



Statement addressing the 10 Clearing Principles

Karratha Solar Farm Geotechnical Investigation

17 June 2024

Contents page

Introduction	3
Statement addressing the 10 Clearing Principles	3
1. Principle a. Comprises high level of biological diversity	3
2. Principle b. Potential impact to any significant habitat for fauna indigenous to Western Australia	9
3. Principle c. Potential impact to any rare flora	10
4. Principle d. Presence of any threatened ecological communities	10
5. Principle e. Significance as a remnant of native vegetation in the area that has been extensively cleared	11
6. Principle f. Impact on any watercourse and / or wetlands	11
7. Principle g. Potential to cause appreciable land degradation	11
8. Principle h. Potential to impact on the environmental values of adjacent or nearby conservation areas	15
9. Principle i. Potential deterioration in the quality of surface or underground water	15
10. Principle j. Potential of clearing to cause, or exacerbate, the incidence or intensity of flooding	15
Conclusion	15
References	17
Attachments	18

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Assessment against the 10 Clearing Principles – Karratha Solar Farm Geotechnical Investigation

Introduction

A geotechnical investigation program is required to evaluate the characteristics of the soil and ground conditions to support the potential future development of the Karratha Solar Farm located south of the existing Yurralyi Maya Power Station (the Proposal). Hamersley Iron Pty Ltd proposes a geotechnical investigation including site testing and sampling to obtain a representation of the sub-surface conditions of the site (hereafter known as the Application Area), which is located 10.9 km southwest of the Town of Karratha and is 139.9 ha (

Figure 1). The proposed disturbance of 10.0 ha of native vegetation accounts for machinery access, all types of tests (test pits, boreholes, pile tests, stockpiling), and a small laydown area.

Access to the Application Area will be via both bitumen road, existing maintenance track along the 220KV line, and a new access track into the Application Area. No widening or maintenance of existing tracks is required.

The Application Area and surrounds were subject to a single-phase detailed biological assessment (AECOM, 2023) and a targeted Northern Quoll and bird survey (Stantec, 2023).

Based on specialist assessment of the survey area and discussion below in relation to the 10 Clearing Principles of the *Environmental Protection Act 1986*, it is deemed that:

- Principles (c), (d), (e), and (h) are not at variance;
- Principles (a), (b), (f), (i) and (j) are not likely to be at variance; and
- Principle (g) may be at variance.

Statement addressing the 10 Clearing Principles

1. Principle a. Comprises high level of biological diversity

Native vegetation should not be cleared if it comprises a high level of biological diversity.

The Pilbara is one of Australia's 15 National Biodiversity Hotspots (DBCA, 2023a) and is a secondary centre of endemism and species richness for *Acacia*, *Triodia*, *Corymbia* and *Sida* in Western Australia (Kendrick, 2001; Maslin & Van Leeuwen, 2008).

The study area occurs within the Roebourne subregion of the Pilbara IBRA bioregion of Western Australia, which is described as: 'Quaternary alluvial and older colluvial coastal and sub-coastal plains with a grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia stellaticeps* or *A. pyrifolia* and *A. inaequilatera*. Uplands are dominated by *Triodia* hummock grasslands. Ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands. Samphire, *Sporobolus* and mangal occur on marine alluvial flats and river deltas. Resistant linear ranges of basalts occur across the coastal plains, with minor exposures of granite' (Kendrick & Stanley, 2001).

Six vegetation types were described from the Application Area: two in hummock grasslands on flat to undulating plains, one in tussock grasslands on flats, and one in a minor channel. Additionally, cleared areas were mapped and accounted for 2.0 ha (1.4%) of the Application Area. Vegetation types and condition within the Application Area are described in Table 1, and mapped in Figure 2 and Figure 3.

None of the vegetation types occurring within the study area are listed as Threatened Ecological Communities (TECs) under either the EPBC Act or under the State listing maintained by DBCA.

The buffer of one Priority Ecological Community (PEC) was identified within the Application Area (Figure 4), the Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (Priority 1). This PEC consists of grasslands on microrelief on strongly gilgaied self-mulching cracking clays, and emergent depositional surfaces (DBCA, 2023b). The gilgai depressions support ephemeral and perennial tussock grasslands dominated by *Sorghum* sp. and *Eragrostis xerophila* along with other native species including *Eriachne benthamii*, *Chrysopogon fallax* and *Panicum decompositum*. This PEC differs from the surrounding non-gilgaied clay flats of the Horseflat land system which are dominated by *Eragrostis xerophila* and other perennial tussock grasses.


The Roebourne Plains PEC (P1) is represented by vegetation type T2 (SsSk), which encompasses 1.3 ha (0.9%) of the Application Area. This community comprises tussock grasslands on deep gilgaied clay soils, and was mapped for 277.5 ha by AECOM in the wider survey area (AECOM, 2023). The extent of this vegetation within the Application Area accounts for 0.4% of the extent of vegetation representative of the PEC mapped by AECOM (2023). The potential clearing of 1.3 ha is unlikely to have a significant impact on this vegetation type. Vegetation type T2 extends outside of the Application Area to the south, east and north. Further occurrences of this PEC as mapped by DBCA (DBCA, 2024) occur east of the Application Area, therefore the clearing of 1.3 ha may represent a lower impact percentage.

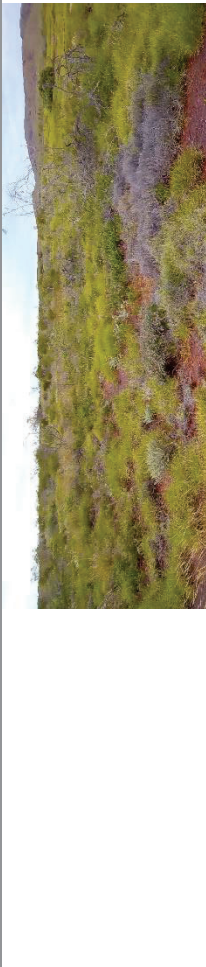
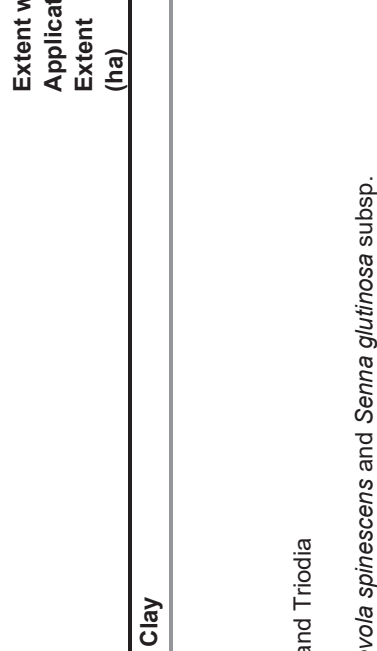
An additional PEC, the Horseflat Land System of the Roebourne Plains (Priority 3), was identified as potentially occurring by AECOM (2023). This PEC forms extensive clay plains dominated by tussock grasslands on mostly alluvial, red clay loams gilgaied and non-gilgaied for this community. The PEC is dominated by perennial tussock grasses including *Eragrostis xerophila*, *Chrysopogon fallax*, and other *Eragrostis* spp. and *Eriachne* spp. The community also supports a suite of annual grasses including *Dichanthium* spp., and *Sorghum* spp.



Vegetation type H5 (TwSk) was considered analogous to the Horseflat PEC (P3) due to sharing soil and/or floristic characteristics to some extent. This vegetation type was mapped for 153.0 ha by AECOM (2023) in the wider survey area. A total of 2.7 ha (2.0%) of vegetation type H5 is mapped within the Application Area, which accounts for 1.8% of the extent of vegetation representative of the PEC mapped by AECOM (2023). The potential clearing of 2.7 ha is unlikely to have a significant impact on this vegetation type. Additionally, the Horseflat PEC (P3) extends to the east, northeast, and west of the survey area as mapped by AECOM (2023) and DBCA (DBCA, 2024), therefore the clearing of 2.7 ha may represent a lower impact percentage.


The remaining four vegetation types were considered of low conservation value and well represented in the Roebourne subregion.

Table 1: Vegetation types in the Application Area, their representation and photographs

Description	Extent within the Application Area		Extent as per AECOM (2023)		Photograph (AECOM, 2023)
	Extent (ha)	Proportion (%)	Extent (ha)	Proportion (%)*	
Flats with Gilgai Clay					
T2					
SsSk Low Tussock Grassland Eragrostis and Sorghum	1.3	0.9	277.5	15.2	
<p><i>Sorghum stipoides</i>, <i>Eragrostis xerophila</i> and <i>Iseilema vaginiflorum</i> low tussock grassland with <i>Stemodia kingii</i>, <i>Streptoglossa</i> sp. and <i>Ptilotus gomphrenoides</i> low herbland.</p> <p>Recorded on flat terrain with red deep clay gilgai loams. Includes <i>Panicum decompositum</i> var. <i>decompositum</i>, <i>Astrelia pectinata</i> and <i>Chrysopogon fallax</i> as indicator species for the Roebourne Plains PEC and another 11 native grass species. Considered a good representation of the Roebourne Plains PEC.</p>					

Description	Extent within the Application Area		Extent as per AECOM (2023)		Photograph (AECOM, 2023)
	Extent (ha)	Proportion (%)	Extent (ha)	Proportion (%)*	
Flats with Non-Gilgai Clay					
H1 AbTwBp Low Hummock Grassland Triodia	4.7	3.4	90.8	5.0	
<p><i>Acacia bivenosa</i>, <i>Scaevola spinescens</i> and <i>Senna glutinosa</i> subsp. <i>pruinosa</i> mid open shrubland over <i>Triodia wiseana</i>, <i>Eulalia aurea</i> and <i>Sorghum stipoides</i> low mixed hummock and tussock grassland with <i>Bonania pilbarensis</i>, <i>Afrohybanthus aurantiacus</i> and <i>Goodenia microptera</i> low open herbland.</p> <p>Recorded on flat soils with hard clay loam with crusting and/or pebbles on surface. Included quartz and granite rocks.</p>					
H5 TwSk Low Hummock Grassland Triodia	2.7	2.0	153.0	8.4	
<p><i>Triodia wiseana</i>, <i>Eragrostis xerophila</i> and <i>Sorghum stipoides</i> low mixed tussock and hummock grassland with <i>Stemodia kingii</i>, <i>Streptoglossa</i> sp. and <i>Ptilotus gomphrenoides</i> low open herbland.</p> <p>Includes low shrub layer. Represents characteristics of both hummock grasslands and tussocks on deeper clays. The tussock grasslands on harder clays form bands intermittent with tussocks on deeper non-gilgai clay loams. It is therefore considered analogous to the Horseflat PEC.</p>					

Description	Extent within the Application Area		Extent as per AECOM (2023)		Photograph (AECOM, 2023)
	Extent (ha)	Proportion (%)	Extent (ha)	Proportion (%)*	
Hard Clay with Pebbles					
H2 AI TwBe Low Hummock Grassland Triodia	106.5	76.1	271.5	14.9	
<p><i>Acacia inaequilatera</i>, <i>Acacia bivenosa</i> and <i>Acacia ancistrocarpa</i> mid open shrubland over <i>Triodia wiseana</i>, <i>Eriachne pulchella</i> subsp. <i>dominii</i> and <i>Chrysopogon fallax</i> low mixed hummock and tussock grassland with <i>Bonamia erecta</i>, <i>Indigofera monophylla</i> and <i>Triumfetta clementii</i> low open shrubland.</p> <p>Recorded on flat terrain with hard red clay loam soils and quartz, calcrete and granite pebbles on the surface. Small pockets of <i>*Cenchrus ciliaris</i> noted near infrastructure.</p>					
H3 Cp Tw Low Hummock Grassland Triodia	22.6	16.2	104.5	5.7	
<p><i>Corchorus parviflorus</i>, <i>Ptilotus aervooides</i> and <i>Euploca heterantha</i> low mixed shrub and herbland with <i>Triodia wiseana</i>, <i>Aristida contorta</i> and <i>Enneapogon caeruleus</i> low mixed hummock and tussock grassland.</p> <p>Recorded on flat terrain with red clay loam soils (hard) and many granite pebbles on surface.</p>					

Description	Extent within the Application Area		Extent as per AECOM (2023)		Photograph (AECOM, 2023)
	Extent (ha)	Proportion (%)	Extent (ha)	Proportion (%)*	
Drainage Lines					
W1					
ChActw					
Open Woodland Corymbia					
<i>Corymbia hamersleyana</i> low open woodland over <i>Acacia coriacea</i> subsp. <i>pendens</i> , <i>Scaevola spinescens</i> and <i>Solanum cleistogamum</i> tall to low open shrubland over <i>Triodia wiseana</i> , <i>Chrysopogon fallax</i> and <i>Eulalia aurea</i> tall to low mixed hummock and tussock grassland.	<0.1	<0.1	5.8	0.3	
Associated with minor drainage near the power station. Condition mapped as Good caused by the presence of * <i>Cenchrus ciliaris</i> dominating parts of understorey.					
Cleared	2.0	1.4	30.6	1.7	N/A

* Note that the proportions presented in the table will not add up to 100% due to only a subset of vegetation types being included. Only vegetation types present within the Application Area were included in the table.

A total of 174 native flora taxa were recorded by AECOM (2023) in the wider survey area, representing 108 genera and 40 families. The Application Area is likely to reflect a small proportion of the suite of species occurring in the wider area due to the presence of fewer vegetation types. The floristic diversity was considered representative of the subregion. Seasonal conditions during the August 2022 survey were considered good due to significant rainfall in May, which was reflected in the presence of many annual flora taxa and adequate material for confident identification of grasses and herbs (AECOM, 2023).

No Commonwealth or State listed Threatened flora taxa were recorded in the Application Area and based on the results of the desktop assessment, none were expected to occur (AECOM, 2023). No Priority flora species were recorded within the Application Area, however three were recorded within the wider survey area (Figure 5), including:

- *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (P3) was recorded at eight locations within the wider survey area, the closest to the Application Area being 121.6 m away.
- *Euphorbia inappendiculata* var. *inappendiculata* (P2) was recorded at five locations within the wider survey area, the closest being 53.6 m from the Application Area.
- *Themeda* ?sp. Hamersley Station (M.E. Trudgen 11431) (P3) was recorded at five locations within the wider survey area, the closest being 573.7 m from the Application Area.

No other conservation significant flora taxa identified in the desktop study were considered likely to occur within the Application Area or the wider area.

Based on specialist assessment, the proposal is not likely to be at variance to this principle.

2. **Principle b. Potential impact to any significant habitat for fauna indigenous to Western Australia**

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 Western Australia.

Two broad fauna habitat types were recorded within the Application Area: 'clay plain' (137.9 ha, 98.6%) and 'minor drainage' (<0.1 ha, <0.1%) (Figure 6). These fauna habitats are not considered to be restricted at a local or regional level, and are widespread throughout the Pilbara region. Cleared areas were also mapped (2.0 ha, 1.4%), comprising access tracks, fence lines and existing infrastructure associated with the powerplant.

Clay plain habitat supported hummock grasslands and tussock grasslands, which offer refuge for ground-dwelling species in the hummocks and facilitate burrowing in seasonally soft soils (AECOM, 2023). It is anticipated that this fauna habitat changes significantly following dry periods, with clays becoming hard and cracking, and biomass reducing to perennial plants.

Minor drainage habitat consisted of minor flow lines and minor creeks that are ephemeral and support water following rainfall events. No hollows were observed in the trees.

No evidence of Matters of National Environmental Significance (MNES) fauna or Priority fauna was recorded within the Application Area or wider survey area (AECOM, 2023; Stantec, 2023). One conservation significant fauna taxon was recorded during a targeted fauna survey: Peregrine Falcon (*Falco peregrinus*, OS), however this was recorded outside of the wider survey area (Stantec, 2023).

No shorebird or waterbird species were recorded during a bird survey (Stantec, 2023), however the clay plain habitat may become seasonally inundated and support seasonal conditions for foraging shorebirds. A targeted Northern Quoll survey did not record any signs of the presence of this species within the wider survey area, and the minor drainage habitat is sparsely vegetated and does not contain denning habitat (Stantec, 2023).

An assessment of the likelihood of occurrence was completed internally and found that no fauna taxa of conservation significance are likely to occur within the Application Area. Additionally, eight fauna taxa of conservation significance have the potential to occur within the Application Area:

- Barn Swallow, *Hirundo rustica* (MI, MI).
- Fork-tailed Swift, *Apus pacificus* (MI, MI).
- Ghost Bat, *Macroderma gigas* (EN, EN).
- Grey Falcon, *Falco hypoleucos* (VU, not listed under the EPBC Act).
- Lined Soil-crevice Skink, *Notoscincus butleri* (P4, not listed under EPBC Act).
- Northern Quoll, *Dasyurus hallucatus* (EN, EN).
- Northern Short-tailed Mouse, *Leggadina lakedownensis* (P4, not listed under EPBC Act).
- Oriental Plover, *Charadrius veredus* (MI, MI).

Although, no denning or roosting habitat is present within the Application Area, the Northern Quoll and Ghost Bat are highly mobile species and have the potential to disperse or forage across the habitats in the Application Area.

None of the fauna taxa with potential to occur would be reliant on the habitat of the Application Area for their survival. Due to the small size of the Application Area, it is considered unlikely the Proposal will negatively impact on the conservation status of any of these species, on either a local or regional scale.

Based on specialist assessment, the proposal is not likely to be at variance to this principle.

3. Principle c. Potential impact to any rare flora

Native vegetation should not be cleared if it includes, or is necessary for the continued existence of rare flora.

No Threatened flora taxa were recorded, nor were any EPBC Act listed Threatened flora observed. No Threatened flora taxa were identified in the desktop assessment as occurring within a 100 km radius of the wider survey area (AECOM, 2023).

Based on specialist assessment, the proposal is considered not at variance to this principle.

4. Principle d. Presence of any threatened ecological communities

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 (TEC).

There are no Parks and Wildlife or Commonwealth listed TECs within or adjacent to the study area.

Based on specialist assessment, the proposal is considered not at variance to this principle.

5. Principle e. Significance as a remnant of native vegetation in the area that has been extensively cleared

Native vegetation should not be cleared if it is significant as remnant vegetation in an area that has been extensively cleared.

The majority of the Pilbara region has not been extensively cleared. However, grazing, inappropriate fire regimes and weed invasion have greatly altered the vegetation in some areas. The Application Area lies on one of Beard's mapping units: Abydos Plain – Roebourne 589, of which more than 99% of its pre-European extent is remaining. Vegetation types within the study area would not represent remnant stands of extensively cleared vegetation.

Based on specialist assessment, the proposal is considered not at variance to this principle.

6. Principle f. Impact on any watercourse and / or wetlands

Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

The Application Area intersects one minor ephemeral creekline that flows after significant rainfall events. This flow line is not considered to be significant watercourses or wetlands.

Based on specialist assessment, the proposal is not likely to be at variance to this principle.

7. Principle g. Potential to cause appreciable land degradation

Native vegetation should not be cleared if the clearing of vegetation is likely to cause appreciable land degradation.

The study area lies within the Horseflat Land System. Parts of some units of this land system (non-gilgaied plains, alluvial plains and dissected slopes, units 4, 5 and 6) are moderately to highly susceptible to erosion if vegetation is depleted (van Vreeswyk, 2004). Other flat units with clay soils and stony mantles are inherently resistant to erosion and degradation.

The landforms of the Application Area show affinities to three units of the Horseflat land system, and these are shown in Table 2.

Table 2: Analysis of landforms of the Application Area against the Horseflat land system units as described by van Vreeswyk (2004)

Land system unit	Landform	Soil	Associated species	Erosion susceptibility	Vegetation types (AECOM, 2023)	Area and proportion of the Application Area
3	Gilgaid plains	Self-mulching cracking clays	Tussock grasslands dominated by <i>Eragrostis xerophila</i> , but also other grasses such as <i>Chrysopogon fallax</i> and <i>Eriachne benthamii</i> . Occasional patches of <i>Acacia xiphophylla</i> with tussock grasses.	Inherently resistant to erosion	T2: although lacking <i>Acacia xiphophylla</i> and <i>Eriachne benthamii</i> , it exhibits other tussock grasses such as <i>Aristida</i> spp., <i>Eriachne flaccida</i> , <i>Bothriochloa ewartiana</i> , <i>Panicum decompositum</i> var. <i>decompositum</i> , <i>Sorghum stipoideum</i> and <i>Xerochloa laniflora</i>	1.3 ha 0.9%

4	Non-gilgaid, sometimes stony plains	Deep red non-cracking clays	Scattered shrublands of <i>Acacia xiphophylla</i> with tussock grasses, mostly <i>Eragrostis xerophila</i> . Also, patchy tussock and annual grasslands with hummock grasslands of <i>Triodia wiseana</i> , <i>T. longiceps</i> .	Moderately to highly susceptible to erosion if vegetation is depleted	H1: although lacking <i>Eragrostis xerophila</i> , this vegetation type exhibits other tussock grasses such as <i>Aristida</i> spp., <i>Bothriochloa ewartiana</i> , <i>Chrysopogon fallax</i> , <i>Digitaria brownii</i> , <i>Eragrostis setifolia</i> and others. <i>Acacia xiphophylla</i> and <i>Triodia wiseana</i> are also present in this vegetation type.	136.6 ha
					H2: this vegetation type lacks <i>Acacia xiphophylla</i> , <i>Eragrostis xerophila</i> and <i>Triodia longiceps</i> , however it exhibits other tussock grasses and <i>Triodia wiseana</i> as its dominant hummock grass. Associated grasses include <i>Aristida</i> spp., <i>Bothriochloa ewartiana</i> , <i>Chrysopogon fallax</i> , <i>Digitaria brownii</i> , <i>Eragrostis setifolia</i> and others.	97.6%
					H3: this vegetation type includes <i>Acacia xiphophylla</i> , <i>Eragrostis xerophila</i> and <i>Triodia wiseana</i> , as well as other tussock grasses.	
					H5: this vegetation type includes <i>Eragrostis xerophila</i> and <i>Triodia wiseana</i> , although lacks <i>Acacia xiphophylla</i> and <i>Triodia longiceps</i> . Other associated grasses include <i>Aristida</i> spp., <i>Bothriochloa ewartiana</i> , <i>Chrysopogon fallax</i> , <i>Eriachne flaccida</i> and others.	

7	Drainage depressions	Deep red/brown non-cracking clays and red loamy earths	Dense tussock grasslands including <i>Eriachne benthamii</i> , <i>Chrysopogon fallax</i> with occasional eucalypt trees and shrubs such as <i>Vachellia farnesiana</i> .	Inherently resistant to erosion	W1: tussock grasses include <i>Bothriochloa ewartiana</i> , <i>Chrysopogon fallax</i> , <i>Eriachne flaccida</i> , <i>Eulalia aurea</i> and others. No eucalypt trees were recorded, however <i>Corymbia hamersleyana</i> was the dominant tree species. Shrubs included <i>Acacia</i> spp., <i>Indigofera monophylla</i> , <i>Scaevola spinescens</i> .	<0.1 ha <0.1%
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The Proposal is not expected to result in nutrient export, water-logging/flooding, acidification, salinization or deep subsoil compaction, however may result in soil erosion due to the majority (97.6%) of the Application Area being mapped over a susceptible landform.

Based on specialist assessment, the proposal may be at variance to this principle.

8. Principle h. Potential to impact on the environmental values of adjacent or nearby conservation areas

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.

The Application Area is not overlapping or adjacent to a conservation area. The closest conservation area is Murujuga National Park, located 9.7 km north of the Application Area. Due to the spatial separation, the national park will not be impacted.

Based on specialist assessment, the proposal is considered not at variance to this principle.

9. Principle i. Potential deterioration in the quality of surface or underground water

Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

No major drainage lines, permanent or semi-permanent water features occur within or adjacent to the Application Area. No Public Drinking Water Source areas intersect with the Application Area.

Given the small scale of Proposal, there is no reason to expect that the Proposal would affect groundwater quality in the region.

Based on specialist assessment, the proposal is not likely to be at variance to this principle.

10. Principle j. Potential of clearing to cause, or exacerbate, the incidence or intensity of flooding

Native vegetation should not be cleared if the clearing of vegetation is likely to cause, or exacerbate, the incidence of flooding.

Local flooding occurs seasonally in the Pilbara region as a result of cyclonic activity and sporadic thunderstorm activity. The small scale of clearing proposed is not expected to exacerbate the incidence or intensity of flooding in the area.

Based on specialist assessment, the proposal is not likely to be at variance to this principle.

Conclusion

Hamersley Iron Pty Ltd proposes a geotechnical investigation to evaluate the characteristics of the soil and ground conditions to support the potential future development of the Karratha Solar Farm, which will require the clearing of 10.0 ha of native vegetation. A larger area was surveyed to identify potential environmental sensitivities in 2023 and met the requirements for a reconnaissance level survey to support a Native Vegetation Clearing Permit (NVCP).

Six vegetation types were described from the Application Area, none of which are considered representative of TECs. Two vegetation types were considered to represent PECs: vegetation type T2

was representative of the Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (Priority 1), and vegetation type H5 was considered analogous to the Horseflat Land System of the Roebourne Plains (Priority 3).

A total of 174 native flora taxa were recorded in the wider survey area, representing 108 genera and 40 families. No Commonwealth or State listed Threatened flora taxa were recorded in the Application Area and based on the results of the desktop assessment, none were expected to occur. No Priority flora species were recorded within the Application Area. No other conservation significant flora taxa identified in the desktop study were considered likely to occur within the Application Area or the wider area.

Two broad fauna habitat types were recorded within the Application Area: 'clay plain' and 'minor drainage'. These fauna habitats are not considered to be restricted at a local or regional level, and are widespread throughout the Pilbara region.

No evidence of MNES or Priority fauna taxa was recorded within the Application Area or wider survey area. The clay plain habitat may become seasonally inundated and support seasonal conditions for foraging shorebirds.

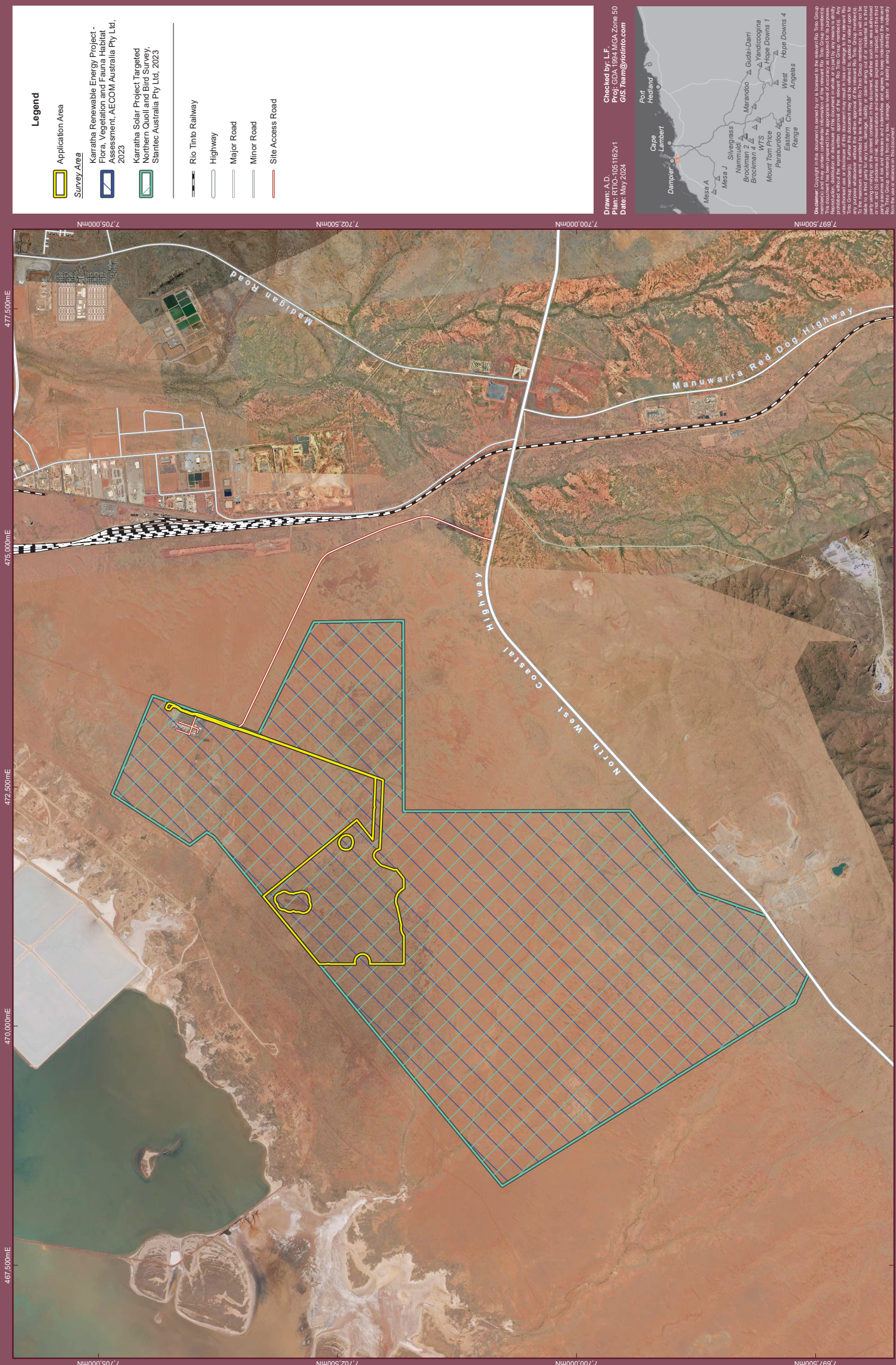
An assessment against the 10 Clearing Principles deemed that:

- Principles (c), (d), (e), and (h) are not at variance;
- Principles (a), (b), (f), (i) and (j) are not likely to be at variance; and
- Principle (g) may be at variance.

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Attachments



Legend

- Application Area
- Survey Area**
- Karratha Renewable Energy Project - Flora, Vegetation and Fauna Habitat Assessment, AECOM Australia Pty Ltd, 2023
- Karratha Solar Project Targeted Northern Quail and Bird Survey, Sinterc Australia Pty Ltd, 2023
- Rio Tinto Railway
- Highway
- Major Road
- Minor Road
- Site Access Road

Checked by: L.F.
 Proj: GDA 1984 MGA Zone 50
 GIS Team@riotinto.com

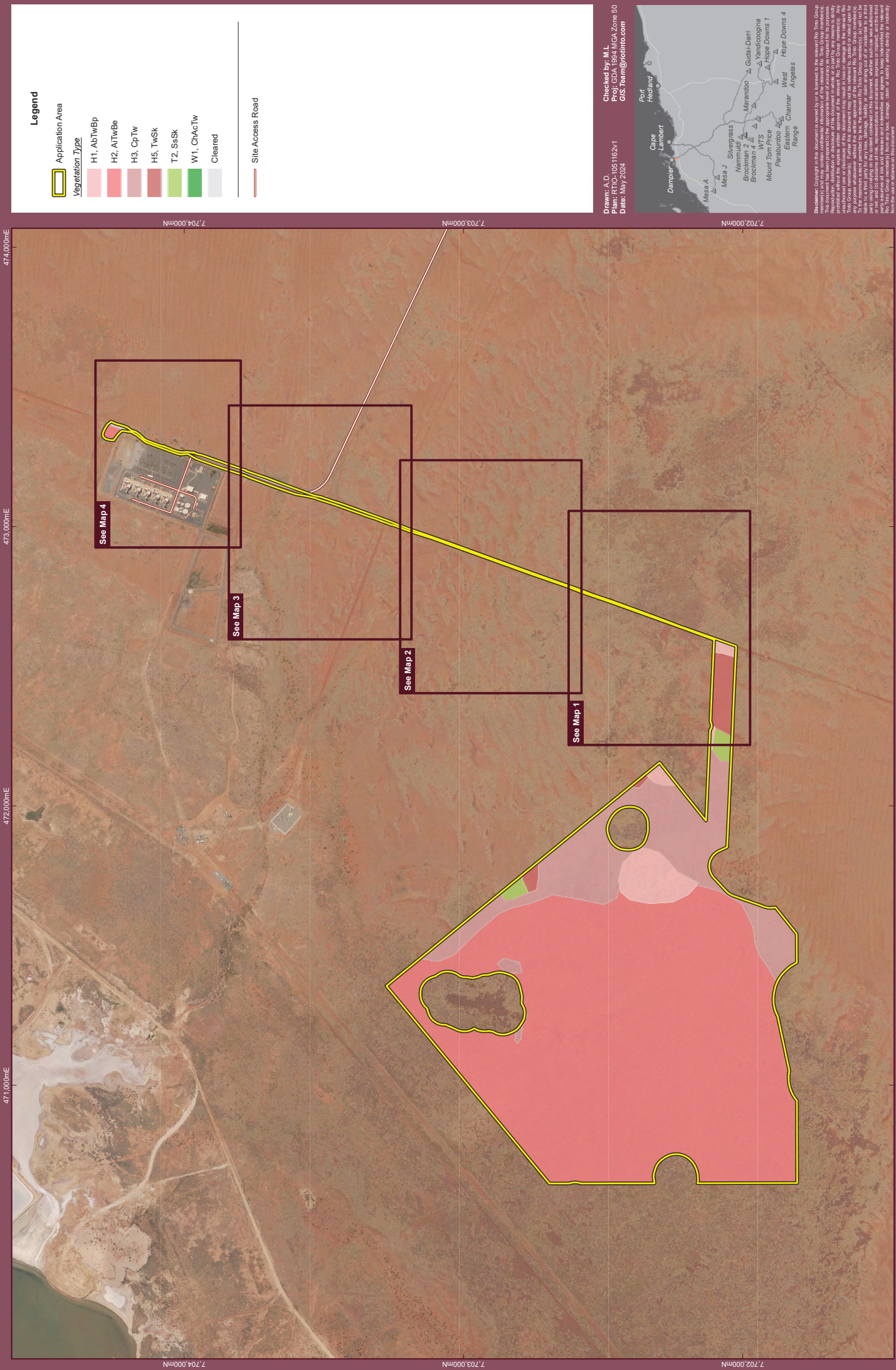


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467,500mE 470,000mE 472,500mE 475,000mE 477,500mE
 7,705,000mN 7,702,500mN 7,700,000mN 7,697,500mN



Figure 1: Application Area Location and Previous Surveys



Legend

- Application Area
- Vegetation Type
 - H1, ABTWBp
 - H2, AITWBe
 - H3, CpTw
 - H4, TWsk
 - T2, SsSk
 - W1, ChActW
 - Cleared
- Site Access Road

Checked by: M.L.
 Proj: GDA 1984 MGA Zone 50
 GIS team@riotinto.com

Drawn: A.D.
 Plant: RTIC-1051162x1
 Date: May 2024



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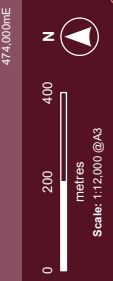
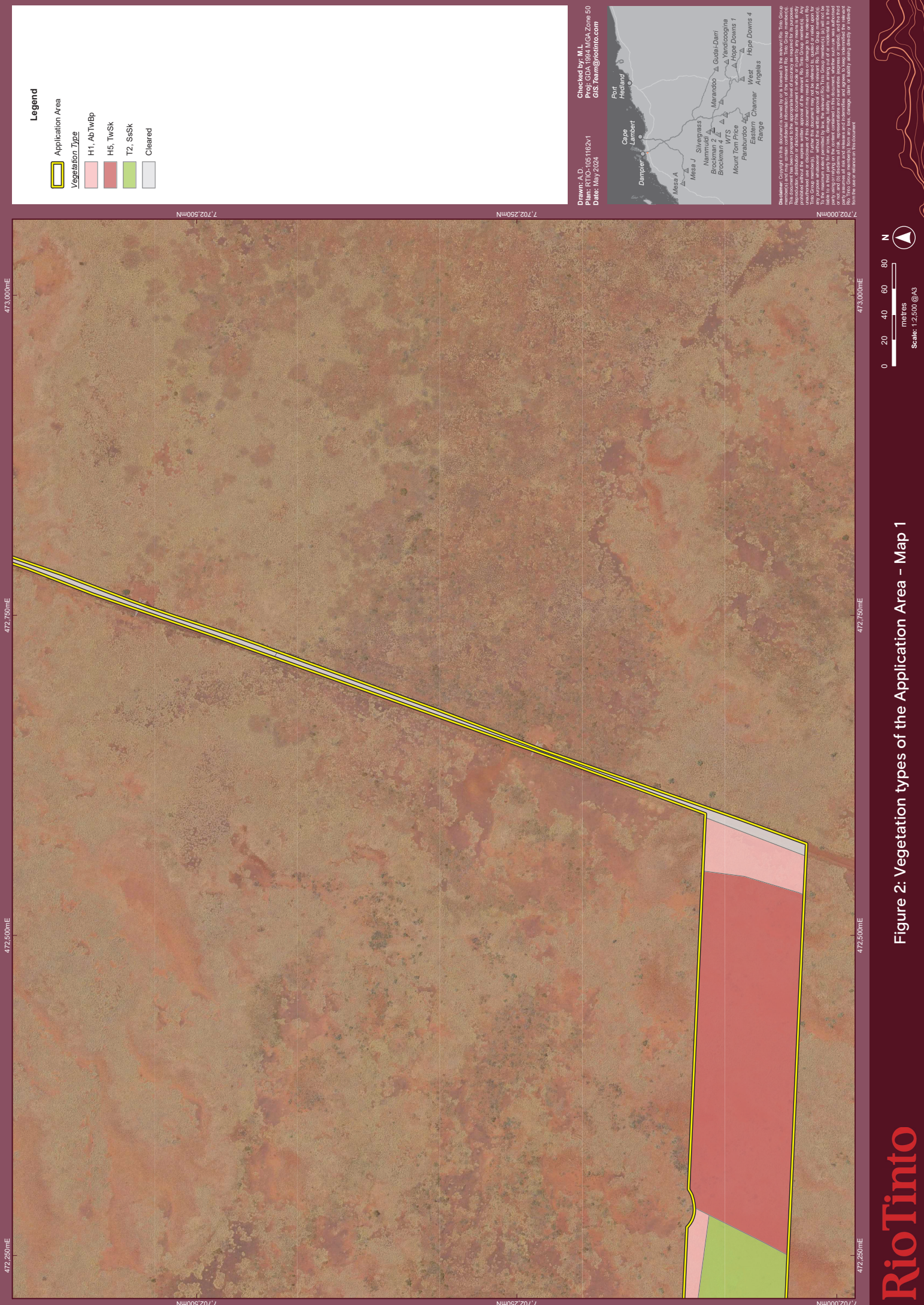


Figure 2: Vegetation types of the Application Area - Overview



Legend

- Application Area
- Vegetation Type**
- H1, AbTwBp
- H5, TwSk
- T2, SsSk
- Cleared

Drawn: A. D.
 Plant: RTIC-1051165x1
 Date: May 2024

Checked by: M. L.
 Proj: GDA 1984 MGA Zone 50
 GIS: team@riotinto.com



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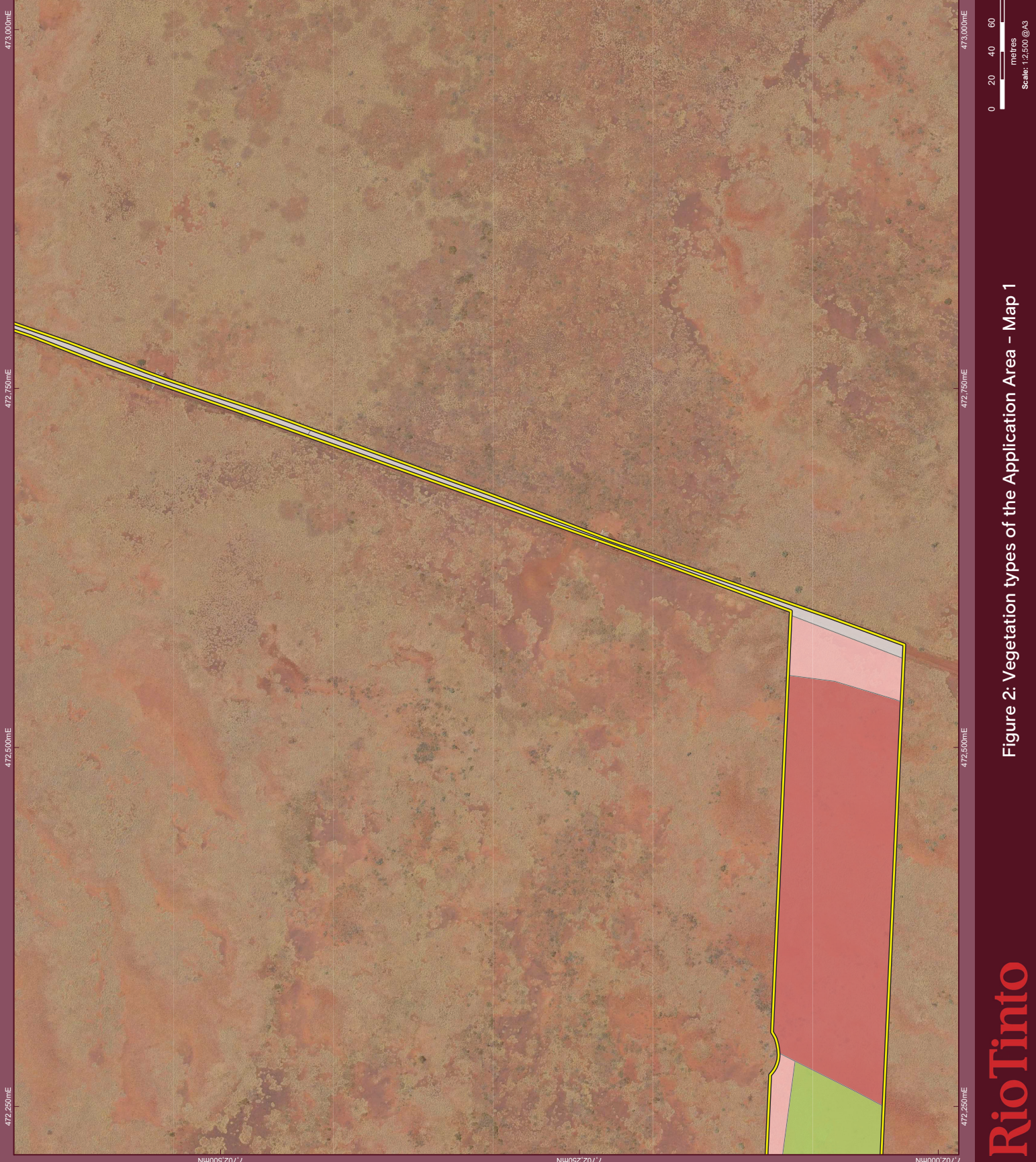


Figure 2: Vegetation types of the Application Area – Map 1

Legend

- Application Area
- Vegetation Type
- Cleared

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0 20 40 60 80
 metres
 Scale: 1:2,500 @A3

N

Figure 2: Vegetation types of the Application Area – Map 2



Legend

- Application Area
- Vegetation Type**
- H5, TwSk
- T2, SsSk
- W1, ChAcTw
- Cleared
- Site Access Road

Drawn: A. D.
 Plant: RTIC-1051162x1
 Date: May 2024

Checked by: M. L.
 Proj: GDA 1984 MGA Zone 50
 GIS team@riotinto.com



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473,250mE

473,000mE

472,750mE

7,703,750mN

7,703,500mN

7,703,250mN

473,250mE

473,000mE

472,750mE



Figure 2: Vegetation types of the Application Area – Map 3



Legend

- Application Area
- Vegetation Type**
- H2, AITWBe
- T2, SsSk
- Cleared
- Site Access Road

Drawn: A. D.
 Plan: RTIC-1051162x1
 Date: May 2024

Checked by: M. L.
 Proj: GDA 1984 MGA Zone 50
 GIS: team@riotinto.com



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473,500mE

473,250mE

473,000mE

7,704,250mN

7,704,000mN

7,704,250mN

7,704,000mN

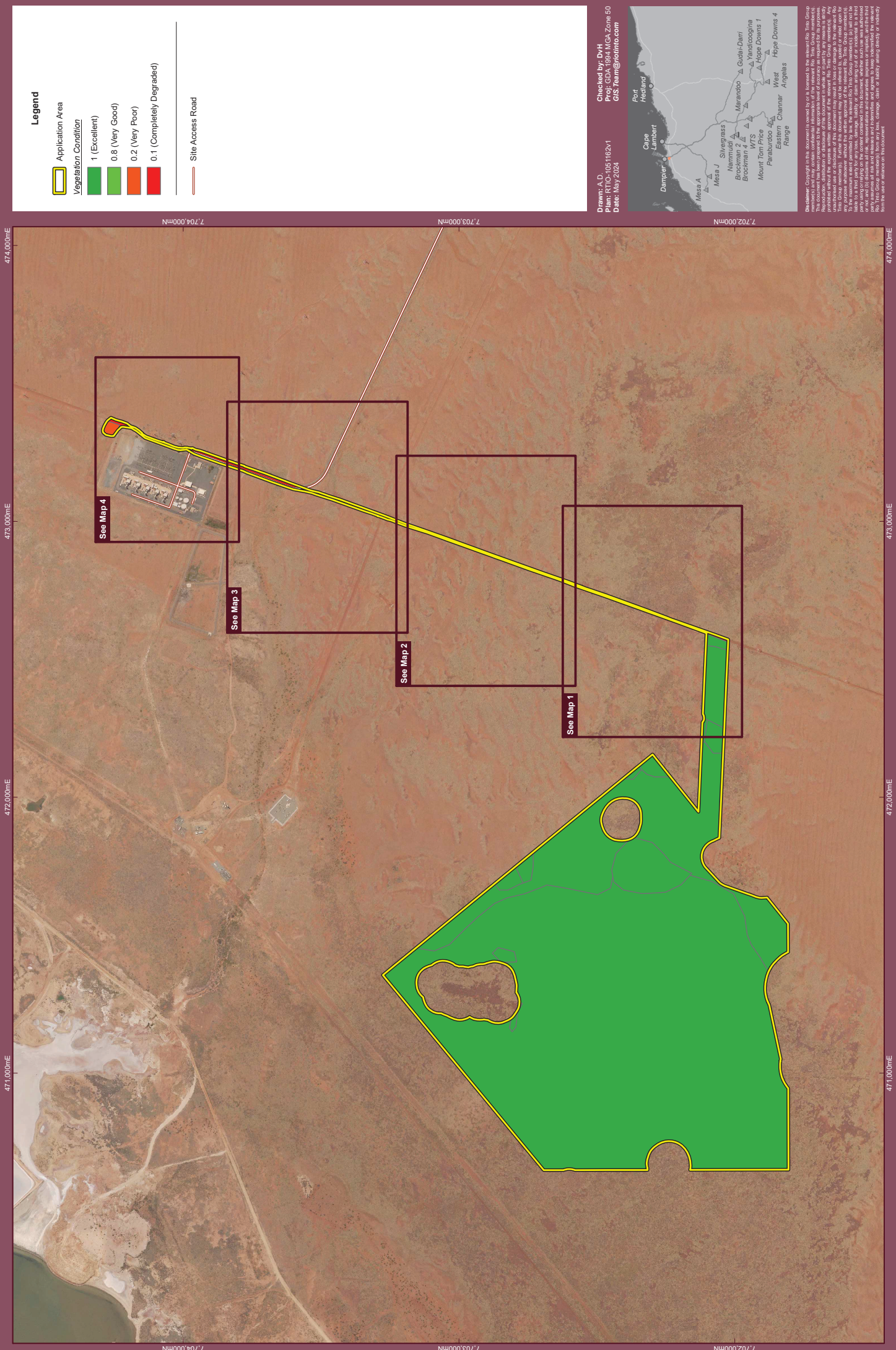
473,500mE

473,250mE

473,000mE



Figure 2: Vegetation types of the Application Area – Map 4



Drawn: A.D.
 Plan: RTIC-1051162v1
 Date: May 2024

Checked by: DVH
 Proj: GDA 1984 MGA Zone 50
 GIS: team@riotinto.com



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Figure 3: Vegetation condition of the Application Area – Overview

Legend

 Application Area

 Vegetation Condition

0.1 (Completely Degraded)

Drawn: A. D.
 Plan: RTIC-1051165x1
 Date: May 2024

Checked by: DVH
 Proj: GDA 194 MGA Zone 50
 GIS Team@riotinto.com



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0 20 40 60 80 metres
 Scale: 1:2,500 @A3

N 

472,500mE 472,750mE 473,000mE
 7,702,750mN 7,703,000mN

RioTinto

Figure 3: Vegetation condition of the Application Area - Map 2



Legend

- Application Area
- Vegetation Condition**
- 1 (Excellent)
- 0.8 (Very Good)
- 0.1 (Completely Degraded)
- Site Access Road

Drawn: A.D.
 Plant: RTIC-1051165x1
 Date: May 2024

Checked by: DVH
 Proj: GDA 1984 MGA Zone 50
 GIS Team@rio.tinto.com



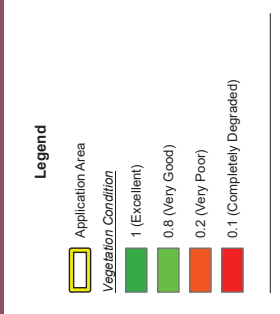
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0 20 40 60 80 metres

Scale: 1:2,500 @A3



Figure 3: Vegetation condition of the Application Area - Map 3



Drawn: A. D.
 Plan: RT10-1051162v1
 Date: May 2024

Checked by: DVH
 Proj: GDA 194 MGA Zone 50
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473,000mE 473,200mE 473,400mE 7,704,200mN 7,704,000mN 7,704,400mN 7,703,800mN



Figure 3: Vegetation condition of the Application Area – Map 4



Drawn: A. D.
 Plan: RT10-1051162X1
 Date: May 2024

Checked by: L.F.
 Proj: GDA 1984 MGA Zone 50
 GIS: team@riotinto.com

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Figure 4: Priority Ecological Communities Located Within and Adjacent to the Application Area



Legend

Application Area

Significant Flora Species

P2

Euphorbia inappendiculata var. *inappendiculata*

P3

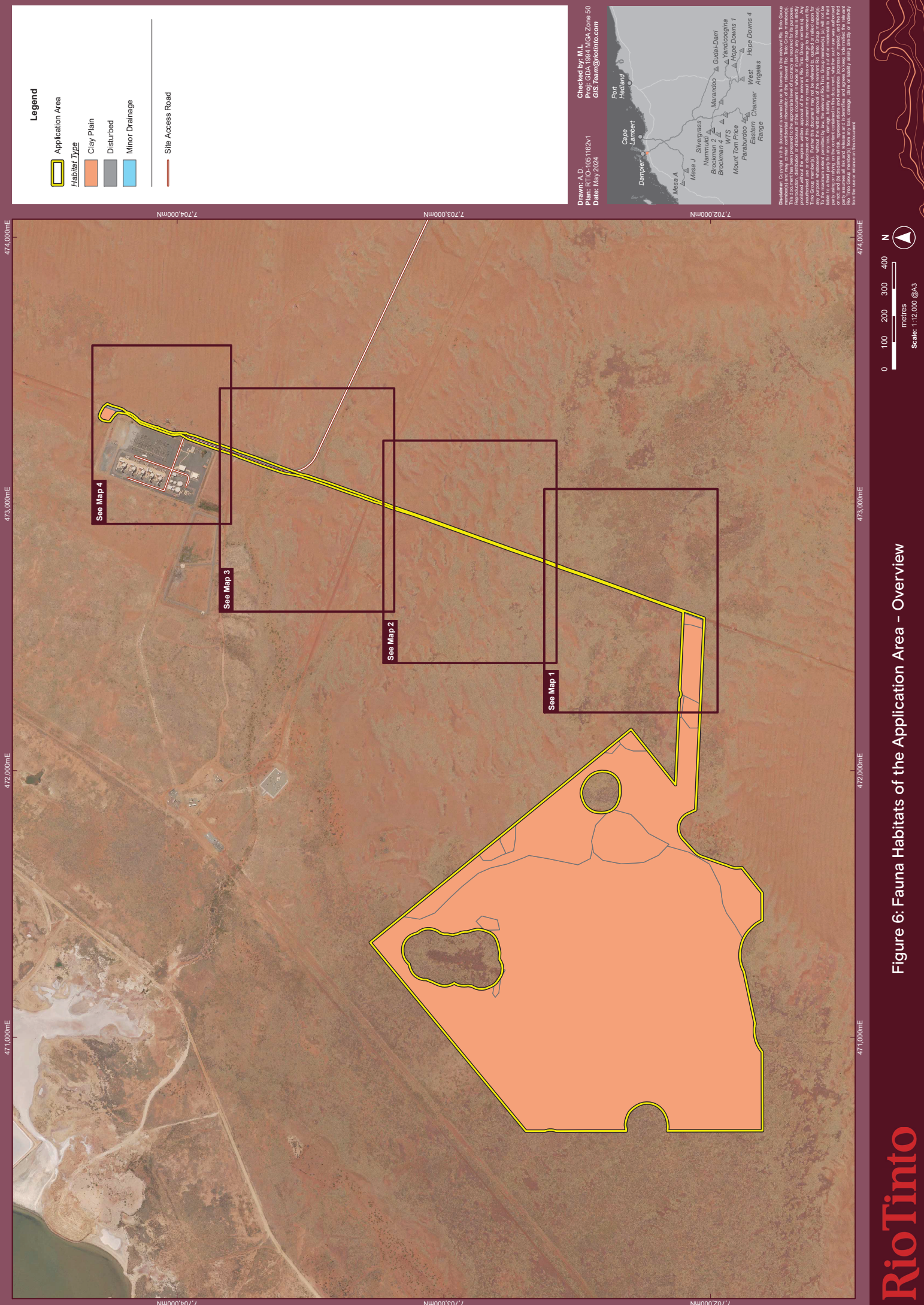
- *Dolichocarpus* sp. Hammersley Station (A.A. Mitchell PRP 1479)
- *Thermopsis* ? sp. Hammersley Station (M.E. Trudgen 11431)
- *Thermopsis* sp. Hammersley Station (M.E. Trudgen 11431)

Site Access Road







Checked by: L.F.
 Proj: GDA 1984 MGA Zone 50
 OS: team@riotinto.com



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Legend

-  Application Area
-  Habitat Type
-  Clay Plain
-  Disturbed
-  Minor Drainage
-  Site Access Road

Drawn: A. D.
 Plant: RTIC-1051162x1
 Date: July 2024

Checked by: M. L.
 Proj: GDA 1984 MGA Zone 50
 GIS: team@riotinto.com



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0 100 200 300 400
 metres
 Scale: 1:12,000 @A3

N

From the use or reliance on this document

Figure 6: Fauna Habitats of the Application Area - Overview

Legend

Application Area

Habitat Type

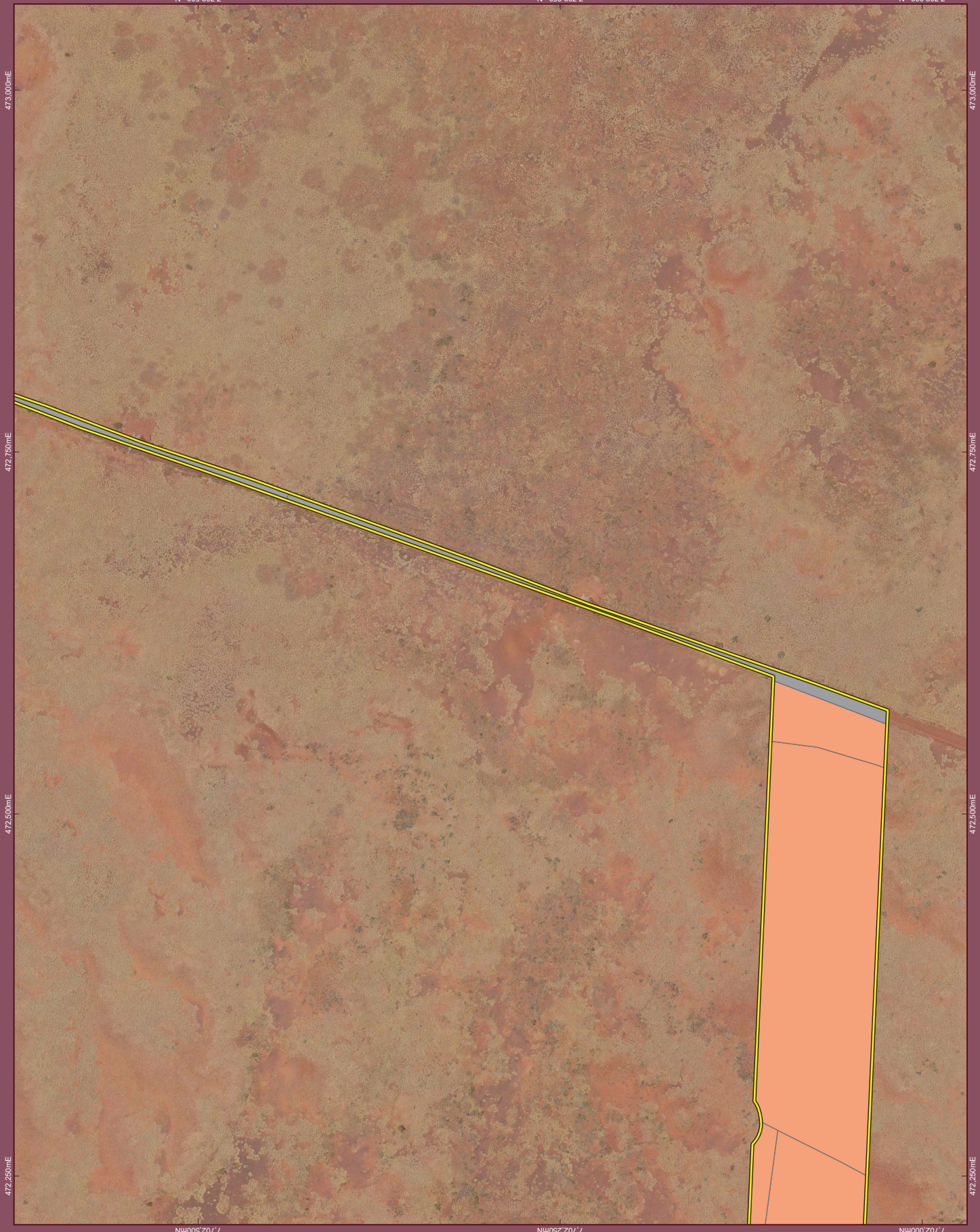
- Clay Plain
- Disturbed

Drawn: A. D.
 Plan: RTIO-1051162x1
 Date: May 2024

Checked by: M. L.
 Proj: GDA 1984 MGA Zone 50
 GIS: team@riotinto.com



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0 20 40 60 80
metres
Scale: 1:2,500 @A3

N

Figure 6: Fauna Habitats of the Application Area - Map 1

Legend

Application Area

Habitat Type

Disturbed

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Scale: 1:2,500 @A3

0 20 40 60 80 metres

N

Figure 6: Fauna Habitats of the Application Area - Map 2

RioTinto

Legend

Application Area

Habitat Type

- Clay Plain
- Disturbed
- Minor Drainage

Site Access Road

Drawn: A. D.
 Plant: RTIC-1051165X1
 Date: May 2024

Checked by: M. L.
 Proj: GDA 1984 MGA Zone 50
 GIS: team@riotinto.com



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473,000mE 473,250mE

7,703,750mN 7,703,500mN

0 20 40 60 80
metres
Scale: 1:2,500 @A3

North Arrow

Figure 6: Fauna Habitats of the Application Area - Map 3



Legend

- Application Area
- Habitat Type
 - Clay Plain
 - Disturbed
- Site Access Road

Drawn: A. D.
 Plan: RTIC-1051162-V1
 Date: May 2024

Checked by: M. L.
 Proj: GDA 1984 MGA Zone 50
 GIS: team@riotinto.com



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473,500mE

473,250mE

473,000mE



Figure 6: Fauna Habitats of the Application Area - Map 4