

Achilles Native Vegetation Clearing Permit (Purpose Permit) Application: Supporting Document

**Tenements L77/114, M77/721, M77/722, M77/224,
M77/133 & M77/159**





PREPARED FOR BARTO GOLD MINING PTY LTD | July 2022

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Abbreviations

Abbreviation	Definition
Barto	Barto Gold Mining Pty Ltd
BC Act	<i>Biodiversity Conservation Act 1999</i>
BAM Act	<i>Biosecurity and Agriculture Management Act 2007</i>
BoM	Bureau of Meteorology
COO	Coolgardie bioregion
DMIRS	Department of Mines, Industry Regulation and Safety
DPIRD	Department of Primary Industries and Regional Development
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
EPA	Environmental Protection Authority
EP Act	<i>Environmental Protection Act 1986</i>
ESA	Environmentally Sensitive Area
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
Km	Kilometre
LGA	Local Government Area
m	metres
mg	milligrams
MCP	Mine Closure Plan
MOP	Mine Ore Pad
NVCP	Native Vegetation Clearing Permit
PEC	Priority Ecological Community
SDP	Surface Disturbance Permit
SXO	Southern Cross Operations
TEC	Threatened Ecological Community
TDS	Total Dissolved Solids
WAH	Western Australian Herbarium
WRD	Waste Rock Dump
WoNS	Weed of National Significance

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1. Introduction

Barto Gold Mining Pty Ltd (Barto) propose to develop the Achilles deposit (the Project), part of their Southern Cross Operations (SXO), approximately 10 km southeast of Southern Cross in the Eastern Goldfields region of Western Australia (Figure 1-1). Stantec Australia Pty Ltd (Stantec) was commissioned by Barto to prepare an *Environmental Protection Act 1986* (EP Act) Part V Native Vegetation Clearing Permit (NVCP) application to the Department of Mines, Industry Regulation and Safety (DMIRS) to seek approval for clearing native vegetation on mining tenements L77/114, M77/721, M77/133, M77/159, M77/224 and M77/722 to facilitate the Project's resource development. This document has been prepared to support the NVCP application, which seeks approval for the clearing of up to 48.6 hectares (ha) of native vegetation within a 295.5 ha proposed Purpose Permit Area located on these tenements (Figure 1-2). All mining tenements are owned by Barto.

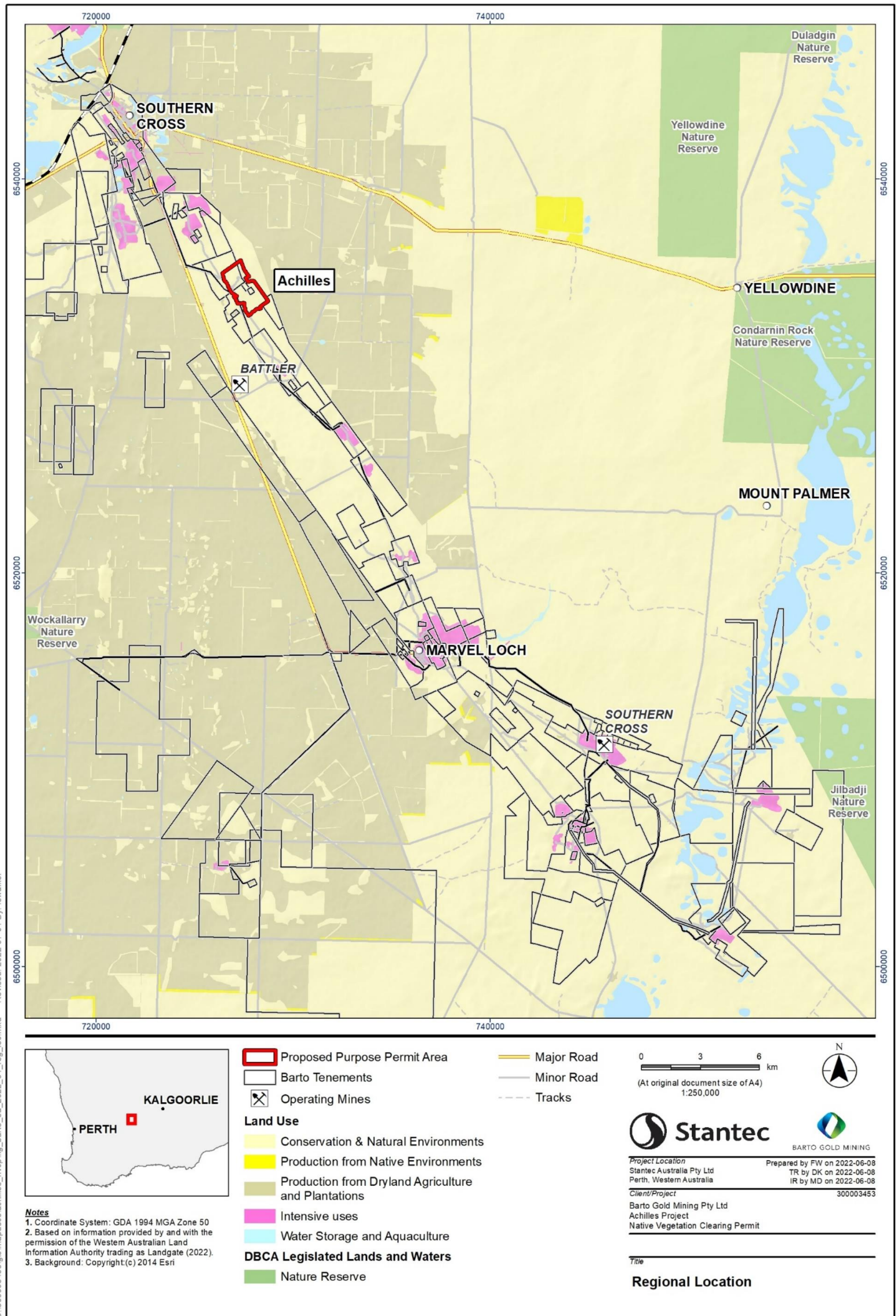
The application for the NVCP (Purpose Permit) is based primarily on the findings of the *Achilles Targeted Significant Flora Survey October 2020, February and May 2022* (Stantec 2022a), which focused on a survey area of 313 ha (Appendix A) and the *Chuditch Survey Memorandum* (Stantec 2021a) which spanned the broader SXO area (>60,000 ha)(Appendix B). The proposed Purpose Permit Area (295.5 ha) lies within broader biological study areas that have been regularly surveyed for flora, vegetation and fauna. The information in this document has been sourced from existing surveys and reports completed by Stantec and commissioned by Barto.

1.1. Document Purpose

The purpose of this document is to provide the necessary information and justification, as prescribed within the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 to seek approval under Part V of the EP Act for the clearing of native vegetation. Stantec has prepared this document to support a NVCP application to DMIRS on behalf of Barto, to clear up to 48.6 ha within a 295.5 ha Purpose Permit Area located on tenements L77/114, , M77/721, M77/133, M77/159, M77/224 and M77/722.

This NVCP document is structured to provide the following information:

- description and map of the proposed Purpose Permit Area proposed for clearing in regard to location, size and purpose;
- site overview with a brief description of local climate, biogeographic region, geology, land use and land systems, soils, hydrology and hydrogeology;
- description of the proposed Purpose Permit Area to be cleared in regard to vegetation type, condition and representation in a regional context;
- significant flora species;
- identification of any significant flora within the proposed Purpose Permit Area;
- description of broad fauna habitat within the proposed Purpose Permit Area; and
- discussion of proposed vegetation clearing in relation to the EP Act Schedule 5 10 clearing principles.



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Figure 1-1: Regional location of the proposed Purpose Permit Area.

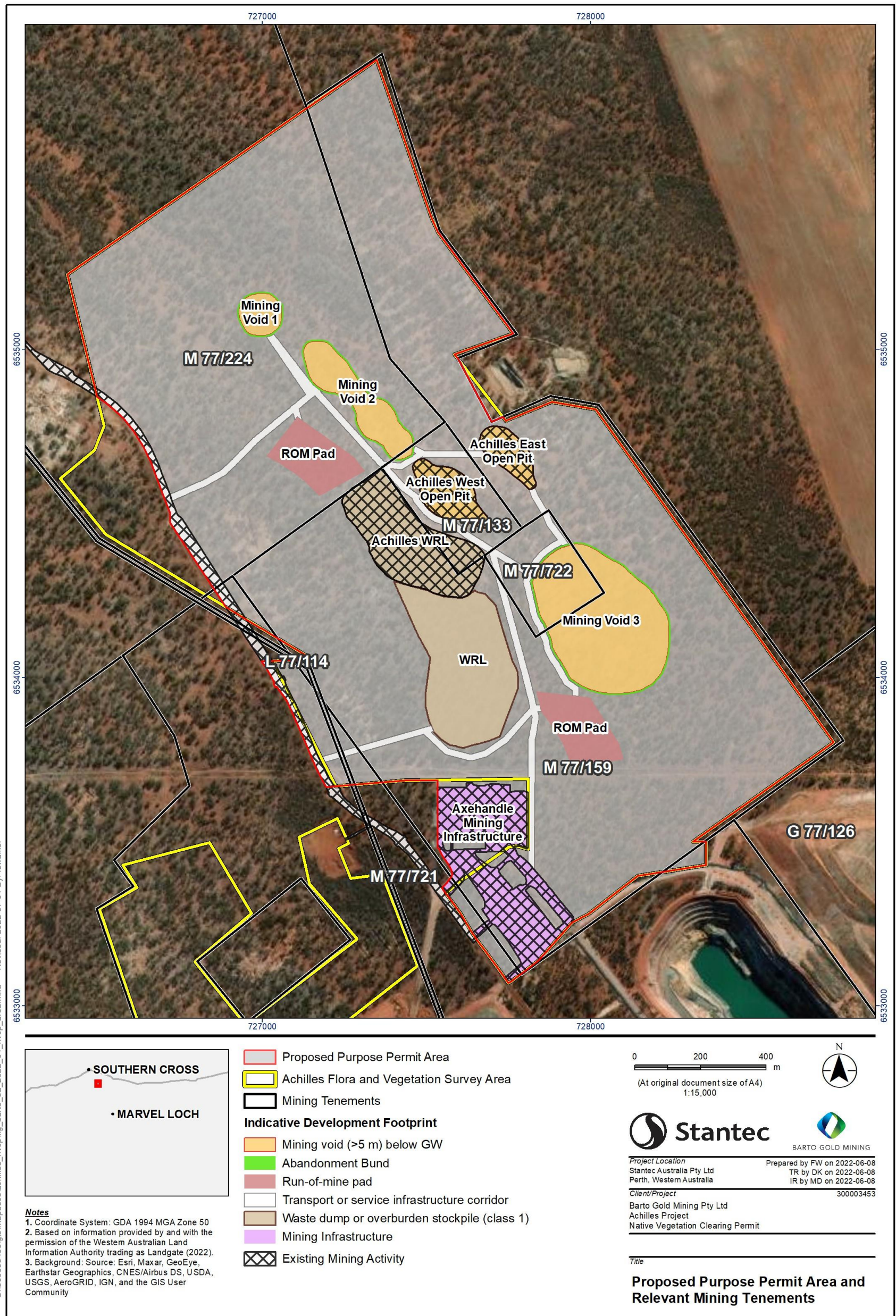


Figure 1-2: Proposed Purpose Permit Area and relevant mining tenements.

2. Background

2.1. Location, Tenure and Site Layout

The proposed Purpose Permit Area lies within six tenements, (L77/114, M77/721, M77/133, M77/159, M77/224 and M77/722) held by Barto, the owner of the SXOs, which in turn is managed by Minjar Gold Pty Ltd (Minjar). The tenements relevant to the NVCP application are approximately 20 kms from Marvel Loch Processing Plant and administrative centre for the SXO (Table 2-1, Figure 1-2).

Table 2-1: Barto tenements within the proposed Purpose Permit Area.

Tenement	Area (ha)	Granted	Expires	Leasee
M77/133	9.59	13/9/1987	17/9/2029	Barto Gold Mining Pty Ltd
M77/159	180.67	13/9/1987	17/9/2029	Barto Gold Mining Pty Ltd
M77/224	89.69	24/6/1988	28/6/2030	Barto Gold Mining Pty Ltd
M77/722	7.30	01/12/1998	30/11/2040	Barto Gold Mining Pty Ltd
L77/114	0.49	24/12/1992	23/12/2022	Barto Gold Mining Pty Ltd
M77/721	8.27	01/12/1998	30/11/2040	Barto Gold Mining Pty Ltd

2.2. Contact Details

Company Details:

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Trading Name: Barto Gold Mining Pty Ltd

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Authorised Person & Contact Person: Bronwen Smith

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3. Proposed Activities

3.1. Description of Proposed Activities

The proposed Project involves the development of three new mining void areas to allow the extraction of gold from the Achilles deposit. Ore extracted from the pits will be processed through the existing Marvel Loch Processing Plant. The Project will consist of the development of three new mining void areas containing up to 5 individual open pits and expansion of the existing waste rock dump (WRD) and supporting mining infrastructure. The main activities that will require vegetation clearing are listed below:

- three new open mining void areas containing up to 5 pits;
- access roads;
- extension to the existing Achilles WRD;
- laydown area and run of mine pads (ROMs);
- topsoil stockpiles;
- abandonment bunds;
- dewatering pipeline and spill containment infrastructure to Axehandle Open Pit; and
- turkeys' nest for containing mine dewater (if required).

Conventional drill and blast methods will be used to release ore and waste from the pits. Ore and waste will be extracted by using excavators and dump trucks. Mining will be undertaken using a top-down mining method. Ore will be placed at ROMs to be established adjacent to pits and hauled to the Marvel Loch Processing Plant for processing. Waste will be placed on the Achilles WRD(s) with some backfilling of the existing Achilles pits and the staged backfilling of the new Achilles pits. A hydrogeological assessment currently undertaken indicates that dewatering will likely be required as the proposed open pits sit below the water table. The dewatering volumes are yet to be determined. At the end of the mine life, abandonment bunds will be installed around the open pits in accordance with relevant regulations by removing vegetation within the footprint area (if present) by dozer to the width of the abandonment bund. Dump trucks will be used to end dump inert rock material to create the bund.

3.2. Estimated Vegetation Disturbance Requirements

Barto propose that up to 48.6 ha of native vegetation will be required to be cleared within 295.5 ha proposed Purpose Permit Area to allow the works listed in Section 3.1 to occur. An indicative site layout (48.6 ha) and proposed Purpose Permit Area is shown in Figure 1-2. There is existing infrastructure on the site, covering 20.1 ha (excluding Axehandle mining infrastructure). Barto will ensure that clearing is minimised as much as practicable and is maintained within the boundaries of the proposed Purpose Permit Area.

3.3. Indicative Time

Barto proposes to commence vegetation clearing in Q4 2022 with vegetation clearing being progressively implemented over the life of the mine.

3.4. Method of Vegetation Clearing

Barto will ensure all clearing and ground disturbance is carried out in accordance with their Surface Disturbance and Clearing Procedures (Barto Gold Mining Pty Ltd 2022). Noting this, the following methods of vegetation clearing will be implemented during the construction phase of the Project:

- Prior to clearing, a project-specific internal Surface Disturbance Permit (SDP) (Doc No. SX-EN-FO-0030) will be completed and signed off by the Environmental Department.
- Clearing areas will be delineated in accordance with the project-specific internal SDP, the clearing boundary will be surveyed and demarcated with survey pegs and flagging tape.
- Vegetation will be removed prior to topsoil stripping. Vegetation will generally be cleared 'blade up' with bulldozers or graders within the proposed Purpose Permit Area. Diggers and loaders may be used around drainage lines as required.
- Vegetation will typically be stripped and stored to the side of each disturbed area for use in rehabilitation works. Areas with thicker vegetation may need to have the vegetation pushed into piles and mulched.

- The upper 0.2 m (topsoil) of the soil profile within the proposed disturbance areas is stripped (where possible) and placed in stockpiles (paddock dumped not greater than 2 m in height with adequate distance between them to create a series of mounds and troughs).
- Subsoil may also be stripped and stockpiled separately to ensure adequate capping and growth media is collected.
- Any rock fragments and surface litter present within the soil profiles will be collected and stockpiled with the topsoil.
- Machinery operators will aim to minimise the frequency and intensity of disturbance, so they do not compromise the structural integrity of the material. Handling of topsoil will be minimised as much as possible, particularly when wet.
- Soil stripping is planned to occur as close as possible to the time when the proposed disturbance is scheduled to commence.

3.5. Rehabilitation and Maintenance

Barto and its contractors will complete a Weed, Seed and Hygiene Certificate (Doc No. SX-EN-FO-0031) prior to arrival upon site and adhere to hygiene procedures to minimise the risk of spreading or introducing weeds within the proposed Purpose Permit Area. In areas where topsoil has been disturbed it will be spread back over the area and rehabilitated according to the specifications of the SXO's Mine Closure Plan (MCP) (Reg ID 84650) and seeded with local native species. Rehabilitation monitoring will be undertaken on all substantial rehabilitation areas within one year of seeding to determine whether germination and establishment has been successful. Ongoing monitoring will determine if further management measures are required, including re-seeding or other interventions (for example, to remediate eroded areas) will be undertaken.

4. Site Overview

4.1. Biogeographic Location

The proposed Purpose Permit Area lies within the Southern Cross (COO2) subregion of the Coolgardie bioregion (COO) (Cowan *et al.* 2001) (Figure 4-2). The Southern Cross subregion is described as having subdued relief, comprising gently undulating uplands dissected by broad valleys with bands of low greenstone hills. The valleys include chains of saline playa-lakes. Diverse *Eucalyptus* Woodlands (*Eucalyptus salmonophloia*, *Eucalyptus salubris*, *Eucalyptus transcontinentalis* and *Eucalyptus longicornis*) rich in endemic eucalypts occur around these salt lakes, as well as on the low greenstone hills, valley alluvials and broad plains of calcareous earths (Cowan *et al.* 2001).

Dwarf shrublands of samphire are associated with salt lakes within the Southern Cross subregion. Granite basement outcrops occur at mid-levels in the landscape and support swards of *Borya constricta* with stands of *Acacia acuminata* and *Eucalyptus loxophleba*. The yellow sandplains, gravelly sandplains and lateritic breakaways of the uplands support mallees (*Eucalyptus leptopoda*, *Eucalyptus platycorys* and *Eucalyptus scyphocalyx*) and scrub-heaths (*Allocasuarina corniculata*, *Callitris preissii*, *Melaleuca uncinata* and *Acacia beauverdiana*) (Cowan *et al.* 2001). Based on the EPBC Act Protected Matters Search Tool results (Appendix C), significant vertebrate fauna that may occur include the Chuditch (*Dasyurus geoffroii*) (Vu; Vu) and the Malleefowl (*Leipoa ocellata*) (Vu; Vu).

4.2. Climate

The Coolgardie Botanical District of Western Australia has a semi-arid climate, characterised by hot summers and cool winters (Beard 1990). Long-term climate data (1996-2021) was obtained from the Bureau of Meteorology (BoM) weather station at Southern Cross Airfield (Station 12320), located approximately 8 km north of the proposed Purpose Permit Area. The majority of the region's annual average rainfall is received during January to March and from June to August (Figure 4-1). The hottest months of the year are the summer months (December to February, with daily maximum temperatures regularly exceeding 30 degrees Celsius (°C)) and the coolest months occur between June and August, with minimum temperatures frequently falling below 5°C (Figure 4-1).

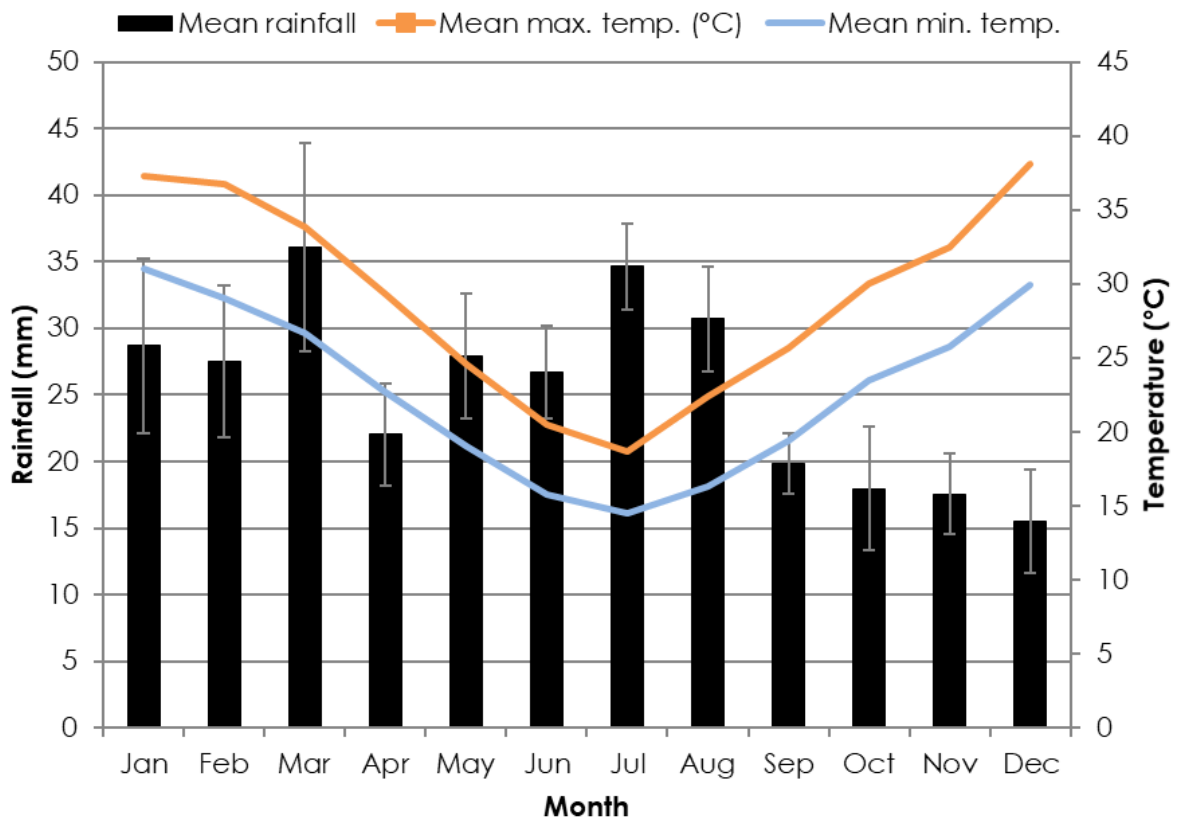


Figure 4-1: Long-term (1996 – 2021) rainfall (mm) and temperature (°C) data recorded at the Southern Cross Airfield weather station (station 12320).

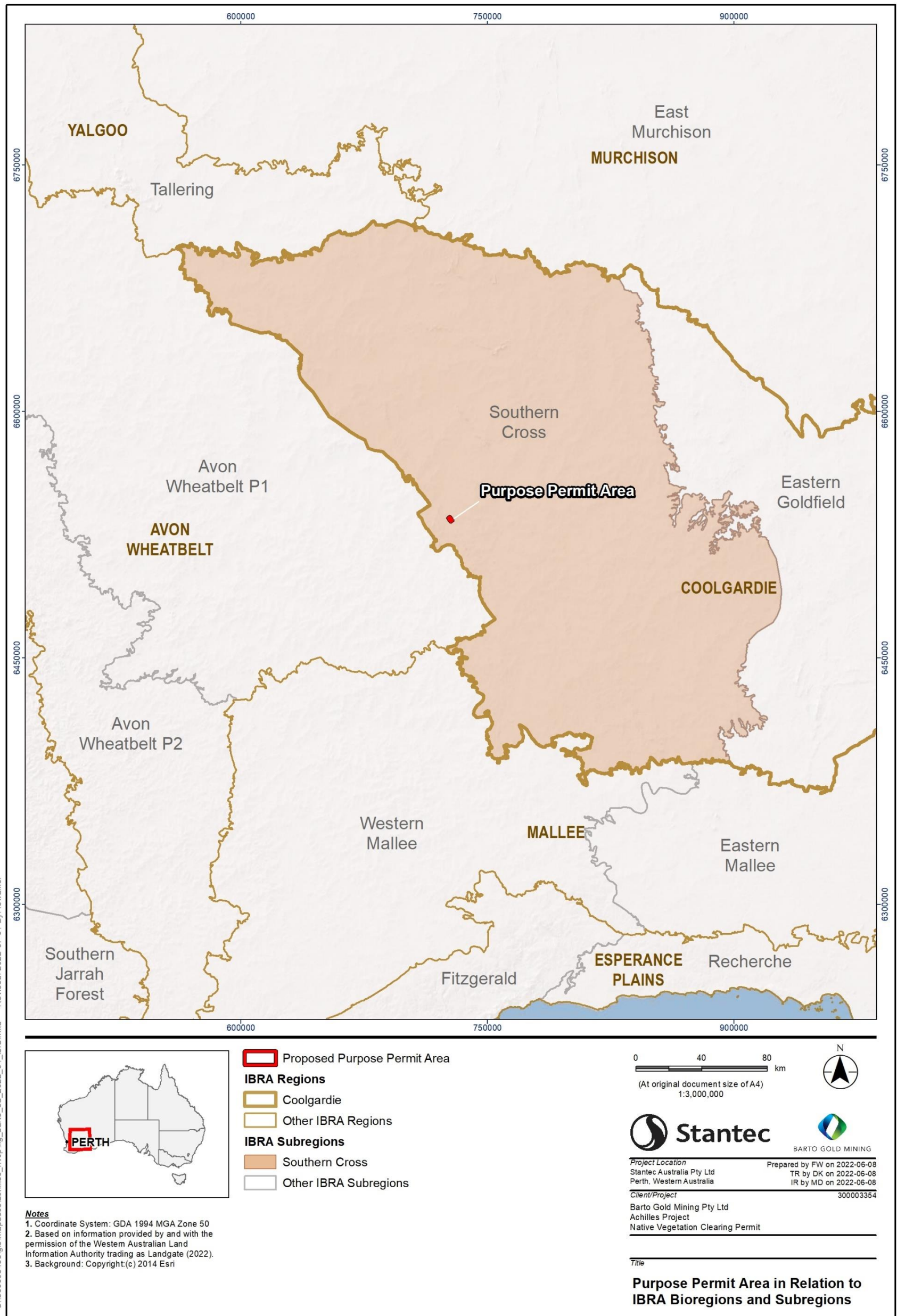


Figure 4-2: Location of the proposed Purpose Permit Area within the IBRA Southern Cross subregion.

4.3. Land Use

Land use in the area is predominantly for agriculture purposes such as cropping and grazing (Cowan *et al.* 2001). Crown Reserves and mining are also other dominant land uses in the areas surrounding Southern Cross, with numerous small and abandoned mines and open shafts dotted across the Yilgarn landscape. The proposed Purpose Permit Area has been subject to previous mining exploration activity.

4.4. Conservation Reserves and Environmentally Sensitive Areas

Under s. 51B of the EP Act, Environmentally Sensitive Areas (ESAs) are declared by the Minister for Environment. The aim of these areas is to protect against the degradation of environmental values such as declared rare flora, threatened ecological communities (TECs) or significant wetlands. The criteria for the declaration of ESAs do not include State-listed priority ecological communities (PECs), which are protected under the *Biodiversity Conservation Act, 2016* (BC Act).

The proposed Purpose Permit Area does not overlap with any reserves or ESAs. The nearest nature reserves are Wockallary and Yellowdine, both located approximately 20 km to the southwest and east-northeast, respectively. Wockallary Nature Reserve is 205 ha in area and comprises medium woodland. It is typically dominated by *Eucalyptus salmonophloia*, *Eucalyptus longicornis*, *Eucalyptus salubris*, and *Eucalyptus sheathiana* (Elith and Bidwell 2004). It lies in the South-West Botanical Province. Yellowdine Nature Reserve lies in the transition zone between the Eremaean and South-West botanical provinces, supporting a rich and diverse flora community with many species of plant and animal persisting on the extremities of their distributions (Department of the Environment and Energy 2019). No TECs were found to have buffers that overlap the proposed Purpose Permit Area and the nearest TEC, the eucalypt woodlands of the Western Australian wheatbelt (BC Act, P3; EPBC Act, CE), is located more than 10 km from the proposed Purpose Permit Area. No wetlands of international or national significance are located within the vicinity of the proposed Purpose Permit Area; however, several wetlands of subregional significance occur within the Southern Cross subregion including Wallagne Soak (artificial), Lake Deborah East, Lake Deborah West, Johnston Lakes, Eva Lake, Lake Walton and an unnamed lake south of Boondine Hill (Cowan *et al.* 2001).

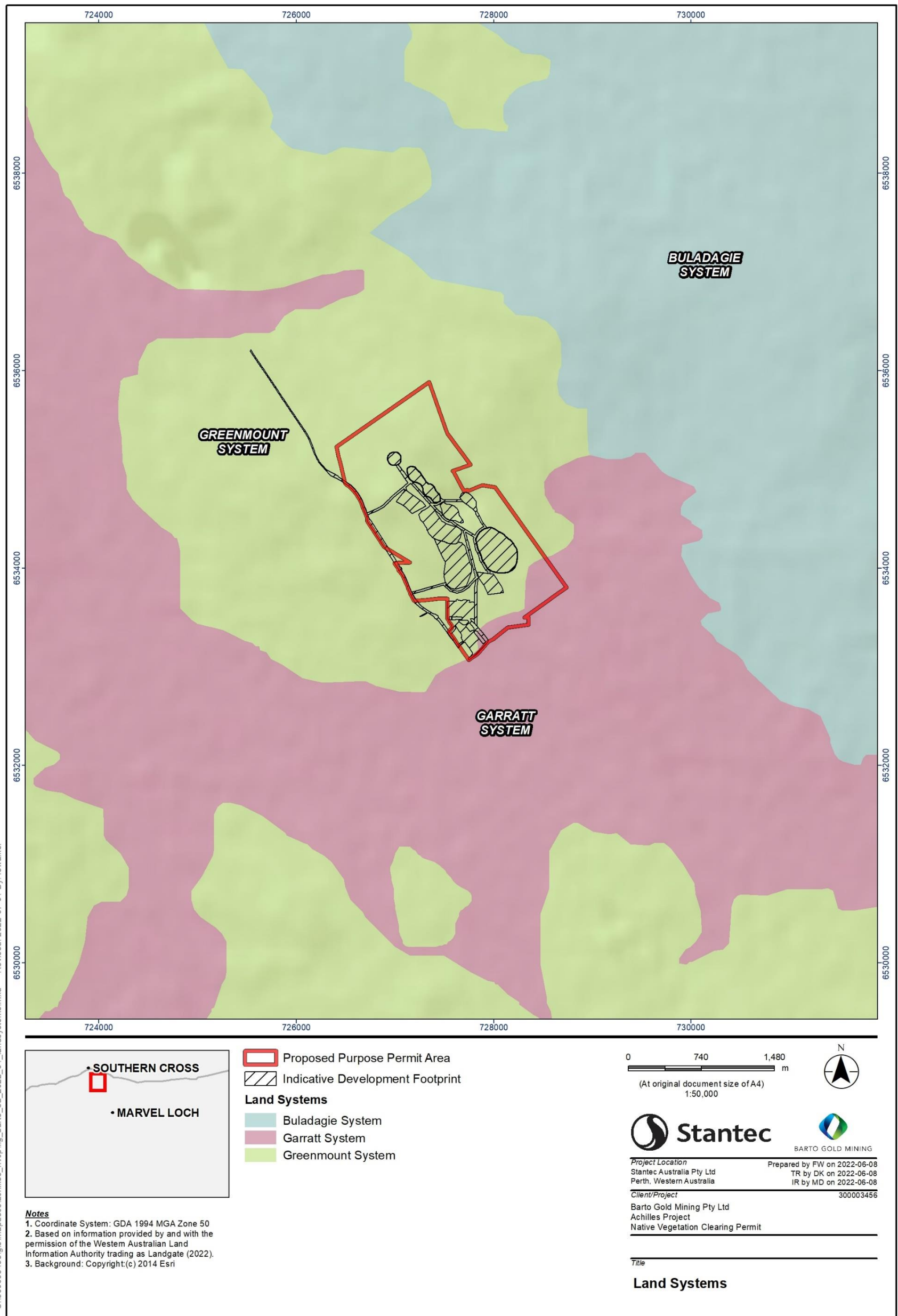
4.5. Land Systems and Soils

Land systems are defined as an area or group of areas throughout which there is a recurring pattern of topography, soils and vegetation (Tille 2006). An assessment of land systems provides an indication of the occurrence and distribution of vegetation types (Purdie *et al.* 2004) within and surrounding the proposed Purpose Permit Area. Land systems across the Goldfields have been mapped by the Natural Resources Assessment Group of the Department of Primary Industries and Regional Development (DPIRD). This mapping provides a comprehensive description of biophysical resources within the area (Purdie *et al.* 2004). The proposed Purpose Permit Area occurs within the Greenmount System (92%) and the Garret System (8%) (Table 4-1; Figure 4-3).

The Greenmount land system consists of areas of ancient drainage, meaning parts of the land system may be prone to land degradation as a result of clearing, presenting as salinisation, waterlogging, soil erosion and acidity. However, the small scale of clearing, short duration of the project, proposed management measures and rehabilitation commitments means it is unlikely that the proposed clearing will result in salinisation, waterlogging, soil erosion and/or acidity.

Table 4-1: Extent of land systems within the proposed Purpose Permit Area.

Land System	Description	Extent within the Purpose Permit Area	
		Extent (ha)	Proportion (%)
Greenmount	Gently undulating rises to rolling low hills in the eastern Zone of Ancient Drainage. Loamy earth (mostly red, calcareous, and clayey and stony. Vegetation: Eucalypt woodland.	271.858	92
Garret	Lower slopes and footslopes adjacent to salt lakes in the eaten Zone of Ancient Drainage. Loamy earth (mostly calcareous), hard cracking clay and alkaline shallow duplex	23.65	8



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Figure 4-3: Land systems of the proposed Purpose Permit Area.

4.5.1. Soil Characteristics

The proposed Purpose Permit Area is mapped as soil landscape zone 261 – Southern Cross, in the Kalgoorlie Province (Figure 4-4) (Tille 2006). The Southern Cross soil unit is described as undulating plains and uplands, with some salt lakes and low hills, on deeply weathered mantle, colluvium and alluvium over greenstone and granite rocks of the Yilgarn Craton (Tille 2006). Soils of this unit are varied and consist of calcareous loamy earths, red and yellow loamy earths, and alkaline deep and shallow sandy duplexes, with some yellow sandy earths, salt lake soils, yellow deep sand and red shallow loamy duplexes (Tille 2006).

4.5.1.1. Land Degradation Summary

Land degradation includes any alteration to land capability, soil erosion, salinity, nutrient export, acidification, waterlogging and flooding that affects the present or future use of land. A review of the grade of soil erosion for the Yilgarn Plateau Province of Australia (Geoscience Australia 2021) indicated the proposed Purpose Permit Area lies within an area graded as 'Poor' owing to the province being vulnerable to wind erosion due to low ground cover and erodible soils. Poor soil erosion grading of the province is likely attributed to agriculture and grazing activities that dominate the region. The proposed Purpose Permit Area does not occur within a known acid sulphate risk area.

4.6. Geology

4.6.1. Local Geology

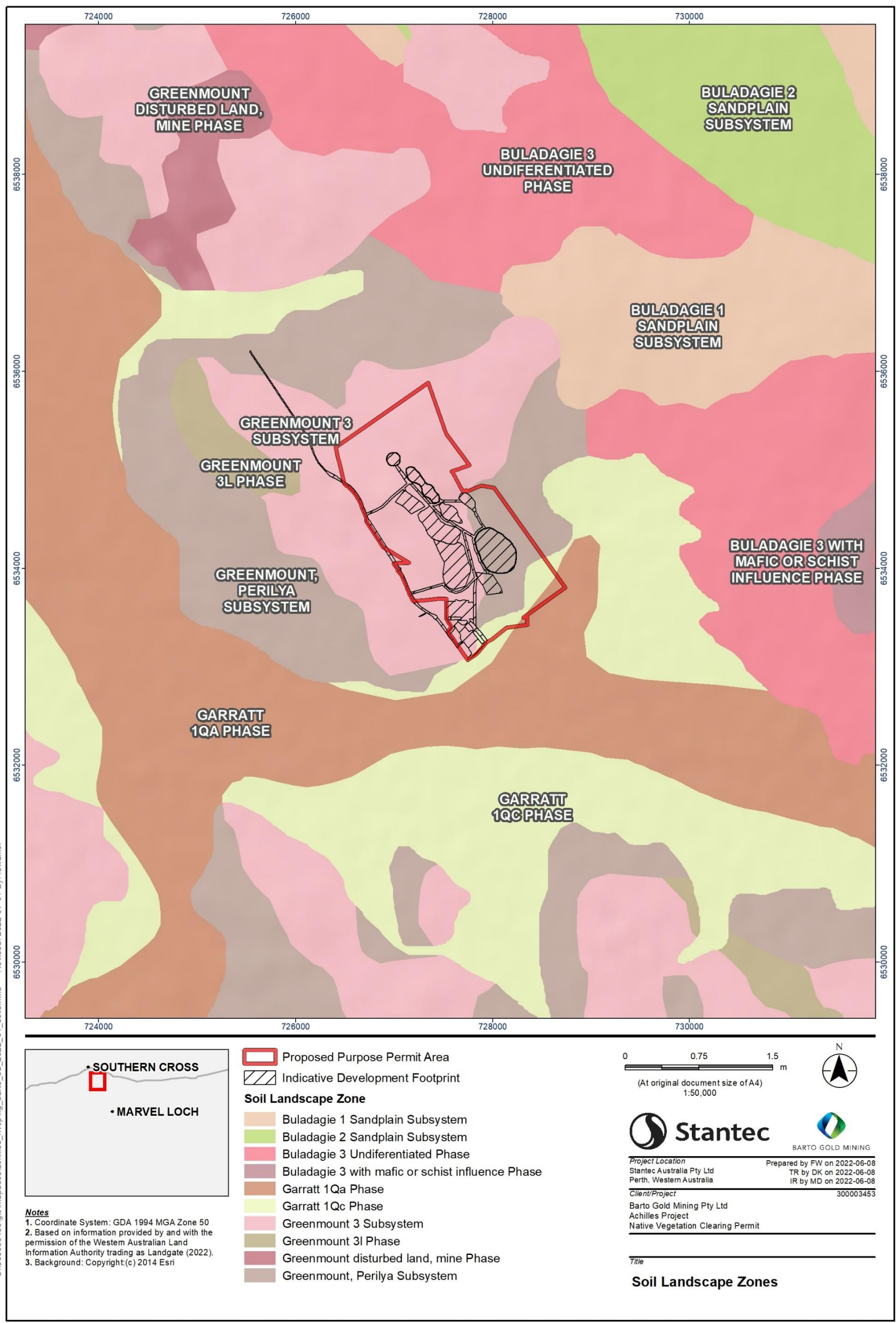
The proposed Purpose Permit Area intersects two geological units, comprising volcanic and sedimentary rocks (unit: 74483) and colluvium (unit: 38491) (Table 4-2, Figure 4-5) (Australian Government 2012a).

Table 4-2: Geological features within the proposed Purpose Permit Area.

Geological unit	Description	Proposed Purpose Permit Area (ha)
Awy: Volcanic and sedimentary rocks 74483	Rhyodacitic porphyry, volcanoclastic rocks, tuff, para-amphibolite, quartzite, mafic schist, amphibolite, felsic volcanic rocks, mafic volcanic rocks, banded iron formation, siliciclastic rocks, ultramafic rocks, chert	229.6
Qrc: Colluvium 38491	Colluvium and/or residual deposits, sheetwash, talus, scree; boulder, gravel, sand; may include minor alluvial or sand plain deposits, local calcrete and reworked laterite	65.8
Total		295.5

4.7. Surface Water and Hydrology

The Southern Cross subregion has endorheic drainage with any excess surface water after heavy rainfall draining into salt lakes (Bureau of Meteorology 2012; Cowan *et al.* 2001). The proposed Purpose Permit Area occurs within the Lake Julia sub-catchment of the Swan Coast – Avon River drainage division (Bureau of Meteorology 2012). Numerous ephemeral watercourses and lakes occur within proximity to the proposed Purpose Permit Area; however, none of these intersect the proposed Purpose Permit Area. A chain of salt lakes occurs approximately 30 km east of the proposed Purpose Permit Area and another chain is located 15 km to the north (Figure 4-6).



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Figure 4-4: Soil landscape zones of the proposed Purpose Permit Area.

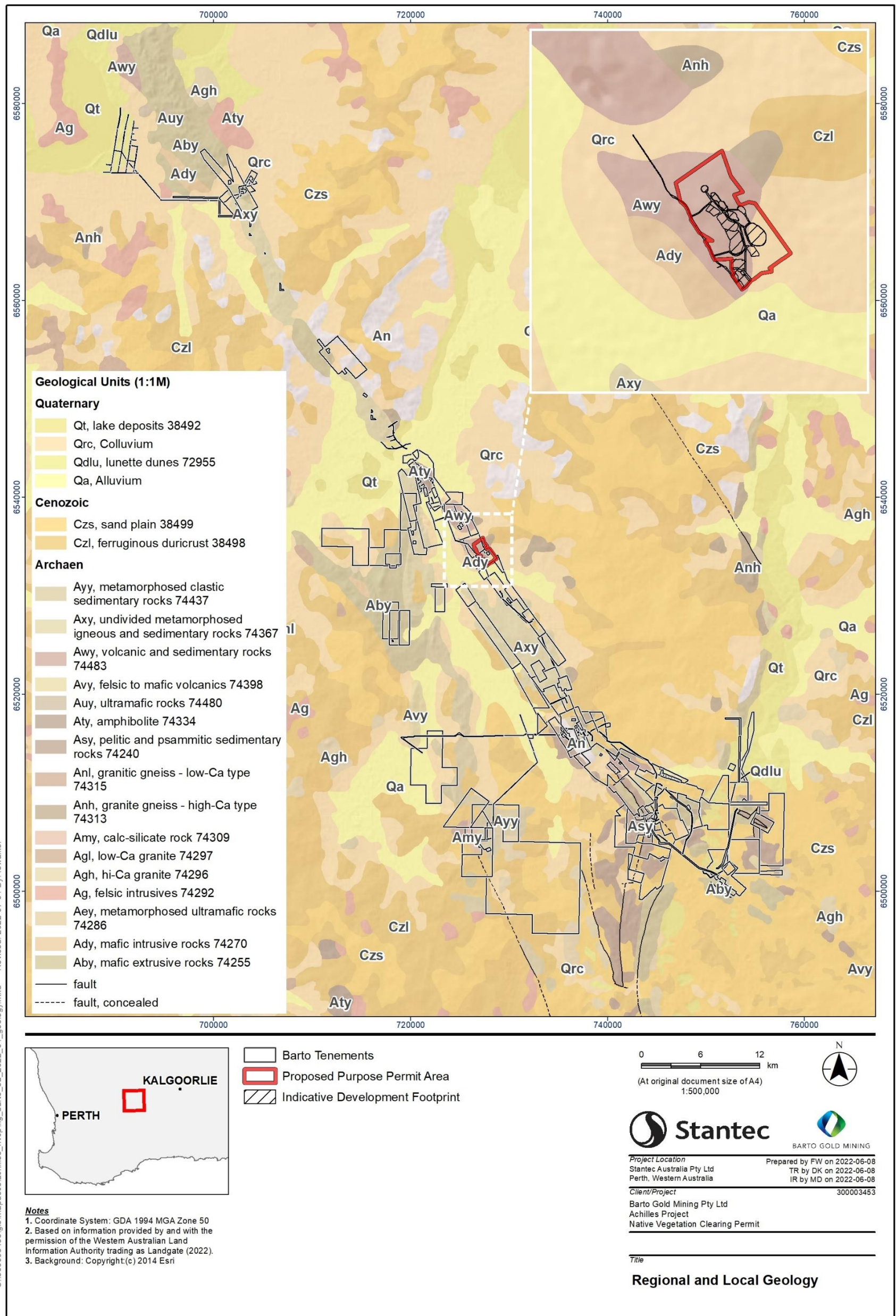


Figure 4-5: Regional and local surface geology of the proposed Purpose Permit Area.

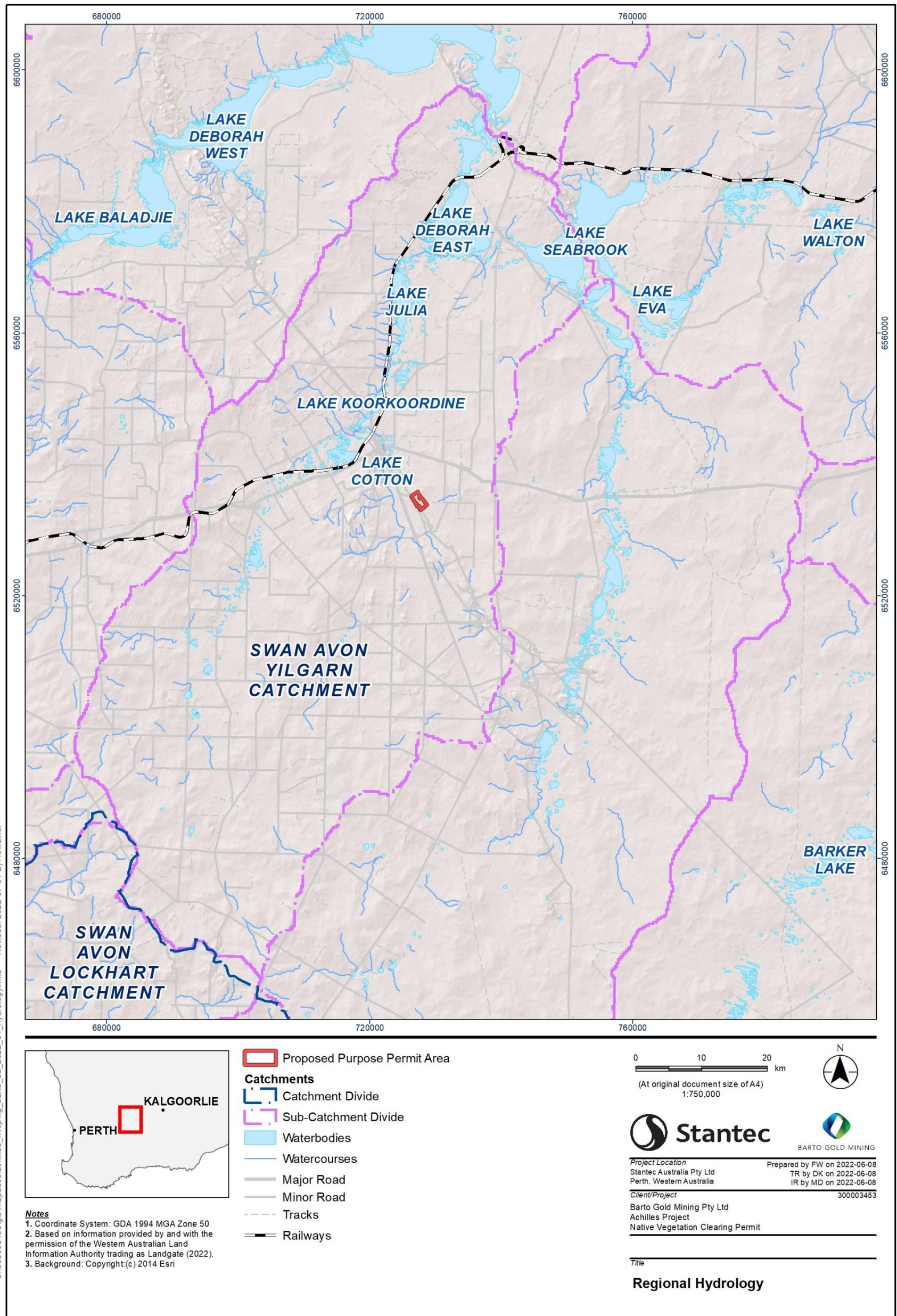


Figure 4-6: Regional hydrology of the proposed Purpose Permit Area.

4.8. Hydrogeology

The proposed Purpose Permit Area is located within an area dominated by Archaean Greenstones with significant granitic and gneiss inliers. The Greenstones within the area can be significantly metamorphosed. The Archaean units are generally considered to be a poor groundwater source; however some quartzite rocks, together with shear zones, can offer potential groundwater resources (Barto Gold Mining Pty Ltd 2020).

The aquifer units found with the Southern Cross area comprise superficial, paleochannel and bedrock aquifers. Groundwater recharge in the area is generally restricted to the southern margins of the Ghooli Dome, where lower salinity groundwater has been located within fractured rocks and alluvium (Barto Gold Mining Pty Ltd 2020). The regional water table ranges between 5 m and 45 m in depth, with groundwater flowing in a north-westerly direction towards the Yilgarn Palaeovalley (Barto Gold Mining Pty Ltd 2020) in which the Koorkoordine-Julia-Deborah salt lake complex is located. Groundwater is hypersaline and has no near-by users or value to vegetation. Groundwater salinity generally ranges from 14,000 mg/L total dissolved solids and 35,000 mg/L TDS, but is more typically between 20,000 mg/L TDS and 110,000 mg/L TDS (Barto Gold Mining Pty Ltd 2020).

The proposed Purpose Permit Area is located within the *Rights in Water and Irrigation Act 1914* Goldfields Groundwater Proclamation Area, meaning a licence is required for the abstraction of groundwater or the construction of bores. Clearing is unlikely to impact on groundwater quality provided that appropriate management measures are implemented to reduce the likelihood of spills and contamination of groundwater.

5. Environmental Values

This section contains information about the environmental characteristics of the proposed Purpose Permit Area (within the context of the region), specifically relating to flora, vegetation and terrestrial fauna values, that may be relevant to this NVCP application. The assessment against the 10 clearing principles has also taken into regard the geological, soil characteristics and hydrogeology to inform the impact predictions.

5.1. Flora

5.1.1. Survey Objective, Area and Timing

A targeted significant flora survey was conducted by Stantec (2022a) in October 2020, February 2022 and May 2022. The survey area encompassed, and extended beyond, the proposed Purpose Permit Area (Figure 5-1); however, disturbed parts of the proposed Purpose Permit Area and the Indicative Footprint was not assessed. The objective of the survey was to understand the flora and vegetation values of the survey area, including characterising the flora, delineating vegetation units, and providing an assessment of the significance of the flora and vegetation. The Environmental Protection Authority (2016) recommends that flora and vegetation surveys be undertaken following the season of highest rainfall to optimise the likelihood of encountering flowering and fruiting taxa and capturing ephemeral species. The recommended survey timing for the South-Western Interzone Botanical Province is during spring (September to November). However, targeted surveys can be undertaken during the flowering period for significant flora with the potential to be in the local area.

5.1.2. Flora of Significance

One individual of *Rinzia fimbriolata* (P1) was recorded outside of the proposed Purpose Permit Area (50 J 727347 E, 6533384 N (Appendix A). Based on data from the Western Australian Herbarium (WAH), *Rinzia fimbriolata* is known from three records within the Avon Wheatbelt and Coolgardie bioregions (Western Australian Herbarium 2022). Recent surveys conducted by Stantec (2022b) in the vicinity of the proposed Purpose Permit Area recorded 201 locations where *Rinzia fimbriolata* occurred, comprising 9,311 individuals. The species also extends into the adjacent Avon Wheatbelt (AW01) subregion. Therefore, if the species occurs, it is unlikely that *Rinzia fimbriolata* is restricted to the proposed Purpose Permit Area.

According to the WAH, this species is usually found in association with well-drained soils of brown sandy loam, as well as clays with quartz pieces (Western Australian Herbarium 2022). Adjacent to the proposed Purpose Permit Area, *Rinzia fimbriolata* was recorded in a vegetative state (non-flowering) on brown sandy clay loam soils with lateritic pebbles, growing in association with vegetation type EcAaBssPtHe. This vegetation type has been recorded across other Barto tenements and to date, Stantec have mapped approximately 70 ha during recent surveys in the vicinity of the proposed Purpose Permit Area (Stantec 2022b).

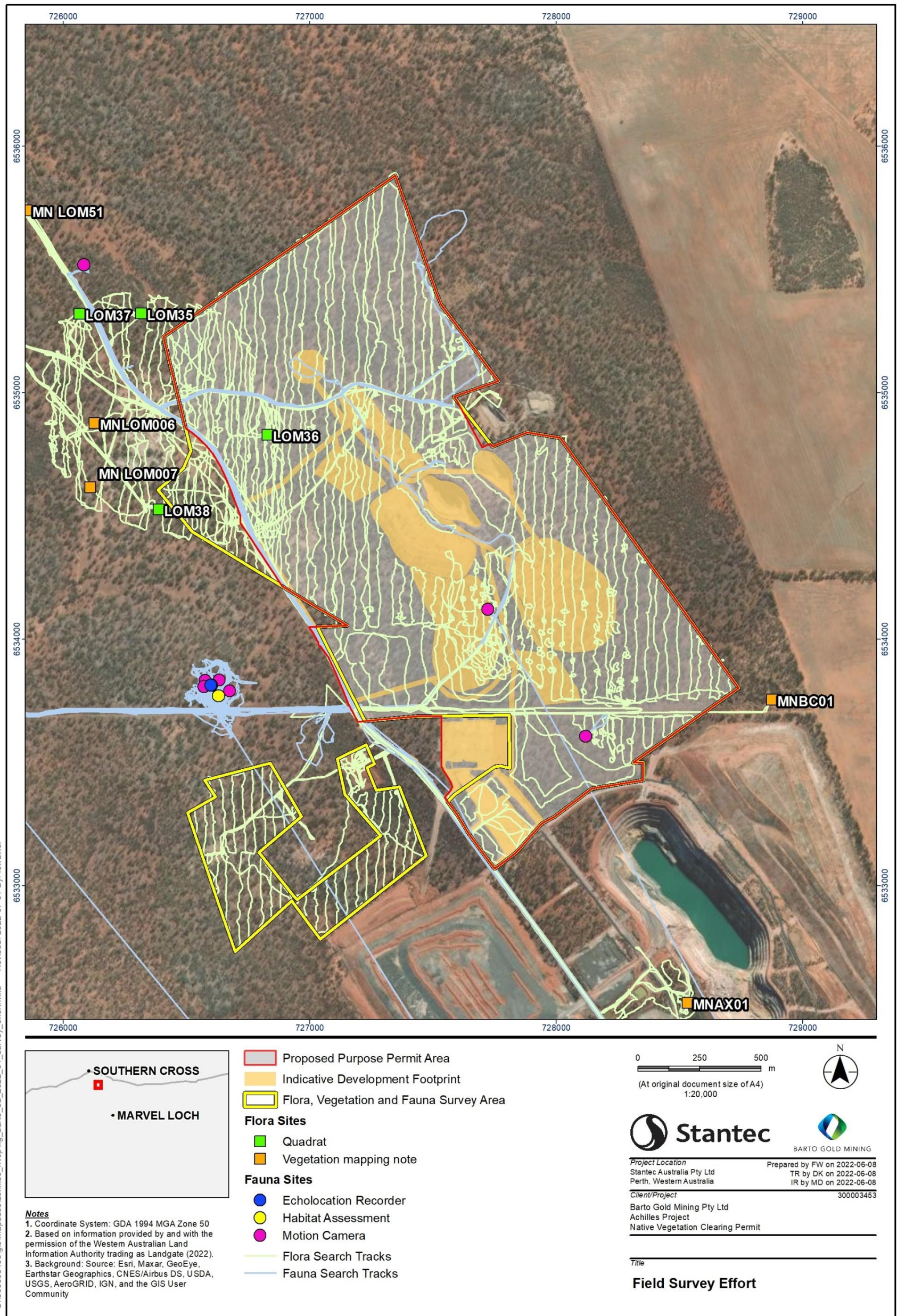
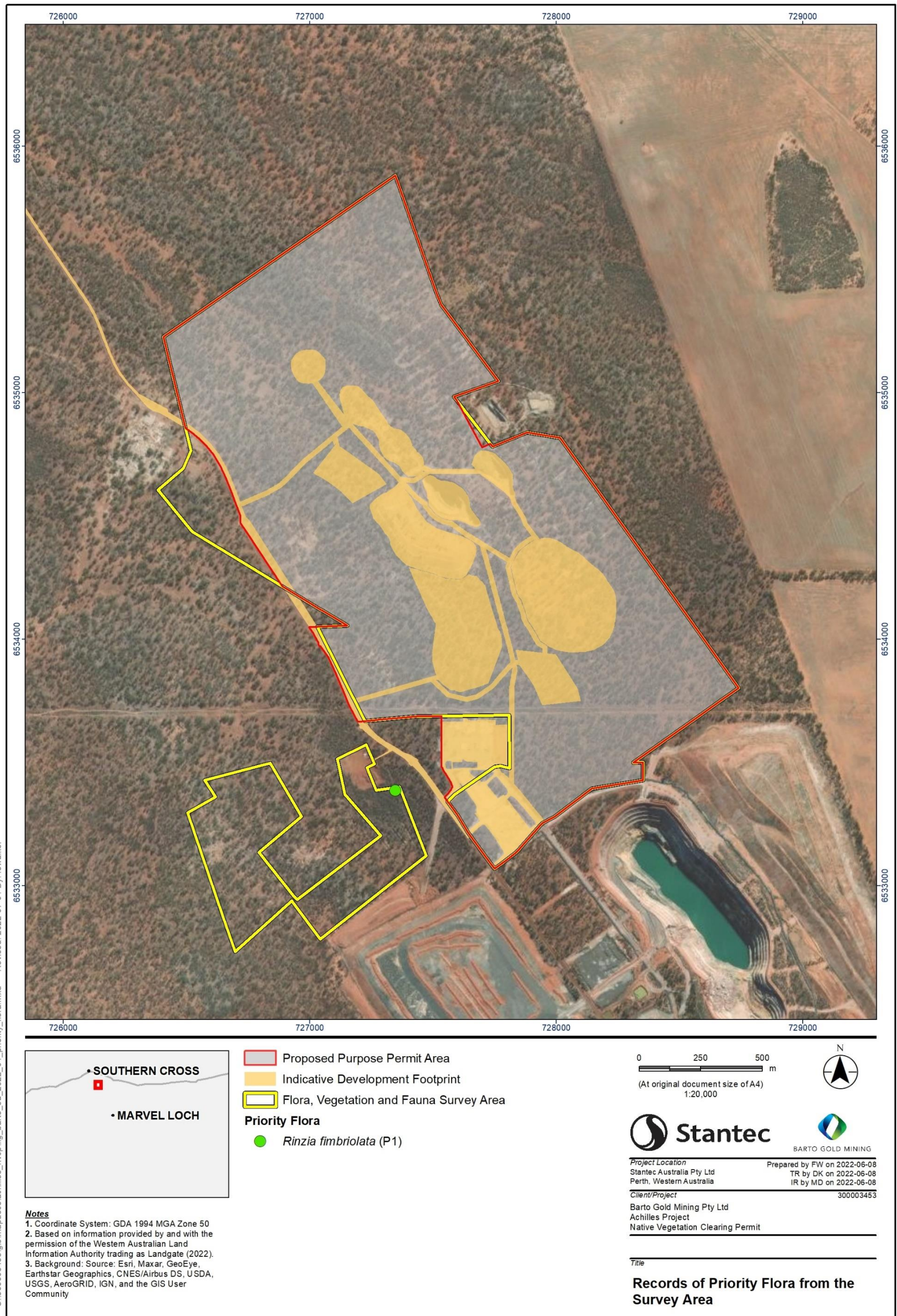


Figure 5-1: Flora, vegetation and fauna survey effort within, and adjacent to, the proposed Purpose Permit Area.



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Figure 5-2: Records of Priority flora from adjacent to the proposed Purpose Permit Area.

5.1.3. Introduced Flora

Five introduced flora (weed) species were recorded within the proposed Purpose Permit Area; **Mesembryanthemum nodiflorum*, **Carrichtera annua*, **Erodium aureum*, **Hordeum leporinum* and **Mesembryanthemum crystallinum*. The ecological impact and invasiveness classifications (Department of Parks and Wildlife 2013b) for these weed species are provided in Table 5-1. No species within the proposed Purpose Permit Area are listed as a declared pest under s. 22 of the *Biosecurity and Agriculture Management Act 2007* (BAM Act), or as a Weed of National Significance (WoNS) (Australian Government 2012b). All records were found along the existing haul road (Figure 5-5).

Table 5-1: Introduced flora taxa identified from within the proposed Purpose Permit Area.



Common Name	Taxon	DBCA Classification		# Individual Specimens
		Ecological Impact	Invasive	
Slender Iceplant	<i>*Mesembryanthemum nodiflorum</i>	Unknown	Unknown	88
Common Iceplant	<i>*Mesembryanthemum crystallinum</i>	Unknown	Unknown	2,600
Ward's Weed	<i>*Carrichtera annua</i>	High	Rapid	80
	<i>*Erodium aureum</i>	Unknown	Unknown	645
Barley	<i>*Hordeum leporinum</i>	Unknown	Unknown	2

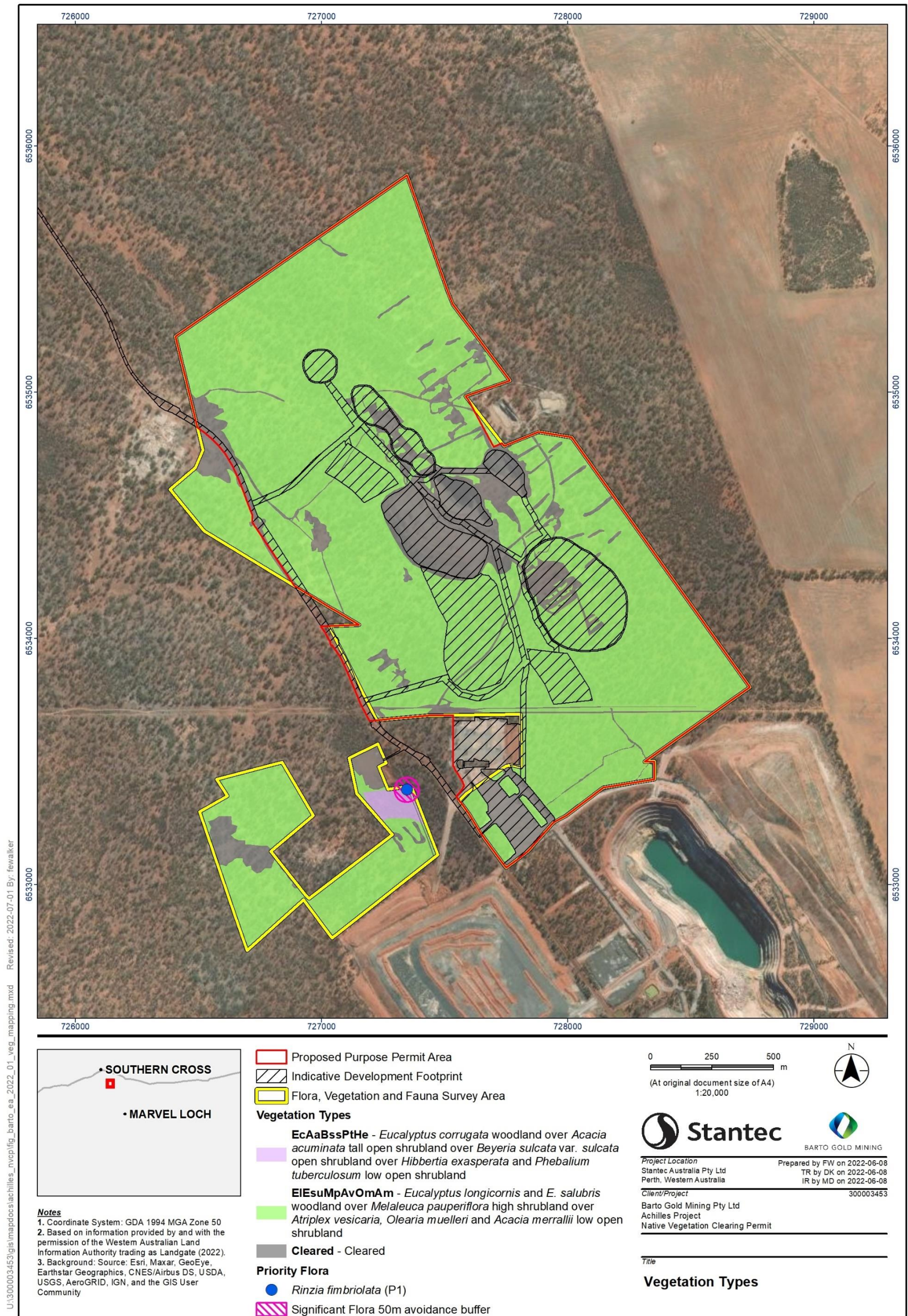
5.2. Vegetation

5.2.1. Vegetation Types

One vegetation type was identified and described from the proposed Purpose Permit Area (295.51 ha), EESuMpAvOmAm, which occupied 81% of the proposed Purpose Permit Area (Table 5-2). Vegetation type mapping is presented in Figure 5-3. The vegetation of the proposed Purpose Permit Area is broadly represented by *Eucalyptus longicornis* and *Eucalyptus salubris* woodland over *Melaleuca pauperiflora* high shrubland over *Atriplex vesicaria*, *Olearia muelleri* and *Acacia merrallii* low open shrubland. The remainder of the proposed Purpose Permit Area was cleared (55 ha), comprising 19%. Vegetation was considered typical of the South-West Interzone Botanical Province (Gibson and Lyons 1998; Recon Environmental 2008a;b) and of the *Eucalyptus* woodlands of the Southern Cross subregion (Cowan *et al.* 2001). None of the EcAaBssPtHe vegetation type, which contains *Rinzia fimbriolata*, was found within the proposed Purpose Permit Area (Appendix A).

Table 5-2: Vegetation types occurring within, and adjacent to, the proposed Purpose Permit Area.

Vegetation Type Code	Vegetation Type Description	Extent Within Survey Area		Extent Within The Proposed Permit Area		Representative Photograph
		Extent (ha)	Proportion (%)	Extent (ha)	Proportion (%)	
EIEsuMpAvOmAm	<i>Eucalyptus longicornis</i> and <i>Eucalyptus salubris</i> woodland over <i>Melaleuca pauperiflora</i> high shrubland over <i>Atriplex vesicaria</i> , <i>Olearia muelleri</i> and <i>Acacia merrallii</i> low open shrubland.	276.043	82.8	240.498	81	
EcAaBssPtHe	<i>Eucalyptus corrugata</i> woodland over <i>Acacia acuminata</i> tall open shrubland over <i>Beyeria sulcata</i> var. <i>sulcata</i> open shrubland over <i>Hibbertia exasperata</i> and <i>Phebalium tuberosum</i> low open shrubland.	2.42	0.73	0	0	
Cleared	Cleared	55	16.4	55	19	



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Figure 5-3: Vegetation types recorded from within, and adjacent to, the proposed Purpose Permit Area.

5.2.2. Vegetation of Significance

There was no vegetation of significance mapped within, or adjacent to, the proposed Purpose Permit Area and no vegetation types were analogous to any known TECs or PEC. The Parker Range vegetation complexes PEC, listed as P3 under the BC Act, is approximately 16.6 km away from the proposed Purpose Permit Area (Figure 5-4).

5.2.3. Vegetation Condition

Vegetation condition within the proposed Purpose Permit Area ranged from 'Completely Degraded' to 'Excellent', with the majority in 'Excellent' condition (62.3%) (Table 5-3). These areas represented intact vegetation with minimal disturbance. Approximately 54.6 ha (16.42%) of vegetation within, and adjacent to, the proposed Purpose Permit Area was mapped as 'Completely Degraded' and comprised areas that had been previously cleared for road and mine-related infrastructure.

Table 5-3: Vegetation condition recorded within, and adjacent to, the proposed Purpose Permit Area.

Vegetation Condition	Extent Within Survey Area		Extent Within Proposed Permit Area	
	Extent (ha)	Proportion (%)	Extent (ha)	Proportion (%)
Excellent	278.46	83.58	240.5	62.315
Completely Degraded	54.6	16.42	55	18.6
Total	333.15	100	295.5	100

5.2.4. Pre-European Vegetation

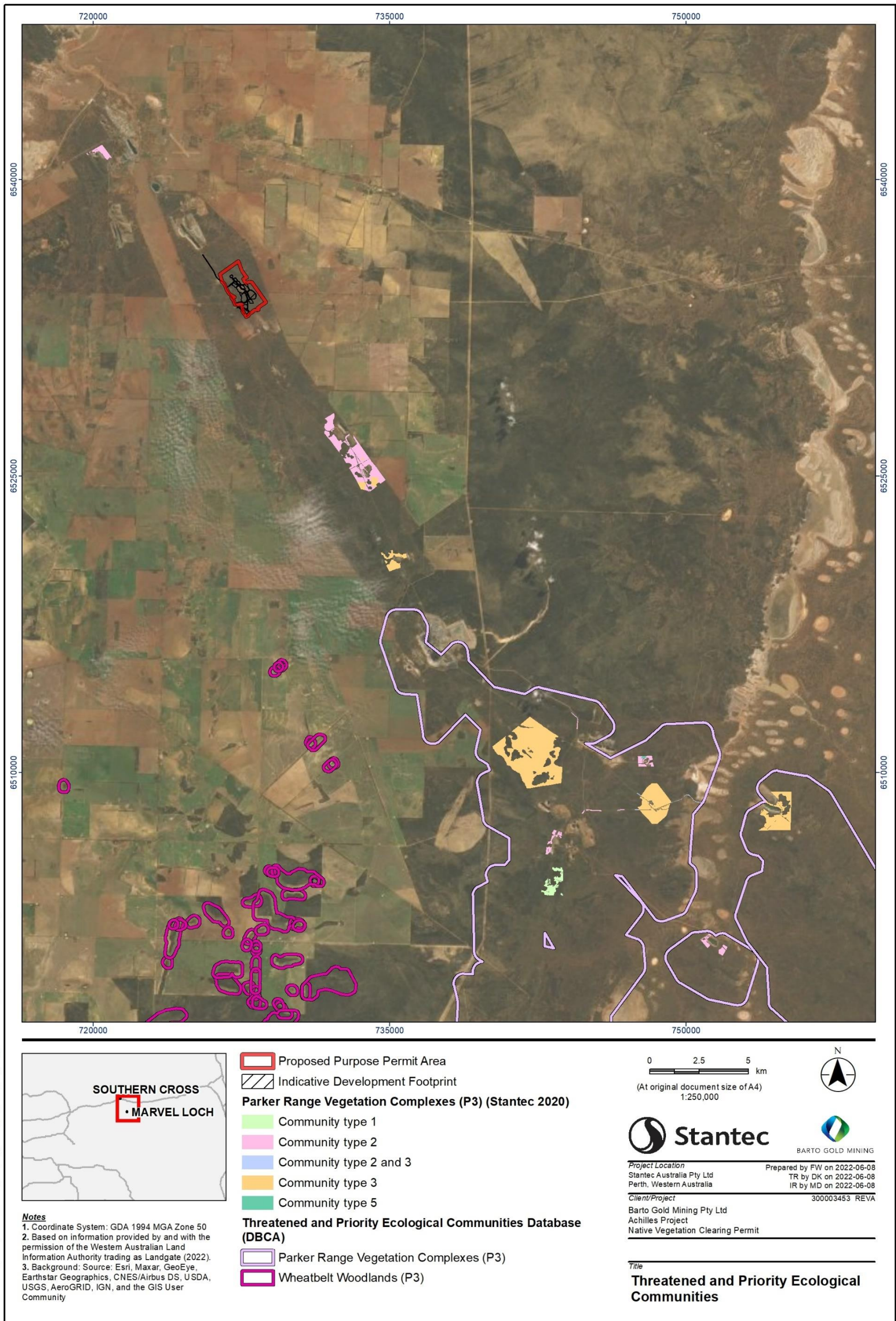
Vegetation mapping of Western Australia was completed on a broad scale (1:1,000,000 and 1:250,000) by Beard (1975), classifying vegetation into broad vegetation associations. These vegetation associations were reassessed by Shepherd *et al.* (2002) to account for clearing in the intensive land use zone, and to divide some larger vegetation units into smaller units. In addition, Shepherd *et al.* (2002) developed a series of systems to assist in the removal of mosaics; however, some mosaics still occur. Vegetation system associations described by Shepherd *et al.* (2002) correspond with that of Beard (1975).

The proposed Purpose Permit Area is situated within a single vegetation association (Yilgarn 1068.1) (Table 5-4). The significance of clearing a particular vegetation association can be determined by comparing current and pre-European extents. Vegetation associations retaining less than 30% of their pre-European extent generally experience accelerated species loss at an ecosystem level and are regarded as being 'vulnerable', while vegetation types retaining less than 10% of their original extent are regarded as being 'endangered' (Environmental Protection Authority 2020a). The current extent of the vegetation associations is above the 30% threshold across all four scales of assessment (State, bioregion, subregion and Local Government Area; LGA) (Government of Western Australia 2020). Given the small area of the proposed Purpose Permit Area, it is also unlikely that additional clearing on such a small scale will significantly reduce the overall extent.

Table 5-4: Extent of pre-European vegetation associations remaining across four scales (State, bioregion, subregion, LGA) and within, and adjacent to, the proposed Purpose Permit Area.

System / System Code	Description	Extent In Proposed Permit Area (ha)	Scale	Pre-European Extent (ha)	Current Extent (ha)	Proportion Remaining (%)	Current Extent Within IUCN Class I-IV Reserves (ha)	Proportion Of Current Extent Protected Within IUCN Class I-IV Reserves (%) ¹
Yilgarn 1068.1	Medium woodland; Salmon Gum, Morrel, Gimlet and <i>Eucalyptus sheathiana</i>	48.6	State-wide	268,900	142,088	53	16,761	6.2
			Coolgardie bioregion	193,988	104,804	54	14,179	7.3
			Southern Cross subregion	193,988	104,804	54	14,179	7.3
			Shire of Yilgarn LGA	268,900	142,088	53	16,790	6.2

Note: Area values have been rounded to the nearest whole number.



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Figure 5-4: PECs located adjacent to the proposed Purpose Permit Area.

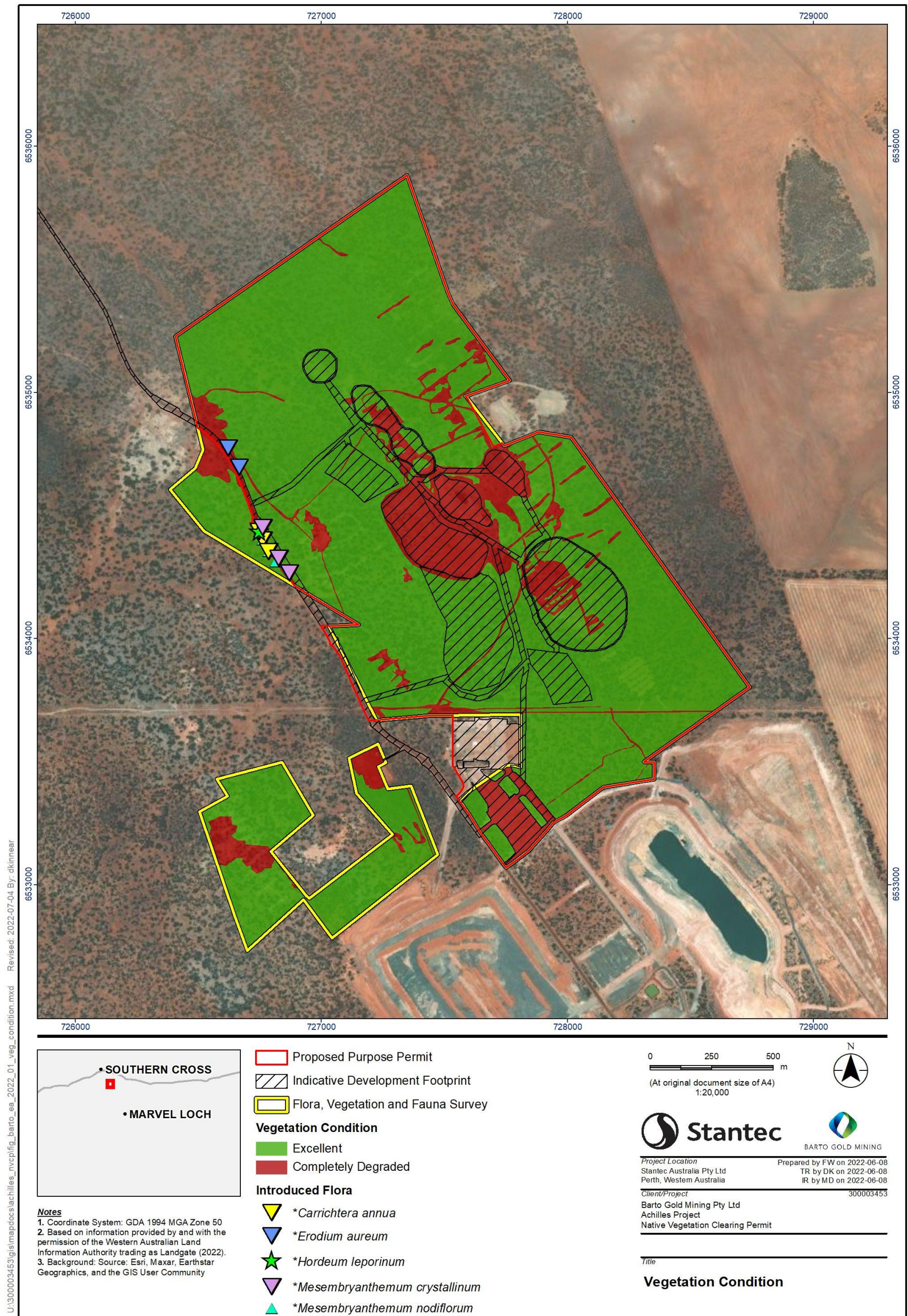
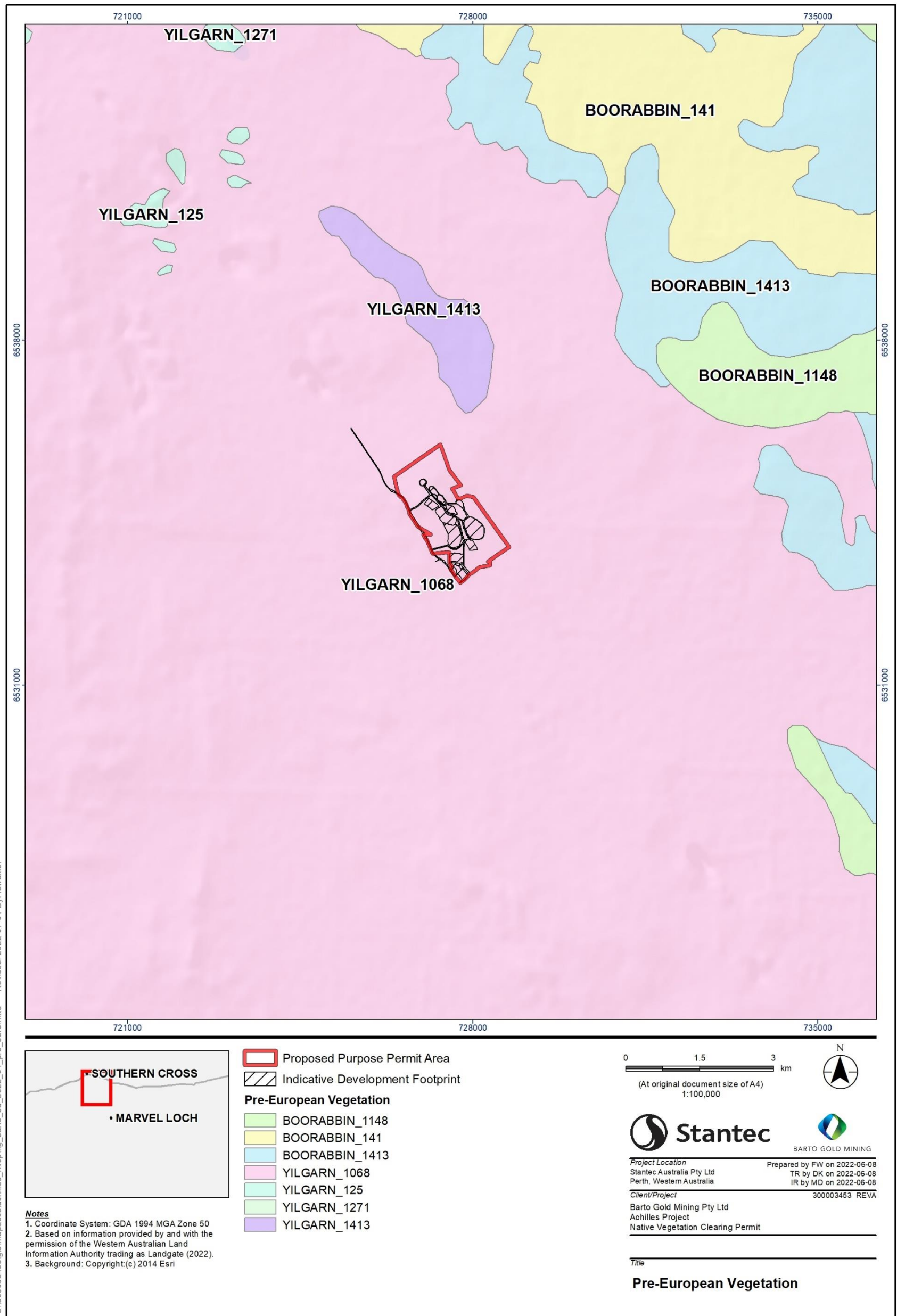


Figure 5-5: Vegetation condition within, and adjacent to, the proposed Purpose Permit Area.



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Figure 5-6: Pre-European vegetation of the proposed Purpose Permit Area.

5.3. Terrestrial Fauna

A regional targeted Chuditch (*Dasyurus geoffroii*) survey was undertaken in 2021 for Barto on the broader SXO tenements and broad fauna habitats were mapped. The Chuditch is listed as Vulnerable under the BC Act and Vulnerable under the EPBC Act.

5.3.1. Survey Objective and Methods

The objective of the targeted survey was to determine the presence of Chuditch across Barto's tenements. Fauna habitat was defined in terms of distribution and significance according to the following criteria:

- Distribution: Habitats that are widespread and common are categorised as 'Widespread'; otherwise, they are categorised to have 'Limited Extent'.
- Significance: Habitats considered important to species of significance that are confirmed from, or likely to occur in, an area, or distinct fauna assemblages are categorised as 'Significant'; otherwise, they are categorised as being of 'Limited Significance'.

The likelihood of occurrence of significant species identified from the database searches was assessed in relation to the proposed Purpose Permit Area. Rankings were assigned using the definitions and criteria provided in Table 5-5.

Table 5-5: Criteria for assessing the likely presence of significant fauna.


Likelihood: Confirmed
The species has been recorded unambiguously (i.e. during recent assessments of the survey area or from reliable records obtained via database searches or from current vouchered specimen at WA Herbarium) in the survey area.
Likelihood: Likely
There is a medium to high likelihood that the species occurs in the survey area as it occurs within the known distribution of the species, contains suitable habitat (either year-round or intermittently, such as temporary water sources or features that are only relied upon during certain times of the year; e.g. breeding caves, for fauna) and the species has been recorded recently nearby.
Likelihood: Possible
There is a potential for the species to occur in the survey area, as: <ul style="list-style-type: none"> • the species has been recorded recently nearby; however: <ul style="list-style-type: none"> – the species may not have been detectable during current or previous studies (e.g. rare, patchily distributed, highly mobile (fauna), non-optimal survey timing). – the species is known to be cryptic and may not have been detectable despite extensive studies. • the species has been recorded recently nearby and species presence cannot be ruled out due to factors such as species ecology or distribution; however: <ul style="list-style-type: none"> – doubt remains over taxonomic identification. – the majority of habitat does not appear suitable. – coordinates are doubtful.
Likelihood: Unlikely
The species is unlikely to occur in the survey area as: <ul style="list-style-type: none"> • the species has not been recorded locally through DBCA database searches; • the survey area lacks potential or critical habitat, supporting at best marginally suitable habitat, and/or being severely degraded; • it has only been recorded from a few historic record/s and no other collections have occurred in the area; and • the species has not been recorded in the survey area despite adequate survey effort, such as a standardised methodology or targeted searching within potentially suitable habitat.

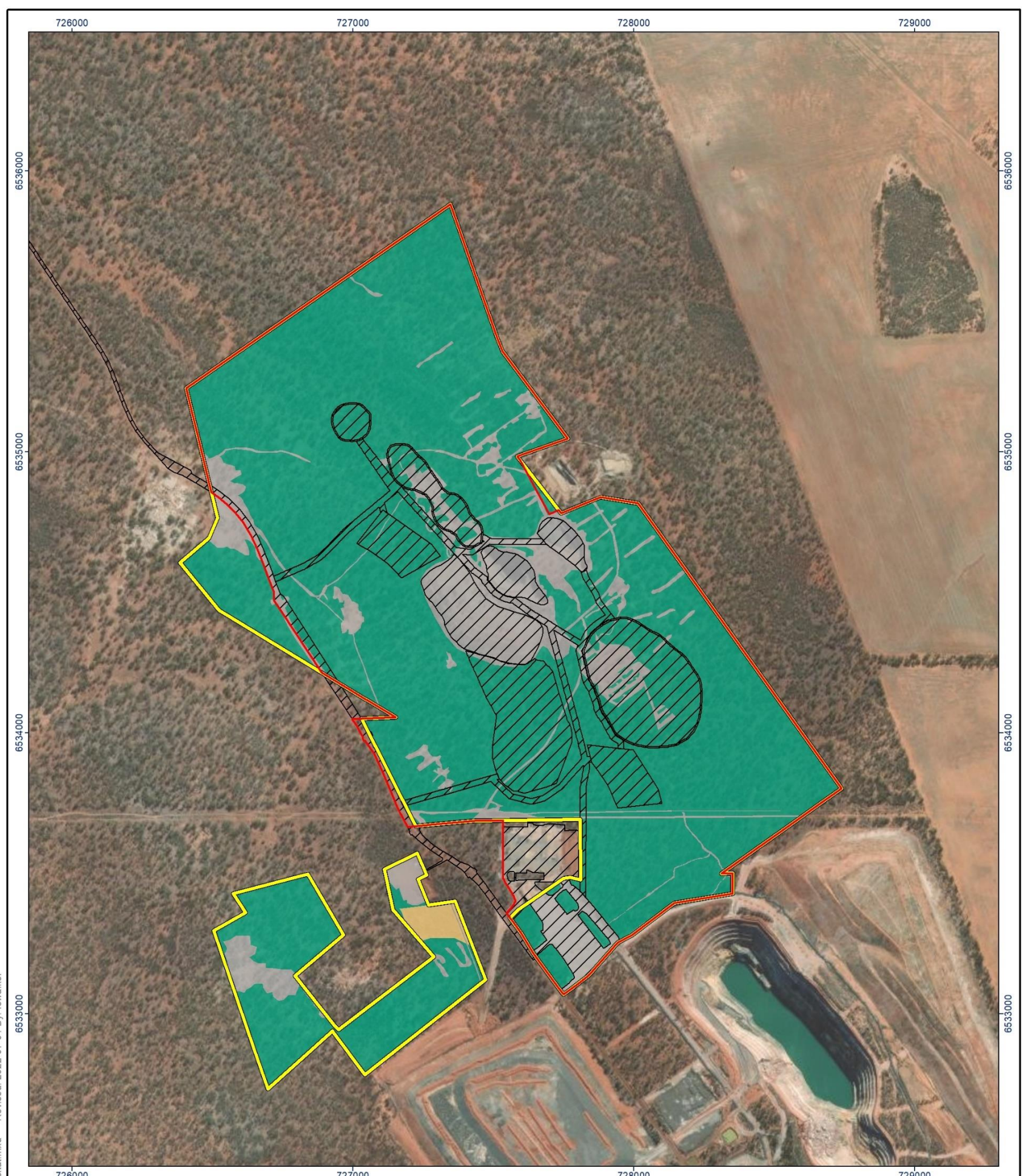
5.3.2. Fauna Habitats

One broad fauna habitat type was identified and delineated from fauna habitat assessments within proposed Purpose Permit Area, in conjunction with landforms and vegetation types. This fauna habitat was described as 'Eucalyptus Woodlands', comprising 81% of the proposed Purpose Permit Area. Cleared/disturbed areas represented the remaining 19%. Fauna habitat is described in Table 5-6 and the extent of this habitat has been mapped in Figure 5-7.

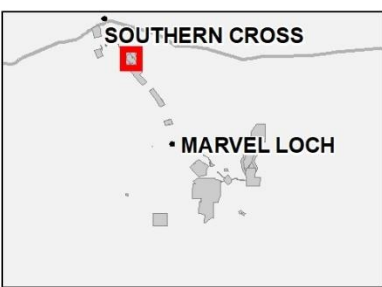
The *Eucalyptus* Woodlands fauna habitat was considered 'Significant' and may support significant fauna, particularly listed threatened species or distinct assemblages (Table 5-6). The large hollow-bearing trees provide important habitat for the Western Rosella (inland pop.) (*Platycercus icterotis xanthogenys*) (P4) and the Peregrine Falcon (*Falco peregrinus*) (OS). In addition, the thick vegetation at some sites may also serve as suitable foraging habitat for the Western Rosella within this habitat type. Large woody debris and logs present in the *Eucalyptus* Woodlands habitat may provide denning habitat for the Chuditch (*Dasyurus geoffroii*) (Vu; Vu).

Table 5-6: Fauna habitats recorded within the Survey Area.

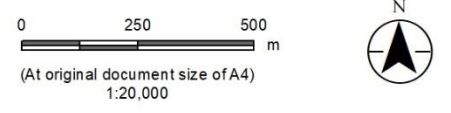
Habitat / Category	Extent Within Survey Area		Extent Within Proposed Permit Area		Vegetation Codes	Reference Photographs
	Extent (ha)	Proportion (%)	Extent (ha)	Proportion (%)		
<i>Eucalyptus</i> Woodlands Widespread Significant	278.5	83.5	240.5	81	EcAaBssPtHe ElEsuMpAvOmAm	
Broad Description And Value To Fauna						
Gently undulating terrain dominated by a woodland of <i>Eucalyptus longicornis</i> , <i>Eucalyptus salmonophloia</i> , <i>Eucalyptus salubris</i> and <i>Eucalyptus loxophleba</i> subsp. <i>lissophloia</i> over <i>Melaleuca</i> spp. tall shrubland over low open shrubland. The habitat ranged from relatively open areas dominated by mature tall eucalypts to densely vegetated areas with immature eucalypts, regenerating after fire. Mallee forms of the eucalypts also occurred within the Eucalyptus Woodland habitat. This habitat contained abundant leaf litter and large woody debris, providing shelter for a range of fauna such as the Chuditch (<i>Dasyurus geoffroii</i>). Mature eucalypt trees may contain hollows and provide suitable nesting and/or roosting habitat for a range of avifauna, including the Western Rosella (inland pop.) (P4) and the Peregrine Falcon (OS). However, the Peregrine Falcon (OS) preferentially nests in cliff faces (Menkhorst <i>et al.</i> 2017). Areas of mature Eucalyptus Woodland with thick vegetation may serve as suitable foraging habitat for the Western Rosella (inland pop.) (P4) which has been recorded within this habitat outside of the proposed Purpose Permit Area. This habitat may also support Malleefowl (Vu ; Vu) mound building and the Western Brush Wallaby (<i>Notamacropus irma</i>) (P4), which have been recorded in the vicinity of the proposed Purpose Permit Area.						
Cleared	55	16.5	55	19	-	N/A
Broad Description And Value To Fauna						
Degradation associated with clearing for road and infrastructure installation. Habitat considered of little to no value to fauna.						
Total	333.5	100	295.5	100	-	-



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- Proposed Purpose Permit Area
 - Indicative Development Footprint
 - Flora, Vegetation and Fauna Survey Area
- Fauna Habitat**
- Eucalyptus Woodland
 - Shrubland Stony Rise
 - Cleared



Project Location
 Stantec Australia Pty Ltd
 Perth, Western Australia

Prepared by
 FW on 2022-06-08
 TR by DK on 2022-06-08
 IR by MD on 2022-06-08

Client/Project
 Barto Gold Mining Pty Ltd
 Achilles Project
 Native Vegetation Clearing Permit

300003453

Notes

1. Coordinate System: GDA 1994 MGA Zone 50
2. Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2022).
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Title

Fauna Habitat Mapping

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Figure 5-7: Fauna habitat mapping within, and adjacent to, the proposed Purpose Permit Area.

5.3.3. Fauna Assemblage

Stantec has undertaken extensive fauna survey throughout the SXO mining tenements. More than 30 vertebrate fauna species have been recorded in the vicinity of the proposed Purpose Permit Area, including at least three introduced species; the Rabbit (*Oryctolagus cuniculus*), Feral Cat (*Felis catus*) and Red Fox (*Vulpes vulpes*). Of these species, only the Red Fox has been captured on motion-sensing cameras. No terrestrial vertebrate fauna species of significance have been recorded within the proposed Purpose Permit Area; however, no dedicated fauna surveys have been undertaken within the proposed Purpose Permit Area.

5.3.4. Fauna of Significance

More than 200 species of vertebrate fauna were identified as part of desktop assessments across the SXO tenements, with at least 20 species listed as significant under the BC Act and/or the EPBC Act, comprising six mammals, 12 birds, and two reptiles. Of these:

- Seven are listed as Threatened under the BC Act and/or EPBC Act.
- Five are recognised by DBCA as Priority fauna (DBCA recognises several species that are not listed under the BC Act or the EPBC Act, but for which there is some conservation concern, and has produced a supplementary list of priority fauna).
- One species, the Peregrine Falcon (*Falco peregrinus*) is recognised by the State (BC Act), as being in need of special protection (OS).
- One species, the Red-tailed Phascogale (*Phascogale calura*), is recognised by the State (BC Act) to be conservation dependent (CD).
- Seven species are listed as Migratory under the EPBC Act or listed under the BC Act in alignment with an International Agreement.
- One species, the Bilby (*Macrotis lagotis*), is considered to be extinct in the Coolgardie and Avon Wheatbelt bioregions (Woinarski *et al.* 2014); therefore, it is unlikely to occur within the proposed Purpose Permit Area.
- Three invertebrates of significance were recorded as potentially occurring within the vicinity of the proposed Purpose Permit Area, two of which are aquatic and one terrestrial.

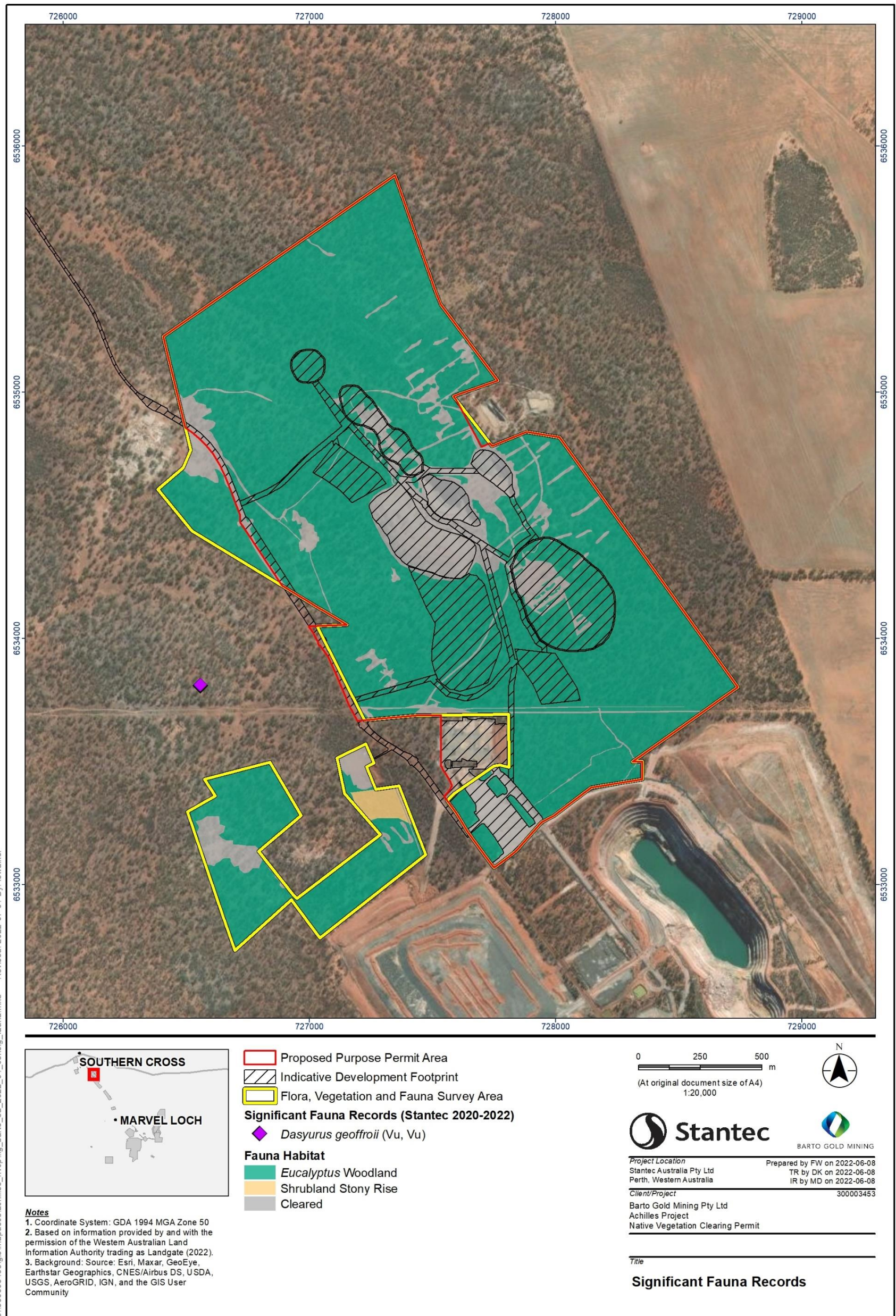
Seven species were considered 'Possible' to occur within the proposed Purpose Permit Area, comprising the Chuditch (*Dasyurus geoffroii*) (Vu, Vu), Western Brush Wallaby (*Notamacropus irma*) (P4), Malleefowl (*Leipoa ocellata*) (Vu ; Vu), Western Rosella (*Platycercus icterotis xanthogenys*) (P4), Peregrine Falcon (*Falco peregrinus*) (OS), Woma Python (southwest subpop.) (*Aspidites ramsayi*) (P1) and the Tree-stem trapdoor spider (*Aganippe castellum*) (P4). The remaining species were considered 'Unlikely' to occur based on a lack of recent records, unsuitable habitat and/or the proposed Purpose Permit Area occurring outside the known species range.

5.3.4.1. Malleefowl (*Leipoa ocellata*)

Malleefowl have been recorded recently within the SXO tenements, including sightings and active mounds. Recent Malleefowl (Vu; Vu) mounds are located approximately 29 km away from the proposed Purpose Permit Area, primarily within *Acacia* Shrubland and *Eucalyptus* Woodland habitats (Stantec 2021b) (Stantec, in prep). In addition, Botanica (2016) recorded seven inactive Malleefowl mounds, one individual and one set of tracks within different areas, though predominantly in the Sandplain Shrublands habitat. Numerous *ad hoc* surveys have been undertaken for the Malleefowl within the proposed Purpose Permit Area, although no mounds have been recorded. However, it is considered possible that the Malleefowl still uses the proposed Purpose Permit Area for foraging on occasion.

5.3.4.2. Chuditch (*Dasyurus geoffroii*)

The Chuditch (*Dasyurus geoffroii*) has been recorded within the broader SXO area, predominantly to the southeast. The closest individuals have been recorded via motion cameras approximately 22.6 km from the proposed Purpose Permit Area. The Chuditch (*Dasyurus geoffroii*) has been recorded within the *Eucalyptus* Woodland habitat and also the Shrubland habitat (Appendix B). It is considered possible that the Chuditch uses the proposed Purpose Permit Area as it occurs within the species known distribution and contains suitable habitat (either year-round or intermittently); however, the areas in which the species has been recorded was generally characterised by more dense vegetation, either woodland or shrubland.



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Figure 5-8: Significant fauna records adjacent to the proposed Purpose Permit Area.

6. Environmental Management Measures and Rehabilitation

6.1. Approved Policies and Planning Instruments

The clearing of native vegetation in Western Australia is regulated under Part V of the EP Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004. In addition to the matters required to be considered in accordance with s. 51O of the EP Act, Barto has also had regard for the below statutes, polices and guidelines:

- *Biodiversity Conservation Act 2016* (WA) (BC Act);
- *Conservation and Land Management Act 1984* (WA) (CALM Act);
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act);
- *Soil and Land Conservation Act 1945*;
- *Rights in Water and Irrigation Act 1914*;
- *Aboriginal Heritage Act 1972*;
- *Aboriginal Cultural Heritage Act 2021*;
- WA Environmental Offsets Policy (Government of Western Australia 2011);
- A guide to the assessment of applications to clear native vegetation: Under Part V Division 2 of the *Environmental Protection Act 1986* (Department of Environmental Regulation 2014);
- Procedure: Native vegetation clearing permits (Department of Water and Environmental Regulation 2021);
- Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (Environmental Protection Authority 2016);
- Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (Environmental Protection Authority 2020b);
- Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan (Department of Parks and Wildlife 2013a);
- National Recovery Plan for Malleefowl *Leipoa ocellata* (Department for Environment and Heritage); and
- Chuditch (*Dasyurus geoffroii*) National Recovery Plan (Department of Environment and Conservation 2012).

6.2. Management Measures – Avoidance

Barto is committed to appropriately managing its activities and ensuring any potential impacts to the environment are managed appropriately. Clearing has been minimised by utilising existing disturbed areas. Historic open pits will be backfilled with mine waste to minimise clearing required for WRDs. Where practical, existing disturbed areas will be utilised for haul/access roads and associated infrastructure to minimise clearing requirements.

Biological surveys identified the priority flora species, *Rinzia fimbriolata* (P1), at 201 locations across the SXO tenements. The recording of this priority species resulted in Barto implementing a number of proponent-led avoidance measures to avoid and minimise impacts to significant flora species. These measures included:

- The proposed Purpose Permit Area has been designed to avoid any direct impact to *Rinzia fimbriolata* and an associated 50 m buffer.
- The Proponent will take additional measures to avoid impacts to *Rinzia fimbriolata* through dust management and minimization and by prohibiting any unauthorised entry.

Furthermore, Barto are committed to undertaking all compliance monitoring and reporting stipulated by applicable laws and regulations, and the operation will require all employees to exercise appropriate environmental practices. Environmental management includes, but is not limited to:

- identifying risk and hazards;
- operational environmental management plans;
- training and competencies;
- monitoring programs;
- auditing and inspections;
- incident investigation; and
- reporting requirements.

6.3. Management Measures – Minimisation

6.3.1. Land Clearing and Flora Management

Barto will ensure all clearing and ground disturbance is carried out in accordance with their Surface Disturbance and Clearing Procedures. Noting this, the following methods of vegetation clearing will be implemented during the construction phase of the Project. The following actions will be implemented to minimise and manage land disturbance impacts:

- Prior to clearing, an internal Surface Disturbance Permit (SDP) will be completed and signed off by the Environment Department.
- The disturbance permit will identify any conditions that apply to the clearing area (including any protected areas / species to be avoided where practicable).
- The clearing area will be delineated on foot and marked with survey pegs and flagging tape to ensure only the surveyed area is cleared.
- Clearing will not be undertaken until construction is imminent, minimising erosion and dust risks.
- Environmental awareness training will be completed by personnel involved in clearing activities (including identification of flora of conservation significance).
- A spotter will be used during clearing of external boundaries to ensure clearing remains within approval boundaries.
- Fire management practices will be implemented.
- No burning of vegetation spoil will occur on site.
- All cleared vegetation will be stockpiled for later use in rehabilitation activities.

6.3.2. Weed Management

Barto will aim to prevent the introduction of weeds and limit the spread of weeds in the proposed Purpose Permit Area as far as practicable. The following management measures will be implemented to minimise the risk of introducing flora into the proposed Purpose Permit Area:

- Weed, Seed and Hygiene Certificates (Doc No. SX-EN-FO-0031) will be presented as verification prior to mobilisation.
- All vehicles and equipment will be cleaned before mobilisation to the proposed Purpose Permit Area, to remove all dirt and vegetative materials.
- Vehicle and equipment washdown will only occur at an appropriate facility.
- Off-road vehicle use will be strictly controlled with no driving permitted off designated roads.
- Any new weed outbreaks will be recorded in the operation's Incident Reporting system and managed in accordance with site environmental procedures.

6.3.3. Fauna

Barto will aim to ensure fauna species are not adversely affected, via either direct impacts or impacts to habitat, as far as practicable. The following management measures will be implemented to minimise potential impacts on fauna:

- Pre-clearance surveys within the specified clearing areas will be undertaken in the morning of clearing to search for the presence of significant fauna species.
- No night time clearing is to occur to avoid impacting nocturnal species.
- Awareness training will outline the appropriate behaviour and responses in the event of contact with native fauna.
- Native fauna will not be captured, fed, harmed or disturbed. If relocation is required, the site Environmental Department will be contacted.
- All significant fauna deaths will be reported through the site Incident Reporting system.
- An SDP will be required for all clearing.
- Open excavations will be monitored regularly to ensure that any trapped fauna are rescued and released as quickly as possible.
- Water holding infrastructure, including any turkey's nests, will have fauna egress matting installed.
- Rehabilitation will be conducted progressively where possible;
- No pets or other animals will be brought to the Project site.
- All bores will be capped.

6.3.4. Dust Deposition on Vegetation

Barto will aim to minimise fugitive dust emissions and other air quality issues created during Project construction and operation by:

- Using water to suppress dust emission from unsealed roads, stockpiles and work areas as required.
 - Ensure that any saline water used is only sprayed within the haul road and cleared infrastructure footprints.
 - Implement water truck operating procedures and train water cart operators so that personnel are aware of the potential impacts of saline water on vegetation.
- Reducing vehicle speeds as appropriate if dust emission from roads are visually excessive.
- Where possible, operational activities will be scheduled to avoid high winds that may generate excessive dust.
- Report any community complaints regarding dust emissions that are deemed excessive as an incident.

6.3.5. Soil and Topsoil Management

Topsoil is an important resource for rehabilitation of disturbed sites, which need to be managed effectively. Incorrect management of topsoil can impact upon the soil structure and decrease its usefulness in rehabilitation. Topsoil will be managed by:

- Stockpiling vegetation, topsoil and subsoil as per the SDP.
- Striping topsoil to the required depth (maximum 250 mm).
- Not using topsoil for construction of windrows or in surface water management.
- Not using saline water for dust suppression during topsoil / subsoil harvesting or rehandling.
- Not storing materials or equipment on topsoil stockpiles.
- Marking out stockpile locations on maps and recording them in a GIS database, along with volumes.
- Implement weed, seed and hygiene requirements.

6.3.6. Water Management

The proposed Purpose Permit Area is not located within any major drainage lines or watercourses; therefore, clearing is not expected to impact surface water flow. Additionally, the proposed clearing is not located in proximity to any public drinking water source areas. Surface water management measures will be implemented if required to divert surface water flow away from mining infrastructure and Barto will aim to minimise impacts on the quality of surface water and avoid unnecessary disturbance to natural surface drainage. General recommendations for surface water management that will be considered for all mine infrastructure areas include:

- Implement erosion and sediment management measures where there is a risk of:
 - discharge of runoff from the mine occurring to downstream environments; and/or
 - discharge of sediment laden runoff.
- Installation of culverts and road drainage options where there are risks of modification to downstream flow, particularly for linear infrastructure developments.
- Construction and / or maintenance of roadside drainage so that runoff from the haul road will be contained during rainfall events.

Clearing is unlikely to impact on groundwater quality provided that groundwater contamination from the use of hydrocarbons and chemicals will be actively managed as detailed in Section 6.3.7.

6.3.7. Hydrocarbon Management

Barto will actively manage the storage and use of hydrocarbon in machinery and vehicles to minimise and contain spills and uncontrolled releases to prevent impacts to vegetation, soil and/or water. Increased vehicle activity during construction and operation may result in hydrocarbon spills; however, Barto aims to minimise such occurrences by ensuring that:

- hazardous materials are approved prior to site entry;
- hydrocarbons and chemicals are safely stored;
- hydrocarbons and other hazardous wastes are collected, treated, transported and disposed of in an environmentally sound manner, in accordance with regulatory and legislative requirements;
- the risk of hydrocarbons and hazardous waste spills is minimised; and
- effective spill clean-up material is readily available at each work site and on all mobile service trucks or vehicles, and where hydrocarbons and chemicals are stored and / or used.

6.4. Management Measures – Rehabilitation

A Mining Proposal is being prepared for the Project and mine closure activities will be captured in a revision of to the SXO's MCP submitted with the Mining Proposal. All clearing activities outlined in this document will be addressed in the revised MCP. Rehabilitation of the Achilles Project will be conducted at the end of the project life. Due to the short duration of the project, progressive rehabilitation is unlikely to occur; however, it will be undertaken if possible. Ongoing monitoring will be implemented during, and post, the life of the Project to ensure legal obligations and closure objectives are met. Rehabilitation activities will aim to meet post closure land use objectives. Barto will:

- continue to consult with key stakeholders throughout the life of the Project and at closure;
- ensure the rehabilitated land surfaces are safe and stable; and
- undertake rehabilitation tasks detailed in the MCP.

7. Assessment Against the 10 Clearing Principles

7.1. Scale of the Proposed Clearing

The proposed Purpose Permit Area covers an area of 278 ha, of which 62.31% (90.57 ha) is in 'excellent' condition, 9% (13.09 ha) is in good condition and 8.98% (13.06 ha) is degraded. The proposed Purpose Permit Area will require clearing of up to 60 ha of native vegetation, of which, 100.16 ha (78.38%) occurs within the *Eucalyptus* Woodland habitat type.

7.2. Assessment Against the 10 Clearing Principles

The proposed clearing works were assessed against the 10 clearing principles for native vegetation as listed in Schedule 5 of the EP Act (Table 7-1). The 10 clearing principles stipulate when native vegetation should not be cleared. The proposal to clear native vegetation for Barto's Achilles project area, located within their Southern Cross Operations, is considered in terms of these principles, in accordance with Department of Environmental Regulation (2014) (now Department of Water and Environment Regulation) assessment guidelines. As detailed design has progressed, an Indicative Footprint has been delineated to accommodate the mining infrastructure and is approximately 60 ha in area within the 278 ha proposed Purpose Permit Area (Figure 1-2). Clearing will not extend beyond the proposed Purpose Permit Area and Barto commit to avoiding and minimising impacts to significant flora as far as practical. The following sections address each of the 10 clearing principles as specified in Schedule 5 of the EP Act. These assessments have been made using information obtained from existing surveys and reports completed by Stantec and commissioned by Barto.

Table 7-1: Assessment against the 10 clearing principles of clearing of native vegetation within the proposed Purpose Permit Area.

Clearing Principle	Justification of Variance	Variance
<p>Principle (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.</p>	<p>The proposed Purpose Permit Area is 295.5 ha in area, of which 240.88 ha (86.72%) contains remnant vegetation. One BC Act-listed Priority flora species was recorded during the Stantec (2022a) targeted survey; <i>Rinzia fimbriolata</i> (P1). <i>Rinzia fimbriolata</i> (P1) is known from three records within the Avon Wheatbelt and Coolgardie bioregions (Western Australian Herbarium 2022). Recent extensive surveys conducted by Stantec (2022a) recorded 201 locations where <i>Rinzia fimbriolata</i> occurred, comprising 9,311 individuals. The species also extends into the adjacent Avon Wheatbelt (AW01) subregion; therefore, it is unlikely that <i>Rinzia fimbriolata</i> is restricted to the survey area. No species have been recorded within the proposed Purpose Permit Area. One species has been recorded in the vicinity of, but outside, the proposed Purpose Permit Area.</p> <p>No PECs or TECs are known to occur within the proposed Purpose Permit Area. One TEC, the eucalypt woodlands of the Western Australian wheatbelt (BC Act, P3; EPBC Act, CE), is located more than 10 km from the proposed Purpose Permit Area. The Parker Range vegetation complexes PEC, listed as P3 under the BC Act, is approximately 16.6 km away from the proposed Purpose Permit Area.</p> <p>No significant fauna has been recorded recently within the Proposed Purpose Permit area. The Malleefowl (<i>Leipoa ocellata</i>) (Vu; Vu) has been recorded recently within the SXO tenements, including sightings and active mounds; however, the mounds are located approximately 29 km away and primarily within Acacia Shrubland and <i>Eucalyptus</i> Woodland habitats (Stantec 2021b) (Stantec, in prep). It is considered possible that the Malleefowl still uses the proposed Purpose Permit Area for foraging on occasion. Similarly, the Chuditch (<i>Dasyurus geoffroii</i>) has been recorded within the broader SXO area, predominantly to the southeast, within the <i>Eucalyptus</i> Woodland habitat and also the Shrubland habitat. The closest individuals have been recorded via motion cameras approximately 22 km from the proposed Purpose Permit Area. It is considered possible that the Chuditch uses the proposed Purpose Permit Area as it occurs within the species known distribution and contains suitable habitat (either year round or intermittently); however, the areas in which the species has been recorded was generally characterised by more dense vegetation, either woodland or shrubland.</p> <p>One broad fauna habitat type was identified and delineated from fauna habitat assessments within proposed Purpose Permit Area (<i>Eucalyptus</i> Woodlands) and is considered 'Significant'. The large hollow-bearing trees provide important habitat for the Western Rosella (inland pop.) (<i>Platycercus icterotis xanthogenys</i>) (P4) and the Peregrine Falcon (<i>Falco peregrinus</i>) (OS). In addition, the thick vegetation at some sites may also serve as suitable foraging habitat for the Western Rosella within this habitat type. Large woody debris and logs present in the <i>Eucalyptus</i> Woodlands habitat may provide denning habitat for the Chuditch (<i>Dasyurus geoffroii</i>) (Vu; Vu).</p> <p>Overall, it is considered that the fauna habitat, biological diversity and occurrences of significant species within, and adjacent to, the proposed Purpose Permit Area is widespread throughout the surrounding region and not considered restricted to the area of proposed clearing. Although clearing within an area that has the potential to support a high biodiversity of flora and fauna, the small scale of clearing, short duration of the project, proposed management measures and rehabilitation commitments means it is unlikely that the proposed clearing will be at variance with this principle.</p> <p>The proposed clearing is unlikely to be at variance with this principle.</p>	<p>Unlikely to be at variance</p>

Clearing Principle	Justification of Variance	Variance
<p>Principle (b)</p> <p>Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.</p>	<p>The proposed Purpose Permit Area contains one broad fauna habitat: <i>Eucalyptus</i> Woodland. While this habitat is considered to be Significant to fauna species, it is typical of the Southern Cross subregion and is broadly represented outside of the proposed Purpose Permit Area. No significant fauna has been recorded recently within the proposed Purpose Permit Area.</p> <p>More than 200 species of vertebrate fauna were identified as part of desktop assessments across the SXO tenements, with at least 20 species listed as significant under the BC Act and/or the EPBC Act. Seven species were considered 'Possible' to occur within the proposed Purpose Permit Area, comprising the Chuditch (<i>Dasyurus geoffroii</i>) (Vu, Vu), Western Brush Wallaby (<i>Notamacropus irma</i>) (P4), Malleefowl (<i>Leipoa ocellata</i>) (Vu ; Vu), Western Rosella (<i>Platycercus icterotis xanthogenys</i>) (P4), Peregrine Falcon (<i>Falco peregrinus</i>) (OS), Woma Python (southwest subpop.) (<i>Aspidites ramsayi</i>) (P1) and the Tree-stem trapdoor spider (<i>Aganippe castellum</i>) (P4). The remaining species were considered 'Unlikely' to occur based on a lack of recent records, unsuitable habitat and/or the proposed Purpose Permit Area occurring outside the known species range.</p> <p>It is unlikely that significant fauna and their habitats are restricted to within the proposed Purpose Permit Area; therefore, clearing of native vegetation is unlikely to fragment, restrict or isolate any populations of significant fauna species.</p> <p>The proposed clearing is unlikely to be at variance with this principle.</p>	<p>Unlikely to be at variance</p>
<p>Principle (c)</p> <p>Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.</p>	<p>No significant flora were recorded within the proposed Purpose Permit Area or were considered to have the potential to occur. One individual of the BC -Act listed <i>Rinzia fimbriolata</i> (P1) was recorded adjacent to the proposed Purpose Permit Area. Based on data from the WAH, <i>Rinzia fimbriolata</i> is known from three records within the Avon Wheatbelt and Coolgardie bioregions (Western Australian Herbarium 2022). Recent extensive surveys conducted by Stantec (2022a) recorded 201 locations where <i>Rinzia fimbriolata</i> occurred, comprising 9,311 individuals. The species also extends into the adjacent Avon Wheatbelt (AW01) subregion. Therefore, if the species occurs, it is unlikely that <i>Rinzia fimbriolata</i> is restricted to the proposed Purpose Permit Area.</p> <p>The proposed clearing is not at variance with this principle.</p>	<p>Not at variance</p>
<p>Principle (d)</p> <p>Native vegetation should not be cleared if it comprises the whole or a part of or is necessary for the maintenance of a Threatened ecological community.</p>	<p>No TECs were found to have buffers that overlap the proposed Purpose Permit Area and the nearest TEC, the eucalypt woodlands of the Western Australian wheatbelt (BC Act, P3; EPBC Act, CE), is located more than 10 km from the proposed Purpose Permit Area.</p> <p>The proposed clearing is not at variance with this principle.</p>	<p>Not at variance</p>
<p>Principle (e)</p> <p>Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area</p>	<p>The proposed Purpose Permit Area is situated within a single vegetation association (Yilgarn 1068.1) (Table A). The current extent of the vegetation associations is above the 30% threshold across all four scales of assessment (State, bioregion, subregion, LGA) (Government of Western Australia 2020). The significance of clearing a particular vegetation association can be determined by comparing current and pre-European extents. Vegetation associations retaining less than 30% of their pre-European extent generally experience accelerated species loss at</p>	<p>Not at variance</p>

Clearing Principle	Justification of Variance	Variance																		
<p>that has been extensively cleared.</p>	<p>an ecosystem level and are regarded as being 'vulnerable', while vegetation types retaining less than 10% of their original extent are regarded as being 'endangered' (Environmental Protection Authority 2020a). The current extent of the vegetation associations is above the 30% threshold across all four scales of assessment (State, bioregion, subregion, LGA; Table A) (Government of Western Australia 2020). Given the small area of the proposed Purpose Permit Area, it is also unlikely that additional clearing on such a small scale will significantly reduce the overall extent.</p> <p>The proposed clearing is not at variance with this principle.</p> <p>Table A: Extent of pre-European vegetation associations remaining across three scales (Bioregion, Subregion and Local Government Area).</p> <table border="1" data-bbox="539 528 1850 743"> <thead> <tr> <th>Vegetation Association</th> <th>Scale</th> <th>Pre-European Extent (ha)</th> <th>Current Extent (ha)</th> <th>Proportion Remaining (%)</th> </tr> </thead> <tbody> <tr> <td rowspan="3">1068</td> <td>Bioregion (COO)</td> <td>193,988</td> <td>104,804</td> <td>54</td> </tr> <tr> <td>Subregion (COO2)</td> <td>193,988</td> <td>104,804</td> <td>54</td> </tr> <tr> <td>LGA (Yilgarn)</td> <td>268,900</td> <td>142,088</td> <td>53</td> </tr> </tbody> </table>	Vegetation Association	Scale	Pre-European Extent (ha)	Current Extent (ha)	Proportion Remaining (%)	1068	Bioregion (COO)	193,988	104,804	54	Subregion (COO2)	193,988	104,804	54	LGA (Yilgarn)	268,900	142,088	53	
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<p>Principle (f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.</p>	<p>No wetlands of international or national significance are located within the vicinity of the proposed Purpose Permit Area; however, several wetlands of subregional significance occur within the Southern Cross subregion including Wallagne Soak (artificial), Lake Deborah East, Lake Deborah West, Johnston Lakes, Eva Lake, Lake Walton and an unnamed lake south of Boondine Hill (Cowan <i>et al.</i> 2001). It is unlikely that the native vegetation to be cleared is associated with a watercourse or wetland.</p> <p>The proposed clearing is not at variance with this principle.</p>	Not at variance																		
<p>Principle (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.</p>	<p>Land degradation includes any alteration to land capability, soil erosion, salinity, nutrient export, acidification, waterlogging and flooding that affects the present or future use of land. A review of the grade of soil erosion for the Yilgarn Plateau Province of Australia (Geoscience Australia 2021) indicated the proposed Purpose Permit Area lies within an area graded as 'Poor' owing to the province being vulnerable to wind erosion due to low ground cover and erodible soils. Poor soil erosion grading of the province is likely attributed to agriculture and grazing activities that dominate the region. The proposed Purpose Permit Area does not occur within a known acid sulphate risk area.</p> <p>The proposed Purpose Permit Area is located predominately within the Greenmount land system (92%) which consists of areas of ancient drainage, meaning areas of the land system may be prone to land degradation as a result of clearing, presenting as salinisation, waterlogging, soil erosion and acidity. However, the small scale of clearing, short duration of the project, proposed management measures and rehabilitation commitments means it is unlikely that the proposed clearing will result in salinisation, waterlogging, soil erosion and/or acidity.</p> <p>The proposed clearing is not at variance with this principle.</p>	Not at variance																		

Clearing Principle	Justification of Variance	Variance
<p>Principle (h)</p> <p>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.</p>	<p>The proposed Purpose Permit Area does not overlap with any reserves or ESAs. The nearest reserves are Wockallarry and Yellowdine, both located approximately 20 km from the proposed Purpose Permit Area.</p> <p>The proposed clearing is not at variance with this principle.</p>	<p>Not at variance</p>
<p>Principle (i)</p> <p>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.</p>	<p>The proposed Purpose Permit Area is not located within any major drainage lines or watercourses; therefore, clearing is not expected to impact surface water flow and/or water quality within any watercourse. Additionally, the proposed clearing is not located in proximity to any public drinking water source areas. Surface water management measures will be implemented if required to divert surface water flow away from mining infrastructure and Barto will aim to minimise impacts on the quality of surface water and avoid unnecessary disturbance to natural surface drainage. General recommendations for surface water management will be considered for all mine infrastructure areas. Clearing is unlikely to impact on groundwater quality provided that groundwater contamination from the use of hydrocarbons and chemicals will be actively managed.</p> <p>The proposed clearing is not at variance with this principle.</p>	<p>Not at variance</p>
<p>Principle (j)</p> <p>Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.</p>	<p>The proposed Purpose Permit Area is not located within any major drainage lines or watercourses, and while numerous ephemeral watercourses and lakes occur within proximity to the proposed Purpose Permit Area, none of these intersect the proposed Purpose Permit Area. Therefore, clearing is not expected to alter the hydrological regime of the area leading to an increase in the frequency or intensity flooding.</p> <p>The proposed clearing is not at variance with this principle.</p>	<p>Not at variance</p>

8. Stakeholder Consultation

Barto understands that stakeholders are an integral part of their day-to-day operations and long-term operational strategy. In recognition of this, Barto has developed a stakeholder consultation strategy to support the expansion of Barto's SXO operations, and to ensure that any communication will be undertaken in accordance with the following principles:

- Consultation is undertaken in a timely manner.
- Consultation is sincere and meaningful.
- Consultation ensures that all affected parties are included, and the information provided is easily accessible.
- Consultation is responsive and any concerns raised will be dealt in accordance with Barto's internal procedures.

A stakeholder engagement register will be developed and updated regularly to record all stakeholder consultation.

Table 8-1: Stakeholder consultation undertaken so far for the proposed Purpose Permit Area.

Date	Group	Action
17/03/2022	Shire of Yilgarn CEO	Barto delivered a presentation about the proposed Achilles Project. No concerns were raised.
29/04/2022	Residents of Marvel Loch	Barto delivered a presentation about the proposed Achilles Project. No concerns were raised in regard to the project.
07/07/2022	DMIRS – Resource and Environmental Compliance Division	Details of project discussed including no disturbance of priority species, targeted search as survey method, minimisation of disturbance through backfilling mine voids and utilising existing disturbance for infrastructure. No concerns raised.
07/07/2022	Surrounding landowners	Initial contact conducted, further consultation planned.

9. Conclusion

Barto proposes to clear no more than 48.6 ha of native vegetation within a 295.5 ha proposed Purpose Permit Area as part of the development of the Project. The proposed clearing is not at variance to EP Act Schedule 5 clearing principles (c), (d), (e), (f), (g), (h), (i) and (j). Clearing is unlikely to be at variance to EP Act Schedule 5 clearing principle (a) or (b) based on the small scale of clearing, short duration of the project, proposed management measures and rehabilitation commitments. While development of the Project will result in the loss of some terrestrial fauna habitat, the fauna habitat, biological diversity and occurrences of priority species within the proposed Purpose Permit Area are regionally widespread and are not considered restricted to the area of clearing.

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Appendices

We design with community in mind



Appendix A Targeted Significant Flora Assessment (Stantec 2022a)

To: Bronwen Smith
Barto Gold Mining Pty Ltd
Private Mail Bag 10
Southern Cross WA 6426

From: Gearoid Fitzmaurice
Stantec Australia Pty Ltd
Ground Floor, 226 Adelaide
Terrace
Perth WA 6000

Project/File: 300003380 Date: 1 July 2022

Reference: Achilles Targeted Significant Flora Survey October 2020, February and May 2022

Dear Bronwen,

This memorandum comprises the results of flora and vegetation surveys undertaken for the Achilles project area (the Survey Area, approximately 313 hectares (ha)) in October 2020, February and May 2022.

The first survey was conducted between 17 and 20 October 2020 by botanist Scott Pansini (FB620000320 and TFL-22-1920 (DRF)) and ecologist Stephanie Williams as part of recent surveys in the surrounding areas. The second survey was conducted between 1 and 6 February 2022 by Scott Pansini and Stantec botanist Gearoid Fitzmaurice (FB20000320 and TFL 159-2021). Due to changes to the Survey Area, and to ensure comprehensive coverage of the Survey Area a third survey was conducted in May 2022 by Scott Pansini and Jonas Mitchell (FB62000315 and TFL 146-2021).

Traverses of the Survey Area were spaced at 40 metre intervals (**Figure 1**) and where potential flora of significance were observed, the following information was collected:

- co-ordinates (recorded using a GPS-enabled device);
- a photograph of the individual plant taken in situ, along with a specimen collection;
- abundance, plant health, vegetation type description, and
- habitat description (including landform and soils).

Flora specimens that were collected were identified by senior taxonomist, Sharnya Yates.

The first survey was conducted within the recommended timing for flora and vegetation surveys in the Southwest and Interzone Botanical Province (EPA 2016). Subsequent surveys were outside this timeframe however, they were conducted inside the flowering period for potential priority flora in the area.


Rainfall recorded from the nearest weather station, Southern Cross Airfield (Station 12320), during the six months preceding the first survey (113 millimetres (mm)) was 47.5 mm below the long-term mean of 160.6 mm over the same period (BoM 2020). Rainfall in the six months prior to the February 2022 survey (54.6 mm) was 72.4 mm below the long-term mean of 127 mm for the same time period (BoM 2022). Prior to the third survey 78.2 mm of rainfall was recorded; 67.3 mm below average for this period (145.5 mm).

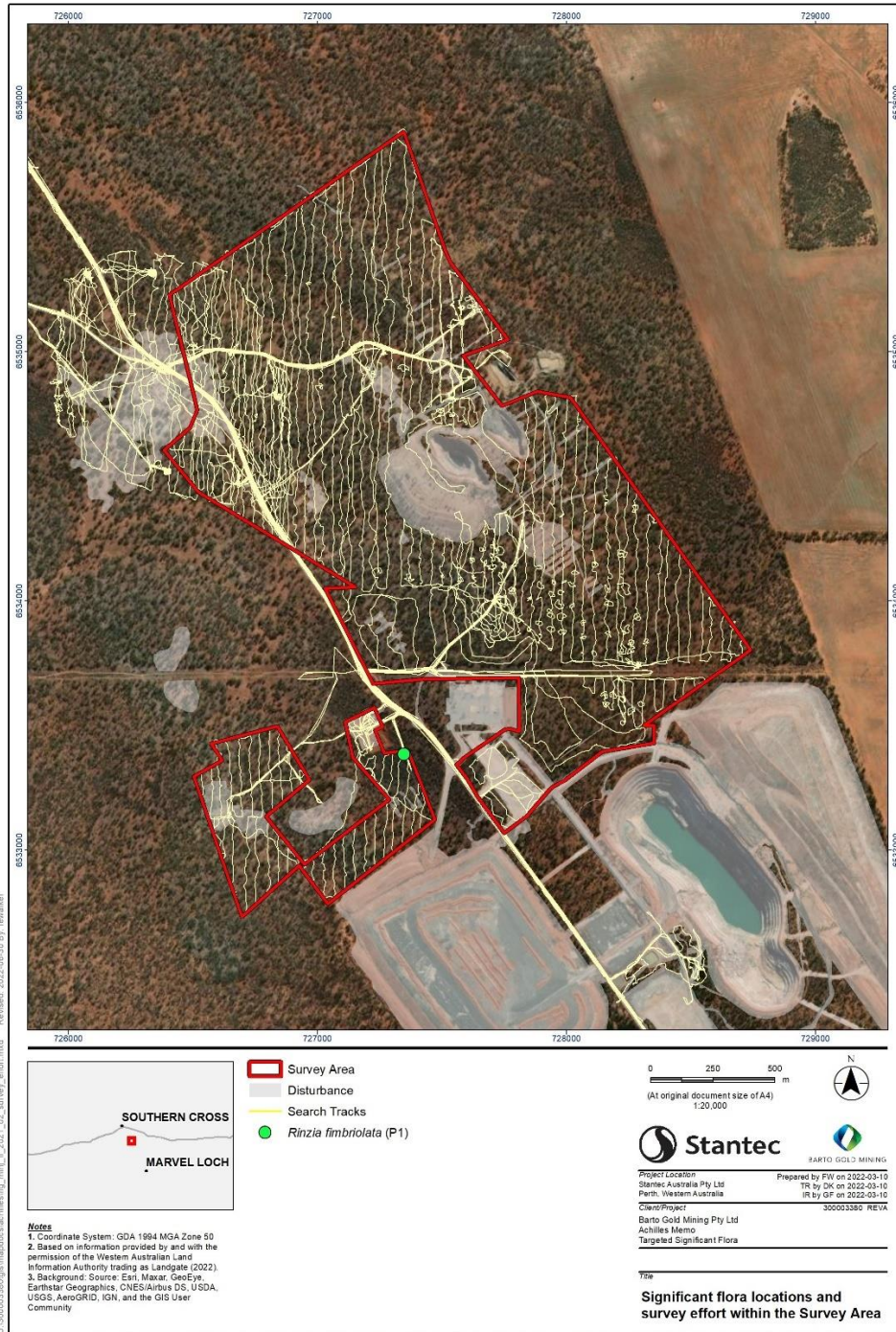
Reference: Stantec 2022

One individual of the Priority 1 flora species, *Rinzia fimbriolata*, was recorded within the Survey Area (50J 727347E, 6533384N) (**Figure 1**). Based on data from the Western Australian Herbarium (WAH), *Rinzia fimbriolata* (P1) is known from three records within the Avon Wheatbelt and Coolgardie bioregions (DBCA 2022). Recent surveys conducted by Stantec in the vicinity of the Survey Area have recorded 201 locations (defined by 20m x 20m) of *Rinzia fimbriolata* (P1) comprising 9,311 individuals (Stantec 2022)

According to the WAH, this species is usually found in association with well-drained soils of brown sandy loam, as well as clays with quartz pieces (DBCA 2022). In the Survey Area, it was recorded in a vegetative state (non-flowering) on brown sandy clay loam soils with lateritic pebbles, growing in association with vegetation type EcAaBssPtHe (**Figure 2**). This vegetation type has been recorded across other Barto tenements and to-date, Stantec have mapped approximately 70 ha of this vegetation type during recent surveys in the vicinity of the Survey Area (Stantec 2022).

Table 1: Priority flora recorded within the Survey Area

Photo	Vegetation type	Total count	Life stage	Reproductive stage	Habitat and habitat within Survey Area	Health
<i>Rinzia fimbriolata</i> (P1)						
	<p>EcAaBssPtHe <i>Eucalyptus corrugata</i> woodland over <i>Acacia acuminata</i> tall open shrubland over <i>Beyeria sulcata</i> var. <i>sulcata</i> open shrubland over <i>Hibbertia exasperata</i> and <i>Phebalium tuberculosum</i> low open shrubland.</p>	1	Mature	Vegetative	Erect shrub, 0.25 meters high. Brown sandy loam, common laterite pebbles. Low south-eastern slope	Moderate



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Figure 1: Significant flora location and survey effort within the Survey Area

Reference: Stantec 2022

There were two vegetation types identified and described for the Survey Area, the majority (82%) of which comprised vegetation type EIEsuMpAvOmAm (Table 2).

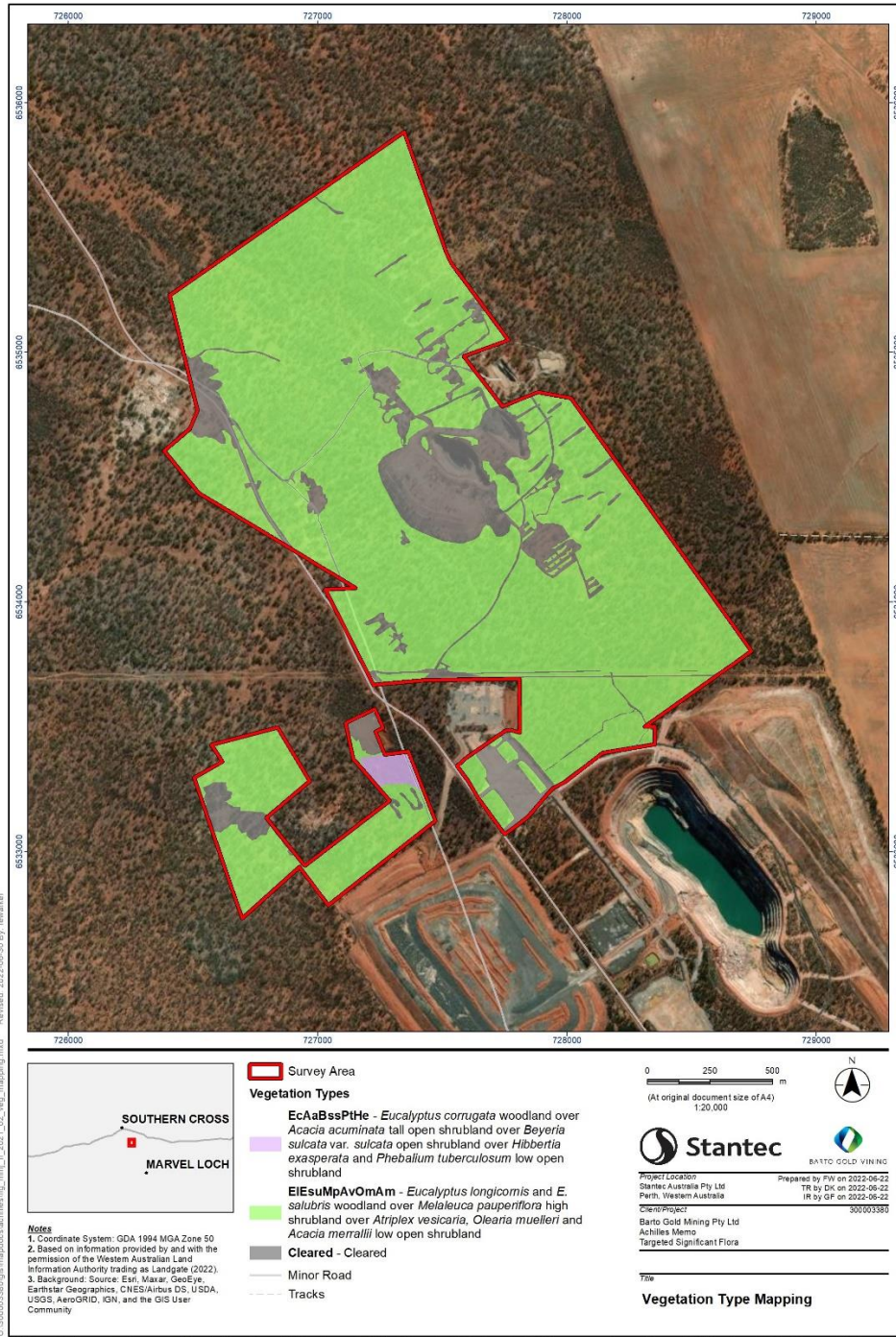
Table 2: Vegetation types within the Survey Area

Vegetation type code	Vegetation type description	Extent within Survey Area	
		Hectares (ha)	Proportion (%)
EIEsuMpAvOmAm	<i>Eucalyptus longicornis</i> and <i>E. salubris</i> woodland over <i>Melaleuca pauperiflora</i> high shrubland over <i>Atriplex vesicaria</i> , <i>Olearia muelleri</i> and <i>Acacia merrallii</i> low open shrubland.	276.04	82.85%
EcAaBssPtHe	<i>Eucalyptus corrugata</i> woodland over <i>Acacia acuminata</i> tall open shrubland over <i>Beyeria sulcata</i> var. <i>sulcata</i> open shrubland over <i>Hibbertia exasperata</i> and <i>Phebalium tuberosum</i> low open shrubland.	2.42	.73
Cleared	Disturbed unvegetated areas	54.69	16.41%
Total		333.15	100

Vegetation condition within the Survey Area was assessed using the vegetation condition scale described by Keighery (1994), and ranged from Excellent to Completely Degraded, with the majority (83%) assessed as Excellent condition (Table 3; Figure 3). Areas in Completely Degraded condition comprised areas that had been previously cleared for road and mine-related infrastructure.

Table 3: Vegetation condition within the Survey Area

Vegetation condition	Extent within Survey Area	
	Hectares (ha)	Proportion (%)
Excellent	278.46	83.58
Completely Degraded	54.69	16.42
Total	333.15	100



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Figure 2: Vegetation types within the Survey Area

Reference: Stantec 2022

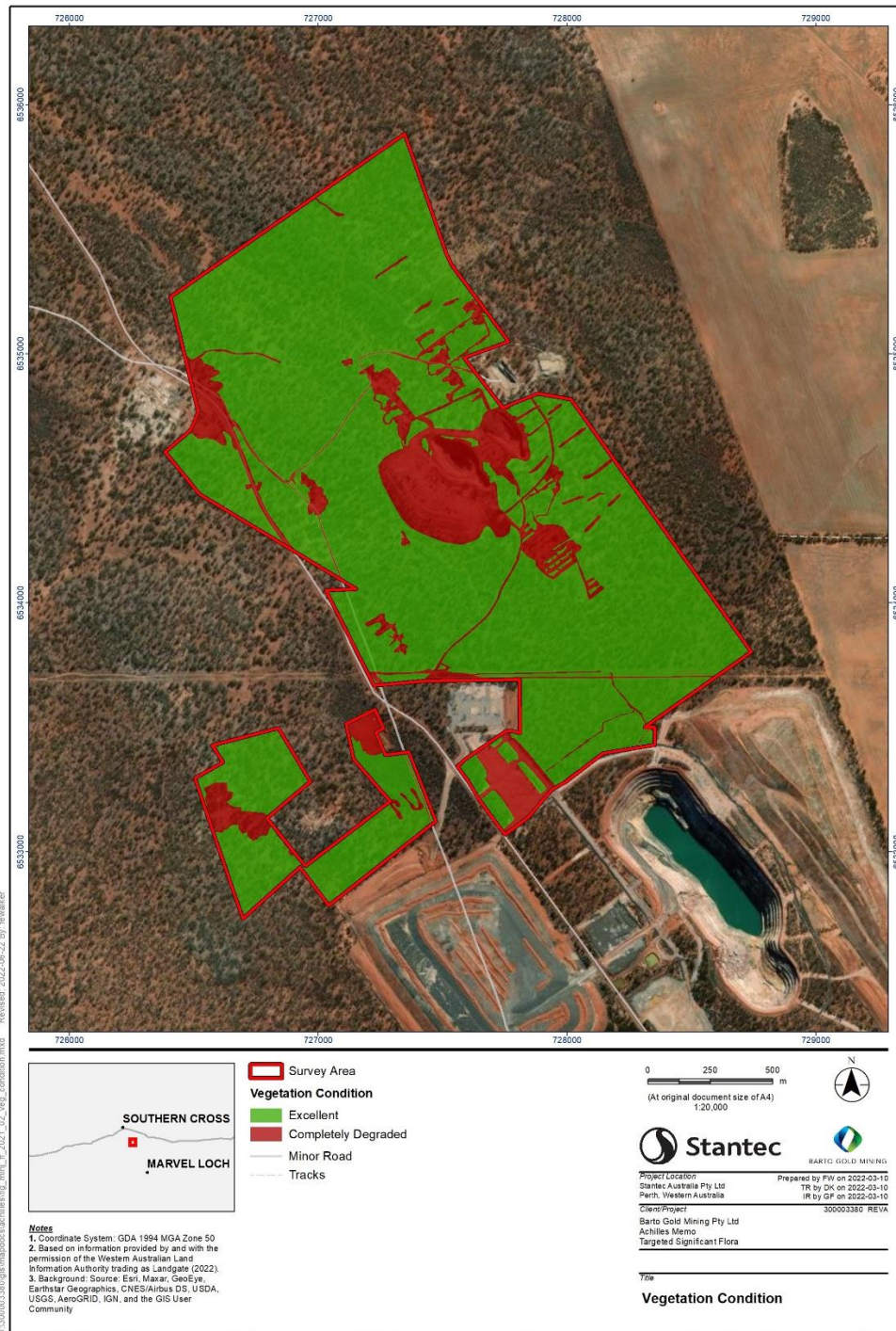


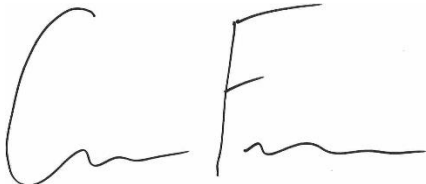
Figure 3:Vegetation condition within the Survey Area

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Reference: Stantec 2022

Appendix A presents the Threatened and Priority Flora Report Form that was submitted to the Department of Biodiversity, Conservation and Attractions. If you have any questions related to this memo, please contact us.

Best regards,

A handwritten signature in black ink, consisting of a large, stylized 'G' followed by a large 'F' and a wavy line underneath.

Gearoid Fitzmaurice
Botanist
Stantec Australia Pty Ltd

Reference: Stantec 2022

References

- BoM, Bureau of Meteorology. (2020) *Climate Data Online (custom search)*. Commonwealth of Australia, Canberra, Australian Capital Territory.
- BoM, Bureau of Meteorology. (2022) *Climate Data Online (custom search)*. Commonwealth of Australia, Canberra, Australian Capital Territory.
- DBCA, Department of Biodiversity Conservation and Attractions. (2022) *Western Australian Herbarium Specimen database (WAHerb) (custom search)*. Kensington, Western Australia.
- EPA, Environmental Protection Authority. (2016) *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment*. Environmental Protection Authority, Western Australia.
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- Stantec, U. (2022) *Southern Cross Operations: Detailed and Targeted Flora and Vegetation Consolidation Survey*, Unpublished Report for Barto Gold Mining.

Appendix A: Threatened and Priority Flora Report Form



Threatened and Priority Flora Report Form

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at <http://dpaw.wa.gov.au/> under Standard Report Forms

TAXON:	Rinzia fimbriolata	TPFL Pop. No.:	
OBSERVATION DATE:	20/10/2020	CONSERVATION STATUS:	P1 New population <input checked="" type="checkbox"/>
OBSERVER/S:	Scott Pansini, Stephanie Williams	PHONE	0447604646
ROLE:	Botanist	ORGANISATION:	Stantec

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): 10.7km Southwest of Southern Cross
19.6km north-northwest of Marvel Loch

Reserve No.: _____

DBC DISTRICT: NO DBCA District. Area administrated from DBCA Regional office - Wheatbelt (Narrogin) **LGA:** Southern Cross **Land manager present:**

DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: 6533384	No. satellites: _____ Map used: _____
WGS84 <input checked="" type="checkbox"/>	Long / Easting: 727347	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: 50J	

LAND TENURE:

<input type="checkbox"/> Nature reserve	<input type="checkbox"/> Timber reserve	<input type="checkbox"/> Private property	<input type="checkbox"/> Rail reserve	<input type="checkbox"/> Shire road reserve
<input type="checkbox"/> National park	<input type="checkbox"/> State forest	<input type="checkbox"/> Pastoral lease	<input type="checkbox"/> MRWA road reserve	<input type="checkbox"/> Other Crown reserve
<input type="checkbox"/> Conservation park	<input type="checkbox"/> Water reserve	<input type="checkbox"/> UCL	SLK/Pole _____ to _____	Specify other: <u>Mining tenement</u>

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): 2775987.04
EFFORT: Time spent surveying (minutes): 7200 No. of minutes spent / 100 m²: _____
POP'N COUNT ACCURACY: Actual Extrapolation Estimate Count method: Observed
(Refer to field manual for list)

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	1			
Dead				

Area of pop (m²): 20m x 20m
Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. 0 Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive			
-----------------------------	--	--	--

REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower
 Immature fruit Fruit Dehisced fruit Percentage in flower: 0%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent
COMMENT: located on the side of an unsued (historic) gravel track

THREATS - type, agent and supporting information:	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)			
• Clearing	N	H	M
•	_____	_____	_____



Threatened and Priority Flora Report Form

•	_____	_____	_____
	_____	_____	_____

Please return completed form to **Species And Communities Branch DBCA**,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input checked="" type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input checked="" type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input checked="" type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input checked="" type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input checked="" type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>			<u>Sandy clay loam</u>		
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: _____ (Refer to field manual for additional values)				
CONDITION OF SOIL:	Dry <input checked="" type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
 2. Open shrubland (Hibbertia sp., Acacia spp.);
 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Eucalyptus woodland (Eucalyptus corrugata).
2. Tall open shrubland (Acacia acuminata (Allocasuarina helmsii and Melaleuca eleuterostachya)).
3. Low open shrubland (Beyeria sulcata var. sulcata (Phebalium tuberculosum)).
- 4.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: >15 **Fire Intensity:** High Medium Low No signs of fire years ago

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

The Rinzia fimbriolata specimen was found on the west side of an old gravel track just south of a large gravel pit. The plant can be found within 2 meters from the edge of the track.

DRF PERMIT/ LICENCE No: FB62000122/ TFL 22-1920 Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licencing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: spt29 WA Herb. Regional Herb. District Herb. Other: _____

ATTACHED: Map Mudmap Photo GIS data Field notes Other: _____

COPY SENT TO: Regional Office District Office Other: _____

Submitter of Record: Scott Pansini Role: Botanist Signed: Scott Pansini Date: 10/12/2020

Please return completed form to **Species And Communities Branch DBCA**,
 Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 OR email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database

Appendix B: Vegetation Condition Scale for the South West and Interzone Botanical Provinces (Keighery 1994)

Rating	Description
Pristine	Pristine or nearly so; no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

Appendix B Targeted Chuditch Survey Report (Stantec 2021a)

23 August 2021
Senior Environmental Advisor
Barto Gold Pty Ltd

Dear Haydn,

This memorandum comprises the results of the Targeted Chuditch survey (the Survey) undertaken for Barto Gold Pty Ltd (Barto) on their Southern Cross Operations tenements (the Survey Area). The Chuditch (also referred to as Western Quoll) (*Dasyurus geoffroii*) is listed as Vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and Vulnerable under the Biodiversity Conservation Act 2016. The purpose of this Survey was to determine the presence of Chuditch (Vu; Vu) across the Survey Area to support environmental approvals for the Project. The Survey was conducted by Stantec zoologists Steph Williams and Melissa Jensen using 60 Reconyx Hyperfire-2 motion cameras over two surveys: 20th to 26th March 2021 (survey 1) and 22nd to the 25th of June 2021 (survey 2). After Chuditch were initially detected on a motion camera deployed in March, the Survey 2 scope increased to incorporate a wider survey area to specifically target Chuditch.

A total of 13 cameras were deployed during survey 1 for a period of up to 31 consecutive nights. While an additional 47 cameras were deployed during survey 2 for a period of up to 32 nights, resulting in a total of 60 motion cameras deployed throughout the cumulative survey period for a total of 1,783 camera trap nights. Universal bait (a mixture of sardines, rolled oats and peanut butter) was used to attract animals and cameras were deployed in habitats likely to support or be used by Chuditch (**Table 1**). Motion cameras were deployed with an emphasis on directing cameras towards fallen trees, hollow logs or rock piles with the potential to contain shelter sites (Rayner *et al.* 2012).

All images were analysed by Stantec zoologists, with a total of 79 detections of Chuditch recorded across 13 cameras, with all of the detections grouped in the southern portion of the Survey Area (**Table 1, Figure 1**). Of the 13 cameras on which Chuditch were detected, nine were within *Eucalyptus* Woodland habitats and the remaining three located within Shrubland habitat (**Table 1**). This indicates that both *Eucalyptus* Woodlands and Shrublands are important habitats for Chuditch within the Survey Area, with both habitat types ideal for foraging and sheltering purposes.

The density of *Eucalyptus* Woodland and Shrubland within the southern portion of the Survey Area coupled with the lack of clearing and habitat fragmentation, could support several individuals and give an indication as to why there was a higher number of Chuditch detected here. Cameras were also deployed towards the end of the mating season, so increases in activity could be contributed to males looking for mates and the increased dietary demands of females with pouch young. Chuditch have large home ranges (males approximately 15 km² and females ~4 km²) so they are likely to roam through and between these habitats naturally (DEC 2012a, Soderquist 1988).

The Western Brush Wallaby (*Macropus irma*) which is listed as a Priority 4 (P4) species by the Department of Biodiversity Conservation and Attractions (DBCA), was recorded on motion camera at two locations. The two records were within the southern half of the Survey Area within Shrubland habitat. The Western Brush Wallaby notably favours more open Shrubland, which occurs across the Survey Area (DEC 2012b) (**Table 2**).

Table 1: Summary of Chuditch (*Dasyurus geoffroii*) individuals recorded during the Survey.

Figure Reference	Coordinates (50J)		Habitat Type	Camera Trap Nights	Nights with Chuditch Activity (Distinct Visits*)	Photograph
	Easting	Northing				
REC65	736064 mE	6500907 mN	Eucalyptus Woodland	32	1(1)	
REC70	741409 mE	6514981 mN	Shrubland	31	6(10)	
REC61	743412 mE	6504712 mN	Eucalyptus Woodland	30	4(12)	

Figure Reference	Coordinates (50J)		Habitat Type	Camera Trap Nights	Nights with Chuditch Activity (Distinct Visits*)	Photograph
	Easting	Northing				
REC98	743092 mE	6506189 mN	Eucalyptus Woodland	32	3(4)	
REC99	743275 mE	6505569	Shrubland	32	1(1)	
REC68	742717 mE	6503994 mN	Eucalyptus Woodland	30	7(14)	

Figure Reference	Coordinates (50J)		Habitat Type	Camera Trap Nights	Nights with Chuditch Activity (Distinct Visits*)	Photograph
	Easting	Northing				
REC85	742717 mE	6503994 mN	Shrubland	3	4(13)	
REC59	743532 mE	6502352 mN	Eucalyptus Woodland	30	5(11)	
REC75	744238 mE	6503465 mN	Eucalyptus Woodland	30	4(8)	

Figure Reference	Coordinates (50J)		Habitat Type	Camera Trap Nights	Nights with Chuditch Activity (Distinct Visits*)	Photograph
	Easting	Northing				
REC02	749025 mE	6503340 mN	Eucalyptus Woodland	31	2(2)	
REC86	743670 mE	6512520 mN	Eucalyptus Woodland	31	1(1)	
REC123	740992 mE	6511029 mN	Shrubland	31	1(1)	

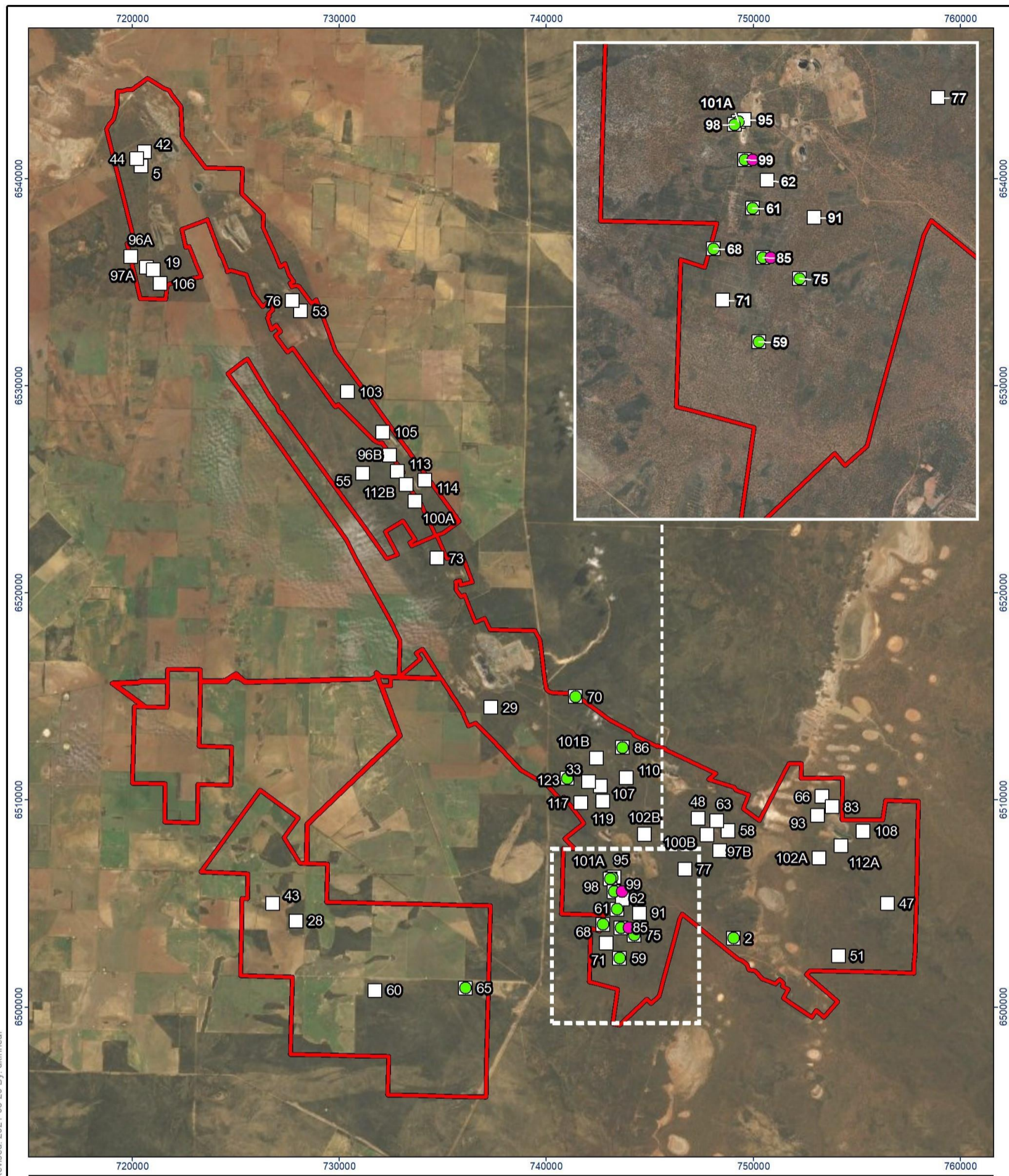
Figure Reference	Coordinates (50J)		Habitat Type	Camera Trap Nights	Nights with Chuditch Activity (Distinct Visits*)	Photograph
	Easting	Northing				
REC101A	743164 mE	6506243 mN	Eucalyptus Woodland	32	1(1)	

* Distinct visits: Detections separated by a period of 30 minutes were considered as a new detection and distinct visit.

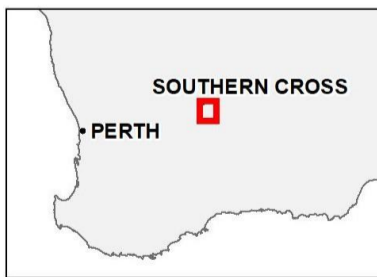
Table 2: Summary of Western Brush Wallaby (*Macropus irma*; P4) individuals recorded during the Survey

Figure Reference	Coordinates (50J)		Habitat Type	Camera Trap Nights	Nights with Western Brush Wallaby Activity (Distinct Visits*)	Photograph
	Easting	Northing				
REC85	742717 mE	6503994 mN	Shrubland	3	1(1)	
REC99	743275 mE	6505569 mN	Shrubland	32	1(1)	

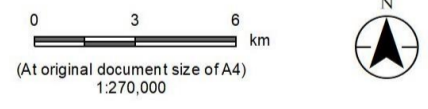
* Distinct Visits: Detections separated by a period of 30 minutes were considered as a new detection and distinct visit.



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- Survey Area
- Motion Camera Site
- Conservation Significant Fauna Record**
- Chuditch
- Western Brush Wallaby



Stantec BARTO GOLD MINING

Project Location Stantec Australia Pty Ltd
Perth, Western Australia

Prepared by FW on 2021-08-19
TR by DK on 2021-08-19
IR Review by SR on 2021-08-19

Client/Project Barto Gold Mining Pty Ltd
Southern Cross Operations
Targeted Chuditch Survey

300003294 REVA

Notes

1. Coordinate System: GDA 1994 MGA Zone 50
2. Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2021).
3. Background: Barto Gold Mining Pty Ltd, 2019.

Title

Conservation Significant Fauna Records

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Figure 1: Conservation Significant Fauna records within the Survey Area. Individual cameras units deployed twice are labelled with an 'A' suffix for deployments in March, and 'B' for deployments in June/July.

Chuditch once ranged across 70% of the Australian mainland but are now restricted to the south-west of Western Australia and a small number of reintroduced populations in Western Australia and South Australia (Morris 2003, Moseby *et al.* 2021). A major threat to remaining Chuditch populations is the clearing of land, particularly the destruction or removal of log hollows and denning sites (DEC 2012a). The majority of the Survey Area lies within the boundary of the Coolgardie Interim Biogeographic Regionalisation for Australia (IBRA) bioregion, with a small portion within the highly fragmented and intensive agricultural Avon Wheatbelt IBRA region. The lack of habitat fragmentation within the Coolgardie bioregion and within the southern half of the Survey Area may provide important shelter and foraging habitat for Chuditch populations.

A known Chuditch population exists approximately 50 km to the south of the Survey Area at Mt Holland Mine (DBCA 2021, Western Wildlife 2017). Clearing and/or disturbance should aim to maintain a vegetated corridor and reduce habitat fragmentation between the Survey Area and the population to the south to facilitate dispersal between the populations. Removal and/or disturbance of dense Shrubland and *Eucalyptus* Woodland habitats within the Survey Area should be limited wherever practicable.

Yours sincerely,

Reviewed by:



Sam Ronan
Terrestrial Ecologist



Melissa Jensen
Senior Zoologist



Alice Bott
Flora Technical Lead

References

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Appendix C PMST Results



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 05/07/22 15:43:18

[Summary](#)

[Details](#)

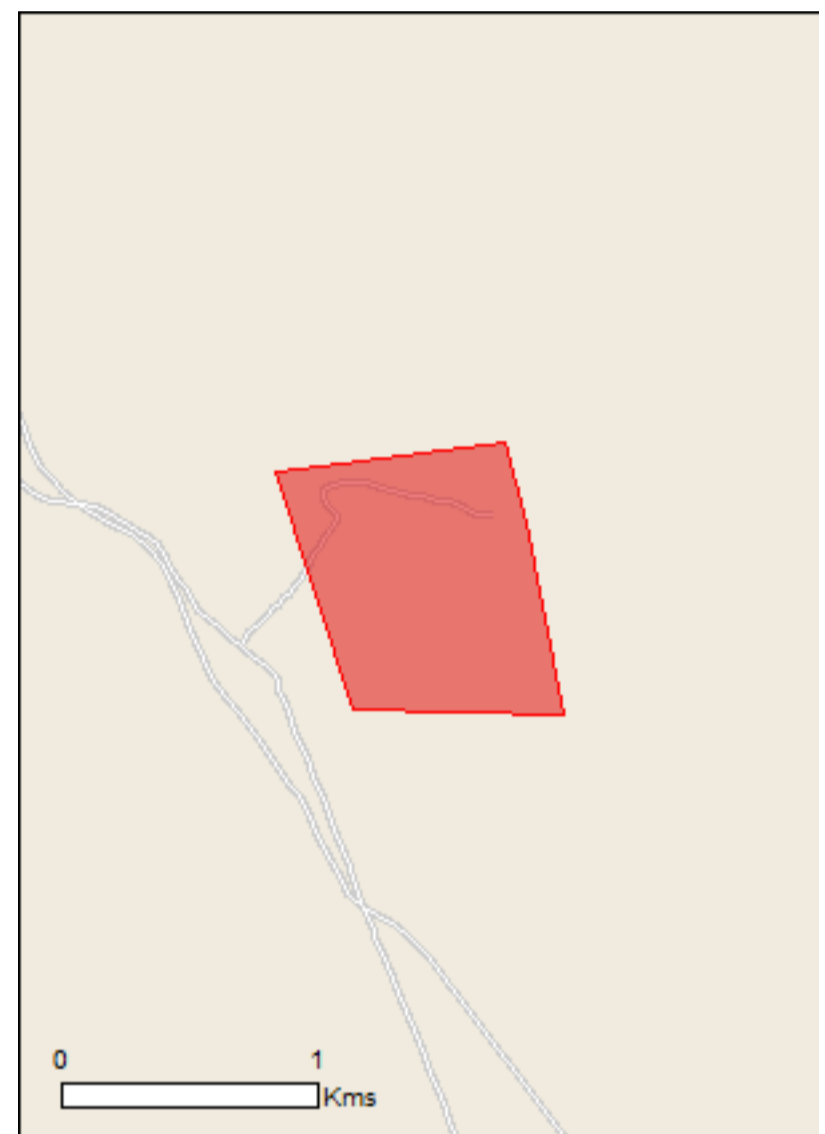
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	8
Listed Migratory Species:	6

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	9
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	9
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species [\[Resource Information \]](#)

Name	Status	Type of Presence
------	--------	------------------

Birds

Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
---	-----------------------	--

Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
---	------------	--

Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
---	------------	--

Mammals

Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area
---	------------	--

Plants

Banksia sphaerocarpa var. dolichostyla Ironcaps Banksia, Ironcap Banksia [10518]	Vulnerable	Species or species habitat may occur within area
---	------------	--

Dasymalla axillaris Native Foxglove [38829]	Critically Endangered	Species or species habitat may occur within area
--	-----------------------	--

Daviesia microcarpa Norseman Pea [56766]	Endangered	Species or species habitat likely to occur within area
---	------------	--

Eremophila viscida Varnish Bush [2394]	Endangered	Species or species habitat may occur within area
---	------------	--

Listed Migratory Species [\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
------	------------	------------------

Migratory Marine Birds

Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
---	--	--

Migratory Terrestrial Species

Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
---	--	--

Migratory Wetlands Species

Name	Threatened	Type of Presence
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area

Extra Information

Invasive Species

[[Resource Information](#)]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
<i>Streptopelia senegalensis</i> Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
<i>Canis lupus familiaris</i> Domestic Dog [82654]		Species or species habitat likely to occur within area
<i>Capra hircus</i> Goat [2]		Species or species habitat likely to occur within area
<i>Equus asinus</i> Donkey, Ass [4]		Species or species habitat likely to occur within area
<i>Felis catus</i> Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
<i>Oryctolagus cuniculus</i> Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
<i>Vulpes vulpes</i> Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
<i>Carrichtera annua</i> Ward's Weed [9511]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-31.296817 119.384979,-31.296817 119.385065,-31.295937 119.393047,-31.298284 119.393819,-31.304077 119.395193,-31.303931 119.387725,-31.296817 119.384979

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
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- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
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- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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