- Salt Creek – Inland mangroves community of Salt Creek (P1) – 46 km north of RAC
- Mandora Land System (P3) – 33 km north of RAC
    - Line Land System (P3) – 62 km west-south-west of the RAC (Great Northen Highway intersection)
    - Roebuck Land System (p3) – 37 km north-east of the RAC (Great Northen Highway intersection).

None of the surveys undertaken for the Proposal have identified surface- or sheet- flow dependent vegetation within or near the Development Envelope.

121°0'0"E

Great Northern Hwy

N

NYANGUMARTA PEOPLE (PART A)

20°0'0"S

Legend

Vegetation Type

- P2
- P3
- P8
- Highway
- Conceptual Footprint
- Development Envelope
- Native Title Determinations

RioTinto

Figure 8-5: Locally Significant Vegetation Sheet 1 of 5

Rio Tinto Copper (RTC)

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Date Published: Tuesday, 7 July 2026

Coordinate System:
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Datum: GDA 1994
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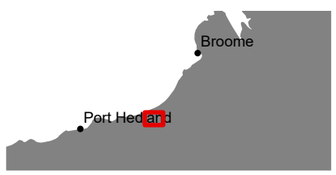

0 10 20 Kilometres

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121°0'0"E

121°30'0"E

N

NYANGUMARTA PEOPLE (PART A)

Legend

Vegetation Type

- D3
- P8
- Conceptual Footprint
- Development Envelope
- Native Title Determinations

RioTinto

Figure 8-5: Locally Significant Vegetation Sheet 2 of 5

Rio Tinto Copper (RTC)

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Coordinate System:
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Datum: GDA 1994
Units: Degree
Scale: 1:160,000

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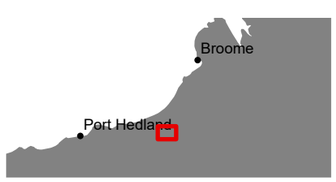

0 10 20 Kilometres

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121°30'0"E

121°30'0"E

20°30'0"S

N

NYANGUMARTA PEOPLE (PART A)

Legend

Vegetation Type

- D1
- D2
- D3
- P1
- P2
- P3
- P4
- P8
- C4
- Conceptual Footprint
- Development Envelope
- Native Title Determinations

RioTinto

Figure 8-5: Locally Significant Vegetation Sheet 3 of 5

Rio Tinto Copper (RTC)

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Coordinate System:
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Datum: GDA 1994
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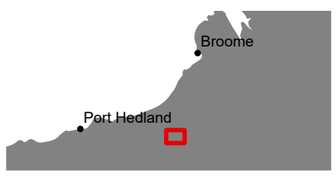


0 10 20 Kilometres

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Vegetation - Locally Significant

121°30'0"E

122°0'0"E

N

NYANGUMARTA PEOPLE (PART A)

MARTU (PART A)

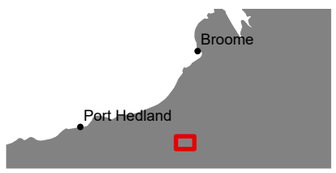
Legend

Vegetation Type

- D1
- D2
- D3
- P1
- P2
- P3
- P4
- P8
- R1
- R2
- C2
- C4
- P23
- P23a
- P23b
- P23c
- P23d
- Conceptual Footprint
- Development Envelope
- Native Title Determinations

RioTinto

Figure 8-5: Locally Significant Vegetation Sheet 4 of 5



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0 10 20 Kilometres

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Vegetation - Locally Significant

122°0'0"E

N

Legend

Vegetation Type

- D1
- D2
- P1
- P2
- P3
- P4
- P8
- R1
- R2
- C2
- C4
- Conceptual Footprint
- Development Envelope

RioTinto

Rio Tinto Copper (RTC)

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Units: Degree
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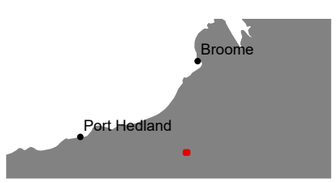
Figure 8-5: Locally Significant Vegetation Sheet 5 of 5



0 2 4 Kilometres

8.3.2.5 Groundwater Dependent Ecosystems and Vegetation

GDEs are ecosystems that require access to groundwater to persist in the landscape (Section 7). Terrestrial GDEs in the form of GDV rely on shallow groundwater (i.e. less than 20 mbgl) and are typified by GDV and GDV indicator species called phreatophytes. Phreatophytes may be classified as either obligate or facultative depending on their reliance on groundwater (Eamus et al. 2016 cited in Biologic 2021; Trotter and Cross 2022) Obligate phreatophytes are confined to habitats with access to, and are highly dependent on, groundwater. Facultative phreatophytes will use groundwater where it is available but can also exist in environments without access to groundwater.

The Proposal is only expected to have the potential to impact GDV not other forms of terrestrial or aquatic GDE, as outlined below and in Section 7.3.4.5. Stygofauna, as groundwater dependent taxa, are addressed under that chapter (Section 10).

8.3.2.5.1 Percival Palaeovalley

On a precautionary basis, GDV is assumed to occur in the Percival Palaeovalley within and south of the Development Envelope at Rimfire, within vegetation units P23, P23a-d and C1+P23 (Figure 8-6).

The Percival Palaeovalley is the only area within the vicinity of the Proposal that has been observed with a shallow watertable that might support GDEs or GDV. The regional watertable is considered too deep to support GDEs, given observed depths of generally over 17 mbgl at Rimfire and over 20 mbgl at the MIA (Section 7). The palaeovalley in the south Rimfire area appears to be an infilled tributary valley for a river that once discharged into the main Percival Palaeoriver 40 km to the south (Worley 2025i). The main Percival Palaeovalley thus extends for many kilometres south, and then south-west and south-east, of Rimfire following its ancient path to the ocean. The total area of the palaeovalley is approximately 35,000 km^2.

While regional groundwater levels are generally greater than approximately 20 mbgl, groundwater is relatively shallow within the Percival Palaeovalley tributary palaeochannel south of Rimfire. Gauging data indicate depths of 3.5 mbgl (WINU1446) to 6.7 mbgl (WINU1445) in the north, and 9.5 mbgl (WINU1454) and 12 mbgl (WINU1453) in the south. Two (2) other groundwater bores (WINU1451 and WINU1452) mapped within the south-western extent of vegetation type P23c, but outside the palaeochannel, also reported shallow groundwater, of 5.6 and 5.7 mbgl, respectively.

The Rimfire Borefield area and the northern palaeovalley area sit at an elevation of between 250 to 290 m AHD, with the lowest elevations occurring in the south-east within the inferred boundary of the Percival Palaeovalley system (Richardson Consulting 2026). The paleochannel is approximately 3 to 4 km wide and forms a local topographic low sitting at approximately 5 to 10 m below the surrounding land. A potential drainage pathway coincides with the palaeovalley, flowing in a northern direction. However, with the dune-dominated topography across the Rimfire area, and with aeolian sand cover approximately 20 m deep, there are no clearly defined surface water paths. Rainfall accumulation within the paleochannel is expected, which may pool or flood and result in recharge to the unsaturated zone, creating a potential source of water for vegetation.

Vegetation mapping initially flagged the possibility that one area of vegetation type, P19 (*Melaleuca lasiandra* Shrubland over *Triodia schinzii*), recorded within Rimfire may have been groundwater dependent (Western Botanical 2026a). That particular area of P19 is located on the relatively elevated northern Percival Palaeovalley tributary, where hydrogeological investigations has indicated a groundwater depth of 10 m. Other patches of P19 occur further north and west of the palaeochannel, where depth to water exceeds 40 mbgl. *Melaleuca lasiandra* is not typically recognised as a significant GDE indicator, and this, together with the depth to groundwater in some locations, demonstrates P19 is not a potential GDE (Figure 8-7) (Brim Box et al. 2022; Richardson Consulting 2026; Western Botanical 2026a).

Similar *Melaleuca*-dominated vegetation to that observed in P19 was observed south of Rimfire outside the Development Envelope, coinciding with the palaeovalley. This extended southern area had also been observed to support scattered *Eucalyptus victrix* (Western Botanical 2026a).

Given the potential occurrence of GDV in the Percival Palaeovalley tributary proximate to Rimfire, the Proponent commissioned a high level study to map *Melaleuca*-dominated vegetation of the palaeovalley tributary area to better understand its extent and floristic characteristics, and to gather baseline information for potential future monitoring programs (Western Botanical 2025a).

The *Melaleuca* study identified the following vegetation units which have a strong spatial correlation with the palaeovalley (Western Botanical 2025a):

- P23a (Plate 8-1) – *Melaleuca lasiandra*, *Melaleuca glomerata* (*Eucalyptus victrix*, *Acacia colei* var. *colei*) Open Shrubland over *Triodia basedowii* (*Acacia stellaticeps*)
- P23b – *Melaleuca lasiandra* (*Hakea lorea*, *Melaleuca glomerata*) Open Shrubland over *Triodia epactia* (*Euploca glandulifera*, *Ptilotus axillaris*)
- P23c – Interzone - *Melaleuca lasiandra*, *Melaleuca glomerata*, *Acacia ancistrocarpa* (*Acacia drepanocarpa, Acacia monticola*) Open Shrubland over *Triodia schinzii*
- P23d – *Melaleuca glomerata* Scattered Low Shrubs over *Trianthema turgidifolium* (*Triodia basedowii)*
- C8 – Clay-Pan (*Eragrostis cumingii*) with Scattered Herbs and Grasses
- C1+P23 (Plate 8-2) – Mosaic *Eucalyptus victrix* Open Woodland + Melaleuca spp. Open Shrubland.

The P23 vegetation types are characterised by the dominance of *Melaleuca* species, with the sub-units P23a-P23d shown above more refined in the study (Western Botanical 2025a) than the coarsely defined unit P23 (noted simply as *Melaleuca* spp. [boundaries defined, excludes subcategorization]). The P23 unit is widespread and extends south along the palaeovalley from approximately 10 km south of Rimfire and therefore not expected to have the potential to be significantly influenced or impacted by groundwater drawdown from the Rimfire Borefield.

The unique occurrence of these communities, combined with the potential presence of shallow groundwater, may indicate a level of groundwater dependence (Richardson Consulting 2026). *Melaleuca* species, along with *Eucalyptus victrix* can utilise groundwater, but may not be entirely dependent on it for survival and may access water stores within the unsaturated zone when available. *Melaleuca glomerata* is known to be species dependent on groundwater, and has been referred to as an ‘obligate GDE’ (Brim Box et al. 2022), implying it is entirely dependent on groundwater. While potential dependence is likely, there is little direct evidence that groundwater is its only source of water at this location (Richardson Consulting 2026).

Eucalyptus victrix is a facultative phreatophyte, i.e. that satisfies its water requirements largely through stored soil water reserves and occasionally, groundwater, to satisfy part of its water needs. However, *E. victrix* is also considered an obligate phreatophyte where it occurs over groundwater that is within 10 m of the surface (Brim Box et al. 2022). Observations of *E. victrix* in the Pilbara indicate it has mean rooting depth of approximately nine metres (Fan et al 2017 cited in Richardson Consulting 2026). More broadly, *E. victrix* can reach rooting depths of 15-20 m where deeper water tables exist. The rooting depth of the *E. victrix* can be inferred from long-term watertable elevations because they demonstrate 'opportunistic physiognomy in using water' (i.e. they will extend their roots to the water table if shallow soil stores are depleted, and the water table has declined). However, other studies in the eastern Pilbara have shown that *E. victrix* is not groundwater dependent where geological barriers to root development occur and/or where groundwater is more than 10 m deep (Richardson Consulting 2026).

The scattered herbs and grasses that characterise the C8 Clay-Pan vegetation type are anticipated to be fed by surface runoff, although they may also benefit from the increased moisture content if groundwater is close to the surface.

Vegetation greenness indicators (Modified Soil Adjusted Vegetation Index [MSAVI], Normalised Difference Vegetation Index [NDVI], and Soil Adjusted Vegetation Index [SAVI]) have also been generated for vegetation in the palaeochannel to assess how vegetation responds to wet and dry periods (Richardson Consulting 2026). These indicators provide a quantitative measure of vegetation condition and persistence over time. Initial analysis has identified vegetation areas within the palaeovalley that remain comparatively green in both wet and dry season imagery, indicating greater persistence through seasonal conditions.

The shallow groundwater along with unsaturated water stores that accumulate in the lower lying palaeochannel are anticipated to be the main sources of water for *Eucalyptus victrix* and *Melaleuca glomerata* within the Percival Palaeovalley (Richardson Consulting 2026). However, it should be noted that other environmental conditions or processes can also support a unique biome such as that seen at the paleochannel, thereby leading to a spatial correlation. This includes:

- Local change in soil type. The shallow geology of the Percival Paleochannel may create a different regolith and/or soil type, which may be favourable, or unfavourable, to different ecological communities. Differences in soil composition and chemistry may not be visually evident
- Local change in topography. The paleochannel occurs in a topographic low (5–10 m deeper than the surrounding land), which likely retains surface run-off for an extended period of time compared to the surrounding land.

Rainfall is likely to accumulate within the paleochannel and may pool or flood and result in recharge to the unsaturated zone creating a potential source of water for vegetation (Richardson Consulting 2026).

The Proponent acknowledges the current understanding of the hydrogeology of the palaeovalley system and of its vegetation is limited, and that overall data on GDV species and GDEs in the Great Sandy Desert at large remains relatively limited. However, the vegetation units assumed to represent GDV are considered to be a conservative interpretation of the extent of potential GDV occupying the palaeovalley system within and south of Rimfire. Although units containing *Eucalyptus victrix* and *Melaleuca glomerata* were observed, no other confirmed or potential GDV indicator species, including smaller species, were recorded (Western Botanical 2025a). Given that *E. victrix* and *Melaleuca glomerata* are GDV species when occurring over a 0-10 mbgl watertable (Brim Box et al. 2022), and these species occur within the P23 and C1+P23 units, the Proponent considers the potential for true GDVs to be present in the palaeovalley is limited to those units.

8.3.2.5.2 Mandora Marsh

The nearest GDEs to the Development Envelope as mapped by the online GDE Atlas tool hosted by BoM, all rated as low GDE potential, are located between 26 and 35 km to the west-south-west and north-north-east, respectively, from the MIA and all beyond the potential influence of groundwater drawdown attributable to the Proposal (Worley 2025e).

The Mandora Marsh mound spring and wetland system, approximately 90 km north-west of the MIA, is fed by the upwelling of groundwater from the Wallal Aquifer along a roughly sub-vertical geological fault zone (Advisian 2023a). Several ecosystems are dependent on the groundwater provided by these springs. The Wallal Aquifer will not be impacted by the Proposal.

8.3.2.5.3 Soaks

The Winu and Djimakarra soaks, approximately 23 km and 45 km north-west of the MIA respectively, were assessed for GDE potential but were interpreted as localised features fed by rainfall and surface water, with shallow ephemeral groundwater perching and considerable separation from the regional watertable (approximately 100 mbgl) within the unconfined sandstone aquifer and; therefore, vegetation at the soaks is not GDV (Figure 8-8) (Worley 2025e; Advisian 2023b; Golder 2022b). The Toramah and Bulgamulgardy soaks are further away from the MIA (54 km and 93 km, respectively) and similarly, not expected to be affected by the Proposal.

Source: (Western Botanical 2025b)

Plate 8-1: P23a - *Melaleuca lasiandra, M. glomerata (Eucalyptus victrix, Acacia colei* var. *colei)* Open Shrubland over *Triodia basedowii (Acacia stellaticeps)*

Source: (Western Botanical 2025a)

Plate 8-2: C1+P23a - Mosaic *Eucalyptus victrix* Open Woodland + *Melaleuca* spp. Open Shrubland

121°45'0"E
121°50'0"E
121°55'0"E
122°0'0"E
122°5'0"E
20°55'0"S
21°0'0"S
21°5'0"S
21°10'0"S

N

Legend

- Development Envelope
- Percival Palaeovalley

Vegetation Type

- C1
- C1+P8
- C2
- C3
- D1
- D2
- D4
- P1
- P1+P14
- P1+P5
- P10c
- P14
- P15a
- P15c
- P16
- P18
- P18+C2
- P19
- P2
- P2+P14
- P2+P3
- P20
- P20+C3
- P21
- P22
- P3
- P4
- P7
- P8
- R1
- R2
- R2+P3
- C1+P23
- C8
- Melaleuca habitat (approximate)
- P23
- P23a
- P23b
- P23c
- P23d

Melaleuca habitat (approximate)

0 2 4 Kilometres

RioTinto

Figure 8-6: Percival Palaeovalley Vegetation Types

Rio Tinto Copper (RTC)

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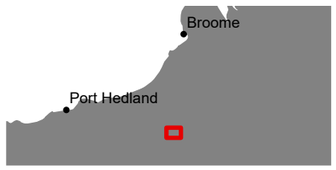

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122°0'0"E

N

Legend

- Inferred Palaeochannel
- Conceptual Footprint
- Development Envelope
- Bores

Vegetation Type

- P19

Groundwater Depth (mBGL)

- 5
- 10
- 20
- 30
- 40
- 50
- 60
- 70

MARTU (AREA A)

WINU1245 (19.28m)

WINU1246 (17.37m)

WINU1425 (13.78m)

WINU1442 (16.05m)

P19

0 5 10 Kilometres

Figure 8-7: P19 Occurrence and Depth to Groundwater

RioTinto

Rio Tinto Copper (RTC)

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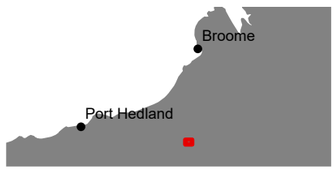

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122°0'0"E

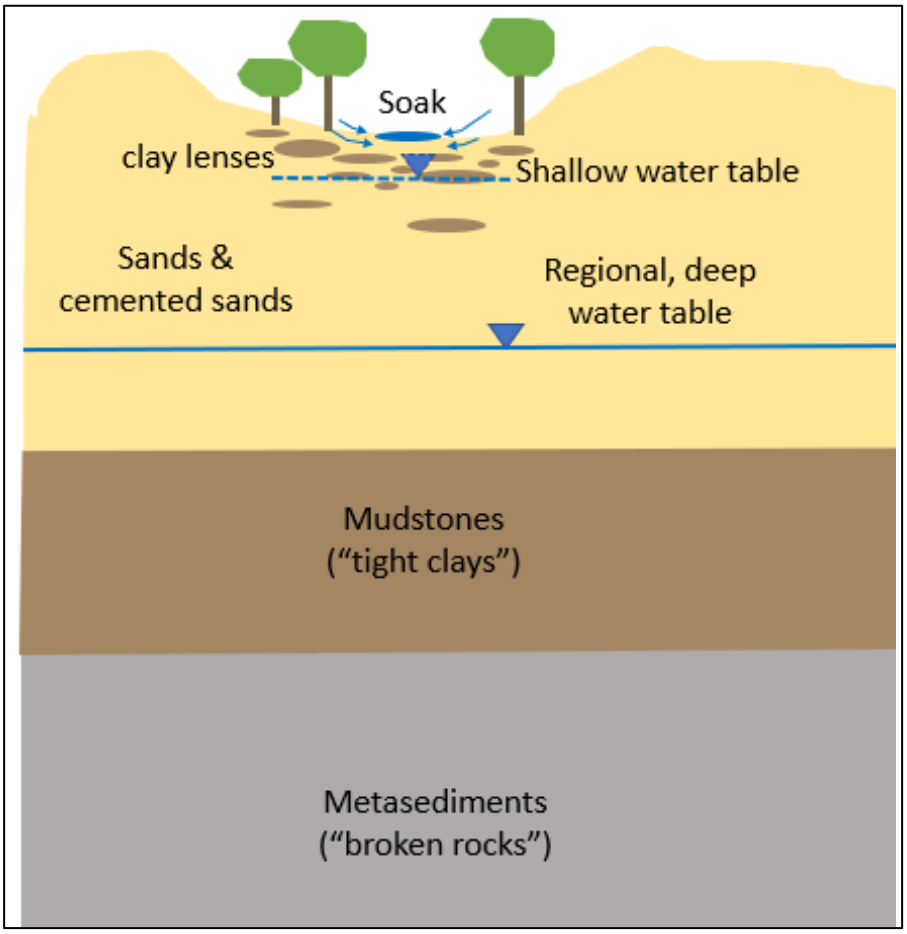
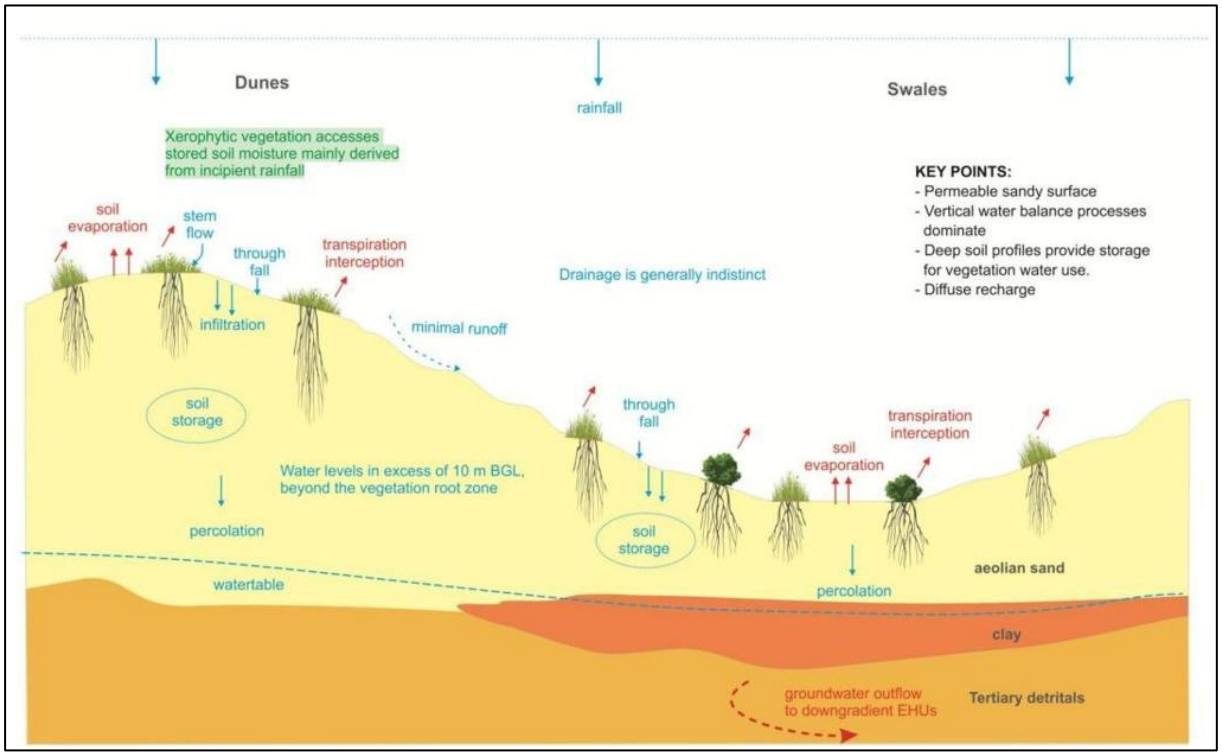


Figure 8-8: Conceptual Hydrogeology of Soaks Surrounding the Proposal (Golder 2022b)

8.3.2.5.4 Ecohydrology of the Infiltration Ponds and MAR Borefield

Key landforms of the Pilbara region have been identified using an ecohydrological conceptualisation approach (MWH 2015 as cited in Biota 2025a). Based on this framework, the area surrounding the Proposal's infiltration ponds and MAR borefield is represented by EHU 5, described as: "Lowland sandplains – level to gently undulating surfaces with occasional linear dunes. Little organised drainage but some tracts receive run-on from upland units" (Figure 8-9) (Biota 2025a).

The EHU 5 unit is not known to support groundwater dependent species. Instead, the unit supports xerophytic vegetation that access stored soil moisture from deep sandy soils, rather than directly from the watertable. Xerophyte species that dominate the Development Envelope, including *Triodia* and *Acacia* species, are also not typically reliant on groundwater. Groundwater levels within the EHU 5 unit are greater than 10 m from the surface and beyond the vegetation root zone, also suggesting no groundwater dependence from lowland sandplains vegetation (Biota 2025a).



Source: (MWH 2015)

Figure 8-9: EHU 5 Lowland Sandplain Conceptualisation

8.3.2.6 Vegetation Condition

Vegetation within the Development Envelope consists largely of vegetation in Excellent condition (99.6%), based on the Trudgen (1988) vegetation scale (Figure 8-10; Table 8-6). Disturbance to vegetation within the Development Envelope comprises disturbed areas, including roads and tracks that existed before the Proponent undertook any exploration activities.

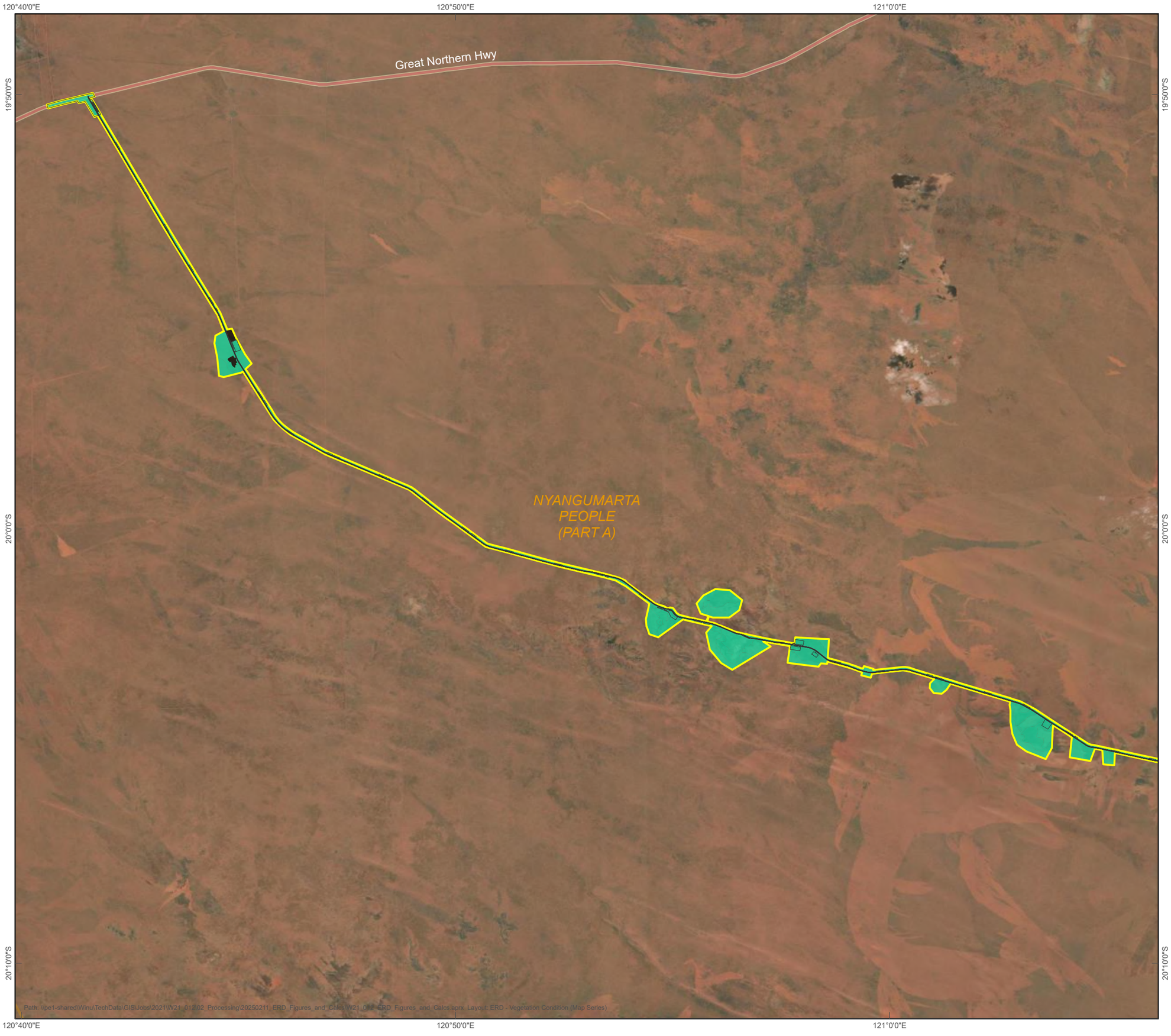
Table 8-6: Vegetation Condition of Remnant Vegetation in the Development Envelope

Condition	Extent within the Development Envelope (ha)
Excellent	23,549
Degraded	100

8.3.2.7 Fire History

The Great Sandy Desert is subject to numerous fire events. Regional fire data for the Development Envelope indicates that the area has been burnt at least once, with some areas experiencing burns as many as four times in the last decade (Western Botanical 2026a). A mosaic of fire ages exists across the MIA with vegetation associations representing many successional stages following recovery after fire. Much of the vegetation in both the MIA and RAC were heavily and recently burnt (May 2018) during the Biota survey (2021). Fire disturbance prevented some areas being effectively investigated during some survey trips, which was remedied in subsequent surveys following sufficient time for vegetation recovery post–fire (Western Botanical 2026a).

Figure 8-10: Vegetation Condition within the Development Envelope Sheet 1 of 5



Legend

- Highway
- Development Envelope
- Conceptual Footprint

Vegetation Condition

- Degraded
- Excellent
- Native Title Determinations

0 3 6

Kilometres

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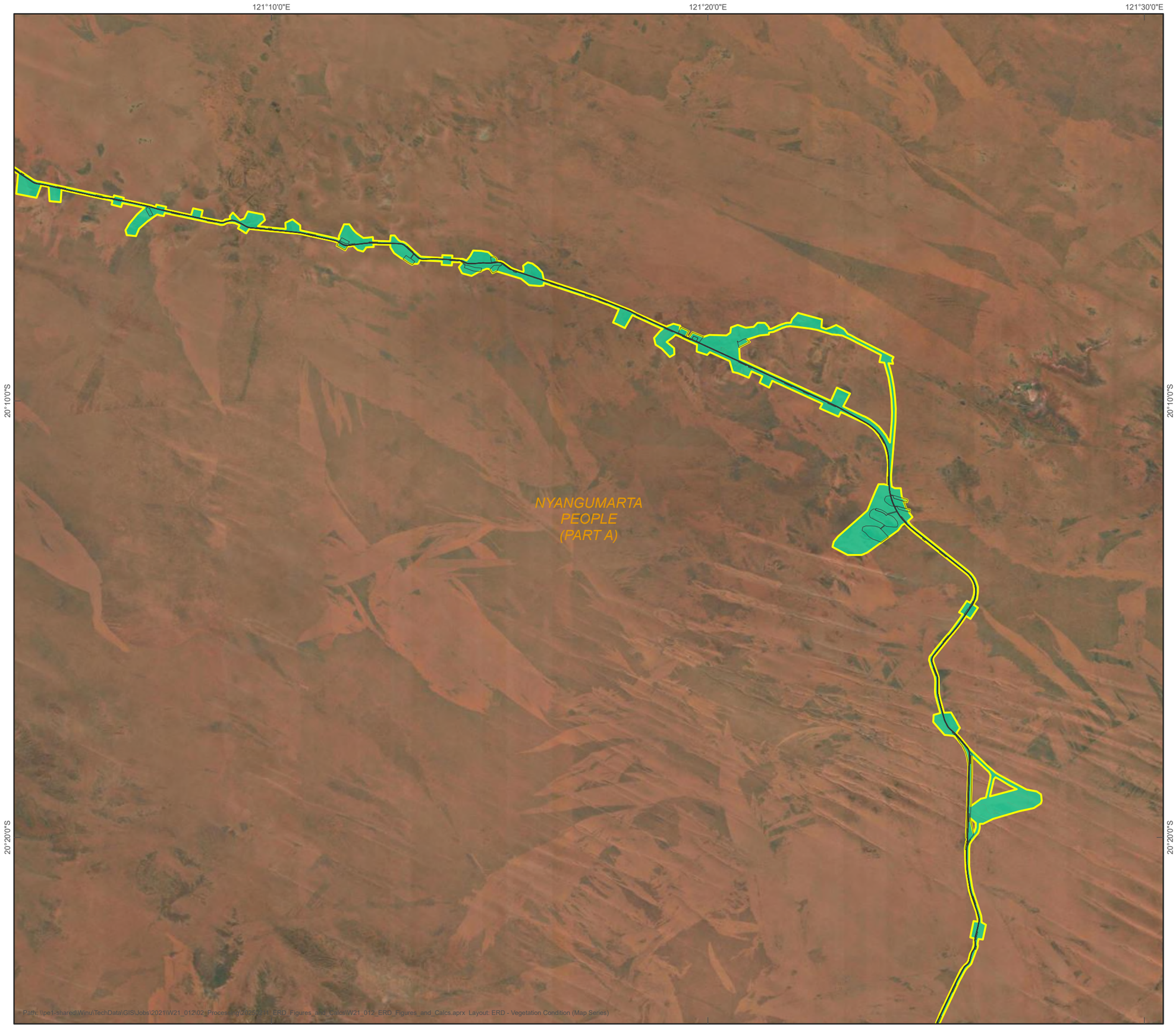
OVERVIEW MAP

1 2 3 4 5

RioTinto

Figure 8-10: Vegetation Condition within the Development Envelope Sheet 2 of 5



Legend

- Development Envelope
- Conceptual Footprint

Vegetation Condition

- Excellent
- Native Title Determinations

0 3 6

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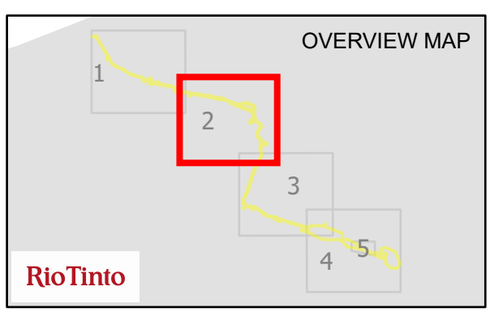

Figure 8-10: Vegetation Condition within the Development Envelope Sheet 3 of 5

Legend

- Development Envelope
- Conceptual Footprint

Vegetation Condition

- Degraded
- Excellent
- Native Title Determinations

0 3 6

Kilometres

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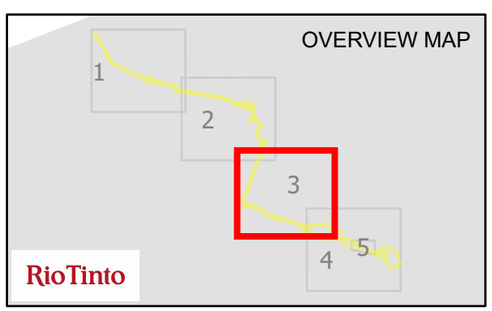
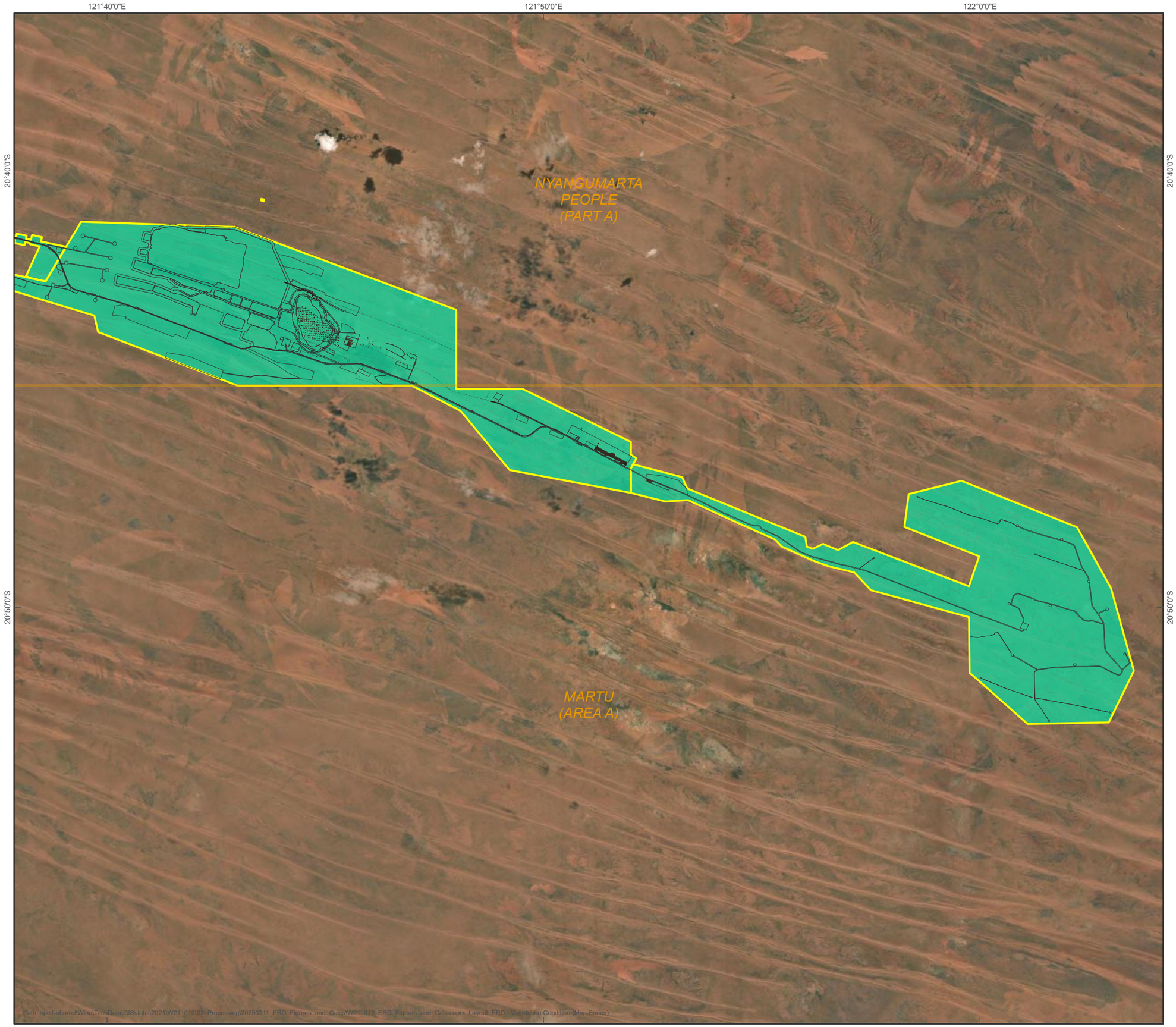


Figure 8-10: Vegetation Condition within the Development Envelope Sheet 4 of 5



Legend

- Development Envelope
- Conceptual Footprint

Vegetation Condition

- Degraded
- Excellent
- Native Title Determinations

0 3 6

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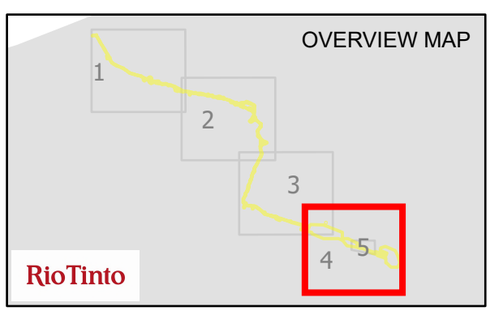

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Figure 8-10: Vegetation Condition within the Development Envelope Sheet 5 of 5

Legend

- Development Envelope

Vegetation Condition

- Degraded
- Excellent
- Native Title Determinations

0 0.8 1.5

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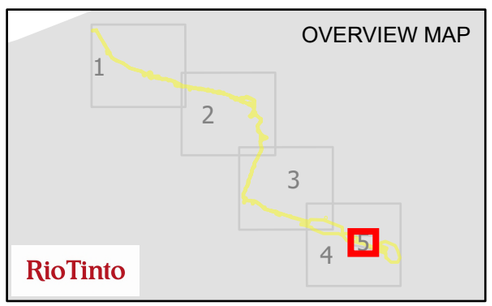

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8.3.3 Flora

A total of 342 native flora species were recorded within the Development Envelope from 147 genera and 52 families (Western Botanical 2026a). The Fabaceae family was the most dominant across the Development Envelope, with 75 different species belonging to this family. This was followed by the Poaceae family, with a total of 53 species. *Acacia* was the most prevalent genus across the Development Envelope, with 33 *Acacia* species recorded to date.

A total of 64 flora specimens recorded over the cumulative years (2018 to 2026) of surveys within the Vegetation Survey Area were not able to be identified to the species level (Western Botanical 2026a). The majority of these specimens represent collections of plants where the sampled material was insufficient to enable definitive identification. Subject to seasonal variations, a body of 'incomplete' flora samples and consequent unresolved identifications is a feature of any thorough Detailed flora survey. Many specimens are duplicates and include sterile and senesced grasses. The remainder of unresolved specimens are considered to represent poor material with insufficient features to definitively identify and are not similar to any known Priority flora of the region. The extensive botanical surveys undertaken for the Proposal to date collectively describe a flora assemblage characterised by extensive populations, limited only by survey extent rather than isolated populations and single records. The botanist engaged to undertake the most recent surveys and consolidate the historical data is confident the number of specimens unable to be fully identified are most likely samples of taxa previously catalogued across the Proposal area (Western Botanical 2026a).

8.3.3.1 Threatened and Priority flora

Significant flora are threatened flora species listed under the EPBC Act, the BC Act, or Priority (P) flora species identified by DBCA as requiring further protection. Significant flora can also include species that:

- Are locally endemic or associated with a restricted habitat type
- Occur as range extensions
- Are a new species or have anomalous features that indicated a potential new species
- Represent a restricted subspecies, varieties or hybrid
- Are relictual representatives of a taxonomic groups that no longer occur widely in the broader landscape.

No Threatened flora species listed under the EPBC Act or the BC Act have been recorded within the Development Envelope.

Thirteen Priority flora species have been recorded across the Vegetation Survey Area (Western Botanical 2026a).

Ten Priority flora, including one P1 and P2 taxa and eight P3 taxa have been recorded within the Development Envelope (Figure 8-11; Table 8-7) (Western Botanical 2026a) (Appendix D01).

Three Priority taxa, *Polymeria* sp. Broome (K.F. Kenneally 9759) (P3), *Tephrosia rosea* var. Port Hedland (A.S. George 1114) (P1) and *Eragrostis lanicaulis* (P3), were recorded outside the Development Envelope (Western Botanical 2026a). A 2019 record is also noted within the Development Envelope of a *Polymeria* sp. Broome (K.F. Kenneally 9759) population; however, the specimen was not recognised as a Priority flora species at the time so was not counted, with no numbers attributed to the record at that time.

Seringia exastia was recorded within the Development Envelope (Figure 8-11) (Western Botanical 2026a). This species was formerly listed as Threatened under the BC Act but has been re-classified as non-threatened, as it has been synonymised with ex-*Seringia elliptica* . This species is currently listed as Critically Endangered under the EPBC Act; however, the Proponent expects this classification to change in line with the State conservation ranking. A taxonomic study that assessed genomic and

morphological characters in several Seringia taxa has concluded that *S. exastia* and *S. elliptica* are the same species. The taxonomy of the genus has been revised to synonymise *S. exastia* and *S. elliptica* under the oldest valid name of *S. exastia* (Binks et al. 2020 as cited in Western Botanical 2026a). As *S. elliptica* is common and widespread throughout the Pilbara, central WA and the Northern Territory and extends into South Australia, following the taxonomic revision *S. exastia* is now considered common and widespread. Seringia elliptica (and therefore S. exastia, given the species' are synonymous) is ubiquitous within and around the Development Envelope (Western Botanical 2026a). This ERD does not address this species further given its change in status.

8.3.3.1.1 Species of Taxonomic Interest

A species of taxonomic interest as a potentially undescribed species, *Portulaca* sp. Nyangumarta (B. Eckermann BE Opp 01), was recorded within the Development Envelope on the margins of a borrow pit within the RAC in June 2026 (Western Botanical 2026a). The specimen and mature seeds are currently being reviewed by Dr. Matt Barrett at James Cook University, and the WA Herbarium, with a final determination of the taxonomic status in process. As its taxonomy will be finalised during the EIA process the species is considered by the Proponent as significant for the purposes of this assessment.

Amphipogon caricinus (hairy lamina) (J. Paterson WB41138) has been encountered within the Development Envelope and is also considered a species of taxonomic interest as an undescribed taxa (Figure 8-11) (Western Botanical 2026a). Multiple collections have been made and submitted to the WA Herbarium for assessment. This taxon was initially thought to be a variant of *Amphipogon sericeus* however ongoing taxonomic work has found that it is more likely a regional variant of *Amphipogon caricinus* var. *caricinus*. Further collections at a regional level will help to better understand variation within and distribution of this group. *Amphipogon caricinus* (hairy lamina) (J. Paterson WB41138) was recognised in late 2025 and historical surveys for the Proposal have not accounted for this species. Surveys in 2026 recorded the taxa throughout the MIA, where it has been intensively assessed; however, distribution appears discontinuous. This discontinuity is considered an artefact of survey timing, and the species is known to be widespread and populations relatively contiguous through the Development Envelope (Western Botanical 2026a).

No systematic assessments for *Amphipogon caricinus* (hairy lamina) (J. Paterson WB41138) have been conducted outside the Development Envelope (Western Botanical 2026a). However, populations of the species were observed to continue outside the Development Envelope during surveys and 33 individuals have been recorded outside and adjacent to the Development Envelope. A*mphipogon caricinus* (hairy lamina) (J. Paterson WB41138) has also been recorded by the botanical team near the Nifty mine site, prior to recognition of its taxonomic status. The species is expected to be locally and regionally abundant and widespread outside the Development Envelope (Western Botanical 2026a). Further targeted priority flora surveys are planned by the Proponent, and total records outside the Development Envelope are expected to increase as a result of the additional survey effort.

Eragrostis sp. recurved spikelets (J. Paterson & N. Dakin WB1179), a small annual to 20 cm on the margins of small claypans, is another species of taxonomic interest recorded in the Vegetation Survey Area; however, the records occur outside the Development Envelope (Western Botanical 2026a). Attempts to assess this species since it was recognised have been hampered by unfavourable (i.e. dry) seasonal conditions. The species is undergoing taxonomic review at the WA Herbarium. Given this species occurs outside of the Development Envelope, it will not be discussed further in this ERD.

8.3.3.1.2 Population of Priority Flora and Species of Interest

The number of populations or sub-populations of each Priority Flora species within and outside the Development Envelope are presented in Table 8-7. Population numbers are heavily biased to records

within the Development Envelope as few records exist and few systematic studies undertaken outside the Development Envelope for these species. Many of the species in the MIA and Rimfire Borefield demonstrate a habitat-specific distribution that corresponds to the topography, landform and soils of area. Given the relatively uniformity of the land systems and habitats in the broader region around the Proposal area, Western Botanical (2026a) consider it highly likely that these species will be regionally widespread and more abundant outside the Development Envelope than current data represents.

Table 8-7: Priority Flora Recorded within the Development Envelope

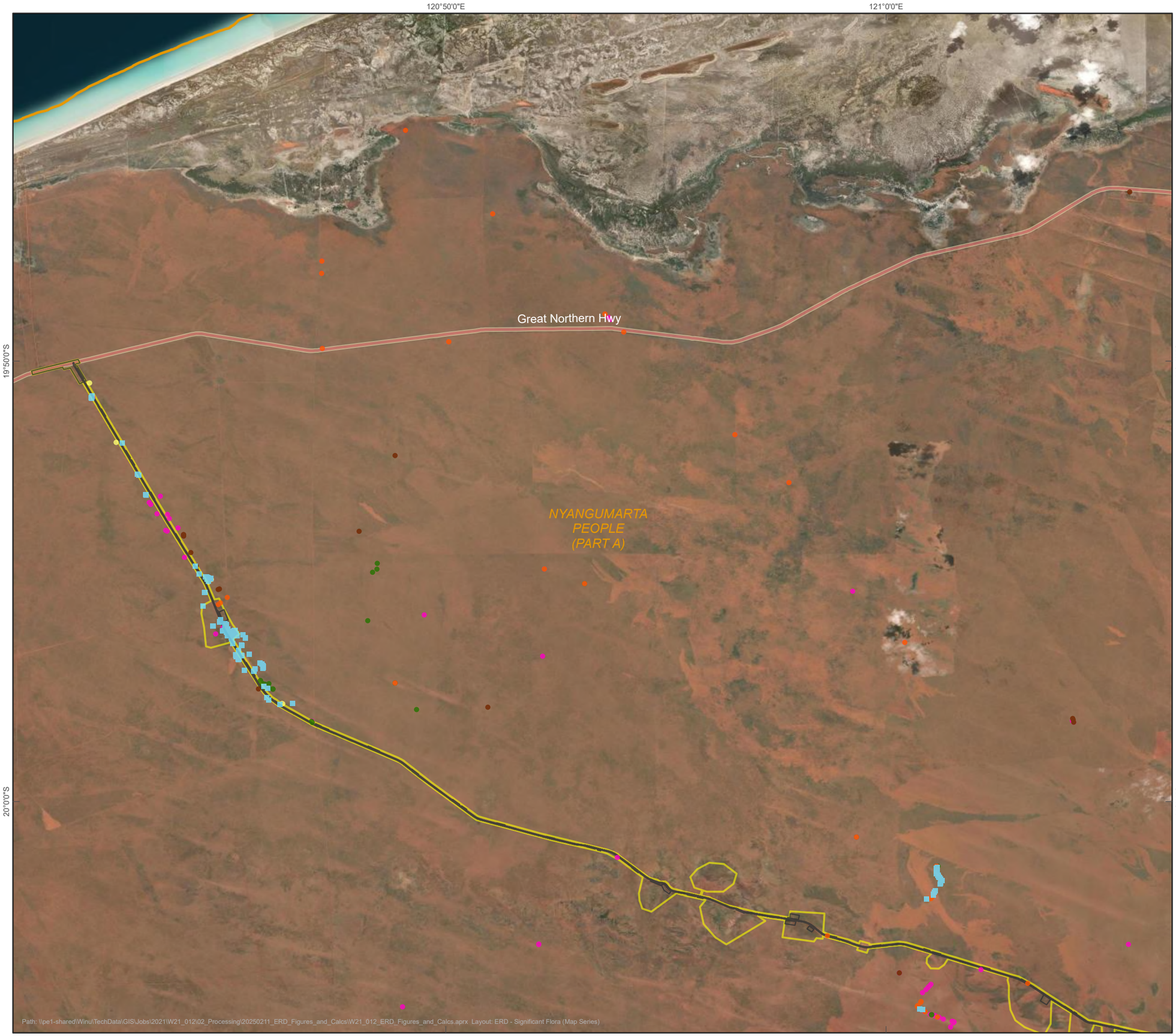
Taxon	Consolidated Abundances within the Flora Survey Area					
	No of Pops* Outside DE	No of Individuals Outside DE	No of Pops* Within DE	No of Individuals Within DE	Total Pops*	Total Individuals
Priority 1						
Cynodon anisocarpus	20	367,973	4	63,587	24	431,560
Priority 2						
Goodenia hartiana	147	335,702	43	552,280	190	887,982
Priority 3						
Bonamia oblongifolia	5	1,263	2	3	7	1,266
Comesperma sabulosum	24	220	3	51	27	271
Corynotheca asperata	52	5,962	19	2,554	71	8,516
Dasymalla chorisepala	5	259	5	118	10	377
Indigofera ammobia	60	19,217	23	18,658	83	37,875
Synostemon arenosus	31	2,508	9	2,467	40	4,975
Terminalia kumpaja	5	113	2	110	7	223
Tribulopis marliesiae	40	870	42	787	82	1,657
Species of Taxonomic Interest						
Amphipogon caricinus (hairy lamina) (J. Paterson WB41138)	2	33	7	111,003	9	111,036
Portulaca sp. Nyangumarta (B. Eckermann BE Opp 01)	1	59	1	77	2	136

**Pops – Populations*

Figure 8-11: Significant Flora Species Recorded within and Surrounding the Development Envelope
Sheet 1 of 10

Legend

- Goodenia *hartiana* (P2)
- Bonamia *oblongifolia* (P3)
- Indigofera *ammobia* (P3)
- Polymeria *sp. Broome (K.F. Kenneally 9759)* (P3)
- Terminalia *kumpaja* (P3)
- Tribulopis *marliesiae* (P3)
- Highway
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Native Title Determinations
- Development Envelope
- Conceptual Footprint



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Kilometres

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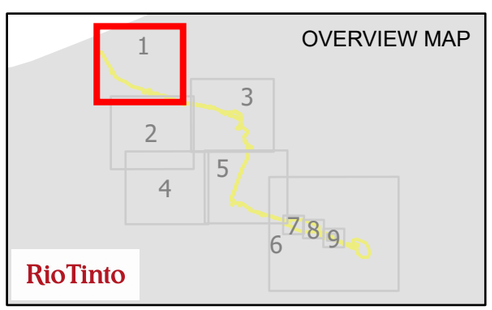
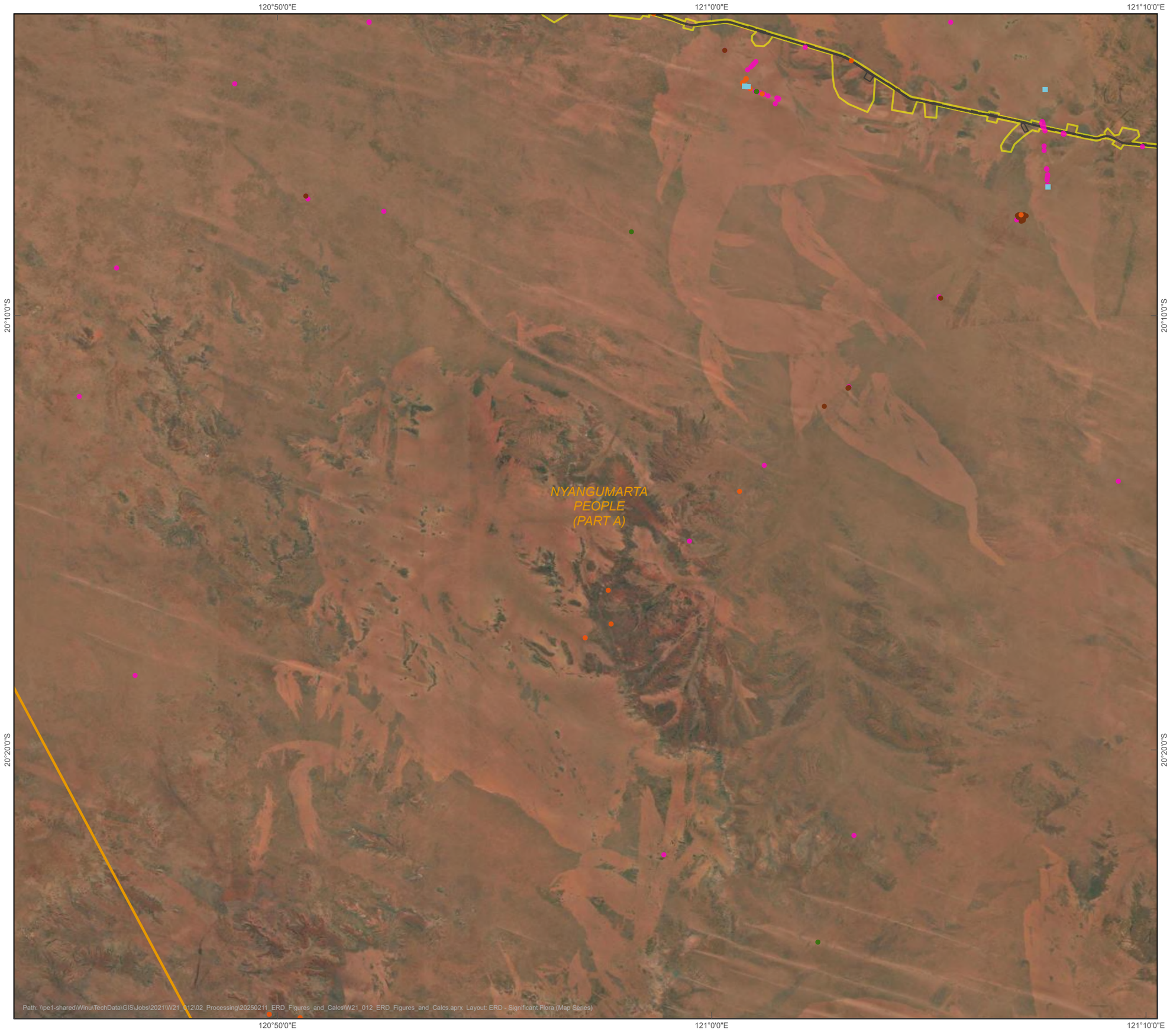


Figure 8-11: Significant Flora Species Recorded within and Surrounding the Development Envelope
Sheet 2 of 10

Legend

- Goodenia *hartiana* (P2)
- Bonamia *oblongifolia* (P3)
- Indigofera *ammobia* (P3)
- Terminalia *kumpaja* (P3)
- Tribulopis *marliesiae* (P3)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Native Title Determinations
- Development Envelope
- Conceptual Footprint



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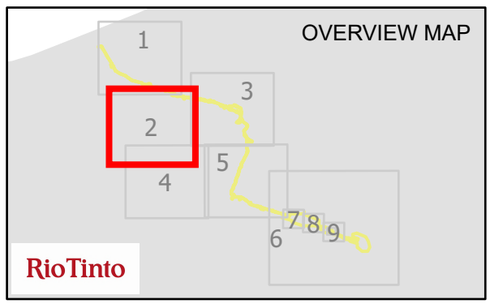
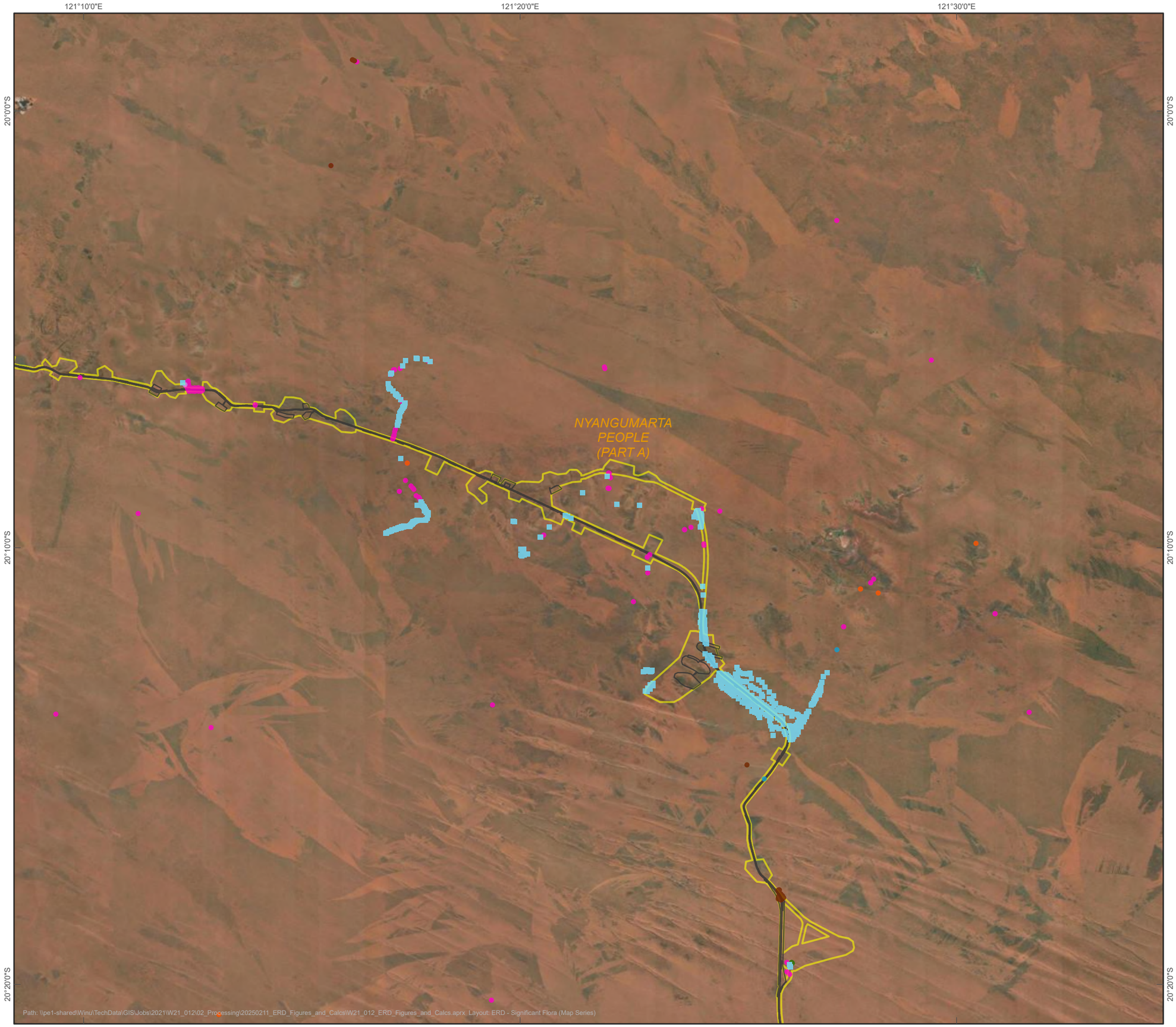


Figure 8-11: Significant Flora Species Recorded within and Surrounding the Development Envelope
Sheet 3 of 10

Legend

- Goodenia *hartiana* (P2)
- Bonamia *oblongifolia* (P3)
- Corynotheca *asperata* (P3)
- Indigofera *ammobia* (P3)
- Terminalia *kumpaja* (P3)
- Tribulopis *marliesiae* (P3)
- Seringia *exastia* (CE)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Native Title Determinations
- Development Envelope
- Conceptual Footprint



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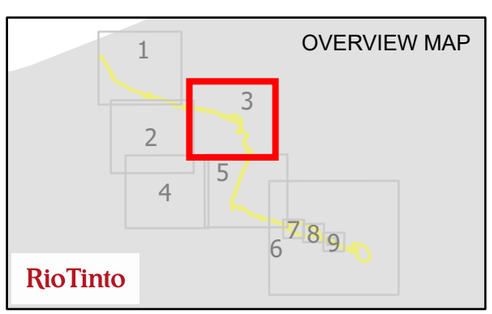
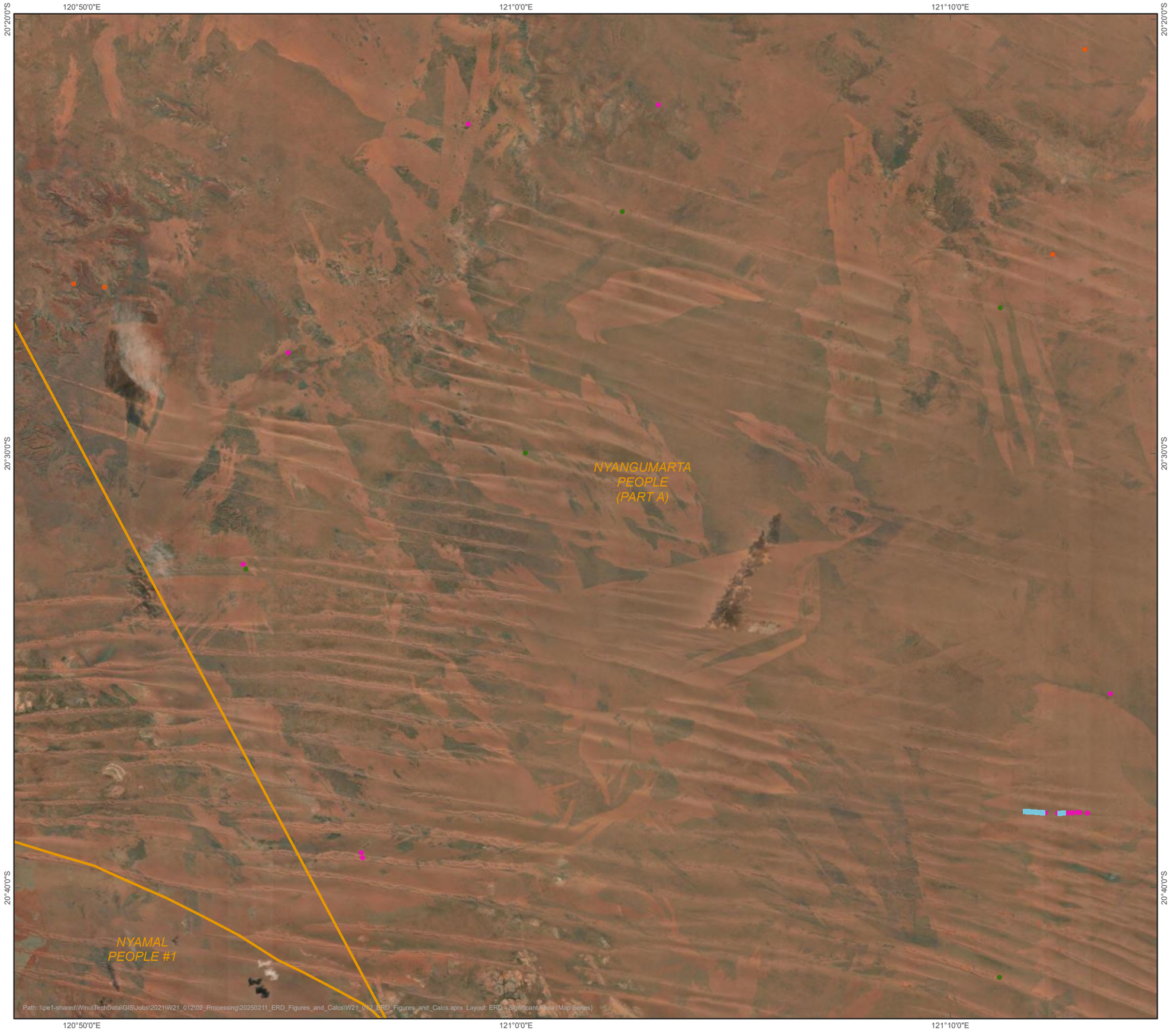


Figure 8-11: Significant Flora Species Recorded within and Surrounding the Development Envelope
Sheet 4 of 10

Legend

- Goodenia *hartiana* (P2)
- Bonamia *oblongifolia* (P3)
- Indigofera *ammobia* (P3)
- Terminalia *kumpaja* (P3)
- Tribulopis *marliesiae* (P3)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Native Title Determinations



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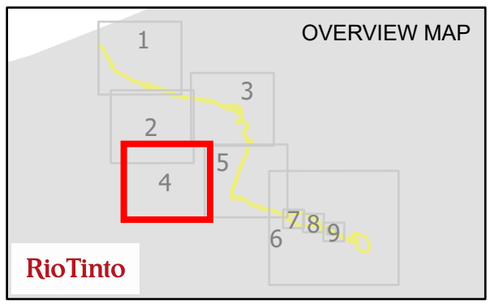

Figure 8-11: Significant Flora Species Recorded within and Surrounding the Development Envelope
Sheet 5 of 10

Legend

- Goodenia *hartiana* (P2)
- Bonamia *oblongifolia* (P3)
- Comesperma *sabulosum* (P3)
- Corynotheca *asperata* (P3)
- Dasymalla *chorisepala* (P3)
- Indigofera *ammobia* (P3)
- Synostemon *arenosus* (P3)
- Seringia *katatona* (P3)
- Terminalia *kumpaja* (P3)
- Tribulopis *marliesiae* (P3)
- Seringia *exastia* (CE)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Native Title Determinations
- Development Envelope
- Conceptual Footprint

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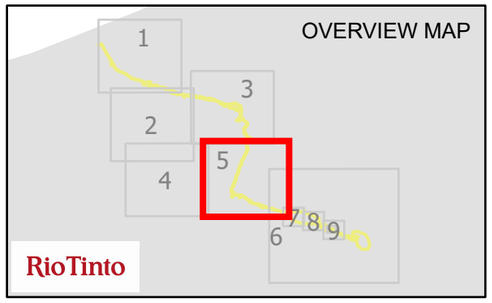
OVERVIEW MAP



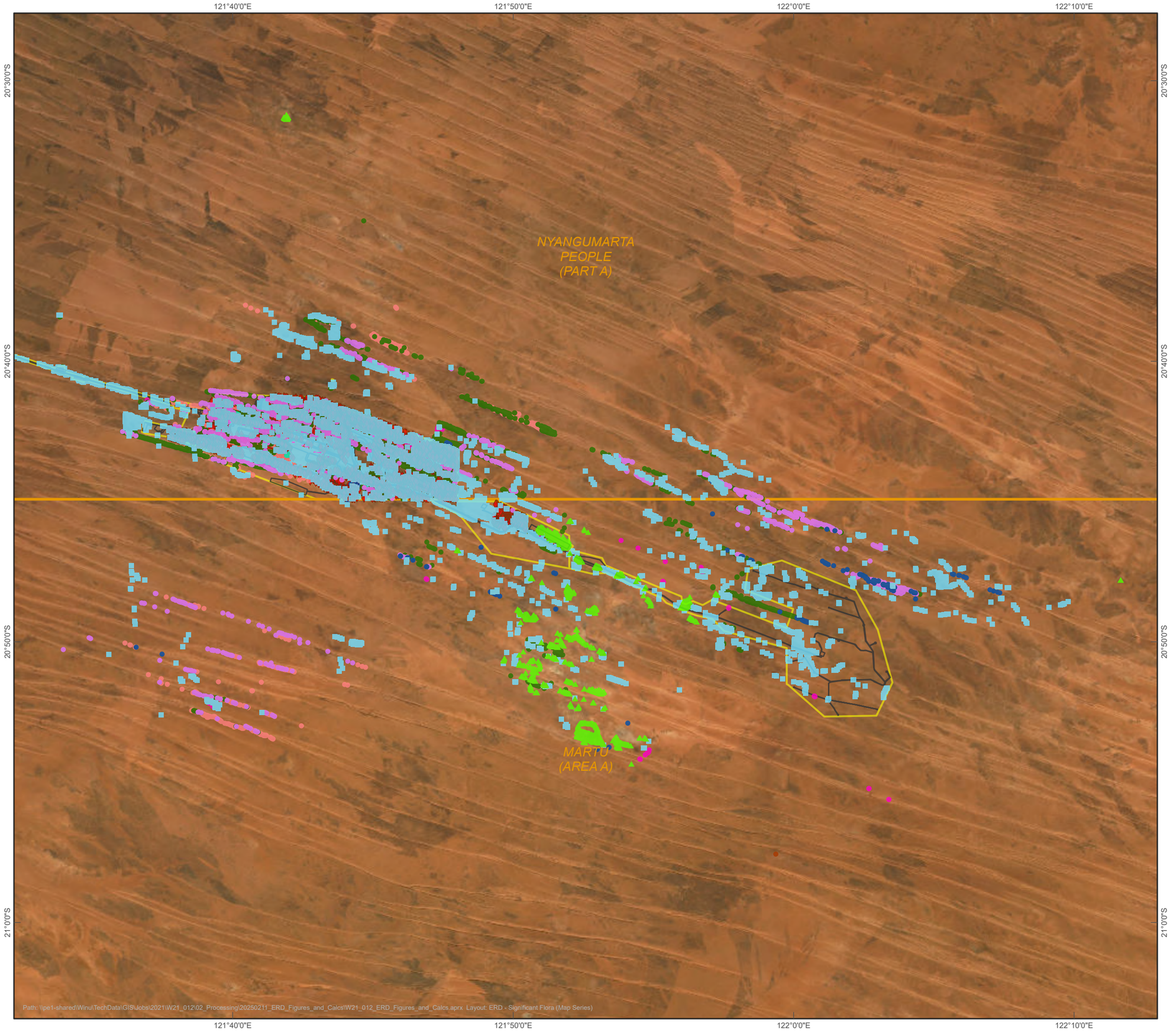
RioTinto

121°20'0"E
121°30'0"E
20°20'0"S
20°30'0"S
20°40'0"S

NYANGUMARTA PEOPLE (PART A)

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Significant Flora (Map Series)

Figure 8-11: Significant Flora Species Recorded within and Surrounding the Development Envelope
Sheet 6 of 10



Legend

- Cynodon *anisocarpa* (P1)
- Goodenia *hartiana* (P2)
- Comesperma *sabulosum* (P3)
- Corynotheca *asperata* (P3)
- Dasymalla *chorisepala* (P3)
- Indigofera *ammobia* (P3)
- Synostemon *arenosus* (P3)
- Tribulopis *marliesiae* (P3)
- Tephrosia *rosea var. Port Hedland (A.S. George 1114)* (P1)
- Eragrostis *lanicaulis* (P3)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Native Title Determinations
- Development Envelope
- Conceptual Footprint

0 4.6 9.3
Kilometres

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Units: Degree

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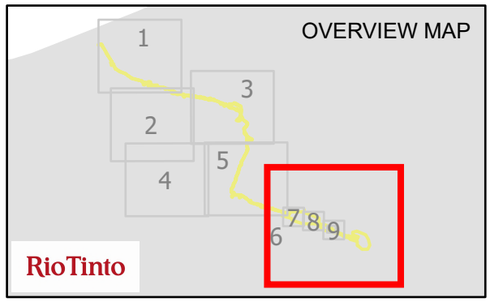
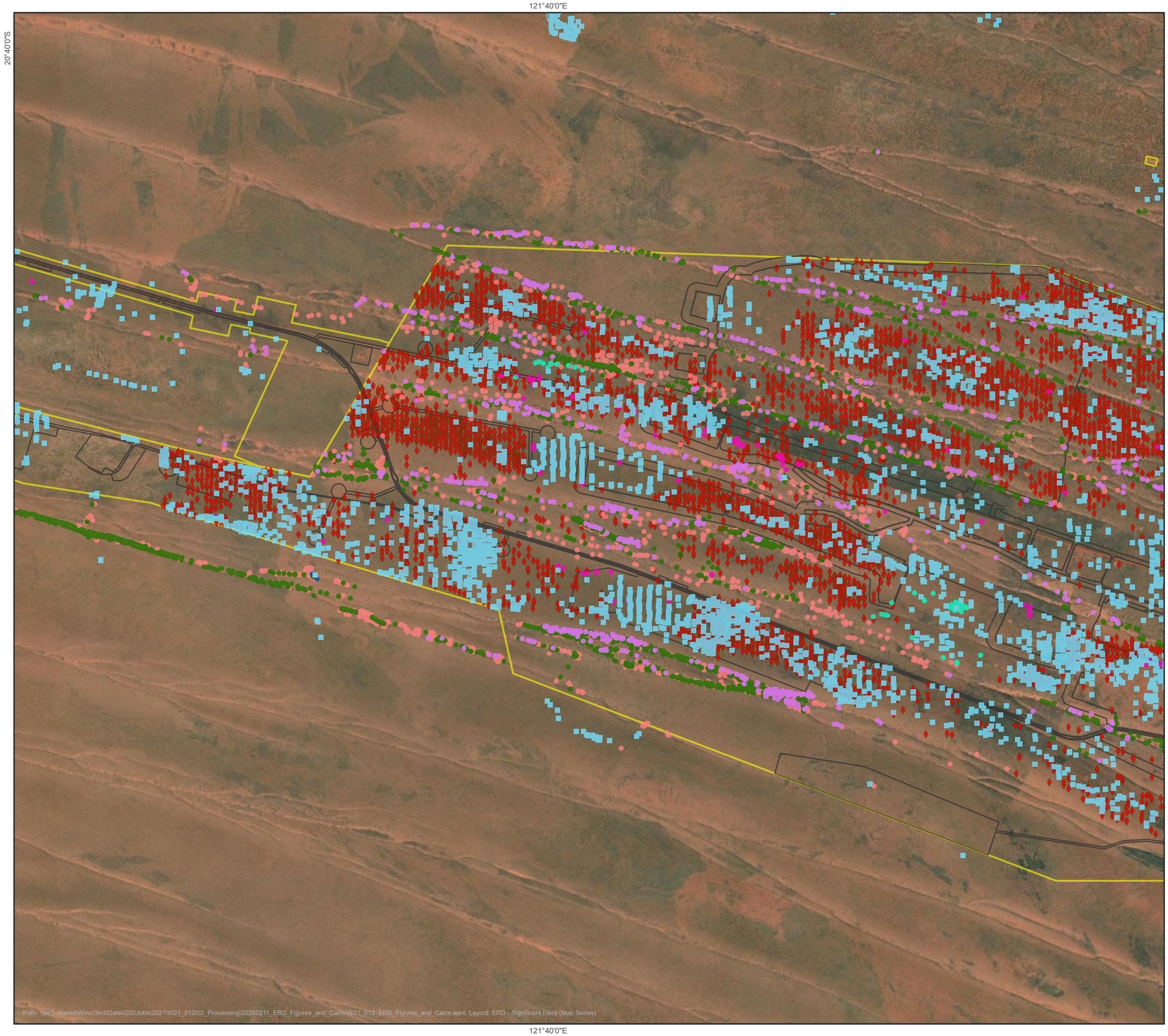


Figure 8-11: Significant Flora Species Recorded within and Surrounding the Development Envelope
Sheet 7 of 10

Legend

- Goodenia *hartiana* (P2)
- Comesperma *sabulosum* (P3)
- Corynotheca *asperata* (P3)
- Dasymalla *chorisepala* (P3)
- Indigofera *ammobia* (P3)
- Synostemon *arenosus* (P3)
- Tribulopis *marliesiae* (P3)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Development Envelope
- Conceptual Footprint



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Kilometres

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Coordinate System:
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Datum: GDA 1994
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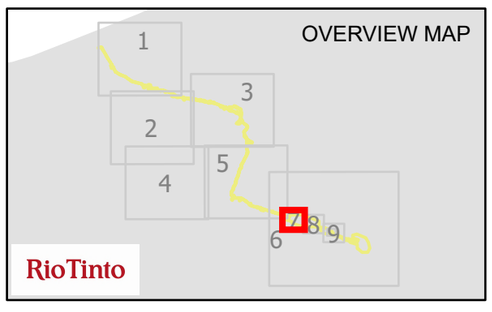
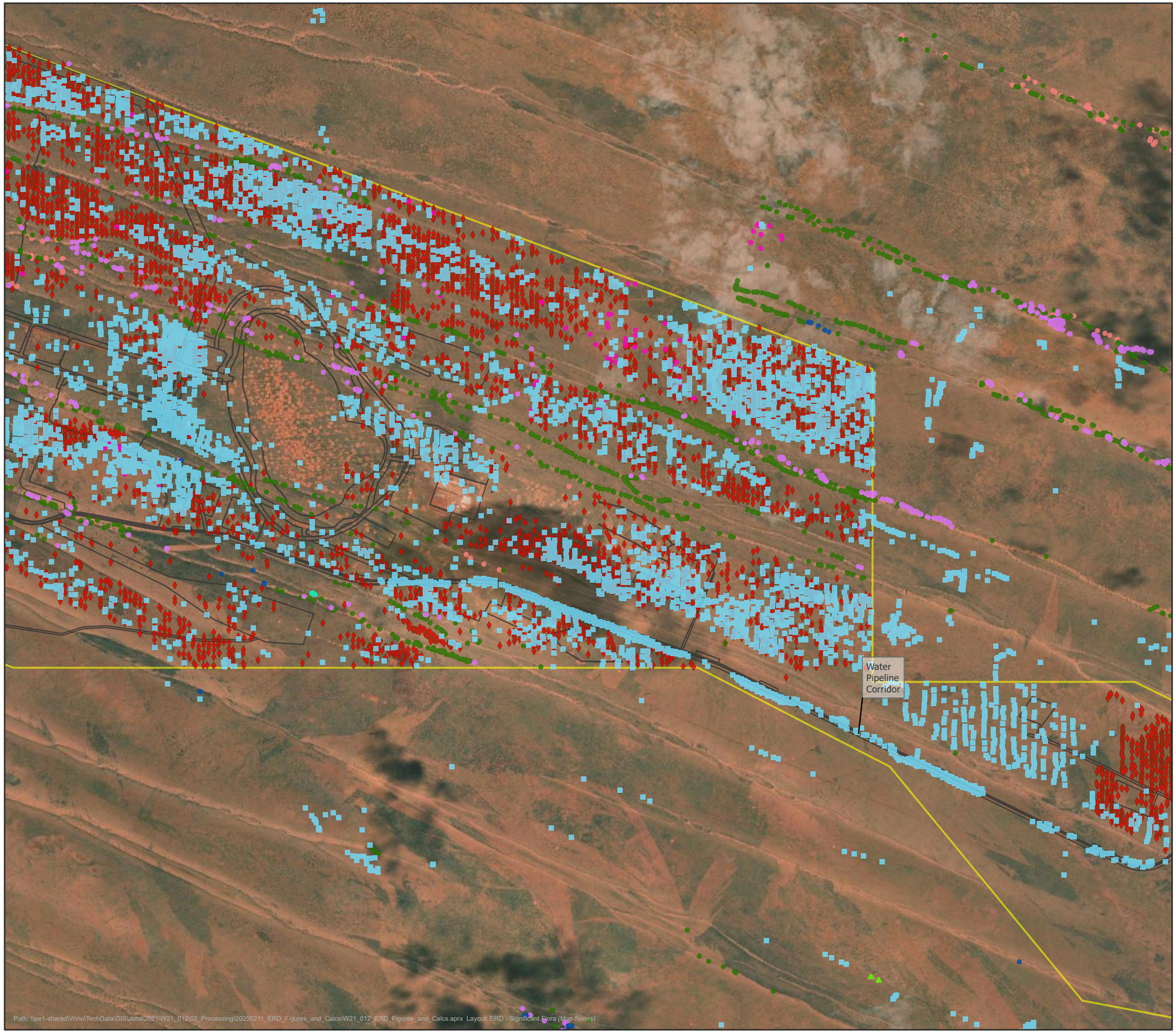


Figure 8-11: Significant Flora Species Recorded within and Surrounding the Development Envelope
Sheet 8 of 10

Legend

- Cynodon *anisocarpa* (P1)
- Goodenia *hartiana* (P2)
- Comesperma *sabulosum* (P3)
- Corynotheca *asperata* (P3)
- Dasymalla *chorisepala* (P3)
- Indigofera *ammobia* (P3)
- Synostemon *arenosus* (P3)
- Tribulopis *marliesiae* (P3)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Development Envelope
- Conceptual Footprint



0 0.8 1.5

Kilometres

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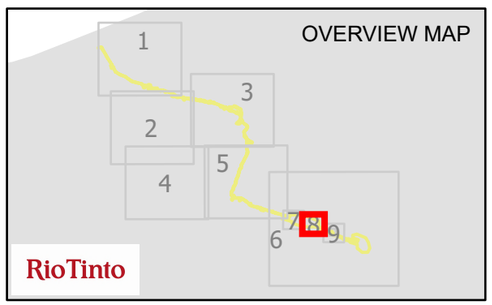

Figure 8-11: Significant Flora Species Recorded within and Surrounding the Development Envelope
Sheet 9 of 10

121°50'0"E

Legend

- Cynodon *anisocarpa* (P1)
- Goodenia *hartiana* (P2)
- Comesperma *sabulosum* (P3)
- Corynotheca *asperata* (P3)
- Indigofera *ammobia* (P3)
- Tribulopis *marliesiae* (P3)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Development Envelope
- Conceptual Footprint

Aerodrome

Water Pipeline Corridor

0 0.8 1.5

Kilometres

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Coordinate System:
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Datum: GDA 1994
Units: Degree

Scale: 1:40,000

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OVERVIEW MAP

1 2 3 4 5 6 7 8

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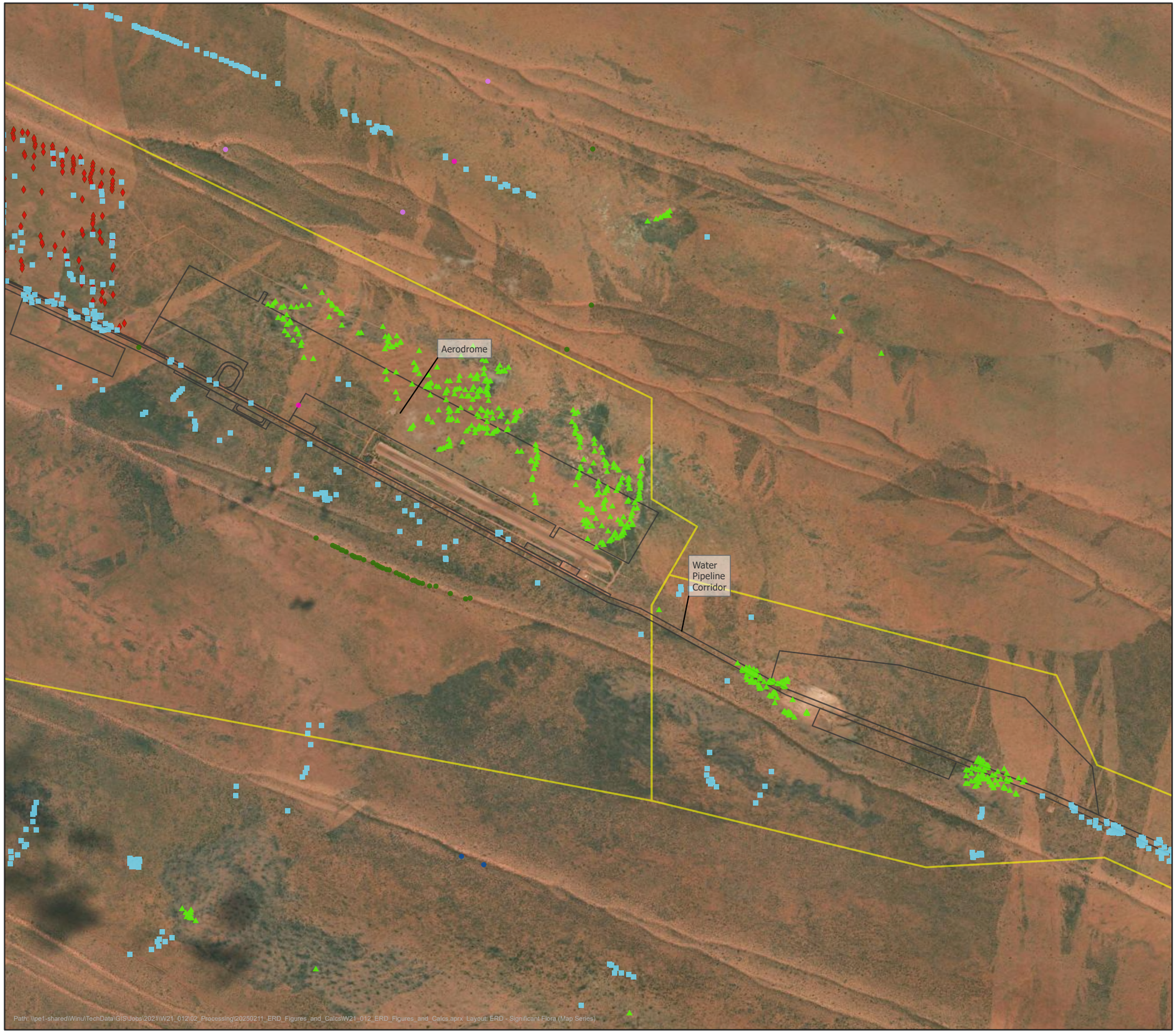
121°50'0"E

Figure 8-11: Significant Flora Species Recorded within and Surrounding the Development Envelope
Sheet 10 of 10

Legend

- Cynodon *anisocarpa* (P1)
- Goodenia *hartiana* (P2)
- Comesperma *sabulosum* (P3)
- Corynotheca *asperata* (P3)
- Indigofera *ammobia* (P3)
- Tribulopis *marliesiae* (P3)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Development Envelope
- Conceptual Footprint



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Kilometres

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Units: Degree

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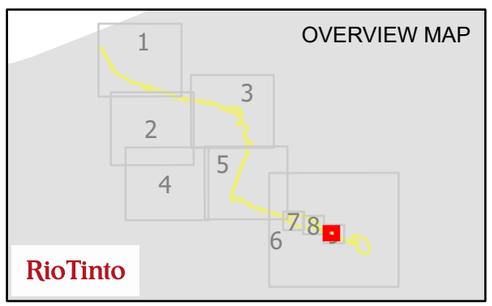

8.3.3.2 Culturally Significant Flora

A total of 41 flora species that occur across the Development Envelope are considered to have ethno-botanical significance (Western Botanical 2026a). None of these are also conservation significant (i.e. as described in Section 8.3.3.1) and all are considered common and widespread both across the Development Envelope and regionally across the Great Sandy Desert bioregion, with many extending across surrounding bioregions and into central and eastern Australia (Western Botanical 2026a). All flora species of ethno-botanical significance within the Development Envelope were also considered common and widespread at the local scale, with approximately 65% of species having been recorded in five or more quadrat sites (Western Botanical 2023) (Appendix D06). Ethnobotanical surveys of the Nyangumarta Warrarn Indigenous Protected Area have documented numerous species occurring in the area, principally those with traditional uses (see NWAC 2016).

Section 6 (Social Surroundings) also addresses these species.

8.3.3.3 Introduced Flora (Weeds)

Introduced flora (weeds) are largely absent across the Development Envelope, with small populations noted within the pastoral lease area of the north-western section of Nyangumarta Highway, and near the exploration camp (Figure 8-12). A total of seven weed species have been encountered across the Development Envelope to date (Western Botanical 2025b, 2026a) (Appendix D01), including:

- *Cenchrus ciliaris* (Buffel Grass) (46 records)
- *Citrullus amarus* (Bitter Melon) (352 records)
- *Dactyloctenium aegyptium* (Coast Button Grass) (240 records)
- *Euphorbia prostrata* (250 records)
- *Solanum lycopersicum* (Tomato) (two records)
- *Trianthema portulacastrum* (Giant Pigweed) (one record)
- *Tribulus terrestris* (Caltrop) (two records).

Of these, none are classified as Weeds of National Significance (WoNS) or as Declared Pests under s.11 of the *Biosecurity and Agriculture Management Act 2007* (BAM Act). Three of these are considered environmental weeds in the Pilbara region, and four are considered environmental weeds in the adjacent Kimberley region. Bitter Melon and Tomato are not included. Ecological impact and invasiveness ratings for these species within the Pilbara and Kimberley regions are summarised in Table 8-8 (DBCA 2023a, 2023b). Annual targeted weed monitoring recorded Buffel Grass, Bitter Melon and Tomato around the exploration camp, which have all been manually removed (Western Botanical 2026a) (Appendix D01).

Table 8-8: Ecological Impact and Invasiveness Ratings of Weed Species within the Development Envelope

Species	Ecological Impact		Invasiveness Rating	
	Pilbara	Kimberley	Pilbara	Kimberley
Cenchrus ciliaris (Buffel Grass)	High	High	Rapid	Moderate
Dactyloctenium aegyptium (Coast Button Grass)	-	Low	-	Unknown
Euphorbia prostrata	Unknown	-	Unknown	-
Trianthema portulacastrum (Giant Pigweed)	-	Low	-	Rapid
Tribulus terrestris (Caltrop)	Unknown	Low	Moderate	Rapid

Source: Weed Impact and Invasiveness Ratings: Pilbara and Kimberley (DBCA 2023a, 2023b)

120°30'0"E
121°0'0"E
121°30'0"E
122°0'0"E
20°0'0"S
20°30'0"S

Great Northern Hwy

N

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

Legend

- *Cenchrus ciliaris* (Buffel Grass)
- *Citrullus amarus* (Bitter Melon)
- *Dactyloctenium aegyptium* (Coast Button Grass)
- *Euphorbia prostrata*
- *Solanum lycopersicum* (Tomato)
- *Trianthema portulacastrum*
- *Tribulus terestris*
- Highway
- Development Envelope
- Conceptual Footprint
- Native Title Determinations

RioTinto

Figure 8-12: Introduced Flora Species Recorded within the Development Envelope

Rio Tinto Copper (RTC)

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Datum: GDA 1994
Units: Degree
Scale: 1:500,000
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0 10 20 Kilometres

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Introduced Flora (Weeds)

8.4 Potential Environmental Impacts

8.4.1 Direct Impacts

Potential direct impacts of the Proposal to Flora and Vegetation have been identified as:

- Clearing of native vegetation
- Increased fragmentation of native vegetation as a result of clearing
- Clearing of significant flora individuals.

8.4.1.1 Clearing of Native Vegetation

This section presents the approximate clearing of vegetation types based on a Conceptual Footprint, allowing for flexibility to modify the location of Proposal elements within the Development Envelope. To ensure environmental impacts are not greater than assessed, the Proponent proposes a maximum clearing extent for vegetation types of local significance as presented as part of the proposed mitigation in Section 8.5.

The Proposal will clear up to 4,878 ha of native vegetation, of which approximately 4,825 ha is in Excellent condition (Table 8-9). This represents 20.4% of the mapped Excellent condition vegetation within the Development Envelope.

Table 8-10, Table 8-11 and Figure 8-13 present the indicative clearing of vegetation within the Development Envelope. Of the 31 distinct vegetation types that occur within the Development Envelope 28 will be impacted as a result of the Proposal. Of the 10 mosaic vegetation units within the Development Envelope, two will be impacted as a result of the Proposal.

Up to 4,878 ha of locally significant vegetation types (D1, D2, D3, P1, P2, P3, P4, P8, C2, C4, R1 and R2) will be impacted.

Table 8-9: Indicative Disturbance by Vegetation Condition

Vegetation Condition	Development Envelope (ha)	Approximate Impact from the Proposal (ha)	Approximate Percentage of Vegetation in Development Envelope impacted by the Proposal (%)
Excellent	23,549	4,825	20.4
Disturbed	100	53	0.2
Total	**23,649**	**4,878**	**20.6**

Table 8-10: Indicative Disturbance by Locally Significant Vegetation Types

Vegetation Code	Mapped Vegetation Extent			Percentage of Vegetation in Vegetation Survey Area Impacted from Conceptual Footprint (%)	Percentage of Vegetation in Development Envelope Impacted from Conceptual Footprint (%)	Upper Limit of Vegetation Disturbance Assessed for Project Flexibility (ha, [%]) in Vegetation Survey Area*
	Vegetation Survey Area (ha)	Development Envelope (ha)	Approximate Impact on Vegetation from Conceptual Footprint (ha)			
Locally Significant Vegetation Types						
D1	3,000	1,951	709	23.6	36.3	780 [26.0]
D2	3,450	1,099	68	2.0	6.2	690 [20.0]
D3	261	81	21	8.2	26.5	52 [20.0]
P1	10,725	6,823	1,942	18.1	28.5	2,681 [25.0]
P2	6,045	1,978	608	10.1	30.7	1,209 [20.0]
P3	3,114	1,353	235	7.6	17.4	467 [15.0]
P4	3,325	722	69	2.1	9.6	333 [10.0]
P8	5,143	919	139	2.7	15.1	514 [10.0]
C2	1,449	15	<1	<0.1	0.6	15 [1.0]
C4	379	146	41	10.9	28.1	57 [15.0]
R1	642	234	60	9.3	25.6	96 [15.0]
R2	1,871	1,395	36	1.9	2.6	187 [10.0]

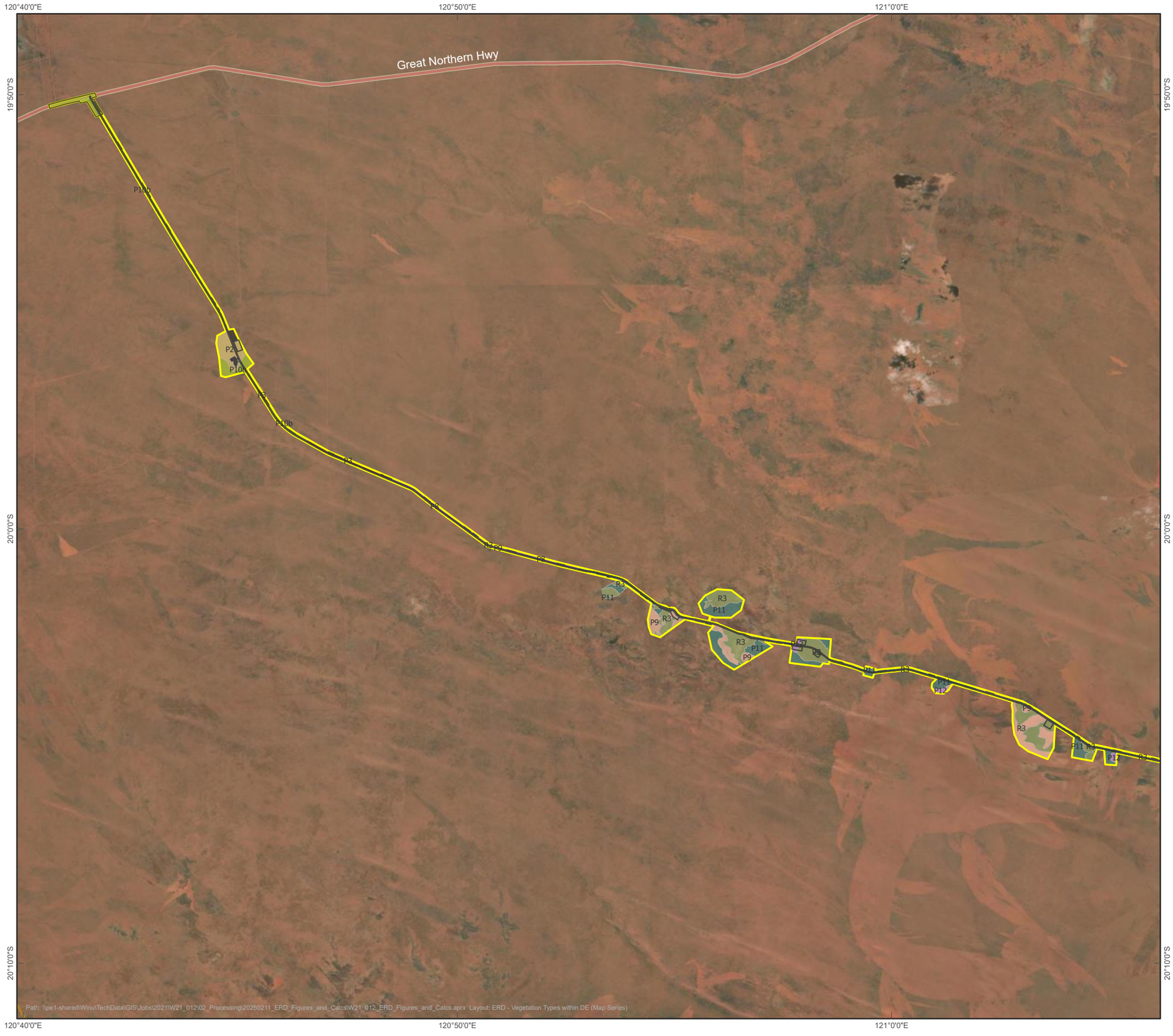
**Total clearing will not exceed 4,878 ha*

Table 8-11: Indicative Disturbance by Vegetation Type

Vegetation Code	Mapped Vegetation Extent			Percentage of Vegetation in Vegetation Survey Area Impacted from Proposal (%)	Percentage of Vegetation in Development Envelope Impacted from Proposal (%)
	Vegetation Survey Area (ha)	Development Envelope (ha)	Approximate Impact from Proposal (ha)		
Other Vegetation Types					
P5	552	551	41	7.4	7.4
P6	221	104	50	22.5	47.8
P9	732	533	64	8.8	12.1
P10a	527	72	1	0.2	1.2
P10b	343	325	109	31.8	33.5
P10c	1,845	424	72	3.9	17.1
P11	1,975	917	119	6.0	13.0
P12	164	143	19	11.6	13.3
P13	942	625	105	11.2	16.8
P14	1,099	318	7	0.6	2.1
P15a	221	49	0	0	0
P15b	86	19	2	2.8	12.9
P16	21	14	0	0	0
P18	475	192	2	0.5	1.2
P19	320	243	4	1.1	1.5
P20	921	249	35	3.8	14.1
R3	3,114	1,675	260	8.4	15.5

Vegetation Code	Mapped Vegetation Extent			Percentage of Vegetation in Vegetation Survey Area Impacted from Proposal (%)	Percentage of Vegetation in Development Envelope Impacted from Proposal (%)
	Vegetation Survey Area (ha)	Development Envelope (ha)	Approximate Impact from Proposal (ha)		
R4	< 1	< 1	0	0	0
R6	76	76	6	7.3	7.3
P1+D2	3	3	0	0	0
P1+P4	15	7	0	0	0
P1+P5	87	87	0	0	0
P1+P14	37	5	0	0	0
P1+P18	39	8	0	0	0
P2+P3	142	50	0	0	0
P2+P14	17	11	< 1	1.8	2.9
P4+R1	10	2	0	0	0
P4+R4	2	2	0	0	0
R2+P3	134	133	< 1	0.1	0.1

Figure 8-13: Indicative Clearing (Conceptual Footprint) of Vegetation Types within the Development Envelope Sheet 1 of 5



Legend

- Highway
- Development Envelope
- Native Title Determinations
- Conceptual Footprint

Vegetation Type

- P11
- P12
- P2
- P3
- P8
- P9
- R3
- Disturbed
- P10b

0 3 6

Kilometres

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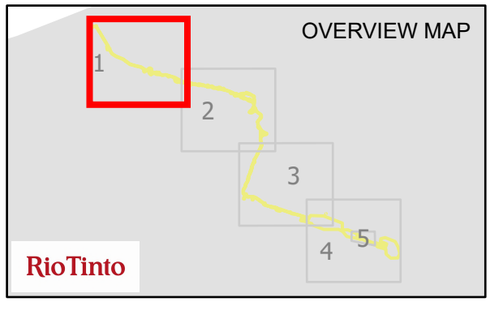
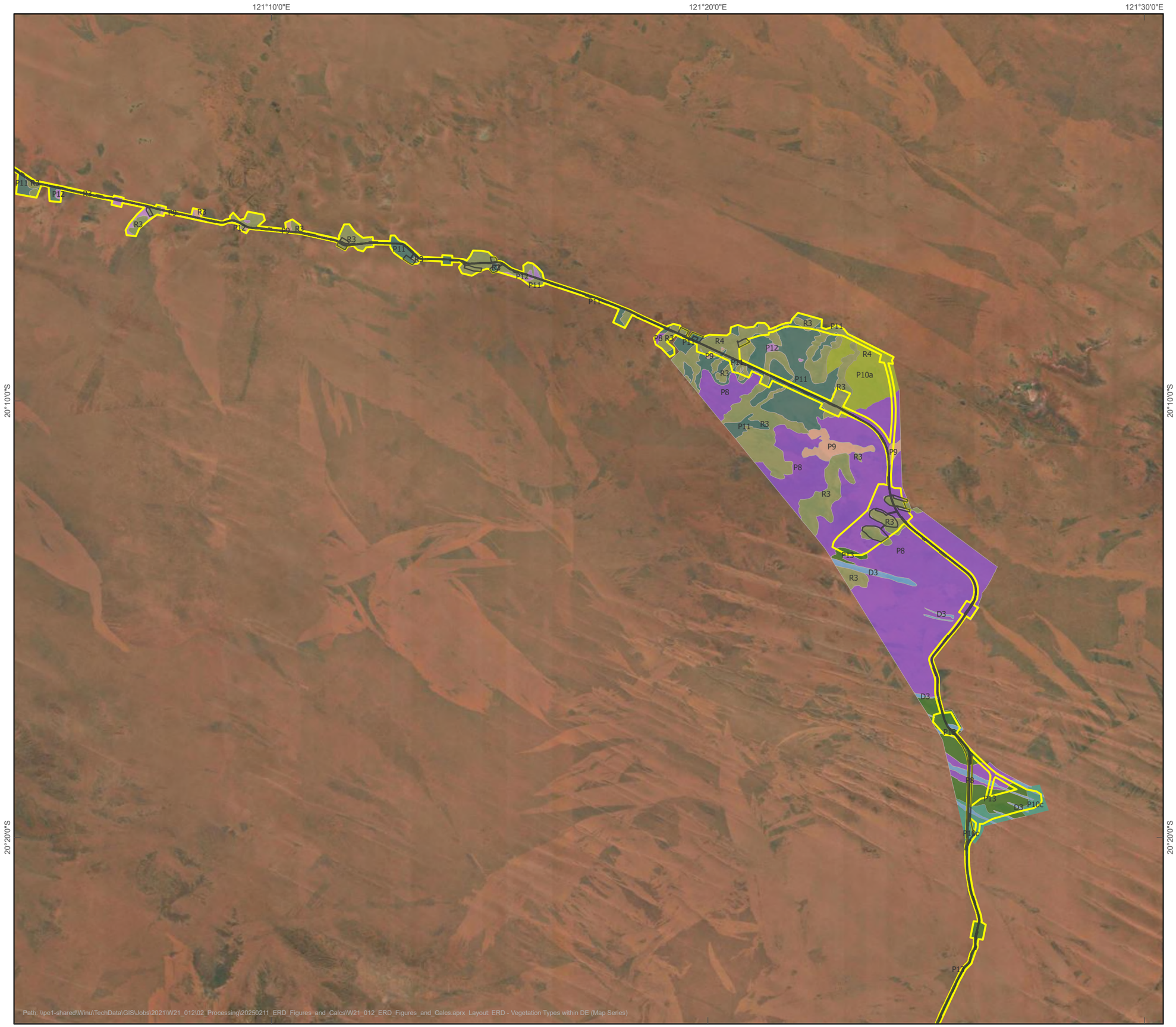


Figure 8-13: Indicative Clearing (Conceptual Footprint) of Vegetation Types within the Development Envelope Sheet 2 of 5



Legend

- Development Envelope
- Native Title Determinations
- Conceptual Footprint

Vegetation Type

- D3
- P11
- P12
- P13
- P8
- P9
- R3
- R4
- P10c
- P10a

0 3 6

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Datum: GDA 1994
Units: Degree

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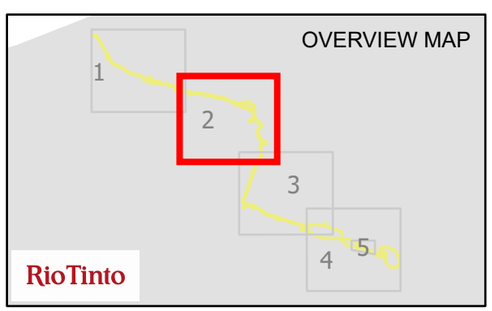

Figure 8-13: Indicative Clearing (Conceptual Footprint) of Vegetation Types within the Development Envelope Sheet 3 of 5

Legend

- Development Envelope
- Native Title Determinations
- Conceptual Footprint

Vegetation Type

- D1
- D2
- D3
- P1
- P11
- P13
- P2
- P3
- P6
- P8
- P9
- Disturbed
- P10c
- P14
- C4
- P15b

0 3 6

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OVERVIEW MAP

1 2 3 4 5

RioTinto

121°20'0"E 121°30'0"E 121°40'0"E

20°30'0"S

20°40'0"S

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Vegetation Types within DE (Map Series)

Figure 8-13: Indicative Clearing (Conceptual Footprint) of Vegetation Types within the Development Envelope Sheet 4 of 5

Legend

- Development Envelope
- Native Title Determinations
- Conceptual Footprint

Vegetation Type

- D1
- D2
- P1
- P2
- P3
- P4
- P5
- P6
- P7
- P8
- P9
- R1
- R2
- R3
- Disturbed
- C3
- P10c
- P14
- C2
- P18
- P20
- C1
- P15a
- D4
- C4
- P19
- P2+P3
- R2+P3
- P15c
- P21
- R5
- P1+P4
- P15b
- P15c+P18
- P16
- P22
- R2+P18
- C1+P8
- C5
- D2+P8
- P1+D2
- P1+P14
- P1+P18
- P1+P2
- P1+P5
- P10c+P8
- P10d
- P15a+P3
- P18+C2
- P2+C3
- P2+P14
- P20+C3
- P4+P14
- P4+R1
- P4+R4
- R2+P2
- R6
- C6
- P1+P3
- R2+P4

0 3 6

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OVERVIEW MAP

1 2 3 4 5

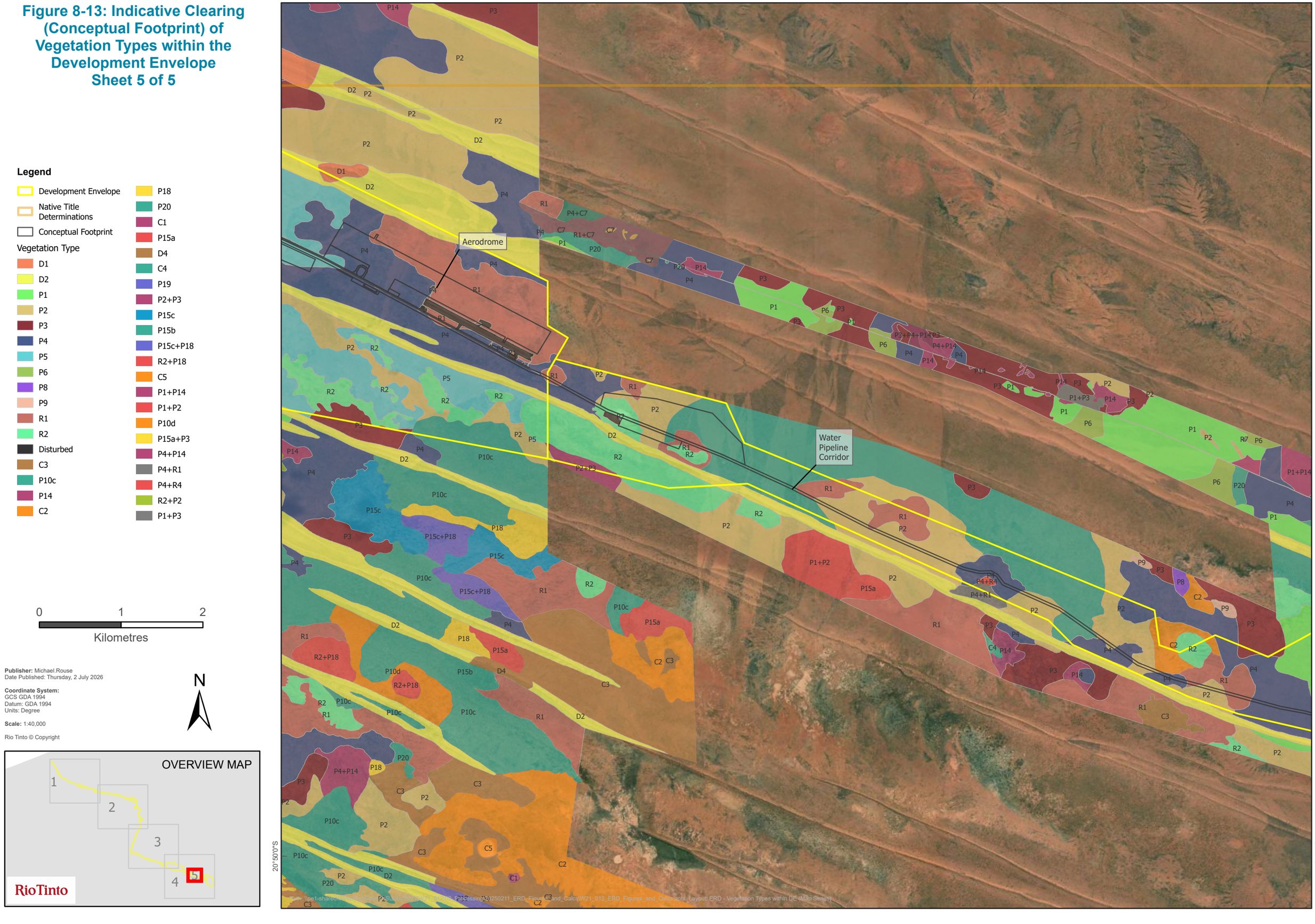
RioTinto

121°40'0"E 121°50'0"E 122°0'0"E

20°40'0"S 20°50'0"S

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Vegetation Types within DE (Map Series)

Figure 8-13: Indicative Clearing (Conceptual Footprint) of Vegetation Types within the Development Envelope Sheet 5 of 5



8.4.1.2 Increased Fragmentation of Native Vegetation as a Result of Clearing

Fragmentation of vegetation occurs when clearing or construction of infrastructure result in patches of vegetation becoming isolated. Fragmentation of vegetation patches can result in the following impacts:

- Degradation of vegetation from edge effects, where cleared areas become a vector for weeds, dust and changes to surface water flows
- Reduction in the reproduction and genetic diversity of flora from the reduction in ecological corridors which allow pollinators to move between vegetation patches.

Clearing and construction of infrastructure for the Proposal has the potential to result in fragmentation of vegetation unless appropriately managed.

An interpretation of the number of patches and overall area of each vegetation unit can provide an indication of the resilience of each vegetation unit. As an initial filter, noting that there is limited vegetation mapping outside the Development Envelope and not all of the Development Envelope will be cleared, a criterion of 30% or greater of the area of occurrence and the number of patches for each vegetation type has been applied to identify vegetation types most at risk of significant proportional loss (Western Botanical 2026a). Table 8-12 shows the sorted number of patches and areas of each vegetation type within the Development Envelope in accordance with the 30% criterion.

Based on the area of occurrence, 80.5% of the vegetation types within the Development Envelope are known from less than 70% of their respective areas of occurrence outside the Development Envelope. Of these, three vegetation mosaics are only known to occur within the Development Envelope, however, the individual component of each of the mosaics are known to occur outside the Development Envelope. The R6 vegetation type is only known from within the Rimfire Borefield (Western Botanical 2026a).

An analysis of the number of patches of each vegetation type within the Development Envelope shows that nine vegetation types (C2, P20, P15a, P10c, C4, P14, P4, R3, P1+P14) to occur sufficiently commonly outside the Development Envelope and 70% or more of these units' patches are known from outside the Development Envelope. The remaining 32 vegetation types have fewer than 30% of patches within the Development Envelope (Western Botanical 2026a).

Patches of all 12 locally significant vegetation types occur outside the Development Envelope. Of these 12 (Table 8-12):

- C4 (379 ha total mapped extent) has the least number of patches represented outside the Development Envelope, with seven Table 8-12; however, these cover 61% of the total mapped extent of C4 and include seven of the nine patches mapped within the Vegetation Survey Area. Approximately 11% of the total mapped extent of C4 occurs in the Conceptual Footprint
- D3 (261 ha total mapped extent) occupies the smallest total area of the 12 significant vegetation types; however, 20 (53%) of its 38 patches, covering 69% of its mapped extent, occur outside the Development Envelope. Eight percent of the total mapped extent of D3 occurs in the Conceptual Footprint
- R1 (642 ha total mapped extent), the third smallest of the locally significant vegetation types, has 15 (58%) of its 26 patches occurring outside the Development Envelope. This is the equivalent to approximately 63% of its mapped extent; and at least 85% of its mapped extent will be avoided by any Proposal disturbance, based on the proposed upper limit of disturbance (Table 8-12). Nine percent of the total mapped extent of R1 occurs in the Conceptual Footprint
- R2 (1,871 ha total mapped extent) has the least area, 25%, as a proportion of its surveyed extent mapped outside the Development Envelope; however, this is comprised of 38 (46%) patches compared to 45 patches mapped within the Development Envelope. At least 90% of the mapped extent of R2 will not be disturbed by the Proposal, based on the proposed upper limit of disturbance (Table 8-12). Two percent of the total mapped extent of R1 occurs in the Conceptual Footprint.

The remaining eight locally significant vegetation units occur sufficiently commonly outside the Development Envelope. Given the number and extent of patches outside the Development Envelope

for these locally significant vegetation units, the Proponent anticipates the Proposal is not likely to contribute to naturally occurring stochastic events that may impact the persistence of these vegetation types in the area.

Table 8-12: Number of Patches and Areas of Vegetation Types within the Development Envelope

Vegetation Type	Locally Significant	Total Extent in Vegetation Survey Area (ha)	Area within the CF^ (ha, [%])	No. of Patches within the DE^	Area of Patches (ha, [%]) within the DE^	No. of Patches outside the DE (% of total Patches)*	Area (ha, [%]) outside the DE*
Locally Significant Vegetation Types							
D1	Yes	3,000	709 [23.6]	12	1,952 [65.1]	22 (65)	1,049 [35.0]
D2	Yes	3,450	68 [2.0]	37	1,099 [31.9]	55 (60)	2,351 [68.1]
D3	Yes	261	21 [8.0]	18	81 [31.0]	20 (53)	180 [68.9]
P1	Yes	10,725	1,942 [18.1]	61	6,823 [63.6]	112 (65)	3,902 [36.4]
P2	Yes	6,045	608 [10.1]	50	1,978 [32.7]	102 (67)	4,067 [67.3]
P3	Yes	3,114	235 [7.5]	43	1,353 [43.4]	64 (60)	1,761 [56.6]
P4	Yes	3,325	69 [2.1]	21	722 [21.7]	55 (72)	2,603 [78.3]
P8	Yes	5,143	139 [2.7]	18	919 [17.9]	37 (67)	4,224 [82.1]
C2	Yes	1,449	< 1 [< 0.1]	2	15 [1.0]	20 (91)	1,434 [99.0]
C4	Yes	379	41 [10.8]	2	146 [38.5]	7 (78)	233 [61.5]
R1	Yes	642	60 [9.3]	11	234 [36.4]	15 (58)	408 [63.6]
R2	Yes	1,871	36 [1.9]	45	1,396 [74.6]	38 (46)	476 [25.4]
Other Vegetation Types							
P5	No	552	41 [7.4]	11	552 [100.0]	1 (8)	1 [0.1]
P6	No	221	50 [22.6]	4	104 [47.1]	9 (69)	118 [53.2]
P9	No	732	64 [8.7]	22	533 [72.8]	35 (61)	199 [27.2]
P10a	No	527	1 [0.2]	5	72 [13.7]	3 (38)	455 [86.4]
P10b	No	343	109 [31.8]	3	325 [94.8]	5 (63)	18 [5.3]
P10c	No	1,845	72 [3.9]	12	424 [23.0]	49 (80)	1,421 [77.0]
P11	No	1,975	119 [6.0]	40	917 [46.4]	57 (59)	1,058 [53.6]
P12	No	164	19 [11.6]	10	143 [87.2	16 (62)	21 [12.8]
P13	No	942	105 [11.1]	17	625 [66.3]	37 (69)	318 [33.7]
P14	No	1,099	7 [0.6]	18	318 [28.9]	51 (74)	781 [71.1]
P15a	No	221	0 [0.0]	3	49 [22.2]	13 (81)	172 [77.7]
P15b	No	87	2 [2.3]	1	19 [21.8]	2 (67)	68 [78.3]
P16	No	21	0 [0.0]	1	14 [66.7]	1 (50)	7 [34.0]

Vegetation Type	Locally Significant	Total Extent in Vegetation Survey Area (ha)	Area within the CF^ (ha, [%])	No. of Patches within the DE^	Area of Patches (ha, [%]) within the DE^	No. of Patches outside the DE (% of total Patches)*	Area (ha, [%]) outside the DE*
P18	No	475	2 [0.4]	10	192 [40.4]	14 (58)	283 [59.6]
P19	No	320	4 [1.3]	3	243 [75.9]	4 (57)	76 [23.9]
P20	No	921	35 [3.8]	5	249 [27.0]	22 (81)	673 [73.0]
R3	No	3,114	260 [8.3]	38	1,675 [53.8]	89 (70)	1,439 [46.2]
R4	No	<1	0 [< 0.1]	< 1	< 1 [-]	1 (50)	<1 [25.6]
R6	No	76	6 [7.9]	1	76 [100.0]	0 (0)	0 [0]
P1+D2	No	3	0 [0.0]	1	3 [100.0]	0 (0)	0 [0]
P1+P4	No	15	0 [0.0]	2	7 [46.7]	2 (50)	8 [53.0]
P1+P5	No	87	0 [0.0]	1	87 [100.0]	0 (0)	0 [0]
P1+P14	No	37	0 [0.0]	1	5 [13.5]	3 (75)	32 [85.7]
P1+P18	No	39	0 [0.0]	1	8 [20.5]	1 (50)	31 [79.3]
P2+P3	No	142	0 [0.0]	5	50 [35.2]	5 (50)	92 [64.9]
P2+P14	No	17	< 1 [< 0.1]	1	11 [64.7]	1 (50)	5 [31.0]
P4+R1	No	10	0 [0.0]	1	2 [20.0]	1 (50)	8 [79.4]
P4+R4	No	2	0 [0.0]	1	2 [100.0]	0 (0)	0 [0]
R2+P3	No	134	< 1 [< 0.1]	5	133 [99.3]	3 (38)	<1 [0.3]

** Percentages may not sum to 100% due to rounding. DE – Development Envelope, CF – Conceptual Footprint*

8.4.1.3 Clearing of Significant Flora Individuals

Direct impacts to significant flora records within the Conceptual Footprint are presented in Table 8-13 and Figure 8-14. Of the 10 Priority species recorded within the Development Envelope, nine species are expected to be impacted by the Proposal.

One species of taxonomic interest, *Amphipogon caricinus* (hairy lamina) (J. Paterson WB41138), was recorded within the Conceptual Footprint. A significant proportion (38%) of known records occur within the Conceptual Footprint and nearly all (99.9%) records occur within the DE. However, as discussed (Section 8.3.3.1) this is considered an artefact of its recently elevated taxonomic status and survey effort focused within the Development Envelope, with populations observed to continue outside the Development Envelope including at the Nifty mine site (approximately 100 km from the Development Envelope) and it is expected to be locally and regionally abundant and widespread outside the Development Envelope (Western Botanical 2026a). Further targeted Priority flora surveys are planned, and expected to produce more records outside the Development Envelope.

One of the two populations of the taxonomically unresolved *Portulaca* sp. Nyangumarta (B. Eckermann BE Opp 01) occurs within the Development Envelope along the RAC. The occurrence of the species within the Conceptual Footprint reflects the recency of its observation and its taxonomic uncertainty. The Proponent is treating the species as significant pending taxonomic resolution and; therefore, commits to complete avoidance of all known records (Table 8-13) unless the identification process confirms that the species is common and not newly described and/or threatened – as such the Conceptual Footprint will be amended as required at that time. There is expected to be adequate spatial options in the relevant section of the RAC to allow the road alignment to be relocated to ensure an appropriate buffer between disturbed areas and the *Portulaca* sp. Nyangumarta (B. Eckermann BE Opp 01) records.

A statewide database search for the 10 Priority species recorded within the Development Envelope was requested on 2 August 2025 through DBCA (Ref: 12-0825FL; Western Botanical, 'Statewide Flora Records for Priority Flora of the Winu Project'). The search results include digital records of validated populations so while more physical records may exist for the species, they have not yet been input into the State Threatened and Priority Flora database. Additional individuals can be expected at each record location. This information is likely contained in various published or unpublished botanical reports, or remains unacknowledged due to the lack of submission of Threatened and Priority Flora Forms (Western Botanical 2025e). As such, statewide records are considered conservative.

To ensure environmental impacts are not greater than assessed, the Proponent proposes a maximum clearing extent for significant flora species as presented as part of the proposed mitigation in Section 8.5.

An analysis of number of populations or sub-populations of each Priority Flora species within and outside the Development Envelope is presented in Table 8-14. The analysis is inherently and heavily biased to records within the Development Envelope as few records, and no systematic studies have been conducted outside the Development Envelope for these species for the Proposal. Given the relatively uniformity of the land systems and habitats in the broader region around the Development Envelope, Western Botanical (2026a) considers it highly likely that these species will be regionally widespread and more abundant outside the Development Envelope than current data represents. Based on the available data:

- About 50% of the known local populations of *Dasymalla chorisepala* (P3) and *Tribulopis marliesiae* (P3) occur within the Development Envelope
- No Priority species has 30% or greater number of its state-wide populations within the Development Envelope. The Priority species are considered sufficiently well-known outside the Development Envelope (both locally and more broadly in WA) that the proportions within are relatively low.

Portulaca sp. Nyangumarta (B. Eckermann Opp01) is known from one area on the RAC, and is found on either side of the Development Envelope boundary, so it is recorded as two populations, divided by this cadastral boundary.

The data indicate *Amphipogon caricinus* (hairy lamina) (J. Paterson WB41138) is known only in detail from within the Development Envelope given the records there comprise both 78% of the known local and state-wide population records. However, as discussed, it has been observed outside the Development Envelope and is expected to be locally and regionally abundant.

Note a record of *Polymeria* sp. Broome (K.F. Kenneally 9759) (P3) was made in quadrat WIN036 within the Development Envelope, in August 2019, prior to confirmation of identity of that specimen, and no numbers of plants attributed at that time. Hence there is a population recorded within the Development Envelope no number of individuals known.

Table 8-13: Impacts on Significant Flora Species within the Development Envelope - Individuals

Species	Number of known records in the State	Number of Individuals in Flora Survey Area	Number of Individuals in the Development Envelope	Number of Individuals in the Conceptual Footprint	Predicted Impact (%) of Number of Individuals in Flora Survey Area	Predicted Impact (%) of Known Individuals in Development Envelope	Upper Limit of Disturbance Assessed for Project Flexibility (Number of Individuals [%]) in Flora Survey Area
Priority 1							
Cynodon anisocarpus	142	431,560	63,587	18,268	4.2	28.7	21,578 [5.0]
Priority 2							
Goodenia hartiana	64,153	887,982	552,280	194,741	21.9	35.3	177,596 [20.0]
Priority 3							
Bonamia oblongifolia	287	1,266	3	0	0	0	3 [0.2]
Comesperma sabulosum	255	271	51	4	1.5	7.8	13 [5.0]
Corynotheca asperata	10,275	8,516	2,554	794	9.3	31.1	852 [10.0]
Dasymalla chorisepala	39	377	118	8	2.1	6.8	37 [10.0]
Indigofera ammobia	271	37,875	18,658	2,755	7.3	14.8	3,788 [10.0]
Synostemon arenosus	269	4,975	2,467	519	10.4	21.0	746 [15.0]
Terminalia kumpaja	234	223	110	56	25.1	50.9	62 [28.0]
Tribulopis marliesiae	98	1,657	787	480	29.0	61.0	497 [30.0]

Species of Taxonomic Interest							
Amphipogon caricinus (hairy lamina) (J. Paterson WB41138)	Unknown*	111,036	111,003	42,369	38.2	38.2	33,311 (30.0)^
Portulaca sp. Nyangumarta (B. Eckermann BE Opp 01)	Unknown*	136	77	43	31.6	55.8	0^

*These species are yet to have their taxonomy confirmed. ^Subject to further fieldwork and/or taxonomy

Table 8-14: Impacts on Significant Flora Populations

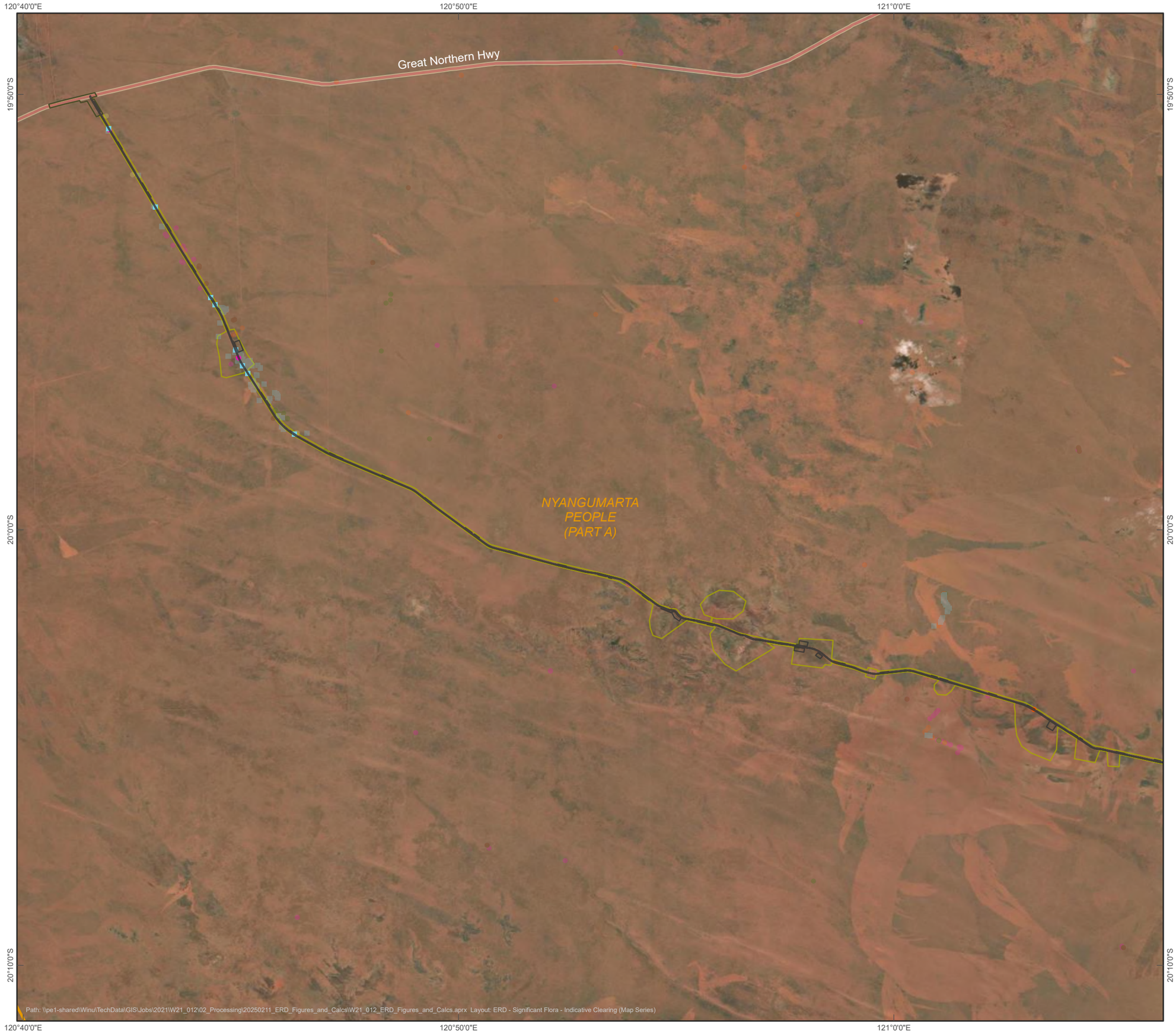
Species	No. Populations outside the DE^	No. Populations within the DE^	% Local Pop Within Winu DE^	Regional WA Populations	Total Populations	% Total Pop Within Winu DE^
Priority 1						
Cynodon anisocarpus	20	4	17	5	29	14
Priority 2						
Goodenia hartiana	147	43	23	19	209	21
Priority 3						
Bonamia oblongifolia	5	2	29	6	13	15
Comesperma sabulosum	24	3	11	19	46	7
Corynotheca asperata	52	19	27	8	79	24
Dasymalla chorisepala	5	5	50	7	17	29
Indigofera ammobia	60	23	28	19	102	23
Synostemon arenosus	31	9	23	12	52	17

Species	No. Populations outside the DE^	No. Populations within the DE^	% Local Pop Within Winu DE^	Regional WA Populations	Total Populations	% Total Pop Within Winu DE^
Terminalia kumpaja	5	2	29	15	22	9
Tribulopis marliesiae	40	42	51	92	174	24
Species of Taxonomic Interest						
Amphipogon caricinus (hairy lamina) (J. Paterson WB41138)	2	7	78	Not known	9	78
Portulaca sp. Nyangumarta	1	1	50	Not known	2	50

^Development Envelope

Figure 8-14: Indicative Clearing (Conceptual Footprint) of Significant Flora

Sheet 1 of 8



Legend

- Goodenia *hartiana* (P2)
- Bonamia *oblongifolia* (P3)
- Tribulopis *marliesiae* (P3)
- Highway
- Native Title Determinations
- Conceptual Footprint
- Development Envelope

0 3 6

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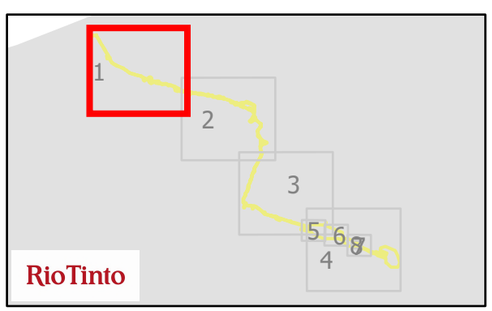
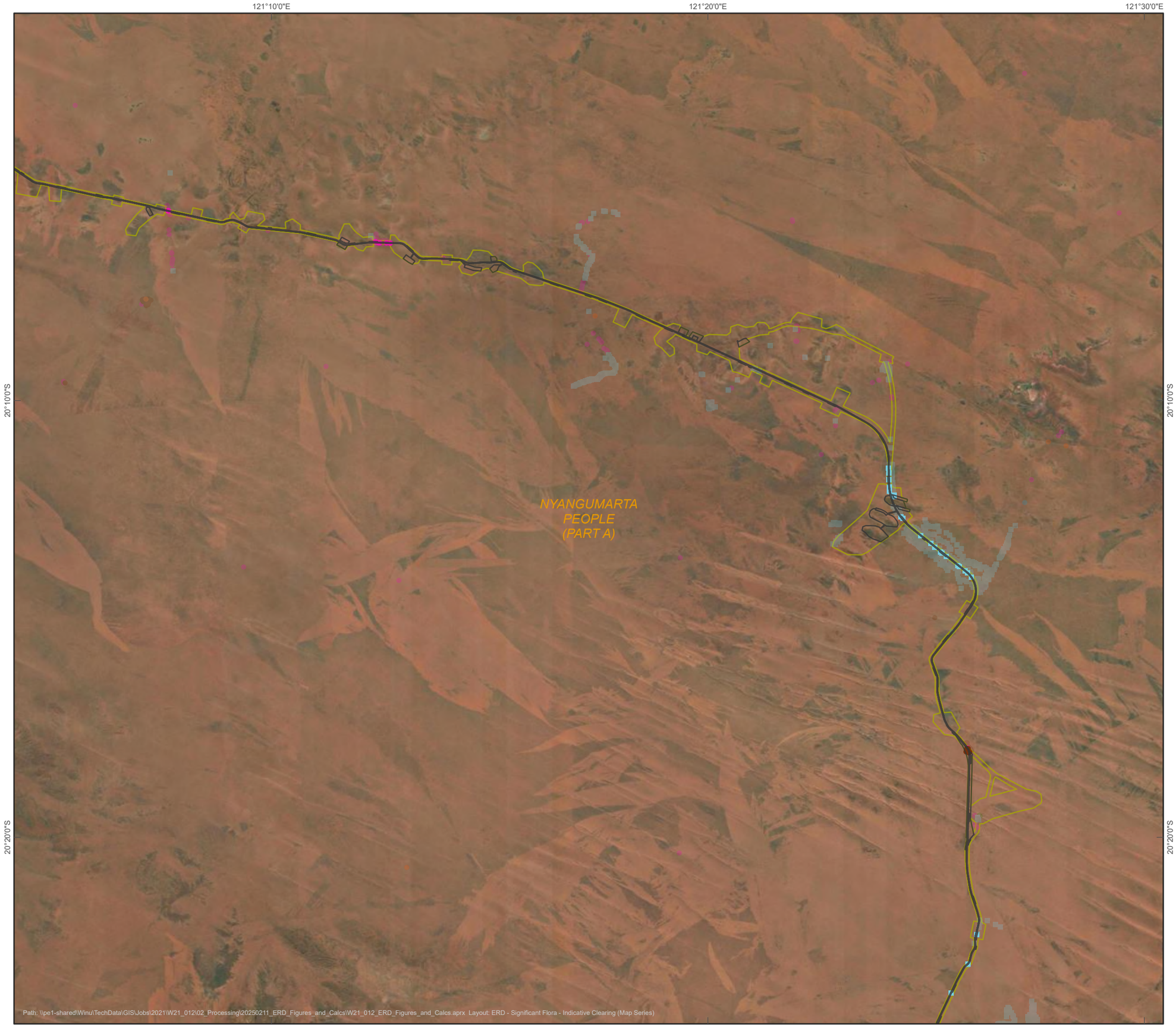


Figure 8-14: Indicative Clearing (Conceptual Footprint) of Significant Flora

Sheet 2 of 8



Legend

- Goodenia *hartiana* (P2)
- Terminalia *kumpaja* (P3)
- Tribulopis *marliesiae* (P3)
- Native Title Determinations
- Conceptual Footprint
- Development Envelope

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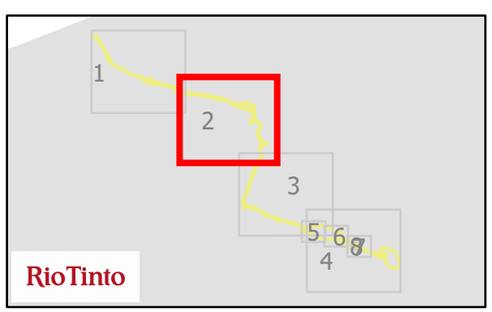

Figure 8-14: Indicative Clearing (Conceptual Footprint) of Significant Flora

Sheet 3 of 8

Legend

- Goodenia *hartiana* (P2)
- Comesperma *sabulosum* (P3)
- Corynotheca *asperata* (P3)
- Dasymalla *chorisepala* (P3)
- Indigofera *ammobia* (P3)
- Synostemon *arenosus* (P3)
- Seringia *katatona* (P3)
- Tribulopis *marliesiae* (P3)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Native Title Determinations
- Conceptual Footprint
- Development Envelope

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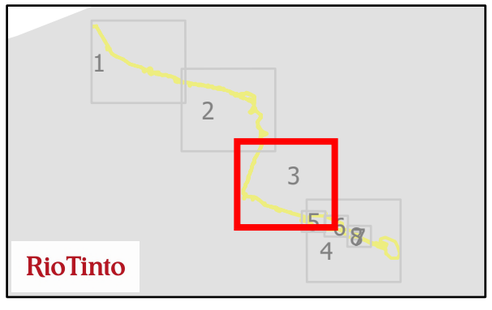


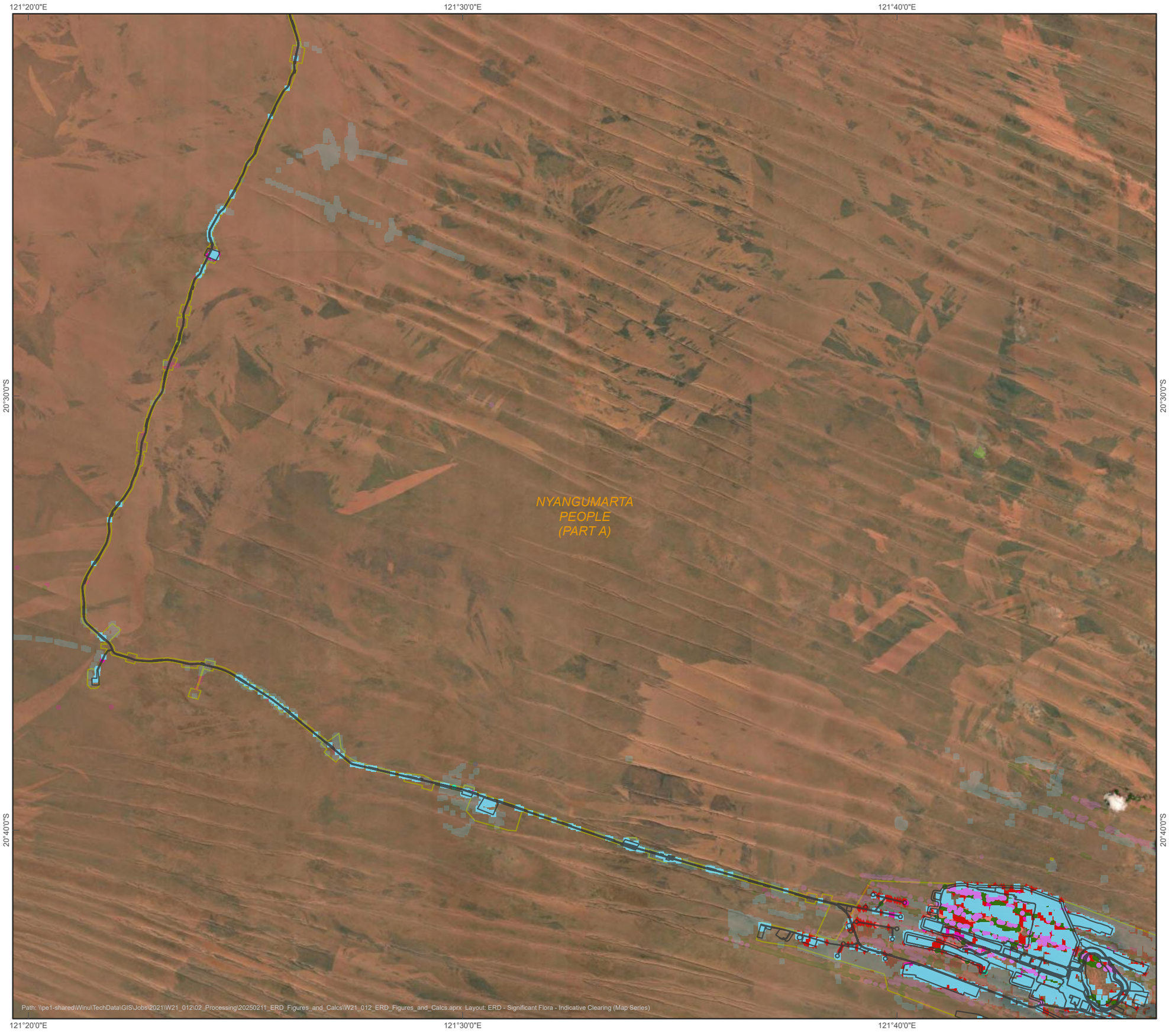
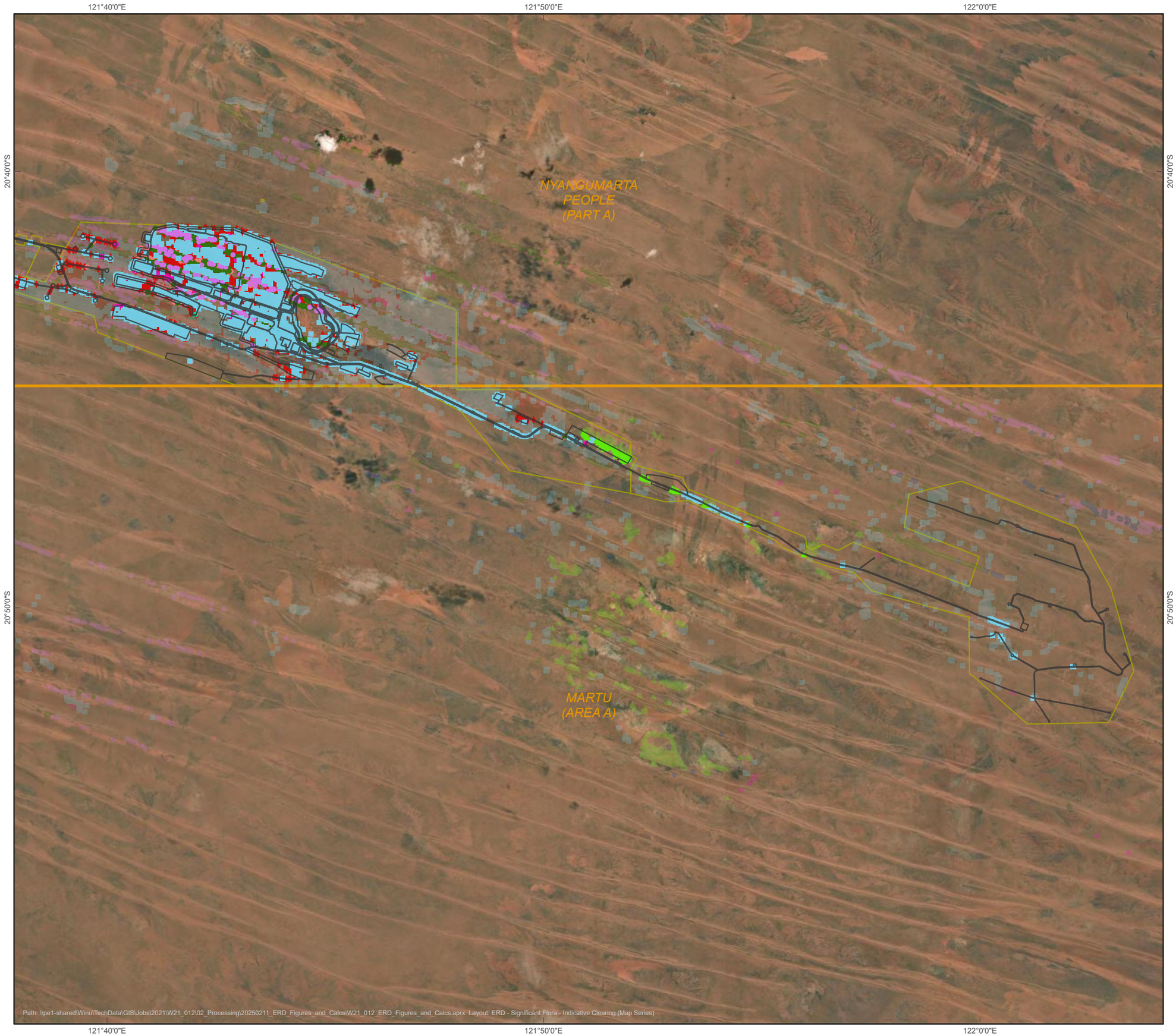


Figure 8-14: Indicative Clearing (Conceptual Footprint) of Significant Flora

Sheet 4 of 8



Legend

- Cynodon *anisocarpa* (P1)
- Goodenia *hartiana* (P2)
- Comesperma *sabulosum* (P3)
- Corynotheca *asperata* (P3)
- Dasymalla *chorisepala* (P3)
- Indigofera *ammobia* (P3)
- Synostemon *arenosus* (P3)
- Tribulopis *marliesiae* (P3)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Native Title Determinations
- Conceptual Footprint
- Development Envelope

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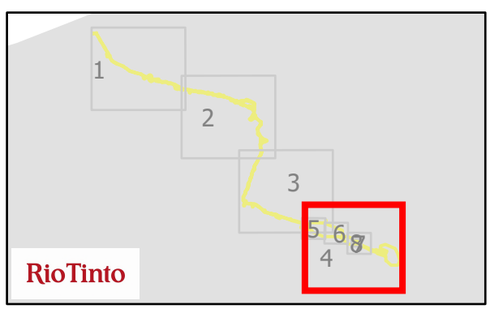

Figure 8-14: Indicative Clearing (Conceptual Footprint) of Significant Flora

Sheet 5 of 8

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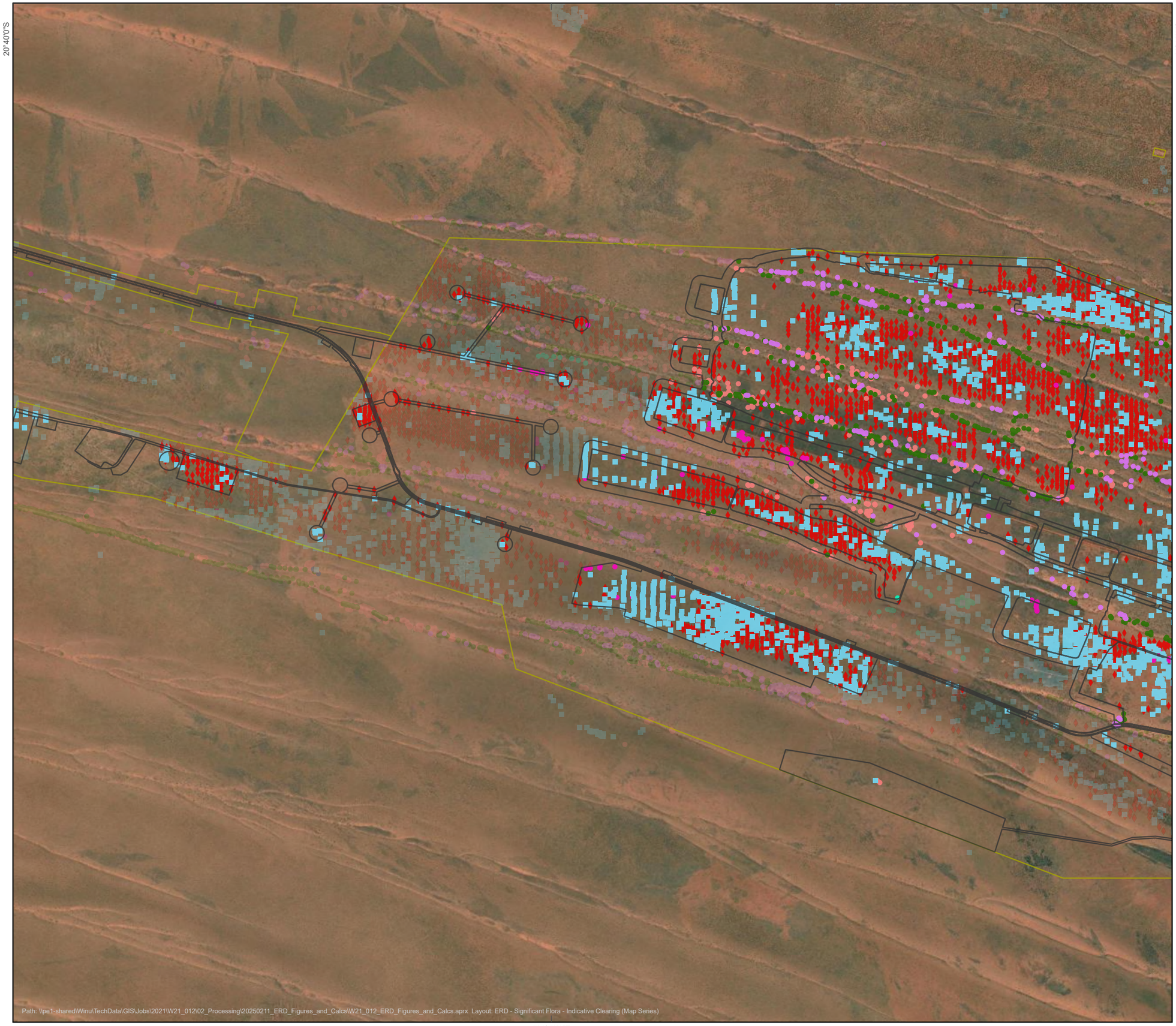
20°40'0"S



20°40'0"S

Legend

- Goodenia *hartiana* (P2)
- Corynotheca *asperata* (P3)
- Dasymalla *chorisepala* (P3)
- Indigofera *ammobia* (P3)
- Synostemon *arenosus* (P3)
- Tribulopis *marliesiae* (P3)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Conceptual Footprint
- Development Envelope

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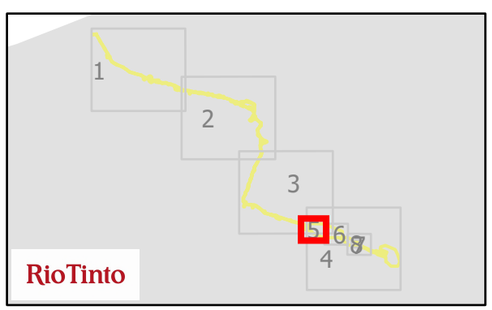

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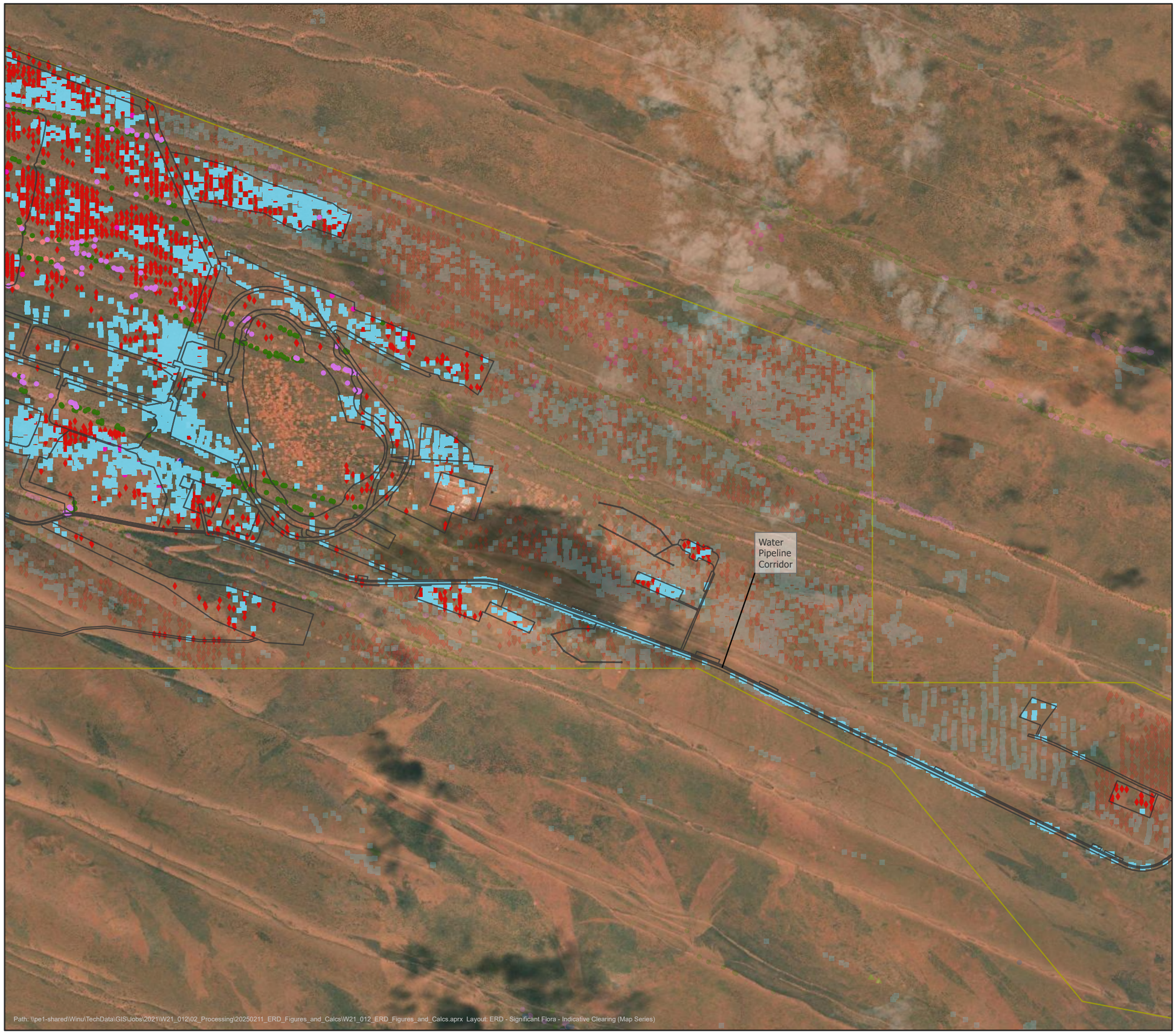
121°40'0"E

Figure 8-14: Indicative Clearing (Conceptual Footprint) of Significant Flora

Sheet 6 of 8



Legend

- Goodenia *hartiana* (P2)
- Comesperma *sabulosum* (P3)
- Corynotheca *asperata* (P3)
- Dasymalla *chorisepala* (P3)
- Indigofera *ammobia* (P3)
- Synostemon *arenosus* (P3)
- Tribulopis *marliesiae* (P3)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Conceptual Footprint
- Development Envelope

0 0.8 1.5

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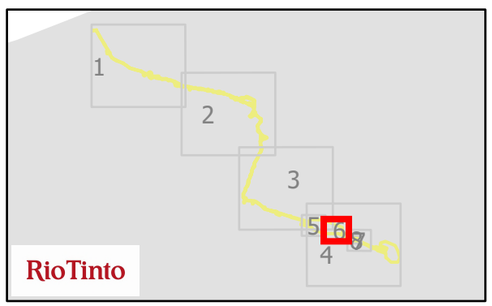

Figure 8-14: Indicative Clearing (Conceptual Footprint) of Significant Flora

Sheet 7 of 8

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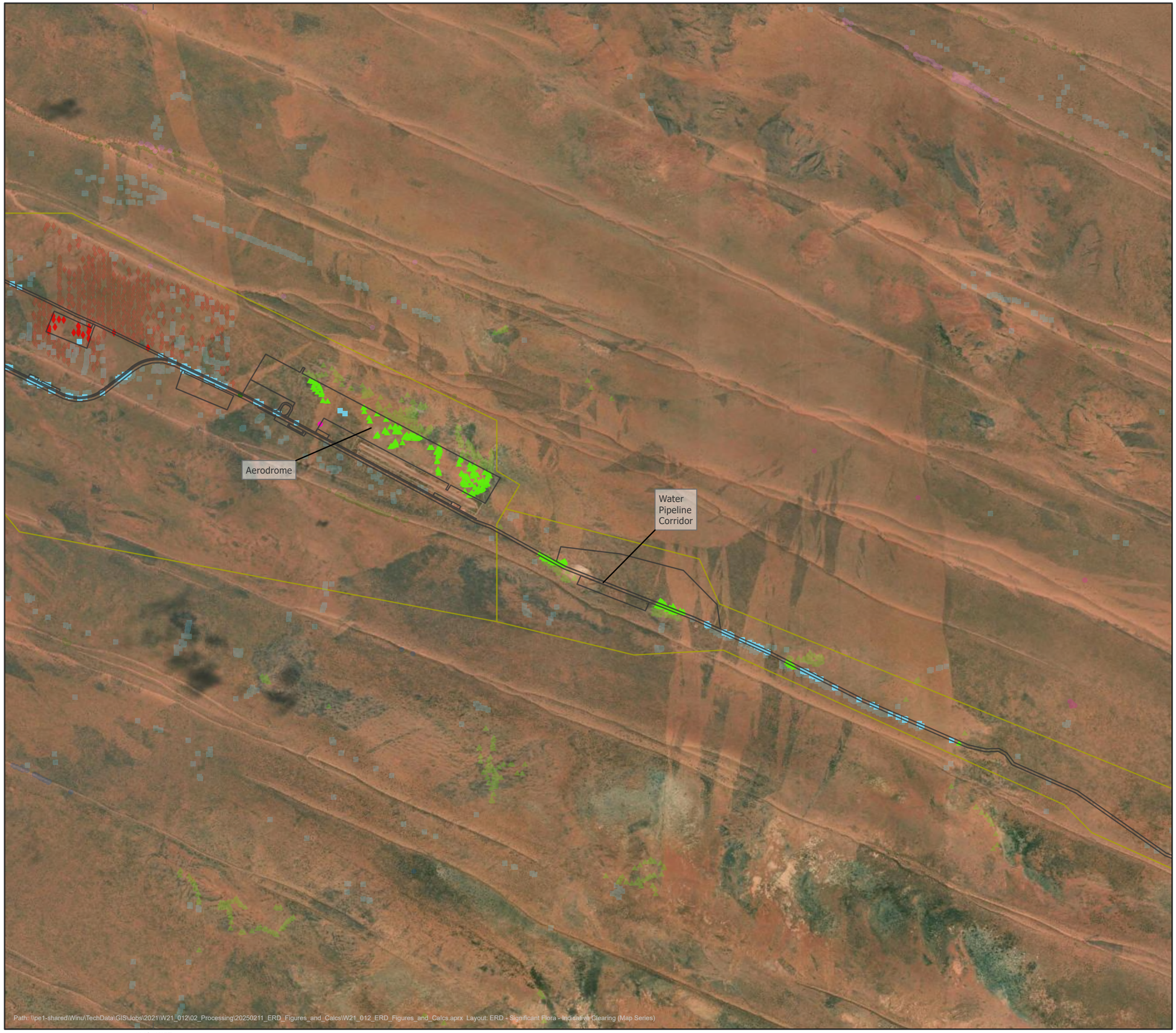

121°50'0"E

Legend

- Cynodon *anisocarpa* (P1)
- Goodenia *hartiana* (P2)
- Indigofera *ammobia* (P3)
- Tribulopis *marliesiae* (P3)
- Amphipogon *caricinus (hairy lamina) (J. Paterson WB41138)*
- Conceptual Footprint
- Development Envelope

0 0.8 1.5

Kilometres

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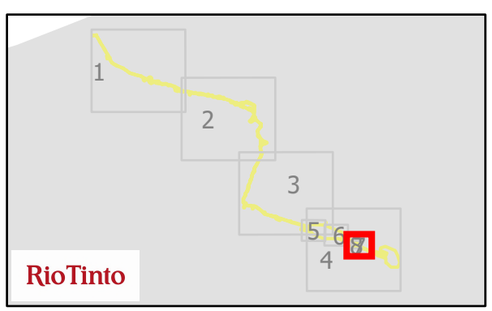

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Figure 8-14: Indicative Clearing (Conceptual Footprint) of Significant Flora

Sheet 8 of 8

Legend

- Cynodon *anisocarpa* (P1)
- Goodenia *hartiana* (P2)
- Indigofera *ammobia* (P3)
- Tribulopis *marliesiae* (P3)
- Conceptual Footprint
- Development Envelope

0 0.4 0.8

Kilometres

Publisher: Michael.Rouse
Date Published: Monday, 6 July 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree

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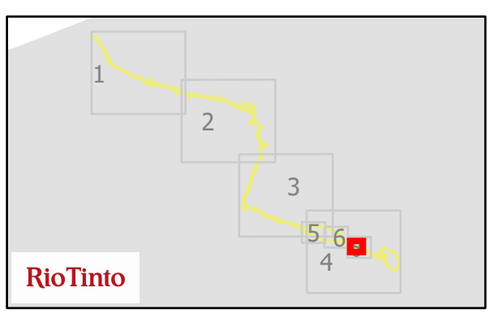

8.4.2 Indirect Impacts

Potential indirect impacts of the Proposal on Flora and Vegetation have been identified as:

- Degradation or alteration of GDV as a result of groundwater drawdown
- Degradation of vegetation as a result of altered hydrological regimes
- Degradation of vegetation as a result of the introduction or spread of weed species
- Degradation of vegetation as a result of increased dust emissions or altered fire regimes.

8.4.2.1 Degradation or Alteration of GDV as a Result of Groundwater Drawdown

The Percival Palaeovalley within and south of Rimfire has potential to host GDV due to a shallow watertable. A reduction in groundwater levels due to drawdown from Rimfire has the potential to impact any GDV in the palaeovalley (Worley 2025e). Some *Melaleuca*-dominated vegetation units occur in the palaeovalley, with *M. glomerata* along with *Eucalyptus victrix* considered obligate GDV species when present over a shallow watertable (Brim Box et al. 2022).

Figure 8-15 shows the modelled existing depth to groundwater of the deeper fracture rock aquifer, overlain by the vegetation types assumed to be GDV (P23 and C1+P23) within the Percival Palaeovalley.

Rimfire is required to supplement Proposal water supply. Although modelling indicates that the actual water requirements through the life of the Proposal will be substantially less, the current assessment of potential impacts to GDV will be based on the project licensing case, in which a requirement of up to 2.8 GL/a is abstracted continuously over 32 years. This rate of continuous abstraction over the LoM is not realistic but is used for reference purposes as this reflects the proposed borefield licence limit and could therefore be considered a theoretical maximum. Under the more realistic conservative (P90 probability) project water demand case, Rimfire Borefield abstraction starts 13 years after the commencement of mining, borefield flows vary from zero to a peak in Year 26 of approximately 2.0 GL/a.

Figure 8-16 shows the GDV units that overly the theoretical zone of influence of the drawdown cone of depression from abstraction at Rimfire under the project licensing case (Worley 2025b)..

Figure 8-17 shows the extent of drawdown underlying GDV units in the palaeovalley system in relation to the more realistic P90 Project water demand case.). Under this P90 scenario none of the GDV units are located within the two metre or greater drawdown contour. A small proportion of vegetation units P23a, P23b and P23c are located in an area predicted to experience between one and two metres drawdown. This area has a baseline depth to groundwater of 3-7 mbgl. Under current conditions, *Melaleuca glomerata* and *M. lasiandra* may access groundwater during dry periods, and a decline of one to two metres could affect water availability. However, the modelling indicates this drawdown would occur gradually over 15 to 20 years, providing an opportunity for vegetation to adapt and extend root systems as groundwater levels fall. *Eucalyptus victrix* open woodland (C1+P23) and P23d lie south of the one-metre drawdown contour, indicating that no impact on groundwater availability is expected.

Parts of P19 *Melaleuca lasiandra* low open shrubland are located closer to the central areas of the Rimfire borefield, where drawdown is greatest. As discussed, although P19 contains scattered *Melaleuca lasiandra* it has characteristics that suggest a reduced potential for groundwater dependency. Nevertheless, the estimated drawdown of two to five metres at the end of mining could affect water availability in these areas. However, the modelled drawdown is expected to occur gradually over 15 to 20 years, allowing time for vegetation to adapt and extend root systems.

The area of the palaeovalley that is within the 2 m drawdown zone of influence of the borefield is negligible, even under the project licensing case, which would affect approximately 0.15% of the entire Percival Palaeovalley system (Section 10.6.1.2).

No vegetation types containing GDV occur within mine pit dewatering drawdown contours (Section 8.3.2.5). Therefore, no GDV is expected to be impacted by mine pit dewatering.

As discussed, no other GDEs have the potential to be impacted by the Proposal.

Figure 8-15: Potential GDV (P23a-d and C1+P23) of the Percival Palaeovalley and Baseline Deeper Fracture Rock Aquifer Groundwater Depths

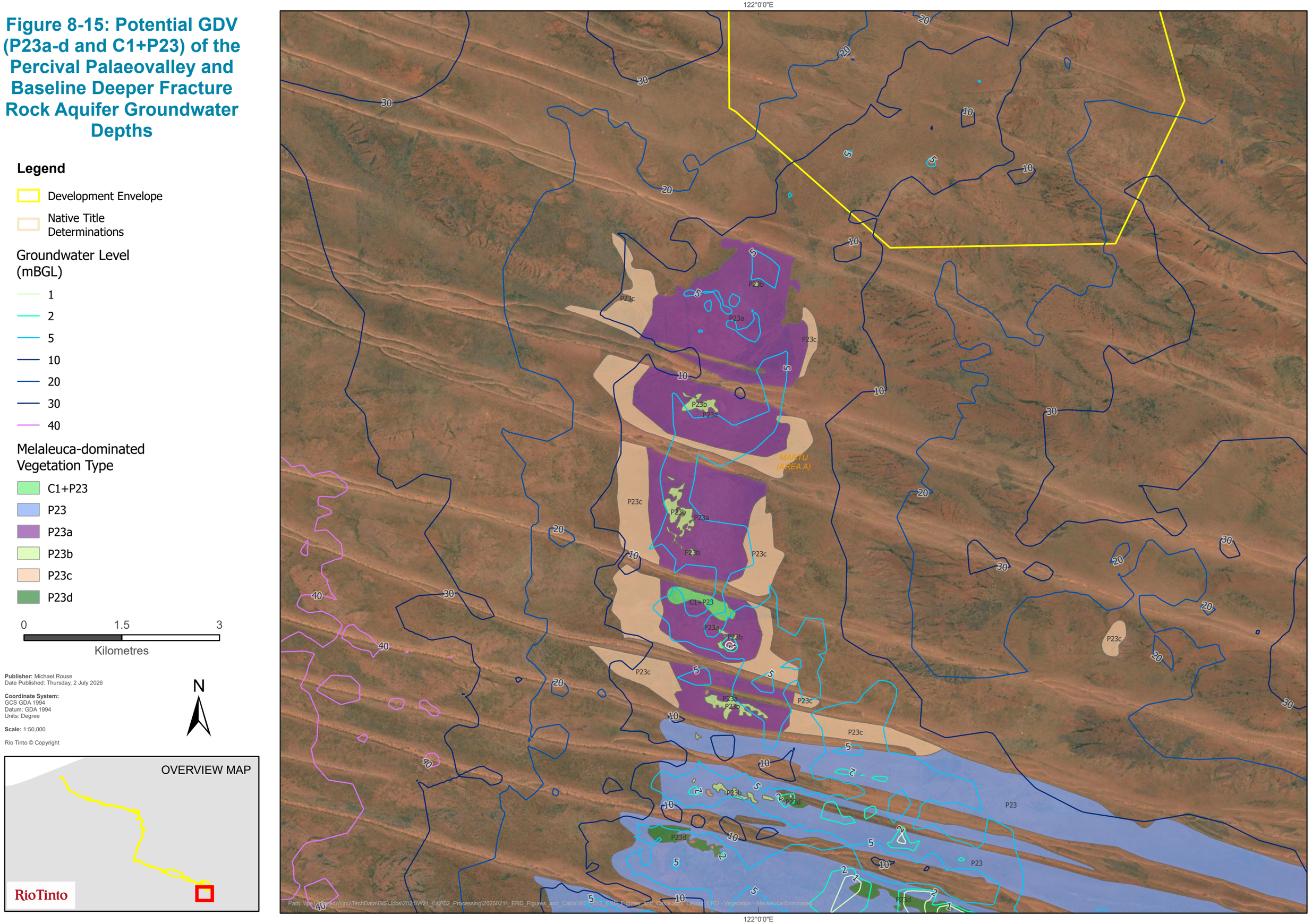

Figure 8-16: Potential GDV (P23a-d and C1+P23) of the Percival Palaeovalley and Rimfire Borefield Modelled Maximum Drawdown

Legend

- Development Envelope
- Native Title Determinations

Melaleuca-dominated Vegetation Type

- C1+P23
- P23
- P23a
- P23b
- P23c
- P23d

Maximum Drawdown Contours

Contours (m)

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 30

0 2 4

Kilometres

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OVERVIEW MAP

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122°0'0"E

20°50'0"S

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

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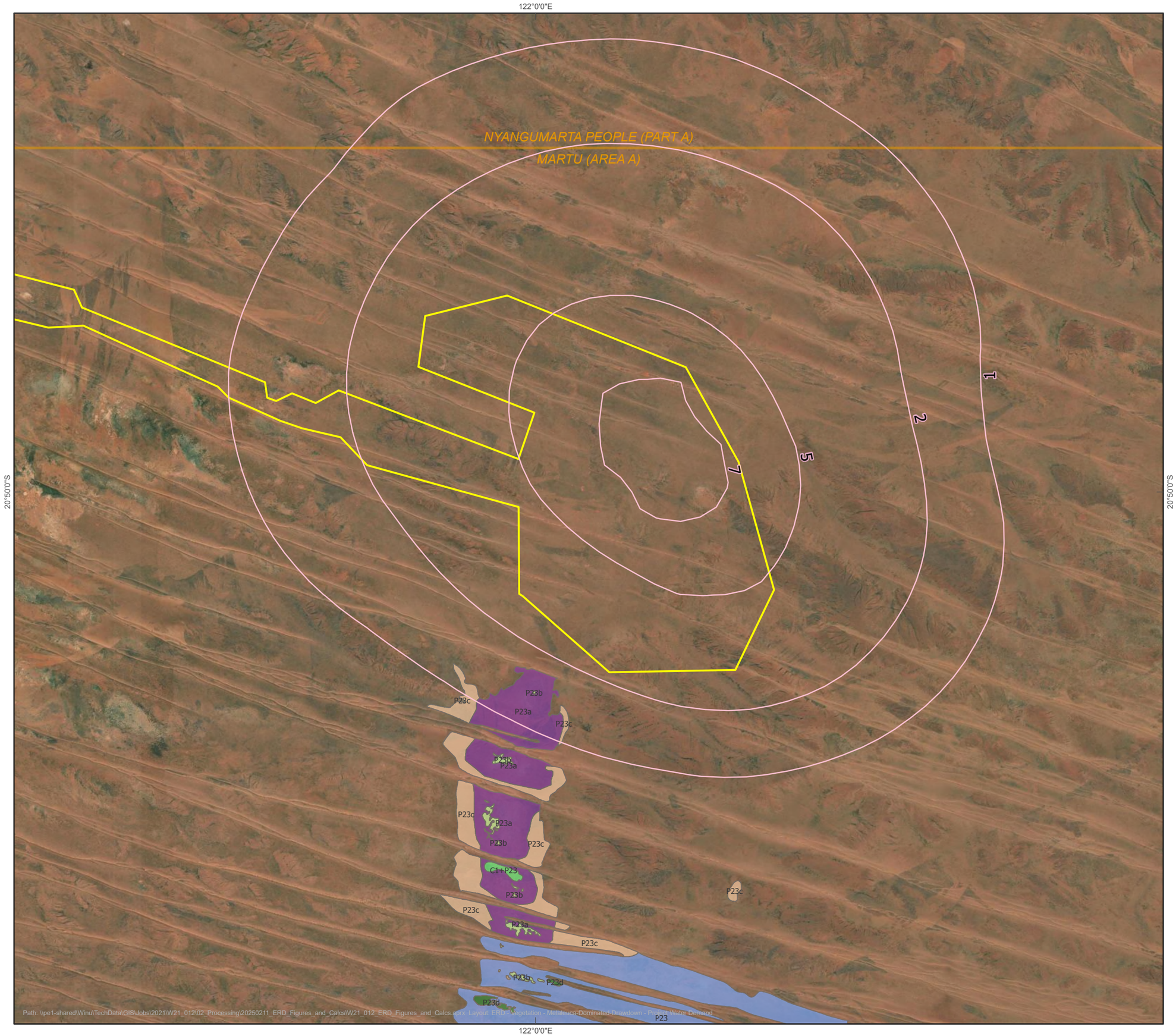
Figure 8-17: Potential GDV (P23a-d and C1+P23) of the Percival Palaeovalley and Rimfire Borefield Modelled P90 Drawdown



Legend

- Development Envelope
- Native Title Determinations
- Rimfire P90 Drawdown (m)

Melaleuca-dominated Vegetation Type

- C1+P23
- P23
- P23a
- P23b
- P23c
- P23d

0 2 4

Kilometres

N

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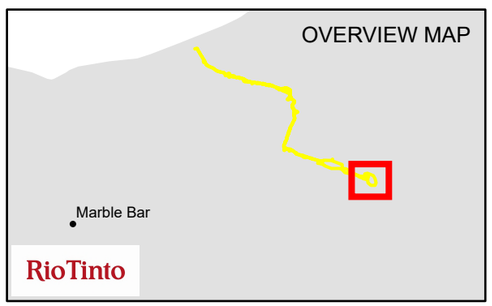

8.4.2.2 Degradation of Vegetation as a Result of Altered Hydrological Regimes

The Greater Sandy Desert region experiences little to no surface water runoff with no clearly defined surface water courses intersecting the Proposal due to the dominance of dunal landforms and aeolian sand cover (Section 7). As such, no significant surface water features, or known surface/sheet flow dependent vegetation, occur in or within 20 km of the Development Envelope (Section 2.3.4; Section 7) (Golder 2020b). Regardless, infrastructure can potentially cause alterations in the existing hydrological environment. The region experiences climate extremes where severe droughts can be followed by significant flooding, particularly during cyclonic events, as such its vegetation and flora are expected to be well adapted to any inundation exacerbated by the placement of infrastructure, with any such eventuality expected to be temporary and of short duration, in keeping with the existing environment (Section 7). The implementation of appropriate surface water management strategies (Section 8.5 and Section 7) to retain, divert or assist water flows as appropriate are expected to mitigate any risk of impact to flora and vegetation within and surrounding the Development Envelope.

Management of excess dewatering water into infiltration ponds and MAR bores will be undertaken (Section 7). This has potential to lead to localised groundwater mounding and surface water expression in areas around the ponds and MAR borefield, which may lead to indirect impacts including:

- Changes in vegetation structure including increased weed abundance and establishment of opportunistic species
- Decline in existing plant health due to waterlogging and/or salinity from the construction and operation of the infiltration ponds.

Surplus water discharge to the infiltration ponds and MAR bores is expected to peak in Year 9 when pit dewatering requirements will be at their greatest, reducing to zero by Year 20 when operational water demand is modelled to exceed dewatering rates (Section 7) (Worley 2025e). Field investigations and predictive groundwater flow modelling was used to estimate effects on groundwater around the proposed infiltration ponds and MAR bores. This indicated that mounding of the watertable is expected to occur around the ponds due to seepage (Worley 2025d). The MAR borefield itself is not expected to lead to mounding in the surficial sands. While the infiltration ponds and bores will be located to provide distance from and reduce circulation back into the mine pit, the modelling indicates some influence from mine pit dewatering.

An assessment was undertaken on the potential impact of the groundwater mounding on vegetation, based on groundwater modelling (Biota 2025a; Worley 2025d). Based on the modelling: Two groundwater mounds will develop around the ponds within the surficial sands, but most of the water volume is predicted to seep down to the sandstone aquifer (Figure 8-18).

Mounding in the surficial sands will be relatively localised and cover a smaller footprint (approximately 102 ha) at the peak period of surplus water management in Year 9 (Biota 2025a). This has been calculated on the 10 m depth to groundwater contour (Figure 8-18).Mounding of the deeper sandstone aquifer will occur over a larger footprint (approximately 344 ha) at the peak period of surplus water management in Year 9, with some of the infiltrated water reporting back to the mine pit. This has been calculated on the 30 m depth to groundwater contour (Figure 8-18).

From peak infiltration in Year 9 the surplus volume will gradually reduce which will also result in a smaller infiltration mound footprint over time.

Across all vegetation types within the groundwater mounding study area, shrub species were the most abundant (ranging from 29-50% of the total species composition), followed by grass-like forms such as spinifex (*Triodia*) hummocks (19-24% composition), trees (2-4% composition) and tall shrubs (6-12% composition) represented a relatively small proportion of the total species composition for all vegetation types (Biota 2025a).

The total predicted extent of groundwater mounding resulting from infiltration is approximately 532.2 ha, representing a range of watertable depths (Figure 8-16) including:

- <1 mbgl: 14.6 ha
- 1-2 mbgl: 10.9 ha
- 2-5 mbgl: 32.0 ha
- 5-10 mbgl: 101.9 ha.

Table 8-15 describes the area of predicted groundwater mounding according to a range of depths from surface, in relation to relevant vegetation types and two conservation significant species that occur within the groundwater mounding impact assessment study area (Biota 2025a).

Groundwater mounding within the 0-10 m contour has the potential to affect vegetation types D2, P1 and P2, covering an overall area of 124.8 ha. Of this:

- 3.1 ha (2.5% of the 124.8 ha area) falls within groundwater contours of less than 1 mbgl
- A further 8.4 ha (6.7%) falls within the 2 mbgl contour
- Vegetation within contours that are less than 5 mbgl represents a total area of 40.1 ha (32.1%), which is made up of 13.9 ha of P1 vegetation and 26.2 ha of P2 vegetation.

The area of indirect impact within groundwater mounding contours less than 5 mbgl represents 0.1% of the mapped extent (6,823 ha) of the P1 vegetation type and 0.4% of the mapped extent (1,978 ha) of P2 vegetation.

The P2 and P1 vegetation types have the largest areas located within the 10 mbgl contour, at 79.1 ha (63.4%) and 43.9 ha (35.2%), respectively, while 1.8 ha (1.4%) of the D2 vegetation type falls within this contour.

Due to the moderately saline nature of the watertable in the area, any elevation of water levels to the root zone is unlikely to expose vegetation to highly saline water (Biota 2025a).

Two conservation significant flora species, *Goodenia hartiana* (P2) and *Indigofera ammobia* (P3) occur within the groundwater mounding study area (Table 8-15) (Biota 2025a). *Goodenia hartiana* was recorded within mounding contours between 7-10 mbgl and *Indigofera ammobia* was recorded in very low numbers within groundwater contours that were predicted to be deeper than 10 mbgl. Given the growth form of both species (low shrubs), and an expected shallow root system, indirect impacts from groundwater mounding for either species is considered very unlikely, and these species are not discussed further in relation to this potential impact.

N

NYANGUMARTA PEOPLE (PART A)

MARTU (AREA A)

Legend

- Development Envelope
- Native Title Determinations
- Infiltration Ponds
- Conceptual Footprint

Depth to Water Table (m)

- 2
- 4
- 6
- 8
- 10
- 15
- 20
- 30
- 40
- 50

0 500 1,000 Metres

RioTinto

Figure 8-18: Potential Impact on Groundwater Mounding from Infiltration - Peak rate (Year 9)

Rio Tinto Copper (RTC)

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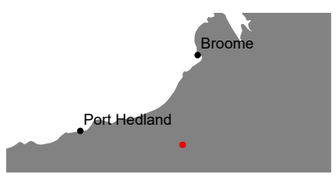

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Table 8-15: Potential Indirect Impacts on Vegetation and Flora Surrounding the Winu Infiltration Ponds

Predicted Groundwater Mounding (mbgl)	Vegetation Types (ha) within Extent of Predicted Groundwater Mounding					Priority Species No. of Locations (No of plants)	
	P1	P2	D1	D2	Total	*Goodenia hartiana* (P2)	*Indigofera ammobia* (P3)
<1	1.2	2.0	0	0	3.2	0	0
1-2	2.9	5.6	0	0	8.5	0	0
2-5	9.8	18.7	0	0	28.5	0	0
5-7	9.9	24.8	0	0	34.7	0	0
7-10^	20.1	28.1	0	1.8	50.0	80 (2,999)	0
10-35*	179.7	112.3	1.1	49.1	342.2	113 (3,237)	2 (3)
Total	**223.7**	**191.5**	**1.1**	**50.9**	**467.1***	**193 (6,236)**	**2 (3)**

*^10 mbgl mounding extent represents the expected rooting depth of vegetation in the relevant area. *35 mbgl contours represent extent of study area. Minor discrepancies in summed totals are due to rounding Source: (Biota 2025a).*

8.4.2.3 Degradation of Vegetation as a Result of the Introduction or Spread of Weed Species

The Development Envelope is largely devoid of weeds, and no species considered Declared Pests as defined by the BAM Act or WoNS have been identified within the Development Envelope (Western Botanical 2026a) (Appendix D01). Four identified weed species are considered environmental weeds in the Pilbara region, and seven are considered environmental weeds in the adjacent Kimberley region (Table 8-8).

Weeds can spread through wind, water, vehicles, machinery and fauna (including native fauna and livestock). Historically, weeds in the Pilbara have been introduced through pastoral activities (EPA 2014). However, weeds can often also rapidly invade locations subject to disturbance, land clearing and/or altered hydrological regimes. Introducing weeds into an area of native vegetation can cause an increase in fuel loads and potentially alter the vegetation's natural fire regimes. Weeds can also increase the competition for resources of native species, resulting in their replacement and the simplification of natural ecosystems.

The Proposal may result in the introduction or spread of weeds through vehicle movements, personnel movements and earthmoving activities.

8.4.2.4 Degradation of Vegetation as a Result of Increased Dust Emissions or Altered Fire Regimes

8.4.2.4.1 Dust

Dust deposition from the Proposal is expected during vegetation clearing and operation activities such as vehicle, heavy haulage, machinery movements, blasting and crushing. Native vegetation in the Development Envelope is expected to be reasonably tolerant to dust deposition (EAQ 2026). Dust modelling conducted for the Proposal concluded dust deposition rates - of 0.16 to 0.26 g/m^2/month at the proposed accommodation village, approximately 10 km west of the central MIA and considered representative of areas outside of operational areas - are below the impact criteria for amenity and nuisance effects (4 g/m^2/30 days [maximum concentration] and 2 g/m^2/30 days [above background levels]) with deposition rates . The modelled deposition rates are also well below conservative vegetation impact criteria applied for a study undertaken for the Rio Tinto West Angelas Iron Ore Mine of 7 g/m^2/month based on a study undertaken by Farmer (1993, cited in [ETA 2021]).

A separate study undertaken in the Pilbara found that dust does not affect plant function and, while plant functional types can show different patterns of leaf dust accumulation, there was no detectable negative impact of dust on plant function itself (Butler 2009). Another Pilbara (Barrow Island) and Murchison (Windarling Range) study found no evidence that dust deposition rates up to 20 or 77 g m^2/month dust accumulation on plants causes negative nor any significant effect between distance from the source of dust and floristic composition over a five-year period (Matsuki et al. 2016).

As such, increased dust deposition as a result of the Proposal is not expected to result in the degradation of vegetation and this impact is not discussed further.

8.4.2.4.2 Altered Fire Regimes

Implementing the Proposal will increase ignition sources (e.g. vehicle movement, clearing and road maintenance), potentially increasing fire risk which may result in widespread loss of native vegetation and flora.

8.4.3 Cumulative Impacts

The Proposal will contribute to the following cumulative impacts at a regional scale:

- Clearing of native vegetation
- Clearing of significant flora species.

For the purposes of assessing potential impacts to Flora and Vegetation, cumulative impacts have been considered based on any existing or reasonably foreseeable projects that occur within the three subregions relevant to the Proposal (Mackay, McLarty and Pindanland).

8.4.3.1 Cumulative Impacts Resulting from Clearing of Native Vegetation

Detailed vegetation mapping at a regional scale is not available. Pre-European vegetation association mapping can be used as a surrogate for assessing the vegetation within the Development Envelope in a regional context where more detailed mapping is unavailable. Where project footprints are not publicly available, the entire development of the project is used, to be conservative.

The potential cumulative loss of pre-European vegetation is shown in Table 8-16.

8.4.3.2 Cumulative Impacts Resulting from Clearing of Significant Flora Species

Six species of significance haven the potential to be cumulatively impacted by the Proposal when including existing/reasonably foreseeable projects with common species within the relevant subregions. Six existing and reasonably foreseeable projects have been considered. Publicly available information has been used to make this assessment. To be conservative, where project footprints were not available, the entire development of the project is used, and where quantitative data on the number of individuals impacted was not available, cumulative impacts have been described based on descriptions on presence or absence.

The Woodie Continued Operations Project and the Goldsworthy Iron Ore Mines Extension Project did not record any impacts to the Priority flora species identified in the Proposal's Development Envelope.

Records of *Goodenia hartiana* (P2) were recorded in the mine site and borefield of the Telfer Goldmine Expansion and Infrastructure Project and along the corridor of the Telfer Power Supply and Infrastructure Corridor Project. The species was also considered Likely to Occur within the AREH Project due to the presence of suitable habitat.

Bonamia oblongifolia (P3) was recorded at the AREH Project with a 0.1-1% cover at 13 locations. Stage 3 of the Pardoo Irrigated Agriculture Project recorded a cumulative loss of 158 individuals of this species.

The AREH Project recorded the following Priority flora species:

- Corynotheca asperata (P3) considered Likely to Occur due to the presence of suitable habitat

- Indigofera ammobia (P3) with a 0.1% cover at seven locations
- 176+ individuals of Tribulopis marliesiae (P3)
- 68 individuals of Terminalia kumpaja (P3).

Table 8-16: Cumulative Impacts on Beard (1975) Vegetation Associations

Vegetation Association	Pre-European Extent (ha)	Current Subregional Extent (ha)	Impact from the Proposal (ha; [% of Current Extent])	Cumulative Impact								
				Australian Renewable Energy Hub*	Gas Pipeline to Nifty Copper Operations	Kintyre Uranium Project	Pardoo Irrigated Agriculture Project – Stage 3	Telfer Project, Power Supply and Infrastructure Corridor	Telfer Project, Expansion of Telfer Gold Mine, Great Sandy Desert	Telfer-Havieron Gold Mining Project	Area (ha)	% of Current Subregional Extent
Great Sandy Desert 134	13,595,888	13,593,951	4,216 [<0.1%]	9,843	443	634	-	889	3,798	26,201	46,024	0.3
Mandora East 80	294,534	294,534	121 [<0.1%]	4,951	-	-	-	-	-	-	5,072	1.7
Mandora East 101	963,087	963,041	70 [<0.1%]	2,813	-	-	-	-	-	-	2,883	0.3
Mandora East 117	496,473	489,195	395 [<0.1%]	8,709	-	-	-	-	-	-	9,104	1.9
Pindan 32	244,347	244,347	76 [<0.1%]	275	-	-	984	-	-	-	1,259	1.0
Total	**15,594,360**	**15,585,068**	**4,878 [<0.1%]**	**26,591**	**443**	**634**	**984**	**889**	**3,798**	**26,201**	**59,540**	**0.4**

^Note some of the projects listed differ from Table 2-5 as that includes only existing and reasonably foreseeable projects within 150 km of the Proposal.

8.5 Mitigation

The Proponent is committed to ensuring that the Proposal avoids or minimises, where practicable, impacts on locally significant vegetation types and Priority flora species present in the Development Envelope.

During Proposal design, the mitigation hierarchy (avoid, minimise and rehabilitate) has been applied to mitigate the potential impacts of the Proposal on Flora and Vegetation as far as practicable. Table 8-17 summarises the application of the mitigation hierarchy.

8.5.1 Avoidance and Minimisation

The Proponent has refined the Development Envelope and Conceptual Footprint to ensure the Proposal prioritises the avoidance of important vegetation where other options were available.

Key outcomes of the Proposal design refinements have been described in Section 2.2. The key avoidance measures relevant to Flora and Vegetation are:

- The reduction of the Development Envelope from 37,744 ha during early project design stages to 23,649 ha, including removal of the Texas Borefield from the Development Envelope
    - This resulted in the avoidance of large populations of *Cynodon anisocarpus* (P1)
- An ore stockpile as originally planned was moved to minimise impacts to *Dasymalla chorisepala* - this relocation has prevented the potential clearing of up to approximately 88% of *D. chorisepala* individuals mapped within the Development Envelope.

Although the recently recorded species of interest *Portulaca* sp. Nyangumarta (B. Eckermann BE Opp 01) includes individuals mapped within the Conceptual Footprint, the Proponent is committed to complete avoidance of the disturbance of all known records of the plant, subject to resolution of its taxonomy. If the species is confirmed as conservation significant, the Conceptual Footprint will be redesigned to ensure avoidance.

8.5.1.1 GDV Monitoring and Management

To mitigate the potential impact of groundwater drawdown from the operation of the Rimfire Borefield on potential GDV (and Stygofauna – Section 10) in the Percival Palaeovalley, the Proponent proposes to implement a groundwater monitoring and management program under the Rimfire Groundwater Operating Strategy, as introduced in Section 7.5.2 and discussed further in Section 10.5.1.1. The program encompasses monitoring of specific bores to gauge the effect of drawdown in the palaeovalley within and outside the Development Envelope and to provide information against defined:

- Early response indicators
- Trigger criteria
- Threshold criteria.

Where any of these are met, measures will be undertaken in cascading levels of intensity and timeliness. In addition to potential changes to borefield operations, for GDV, this will include vegetation monitoring to gauge changes against baseline conditions and to ascertain any correlation with groundwater drawdown trends.

8.5.1.2 Environmental Management Plan

An EMP (Appendix A05) has been developed to manage the potential impacts of the Proposal and ensure environmental outcomes and objectives are met.

The Proponent has prepared Surface Water Management Plans (Appendices C01, C02, C03) to minimise the impacts of altered hydrological regimes, including flood bunds, toe drains, internal bunds and water settling ponds (see Section 7 for more details).

8.5.1.3 Management Areas

Three Management Areas have been delineated to manage any increase in abundance or introduction of pest species (feral/invasive fauna and weeds, including priority weeds within the Kimberley and Pilbara regions) across the Development Envelope attributable to the Proposal (Figure 8-19). The different Management Areas have been chosen based on the management targets and operational controls that can be reasonably expected to be implemented given the size, access, and abundance of existing pest species for each of the Management Areas.

Management Area 1 comprises the section of the RAC within the Wallal Downs pastoral lease which is known to have a presence of weed species which is likely ongoing (Figure 8-19). The Proponent will implement weed monitoring and treatment within Management Area 1.

The Proponent considers that any introduction or increase in abundance of pest species in Management Area 2 (RAC east of Wallal Downs pastoral lease to MIA; Figure 8-19) cannot be wholly attributable to the Proposal, given the extent (approximately 183 km) of non-exclusive access, and potential for translocation of existing weed species from Management Area 1. Therefore, the Proponent will implement management measures to minimise the spread of weeds or the introduction of feral/invasive fauna within Management Area 2. This will include the engagement of the Nyangumarta People and rangers to undertake intermittent weed monitoring within Management Area 2.

Any introduction or increase in abundance of pest species in Management Area 3 (MIA and Rimfire; Figure 8-19) are likely to be attributable to the Proposal, given the Proponent's control of access, intensity of activities and the lack of existing weed species present in the Management Area. Therefore, the Proponent will implement extensive management within Management Area 3 to control any introduction of feral/invasive fauna, prevent the introduction or spread of weed species and ensure a prompt response to all weeds identified within the area. Implementation of feral and weed management activities will be done in consultation with the Traditional Owners to avoid impacts to non-feral species

8.5.2 Mitigation of Risks at Closure

The MCP has been prepared to address closure requirements of the Proposal (Appendix A03). The MCP will be regularly updated (at intervals not exceeding five years) to ensure its objectives remain relevant and aligned to stakeholder expectations and its strategies and plan are appropriate to achieve closure outcomes.

To meet closure outcomes and manage closure risks, the following strategies that relate to the Flora and Vegetation environmental factor will be implemented at the Proposal:

- Rehabilitation of ex-pit WRLs, with design informed by waste characterisation, to ensure long term stability and minimise the risk of erosion
- Implementation of progressive rehabilitation to promote revegetation and habitat development
- Surface water and groundwater modelling to inform operations, closure planning and design and ensure no unacceptable impacts to sensitive receptors
- Rehabilitation monitoring of progressive rehabilitation to inform closure planning, closure outcomes and completion criteria development and refinement
- Ensure significant cultural heritage values are protected and adequate post-mining land access is facilitated
- Design and placement of closure safety bunding to manage risks associated with inadvertent public access post-closure
- Removal of infrastructure to 1m below ground level at closure unless otherwise agreed with relevant stakeholders
- Ongoing closure engagement with internal and external stakeholders to ensure technical and stakeholder input is considered and incorporated, where appropriate, into life of mine and closure planning and decision-making processes
- Contaminated sites assessment and remediation, where required.

Rehabilitation of exploration areas in the Winu area has been underway for several years. The details of the rehabilitation activity are reported to the regulator on an annual basis, in accordance with the Winu Exploration Ground Disturbance and Rehabilitation Work Practice (Rio Tinto 2025d). These areas will continue to be monitored and outcomes used to inform future rehabilitation activity at the Winu Project. In addition, a summary report on the performance on samples of exploration rehabilitation at Winu has been completed (Rio Tinto 2026). The report indicates that minimisation of time between initial disturbance and rehabilitation along with time since rehabilitation are key drivers in the recovery of vegetation.

A rehabilitation monitoring program will be conducted through mine closure planning to evaluate successional development of rehabilitation areas and thereby provide useful feedback for the improvement of rehabilitation techniques, and to help assess progress towards long-term rehabilitation outcomes. Rehabilitation sites and associated reference sites (undisturbed native vegetation representative of the local area) will be used to inform rehabilitation practices and success and will be monitored throughout the mine life. Further detail of the rehabilitation monitoring program and monitoring procedures will be provided in future versions of this MCP.

The results of rehabilitation monitoring will provide vital information to set realistic, achievable, and meaningful completion criteria. This will occur through evaluation of trends and trajectories in key parameters, and by comparison of monitoring results from corresponding reference or analogue sites, positioned within local areas of undisturbed native vegetation. These programs will be designed to evaluate successional development of rehabilitation areas to provide feedback assessment against completion criteria for elements including erosion and soil retention, native flora re-establishment (including soil bacteria and micro-organisms), weed control, and fauna re-introduction (including feral animal control).

The goal for rehabilitation monitoring is the ability to demonstrate that rehabilitated areas are achieving a degree of self-sustainability and resilience to events such as bushfires and drought. The initial rehabilitation monitoring frequency is likely to be bi-annual, with reporting annually. The frequency will be altered to an appropriate cadence as rehabilitation matures.

A Winu Rehabilitation Monitoring Handbook will be developed and incorporated into future updates of this Mine Closure Plan and will include elements such as:

- Monitoring methods – quantitative and qualitative for flora, fauna, and erosion
- Performance against revegetation completion criteria – native species richness, diversity density, plant cover (including appropriate reference sites), weed presence
- Fauna and habitat monitoring – litter cover, habitat structures, food sources, activity indicators (e.g. scats)
- Erosion - gully identification, depth and width, soil loss
- Wind erosion and deposition
- Records of events – climate and fires
- Documentation and assessment of trials.

120°30'0"E
121°0'0"E
121°30'0"E
122°0'0"E
20°0'0"S
20°30'0"S

Great Northern Hwy

Management Area 1

Cattle Grid

WALLAL DOWNS

NYANGUMARTA PEOPLE (PART A)

Management Area 2

Management Area 3

Winu Camp

MARTU (AREA A)

N

0 10 20 Kilometres

Legend

- Management Area 1
- Management Area 2
- Management Area 3
- Development Envelope
- Wallal Downs Pastoral Station
- Native Title Determinations

RioTinto

Figure 8-19: Management Areas within the Development Envelope

Rio Tinto Copper (RTC)

Publisher: Michael.Rouse
Date Published: Thursday, 2 July 2026

Coordinate System:
GCS GDA 1994
Datum: GDA 1994
Units: Degree
Scale: 1:475,811
Rio Tinto © Copyright

Path: \\pe1-shared\Winu\TechData\GIS\Jobs\2021\W21_012\02_Processing\20250211_ERD_Figures_and_Calcs\W21_012_ERD_Figures_and_Calcs.aprx Layout: ERD - Management Areas within DE

Table 8-17: Application of the Mitigation Hierarchy for Flora and Vegetation

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
Direct Impacts				
Clearing of native vegetation and increased fragmentation	**Measure to Avoid**			
	The Development Envelope and Conceptual Footprint have been modified during the design phase to avoid direct impacts to native vegetation where possible and to minimise the size of the footprint where practicable The total extent of clearing will not exceed 4,878 ha within the 23,649 ha Development Envelope	Proposal specific	No	Avoidance is the first and preferred step in the mitigation hierarchy and therefore is consistent with the EPA's Statement of Environmental Principles, Factors, Objectives and Aims of EIA (EPA 2023b)
	Measure to Minimise			
	Clearing of locally significant vegetation types will be restricted through authorised maximum extents, including: • 26.0% of known extent in Vegetation Survey Area of D1 • 20.0% of known extent in Vegetation Survey Area of D2 • 20.0% of known extent in Vegetation Survey Area of D3 • 25.0% of known extent in Vegetation Survey Area of P1 • 20.0% of known extent in Vegetation Survey Area of P2 • 15.0% known extent in Vegetation Survey Area of P3 • 10.0% of known extent in Vegetation Survey Area of P4 • 10.0% of known extent in Vegetation Survey Area of P8 • 1.0% known extent in Vegetation Survey Area of C2 • 15.0% of known extent in Vegetation Survey Area of C4 • 15.0% of known extent in Vegetation Survey Area of R1 • 10.0% of known extent in Vegetation Survey Area of R2	Proposal specific	No	Clearing limits are considered to be an effective mitigation strategy for minimising impacts on native vegetation

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	Known locations of native vegetation will be included in the Proponent's GIS system to ensure impacts are minimised and adhere to authorised extents Where practicable, clearing will be minimised during construction and will be undertaken in areas required for future use			
	Measure to Rehabilitate			
	The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement Topsoil will be recovered and stockpiled before all construction activities to ensure a surplus of growth media available for revegetation of disturbed lands and permanent landforms post-mining Rehabilitation and seed harvesting processes will be undertaken in consultation with the Traditional Owners Rehabilitation will be undertaken progressively, including areas not required for ongoing operations, to minimise disturbed areas, reducing fragmentation	A Proposal specific MCP has been developed	Yes – DMPE for the implementation of the MCP (Appendix A03)	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) Rehabilitation will be required to provide a vegetated and stable landform. However, the uncertainty in relation to the re-creation of flora values following mining is acknowledged. Therefore, clearing is treated as a long-term or permanent impact for this assessment
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	Upper clearing limit for native vegetation Upper clearing limit for locally significant vegetation		Clearing limits to be included as Ministerial Condition	
	Measure to Minimise			

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
Clearing of significant flora individuals	Vehicle traffic will be confined to defined roads and tracks Clearing of Priority flora individuals will be restricted through authorised maximum extents, including: • 5.0% of known records within Flora Survey Area of *Cynodon anisocarpus* (P1) • 20.0% of known records within Flora Survey Area of *Goodenia hartiana* (P2) • 0.2% of known records within Flora Survey Area of *Bonamia oblongifolia* (P2) • 5.0% of known records within Flora Survey Area of *Comesperma sabulosum* (P3) • 10.0% of known records within Flora Survey Area of *Corynotheca asperata* (P3) • 10.0% of known records within Flora Survey Area of *Dasymalla chorisepala* (P3) • 10.0% of known records within Flora Survey Area of *Indigofera ammobia* (P3) • 15.0% of known records within Flora Survey Area of *Synostemon arenosus* (P3) • 28.0% of known records within Flora Survey Area of *Terminalia kumpaja* (P3) • 30.0% of known records within Flora Survey Area of *Tribulopis marliesiae* (P3) • 30.0% of known records within the Flora Survey Area of *Amphipogon caricinus* (hairy lamina) (J. Paterson WB41138) (species of taxonomic interest) • 0% of currently known records of *Portulaca* sp. Nyangumarta (B. Eckermann BE Opp 01) (species of taxonomic interest)	Proposal specific	No	Clearing limits are considered to be an effective mitigation strategy for minimising impacts on conservation significant flora

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	Measure to Rehabilitate			
	The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement Topsoil will be recovered and stockpiled before all construction activities to ensure a surplus of growth media available for revegetation of disturbed lands and permanent landforms post-mining Rehabilitation will be undertaken progressively to minimise disturbed areas, reducing fragmentation	A Proposal specific MCP has been developed	Yes – DMPE for the implementation of the MCP (Appendix A03)	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) Rehabilitation will be required to provide a vegetated and stable landform. However, the uncertainty in relation to the re-creation of flora values following mining is acknowledged. Therefore, clearing is treated as a long-term or permanent impact for this assessment
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	Upper clearing limits for 10 Priority flora species		Clearing limits to be included as Ministerial Conditions	
Indirect Impacts				
Degradation or Alteration of GDV as a Result of Groundwater Drawdown	**Measures to Avoid**			
	The Development Envelope and Conceptual Footprint have been modified during the design phase avoid direct impacts to native vegetation where possible and to minimise the size of the footprint where practicable	Standard practice	No	Project optimisation through reducing Proposal extents is the most effective control to ensure impacts are as low as reasonably practicable

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	Measures to Minimise			
	Develop targeted groundwater monitoring points within both the Percival Palaeovalley system and deeper fractured rock aquifer system to assess and monitor differences in water levels Carry out regular groundwater level monitoring and contingency responses against: • Early response indicators • Trigger criteria • Threshold criteria Develop targeted vegetation health monitoring of potential GDV areas within zone of influence of groundwater drawdown to assess vegetation stress. An assessment of baseline conditions to inform monitoring will commence at least 2 years prior to the commencement of Rimfire Borefield abstraction Proposed abstraction volumes to be within the sustainable yield of Rimfire Borefield's groundwater resources	Proposal specific	Yes – DWER – Groundwater Abstraction Licence (5C)	Ongoing groundwater level and vegetation stress monitoring is used to verify models and adjust dewatering programs as required Development of a Rimfire Groundwater Operating Strategy, including triggers (Appendix C19) Abstraction from the Proposal's groundwater resources and associated limits will be subject to assessment from DWER
	Measures to Rehabilitate			
	The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement All disturbed areas that are no longer required will be stabilised and, if appropriate, rehabilitated Groundwater level recovery timeframes have been modelled and discussed in Section 7	Standard practice	Yes – DMPE for the implementation of the MCP (Appendix A03)	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c) The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b) Groundwater recovery trends have already been recorded where other dewatering programs

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
				have concluded across projects operated by the Proponent
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	Abstraction of no more than 2.8 GL/a from Rimfire		Addressed in the Rimfire Groundwater Operating Strategy (Appendix C19)	
Degradation of vegetation as a result of altered hydrological regimes	**Measure to Avoid**			
	The Development Envelope and Conceptual Footprint have been modified during the design phase to avoid direct impacts to native vegetation where possible and to minimise the size of the footprint where practicable	Standard practice	No	Project optimisation through reducing Proposal extents is the most effective control to ensure impacts are as low as reasonably practicable.
	Measure to Minimise			
	The Proponent will take measures to ensure runoff is retained or diverted by flood protection bunds or floodway to minimise effects on natural flow regimes Surplus clean water from operations will be directed into a CWD. Where surplus water cannot be managed in the CWD, MAR (preferentially) and infiltration ponds will be used Develop targeted vegetation health monitoring around the infiltration ponds and MAR borefield to assess vegetation stress within the modelled 10 mbgl mounding contour	Design and surface water management - Standard practice Infiltrations ponds and MAR – Proposal specific	Yes – DWER – Licence to Construct or Alter a Well (26D)	Impact minimised by use of CWD and MAR reducing the extent of mounding and seepage associated with infiltration ponds
	Measure to Rehabilitate			
	The Proponent will prepare and regularly update, at intervals not exceeding five years, an MCP (Appendix A03) consistent with DMPE guidance (DMPE 2025b; DEMIRS 2025) and in accordance with the requirements of the Mining Act Approvals Statement All disturbed areas that are no longer required will be stabilised and, if appropriate, rehabilitated	Standard practice	Yes – DMPE for the implementation of the MCP (Appendix A03)	Guidelines for preparing MCPs and MDCPs are available and are consistent with industry-leading practice (DMPE 2025b; DEMIRS 2025; DMPE 2025c)

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
				The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMPE 2025b)
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	Two infiltration ponds and MAR borefield to manage excess water		Ministerial condition requiring monitoring of groundwater levels and vegetation changes in the area of the infiltration ponds and MAR	
Degradation of vegetation condition due to increased abundance and diversity of weeds	**Measure to Minimise**			

	Minimise the spread of weeds in Management Area 1 by implementing the following:
	• Undertake weed monitoring within Management Area 1
	Minimise the entry and spread of weeds in Management Area 2 by implementing the following:
	• Engage with the Nyangumarta People and Rangers to undertake intermittent weed monitoring within Management Area 2.
	• Active guidance from and participation of the Nyangumarta Traditional Owner group representatives, including the installation of a washdown facility at the intersection of Management Area 2 and the Wallal Downs Pastoral Lease, which will include:
	  ○ Vehicle inspection and washdown at the entry to Management Area 2
	  ○ Equipment inspection and washdown at the entry to Management Area 2
	• The washdown facility will be co-managed with the Nyangumarta People
	• Treatment of identified weeds whether by application of appropriate herbicide and/or manual extraction from the ground
		Standard practice	No	These measures have been developed to meet the current industry standards

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	Prevent the introduction and spread of weeds in Management Area 3 by implementing the following: • Undertake weed inspections on all vehicles and equipment entering Management Area 3 • Vehicle washdown before entry to Management Area 3 (will occur at the entry to Management Area 2) • Equipment washdown before entry to Management Area 3 (will occur at the entry to Management Area 2) • Include weed checks in routine work area inspections • Undertake targeted weed monitoring within Management Area 3, including around the infiltration ponds, in consultation with the Traditional Owners • Personnel to report any weed sightings • Weed hygiene measures for incoming personnel • Weed management measures in personnel inductions • Treatment of identified weeds either by application of appropriate herbicide and/or manual extraction from the ground			
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	Within Management Areas 1 and 2 - No limits proposed– managed through standard industry practises and included as a specific aspect to manage within the EMP Within Management Area 3 – No decline in mapped vegetation condition due to the presence of weeds		Within Management Areas 1 and 2 - N/A Within Management Area 3 – Limit on decline in vegetation condition to be included as Ministerial Condition	
Degradation of vegetation as a result of increased dust emissions or altered fire regimes	**Measure to Minimise**			
	The RAC will be sealed to minimise dust emissions Fixed plant dust suppression will be included in the design Appropriate dust controls (including but not limited to water carts, non-toxic stabilisers, speed limits, and progressive rehabilitation) to be implemented throughout construction and operations as required	Standard practice	No	These measures have been developed to meet the current industry standards

Potential Impact	Mitigation	Standard Business Practice or Proposal Specific	Are Other Decision-making Processes Relevant?	Effectiveness of Nominated Control
	Vehicles will be required to travel at designated operating speeds on all roads and will be restricted from accessing rehabilitated surfaces except for management purposes Develop and implement a Fire Management Plan			
	Proposed Limits on Impact to Ensure Environmental Outcomes		**Mechanism for Limit**	
	No limits proposed – managed through industry standard practice		N/A	

8.6 Assessment of Significance of Residual Impacts

8.6.1 Assessment of Direct Impacts

8.6.1.1 Clearing of Native Vegetation

The Proposal will clear up to 4,878 ha of native vegetation across 28 vegetation types, all of which is in Excellent condition (Table 8-9).

Clearing for the Proposal includes the removal of a maximum of 4,878 ha of locally significant vegetation across 12 vegetation types (D1, D2, D3, P1, P2, P3, P4, P8, C2, C4, R1 and R2). An assessment of residual direct impacts on locally significant vegetation is provided in Table 8-18. Allowing for flexibility, with the proposed application of upper limits of clearing of <26% of the mapped extent within the Vegetation Survey Area of eight vegetation types, and upper limits of 10% or less for five of the vegetation types due to their smaller representation within the Survey Area, the proposed clearing is not expected to result in a significant impact to any locally significant vegetation type.

All other vegetation types are not considered locally significant and are well represented in the surrounding area.

An assessment of direct impacts to culturally significant vegetation types is provided in the Social Surroundings chapter (Section 6).

8.6.1.2 Increased Fragmentation of Native Vegetation as a Result of Clearing

Clearing for the Proposal may result in fragmentation of native vegetation, although this is not expected to significantly impact any vegetation types or significant flora species. Clearing associated with the RAC involves expansion and upgrade of an existing access track. As such, clearing of vegetation within the RAC is not expected to result in additional fragmented patches of vegetation.

Vegetation may be fragmented at a local scale as a result of clearing for the MIA. However, the Conceptual Footprint has been designed to maintain connectivity between vegetation within the Development and the wider region. As such, the Proposal is not expected to result in genetic isolation or reduced floral reproduction.

Furthermore, clearing for the Proposal is not expected to result in significant fragmentation of patches of vegetation types within the Development Envelope as all vegetation types are likely to be found more widely distributed and occupying significantly greater area in numerous patches outside of the Development Envelope, within the subregions of the Great Sandy Desert.

Table 8-18: Assessment of Direct Impacts on Locally Significant Vegetation within the Development Envelope

Vegetation Type	Extent within Vegetation Survey Area (ha)	Extent within Development Envelope (ha)	Upper Clearing Limit (ha) [% of Extent in Vegetation Survey Area]*	Assessment of Impacts
D1	3,000	1,951	26.0	The Proposal will result in the clearing of approximately 709 ha of the mapped extent of this vegetation type within the Development Envelope (36.3%). To allow for flexibility, an upper clearing limit of 26.0% of the mapped extent within the Vegetation Survey Area will be implemented to ensure that this vegetation type remains represented the surrounding region. As such, the proposed clearing is not expected to result in significant impacts to this vegetation type
D2	3,450	1,099	20.0	The Proposal will result in the clearing of approximately 68 ha of the mapped extent of this vegetation type within the Development Envelope (6.2%). To allow for flexibility, an upper clearing limit of 20.0% of the mapped extent within the Vegetation Survey Area will be implemented to ensure this vegetation type remains represented within the surrounding region. As such, the proposed clearing is not expected to result in significant impacts to this vegetation type
D3	261	81	20.0	The Proposal will result in the clearing of approximately 21 ha of the mapped extent of this vegetation type within the Development Envelope (26.5%). To allow for flexibility, an upper clearing limit of 20.0% of the mapped extent within the Vegetation Survey Area will be implemented to ensure this vegetation type remains represented within the surrounding region. As such, the proposed clearing is not expected to result in significant impacts to this vegetation type
P1	10,725	6,823	25.0	The Proposal will result in the clearing of 1,942 ha of the mapped extent of this vegetation type within the Development Envelope (28.5%). To allow for flexibility, an upper clearing limit of 25.0% of the mapped extent within the Vegetation Survey Area will be implemented to ensure this vegetation type remains represented within the surrounding region. As such the proposed clearing is not expected to result in significant impacts to this vegetation type
P2	6,045	1,978	20.0	The Proposal will result in the clearing of approximately 608 ha of the mapped extent of this vegetation type within the Development Envelope (30.7%). To allow for flexibility, an upper clearing limit of 20.0% of the mapped extent within the Vegetation Survey Area will be implemented to ensure this vegetation type remains represented within the surrounding region. As such, the proposed clearing is not expected to result in significant impacts to this vegetation type

Vegetation Type	Extent within Vegetation Survey Area (ha)	Extent within Development Envelope (ha)	Upper Clearing Limit (ha) [% of Extent in Vegetation Survey Area]*	Assessment of Impacts
P3	3,114	1,353	15.0	The Proposal will result in the clearing of approximately 235 ha of the mapped extent of this vegetation type within the Development Envelope (17.4%). To allow for flexibility, an upper clearing limit of 15.0% of the mapped extent within the Vegetation Survey Area will be implemented to ensure this vegetation type remains represented within the surrounding region. As such, the proposed clearing is not expected to result in significant impacts to this vegetation type
P4	3,325	722	10.0	The Proposal will result in the clearing of approximately 69 ha of the mapped extent of this vegetation type within the Development Envelope (9.6%). To allow for flexibility, an upper clearing limit of 10.0% of the mapped extent within the Vegetation Survey Area will be implemented to ensure this vegetation type remains represented within the surrounding region. As such, the proposed clearing is not expected to result in significant impacts to this vegetation type
P8	5,143	919	10.0	The Proposal will result in the clearing of approximately 139 ha of the mapped extent of this vegetation type within the Development Envelope (15.1%). To allow for flexibility, an upper clearing limit of 10.0% of the mapped extent within the Vegetation Survey Area will be implemented to ensure this vegetation type remains represented within the surrounding region. As such, the proposed clearing is not expected to result in significant impacts to this vegetation type
C2	1,449	15	1.0	The Proposal will result in the clearing of less than 1 ha of the mapped extent of this vegetation type within the Development Envelope (0.6%). To allow for flexibility, an upper clearing limit of 1.0% of the mapped extent within the Vegetation Survey Area will be implemented to ensure this vegetation type remains represented within the surrounding region. As such, the proposed clearing is not expected to result in significant impacts to this vegetation type
C4	379	146	15.0	The Proposal will result in the clearing of approximately 41 ha of the mapped extent of this vegetation type within the Development Envelope (28.1%). To allow for flexibility, an upper clearing limit of 15.0% of the mapped extent within the Vegetation Survey Area will be implemented to ensure this vegetation type remains represented within the surrounding region. As such, the proposed clearing is not expected to result in significant impacts to this vegetation type
R1	642	234	15.0	The Proposal will result in the clearing of approximately 60 ha of the mapped extent of this vegetation type within the Development Envelope (25.6%). To allow for flexibility, an upper clearing limit of 15.0% of the mapped extent within the Vegetation

Vegetation Type	Extent within Vegetation Survey Area (ha)	Extent within Development Envelope (ha)	Upper Clearing Limit (ha) [% of Extent in Vegetation Survey Area]*	Assessment of Impacts
				Survey Area will be implemented to ensure this vegetation type remains represented within the surrounding region. As such, the proposed clearing is not expected to result in significant impacts to this vegetation type
R2	1,871	1,395	10.0	The Proposal will result in the clearing of approximately 36 ha of the mapped extent of this vegetation type within the Development Envelope (2.6%). To allow for flexibility, an upper clearing limit of 10.0% of the mapped extent within the Vegetation Survey Area will be implemented to ensure this vegetation type remains represented within the surrounding region. As such, the proposed clearing is not expected to result in significant impacts to this vegetation type

**Total clearing will not exceed 4,878 ha*

8.6.1.3 Clearing of Significant Flora Individuals

The Proponent has taken measures to avoid and minimise all impacts to Priority flora as far as practicable. No Threatened species have been recorded within the Development Envelope.

Clearing will result in the direct loss of individuals from one Priority 1, one Priority 2 and seven Priority 3 flora taxa (Table 8-13). However, implementing the Proposal is not expected to significantly impact any Priority flora species or cause any Priority flora to become threatened. Species-specific impacts are described below. All species have additional populations records outside the Survey Area, based on the State Threatened and Priority Flora database (Table 8-13), as such the overall level of disturbance on each species will be lower than indicated below.

8.6.1.3.1 *Cynodon anisocarpus* (P1)

A total of 63,587 known individuals occur within the Development Envelope. An additional 367,973records occur within the Flora Survey Area outside the Development Envelope. The Proposal may impact approximately 18,268 (28.7%) individuals within the Development Envelope. To allow for flexibility, the Proponent will implement an upper limit of clearing of 5.0% of records within the Flora Survey Area (Table 8-13). In addition, 142 records, each of which may include multiple individuals, of this species are known from the State database, and are not included in this proposed limit calculation (i.e. the overall percentage impact is expected be lower than shown).

Given the extent of this impact and representation of the species regionally, the Proponent does not anticipate that the Proposal will affect the conservation status or the viability of this species. Therefore, the Proposal is not expected to significantly impact this species.

8.6.1.3.2 *Goodenia hartiana* (P2)

A total of 552,280 known individuals occur within the Development Envelope. An additional 335,702 records occur within the Flora Survey Area outside of the Development Envelope. The Proposal may impact approximately 194,741 individuals (35.3%) individuals within the Development Envelope (Table 8-13). To allow for flexibility, the Proponent will implement an upper clearing limit of 20.0% of records within the Flora Survey Area (Table 8-13). In addition, 64,153 records, each of which may include multiple individuals, of this species are known from the State database, and are not included in this proposed limit calculation (i.e. the overall percentage impact is expected to be lower than shown).

Considering the extensive number of individuals recorded within the Flora Survey Area and the limited targeted survey effort within the surrounding area, it is considered that the species likely occurs across the Great Sandy Desert in greater abundances and is a common but under-surveyed species (Western Botanical 2026a).

Given the extent of this impact and representation of the species regionally, the Proponent does not anticipate that the Proposal will affect the conservation status or the viability of this species; it is expected that additional regional survey work has the potential to reduce the conservation significance of this species (Western Botanical 2026a). Therefore, the Proposal is not expected to significantly impact this species.

8.6.1.3.3 Priority 3 Species

The Development Envelope contains nine Priority 3 flora species, of which seven occur within the Conceptual Footprint (Table 8-13). The significance of impacts to the species within the Development Envelope are described in Table 8-19 below.

8.6.1.3.4 Species of Taxonomic Interest

There have been 111,003 individual *Amphipogon caricinus* (hairy lamina) (J. Paterson WB41138) identified within the Development Envelope, with another 33 individuals occurring within the Flora Survey Area outside of the Development Envelope (Table 8-13). There are 42,369 plants of this species

within the Conceptual Footprint. However, the Proponent is committed to minimising the disturbance of known records of the plant, subject to resolution of its taxonomy, by reducing potential disturbance levels, allowing for project flexibility, to a limit of up to 30% of its known records within the Flora Survey Area. If the species is confirmed as conservation significant, the Conceptual Footprint will be redesigned to ensure this reduced impact.

Forty three individuals of *Portulaca* sp. Nyangumarta (B. Eckermann BE Opp 01) have been recorded within the Conceptual Footprint, 34 individuals within the Development Envelope outside the Conceptual Footprint and an additional 59 individuals of the species occurred outside of the Development Envelope, within the Flora Survey Area. Although individuals of *Portulaca* sp. Nyangumarta (B. Eckermann BE Opp 01) occur within the Conceptual Footprint, the Proponent is committed to complete avoidance of the disturbance of all currently known records of the plant, subject to resolution of its taxonomy. If the species is confirmed as conservation significant, the Conceptual Footprint will be redesigned to ensure avoidance.

Table 8-19: Impacts on Priority 3 Flora Species and Species of Taxonomic Interest within the Development Envelope

Flora Species	Assessment of Residual Impact
Priority 3	
Bonamia oblongifolia	A total of three individuals occur within the Development Envelope. An additional 1,263 records occur within the Flora Survey Area, outside of the Development Envelope. The Proposal is expected to result in the clearing of no individuals. However, to allow for flexibility, the Proponent will implement an upper clearing limit of 0.2% of known individuals within the Flora Survey Area, comprising all three known individuals within the Development Envelope New populations have been identified on Mandora Station (Biota 2021 as cited in Western Botanical 2026a), in addition to populations recorded at Wallal Downs Station, Pardoo Station and Anna Plains Station, which are estimated to total 1,200,000 plants (EnviroWorks 2017 as cited in Western Botanical 2026a). As such, the species is not considered to be regionally restricted Given the extent of proposed impact and representation of the species regionally, the Proponent does not anticipate that the Proposal will affect the conservation status or the viability of this species. Therefore, the Proposal is not expected to significantly impact this species
Comesperma sabulosum	A total of 51 individuals occur within the Development Envelope. An additional 220 records occur within the Flora Survey Area, outside of the Development Envelope. The Proposal will result in the clearing of four individuals, representing 7.8% of the individuals recorded within the Development Envelope. To allow for flexibility, the Proponent will implement an upper clearing limit of 5.0% of known individuals within the Flora Survey Area This species is associated with sand dune slopes distributed from Newman, Western Australia to Tanami, Northern Territory, extending across the Great Sandy Desert and Little Sandy Desert (Western Botanical 2026a) Given the extent of this impact and representation of the species regionally, the Proponent does not anticipate that the Proposal will affect the conservation status or the viability of this species. Therefore, the Proposal is not expected to significantly impact this species
Corynotheca asperata	A total of 2,554 individuals occur within the Development Envelope. An additional 5,962 records occur within the Flora Survey Area, outside of the Development Envelope. The Proposal will result in the clearing of approximately 794 individuals, representing 31.1% of the individuals recorded within the Development Envelope. To allow for flexibility, the Proponent will implement an upper clearing limit of 10.0% of known individuals within the Flora Survey Area Given the extent of this impact, the Proponent does not anticipate that the Proposal will affect the conservation status or the viability of this species. Therefore, the Proposal is not expected to significantly impact this species
Dasymalla chorisepala	A total of 118 individuals occur within the Development Envelope. An additional 259 records occur within the Flora Survey Area, outside of the Development Envelope. The Proposal will result in the clearing of 8 individuals, representing 6.8% of the individuals recorded within the Development Envelope. To allow for flexibility, the Proponent will implement an upper clearing limit of 10.0% of known individuals within the Flora Survey Area Given the extent of this impact, the Proponent does not anticipate that the Proposal will affect the conservation status or the viability of this species. Therefore, the Proposal is not expected to significantly impact this species
Indigofera ammobia	A total of 18,658 individuals occur within the Development Envelope. An additional 19,217 records occur within the Flora Survey Area, outside of the Development Envelope. The Proposal will result in the clearing of approximately 2,755 individuals, representing 14.8% of the individuals recorded within the

Flora Species	Assessment of Residual Impact
	Development Envelope. To allow for flexibility, the Proponent will implement an upper clearing limit of 10.0% of known individuals within the Flora Survey Area Given the extent of this impact and representation of the species regionally, the Proponent does not anticipate that the Proposal will affect the conservation status or the viability of this species. Therefore, the Proposal is not expected to significantly impact this species
Synostemon arenosus	A total of 2,467 individuals occur within the Development Envelope. An additional 2,508 records occur within the Flora Survey Area, outside of the Development Envelope. The Proposal will result in the clearing of approximately 519 individuals, representing 21.0% of the individuals recorded within the Development Envelope. To allow for flexibility, the Proponent will implement an upper clearing limit of 15.0% of known individuals within the Flora Survey Area Given the extent of this impact, the Proponent does not anticipate that the Proposal will affect the conservation status or the viability of this species. Therefore, the Proposal is not expected to significantly impact this species
Terminalia kumpaja	A total of 110 individuals occur within the Development Envelope. An additional 113 records occur within the Flora Survey Area, outside the Development Envelope. The Proposal will result in the clearing of up to 56 individuals of this species which occur within the Development Envelope. To allow for flexibility, the Proponent will implement an upper clearing limit upper of 28.0% of the known individuals within the Flora Survey Area The species has been recorded over a range of 280 km from Wallal Downs Station to north of Broome. New populations (66 individuals and 14 locations) have also been recorded along the Cape Leveque Road (Biota 2018 as cited in Western Botanical 2026a) The Proposal is not expected to significantly impact this species
Tribulopis marliesiae	A total of 787 individuals occur within the Development Envelope. An additional 870 records occur within the Flora Survey Area, outside of the Development Envelope. The Proposal will result in the clearing of approximately 480 individuals, representing 61.0% of the individuals recorded within the Development Envelope. To allow for flexibility, the Proponent will implement an upper clearing limit of 30.0% of known individuals within the Flora Survey Area This species is cryptic and only detectable during its flowering period. It is therefore likely that subsequent targeted survey work would yield greater abundances of this species (Western Botanical 2026a) Given the extent of this impact, the Proponent does not anticipate that the Proposal will affect the conservation status or the viability of this species. Therefore, the Proposal is not expected to significantly impact this species
Species of Taxonomic Interest	
Amphipogon caricinus (hairy lamina) (J. Paterson WB41138)	111,003 individuals occur within the Development Envelope. An additional 33 records occur within the Flora Survey Area, outside of the Development Envelope. Although 42,369 individuals occur in the Conceptual Footprint, the Proponent is committed to limiting clearing to 30% of the known records within the Flora Survey Area, pending resolution of its taxonomic status Though initially thought to be a variant of *Amphipogon sericeus,* ongoing taxonomic work has found the species is more likely to be a regional variant of *Amphipogon caricinus* (Western Botanical 2026b). Taxonomy is currently inconclusive, and is not expected to be completed during the timeframe of this assessment, and will therefore not be formally named. These records will be used to further future taxonomic work on the species

Flora Species	Assessment of Residual Impact
Portulaca sp. Nyangumarta (B. Eckermann BE Opp 01)	A total of 77 individuals occur within the Development Envelope, including 43 within the Conceptual Footprint. An additional 59 records occur within the Flora Survey Area, outside of the Development Envelope The species was different to the 13 published species and six Phrase-named species held by the WA Herbarium (Western Botanical 2026b). The specimens are being reviewed by Dr Matt Barrett (James Cook University), with a final determination of the taxonomic status expected The Proposal will avoid all currently known records of this species pending resolution of its taxonomic status – i.e. undertaking redesign of the Conceptual Footprint if required to ensure avoidance

8.6.2 Assessment of Indirect Impacts

8.6.2.1 Degradation or Alteration of GDV as a Result of Groundwater Drawdown

The Proposal is not expected to pose a risk of significant impacts to GDV through groundwater drawdown.

The groundwater levels at the shallow groundwater system in the Percival Palaeovalley with which assumed GDV occurs is thought to be associated, was recorded at less than 5 mbgl (Worley 2025a), within the rooting zone of *M. glomerata* and *Eucalyptus victrix* (Section 8.3.2.5). The Proposal will access groundwater at Rimfire from the deeper fractured rock aquifer, with depths to the watertable of greater than 17 mbgl (Worley 2025b). Under the precautionary principle the hydrogeological modelling assumes a full connection between the deeper sedimentary basis and the upper palaeovalley aquifer for the purposes of environmental impact assessment (Section 7) (Worley 2025a). Areas outside the palaeovalley are considered to overlie deeper aquifer groundwater depths (>17 mbgl) that are generally well beyond the typical rooting depth for GDEs, of less than 20 mbgl (Figure 8-15).

While the zone of influence of the drawdown from Rimfire is predicted to underly most of the potential assumed GDV vegetation mapped within the palaeovalley (P23, P23a-d and mosaic unit C1+P23), the risk of the drawdown significantly impacting any GDV within the Percival Palaeovalley is expected to be negligible due to:

- The palaeovalley system, that may support similar relevant vegetation (Western Botanical 2026a), extending for many kilometres to the south of Rimfire (Worley 2025i) outside any potential drawdown influence from the borefield, with approximately 0.05% of the system within the 2 m drawdown contour
- The actual water demand for the project being significantly less than the theoretical worst case project licensing abstraction scenario. Although 2.8 GL may be required in a given year the maximum total abstraction is significantly less than the project licensing case scenario.

Due to the potential for the groundwater drawdown affecting GDVs (and stygofauna) in the palaeovalley the Proponent has committed to implementing a groundwater monitoring and adaptive management program under the Rimfire Groundwater Operating Strategy (Appendix C19). The program will involve the use of specific water triggers at specific monitoring bores and vegetation health monitoring within the palaeovalley to inform appropriate contingency responses to prevent any significant impact on groundwater dependent values and is discussed in more detail in Section 10.5.1.1.

8.6.2.2 Degradation of Vegetation as a Result of Altered Hydrological Regimes

Indirect impacts from the operation of infiltration ponds and MAR are largely associated with groundwater mounding. Although mounding may occur from use of the infiltration ponds; MAR, which is not expected to result in mounding near the surface, will be used preferentially over the infiltration ponds, as such this assessment is based on a conservative worst case scenario.

Groundwater mounding has the potential to affect vegetation types P1, P2, and D2, that fall within the 10 mbgl mounding contour (Table 8-15). An impact assessment was undertaken of all the species recorded from within these vegetation types (Biota 2025a). Four species, all either trees or tall shrubs, were ranked as the most vulnerable to mounding due to their relative abundance within the relevant vegetation types and their deeper rooting depth:

- Acacia ancistrocarpa (occurs in P1 and P2)
- Erythrophleum arenaria (P1, P2, D2)
- Hakea macrocarpa (P1, P2)
- Owenia reticulata (P1, P2, D2).

The majority of these tall shrub/tree species were recorded in very low abundance (less than 1% cover), with only *Acacia ancistrocarpa* slightly more abundant (7-15% cover); therefore, putting a relatively

higher number of *A. ancistrocarpa* individuals at risk from mounding impacts. However, *A. ancistrocarpa* has also shown it can adapt well to hydrological change (Biota 2025a).

Shallower-rooted dominant grass species within the vegetation types are not expected to be affected by groundwater mounding, including within the area subject to mounding less than 1 mbgl (Biota 2025a).

Being mindful that the predicted mounding discussed here is based on an unlikely worst case scenario with respect to use of infiltration ponds over MAR, the tall shrubs and trees within P1 and P2 (all four species listed above) are expected to be affected by waterlogging within the 8.5 ha 2 mbgl mounding contour applicable to these units (Biota 2025a). These species are also expected to be affected within the 10 mbgl contour, an area of 48.2 ha. Other remaining shrub species are expected to persist where the groundwater mounding is greater than 2 mbgl.

P2 has the largest representation within the 2 mbgl mounding area (5.6 ha). P2 also has the highest proportion of dominant grass species of all the vegetation types in the groundwater mounding study area (Biota 2025a). As indicated, grasses are generally associated with shallower spreading root systems that tolerate a shallower watertable. An abundance of grasses in the areas where the mounding is closest to the surface can have beneficial effects as these groups can take advantage of the wetter environment and provide fast cover and competitive protection from potential opportunistic weed species that could take advantage of the wetter conditions.

While there may be some loss of tall shrubs and trees within the P1 and P2 units surrounding the infiltration pond, particularly within the 3.2 ha area where mounding may be less than 1 mbgl, the relatively small area affected, the low abundance of most species and potential for the more abundant *A. ancistrocarpa* to adapt to shallow watertables is not expected to result in a significant environmental impact.

Given only a small area of D2 falls within the 7 to 10 mbgl mounding contour, and entirely outside the 0 to 7 mbgl contours, no significant impact on tree and shrub species within this vegetation type is expected (Biota 2025a).

Additionally, salinisation from mounding is unlikely to occur due to the moderately saline nature of the watertable (Biota 2025a).

A temporary transition may occur in the ecohydrological unit at the infiltration pond area due to mounding, from the current EHU 5 unit to align more with EHU 9 (Lowland receiving areas [drainage termini in the form of ephemeral lakes, claypans and flats]) (Biota 2025a). This is not expected to result in any significant environmental impact given the temporary nature of the effect.

Table 8-20 shows the expected severity of impact on taller trees and shrubs (*Acacia ancistrocarpa*, *Erythrophleum arenaria*, *Hakea macrocarpa* and *Owenia reticulata*) within the area of influence of groundwater mounding around the infiltration ponds. The shading in the table illustrates, by colour intensity, the progression of decreasing severity of disturbance, from the 1 mbgl (greater effect) to the 10-35 mbgl contour (no effect). Grasses and small shrubs are not expected to be greatly affected. This shows that within the areas potentially affected by mounding, vegetative cover (trees and tall shrubs combined) of up to 14%, 13% and 8% has potential to be affected within P1, P2 and D2, respectively.

Table 8-20: Potential Disturbance Impacts of Tall Trees and Shrubs Within Vegetation Types Surrounding the Winu Infiltration Ponds

Predicted Groundwater Mounding (mbgl)	Cover	Vegetation Types (ha)				
		P1	P2	D1	D2	Total
	Trees (%)	2	2	NA	2	NA
	Tall shrubs (%)	12	11	NA	6	NA
	Total (%)	**14**	**13**	**-**	**8**	NA
<1		1.2	2.0	-	-	3.2
1-2		2.9	5.6	-	-	8.5
2-5		9.8	18.7	-	-	28.5
5-7		9.9	24.8	-	-	34.7
7-10		20.1	28.1	-	1.8	50.0
10-35		-	-	-	-	-
Total		**43.9**	**79.2**	**0**	**1.8**	**124.9**

Minor discrepancies in summed totals are due to rounding

The areas within the potential influence of mounding represent a fraction of the mapped extents of each vegetation type within the survey area, and of the upper limits of disturbance proposed for project flexibility (Table 8-21).

In summary, mounding from the infiltration ponds is not expected to result in a significant residual impact given the:

- Effect is expected to be temporary
- Relatively small area of potential impact
- Low abundance of most tree and tall shrub species that have potential to be impacted by shallow groundwater
- Resilience of lower, shallow-rooted species, with at least 86% (in P1;Table 8-20) of these structural components of the vegetation within the potential zones of influence of mounding expected to remain intact
- Expected ability of the most abundant tree in the P1 and P2 units, Acacia ancistrocarpa, to adapt to shallow groundwater. As such, the 14% (P1) and 13% (P2) of cover potentially affected by mounding in these units as shown in Table 8-20 is likely an overestimate.

Table 8-21: Presence of Vegetation Types within Area of Influence of Mounding from the Winu Infiltration Ponds

Vegetation Type	Extent within Vegetation Survey Area (ha)	Extent within Development Envelope (ha)	Upper Clearing Limit (ha) [% of Extent in Vegetation Survey Area]*	Extent within Area of Influence of Mounding (<10 mbgl) (% of upper clearing limit)*
P1	10,725	6,823	3,218 [30.0]	43.9 (0.01)
P2	6,045	1,978	1,814 [30.0]	29.2 (0.04)
D2	3,450	1,099	1,035 [30.0]	1.8 (<0.01)

**These areas fall within, not additional to, the upper clearing limits as proposed in Table 8-18*

8.6.2.3 Degradation of Vegetation as a Result of the Introduction or Spread of Weed Species

The Proposal is not expected to result in the introduction or spread of weeds within the Development Envelope to the extent that vegetation is significantly degraded. While there is an inherent risk that increased vehicle movement and earthmoving activities may introduce or spread weeds within the Development Envelope, the Proponent will implement well established weed hygiene procedures and management practices throughout the construction and operation phases of the Proposal, through the implementation of the EMP (Appendix A05).

The EMP will be developed and implemented in consultation with the Nyangumarta and Martu Traditional Owners to avoid the introduction and spread of weeds in Management Area 3 and minimise the introduction and spread of weeds in Management Areas 1 and 2. Avoidance will be achieved in Management Area 3, by utilising weed prevention and eradication controls, including vehicle washdown, early identification and prompt treatment by application of herbicide and/or manual extraction.

The Proponent will engage Nyangumarta Traditional Owner group representatives for active guidance and participation in managing Management Area 2. This includes the installation of a washdown facility at the intersection of Management Area 2 and the Wallal Downs Pastoral Lease to minimise the ingress of weeds within the Nyangumarta IPA, which maybe Nyangumarta owned and operated. Furthermore, the Proponent will also work with NWAC on supporting regional weed management programs.

Weed monitoring within Management Area 1,2 and 3 will be undertaken on an annual or bi-annual basis, in accordance with the EMP.

On this basis, the Proposal is not expected to significantly impact the condition of native vegetation through the spread or introduction of weed species. Any impacts are predicted to be localised to disturbed areas and will have no impact on vegetation in surrounding areas. As a result, no significant residual impacts on vegetation conditions from the spread of weeds are expected from the Proposal.

8.6.2.4 Degradation of Vegetation as a Result of Increased Dust Emissions or Altered Fire Regimes

8.6.2.4.1 Dust

The Proposal is not expected to result in a level of dust emissions that will significantly impact native vegetation.

Matsuki et al. (2016) conducted a study examining the impacts of dust on plant health in semi-arid environments. The study found no evidence of negative impacts on plant health for dust deposition rates from 22 g/m^2/month up to 77 g/m^2/month. The dust impact assessment conducted for the Proposal indicated a deposition rate directly adjacent to mining activities of approximately 0.16-0.26 g/m^2/month (EAQ 2026). The Proponent will implement strategies for managing dust emissions including, best practice dust controls, fixed plant dust suppression and vehicle restrictions as outlined in the EMP (Appendix A05).

8.6.2.4.2 Altered Fire Regimes

The Proposal is not expected to result in a significant impact to native vegetation as a result of altered fire regimes. The highest risk of ignition occurs during construction while undertaking hot work activities. The Proponent will develop and implement a Fire Management Plan, which includes appropriate work procedures to reduce the risk of fires starting from activities associated with the Proposal. The Proponent considers that through the implementation of management measures outlined in Section 8.5, the EMP (Appendix A05) and the Fire Management Plan, the Proposal is not expected to significantly increase the risk of fire leading to significant impacts to native vegetation.

8.6.3 Assessment of Cumulative Residual Impacts

8.6.3.1 Cumulative Impacts Resulting from Clearing Native Vegetation

The estimated cumulative impacts from this Proposal, existing and reasonably foreseeable projects within the region on native vegetation associations are anticipated to be a total of 64,678 ha (0.4% of the current extent) (Table 8-16). The Proposal's contribution is 4,878 ha (<0.1% of the current extent).

The National Objectives and Targets for Biodiversity Conservation include avoiding clearance of existing vegetation with a pre-European extent of below 30.0% (Commonwealth of Australia 2001). The assessment shows that the Proposal will have negligible cumulative effects at these scales, with more than 96% of pre-European extents remaining within the subregions following the implementation of the Proposal, including existing and reasonably foreseeable projects (Table 8-16). The maximum impact of clearing will be associated with the Mandora East 80 vegetation association at 1.7% of the current subregional extent, with the Proposal contributing <0.1% to this impact (Table 8-16). There are no significant impacts to any vegetation associations from the cumulative disturbance of existing and reasonably foreseeable projects.

Given the extent of pre-European vegetation associations remaining within the region after the implementation of the Proposal and existing and reasonably foreseeable projects (15,520,390 ha; 99.5% of pre-European extents), cumulative impacts to native vegetation are not considered to be significant.

8.6.3.2 Cumulative Impacts Resulting from Clearing of Significant Flora Species

As a result of the Proposal, existing and reasonably foreseeable projects, it is expected that one Priority 2 and four Priority 3 flora species within the Mackay, McLarty and Pindanland subregions are likely to be cumulatively impacted, namely, *Goodenia hartiana* (P2)*, Bonamia oblongifolia* (P3)*, Corynotheca asperata* (P3)*, Indigofera ammobia* (P3) and *Tribulopis marliesiae* (P3).

All of the six Priority species that have either been recorded or are considered Likely to Occur within the six existing and reasonably foreseeable projects, are distributed in large numbers outside of the project development area (Table 8-13 and Section 8.6.1.3).

Given the extent of known individuals remaining within the subregions, the cumulative impacts are not considered to be significant.

8.7 Likely Environmental Outcomes

In consideration of the proposed management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Flora and Vegetation include:

- Clearing of native vegetation for the Proposal will not exceed:
  - 4,878 ha of native vegetation in Excellent condition
  - 4,878 ha of locally significant native vegetation, ensuring no more than 26% of the extent within the Vegetation Survey Area is cleared for any locally significant vegetation type
- Clearing for Priority flora individuals will not exceed:
  - 5.0% of known records within Flora Survey Area of *Cynodon anisocarpus* (P1)
  - 20.0% of known records within Flora Survey Area of *Goodenia hartiana* (P2)
  - 0.2% of known records within Flora Survey Area of *Bonamia oblongifolia* (P2)
  - 5.0% of known records within Flora Survey Area of *Comesperma sabulosum* (P3)
  - 10.0% of known records within Flora Survey Area of *Corynotheca asperata* (P3)
  - 10.0% of known records within Flora Survey Area of *Dasymalla chorisepala* (P3)
  - 10.0% of known records within Flora Survey Area of *Indigofera ammobia* (P3)
  - 15.0% of known records within Flora Survey Area of *Synostemon arenosus* (P3)
  - 28.0% of known records within Flora Survey Area of *Terminalia kumpaja* (P3)

    - 30.0% of known records within Flora Survey Area of *Tribulopis marliesiae* (P3)
    - Subject to resolution of taxonomic status – 30% of known records within Flora Survey Area of *Amphipogon caricinus* (hairy lamina) (J. Paterson WB41138) (Species of Taxonomic Interest)
    - Subject to resolution of taxonomic status – 0% of currently known records of *Portulaca* sp. Nyangumarta (B. Eckermann BE Opp 01) (Species of Taxonomic Interest)
- Within Management Area 3 – no decline in mapped vegetation condition due to the presence of weeds.

The Proponent will implement the EMP as per Appendix A05 to achieve these outcomes, including to minimise direct and indirect impacts from the Proposal to native vegetation and flora species.

Following the implementation of the mitigation hierarchy, no significant residual impacts were identified. As such, the Proponent considers that the Proposal can be implemented to meet the EPA's objective to protect Flora and Vegetation so that biological diversity and ecological integrity are maintained