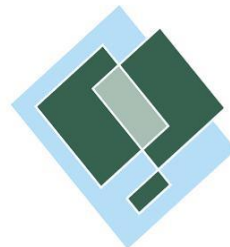




**RioTinto**



**Preston  
Consulting**

# **NATIVE VEGETATION CLEARING PERMIT APPLICATION**

**PATERSON PROVINCE ACCESS ROAD**

**SUPPORTING INFORMATION**

1 DECEMBER 2021  
PREPARED FOR RIO TINTO EXPLORATION PTY LIMITED  
BY PRESTON CONSULTING PTY LTD

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- Appendix 3:** Mapping of flora and vegetation types within Permit Area
- Appendix 4:** Relevant fauna survey reports
- Appendix 5:** Fauna habitats of the Permit Area



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# 1 INTRODUCTION

---

## 1.1 PROJECT BACKGROUND

Rio Tinto Exploration Pty Limited (RTX), a member of Rio Tinto Group of Companies (Rio Tinto) is currently conducting an extensive exploration program within the Paterson Province. The tenure is wholly owned by RTX, however the works will be managed by Rio Tinto. Rio Tinto intends to continue exploration activities throughout the Paterson Province over several years, in conjunction with the ongoing feasibility studies for potential future development of the Winu Project. As a result, it has been determined that the current access road cannot provide safe access for this level of activity. Improvements to the access road are therefore proposed (the Access Road) (Figure 1). Up to 125 hectares (ha) of native vegetation is proposed to be cleared to enable this upgrade to occur.

A Native Vegetation Clearing Permit (NVCP) (Purpose Permit) is required under Part V Section 51E of the *Environmental Protection Act 1986* (EP Act) to allow vegetation clearing for the upgrade of the Access Road. RTX intends to submit a Section 38 Referral to the Environmental Protection Authority (EPA) in Q1/2 2022 for the Winu Project, which will include further works related to the access road (beyond the scope of works presented in this application).

The proposed clearing for the Access Road will occur entirely within appropriate tenure under the *Mining Act 1978* held by RTX.

RTX intends to rehabilitate any areas disturbed during construction which are not required to remain cleared during operation of the Access Road. Wherever possible, areas that have been previously cleared shall be used.

## 1.2 PURPOSE

The purpose of this NVCP application is to allow the clearing of native vegetation to enable the safe upgrade of an access road and associated infrastructure located in the Yeneena Basin of the Paterson Province of Western Australia (WA) (Figure 1).



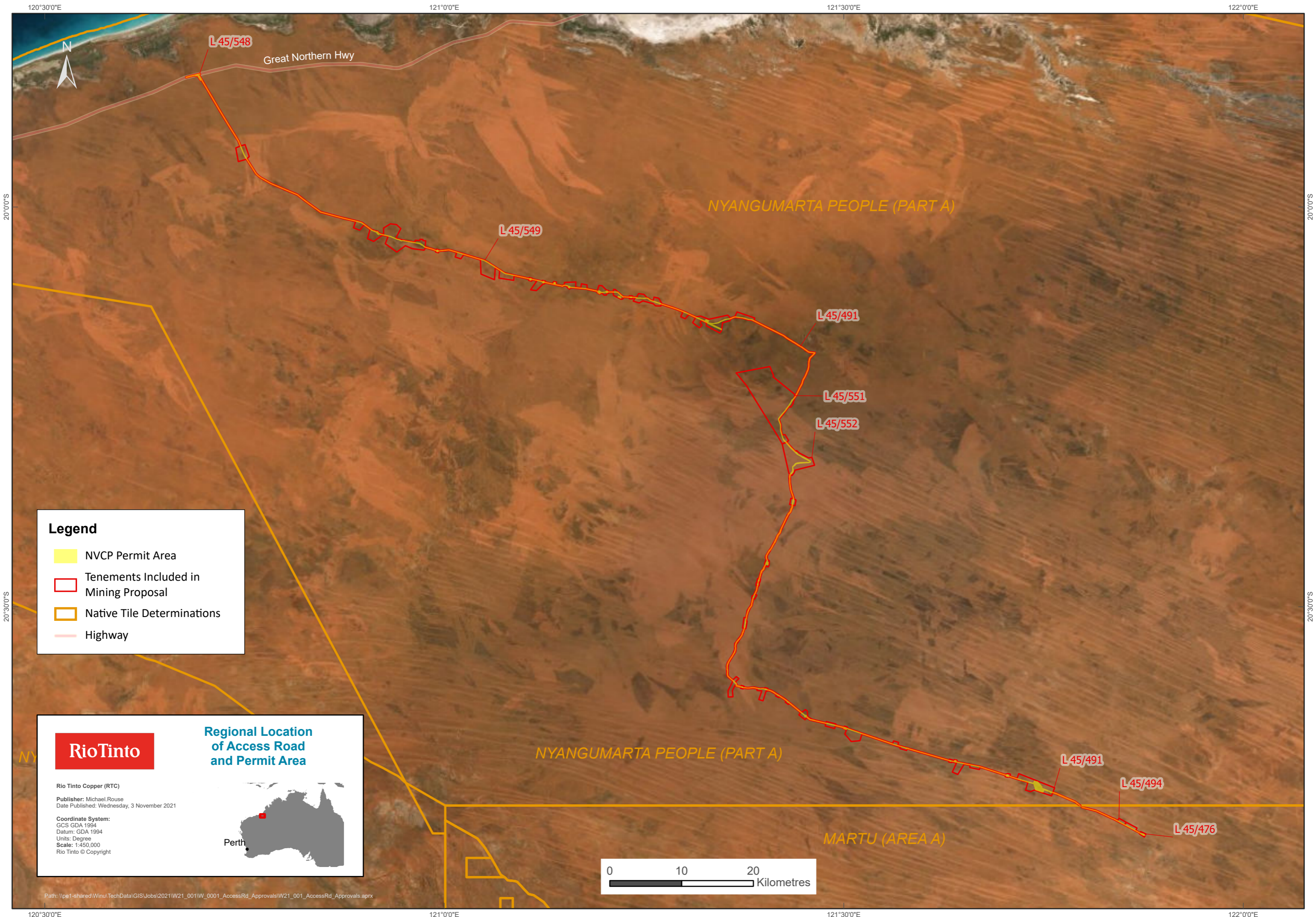


Figure 1: Regional location of the Access Road and proposed Permit Area

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## 2 PURPOSE PERMIT AREA

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### 2.1 BOUNDARY

The proposed Purpose Permit Area (Permit Area) is located entirely within the Shire of East Pilbara.

All vegetation disturbance proposed in this NVCP Application is to occur entirely within the Permit Area shown in Figures 2-8. The access road upgrades, associated infrastructure (including borrow pits, laydown areas, topsoil stockpiles, water bores, pipeline, turkeys nests and water tanks) and construction activities shall also occur entirely within the Permit Area.

The boundary of the Permit Area was determined as land that met the following criteria:

- Where proposed Access Road upgrades are required;
- Within approved and appropriate RTX tenure (i.e. miscellaneous licences);
- Within areas that have been subject to appropriate flora, vegetation and fauna surveys (Biota, 2020a & 2020b; Figure 9);
- Within areas that have been surveyed for Aboriginal Heritage and no significant sites exist; and
- Within the Nyangumarta Native Title determination area or the Martu Native Title determination area, subject to agreements between the Native Title Holders and RTX.

Shapefiles of the Permit Area are provided in Appendix 1.

### 2.2 TENURE AND LAND ACCESS

The Access Road upgrade will be developed on tenure issued under the *Mining Act 1978*. The Permit Area lies solely on L45/476, L45/491, L45/494, L45/548, L45/549, L45/551, and L45/552, all held by RTX.

The Permit Area is located within the Nyangumarta Native Title determination area, with a small portion extending into the Martu Native Title Determination area. Land Access and Heritage Protection requirements will be managed under the Agreement between the Native Title Party and RTX.

The Permit Area has been previously surveyed for Aboriginal Heritage sites as part of activities undertaken in recent years by RTX.





120°40'0"E

120°45'0"E

120°50'0"E

19°50'0"S

19°50'0"S

19°55'0"S

19°55'0"S

20°0'0"S

20°0'0"S





120°20'0"E 4 0 '0 " E

120°45'0"E

120°50'0"E



**Legend**

-  Native Tile Determinations
-  Tenements Included in Mining Proposal
-  Indicative Disturbance Footprint
-  Disturbance Envelope

L 45/548

L 45/549



**Winu Access Road  
Purpose Permit  
Disturbance Footprint**

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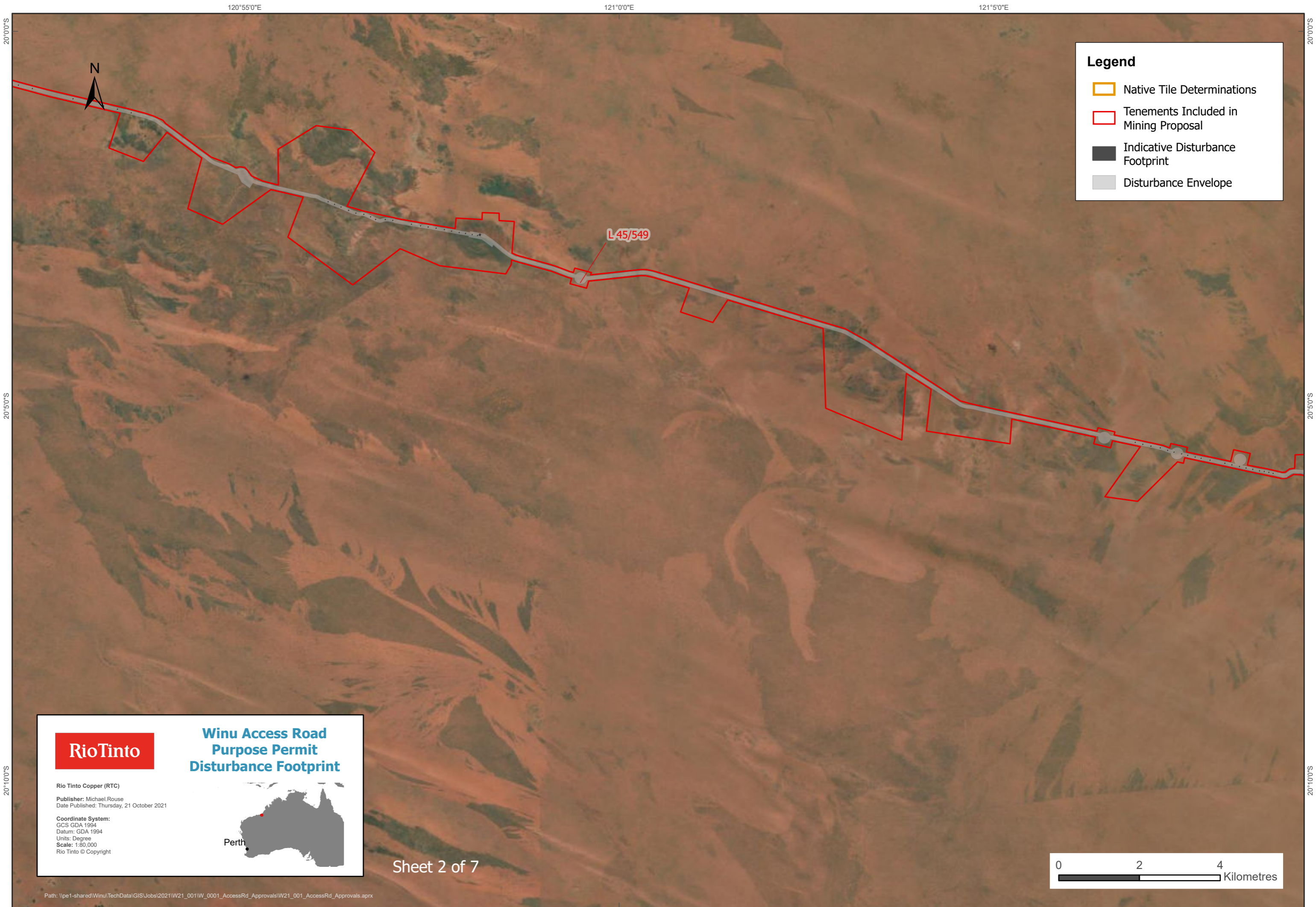
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Sheet 1 of 7



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Figure 2: Purpose Permit Area (1 of 7)



**Legend**

- Native Tile Determinations
- Tenements Included in Mining Proposal
- Indicative Disturbance Footprint
- Disturbance Envelope



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**Winu Access Road  
Purpose Permit  
Disturbance Footprint**



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Sheet 2 of 7



Figure 3: Purpose Permit Area (2 of 7)

121°10'0"E





121°15'0"E

121°20'0"E

121°25'0"E



**Legend**

-  Native Tile Determinations
-  Tenements Included in Mining Proposal
-  Indicative Disturbance Footprint
-  Disturbance Envelope

20°50'0"S

20°10'0"S

20°50'0"S

20°10'0"S

L 45/549

L 45/491

L 45/551

**RioTinto**

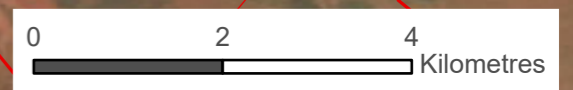
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Disturbance Footprint**

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121°10'0"E

1 2 0 ° 4 0 ' 0 " E

121°15'0"E

121°20'0"E

121°25'0"E

Figure 4: Purpose Permit Area (3 of 7)

121°20'0"E

121°25'0"E

121°30'0"E

20°10'0"S

20°10'0"S

20°15'0"S





20°15'0"S

20°20'0"S

20°20'0"S



### Legend

-  Native Tile Determinations
-  Tenements Included in Mining Proposal
-  Indicative Disturbance Footprint
-  Disturbance Envelope

L 45/491

L 45/551

L 45/552

**RioTinto**

## Winu Access Road Purpose Permit Disturbance Footprint

Rio Tinto Copper (RTC)

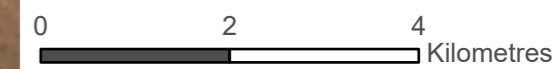
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121°20'0"E 4 0 '0 " E

121°25'0"E

121°30'0"E

Figure 5: Purpose Permit Area (4 of 7)





121°20'0"E

121°25'0"E

121°30'0"E



**Legend**

-  Native Tile Determinations
-  Tenements Included in Mining Proposal
-  Indicative Disturbance Footprint
-  Disturbance Envelope

20°25'0"S

20°25'0"S

L 45/552

20°30'0"S

20°30'0"S



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121°20'0"E 4 0 '0 " E

121°25'0"E

121°30'0"E

Figure 6: Purpose Permit Area (5 of 7)





121°25'0"E

121°30'0"E

121°35'0"E



**Legend**

-  Native Tile Determinations
-  Tenements Included in Mining Proposal
-  Indicative Disturbance Footprint
-  Disturbance Envelope

20°35'0"S

20°35'0"S

20°40'0"S

20°40'0"S

L 45/552



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121°25'0"E





121°30'0"E

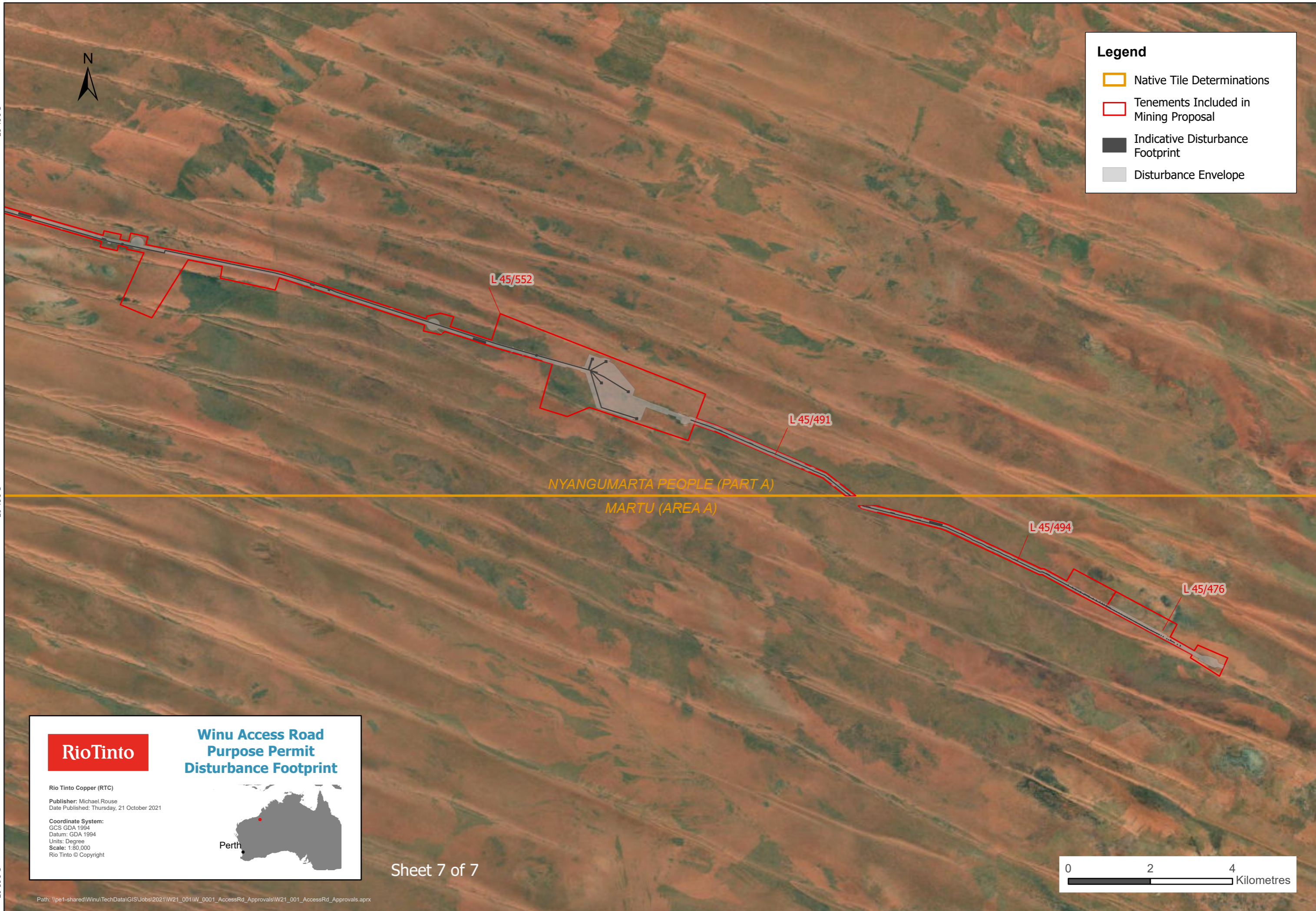
121°35'0"E

Figure 7: Purpose Permit Area (6 of 7)



**Legend**

-  Native Tile Determinations
-  Tenements Included in Mining Proposal
-  Indicative Disturbance Footprint
-  Disturbance Envelope



NYANGUMARTA PEOPLE (PART A)  
MARTU (AREA A)

L 45/552

L 45/491

L 45/494

L 45/476



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**Winu Access Road  
Purpose Permit  
Disturbance Footprint**



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Sheet 7 of 7

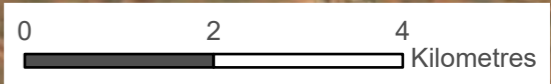


Figure 8: Purpose Permit Area (7 of 7)

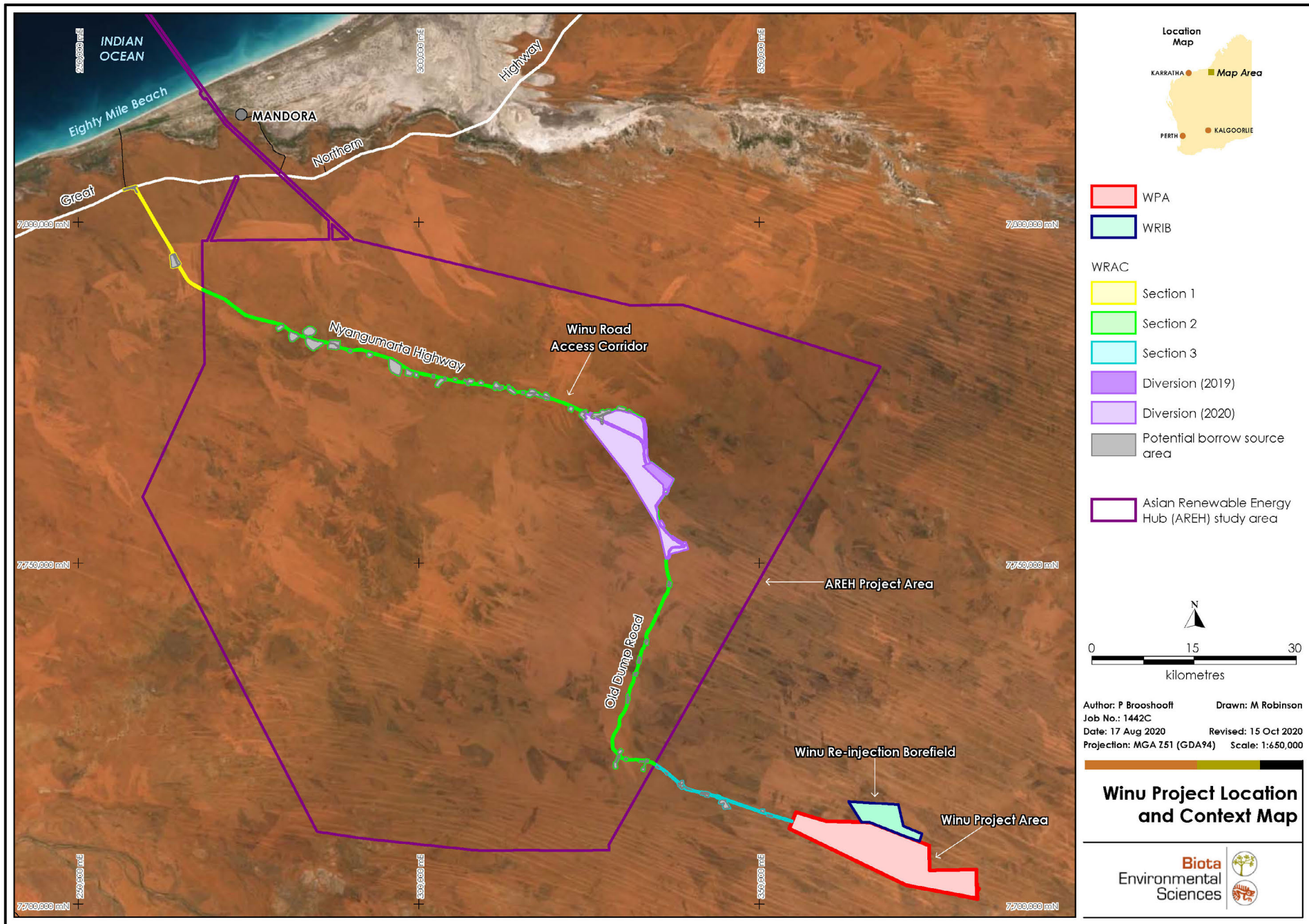


Figure 9: Flora, Vegetation and Fauna study areas (Biota, 2020a & 2020b)



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## 3 PROPOSED ACTIVITIES

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### 3.1 DESCRIPTION OF PROPOSED ACTIVITIES

RTX is seeking permission to clear native vegetation to allow for the safe upgrade of an existing road used to provide access for investigation and exploration activities within the Paterson Province (Figure 1). The improvements to the Access Road will occur from the Great Northern Highway (approximately 185 km north east of Port Hedland) to the existing emergency airstrip east of the Winu Project, comprising the roads known as Nyangumarta Highway, Wirikirr Wirikirr Road (aka Old Dump Road), Copperhead Road and Airport Drive extending to the east of the Winu Project.

The upgraded access road will utilise a traditional cut/fill construction methodology. It is anticipated that the road formation will be comprised of locally won borrow material from new or existing sources, or imported if unavailable locally. Construction activities will utilise earthmoving equipment such as dozers, graders, water carts and rollers. Base course capping material will be won locally if available or imported should the required specification not be available. Water required for the road construction will be supplied via groundwater bores and stored in turkeys nests and tanks as required. A water pipeline will be established on the surface alongside the Access Road.

Future development and operation of the Winu Project would require further works to upgrade the access roads. This is likely to include: road widening, surface and drainage upgrades, road realignments to avoid Black-footed Rock-wallaby habitat and allow safe access for required vehicles and equipment, as well as, extension of any required water infrastructure to support road construction and maintenance activities (including pipelines, turkey's nests and tanks). Any future works proposals will be submitted following Winu Project approval under Part IV of the *Environmental Protection Act 1986* (EP Act).

### 3.2 ESTIMATED VEGETATION DISTURBANCE REQUIREMENTS

The maximum potential native vegetation disturbance required for the proposed activities is 125 ha. This clearing allowance is in addition to previous clearing conducted in the area for the current access track. All vegetation clearing shall be undertaken within the Permit Area shown in Figures 2 - 8.

### 3.3 METHOD OF VEGETATION DISTURBANCE

Vegetation will generally be cleared with bulldozers or graders within the Permit Area. Diggers and loaders may be used around drainage lines as required.

Vegetation and topsoil will typically be cleared and pushed to the side of the Access Road corridor or taken to dedicated rehabilitation material storage areas.



## **3.4 REHABILITATION AND MAINTENANCE**

RTX and its contractors will have a weed and hygiene procedure in place to minimise the risk of spreading or introducing weeds within the Permit Area during construction.

During construction, any topsoil which must be removed will be salvaged from the clearing area and either stored in already cleared areas or placed directly onto areas to be rehabilitated. It is anticipated that the topography of the site will be suitable to support the Access Road upgrade without the need for significant benching or landforming.

Upon completion of the construction phase of the Access Road upgrade, RTX shall rehabilitate any areas that are not required to remain clear during operations. In areas where vegetation has been track-rolled without soil disturbance, the area can be left to naturally rehabilitate from in-situ and wind-blown seed. In areas where topsoil has been disturbed it will be spread back over the area and left to revegetate from in-situ and wind-blown seed. If it is found that there are areas where compaction has occurred in areas not required for operations, an instrument may be used to scarify and provide a rough seed bed.

Borrow pits that are created during the Access Road upgrade will be reshaped as required and revegetated. As Rio Tinto has limited experience with rehabilitation in the Great Sandy Desert, these areas will be used for rehabilitation studies and trials where practicable to ensure that it can achieve its goals of restoring self-sustaining and resilient native ecosystems on disturbed land in the area.

The rehabilitation of cleared areas will be undertaken in accordance with a Mine Closure Plan and managed so as to achieve the outcomes and completion criteria specified therein. Rehabilitation areas will be monitored in accordance with the broader rehabilitation monitoring programme specified in the Mine Closure Plan, with results reported to DMIRS.

## **3.5 INDICATIVE TIMELINE**

RTX proposes to commence vegetation clearing in Q1/2 2022. RTX anticipates completion and operation of the Access Road in Q1/2 2023.



## 4 RELEVANT ENVIRONMENTAL CHARACTERISTICS

This section contains information about the environmental characteristics of the Permit Area (within the context of the Pilbara region) that may be relevant to this NVCP application.

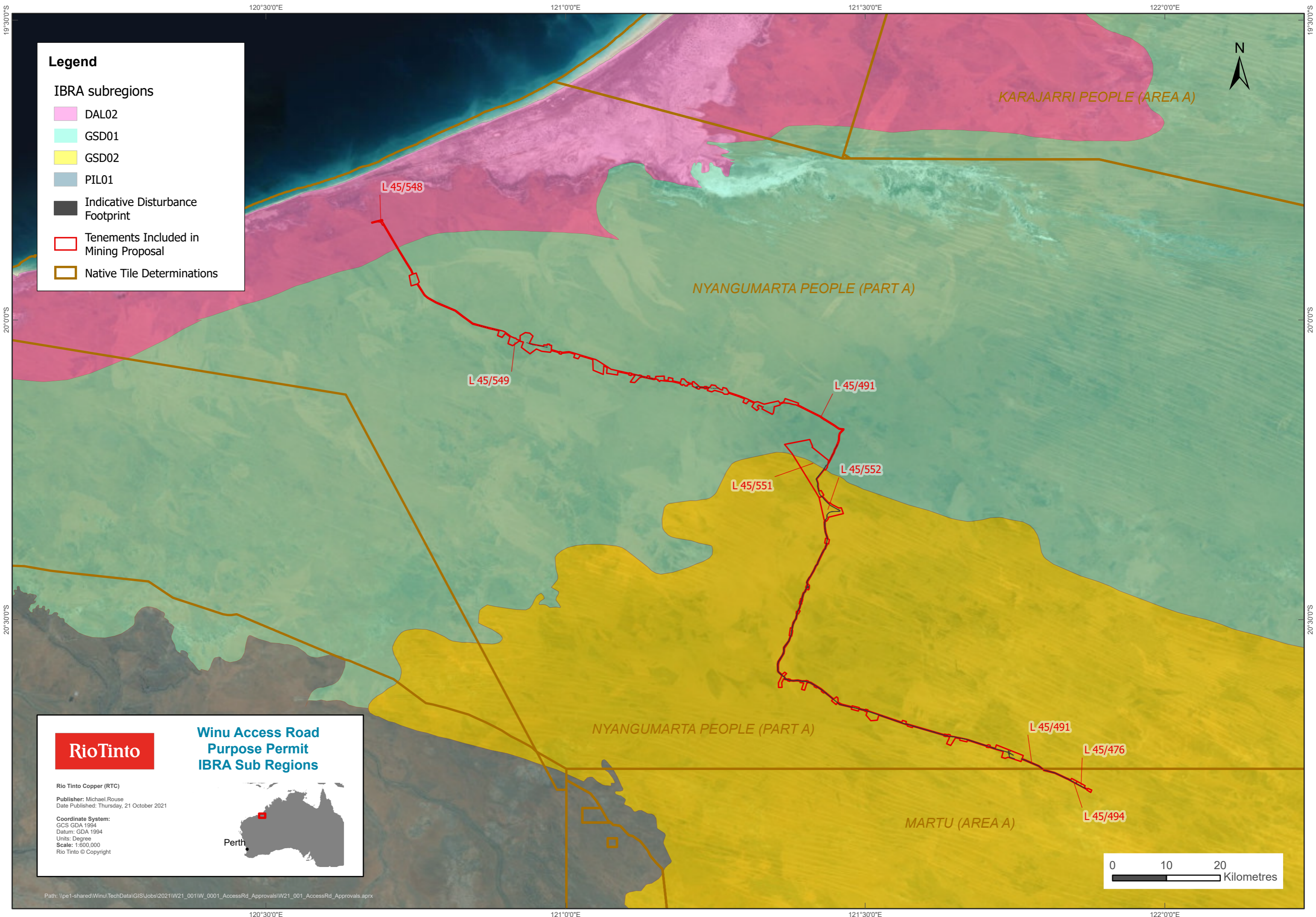
### 4.1 BIOGEOGRAPHIC REGIONS

The Permit Area lies within the Mackay (GSD02) and McLarty (GSD01) subregions of the Great Sandy Desert Interim Biogeographical Regionalisation of Australia (IBRA) bioregion, with a small portion of the northern extent extending into the Pindanland subregion (DAL02) of the Dampierland IBRA bioregion. The three subregions are shown in Figure 10 and outlined in Table 1, as summarised by Biota (2020a).

Table 1: IBRA Subregions of the Permit Area (Biota, 2020a)

Subregion	Description
Mackay subregion (GSD02)	<p>The subregion comprises the tropical inland 'red-centre' desert and includes the 'Percival' and 'Auld' palaeoriver systems.</p> <p>The vegetation is mainly tree steppe grading to shrub steppe in the south; comprising open hummock grassland of <i>Triodia pungens</i> and <i>Triodia schinzii</i> with scattered trees of <i>Owenia reticulata</i> and bloodwood (<i>Corymbia</i> spp.), and shrubs of <i>Acacia</i> spp., <i>Grevillea wickhamii</i> and <i>G. refracta</i>, on Quaternary red longitudinal sand dune fields. The vegetation is very similar to the McLarty subregion.</p> <p>The climate is arid tropical with summer rainfall and monsoonal influences apparent in the north-western sector of the region.</p>
McLarty subregion (GSD01)	<p>The subregion includes the Mandora palaeoriver system and red-brown dune fields with finer texture than further south. It also includes gravelly surfaces of Anketell Ridge along its northern margin.</p> <p>The vegetation is mainly tree steppe grading to shrub steppe in the south; comprising open hummock grassland of <i>Triodia pungens</i> and <i>Triodia schinzii</i> with scattered trees of <i>Owenia reticulata</i> and bloodwoods (<i>Corymbia</i> spp.), and shrubs of <i>Acacia</i> spp., <i>G. wickhamii</i> and <i>G. refracta</i>, on Quaternary red longitudinal sand fields overlying Jurassic and Cretaceous sandstones of the Canning and Amadeus Basins. Gently undulating uplands support shrub steppe. Wetland features in the subregion include isolated mound springs supporting <i>Melaleuca leucandendra</i> closed forests, and <i>Melaleuca glomerata</i> – <i>M. lasiandra</i> shrublands around salt lakes.</p> <p>The climate is arid tropical with summer rain and is influenced by monsoonal activity. Morning fogs are recorded during the dry season.</p>
Pindanland subregion (DAL02)	<p>The subregion comprises sandplains of the Dampier Peninsula 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.</p> <p>The vegetation is described primarily as pindan, but includes <i>Melaleuca alsophila</i> low forests on coastal plains and <i>Spinefex</i> spp. – <i>Crotalaria</i> spp. Strand communities.</p> <p>The climate is dry hot tropical and semi-arid with summer rainfall. The average rainfall is between 450 - 700 mm, slightly lower than the Fitzroy Trough subregion.</p>





**Legend**

IBRA subregions

- DAL02
- GSD01
- GSD02
- PIL01
- Indicative Disturbance Footprint
- Tenements Included in Mining Proposal
- Native Tile Determinations

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Purpose Permit  
IBRA Sub Regions**

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Figure 10: IBRA Subregions of the Patterson Province

## 4.2 LAND SYSTEMS AND SOILS

The Permit Area intersects four land systems along its extent: Little Sandy, Nita, Callawa and Buckshot, as shown in Figure 11. The current land system dataset for the Rangelands regions of WA, mapped by the WA Department of Agriculture (van Vreeswyk *et. al*, 2004), does not entirely cover the southern portion of the Permit Area. Within the existing dataset, the southern area is dominated by the Little Sandy land system, while the northern section is a mosaic of the Nita and Callawa land systems. The Buckshot land system is present in two small areas and features gravelly sand plains and occasional sand dunes. All four land systems are well represented outside of the Permit Area within the McLarty, Mackay and Pindanland subregions (Biota, 2020a). The land systems are described in detail in Biota (2020a; Appendix 2) and summarised in Table 2.

**Table 2: Descriptions of land systems present in the Permit Area.**

Land System	% of the Permit Area	Description
Buckshot	2%	Gravelly sandplains and occasional sand dunes supporting hard spinifex grasslands.
Callawa	14%	Highly dissected low hills, mesas and gravelly plains of sandstone and conglomerate supporting soft and hard spinifex grasslands.
Little Sandy	51%	Sandplains with linear and reticulate dunes supporting shrubby hard and soft spinifex grasslands.
Nita	33%	Sandplains supporting shrubby spinifex grasslands with occasional trees.

Biota (2020a) identified four broad soil types (AB21, AB22, AB39, AB40) within their study area and all four intersect with the Permit Area. These soil units are similarly described as gently undulating plains, and are shown in Figure 12 and described in further detail in Table 3.

**Table 3: Description of soil units in the Permit Area (Biota, 2020a).**

Soil Unit	Description
AB21	Pindan country: gently undulating sand plain with a few small rocky sandstone residuals; no external drainage: Chief soils are red earthy sands (Uc5.21), with associated (Uc5.11) and hummocks of siliceous sands (Uc1.23).
AB22	Gently undulating sand plain as for unit AB21 but with many rocky sandstone residuals: chief soils are red earthy sands (Uc5.21), with (Uc5.11) and (Uc1.23) as for unit AB21. Associated are bare rock and shallow sands, probably Uc1.4, of the sandstone residuals.
AB39	Gently undulating plains dominated by longitudinal dunes of varying frequency; some exposures of ironstone gravels on low rises occur in the dune swales: chief soils are red earthy sands (Uc5.21) on dune slopes, and inter-dune plains with red siliceous sands (Uc 1.23) on the dunes. Other soils include (KS-Uc5.21) on the gravelly rises where an ironstone (laterite) duricrust is present at about 45 cm depth; and (Um5.11) on small included areas of calcrete (kunkar).
AB40	Gently undulating plain slightly more elevated than unit AB39, and dominated by longitudinal dunes, many exposures of ironstone gravels and some breakaways capped by ironstone (laterite) duricrust: chief soils are red earthy sands (Uc5.21), with red siliceous sands (Uc1.23) on the dunes. There is an increased amount of (KS-Uc5.21) soil compared with unit AB39, and locally it may become dominant.



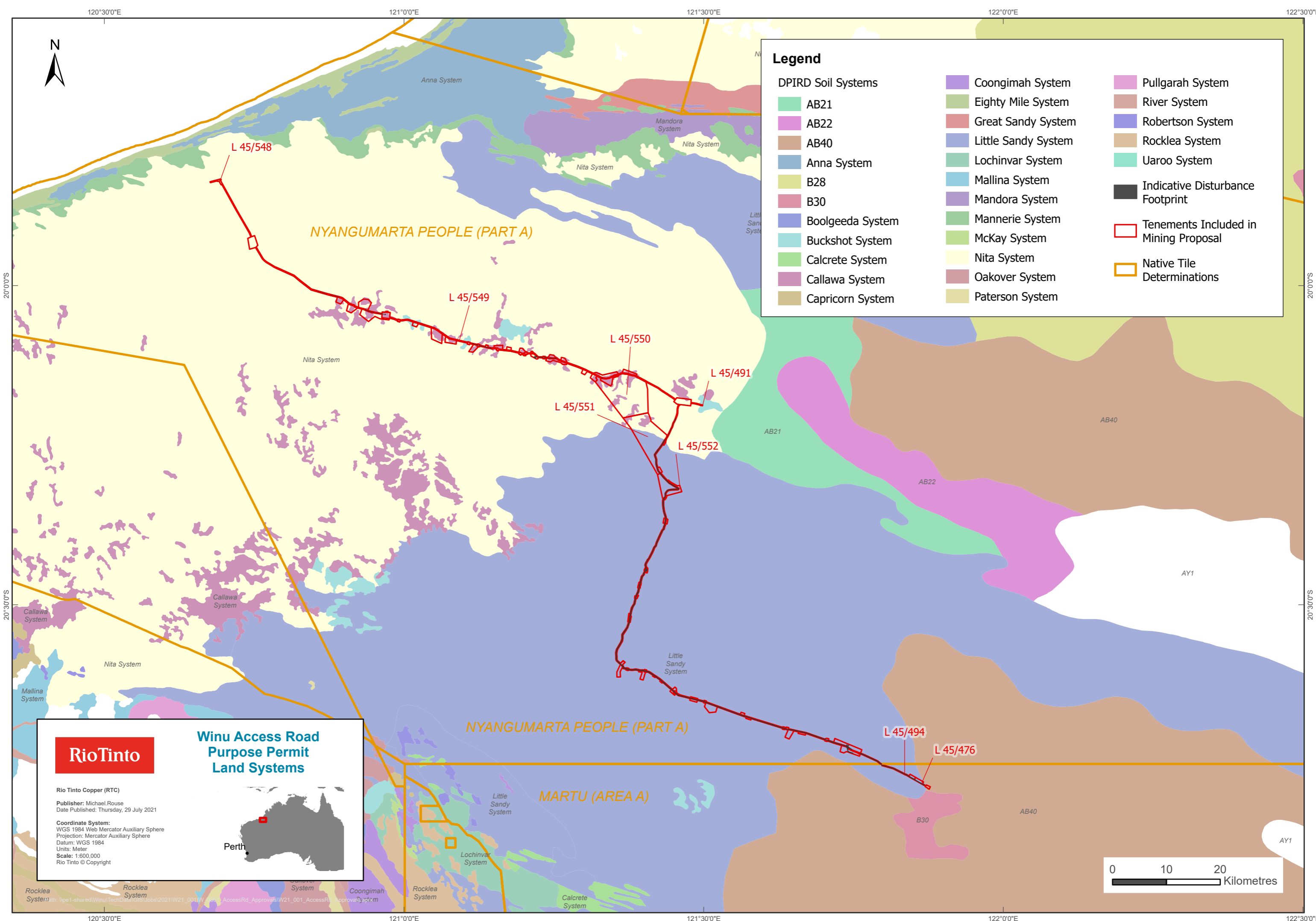


Figure 11: Land Systems of the Permit Area

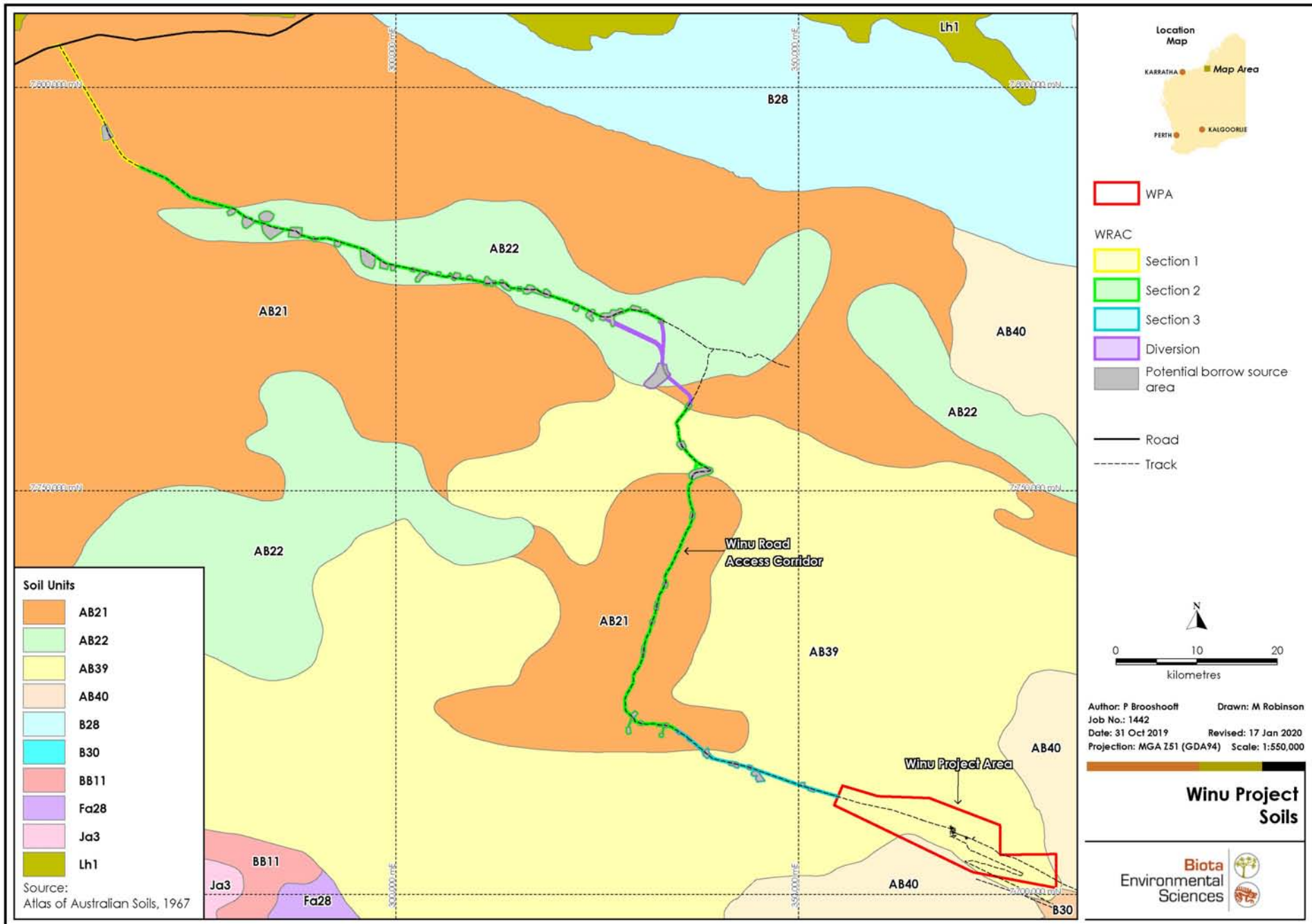


Figure 12: Soil Types (Biota, 2020b)

## 4.3 FLORA AND VEGETATION

A number of flora and vegetation desktop and field surveys have been undertaken within the proposed Permit Area by Astron Environmental Services (Astron) and Biota Environmental Sciences (Biota). These included:

- Three reconnaissance level flora and vegetation surveys undertaken by Astron:
  - A 116 ha polygon within the Winu Project area surveyed in October 2018;
  - Eight polygons (292 ha) within the Winu Project area surveyed in March 2019; and
  - A road corridor (52 km) to the southern edge of the current road alignment, surveyed in May 2019;
- Further flora and vegetation surveys undertaken by Biota (Figure 9; Biota, 2020a), including:
  - A desktop review of the Winu Project Area (WPA) and the 215 km Winu Road Access Corridor (WRAC);
  - A reconnaissance level survey of the WRAC;
  - A single-phase survey of the Proposed Borefield, the WRAC Diversion and Borrow Source Areas; and
  - A detailed survey of the WPA.

Additionally, several other flora and vegetation surveys have been undertaken in the region since 2018, which are described in Biota (2020a).

The information in this section has been sourced from Biota (2020a) which is provided in Appendix 2. For reference, the Biota (2020a) flora and vegetation survey study areas (WPA, Proposed Borefield and WRAC) mentioned in this section are shown in Figure 9. The Permit Area intersects both of these study areas.

### 4.3.1 SIGNIFICANT FLORA

One Threatened Flora species (*Seringia exastia*) was recorded within the WRAC by Biota in a 2018 survey. However, this species is no longer listed as Threatened (Biota, 2020a).

No other Threatened Flora species listed under State or Commonwealth legislation were recorded within the Permit Area during the 2019 and 2020 Biota surveys, and none would be expected to occur (Biota, 2020a).

Five Priority Flora have been recorded within the Permit Area, of which only one was recorded within the Disturbance Footprint as detailed in Table 4.

**Table 4: Priority Flora within the Permit Area**

Species	# recorded within Permit Area	% of total recorded in broader survey area	# recorded within indicative disturbance footprint	% of total recorded in broader survey area
<i>Goodenia hartiana</i> (P2)	36,445	16.49%*	7,067	3.17%*
<i>Bonamia oblongifolia</i> (P3)	2	100%**	Not present	NA





Species	# recorded within Permit Area	% of total recorded in broader survey area	# recorded within indicative disturbance footprint	% of total recorded in broader survey area
<i>Dasymalla chorisepala</i> (P3)	5	20%**	Not present	NA
<i>Seringia katatona</i> (P3)	150	100%**	Not present	NA
<i>Tribulopsis marliesiae</i> (P3)	16	27.59%**	Not present	NA

\*species recorded in Biota 2019 survey and Astron 2018/2019 surveys

\*\*species recorded in Biota 2019 survey only

An additional six Priority Flora species have been recorded during previous surveys of the surrounding area:

- *Comesperma sabulosum* (P3);
- *Corynotheca asperata* (P3);
- *Indigofera ammobia* (P3);
- *Polymeria* ? sp. Broome (K.F. Keneally 9759) (P3);
- *Sauropus arenosus* (P3); and
- *Terminalia kumpaja* spp..

The following information has been sourced from Biota (2020a).

A total of approximately 150,000 *Goodenia hartiana* (P2) individuals have been recorded in surveys undertaken within the Biota survey area. The species is represented in the WA Herbarium with a range of almost 250 km in the Great Sandy Desert. This species is the only priority species located within the proposed disturbance footprint (a total of 7,067 individuals or 3.17%). This species was recorded in large numbers, across numerous plains vegetation types and responded quickly to recent fires. As such, it is likely to be more common across the WPA and WRAC than was captured during survey (Biota, 2020a).

While only two *Bonomia oblongifolia* individuals were recorded by Biota (2020a) within the Permit Area, the species was commonly found by Astron during the AREH survey and therefore would be expected to occur more widely through the WRAC survey area during more suitable weather conditions. Additionally, it was estimated that a total of 1,200,000 individuals were recorded across surveys at Wallal Downs, Pardoo and Anna Plains Stations and therefore it can be concluded that the species is clearly not uncommon in suitable habitat.

The records of *Dasymalla chorisepala* (P3) represent a 160 km range extension for the species, previously only recorded as far south as the border of the Great Sandy Desert and Dampierland bioregions.

A total of 150 individuals of *Seringia katatona* was recorded at a single location within the study area of the AREH project, however, the current known range of *Seringia katatona* extends over a maximum range of 450 km (Biota, 2018). It was noted by Wilkins and Whitlock in 2015 that “given the extent of unexplored suitable habitat among the [then] known localities, the species was most likely not under threat”. Recent discoveries within the known range include 1,268 individuals on Mandora Station, 450 individuals on Nita Downs Station and 19 individuals on Shelamar Station (Biota, 2018). This data indicates that it is likely that *Seringia katatona* occurs more broadly throughout pindan vegetation in the locality. Abundant suitable and contiguous



habitat within the region suggests that this species cannot be considered to be rare (Biota, 2018).

*Tribulopsis marliesiae* was recorded from vegetation within sandplains, and has been vouchered for or recorded at various locations within a wide range of the Permit Area. The individuals recorded during this survey represent a south-easterly extension of the known distribution for this species.

### 4.3.2 INTRODUCED FLORA SPECIES

No declared pests, Weeds of National Significance or introduced taxa were recorded within the Permit Area (Biota, 2020a). However, ten weed species were recorded from the AREH survey area (Biota, 2018) and two weed species, *Aerva javanica* and *Bidens bipinnata*, were recorded within the R4 vegetation unit by Biota. None of these were present within the WRAC, and it is therefore assumed that weeds may occur in some locations within the Disturbance Envelope. In particular, it is possible that common roadside weed species such as Buffel Grass (*Cenchrus ciliaris*), Birdwood Grass (*Cenchrus setiger*), Kapok Bush (*Aerva javanica*) and *Bidens bipinnata* may be present.

### 4.3.3 VEGETATION

#### *Listed Vegetation Communities*

No Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) protected by Commonwealth or State legislation were identified within the Permit Area (Biota, 2020a).

#### *Vegetation Associations*

Broad-scale vegetation mapping for the locality has been prepared at the 1:1,000,000 scale based on the work of J.S. Beard for the Pilbara (Beard, 1975) and Great Sandy Desert (Beard, 1968). The WPA and Proposed Borefield includes only one of Beard's vegetation system associations: 'Great Sandy Desert 134'. The WRAC was mapped as a mosaic of 'Great Sandy Desert 134', along with the 'Mandora East 80, 101, 117' and 'Pindan 32' vegetation system associations, as described below:

- Great Sandy Desert 134 comprises a 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;
- Mandora East 80 comprises hummock grasslands and low tree steppe with Desert Walnut over soft spinifex between sand ridges;
- Mandora East 101 comprises hummock grasslands and shrub steppe with *Acacia pachycarpa* over soft spinifex;
- Mandora East 117 comprises hummock grasslands and grass steppe with soft spinifex; and
- Pindan 32 comprises pindan sand plain with *Acacia* shrubland with scattered low trees over *Triodia* spp.

The pre-European and current extents of Beard's vegetation system associations have been calculated using interpretation of imagery to determine areas that have been cleared (Shepherd et al., 2002, and Government of WA, 2018). According to this, none of the system associations



have had extensive clearing, and the Permit Area only contains very small proportions of each of the current extents. The largest of these is the Mandora East 117 association, with the WRAC containing 1.2% of its current extent.

### **Vegetation Types**

A total of 20 vegetation types were described within the Permit Area by Biota (2020a), shown in Appendix 3.

One vegetation type within the Permit Area was considered of local significance, as it supports large populations of Priority Flora (Biota, 2020a):

- **P1:** *Owenia reticulata*, *Erythrophyleum chlorostachys* scattered low trees over *Acacia platycarpa* open shrubland over *Jacksonia aculeate*, (*Androcalva loxophylla*, *Dicrastylis cordifolia*, *Gompholobium simplicifolium*, *Seringia eliptica*) low shrubland over *Triodia schinzii* open hummock grassland.

Biota (2020a) concluded that it is likely that these represented species have been poorly documented in the Great Sandy Desert, as they are well known from the broader locality, with some being recorded at locations up to 1,400 km away.

Vegetation type P1 was mapped over an area of 6,462.2 ha within the WPA, Proposed Borefield and WRAC, accounting for 37.5% and 1.77% of the mapped vegetation within the WPA and WRAC, respectively.

## **4.4 FAUNA**

### **4.4.1 SURVEY EFFORT**

A number of fauna surveys have been undertaken across the proposed Permit Area by Biota and Astron, including:

- A Level 2 fauna survey of the WPA;
- A Level 2 fauna survey of the majority of the WRAC (as part of an unrelated development: the Asian Renewable Energy Hub (AREH)), classified as “WRAC Section 2” in this application;
- A Level 1 reconnaissance level surveys of the remaining sections of the WRAC: the western portion of the WRAC (“WRAC Section 1”) and the eastern portion of the WRAC (“WRAC Section 3”);
- A Level 1 reconnaissance level survey of a diversion to the existing access road (“WRAC Diversion”);
- A Level 1 reconnaissance level survey of the Proposed Borefield and Borrow Source Areas; and
- A population analysis of an identified Bilby population within the WPA.

The information in this section has been sourced from Biota (2020b and 2020c) (Appendix 4), with detail around fauna species presented in line with specific survey study areas. The fauna survey study areas (WPA, WRAC Sections 1-3, the WRAC Diversion and the Borefield) mentioned in this section are shown in Figure 9.



#### 4.4.2 FAUNA HABITAT

Five fauna habitats were described within the Biota (2020b) study area, each aligning broadly with the landforms present:

- Shrub and spinifex on sandplain;
- Longitudinal sand dune ridge;
- Gravelly lateritic rise;
- Clayey sand plain with termitaria; and
- Rock outcropping.

Three of these habitats were present in the Permit Area and within the indicative disturbance footprint. A small area (<0.005 ha) of Rock outcropping is also present within the Permit Area, however it is not present within the indicative disturbance footprint and this habitat will not be cleared. Further detail of each fauna habitat within the Permit Area is included in Table 5 (Biota, 2020a) and shown in Appendix 5.

Table 5: Fauna habitat within the Permit Area (Biota, 2020a).

Habitat	Area within Permit Area (ha)	Area within indicative disturbance footprint (ha)	Description / Fauna Assemblages
Shrub and spinifex on sandplain	2,109.99 (22.15% of extent mapped by Biota (2020b))	110.8 (0.86% of mapped extent)	<ul style="list-style-type: none"> <li>• Substrate consisted of red loose sand to a depth of 5 cm</li> <li>• Comprising open hummock grasslands dominated by <i>Triodia schinzii</i> with scattered trees by <i>Owenia reticulata</i> and shrubs of mixed <i>Acacia</i> species</li> <li>• Species with particular associations to spinifex, i.e. mammals that forage on seeds, or species that utilised shrubs and spinifex for cover and/or foraging would be expected to occur in this habitat</li> </ul>
Longitudinal sand dune ridge	8.02 (0.24% of mapped extent)	0.5 (0.01% of mapped extent)	<ul style="list-style-type: none"> <li>• Typically long linear sand dunes trending east-west</li> <li>• Substrate consisted of red loose sand to depth of 10 cm</li> <li>• Dominated by <i>Corymbia chippendalei</i>, <i>Erythrophleum chlorostachys</i> and <i>Owenia reticulata</i> low woodland and scattered trees over mixed <i>Acacia</i> low open shrublands over open hummock grasslands dominated by <i>Triodia schinzii</i></li> <li>• Species associated with this habitat include fossorial species and dune specialists</li> <li>• Species such as the Northern Marsupial Mole would also preferentially occupy this habitat type, particularly interconnected dunes that provide dispersal opportunity</li> </ul>
Gravelly lateritic rise	274.48 (89.93% of mapped extent)	0.9 (0.29% of mapped extent)	<ul style="list-style-type: none"> <li>• Patchy habitat type within the WPA</li> <li>• Comprising low rises of laterite gravel and pebble surface cover with sandy clay loam substrate</li> <li>• Comprised scattered <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> over <i>Mirbelia viminalis</i> low shrubland over <i>Triodia brizoides</i> open hummock grassland</li> <li>• Species with a preference for rocky substrate would be expected to be associated with this habitat type, however, none were recorded in this habitat most likely due to the small extent of this habitat type within surrounding sandy dunes and plains</li> <li>• Multiple diggings from the Spinifex Hopping Mouse, which is reported to be restricted to sandy areas for burrowing and foraging, amongst <i>Mirbelia viminalis</i> shrubs indicated that this habitat represented a foraging habitat for adjacent sand plain species</li> </ul>
Rock outcropping	<0.005 (<0.001% of	NA	<ul style="list-style-type: none"> <li>• Patchily distributed and occurs as rock piles and rocky ridge landforms</li> <li>• Comprising rocky areas supported some flora species that were not found in any other habitat</li> </ul>



Habitat	Area within Permit Area (ha)	Area within indicative disturbance footprint (ha)	Description / Fauna Assemblages
	mapped extent)		<ul style="list-style-type: none"> <li>• Flora species including <i>Ficus brachypoda</i>, <i>Mallotus nesophilus</i>, <i>Trichosanthes cucumerina</i> and <i>Triumfetta incana</i></li> <li>• Fauna species utilising rocky overhangs as shelters or for denning purposes, or species foraging on vegetation restricted to this habitat would be expected to occur</li> <li>• The Black-footed Rock-wallaby was recorded exclusively from this habitat type (although not in proximity to the Disturbance Envelope). This species rarely forages far from rock piles, where it feeds on fruits of <i>Ficus brachypoda</i>, and seeks refuge from the desert heat amongst rocky overhangs</li> <li>• Other species such as the Northern Quoll would be expected to utilise this rocky habitat for foraging, shelter and possibly denning, however none were recorded within proximity to the Disturbance Envelope</li> </ul>

#### 4.4.3 CONSERVATION SIGNIFICANT FAUNA

Excluding EPBC Marine-listed species (there is no habitat significant for marine species within the Permit Area), 11 species of conservation significance were recorded from surveys within the WRAC and WPA and may utilise the Permit Area:

- Black-footed Rock-wallaby (*Petrogale lateralis lateralis*, BC Act and EPBC Act Endangered);
- Northern Quoll (*Dasyurus hallucatus*, BC Act and EPBC Act Endangered);
- Bilby (*Macrotis lagotis*, BC Act and EPBC Act Vulnerable);
- Grey Falcon (*Falco hypoleucos*; BC Act Vulnerable);
- Gull-billed Tern (*Gelochelidon nilotica*; BC Act and EPBC Act Migratory);
- Oriental Plover (*Charadrius veredus*; BC Act and EPBC Act Migratory);
- Oriental Pratincole (*Clareola maldivarum*, BC Act and EPBC Act Migratory);
- *Lerista separanda* (DBCA Priority 2);
- Brush-tailed Mulgara (*Dasyercus blythi*; DBCA Priority 4);
- Northern Marsupial Mole (*Notoryctes caurinus*, DBCA Priority 4); and
- Western Pebble-mound Mouse (*Pseudomys chapmani*, DBCA Priority 4).

Records indicate that signs of Black-footed Rock-wallaby presence were identified during the fauna surveys outside the Permit Area, with the records within the vicinity of the WRAC Section 2 being significant as it appears to represent the only recent record of the species from the Great Sandy Desert, and was a previously unknown colony prior to the completion of the AREH project survey (Biota, 2020c). Rocky habitat in the form of breakaways and rock piles were searched, yielding numerous scat and track records. In addition an individual was recorded in a cage trap and on motion cameras, and individuals were also sighted on the rock piles just after dawn (Biota, 2020c). This species rarely forages far from rock piles, where it feeds on fruits of *Ficus brachypoda*, and seeks refuge from the desert heat amongst rocky overhangs (Biota, 2020c).

The Northern Quoll (*Dasyurus hallucatus*) was recorded during the Level 2 AREH survey from a scat collected, however no evidence of denning was recorded and no individuals were trapped or recorded on automated cameras (Biota, 2020c). Extensive searching of rocky habitat was undertaken to target the Black-footed Rock Wallaby within WRAC Section 2, therefore the limited



evidence to indicate denning of the Northern Quoll would seem to indicate that it is occurring at most on a transient basis (Biota, 2020c).

The species *Lerista separanda* was recorded from two sites within WRAC Section 2. The records were notable given how rarely the species has been recorded to date, however records from the surveys (of both the WPA and the WRAC Section 2) indicate that the species has a considerably broader distribution than was previously known (Biota, 2020c).

Potential evidence of the Brush-tailed Mulgara (*Dasyercus blythi*) was found in two locations in the Diversion, comprising one main burrow and four 'pop holes' (vertical entrances to tunnels associated with a main burrow). The burrow was inactive, located within a recently burnt area, and had no burrow entrance near the pop holes. It was concluded that the sign recorded likely represents evidence of past presence of the Brush-tailed Mulgara (Biota, 2020c).

The Northern Marsupial Mole (*Notoryctes caurinus*) was recorded during the AREH survey from moleholes observed within WRAC Section 2. Marsupial moles inhabit sand dunes and, to a lesser extent, adjacent swales where there is suitable deep, loose sand (Biota, 2020c). There is no robust estimate of population size (Department of Environment and Energy, 2018).

Three mounds of the Western Pebble-mound Mouse (*Pseudomys chapmani*) were detected during the AREH survey within WRAC Section 2 (Biota, 2020c). This species is known over the entire Pilbara region and into the Gascoyne, where it is commonly found on stony hillsides with hummock grasslands within the Hamersley and Chichester subregions of the Pilbara bioregion (Menkhorst and Knight, 2011). The occurrence of the species within WRAC Section 2 was notable as it was further north than where the species has typically been recorded, however this is likely due to lack of survey coverage. Only one of the three mounds recorded was classified as active (Biota, 2020c).

Targeted surveys were undertaken for the Bilby (*Macrotis lagotis*) within the WPA, and as part of the reconnaissance survey of the WRAC Section 1 and Section 3, the WRAC Diversion, the Proposed Borefield and Borrow Source Areas. Evidence positively attributable to the Bilby, comprised of recent diggings, scats, tracks and active burrows, was found during unbounded transect searches within one primary locale of the WPA. Signs indicative of past presence of the Bilby were found in WRAC Section 1, the WRAC Diversion and Borrow Source Areas. Tracks were encountered within WRAC Section 3, however no other signs were detected in this area. High prospective Bilby habitat was mapped over 25% of the total WPA, the remaining proportions were assessed to be moderate or low prospective habitat. Highly prospective habitat was identified within the WRAC Section 1 and Section 3, as well as within the Borrow Source Areas and WRAC Diversion (Biota, 2020b). Bilby habitat prospectivity mapped within the WRAC, Borrow Source Areas and WRAC Diversion is provided in Figure 8.6 – 8.14 of Biota (2020b; Appendix 4). A population analysis was also undertaken at an identified Bilby population within the WPA (outside the Permit Area). A copy of this analysis is provided in Appendix 4 (Biota, 2020c)

An additional six conservation significant species were identified as likely to occur or potentially occurring within the WPA and WRAC based on previous records and habitat availability:

- Great Desert Skink (*Liopholis kintorei*, BC Act and EPBC Act Vulnerable);
- Fork-tailed Swift (*Apus pacificus*, BC Act and EPBC Act Migratory);
- Little Curlew (*Numenius minutus*, BC Act and EPBC Act Migratory); and
- Short-tailed Mouse (*Leggadina lakedownensis*, DBCA Priority 4).



- Princess Parrot (*Polytelis alexandrae*, DBCA Priority 4, EPBC Act Vulnerable); and
- Night Parrot (*Pezoporus occidentalis*, BC Act Critically Endangered, EPBC Act Endangered).

A likelihood of occurrence assessment was undertaken by Biota (2020d) to determine potential for the Great Desert Skink to occur within the broader Winu Project Area (the WPA, Proposed Borefield, WRAC and AREH) (Appendix 4). The assessment identified that while there is potential habitat, the WPA, Proposed Borefield, WRAC and AREH are located outside the range of records to date, with the nearest records almost 200 km away (Biota, 2020d). Given that there have been no records of the Great Desert Skink obtained during any recent surveys, despite extensive survey effort, it is unlikely that the Great Desert Skink currently occurs within the WPA, Proposed Borefield, WRAC or AREH (Biota, 2020d).

The Fork-tailed Swift is not expected to rely on terrestrial habitat within the WRAC as the species is believed to be exclusively aerial within Australia. The Little Curlew and the Oriental Plover both forage on and over inland plains within the greater locality, and therefore are likely to occur within the WRAC on occasion. Some areas of undisturbed habitat (mixed grasslands and shrublands) that may be suitable to the Short-tailed Mouse were identified within the WRAC, and therefore it was conservatively considered to have potential to occur (Biota, 2020b).

Recording of the Princess Parrot within the Permit Area would be difficult to determine as it is a highly nomadic species. If present, it is expected the Princess Parrot would only be in the Permit Area on occasion to forage on spinifex during seeding events.

The Night Parrot has not been recorded despite targeted survey efforts within the WPA. Recent and repeated fires within spinifex on sandplain fauna habitat has resulted in removal of large and mature spinifex hummocks, which reduced suitable nesting habitats for the Night Parrot. It remains possible that the Night Parrot may be present in the Permit Area, however no records were made and no evidence of suitable nesting habitat or foraging habitat was recorded (Biota, 2020b).

The following introduced fauna species have been recorded to occur within the WPA (Biota, 2020b):

- *Felis catus* (Cat);
- *Vulpes vulpes* (Red Fox);
- *Camelus dromedarius* (Camel); and
- *Canis familiaris dingo* (Dingo; naturalised exotic species).

#### 4.4.4 SHORT RANGE ENDEMIC INVERTEBRATE FAUNA

Biota (2020b) collected a total of 41 invertebrate specimens through the methods of dry pitfall trapping and targeted searching within the WPA, including 28 spiders and 13 scorpions. DNA sequencing was undertaken on these specimens, and it was conservatively estimated that the specimens including ten potential short-range endemic (SRE) species, include eight spiders and two scorpions.

A total of 36 invertebrate specimens were collected from within WRAC Section 2 during the AREH survey, including 23 spiders, nine scorpions and four snails. DNA sequencing was undertaken on these specimens and three species of mygalomorph (trapdoor) spiders were identified to be belonging to newly recorded taxa assigned potential SRE status (Biota, 2020b).



## 4.5 SURFACE WATER DRAINAGE

The Permit Area is located in a low rainfall/runoff location, with potential for rare high rainfall events to occur. There are no obvious drainage paths in the area, therefore flood risk potential is more likely due to ponding rather than flooding of any major drainage lines.

The Permit Area lies partially within the Pilbara Surface Water Area proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). This area lies mainly within the Sandy Desert Lake Dora catchment of the Sandy Desert Basin with a very small portion within the De Grey River catchment of the De Grey River Basin.

There are no surface water features within the Permit Area (Figure 13). Lake Waukarlycarly is approximately 20 km south of the Permit Area, while Mandora Marsh is approximately 43 km to the north. The Permit Area is not within the catchment for either of these surface water features (Jacobs, 2019).

## 4.6 CURRENT LAND USE

The western end of the Permit Area (L45/493) is located within the Wallal Downs Pastoral Station, with the remainder of the Permit Area located on Unallocated Crown Land.

The Permit Area also intersects with the Nyangumarta Warrarn Indigenous Protected Area (IPA), which covers an area of 28,240 km<sup>2</sup> and was established in 2015 after the Traditional Owners of the land entered into a voluntary agreement with the Australian Government for the purposes of promoting biodiversity and cultural resource conservation.





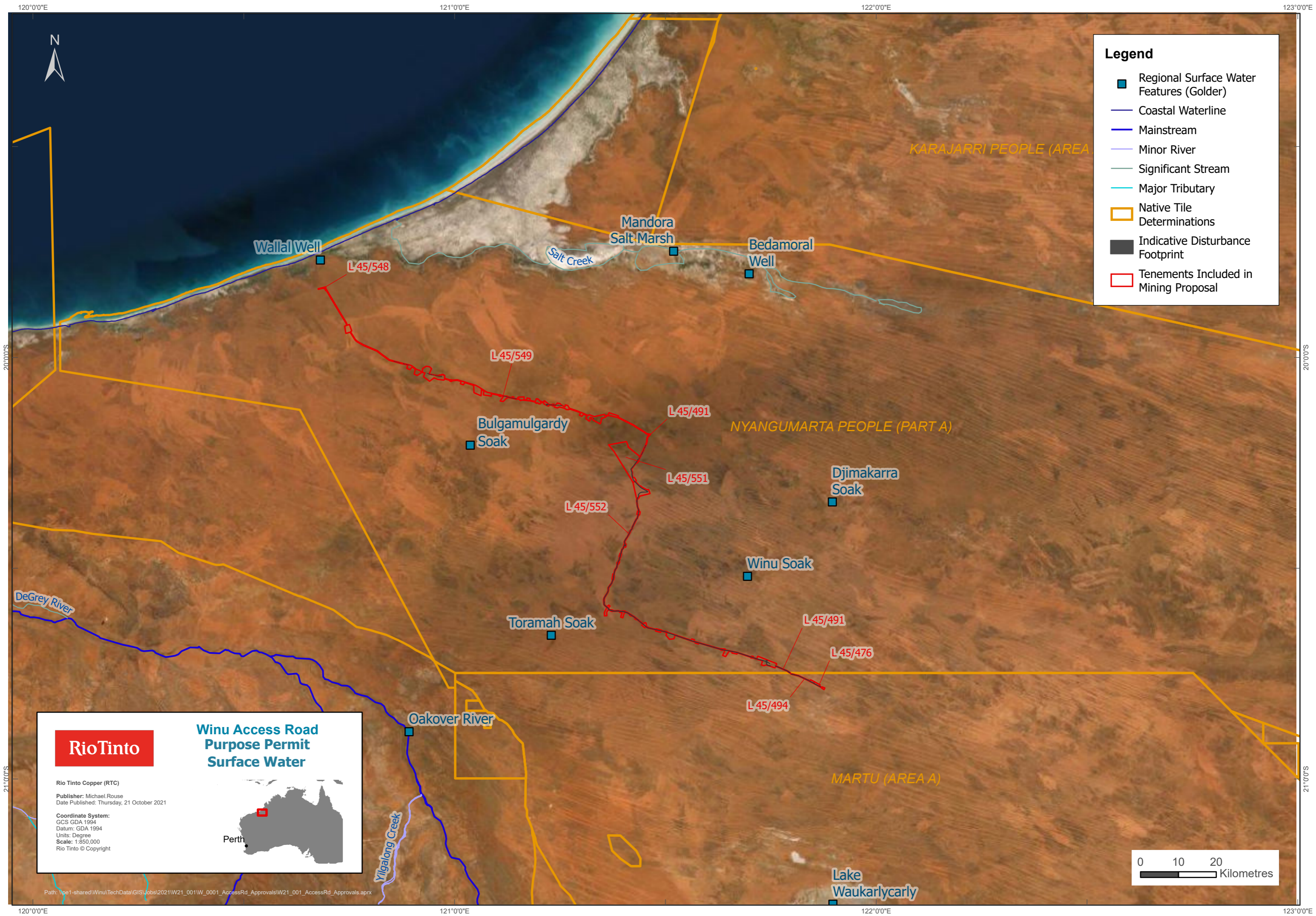


Figure 13: Surface water features and catchments

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## 5 ASSESSMENT OF CLEARING AGAINST THE TEN CLEARING PRINCIPLES

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The proposed vegetation disturbance has been assessed against the ten clearing principles described within *A Guide to the Assessment of Applications to Clear Native Vegetation* (Department of Environment Regulation (DER), 2014) under Part V Division 2 of the EP Act (Table 6). The results of flora, vegetation and fauna surveys described in Section 4 have been used to support the assessment.



Table 6: Assessment of proposed vegetation disturbance against the ten clearing principles

Relevant information	Assessment of potential impacts	Proposed control measures	Outcome - Assessment of variance with principle
<b>1. Native vegetation should not be cleared if it comprises a high level of biological diversity</b>			
<p>One current Threatened Flora (<i>Seringia exastia</i>) was recorded within the WRAC in a 2018 survey, however this is no longer of conservation significance (Biota, 2020a).</p> <p>Five Priority flora species were recorded within the Permit Area:</p> <ul style="list-style-type: none"> <li>• <i>Goodenia hartiana</i> (P2);</li> <li>• <i>Bonamia oblongifolia</i> (P3);</li> <li>• <i>Dasymalla chorisepala</i> (P3);</li> <li>• <i>Seringia katatona</i> (P3); and</li> <li>• <i>Tribulosa marliesiae</i> (P3).</li> </ul> <p>These Priority Flora species were considered to be poorly documented within the Great Sandy Desert, as they are well known from the broader locality (Biota, 2020a). The species were not considered to be restricted to the Permit Area, and either were represented outside of the Permit Area or records of the species represented a range extension for the species.</p> <p>No TECs or PECs were recorded within the Permit Area (Biota 2020a).</p> <p>One vegetation type within the Permit Area (code: P1) was considered to be of local significance as it supported large populations of Priority Flora (Biota, 2020a). This vegetation type was mapped over an area of 6,462.2 ha.</p> <p>A total of three broad fauna habitats were identified within the Permit Area (Biota, 2020b):</p> <ul style="list-style-type: none"> <li>• Shrub and spinifex on sandplain;</li> <li>• Longitudinal sand plain ridge; and</li> <li>• Gravelly lateritic rise.</li> </ul> <p>None of these fauna habitats represented constrained habitat for any significant fauna species, however 11 species of were recorded from surveys within the WRAC and WPA and may utilise the Permit Area.</p> <p>A portion of cleared area was also present within the Permit Area.</p>	<p>Up to 125 ha of vegetation clearing is required to allow the upgrade of the existing access road. This vegetation clearing is to occur within the boundary of the Permit Area.</p> <p>The Permit Area does not represent significant habitat for any of the Priority Flora species. All but two Priority Flora species (<i>Bonamia oblongifolia</i> (P3), <i>Seringia katatona</i> (P3)), had more than 70% of the local Biota (2020a) records occurring outside the Permit Area, and only one Priority Flora species was present within the indicative disturbance footprint (Table 4). Only two records of <i>Bonamia oblongifolia</i> were recorded within the Permit Area and this species was commonly found by Astron during the AREH survey and therefore would be expected to occur more widely through the area. Additionally, it was estimated that a total of 1.2 million <i>Bonamia oblongifolia</i> individuals were recorded across surveys at Wallal Downs, Pardoo and Anna Plains Stations and therefore it can be concluded that the species is clearly not uncommon in suitable habitat. A total of 150 individuals of <i>Seringia katatona</i> were recorded within the Permit Area, however 1,737 individuals were recorded in additional surveys within the known range of the species (Biota, 2018). It is likely that <i>Seringia katatona</i> occurs more broadly within the locality, and the presence of abundant suitable and contiguous habitat in the region suggests that the species cannot be considered to be rare (Biota, 2018).</p> <p>The vegetation within the proposed Permit Area represents only a small narrow portion of broad recorded vegetation types that are known to occur outside of the Permit Area. The associated vegetation associations are almost completely intact with minimal other clearing in the area.</p> <p>The P1 vegetation unit was noted to potentially be of local significance due to presence of Priority species, however this vegetation type was recorded over a large area (6,462.2 ha) and only a small portion of this vegetation type intersects with the Permit Area (Appendix 3).</p> <p>The fauna habitat within the Permit Area is representative of surrounding undisturbed habitat and none was noted by Biota (2020b) as being unique or comprising a high level of fauna diversity. All unique or constrained habitats and recorded significant fauna populations identified by Biota (2020b and 2020c) occur outside the Permit Area.</p> <p>Based on the above, the native vegetation within the Permit Area is considered unlikely to comprise a high level of biological diversity.</p>	<ul style="list-style-type: none"> <li>• All clearing to be managed under RTX's Ground Disturbance Permit (GDP) (SNS) system;</li> <li>• The coordinates of all known locations of Priority Flora will be recorded in RTX's GIS system;</li> <li>• Known locations of Priority Flora shall be avoided where reasonably practicable, with specific consideration for <i>Bonamia oblongifolia</i> and <i>Seringia katatona</i> records;</li> <li>• Cleared areas are to be rehabilitated if not required during operations;</li> <li>• All clearing kept to minimum required area within the proposed Permit Area and completed only as required;</li> <li>• In line with RTX's existing Environmental Management Plan, pre-clearance burrow surveys are to be conducted within highly prospective habitat to ensure that there are no active Bilby burrows present;</li> <li>• Night travel is prohibited, except in the case of an emergency which requires an exemption; and</li> <li>• A Black-footed Rock-wallaby Action Plan (Appendix 4) has been developed to reduce potential interaction and impacts for this species.</li> </ul>	<p>The proposed vegetation disturbance is not expected to be at variance with this principle.</p>
<b>2. Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA</b>			
<p>Three broad fauna habitats were identified within the Permit Area:</p> <ul style="list-style-type: none"> <li>• Shrub and spinifex on sandplain;</li> <li>• Longitudinal sand plain ridge; and</li> <li>• Gravelly lateritic rise.</li> </ul> <p>A portion of cleared area was also present within the Permit Area.</p> <p>Eleven significant fauna species were recorded within or in the vicinity of the Permit Area:</p> <ul style="list-style-type: none"> <li>• Black-footed Rock-wallaby (<i>Petrogale lateralis lateralis</i>, BC Act and EPBC Act Endangered);</li> <li>• Northern Quoll (<i>Dasyurus hallucatus</i>, BC Act and EPBC Act Endangered);</li> <li>• Bilby (<i>Macrotis lagotis</i>, BC Act and EPBC Act Vulnerable);</li> <li>• Grey Falcon (<i>Falco hypoleucos</i>; BC Act Vulnerable);</li> <li>• Gull-billed Tern (<i>Gelochelidon nilotica</i>; BC Act and EPBC Act Migratory);</li> <li>• Oriental Plover (<i>Charadrius veredus</i>; BC Act and EPBC Act Migratory);</li> <li>• Oriental Pratincole (<i>Clareola maldivarum</i>, BC Act and EPBC Act Migratory);</li> <li>• <i>Lerista separanda</i> (DBCA Priority 2);</li> <li>• Brush-tailed Mulgara (<i>Dasyercus blythi</i>; DBCA Priority 4);</li> <li>• Northern Marsupial Mole (<i>Notoryctes caurinus</i>, DBCA Priority 4); and</li> <li>• Western Pebble-mound Mouse (<i>Pseudomys chapmani</i>, DBCA Priority 4).</li> </ul>	<p>Up to 125 ha of vegetation clearing is required to allow the upgrade of the existing access road. This vegetation clearing is to occur within the boundary of the Permit Area.</p> <p>Less than 0.86% of the mapped extent (in Biota, 2020b) of any fauna habitat is predicted to be cleared to allow the access road upgrade.</p> <p>RTX notes that fauna species listed under the BC or EPBC Acts, or priority DBCA species are likely to occur on occasions within the Permit Area.</p> <p>All unique or constrained habitats (rockpiles) and recorded significant Bilby populations identified by Biota (2020b and 2020c) occur outside the Permit Area.</p> <p>Bilby are listed as Vulnerable under the BC Act and EPBC Act and evidence of this species was recorded at several locations in the area. Almost all of the Permit Area and surrounding areas were mapped by Biota (2020b) as being prospective habitat for this species. The access road upgrade requires an average clearing width of 20 m, widening an existing road. Given the broad-ranging Bilby habitats mapped by Biota (2020b), the 20 m wide clearing footprint is considered unlikely to significantly affect Bilby populations that may be present or prevent Bilby populations becoming established in the area. The vegetation to be cleared is therefore considered unlikely to represent significant habitat for this species.</p>	<ul style="list-style-type: none"> <li>• Implement measures described above; and</li> <li>• Fauna refuges such as logs will be pushed to the side of the clearing areas and retained where practicable.</li> </ul>	<p>The proposed vegetation disturbance is not expected to be at variance with this principle.</p>



Relevant information	Assessment of potential impacts	Proposed control measures	Outcome - Assessment of variance with principle
<p>An additional four species were noted by Biota (2020b) as likely to occur:</p> <ul style="list-style-type: none"> <li>• Great Desert Skink (<i>Liopholis kintorei</i>, BC Act and EPBC Act Vulnerable);</li> <li>• Fork-tailed Swift (<i>Apus pacificus</i>, BC Act and EPBC Act Migratory);</li> <li>• Little Curlew (<i>Numenius minutus</i>, BC Act and EPBC Act Migratory); and</li> <li>• Short-tailed Mouse (<i>Leggadina lakedownensis</i>, DBCA Priority 4).</li> </ul>	<p>Records indicate that signs of Black-footed Rock-wallaby presence were identified proximate to a small section (approximately 5 km, near the Nyangumarta Highway and Wirrkirr Road intersection) of the Permit Area, with significant habitats located several kilometres from the Permit Area. This species rarely forages far from rock piles, where it feeds on fruits of <i>Ficus brachypoda</i>, and seeks refuge from the desert heat amongst rocky overhangs (Biota, 2020c). Rock pile habitat will not be impacted by the proposal and therefore significant impacts to this species is not expected.</p> <p>The Northern Quoll was recorded during the AREH survey from a scat collected from rock substrate; no other evidence of the species was recorded. Given the extensive searching of rock habitat to target the Black-footed Rock-wallaby, the limited evidence of the Northern Quoll would indicate that it is occurring at most on a transient basis.</p> <p>The recorded bird species are all relatively wide-ranging and the narrow portion of the broad fauna habitats within the Permit Area is unlikely to represent significant habitat for any of these species.</p> <p>The small proportion of the mapped fauna habitats to be cleared within the Permit Area are also considered unlikely to represent significant habitat for any of the remaining species. The fauna habitats mapped by Biota (2020b) will all have more than 99% of their mapped extent remaining after the proposed clearing has occurred. In addition, there is expected to be significant additional areas of these habitats that are undisturbed in the surrounding region.</p> <p>In summary, the proposed disturbance within the Permit Area is not expected to comprise the whole, or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA as:</p> <ul style="list-style-type: none"> <li>• The fauna habitat mapped within the Permit Area extends well beyond the boundaries of the Permit Area;</li> <li>• No restricted habitat critical to conservation significant fauna is located within the proposed Permit Area; and</li> <li>• Similar habitats outside of the Permit Area remain almost completely undisturbed.</li> </ul>		
<p><b>3. Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora</b></p>			
<p>One current Threatened Flora (<i>Seringia exastia</i>) was recorded within the WRAC in a 2018 survey however this is no longer of conservation significance (Biota, 2020a).</p> <p>Five Priority flora species were recorded within the Permit Area:</p> <ul style="list-style-type: none"> <li>• <i>Goodenia hartiana</i> (P2);</li> <li>• <i>Bonamia oblongifolia</i> (P3);</li> <li>• <i>Dasymalla chorisepala</i> (P3);</li> <li>• <i>Seringia katatona</i> (P3); and</li> <li>• <i>Tribulosa marliesiae</i> (P3).</li> </ul> <p>These Priority Flora species were considered to be poorly documented within the Great Sandy Desert, as they are well known from the broader locality (Biota, 2020a). The species were not considered to be restricted to the Permit Area, and either were represented outside of the Permit Area or records of the species represented a range extension for the species.</p>	<p>The Access Road upgrade will not result in the disturbance of any recorded Threatened Flora species listed under the BC Act or EPBC Act.</p> <p>The Permit Area does not represent significant habitat for any of the Priority Flora species. All but two Priority Flora species (<i>Bonamia oblongifolia</i> (P3), <i>Seringia katatona</i> (P3)), had more than 70% of the local Biota (2020a) records occurring outside the Permit Area, and only one Priority Flora species was present in the indicative disturbance footprint (Table 4). Only two records of <i>Bonamia oblongifolia</i> was recorded within the Permit Area and this species was commonly found by Astron during the AREH survey and therefore would be expected to occur more widely through the area. Additionally, it was estimated that a total of 1.2 million <i>Bonamia oblongifolia</i> individuals were recorded across surveys at Wallal Downs, Pardoo and Anna Plains Stations and therefore it can be concluded that the species is clearly not uncommon in suitable habitat. A total of 150 individuals of <i>Seringia katatona</i> were recorded within the Permit Area, however 1,737 individuals were recorded in additional surveys within the known range of the species (Biota, 2018). It is likely that <i>Seringia katatona</i> occurs more broadly within the locality, and the presence of abundant suitable and contiguous habitat in the region suggests that the species cannot be considered to be rare (Biota, 2018).</p> <p>In summary, the native vegetation to be cleared does not include Threatened Flora, and is not considered necessary for the continued existence of any Threatened Flora or Priority Flora species.</p>	<p>Implement measures described above.</p>	<p>The proposed vegetation disturbance is not expected to be at variance with this principle.</p>
<p><b>4. Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a Threatened Ecological Community</b></p>			
<p>None of the vegetation recorded within the broader study area was considered to represent a TEC (Biota, 2020a).</p>	<p>No impacts to TECs expected as none were identified within the proposed Permit Area or surrounding study area (Biota, 2020a).</p>	<p>Not applicable.</p>	<p>The proposed vegetation disturbance is not at variance with this principle.</p>



Relevant information	Assessment of potential impacts	Proposed control measures	Outcome - Assessment of variance with principle
<b>5. Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared</b>			
The majority of the Permit Area is located in the Great Sandy Desert bioregion, within the Mackay subregion (18,636,695 ha; GSD02) and the McLarty subregion (13,173,266 ha; GSD01). A small portion of the Permit Area extends into the Pindanland subregion (5,198,904 ha; DAL02), within the Dampierland bioregion. All subregions are well represented outside of the Permit area.  Limited data is available for the vegetation associations mapped within the Biota (2020a) study areas, however it was considered unlikely that any of the units were restricted.	Up to 125 ha of native vegetation is proposed to be cleared within the Permit Area to allow the access road upgrade. The proposed clearing area is within an area that has not been extensively cleared and is not a remnant of native vegetation.	Implement measures described above.	The proposed vegetation disturbance is not at variance with this principle.
<b>6. Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland</b>			
There are no watercourses or wetlands located within the proposed Permit Area.	No native vegetation that is growing in, or in association with, an environment associated with a watercourse or wetland will be cleared.	Not applicable.	The proposed vegetation disturbance is not at variance with this principle.
<b>7. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation</b>			
The area within and surrounding the Permit Area remains mostly uncleared with disturbance limited to that caused by local access (i.e. via the existing access road), pastoral activities and exploration.  No declared pests or Weeds of National Significance were recorded within the Permit Area (Biota, 2020a).  No introduced flora species were recorded in the Permit Area.	Up to 125 ha of native vegetation is proposed to be cleared within the Permit Area for the implementation of the Access Road upgrade.  Degradation from erosion is unlikely given the lack of watercourses within the Permit Area.  No introduced flora or fauna species have been recorded to occur within the proposed Permit Area. With the implementation of weed control measures, the Access Road upgrade is not expected to result in land degradation from the introduction of invasive species populations.	<ul style="list-style-type: none"> <li>• Implement measures described above;</li> <li>• All earthmoving equipment shall be cleaned prior to arriving on site;</li> <li>• Any new identified weed infestations within the Permit Area shall be eradicated as soon as practicable; and</li> <li>• Light vehicles shall use existing tracks.</li> </ul>	The vegetation disturbance is not expected to be at variance with this principle.
<b>8. Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area</b>			
There are no nearby or adjacent conservation lands.	There are no conservation areas within or in close proximity to the proposed Permit Area, therefore the proposed clearing is not likely to have any impact on the environmental values of any conservation area.	Not applicable.	The proposed vegetation disturbance is not at variance with this principle.
<b>9. Native vegetation should not be cleared if the clearing is likely to cause deterioration in the quality of surface or underground water</b>			
The Permit Area lies partially within a Surface Water Area proclaimed under the RIWI Act. This area lies mainly within the Sandy Desert Lake Dora catchment of the Sandy Desert Basin with a very small portion within the De Grey River catchment of the De Grey River Basin. No significant water users (groundwater or surface water) are in close proximity to the proposed works.  There are no wetlands or watercourses located within the proposed Permit Area. Lake Waukarlyarly is approximately 20 km south of the Permit Area, while Mandora Marsh is approximately 43 km to the north. The Permit Area is not within the catchment for either of these surface water features (Jacobs, 2019).	Potential impacts to surface or groundwater quality as a result of the clearing include sediment loss from disturbed areas and minor hydrocarbon spills, which may occur as a result of leaks from hydraulics, earthmoving equipment or light vehicles.  The Access Road upgrade is unlikely to cause deterioration in the quality of surface or groundwater. Any changes to surface or groundwater quality will be temporary, small scale and isolated. Such impacts would not likely be detected on anything more than a micro-scale.	<ul style="list-style-type: none"> <li>• Implement measures described above;</li> <li>• Standard engineering controls will be used to limit the potential for erosion and sediment loss; and</li> <li>• If any spillage of hydrocarbons or other pollutants occur during construction activities, the contaminated soil shall be removed and disposed of at a licenced facility.</li> </ul>	The proposed vegetation disturbance is not expected to be at variance with this principle.
<b>10. Native vegetation should not be cleared if the clearing is likely to cause, or exacerbate, the incidence or intensity of flooding</b>			
The Permit Area lies partially within the Surface Water Area proclaimed under the RIWI Act. This area lies mainly within the Sandy Desert Lake Dora catchment of the Sandy Desert Basin with a very small portion within the De Grey River catchment of the De Grey River Basin.  The region is generally dry, with occasional significant rainfall events often associated with cyclones. Drainage in the area is therefore ephemeral.	There may be minor changes to localised minor surface drainage through the clearing of vegetation, however there is not expected to be any significant or ongoing impact to surface water flows given the lack of watercourses in the Permit Area.  The clearing will only cause localised disturbance that will not exacerbate the incidence or intensity of flooding.	Implement measures described above.	The proposed native vegetation disturbance is not expected to be at variance with this principle.



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## 6 SUMMARY AND CONCLUSIONS

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The purpose of this NVCP application is to allow the clearing of native vegetation necessary to enable the safe upgrade of an access road to RTX's Winu Project, and exploration activities in the broader Paterson Province (Figure 1).

All vegetation disturbance detailed in this NVCP application is proposed to occur within the Permit Area shown in Figures 2 – 8.

The proposed Permit Area lies within broad study areas surveyed for RTX's Winu Project (Biota, 2020a & 2020b). In addition, there have been several other fauna, flora and vegetation surveys in the region, which are described in Biota's (2020a & 2020b) flora and vegetation and fauna survey reports (Appendix 2 & 4). Therefore, the assessment against the ten clearing principles described within *A Guide to the Assessment of Applications to Clear Native Vegetation* (DER, 2014) under Part V Division 2 of the EP Act was based on a significant database, derived from those biological survey reports.

The access road upgrade has been designed to minimise potential environmental impacts, including:

- Following an existing road alignment to reduce clearing and fragmentation impacts;
- Minimising the scope of the disturbance for the works so that all clearing is kept to minimum required areas and completed only as required;
- Avoid clearing of known individuals or populations of Priority flora where practicable; and
- Any cleared areas not required for operations will be rehabilitated following completion of construction.

The proposed clearing is not expected to be at variance with any of the ten clearing principles (Table 6). RTX shall implement the proposed control measures listed in Table 6 to ensure that potential impacts are minimised.



## 7 GLOSSARY

Term	Meaning
AREH	Asian Renewable Energy Hub
Astron	Astron Environmental Services
BC Act	<i>Biodiversity Conservation Act 2016</i>
Biota	Biota Environmental Sciences
DBCA	Department of Biodiversity, Conservation and Attractions
DER	Department of Environment Regulation
EP Act	<i>Environmental Protection Act 1986</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GDP	Ground Disturbance Permit
ha	Hectares
IBRA	Interim Biogeographical Regionalisation of Australia.
km	Kilometres
m	Metres
NVCP	Native Vegetation Clearing Permit
P	Priority
PEC	Priority Ecological Community
Permit Area	The proposed Purpose Permit Area (Figure 1)
Project	Winu Project
RTX	Rio Tinto Exploration Pty Limited
SRE	Short-range endemic
TEC	Threatened Ecological Community
WA	Western Australia
WPA	Winu Project Area
WRAC	Winu Road Access Corridor

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## 9 APPENDICES

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The following appendices have been provided electronically:

**Appendix 1:** Shapefiles of the Permit Area

**Appendix 2:** Relevant flora and vegetation survey reports

**Appendix 3:** Mapping of flora and vegetation types within Permit Area

**Appendix 4:** Relevant fauna survey reports

**Appendix 5:** Fauna habitats of the Permit Area

