

**Flora / Vegetation & Fauna
Desktop Assessment
Proposed Core Yard-M53/552 & G53/20**

**Prepared for
Northern Star Resources Limited**



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**Prepared by:
Botanica Consulting Pty Ltd
PO Box 2027
Boulder WA 6432**

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Prepared by: Lauren Pick
Senior Environmental Consultant
Botanica Consulting

Reviewed by: Andrea Williams
Director
Botanica Consulting

Approved by: Jim Williams
Director
Botanica Consulting

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Glossary

Acronym	Description
ANCA	Australian Nature Conservation Agency.
BAM Act	<i>Biosecurity and Agriculture Management Act 2007</i> , WA Government.
BC Act	<i>Biodiversity Conservation Act 2016</i> , WA Government.
BoM	Bureau of Meteorology.
Botanica	Botanica Consulting Pty Ltd.
DAFWA	Department of Agriculture and Food (now DPIRD), WA Government.
DAWE	Department of Agriculture, Water and Environment (formerly DoEE), Australian Government.
DBCA	Department of Biodiversity, Conservation and Attractions (formerly DPaW), WA Government.
DER	Department of Environment Regulation (now DWER), WA Government.
DMIRS	Department of Mines, Industry Regulation and Safety (formerly DMP), WA Government
DMP	Department of Mines and Petroleum (now DMIRS), WA Government.
DoEE	Department of the Environment and Energy (now DAWE), Australian Government.
DoW	Department of Water (now DWER), WA Government.
DPaW	Department of Parks and Wildlife (now DBCA), WA Government.
DPIRD	Department of Primary Industries and Regional Development, WA Government
DWER	Department of Water and Environmental Regulation (formerly EPA, DER and DoW), WA Government
EP Act	Environmental Protection Act 1986, WA Government.
EP Regulations	Environmental Protection (Clearing of Native Vegetation) Regulations 2004, WA Government.
EPA	Environmental Protection Authority (now DWER), WA Government.
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> , Australian Government.
ESA	Environmentally Sensitive Area.
Ha	Hectare (10,000 square metres).
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union.
Km	Kilometre (1,000 metres).
MVG	Major Vegetation Groups.
NVIS	National Vegetation Information System.
OEPA	Office of the Environmental Protection Authority, WA Government.
PEC	Priority Ecological Community.
RAOU	Royal Australia Ornithologist Union.
SRE	Short Range Endemic.
SSC	Species Survival Commission, International.
TEC	Threatened Ecological Community.
WA	Western Australia.
WAHERB	Western Australian Herbarium.
WAM	Western Australian Museum, WA Government.

1 Introduction

Botanica Consulting Pty Ltd (Botanica) were commissioned by Northern Star Resources Limited (Northern Star) to conduct a desktop environmental assessment of the proposed Jundee core yard (referred to as the 'assessment area') to provide supporting documentation for the proposed Julius Project. The core yard is located within tenements M53/552 & G53/20. The assessment area covers an area of approximately 36.5 ha (Figure 1-1) and is located at the Jundee Mine Site approximately 47 km north-east of Wiluna, Western Australia (Figure 1-2).

The objectives of the desktop assessment were to:

- Conduct a literature review, database and map-based searches of flora and fauna with the potential to occur within the Assessment Area;
- Provide a summary of vegetation communities and fauna habitats potentially present within the Assessment Area (based on results of database information and existing surveys conducted in the local area);
- Assess the potential for significant flora and fauna to occur within the Assessment Area;
- Assess the State and Commonwealth legislative requirements relevant to the Assessment Area; and
- Summarise management measures to be implemented to minimise impacts to flora/ fauna within the Assessment Area.

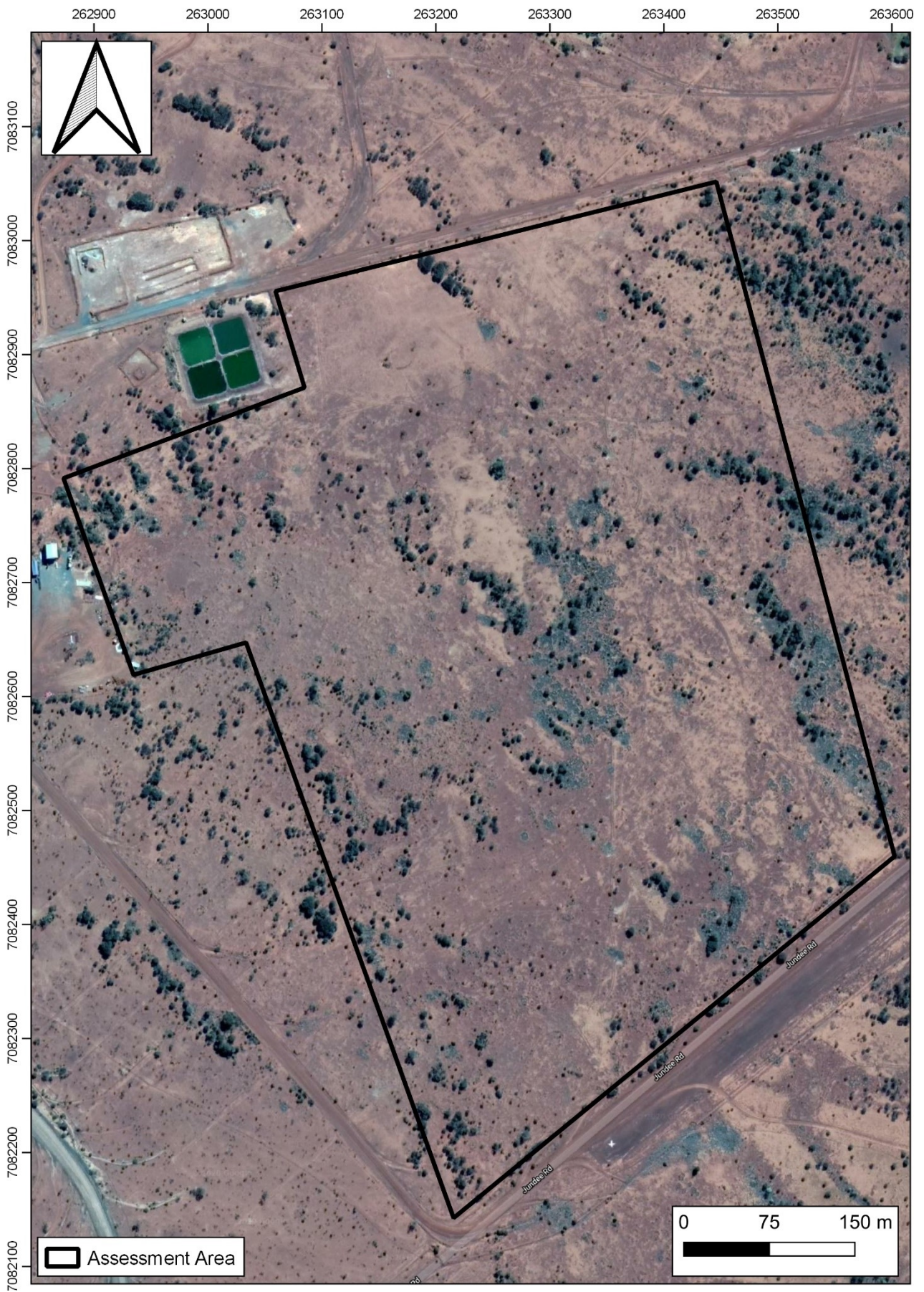


Figure 1-1: Assessment Area

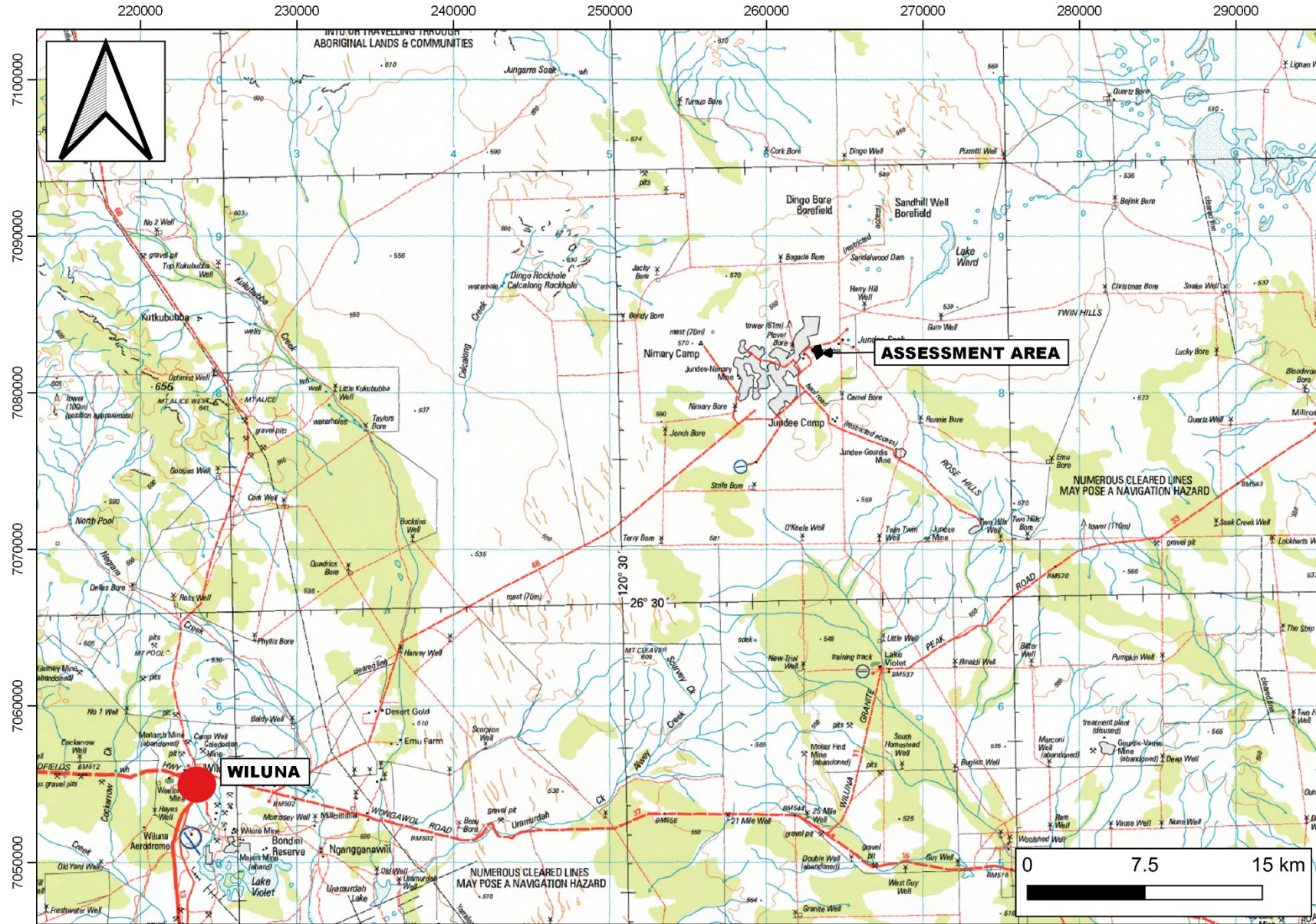


Figure 1-2: Regional map of the Assessment Area

2 Existing Environment

2.1 Regional Setting

The Assessment Area occurs in the Murchison Bioregion (Figure 2-1), as defined by the Interim Biogeographic Regionalisation for Australia (IBRA) classification system (McKenzie, 2003). The Murchison Bioregion is further divided into two subregions; Eastern Murchison (MUR1), and Western Murchison (MUR2) subregions with the Assessment Area located within the Eastern Murchison subregion.

The Eastern Murchison comprises the northern parts of the craton's Southern Cross and Eastern Goldfields Terrains and is characterised by internal drainage and extensive areas of elevated red desert sandplains with minimal dune development. Salt Lake systems are associated with the occluded paleodrainage system. Broad plains of red-brown soils and breakaways complexes as well as red sandplains are widespread. Vegetation is dominated by Mulga woodlands and is often rich in ephemerals, hummock grasslands, saltbush shrublands and *Halosarcia* shrublands (Cowan, 2001).



Figure 2-1: Map of IBRA bioregions in relation to the Assessment Area

2.2 Soils and Landscape Systems

Based on geographic information provided by DAFWA (2014), the Assessment Area is located within the Murchison Province. The Murchison Province, which consists of hardpan wash plains and sandplains (with some stony plains, hills, mesas and salt lakes) on the granitic rocks and greenstone of the Yilgarn Craton. The Murchison Province is located in the inland Mid-west and northern Goldfields between Three Springs, the Gascoyne River, Wiluna, Cosmo Newberry and Menzies. Soil types consist of red loamy earths, red sandy earths, red shallow loams, red deep sands and red-brown hardpan shallow loams with some red shallow sands and red shallow sandy duplexes present. Vegetation communities are predominately Mulga shrublands with spinifex grasslands, with areas of bowgada shrublands, Eucalypt woodlands and halophytic shrublands (Tille, 2006).

The Murchison Province is further divided into soil-landscape zones, with the Assessment Area located within the Salinaland Plains Zone (279). The Salinaland Plains Zone comprises of sandplains (with hardpan wash plains and some mesas, stony plains and salt lakes) on granitic rocks (and some greenstone) of the Yilgarn Craton. Soils include red sandy earths, red deep sands, red shallow loams and red loamy earths with some red-brown hardpan shallow loams, salt lake soils and red shallow sandy duplexes. Vegetation consists of mulga shrublands with spinifex grasslands (and some halophytic shrublands and eucalypt woodlands). This zone is located in the northern Goldfields from Lakes Barlee and Ballard to Wiluna and Laverton (Tille, 2006).

The Salinaland Plains Zone is further divided into soil landscape systems within the Assessment Area located within two soil landscape systems described in Table 2-1 and Figure 2-2.

Table 2-1: Soil Landscape Systems within the Assessment Area

Soil Landscape System	Description
Jundee System	Hardpan plains with variable gravelly mantles and minor sandy banks supporting weakly groved mulga shrublands.
Violet System	Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supporting groved mulga and bowgada shrublands and occasionally chenopod shrublands.

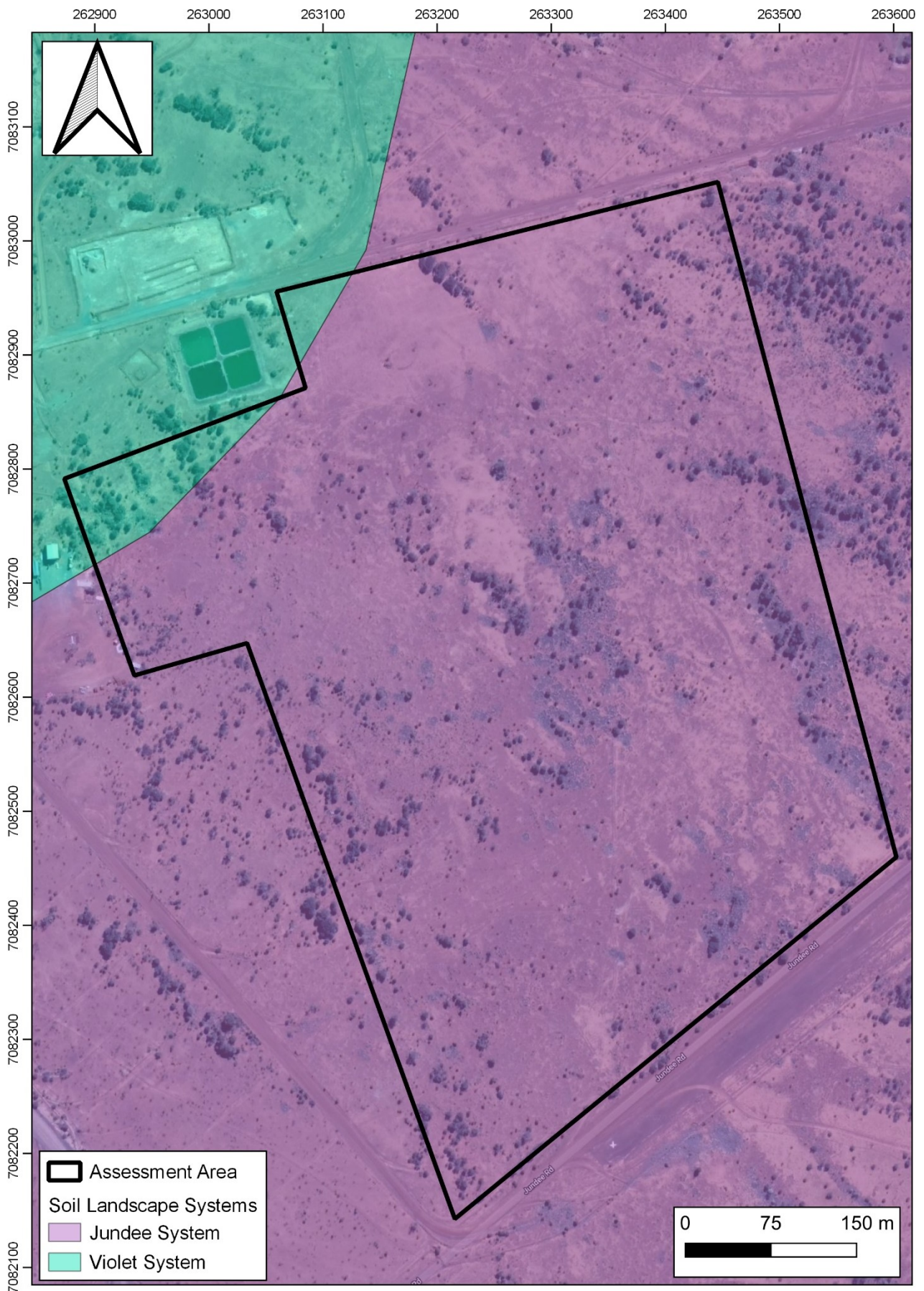


Figure 2-2: Map of Soil Landscape Systems within the Assessment Area

2.3 Hydrology

According to the Geoscience Australia Global Map Australia database (2015), there are no permanent or ephemeral inland waters within the Assessment Area. No permanent or ephemeral drainage lines occur within the Assessment Area. The nearest surface water feature is Lake Ward which is located approximately 8 km to the north-east of the Assessment Area (Figure 2-3).

Groundwater Dependent Ecosystems (GDE) includes biological assemblages of species such as wetlands or woodlands that use groundwater either opportunistically or as their primary water source. For the purposes of this report, a GDE is defined as any vegetation community that derives part of its water budget from groundwater and must be assumed to have some degree of groundwater dependency. According to the BoM *Atlas of Groundwater Dependent Ecosystems* database (BoM, 2020), there are no known or potential GDEs located within the Assessment Area.

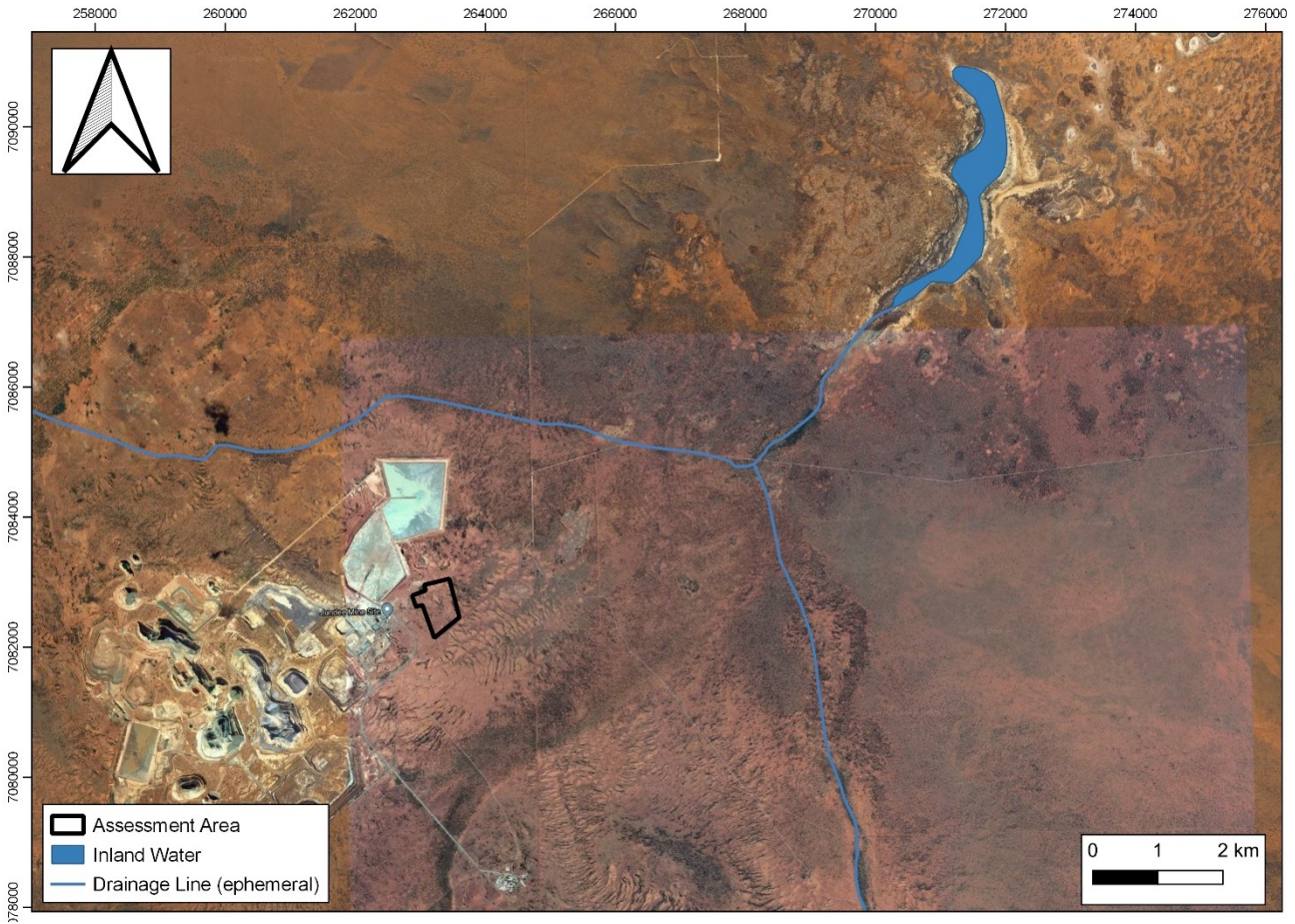


Figure 2-3: Surface Hydrology

2.4 Conservation Areas

The Assessment Area is not located within an Environmentally Sensitive Area (ESA), Threatened Ecological Communities or any proposed or vested Conservation Reserves. The survey area is located within the *Jundee Homestead calcrete groundwater assemblage type on Carnegie palaeodrainage on Jundee Station* Priority 1 Ecological Community, however as the proposed development within the Assessment Area is only related to development of a core yard and will not require interaction with the groundwater table, no impacts to this Priority Ecological Community are anticipated.

The closest conservation reserve is the ex. Lorna Glenn UCL, located approximately 43 km east of the Assessment Area (Figure 2-4). Given the distance from the Assessment Area to any conservation reserves, impacts to the environmental values of conservation areas are unlikely.

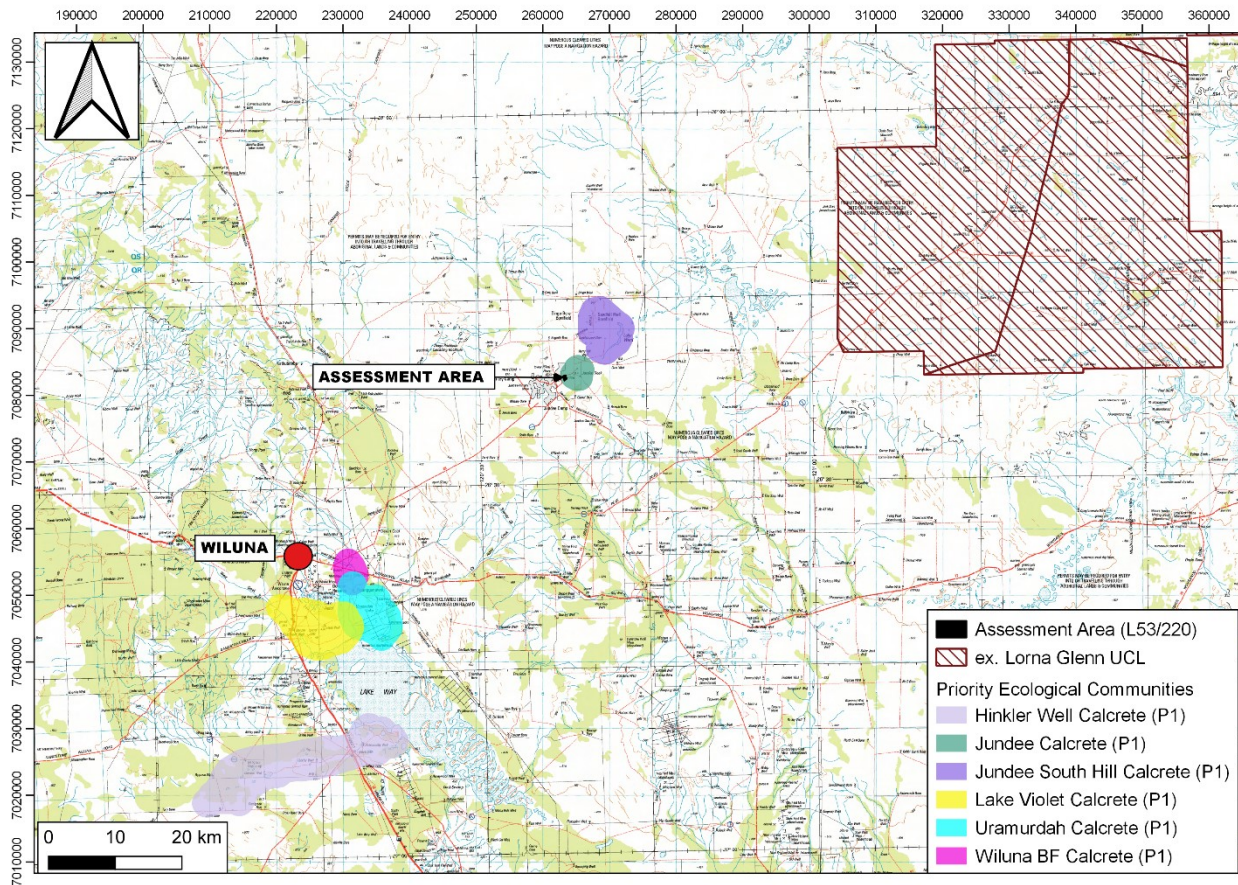


Figure 2-4: Conservation areas in relation to the Assessment Area

3 Methodology

3.1 Literature Review

A literature review was undertaken of previous flora and vegetation assessments conducted within the local area for the Julius Project. Documents reviewed included:

- Botanica Consulting (2020a). Reconnaissance Flora/ Vegetation & Fauna Survey Jundee TSF alternative locations. Prepared for Northern Star Resources Limited.
- Botanica Consulting (2020b). Reconnaissance Flora/ Vegetation & Fauna Survey within M53/191. Prepared for Northern Star Resources Limited.
- Ecologia (1995). Jundee Gold Project Environmental Assessment.
- Hall, N.J., Newbey, K.R., McKenzie, N.L., Keighery, G.J., Rolfe, J.K & Youngson, W. K., (1993). *The Biological survey of the Eastern Goldfields of Western Australia Part 7: Sandstone-Sir Samuel Laverton-Leonora study area*, West. Aust. Mus. Suppl. 47.

3.2 Database Searches

Searches of the following databases were undertaken to aid in the compilation of a list of flora and fauna within the Assessment Area:

- DBCA Priority/ Threatened Flora Database Search (DBCA, 2019a);
- DBCA Priority/ Threatened Ecological Communities Database Search (DBCA, 2019b);
- DBCA NatureMap Database (DBCA, 2020); and
- DAWE Protected Matters search tool (DAWE, 2020).

The NatureMap and Protected Matters Search were conducted for an area encompassing a 40km radius of the centre coordinates -26.357S 120.591E. It should be noted that these lists are based on observations from a broader area than the assessment area (40km radius) and therefore may include taxa not present. The databases also often include very old records that may be incorrect or in some cases the taxa in question have become locally or regionally extinct. Information from these sources should therefore be taken as indicative only and local knowledge and information also needs to be taken into consideration when determining what actual species may be present within the specific area being investigated.

The conservation significance of flora and fauna taxa was assessed using data from the following sources:

- *Environment Protection and Biodiversity and Conservation (EPBC) Act 1999*. Administered by the Australian Government (DAWE);
- *Biodiversity Conservation (BC) Act 2016*. Administered by the WA Government (DBCA);
- Red List produced by the Species Survival Commission (SSC) of the World Conservation Union (also known as the IUCN Red List – the acronym derived from its former name of the International Union for Conservation of Nature and Natural Resources). The Red List has no legislative power in Australia but is used as a framework for State and Commonwealth categories and criteria; and
- Priority Flora/ Fauna list. A non-legislative list maintained by DBCA for management purposes (fauna list released April 2019; flora list released December 2018).

The EPBC Act also requires the compilation of a list of migratory species that are recognised under international treaties including the:

- Japan Australia Migratory Bird Agreement 1981 (JAMBA)¹;
- China Australia Migratory Bird Agreement 1998 (CAMBA);
- Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA); and
- Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals).

¹ Most but not all species listed under JAMBA are also specially protected under Specially Protected Species of the BC Act.

4 Results

4.1 Flora

According to the results of the NatureMap search (DBCA, 2020), a total of 206 flora taxa have been recorded within a 40 km radius of the survey area. Dominant genera include *Acacia* and *Eremophila*. Results of database searches identified five introduced taxa as potentially occurring within a 40 km radius of the survey area:

1. *Carrichtera annua* (Wards weed)
2. *Cenchrus ciliaris* (Buffel Grass)
3. *Cynodon dactylon* (Couch)
4. *Polypogon monspeliensis* (Annual Beard grass)
5. *Tribulus terrestris* (Caltrop)

A reconnaissance flora and vegetation survey of the Jundee proposed TSF alternative locations (referred to as 'TSF survey') which is located approximately 1km west of the Assessment Area was conducted by Botanica in 2020 (Botanica, 2020a). A total of 14 Families, 21 Genera and 47 Taxa (including sub-species and variants) were recorded during the survey. No significant flora were identified during previous flora surveys of the TSF survey area. Two introduced species were recorded during the TSF survey; *Cynodon dactylon* (Couch) and *Tribulus terrestris* (Caltrop). Neither species is listed as a Declared Pest under the *Biosecurity and Agriculture Management (BAM) Act 2007*.

4.1.1 Conservation Significant Flora

The results of the literature review, combined search of the DBCA's Flora of Conservation Significance databases (DBCA, 2019a) and DAWE protected matters search (DAWE, 2020) recorded no Threatened Flora or Priority Flora within the Assessment Area. No Threatened Flora and a total of eleven Priority Flora taxa were listed on the databases as occurring within a 40km radius of the Assessment Area (map of flora locations provided in Appendix 1). Priority Flora were assessed and ranked for the likelihood of occurrence within the Assessment Area. The rankings and criteria used were:

- Unlikely: Area is outside of the currently documented distribution for the species/no suitable habitat (type, quality and extent) was identified as being present during the desktop study.
- Possible: Area is within the known distribution of the species in question and habitat of at least marginal quality was identified as being present during the desktop study, supported in some cases by recent records being documented from within or near the area.
- Known to Occur: The species in question was positively identified as being present during previous field surveys.

Table 4-1: Likelihood of occurrence for Threatened and Priority Flora within the Assessment Area

Taxon	EPBC Act	BC Act	DBCA Priority Rating	Habitat Description (WAHERB, 2020)	Likelihood of occurrence
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>			P3	Hardpan plains.	Unlikely
<i>Eremophila arguta</i>			P1	Loamy soils, floodplains.	Unlikely
<i>Eremophila congesta</i>			P1	Lateritic outcrops in greenstone hills, stony quartzite slopes.	Unlikely
<i>Eremophila pungens</i>			P4	Sandy loam, clayey sand over laterite. Plains, ridges, breakaways.	Unlikely
<i>Hemigenia exilis</i>			P4	Rocky lower slopes of hill sides, drainage lines.	Unlikely
<i>Ptilotus luteolus</i>			P3	Rocky slopes, screes, and ridges	Unlikely
<i>Sida picklesiana</i>			P3	Breakaways and outcrops, banded ironstone.	Unlikely
<i>Stackhousia clementii</i>			P3	Skeletal soils. Sandstone hills.	Unlikely
<i>Tribulus adelacanthus</i>			P3	Lower slopes. Gravelly loam soils.	Unlikely
<i>Vittadinia pustulata</i>			P3	Sandy soils.	Unlikely
<i>Xanthoparmelia nashii</i>			P3	Granite rocks	Unlikely

4.2 Vegetation

The Assessment Area is situated in the Austin Botanical District within the Eremaean Botanical Province. This botanical district is predominantly Mulga low woodlands on plains, often rich in ephemerals, which reduce to scrub on hills. It is also characterised by hummock grasslands, Saltbush shrublands and Samphire shrublands (Beard, 1990). The Eremaean Province is the largest of the three botanical provinces within Western Australia. The vegetation of the Austin Botanical District of the Murchison Region is predominantly low mulga (*Acacia aneura*) woodlands on plains and reduced to scrub on hills. This district is often associated with a tree steppe of *Eucalyptus* spp. and *Triodia basedowii* on sand plains.

The Department of Primary Industries and Regional Development GIS file (DPIRD, 2018) indicates that the Assessment Area is located within Pre-European Beard vegetation association Wiluna 18. The extent of this vegetation association, as specified in the 2018 Statewide Vegetation Statistics (DBCA, 2019) is provided in Table 4-2 and Figure 4-1.

Areas retaining less than 30% of their pre-European vegetation extent generally experience exponentially accelerated species loss, while areas with less than 10% are considered “endangered” (EPA, 2000). Development within the Assessment Area will not significantly reduce the extent of pre-European vegetation.

Table 4-2: Pre-European Vegetation Associations with the Assessment Area

Vegetation Association	Pre-European Extent (ha)	Pre-European extent remaining (%)	% of Current extent within DBCA managed lands	Vegetation Description (Beard, 1990)
Wiluna 18	4,273,509.57	99.59	1.05	Low woodland; mulga (<i>Acacia aneura</i>)

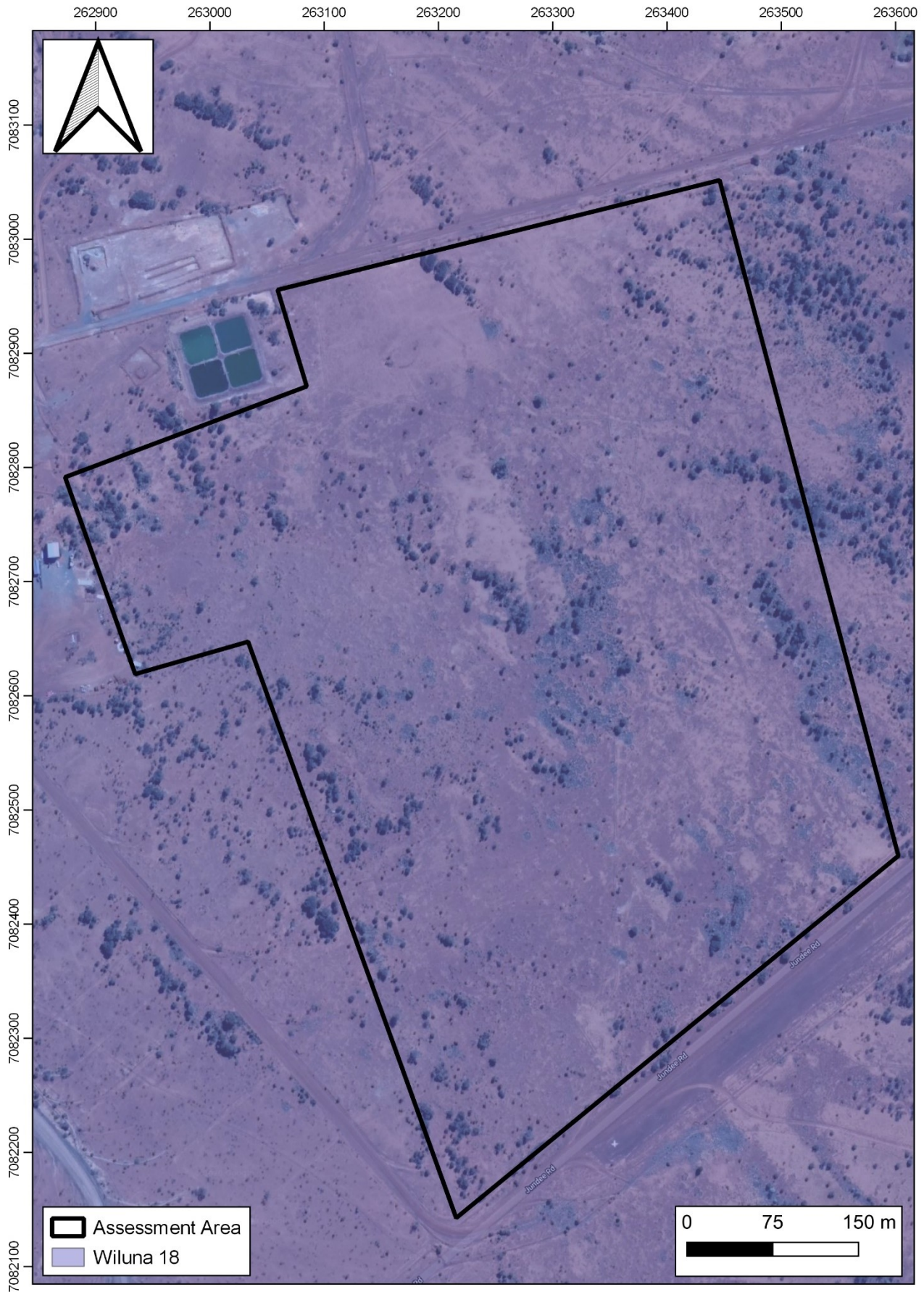







Figure 4-1: Pre-European vegetation in relation to the Assessment Area

Five vegetation types were identified during the TSF survey conducted by Botanica (Table 4-3). Vegetation condition across the TSF survey area ranged from good to very good condition. No significant vegetation was identified during the survey.

Photographic records of the Assessment Area taken by Northern Star’s Senior Environment & Social Responsibility Advisor on the 24th November 2020 (provided in Appendix 2), identified vegetation within the Assessment Area as most representative of vegetation community QRP-AOW1.

Table 4-3: Vegetation Types-TSF Survey (Botanica, 2020)

Vegetation Types	Vegetation Code	Image
<p>Low woodland of <i>Acacia incurvaneura</i> over low shrubland of <i>Eremophila forrestii</i>/<i>E. margarethae</i> and low tussock grassland of <i>Eragrostis eriopoda</i> on clay-loam plain</p>	<p>CLP-AFW1</p>	
<p>Low open woodland of <i>Acacia incurvaneura</i>/<i>Hakea lorea</i> over mid open shrubland of <i>Eremophila fraseri</i> and low shrubland of <i>Eremophila margarethae</i> on quartz-rocky plain</p>	<p>QRP-AOW1</p>	

Vegetation Types	Vegetation Code	Image
<p>Low woodland of <i>Acacia incurvaneura</i> over mid open shrubland of <i>Psyrax suaveolens</i> and low open tussock grassland of <i>Eragrostis eriopoda</i> on quartz-rocky plain</p>	<p>QRP-AFW1</p>	
<p>Low woodland of <i>Acacia ayersiana/ A. incurvaneura</i> over mid open shrubland of <i>Eremophila fraseri/ E. latrobei</i> and low tussock grassland of <i>Eriachne mucronata</i> on rocky slope</p>	<p>RS-AFW1</p>	
<p>Low woodland of <i>Acacia caesaneura/ A. incurvaneura</i> over mid open shrubland of <i>Eremophila forrestii</i> and low hummock grassland of <i>Triodia basedowii</i> on sand-loam plain</p>	<p>SLP-AFW1</p>	

4.3 Fauna


According to the results of the NatureMap search (DBCA, 2020), a total of 152 vertebrate fauna taxa have been recorded within a 40 km radius of the Assessment Area including 87 bird species, 5 amphibians, 16 mammals and 44 reptiles. Combined results of database searches identified nine introduced taxa as potentially occurring within the Assessment Area, these being:




1. *Camelus dromedaries* (Camel)
2. *Canis lupus familiaris* (Dog)
3. *Capra hircus* (Goat)
4. *Columba livia* (Rock Pigeon)
5. *Equus asinus* (Donkey)
6. *Felis catus* (Cat)
7. *Mus musculus* (House Mouse)
8. *Oryctolagus cuniculus* (Rabbit)
9. *Vulpes vulpes* (Red Fox)

A Level 1 Fauna survey of the TSF survey area located approximately 1km west of the Assessment Area was conducted by Botanica in 2020 (Botanica, 2020a). Four broad scale fauna habitats were identified are based on vegetation and associated landforms identified during the flora and vegetation assessment (Table 4-4). No introduced fauna were observed during the survey however there was evidence of cattle tracks and scats within the survey area.

Photographic records of the Assessment Area taken by Northern Star's Senior Environment & Social Responsibility Advisor on the 24th November 2020 (provided in Appendix 2), identified fauna habitats within the Assessment Area as most representative of fauna habitat; Quartz-Rocky Plain Acacia Open Woodland.

Table 4-4: Fauna Habitats-TSF Survey (Botanica, 2020)

Fauna Habitat	Image
<p><u>Clay-Loam Plain</u></p> <p>Acacia Woodland</p>	

Fauna Habitat	Image
<p><u>Quartz-Rocky Plain</u></p> <p>Acacia Open Woodland/ Woodland</p>	
<p><u>Rocky Slope</u></p> <p>Acacia Woodland</p>	
<p><u>Sand-Loam Plain</u></p> <p>Acacia Woodland</p>	

4.3.1 Conservation Significant Fauna

Fauna of conservation significance identified during the literature review as previously being recorded in the general area were assessed and ranked for their likelihood of occurrence within the Assessment Area itself (Table 4-5). The rankings and criteria used were:

- **Would Not Occur:** There is no suitable habitat for the species in the Assessment Area and/or there is no documented record of the species in the general area since records have been kept and/or the species is generally accepted as being locally/regionally extinct (supported by a lack of recent records).
 - **Locally Extinct:** Populations no longer occur within a small part of the species natural range, in this case within 10 or 20km of the Assessment Area. Populations do however persist outside of this area.
 - **Regionally Extinct:** Populations no longer occur in a large part of the species natural range, in this case within the northern goldfields region. Populations do however persist outside of this area.
- **Unlikely to Occur:** The Assessment Area is outside of the currently documented distribution for the species in question, or no suitable habitat (type, quality and extent) was identified as being present during the field assessment. Individuals of some species may occur occasionally as vagrants/transients especially if suitable habitat is located nearby but the site itself would not support a population or part population of the species
- **Possibly Occurs:** Assessment Area is within the known distribution of the species in question and habitat of at least marginal quality was identified as likely to be present during the literature review, supported in some cases by recent records being documented in literature from within or near the Assessment Area. In some cases, while a species may be classified as possibly being present at times, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.
- **Known to Occur:** The species in question has been positively identified as being present (for sedentary species) or as using the Assessment Area as habitat for some other purpose (for non-sedentary/mobile species) during field surveys within or near the Assessment Area. This information may have been obtained by direct observation of individuals or by way of secondary evidence (e.g. tracks, foraging debris, scats). In some cases, while a species may be classified as known to occur, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

Table 4-5: Likelihood of occurrence for Threatened and Priority Fauna within the Assessment Area

Species	Conservation Status			Habitat Description	Likelihood of Occurrence
	EPBC Act	BC Act	DBCA Priority		
Malleefowl <i>Leipoa ocellata</i>	VU	VU	-	Scrublands and woodlands dominated by mallee and wattle species (DAWE, 2020).	Unlikely to Occur. No recent records nearby and habitat unsuitable/very marginal
Grey Falcon <i>Falco hypoleucos</i>		VU		The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter (DAWE, 2020).	Possibly Occurs aerially over survey area on very rare occasions. No suitable breeding habitat.
Peregrine Falcon <i>Falco peregrinus</i>	-	OS	-	The Peregrine Falcon is found in most habitats, from rainforests to the arid zone, and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites, and prefers coastal and inland cliffs or open woodlands near water, and may even be found nesting on high city buildings (Birdlife Australia, 2018).	Possibly Occurs aerially over survey area on very rare occasions. No suitable breeding habitat.
Migratory Shorebirds (Various species)	MI	IA	-	Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland (DAWE, 2020).	Would Not Occur. No Suitable Habitat.
Grey Wagtail <i>Motacilla cinerea</i>	MI	IA	-	Running water in disused quarries, sandy, rocky streams in escarpments and rainforest, sewerage ponds, ploughed fields and airfields (Morecombe 2004).	Would Not Occur. No documented records in goldfields region
Yellow Wagtail <i>Motacilla flava</i>	MI	IA	-	Occurs in a variety of damp or wet habitats with low vegetation, from rushy pastures, meadows, hay fields and marshes to damp steppe and grassy tundra (Morecombe 2004).	Would Not Occur. No documented records in the goldfields region.
Night Parrot <i>Pezoporus occidentalis</i>	EN	CR	-	Broad habitat requirements include areas of old-growth spinifex (<i>Triodia</i>) for roosting and nesting, together with foraging habitats that are likely to include various native grasses and herbs, and may or may not contain shrubs or low trees. (DPaW, 2017).	Unlikely to Occur. No recent records nearby and no suitable habitat.
Princess Parrot <i>Polytelis alexandrae</i>	VU	-	P4	Inhabits sand dunes and sand flats in the arid zone of western and central Australia. It occurs in open savanna woodlands and shrublands that usually consist of scattered stands of <i>Eucalyptus</i> (including <i>E. gongylocarpa</i> , <i>E. chippendalei</i> and mallee species), <i>Casuarina</i> or <i>Allocasuarina</i> trees; an understorey of shrubs such as <i>Acacia</i> (especially <i>A. aneura</i>), <i>Cassia</i> , <i>Eremophila</i> , <i>Grevillea</i> , <i>Hakea</i> and <i>Senna</i> ; and a ground cover dominated by <i>Triodia</i> species (DAWE, 2020)	Unlikely to Occur. Rarely recorded this far south and no recent records nearby.
Brush-tailed Mulgara <i>Dasyercus blythi</i>	-	-	P4	Occurs on sand dunes with sparse cover of sandhill cain grass or areas around salt lakes (DAWE, 2020).	Unlikely to Occur. Habitat unsuitable/very marginal
Greater Bilby <i>Macrotis lagotis</i>	VU	VU		Suitable habitat includes; open tussock grassland (both grasses and forbs) growing on uplands and hills, mulga woodland/shrubland (both pure mulga and mixed stands of mulga/witchetty bush) growing on ridges and rises, and hummock grassland growing on sand plains and dunes, drainage systems, salt lake systems and other alluvial areas Pavey, C., 2006).	Unlikely to Occur. No recent records nearby and habitat unsuitable/very marginal

4.4 Matters of National Environmental Significance

4.4.1 *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act protects matters of national environmental significance, and is used by the Commonwealth DAWE to list threatened taxa and ecological communities into categories based on the criteria set out in the Act (www.environment.gov.au/epbc/index.html). The Act provides a national environmental assessment and approval system for proposed developments and enforces strict penalties for unauthorised actions that may affect matters of national environmental significance. Matters of national environmental significance as defined by the Commonwealth EPBC Act include:

- Nationally threatened flora species;
- World heritage properties;
- National heritage places;
- Wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed);
- Nationally threatened ecological communities;
- Commonwealth marine area;
- The Great Barrier Reef Marine Park; and
- Nuclear actions (including uranium mining) a water resource, in relation to coal seam gas development and large coal mining development.

No matters of national environmental significance as defined by the Commonwealth EPBC Act are known to occur within the Assessment Area.

4.5 Matters of State Environmental Significance

4.5.1 *Environmental Protection Act WA 1986*

The EP Act provides for the prevention, control and abatement of pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment. The Act is administered by The Department of Water and Environment Regulation (DWER), which is the State Government's environmental regulatory agency.

Under Section 51C of the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations (Regulations) WA 2004* any clearing of native vegetation in Western Australia that is not eligible for exemption under Schedule 6 of the *EP Act 1986* or under the Regulations 2004 requires a clearing permit from the DWER or DMIRS. Under Section 51A of the *EP Act 1986* native vegetation includes aquatic and terrestrial vegetation indigenous to Western Australia, and intentionally planted vegetation declared by regulation to be native vegetation, but not vegetation planted in a plantation or planted with commercial intent. Section 51A of the *EP Act 1986* defines clearing as "the killing or destruction of; the removal of; the severing or ringbarking of trunks or stems of; or the doing of substantial damage to some or all of the native vegetation in an area, including the flooding of land, the burning of vegetation, the grazing of stock or an act or activity that results in the above". Exemptions under Schedule 6 of the EP Act and the EP Regulations do not apply in ESAs as declared under Section 51B of the EP Act or TEC listed under State and Commonwealth legislation.

No TEC, Threatened Flora or Fauna are known to occur within the Assessment Area. The Assessment Area is not located within an ESA. As the clearing proposed will not exceed 10 hectares of clearing per tenement per annum, clearing for the core yard is exempt from a clearing permit.

4.5.2 Biodiversity Conservation Act 2016

This Act is used by the Western Australian DBCA for the conservation and protection of biodiversity and biodiversity components in Western Australia and to promote the ecologically sustainable use of biodiversity components in the State. Taxa are classified as 'Threatened' when their populations are geographically restricted or are threatened by local processes (see following sections for Threatened definitions). Under this Act all native flora and fauna are protected throughout the State. Financial penalties are enforced under this Act if threatened species are collected without an appropriate licence.

Under Section 54(1) of the BC Act, habitat is eligible for listing as critical habitat if:

- (a) it is critical to the survival of a threatened species or a threatened ecological community; and
- (b) its listing is otherwise in accordance with the ministerial guidelines.

No threatened species or critical habitat listed under the BC Act are known to occur within the Assessment Area.

5 Environmental Management Measures

In order to minimise impacts on flora/vegetation and fauna from the proposed clearing activities, the following measures should be implemented:

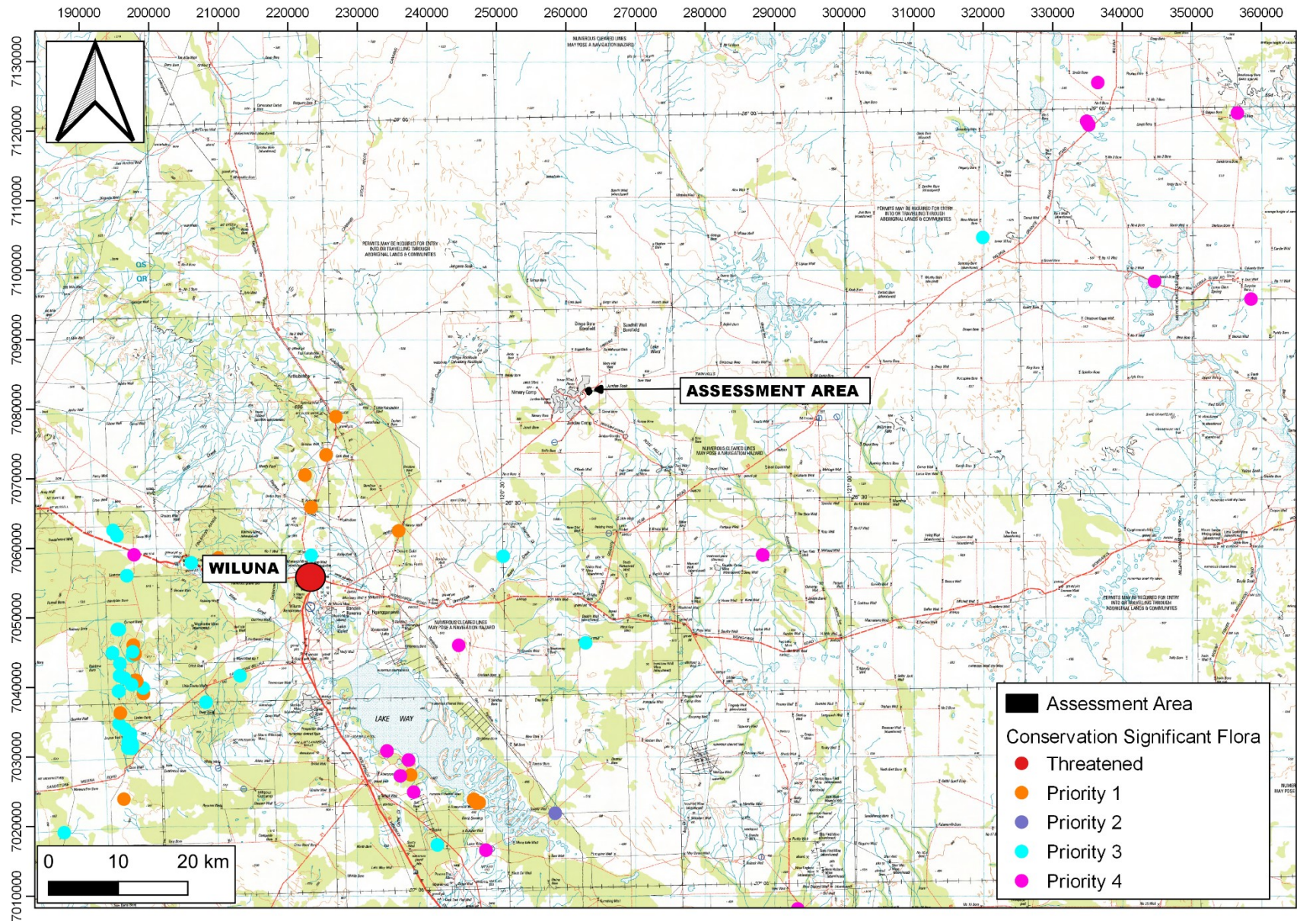
- Induction and training on presence of potential significant flora/ fauna and associated habitat to staff and contractors.
- Avoidance of clearing mature trees where possible.
- Vehicle hygiene/ weed management measures be implemented prior to any clearing to prevent introduction or spread of introduced species.

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Appendix 1: Conservation Significant Flora Records in relation to the Assessment Area



Appendix 2: Photographic Records of the Assessment Area

